VENTURA PORT DISTRICT
BOARD OF PORT COMMISSIONERS

PORT COMMISSION AGENDA
TELECONFERENCE
SEPTEMBER 2, 2020
5 TELECONFERENCE LOCATIONS
VENTURA PORT DISTRICT OFFICE
1603 ANCHORS WAY DRIVE
VENTURA, CA 93001

IN ACCORDANCE WITH THE CALIFORNIA GOVERNOR'S EXECUTIVE STAY AT HOME ORDER AND THE COUNTY OF VENTURA HEALTH OFFICER DECLARED LOCAL HEALTH EMERGENCY AND BE WELL AT HOME ORDER RESULTING FROM THE NOVEL CORONAVIRUS, THE VENTURA PORT DISTRICT ADMINISTRATION BUILDING IS CLOSED TO THE PUBLIC. THIS MEETING IS BEING HELD IN ACCORDANCE WITH THE STATE EMERGENCY SERVICES ACT, THE GOVERNOR'S EMERGENCY DECLARATION, AND THE GOVERNOR'S EXECUTIVE ORDER NO. 25-20 ISSUED ON MARCH 12, 2020 TO ALLOW ATTENDANCE BY MEMBERS OF THE PORT COMMISSION BY TELECONFERENCE IN FULL COMPLIANCE WITH THE BROWN ACT.

PUBLIC PARTICIPATION OPTIONS

1. Join a Zoom meeting LIVE:
   https://us02web.zoom.us/j/87224314452
   Meeting ID: 872 2431 4452

   1-669-900-6833
   1-877-853-5257

2. If you do not wish to speak but would like to submit a written comment on a specific agenda item, do so via email by 4:00PM on the day of the meeting. Please submit your comment to the Clerk of the Board at jrauch@venturaharbor.com. **Written comments will be distributed to the Commissioners and will be attached to the minutes of the meeting but will not be read aloud during the meeting.**

3. If you wish to speak on a specific agenda item when watching the live Zoom meeting, please email the Clerk of the Board at jrauch@venturaharbor.com by 4:00PM on the day of the meeting so you can participate appropriately.

   Attendees can dial *9 or use the 'raise hand' function in Zoom if they would like to speak during public comment periods.

CLOSED SESSION – 5:30PM

CALL TO ORDER: *By Chairman Chris Stephens.*

ROLL CALL: *By the Clerk of the Board.*

PUBLIC COMMUNICATIONS (3 minutes)
*The Public Communications period is set aside to allow public testimony on items only on the Closed Session Agenda. Each person may address the Commission for up to three minutes or at the discretion of the Chair. Attendees can dial *9 or use the 'raise hand' function in Zoom if they would like to speak during public comment periods.*

CONVENE IN CLOSED SESSION – 5:35PM

CLOSED SESSION AGENDA (1 hour 25 minutes)
See Attachment to Agenda-Closed Session Conference with Legal Counsel.

OPEN SESSION – 7:00PM

CALL TO ORDER: *By Chairman Chris Stephens.*

PLEDGE OF ALLEGIANCE: *By Chairman Chris Stephens.*

ROLL CALL: *By the Clerk of the Board.*

ADOPTION OF AGENDA (3 minutes)
Consider and approve, by majority vote, minor revisions to agenda items and/or attachments and any item added to or removed/continued from the Port Commission's agenda. Administrative Reports relating to this agenda and materials related to an item on this agenda submitted after distribution of the agenda packet are available for public review at the Port District's office located at 1603 Anchors Way Drive, Ventura, CA during business hours as well as on the District's website - www.venturaharbor.com.

APPROVAL OF MINUTES (3 minutes)
The Minutes of the July 15, 2020 Regular Meeting and the August 19, 2020 Special Meeting will be considered for approval.

PUBLIC COMMUNICATIONS (3 minutes)
*The Public Communications period is set aside to allow public testimony on items not on today's agenda. Each person may address the Commission for up to three minutes or at the discretion of the Chair. Attendees can dial *9 or use the 'raise hand' function in Zoom if they would like to speak during public comment periods.*

CLOSED SESSION REPORT (3 minutes)
Closed Sessions are not open to the public pursuant to the Brown Act. Any reportable actions taken by the Commission during Closed Session will be announced at this time.

BOARD COMMUNICATIONS (5 minutes)
Port Commissioner's may present brief reports on port issues, such as seminars, meetings and literature that would be of interest to the public and/or Commission, as a whole. Port Commissioner's must provide a brief summary and disclose any discussions he or she may have had with any Port District Tenants related to Port District business.

STAFF AND GENERAL MANAGER REPORTS (5 minutes)
Ventura Port District Staff and General Manager will give the Commission updates on important topics or items of general interest if needed.

LEGAL COUNSEL REPORT (5 minutes)
Legal Counsel will report on progress of District assignments and any legislative or judicial matters.

CONSENT AGENDA:

a) Approval of New Restaurant Lease Agreement for Rigoberto Lopez Rangel dba Baja Bay Surf Taco

Recommended Action: Roll Call Vote.

That the Board of Port Commissioners approve a new restaurant lease agreement for the premises located at 1567 Spinnaker #104, consisting of 773 square feet with 623 patio square feet between the Ventura Port District dba Ventura Harbor Village and Rigoberto Lopez Rangel dba Baja Bay Surf Taco for a two-year term with a two-year option.

STANDARD AGENDA:

1) Consideration of Preliminary Operations Plan and Draft Economic and Fiscal Impacts of the Proposed Ventura Shellfish Enterprise Project

Recommended Action: Informational.

That the Board of Port Commissioners receive an informational report on the Preliminary Operations Plan and Draft Economic and Fiscal Impacts of the Proposed Ventura Shellfish Enterprise Project.

2) Ventura Port District Operations Update as it Relates to COVID-19

Recommended Action: Informational. (Verbal Report)

That the Board of Port Commissioners receive an update on:

a) The COVID-19 Ventura Harbor Rental Abatement and Deferment Program; and
b) Status of Ventura Port District operations.

ADJOURNMENT

This agenda was posted on Friday, August 28, 2020 by 5:00 p.m. at the Port District Office and online at www.venturaharbor.com - Port District Business - Meetings and Agendas.

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In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, please contact the Ventura Port District at (805) 642-8538. Notification 48 hours before the meeting will enable the District to make reasonable arrangements to ensure accessibility. (28 CFR 35.102.35.104 ADA Title II)

ATTACHMENT TO PORT COMMISSION AGENDA
CLOSED SESSION CONFERENCE WITH LEGAL COUNSEL

WEDNESDAY, SEPTEMBER 2, 2020

1. Conference with Labor Negotiators - Per Government Code Section 54957.6:

a) Employee Units: **Courtesy Patrol Officers**
Groups: International Brotherhood of Teamsters Union, Local 186
Negotiating Parties: Brian Pendleton, Todd Mitchell, Andy Turner, Oliver Yee
Under Negotiation: **Labor Negotiations**

2. Conference with Real Property Negotiators - Per Government Code Section 54956.8:

a) Property: **Parcel 20**
Negotiating Parties: Brian Pendleton, Todd Mitchell, Andy Turner
Dereckter Marine Holdings LLC
Under Negotiation: **Terms of Assignment of Lease and 50-year Lease Option**

b) Property: **1567 Spinnaker Drive #104**
Negotiating Parties: Brian Pendleton, Todd Mitchell, Andy Turner
Rigoberto Lopez Rangel DBA Baja Bay Surf Taco
Under Negotiation: **Terms of New Restaurant Lease Agreement** (verbal report)

3. Conference with Legal Counsel - Potential Litigation per Government Code Section 54956.9(d)(2): 1 Case. (verbal report)

BOARD OF PORT COMMISSIONERS

SEPTEMBER 2, 2020

APPROVAL OF MINUTES

JULY 15, 2020 REGULAR MEETING

AUGUST 19, 2020 SPECIAL MEETING

VENTURA PORT DISTRICT

BOARD OF PORT COMMISSIONERS
MINUTES OF JULY 15, 2020

CLOSED SESSION

CALL TO ORDER:
The Ventura Board of Port Commissioners Regular Closed Session Meeting was called to order by Chairman Chris Stephens at 5:31PM at the Ventura Port District Administration Office, 1603 Anchors Way Drive, Ventura, CA 93001 and via Zoom meeting.

ROLL CALL:

Commissioners Present:
Chris Stephens, Chairman
Brian Brennan, Vice Chairman
Everard Ashworth via Teleconference
Michael Blumenberg via Teleconference

Commissioners Absent:
Jackie Gardina, Secretary

Port District Staff:
Brian Pendleton, General Manager
Todd Mitchell, Business Operations Manager
Jessica Rauch, Clerk of the Board

Legal Counsel:
Andy Turner via Teleconference
Elsa Sham via Teleconference
Tim Gosney via Teleconference

PUBLIC COMMUNICATIONS: Leonora Valvo and Tom Derecktor, Derecktor Marine Holdings, LLC, explained what they would like to do with Parcel 20.

CONVENED TO CLOSED SESSION AT 5:45PM.

ADJOURNMENT: Closed Session was adjourned at 6:59PM.

OPEN SESSION

ADMINISTRATIVE AGENDA:

CALL TO ORDER:
The Ventura Board of Port Commissioners Regular Open Session Meeting was called to order by Chairman Chris Stephens at 7:04PM at the Ventura Port District Administration Office, 1603 Anchors Way Drive, Ventura, CA 93001 and via Zoom Meeting.

PLEDGE OF ALLEGIANCE: By Chairman Stephens.

ROLL CALL:

Commissioners Present:
Chris Stephens, Chairman
Brian Brennan, Vice Chairman
Everard Ashworth via teleconference
Michael Blumenberg via teleconference

Commissioners Absent:
Jackie Gardina, Secretary

Port District Staff:
Brian Pendleton, General Manager
Todd Mitchell, Business Operations Manager
Jessica Rauch, Clerk of the Board
Gloria Adkins, Accounting Manager
Robin Baer, Property Manager via teleconference
John Higgins, Harbormaster via teleconference
Joe Gonzalez, Facilities Manager via teleconference
Dave Werneburg, Marina Manager via teleconference
Jennifer Talt-Lundin, Marketing Manager via teleconference

Legal Counsel:
Andy Turner via teleconference
Elsa Sham via teleconference

ADOPTION OF AGENDA

ACTION: Commissioner Ashworth moved, seconded by Commissioner Blumenberg, and carried by a vote of 4-0 to adopt the July 15, 2020 agenda.

APPROVAL OF MINUTES
The Minutes of the July 1, 2020 Regular Meeting were considered as follows:

ACTION: Commissioner Ashworth moved, seconded by Commissioner Blumenberg, and carried by a vote of 4-0 to approve the June 17, 2020 Regular Meeting Minutes.

PUBLIC COMMUNICATIONS:
Sam Sadove, owner of Ventura Harbor Marine Associates, LLC., thanked Paul Armaral from TowBoatUS and Harbor Patrol staff for helping bring up a 40 ft boat that sank at his docks.

CLOSED SESSION REPORT: Mr. Turner stated that the Board met in closed session; discussed and reviewed all items on the closed session agenda. The Board gave direction to staff as how to proceed. No action was taken that is reportable under The Brown Act.

BOARD COMMUNICATIONS: Commissioner Brennan reported that members of the public have contacted him about the proposed paid parking plan at the beaches and Village. Commissioner Blumenberg reported that he and his sons went diving at the Channel Islands on the Spectre out of Ventura Harbor. Commissioner Ashworth and his family rented a boat from Just 4 Dreamers who has been doing well during this time.

STAFF AND GENERAL MANAGER REPORTS: Mr. Mitchell reported the status of vacant space 1591 Spinnaker Drive #113/114/115 and the new EV charging stations.

LEGAL COUNSEL REPORT: None.

CONSENT AGENDA:

a) Approval of Notice of Completion for the Ventura Harbor Village Commercial Dock Replacement Project

Recommended Action: Roll Call Vote.

That the Board of Port Commissioners adopt Resolution No.3393:

a) Accepting the work of Bellingham Marine Industries for the Ventura Harbor Village Commercial Dock Replacement Project.
b) Authorizing the filing of a Notice of Completion with the Ventura County Recorder.

ACTION: Commissioner Brennan moved, seconded by Commissioner Ashworth and carried by a vote of 4-0 to adopt Resolution No.3393 accepting the work of Bellingham Marine Industries for the Ventura Harbor Village Commercial Dock Replacement Project and authorizing the filing of a Notice of Completion with the Ventura County Recorder.

b) Approval of New Office Lease Agreement for Sheree Ali dba Sparkle Light Entertainment, Inc.

Recommended Action: Roll Call Vote.

That the Board of Port Commissioners approve a new Office Lease Agreement between the Ventura Port District dba Ventura Harbor Village and Sheree Ali dba Sparkle Light Entertainment, Inc. for the premises located at 1583 Spinnaker Drive #209 consisting of a total of 316 square feet for a three (3) year term with a three (3) year option.

ACTION: Commissioner Brennan moved, seconded by Commissioner Ashworth and carried by a vote of 4-0 to approve a new Office Lease Agreement between the Ventura Port District dba Ventura Harbor Village and Sheree Ali dba Sparkle Light Entertainment, Inc. for the premises located at 1583 Spinnaker Drive #209 consisting of a total of 316 square feet for a three (3) year term with a three (3) year option.

STANDARD AGENDA:

1) Consideration of Navigation Risk Assessment for the Proposed Ventura Shellfish Enterprise Project

Recommended Action: Roll Call Vote.

That the Board of Port Commissioners receive and consider public comment and authorize submission of the Navigation Risk Assessment for the proposed aquaculture project referred to as the Ventura Shellfish Enterprise to the U.S. Army Corps of Engineers, U.S. Coast Guard, California Coastal Commission and other regulatory agencies as necessary.

Report by Brian D. Pendleton, General Manager, Chris Thomas, COWI, and Maria Grønnegaard, COWI.

Public Comment: Diane Pleschner-Steele, Executive Director of the California Wetfish Producers Association had her concerns read into the record and asked they be attached to the minutes. (Attachment 1)

Alexa Penalosa, Law Clerk from the Environmental Defense Center stated that they, along with eight other groups, submitted a comment letter regarding this issue. The letter recommended that the District refrain from submitting the assessment at this time. They are not opposed to aquaculture development but believe projects within state waters are more appropriate. Also, for this project to operate in federal waters, permission must be granted by LAFCo, who does not have the authority to approve projects outside its jurisdictional boundary. Because of this conflict, the Army Corps of Engineers cannot approve the permit even after the assessment is submitted.

Mike Conroy, West Coast Fisheries Consultants and Executive Director of the Pacific Coast Federation of Fishermen's Associations acknowledged the hard work of the consultants and the changes they made in response to prior public comments. He stated that there will be other regulatory authorities that may have an opinion on the recommendations contained in section 5.5. These authorities may require communications with the local maritime community. With regards to the exclusion zones, even if the project is not officially within one, you do have to keep in mind for commercial fisheries depending upon the gear type, the site will in effect be an exclusion zone. He still thinks the risk analysis could stand for more thorough and detailed analysis, but fully understand and appreciate the lack of data that is available to arrive at an informed opinion. While he agrees that the harbormaster would be in a good position to identify the number of vessels departing the harbor, he questions if the Harbormaster would know where vessels are going once they leave the harbor. It is true that not all vessels have AIS. He continues to believe a great majority of the vessels that berth in Ventura do not have AIS. He appreciates the submerged system, but it will still be susceptible to interaction with fishing vessels, especially if they experience mechanical breakdowns or failures. With regards to 8-16 vessel servicing the project area, those vessels servicing each day will result in 16 to 32 trips per day. He was wondering if there was a time element considered in determining the traffic patterns, clearly those will be more heavily trafficked during the daytime. If more the of trips were departing Ventura during nonservice traffic time, i.e. in the evening hours or at night like some of the charter boats, that would be something helpful to know and help inform if the risk assessment is good from that stand point.

ACTION: **Commissioner Ashworth moved, seconded by Commissioner Blumenberg and carried by a vote of 3-1 (Brennan no) to authorize submission of the Navigation Risk Assessment for the proposed aquaculture project referred to as the Ventura Shellfish Enterprise to the U.S. Army Corps of Engineers, U.S. Coast Guard, California Coastal Commission and other regulatory agencies as necessary, with a cover letter asking the USCG to consider whether two additional mitigation measures discussed in Section 5.5 *Additional Mitigation Measures* – 1) AIS on project vessels; and 2) Communication to the local maritime community – would be considered appropriate by the USCG to implement as project conditions.**

2) Ventura Shellfish Enterprise Status Report

Recommended Action: Informational.

That the Board of Port Commissioners receive an annual status report on the proposed aquaculture project referred to as the Ventura Shellfish Enterprise.

Reported by Brian D. Pendleton, General Manager, Robert Smith, K&L Gates, Laurie Monarres, Dudek, and Linda Santschi, Coastal Marine Biolabs.

Public Comment: Sam Sadove, owner of Ventura Harbor Marine Associates, LLC commented on the environmental review, specifically Section 7 Consultation with NOAA. He reiterated that there is going to be a potential to review this further than it has been to this point because of the fact that Blue and Humpback whales make regular use of the area where the project is proposed. While he does agree that sinking lines can be less of a issue then fixed and suspended lines, they also then become marine debris and marine debris does have serious complications and issues especially under Section 7 Consultations and specifically when you referring to Blue Whales. He strongly suggests having someone survey the whale activity in the proposed area.

ACTION: The Board of Port Commissioners received an annual status report on the proposed aquaculture project referred to as the Ventura Shellfish Enterprise.

3) Approval of New Professional Services Agreement with Dudek for Environmental Consulting Services

Recommended Action: Roll Call Vote.
That the Board of Port Commissioners approve a Professional Services Agreement with Dudek in the amount of $75,000 for FY2020-2021 in support of the proposed Ventura Shellfish Enterprise project and related 2018 Sea Grant tasks.

Report by Brian D. Pendleton, General Manager.

Public Comment: Sam Sadove, owner of Ventura Harbor Marine Associates, LLC. asked if the $75,000 for Dudek and K&L Gates is coming out of the grant or general fund.

ACTION: Commissioner Brennan, seconded by Commissioner Blumenberg and carried by a vote of 4-0 to approve a Professional Services Agreement with Dudek in the amount of $75,000 for FY2020-2021 in support of the proposed Ventura Shellfish Enterprise project and related 2018 Sea Grant tasks.

4) Approval of New Professional Services Agreement with K&L Gates for Legal Consulting Services

Recommended Action: Roll Call Vote.
That the Board of Port Commissioners approve a Professional Services Agreement with K&L Gates in the amount of $75,000 for FY2020-2021 in support of the proposed Ventura Shellfish Enterprise project and related 2018 Sea Grant tasks.

Report by Brian D. Pendleton, General Manager.

Public Comment: None.

ACTION: Commissioner Brennan moved, seconded by Commissioner Blumenberg and carried by a vote of 4-0 to approve a Professional Services Agreement with K&L Gates in the amount of $75,000 for FY2020-2021 in support of the proposed Ventura Shellfish Enterprise project and related 2018 Sea Grant tasks.

5) Complaint re Brown Act Violation (Government Code §54956.8)

Recommended Action: Informational.
That the Board of Port Commissioners receive and file this report regarding alleged Brown Act violations, for the purposes of promoting transparency, encouraging public comment, and increasing public trust, in alignment with the District's Goals and 5-Year Objectives (as approved on the January 22, 2020's Open Session Meeting).

Report by Andy Turner, Legal Counsel, Lagerlof.

Public Comment: Sam Sadove, owner of Ventura Harbor Marine Associates, LLC. suggested putting the Brown Act training back on the agenda that was planned for March, preferably at the next in-person Board Meeting.

ACTION: The Board of Port Commissioners received a report regarding alleged Brown Act violations, for the purposes of promoting transparency, encouraging public comment, and increasing public trust, in alignment with the District's Goals and 5-Year Objectives (as approved on the January 22, 2020's Open Session Meeting).

6) Ventura Port District Operations Update as it Relates to COVID-19

Recommended Action: Informational. (Verbal Report)

That the Board of Port Commissioners receive an update on:

a) The COVID-19 Ventura Harbor Rental Abatement and Deferment Program; and

b) Status of Ventura Port District operations.

Report by Brian D. Pendleton, General Manager.

Public Comment: Sam Sadove, owner of Ventura Harbor Marine Associates, LLC. commented that the District may want to consider extra measures for the businesses heavily affected by this pandemic.

ACTION: The Board of Port Commissioners received an update on the new regulations ordered by Governor Newsom concerning COVID-19.

ADJOURNMENT: The meeting was adjourned at 9:30PM.

The next meeting is Wednesday, September 2, 2020.

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Jackie Gardina, Secretary

ATTACHMENT 1

CALIFORNIA WETFISH PRODUCERS ASSOCIATION
PO Box 1951 • Buellton, CA 93427 • Office: (805) 693-5430 • Mobile: (805) 350-3231 • Fax: (805) 686-9312 • www.californiawetfish.org

July 14, 2020

Board of Port Commissioners
Ventura Port District
1601 Anchors Way Drive
Ventura, Ca 93001

Attn: jrauch@venturaharbor.com

Subject: Agenda Item 1. Consideration of Draft Navigation Risk Assessment for the Proposed Ventura Shellfish Enterprise Project

Dear Chairman Stephens and Commissioners,

We appreciate this opportunity to present comments on the revised Draft Navigation Risk Assessment on behalf of the members of the California Wetfish Producers Association, representing fishermen and processors who harvest and market coastal pelagic "wetfish" species (CPS), including sardines, mackerels and market squid. California's wetfish industry has produced, on average, 80 percent of the volume and more than 30 percent of the dockside value of all seafood landed commercially in California: this complex of CPS fisheries has endured for the past century as a bedrock of California's fishing economy. Market squid is the economic driver of this historic industry, as well as the most valuable fishery in California, in non-El Niño years. The squid fishery also is the most valuable fishery in the Ventura Port District.

We have reviewed the revised Draft Navigation Risk Assessment (RA), as well as detailed comments submitted on July 2 by the Pacific Coast Federation of Fishermen's Associations (PCFFA). We concur with PCFFA's recognition of COWI for producing a draft RA that was comprehensive in scope (as far as it went). However, we also agree with the criticisms outlined by PCFFA, and their ultimate conclusion: "*We disagree with the conclusion '…that the navigation risk level associated with the VSE project is low'.*" We, too, believe insufficient data have been collected to validate that statement.

Further, we, along with PCFFA, "…question the conclusion that the '*risk of accidents caused by the presence of project is not expected to be significant*.' The data for that finding were based on historic accident statistics. PCFFA questioned "*…how relevant historical statistics will be when the project will result in an additional 3,000 – 6,000 trips between Ventura Harbor and the project area.*" We recommend that COWI reassess risk, including both the additional years and additional vessel traffic identified in PCFFA's July 2 comment letter, and the additional information pertaining to the squid fishery that we provide below.

We would appreciate the Commission's consideration of the following information, questioning and correcting information stated in Attachment 1 –

Section 4.3 Vessel Traffic Survey
The RA acknowledged: "*AIS data is the primary data source for the commercial traffic survey presented (Chapter 10).*"
Responding to PCFFA's criticism of this fact, General Manager Brian Pendleton summarized in the Board Communication Memo for Standard Agenda Item 1, July 15 meeting:

> *One of the major comments was directed to the perceived over-reliance of AIS data for the Navigation Risk Assessment. While it is agreed that reliance solely on AIS would not be appropriate, COWI does not agree that there was an overreliance on this data in this study. The study report describes where other sources of data have been used to cover any gaps between AIS and actual vessel numbers, with actual numbers of all AIS and non-AIS vessels entering and leaving Ventura Harbor numbering around 50,000 per year.*

However, the report itself gave the harbormaster's estimate as 55,000 per year [Att. 1 p. 37]. Five thousand vessels generate a lot of additional traffic.

We also note, and disagree with, discussion on p. 38:

> *"Vessels that may go near the project site without AIS are generally limited to a few to a relatively low number of smaller recreational or commercial fishing vessels, particularly squid fishing vessels in a season where squid are found in that area."*

Sec. 4.3.10 describes the squid fishery as having 55 limited entry permits. While we appreciate that the revised RA acknowledged that squid vessels use the area, 55 permits represent a capacity goal to be reached by attrition. In fact, the total number of limited entry vessels operating in the squid fishery now is 65, and most of those vessels employ a lightboat to assist in the harvest, so the actual number of vessels involved in squid fishing is nearly double the number reported. More than half of those vessels are not equipped with AIS.

Further, while Figure 4-22, the estimated catch by 10 nm block, was expanded to include the years 2010-19, Figure 4-23, estimated catch by 1 nm microblock, excluded catches in 2010-2011, two huge squid years where 2010 landings in Ventura Harbor were 66,721,872 pounds and $15.9 million ex vessel, and 2011 landings were 67,797,550 pounds and $15,535,185 ex vessel. These landings represented 95.4% of volume and 85% of value in Ventura Harbor in 2010, and 98.6% of volume and 82% of value in 2011.
We, too, question the issue raised in the PCFFA comment letter, in light of the data presented above, which was extracted from CDFW Port Landing Tables for 2010 and 2011:

> *"The legend indicates that catches in the micro blocks do not exceed 240 short tons in any of the areas. Based on our knowledge and experience in fishing squid in the area, this seems highly unlikely. How are areas where catch exceeded 240 st in a year denoted?"*

Clearly, Ventura Harbor is very important to the squid fishery, and we argue, the squid fishery is also important to the Harbor District. We disagree with the RA's attempts to downplay this importance. One further point, even though Figure 4-23 eliminated the two big squid years, it did include a microblock directly adjacent to the project site where the harvest level was very high. Squid are known to spawn all along the stretch of the mainland coast near Ventura Harbor, and the potential for both direct and indirect impacts is significant -- belying the conclusions in this draft RA.

The PCFFA letter highlighted issues with potential interaction with the project site involving vessel collision or gear entanglement. Commissioners should be aware that when a squid seiner is in the process of wrapping a set, the vessel may drift as much as mile or more in windy conditions. Thus, the actual project site represents the nucleus of a much larger area that vessels need to avoid to minimize the risk of losing gear and catch, not to mention the vessel itself. These factors need to be included if the final risk analysis is to be accurate. We disagree with the finding that risk is minimal because vessel traffic is assumed to be minimal.

The PCFFA letter presented detailed comments on the RA that we agree with, and we will not repeat them here. However, we raise an objection to the assumption stated in the revised narrative under Risk 1.2:

> *It is assumed that once the farm is operational, trawling vessels will choose to navigate a safe distance from the project site, as determined by the vessel's captain. Further, it is assumed that there will be sufficient time for fishing nets to be retrieved*

by the vessel operator in the event that the vessel drifts towards, or otherwise gets too close to, the project site, to avoid damage to the nets.

This flawed assumption applies equally to purse seine vessels, and as noted above, once in the act of drying up the net, a seiner is NOT capable of speeding up the process or changing direction without risk. Considering that the proposed project site is located in an active squid fishing area, the risk analysis will need to take these impacts into consideration.

As currently worded, this draft RA significantly minimizes risk, we believe. More detailed analyses are needed to consider the full scope and potential risk impact from vessels, both commercial and recreational, that are not AIS equipped. We also suggest revising Figure 4.23 to include the years 2010 and 2011, which would incorporate two squid boom years (and associated squid vessel traffic into and out of Ventura Harbor) that are currently missing from the RA.

We note, and also agree with, the conclusions in the PCFFA letter addressing the need for an indemnity and gear loss mitigation plan PRIOR to commencement of construction, as the Coastal Commission required before approval of the KZO / Catalina Sea Ranch aquaculture project. We also believe, as stated in the PCFFA conclusion: *"VSE needs to assure that all vessel's servicing the leased facilities have adequate insurance to cover all foreseeable incidents. VSE should be required to post a bond in an amount sufficient to ensure foreseeable damages are available."*

We further understand that these issues are beyond the scope of the draft RA. Nevertheless, they are critically important aspects that must be considered and implemented if and when the VSE project moves forward.

Thank you very much for considering these comments.

Sincerely,

Diane Pleschner-Steele
Executive Director

VENTURA PORT DISTRICT

BOARD OF PORT COMMISSIONERS
MINUTES OF AUGUST 19, 2020 SPECIAL MEETING

<u>CLOSED SESSION</u>

CALL TO ORDER:
The Ventura Board of Port Commissioners Regular Closed Session Meeting was called to order by Chairman Chris Stephens at 5:32PM at the Ventura Port District Administration Office, 1603 Anchors Way Drive, Ventura, CA 93001 and via Zoom meeting.

ROLL CALL:

<u>Commissioners Present:</u>
Chris Stephens, Chairman
Brian Brennan, Vice Chairman
Jackie Gardina, Secretary via Teleconference
Everard Ashworth via Teleconference
Michael Blumenberg via Teleconference

<u>Commissioners Absent:</u>
None.

<u>Port District Staff:</u>
Brian Pendleton, General Manager
Todd Mitchell, Business Operations Manager
Jessica Rauch, Clerk of the Board

<u>Legal Counsel:</u>
Andy Turner via Teleconference
Elsa Sham via Teleconference

PUBLIC COMMUNICATIONS: Tom Derecktor and Leonora Valvo are looking forward to signing a lease assignment and moving forward.

CONVENED TO CLOSED SESSION AT 5:40PM.

ADJOURNMENT: Closed Session was adjourned at 7:02PM.

<u>OPEN SESSION</u>

<u>ADMINISTRATIVE AGENDA:</u>

CALL TO ORDER:
The Ventura Board of Port Commissioners Regular Open Session Meeting was called to order by Chairman Chris Stephens at 7:08PM at the Ventura Port District Administration Office, 1603 Anchors Way Drive, Ventura, CA 93001 and via Zoom Meeting.

PLEDGE OF ALLEGIANCE: By Chairman Stephens.

ROLL CALL:

Commissioners Present:
Chris Stephens, Chairman
Brian Brennan, Vice Chairman
Jackie Gardina, Secretary via teleconference
Everard Ashworth via teleconference
Michael Blumenberg via teleconference

Commissioners Absent:
None.

Port District Staff:
Brian Pendleton, General Manager
Todd Mitchell, Business Operations Manager
Jessica Rauch, Clerk of the Board
Gloria Adkins, Accounting Manager
Robin Baer, Property Manager via teleconference
John Higgins, Harbormaster via teleconference
Joe Gonzalez, Facilities Manager via teleconference
Dave Werneburg, Marina Manager via teleconference
Jennifer Talt-Lundin, Marketing Manager via teleconference

Legal Counsel:
Andy Turner via teleconference
Elsa Sham via teleconference

ADOPTION OF AGENDA

ACTION: **Commissioner Brennan moved, seconded by Commissioner Ashworth, and carried by a vote of 5-0 to adopt the August 19, 2020 Special Meeting agenda.**

APPROVAL OF MINUTES
The Minutes of the July 15, 2020 Regular Meeting were considered as follows:

ACTION: The minutes were moved to the September 2nd agenda, so staff could review.

PUBLIC COMMUNICATIONS: Sam Sadove, owner of Ventura Harbor Marine Associates, LLC., recommended reporting positive cases of COVID that occur within the Port District.

CLOSED SESSION REPORT: Mr. Turner stated that the Board met in closed session; discussed and reviewed all items on the closed session agenda. The Board gave direction to staff as how to proceed. No action was taken that is reportable under The Brown Act.

BOARD COMMUNICATIONS: Commissioner Blumenberg reported that he has taken tours of the Ventura Harbor Boatyard and Parcel 20. He has also attended the commercial fishing meeting and village tenant meeting. Commissioner Brennan has been enjoying the Village and is impressed with staff in the Village and how the facility is being managed. Commissioner Stephens congratulated Commissioner Brennan on his reappointment to the Board. He also reported that he joined Commissioner Blumenberg on the Parcel 20 tour and attended the commercial fishing and village tenant meetings. He also announced the passing of Island Packers Founder Lillian Connally.

STAFF AND GENERAL MANAGER REPORTS: Harbormaster, John Higgins reported on the boat fire that occurred off Anacapa Island on August 2, 2020 and Harbor Patrol's response to the incident.

LEGAL COUNSEL REPORT: None.

CONSENT AGENDA:

A) Approval of New Retail Lease Agreement for Shirley Rios dba Hair Extensions by Shirley
Recommended Action: Roll Call Vote.
That the Board of Port Commissioners approve a new Retail Lease Agreement between the Ventura Port District dba Ventura Harbor Village and Shirley Rios dba Hair Extensions for the premises located at 1559 Spinnaker Drive #103 consisting of a total of 400 square feet for a two (2) year term.

ACTION: **Commissioner Gardina moved, seconded by Commissioner Brennan and carried by a vote of 5-0 to approve a new Retail Lease Agreement between the Ventura Port District dba Ventura Harbor Village and Shirley Rios dba Hair Extensions for the premises located at 1559 Spinnaker Drive #103 consisting of a total of 400 square feet for a two (2) year term.**

B) Approval of New Office Lease Agreement for Ahmad Vahedian, Ph.D
Recommended Action: Roll Call Vote.
That the Board of Port Commissioners approve a new Office Lease Agreement between the Ventura Port District dba Ventura Harbor Village and Ahmad Vahedian, Ph.D for the premises located at 1575 Spinnaker Drive #204C, consisting of a total of 275 square feet for a two-year lease term with a two-year option.

ACTION: **Commissioner Gardina moved, seconded by Commissioner Brennan and carried by a vote of 5-0 to approve a new Office Lease Agreement between the Ventura Port District dba Ventura Harbor Village and Ahmad Vahedian, Ph.D for the premises located at 1575 Spinnaker Drive #204C, consisting of a total of 275 square feet for a two-year lease term with a two-year option.**

C) Approval of Two Professional Services Agreements with Rincon Consultants, Inc. for Dredging Services
Recommended Action: Roll Call Vote.
That the Board of Port Commissioners approve:
a) A Professional Services Agreement with Rincon Consultants, Inc. in the amount of $30,924 for maintenance dredging environmental consulting and monitoring services; and,
b) A Professional Services Agreement with Rincon Consultants, Inc. in the amount of $35,225 for maintenance dredging permit amendment services.

ACTION: **Commissioner Gardina moved, seconded by Commissioner Brenna and carried by a vote of 5-0 to approve a Professional Services Agreement with Rincon Consultants, Inc. in the amount of $30,924 for maintenance dredging environmental consulting and monitoring services; and a Professional Services Agreement with Rincon Consultants, Inc. in the amount of $35,225 for maintenance dredging permit amendment services.**

STANDARD AGENDA:

1) Ventura Port District Operations Update as it Relates to COVID-19
Recommended Action: Informational.
That the Board of Port Commissioners receive an update on:
a) The COVID-19 Ventura Harbor Rental Abatement and Deferment Program; and
b) Status of Ventura Port District operations.

Report by General Manager, Brian D. Pendleton.

Public Comment: Sam Sadove, owner of Ventura Harbor Marine Associates, LLC., reiterated his previous public comment by stating positive cases of COVID that occur within the Port District, staff/tenants, should be reported.

ACTION: The Board of Port Commissioners received an update on the COVID-19 Ventura Harbor Rental Abatement and Deferment Program and status of Ventura Port District operations.

2) Parcel 20 Potential Future Development Discussion
Recommended Action: Informational.
That the Board of Port Commissioners receive an informational report to discuss potential future development for Parcel 20.

Report by General Manager, Brian D. Pendleton, owner of Ventura Harbor Marine Associates, LLC., Sam Sadove, and potential assignee's Leonora Valvo and Tom Derecktor.

Public Comment: See Attachment 1.

ACTION: The Board of Port Commissioners received a presentation from Sam Sadove, Leonora Valvo and Tom Derecktor on the future of Parcel 20.

ADJOURNMENT: The meeting was adjourned at 8:13PM in honor of Lillian Connally.

The next meeting is Wednesday, September 2, 2020.

Jackie Gardina, Secretary

Jessica Rauch

To: Andria's Seafood
Subject: RE: Notice of August 19 Special Port Commission Meeting

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From: Andria's Seafood <info@andriasseafood.com>
Sent: Wednesday, August 19, 2020 2:39 PM
To: Jessica Rauch <jrauch@venturaharbor.com>
Cc: 'Michael Wagner' <buymorefish@gmail.com>
Subject: RE: Notice of August 19 Special Port Commission Meeting

Hi Jessica,

Please enter this comment from Michael Wagner

Re: Standard Agenda Item #2

Dear Commissioner Stevens and fellow Commissioners,

The interest in Parcel 20 by a very large company, and their investment to enhance that property, could be a real positive for the Ventura Port District. This could be as positive as the investment by Silver Bay. I encourage you all to look carefully at this option.

Michael Wagner

VENTURA
PORT DISTRICT
Established 1952

BOARD OF PORT COMMISSIONERS

SEPTEMBER 2, 2020

CONSENT AGENDA ITEM A

APPROVAL OF NEW RESTAURANT LEASE AGREEMENT FOR RIGOBERTO LOPEZ RANGEL DBA BAJA BAY SURF TACO

VENTURA PORT DISTRICT **CONSENT AGENDA ITEM A**

BOARD COMMUNICATION Meeting Date: September 2, 2020

TO:	Board of Port Commissioners
FROM:	Todd Mitchell, Business Operations Manager Robin Baer, Property Manager
SUBJECT:	Approval of New Restaurant Lease Agreement for Rigoberto Lopez Rangel dba Baja Bay Surf Taco; 1567 Spinnaker Drive #104

RECOMMENDATION:
That the Board of Port Commissioners approve a new restaurant lease agreement for the premises located at 1567 Spinnaker #104, consisting of 773 square feet with 623 square feet patio between the Ventura Port District dba Ventura Harbor Village and Rigoberto Lopez Rangel dba Baja Bay Surf Taco for a two-year term with a two-year option.

SUMMARY:
Staff has re-negotiated with this tenant who will now be signing a two-year term lease with a two-year option. Baja Bay Surf Taco has been a tenant since May 2007. Mr. Rangel will install new exterior signage in compliance with the District's new signage program within the first twelve months of his lease term. There are no District tenant improvements for this space.

LONG-TERM GOALS:
- Goal 3: Economic Vitality
  - Increase economic development, vitality, and diversity of the District through effective leasing and marketing strategies.

5-YEAR OBJECTIVES:
- Objective V: Harbor Village
  - Maintain and improve Harbor Village infrastructure and enhance the overall visitor experience
    - 1: Complete Harbor Village refresh program
    - 2: Leasing/Property Management Action Plan

BACKGROUND:
After visiting Ensenada, a city on the Pacific coast of Mexico's Baja California, Mr. Rangel's vision was to bring to the Harbor his experience of Mexican cuisine. He has been a chef for over twenty years and specializes in fish tacos, burritos, and tostadas along with the traditional Mexican dishes for lunch, dinner, and desserts.

FISCAL IMPACT:
This new lease reflects current market rental rates for restaurant space in the complex. The minimum rent over the two-year term is adjusted annually and the two-year option adjusted by Consumer Price Index (CPI).

ATTACHMENTS:
None.

BOARD OF PORT COMMISSIONERS

SEPTEMBER 2, 2020

STANDARD AGENDA ITEM 1

CONSIDERATION OF PRELIMINARY OPERATIONS PLAN AND ECONOMIC AND FISCAL IMPACTS OF THE PROPOSED VENTURA SHELLFISH ENTERPRISE PROJECT

VENTURA PORT DISTRICT | **STANDARD AGENDA ITEM 1**
BOARD COMMUNICATION | Meeting Date: September 2, 2020

TO:	Board of Port Commissioners
FROM:	Brian D. Pendleton, General Manager
SUBJECT:	Consideration of Preliminary Operations Plan and Draft Economic and Fiscal Impacts of the Proposed Ventura Shellfish Enterprise Project

RECOMMENDATION:
That the Board of Port Commissioners receive an informational report on the Preliminary Operations Plan and Draft Economic and Fiscal Impacts of the Proposed Ventura Shellfish Enterprise Project (VSE).

SUMMARY:
The Ventura Port District (Port District) filed an application with the U.S. Army Corps of Engineers (Corps) for a permit to establish an aquaculture farm in federal waters near Ventura Harbor (Blocks 664 and 665). The Port District filed an application with the California Coastal Commission (Coastal Commission) for a Coastal Consistency Determination for the same project. Both were submitted in October 2018. The Preliminary Operations Plan (Operations Plan) has been developed in support of these applications and is intended for the use by federal and state regulators in developing project conditions of approval. The Draft Economic and Fiscal Impacts of the Proposed VSE Project (Economic and Fiscal Impacts Report) was requested by the Board for public policy considerations. It is not required by federal and state regulators, nor the 2018 California Sea Grant awarded to the Port District. However, development of the Economic and Fiscal Impacts Report can be beneficial to the Board and a broad spectrum of federal, state and local policy makers, commercial fishing and shellfish farming interests, researchers and stakeholders in considering projects of this nature.

It is the goal of this meeting to present the Operations Plan and Economic and Draft Fiscal Impacts Report, receive and consider stakeholder comment, and return to the Board at the September 16, 2020 meeting seeking authorization to submit the Operations Plan to the Corps, Coastal Commission and other regulatory agencies as appropriate. Concurrently, staff will request the Board receive the Final Economic and Fiscal Impacts Report.

LONG-TERM GOALS:
- Goal 1: Safety & Navigation
    - Maintain and enhance a safe and navigable harbor
        - a: Securing funding for dredging the Harbor entrance through the Army Corps of Engineers in coordination with agencies and our elected officials
- Goal 2: Commercial & Recreational Boating & Fishing
    - Support and promote commercial and recreational boating and fishing

5-YEAR OBJECTIVES:
- Objective F: Commercial Fishing
    - Support current commercial fishing industry central to Ventura's premier working waterfront through: stakeholder engagement, diversification, and infrastructure improvements
        - 3: VSE Project Grant Utilization
- Objective D: Harbor Dredging
    - Ensure that annual dredging occurs at the federal Harbor entrance and as needed in the inner Harbor

- 1: Support and advocate for congressional funding to the Army Corps of Engineers in support of the Harbor's annual dredging program

BACKGROUND:
The VSE project is an initiative proposed by the Port District with support from project volunteers that seeks to permit twenty 100-acre plots for growing the naturalized Mediterranean mussel (*Mytilus galloprovincialis*), in California coastal waters via submerged long lines within the Santa Barbara Channel near Ventura Harbor. Increasing the supply of safe, sustainably produced domestic seafood is a priority of the State Legislature, NOAA and the U.S. Department of Commerce.

The VSE project objectives include:

- To increase the supply of safe, sustainably produced, and locally grown shellfish while minimizing potential negative environmental impacts;
- To enhance and sustain Ventura Harbor as a major west coast fishing port and support the local economy;
- To provide economies of scale, pre-approved sub-permit area, and technical support to include small local producers who would not otherwise be able to participate in shellfish aquaculture;
- To provide an entitlement and permitting template for aquaculture projects state-wide;
- To enhance public knowledge and understanding of sustainable shellfish farming practices and promote community collaboration in achieving VSE objectives; and,
- To advance scientific knowledge and state of the art aquaculture practices through research and innovation.

The project's origins, goals and project funding are extensively discussed in a project status report to the Board on July 17, 2019. The VSE Annual Status Report was provided to the Commission and stakeholders at the July 15, 2020 Board meeting.

Since receiving the permit application, the Corps conducted its required public comment process, and received comments from the USCG and the Ventura Local Agency Formation Commission (LAFCo). On January 15, 2020, the Corps sent a letter to the Port District requesting a Navigation Risk Assessment, as requested by the USCG, and resolution of a jurisdictional issue raised in the LAFCo letter. As stated in the Corps' letter: "If the requested information cannot be submitted within 30 days, the Corps will withdraw your permit application. When you do provide the requested information, the Corps will resume review of your previously submitted permit application." On February 18, 2020, the Corps notified the Port District that its application had been administratively withdrawn, again stating that it would resume processing the application once the Port District provides the information requested in the January 15 letter.

The Navigation Risk Assessment, prepared by COWI on the Port District's behalf, was presented to the Commission and stakeholders at two Board meetings held on July 1 and 15, 2020. It is complete and submitted to the Corps, Coastal Commission and USCG. The project team presented the findings to the USCG in August.

The Port District is working cooperatively with the Ventura LAFCo to resolve their differences and provided an update on the issue as part of the VSE Annual Status Report to the Commission and stakeholders at the July 15, 2020 Board meeting.

FISCAL IMPACT:
In FY2020-2021, the Port District entered into a Professional Services Agreement with Dudek for VSE environmental and project management support in the amount of $75,000 and Illuminas Consulting for an initial amount of $7,500 with additional expenses up to $2,500 for a total cost of $10,000 to develop the Economic and Fiscal Impacts Report.

ATTACHMENTS:
Attachment 1 - Preliminary VSE Operations Plan
Attachment 2 - Draft Economic and Fiscal Impacts of the Proposed Ventura Shellfish Enterprise Project
Attachment 3 - Draft Shellfish Grower Proforma

ATTACHMENT 1

DRAFT

Ventura Shellfish Enterprise

Preliminary Operations Plan

Prepared for

Ventura Port District
August 2020
Contact: Brian Pendleton

Prepared by
DUDEK
1630 San Pablo Avenue Suite 300
Oakland, California 94612
Contact: Laurie Monarres

Operations Plan Revision History

Revision Number	Date	Reason for Revision	Sections Revised	Explanation of Revisions
Example Version 0.0	August 2020	Updates provided to Ops Plan based on team review	Sections 1 through 12	Multiple revisions made to each section, including refinement of language and content.

This Plan is intended to be a living document that is updated as needed through the project's permitting, construction, and operational phases. Plan revisions and history will be posted in the table above.

Acknowledgements

The Ventura Shellfish Enterprise project is an initiative proposed by the Ventura Port District to permit mussel farming in federal waters of the Santa Barbara Channel northwest of Ventura Harbor. Ventura Shellfish Enterprise project volunteers and consultants have been crucial in the development and permitting of this project. Ventura Port District would like to acknowledge all the dedication and commitment shown by project volunteers: Coastal Marine Biolabs, The Cultured Abalone Farm, and Ashworth Leininger Group; as well as our project consultants: K&L Gates, Woods Hole Oceanographic Institution (Scott Lindell), and Dudek. Ventura Port District would like to give special recognition to the participation of National Oceanic and Atmospheric Administration (NOAA) throughout the development of the project.

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Table of Contents

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TABLES

FLOWCHARTS

FIGURES

APPENDICES

Acronyms, Abbreviations, and Definitions

BMP	Best Management Practice
backbone	The horizontal longline that supports mussel growing ropes and is suspended by tethers; also known as "horizontal header line."
buoy	A buoyant device at the *surface* used to mark a nautical location and/or support the longline mussel-growing structure
CCC	California Coastal Commission
CDFW	California Department of Fish and Wildlife (formerly California Department of Fish and Game)
Corps	U.S. Army Corps of Engineers
Duradan	A brand of rope made out of blended resins of virgin polypropylene and serves as a floating rope.
FDA	U.S. Food and Drug Administration
float	A buoyant *subsurface* device used to support the longline mussel-growing structure.
GDEP	Aquaculture Gear Monitoring & Marine Debris, and Wildlife Entanglement Plan
Growers	shellfish growers
ISSC	Interstate Shellfish Sanitation Conference
lbf	pound of force
LDPE	Low density polyethylene; related to buoys in this Plan.
Line	Heavy rope used for aquaculture activities; in some instances also known as longline or rope.
LOP	Letter of Permission issued by the Corps
MMRP	Mitigation, Monitoring, and Reporting Program
MWO	Marine Wildlife Observer
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	National Marine Fisheries Service
NSSP	National Shellfish Sanitation Program
PATON	Private Aid to Navigation
Plan	Ventura Shellfish Enterprise Operations Plan
project	Ventura Shellfish Enterprise Project
ROV	Remotely Operated Vehicle
SCUBA	Self-Contained Underwater Breathing Apparatus
SPRP	Spill Prevention and Response Plan
SWQMP	Sediment and Water Quality Management Plan
tethers	Shorter longlines that connect the surface buoys to the backbone.
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
VPD	Ventura Port District
VSE	Ventura Shellfish Enterprise

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1 Introduction

1.1 Operations Plan Purpose

This Ventura Shellfish Enterprise (VSE) Preliminary Operations Plan (Plan) is intended to summarize the terms, conditions, and responsibilities of shellfish growers (Growers), Ventura Port District (VPD), and other regulatory agencies associated with the VSE project; and provides the basis for ensuring that all operations, maintenance, monitoring, and decommissioning activities are carried out consistent with the project's approved permits. Users of this Plan include, but are not limited to, Growers and their employees, VPD staff and commissioners, regulatory permitting and enforcement agencies, and the public. The Plan has two primary purposes:

1. To clearly describe the respective roles and responsibilities of Growers, VPD, and relevant regulatory agencies; and
2. To serve as a consolidated resource for Growers and provide a summary of the VSE project terms, conditions, and other information needed to ensure Grower compliance with project requirements.

In many cases, Growers will be responsible for complying with permit terms and conditions and will report their compliance to VPD, which will then compile this information in reports submitted to the relevant regulatory agencies. If a Grower has any questions concerning the obligations contained herein, he or she should review project permits and associated plans, many of which are attached to this Plan[1], and follow up with VPD to obtain clarification.

1.2 Plan Organization

This Plan is organized by the processes that Growers may encounter with the project. Specifically, **Section 2** provides an overview of the project location and description; **Section 3** provides an overview of the Grower selection process; **Section 4** provides a summary of the proposed agreements between the Growers and VPD; **Section 5** describes both voluntary and mandatory training for Growers; **Section 6** provides an overview of all permit conditions, timelines, and monitoring requirements for the project; **Section 7** delineates the specific monitoring roles and reporting requirements of Growers, VPD, and each regulatory agency associated with the project; **Section 8** provides an overview of VPD monitoring and enforcement protocol; **Section 9** provides a summary of VPD administration and management responsibilities for the project; **Section 10** provides a process for refining the details in this Plan, including adaptive management; and **Section 11** describes the process for any proposed permit amendments.

Monitoring and reporting responsibilities are shown in several formats throughout this Plan. The primary sources detailing required mitigation are the management plans (Appendices A through F) summarized in Section 6, Table 2 (Summary of the Mitigation, Monitoring, and Reporting Program). Although the Mitigation Monitoring and Reporting Program (MMRP) (Table 2) provides a summary of mitigation requirements, this Plan provides several additional formats in order to assist the users in more fully understanding process, roles, and responsibilities. The flowcharts and tables in Section 7 provide various illustrative visuals and organizational structures depicting the responsibilities associated with Growers, VPD, and relevant regulatory agencies. The flowcharts are intended to show the process whereas the tables are intended to explain the responsibilities of each party for a given mitigation measure.

[1] Any revisions to the management plans will be updated after receiving comments from relevant regulatory agencies.

1.3 Plan Revisions

Although this Plan is designed as a comprehensive guide, it is also intended to be a living document that is updated as needed through the project's permitting, construction, and operational phases. The current iteration of this Plan is meant to provide greater detail concerning operational and oversight responsibilities to regulatory agencies during VPD's permitting process.

This Plan will be updated as determined necessary by VPD in coordination with regulatory agencies and Growers. For example, the management plans, project permit conditions, and responsibilities will be updated after agency approvals; the sanitation testing descriptions will be updated after management and contingency plans are in place; and certain sections will be updated once the number of Growers, identity of Growers, and project phasing become more definitive. The date of each revision and a description of the main edits will be provided after the cover page.

2 Project Location and Description

2.1 Project Location

The Ventura Shellfish Enterprise Project is a multi-party initiative to permit twenty 100-acre farms for growing mussels in open federal waters of the Santa Barbara Channel northwest of Ventura Harbor, approximately 3.53 miles from shore (Figure 1, Project Location). The project will consist of twenty 100-acre farms (total of 2,000 acres) to be used for growing Mediterranean mussel (*Mytilus galloprovincialis*) via submerged long lines (Figure 2, Parcel Array Overview). The project location was selected using marine spatial planning analyses conducted by NOAA (Theuerkauf et. al. 2018). In addition, the growing sites are located on sandy-bottom habitat outside of any rocky reef habitat, as evaluated in Gentry et al. (2017) and illustrated by National Oceanic and Atmospheric Administration (NOAA) United States West Coast nautical charts (NOAA 2017). Project implementation will be phased such that a maximum of 500 acres of growing area will be installed per year, provided that the project meets certain identified thresholds and standards established by regulatory agencies as part of their approval of project permits and monitoring plans.

2.2 Project Description

The mussels will be grown and harvested by Growers who operate the farms pursuant to agreements with VPD. The project will consist of twenty 100-acre farms (total of 2,000 acres) to be used for growing Mediterranean mussel via submerged longline technology. Each of the 20 farms is approximately 2,299.5 feet by 1,899.5 feet, for an average farm size of 100.27 acres (Figure 2). Buoys marking the corners of each of the 20 parcels will identify the cultivation area for navigational safety and will comply with all regulations for height, illumination, and visibility, including radar reflection.

There will be a 50-foot setback on each end of the longline pairs (for a total of 100 feet of spacing between lines of adjacent parcels) and 50 foot spacing between the two center pins. Parallel lines will be spaced 150 feet apart, with a 125-foot setback at each of the long sides (for a total of 250 feet of spacing between lines of adjacent parcels). The installation of anchors, longlines, and other facilities will be performed by the Growers, in compliance with all permit requirements. The shape of each of the 100-acre cultivation parcels will be a function of the geometry of the submerged backbone line and anchoring.

Each farm will contain up to 24 lines (12 end-to-end pairs) with each line measuring a distance of approximately 1,075 feet (358 meters) between two anchors. As shown in Figure 3, Detailed Plan for Shellfish Longlines, submerged longlines consist of a central horizontal structural header line, or "backbone," that is attached to the seafloor by sand screw anchors at each end and supported by a series of buoys along the backbone. All of the depicted lines will lie below the surface; their subsurface location will be marked with surface buoys as indicated in the figure. The remaining anchor line buoys shown in the figure are subsurface and used for the purpose of maintaining tension in the system. Inspections of the anchor ropes, anchors, and connecting ropes shall take place at a minimum of twice per month by VPD Harbor Patrol. In addition, maintenance of the longlines will be carried out on a monthly basis, which consists of lifting the longlines out of the water, adding additional buoys as necessary to account for increased mussel weight, and checking for any escaped or damaged longlines or gear.

Overall, the descriptions for the submerged longline system, provided below, is based on engineering modeling designed to withstand a 100-year storm (Dewhurst 2019). However, it should be noted that operational flexibility is also necessary. For additional details on operational flexibility see Section 2.2.8, Operational Flexibility.

2.2.1 Longlines

Each 100-acre parcel has up to 24 longlines, each with a backbone length of about 575 feet (175 meters) and with anchor lines measuring 264 feet (80.5 meters) attached to sand screw anchors, discussed below. For the entire built out project, there will be approximately 480 longlines total. The longlines are thick (1-inch diameter) rope made out of blended resins of virgin polypropylene and polypropylene and the system (along with buoys) produces a fairly rigid structure to which the cultivation ropes are attached. The backbone is estimated to support up to 195 individual mussel growing ropes each up to 30 feet long for a total of up to 5,850 feet of “fuzzy” cultivation line per backbone line (or an equivalent weight of continuous grow ropes)(Figure 3). Cultivation ropes are characterized by extra filaments that provide substrate for mussels to attach. These “fuzzy ropes” are attached to and suspended from the tensioned backbone rope as individual lengths or as continuous grow ropes. The length of the “fuzzy ropes” may be less depending on the lifting capacity of the servicing vessel.

Since significant slack is not likely to occur in the lines during certain storm conditions, the Grower may opt to use either sinking or floating (Duradan) rope throughout the system. However, sinking lines must be used for the tethers that connect the surface buoys to the backbone (as shown in Figure 3) and should be of a loaded breaking strength matched to the surface buoy volume. Sinking lines are proposed to help prevent marine mammal entanglement (Price and Morris 2013; Ludwig et al. 2014) and have been adopted by lobster fisheries as a method to reduce entanglement risk (Johnson et al. 2005; Knowlton et al. 2012). As an additional precaution against entanglement, grow ropes will be attached to the headrope with a low-breaking-strength twine (0.16-inch diameter), which will facilitate rapid detachment in the unlikely event of any interaction with the longline as well as a 1,100 pound breakaway link which will be installed between the surface buoys and vertical lines. In the event that a surface buoy becomes disconnected from its attachment line the rope would sink below the connection point and not pose a hazard to vessels.

Specific project design features for the submerged longlines have been modeled and engineered to withstand current, wave, and 100-year storm events under maximum loading conditions (Dewhurst 2019). However, as with any system, the design features have a maximum allowable weight in order to function successfully under these storm events. Table 1 provides a summary of the maximum allowable design features for each of the 24 lines within a farm. Under this project design, the force (lbf) required to lift a fully-stocked backbone two or three meters above the surface is estimated to be 2,927 lbf and 3,397 lbf, respectively.

Table 1. Maximum Design Features for One Line within a Farm[1]

Component	Material[2]	Quantity	Length, ft (m)	Required Minimum Breaking Strength (lbf)	Required Holding Capacity (lbf)
Mussel Ropes (Droppers)	Fuzzy rope	195	30 ft (10 m)	-	-
Anchor Lines	Duradan[5]	2	264 ft (80.5 m)	61,147 lbf	-
Anchor Line Buoys	420L, LDPE	2	-	-	-
Sub Corner Buoys	120L, LDPE	-	-	-	-
Corner Buoys	300L, LDPE	2	-	-	-
Corner Float Line[3]	Duradan[5]	2	20 ft (6.1 m)	-	-
Long Line	Duradan[5]	1	575 ft (175 m)	61,727 lbf	-
Long Line Buoys	120L, LDPE	30	-	-	-
Tethers[4]	Duradan[4]	30	3 ft (0.9 m)	-	-
Surface Center Buoys	300L, LDPE	10	-	-	-
Surface Center Buoy Line[3]	Duradan[5]	10	20 ft (6.1 m)	-	-
Helical Anchors	-	2	-	-	65,821 lbf (horizontal); 13,754 lbf (vertical)

Notes: ft = feet; m = meters; lbf = pound of force.
1 Design features determined by as determined by site-specific storm load modeling and threshold values.
2 LDPE = Low Density Polyethylene
3 The surface center lines and corner float lines may be lowered to 40 feet to avoid predation by birds.

4 Sinking lines must be used for tethers, which connect the surface buoys to the backbone. Sinking lines should be of a loaded breaking strength matched to the surface buoy volume.

5 The longlines are thick (1-inch diameter) rope made out of blended resins of virgin polypropylene and polypropylene (Duradan), a floating rope. Sinking or floating rope can be used.

2.2.2 Anchors

Helical sand screw anchors have been shown to exhibit superior holding power as compared to other anchoring systems. Sand screw anchors also have the advantage of being removable at project decommissioning. Sand screw anchors will be installed by a hydraulic drill with a drill head that operates from a rig lowered to the ocean floor. The sand screw anchors will be screwed into the sandy bottom ocean floor approximately 10 to 20 feet (3 to 6 meters) deep into the sediment. Each 100-acre farm will contain up to 48 anchors for a total of 960 anchors at full project build out.

2.2.3 Floats and Buoys

Buoys marking the corners of each parcel will identify the cultivation area for navigational safety and will comply with all regulations for height, illumination, and visibility, including radar reflection. As the project will be a phased development, individual users will also mark their own areas as part of the operational requirements. Permanent surface buoys for each longline will consist of two 300L surface corner buoys with one corner buoy supporting and marking either end of the backbone. During the mussel production cycle, a combination of surface buoys and submerged floats attached to the backbone line will be used to maintain tension on the structural backbone line as the weight of the mussel crop increases. These will consist of buoys with 300L buoyancy attached at necessary intervals along the surface and connecting to the backbone line, in combination with smaller submerged floats with 120L buoyancy affixed directly to the backbone line. The combination of surface and submerged buoyancy is designed to create a tensioned but flexible structure that is capable of responding dynamically to surface waves and storms. Additional buoys included in system include anchor line floats, which are attached at 98 feet (30 meters) above each anchor.

The number of surface buoys required for each longline is dependent on the growth period of the mussels. Longlines initially seeded with spat are expected to only require two surface corner buoys (with smaller submerged buoys) whereas a fully stocked longline may support up to 12 individual surface buoys, including the two corner buoys. The exact number of surface buoys present at any one time will depend on mussel growth and harvesting operations. Harvesting operations are expected to occur on a regular basis throughout the year with regular rotations within a 100-acre farm of stocking and harvesting of all 24 longlines.

Each of the mussel ropes will hold a maximum stocking density of 8 pounds wet weight mussel mass per linear foot of grow rope. Assuming the maximum 195 grow ropes, each 30 feet long, the total wet weight per line would total 46,800 pounds. To float and maintain tension in the backbone system at maximum stocking density, the backbone lines will be held up by a maximum of 30 submerged longline floats attached by short 3 feet (0.9 meters) long tethers and up to 10 surface center buoys attached by 15- to 40-foot-long (6.1-meter-long) tethers. All surface buoys will be uniquely marked with an identifying number of the Grower.

Buoys and floats attached to the central horizontal portion of the backbone line support the line, provide a means of lifting the backbone line to access the cultivation ropes, and determine the depth of the submerged backbone, which will vary seasonally from 15 to 40 feet below the surface. To avoid predation, all tethers for the center floats and corner floats can be extended to 40 feet (12.2 meters) so the backbone is lowered to 40 feet below the surface.

2.2.4 Construction Timeline

Installation of anchors, longlines, and buoys will be performed by Growers in compliance with all permit requirements and VPD agreements. Construction in each individual 100-acre farm will take place only after VPD approval of a sub-permit and/or agreement with the individual Grower. While project development is dependent on market demand, VPD estimates that full build out would occur within 3 to 5 years after project approval. Project implementation will be phased such that a maximum of 500 acres per year of growing area will be installed, provided that the project meets certain identified thresholds and standards established by regulatory agencies as part of their approval of project permits and monitoring plans.

2.2.5 Seeding, Cultivation, and Harvesting

Juvenile seed mussels, commonly referred to as spat, will be purchased from onshore hatcheries certified by the California Department of Fish and Wildlife (CDFW). At the hatcheries, mussels adhere directly to the special textured fuzzy ropes that promote mussel attachment. When the spat are settled to nursery ropes, the ropes are covered with cotton socking material to protect them from shaking off the ropes during transport to the offshore growing site and deployment on the backbone longlines. After the nursery ropes are attached to the backbone lines, the socking holds the spat next to the rope until the mussels firmly attach with their byssal threads, by which time the cotton socking material has naturally degraded. Seed grow on nursery ropes until they reach a size (> 10mm typically), whereby they can be stripped from the ropes and reapplied to grow-out ropes at densities that support optimal growth to market. The mussels grow by filtering naturally occurring phytoplankton from the ocean.

Juvenile mussels will grow on lines until an intermediate size where the density of mussels on the fuzzy rope becomes limiting. At this point, a servicing vessel will lift the backbone line in order to access the fuzzy rope with juvenile mussels and pull the fuzzy rope through vessel-based equipment designed to strip the mussels from the fuzzy rope and then clean, separate, and grade the juvenile mussels by size. Juvenile mussels then will be restocked to clean fuzzy rope at a reduced density for their second stage of grow out to reach market size. All of these activities take place on the servicing vessel. The mussel grow-out ropes themselves are typically planted with seed to an overall diameter of three inches. Over time the grow ropes may become stiff with byssus and, by mussel growth, develop total diameters of 10-inches or more at harvest, thus making the grow ropes very unlikely sources of entanglement.

When the mussels reach market size, which is expected to occur after about 1 year of time in the water, the submerged backbone lines again will be lifted to access the fuzzy cultivation ropes, and mussels again will be stripped from the line, cleaned, and separated, and this time size-graded and bagged for landing at the Ventura Harbor as market-ready product. Again, all these activities will take place shipboard.

Per terms of the Growers' agreements with VPD, all mussels must be landed at the Ventura Harbor. From Ventura Harbor, the bagged mussels will be transported for distribution and sale. Distribution of the product will be independently managed by individual Growers. All husbandry activities related to harvesting, grading, and restocking of mussels to cultivation lines will occur onboard the servicing/harvesting vessel using specialized equipment for that purpose. Watercraft used for planting, inspections, and harvesting would likely be home ported at Ventura Harbor.

2.2.6 Sanitary Testing

The National Shellfish Sanitation Program (NSSP) is the federal/state cooperative program recognized by the U.S. Food and Drug Administration (FDA) and the Interstate Shellfish Sanitation Conference (ISSC) for the sanitary control of shellfish produced and sold for human consumption. The NSSP Guide for the Control of Molluscan Shellfish (FDA and ISSC 2017) consists of a Model Ordinance that specifies guidelines to ensure that shellfish destined for commerce are safe and sanitary. In accordance with the Model Ordinance, the VSE project is in the process of developing Marine Biotoxin Management and Contingency Plans, which will be subject to FDA review and approval. These plans specify the administrative and control procedures that Growers will implement to manage public health threats posed by known or anticipated biotoxins.

Under the best-case scenario, the Marine Biotoxin Management and Contingency plans will apply to the entire 2,000-acre project site and will streamline the contractual agreements Growers must establish with the NOAA Seafood Inspection Program before harvested product enters intra- and interstate commerce. Data dissemination and compliance with these sanitation plans is expected to be managed, in part, through an electronic platform.

Upon initiating mussel farming operations in accordance with recently approved revisions to the NSSP Model Ordinance, Growers will be required to use one of several biotoxin management strategies (e.g., Pre-Harvest Shellfish Toxicity Testing, Shellfish Lot Testing, or Pre-Harvest Shellfish Toxicity Screening Combined with Lot Testing). They will also be required to comply with administrative and control procedures specified in the Biotoxin Monitoring and Contingency Plans and any additional regulations specified by the California Department of Public Health.

2.2.7 Decommissioning

Prior to beginning activities within the project site, each Grower will be required to prepare a decommissioning plan to be implemented when a Grower's authorized use of the area is terminated or otherwise expires. The decommissioning plan will include details for removal of all shellfish operation equipment, including, but not limited to, growing ropes and structures, anchoring devices, equipment, and materials associated with the shellfish cultivation activity and process for the documentation of completion of removal activities. The plan will only allow anchors or other gear (e.g., longlines, buoys, mussels, etc.) to remain in place only if another Grower will immediately take over the vacated farm and all responsibilities and liability associated with the farm. In addition, the plan will include an estimated cost of decommissioning based on third party implementation. Financial assurance to guarantee implementation of the plan will be required of each Grower and reviewed periodically by VPD to ensure the financial assurances remain current and in effect.

Growers interested in discontinuing operations shall submit a non-renewal notice to VPD no less than 180 days prior to the expiration date. Growers interested in continuing operations beyond an individual VPD authorization expiration date will apply to renew and submit a renewal application to VPD no less than 180 days prior to the expiration date. During VPD review of the renewal application Grower operation activities may continue until VPD has notified the Grower of the renewal application decision.

Upon expiration of the overall permits for the VSE project, or expiration, termination, or denial of a renewal application for an individual VPD authorization held by a Grower, the Grower will commence removal of all aquaculture gear and structures within 30 days of permit expiration or termination. If a portion of the farm site is not ready to be harvested at the time of permit expiration/termination, the Grower will have a total of 90 days after permit expiration/termination to harvest any and all remaining shellfish, remove all aquaculture gear and structures, remove any significant shell accumulation or marine debris from the seafloor under its farm site as well as any known debris from its farm site that is located beyond the farm boundaries, and return the site to its original condition.

2.2.8 Operational Flexibility

Individual Grower management choices related to reducing stocking density and reducing number and total length of grow rope droppers could reduce total load requirements. Growers require operational flexibility to respond to dynamic environmental and growing conditions. Therefore, among other things, the scope of the anchoring system, buoy placement and number of buoys, the specific configuration of grow ropes, and final design specifications may vary depending on the specific farm requirements and Grower preferences; however, the equipment used must be consistent with the engineering analysis and maximum design features identified in Table 1 to ensure proper gear maintenance and to minimize gear loss.

2.3 Project Design Approval

The project description provided above has been engineered to withstand a 100-year storm (Dewhurst 2019). Individual Growers may choose to employ lower loading conditions (e.g., lighter stocking rates, shorter droppers, or less equivalent continuous loop grow ropes) than those described above. However, higher loading conditions will require a proper engineering study that supports the modified design stability in a 100-year storm and approval by VPD and other regulatory agencies as further described in Section 11.

2.4 Project Objectives

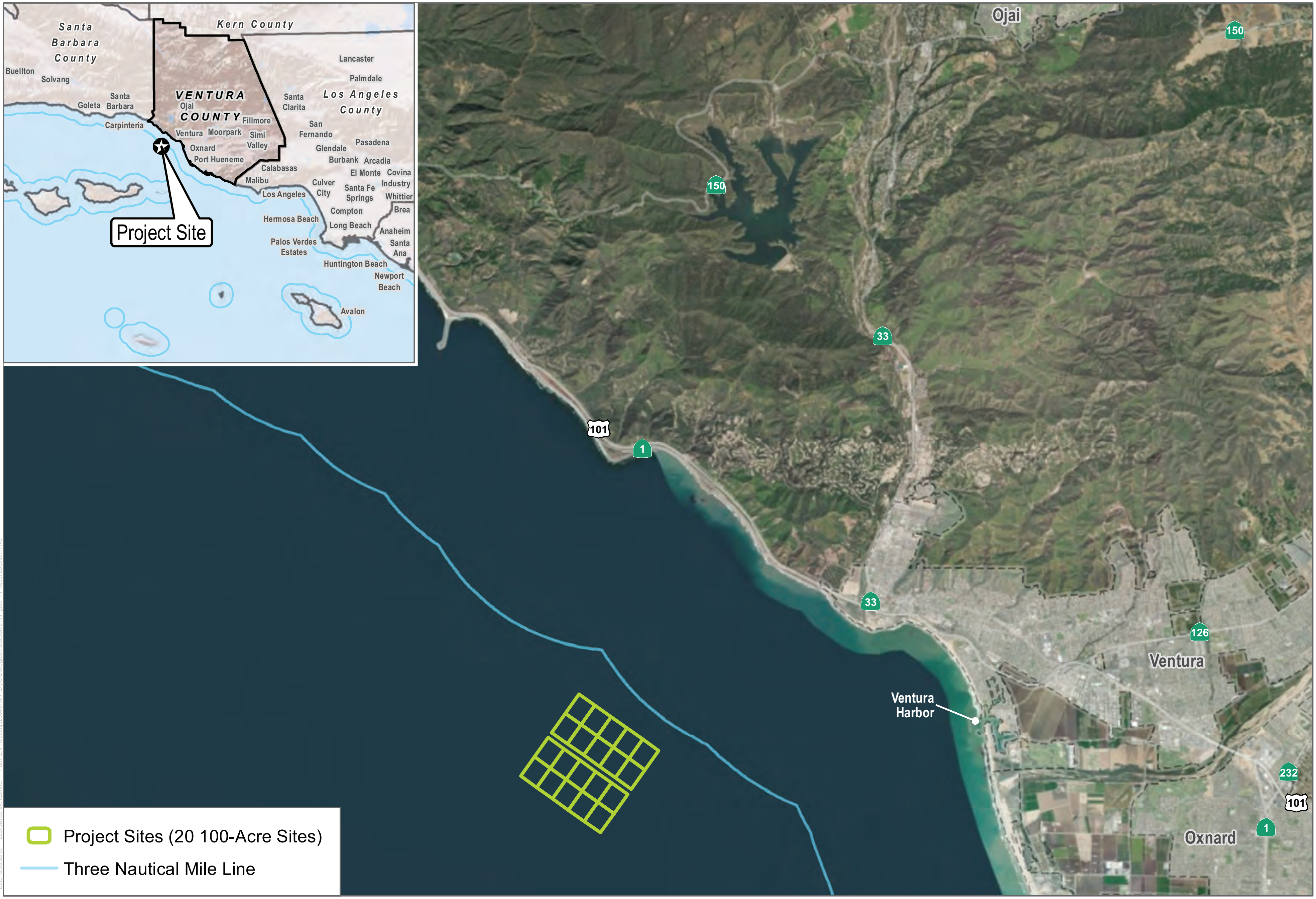
The VSE project objectives are:

- Increase the supply of safe, sustainably produced, and locally grown shellfish while minimizing potential negative environmental impacts.
- Enhance and sustain Ventura Harbor as a major west coast fishing port to support the local economy.
- Provide economies of scale, a pre-approved permit area, and technical support to include small local Growers who would not otherwise be able to participate in shellfish aquaculture.
- Provide an entitlement and permitting template for aquaculture projects statewide.
- Enhance public knowledge and understanding of sustainable shellfish farming practices and promote community collaboration in achieving VSE objectives.
- Advance scientific knowledge and state-of-the-art aquaculture practices through research and innovation.

Project goals and objectives further several of VPD's fundamental mission and objectives, as summarized below:

- Maintain a safe and navigable harbor.
- Diversify commercial fishing opportunities to benefit the fishing industry and local and regional economies.
- Continued priority (as a commercial fishing harbor) for federal funding appropriations for annual dredging of the federal harbor entrance.

ATTACHMENT 1



SOURCE: NAIP 2016

DUDEK

0 6,250 12,500 Feet

FIGURE 1

Project Location

Ventura Shellfish Enterprise Project

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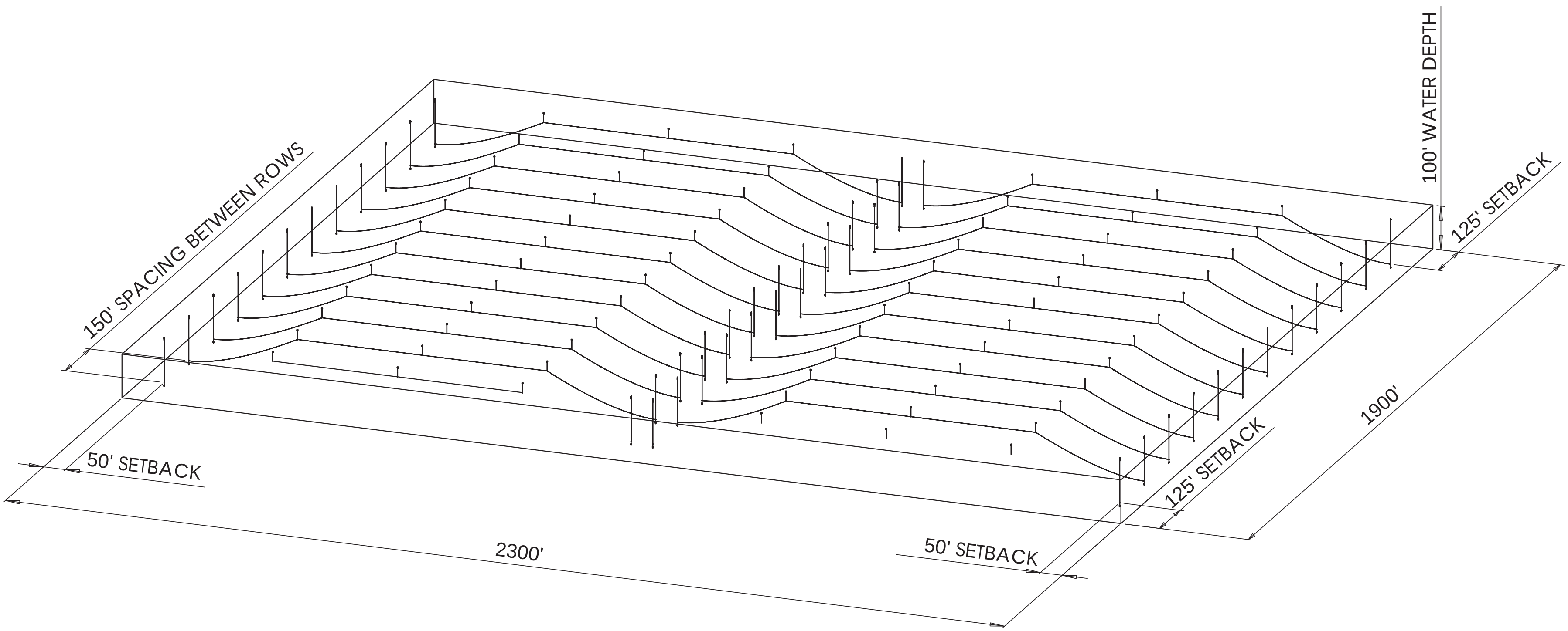

FIGURE **2**

Parcel Array Overview

Ventura Shellfish Enterprise Project

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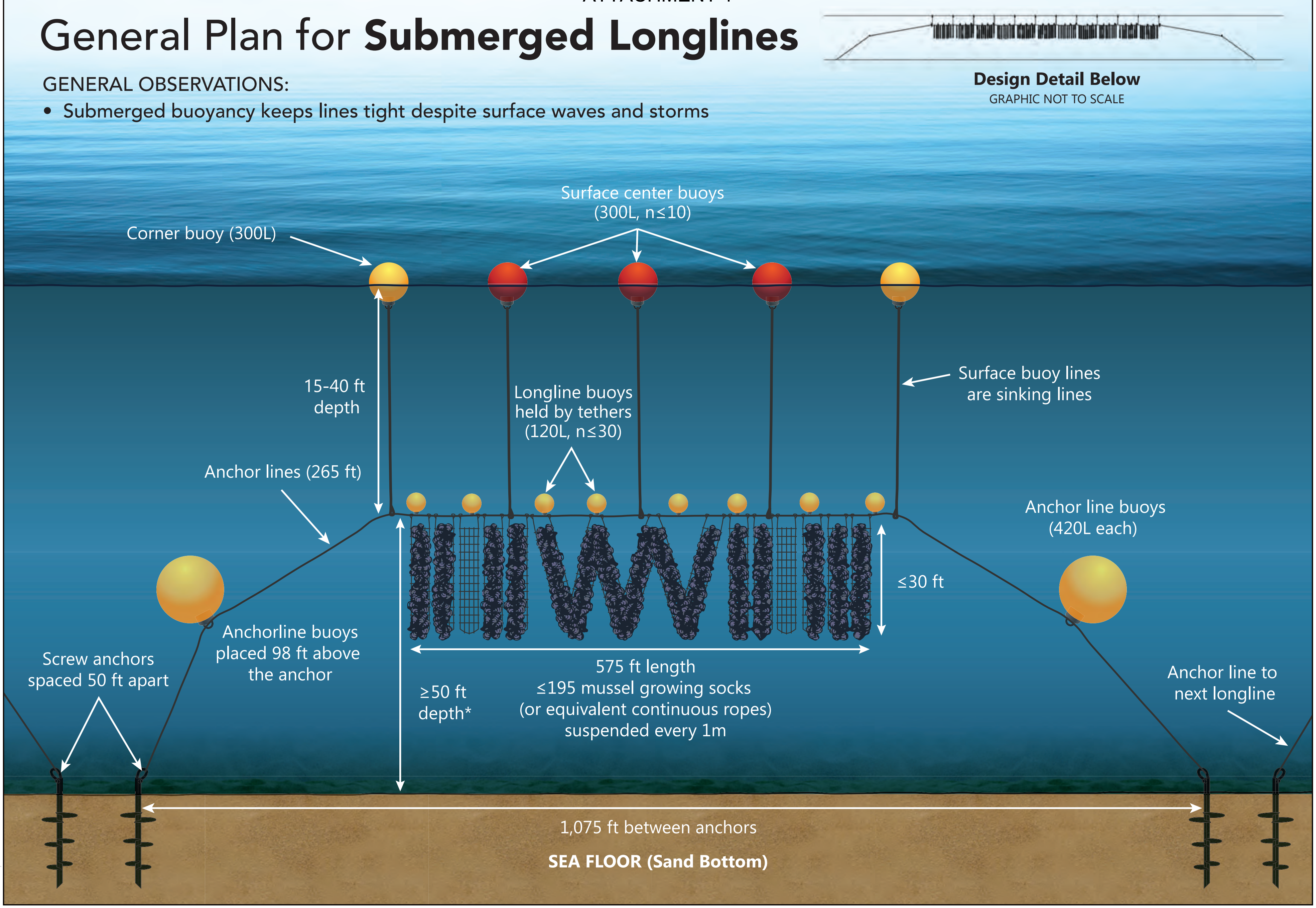

*Assumes a Mean Lower-Low Water Depth of 90 ft

FIGURE 3
Detailed Plan for Shellfish Longlines
Ventura Shellfish Enterprise Project

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3 Grower Selection Process

VPD is the project applicant for federal permits through the U.S. Army Corps of Engineers (Corps). VPD will manage the project through a public/private partnership with Growers under individual sub-permits or other agreements with VPD that incorporate all project permit conditions and best management practices (BMPs; see Section 6 below for additional details). As such, the VSE project is designed to minimize constraints and barriers for entrepreneurs and existing seafood Growers seeking to enter the aquaculture industry or expand current mussel farming operations by obtaining permits for the project as a whole. After VPD secures all required project permits, VPD will engage in a public process to solicit applications and to sub-permit the farms to Growers.

Prospective Growers will be selected according to a public bid selection process. A Request for Qualifications/Proposals will be issued by VPD which will detail all requirements for the public bid selection process. Potential Growers will be required to submit an application to VPD which includes a project description of their proposed farm, the requested charted location within the permitted area, a summary of their relative experience and expertise (including representative projects), insurance information, and financial data to establish sufficient capital to conduct the proposed operations. Growers will be responsible for purchasing, transporting, installing, maintaining and harvesting the Mediterranean mussels. The Growers will be responsible for: providing any gear needed to implement the project, maintenance of all equipment, landing all mussel product at Ventura Harbor, and following the commercial landing procedures required by Ventura Harbor.

The application will be reviewed by VPD staff, who will also conduct an interview with the applicant and grade the application based upon a qualitative and quantitative rating system. VPD will evaluate the application materials and project descriptions to determine if they are substantially similar to the operational design approved by the Corps and California Coastal Commission (CCC). Each Grower's operation will also be reviewed by the Corps for consistency with the project permit and conditions. If the Corps determines that a proposed operation is substantially different from the design approved by the Corps and CCC, the applicant can either modify its project description and design or seek approval of a modification from VPD, CCC, and the Corps, as further described in Section 11 below. Under no circumstances will such an inconsistent operation be allowed to commence until necessary amendments are approved by the applicable agencies.

VPD staff will recommend applications that it believes meet the project permit conditions and VPD selection criteria to VPD Board of Commissioners for consideration and approval at public meetings. VPD will notify the Corps, U.S. Coast Guard (USCG), CCC, California Department of Public Health, and FDA of any approved applications and forward approved project descriptions and site locations for their review.

ATTACHMENT 1

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4 Summary of Agreements: VPD and Growers

This section identifies the terms and conditions of agreement between VPD and selected Growers. As mentioned above, through its application to the Corps VPD seeks to permit twenty 100-acre farms in federal waters off the coast of Ventura for longline mussel aquaculture. Upon acquiring a Corps permit and all other necessary governmental approvals, VPD proposes to then engage in a public process to solicit applications and authorize Growers to operate within the permitted area pursuant to sub-permits and/or an operating agreement.

VPD is proposing this unique approach to aquaculture for several reasons. The primary reason is the cost of obtaining the necessary permits and authorizations for an aquaculture farm in California is extraordinarily high compared to other states, even for projects located in federal waters. With support from grants from the NOAA Sea Grant program, VPD is able to substantially reduce these costs for the Growers and provide economies of scale that individual Growers could not achieve on their own. A key goal of the project is to establish a project site that can include a diverse group of Growers, including smaller Growers that may otherwise be precluded from entering the industry due to the upfront regulatory permitting and other costs incurred prior to establishing a working farm. VPD enthusiastically supports expansion of shellfish aquaculture to provide a stable and consistent fishery for its port, providing revenue necessary to maintain the Port's harbor dredging program, which is essential for an open channel between the harbor and the ocean. Thus, the project benefits all harbor users, including VPD's commercial fishing industry.

VPD also seeks to establish a partnership with NOAA and the Corps to share the responsibilities associated with monitoring, oversight, enforcement, and overall management of the project site. VPD will provide local, on-ground oversight of the project to co-manage compliance of the operation with the Corps. VPD's expectation is that this will ease the Corps' management and oversight workload, while allowing more consistent and frequent supervision of project operations by VPD staff and Harbor Patrol, given VPD's proximity to the project site and more limited regulatory focus.

The ultimate goal of VPD's proposal is for VPD to retain partial oversight and control over the VSE project, while delegating responsibility for compliance with the operational conditions associated with the project to individual Growers. As noted below, the proposed framework will still provide for the Corps' approval of the individual Growers. The Corps would approve the proposal if the Grower's proposed operation: (1) complies with all terms and conditions of the project permit, (2) is substantially similar to the overall VSE project approved by the Corps, and (3) is consistent with the CCC's project consistency certification.

This is similar to the framework utilized by the Corps under some habitat conservation plans. For example, in 2019 the Corps approved a programmatic general permit for the South Sacramento Habitat Conservation Plan, which was the first in the nation to include a Clean Water Act permit from the Corps and Endangered Species Act permits from the U.S. Fish and Wildlife Service (USFWS) as part of its approval. Pursuant to the programmatic general permit (SPK-1995-00386), many activities can be permitted by local county agencies, with a more streamlined review process or no additional review by the Corps if the project complies with the habitat conservation plan. While the framework proposed below is different in some significant ways, it uses many of the same concepts to establish a partnership between the Corps and VPD.

Proposal

1. VPD will prepare all applications and obtain all necessary permits and authorizations for the project, including the Corps permit and a CCC consistency certification. Further, VPD will assure preparation of associated documents necessary for compliance with the National Environmental Policy Act, including an Environmental Assessment and/or Environmental Impact Statement. VPD will be the named permittee on the permits and will remain the named permittee on such permits during the permit term.

2. Upon receiving permit approval, VPD will solicit applications for Growers to operate within a designated portion of the permitted area. Prior to consideration of such applications, VPD will undertake public outreach to identify prospective Growers and develop qualitative and quantitative criteria to evaluate the applications (see Section 3). The criteria will be focused on ensuring that Growers will be responsible and successful operators of aquaculture farms within the permitted area.
3. Each Grower applicant must submit to VPD an application with (1) a chart that identifies the proposed area that it seeks to farm within the overall project area, (2) a project description, (3) the proposed timing associated with installation of structures and commencement of operations, and (4) any additional information required by VPD that is responsive to the qualitative and quantitative criteria listed in the solicitation for applications, including financial information.
4. VPD's Port Commission will hold public hearings to approve Grower applicants based on VPD staff's evaluation of the application materials. As a condition of each authorization issued by VPD, the Grower will be required to comply with all applicable conditions of the project entitlements, as well as any additional conditions imposed by VPD (provided that such additional conditions are consistent with, and no less stringent than, the conditions imposed by the Corps and CCC).
5. A Grower's operation must be consistent with the project approved by CCC and the Corps. In the event that a Grower's proposed operation is materially different than the approved project, the Grower must first obtain VPD authorization to seek any required permit amendments. VPD, as the master permit holder, reserves the right to deny any such proposed amendments. After VPD approval, the Grower will need to seek approval from the Corps and CCC. Under no circumstances will such an operation be allowed to commence until such required amendments are approved by the applicable agencies.
6. Upon approval by VPD's Port Commission, each Grower application and any VPD conditions of approval will be provided to the Corps for its review and approval. The Corps will approve each authorized Grower within 45 days of VPD submittal pursuant to a Letter of Permission (LOP) if the proposed operation complies with all master permit conditions and mitigation measures and is substantially similar to the overall project approved by the Corps and CCC. The Corps and CCC retain full discretionary authority to review any proposed permit amendments.
7. Upon Corps issuance of an LOP, the Grower shall sign VPD authorization, agreeing to comply with all applicable terms and conditions of the permit as well as any additional requirements imposed by VPD (provided that such additional conditions are consistent with, and no less stringent than, the conditions imposed by the Corps and CCC). Upon such Grower agreement, the Grower assumes full and exclusive responsibility for compliance with all permit terms and conditions identified in the authorization.
8. VPD shall collect information required by any project monitoring plans and transmit such information to the Corps for review as specified in the monitoring plans (see Section 7 below). VPD shall also cooperate with the Corps to supervise the site and coordinate any enforcement action with the Corps if any Growers are determined to be out of compliance with permit conditions (see Section 8 below).

The Corps retains full authority regarding any enforcement actions; however, as a public agency with a vested interest in the project, VPD proposes to work closely with the Corps to quickly address and cure any potential violations and/or terminate VPD authorizations when warranted.

5 Grower Trainings

To prepare Growers for the comprehensive approach of the VSE project and to facilitate Growers' success, VPD and partners will provide the appropriate training opportunities prior to the start of installation activities to ensure that Growers understand aspects of mussel farming activities and permitting requirements. Training will be divided into two categories: voluntary training and mandatory training. An overview of each is provided below.

Voluntary training is training that is not mandatory or required prior to the start of installation/construction and operation activities. Voluntary training is targeted for the new mussel Growers who have not previously participated in mussel production and cultivation. This training will cover a variety of introductory topics to assist new Growers with being successful in this industry, such as (1) biology of mussels as it relates to production methods, (2) overview of the rigging and equipment needs, (3) mussel seeding, cultivating, and harvesting techniques, (4) gear installation and maintenance, (5) product transportation and sale, and (6) basic financial budgeting and revenue projections.

Mandatory training is training that is required for all Growers (new and veteran alike) prior to the start of installation/construction and operation activities. Mandatory training will cover regulatory permitting and permit/authorization requirements for each Grower. These trainings include topics such as (1) VPD authorization requirements; (2) mussel sanitation and biotoxin testing requirements; (3) agencies' compliance, recording, and reporting procedures; (4) Best Management Practices (BMPs) and Mitigation, Monitoring and Reporting Program (MMRP) requirements; and (5) using the database management system, including mobile devices and tracking systems. The BMPs and MMRP requirements are described in further detail in this Plan and cover topics such as spill prevention and procedures, gear checks and repair methods, invasive species removal, marine wildlife entanglement reporting and procedures, predator control, etc. Mandatory training will be required of each Grower once a year to provide a regular refresher of the permitting requirements. The final details of the mandatory training materials and content will include a review of all agency permitting requirements and be developed in collaboration with NOAA Sea Grant colleagues. Maintaining a close relationship with NOAA in the development of the project, including the development of training materials, will ensure that the efforts of VSE partners and collaborators in the development of the VSE project are shared with the greater aquaculture community, and especially other efforts to develop aquaculture along the West Coast.

For both voluntary and mandatory trainings, VPD will prepare a set of manuals to serve as reference materials. Both voluntary and mandatory training will ensure that new entrants and industry veterans alike have access to information necessary to establish and manage a successful mussel farming operation in compliance with all VSE permit conditions. In order to ensure all Grower employees are adequately trained, training resources will be digitized and deployed through a learning management system that enables training resources to be easily accessed, independent of time and location. The virtual classroom will be designed to provide instructors, facilitators, and participants access to a cost-effective platform that lends the ability to centralize learning materials, streamline communication and feedback mechanisms, and provide opportunities for blended learning and instruction that includes both online and in-person elements.

Overall, the training provided will supplement and support VPD's permitting efforts to ensure that both new and veteran Growers have access to proper training, mussel farm management protocols, logistical support, and technology transfers to maximize their opportunities to develop a successful and compliant aquaculture operation.

ATTACHMENT 1

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6 Overview of Project Permits and Conditions

This section provides an overview of the applicant-proposed BMPs, project permit conditions, and mitigation measures that will be carried out before construction, during construction, throughout project operations, and during project decommissioning. Necessary permits and approvals associated with the project are in process. As such, any additional requirements that may be imposed by regulatory agencies as a condition of permit approval will be incorporated when they become available. Specifically, VPD is in the process of acquiring the following project permits/approvals:

- Section 10 Permit from the Corps, pursuant to the Rivers and Harbors Act of 1899
- Consistency Certification from CCC pursuant to 15 CFR Section 930.57

In addition, the Corps has initiated consultations with NOAA National Marine Fisheries Service (NOAA Fisheries) regarding Essential Fish Habitat pursuant to the Magnuson-Stevens Fishery Conservation and Management Act of 1996, and informal Section 7 consultations with NOAA Fisheries and the U.S. Fish & Wildlife Service pursuant to the Endangered Species Act.

Product sanitary control is in the process of being established through the FDA in collaboration with NOAA's Seafood Inspection Program. These agencies are developing an NSSP compliance pathway for entities seeking to grow and harvest shellfish in federal waters that can be utilized for this project and other shellfish aquaculture projects in federal waters. Part of this effort is development of a Biotoxin Monitoring and Contingency Plan that articulates Grower testing requirements. Upon agency approvals, agency permit conditions and measures will be incorporated into this section.

VPD will also seek a Private Aid to Navigation (PATON) approval from USCG for the location and type of navigational buoys deployed for the project.

Overall, the project was designed with the consideration of minimizing impacts on the marine environment. In addition to the project features, the project will incorporate a number of other resource protection measures in the form of BMPs to avoid and minimize impacts on the aquatic environment. Table 2 (Summary of the Mitigation, Monitoring, and Reporting Program), provides a summary of measures recommended for this project and identifies the responsible party required to carry out the action(s), the agency that will enforce the action(s), implementation timing, and reporting timing. The MMRP measures are detailed in the following documents/management plans:

- Biological Assessment for the Ventura Shellfish Enterprise Project (Appendix A)
- Predator Control Management Plan for the Ventura Shellfish Enterprise Project (Appendix B)
- Sediment and Water Quality Management Plan for the Ventura Shellfish Enterprise Project (Appendix C)
- Spill Prevention and Response Plan for the Ventura Shellfish Enterprise Project (Appendix D)
- Aquaculture Gear Monitoring & Marine Debris, and Wildlife Entanglement Plan for the Ventura Shellfish Enterprise Project (Appendix E)
- Gear Removal Management Plan for the Ventura Shellfish Enterprise Project (Appendix F)
- Additional mitigation requirements as a result of correspondence with regulatory agencies (e.g., biofouling, training measures)

Users of this Plan will notice project measures and conditions are described in several formats. The primary sources detailing required mitigation are the management plans (Appendices A through F) summarized in Section 6, Table 2 (Summary of the MMRP). Although the MMRP (Table 2) provides a summary of mitigation requirements, this Plan provides several additional formats in order to assist the users in more fully understanding process, roles, and responsibilities. The flowcharts and tables in Section 7 provide various illustrative visuals and organizational structures depicting the responsibilities associated with Growers, VPD, and relevant regulatory agencies. The flowcharts are intended to show the process whereas the tables are intended to explain the responsibilities of each party for a given mitigation measure.

Table 2. Summary of the Mitigation, Monitoring, and Reporting Program

Source	Mitigation Measure No.	Measure (Including Plan Summary Text)	Responsible Party	Enforcing Agency	Implementation Timing: Details	Implementation Timing: Pre-Con.	Implementation Timing: Con.	Implementation Timing: Oper.	Implementation Timing: Decom.	Reporting Timing: Reporting Details	Reporting Timing: Immediately	Reporting Timing: Monthly	Reporting Timing: Annually	Reporting Timing: ≥ 180 Days
Biological Assessment	BIO-1	**Marine Wildlife Entanglement Plan.** No less than twice per month, each Grower operating on a VPD lease shall visually inspect all ropes, cables, and equipment via depth/fish finders, ROV or SCUBA divers to determine if any entanglement of a marine mammal has occurred and to ensure that (a) no lines have been broken, lost or removed; (b) all longlines, anchor lines, and buoy lines remain taught and in good working condition; and (c) any derelict fishing gear or marine debris that collects in the growing gear is removed and disposed of at an identified onshore facility. All equipment and materials accidentally released or found to be missing from the facility during monthly inspections, including buoys, floats, lines, ropes, chains, cultivation lines, wires, fasteners, and clasps, shall be searched for, collected, properly disposed of onshore, and documented in the annual inspection report. Monitoring shall occur monthly for the first two years following deployment and, in the event that there are no marine wildlife entanglements within the first two years, may be reduced to quarterly inspections thereafter. Reports of these inspections shall be prepared and submitted annually. Inspections shall include recordings by depth/fish finder or ROV surveys of lines and/or monitoring performed by SCUBA divers. Recorded video shall be provided along with the annual report described above. Any maintenance issues including wear, loosening, or fatigue of materials shall be remedied as soon as possible. All incidents of observed whale entanglement shall be immediately reported to SOS WHALe. Any other marine mammals and turtles observed to be entangled will be immediately reported to NOAA Fisheries Marine Mammal Stranding Network Coordinator, West Coast Region, Long Beach Office. Only personnel who have been authorized by NOAA Fisheries and who have training, experience, equipment, and support will attempt to disentangle living marine wildlife. If possible, the Grower shall document and photograph entangled wildlife and the entangling gear material to inform gear modifications so as to avoid future entanglements.	Growers	VPD, Corps, and NOAA Fisheries VPD Harbor Patrol will routinely assess the project site for gear compliance	None			X		Growers to submit monthly reports documenting compliance by the 5th of the month to VPD. VPD compiles monthly reports and submits with an annual report to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	X for marine wildlife entanglements	X	X	
Biological Assessment	BIO-2	**Entanglement Prevention.** Grow-ropes will be attached to the head rope with a low-breaking-strength twine (4-millimeter (0.16-inch) diameter; <1,000 pounds), which will facilitate rapid detachment in the unlikely event of any marine mammal interaction with the longline. A 1,100-pound breakaway link will be installed between surface marking buoys and the vertical lines.	Growers	VPD Harbor Patrol to provide a visual inspection of equipment prior to installation and will routinely assess the project site for gear compliance	None		X	X (ongoing project design feature)		VPD Harbor Patrol to retain a record of Grower compliance and include in annual report. VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.			X	
Biological Assessment	BIO-3	**Marine Wildlife Observer.** An approved Marine Wildlife Observer (MWO) shall be present on each project construction vessel during all construction activities, including the installation of anchor lines and anchoring systems. The MWO shall monitor and record the presence of all marine mammals and sea turtles within 100 yards of the work area. The MWO shall have the authority to halt operations if marine wildlife are observed or anticipated to be near a work area and construction activities have the potential to result in injury or entanglement of marine wildlife. In addition, all work (including vessel motors) will be halted if a cetacean is observed within the monitoring area or if a pinniped or sea turtle is observed within 50 yards of the work area. Work may recommence after the observed individuals have moved out of the monitoring area.	Growers to identify and hire qualified MWOs Growers ensure a qualified MWO is present during construction activities and that observers' directives are heeded.	VPD and NOAA Fisheries	None		X			MWOs submit monthly reports to VPD by the 5th of the month. VPD reviews, compiles, and submits monthly MWO observation reports to the Corps, CCC, and NOAA Fisheries by the 15th of the month.		X		

Table 2. Summary of the Mitigation, Monitoring, and Reporting Program

Source	Mitigation Measure No.	Measure (Including Plan Summary Text)	Responsible Party	Enforcing Agency	Implementation Timing: Details	Pre-Con.	Con.	Oper.	Decom.	Reporting Timing: Reporting Details	Immediately	Monthly	Annually	≥ 180 Days
		MWOs' reports on marine mammal monitoring during construction activities shall be prepared and submitted to NOAA Fisheries on a monthly basis. Reports shall include such information as the (1) number, type, and location of marine mammals observed; (2) the behavior of marine mammals in the area of potential sound effects during construction; (3) dates and times when observations and in-water project construction activities were conducted; and (4) dates and times when in-water construction activities were suspended because of marine mammals. VPD shall prepare a list of qualified MWOs who meet the following minimum qualifications: (1) visual acuity in both eyes (correction is permissible) sufficient to discern moving targets at the water's surface with ability to estimate target size and distance; (2) use of binoculars or spotting scope as necessary to correctly identify the target; (3) advanced education in biological science, wildlife management, mammalogy, or related fields (bachelor's degree or higher is preferred); (4) experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience); (5) experience or training in the field identification of marine mammals (cetaceans and pinnipeds) and sea turtles; and (6) ability to communicate orally, by radio or in person, with project personnel to provide real time information on marine wildlife observed in the area, as needed.	VPD to review resumes and approve qualified MWOs. VPD will retain a list of approved qualified MWOs.											
Biological Assessment	BIO-4	**Cultivation of Spat Offsite.** Only hatchery-reared mussel spat grown at a CDFW-certified facility will be used in order to ensure that spat are free of introduced invasive species, parasites, and pathogens of concern; however, natural mussel spat naturally settling on farm grow-out lines may also be harvested and cultivated.	Growers	VPD and CDFW	None			X		Growers retain records of purchases from CDFW certified facility and submit documentation in an annual report to VPD. VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.			X	
Biological Assessment	BIO-5	**Marine Wildlife Education.** Each Grower will be required to provide annual marine wildlife education to its employees regarding proper procedures relating to marine wildlife. The training curriculum will include identifying the presence of specified marine wildlife and procedures for avoiding impacts to marine wildlife during operations. These procedures will include: (1) reducing speed and observing the distances from marine life specified in MM BIO-6; (2) providing a safe path of travel for marine mammals that avoids encirclement or entrapment of the animal(s) between the vessel and growing apparatus; (3) if approached by a marine mammal, reducing speed, placing the vessel in neutral and waiting until the animal is observed clear of the vessel before making way; (4) avoiding sudden direction or speed changes when near marine mammals; (5) refraining from approaching, touching or feeding a marine mammal; and (6) immediately contacting their supervisor and other identified parties/agencies identified in MM BIO-1 should an employee observe an injured marine mammal.	VPD to include this topic in the mandatory annual training curriculum Growers must attend training provided by VPD or a third-party consultant regarding this topic.	VPD and NOAA Fisheries	Annual marine wildlife education			X		Growers submit evidence of training to VPD as part of the annual report VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.			X	
Biological Assessment	BIO-6	**Vessel Management.** Vessels in transit to and from the growing area shall maintain a distance of 100 yards from any observed cetacean and 50 yards between any observed pinniped or sea turtle. If cetaceans are observed within 100 yards or pinnipeds or sea turtles observed within 50 yards, the vessel shall reduce speeds to 12 knots or less until it is the	Grower	VPD Harbor Patrol and USCG	None		X	X		Growers report to VPD sightings of federally listed whales or turtles as part of annual report.			X	

Table 2. Summary of the Mitigation, Monitoring, and Reporting Program

					Implementation Timing					Reporting Timing				
Source	Mitigation Measure No.	Measure (Including Plan Summary Text)	Responsible Party	Enforcing Agency	Details	Pre-Con.	Con.	Oper.	Decom.	Reporting Details	Immediately	Monthly	Annually	≥ 180 Days
		appropriate distance (as required by this condition) from the particular marine life. If a cetacean is heading into the direct path of the vessel (i.e., approaching a moving vessel directly into the bow), the vessel shall shut off the engine until the cetacean is no longer approaching the bow and until a greater separation distance is observed. If small cetaceans are observed bow-riding, and the vessel is operating at speeds of 12 knots or less, the vessel shall remain parallel to the animal's course and avoid abrupt changes in direction until the cetaceans have left the area. Each sighting of a federally listed threatened or endangered whale or turtle shall be recorded and the following information shall be included in the operation log: a. Date, time, coordinates of vessel b. Visibility, weather, sea state c. Vector of sighting (distance, bearing) d. Duration of sighting e. Species and number of animals f. Observed behaviors (feeding, diving, breaching, etc.) g. Description of interaction with aquaculture facility								VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.				
Biological Assessment	BIO-7	**Spill Prevention and Response.** Discharges of feed, pesticides, or chemicals (including antibiotics and hormones) in ocean waters are prohibited. Fuel, lubricants and chemicals must be labeled, stored and disposed of in a safe and responsible manner, and marked with appropriate warning signs per Occupational Health & Safety Administration requirements. Precautions shall be taken to prevent spills, fires, and explosions, and procedures and supplies shall be readily available to manage chemical and fuel spills or leaks. Each Grower shall comply with the Spill Prevention and Response Plan (SPRP) for vessels and work barges that will be used during project construction and operations. Each Grower operating in the project area shall be trained in, and adhere to, the emergency procedures and spill prevention and response measures specified in the SPRP during all project operations. The SPRP shall provide for emergency response and spill control procedures to be taken to stop or control the source of the spill and to contain and clean up the spill. The SPRP shall include, at a minimum: (a) identification of potential spill sources and quantity estimates of a project specific reasonable worst case spill; (b) identification of prevention and response equipment and measures/procedures that will be taken to prevent potential spills and to protect marine and shoreline resources in the event of a spill; (c) a listing of minimum spill prevention and response equipment to be kept onboard project vessels at all times; (d) a prohibition on at-sea vessel or equipment fueling/refueling activities; and (e) emergency response and notification procedures, including a list of contacts to call in the event of a spill; and (f) specification that all hydraulic fluid used for installation, maintenance, planting, and harvesting activities shall be vegetable based.	VPD to prepare SPRP and include this topic in the mandatory annual training curriculum Growers to implement VPD-prepared SPRP Growers must attend training provided by VPD or a third-party consultant regarding this topic.	VPD Harbor Patrol, Corps, USCG, California Office of Emergency Services, CCC, NOAA Fisheries	Plan submitted for approval Approved Plan provided to Growers Growers to provide required onboard SPRP equipment	X (plan prep.)	X	X	X	Growers immediately report spills to the USCG, California Office of Emergency Services, and VPD. Growers submit description of compliance with the SRPR and evidence of training as part of the annual report VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	X		X	

Table 2. Summary of the Mitigation, Monitoring, and Reporting Program

Source	Mitigation Measure No.	Measure (Including Plan Summary Text)	Responsible Party	Enforcing Agency	Implementation Timing					Reporting Timing				
					Details	Pre-Con.	Con.	Oper.	Decom.	Reporting Details	Immediately	Monthly	Annually	≥ 180 Days
Biological Assessment	BIO-8	**Invasive Species.** Grower employees operating in the project area shall be required to receive annual training from NOAA Fisheries or a third-party consultant to identify potential invasive species and properly dispose of such invasive species if discovered.	VPD to prepare and include topic in mandatory annual training curriculum Growers must attend training provided by VPD or a third-party consultant regarding this topic.	NOAA Fisheries or qualified entity delegated by VPD to conduct training	None			X		Growers submit evidence of training to VPD as part of the annual report VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.			X	
Biological Assessment	BIO-9	**Sediment Quality Monitoring Plan.** A Sediment Quality Monitoring Plan shall be developed requiring monitoring of sediment conditions within the project area, including monitoring the quantity, type, and distribution of biological materials (such as shellfish, shell material, and fouling organisms) that accumulate on the seafloor. Monitoring will also include an evaluation of any changes to oxygen demand of benthic infaunal and epifaunal communities, and changes to the chemical and biochemical conditions of seafloor sediments along with a description of performance standards to meet. If performance standards are not met, corrective actions will be outlined. The Plan will include reporting requirements, including annual report submittals to NOAA Fisheries for review. If performance standards are met for a period of time, the plan will provide for appropriately scaling down monitoring and intervals over time.	VPD to prepare plan Third-party consultant hired by VPD to conduct monitoring Growers are responsible for payment of benthic monitoring	VPD, Corps, NOAA Fisheries	Plan submitted for approval	X (plan prep.)		X		Third-party consultant will provide VPD with the results of benthic sampling occurring up to twice per year. VPD will review and compile annual reports and send to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.			X (up to twice per year)	
Biological Assessment	BIO-10	**Aquaculture Gear Monitoring and Escapement Plan.** Include in overall management plan an aquaculture gear monitoring and escapement plan. Any farm gear that has broken loose from the farm location shall be retrieved. Growers shall inspect their farm site at least twice per month to examine the aquaculture gear for potential loss or non-compliant deployment, including inspections for fouling organisms. Any organisms that have a potential to cover the sea floor will be removed and disposed of at an identified upland facility. **Marine Debris Management Plan.** The overall management plan shall also include (a) a plan for feasibly marking floating equipment with an identifying number of the Grower; (b) a description of the extent and frequency of maintenance operations necessary to minimize the loss of materials and equipment to the marine environment resulting from breakages and structural failures; and (c) a description of the search and cleanup measures that would be implemented if loss of shellfish cultivation facility materials, equipment, and/or infrastructure occurs.	VPD to include these topics in mandatory annual training curriculum Growers must attend training provided by VPD or a third-party consultant regarding this topic.	VPD, VPD Harbor Patrol, and the Corps VPD to prepare plan VPD Harbor Patrol to routinely inspect sites	Plans submitted for approval	X (plan prep.)		X		Growers document gear inspections twice per month and submit to VPD by the 5th of the month. Growers submit evidence of training to VPD as part of the annual report VPD to review and compile inspection results into the annual report send to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.		X	X	
Biological Assessment	BIO-11	**Decommissioning Plan.** A decommissioning plan for the timely removal of all shellfish, structures, anchoring devices, equipment, and materials associated with the shellfish cultivation facility, including debris, and documentation of completion of removal activities will be a requirement of each permit or authorization. Financial assurance (bond or letter of credit) to guarantee implementation of the plan will be in place and reviewed periodically.	Growers to prepare and implement approved plan VPD to approve plan	VPD Harbor Patrol and the Corps	None	X			X	Growers submit proposed plan to VPD for approval. VPD to compile approved plans and submit to the Corps prior to construction. VPD to report on compliance with			X	

Table 2. Summary of the Mitigation, Monitoring, and Reporting Program

Source	Mitigation Measure No.	Measure (Including Plan Summary Text)	Responsible Party	Enforcing Agency	Implementation Timing					Reporting Timing				
					Details	Pre-Con.	Con.	Oper.	Decom.	Reporting Details	Immediately	Monthly	Annually	≥ 180 Days
										decommissioning plan after gear removal in a report and send to the Corps, CCC, and NOAA Fisheries within 30 days of notice of completion.				
Biological Assessment	BIO-12	**Lighting.** All growing area operations shall be completed during daylight hours. No growing area operations can be conducted at night and no permanent artificial lighting of the shellfish cultivation facility shall occur, except for that associated with the use of navigational safety buoys required by the USCG.	Growers	VPD Harbor Patrol, USCG, Corps VPD Harbor Patrol will routinely visit the project site and document compliance	None			X		VPD to report on compliance with this measure in an annual report and send to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.			X	
Biological Assessment	BIO-13	**Predator Control.** Potential predator species will be identified. Specified humane methods of predator deterrence will be utilized, favoring non-lethal methods. No controls, other than non-lethal exclusion, shall be applied to species that are listed as threatened or endangered. Also see MM PC-1.	VPD to prepare a Predator Control Plan, which identifies potential predator species and deterrence methods Grower to implement identified methods as necessary VPD to include this topic in the mandatory annual training curriculum Growers must attend training provided by VPD or a third-party consultant regarding this topic.	Any methods of predator control are subject to prior approval of VPD, USFWS, and NOAA Fisheries	Plan submitted for approval	X (plan prep.)		X		Any deviations from approved predator control methods must also be requested and approved VPD prior to implementation. VPD review and forward Growers request for deviation from approved methods to Corps, USFWS, and NOAA Fisheries. A copy will also be sent to the CCC. Growers submit evidence of training to VPD as part of the annual report VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	X		X	

Table 2. Summary of the Mitigation, Monitoring, and Reporting Program

Source	Mitigation Measure No.	Measure (Including Plan Summary Text)	Responsible Party	Enforcing Agency	Implementation Timing					Reporting Timing				
					Details	Pre-Con.	Con.	Oper.	Decom.	Reporting Details	Immediately	Monthly	Annually	≥ 180 Days
Aquaculture Gear Monitoring & Marine Debris, and Wildlife Entanglement Plan	GDEP-1	**Equipment Identification.** Prior to installation, floating equipment will have permanent markers or an attached metal or plastic tag with the identifying number of the Grower. Markings shall be securely attached and robust enough to remain attached and legible after an extended period in the marine environment (e.g., heat transfer, hot stamp, etching, painted on, etc.).	Growers	VPD Harbor Patrol and the Corps	None		X			VPD Harbor Patrol to retain a record of Grower compliance and include in annual report. VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.			X	
Aquaculture Gear Monitoring & Marine Debris, and Wildlife Entanglement Plan	GDEP-2	**Visual Inspections of Equipment.** Growers will utilize a remote operated vehicle (ROV), certified SCUBA divers, and/or fish/depth finders for equipment inspection and the detection of derelict gear. ROVs, if utilized, will be equipped with a video camera for all deployments, and a manipulator skid, grabber arm, and rotary disc cutter or other cutting device for gear removal deployments. Alternatively, removal of derelict gear can be performed by certified SCUBA divers equipped with cameras to document removal efforts. All equipment and materials accidentally released or found to be missing from the aquaculture facility shall be searched for, collected, and either repaired or properly disposed of onshore, and documented in the annual inspection report. Additional details and requirements are provided in the GDEP.	Growers are responsible for conducting equipment inspection.	VPD, the Corps, and USCG VPD Harbor Patrol will also routinely visit the project site and document compliance.	None			X		Monthly reporting by Growers to VPD. VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	X (marine wildlife entanglement)	X	X	
Aquaculture Gear Monitoring & Marine Debris, and Wildlife Entanglement Plan	GDEP-3	**Cleanup Events.** Each Grower will carry out quarterly cleanup events on nearby beaches between Ventura and Santa Barbara which may be in coordination with other interested parties or organizations. Cleanup events shall include, but not be limited to, walking different beaches to pick up escaped shellfish gear and other trash (regardless of whether it is generated by the project). Cleanup events may also be organized to remove floating debris in areas where circulation patterns result in accumulation. The volume and type of shellfish gear collected, the cleanup location (marked on a chart or described with GPS coordinates), and duration of cleanup activity shall be recorded and documented in the annual report.	Growers	VPD	Quarterly clean up events			X		Growers document compliance with measure in an annual report VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year			X	
Gear Removal Management Plan	GRMP-1	**Bond Requirement.** Prior to starting construction within the project site, the Grower must provide a surety bond or letter of credit to VPD for $65,000. VPD may revise the required bond amount as necessary based upon additional information regarding the actual costs of gear removal and site cleanup.	Growers	VPD	None	X				VPD to retain a record of surety bond	X			

Table 2. Summary of the Mitigation, Monitoring, and Reporting Program

Source	Mitigation Measure No.	Measure (Including Plan Summary Text)	Responsible Party	Enforcing Agency	Implementation Timing					Reporting Timing				
					Details	Pre-Con.	Con.	Oper.	Decom.	Reporting Details	Immediately	Monthly	Annually	≥ 180 Days
Gear Removal Management Plan	GRMP-2	**Permit or Authorization Renewal and Expiration.** No less than 180 days of an individual VPD permit or authorization expiration date, Growers shall notify VPD of their operational intent. Growers seeking to discontinue operations shall submit a **non-renewal notice**. Growers interested in continuing operations shall submit a **renewal application** to VPD. During VPD review of the renewal application Grower operation activities may continue until VPD has notified the Grower of the renewal application decision. The following shall apply for cases where a renewal application has not been approved: Upon expiration of the overall permits for the VSE project, or individual VPD authorization held by a Grower, the Grower shall commence removal of all aquaculture gear and structures within 30 days of permit expiration. If a portion of the farm site is not ready to be harvested at the time of permit expiration, the Grower shall have a total of 90 days after permit expiration to harvest any and all remaining shellfish, remove all aquaculture gear and structures, remove any significant shell accumulation or marine debris from the seafloor under its farm site as well as any known debris from its farm site that is located beyond the farm boundaries, and return the site to its original condition. (See Section 3.5 of the GRMP for Methodology of Gear Removal)	Growers	VPD, VPD Harbor Patrol, and the Corps	Growers notify VPD no less than 180 days of permit expiration; gear removal up to 90 days after notice of permit expiration if a portion of the farm is not ready for harvest.				X	For renewal applications, VPD reviews and notifies Growers of renewal decision. Growers report to VPD upon removal of gear, structures, and any debris. VPD reviews and compiles reports documenting compliance and forwards to the Corps, CCC, and NOAA Fisheries within 30 days of notice of completion.	X (gear removal within 30 or 90 days, as applicable)			X (Notify no less than 180 days)
Biological Assessment	NAV-1	**Update NOAA Charts.** VPD to submit to the NOAA Office of Coast Survey: (a) the geographical coordinates of the facility boundaries obtained using a different geographic position unit or comparable navigational equipment; (b) as-built plans of the facility and associated buoys and anchors; (c) each Grower's point of contact and telephone number; and (d) any other information required by the NOAA Office of Coast Survey to accurately portray the location of the shellfish cultivation facility on navigational charts.	Growers	VPD, NOAA Office of Coast Survey	None		X			Growers submit as-built plans and required information to VPD immediately after the completion of construction. VPD compiles as-built plans and submits to the NOAA Office within 7 days of completion of construction.	X			
Biological Assessment	NAV-2	**Notice to Mariners.** No less than 15-days prior to the start of in-water activities associated with the installation phase of the project, VPD shall submit to USCG (for publication in a Notice to Mariners) and the harbormasters from Point Conception to Long Beach (for posting in their offices or public noticeboards), notices containing the anticipated start date of installation, the anticipated installation schedule, and the coordinates of the installation sites. During installation, VPD shall also make radio broadcast announcements to the local fishers' emergency radio frequency that provide the current installation location and a phone number that can be called for additional information.	VPD	USCG	None	X	X			Within 15 days of in-water installation activities - report to U.S. Coast Guard and harbormasters; and VPD weekly radio announcements during construction activities	X Within 15 days of installation and weekly broadcasts during construction			
Predator Control Management Plan	PC-1	**Predator Control Procedures.** The following predator control actions are allowed to reduce diving duck and seabird predation: lower headrope to 40 feet or lower; be active on the farm; and use protective socking around spat lines. If these predator control measures are unsuccessful, a less preferred method is the addition of buoys to the arrays. No further predator control methods are allowed without prior review and approval by VPD, Corps, and USFWS.	Growers	VPD For approval of other control methods: Corps, USFWS, VPD	None			X		Any deviations from approved predator control methods must also be requested and approved VPD prior to implementation. VPD reviews and forwards Grower's request for deviation	X		X	

Table 2. Summary of the Mitigation, Monitoring, and Reporting Program

Source	Mitigation Measure No.	Measure (Including Plan Summary Text)	Responsible Party	Enforcing Agency	Implementation Timing					Reporting Timing				
					Details	Pre-Con.	Con.	Oper.	Decom.	Reporting Details	Immediately	Monthly	Annually	≥ 180 Days
										from approved methods to Corps, USFWS, and NOAA Fisheries. An informational copy will also be sent to CCC. VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.				
Spill Prevention and Response Plan	SPRP-1	**Spill Compliance and Training.** Each Grower operating in the project area shall be trained in, and adhere to, the emergency procedures and spill prevention and response measures specified in the SPRP during all project operations.	VPD to include this topic in the mandatory annual training curriculum Growers to comply with measures and plan Growers must attend training provided by VPD or a third-party consultant regarding this topic.	VPD, Corps, U.S. Coast Guard, California Office of Emergency Services VPD Harbor Patrol to routinely visit the project site and document compliance	None		X	X	X	Growers submit evidence of training to VPD as part of the annual report VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.			X	
Spill Prevention and Response Plan	SPRP-2	**Emergency Response Procedures.** All significant releases or threatened releases of a hazardous material, including oil and radioactive materials, requires emergency notification to applicable government agencies. See SPRP for additional details.	Growers	VPD, Corps, U.S. Coast Guard, California Office of Emergency Services VPD Harbor Patrol to routinely visit the project site and document compliance	None		X	X	X	Growers immediately report spills, as applicable, to USCG, California Office of Emergency Services, and VPD. Growers describe compliance with the SPRP in the annual report submitted to VPD. VPD will include reported spills and details in annual reports submitted to the Corps, CCC, and NOAA Fisheries by January 31 of each year.	X			

Table 2. Summary of the Mitigation, Monitoring, and Reporting Program

Source	Mitigation Measure No.	Measure (Including Plan Summary Text)	Responsible Party	Enforcing Agency	Implementation Timing					Reporting Timing				
					Details	Pre-Con.	Con.	Oper.	Decom.	Reporting Details	Immediately	Monthly	Annually	≥ 180 Days
Sediment and Water Quality Management Plan (SWQMP)	SWQMP-1	**Substrate Sampling**. Third-party surveys will be conducted prior to construction to determine if rocky reef or other Essential Fish Habitat (EFH) or Habitat Areas of Particular Concern are present in the growing areas. EFH will be charted and completely avoided. Sediment, benthic habitat, and water quality sampling and analysis will be conducted by a third-party consultant prior to construction to establish baseline conditions and, once aquaculture gear has been installed, up to twice annually thereafter. The sampling methodology and analytical parameters are detailed in the SWQMP. Each aquaculture farm will be evaluated based on the benthic monitoring and a sub-permit assessment will be provided indicating any biological effects of the Grower's operation on the environment as determined by toxicity, chemistry, water quality and benthic community condition.	Third-party consultant hired by VPD to conduct surveys, evaluation, and monitoring Growers are responsible for costs of benthic monitoring and evaluation	VPD and NOAA Fisheries	None	X		X		Third-party consultant will provide VPD with the results of benthic surveys and sampling prior to construction and up to twice per year after construction. VPD will review and compile annual reports and send to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.			X	

Notes: Upon permit approval, and based on agency conditions, measures may be revised, removed, or added throughout this Plan.

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7 Monitoring and Reporting Responsibilities

As a public agency and the permittee for the project, it is important to VPD that all shellfish Growers comply with all project requirements and conditions. This section provides a clear delineation of responsibility for the required permit conditions, measures, and BMPs that were discussed in Section 6, Overview of Project Permits and Conditions, to assist all responsible parties in complying with all measures required for project compliance. Flowcharts 1 through 4 are intended to show the process for pre-construction, construction, operations, and decommissioning activities, respectively. Tables 3 through 6 are intended to explain the responsibilities for each entity for those measures required during pre-construction, construction, operations, and decommissioning activities, respectively.

7.1 Monitoring

VPD seeks to establish a partnership with NOAA, the Corps, and USCG to share responsibilities associated with monitoring, oversight, enforcement, and overall management of the project. VPD proposes to retain partial oversight and control over the project, while delegating responsibility for compliance with the operational conditions associated with the project to individual Growers through Letters of Permissions (LOPs) issued by the Corps. VPD, as master permit holder, will require Growers to adhere to all permit obligations and to ensure ongoing compliance with regulatory agency requirements, memorialized in agreements between the Growers and VPD.

Table 2, above, provides a summary of the project conditions required for this project. Refer to Appendices A through F for complete details for each measure summarized in Table 2. In addition to those actions described in Flowcharts 1 through 4 and Tables 3 through 6, VPD also plans to conduct regular site visits and inspections using VPD Harbor Patrol to confirm that each growing area is being operated properly and consistent with all regulatory requirements and conditions.

Flowchart 1. Overview of Pre-Construction Activities

Project Approvals Acquired:
Corps Approves of Various Management Plans (BIO-7, BIO-9, BIO-10, BIO-13, etc.) and Issues a Section 10 Permit
California Coastal Commission Consistency Determination
FDA & NOAA National Shellfish Sanitation Certification
USCG PATON Approval

VPD/third-party consultant performs pre-construction sediment sampling

VPD compiles and submits reports prior to construction and; annually thereafter (SWQMP-1/BIO-9)

Corps, NOAA Fisheries, and CCC review pre-construction sediment sampling report (SWQMP-1/BIO-9)

VPD requests SOQ from interested parties (prospective "Growers"); conducts interviews; negotiates contracts

VPD/VSE partners provide detailed training for Growers prior to construction; this includes both **voluntary** and **mandatory** training

Growers submit a Decommissioning Plan to VPD; VPD reviews, sends to agencies, and approves (BIO-11); secures surety bond (GRMP-1)

VPD notifies USCG and harbormasters 15 days prior to construction on specific farms; notifications will be ongoing until all 2,000 acres are developed (NAV-2)

USCG and harbormasters post notifications (NAV-2)

Construction Phase Begins

Table 3. Summary of Pre-Construction Requirements Organized by Mitigation Measure Number and Responsible Entity*

Responsible Entity	Spill Prevention and Response	SWQMP	Gear Monitoring and Escapement Plan	Decommissioning Plan	Predator Control	Financial Assurance Requirement	Notice to Mariners	Substrate Sampling
	BIO-7	BIO-9	BIO-10	BIO-11	BIO-13	GRMP-1	NAV-2	SWQMP-1
Pre-Construction								
Grower	- Growers must attend training provided by VPD or a third-party consultant regarding this topic. **Reporting:** - Growers submit evidence of training to VPD as part of the annual report.	- Growers are responsible for the cost of benthic monitoring.	- Growers must attend training provided by VPD or a third-party consultant regarding this topic. **Reporting:** - Growers submit evidence of training to VPD as part of the annual report.	**Reporting:** - Prepare a decommissioning plan for the timely removal of all equipment and debris associated with the aquaculture farm; submit the plan to VPD for approval - Submit financial assurances (bond or letter of credit) to guarantee plan implementation	- Growers must attend training provided by VPD or a third-party consultant regarding this topic. **Reporting:** - Growers submit evidence of training to VPD as part of the annual report.	- Prior to starting construction within the project site, the grower must provide a surety bond or letter of credit to VPD for $65,000. - VPD may revise the required bond amount as necessary based upon additional information regarding the actual costs of gear removal and site cleanup.		- Growers are responsible for the cost of benthic monitoring.
Ventura Port District	- VPD or third-party consultant prepares a Spill Prevention and Response Plan (SPRP). *Note: This Plan has been produced and submitted to the Corps and CCC for approval.* - VPD or third-party consultant to provide for this topic in the annual training curriculum. **Reporting:** - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	- VPD or third- party consultant prepares a Sediment Water Quality Management Plan (SWQMP). *Note: This Plan has been produced and submitted to the Corps and CCC for approval.* - VPD hires third-party consultant to conduct benthic monitoring. - Prior to construction, third-party consultant performs benthic sampling and coordinate with approved laboratories for analysis. **Reporting:** - All benthic sampling and laboratory data will be sent to VPD by third-party consultant in a report for review and compilation into an annual report. - VPD will review benthic monitoring reports, compile annual reports, and send to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	- VPD or third-party consultant prepares an Aquaculture Gear Monitoring & Marine Debris, and Wildlife Entanglement Plan (GDEP). *Note: This Plan has been produced and submitted to the Corps and CCC for approval.* - VPD or third-party consultant to provide for this topic in the annual training curriculum. **Reporting:** - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	- VPD review and approve of Grower submitted plan or request additional information or revisions - Periodically review financial assurances to guarantee implementation of the decommissioning plan.	- VPD or third-party consultant prepares a Predator Control Management Plan *Note: This Plan has been produced and submitted to the Corps and CCC for approval.* - VPD or third-party consultant to provide for this topic in the annual training curriculum. **Reporting:** - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	- At construction and annually thereafter ensure financial assurance has been received and approved - Retain record of financial assurance	**Reporting:** - Within 15 days of in-water installation activities - report to USCG and harbormasters with required information - USCG and harbormasters receive and post information	- VPD retains third-party consultant to conduct benthic monitoring and coordinate with approved laboratories for analysis. **Reporting:** - All benthic sampling and laboratory data will be sent to VPD by third-party consultant in a report for review and compilation into an annual report - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.
Corps	- *Corps is currently reviewing the SPRP.* - Receive and review annual reports submitted by VPD.	- *Corps is currently reviewing the SWQMP.* - Receive and review annual reports submitted by VPD.	- *Corps is currently reviewing the GDEP.* - Receive and review annual reports submitted by VPD.	- Receive and review decommissioning plans; request information, deny, or approve.	- *Corps is currently reviewing the PCMP.* - Receive and review annual reports submitted by VPD.			- Receive and review annual reports submitted by VPD.
CCC	- *CCC is currently reviewing the SPRP.* - Receive and review annual reports submitted by VPD.	- *CCC is currently reviewing the submitted SWQMP.* - Receive and review annual reports from VPD.	- *CCC is currently reviewing the GDEP.* - Receive and review annual reports submitted by VPD.		- *CCC is currently reviewing the PCMP.* - Receive and review annual reports submitted by VPD.			- Receive and review annual reports from VPD
NOAA Fisheries	- Receive and review annual reports submitted by VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports submitted by VPD.		- Receive and review annual reports submitted by VPD.			- Receive and review annual reports from VPD
US Coast Guard							- Receive and post information	

* See Table 2 and associated management plans (Appendices A through F) for complete requirement details. See Section 7.2, Reporting, for reporting requirements.

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Flowchart 2. Overview of Construction Activities

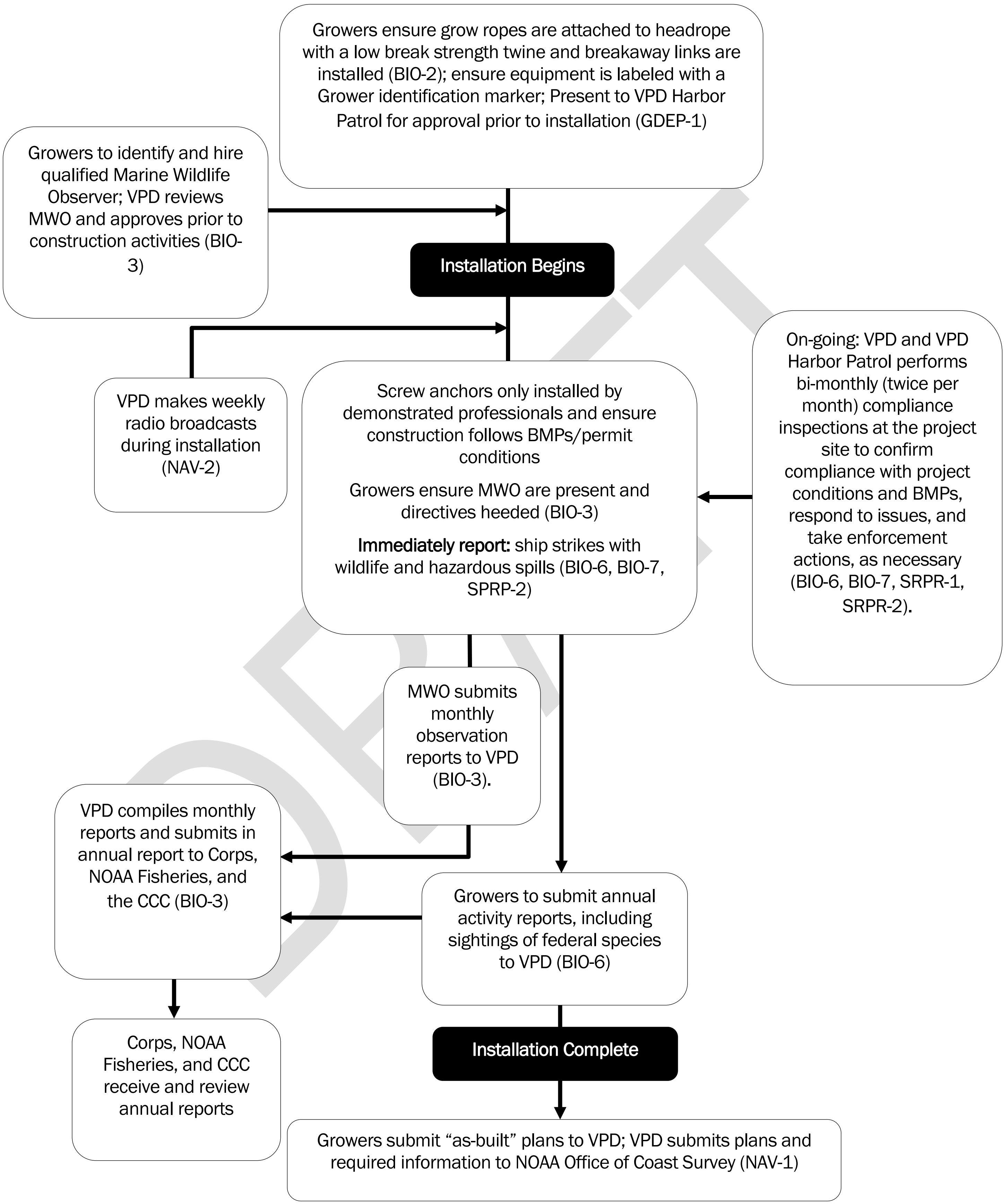

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Table 4. Summary of Construction Requirements Organized by Mitigation Measure Number and Responsible Entity*

Responsible Entity	Entanglement Prevention	Marine Wildlife Observer	Vessel Management	Spill Prevention and Response	Equipment Identification	Update NOAA Charts	Notice to Mariners	Spill Compliance and Training	Emergency Response Procedures
	BIO-2	BIO-3	BIO-6	BIO-7	GDEP-1	NAV-1	NAV-2	SPRP-1	SPRP-2
Construction									
Grower	- Prior to installation, present gear to VPD Harbor Patrol for inspection. - Attach grow ropes to the head rope with a low-breaking-strength twine. Install a 1,100-pound breakaway link between surface marking buoys and the vertical lines.	- Identify and hire qualified Marine Wildlife Observers (MWOs) and submit their resumes to VPD for approval. - Ensure a qualified MWO is present during construction activities and that observers' directives are heeded. **Reporting:** - MWOs submit monthly observation reports to VPD by the 5th of the month.	- Ensure vessels maintain specified distances, speeds, and other specifics of BIO-6 from cetaceans, pinnipeds, and sea turtles. **Reporting:** - Report to VPD sightings of federally-listed whales or turtles in an annual report. - Immediately report ship strikes or adverse interactions to NOAA Fisheries and VPD.	- Ensure any vessels traveling to and from the project site adhere to the requirements outlined in the SPRP. **Reporting:** - Immediately report spills to the USCG, California Office of Emergency Services, and VPD. - In annual report submitted to VPD describe compliance with the SPRP.	- Prior to installation, present gear to Harbor Patrol for inspection. Ensure floating equipment will have permanent markers or an attached metal or plastic tag with the identifying number of the Grower. Attach information securely to gear.	**Reporting:** - Growers are responsible for the submission of as-built plans to VPD immediately after the completion of construction.		- Growers must attend training provided by VPD or a third-party consultant regarding this topic. - Ensure employees comply with measures and plan. **Reporting:** - Growers submit evidence of training to VPD as part of the annual report	**Reporting:** - Growers immediately report spills to the USCG, California Office of Emergency Services, and VPD. - In annual report submitted to VPD describe compliance with the SPRP.
Ventura Port District	- VPD Harbor Patrol to provide a visual inspection of equipment prior to installation. **Reporting:** - VPD Harbor Patrol to retain a record of Grower compliance and include in the annual report. - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	- Review resumes and approve of MWOs. Retain a list of qualified MWOs. - Receive, review, and compile all monthly reports from MWOs. **Reporting:** - Submits monthly compiled reports to the Corps, CCC, and NOAA Fisheries by 15th of the month.	- VPD Harbor Patrol enforces vessel management measures. **Reporting:** - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	- VPD Harbor Patrol routinely visits project site and documents compliance with the SRPR. **Reporting:** - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	**Reporting:** - VPD Harbor Patrol to document inspections and retain a record of Grower compliance to include in the annual report. - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	**Reporting:** - VPD compiles as-built plans and required information and submits to the NOAA Office of Coast Survey within 7 days of completion of construction.	- Weekly during installation, make radio broadcast announcements to the local fishers' emergency radio frequency that provide the current installation location and a phone number that can be called for additional information.	**Reporting:** - Documents notifications of spills and Grower reporting pathway in annual report. - VPD or third-party consultant to provide for this topic in the annual training curriculum. - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	**Reporting:** - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.
Corps	- Receive and review annual reports from VPD.	- Receive and review monthly compiled MWO reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.			- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.
CCC	- Receive and review annual reports from VPD.	- Receive and review monthly compiled MWO reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.			- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.
NOAA Fisheries	- Receive and review annual reports from VPD.	- Receive and review monthly compiled MWO reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.			- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.
US Coast Guard			- Enforces vessel management measures.	- Respond to any immediate reporting of spills				- Respond to any immediate reporting of spills	- Respond to any immediate reporting of spills
NOAA Office of Coast Survey						- Receive and review compiled as-built plans from VPD.			
State and Fed. Govt.								- Respond to any immediate reporting of spills	- Respond to any immediate reporting of spills
California Office of Emergency Services				- Respond to any immediate reporting of spills				- Respond to any immediate reporting of spills	- Respond to any immediate reporting of spills

* See Table 2 and associated Management Plans (Appendices A through F) for complete requirement details. See Section 7.2, Reporting, for reporting requirements.

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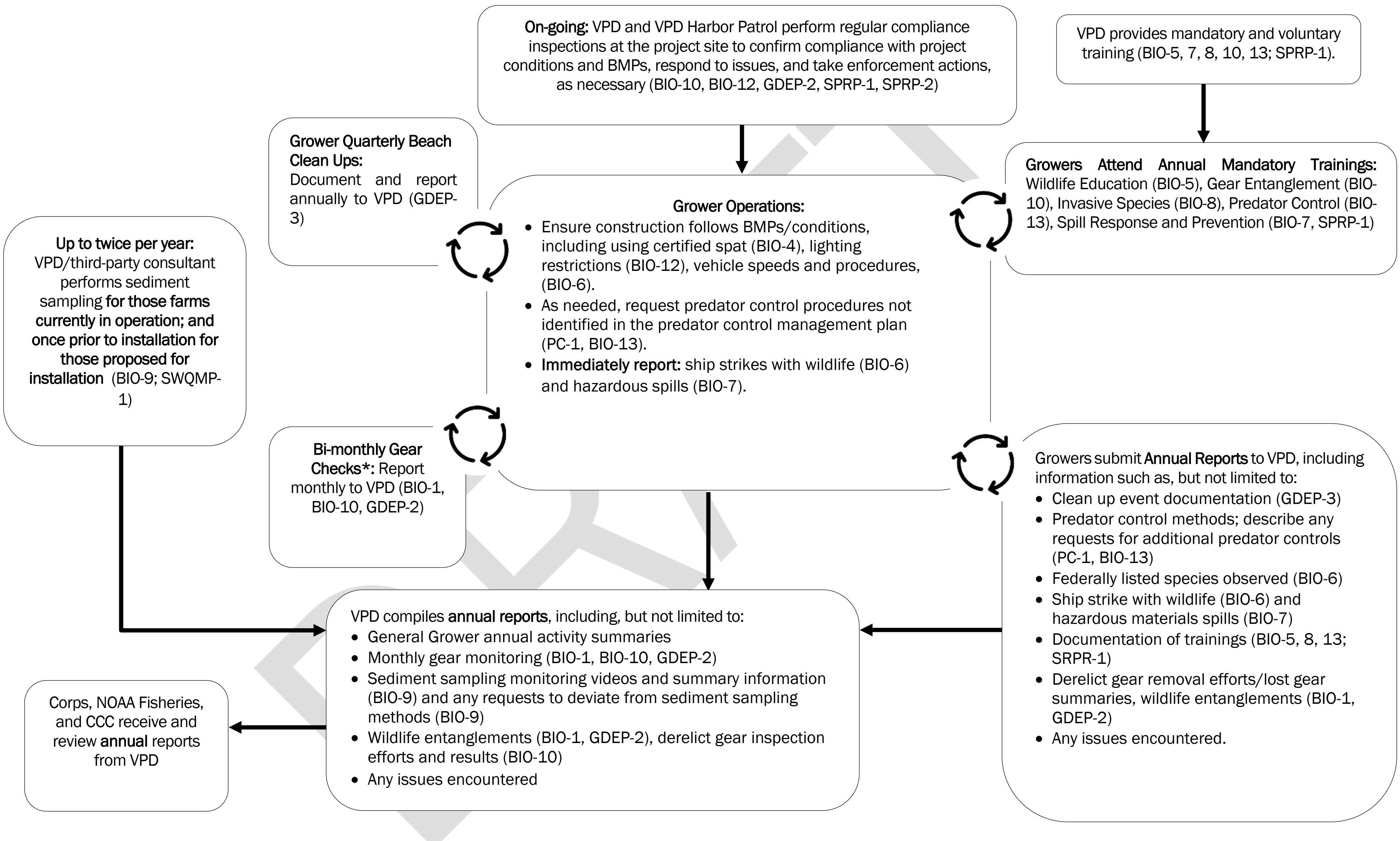
Flowchart 3. Overview of Operations Activities



* Gear checks may be reduced to quarterly checks if no marine wildlife entanglements occur within the first 2 years. Gear checks are also required after significant swell events, defined as when wave heights reach greater than 8.0 feet (2.44 meters) at NOAA Station 46217- Anacapa Passage, CA (111), located approximately 6.5 miles southwest from the project site.

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Table 5. Summary of Operation Requirements Organized by Mitigation Measure Number and Responsible Entity*

Responsible Entity	Entanglement Plan	Cultivation of Spat Off site	Marine Wildlife Education	Vessel Management	Spill Prevention and Response	Invasive Species	SWQMP	Gear Monitoring and Escapement Plan	Lighting	Predator Control	Inspecting Equipment	Clean Up Events	Predator Control Procedures	Spill Compliance and Training	Emergency Response Procedures	Substrate Sampling
	BIO-1	BIO-4	BIO-5	BIO-6	BIO-7	BIO-8	BIO-9	BIO-10	BIO-12	BIO-13	GDEP-2	GDEP-3	PC-1	SPRP-1	SPRP-2	SWQMP-1
Operations																
Grower	- At least twice per month conduct visual inspections (first two years); if no issues, may be reduced to quarterly thereafter. Reporting: - Submit documentation of gear inspections to VPD by the 5th of each month. - Provide a monthly report to VPD by the 5th of each month. - Report all incidences of entanglement immediately to SOS WHALe (whales) or NOAA Fisheries Marine Mammal Stranding Network Coordinator, West Coast Region (any other marine wildlife).	- Only hatchery-reared mussel spat grown at a facility certified by CDFW will be used; however, mussel spat naturally adhering to farm grow-out lines may also be cultivated. - Retain records of purchases from CDFW certified facilities. Reporting: - Submit documentation of purchases in annual report to VPD.	- Growers must attend annual training provided by VPD or a third-party consultant regarding this topic. Reporting: - Growers submit evidence of training to VPD as part of the annual report.	- Ensure vessels maintain specified distances, speeds, and other specifics of BIO-6 from cetaceans, pinnipeds, and sea turtles. Reporting: - Report to VPD sightings of federally-listed whales or turtles in an annual report. - Immediately report ship strikes or adverse interactions to NOAA Fisheries and VPD.	- Ensure any vessels traveling to and from the project site adhere to the requirements outlined in the SPRP. Report releases of hazardous material to appropriate state and federal government agencies and VPD. See SPRP for additional details, including reporting requirements. - Growers must attend annual training provided by VPD or a third-party consultant regarding this topic. Reporting: - Immediately report spills to USCG (ocean-based spills), California Office of Emergency Services, and VPD. - In annual report submitted to VPD describe compliance with the SPRP and evidence of training.	- Growers must attend annual training provided by VPD or a third-party consultant regarding this topic. Reporting: - Growers submit evidence of training to VPD as part of the annual report	- Growers are responsible for cost of benthic monitoring. Benthic sampling to occur up to twice per year.	Growers to implement plan procedures, including conducting and documenting gear inspections twice per month. - Growers must attend annual training provided by VPD or a third-party consultant regarding this topic. Reporting: - Submit documentation of gear inspections to VPD by the 5th of each month. - Growers submit evidence of training to VPD as part of the annual report.	- Ensure all operations are completed during daylight hours. No night operations are allowed. - No permanent artificial lighting shall occur except navigational safety buoys required by USCG.	- Implement identified predator control methods, as necessary. Request VPD approval for deviations from predator control plan. - Growers must attend annual training provided by VPD or a third-party consultant regarding this topic. Reporting: - Submit evidence of training to VPD as part of the annual report	Growers to implement plan procedures, including documenting gear inspections twice per month. - Growers are responsible for payment of equipment inspections. Reporting: - Submit documentation of gear inspections to VPD by the 5th of each month. - Immediately report marine wildlife entanglements.	- Carry out quarterly clean up events on nearby beaches in Ventura and Santa Barbara. Reporting: - Record and document in annual report to VPD.	- If needed, implement identified procedures in the PCMP: lower backbone to 40 feet, be active, no additional buoys, use protective socking around lines. Reporting: - If active predator management is required, seek approval from VPD and other regulatory agencies. If approved, describe actions taken to control predation in annual report. - Submit predator control activities and details in annual report to VPD.	- Growers must attend annual training provided by VPD or a third-party consultant regarding this topic. - Ensure employees comply with measures and plan. Reporting: - Growers submit evidence of training to VPD as part of the annual report	Reporting: - Growers immediately report spills to the USCG, California Office of Emergency Services, and VPD. - In annual report submitted to VPD describe compliance with the SPRP.	- Growers are responsible for the cost of benthic monitoring. Benthic sampling to occur up to twice per year.

Table 5. Summary of Operation Requirements Organized by Mitigation Measure Number and Responsible Entity*

Responsible Entity	Entanglement Plan	Cultivation of Spat Off site	Marine Wildlife Education	Vessel Management	Spill Prevention and Response	Invasive Species	SWQMP	Gear Monitoring and Escapement Plan	Lighting	Predator Control	Inspecting Equipment	Clean Up Events	Predator Control Procedures	Spill Compliance and Training	Emergency Response Procedures	Substrate Sampling
	BIO-1	BIO-4	BIO-5	BIO-6	BIO-7	BIO-8	BIO-9	BIO-10	BIO-12	BIO-13	GDEP-2	GDEP-3	PC-1	SPRP-1	SPRP-2	SWQMP-1
Operations																
Ventura Port District	- VPD Harbor Patrol will routinely assess the project site for gear compliance. - VPD reviews and compiles monthly reports and submits with an annual report to the agencies. **Reporting:** - Compile monthly reports into an annual report. Send annual report to Corps, CCC, and NOAA Fisheries by Jan. 31 of each year.	**Reporting:** - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	- VPD or third-party consultant to provide for this topic in the annual training curriculum. **Reporting:** - VPD compiles evidence of Grower training to include in annual reports sent to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	- VPD Harbor Patrol enforces vessel management measures. - VPD or third-party consultant to provide for this topic in the annual training curriculum. **Reporting:** - VPD compiles annual reports from Growers and submits annual reports to the Corps, CCC, and NOAA Fisheries by January 31 of each year.	- VPD Harbor Patrol routinely visits project site and documents compliance with the SRPR. **Reporting:** - VPD compiles annual reports from Growers and submits annual reports to the Corps, CCC, and NOAA Fisheries by January 31 of each year.	- VPD or third-party consultant to provide for this topic in the annual training curriculum. **Reporting:** - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	- VPD retains third-party consultant to conduct benthic monitoring up to twice per year and coordinate with approved laboratories for analysis. **Reporting:** - All benthic sampling and laboratory data will be sent to VPD by third-party consultant in a report for review and compilation into an annual report. - VPD reviews benthic sampling reports, compiles with annual reports, and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	- VPD Harbor Patrol routinely visits project site and documents compliance. - VPD or third-party consultant to provide for this topic in the annual training curriculum. **Reporting:** - VPD to review and compile results into the annual report and send to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	- VPD Harbor Patrol routinely visits project site and documents compliance. **Reporting:** - VPD to report on compliance with this measure in an annual report and send to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	- VPD or third-party consultant to provide for this topic in the annual training curriculum. **Reporting:** - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year. - As needed, review and forward Growers request for deviation from approved methods to Corps, USFWS, and NOAA Fisheries. A copy will also be sent to the CCC.	- VPD Harbor Patrol routinely visits project site and documents compliance. **Reporting:** - VPD to review and compile inspection results into the annual report and send to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	**Reporting:** - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	- VPD or third-party consultant to provide for this topic in the annual training curriculum. **Reporting:** - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	- VPD Harbor Patrol routinely visits project site and documents compliance. - VPD to prepare training curriculum. **Reporting:** - Documents notifications of spills and Grower reporting pathway in annual report. - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	- VPD Harbor Patrol routinely visits project site and documents compliance. **Reporting:** - VPD compiles annual reports from Growers and submits annual reports to the Corps, CCC, and NOAA Fisheries by January 31 of each year.	- VPD retains third-party consultant to conduct benthic monitoring up to twice per year and coordinate with approved laboratories for analysis. **Reporting:** - All benthic sampling and laboratory data will be sent to VPD by third-party consultant in a report for review and compilation into an annual report - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.

Table 5. Summary of Operation Requirements Organized by Mitigation Measure Number and Responsible Entity*

Responsible Entity	Entanglement Plan	Cultivation of Spat Off site	Marine Wildlife Education	Vessel Management	Spill Prevention and Response	Invasive Species	SWQMP	Gear Monitoring and Escapement Plan	Lighting	Predator Control	Inspecting Equipment	Clean Up Events	Predator Control Procedures	Spill Compliance and Training	Emergency Response Procedures	Substrate Sampling
	BIO-1	BIO-4	BIO-5	BIO-6	BIO-7	BIO-8	BIO-9	BIO-10	BIO-12	BIO-13	GDEP-2	GDEP-3	PC-1	SPRP-1	SPRP-2	SWQMP-1
Operations																
Corps	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD. - Receive and approve of proposed deviations from predator control plan methods.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.
CCC	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD. - Receive and review proposed deviations from predator control plan methods.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.
NOAA Fisheries	- Receive and review annual reports from VPD. - NOAA Fisheries Marine Mammal Stranding Network Coordinator: to immediately address any reported entanglements.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD. - Receive and approve of proposed deviations from predator control plan methods.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.			- Receive and review annual reports from VPD.
US Coast Guard				- Enforce vessel management measures.	- Respond to any immediate reporting of spills				- Monitor project site for compliance with lighting restrictions.		- Monitor project site for compliance with gear and equipment restrictions.			- Respond to any immediate reporting of spills	- Respond to any immediate reporting of spills	
State and Federal Governments														- Respond to any immediate reporting of spills	- Respond to any immediate reporting of spills	

Table 5. Summary of Operation Requirements Organized by Mitigation Measure Number and Responsible Entity*

Responsible Entity	Entanglement Plan	Cultivation of Spat Off site	Marine Wildlife Education	Vessel Management	Spill Prevention and Response	Invasive Species	SWQMP	Gear Monitoring and Escapement Plan	Lighting	Predator Control	Inspecting Equipment	Clean Up Events	Predator Control Procedures	Spill Compliance and Training	Emergency Response Procedures	Substrate Sampling
	BIO-1	BIO-4	BIO-5	BIO-6	BIO-7	BIO-8	BIO-9	BIO-10	BIO-12	BIO-13	GDEP-2	GDEP-3	PC-1	SPRP-1	SPRP-2	SWQMP-1
Operations																
California Office of Emergency Services					- Respond to any immediate reporting of spills									- Respond to any immediate reporting of spills	- Respond to any immediate reporting of spills	
USFWS										- Receive and approve of proposed deviations from predator control plan methods.						

* See Table 2 and associated Management Plans (Appendices A through F) for complete requirement details. See Section 7.2, Reporting, for reporting requirements.

Flowchart 4. Overview of Decommissioning Activities

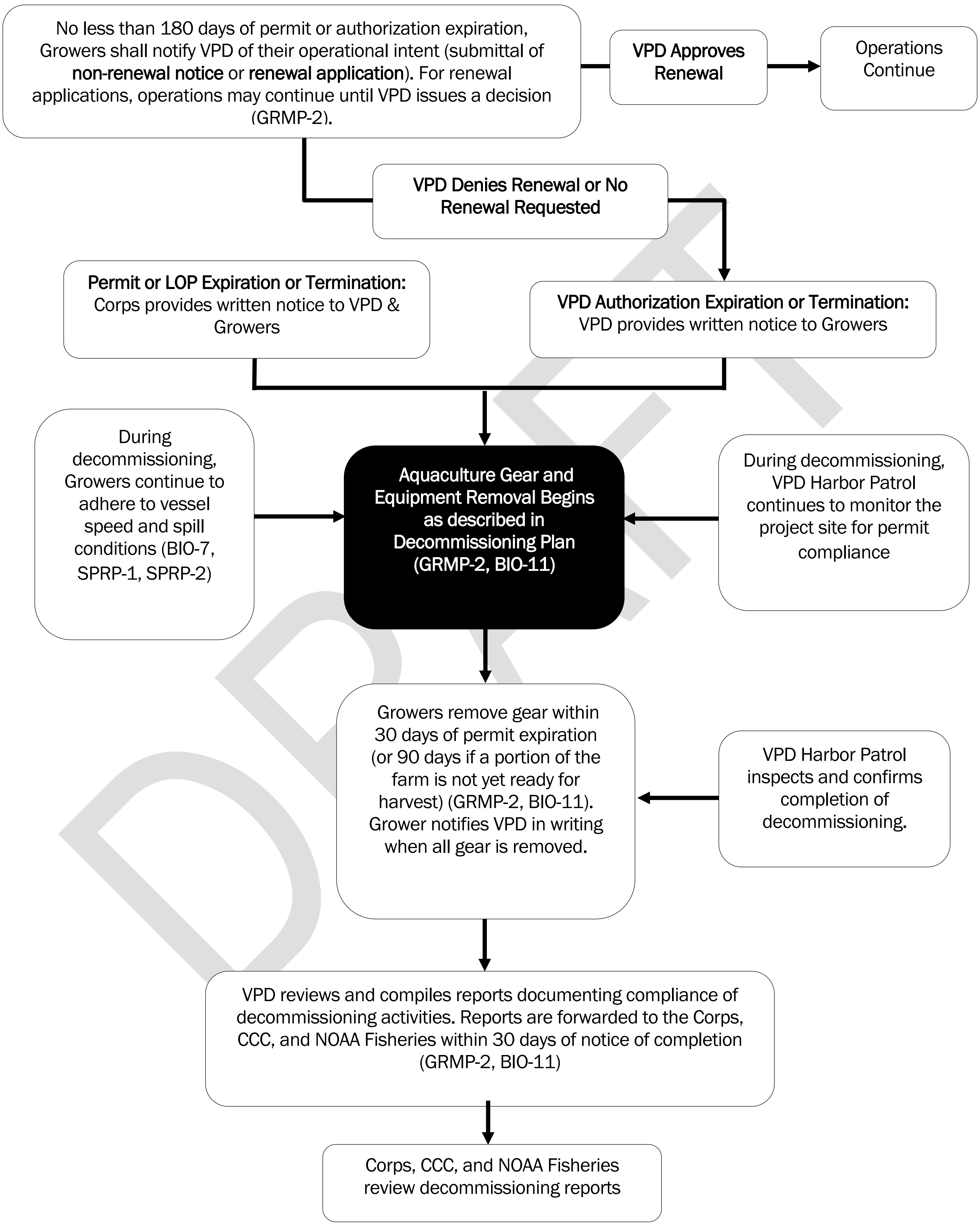

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Table 6. Summary of Decommissioning Requirements Organized by Mitigation Measure Number and Responsible Entity*

Responsible Entity	Spill Prevention and Response	Decommissioning Plan	Permit /LOP/VPD Authorization Expiration	Spill Compliance and Training	Emergency Response Procedures
	BIO-7	BIO-11	GRMP-2	SPRP-1	SPRP-2
Decommissioning					
Grower	- Ensure any vessels traveling to and from the project site adhere to the requirements outlined in the SPRP **Reporting:** - Immediately report spills to the USCG, California Office of Emergency Services, and VPD - In annual report submitted to VPD describe compliance with the SPRP	- Adhere to the conditions of the approved plan	- No less than 180 days, Growers shall notify VPD of their operational intent (non-renewal notice or renewal application). - Upon expiration of permit, authorization, or LOP, remove all aquaculture gear and structures within 30 days of permit expiration (or 90 days if a portion of the farm is not yet ready for harvest). **Reporting:** - No less than 180 days, submittal of a non-renewal notice or renewal application. - Report to VPD upon completion of decommissioning plan.	- Growers ensure employees attend annual trainings - Ensure employees comply with measures and plan **Reporting:** - Growers submit evidence of training to VPD as part of the annual report	**Reporting:** - Growers immediately report spills to the USCG, California Office of Emergency Services, and VPD - In annual report submitted to VPD describe compliance with the SPRP
Ventura Port District	- VPD Harbor Patrol routinely visits project site and documents compliance with the SPRP **Reporting:** - VPD compiles annual reports from Growers and submits annual reports to the Corps, CCC, and NOAA Fisheries by January 31 of each year.	- VPD Harbor Patrol monitors implementation of decommissioning in accordance with approved plans. **Reporting:** - VPD reports on compliance with decommissioning plan after gear, etc. removal in an annual report and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	- VPD considers renewal applications and issues a decision. - VPD Harbor Patrol verifies compliance with decommissioning plan. **Reporting:** - VPD reviews and compiles reports documenting decommissioning compliance and forwards to the Corps, CCC, and NOAA Fisheries within 30 days of notice of completion.	**Reporting:** - VPD documents notifications of spills and Grower reporting pathway in annual report. - VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.	**Reporting:** - VPD compiles annual reports from Growers and submits annual reports to the Corps, CCC, and NOAA Fisheries by January 31 of each year.
Corps	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.
CCC	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.
NOAA Fisheries	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.	- Receive and review annual reports from VPD.
US Coast Guard	- Respond to any immediate reporting of spills			- Respond to any immediate reporting of spills	- Respond to any immediate reporting of spills
State and Federal Governments				- Respond to any immediate reporting of spills	- Respond to any immediate reporting of spills
California Office of Emergency Services	- Respond to any immediate reporting of spills			- Respond to any immediate reporting of spills	- Respond to any immediate reporting of spills

* See Table 2 and associated Management Plans (Appendices A through F) for complete requirement details. See Section 7.2, Reporting, for reporting requirements.

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7.2 Reporting

For all mitigation measures described in the MMRP (Table 2) documentation of compliance is required. Table 7 provides a summary of reporting requirements for mitigation measures organized by project phase (e.g., pre-construction, construction, operation, decommissioning). For most measures, Growers will be required to submit monthly monitoring results to VPD. VPD will in turn develop and file an annual report to the Corps, NOAA Fisheries, and CCC describing the monitoring results during the previous calendar year. This will include a summary of monthly gear monitoring results; any derelict gear removal effort and lost gear; wildlife entanglement, if any; beach cleanup efforts; and any issues or concerns identified in the previous year. VPD will also conduct regular site visits and inspections to confirm that sites are being operated properly and consistent with all regulatory requirements and conditions.

In order to efficiently and effectively track and ensure compliance with all permit requirements, VPD will develop an electronic database interface to effectively track and demonstrate compliance with BMPs and regulatory agency permitting conditions, and to efficiently report results. In addition, this data management system will coordinate communication between Growers, VPD, and regulatory agencies by offering safeguard measures to validate that no permitting requirements, enforcement requirements, or monitoring requirements slip through the cracks; additionally, the data management system will be flexible enough to accommodate future datasets pertaining to operations analysis, business intelligence, and secure data integrations with other systems.

The mobile data collection systems that will be developed will integrate the intelligence of a GIS database and data models to provide tools (e.g., dropdown lists, date pickers, and photo and document attachments) to eliminate mistakes associated with free-form data entry. This database system will incorporate the latest Web GIS application technology, such as custom digital dashboards, for data interaction, management, planning, analysis, and work tracking. In addition, the integrated toolsets will include a user-friendly mobile field forms that Growers can easily use to upload monitoring and survey results which will assist them in quickly documenting compliance with permit requirements, ultimately spending less time on compliance documentation and more on farming.

The plans for this database system are in discussion; however potential features include mobile field forms, mobile mapping, desktop mapping, automated dataflows, alters and notification, custom dashboards, and custom reports that are quickly integrated into a pre-formatted template in word, excel, and PDF formats for easy documentation.

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Table 7. Summary of Reporting Requirements Organized by Project Phase and Mitigation Measure Number*

Mitigation Measure	Party to Prepare Report	Initial Recipient of Report	Specific Due Date / Timing	Reporting Detail Summary	Reporting Frequency	Additional Deliverables to Subsequent Enforcing Agencies
Pre-Construction						
BIO-7: Spill Prevention and Response Plan**	VPD	Corps and CCC	—	Plan details the measures that will be required to prevent and report spills.	One final plan will be produced and include agency requested revisions.	—
BIO-9: Sediment Quality Monitoring Plan**	VPD	Corps and CCC	—	Plan details monitoring of benthic communities, water quality, and aquatic life within the vicinity of the farms.	One final plan will be produced and include agency requested revisions.	The Corps reviews and provides plan to NOAA Fisheries for review.
BIO-10: Aquaculture Gear/Escapement Plan**	VPD	Corps and CCC	—	Plan details the measures that will be required to addresses potential species entanglement issues, set protocols for aquaculture gear checks, provide clear notification pathways for personnel with gear issues, and define action thresholds.	One final plan will be produced and include agency requested revisions.	—
BIO-11: Decommissioning Plan	Grower	VPD	—	A plan for the timely removal of equipment and debris associated with the aquaculture farm.	Once, with periodic financial reviews by VPD. One plan will be produced and include VPD requested revisions.	VPD reviews and sends to the Corps.
BIO-13: Predator Control**	VPD	Corps and CCC	—	Plan details potential predator species and deterrence methods.	One final plan will be produced and include agency requested revisions.	The Corps reviews and provides Plan to the USFWS and NOAA Fisheries for review.
GRMP-1: Bond Requirement	Grower	VPD	—	Surety bond or letter of credit.	Prior to construction and annually thereafter for updated amount.	—
NAV-2: Notice to Mariners	VPD	U.S. Coast Guard and Harbormasters	≤ 15 days before installation	Notices containing anticipated installation start date, installation schedule, and coordinates of installation site.	As needed. Reporting will occur prior to installation. Reporting will continue until the entire 2,000 acres are installed.	—
SWQMP-1: Substrate Sampling	Third-Party Consultant	VPD	VPD will submit this annual report to NOAA Fisheries, the Corps, CCC by January 31.	Appropriate datasheets and data associated with the SWQMP.	As determined by phased development. Needed to establish baseline for farms prior to installation of gear.	Results will be included in an annual report submitted by VPD to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.
Construction						
BIO-2: Entanglement Prevention	VPD Harbor Patrol	VPD	-	Prior to installation, VPD Harbor Patrol will document compliance/non-compliance during routine visual inspections of equipment.	VPD Harbor Patrol to retain a record of Grower compliance.	—
BIO-3: Marine Wildlife Observer	Grower/ Marine Wildlife Observer	VPD	5th of each month for activities in the preceding month	Observation reports.	Each month until construction is complete.	VPD compiles monthly reports and submits with an annual report to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.
BIO-6: Vessel Management	Grower	VPD	Annually Due to VPD January 15 for activities in the preceding year	In annual report, include sightings of federally listed whales and turtles. See BIO-6 for details.	Each year until construction is complete.	VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.
BIO-6: Vessel Management	Grower	NOAA Fisheries	Immediately upon ship strike or adverse wildlife interaction	Ship strikes or adverse wildlife interactions.	Immediately after occurrence.	After contacting NOAA Fisheries, Grower informs VPD of occurrence. VPD documents occurrence in annual report and sends to the Corps, CCC, and NOAA annually by January 31 of each year.
BIO: 7 – Spill Prevention and Response	Grower	USCG, California Office of Emergency Services, VPD	Immediately and annual report	Immediately report spills to the USCG, California Office of Emergency Services, and VPD. In annual report submitted to VPD describe compliance with the SPRP.	Immediately after occurrence; and document in an annual report to VPD.	VPD compiles annual reports and sends to the Corps, CCC, and NOAA annually by January 31 of each year.
GDEP-1: Equipment Identification	VPD Harbor Patrol	Corps, CCC, and NOAA Fisheries	—	VPD Harbor Patrol to document inspections and retain a record of Grower compliance.	Monthly	VPD includes in annual reports. VPD compiles annual reports and sends to the Corps, CCC, and NOAA annually by January 31 of each year.
NAV-1: Update NOAA Charts	VPD	NOAA Office of Coast Survey	Within 7 days after construction is completed	Short notification will include (1) as-built plans, (2) coordinates of the facility boundary, (3) Grower's contact, (4) any supplemental information necessary.	As needed. Reporting will continue as needed until the entire 2,000 acres are built out.	—
NAV-2: Notice to Mariners	VPD	Local Fishers' Emergency Radio Frequency	During construction	Broadcast will include the current installation location and a phone number to call for more information	Continuous during installation activities	—
SPRP-1 and -2: Spill Prevention and Response	Grower	Appropriate State and Federal Government agencies and VPD	Immediately upon spill	See Spill Prevention and Response Plan (SPRP) for details.	Immediately upon spills.	VPD includes any reporting in compiled annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.
Operations						
BIO-1: Entanglement	Grower	VPD	5th of each month for activities in the preceding month	See GDEP for details.	Monthly	VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.

Table 7. Summary of Reporting Requirements Organized by Project Phase and Mitigation Measure Number*

Mitigation Measure	Party to Prepare Report	Initial Recipient of Report	Specific Due Date / Timing	Reporting Detail Summary	Reporting Frequency	Additional Deliverables to Subsequent Enforcing Agencies
BIO-4: Cultivation of Spat Off site	Grower	VPD	Annually	Submit documentation of purchases in an annual report to VPD	Annually	VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.
BIO-5: Wildlife Education/BIO-7: Spill Prevention and Response/BIO-8: Invasive Species/BIO-10: Gear Monitoring and Escapement Plan/BIO-13: Predator Control/SPRP-1: Spill Compliance and Training	Grower	VPD	Annually	Evidence of annual training.	Annually.	VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.
BIO-6: Vessel Management	Grower	VPD	Annually Due to VPD January 15 for activities in the preceding year	In annual report, include sightings of federally listed whales and turtles.	Every year until construction is completed.	VPD compiles annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.
BIO-6: Vessel Management	Grower	NOAA Fisheries	Immediately upon ship strike or adverse wildlife interaction	Ship strikes or adverse wildlife interactions.	Immediately after occurrence.	After contacting NOAA, Grower informs VPD of occurrence. VPD includes any reporting in annual reports and sends to the Corps, CCC, and NOAA Fisheries annually by January 31 of each year.
BIO-7: Spill Prevention and Response	Grower	Appropriate State and Federal Government agencies and VPD	Immediately upon spill	See Spill Prevention and Response Plan (SPRP) for details.	Immediately upon spills.	VPD document reporting in annual report submitted to the Corps.
BIO-9: SWQMP/SWQMP-1: Substrate Sampling	Third-Party Consultant	VPD	Annually (sampling occurs up to twice per year)	Appropriate datasheets and data associated with the SWQMP.	Annually.	VPD includes information in compiled annual reports and sends to the Corps, CCC, and NOAA annually by January 31 of each year.
BIO-10: Aquaculture Gear/Escapement Plan; GDEP-2 Inspecting Equipment	Grower	VPD	Monthly (Gear Inspections); Immediately (Entanglements)	Submit documentation of gear inspections to VPD by the 5th of each month. Report all incidences of entanglement immediately to SOS WHALe (whales) or NOAA Fisheries Marine Mammal Stranding Network Coordinator, West Coast Region (any other marine wildlife).	Monthly (Gear Inspections) and Annual Report	VPD staff or contractor will analyze sampling results and produce an annual report. VPD compiles annual reports and sends to the Corps, CCC, and NOAA annually by January 31 of each year.
BIO-12: Lighting	VPD	Corps, NOAA, CCC	Annually	VPD to report on compliance with this measure.	Annually.	VPD compiles annual reports and sends to the Corps, CCC, and NOAA annually by January 31 of each year.
BIO-13 & PC-1: Predator Control Procedures	Grower	VPD	As needed (if requesting control procedures not authorized by the Predator Control Management Plan [PCMP])	Report should describe justification for utilizing control methods not described in the PCMP and describe actions taken to control predation and the numbers and types of predators controlled (if additional measures are approved).	Annually (if additional measures are approved)	VPD reviews request and forwards to the Corps, NOAA, and USFWS. VPD reviews and compiles annual reports and sends to the Corps, CCC, and NOAA annually by January 31 of each year.
GDEP-3: Cleanup Events	Grower	VPD	Annually	Annual report will document quarterly clean up events.	Annually.	VPD compiles annual reports and sends to the Corps, CCC, and NOAA annually by January 31 of each year.
SPRP-1 and 2: Spill Prevention and Response	Grower	Appropriate state and federal government agencies and VPD	Immediately upon spill	See SPRP for details.	Immediately upon spills.	VPD includes documentation in compiled annual reports and sends to the Corps, CCC, and NOAA annually by January 31 of each year.
BIO-1 and GDEP-2: Entanglement	Grower	NOAA and VPD	Immediately upon report of entanglement, injury, etc.	See GDEP for details.	—	VPD includes documentation in compiled annual reports and sends to the Corps, CCC, and NOAA annually by January 31 of each year.
Decommissioning						
BIO-7, SPRP-1, and SPRP-2: Spill Prevention and Response	Grower	Appropriate state and federal government agencies and VPD	Immediately upon spill	See SPRP for details.	Immediately upon spills.	VPD includes documentation in compiled annual reports and sends to the Corps, CCC, and NOAA annually by January 31 of each year.
GRMP-2: Permit or Authorization Renewal and Expiration	Grower	VPD	No less than 180 days of VPD Permit or Approval Expiration Date	Growers submit a non-renewal notice or renewal application.	As needed	-
BIO-11 and GRMP-2: Decommissioning Plan	Grower	VPD	Within 30 days of completion	Compliance with decommissioning plan after gear removal. See Appendix F for details	Once	VPD reviews and compiles reports documenting compliance in an annual report and sends to the Corps, CCC, and NOAA within 30 days of notice of completion.

* See Table 2 and associated Management Plans (Appendices A through F) for complete requirement details.
** This Plan has been produced and submitted to the Corps and CCC for approval.

8 Compliance Monitoring and Enforcement Protocol

Any Grower who installs gear or operates in a manner not authorized by VPD, CCC, or the Corps will be subject to revocation of their VPD authorization and/or LOP, and eviction from the project site.

Although specific enforcement protocols remain to be fully delineated with the Corps, VPD anticipates that its specific enforcement authority and protocols will be described in VPD authorizations and/or LOPs issued to individual Growers. The appropriate response will depend on the severity of the violation and non-compliance; however, generally, VPD will follow the following enforcement protocol:

1. Send notice to the Grower of the violation and request immediate cure of the violation. VPD will also notify appropriate state and federal regulatory agencies of the violation.
2. Depending on the nature of the violation, VPD may request third-party monitoring through an independent consultant selected by VPD, the cost of which would be paid by the violating Grower.
3. In the case of severe or frequent violations or issues of non-compliance, VPD may terminate its authorization, provide notice to the Corps, and seek to evict the Grower from the project site.

All of the above enforcement options are in addition to the Corps' enforcement authority (pursuant to Section 10 of the Rivers and Harbors Act), the USCG, FDA (pursuant to the NSSP), which they would retain regardless of any additional enforcement authority held by VPD.

VPD Harbor Patrol can support the VSE project by inspecting, patrolling, and responding to issues. The Harbormaster and staff can assist with pre-deployment inspections, site inspections, compliance patrols, and responses to issues and emergencies. VPD authority for compliance monitoring and enforcement will be established through authorizations and/or operating agreements between VPD and Growers.

8.1 Pre-Deployment Inspections

VPD Harbor Patrol will help with required pre-deployment inspections to ensure compliance with project permit specifications. These inspections can be done within the harbor or off-site staging areas. The Harbormaster would require some training on the equipment concerned, but could otherwise include this into her/his normal duties.

8.2 Offshore Site Inspections

VPD Harbor Patrol can transport the appropriate level of underwater inspection teams for offshore equipment and deployment inspections. This would also require minimal training and could be done with existing staff.

8.3 Routine Site Patrols

VPD Harbor Patrol can routinely patrol offshore sites. VPD proposes patrols be conducted twice monthly to ensure compliance with project conditions and BMPs. The existing fleet of VPD Harbor Patrol vessels could be used effectively, and this would only incur some increases in annual fuel budgets. There would be some training that would be required, but otherwise the duties are within the normal scope of operations. Any discrepancies or violations of permit conditions discovered by VPD Harbor Patrol will be immediately reported to VPD and other appropriate regulatory agencies.

8.4 Emergency Responses

The Harbormaster and Harbor Patrol staff are well suited to respond to emergencies. The Harbormaster and staff have extensive training in many areas, and will be able to facilitate the coordination and mitigation of emergency events. Any emergency responses would be handled in compliance with the Standardized Emergency Management System and the National Incident Management System. When appropriate, VPD would incorporate a unified command that could include local, state, and federal agencies. These processes would ensure that the appropriate notifications would be made to regulatory agencies. Mitigation and/or clean-up of any emergency would be done with the use of contractors as described in the SPRP.

9 Ventura Port District Project Administration and Management

As described in the previous sections, VPD has many responsibilities to ensure compliance with and adherence to all VSE project permit conditions and measures. To determine the quantity of labor hours that will be required by VPD to sufficiently address VSE project responsibilities, this section provides a summary of VPD responsibilities and anticipated labor hours associated with the project. VPD responsibilities may be divided into several project administration categories, as follows:

- Administrative management
- Enforcement management
- Contract Management
- Accounting management
- Dockside management

The subsections below discuss the anticipated responsibilities and tasks associated with each staff project administration category. Although the VSE project will be phased (e.g., development of all 2,000 acres in several stages or phases), the estimated labor hours below provide a range for anticipated hours associated with initial project implementation to full build out. The estimated labor hours described below may assist VPD in determining the level of effort needed associated with the project. To meet the obligations of the categories, it may be appropriate to use existing staff, new staff, outside consultants, or any combination thereof.

The categories identified above and detailed below provide a preliminary range of weekly hours necessary for project administration and management as currently contemplated by the scope of the project. It is highly likely that the hours needed to accomplish each category of project administration and management will vary during different phases of the project start-up, implementation, and at full build-out.

9.1 Administrative Management

The VSE project will require staff to manage the various tasks associated with administrative activities. The anticipated significant administrative duties (and estimated hourly range per week) includes, but is not limited to:

- **Coordination/Scheduling (8–24 hours per week).** This task includes the coordination of various project components with multiple entities including: coordinating and scheduling initial interviews with Growers; coordinating the substrate sampling efforts with third-party consultants; coordinating and scheduling training for Growers; reviewing, approving, and providing Growers with a list of marine wildlife observers; internal coordination with VPD staff, including the Harbormaster, Contract Manager, etc.; corresponding with appropriate permitting agency representatives; addressing grower requests and coordinating with grower/agencies for deviation from approved permit conditions (e.g., predator control procedures); etc.
- **Reporting (8–32 hours per week).** This task includes acquiring, compiling, and delivering any required reporting commitments to the appropriate agencies. This task includes tracking growers reporting requirements; contacting growers to ensure the timely submittal of reports during all phases of the project; establishing and maintaining an electronic mobile platform that growers and their employees will use to submit data requirements, if desired; compiling the documentation from growers, summarizing compliance and project activities, and submitting to regulating agencies on an annual basis; reporting, as needed, during VPD public meetings; etc.

- **Notifications/Distributions (0–4 hour per week).** This task includes distributing and updating Operations Plans, as revisions are determined necessary by VPD and in coordination with regulatory agencies; notifying the Harbormaster/U.S. Coast Guard of any new construction activities occurring; addressing grower violations and appeals; etc.

In addition to the list above there may be other administrative tasks associated with this project not identified above that may add some additional time to this task. Overall, it is estimated that between **16 to 60 hours** per week may be required for VSE project administrative duties.

9.2 Enforcement Management

The VSE project will require staff to manage the various tasks associated with enforcement activities, including providing pre-installation inspections; providing monthly (initially twice per month) offshore site inspections; providing routine site patrols; providing emergency responses; ensuring compliance with decommissioning plans; addressing non-compliance issues; and managing violation appeals and coordination with VPD General Manager or designated representative; etc. As discussed in Section 8, Enforcement Protocol, VPD Harbor Patrol can assist the VSE project by inspecting, patrolling, and responding to issues. The Harbormaster and staff can assist with pre-installation inspections, site inspections, compliance patrols, and responses to issues and emergencies. Overall, it is estimated that between **8 to 24** hours per week may be required for enforcement management duties, with a significant portion of this time incorporated into the existing duties currently within the existing Harbormaster duties.

9.3 Contract Management

The VSE project will require staff to manage the various tasks associated with Grower contracts, including receiving and reviewing contract requests; issuing and negotiating contract agreements; collecting surety bonds or letters of credit; sending notices of fee delinquency; sending notices of violation and requests for immediate cure of the violation; coordinating with the General Manager to ensure violations are adequately addressed; terminating contracts and issuing credit; and maintaining records associated with contracts. Overall, it is estimated that between **8 to 10 hours** per week may be required for VSE project contract management duties.

9.4 Accounting Management

The VSE project will require staff to manage the various tasks associated with accounting with Growers, including issuing monthly fee and landing invoices; collecting monthly fees; notifying the contract manager on any delinquent payments; maintaining invoice and payment records; and issuing payment receipts. Overall, it is estimated that between **1 to 4 hours** per week may be required for VSE project accounting management duties.

9.5 Dockside Management

The VSE project will require staff to manage the various tasks associated with dockside activities, including providing landing services, maintaining tonnage records, and ensuring products landed have passed public health and sanitation requirements. Overall, it is estimated that between **8 to 24 hours** per week may be required for VSE project dockside management duties.

10 Refinement and Adaptive Management

The VSE project is an innovative approach to providing economies of scale, pre-approved permitted areas, and technical support for local Growers who might otherwise be unable to participate in shellfish aquaculture. As described in the previous sections, implementation of this Plan requires the participation of several agencies and parties to ensure that all project permit conditions are adhered to, carried out, addressed, and reported on in a timely manner. This Plan is intended to be a living document that is updated as the project site is developed, additional permit terms and conditions are imposed, and additional details become known during project implementation and operation. During implementation of the project, unforeseen issues may arise or new techniques to reduce impacts may be developed. To efficiently address unforeseen issues, this Plan incorporates an adaptive management approach to ensure the safety of all Growers and their employees, and the protection of the marine environment.

As unforeseen issues arise, VPD will consult with the appropriate agencies (e.g., the Corps, NOAA Fisheries, CCC, and USCG) to identify and implement adaptive measures. This Plan will be updated with the refined methods developed during agency consultations, and all Growers will be informed of any updates to the Plan. In addition, during implementation, technical issues may arise, and data interpretation associated with gear, debris, and wildlife entanglement monitoring may change or evolve. In these instances, Growers and VPD will consult with the appropriate agencies to consider the results of monitoring efforts and subsequent adjustments to monitoring methods.

Adaptive management and adjustments to the Aquaculture Gear Monitoring & Marine Debris, and Wildlife Entanglement Plan (GDEP) (Appendix E) will occur following the triggers and subsequent actions below. Additional details are provided in Appendix E.

GDEP Adaptive Management Trigger 1: If monitoring shows that derelict gear has become ensnared or collected on any Project structure but there was no wildlife entanglement, Growers will remove the derelict gear as soon as feasible and notify VPD within one week. If monitoring shows that aquaculture gear is lost, seek to collect the lost gear as soon as feasible in compliance with Section 4.3 [of the GDEP] and notify VPD within one week. In the event that derelict gear is a persistent issue for a certain Grower, or a certain type of gear is frequently lost, affected Grower and VPD will consult with NOAA Fisheries and Corps in order to modify the Project and/or monitoring plan as necessary.

GDEP Adaptive Management Trigger 2: If monitoring shows non-listed species found entangled or otherwise impinged at the project site, Grower will remove the derelict gear as soon as feasible, provide photographic or video documentation of the entanglement, notify VPD within one week, and provide a report to VPD. VPD and the Grower will consult with NOAA Fisheries and Corps in order to modify the Project and/or monitoring plan if necessary.

GDEP Adaptive Management Trigger 3: If monitoring shows marine mammals that are alive, but appearing debilitated, the Grower will record the sighting as part of their monitoring report as highlighted in the Reporting Protocol for Injured or Stranded Marine Mammals. VPD and the Grower will consult with NOAA Fisheries and Corps in order to modify the Project and/or monitoring plan if necessary.

GDEP Adaptive Management Trigger 4: If monitoring shows live marine mammals/protected species observed entangled in fishing gear or marine debris, the Grower will immediately contact NOAA Fisheries by calling the 24-hour hotline: 877-SOS-WHALe as highlighted below in the Reporting Protocol for Injured or Stranded Marine Mammals, and contact VPD, giving all available information on the case as highlighted below. The Grower and VPD will consult with NOAA Fisheries and Corps in order to modify the Project and/or monitoring plan.

In addition, the Sediment and Water Quality Management Plan (SWQMP) (Appendix C), and monitoring described in the SWQMP, will commence upon installation of the first 100-acre farm and require 3 years of monitoring at 80%

capacity for the aquaculture site. The SWQMP is dependent on the length of time it takes to attain full occupancy of all of the farms. Hence, if the project site takes 2 years to develop to 80% capacity, and along with the 3-year monitoring requirement at that capacity, then the SWQMP will have a duration of 5 years total.

As described in Section 7.2, Reporting, VPD will compile Growers annual reports and provide all reports and a summary to the appropriate agencies. The annual report will evaluate methods, interpret data, provide an aquaculture impact assessment, and include recommendations for adaptive management, as necessary.

11 Process for Permit Amendments

As mentioned above, VPD will process all entitlement permit applications for the project, including its Corps permit application, associated Environmental Assessment and/or Environmental Impact Statement, CCC consistency certification, and USCG PATON application. VPD will be the named permittee on such permits, and will remain the named permittee on such permits during the permit term.

A Grower's operation must be consistent with the project approved by CCC and the Corps. In the event that a Grower's proposed operation is materially different than the approved project, the Grower must first obtain VPD authorization to seek any required permit amendments prior to seeking approval from the Corps and CCC. VPD, as the master permit holder, reserves the right to deny any such proposed amendments. Under no circumstances will such an operation be allowed to commence until such required amendments are reviewed and approved by the CCC and Corps.

Examples of design modifications that would require an amendment include:

- Modifications to species cultivated
- Significant differences in cultivation technique
- Modifications to reduce spacing or increase the density and/or weight of longlines
- Modifications of permit conditions

Examples of design modifications that would not require an amendment include:

- Increasing or decreasing the number of buoys
- Changing brands
- Changing the depth of the backbone (provided that it is not shallower than 15 feet)

Additional detail concerning what types of modifications would require a permit amendment will be finalized in discussions with the Corps and this Plan will be updated accordingly.

Upon approval by VPD, each VPD authorization will be provided to the Corps for its review and approval. The Corps will approve each authorized Grower within 45 days pursuant to a LOP if the proposed operation complies with all master permit conditions and mitigation measures and is substantially similar to the overall project approved by the Corps and the CCC. The Corps and CCC retain full discretionary authority to review any proposed permit amendments.

Upon Corps review and approval of an LOP, the Grower shall sign the VPD authorization, agreeing to comply with all terms and conditions of the permit. Upon such approval, VPD shall not be responsible for compliance with any permit terms and conditions identified in the authorization as those shall be exclusively the responsibility of the Grower.

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Appendix A

Biological Assessment for the Ventura Shellfish Enterprise Project*

* Any revisions to the management plans will be updated after receiving comments from relevant regulatory agencies.

ATTACHMENT 1

BIOLOGICAL ASSESSMENT

FOR THE VENTURA SHELLFISH ENTERPRISE PROJECT

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SEPTEMBER 2018

ATTACHMENT 1

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1.0 INTRODUCTION

This Biological Assessment (BA) has been prepared for the Ventura Port District (VPD, project applicant) to evaluate the effects of the Ventura Shellfish Enterprise (VSE) Project (project) on federally protected species along with federally designated critical habitat. The project, supported in part through the NOAA 2015 Sea Grant Aquaculture Extension and Technology Transfer to California Sea Grant (NOAA Sea Grant Program), will establish a commercial offshore bivalve aquaculture operation. VPD is applying for a U.S. Army Corps of Engineers (Corps) authorization under Section 10 of the Rivers and Harbors Act. The Corps will act as the federal lead agency on the project. The BA will determine whether any federally protected species or habitats are likely to be adversely affected by the project. Pursuant to Section 7 of the Endangered Species Act (ESA) and its implementing regulations (50 CFR § 402.01 et seq.), this BA has been prepared to support consultation between the Corps, the U.S. Fish and Wildlife Service (USFWS), and National Oceanic and Atmospheric Administration's (NOAA's) National Marine Fisheries Service (NMFS). Section 7 of the ESA insures that through consultation federal actions are not likely to jeopardize the continued existence of any federally protected species or result in the destruction or adverse modification of critical habitat. This BA is also intended to support of the National Environmental Quality Act (NEPA) planning process as well as the resource agency permitting of the project. An Essential Fish Habitat (EFH) assessment has also been prepared, which analyzes how the project would affect EFH for species regulated under a Fisheries Management Plan, pursuant to the requirements of the Magnuson-Stevens Fishery Conservation and Management Act, which requires consultation with NMFS on all actions or proposed actions that may adversely affect EFH (Appendix A).

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2.0 DESCRIPTION OF PROJECT ACTION

The project will establish a commercial offshore bivalve aquaculture operation based from the Ventura Harbor in Ventura, California, focused on the cultivation of Mediterranean mussels (*Mytilus galloprovincialis*).

2.1 Project Location

The project will consist of twenty 100-acre plots (total of 2,000 acres) located in open federal waters of the Santa Barbara Channel (Channel) in the Southern California Bight (SCB), northwest of Ventura Harbor (Figure 1), with approximate depths ranging from 78 to 114 feet below sea level (13 – 19 fathoms) and an average depth of 98 feet. The plots are 3.53 miles from the shore. Each of the 20 plots are 2,299.5 feet by 1,899.5 feet, for an average plot size of 100.27 acres. Each plot will contain up to 24 lines (12 end-to-end pairs), with each line consisting of 575 feet of backbone length and 250 feet of horizontal scope on each end. There will be a 50 foot setback on each end of the pairs (for a total of 100 feet of spacing between lines of adjacent parcels) and 50 foot spacing between the two center pins. Parallel lines will be spaced 150 feet apart, with a 125 foot setback at each of the long sides (for a total of 250 feet of spacing between lines of adjacent parcels). The closest distance to the 3-mile nautical line is 2,900 feet from the plots, with an average closest distance of over 3,000 feet. The closest distance to the City of Ventura limit is 4.5 miles. Ventura harbor is 4.1 miles from the closest plot (8 miles in distance to the most distant plot). The lease sites are located on sandy bottom habitat outside of any rocky reef habitat, as evaluated in Gentry et al. 2017 and illustrated by NOAA United States West Coast nautical charts (NOAA 2017a).

The project site is characterized by a gradually sloping sandy/soft bottom. The SCB is located along the curved coastline of Southern California from Point Conception south to Cape Colnett in Baja California and includes the Channel Islands and the Pacific Ocean. The habitats and biological communities of the SCB are influenced by dynamic relationships among climate, ecology, and oceanography (e.g., currents) (Leet et al. 2001). The SCB provides essential nutrients and marine habitats for a range of species and organisms. Submarine canyons, ridges, basins, and seamounts provide unique deep water habitats within the region. The basins provide habitats for a significant number of mid-water and benthic deep-sea fish near the Channel Islands, whereas nearshore areas provide habitats for kelp and seagrass communities. Nearshore geology includes a variety of bottom types, including soft sediments and rocky bottoms. Hard-substrates environments, such as the rocky intertidal, shallow subtidal reefs, and deep rocky reefs, are a key component of the high productivity found near the project area. Due to linkages among ecosystems, the impacts of ecosystem dynamics contained within the project area extend to interactions with species in the greater Eastern Pacific Ocean. The Santa Barbara Channel is located within the SCB and extends from Point Conception to Point Mugu.

The waters of the Santa Barbara Channel form one of the most biologically productive ecosystems found on Earth. Unlike most of coastal California, which faces due west and the open ocean, the coastal waters of the Santa Barbara Channel are on a south-facing coast and situated between two land masses, the South Coast and the Northern Channel Islands. The project site is 9.1 miles from the Channel Islands National Marine Sanctuary, a Federal Marine Protected Area, and 13.5 miles from the Channel Islands National Park boundary. The western section of the Santa Barbara Channel is a meeting place of the cool Northern California Current and warm Southern California Countercurrent. This type of ecosystem is called a "transition zone." Transition zones are known to promote large concentrations of both biomass and species diversity, as they are the confluence between two or more ecologically distinct systems. In addition, upwelling provides unusually high concentrations of nutrients, especially macrozooplankton, which are one of the primary driving forces behind the Santa Barbara Channel's biological productivity and diversity. Wind patterns around Point Conception and in the Santa Barbara Channel create frequent seasonal upwelling, which force deep nutrient-laden ocean waters to rise up the water column into the biologically rich euphotic zone (Santa Barbara Channelkeeper 2017). Data from last year, for the closest oceanographic buoy to the project site (Station 46217 Anacapa Passage), shows the following average wave action conditions for the project area: an average wave height of 1.04 feet, with a dominant wave period of 10.1 seconds, and an average wave period of 6.49 seconds, with surface currents generally moving in a SW (249 degrees) direction and an average temperature of 16 °C (National Data Buoy Center 2017). The Ventura area is known to be an area of high swell height, particularly in the winter (Guza and O'Reilly 2001). Wave action is focused by the large fan of sediment deposited on the shelf from the Ventura and Santa Clara rivers. When deep water swell comes in from a WSW direction, these bathymetric features can focus the wave energy northward into the Ventura area. Wave action is slightly less in the summer months when the Channel Islands block southward swells (Guza and O'Reilly 2001).

2.2 Project Actions

2.2.1 PROJECT CONSTRUCTION

The proposed plots will be used for growing Mediterranean mussels via submerged longlines (Figures 2 and 3).

Installation of anchors, longlines, and other facilities will be performed by permitted shellfish companies, in compliance with all permit requirements. Submerged longlines consist of a horizontal structural header line, or "backbone," that is attached to the seafloor by sand screw anchors at each end and is marked and supported by a series of buoys along the central horizontal section. Sand screw anchors have been shown to exhibit superior holding power as compared to other anchoring systems and are removable. Sand screw anchors will be installed by a hydraulic drill with a drill head that operates from a rig lowered to the ocean floor. The sand screw anchors would be screwed into the sandy bottom ocean floor approximately 10 to 20 feet (3 to 6 meters) deep. Each 100-acre plot will contain up to 48 anchors for a total of 960 anchors at full project build out.

Buoys marking the corners of each parcel will identify the cultivation area for navigational safety and will comply with all regulations for height, illumination, and visibility, including radar reflection. As shown in Figure 2 and Figure 3, surface buoys for each longline would consist of two 16 inch surface corner buoys (one corner buoy supporting and marking either end of the backbone), as well as one 16 inch buoy supporting and marking the center pickup line, for a total of three surface buoys per longline. Simulated views of parcel arrays at the surface and underwater are provided in Figures 4 through 7. All surface buoys would be uniquely colored for each operator and marked with the grower/producer name and phone number. Buoys attached to the central horizontal portion of the backbone line support the line, provide a means of lifting the backbone line to access the cultivation ropes, and determine the depth of the submerged backbone, which will vary seasonally from 15 to 45 feet below the surface. Additionally, a combination of surface and submerged buoys attached to the backbone line will be used during the mussel production cycle to maintain tension on the structural backbone line as the weight of the mussel crop increases. These will consist of 24-inch (or equivalent, with greater than 200 L buoyancy) buoys attached at required intervals along the surface and connecting to the backbone line, in combination with smaller submerged buoys affixed directly to the backbone line. The combination of surface and submerged buoyancy is designed to create a tensioned but flexible structure that is capable of responding dynamically to surface waves and storms.

The longlines that will be utilized are thick (1-inch diameter), tensioned (to approximately 800 pounds) rope that is not conducive to wrapping around or entangling protected species. The longline configuration produces a fairly rigid tensioned structure from which the cultivation ropes, or "fuzzy ropes" are attached. Fuzzy ropes are characterized by extra filaments that provide settlement substrate for mussels to attach. Fuzzy ropes may be attached to and suspended from the backbone rope either as individual lengths or as a continuous looping single length that drapes up and down over the backbone. The length of each section or loop of fuzzy rope would be approximately 20 feet but would depend on the lifting capacity of the servicing vessel. The length of the central horizontal section of backbone line would be 575 feet, which would support approximately 8,000 feet of fuzzy cultivation line.

The shape of each of the 100-acre cultivation parcels would be a function of the geometry of the submerged backbone line and anchoring. Each horizontal section of the longline will be approximately 575 feet and will require an anchor scope of approximately 2.5 times depth. Therefore, in 100 feet of water depth, scope from the horizontal section of backbone to the helical screw anchor will require 250 feet on each end of the line, making a total length of 1,075 feet from anchor screw to anchor screw. A 100-acre parcel with rectangular dimensions of 1,899.5 feet by 2,299.5 feet will therefore accommodate up to 24 individual longlines. The submerged longline growing gear configuration would be specifically engineered for open ocean conditions with respect to size and strength of all lines, anchoring, hardware, and buoyancy.

Construction in each individual growing plot will take place only after VPD approval of a sub-permits with the individual grower/producer. While project development is dependent on market demand, VPD estimates that full build out would occur within three to five years after project approval.

2.2.2 PROJECT OPERATION

The mussels will be grown and harvested by permitted growers/producers and landed at Ventura Harbor. Initial plantings of juvenile seed mussels, commonly referred to as spat, will be purchased from onshore hatcheries certified by the CDFW. At the hatcheries, mussels adhere directly to special textured ropes that promote mussel attachment and growth. When the seed are firmly settled to ropes, the ropes are covered with cotton socking material to protect them from shaking off the ropes during transport to the offshore growing site and deployment. The socks hold the spat next to the rope until the mussels naturally attach with their byssal threads, after which the cotton material naturally degrades. These ropes are then attached to the longlines and buoys, as described above.

The mussel grow-out ropes themselves are typically planted with seed 3-inches thick and may grow to be stiff with byssus at diameters of 10-inches or more at harvest, thus making them very unlikely sources of entanglement. As an additional precaution, grow ropes will be attached to the headrope with a low-breaking-strength twine (4-millimeter

(0.16-inch diameter), which will facilitate rapid detachment in the unlikely event of any interaction with the longline. To further minimize entanglement potential, a 1,100 pound breakaway link will be installed between the surface buoys and vertical lines, similar to strategies used to mitigate potential entanglement in trap fisheries in the northeastern United States (NOAA 2008). Buoy lines between the surface and headrope are generally under tension partially equivalent (0 to 10 kilograms (0 to 22 pounds)) to their full buoyancy (42 kilograms (93 pounds)).

Cultivated mussels grow by filtering naturally occurring phytoplankton from the ocean. Harvesting involves separating the mussels from the ropes, followed by cleaning, sorting, and bagging. All of these activities will take place aboard the harvesting vessel. Juvenile mussels will grow on lines until an intermediate size where the density of mussels on the fuzzy rope becomes limiting. At this point, a servicing vessel will lift the backbone line in order to access the fuzzy rope stocked with juvenile mussels and pull the fuzzy rope through vessel-based equipment designed to strip the mussels from the fuzzy rope and then clean, separate, and grade the juvenile mussels by size. Juvenile mussels then will be restocked to clean fuzzy rope at a reduced density for their second stage of grow out to market size. Maintenance and inspection of the longlines is proposed to be carried out on a monthly basis, which consists of lifting the longlines out of the water and adding additional buoys as necessary to account for increased mussel weight. Inspections of the anchor ropes, anchors, and connecting ropes shall take place at a minimum of twice per month. Inspections shall include recordings by depth/fish finder or ROV surveys of lines and/or monitoring performed by SCUBA divers.

When the mussels reach market size, which is expected to occur after about one year of total production time, the submerged backbone lines again will be lifted in order to access the fuzzy cultivation ropes, and mussels again will be stripped from the line, cleaned, and separated, and this time size-graded and bagged for landing at the Ventura Harbor as market-ready product. The bagged mussels will be transported to Ventura Harbor for offloading, sale, and distribution. All husbandry activities related to harvesting, grading, and restocking of mussels to cultivation lines will occur onboard the servicing vessel using specialized equipment for that purpose.

Watercraft used for planting, inspections, and harvesting would be home ported at Ventura Harbor. On average, between 20 to 40 boats would be traveling to the specific lease sites to conduct these activities on a three times per week to daily basis. The maximum distance traveled would be between the harbor and the farthest potential lease area, which could be up to approximately 8.7 miles. Once constructed, it is projected that each sub-permit site will generate an estimated 150 trips per year to accomplish the tasks outlined above.

Landed product will comply with all testing and labeling regulations as part of the California Department of Public Health (CDPH) Shellfish Sanitation plan and the National Shellfish Sanitation Program (NSSP) guidelines for shellfish grown in federal waters. NOAA-Seafood Inspection Program (NOAA-SIP), in collaboration with the Food and Drug Administration (FDA), recently began the process of developing NSSP-compliant sanitation protocols for bivalve shellfish cultivated in Federal waters.

Qualified researchers affiliated with universities (i.e., U.C. Santa Barbara - Bren School, or University of Southern California, etc.), or qualified marine research institutes (i.e., Woods Hole Oceanographic Institute, Scripps Institution of Oceanography, etc.) will have access to aquaculture plots to conduct research and monitoring approved by the

Ventura Port District; however, access may be limited in certain circumstances to respect grower/producer proprietary data or technology or to accommodate a grower/producer's operational and logistical needs in operating the farm. The Ventura Port District will review and approve research projects in consultation with USACE, NMFS, NOAA, and any affected grower/producers. Grower/producers will be fairly compensated for the use of their vessels, equipment, and fair market value of any mussels produced or generated as part of approved research projects.

2.2.3 PROJECT DECOMISSIONING

The project will include a decommissioning plan when activities in that lease are terminated. The decommissioning plan for the timely removal of all shellfish, structures, anchoring devices, equipment, and materials associated with the shellfish cultivation facility and documentation of completion of removal activities will be a requirement of each permit or sub-permit. Financial assurances to guarantee implementation of the plan will be in place and reviewed periodically.

2.2.4 PROJECT OBJECTIVES

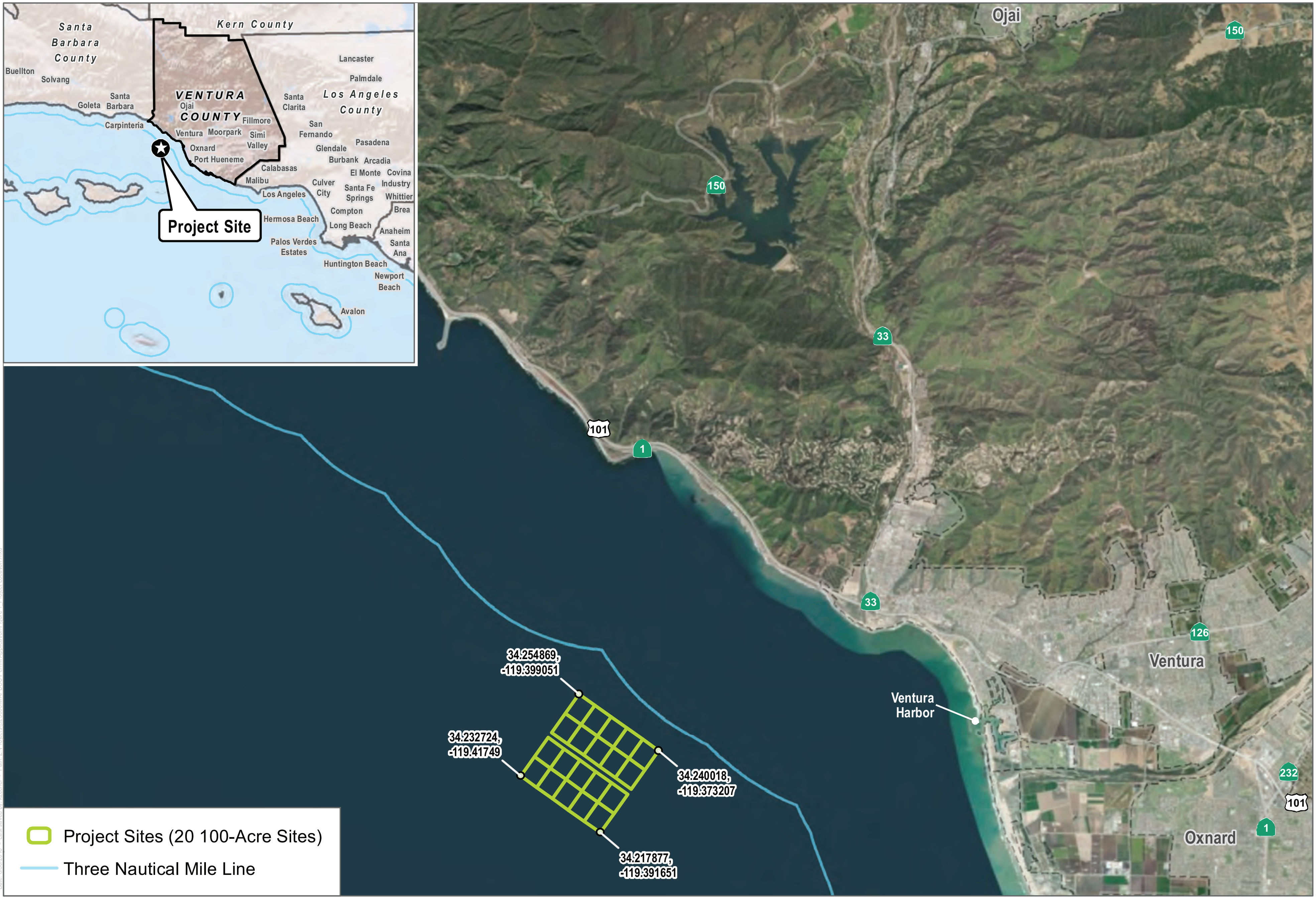
Objectives of the proposed project are as follows:

1. To increase the supply of safe, sustainably produced, and locally grown shellfish while minimizing potential negative environmental impacts;
2. To enhance and sustain Ventura Harbor as a major west coast fishing port and support the local economy;
3. To provide economies of scale, pre-approved sub-permit area, and technical support to include small local producers who would not otherwise be able to participate in shellfish aquaculture;
4. To provide an entitlement and permitting template for aquaculture projects state-wide;
5. To enhance public knowledge and understanding of sustainable shellfish farming practices and promote community collaboration in achieving VSE objectives;
6. To advance scientific knowledge and state of the art aquaculture practices through research and innovation.

2.3 Project Action Area

The Action Area for this project includes the project site (twenty 100-acre growing sites occupying a total project area of 2,000 acres) and all areas within 100 feet of the Project Actions (Figure 8). This Action Area was defined based upon several factors, including the project location and components, the potential noise impacts and disturbance areas for project components, and the properties of underwater acoustics. It is anticipated that the potential noise impacts from the initial installation of the sand screw anchors using a hydraulic drill will be minimal. Helical anchors for mussel farms in open ocean habitats have been installed all over the world, including at Catalina Island. They are drilled into the seabed using a hydraulic auger controlled at the surface. The drill is submersible and is lowered with the anchor. Noise levels are very low in the water, with a 50 horsepower hydraulic power pack on the boat (Fielder Marine Services, New Zealand, pers.comm.). Rotation speeds are very low, which minimizes entanglement of marine species. The anchor installation disturbs less than 1 square meter of sea bed on installation and once installed no rope or chain touches the sea floor which also minimizes seabed disturbance (Fielder Marine Services, New Zealand, Pers.comm). Marine wildlife, especially cetaceans, are known to be sensitive to noise effects (NMFS 2007a). However, construction noise levels will be well within acceptable thresholds for both marine mammals and fish (ICF Jones & Stokes and Illingworth and Rodkin, Inc. 2009; NMFS 2007a). Due to the minimal noise level and area of disturbance on the sea floor, we believe an action area of 100 feet is sufficient.

ATTACHMENT 1



SOURCE: NAIP 2016
DATE OF PREPARATION: 8/30/2018

DUDEK

0 6,250 12,500 Feet

FIGURE 1
Project Location
Ventura Shellfish Enterprise Project

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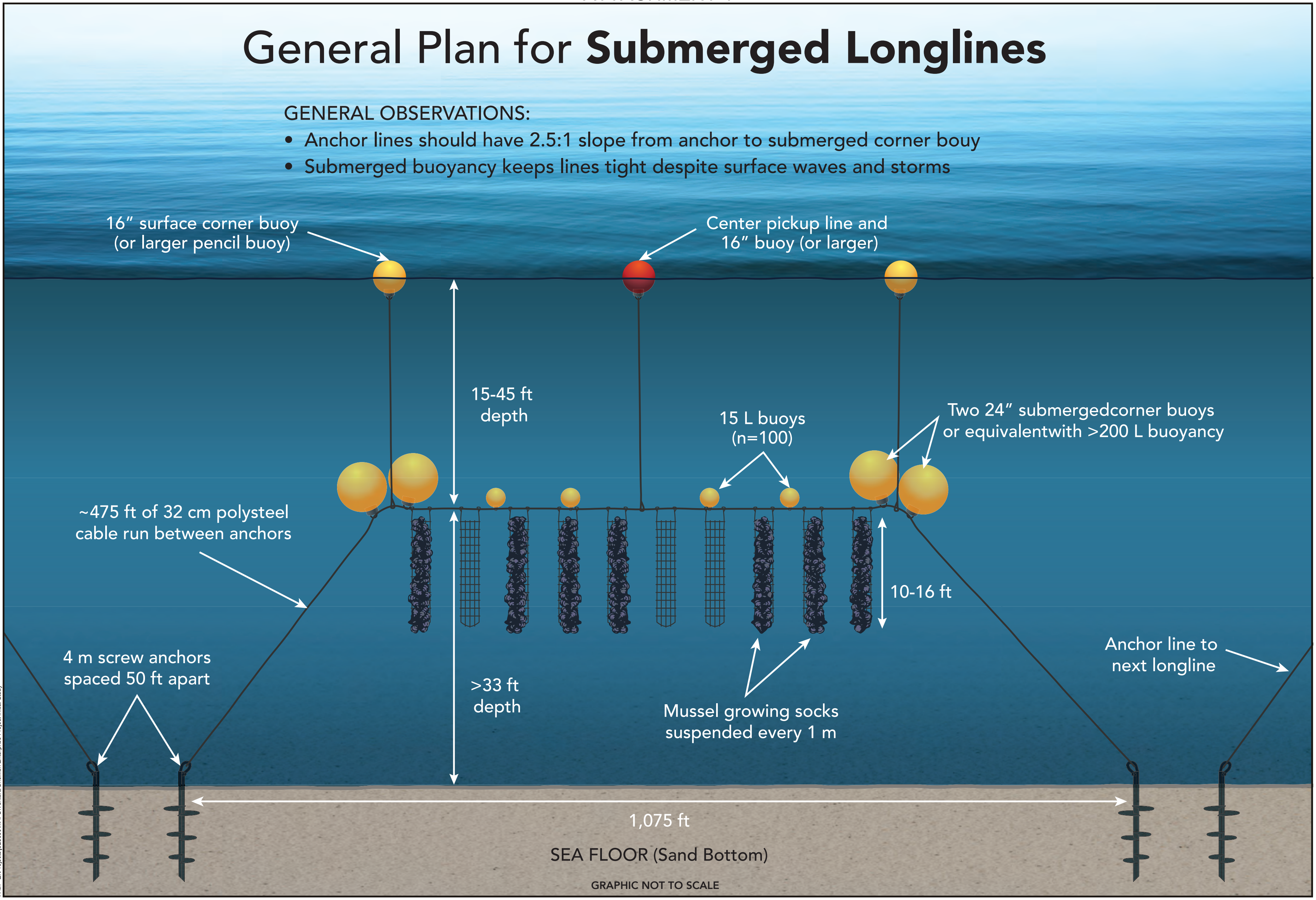

FIGURE 2

Detailed Plan for Shellfish Longlines

Biological Assessment for the Ventura Shellfish Enterprise Project

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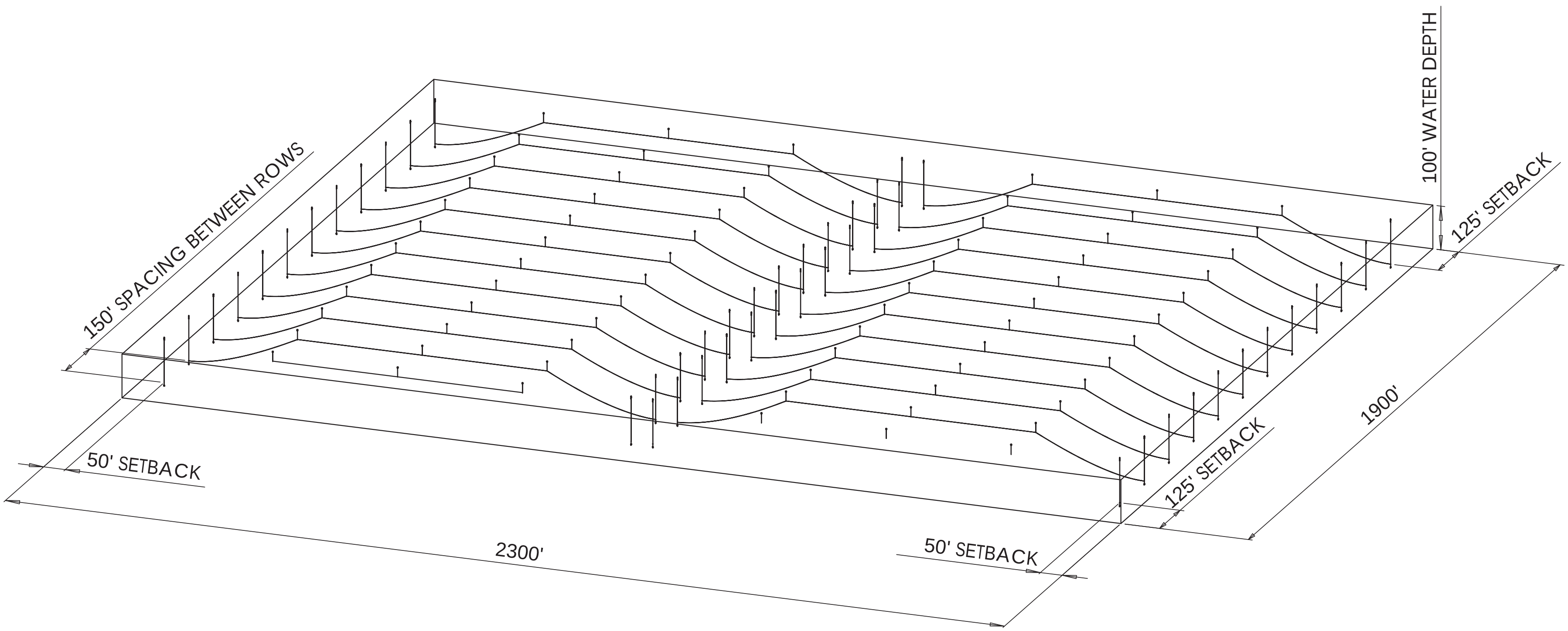

FIGURE 3A

Parcel Array Overview

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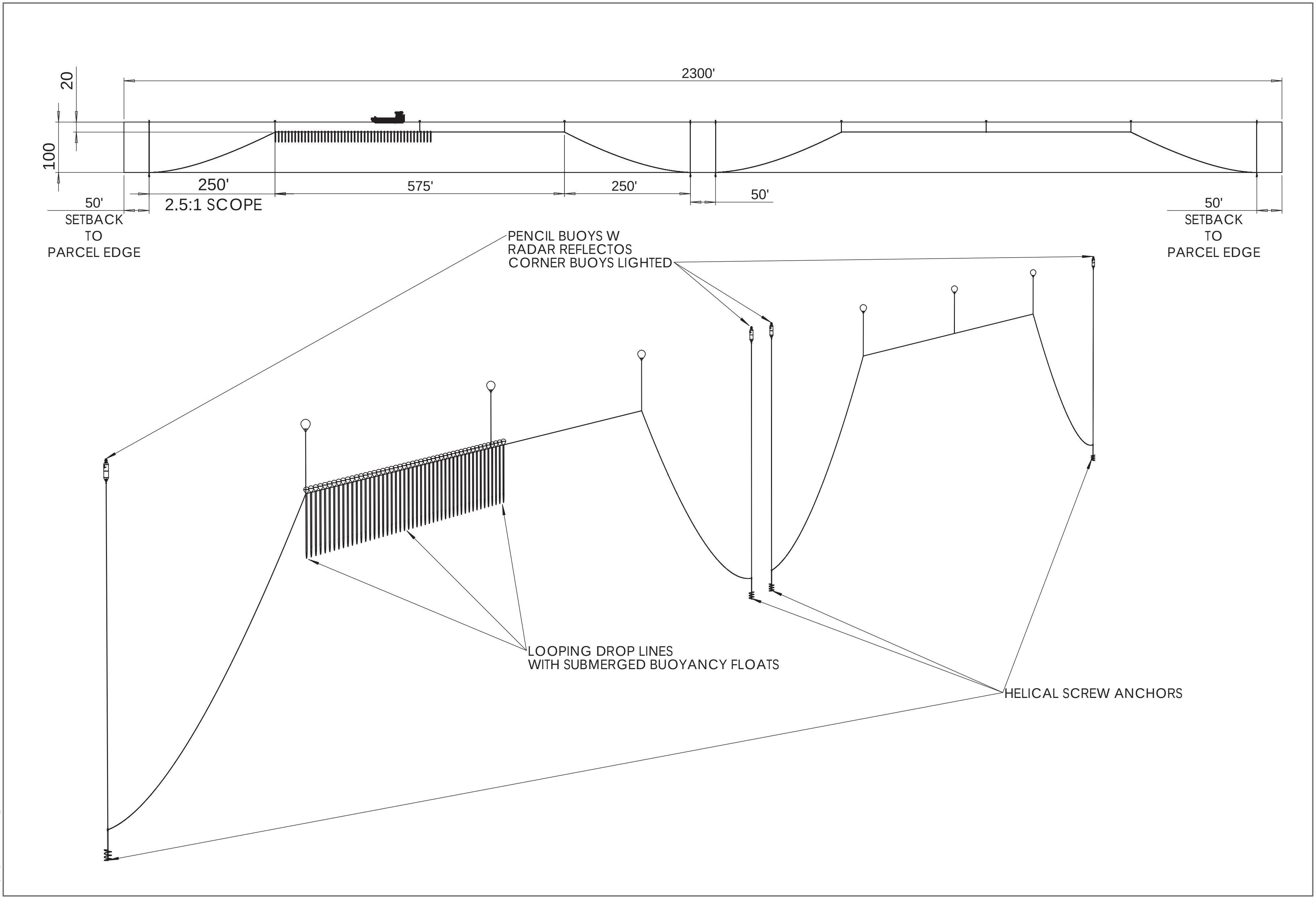
ATTACHMENT 1



SOURCE: VSE 2018

FIGURE **3B**

Backbone Details

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FIGURE 4

Simulated View of Parcel Array at the Surface: 100 Acre Plot

Biological Assessment for the Ventura Shellfish Enterprise Project

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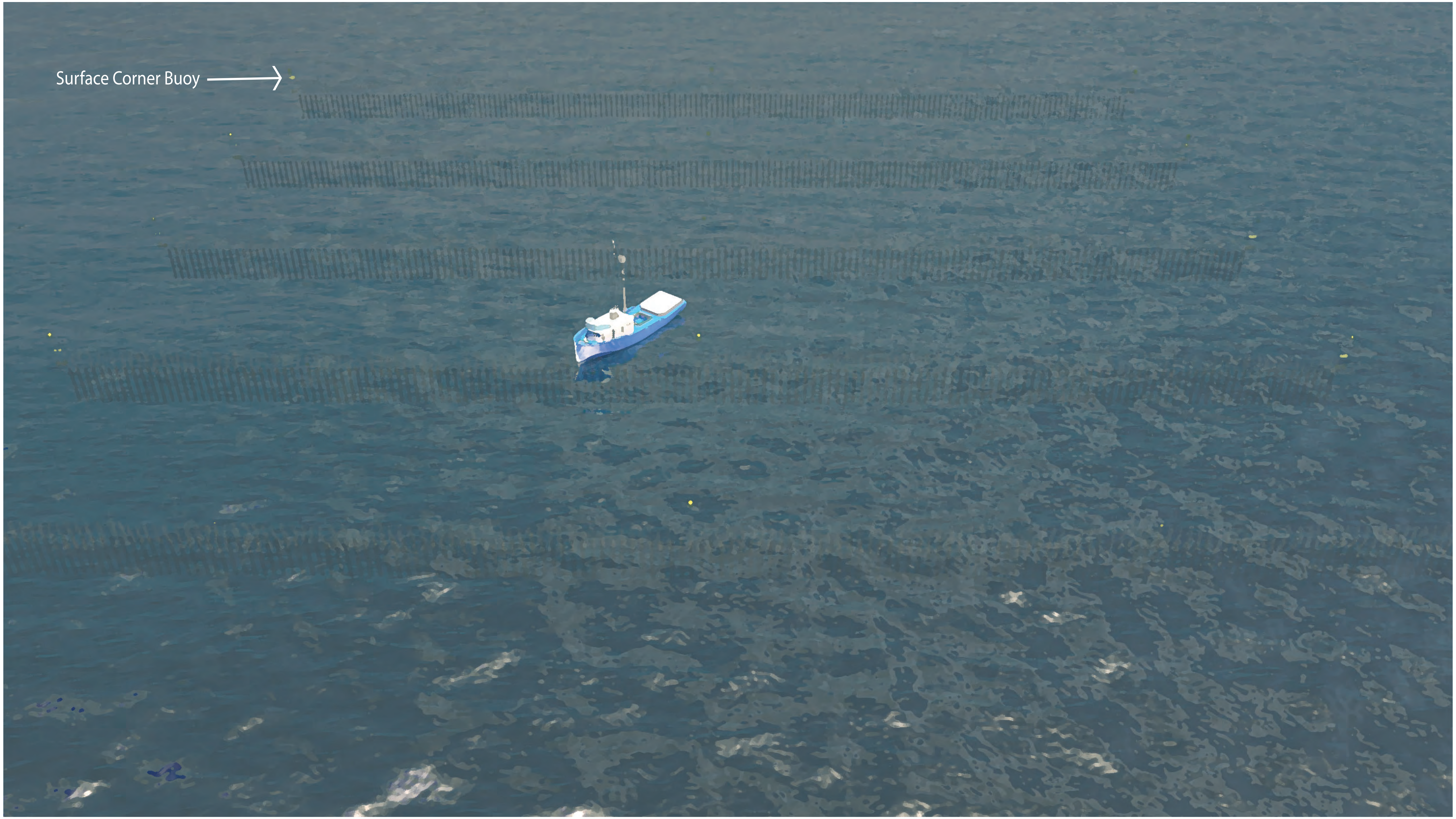

FIGURE 5
Simulated View of Parcel Array at the Surface
Biological Assessment for the Ventura Shellfish Enterprise Project

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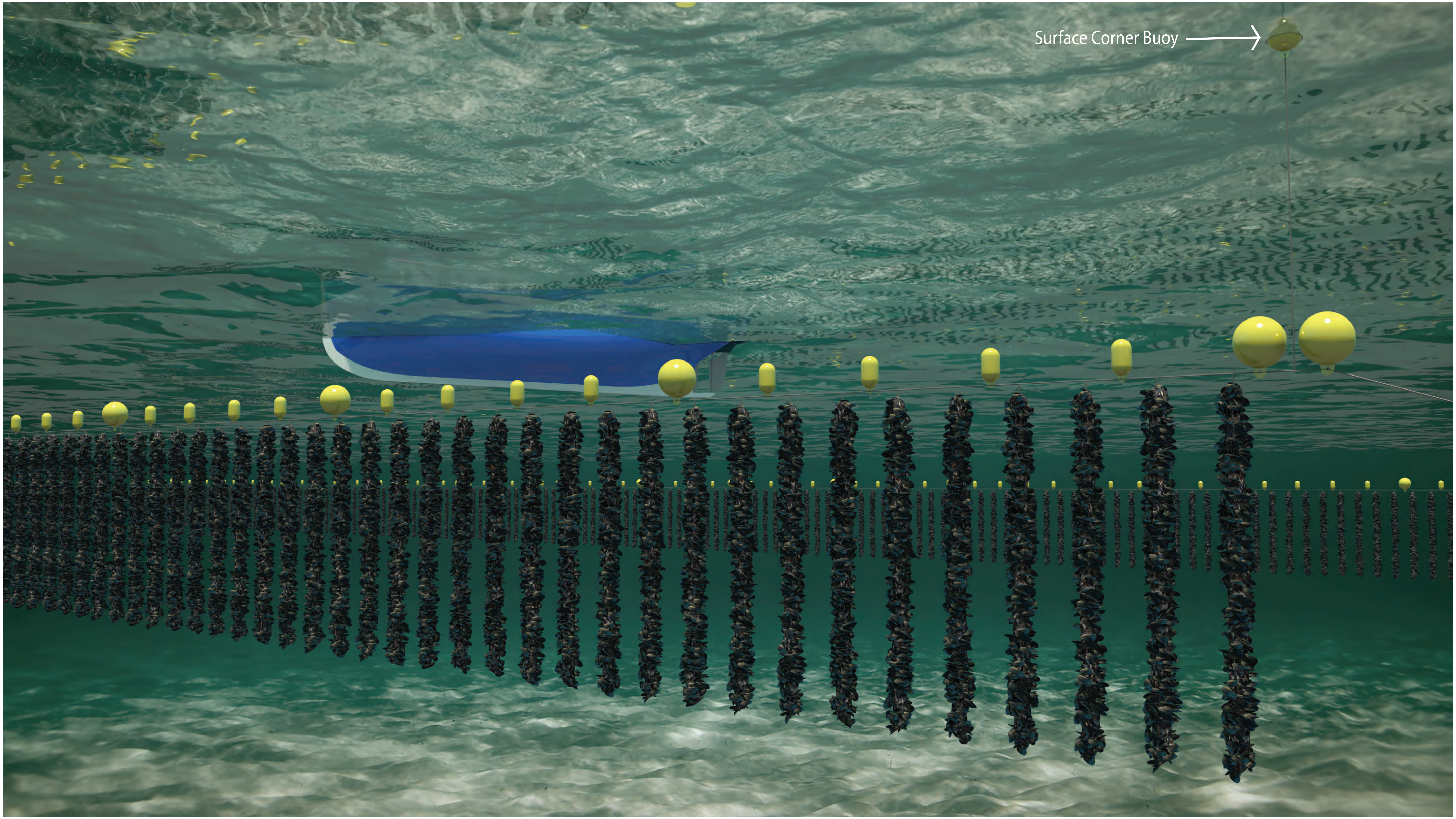

FIGURE 6

Simulated View of Parcel Array Underwater

Biological Assessment for the Ventura Shellfish Enterprise Project

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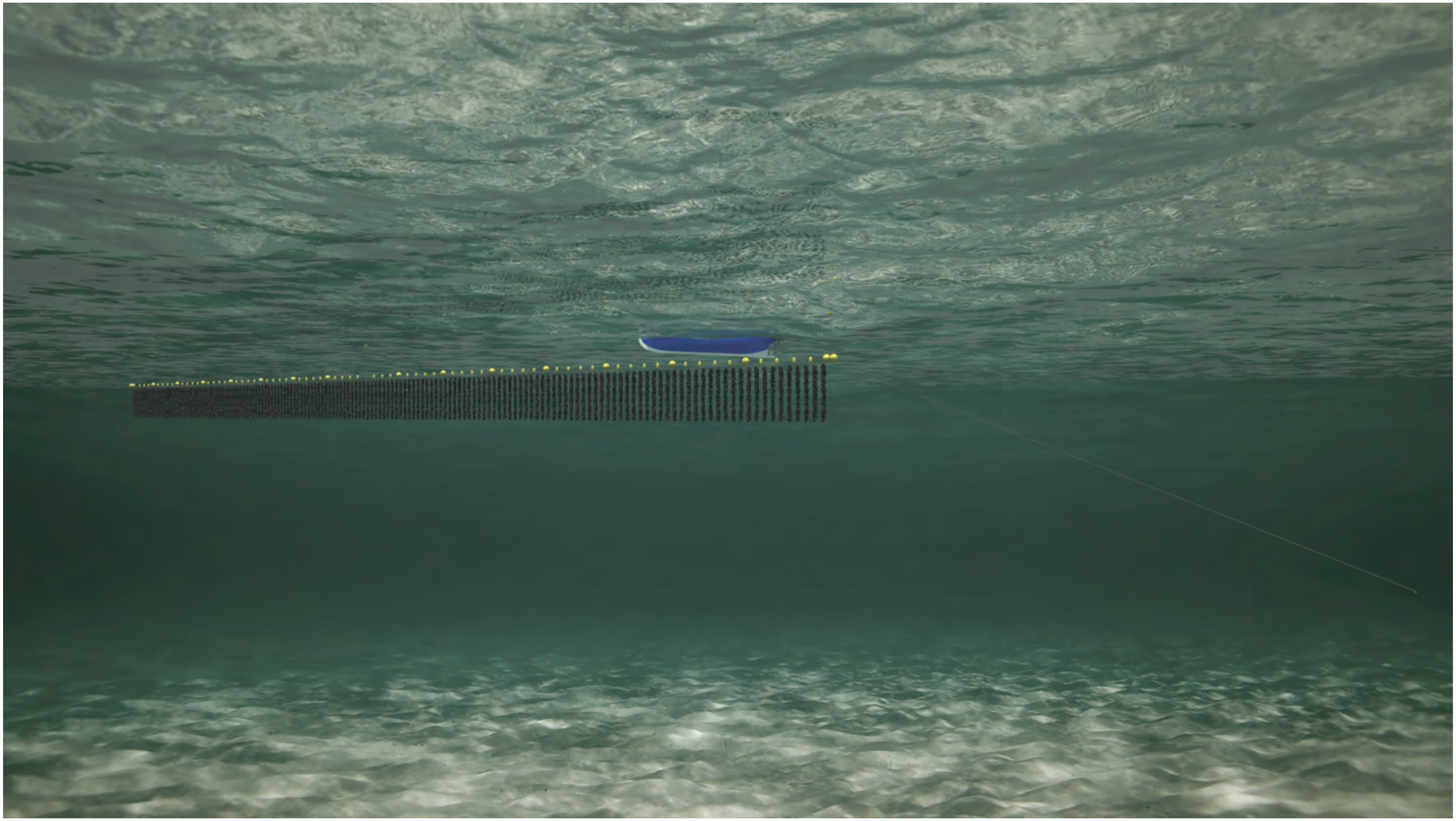

FIGURE 7

Simulated View of Parcel Array Underwater with Anchor Line

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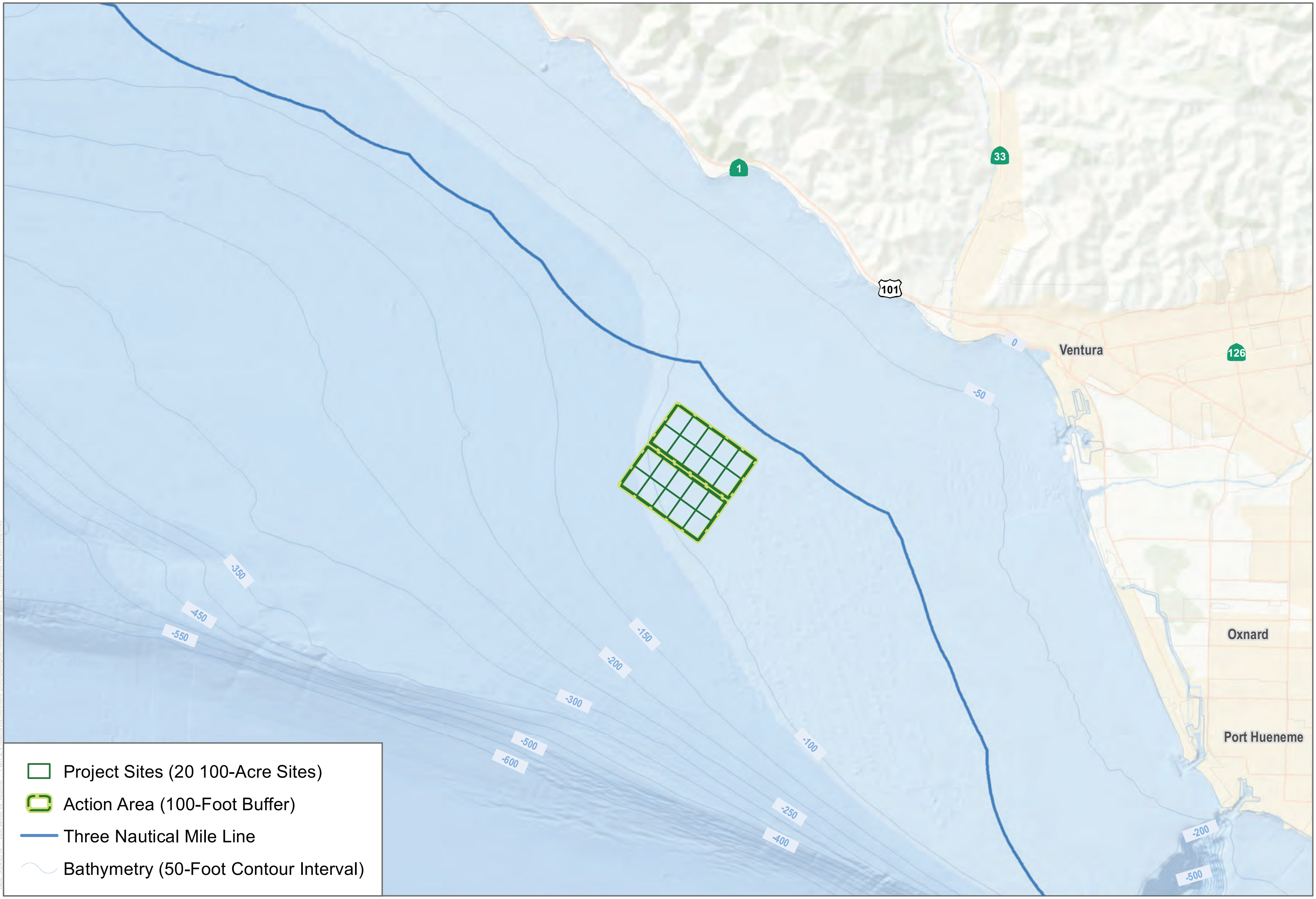

SOURCE: ESRI ArcGIS Online: World Ocean Base

DUDEK

0 1 2 Miles

FIGURE 8

Ventura Shellfish Enterprise Action Area

Biological Assessment for the Ventura Shellfish Enterprise Project

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3.0 REGULATORY SETTING

3.1 Federal Endangered Species Act (1973)

The federal Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 et seq.), as amended, is administered by the USFWS and NMFS. This legislation is intended to provide a means to conserve the ecosystems upon which endangered and threatened species depend and provide programs for the conservation of those species, thus preventing extinction of plants and wildlife. The ESA defines an endangered species as "any species that is in danger of extinction throughout all or a significant portion of its range." A threatened species is defined as "any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Under the provisions of Section 9(a)(1)(B) of the ESA (16 U.S.C. 1531 et seq.), it is unlawful to "take" any listed species. Take is defined in Section 3(19) of the ESA as, "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." A Final Rule published in the Federal Register on November 8, 1999 (64 FR 60727–60731), further defines "harm" as any act that kills or injures fish or wildlife, and emphasizes that such acts may include significant habitat modification or degradation that significantly impairs essential behavioral patterns (e.g., nesting or reproduction) of fish or wildlife. Further, the USFWS, through regulation, has interpreted the terms "harm" and "harass" to include certain types of habitat modification that result in injury to or death of species, which therefore are defined as forms of take. These interpretations, however, are generally considered and applied on a case-by-case basis and often vary from species to species.

In a case where a property owner seeks permission from a federal agency for an action that could affect a federally listed plant or wildlife species, the property owner and agency are required to consult with USFWS. Take prohibitions in Section 9 of the ESA (16 U.S.C. 1531 et seq.) do not expressly encompass all plants. Property owners may take listed plant species without violating the take prohibition if:

- The proposed development is private and does not require federal authorization or permit.
- There are no special federal regulations under Section 4(d) that prohibit take of the plant species.
- There are no state laws prohibiting take of the plant species.

Section 9(a)(2) of the ESA (16 U.S.C. 1531 et seq.) addresses the protections afforded to listed plants. In addition, the ESA provides protection to invertebrate species by listing them as threatened or endangered.

3.2 Marine Mammal Protection Act (1972)

The Marine Mammal Protection Act of 1972 (MMPA), as amended, establishes a federal responsibility for the protection and conservation of marine mammal species by prohibiting the "take" of any marine mammal. The MMPA defines "take" as the act of hunting, killing, capture, and/or harassment of any marine mammal, or the attempt at such. The MMPA also imposes a moratorium on the import, export, or sale of any marine mammals, parts, or products within the U.S. The USFWS and NMFS are jointly responsible for implementation of the MMPA; USFWS is responsible for the protection of sea otters, and NMFS is responsible for protecting pinnipeds (seals and sea lions) and cetaceans (whales and dolphins).

Under Section 101(a)(5)(D) of the MMPA, an incidental harassment permit may be issued for activities other than commercial fishing that may impact small numbers of marine mammals. An incidental harassment permit covers activities that extend for periods of not more than 1 year, and that will have a negligible impact on the impacted species. Amendments to the MMPA in 1994 statutorily defined two levels of harassment. Level A harassment is defined as any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal in the wild. Level B harassment is defined as harassment having potential to disturb marine mammals by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

3.3 Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act)

The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. Sections 1801−1884) of 1976, as amended in 1996 and reauthorized in 2007, is intended to protect fisheries resources and fishing activities within 200 miles of shore. The amended law, also known as the Sustainable Fisheries Act (Public Law 104-297), requires all federal agencies to consult with the Secretary of Commerce on proposed projects authorized, funded, or undertaken by that agency that may adversely affect Essential Fish Habitat (EFH). The main purpose of the EFH provisions is to avoid loss of fisheries due to disturbance and degradation of the fisheries habitat. Managed fisheries found in the project vicinity include, but are not limited to California halibut, ridgeback prawn, sea cucumber trawl, and rock crab trawl fisheries, and set gill net for California halibut and white sea bass

Essential Fish Habitat is addressed in the Essential Fish Habitat Assessment Report for the Ventura Shellfish Enterprise.

4.0 FEDERALLY PROTECTED SPECIES AND CRITICAL HABITAT

4.1 Federally Protected Species

The following resources were used to determine which federally listed, proposed, or federally recognized (i.e., NMFS Species of Concern) species had a potential to occur in the Action Area: NOAA California Species List Tools (NOAA 2018a), NOAA Find a Species Website (NMFS 2018a, filtered for West Coast Region), Channel Islands Bird Checklist (Collins 2011), USFWS Information for Planning and Consulting (USFWS 2018a), USFWS Environmental Conservation Online System (USFWS 2018b), the NOAA Section 6 Program Website (NOAA 2018b), NMFS Species of Concern (NMFS 2018), Environmental Sensitivity Index (ESI 2010), and California Natural Diversity Database (CNDDB; CDFW 2018). The NOAA Species List Tools (NOAA 2018a) and CNDDB (CDFW 2018) were queried for the 7.5-minute U.S. Geological Survey quadrangle that bordered the Pacific Ocean from the Ventura County line south to Port Hueneme, which included Pitas Point, White Ledge Peak, Ventura, Oxnard, and Oxnard OE W.

Information on species distribution, behavior, and habitat preferences was obtained from sources such as NOAA Find a Species Website (NMFS 2018a), Marine Mammal Stock Assessment Reports (e.g., Allen and Angliss. 2014), Marine Mammals of the World: A Comprehensive Guide to Their Identification (Jefferson et al. 2008), Point Blue Conservation Science Whale Alert Map (PBCS 2018), Large Cetacean Analysis for the Santa Barbara Channel Region (Cascadia 2011), Marine Mammal Commission (MMC 2007, 2018), Marine Mammal Haulouts and Rookeries (CDFW 2009), California Bird Records Committee (CBRC 2018), USFWS Recovery Plans, USFWS 5-Year Reviews and/or Federal Registers. Additional resources are reported within the species account information.

The database searches returned a total of 68 species. Of these species, 8 cetaceans, 1 mustelid, 2 pinnipeds, 3 birds, 5 sea turtles, 2 sharks, 8 fish, and 2 invertebrates have a federal status of Endangered or Threatened. Other species that are covered only under the MMPA (no other federal designation) include 21 cetaceans and 4 pinnipeds. Species that are only covered under NMFS Species of Special Concern include 1 shark, 8 fish and 3 invertebrates. Although NMFS Species of Concern designation is not protected under the ESA, this BA includes these species for a complete analysis of species with a recognition from a federal agency.

Based on Dudek's habitat suitability analysis, 13 species have a moderate to high potential to occur in the Action Area. Appendix B provides Dudek's habitat suitability analysis and an assessment of the species potential to occur in the Action Area, including species not expected to occur or a low potential to occur. Section 4.2, below, provides species descriptions and assessments for those species with a moderate to high potential to occur.

4.2 Status of the Species and their Habitat in the Action Area

This section describes the status, basic life history, and potential for occurrence for federally-listed, proposed, or federally recognized species that are identified as potentially affected by the Project Actions as described above.

4.2.1 Federally-Listed Species

4.2.1.1 Cetaceans

Gray Whale

Gray whales (*Eschrichtius robustus*) of the Eastern North Pacific Stock were delisted from the ESA in 1994 (59 FR 31094-31095) but are protected by the MMPA. This species occurs in coastal waters along the west coast of North America from Mexico to Alaska, and in eastern Siberia. Gray whales usually feed along the Bering, Chukchi, and Beaufort seas during the summer, and winter along breeding and calving areas off the coast of Baja California. Calves are born from January to February (NMFS 2018a). During their northward migration from Baja to Alaska, cow-calf pairs stay particularly close to shore to avoid predation by orcas (*Orcinus orca*) (NMFS 2014). Gray whales are bottom feeders that consume benthic amphipods (epibenthic fauna such as mysids, amphipods, polychaete tubeworms). Since this species is a bottom feeder, gray whales are restricted to shallow continental shelf waters (Jefferson et al. 2008). Juvenile gray whales often are found in Santa Barbara Harbor and along the coastline and have been observed in the surf at Ventura Point (J. Davis IV, pers. obs). In Santa Barbara, gray whales are seen during their northward migration within 3 nautical miles from shore, frequently travelling along the kelp line within close proximity to Coal Oil Point where surveys take place for four months beginning in February (Gray Whales Count 2018). Data shows an upward trend for gray whales over the last five years from 736 whales in 2013 to 1,052 whales in 2017. More whales means an increase in the chance for interaction between ships and fishing gear. Ship strikes, entanglement, habitat degradation, whale watching harassment, low-frequency noise disturbance and impacts from commercial/industrial development are the largest threats to gray whales (NMFS 2018c). In California, ship strikes of gray whales are the most commonly reported followed by fin, blue, humpback, and sperm whales (NOAA 2017b).

Potential for Occurrence. High potential to occur. This species is a frequent visitor to the Ventura coastline and the Santa Barbara Channel and is commonly observed during migration, especially during the northward migration from Baja to Alaska. Gray whales are often observed close to shore, and there have been many regular occurrences in the Action Area on a yearly basis (PBCS 2018). The local whale watching boat, The Condor Express, has sighted 12 gray whales within 5 miles of the project area since the start of the 2018 gray whale season in the Santa Barbara Channel (Condor Express 2018, PBCS 2018). Whales are traveling northward at about 2.5 miles from shore as seen for example on the local whale watching trip in Santa Barbara Channel on March 15, 2018 (Condor Express 2018). Gray whale migration routes overlap with the Action Area and encompass the entire Santa Barbara Channel (Calambokidis et al. 2015; NOAA 2012; NOAA 2018e).

Humpback Whale

The humpback whale (*Megaptera noaengliaea*) is a federally-listed endangered species and is protected by the MMPA. Humpback whales occur throughout the North Pacific. North Pacific breeding areas fall broadly into three regions: 1) western Pacific (Japan and Philippines); 2) central Pacific (Hawaiian Islands); and 3) eastern Pacific (Central America and Mexico). Along the U.S. west coast, one stock is currently recognized that includes individuals that appear to be part of two separate feeding groups, a California and Oregon feeding group and a northern Washington and southern

British Columbia feeding group. Humpbacks from both groups have been matched to breeding areas off Central America, mainland Mexico, and Baja California. The population is estimated at approximately 1,918 animals for the California/Oregon/Washington stock (NOAA 2015). Migrating individuals from the Central America Distinct Population Segment (DPS) may migrate through the Action Area on their way to feeding grounds located off the Pacific Northwest (NMFS 2018a). This species stays near the surface of the ocean when migrating and prefers shallow waters when feeding and calving. This species can be seen close to shore when conditions allow for prey switching from krill to small schooling fish, which inhabit nearshore areas. Humpbacks are commonly found feeding in the Santa Barbara Channel during summer and fall, with some observations closer to shore in the Ventura Area. Typically, humpback whales utilize predictable habitats offshore along the continental shelf break and slope where upwelling occurs where they feed on krill (Yen et al. 2004). However, when conditions change and krill is not available, humpback whales are known to prey switch and feed on small schooling fish, which occur in nearshore waters (Fleming et al. 2016). In July 2017, a humpback found its way into Ventura Harbor (VC Star 2017). In addition, this species is strongly associated with the 200 meter isobath (Cascadia 2011). Threats to humpback whales include ship strikes, entanglement in fishing gear, whale watch harassment, and habitat impacts (NMFS 2018c). On the west coast of the United States, ship strikes are an important cause of mortality for baleen whales, including humpback, blue, fin and gray whales (Berman-Kowalewski et al. 2010).

Potential for Occurrence. Moderate to high potential to occur. Foraging and migration habitat is present in the Action Area. Numerous observations of this species have been documented within the Santa Barbara Channel both close to shore and near the Channel Islands (PBCS 2018). NOAA's cetacean mapping tool indicates humpback whale feeding habitat is close to the Action Area and is prevalent in the Santa Barbara Channel (NOAA 2018e). The project area is situated near feeding Biologically Important Areas (BIAs) and encompasses moderate humpback whale predicted densities for the Santa Barbara Channel (Calambokidis et al. 2015). Habitat-based density models show high predicted density in the action area (Becker et al. 2016), and Becker et al. (2017) show a marked seasonal difference in the area, with the highest predictions for this species in winter and spring for the Santa Barbara Channel.

Fin Whale

The fin whale (*Balaenoptera physalus physalus*) is a federally-listed endangered species and also is protected by the MMPA. Fin whales occur worldwide, primarily in temperate to polar latitudes and are less common in the tropics. They are one of the more commonly seen whales in the Northern Hemisphere. Its distribution is not well known, but it generally migrates poleward to feed in the summer and to the subtropics to breed in the winter (Jefferson et al. 2008). The location of the winter breeding grounds is unknown. Fin whales feed on krill, small schooling fish, copepods and squid (NOAA 2018a). They are usually solitary or travel in pairs, but on feeding grounds there can be groups of up to 20, with 100 or more whales loosely grouped (Carwardine et al. 1998). The California/Oregon/Washington stock has approximately 3,200 fin whales. Fin whales prefer deeper, offshore waters and are a fast swimming species. This species is more commonly associated with the 200 meter isobath, which is approximately 7.4 miles from the Action Area (Cascadia 2011). Threats to this species include ship strikes, entanglement and ocean noise pollution (NOAA 2018a). On the west coast of the United States, ship strikes are an important cause of mortality for baleen whales, including humpback, blue, fin and gray whales (Berman-Kowalewski et al. 2010).

Potential for Occurrence. Moderate potential to occur. This species has been observed migrating and feeding through the Santa Barbara Channel on many occasions with one occurrence (12 individuals) noted within 1 mile of the Action Area in 2011 (PBCS 2018; Cascadia 2011). Resources (krill, small schooling fish and squid) are likely present in the Action Area. The project area is situated within moderate fin whale predicted densities within the Santa Barbara Channel (Becker et al. 2016; Calambokidis et al. 2015).

4.2.1.2 SEA TURTLES

Loggerhead Sea Turtle

The loggerhead sea turtle (*Caretta caretta*) is a federally-listed endangered species, and also is protected by the MMPA. The North Pacific Ocean DPS occurs in tropical to temperate waters in the Pacific Ocean. Loggerhead sea turtles migrate from nesting grounds in Japan and Australia to feeding grounds located along the west coast from central to North America. Nesting occurs mainly on open beaches or along narrow bays having suitable sand, and often in association with other species of sea turtles. They choose ocean beaches with high wave energy, narrow, steep slopes, and coarse-grain sand for their nests. There are no known nesting locations that occur along the western seaboard of the U.S. or Hawaii (NMFS and USFWS 1998a). The closest known loggerhead nesting beaches in the North Pacific Ocean are located in Japan (NMFS and USFWS 2007). Baja California has the largest known aggregations of loggerhead sea turtles. Migration occurs along nearshore coastal waters (neritic zone). Loggerhead sea turtles typically feed on benthic invertebrates in hard bottom habitats, although fish and plants are occasionally consumed (NMFS and USFWS 1998a). During ideal conditions (water temperature/break), this species is known to migrate along the coast of California, including the Santa Barbara Channel. Sightings of this species along the U.S. west coast typically are of juveniles measuring 20-60 centimeter shell length (NMFS and USFWS 1998a). Loggerhead sea turtles are subject to several threats including loss of nesting habitat; disorientation of hatchlings by beachfront lighting; degradation of foraging habitat; marine pollution and debris; ship strikes; disease; and incidental take from commercial trawling, longline, and gill net fisheries (NMFS and USFWS 1998a).

Potential for Occurrence. High potential to migrate. Although there is no suitable feeding habitat (hard bottoms, benthic invertebrates) within the Action Area, during migration they may enter the Action Area. This species has been observed at San Clemente Island (NMFS and USFWS 2007). This species has stranded on Ventura beaches in 2014 and 2017 (Dan Lawson, NMFS Protected Resources Division, 2018, pers. comm.). Loggerhead sea turtles are not expected to nest in the Action Area. No beach habitat is present in the Action Area and the Santa Barbara Channel area is outside of nesting range.

Green Sea Turtle

The green sea turtle (*Chelonia mydas*) is a federally-listed threatened species, and also is protected by the MMPA. The Eastern Pacific DPS ranges from Baja California to southern Alaska. However, the green sea turtle is more common from San Diego southward. This species forages in the open ocean when migrating as well as shallow waters of lagoons, bays, estuaries, mangroves, eelgrass, and seaweed beds. They are herbivorous and feed primarily on seagrasses and algae. Green sea turtles are generally found in shallow waters except when migrating. It is a regular visitor in the waters off the southwest coast of the United States. Residents occur in the San Gabriel River, Long Beach (NMFS and USFWS 1998b). The closest known nesting occurrences are in Mexico (NMFS and USFWS 1998b). This species requires open beaches with a sloping platform and minimal disturbance for nesting. Green sea turtles have strong nesting site fidelity and often make long distance migrations between feeding grounds and nesting beaches. Threats to the green sea turtle include commercial harvesting, loss of nesting habitat; disorientation of hatchlings by beachfront lighting; nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; ship strikes; and incidental take from commercial fishing operations (NMFS and USFWS 1998b).

Potential for Occurrence. High potential to occur. They have been captured at Sterns Wharf in Santa Barbara harbor and at the Channel Islands. This species has stranded on Santa Barbara and Ventura beaches in 2014, 2015 and 2017 (Dan Lawson, NMFS Protected Resources Division, 2018, pers. comm.). This species may migrate and/or forage in the Action Area. Green sea turtles are not expected to nest in the Action Area.

Olive Ridley Sea Turtle

The olive ridley sea turtle (*Lepidochelys olivacea*) is a federally-listed threatened species, and also is protected by the MMPA. Olive ridley sea turtles occur worldwide in tropical and warm temperate ocean waters. In the eastern Pacific, this species distribution ranges from Southern California to Northern Chile. Olive Ridley sea turtles are mostly pelagic but will also inhabit coastal areas. This species feeds on algae, lobster, crabs, tunicates, mollusks, shrimp, and fish. The olive ridley sea turtle gets its name from the olive coloration of its heart-shaped carapace. Their nesting behavior is called "arribada" nesting, whereby large groups gather and come ashore and nest all at once. This nesting behavior makes the olive ridley sea turtle vulnerable to harvest of eggs and even adult turtles. The breeding populations on the Pacific Coast of Mexico are listed as endangered and all other populations are listed as threatened under the ESA (NOAA 2018f). Their Pacific nesting grounds include the Pacific coasts of Mexico and Central America. As a highly migratory species, they are encountered in U.S. waters as they travel between nesting and foraging habitats (NOAA 2018f).

Potential for Occurrence. Moderate potential to occur. They have been captured at Sterns Wharf in Santa Barbara harbor and at the Channel Islands. This species may migrate and/or forage in the Action Area. Olive ridley sea turtles are not expected to nest in the Action Area. This species has been observed in the Los Angeles Harbor (NMFS and USFWS 1998e). This species has stranded on Santa Barbara County beaches in 2014 and 2015 (Dan Lawson, NMFS Protected Resources Division, 2018, pers. comm.).

4.2.2 OTHER NON-LISTED SPECIES PROTECTED UNDER THE MMPA

4.2.2.1 Cetaceans

Common Minke Whale

The common minke whale (*Balarnoptera acutorostrata*) is protected by the MMPA. Minke whales are found throughout the world in polar, temperate, and tropical waters in both coastal and offshore habitats (NMFS 2018a). They are the smallest baleen whale in North American waters. It migrates seasonally and travels great distances. Common minke whales are the smallest baleen whale in North American waters. Some individual minke whales are residents in California waters. They are often solitary but sometimes travel in groups of 2-3 individuals (NMFS 2018a). This species feeds on copepods, krill, and small schooling fish. Minke whales are a normally cryptic species but are sometimes curious and will approach vessels (especially stationary vessels). Minke whales are subject to the following threats including entanglement (gill nets, seine nets, herring weirs, lobster traps, driftnets, longlines, and trawls), habitat disturbance, human interactions, noise pollution, and ship strikes (NMFS 2018a).

Potential for Occurrence. Moderate potential to occur. Foraging and migration habitat is present in the Action Area. Minke whales feed on euphausiids, copepods and small schooling fish, which are present in the Channel. In addition, this species has been recorded since 1988 in the Santa Barbara Channel and within 1 mile of the Action Area, although this species is usually in slightly deeper waters (PBCS 2018). Stock reports for the California/Oregon/Washington Stock show minke whales in close proximity to the northern Channel Islands, within the Santa Barbara Channel (NMFS 2016c).

Common Bottlenose Dolphin

The common bottlenose dolphin (*Tursiops truncatus*) is protected by the MMPA. Bottlenose dolphins have a worldwide distribution ranging from 45°N to 45°S latitude and are found in temperate and tropical waters. Coastal populations often migrate into bays, estuaries, and river mouths. Offshore populations inhabit pelagic waters along the continental shelf. The common bottlenose dolphin, as its name suggests, is a common coastal species, and a generalist feeder (squid, fish and crustaceans) (Jefferson et al. 2008). Common bottlenose dolphins are comprised of two sub-populations: coastal bottlenose dolphins and offshore bottlenose dolphins. Coastal bottlenose dolphins are known to regularly occur within 1 kilometer of shore (Carretta et al. 1998). In southern California, they are found within 500 m of the shoreline 99% of the time and within 250 m 90% of the time (NMFS 2017g). On the other hand, offshore bottlenose dolphins inhabit areas at distances greater than a few kilometers from the mainland (NMFS 2011a). They may travel alone or in groups and commonly work together to herd prey. They are active at the surface and will approach ships and even other whales to bow ride as an energy efficient mode of transportation (NMFS 2018a). They interact with fisheries and are often seen following shrimp trawlers (Jefferson et al. 2008). Common bottlenose dolphins are subject to the following threats including entanglement (gill nets, driftnets, longlines, and trawls), habitat degradation, noise pollution, pollution from oil spills and chemicals, and ship strikes.

Potential for Occurrence. High potential to occur; specifically for offshore bottlenose dolphin populations. This species has many occurrences throughout the Santa Barbara Channel and within or directly adjacent to the Action Area (PBCS 2018). Habitat-based density models show high predicted density for this species in the action area (Becker et al. 2016).

Long-beaked Common Dolphin

The long-beaked common dolphin (*Delphinus capensis capensis*) is protected by the MMPA. Long-beaked common dolphins are commonly found along the U.S. west coast, from Baja California (including the Gulf of California) northward to about central California. Long-beaked and short-beaked common dolphins are similar species but have different habitat preferences. Long-beaked common dolphins prefer coastal waters. Long-beaked common dolphins are not as abundant as short-beaked common dolphins. They select shallower areas in tropical, subtropical, and warmer temperate to cool waters closer to the coast (within 50-100 nautical miles (90-180 km)) and the continental shelf (NMFS 2018a). This species will sometimes come close to shore within waters that are only a few meters deep (Jefferson et al. 2008). Long-beaked common dolphins usually travel in pods of 100-500 individuals, but have been seen numbering in the thousands. They are active at the surface and will approach ships to bow ride as an energy efficient mode of transportation (NMFS 2018a). Long-beaked common dolphins are subject to the following threats: entanglement (gill nets, driftnets, longlines, and trawls).

Potential for Occurrence. High potential to occur. Foraging resources (small schooling fish and squid) are likely present in the Action Area. This species has been recorded multiple times and in great numbers (e.g., occurrences with 1,500 individuals) in the Santa Barbara Channel, including the Action Area (PBCS 2018). Habitat-based density models show high predicted density for this species in the action area (Becker et al. 2016; Douglass et al. 2014).

Short-beaked Common Dolphin

The short-beaked common dolphin (*Delphinus delphis delphis*) is protected by the MMPA. Short-beaked common dolphins inhabit warm tropical to cool temperate waters that are primarily oceanic and offshore. Off the U.S. west coast, the majority of the populations are found off California, especially during the warm-water months. This species occurs along the continental slope in waters 650-6,500 feet (200-2,000 m) deep (NMFS 2018a). This species is often associated with areas of upwelling and areas of steep sea-bottom, and as an offshore species they are commonly associated with pilot whales (Jefferson et al. 2008). Short-beaked common dolphins prefer deeper, offshore habitat. Short-beaked common dolphins travel in pods of hundreds to thousands of individuals. They are active at the surface and will approach ships and even other whales to bow ride as an energy efficient mode of transportation (NMFS 2018a). Short-beaked common dolphins are subject to the following threats: entanglement (gill nets, driftnets, longlines, and trawls).

Potential for Occurrence. Moderate to high potential to occur. Foraging resources (small schooling fish and squid) are likely present in the Action Area. This species has been recorded multiple times and in great numbers (e.g., occurrences with 1,500 individuals) in Santa Barbara Channel and adjacent to the Action Area (PBCS 2018). Habitat-based density models show high predicted density in the action area (Becker et al. 2016; Douglass et al. 2014), and indicated a marked seasonal difference in the area, with the highest predictions for this species in summer and fall for the Santa Barbara Channel (Becker et al. 2017; Campbell et al. 2014).

Pacific White-sided Dolphin

The Pacific white-sided dolphin (*Lagenorhynchus obliquidens*) is protected by the MMPA. Pacific white-sided dolphins are found in temperate waters in the North Pacific and they utilize waters over the continental shelf to the deep open ocean (NMFS 2018a). In North America, in the Pacific they range from the Gulf of Alaska to the Gulf of California. Pacific white-sided dolphins exhibit seasonal inshore/offshore and north/south movements, but are generally non-migratory. This species feeds mostly on cephalopods and small schooling fish in deep offshore waters but also on the continental shelf (Jefferson et al. 2008). They are often observed working together in pod sizes of 10-100 individuals working together to herd schools of fish. Pacific white-sided dolphins are subject to several threats: entanglement in fishing gear (gillnets, longline), pollution, noise (will react to pingers), and ship strikes (NMFS 2018a). They will often bow ride with vessels as a method of energetically efficient transportation.

Potential for Occurrence. Moderate potential to occur. Foraging habitat is present in the Action Area. In addition, this species has numerous occurrences within the Santa Barbara Channel (mostly offshore, this species is commonly associated with other deep-water cetaceans such as Risso's dolphins and Northern right whale dolphins (NMFS 2018a)) and a few occurrences in the Action Area (PBCS 2018). Habitat-based density models show high predicted density for this species in the action area (Becker et al. 2016), particularly in the fall (Campbell et al. 2014; Douglass et al. 2014).

4.2.2.2 Pinnipeds

California Sea Lion

The California sea lion (*Zalophus californianus*) is protected by the MMPA. It inhabits the eastern North Pacific Ocean from central Mexico to Canada. This species is present along the west coast from the Tres Marias Islands off Puerto Vallarta, throughout the Gulf of California and the Baja peninsula, north to Alaska. Males (adults, subadults, and juveniles) undertake a northward migration to Central California and Washington after the breeding season in southern rookeries. They are generalist opportunistic feeders (squid and fishes in areas of upwelling) and utilize the continental shelf and slope, but have also been observed in deeper oceanic waters (Jefferson et al. 2008). California sea lions prefer shallow coastal and estuarine waters and sandy beaches for haul out sites but will also haul out on marina docks, jetties, and buoys (NMFS 2018a). On land, they are wary of humans, but in the water they are curious, bold and will approach boats looking for fish. They will take fish from commercial fishing gear, sport fishing lines, and fish passage facilities at dams and rivers. They are less wary of people because they associate people with an easy meal. They may also be curious about construction activities. California sea lions are subject to several threats: entanglement in fishing gear (gillnets, longline), pollution, ship strikes and human caused injuries.

Potential for Occurrence. High potential to occur. This species has known haulouts along all of the Channel Islands and rookeries at San Nicholas Island (CDFW 2009, NMFS 2018a).The project site is within their distribution range (Lowry and Carretta 1999; NOAA 2018a). California sea lions mostly forage near mainland coastlines, the continental shelf, and seamounts. Adult females feed between 10–100 km from shore (Lowry and Carretta 1999) while adult males may forage up to 450 km from shore (Weise et al. 2006).

Pacific Harbor Seal

The Pacific harbor seal (*Phoca vitulina*) is protected by the MMPA. It is widespread in coastal areas of the Northern Hemisphere, in temperate and polar habitats. It is generally non-migratory and inhabits areas from the coast to the continental slope (Jefferson et al. 2008). On the U.S. west coast, this species is found in coastal and estuarine waters from Canada to Baja California, Mexico. Harbor seals inhabit temperate coastal habitats and use rocks, reefs, beaches, and drifting glacial ice for hauling out and pupping sites (NMFS 2018a). Diving averages less than 35 meters and they are generalist feeders (a variety of fish, cephalopods and crustaceans) (Jefferson et al. 2008). On land, harbor seals are very wary and shy, and will stampede into the water when disturbed. In the water, they are curious but cautious and will peer at people/boats. Harbor seals are subject to several threats: incidental capture in fishing gear (gillnets, trawls, purse seines, weirs), ship strikes, pollution, power plant entrainment, and harassment by humans when on land.

Potential for Occurrence. High potential to occur. Harbor seals have known haulouts and rookeries at Carpinteria Bluffs (Santa Barbara County) and Point Mugu (Ventura County); and haulouts from Point Conception to Santa Barbara and along all of the Channel Islands (CDFW 2009).

4.3 Critical Habitat

No designated critical habitat for federally-listed threatened and endangered species occurs within the Action Area (USFWS Environmental Online System (USFWS 2018b), NOAA Critical Habitat Maps (NOAA 2018c)).

5.0 EFFECTS OF THE ACTION

5.1 Effects of the Project Actions

This section analyzes all of the potential effects to listed species from Project Actions. As described in NMFS (2009) and 50 CFR 402.02, **direct effects** are those that have direct or immediate effects on the species or its habitat during construction. These effects include temporary changes in marine wildlife behavior from construction noise; and temporary construction disturbance to feeding habitat. **Indirect effects** are those that are caused by or will result from the Project Action later in time, after completion of initial construction, but still reasonably certain to occur. These effects include marine mammal disturbance due to inadvertent spills or introduction of chemical pollutants; release of invasive species, parasites, and pathogens from seed stock; effects on sediment quality due to biodeposits and changes in benthic invertebrate species; phytoplankton consumption, and fouling organisms and non-native species. Effects that may occur **both** during construction (direct effects) and later in time (indirect effect) include entanglement in aquaculture gear; vessel strikes; noise disturbance from vessels, and interference with migration or feeding routes. Each of these effects is discussed more in detail below. In addition, further assessments and mitigation measures aimed at avoiding, reducing, or remedying the effect of Project Actions are recommended below.

Direct and Indirect Effects (Occurring During and After Construction)

- **Potential for Marine Wildlife Entanglement in Aquaculture Gear**. The Project Actions may result in marine mammal entanglement. Mussel aquaculture utilizes various ropes in the water column that may pose an entanglement risk to cetaceans and sea turtles. In contrast to fishing gear, however, there are far fewer documented entanglement cases in mussel aquaculture gear. Interactions and entanglements with longline aquaculture gear worldwide are rare, and close approaches by protected species are seldom documented (Price et al. 2016). West coast entanglement summaries for 2015 and 2016 report no entanglements from mussel aquaculture fisheries (NOAA 2017c). There have been no reported marine mammal entanglements associated with Santa Barbara Mariculture, which has operated a 25-acre mussel aquaculture farm in the Santa Barbara Channel, using similar cultivation techniques, for over a decade (CDFG 2018).

  Reported entanglements are predominantly from crab, gillnet and spiny lobster fisheries. Fixed fisheries gear (e.g., pot and trap gear) is the most commonly recognized and reported gear type causing entanglements since 2000. Documented entangled animals and disentanglement efforts in the Pacific Northwest have mostly involved gray whales and humpback whales and have involved both gill nets and crab gear. While not as common, both fin and blue whales are sometimes entangled in gill nets and crab gear based on a few stranded animals and scarring on live animals (NOAA 2014). More recently, from 2014 to 2017, the majority of the whale entanglements involved humpback whales and most of the entanglements were from commercial Californian and Washington Dungeness crab traps, and gillnet fisheries (NOAA 2017c). Large whale species appear to be more vulnerable to entanglement than smaller cetacean species, such as dolphins and porpoises, which are more prone to be caught as bycatch in nets due to their smaller size (Benjamins et al. 2014). Furthermore, juveniles are more likely to be entangled due to their inquisitive nature and inexperience. The proposed mussel culture techniques have some significant differences as compared to crab and fishing gear that reduce the potential for marine mammal entanglement. As opposed to fishery gear, the mussel aquaculture gear is stationary, the lines are larger, and the gear is not designed to catch or ensnare fish. Further, as described below, the lines will be highly tensioned, which reduces the risk of marine mammals being caught in slack lines. Therefore, the project design is expected to pose a much smaller risk to marine mammal entanglement compared to longline fishing methods.

Cetaceans also have different ways in which they can perceive mussel farm lines and navigate around them. For example, odontocetes, such as harbor porpoises, are able to use echolocation to detect the lines (Lloyd 2003; Nielson et al. 2012), and minke whales are able to detect and avoid ropes that are white or black (Kot et al. 2012).No entanglements have been reported for pinnipeds with this method of mussel aquaculture (Lloyd 2003, Clement 2013).

Entanglements involving sea turtles and cetaceans have occurred in mussel aquaculture operations in Australia, New Zealand, Iceland, South Korea and Canada (Young et al. 2015). Entanglement risk is highest at mussel farms that employ mussel spat collecting ropes, as these ropes are thinner and more flexible making them more conducive to entanglement (Keeley et al. 2009). The majority of entanglements have involved these thinner mussel spat collector ropes or buoy lines connected to them. To avoid this concern, Mitigation Measure BIO-4 requires all mussel spat to be provided by land-based hatcheries certified by the California Department of Fish and Wildlife (or collected from grow-out lines) and will prohibit spat collector ropes. The project will only utilize grow-out ropes, which are thicker and more tightly anchored and tensioned (Lindell 2014; Moore & Wieting, 1999; Price et al. 2017).

Lines with spat or mature muscles will be freely hanging (not looping ropes), thereby allowing wildlife to traverse through the area. These lines will likely be heavy enough and under sufficient tension to prevent loose lines from becoming entangled and forming loops or knots along the longline. In addition, it is anticipated that when muscles are harvested, the lines will immediately be re-seeded with spat. Project design specifications are also proposed to minimize protected marine mammal and sea turtle entanglement. The longlines that will be used are a thick (1-inch-diameter) tensioned (to approximately 800 pounds) rope that is not conducive to wrapping around or entangling protected species. The mussel grow-out ropes themselves are typically planted with seed 3 inches thick and may grow to be stiff with byssus at diameters of 10 inches or more at harvest, thus making them very unlikely sources of entanglement. As an additional precaution, grow-ropes will be attached to the headrope with a low-breaking-strength twine (4-millimeter (0.16-inch) diameter; <1,000 pounds), which will facilitate rapid detachment in the unlikely event of any marine mammal interaction with the longline (see Mitigation Measure BIO-2).

Other potential entanglement points include (1) two vertical lines to the surface buoys marking each end of the headrope and (2) one pull-up buoy line for servicing at the midpoint. To minimize these potential entanglements, a 1,100-pound breakaway link will be installed between these buoys and the vertical lines, similar to strategies used to mitigate potential entanglement in trap fisheries in the northeastern United States (NOAA 2008). Buoy lines between the surface and headrope are generally under tension partially equivalent

(0 to 10 kilograms (0 to 22 pounds)) to their full buoyancy (42 kilograms (93 pounds)). Overall, the longline configuration produces a fairly rigid structure under tension, with stout lines and little slack.

Other mitigation measures have been incorporated into the project to further minimize the potential for marine mammal entanglement. The project will incorporate a marine wildlife entanglement plan to regularly check equipment for evidence of marine mammal entanglement (MM BIO-1) and require a qualified marine wildlife observer to be present during construction activities that can halt activities if marine mammals are observed (MM BIO-3). Further details regarding these measures are found in the mitigation measures provided in Section 5. After the incorporation of these mitigation measures and given the lack of documented marine mammal entanglement incidents associated with the proposed aquaculture cultivation method, impacts associated with marine mammal entanglement are considered insignificant.

- **Ship Strikes Due to Increased Activity**. Vessel strikes are known to be a hazard to a number of marine species, particularly whales. Project Actions may result in an additional 20 to 40 small boats traveling to lease sites on an average of 3 times per week to daily and would therefore contribute to increased boat traffic in the area during both construction and regular operations. Between 1988 and 2012, there were 100 documented large whale ship strikes along the California coast (NOAA 2017b). Large whale species are vulnerable to collisions with all vessel types, classes and sizes (NOAA 2017b); however, most collisions are associated with large container and freight ships due to their mass and the speed at which they transit the shipping lanes (Silber et al. 2010). When large vessels such as container ships are involved, the crew may be unaware a strike has occurred. As such, the number of ship strikes to whales is likely under reported. Most cases where whales were known to be severely hurt or killed occurred at vessel speeds of 14 knots or more and were caused by large ships of 80 meters or more in length (Laist et al., 2001). However, collisions with smaller boats, such as those that would be used for the aquaculture operations, do have the potential to injure or kill marine wildlife, especially when travelling at high speeds (Ritter 2012). Large container or freight ships will not be used during construction of the mussel farm nor during regular maintenance. To address this concern, the project will require continuous education regarding how to properly interact with marine mammals if encountered during operations (MM BIO-5) and include vessel management requirements if vessels observe marine mammals in close proximity to the vessel (MM BIO-6). After incorporation of these mitigation measures, impacts associated with ship strikes are considered insignificant.
- **Interference with Migration or Feeding Routes.** The Project Actions will result in increased human activity and the establishment of aquaculture facilities across 2,000 acres. Available habitat within Southern California Bight includes 400 miles of recessed coastline from Point Conception, Santa Barbara County to Cabo Colnet, Mexico, (SCCWRP 2016) and comprises over 6 million acres. Increased human activity and facilities during construction and operation may deter marine wildlife from using previously open and unoccupied areas for feeding or migration in different spatial and temporal ways. As a result, marine wildlife may be forced to seek feeding or open migration routes outside of the Action Area, thereby causing wildlife to expend time and energy seeking these resources. The project site is within the northward migration route for gray whales but it is largely unknown how many marine species perceive and respond to man-made structures in the ocean (Price et al. 2017). Habitat exclusion can range from low to high risk depending upon

the location and density of mussel farms. Existing studies have demonstrated the potential for species to be excluded from foraging habitats. Lloyd (2003) describes how curtains of mussel growing lines may act as barriers and impede hunting behavior in dolphins (dusky, common, and Hector's dolphins) by interfering with sonar signals for finding prey and communicating with other members of the pod. Dusky dolphins rarely enter mussel farms (Markowtiz et al. 2004). Whales and some dolphins tend to be more sensitive, while pinnipeds and both common and bottlenose dolphins seem attracted to the underwater arrays (Clement 2013). Dusky dolphins were observed foraging adjacent to mussel farms pointing to the suggestion that fish may be attracted to the structure (Price et al. 2017). Most studies were conducted in nearshore waters and it is uncertain how, or even if these results, pertain to offshore longline mussel farms in deep open ocean locations. However, this effect would be minimal due to the expansive open ranges that are open for marine wildlife in the greater region, and the project site is not located within critical habitat.

Direct Effects (Construction-Related Effects)

- **Changes in Marine Wildlife Behavior from Construction**. Disturbance to marine wildlife such as construction-related noise could occur from anchor installation and array set up. Noise effects may have a variety of indirect effects on marine wildlife species, including increased stress, weakened immune systems, altered feeding behavior, altered mother-infant relationships, displacement due to startle, degraded communication with conspecifics (e.g., masking), damaged hearing from extremely loud noises, and increased vulnerability to predators (MMC 2007; NMFS 2016c; Thomsen 2009). Another potential effect is abandonment of an area due to human disturbance which has been shown in several species (Lloyd 2003). The NOAA Fisheries criteria distinguishes between impulse sound, such as that from impact pile driving, and continuous sounds, such as that from vibratory pile driving. The Level A (injury) and Level B (disturbance) threshold levels used by NOAA Fisheries are summarized in Table 2 for cetaceans (whales, dolphins, and porpoises) and pinnipeds (seals and sea lions). NOAA is developing comprehensive guidance on sound characteristics likely to cause injury and behavioral disruption in the context of the Marine Mammal Protection Act (MMPA), Endangered Species Act (FESA) and other statutes. Until formal guidance is available, NOAA Fisheries uses conservative thresholds of received sound pressure levels from broad band sounds that may cause behavioral disturbance and injury, and the criterion levels specified in Table 1 are specific to the levels of harassment permitted under the MMPA (NMFS 2018e). Project Activities will temporarily disturb and alter the seafloor habitat from the placement of screw anchors used to hold the lines, ropes, floats, and buoys. Construction-related noise with the installation of sand screw anchors is very low in the water, with only a 50 horsepower hydraulic power pack on the boat, stipulating that noise will not approach NOAA thresholds. Furthermore, rotation speeds are also very low, which minimizes entanglement of marine species. The anchor installation disturbs less than 1 square meter of sea bed on installation and once installed no rope or chain touches the sea floor which also minimizes seabed disturbance (Fielder Marine Services, New Zealand, Pers.comm). Marine species that are the focus of this assessment are highly mobile and have the ability to temporarily avoid the project site during construction activities. Therefore, noise impacts associated with installation of equipment are considered insignificant.

Table 1
NOAA Fisheries Acoustic Thresholds

Criterion	Criterion Definition	Threshold
In-Water (Excluding Tactical Sonar and Explosives)		
Level A	PTS (injury) conservatively based on TTS	190 dB $_{rms}$[1] for pinnipeds 180 dB $_{rms}$ for cetaceans
Level B	Behavioral disruption for impulsive noise (e.g., impact pile driving)	160 dB $_{rms}$
Level B	Behavioral disruption for non-pulse noise (e.g., vibratory pile driving, drilling)	120 dB $_{rms}$
In-Air		
Level A	PTS (injury) conservatively based on TTS	None established
Level B	Behavioral disruption for harbor seals	90 dB $_{rms}$
Level B	Behavioral disruption for non-harbor seal pinnipeds	100 dB $_{rms}$

Indirect Effects (After Completion of Initial Construction)

- **Oil Spills.** Construction and harvesting operations (and the use of any heavy equipment) could result in water-quality effects due to chemical-compound pollution (fuel, oil, lubricants, inadvertent spills, and other materials) in the event of an oil spill. As with any mechanized machinery, there is a small risk of accidental discharge of fuel, lubricants, or hydraulic fluids, which could affect marine wildlife in the area and result in injury and/or mortality to wildlife in the area of the contaminant through ingestion, physical contact that reduces survival functions (e.g., oiled wildlife), or a reduction in suitable feeding habitat. Although spills of this nature are detrimental to aquatic organisms, it is expected that the impacts would be negligible because of the limited occurrence of spills and corrective actions.
- **Marine Debris**. The project has the potential to create marine debris if aquaculture gear breaks free through poor maintenance or damage from storm or wave activity. Entanglement may occur if aquaculture gear comes loose, washes away, or otherwise escapes into the environment as a result of tide, wind, or wave action. Additional risk may occur if derelict fishing gear, lines, and other materials become entangled in the longline arrays of this project, which could compromise structural integrity and/or exacerbate the risk of marine wildlife entanglements. There is also a risk that marine debris could be ingested by gray whales and sea turtles. To address this concern, Mitigation Measure BIO-10 incorporates and aquaculture gear monitoring and escapement plan to routinely check and maintain aquaculture gear to prevent breakage and quickly retrieve any gear that breaks free. Further, Mitigation Measure BIO-11 incorporates a decommissioning plan to require timely removal of aquaculture gear once shellfish operations cease on a parcel. Upon incorporation of the proposed mitigation, impacts associated with marine debris are considered insignificant.

1 RMS refers to the sound pressure level that is square root of the sum of the squares of the pressure contained within a defined period from the initial time to the final time. For marine mammals, the RMS pressure historically has been calculated over the period of the pulse that contains 90% of the acoustical energy.

- **Release of Potentially Invasive Species, Parasites, and Pathogens from Seed Stock**. Mussel aquaculture practices have the potential to introduce invasive species, parasites, and pathogens into the environment via contaminated seed stock, which could have detrimental effects on the California marine ecosystem. However, this project will use spat from hatcheries certified by CDFW to not contain invasive species, parasites or pathogens of concern or will be collected directly from grow-out lines. Seed stock, other than those obtained from State waters, must be inspected and certified before planting in compliance with Sections 15201 and 15600 of the Fish and Game Code. Mediterranean mussels are a non-native, but naturalized species. In fact, this mussel is now one of the most abundant mussel species between Marin County and San Diego (Suchanek et al. 1997). Given the widespread nature of this species, the proposed mussel farm would have a negligible effect on the surrounding environment. Furthermore, benthic characteristics of the project site demonstrate a lack of available suitable substrate for any further establishment of mussels beyond the project site, as the closest substrate where mussels could establish beyond the project site is several miles away.

- **Disturbance/ Displacement of the Benthic Environment.** Effects on sediment quality underneath shellfish aquaculture gear could be impacted from biodeposits and changes to the benthic invertebrate species composition. The Project Actions have the potential to disturb or alter the seafloor habitat by the deposition of biological materials resulting from dislodged or discharged shells, shell fragments, and deposits from the growing operation accumulating on the seafloor beneath the aquaculture structures. Such material typically includes feces and pseudofeces from the cultivated shellfish, as well as fouling organisms such as algae, barnacles, sponges, and other invertebrates that accumulate on the project equipment and subsequently become dislodged by natural processes, or due to harvesting or cleaning operations. Cultivated shellfish or shells from can also be dislodged from the structure during growth, storm events, predation by marine wildlife, and cleaning and harvesting activities. The accumulation of material including shell fragments, intact shells, fouling organisms, and feces can alter the physical and chemical characteristics of the bottom substrate, and can affect the benthic community and sediment-dwelling organisms that may be sensitive to conditions such as substrate composition and chemistry. Accumulation of material could also attract organisms that would change the composition of the benthic community. Other potential benthic impacts can include increased loads on sediment dissolved oxygen and redox conditions, and changes to nutrient cycling resulting in a decrease in benthic species abundance and sediment porosity (Pearson and Rosenberg 1978; Wilding and Nickell 2013; Wilding 2012). The effect on benthic nitrogen cycling is determined by biogeochemical and physical variables, such as water depth, current velocities, and bottom type and composition (CFGC 2018). Shellfish are able to alter the biogeochemical process in the water column by stimulating nitrification (Souchu et al. 2001).Mussel farms that are located in areas with greater water depths and current speeds, spread bio-deposits over a larger area without posing the risk of enhanced sediment nutrient release (Stadmark & Conley 2011). A local mussel farm, the Santa Barbara Mariculture Company, with thirteen years in operation, conducted benthic analysis testing. This sediment analysis testing examined grain size, and levels of benthic epifaunal and infaunal biodiversity both within the farm and outside of the farm, and found no significant benthic impact (CFGC 2018). Given the conditions at the Ventura Shellfish Enterprise project site, with the significant depth, wave action and mixing, this potential impact is unlikely to be significant and bioaccumulation is expected to be dispersed over a larger area. To confirm this conclusion, Mitigation

Measure BIO-9 has been incorporated, which requires monitoring of sediment quality and composition to evaluate any benthic impacts associated with the project.

Installation of the anchors proposed with the project also has the potential to displace benthic invertebrates. However, the adverse impacts to epifauna and infauna would be minimal. Each anchor would only have a footprint of less than one square meter. The total habitat area that would be disturbed by the proposed project would be small and regionally insignificant when compared to the overall amount of habitat available in the area. Further, many benthic invertebrates are mobile and would quickly recolonize the area after installation of the anchors. Therefore, impacts associated with benthic disturbance are considered insignificant.

- **Fouling Organisms and Nonnative Species.** The submerged structures of the Project Actions can provide hard substrate habitat for invasive "fouling organisms." Fouling organisms, such as invasive algae, sea squirts, and mussels, can pose economic and ecological risks to the marine environment. For example, the invasive carpet sea squirt (*Didemnum vexillum*) reproduces rapidly and fouls marine habitats (including shellfish aquaculture operations and fishing grounds), ship's hulls, and maritime structures. Like other fouling organisms, they are found on hard substrates that include floats, moorings and ropes, steel chain and ship hulls. They overgrow other marine organisms such as tunicates, sponges, macro algae, hydroids, anemones, bryozoans, scallops, mussels, and oysters. Where these colonies occur on the seabed, they likely cover the siphons of infaunal bivalves and serve as a barrier between demersal fish (or benthic feeding grey whales) and their prey. However, the invasive carpet sea squirt is not present in the Channel Islands area. The nearest known occurrences are in Monterey Bay and Mission Bay in San Diego (Woods Hole Science Center 2007). Further, there is a lack of available substrate within or near the project site suitable for colonization by fouling organisms, as these invasive species cannot attach themselves to the sandy bottom substrate at the project site.
- **Carrying Capacity** (Phytoplankton Consumption). Mussels feed primarily on phytoplankton filtered from the water column. Each individual is capable of filtering over 20-gallons of seawater per day (Okumus et al. 2002). Hence, in some circumstances, large concentrations of mussels found in mussel farms can remove a significant proportion of available phytoplankton from the water column in an area, causing localized phytoplankton depletion (Okumus et al. 2002). Other studies suggest that nutrient regeneration in the water column within mussel farms is high, as phytoplankton consumed by the mussels results in released nutrients supporting new phytoplankton production (CFGC 2018). Ventura Shellfish Enterprise has adopted the methodology utilized by CDFW to evaluate carrying capacity impacts associated with Santa Barbara Mariculture Company's mussel aquaculture farm, whereby the standing stock of phytoplankton biomass outside the facility is determined and compared with the filtration/consumption rate of mussels within the farm. The results of the Santa Barbara Mariculture Company indicated that total production of the fully built-out farm would not have an adverse impact on phytoplankton in the Santa Barbara Channel (CFGC 2018). Similarly, calculations for the Ventura Shellfish Enterprise mussel farm indicate that no adverse impact on phytoplankton in the Santa Barbara Channel would occur (Appendix C).

5.1.1 FEDERALLY-LISTED SPECIES

5.1.1.1 Cetaceans

Gray Whale

Direct Effects

As described in Section 4.0, gray whales and their calves forage and travel in close proximity to shore during their northward migration. Due to their size, behavior, and occurrence close to shore, gray whales are likely to be affected by the Project Actions. The gray whale is a frequent visitor to the Santa Barbara Channel and may migrate directly along the path of the project site. As a result, gray whales may experience both direct and indirect effects from the Project Actions. If Project Actions will occur during the migration period, adults (and particularly calves) have the potential for entanglement in aquaculture gear. However, gray whales routinely swim through kelp and are adept at navigating obstacles, given they are accustomed to coastal areas. Absent mitigation, entanglement could adversely affect this species. However, with incorporation of **MM BIO-1 through BIO-5**, the effect would be reduced.

As described in Section 4.0, one of the main threats to gray whales is from ship strikes. Project Actions will involve an increase in boat traffic both within the Project Action Area and routes to and from the Ventura Harbor. Ship strike risk may also increase at nighttime when whales are resting, unaware of ship presence, and are less visible to staff onboard. Absent mitigation, the Project Actions have the potential to result in injury and/or mortality to gray whales from ship strikes, which would adversely affect this species. However, with incorporation of **MM BIO-6**, the effect would be reduced.

Project Actions have the potential to interfere with gray whale migration and feeding routes. However, the Santa Barbara Channel measures over 20 miles wide and the Project Action Area would be under 2 miles wide. Due to the expansive open ranges that are available for grey whales in the greater region, the Project Actions interference with migration and feeding routes would not adversely affect this species.

Project Actions have the potential to result in changes of gray whale migration or feeding behavior during construction from noise or disturbance to benthic feeding areas. Although noise effects will be very low, gray whales may temporarily avoid construction areas. Absent mitigation, construction activities may adversely affect this species. However, with incorporation of **MM BIO-3, MM BIO-5 and MM BIO-6**, the effect would be reduced.

Indirect Effects

Project Actions have the potential to result in inadvertent oil spills. Any grey whales traversing through areas that enter areas containing material from oil spills or other pollutants may experience immediate health effects. Absent mitigation, Project Activities may adversely affect this species. However, with incorporation of **MM BIO-7**, the effect would be reduced.

Project Actions have the potential to result in the release of invasive species, parasites, and pathogens. Absent mitigation, Project Activities may adversely affect this species through reducing its access to prey within the Project Area. However, with incorporation of **MM BIO-4**, **MM BIO-8**, and **MM BIO-10** the effect would be reduced.

Determination of Effects

Project Actions have the potential to result in direct and indirect effects to grey whale individuals and/or their migration and feeding habitats. The highest risk to this species includes entanglement in gear and vessel strikes. Construction activities are anticipated to be relatively brief (several weeks) within each plot which would cause temporary changes to grey whale feeding and migrating behavior. In addition, due to the availability of feeding habitat in the Santa Barbara Channel, Project Actions are not anticipated to interfere with gray whale migration and feeding routes. Additional Project effects to this species include the potential effects on sediment quality from aquaculture farms or fouling organisms. Measures to avoid and minimize any potential adverse effects to grey whale are discussed above and include **MM BIO-1 through BIO-11**. With implementation of these measures, the effects of the Project Actions would not jeopardize the continued existence of this species. As such, the Project Actions **may affect, but is not likely to adversely affect** the grey whale.

Humpback Whale and Fin Whale

Humpback and fin whales are anticipated to experience similar effects as those described for grey whales, with the exception of effects to sediment quality and the fouling of organisms. As described below, these species are expected to be directly and indirectly effected by the Project Actions from entanglement, ship strikes, interference with migration or feeding routes, changes in behavior from construction activities, oil spills, and release of invasive species. Given recent reports, humpback whales may in fact be more susceptible to entanglements, given their size, large appendages relative to body size ratio, and propensity to roll when entangled (NOAA 2018f).

Direct Effects

Humpback and fin whales may transit directly along the path of the project site. If Project Actions occur during the migration period, individuals have the potential for entanglement in aquaculture gear. Absent mitigation, entanglement would adversely affect this species. However, with incorporation of **MM BIO-1 through BIO-5**, the effect would be reduced.

Project Actions will involve an increase in boat traffic both within the Project Action Area and routes to and from the Ventura Harbor. Ship strike risk may also increase at nighttime when whales are resting, unaware of ship presence, and are less visible to staff onboard. Absent mitigation, the Project Actions have the potential to result in injury and/or mortality to humpback and fin from ship strikes, which would adversely affect these species. However, with incorporation of **MM BIO-6**, the effect would be reduced.

Project Actions have the potential to interfere with humpback and fin whale migration and feeding routes. However, the Santa Barbara Channel measures over 20 miles wide and the Project Action Area would be under 2 miles wide. Due to the expansive open ranges that are available for these in the greater region, the Project Actions interference with migration and feeding routes would not adversely affect these species.

Project Actions have the potential to result in changes of humpback and fin whale migration or feeding behavior during construction from noise or avoidance of suitable feeding areas. Although, noise effects will be very low, these species may temporarily avoid construction areas. Absent mitigation, construction activities may adversely affect this species. However, with incorporation of **MM BIO-3, MM BIO-5 and MM BIO-6**, the effect would be reduced.

Indirect Effects

Project Actions have the potential to result in inadvertent oil spills. Any humpback or fin whales traversing through areas that enter areas containing material from oil spills or other pollutants may experience immediate health effects. Absent mitigation, Project Activities may adversely affect these species. However, with incorporation of **MM BIO-7**, the effect would be reduced.

Determination of Effects

Project Actions have the potential to result in direct and indirect effects to humpback and fin whale individuals and/or their migration and feeding behaviors. The highest risk to these species includes entanglement in gear and vessel strikes. Construction activities are anticipated to be relatively brief (several weeks) within each plot which would cause temporary changes to humpback and fin whale feeding and migrating behavior. In addition, due to the availability of feeding habitat in the Santa Barbara Channel, Project Actions are not anticipated to interfere with these species' migration and feeding routes. Additional Project effects to these species include the release of invasive species, parasites, and pathogens from seed stock. Measures to avoid and minimize any potential adverse effects to the humpback and fin whale are discussed above and include **MM BIO-1 through BIO-11**. With implementation of these measures, the effects of the Project Actions would not jeopardize the continued existence or recovery of these species. As such, the Project Actions **may affect, but are not likely to adversely affect** the humpback and fin whales.

5.1.1.2 Sea Turtles

Direct Effects

Loggerhead, green, and olive ridley sea turtles may traverse the Project Action Area during migration. Should marine debris (e.g., fishing nets or wire not a part of the Project Actions) become entangled on the aquaculture long lines, sea turtles may become entangled leading to injury and/or mortality. Absent mitigation, entanglement would adversely affect these species. However, with incorporation of **MM BIO-1 through BIO-5 and MM BIO-10**, the effect would be reduced.

Project Actions will involve an increase in boat traffic both within the Project Action Area and routes to and from the Ventura Harbor. Absent mitigation, the Project Actions have the potential to result in injury and/or mortality to sea turtles from ship strikes, which would adversely affect these species. However, with incorporation of **MM BIO-6**, the effect would be reduced.

Project Actions have the potential to interfere with sea turtle migration routes. However, the Santa Barbara Channel measures over 20 miles wide and the Project Action Area would be under 2 miles wide. Due to the expansive open ranges that are available for these in the greater region, the Project Actions interference with migration routes would not adversely affect these species.

Project Actions have the potential to result in changes of sea turtle migrating behavior during construction from noise or avoidance of migratory routes. Although noise effects will be very low, these species may temporarily avoid construction areas. Artificial lighting during construction activities and regular operations can be disorienting to sea turtles (as well as seabirds and migratory birds). Absent mitigation, construction activities may adversely affect this species. However, with incorporation of **MM BIO-3, MM BIO-5, MM BIO-6 and MM BIO-12**, the effect would be reduced.

Indirect Effects

Project Actions have the potential to result in inadvertent oil spills. Any sea turtles traversing through areas that enter areas containing material oil spills or other pollutants may experience immediate health effects. Absent mitigation, Project Activities may adversely affect these species. However, with incorporation of **MM BIO-7**, the effect would be reduced.

Determination of Effects

Project Actions have the potential to result in direct and indirect effects to sea turtle individuals and/or their migration behaviors. The highest risk to these species includes entanglement in fugitive nets and fishing line that may become attached to aquaculture gear. Construction activities are anticipated to be relatively brief (several weeks) within each plot which would cause temporary changes to sea turtle and migrating behavior. In addition, due to the availability of open ocean in the Santa Barbara Channel, Project Actions are not anticipated to interfere with these species' migration routes. Additional Project effects to these species include possible ship strikes and the release of invasive species. Measures to avoid and minimize any potential adverse effects to sea turtles are discussed above and include **MM BIO-1 through BIO-12**. With implementation of these measures, the effects of the Project Actions would not jeopardize the continued existence or recovery of these species. As such, the Project Actions **may affect, but are not likely to adversely affect** the loggerhead, green and olive ridley sea turtles.

5.1.2 OTHER NON-LISTED SPECIES PROTECTED UNDER THE MMPA

5.1.2.1 Cetaceans

The common minke whale, common bottlenose dolphin, long-beaked common dolphin, short-beaked common dolphin, and pacific white-sided dolphin are anticipated to experience similar effects as those described for humpback and fin whale. However, these dolphins are resident that may be present in the Santa Barbara Channel year-round. As described below, these species are expected to be directly and indirectly effected by the Project Actions from entanglement, ship strikes, interference with migration or feeding routes, changes in behavior from construction noise, potential oil spills, and release of invasive species, parasites, and pathogens from seed stock. There are few documented cases of interactions between cetaceans and shellfish farms. However, in Australia, studies of bottlenose dolphins indicate that they avoid mussel farms in shallow nearshore waters and the displacement of habitat causes a reduction in fecundity (Kemper et al. 2003). This study involved coastal bottlenose dolphins, and it is unknown if displacement of habitat will occur in offshore waters for offshore bottlenose dolphins. Similarly, in New Zealand, dusky dolphins were seen avoiding mussel leases in shallow waters (they utilize shallow waters for foraging) which may indicate that placing mussel farms in nearshore waters affects their ability to forage. In Chile, a bay used by Chilean dolphins was completed filled in with mussel lines and the dolphins ceased to use the area for foraging

(Kemper et al. 2003). These studies occur in shallow coastal waters and for different species than those that occur on the project site but it habitat displacement may occur to offshore species as well, such as bottlenose dolphins, common dolphins, pacific white-sided dolphins and minke whales in the project area. If these species are prevented from foraging in the project area, it would be a small reduction in their overall foraging area and would not adversely affect these species.

Direct Effects

The common minke whale may migrate along the Project Action Area and many dolphins are year-round residents. If Project Actions occur during the common minke whale migration period, individuals have the potential for entanglement in aquaculture gear. In addition, dolphins have the potential for entanglement year-round. Normally adept at maneuvering around objects, individuals have the potential for entanglement in loose fishing nets, debris and other ghost gear that could become attached to the mussel aquaculture gear. Absent mitigation, entanglement may adversely affect these species. However, with incorporation of **MM BIO-1 through BIO-5 and MM BIO-10**, the effect would be reduced.

Project Actions will involve an increase in boat traffic both within the Project Action Area and routes to and from the Ventura Harbor. Ship strike risk may also increase at nighttime when migrating common minke whales may be resting, unaware of ship presence, and are less visible to staff onboard. In addition, dolphins are known to bow-ride which may result in accidental ship strikes to these species. Absent mitigation, the Project Actions have the potential to result in injury and/or mortality, which would adversely affect these species. However, with incorporation of **MM BIO-6**, the effect would be reduced.

Project Actions have the potential to interfere with common minke whale migration routes. In addition, foraging areas for the common minke whale and dolphins may be disrupted from Project Actions. However, the Santa Barbara Channel measures over 20 miles wide and the Project Action Area would be under 2 miles wide. Habitat displacement could occur for these species, but it would be a small reduction in their overall foraging area. Due to the expansive open ranges that are available for these in the greater region, the Project Actions interference with migration and feeding routes would not adversely affect this species.

Project Actions have the potential to result in changes of common minke whale migration along with whale and dolphin feeding behavior during construction from noise or avoidance of suitable feeding areas. These species may temporarily avoid construction areas or experience more long lasting and adverse effects, as described above. Absent mitigation, construction activities may adversely affect this species. However, with incorporation of **MM BIO-3, MM BIO-5 and MM BIO-6**, the effect would be reduced.

Indirect Effects

Project Actions have the potential to result in inadvertent oil spills. Any common minke whales or dolphins traversing through areas that enter areas containing material from oil spills or other pollutants may experience immediate health effects. Absent mitigation, Project Activities may adversely affect these species. However, with incorporation of **MM BIO-7**, the effect would be reduced.

Project Actions have the potential to result in the release of invasive species, parasites, and pathogens. Absent mitigation, Project Activities may adversely affect these species. However, with incorporation of **MM BIO-4** and **MM BIO-8**, the effect would be reduced.

Determination of Effects

Project Actions have the potential to result in direct and indirect effects to the common minke whale, common bottlenose dolphin, long-beaked common dolphin, short-beaked common dolphin, and pacific white-sided dolphin. The highest risk to these species includes entanglement in gear (loose fishing nets, debris, or other ghost gear that has become entangled in the aquaculture array) and vessel strikes. Construction activities are anticipated to be relatively brief (several weeks) within each plot which would cause temporary changes to whale and dolphin feeding and/or migrating behavior. In addition, due to the availability of feeding habitat in the Santa Barbara Channel, Project Actions are not anticipated to interfere with these species' migration and feeding routes. Additional Project effects to these species include the release of invasive species. Measures to avoid and minimize any potential adverse effects to the common minke whale and dolphins are discussed above and include MM BIO-1 through BIO-11. With implementation of these measures, the effects of the Project Actions would not jeopardize the continued existence of these species. As such, the Project Actions may affect, but are not likely to adversely affect these species.

5.1.2.2 Pinnipeds

Pinnipeds, including the California sea lion and Pacific harbor seal, are expected to experience similar effects as those described for small cetaceans. Similar to dolphins, pinnipeds are resident and are present in the Santa Barbara Channel year-round. As described below, these species are expected to be directly and indirectly effected by the Project Actions from entanglement, ship strikes, interference with feeding routes, changes in behavior from construction activities (disturbance), invasive species, parasites, and pathogens, altered marine food chains/habitat due to fouling the water and changes to the benthic fauna (Kemper et al. 2003). Other affects may include predator control.

Direct Effects

Pinnipeds may be present year round in the Project Action Area. There have been no reported interactions between pinnipeds and shellfish aquaculture (Kemper et al. 2003) indicating a very low possibility of an impact; however, individuals have the potential for entanglement in loose fishing nets, debris and other ghost gear that could become attached to the mussel aquaculture array. Absent mitigation, entanglement may adversely affect these species. However, with incorporation of **MM BIO-1 through BIO-5 and MM BIO-10**, the effect would be reduced.

Project Actions will involve an increase in boat traffic both within the Project Action Area and routes to and from the Ventura Harbor. Absent mitigation, the Project Actions have the potential to result in injury and/or mortality, which would adversely affect these species. However, with incorporation of **MM BIO-6**, the effect would be reduced.

Project Actions have the potential to interfere with pinniped feeding routes. However, the Santa Barbara Channel measures over 20 miles wide and the Project Action Area would be under 2 miles wide. Due to the expansive open ranges that are available for these in the greater region, the Project Actions interference with migration and feeding routes would not adversely affect this species.

Project Actions have the potential to result in changes of pinniped feeding behavior during construction from noise or avoidance of suitable feeding areas. These species may temporarily avoid construction areas or experience more long lasting and adverse effects, as described above. Absent mitigation, construction activities may adversely affect this species. However, with incorporation of **MM BIO-3, MM BIO-5 and MM BIO-6**, the effect would be reduced.

Predator control is unlikely to be needed for this project given the feeding preferences of pinnipeds in the area. However, if predator control is required, **MM BIO-13** will be incorporated.

Indirect Effects

Project Actions have the potential to result in inadvertent oil spills or other pollution. Any pinnipeds traversing through areas that contain material from oil spills may experience immediate health effects. Absent mitigation, Project Activities may adversely affect these species. However, with incorporation of **MM BIO-7**, the effect would be reduced.

Project Actions have the potential to result in the release of invasive species, parasites, and pathogens. Absent mitigation, Project Activities may adversely affect these species. However, with incorporation of **MM BIO-4** and **MM BIO-8**, the effect would be reduced.

Determination of Effects

Project Actions have the potential to result in direct and indirect effects to pinnipeds, including the California sea lion, and Pacific harbor seal. The highest risk to these species includes vessel strikes. Construction activities are anticipated to be relatively brief (several weeks) within each plot which would cause temporary changes to pinniped feeding behavior. In addition, due to the availability of feeding habitat in the Santa Barbara Channel, Project Actions are not anticipated to interfere with these species' feeding routes. Additional Project effects to these species include the release of invasive species, parasites, and pathogens from seed stock. Measures to avoid and minimize any potential adverse effects to pinnipeds are discussed above and include **MM BIO-1 through BIO-11**. With implementation of these measures, the effects of the Project Actions would not jeopardize the continued existence of these species. As such, the Project Actions **may affect, but are not likely to adversely affect** pinnipeds.

5.2 Mitigation Measures

MM BIO-1 **Marine Wildlife Entanglement Plan.** No less than once per month, each grower/producer operating on a VPD lease shall visually inspect all ropes, cables, and equipment via depth/fish finders to determine if any entanglement of a marine mammal has occurred and to ensure that (a) no lines have been broken, lost or removed; (b) all longlines, anchor lines, and buoy lines remain taught and in good working condition; and (c) any derelict fishing gear or marine debris that collects in the growing gear is removed and disposed of at an identified onshore facility. All equipment and materials accidentally released or found to be missing from the facility during monthly inspections, including buoys, floats, lines, ropes, chains, cultivation trays, wires, fasteners, and clasps, shall be searched for, collected, properly disposed of onshore, and documented in the annual inspection report. Monitoring shall occur monthly for the first two years following deployment and, in the event that there are no marine wildlife entanglements within the first two years, may be reduced to quarterly inspections thereafter.

Inspections shall include recordings by depth/fish finder or ROV surveys of lines and/or monitoring performed by SCUBA divers. Recorded video shall be provided along with the annual report described above. Any maintenance issues including wear, loosening, or fatigue of materials shall be remedied as soon as possible. All incidents of observed whale entanglement shall be immediately reported to SOS WHALe. Any other marine wildlife (i.e., other marine mammals, turtles) observed to be entangled will be immediately reported to NOAA Fisheries Marine Mammal Stranding Network Coordinator, West Coast Region, Long Beach Office. Only personnel who have been authorized by NOAA Fisheries and who have training, experience, equipment, and support will attempt to disentangle marine wildlife. If possible, the grower/producer shall document and photograph entangled wildlife and the entangling gear material so as to modify gear and avoid any future entanglements.

MM BIO-2 **Entanglement Prevention.** Grow-ropes will be attached to the head rope with a low-breaking-strength twine (4-millimeter (0.16-inch) diameter; <1,000 pounds), which will facilitate rapid detachment in the unlikely event of any interaction with the longline. A 1,100-pound breakaway link will be installed between surface marking buoys and the vertical lines.

MM BIO-3 **Marine Wildlife Observer**. A Marine Wildlife Observer shall be present on each project construction vessel during all construction activities, including the installation of long lines and anchoring systems. The observer shall monitor and record the presence of all marine wildlife (marine mammals and sea turtles) within 100 yards of the work area. The observer shall have the authority to halt operations if marine wildlife are observed or anticipated to be near a work area and construction activities have the potential to result in injury or entanglement of marine wildlife. In addition, all work (including vessel motors) will be halted if a cetacean is observed within the monitoring area or if a pinniped or sea turtle is observed within 50 yards of the work area. Work may commence after the observed individuals have moved out of the monitoring area.

Observers' reports on marine mammal monitoring during construction activities shall be prepared and submitted to NOAA Fisheries on a monthly basis. Reports shall include such information as the (1) number, type, and location of marine mammals observed; (2) the behavior of marine mammals in the area of potential sound effects during construction; (3) dates and times when observations and in-water project construction activities were conducted; and (4) dates and times when in-water construction activities were suspended because of marine mammals.

VPD shall prepare a list of qualified marine wildlife observers who meet the following minimum qualifications: visual acuity in both eyes (correction is permissible) sufficient to discern moving targets at the water's surface with ability to estimate target size and distance; (2) use of binoculars or spotting scope may be necessary to correctly identify the target; (3) advanced education in biological science, wildlife management, mammalogy, or related fields (bachelor's degree or higher is preferred); (4) experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience); (5) experience or training in the field identification of marine mammals (cetaceans and pinnipeds) and sea turtles; and (6) ability to communicate orally, by radio or in person, with project personnel to provide real time information on marine wildlife observed in the area, as needed.

MM BIO-4 **Cultivation of Spat Off site.** Only hatchery-reared mussel spat grown at a facility certified by CDFW will be used in order to ensure that spat are free of introduced invasive species, parasites, and pathogens of concern; however, natural mussel spat collected on farm grow-out lines and buoys may also be harvested and cultivated.

MM BIO-5 **Marine Wildlife Education.** Each grower/producer will be required to provide bi-annual (twice per year) marine wildlife education to its employees regarding proper procedures relating to marine wildlife. The training curriculum will include identifying the presence of specified marine wildlife and procedures for avoiding impacts to marine wildlife during operations. These procedures will include (1) reducing speed and observing the distances from marine life specified in MM BIO-6; (2) providing a safe path of travel for marine mammals that avoids encirclement or entrapment of the animal(s) between the vessel and growing apparatus; (3) if approached by a marine mammal, reducing speed, placing the vessel in neutral and waiting until the animal is observed clear of the vessel before making way; (4) avoiding sudden direction or speed changes when near marine mammals; (5) refraining from approaching, touching or feeding a marine mammal; and (6) immediately contacting their supervisor and other identified parties/agencies identified in MM BIO-1 should an employee observe an injured marine mammal.

MM BIO-6 **Vessel Management.** Vessels in transit to and from the growing area shall maintain a distance of 100 yards from any observed cetacean and 50 yards between any observed pinniped or sea turtle. If cetaceans are observed within 100 yards or pinnipeds or sea turtles observed within 50 yards, the vessel shall reduce speeds to 12 knots or less until it is the appropriate distance (as required by this condition) from the particular marine life. If a cetacean is heading into the direct path of the vessel (i.e., approaching a moving vessel directly into the bow), the vessel shall shut off the engine until the cetacean is no longer approaching the bow and until a greater separation distance is observed. If small cetaceans are observed bow-riding, and the vessel is operating at speeds of 12 knots or less, the vessel shall remain parallel to the animal's course and avoid abrupt changes in direction until the cetaceans have left the area.

Each sighting of a federally listed threatened or endangered whale or turtle shall be recorded and the following information shall be provided:

a. Date, time, coordinates of vessel
b. Visibility, weather, sea state

c. Vector of sighting (distance, bearing)
d. Duration of sighting
e. Species and number of animals
f. Observed behaviors (feeding, diving, breaching, etc.)
g. Description of interaction with aquaculture facility

MM BIO-7 **Spill Prevention and Response**. Discharges of feed, pesticides, or chemicals (including antibiotics and hormones) in ocean waters are prohibited. Fuel, lubricants and chemicals must be labeled, stored and disposed of in a safe and responsible manner, and marked with warning signs. Precautions shall be taken to prevent spills, fires and explosions, and procedures and supplies shall be readily available to manage chemical and fuel spills or leaks. Each grower/producer shall comply with the Spill Prevention and Response Plan (SPRP) for vessels and work barges that will be used during project construction and operations. Each grower/producer operating in the project area shall be trained in, and adhere to, the emergency procedures and spill prevention and response measures specified in the SPRP during all project operations. The SPRP shall provide for emergency response and spill control procedures to be taken to stop or control the source of the spill and to contain and clean up the spill. The SPRP shall include, at a minimum: (a) identification of potential spill sources and quantity estimates of a project specific reasonable worst case spill; (b) identification of prevention and response equipment and measures/procedures that will be taken to prevent potential spills and to protect marine and shoreline resources in the event of a spill. Spill prevention and response equipment shall be kept onboard project vessels at all times; (c) a prohibition on at-sea vessel or equipment fueling/refueling activities; and (d) emergency response and notification procedures, including a list of contacts to call in the event of a spill; (e) assurance that all hydraulic fluid to be used for installation, maintenance, planting, and harvesting activities shall be vegetable based.

MM BIO-8 **Invasive Species.** Grower/producers operating in the project area shall be required to receive training from NMFS to identify potential invasive species and how to properly dispose of such invasive species if discovered.

MM BIO-9 **Sediment Quality Monitoring Plan.** A Sediment Quality Monitoring Plan shall be developed requiring monitoring of sediment conditions within the project area, including monitoring the quantity, type, and distribution of biological materials (such as shellfish, shell material, and fouling organisms) that accumulate on the seafloor. Monitoring will also include an evaluation of any changes to oxygen demand of benthic infaunal and epifaunal communities, and changes to the chemical and biochemical conditions of seafloor sediments along with a description of performance standards to meet.

If performance standards are not met, corrective actions will be outlined. The Plan will include reporting requirements, including annual report submittals to NOAA and NMFS for review. If performance standards are met for a period of time, the plan will provide for appropriately scaling down monitoring and intervals over time.

MM BIO-10 **Aquaculture Gear Monitoring and Escapement Plan.** Include in overall management plan an aquaculture gear monitoring and escapement plan. Any farm gear that has broken loose from the farm location shall be retrieved. The farm site shall be visited at minimum twice per month to examine the aquaculture gear for potential loss or non-compliant deployment, including inspections for fouling organisms. Any organisms that have a potential to cover the sea floor will be removed and disposed of at an identified upland facility. A Marine Debris Management Plan shall also be prepared that includes (a) a plan for permanently marking all lines, ropes, buoys, and other facility infrastructure and floating equipment with the name and contact information of the grower/producer; (b) a description of the extent and frequency of maintenance operations necessary to minimize the loss of materials and equipment to the marine environment resulting from breakages and structural failures; and (c) a description of the search and cleanup measures that would be implemented if loss of shellfish cultivation facility materials, equipment, and/or infrastructure occurs.

MM BIO-11 **Decommissioning Plan**. A decommissioning plan for the timely removal of all shellfish, structures, anchoring devices, equipment, and materials associated with the shellfish cultivation facility and documentation of completion of removal activities will be a requirement of each permit or sub-permit. Financial assurances to guarantee implementation of the plan will be in place and reviewed periodically.

MM BIO-12 **Lighting.** All growing area operations shall be completed during daylight hours. No growing area operations will be conducted at night and no permanent artificial lighting of the shellfish cultivation facility shall occur, except for that associated with the use of navigational safety buoys required by the U.S. Coast Guard.

MM BIO-13 **Predator Control.** Potential predator species will be identified. Specified humane methods of predator deterrence will be utilized, favoring non-lethal methods. No controls, other than non-lethal exclusion, shall be applied to species that are listed as threatened or endangered.

MM NAV-1 **Update NOAA Charts.** VPD to submit to the NOAA Office of Coast Survey: (a) the geographical coordinates of the facility boundaries obtained using a different geographic position unit or comparable navigational equipment; (b) as-built plans of the facility and associated buoys and anchors; (c) each grower/producer's point of contact and telephone number; and (d) any other information required by the NOAA Office of Coast Survey to accurately portray the location of the shellfish cultivation facility on navigational charts.

MM NAV-2 **Notice to Mariners.** No less than 15-days prior to the start of in-water activities associated with the installation phase of the project, VPD shall submit to (a) the U.S. Coast Guard (for publication in a Notice to Mariners); and (b) the harbormasters (for posting in their offices of public noticeboards), notices containing the anticipated start date of installation, the anticipated installation schedule, and the coordinates of the installation sites. During installation, VPD shall also make radio broadcast announcements to the local fishers' emergency radio frequency that provide the current installation location and a phone number that can be called for additional information.

5.3 Cumulative Effects

Section 7 (FESA) regulations require a federal agency taking an action to provide an analysis of cumulative effects when requesting initiation of formal consultation. Cumulative effects include the effects of future state, tribal, local, or private actions, not involving a federal action, that are reasonably certain to occur in or adjacent to the project site. Future federal actions that are unrelated to the Proposed Action are not considered in this analysis, because they require separate consultation pursuant to Section 7. Federal actions may include granting a permit for a project, authorizing funds for a project, or implementing a project. For the purposes of this BA, cumulative effects are defined as environmental change that results from the incremental effects of several projects that may be individually minor, but that become significant when considered collectively. There are no known actions (Federal, State or Tribal) slated to occur in or immediately adjacent to the project area.

5.4 Compensatory Mitigation

No impacts requiring compensatory mitigation will result from implementation of the Project Actions.

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6.0 CONCLUSIONS

This BA forms the basis for the conclusions presented below regarding the effects of the Project Actions on thirteen species with a potential to occur in the action area. Based on a review of the current status of these species, the effects of the Project Actions, and recommended measures to avoid and minimize effects to listed species, the Project Actions may **affect, but are not likely to adversely affect** each of these species. Table 2 below summarizes the effects determination for the Project Actions.

Table 2
Summary of Effects Determinations

Federally Protected Species	No Effect	May Affect, But Is Not Likely to Adversely Affect	Is Likely to Adversely Affect
Balarnoptera acutorostrata Common Minke Whale		✓	
Balaenoptera physalus physalus Fin Whale		✓	
Caretta caretta Loggerhead Sea Turtle		✓	
Chelonia mydas Green Sea Turtle		✓	
Delphinus capensis capensis Long-beaked Common Dolphin		✓	
Delphinus delphis delphis Short-beaked Common Dolphin		✓	
Eschrichtius robustus Gray Whale		✓	
Lagenorhynchus obliquidens Pacific White-sided Dolphin		✓	
Lepidochelys olivacea Olive Ridley Sea Turtle		✓	
Megaptera novaeangliae Humpback Whale		✓	
Phoca vitulina Pacific Harbor Seal		✓	
Tursiops truncatus Common Bottlenose Dolphin		✓	
Zalophus californianus California Sea Lion		✓	

As noted in the Nationwide Permit (NWP) 48 Decision Document (USACE 2017) recently approved by the Corps, which considered shellfish aquaculture uses nationwide, "Compared to the disturbances and degradation caused by coastal development, pollution, and other human activities in coastal areas, commercial shellfish aquaculture activities present relatively mild disturbances to estuarine and marine ecosystems." The Decision Document concludes that impacts from most aquaculture projects would be *de minimis* on the surrounding environment. This determination is generally reaffirmed in the Corps' 2015 Programmatic Biological Assessment (USACE 2015) that considered new and existing shellfish aquaculture in Washington State, as well as the 2016 Programmatic Biological Opinions from NOAA's NMFS (NMFS 2012f) evaluating the same, which concluded that impacts would be minor upon imposition of identified conservation measures. Notably, the above analyses evaluated shellfish aquaculture at a larger scale than that proposed by the project. NWP 48 covers most shellfish aquaculture projects nationwide and the Programmatic Biological Evaluation evaluated environmental impacts associated with a total of 38,400 commercial aquaculture acres in Washington.

With implementation of the mitigation measures identified in this BA, including measures for navigational safety **MM BIO-14** and **MM BIO-15**, the Project Actions are not expected to directly or indirectly reduce, in any appreciable manner, the likelihood of survival or recovery of the species described above by reducing its reproduction, numbers, or distribution. The measures proposed to offset anticipated effects provide reasonable protections to avoid and minimize adverse effects of the Project Actions. Additionally, no designated critical habitat is present within the Action Area.

Overall, the Project Actions would not result in permanent impacts to ESA-listed or MMPA species, based on: (1) the nature and extent of the activities proposed to be implemented; (2) avoidance and minimization measures proposed in this BA; (3) the relative size of the Project Actions within the Santa Barbara Channel; and (4) the temporary nature of construction activities. See Dudek (2018) for an assessment of Essential Fish Habitat for this project.

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APPENDIX A

Essential Fish Habitat Assessment

ESSENTIAL FISH HABITAT ASSESSMENT

FOR THE VENTURA SHELLFISH ENTERPRISE PROJECT

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ATTACHMENT 1

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1.0 INTRODUCTION

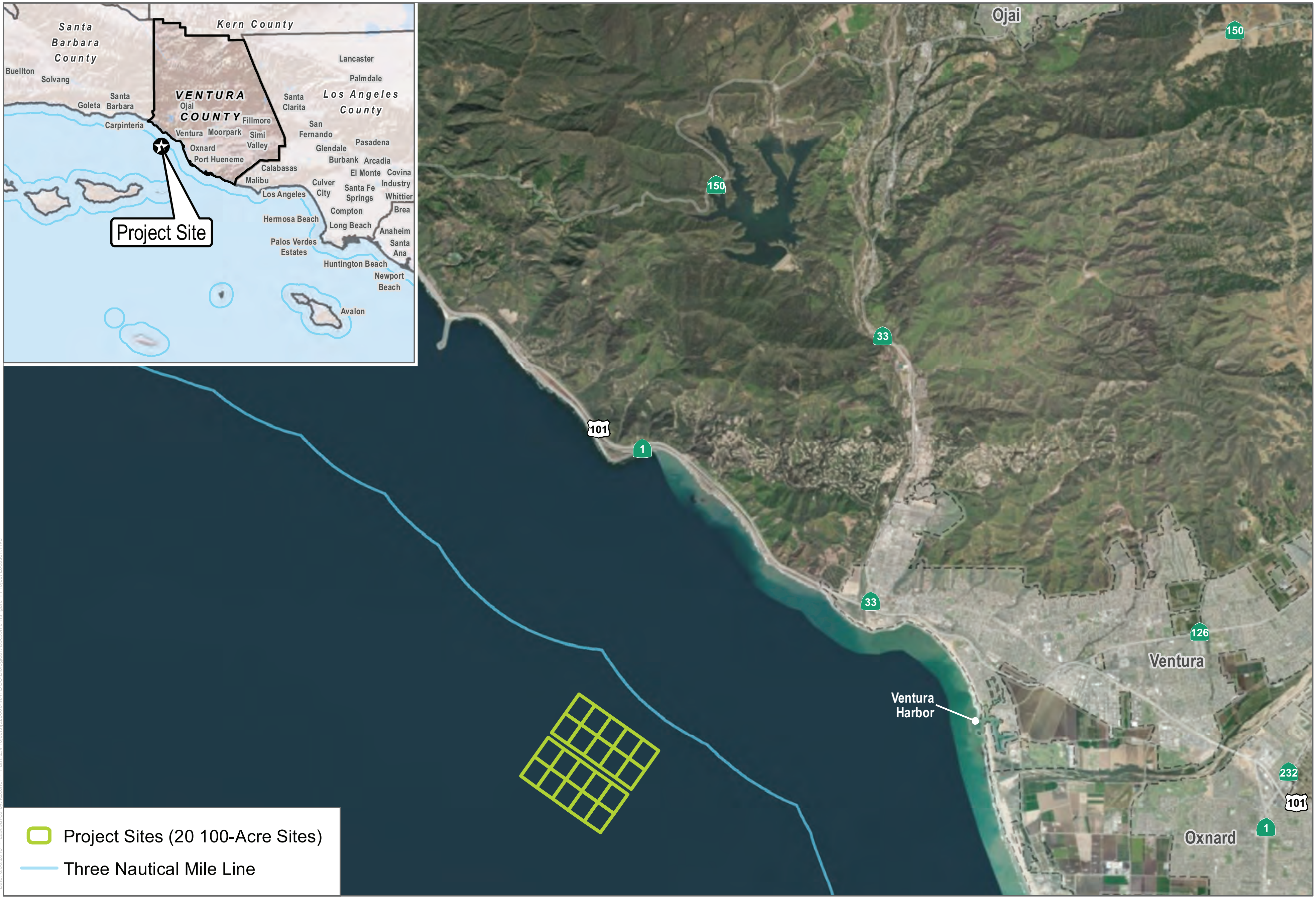
This Essential Fish Habitat (EFH) Assessment has been prepared for the Ventura Port District (VPD, project applicant) to evaluate the effects of the Ventura Shellfish Enterprise (VSE) Project (project) on species regulated under a Fisheries Management Plan (FMP), pursuant to the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). The project, supported in part through the NOAA 2015 Sea Grant Aquaculture Extension and Technology Transfer to California Sea Grant (NOAA Sea Grant Program), will establish a commercial offshore bivalve aquaculture operation. VPD is applying for a U.S. Army Corps of Engineers (Corps) authorization under Section 10 of the Rivers and Harbors Act. The Corps will act as the federal lead agency on the project. The MSFCMA requires consultation with the National Marine Fisheries Service (NMFS) on all actions or proposed actions that may adversely affect EFH. This EFH Assessment analyzes how the project would affect EFH for species regulated under a FMP and supports the National Environmental Policy Act environmental analysis. A Biological Assessment has also been prepared, which will determine whether any federally protected species or habitats are likely to be adversely affected by the project pursuant to Section 7 of the Endangered Species Act (ESA) and its implementing regulations (50 CFR § 402.01 et seq.) (Dudek 2018).

1.1 Project Location

The project will consist of twenty 100-acre plots (total of 2,000 acres) located in open federal waters of the Santa Barbara Channel (Channel) in the Southern California Bight (SCB), northwest of Ventura Harbor (Figure 1), with approximate depths ranging from between 13 – 19 fathoms (78 – 114 feet) mean lower low water (MLLW). The plots are 3.53 miles from the shore. The closest distance to the 3-mile nautical line is 2,900 feet from the plots, with an average closest distance of over 3,000 feet. The closest distance to the City of Ventura limit is 4.5 miles. Ventura harbor is 4.1 miles from the closest plot (8 miles in distance to the most distant plot).The lease sites are located on sandy bottom habitat outside of any rocky reef habitat, as evaluated in Gentry et al. 2017 and illustrated by NOAA United States West Coast nautical charts (NOAA 2017a).

The project site is characterized by a gradually sloping sandy/soft bottom. The SCB is located along the curved coastline of Southern California from Point Conception south to Cape Colnett in Baja California and includes the Channel Islands and the Pacific Ocean. The habitats and biological communities of the SCB are influenced by dynamic relationships among climate, ecology, and oceanography (e.g., currents) (Leet et al. 2001). The SCB provides essential nutrients and marine habitats for a range of species and organisms. Submarine canyons, ridges, basins, and seamounts provide unique deep water habitats within the region. The basins provide habitats for a significant number of mid-water and benthic deep-sea fish near the Channel Islands, whereas nearshore areas provide habitats for kelp and seagrass communities. Nearshore geology includes a variety of bottom types, including soft sediments and rocky bottoms. Hard-substrates environments, such as the rocky intertidal, shallow subtidal reefs, and deep rock reefs, are a key component of the high productivity found near the project area. Due to linkages among ecosystems, the impacts of ecosystem dynamics contained within the project area extend to interactions with species in the greater Eastern Pacific Ocean. The Santa Barbara Channel is located within the SCB and extends from Point Conception to Point Mugu.

The waters of the Santa Barbara Channel form one of the most biologically productive ecosystems found on Earth. Unlike most of coastal California, which faces due west and the open ocean, the coastal waters of the Santa Barbara Channel are on a south-facing coast and caught between two land masses, the South Coast and the Northern Channel Islands. The project site is 9.1 miles from the Channel Islands National Marine Sanctuary, a Federal Marine Protected Area, and 13.5 miles from the Channel Islands National Park boundary. The western section of the Santa Barbara Channel is a meeting place of the cool Northern California Current and warm Southern California Countercurrent. This type of ecosystem is called a "transition zone." Transition zones are known to promote large concentrations of both biomass and species diversity, as they are the confluence between two or more ecologically distinct systems. In addition, upwelling provides unusually high concentrations of nutrients, especially macrozooplankton, which are one of the primary driving forces behind the Santa Barbara Channel's biological productivity and diversity. Wind patterns around Point Conception and in the Santa Barbara Channel create frequent seasonal upwelling, which force deep nutrient-laden ocean waters to rise up the water column into the biologically rich euphotic zone (Santa Barbara Channelkeeper 2017). Data from last year, for the closest oceanographic buoy to the project site (Station 46217 Anacapa Passage), shows the following average wave action conditions for the project area: an average wave height of 1.04, with a dominant wave period of 10.1, and an average wave period of 6.49, with surface currents generally moving in a SW (249 degrees) direction and an average temperature of 16 °C (National Data Buoy Center 2017). The Ventura area is known to be an area of high swell height, particularly in the winter (Guza and O'Reilly 2001). Wave action is focused by the large fan of sediment deposited on the shelf from the Ventura and Santa Clara rivers. When deep water swell comes in from a WSW direction, these bathymetric features can focus the wave energy northward into the Ventura area. Wave action is slightly less in the summer months when the Channel Islands block southward swells (Guza and O'Reilly 2001).



SOURCE: NAIP 2016

DUDEK

0 6,250 12,500 Feet

FIGURE 1

Project Location

Essential Fish Habitat Assessment for the Ventura Shellfish Enterprise Project

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2.0 DESCRIPTION OF PROJECT ACTIONS

The project will establish a commercial offshore bivalve aquaculture operation based from the Ventura Harbor in Ventura, California, focused on the cultivation of Mediterranean mussels (*Mytilus galloprovincialis*). Please refer to the Biological Assessment for the Ventura Shellfish Enterprise (Dudek 2018) and Proposed Best Management Practices to Mitigate Potential Adverse Project Impacts for additional project details.

2.1 Project Actions

2.1.1 PROJECT CONSTRUCTION

The proposed plots will be used for growing Mediterranean mussels via submerged longlines (Figures 2 and 3).

Installation of anchors, longlines, and other facilities will be performed by permitted shellfish companies, in compliance with all permit requirements. Submerged longlines consist of a horizontal structural header line, or "backbone," that is attached to the seafloor by sand screw anchors at each end and is marked and supported by a series of buoys along the central horizontal section. Sand screw anchors have been shown to exhibit superior holding power as compared to other anchoring systems and are removable. Sand screw anchors will be installed by a hydraulic drill with a drill head that operates from a rig lowered to the ocean floor. The sand screw anchors would be screwed into the sandy bottom ocean floor approximately 10 to 20 feet (3 to 6 meters) deep. Each 100-acre plot will contain up to 48 anchors for a total of 960 anchors at full project build out.

Buoys marking the corners of each parcel will identify the cultivation area for navigational safety and will comply with all regulations for height, illumination, and visibility, including radar reflection. As shown in Figure 2 and Figure 3, surface buoys for each longline would consist of two 16 inch surface corner buoys (one corner buoy supporting and marking either end of the backbone), as well as one 16 inch buoy supporting and marking the center pickup line, for a total of three surface buoys per longline. Simulated views of parcel arrays at the surface and underwater are provided in Figures 4 through 7. All surface buoys would be uniquely colored for each operator and marked with the grower/producer name and phone number. Buoys attached to the central horizontal portion of the backbone line support the line, provide a means of lifting the backbone line to access the cultivation ropes, and determine the depth of the submerged backbone, which will vary seasonally from 15 to 45 feet below the surface. Additionally, a combination of surface and submerged buoys attached to the backbone line will be used during the mussel production cycle to maintain tension on the structural backbone line as the weight of the mussel crop increases. These will consist of 24-inch (or equivalent, with greater than 200 L buoyancy) buoys attached at required intervals along the surface and connecting to the backbone line, in combination with smaller submerged buoys affixed directly to the backbone line. The combination of surface and submerged buoyancy is designed to create a tensioned but flexible structure that is capable of responding dynamically to surface waves and storms.

The longlines that will be utilized are thick (1-inch diameter), tensioned (to approximately 800 pounds) rope that is not conducive to wrapping around or entangling protected species. The longline configuration produces a fairly rigid tensioned structure from which the cultivation ropes, or "fuzzy ropes" are attached. Fuzzy ropes are characterized by extra filaments that provide settlement substrate for mussels to attach. Fuzzy ropes may be attached to and suspended from the backbone rope either as individual lengths or as a continuous looping single length that drapes up and down over the backbone. The length of each section or loop of fuzzy rope would be approximately 20 feet but would depend on the lifting capacity of the servicing vessel. The length of the central horizontal section of backbone line would be 575 feet, which would support approximately 8,000 feet of fuzzy cultivation line.

The shape of each of the 100-acre cultivation parcels would be a function of the geometry of the submerged backbone line and anchoring. Each horizontal section of the longline will be approximately 575 feet and will require an anchor scope of approximately 2.5 times depth. Therefore, in 100 feet of water depth, scope from the horizontal section of backbone to the helical screw anchor will require 250 feet on each end of the line, making a total length of 1,075 feet from anchor screw to anchor screw. A 100-acre parcel with rectangular dimensions of 1,899.5 feet by 2,299.5 feet will therefore accommodate up to 24 individual longlines. The submerged longline growing gear configuration would be specifically engineered for open ocean conditions with respect to size and strength of all lines, anchoring, hardware, and buoyancy.

Construction in each individual growing plot will take place only after VPD approval of a sub-permits with the individual grower/producer. While project development is dependent on market demand, VPD estimates that full build out would occur within three to five years after project approval.

2.1.2 PROJECT OPERATION

The mussels will be grown and harvested by permitted growers/producers and landed at Ventura Harbor. Initial plantings of juvenile seed mussels, commonly referred to as spat, will be purchased from onshore hatcheries certified by the CDFW. At the hatcheries, mussels adhere directly to special textured ropes that promote mussel attachment and growth. When the seed are firmly settled to ropes, the ropes are covered with cotton socking material to protect them from shaking off the ropes during transport to the offshore growing site and deployment. The socks hold the spat next to the rope until the mussels naturally attach with their byssal threads, after which the cotton material naturally degrades. These ropes are then attached to the longlines and buoys, as described above.

The mussel grow-out ropes themselves are typically planted with seed 3-inches thick and may grow to be stiff with byssus at diameters of 10-inches or more at harvest, thus making them very unlikely sources of entanglement. As an additional precaution, grow ropes will be attached to the headrope with a low-breaking-strength twine (4-millimeter (0.16-inch diameter), which will facilitate rapid detachment in the unlikely event of any interaction with the longline. To further minimize entanglement potential, a 1,100 pound breakaway link will be installed between the surface buoys and vertical lines, similar to strategies used to mitigate potential entanglement in trap fisheries in the northeastern United States (NOAA 2008). Buoy lines between the surface and headrope are generally under tension partially equivalent (0 to 10 kilograms (0 to 22 pounds)) to their full buoyancy (42 kilograms (93 pounds)).

Cultivated mussels grow by filtering naturally occurring phytoplankton from the ocean. Harvesting involves separating the mussels from the ropes, followed by cleaning, sorting, and bagging. All of these activities will take place aboard the harvesting vessel. Juvenile mussels will grow on lines until an intermediate size where the density of mussels on the fuzzy rope becomes limiting. At this point, a servicing vessel will lift the backbone line in order to access the fuzzy rope stocked with juvenile mussels and pull the fuzzy rope through vessel-based equipment designed to strip the mussels from the fuzzy rope and then clean, separate, and grade the juvenile mussels by size. Juvenile mussels then will be restocked to clean fuzzy rope at a reduced density for their second stage of grow out to market size. Maintenance and inspection of the longlines is proposed to be carried out on a monthly basis, which consists of lifting the longlines out of the water and adding additional buoys as necessary to account for increased mussel weight. Inspections of the anchor ropes, anchors, and connecting ropes shall take place at a minimum of twice per month. Inspections shall include recordings by depth/fish finder or ROV surveys of lines and/or monitoring performed by SCUBA divers.

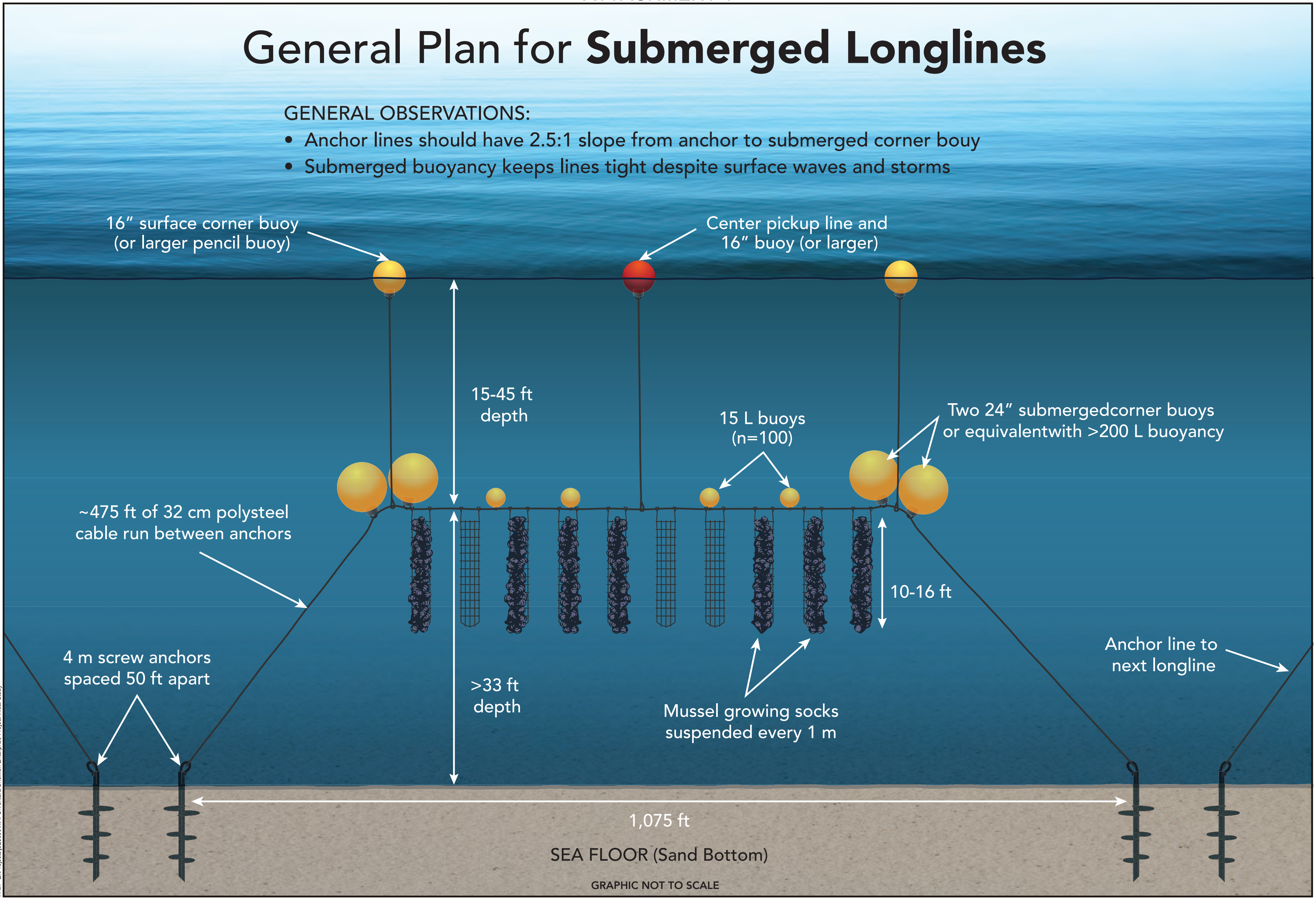
When the mussels reach market size, which is expected to occur after about one year of total production time, the submerged backbone lines again will be lifted in order to access the fuzzy cultivation ropes, and mussels again will be stripped from the line, cleaned, and separated, and this time size-graded and bagged for landing at the Ventura Harbor as market-ready product. The bagged mussels will be transported to Ventura Harbor for offloading, sale, and distribution. All husbandry activities related to harvesting, grading, and restocking of mussels to cultivation lines will occur onboard the servicing vessel using specialized equipment for that purpose.

Watercraft used for planting, inspections, and harvesting would be home ported at Ventura Harbor. On average, between 20 to 40 boats would be traveling to the specific lease sites to conduct these activities on a three times per week to daily basis. The maximum distance traveled would be between the harbor and the farthest potential lease area, which could be up to approximately 8.7 miles. Once constructed, it is projected that each sub-permit site will generate an estimated 150 trips per year to accomplish the tasks outlined above.

Landed product will comply with all testing and labeling regulations as part of the California Department of Public Health (CDPH) Shellfish Sanitation plan and the National Shellfish Sanitation Program (NSSP) guidelines for shellfish grown in federal waters. NOAA-Seafood Inspection Program (NOAA-SIP), in collaboration with the Food and Drug Administration (FDA), recently began the process of developing NSSP-compliant sanitation protocols for bivalve shellfish cultivated in Federal waters.

Qualified researchers affiliated with universities (i.e., U.C. Santa Barbara - Bren School, or University of Southern California, etc.), or qualified marine research institutes (i.e., Woods Hole Oceanographic Institute, Scripps Institution of Oceanography, etc.) will have access to aquaculture plots to conduct research and monitoring approved by the Ventura Port District; however, access may be limited in certain circumstances to respect grower/producer proprietary data or technology or to accommodate a grower/producer's operational and logistical needs in operating the farm. The Ventura Port District will review and approve research projects in consultation with USACE, NMFS, NOAA, and any affected grower/producers. Grower/producers will be fairly compensated for the use of their vessels, equipment, and fair market value of any mussels produced or generated as part of approved research projects.

ATTACHMENT 1



PAth - Z:\Projects\j925000\MAPS\Ventura Shellfish Enterprise Project Initial Study

FIGURE 2

Detailed Plan for Shellfish Longlines

Essential Fish Habitat Assessment for the Ventura Shellfish Enterprise Project

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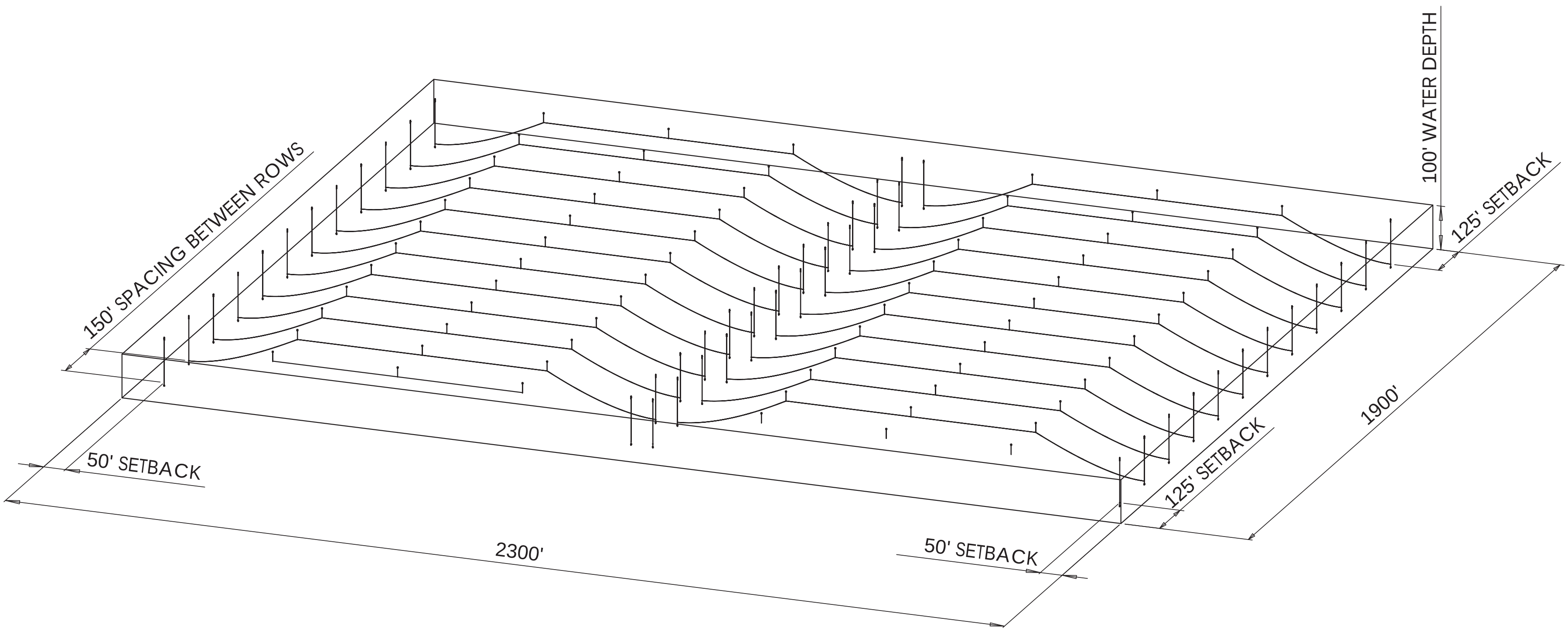

FIGURE **3A**

Parcel Array Overview

Essential Fish Habitat Assessment for the Ventura Shellfish Enterprise Project

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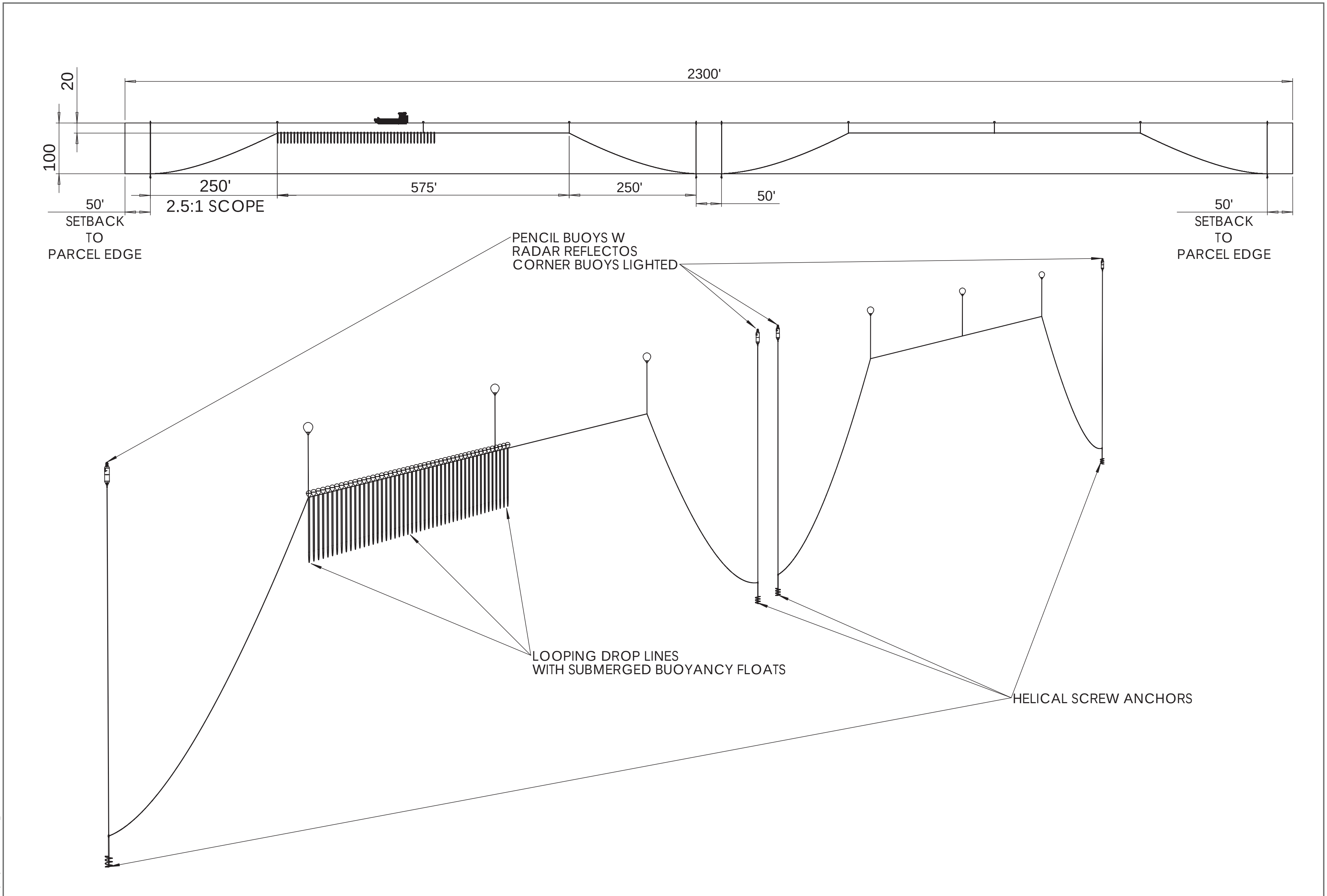

SOURCE: VSE 2018

FIGURE **3B**

Backbone Details

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FIGURE 4

Simulated View of Parcel Array at the Surface: 100 Acre Plot

Essential Fish Habitat Assessment for the Ventura Shellfish Enterprise Project

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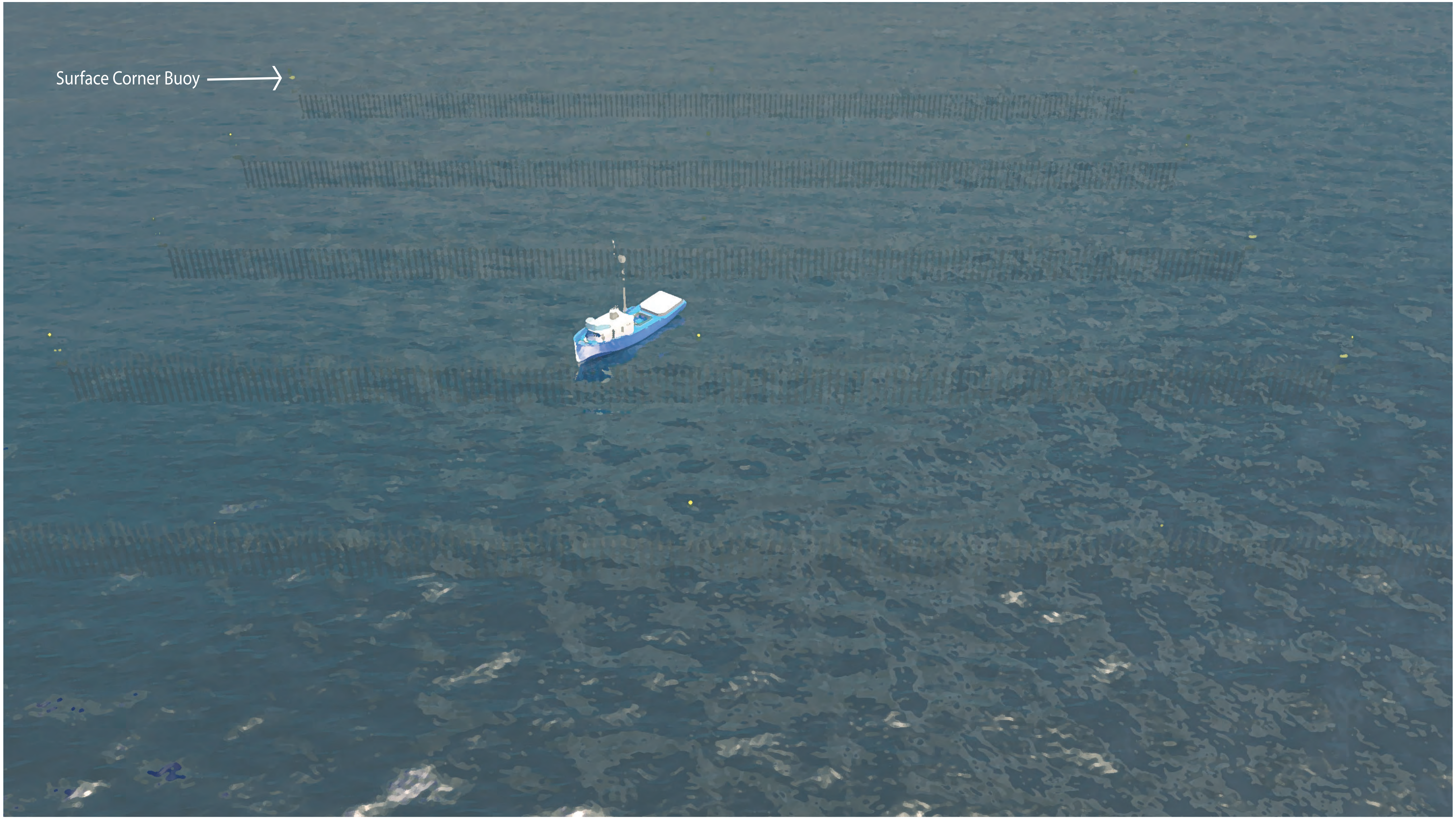

FIGURE 5

Simulated View of Parcel Array at the Surface

Essential Fish Habitat Assessment for the Ventura Shellfish Enterprise Project

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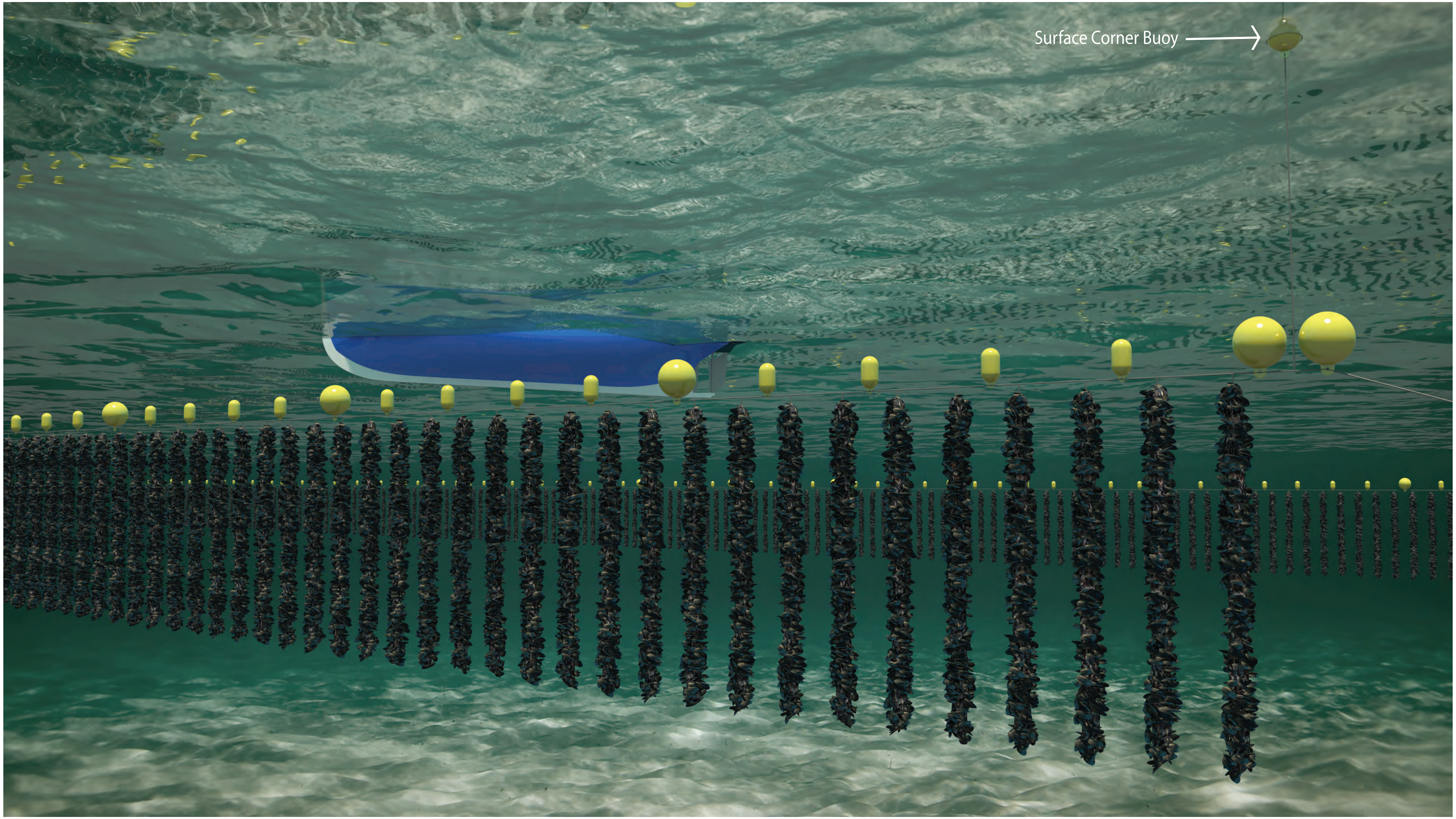

FIGURE 6 Simulated View of Parcel Array Underwater

Essential Fish Habitat Assessment for the Ventura Shellfish Enterprise Project

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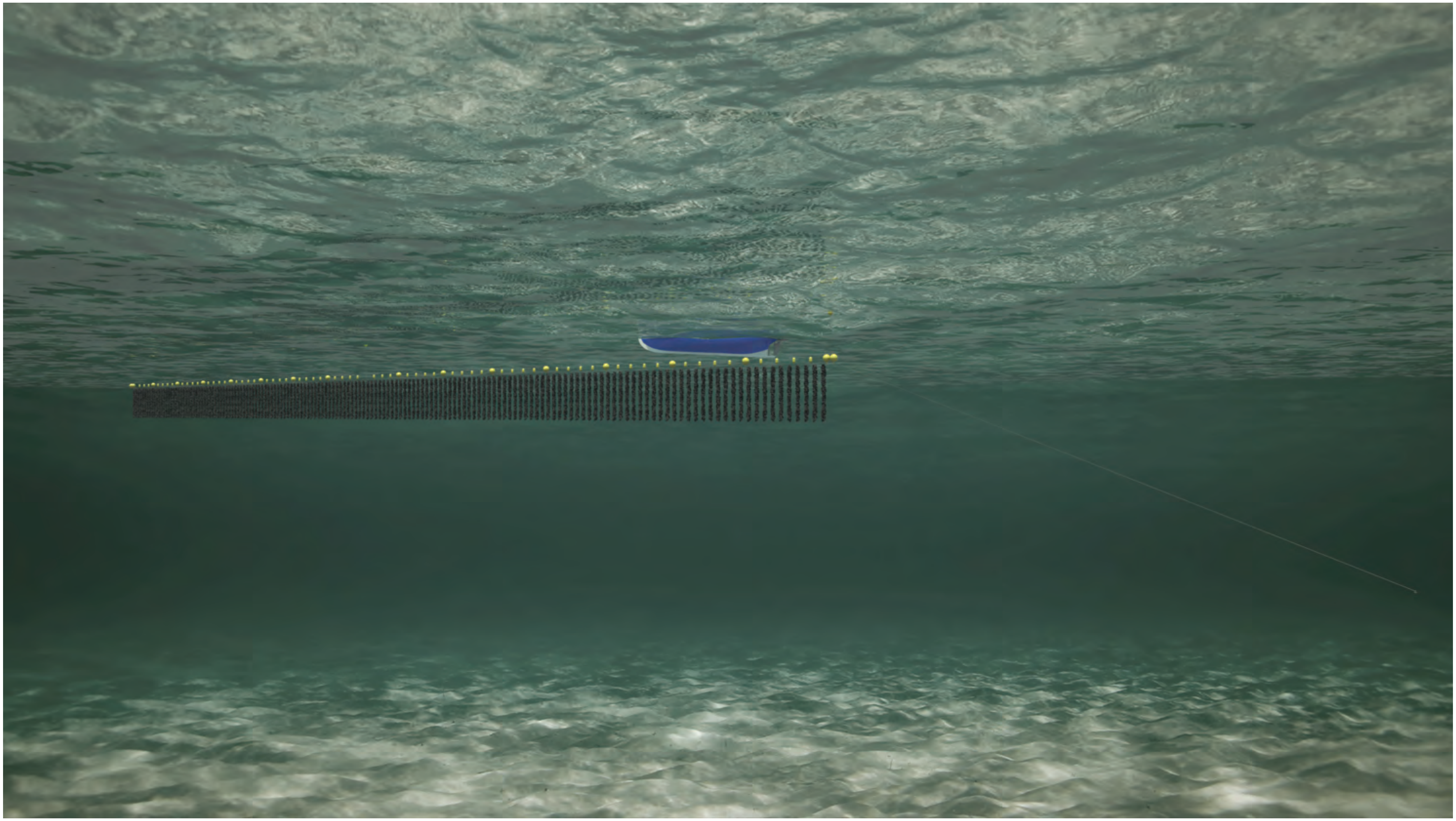

FIGURE 7

Simulated View of Parcel Array Underwater with Anchor Line

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2.2 Project Action Area

The Action Area for this project includes the project site (twenty 100-acre growing sites occupying a total project area of 2,000 acres) and all areas within 100 feet of the Project Actions (Figure 8). This Action Area was defined based upon several factors, including the project location and components, the potential noise impacts and disturbance areas for project components, and the properties of underwater acoustics. It is anticipated that the potential noise impacts from the initial installation of the sand screw anchors using a hydraulic drill will be minimal. Helical anchors for mussel farms in open ocean habitats have been installed all over the world, including at Catalina Island. They are drilled into the seabed using a hydraulic auger controlled at the surface. The drill is submersible and is lowered with the anchor. Noise levels are very low in the water, with a 50 hp hydraulic power pack on the boat (Fielder Marine Services, New Zealand, pers.comm.). Rotation speeds are very low, which minimizes entanglement of marine species. The anchor installation disturbs less than 1 square meter of sea bed on installation and once installed no rope or chain touches the sea floor which also minimizes seabed disturbance (Fielder Marine Services, New Zealand, Pers.comm). Marine wildlife, especially cetaceans, are known to be sensitive to noise effects (eNMFS 2007a). However, construction noise levels will be well within acceptable thresholds for both marine mammals and fish (ICF Jones & Stokes and Illingworth and Rodkin, Inc. 2009; NMFS 2007a). Due to the minimal noise level and area of disturbance on the sea floor, we believe an action area of 100 feet is sufficient.

The Action Area is host to numerous human activities that interact with the natural environment. Human activities occurring in and near the Action Area potentially affecting listed species include both consumptive (removal, harvesting, or depletion risk of resources) and non-consumptive activities. Consumptive activities potentially affecting listed species include oil and gas development, vessel transportation within the busy shipping lanes in nearby waters, non-point source pollution (resulting from many sources of pollution), and commercial and recreational fishing. Recreational fishing charters use the area for baitfish collection. Commercial fishing occurring in the area includes trawling. The California Halibut Trawl Grounds are a designated area located offshore beginning approximately 1 nautical mile from the mainland shore between Point Arguello in Santa Barbara County and Point Mugu in Ventura County. California halibut (*Paralichthys californicus*) is a commercially important flatfish species caught in shallow waters off the Southern California coast.

ATTACHMENT 1

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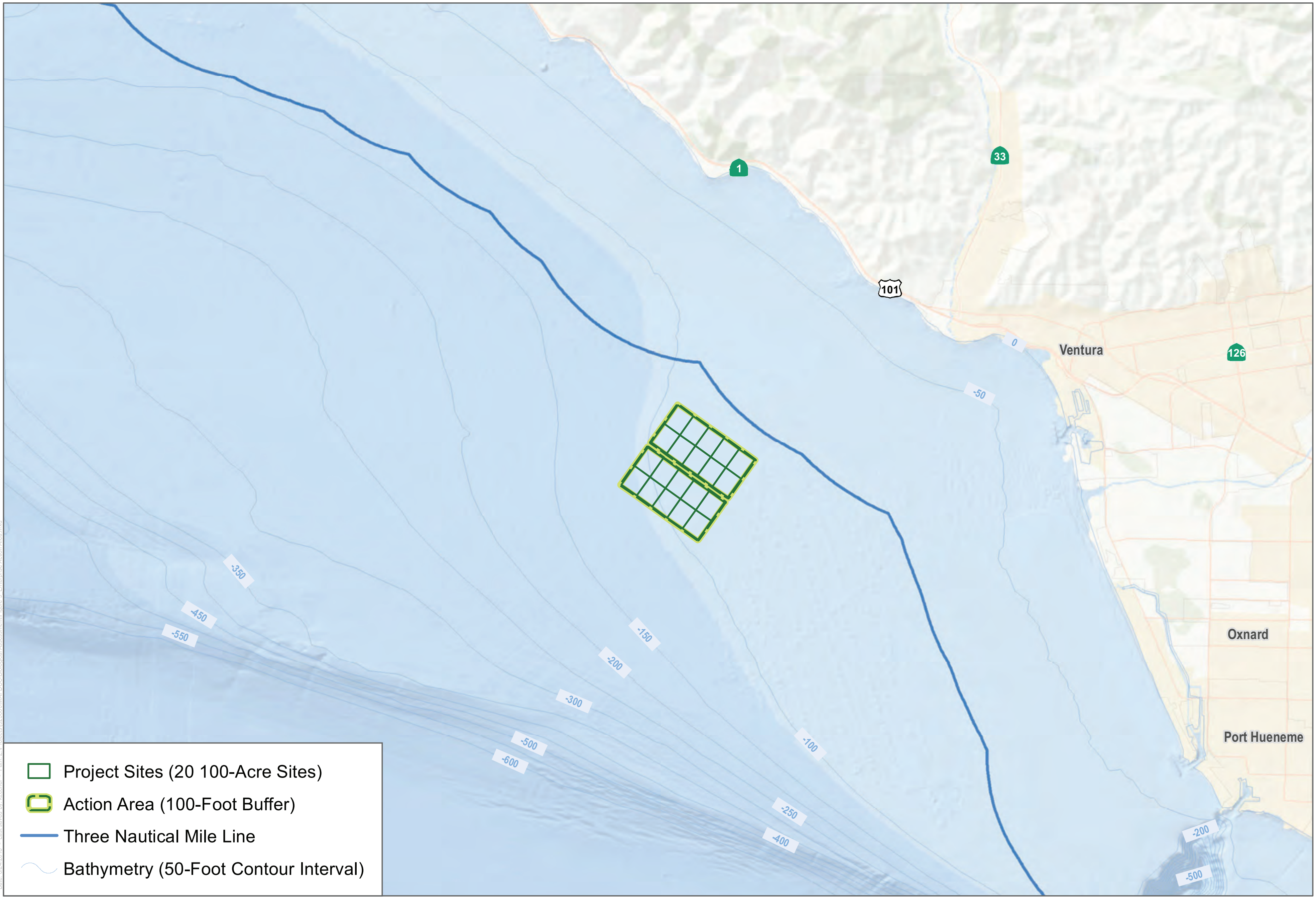
ATTACHMENT 1



SOURCE: ESRI ArcGIS Online: World Ocean Base

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0 1 2 Miles

FIGURE 8

Ventura Shellfish Enterprise Action Area

Essential Fish Habitat Assessment for the Ventura Shellfish Enterprise Project

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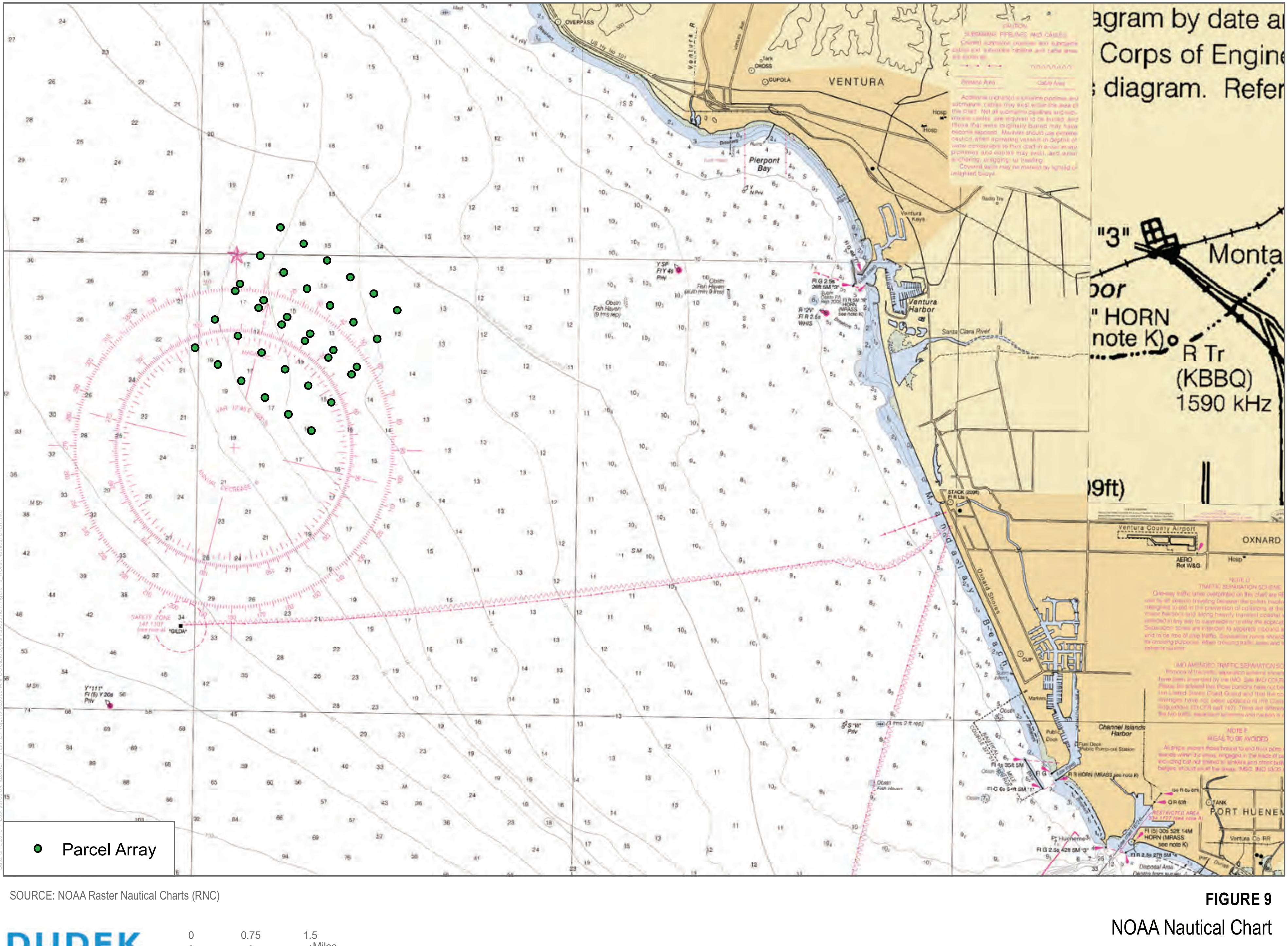

SOURCE: NOAA Raster Nautical Charts (RNC)

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FIGURE 9

NOAA Nautical Chart

Essential Fish Habitat Assessment for the Ventura Shellfish Enterprise Project

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3.0 REGULATORY SETTING

Essential Fish Habitat is regulated under the Magnuson-Stevens Fishery Conservation and Management Act of 1976, 16 U.S.C. 1801 *et seq.* (MSFCMA) protecting waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

3.1 Magnuson-Stevens Fishery Conservation and Management Act

The MSFCMA has jurisdiction over marine fishery resources in the United States. The MSFCMA was reauthorized and amended by the Sustainable Fisheries Act (SFA) of 1996 (Public Law 104-297) to include the EFH mandate. The SFA set forth a number of new directives for the NMFS, regional Fishery Management Councils (FMCs), and other federal agencies to identify and protect important marine, estuarine, and anadromous fish habitat. To that end, the SFA requires that regional FMCs prepare Fishery Management Plans (FMPs) for the identification, protection, and enhancement of EFH for federally "managed species." The goals of FMPs include the development and sustainability of an efficient and profitable fishery, optimal yield, adequate forage for dependent species, and long-term monitoring. The MSFCMA requires that all federal agencies consult with NMFS on all proposed actions permitted, funded, or undertaken by the agency that may adversely affect EFH. The main purpose of the EFH provisions is to avoid loss of fisheries due to disturbance and degradation of the fisheries habitat.

The Pacific Fishery Management Council (PFMC) is one of eight regional fishery management councils established by the MSFCMA. Under the MSFCMA, the federal government has jurisdiction to manage fisheries in the Exclusive Economic Zone (EEZ), which extends from the outer boundary of state waters (3 nautical miles [NM] from shore) to a distance of 200 NM from shore. With jurisdiction over the 822,817 km^2 (317,690 square miles) of EEZ off Washington, Oregon and California, the PFMC manages fisheries for approximately 120 species, including salmon, groundfish, coastal pelagic species (sardines, anchovies, and mackerel), and highly migratory species (tunas, sharks, and swordfish). The PFMC is also active in international fishery management organizations that manage fish stocks that migrate through the PFMC's area of jurisdiction, including the International Pacific Halibut Commission, the Western and Central Pacific Fisheries Commission (for albacore tuna and other highly migratory species), and the Inter-American Tropical Tuna Commission (for yellowfin tuna and other highly migratory species) (PFMC 2018). Management measures developed by the PFMC are recommended to the Secretary of Commerce through NMFS. Management measures are implemented by NMFS West Coast Regional offices and enforced by the National Oceanic and Atmospheric Administration (NOAA) Office of Law Enforcement, the 11th and 13th Coast Guard Districts, and local enforcement agencies (PFMC 2018).

Congress defined EFH to mean those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. In 2002, NMFS further clarified EFH with the following definitions (50 Code of Federal Regulations [CFR] §§ 600.05–600.930):

- "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate.
- "Substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities.
- "Necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10).

3.1.1 HABITAT AREAS OF PARTICULAR CONCERN (HAPC)

Habitat areas of particular concern (HAPC) are considered high priority areas for conservation, management, or research because they are rare, sensitive, stressed by development, or important to ecosystem function. The HAPC designation does not necessarily mean additional protections or restrictions are required for an area, but the designation helps to prioritize and focus conservation efforts. EFH guidelines identify HAPC as types or areas of habitat that are identified based on one or more of the following considerations:

- the importance of the ecological function provided by the habitat;
- the extent to which the habitat is sensitive to human-induced environmental degradation;
- whether, and to what extent, development activities are or will be stressing the habitat type; and
- the rarity of the habitat type.

These areas are detailed in EFH sections of FMPs and are summarized within the Regional Council Approaches to the Identification and Protection of Habitat Areas of Particular Concern. Current HAPC types are estuaries, canopy kelp, seagrass, rocky reefs, as well as Marine Protected Areas (MPAs) or Areas of Interest (such as banks, seamounts, and canyons). MPA's are further defined below.

3.1.1.1 Marine Protected Areas

The Southern California MPAs, from Point Conception to the California-Mexico border, cover areas of the Southern California Bight within state waters and islands. The 50 MPAs in this region cover approximately 356 square miles, or about 15% of Southern California state waters (CDFW 2016). The definition of the different MPA's are as follows:

State Marine Reserve (CCR Title 14, Section 632(a)(1)(A)): In a State Marine Reserve, it is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource, except under a scientific collecting permit issued by the department pursuant to Section 650 or specific authorization from the commission for research, restoration, or monitoring purposes.

State Marine Conservation Area (CCR Title 14, Section 632(a)(1)(C)): In a State Marine Conservation Area, it is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource for commercial or recreational purposes, or a combination of commercial and recreational purposes except as specified in individual MPA regulations. The department may issue scientific collecting permits pursuant to Section 650. The commission may authorize research, education, and recreational activities, and certain commercial and recreational harvest of marine resources, provided that these uses do not compromise protection of the species of interest, natural community, habitat, or geological features.

Special Closure: An area designated by the Fish and Game Commission that prohibits access or restricts boating activities in waters adjacent to sea bird rookeries or marine mammal haul-out sites (restrictions vary).

The closest state or federal marine protected area is the Channel Islands National Marine Sanctuary, a Federal Marine Protected Area, located approximately 9.1 miles from the project site.

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4.0 MANAGED FISHERIES AND HABITAT AREAS OF PARTICULAR CONCERN

The PFMC has approved FMPs for salmon, groundfish, coastal pelagic species, and highly migratory species. The species that have designated EFH in the Action Area may occur in any of several life stages, from larvae to adults, and may include presence at depths or distances beyond the direct influence of the project actions.

4.1.1 SALMON

Salmon EFH for estuarine and marine areas is identified in an area north of the project site that extends from north of Point Conception, California to the northern Washington boarder (PFMC 2008) (Appendix A: Groundfish EFH and HAPC Maps); therefore, no Pacific salmon EFH is designated in the Action Area. Chinook and coho salmon are the main salmon species managed by the PFMC. Chinook salmon are caught commercially and recreationally as far south as Santa Barbara County, located north of the project site. Appendix B: California Commercial Landing for 2017 provides a summary of total fish landed (in pounds) and value (in USD) for the Santa Barbara Area defined as all ports in San Luis Obispo, Santa Barbara, and Ventura Counties. Southern California coast steelhead (steelhead; *Oncorhynchus mykissis*), a salmonid, is federally endangered and managed under the ESA by NMFS. No commercial or recreation landing is permitted for steelhead in the Santa Barbara Area.

4.1.2 GROUNDFISH

The Pacific Coast Groundfish Fishery Management Plan (Groundfish FMP) manages 90-plus species over a large and ecologically diverse area from the Pacific coast border with Mexico to the Pacific coast border with Washington and Canada (PFMC 2016). Information on the life histories and habitats of these species varies in completeness, so while some species are well studied, there is relatively little information on certain other species. Information about the habitats and life histories of the species managed by the Groundfish FMP will certainly change over time, with varying degrees of information improvement for each species. For these reasons, it is impractical for the PFMC to include descriptions identifying EFH for each life stage of the managed species in the body of the FMP (PFMC 2016).

The Action Area is located in designated EFH as defined in the Groundfish FMP (PFMC 2016a) (Appendix A: Groundfish EFH and HAPC Maps). Because the EFH determination from this FMP addresses such a large number of species, it covers areas out to 3,500 meters in depth, shoreline areas up to the MHHW line, and areas up coastal rivers where ocean-derived salinity is at least 0.5 parts per thousand during average annual low flows. The FMP also identifies HAPCs.

The PFMC defines EFH for groundfish as the aquatic habitat necessary to allow for groundfish production to support long-term sustainable fisheries for groundfish and for groundfish contributions to a healthy ecosystem. The overall EFH for adult and juvenile groundfish, as well as for the pelagic eggs and larvae of groundfish, is designated as the water column and all bottom habitat extending from the shoreline to a depth of 400 meters (m) (200 fathoms) encompassing the steep drop-offs and high relief habitats (i.e., seamounts) that are important for bottomfish (PFMC 1998).

This EFH identification is precautionary because it is based on the currently known maximum depth distribution of all life stages of federally managed species (PFMC 2016).

Potential for Occurrence. EFH is present in the Action Area for over 79 species of groundfish; however, no HAPC for these species is known to occur based on available literature. The Action Area is soft-bottom habitat between 13 – 19 fathoms (78 – 114 feet) MLLW. The Groundfish EFH are shown in Table 1 below. Groundfish that has a high potential to utilize the habitat within the Action Area are flatfish, including sand flounders (Family Paralichthyidae): Pacific sanddab and California halibut; as well as righteye flounders (Family Pleuronectidae): English sole and dover sole. There is low potential for suitable habitat for roundfish or rockfish to utilize the sandy bottom habitat found in the Action Area. These species are primarily found over hard substrate, rocky reef, and/or kelp forest habitats, which are not found within the Action Area (please refer to Table 1).

Table 1
Groundfish EFH in the Action Area

Common Name	Species Name	Fish Species Present in Santa Barbara Area	Commercial Landings in Pounds6	General Habitat Preference	Potential to Occur in Action Area
ELASMOBRANCHS					
Big skate	*Raja binoculata*	Yes	0	Soft bottom habitats [2, 5]	Yes
California skate	*Raja inornata*	Yes	32	Soft bottom habitats [2, 5]	Yes
Leopard shark	*Triakis semifasciata*	Yes	3,523	Soft bottom habitats [2, 5]	Yes
Longnose skate	*Raja rhina*	Yes	2,710	Soft bottom habitats [2, 5]	Yes
Spiny dogfish	*Squalus suckleyi*	Yes	347	Soft bottom habitats [2, 5]	Yes
GRENADIERS					
Pacific rattail	*Coryphaenoides acrolepis*	Yes	0	Soft bottom habitats	No
MORIDS					
Finescale codling	*Antimora microlepis*	Yes	0	Unknown	No
RATFISH					
Ratfish	*Hydrolagus colliei*	Yes	0	Soft and hard substrate [3]	Yes

Table 1
Groundfish EFH in the Action Area

Common Name	Species Name	Fish Species Present in Santa Barbara Area	Commercial Landings in Pounds6	General Habitat Preference	Potential to Occur in Action Area
ROUNDFISH					
Cabezon	*Scorpaenichthys marmoratus*	Yes	5,989	Hard substrate and kelp [1, 3, 5]	No
Kelp greenling	*Hexagrammos decagrammus*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Lingcod	*Ophiodon elongatus*	Yes	45,688	Hard substrate and kelp [1, 3, 5]	No
Pacific cod	*Gadus macrocephalus*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Pacific whiting (hake)	*Merluccius productus*	Yes	148	Open water and hard substrate [3, 5]	No
Sablefish	*Anoplopoma fimbria*	Yes	328,296	Hard substrate and kelp [1,3,5]	No
ROCKFISH					
Aurora rockfish	*Sebastes aurora*	Yes	71	Hard substrate and kelp [1, 3, 5]	No
Bank rockfish	*S. rufus*	Yes	561	Hard substrate and kelp [1, 3, 5]	No
Black rockfish	*S. melanops*	Yes	4	Hard substrate and kelp [1, 3, 5]	No
Black and yellow rockfish	*S. chrysomelas*	Yes	492	Hard substrate and kelp [1, 3, 5]	No
Blackgill rockfish	*S. melanostomus*	Yes	8,638	Hard substrate and kelp [1, 3, 5]	No
Blue rockfish	*S. mystinus*	Yes	2,293	Hard substrate and kelp [1, 3, 5]	No
Bocaccio	*S. paucispinis*	Yes	6,563	Hard substrate and kelp [1, 3, 5]	No
Bronzespotted rockfish	*S. gilli*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Brown rockfish	*S. auriculatus*	Yes	121	Hard substrate and kelp [1, 3, 5]	No
Calico rockfish	*S. dallii*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Canary rockfish	*Sebastes pinniger*	Yes	1,363	Hard substrate and kelp [1, 3, 5]	No
Chilipepper	*S. goodei*	Yes	326	Hard substrate and	No

Table 1
Groundfish EFH in the Action Area

Common Name	Species Name	Fish Species Present in Santa Barbara Area	Commercial Landings in Pounds6	General Habitat Preference	Potential to Occur in Action Area
rockfish				kelp [1, 3, 5]	
China rockfish	*S. nebulosus*	Yes	1	Hard substrate and kelp [1, 3, 5]	No
Copper rockfish	*S. caurinus*	Yes	8,903	Hard substrate and kelp [1, 3, 5]	No
Cowcod	*S. levis*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Darkblotched rockfish	*S. crameri*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Dusky rockfish	*S. ciliatus*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Flag rockfish	*S. rubrivinctus*	Yes	96	Hard substrate and kelp [1, 3, 5]	No
Gopher rockfish	*S. carnatus*	Yes	989	Hard substrate and kelp [1, 3, 5]	No
Grass rockfish	*S. rastrelliger*	Yes	9,899	Hard substrate and kelp [1, 3, 5]	No
Greenblotched rockfish	*S. rosenblatti*	Yes	59	Hard substrate and kelp [1, 3, 5]	No
Greenspotted rockfish	*S. chlorostictus*	Yes	2,481	Hard substrate and kelp [1, 3, 5]	No
Greenstriped rockfish	*S. elongatus*	Yes	185	Hard substrate and kelp [1, 3, 5]	No
Harlequin rockfish	*S. variegatus*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Honeycomb rockfish	*S. umbrosus*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Kelp rockfish	*S. atrovirens*	Yes	409	Hard substrate and kelp [1, 3, 5]	No
Mexican rockfish	*Sebastes macdonaldi*	Yes	8	Hard substrate and kelp [1, 3, 5]	No
Olive rockfish	*S. serranoides*	Yes	63	Hard substrate and kelp [1, 3, 5]	No
Pink rockfish	*S. eos*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Pacific ocean perch	*S. alutus*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Quillback rockfish	*S. maliger*	Yes	0	Hard substrate and kelp [1, 3, 5]	No

Table 1
Groundfish EFH in the Action Area

Common Name	Species Name	Fish Species Present in Santa Barbara Area	Commercial Landings in Pounds6	General Habitat Preference	Potential to Occur in Action Area
Redbanded rockfish	*S. babcocki*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Redstripe rockfish	*S. proriger*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Rosethorn rockfish	*S. helvomaculatus*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Rosy rockfish	*S. rosaceus*	Yes	20	Hard substrate and kelp [1, 3, 5]	No
Rougheye rockfish	*S. aleutianus*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Sharpchin rockfish	*S. zacentrus*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Shortbelly rockfish	*S. jordani*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Shortraker rockfish	*S. borealis*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Silvergray rockfish	*Sebastes brevispinis*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Speckled rockfish	*S. ovalis*	Yes	586	Hard substrate and kelp [1, 3, 5]	No
Splitnose rockfish	*S. diploproa*	Yes	29	Hard substrate and kelp [1, 3, 5]	No
Squarespot rockfish	*S. hopkinsi*	Yes	22	Hard substrate and kelp [1, 3, 5]	No
Starry rockfish	*S. constellatus*	Yes	720	Hard substrate and kelp [1, 3, 5]	No
Stripetail rockfish	*S. saxicola*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Tiger rockfish	*S. nigrocinctus*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Treefish	*S. serriceps*	Yes	375	Hard substrate and kelp [1, 3, 5]	No
Vermilion rockfish	*S. miniatus*	Yes	63,684	Hard substrate and kelp [1, 3, 5]	No
Widow rockfish	*S. entomelas*	Yes	88	Hard substrate and kelp [1, 3, 5]	No
Yelloweye rockfish	*S. ruberrimus*	Yes	0	Hard substrate and kelp [1, 3, 5]	No

Table 1
Groundfish EFH in the Action Area

Common Name	Species Name	Fish Species Present in Santa Barbara Area	Commercial Landings in Pounds6	General Habitat Preference	Potential to Occur in Action Area
Yellowmouth rockfish	*S. reedi*	Yes	0	Hard substrate and kelp [1, 3, 5]	No
Yellowtail rockfish	*S. flavidus*	Yes	1,277	Hard substrate and kelp [1, 3, 5]	No
Speckled rockfish	*S. ovalis*	Yes	586	Hard substrate and kelp [1, 3, 5]	No
SCORPIONFISH					
California scorpionfish	*Scorpaena gutatta*	Yes	673	Hard substrate and kelp [1, 3, 5]	No
THORNYHEAD					
Longspine thornyhead	*Sebastolobus altivelis*	Yes	19,336	Hard substrate and kelp [1, 3, 5]	No
Shortspine thornyhead	*Sebastolobus alascanus*	Yes	260,605	Hard substrate and kelp [1, 3, 5]	No
FLATFISH					
Arrowtooth flounder (turbot)	*Atheresthes stomias*	Yes	0	Soft bottom habitats 2, 5	Yes
Butter sole	*Isopsetta isolepis*	Yes	2,078	Soft bottom habitats [2, 5]	Yes
Curlfin sole	*Pleuronichthys decurrens*	Yes	25	Soft bottom habitats [2, 5]	Yes
Dover sole	*Microstomus pacificus*	Yes	323	Soft bottom habitats [2, 5]	Yes
English sole	*Parophrys vetulus*	Yes	2,538	Soft bottom habitats [2, 5]	Yes
Flathead sole	*Hippoglossoides elassodon*	Yes	0	Soft bottom habitats [2, 5]	Yes
Pacific sanddab	*Citharichthys sordidus*	Yes	3,126	Soft bottom habitats [2, 5]	Yes
Petrale sole	*Eopsetta jordani*	Yes	2,322	Soft bottom habitats [2, 5]	Yes
Rex sole	*Glyptocephalus zachirus*	Yes	0	Soft bottom habitats [2, 5]	Yes
Rock sole	*Lepidopsetta bilineata*	Yes	865	Soft bottom habitats [2, 5]	Yes
Sand sole	*Psettichthys melanostictus*	Yes	228	Soft bottom habitats [2, 5]	Yes
Starry flounder	*Platichthys stellatus*	Yes	0	Soft bottom habitats [2, 5]	Yes

Table 1
Groundfish EFH in the Action Area

Common Name	Species Name	Fish Species Present in Santa Barbara Area	Commercial Landings in Pounds6	General Habitat Preference	Potential to Occur in Action Area
California halibut[7]	*Paralichthys californicus*	Yes	148,763	Soft bottom habitats [2, 5]	Yes

1 Kelp Canopy/Forest
2 Seagrass
3 Rocky Reefs
4 Estuaries
5 AOI/MPAs
6 CDFW Commercial Landings Data for 2017 (Appendix B)
7 Non-MSFCMA species. Managed by the California Department of Fish and Wildlife.

Of the flatfish, California halibut, a state regulated species, is the most important commercial fishery for the Santa Barbara Area with 148,763 lbs. landed in 2017 (Table 1, CDFW 2017). More specifically, commercial catch for the California halibut in two blocks that overlap the Action Area, Blocks 0664 and 0665, were reviewed for landings between 2010 to 2016 (Appendix B and C). During those years, an approximate total of 84,524 lbs., or 1.12% of the total catch of all landings from these two blocks, were landed for California halibut; however, for the Santa Barbara Area, California halibut caught in Blocks 0664 and 0665 represent approximately 26 % to 37% of halibut landed for the area (Table 2; Figures 10 and 11). Further, based upon CDFW trawl data from 2012 through 2016, which provided the location (i.e., latitude and longitude) of where each trawl started and stopped:

- The total trawl length within the Santa Barbara Channel during that time period was 40,480 nautical miles.
- The total trawl length within the area of interest evaluated by NOS was 1,508 nautical miles.
- The total trawl length within the proposed project area was 145 nautical miles.

While the approximately 2,000 acre proposed site location does overlap with some known halibut trawl fishery activity in Block 0664 (21,363 acres) and 0665 (66,613 acres) it avoids the known area of highest trawl fishing activity, which is located in a portion of the Santa Barbara Channel northwest of the project site. Given the small amount of existing usage and conversion of approximately 2.27% of the blocks into a viable commercial mussel aquiculture, the impact to the halibut trawl fishery is considered to be negligible. In the Aquaculture Siting Analysis Results for Ventura Shellfish Enterprise (NOAA/National Ocean Services /National Centers for Coastal Ocean Science (NOS/NCCOS)), halibut trawling data was used along with other variables to determine the most suitable project location and layout. This Siting Analysis utilized the best available, high-resolution spatial data to represent key potential environmental and use conflicts that constrain the siting of an aquaculture operation within the Santa Barbara Channel region of interest. The Siting Analysis confirmed that the proposed site location is in the area that minimizes use conflicts, including fishery conflicts, to the greatest extent possible.

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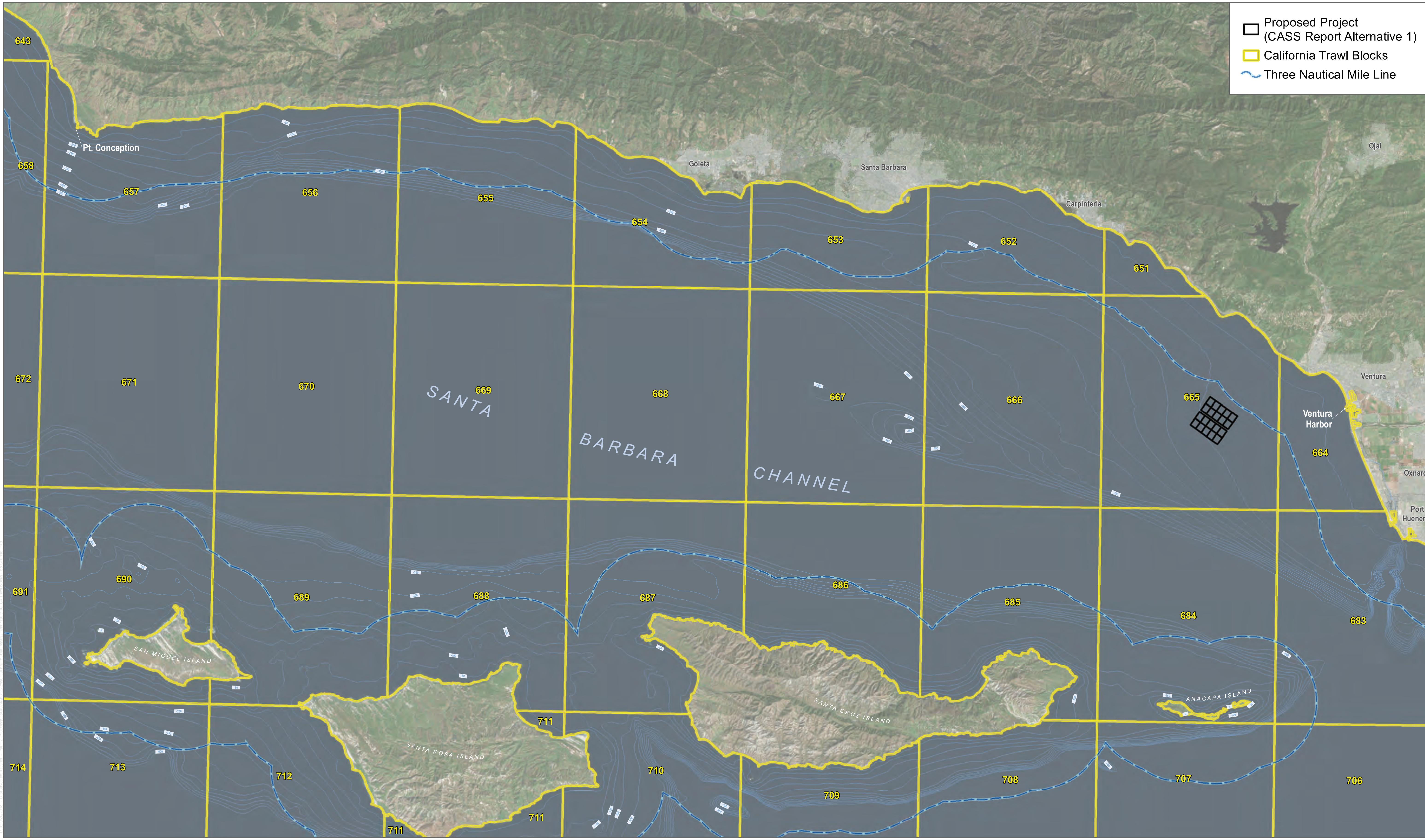
ATTACHMENT 1



SOURCE: California Department of Fish and Game, Marine Region

DUDEK

0 1 2 3 Nautical Miles

FIGURE 10

California Trawl Blocks - Santa Barbara Channel

Essential Fish Habitat Assessment for the Ventura Shellfish Enterprise Project

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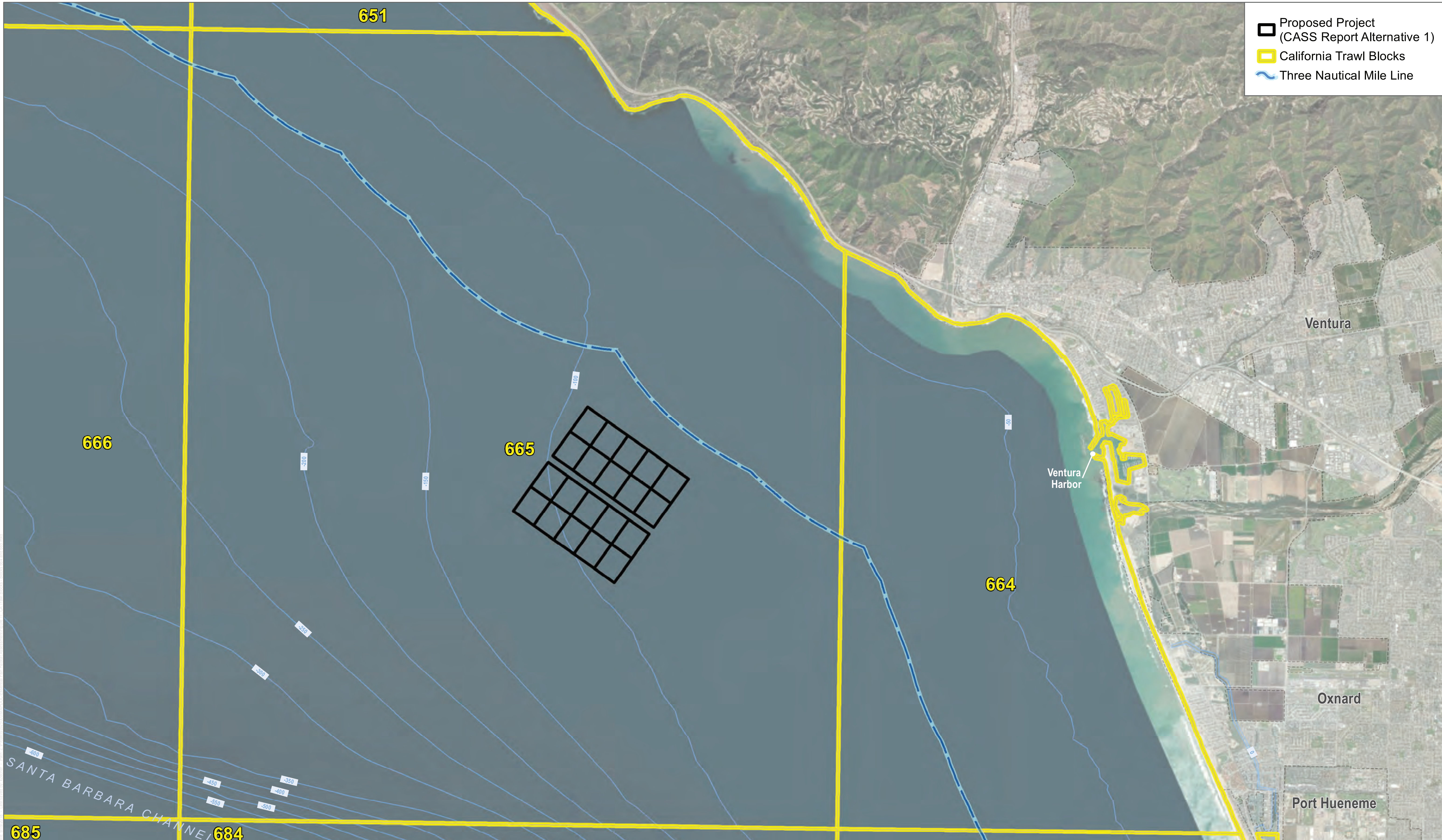

SOURCE: California Department of Fish and Game, Marine Region

DUDEK

0 1 2 3 Nautical Miles

FIGURE 11

California Trawl Blocks - Blocks 664 and 665

Essential Fish Habitat Assessment for the Ventura Shellfish Enterprise Project

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Table 2
California Halibut Regional and Trawl Block Landings in Pounds

Year	Santa Barbara Area[1]	Blocks 0664 and 0665[2]	Percentage of Regional Landings
2016	125,684	35,263	28%
2015	99,977	36,326	36%
2014	77,603	21,253	27%
2013	94,593	34,643	37%
2012	111,497	28,629	26%

1 Santa Barbara Area includes ports located in San Luis Obispo, Santa Barbara, and Ventura Counties
2. California halibut caught in Blocks 0664 and 0665 are primarily landed in Santa Barbara Area, but may be landed in ports outside of the Santa Barbara Area.

4.1.3 COASTAL PELAGIC SPECIES

Coastal pelagic species (CPS) include finfish (northern anchovy, Pacific sardine, Pacific mackerel, and jack mackerel) and California market squid as well as krill (PFMC 2016). Pacific herring (*Clupea pallasii pallasii*) and jacksmelt (*Atherinopsis californiensis*) are also included in the Coastal Pelagic FMP as Ecosystem Component Species. EFH designation for CPS is based on a thermal range bordered within the geographic area where a species occurs at any life stage, where the species has occurred historically during periods of similar environmental conditions, or where environmental conditions do not preclude colonization by the species. The east-west geographic boundary of EFH for each individual CPS finfish and California market squid is defined to be all marine and estuarine waters from the shoreline along the coasts of California, Oregon, and Washington to offshore to the limits of the U.S. EEZ and above the thermocline where sea surface temperatures range between 10°C to 26°C (50°F to 78.8°F). The southern extent of EFH for CPS finfish is the United States–Mexico maritime boundary. The northern EFH extent is the position of the 10°C (50°F) isotherm varying both seasonally and annually (PFMC 1998).

The northern anchovy historically ranged from the Queen Charlotte Islands, British Columbia, south to Cabo San Lucas, Baja California. More recently, populations have moved into the Gulf of California, Mexico. Larvae and juveniles are often abundant in nearshore areas and estuaries with adults being more pelagic; however, adults may also be found in shallow nearshore areas and estuaries. Anchovy are non-migratory but do make extensive inshore-offshore and along-shore movements (Emmett et al. 1991). During historic periods of high abundance (from the early part of the 20th century into the 1940s) Pacific sardines ranged from the Gulf of California north to Washington State before the fishery crashed in the 1950s. Today, large populations still occur south of Point Conception into Baja California. The Pacific sardine is epipelagic, occurring in loosely aggregated schools. When abundant, this species can occur up to 150 miles offshore (Wolf et al. 2001). Jack mackerel and Pacific mackerel occur from Santa Maria Bay, Mexico to Yaquina Bay, Oregon. They occur in California bays, estuaries and coastal pelagic ocean waters throughout the year. Both species are schooling fish which prefer shallow water less than 100 feet deep and are most common at depths of 5 to 50 feet deep (CDFW 2013). All coastal pelagics are associated with the water column except for the female market squid, which lays egg masses on sandy bottoms at depths of about 15–180 feet. The market squid ranges coastally from Baja California to Alaska and can be found within 200 miles of the shore (PFMC 2008).

The Ventura Harbor plays a substantial role in California's commercial fishing industry. Market squid remains California's largest and most lucrative commercial fishery, valued at over $73 million in 2010. In 2011, nearly 33 thousand tons of squid, representing 28% of the state's total catch limit, was unloaded at the Ventura Harbor, making it one of the largest squid landings on the West Coast. Squid generated $16 million in revenues for the fishing companies that operate at the harbor (The California Economic Forecast, 2012).

Table 3
Coastal Pelagic Species in the Action Area

Common Name	Scientific Name	Commercial Landing in Pounds[1]	General Habitat
Northern Anchovy	*Engraulis mordax*	93,862	Open water
Pacific Sardine	*Sardinops sagax*	203,780	Open water
Pacific Mackerel	*Scomber japonicus*	534,813	Open shallow water
Jack Mackerel	*Trachurus symmetricus*	8,697	Open shallow water
Market Squid	*Doryteuthis opalescens*	87,461,026	Open water

1 CDFW Landing Data for 2017 for the Santa Barbara Area (caught in California water) (Appendix B)

Potential for Occurrence. All coastal pelagic species are found in the Action Area. The market squid is the most important of these fisheries. Using the NOS Siting Analysis discussed above, the project site was located in an area that avoids key market squid fishing areas, which occur significantly south of the proposed project site.

4.1.4 HIGHLY MIGRATORY SPECIES

The Highly Migratory Species (HMS) FMP includes important species of tunas, billfish, and sharks, which are harvested by West Coast HMS fisheries. HMS managed under the HMS FMP include tunas (North Pacific albacore, yellowfin tuna, bigeye tuna, skipjack tuna, and pacific bluefin tuna), sharks: common thresher shark, shortfin mako shark, and blue shark), billfish/swordfish (striped marlin and swordfish), and dorado or dolphinfish (Table 4).

Table 4
Highly Migratory Species in the Action Area

Common Name	Scientific Name	Commercial Landing in Pounds[1]	EFH Present	General Habitat
Tunas				
Northern Pacific Albacore	*Thunnus alalunga*	1,528	No	Open water
Yellowfin Tuna	*Thunnus albacares*	351	No	Open water

Table 4
Highly Migratory Species in the Action Area

Common Name	Scientific Name	Commercial Landing in Pounds[1]	EFH Present	General Habitat
Bigeye tuna	*Thunnus obesus*	0	No	Open water
Skipjack tuna	*Katsuwonus pelamis*	0	No	Open water
Pacific bluefin tuna	*Thunnus thynnus*	242	No	Open water
Sharks				
Blue shark	*Prionace glauca*	37	No	Open water
Common thresher shark	*Alopias vulpinus*	26,035	Yes	Open water
Shortfin mako	*Isurus oxyrinchus*	7,571	Yes	Open water
Marlin and Swordfish				
Striped marlin	*Kajikia audax*	0	No	Open water
Swordfish	*Xiphias gladius*	81,890	No	Open water
Other				
Dorado	*Coryphaena hippurus*	0	Yes	Open water

1 CDFW Landing Data for 2017 for the Santa Barbara Area (caught in California water) (Appendix B)

Potential for Occurrence. Thresher shark, shortfin mako shark, and dorado EFH are found in the Action Area. These are highly migratory and mobile species that have large ranges and could seasonally move through the Action Area.

4.2 Habitat Areas of Particular Concern

In the Southern California Bight, there are seven EFHs in state waters: Point Conception, Potato Bank, Hidden Reef Kidney Bank, Catalina Island, Cherry Bank, Cowcod Conservation Area- west, and Cowcod Conservation Area- east.

In the Santa Barbara Channel area, there are five types of HAPCs: Seagrass, Canopy Kelp, Rocky Reefs, Estuaries, and Areas of Interest. Areas of Interest can correspond to a variety of submarine features such as seamounts, canyons and banks. However, for the Santa Barbara Channel region, Areas of Interest correspond to Marine Protected Areas.

4.2.1 SEAGRASS

Seagrasses are one of the only flowering plants, or angiosperms, that can grow in a marine environment. These plants support a diversity of life and can form extensive beds in shallow, protected, estuarine, or other nearshore environments. Two common seagrasses that occur in the west coast region are eelgrass (genus *Zostera*) and surfgrass (genus *Phyllospadix*), with eelgrass being the most prevalent in California (NOAA 2018a). Eelgrass (*Zostera marina and Z. pacifica.*) beds are located in soft, sandy sheltered seafloor environments, typically in shallow bays and estuaries. Eelgrass beds function as nursery grounds and provide habitat for juvenile fish, snails, sea stars, anemones, crabs and clams (NPS 2018a), and further serve as potential foraging habitat for sea turtles (NOAA 2018b). In particular, the federally endangered green sea turtle may utilize eelgrass beds as foraging habitat (CDFW 2018). Surfgrass (*Phyllospadix* sp.) beds are located in the rocky intertidal and subtidal zones with turbulent surf. Surfgrass beds are habitat for several species of invertebrates, juvenile fish, and epiphytic algae (NPS 2018b).

Areas of Seagrass HAPC occur along the coast between Point Conception and Campus Point, and at two of the northern Channel Islands: Anacapa Island and Santa Cruz Island. Specific locations of Seagrass HAPC along the coast occur in three areas coinciding with three Marine Protected Areas: Point Conception SMR, Kashtayit SMCA, and Campus Point SMCA (approximately 59, 48, and 26 miles respectively from the project site). An additional area of Seagrass HAPC occurs at Point Mugu, which is approximately 23 miles from the project site.

At the Channel Islands, Seagrass HAPC occurs at Prisoners Harbor on Santa Cruz Island (approximately 22 miles from the project site), and around the entire perimeter of Anacapa Island, corresponding with the Anacapa Island Special Closure area (approximately 17 miles from the project site).

Seagrass HAPC is not present within the action area and seagrasses and eelgrass are not anticipated in or near the project site, given that the project site is located at a depth not suitable for seagrass and eelgrass growth due to light limitations. Therefore, Project Actions are not expected to have a negative effect on Seagrass HAPC or the species that utilize these habitats.

4.2.2 CANOPY KELP

Giant kelp, perhaps the most recognized species of brown macroalgae, forms the more southern kelp forests, from the southern Channel Islands, California to northwestern Baja. In California, there are two dominant species: Giant kelp (*Macrocystis pyrifera*) and bull kelp (*Nereocystis leutkeana*) (NOAA 2018a). Considered an ecosystem engineer, kelp provides a physical substrate and habitat for kelp forest communities (Jones et al. 1997). A wide range of sea life uses kelp forests for protection or food, including fish (particularly rockfish) and many invertebrates, such as amphipods, shrimp, marine snails, bristle worms, and brittle stars. Many marine mammals and birds are also found, including seals, sea lions, whales, sea otters, gulls, terns, snowy egrets, great blue herons, and cormorants, as well as some shore birds (NOAA 2013). In California, *Macrocystis pyrifera* forests, the nudibranch (*Melibe leonina)*, and skeleton shrimp (*Caprella californica)* are closely associated with surface canopies; the kelp perch (*Brachyistius frenatus)*, rockfish (*Sebastes* spp.), and many other fishes are found within the stipitate understory; brittle stars and turban snails(*Tegula* spp.) are closely associated with the kelp holdfast, while various herbivores, such as sea urchins and abalone, live under the prostrate canopy; many seastars, hydroids, and benthic fishes live among the benthic assemblages; solitary corals, various gastropods, and echinoderms live over the encrusting coralline algae (Foster and Schiel 1985). In addition, pelagic fishes and marine mammals are loosely associated with kelp forests, usually interacting near the edges as they visit to feed on resident organisms.

In the Santa Barbara Channel area, Canopy Kelp HAPC occurs in nearshore waters along the coastline from Point Conception to the City of Ventura. Canopy Kelp HAPC also occurs around the perimeter of the northern Channel Islands: Anacapa, Santa Cruz, Santa Rosa and San Miguel Islands. The nearest Canopy Kelp HAPC is directly shoreward, approximately 3 miles north of the project site.

Canopy Kelp HAPC is not present at the action area. Project Actions are not expected to have a negative effect on Canopy Kelp HAPC or the species that utilize these habitats.

4.2.3 ROCKY REEFS

Rocky reefs are submerged rock outcrops with varying relief, known to be rich in both fish abundance and species diversity (NOAA 2018a). In these systems, rocky reefs provide prey, shelter, and refuge for recruiting, juvenile and adult fishes. Rocky reefs also provide surface area for colonization of algae and invertebrates. It is the physical structure itself of rocky reefs that is the most beneficial to the marine ecosystem. Nearshore rocky reefs receive enough light for photosynthesis and are inhabited by algae, invertebrates, and groundfishes. Rocky reefs in deeper waters do not receive enough light for photosynthesis and are therefore dominated by sessile invertebrates, deep-sea corals, and groundfishes. Several species of groundfish such as lingcod, many species of rockfish, and cabezon prefer rocky reefs (NOAA 2018a). These species inhabit rocky reefs because they can find shelter from predators inside the structure they provide. In reefs close to the surface, algae can attach to the rocks and provide the base of a food chain, making rocky reefs highly productive. When reefs exist at depth below where sunlight can penetrate, invertebrate filter feeders dominate the community, capturing prey as they pass by in the current. Deep-sea corals also form on these reefs (NOAA 2018a).

Rocky Reef HAPC in the Santa Barbara Channel region is found in various locations around San Miguel, Santa Rosa, Santa Cruz and Anacapa Islands, as well as well as two main locations along the Santa Barbara County coastline: Point Conception (approximately 58 miles from the project site) and Carpinteria (approximately 10 miles from the project site, the closest Rocky Reef HAPC to the project site).

Rocky Reefs HAPC is not present at the project site. Project Actions are not expected to have a negative effect on Rocky Reefs HAPC or the species that utilize these habitats.

4.2.4 ESTUARIES

Estuaries are semi-enclosed regions where salt and freshwater mix, leading to a unique and biodiverse community of plant and animal species. Estuaries are characterized by high productivity, sediment deposition, varying salinity, and high biodiversity. Due to the variable salinity, tides, outflow and water properties, many organisms have adapted in a myriad of ways to exploit the environment. Estuaries are vital habitats for marine fishes that use the shallow protected habitat as rearing zones for juveniles (NOAA 2018a). Without these important habitats, juveniles would be exposed to physical forces beyond their swimming capabilities as well as high predatory pressure from lack of shelter. The nutrient input, calm waters, and sedimentation of estuaries allow many plant species to thrive, forming the base of a very productive ecosystem that influences many habitats and species beyond its borders (NOAA 2018a). Estuaries also provide habitat for a variety of seabirds, invertebrates, marine mammals, and turtles. These habitats are typically classified into intertidal, subtidal, and pelagic communities defined by the occurring depths and associated tidal exposure and include rocky reef, dry reef, the intertidal zone, subtidal sandy bottom (inshore), eelgrass and surfgrass beds, kelp forest, rock jetties, piers, submarine canyon, and bay/harbor.

In the Santa Barbara Channel Area, there are several estuaries that are HAPC along the coastline. In Goleta, there are two estuaries: Devereux Slough and Goleta Slough. Devereux Slough is adjacent to the Campus Point SMCA and is approximately 30 miles from the project site. The Goleta Slough estuary is also designated as an MPA. The Goleta Slough SMCA and is approximately 27 miles from the project site. Another important area for estuaries is located along the coast from Pierpont Bay at the City of Ventura, and continues south down the coast to Mugu Canyon, by Point Mugu. The closest location of Estuaries HAPC is located shoreward, northwest approximately 5 miles from the project site in Pierpont Bay.

Estuaries HAPC is not present at the project site. Project Actions are not expected to have a negative effect on Estuaries HAPC or the species that utilize these habitats.

4.2.5 AREAS OF INTEREST

4.2.5.1 Marine Protected Areas

The Southern California MPAs, from Point Conception to the California-Mexico border, cover the Southern California Bight. The 50 MPAs in this region cover approximately 356 square miles, or about 15% of Southern California state waters (CDFW 2016). There are 19 marine protected areas in the Santa Barbara Channel area, along the coastline and at the Channel Islands. These include:

1. Point Conception SMR, located south of Lompoc along the Gaviota coastline. It is located approximately 59 miles west of the project site.
2. Kashtayit SMCA, located south of Gaviota in Santa Barbara County. It is located approximately 48 miles west of the project site.
3. Naples SMCA, located south of the unincorporated areas of Santa Barbara County known as Naples. It is located approximately 32 miles west of the project site.
4. Campus Point SMCA, located along the Gaviota coastline between Coal Oil Point and Goleta Point, adjacent to the Goleta Slough Ecological Preserve. It is located approximately 26 miles west of the project site.

5. Goleta Slough SMCA, located northeast of Goleta Point and includes the slough adjacent to the Goleta Slough Ecological Reserve. It is located approximately 27 miles west of the project site.
6. Richardson Rock State and Federal Marine Reserve (San Miguel Island), located just off the northwest corner of San Miguel Island, the most westerly island of the Channel Islands. It is located approximately 62 miles southwest of the project site.
7. San Miguel Island Special Closure, located on San Miguel Island, wrapping around Point Bennett to Judith Rock, including the Judith Rock SMR. It is located approximately 61 miles southwest of the project site.
8. Harris Point State and Federal Marine Reserve (San Miguel Island), located on the northern side of San Miguel Island. It is located approximately 52 miles southwest of the project site.
9. Judith Rock SMR (San Miguel Island), located on the southern side of San Miguel Island. It is located approximately 61 miles southwest of the project site.
10. Carrington Point SMR (Santa Rosa Island), located on the northern side of Santa Rosa Island. It is located approximately 38 miles southwest of the project site.
11. Skunk Point SMR (Santa Rosa Island), located on the northeastern corner of Santa Rosa Island. It is located approximately 38 miles southwest of the project site.
12. South Point State and Federal Marine Reserve (Santa Rosa Island), located on the south side of Santa Rosa Island. It is located approximately 48 miles southwest of the project site.
13. Painted Cave SMCA (Santa Cruz Island) is located on the north wide of Santa Cruz Island near the most western point. It is located approximately 28 miles southwest of the project site.
14. Gull Island State and Federal Marine Reserve (Santa Cruz Island), located on the south side of Santa Cruz Island. It is located approximately 31 miles southwest of the project site.
15. Scorpion State and Federal Marine Reserve (Santa Cruz Island), located on the north side of Santa Cruz Island near the eastern point. It is located approximately 12 miles southwest of the project site.
16. Anacapa Island Special Closure encompasses the entire immediate perimeter of Anacapa Island. It is located approximately 17 miles south of the project site.
17. Anacapa Island State and Federal Marine Reserve, located on the northern side of Anacapa Island, is the closest MPA to the project site, located approximately 11 miles away to the south. This area includes Anacapa Island State Marine Reserve and the adjoining federal Anacapa Island Marine Reserve. It covers approximately 11.54 square miles of ocean in State waters and extends for approximately 3.5 miles. At Anacapa Island State and Federal Marine Reserve, it is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource.
18. Anacapa Island State and Federal Marine Conservation Area, located on the north side of west Anacapa Island abutting a federal marine conservation area located three nautical miles from Anacapa Island. It is located approximately 12 miles south of the project site.

19. Footprint State and Federal Marine Reserve (Anacapa Channel), located southwest of Anacapa Island between Anacapa and Santa Cruz Islands. It is located approximately 19 miles southwest of the project site.

Given the significant distance between the project site and the MPAs, there are no anticipated effects to the MPA ecosystems due to project actions.

5.0 ANALYSIS OF THE POTENTIAL ADVERSE EFFECTS OF THE ACTION ON EFH AND THE MANAGED SPECIES

An adverse effect is defined in the MSA as "any impact which reduces quality and/or quantity of EFH, and may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions" (50 CFR 600.810). EFH is present for groundfish, coastal pelagic species, and highly migratory species. The project is not located in an area designated as an HAPC.

The potential adverse effects of the proposed project actions evaluated in this EFH Assessment would be:

- Entanglement in loose fishing gear that becomes caught in longlines;
- Temporary loss of sandy softbottom seafloor habitat from anchor installation and associated turbidity;
- Increased noise during construction;
- Hazardous contaminants from potential oil spills;
- Loss of prey resources due to fouling organisms; and
- Disturbance of the benthic environment from project operations.

5.1 Entanglement

Groundfish, coastal pelagic species, and highly migratory species could become entangled in loose fishing nets, debris, and other ghost gear that could become attached to mussel aquaculture gear. Absent mitigation, entanglement may adversely affect these species. However, with incorporation of MM BIO-1 through BIO-5 and MM BIO-10, which pertain to effective management, maintenance, and oversight of aquaculture gear, this effect is considered insignificant.

5.2 Temporary Loss of Habitat and Increased Turbidity due to Anchor Installation

Installation of the anchors associated with the project has the potential to temporarily increase turbidity and displace groundfish that may be utilizing the soft sediment habitat. However, these temporary impacts would be minimal. Each anchor would only have a footprint of less than one square meter and once installed no rope or chain touches the sea floor which also minimizes seabed disturbance. The total habitat area that would be disturbed by the proposed project would be small and regionally insignificant when compared to the overall amount of habitat available in the area. Further, groundfish would be able to utilize the area soon after installation of the anchors. Therefore, impacts associated with benthic disturbance are considered insignificant.

5.3 Construction Noise

Project Activities will temporarily disturb and alter the seafloor habitat from the placement of screw anchors used to hold the lines, ropes, floats, and buoys. Construction-related noise with the installation of sand screw anchors is very low in the water, with only a 50-horsepower hydraulic power pack on the boat. Construction noise levels will be well within acceptable thresholds for fish species (ICF Jones & Stokes and Illingworth and Rodkin, Inc. 2009; NMFS 2007a). The fish species that may utilize the project area are highly mobile and have the ability to temporarily avoid the project site during construction activities. Therefore, noise impacts associated with installation of equipment are considered insignificant.

5.4 Hazardous Contaminants from Oil Spills

Construction and harvesting operations (and the use of any heavy equipment) could result in water-quality effects due to chemical-compound pollution (fuel, oil, lubricants, inadvertent spills, and other materials) in the event of an oil spill. As with any mechanized machinery, there is a small risk of accidental discharge of fuel, lubricants, or hydraulic fluids, which could affect marine wildlife in the area and result in injury and/or mortality to wildlife in the area of the contaminant through ingestion, physical contact that reduces survival functions (e.g., oiled wildlife), or a reduction in suitable feeding habitat. Although spills of this nature are detrimental to aquatic organisms, it is expected that the impacts would be negligible because of the limited occurrence of spills and corrective actions. Incorporation of Mitigation Measure BIO-7 would effectively mitigate risk associated with potential oil spills.

5.5 Loss of Prey Resources due to Fouling Organisms

Groundfish could potentially lose prey resources in the event that the substrate in or near the project site becomes populated with invasive "fouling organisms." The submerged structures of the Project Actions can provide hard substrate habitat for such organisms. Fouling organisms, such as invasive algae, sea squirts, and mussels, can pose economic and ecological risks to the marine environment. For example, the invasive carpet sea squirt (*Didemnum vexillum*) reproduces rapidly and fouls marine habitats (including shellfish aquaculture operations and fishing grounds), ship's hulls, and maritime structures. Like other fouling organisms, they are found on hard substrates that include floats, moorings and ropes, steel chain and ship hulls. They overgrow other marine organisms such as tunicates, sponges, macro algae, hydroids, anemones, bryozoans, scallops, mussels, and oysters. Where these colonies occur on the seabed, they likely cover the siphons of infaunal bivalves and serve as a barrier between groundfish and their prey. However, the invasive carpet sea squirt is not present in the Channel Islands area. The nearest known occurrences are in Monterey Bay and Mission Bay in San Diego (Woods Hole Science Center 2007). Further, there is a lack of available substrate within or near the project site suitable for colonization by fouling organisms, as these invasive species cannot attach themselves to the sandy bottom substrate at the project site.

5.6 Disturbance to the Benthic Environment from Project Operations

Effects on sediment quality underneath shellfish aquaculture gear could be impacted from biodeposits and changes to the benthic invertebrate species composition that can adversely affect groundfish habitat. The Project Actions have the potential to disturb or alter the seafloor habitat by the deposition of biological materials resulting from dislodged or discharged shells, shell fragments, and deposits from the growing operation accumulating on the seafloor beneath the aquaculture structures. Such material typically includes feces and pseudofeces from the cultivated shellfish, as well as fouling organisms such as algae, barnacles, sponges, and other invertebrates that accumulate on the project equipment and subsequently become dislodged by natural processes, or due to harvesting or cleaning operations. Cultivated shellfish or shells from can also be dislodged from the structure during growth, storm events, predation by marine wildlife, and cleaning and harvesting activities. The accumulation of material including shell fragments, intact shells, fouling organisms, and feces can alter the physical and chemical characteristics of the bottom substrate, and can affect the benthic community and sediment-dwelling organisms that may be sensitive to conditions such as substrate composition and chemistry. Accumulation of material could also attract organisms that would change the composition of the benthic community. Other potential benthic impacts can include increased loads on sediment dissolved oxygen and redox conditions, and changes to nutrient cycling resulting in a decrease in benthic species abundance and sediment porosity (Pearson and Rosenberg 1978; Wilding and Nickell 2013; Wilding 2012). The effect on benthic nitrogen cycling is determined by biogeochemical and physical variables, such as water depth, current velocities, and bottom type and composition (CFGC 2018). Shellfish are able to alter the biogeochemical process in the water column by stimulating nitrification (Souchu et al. 2001).Mussel farms that are located in areas with greater water depths and current speeds spread bio-deposits over a larger area without posing the risk of enhanced sediment nutrient release (Stadmark & Conley 2011). A local mussel farm operated by the Santa Barbara Mariculture Company, with thirteen years in operation, conducted benthic analysis testing. This sediment analysis testing examined grain size, and levels of benthic epifaunal and infaunal biodiversity both within the farm and outside of the farm, and found no significant benthic impact (CFGC 2018). Given the conditions at the project site, with the significant depth, wave action and mixing, this potential impact is unlikely to be significant and bioaccumulation is expected to be dispersed over a larger area. To confirm this conclusion, Mitigation Measure BIO-9 has been incorporated, which requires monitoring of sediment quality and composition to evaluate any benthic impacts associated with the project.

Based on the foregoing, no adverse effects to essential fish habitat or habitat of particular concern are anticipated to occur from development and operation of the project.

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6.0 CONCLUSION

This EFH Assessment represents the assessment of the effects of the proposed project actions on managed fisheries in accordance with legal requirements set forth in the MSFCMA . Implementation of the project could result in temporary impacts associated with construction activities and impacts from project operations associated with entanglement, changes in sediment composition, and potential oil spills. However, implementation of the proposed mitigation measures are expected to fully compensate for project impacts and reduce potential impacts on EFH species to negligible levels (Appendix D). The project as proposed may affect, but is not likely to adversely affect EFH and will not reduce the overall value of the EFH of managed groundfish, coastal pelagic, or highly migratory species.

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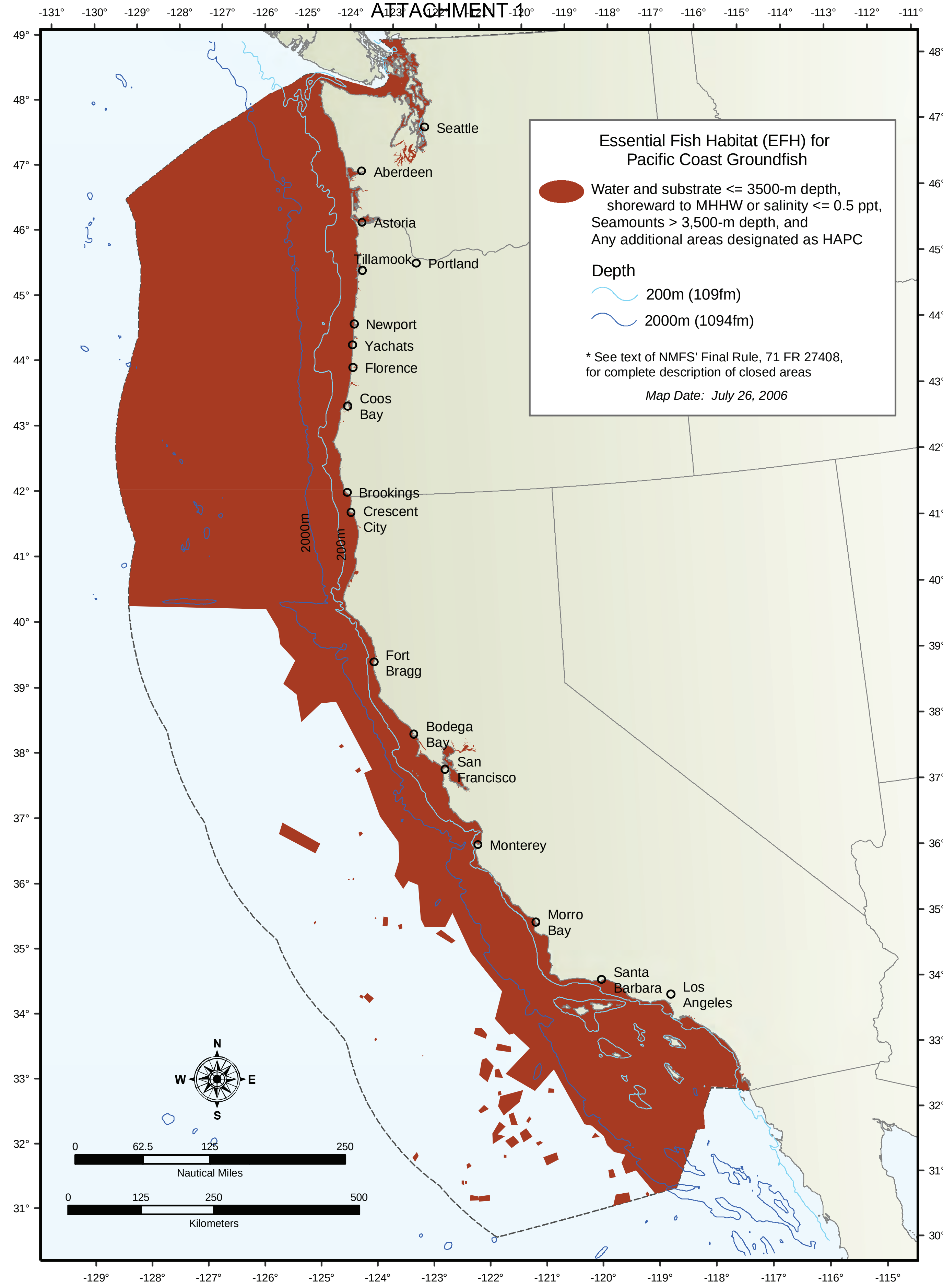
APPENDIX A

Groundfish EFH and HAPC Maps


Essential Fish Habitat (EFH) for
Pacific Coast Groundfish
Water and substrate <= 3500-m depth,
shoreward to MHHW or salinity <= 0.5 ppt,
Seamounts > 3,500-m depth, and
Any additional areas designated as HAPC
Depth
200m (109fm)
2000m (1094fm)
* See text of NMFS' Final Rule, 71 FR 27408,
for complete description of closed areas
Map Date: July 26, 2006
Seattle
Aberdeen
Astoria
Tillamook
Portland
Newport
Yachats
Florence
Coos Bay
Brookings
Crescent City
2000m
200m
Fort Bragg
Bodega Bay
San Francisco
Monterey
Morro Bay
Santa Barbara
Los Angeles
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Nautical Miles
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125
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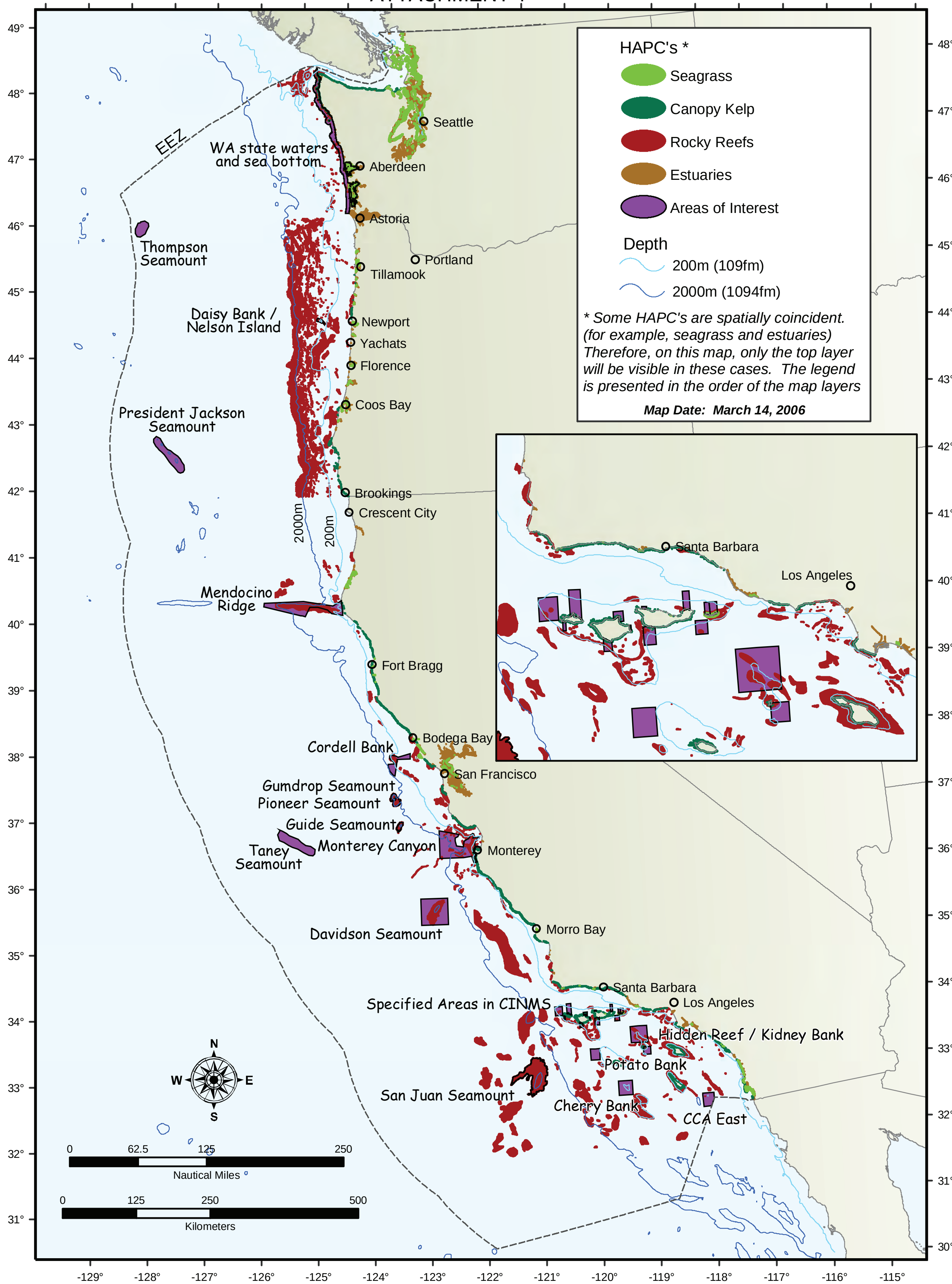
500
Kilometers

ATTACHMENT 1



ATTACHMENT 1

APPENDIX B

Final California Commercial Landings for 2017

California Department of Fish and Wildlife

Table 12 - Monthly Landings In Pounds In The Santa Barbara Area During 2017

Species	January	February	March	April	May	June	July	August	September	October	November	December	Total Landings
California Waters													
Fishes													
Anchovy, northern	0	0	0	0	32,056	60,027	0	0	0	640	0	1,139	93,862
Barracuda, California	0	0	0	0	34	348	102	0	0	3	0	0	486
Bass, giant sea	0	0	237	236	19	863	2,083	705	21	0	130	121	4,416
Bonito, Pacific	821	28	203	236	0	0	71	124	15	221,332	134	154	223,120
Butterfish (Pacific pompano)	352	472	587	196	45	3	51	3	2	48	121	199	2,078
Cabezon	291	254	0	0	805	890	1,211	531	1,139	40	402	426	5,989
Croaker, unspecifed	16	0	0	0	30	0	6	0	0	0	0	0	53
Croaker, white	2,468	2,971	2,123	869	2,003	187	93	38	89	7,944	7,639	1,746	28,170
Eel, California moray	0	8	0	0	0	0	0	0	0	0	0	0	8
Fish, unspecified	101	135	9	0	0	0	0	0	5	85	85	0	420
Grenadier	46	0	0	0	0	0	0	0	0	0	385	320	751
Guitarfish, shovelnose	48	0	23	1,821	40	0	0	0	14	5	410	15	2,376
Hagfishes	0	0	10,571	12,775	12,205	2,523	0	0	0	0	0	0	38,074
Halibut, California	12,417	8,202	14,010	12,907	11,448	13,754	24,871	19,111	9,956	7,918	6,159	8,011	148,763
Halibut, unspecified	0	0	0	40	0	14	23	0	54	282	0	0	413
Kelpfish, giant	0	0	0	0	4	0	0	0	0	0	0	0	4
Lingcod	552	374	0	0	1,689	1,548	2,095	1,060	1,149	944	1,704	1,383	12,499
Lizardfish, California	1,431	2,888	5,607	1,603	7,959	98	77	59	52	9,480	13,696	2,738	45,688
Louvar	0	0	0	0	0	0	0	0	0	0	0	28	28
Mackerel, Pacific	67,798	0	18	1,170	0	4	15	20	5	311,731	80,358	73,693	534,813
Mackerel, jack	3,233	2	50	440	0	0	15	0	0	0	2,161	2,797	8,697
Mackerel, unspecified	1	17	20	96	21	3	22	78	254	168	20	95	795
Mullet, striped	0	0	0	0	0	0	0	0	0	0	2	0	2
Opah	1,516	0	0	0	256	64	0	104	119	822	1,734	3,501	8,116
Opaleye	0	0	0	0	0	0	0	0	0	0	240	0	240
Queenfish	0	11	5	0	0	0	0	0	0	0	0	0	16
Ray, Pacific electric	0	40	61	0	0	0	0	0	0	0	0	0	101
Ray, bat	1,540	908	509	1,015	2,363	522	1,471	953	1,739	403	632	668	12,723
Ray, unspecified	0	0	0	0	0	0	47	15	0	0	0	0	62
Rockfish, China	0	0	0	0	0	0	0	0	1	0	0	0	1
Rockfish, Mexican	0	0	0	0	2	0	0	0	0	0	0	6	8
Rockfish, aurora	0	0	0	0	0	0	0	23	12	22	0	14	71
Rockfish, bank	0	86	3	51	5	0	83	7	0	97	21	208	561
Rockfish, black-and-yellow	0	66	0	0	0	0	72	32	109	0	52	98	429
Rockfish, black	4	0	0	0	0	0	0	0	0	0	0	0	4
Rockfish, blackgill	447	28	366	405	546	53	1,608	1,351	940	414	978	1,504	8,638

Table 12 - Monthly Landings In Pounds In The Santa Barbara Area During 2017

Species	January	February	March	April	May	June	July	August	September	October	November	December	Total Landings
California Waters													
Fishes													
Rockfish, blue	76	117	0	0	127	206	281	80	211	517	251	429	2,293
Rockfish, bocaccio	293	506	0	0	521	740	1,322	549	688	668	639	636	6,563
Rockfish, brown	12	0	0	0	18	20	10	13	0	11	26	12	121
Rockfish, canary	0	55	0	0	14	51	58	92	399	285	178	230	1,363
Rockfish, chilipepper	7	0	0	0	25	35	42	10	11	78	63	55	326
Rockfish, copper	754	332	0	0	1,423	435	1,311	931	1,284	1,068	409	957	8,903
Rockfish, flag	9	6	0	0	16	11	3	11	1	2	10	28	96
Rockfish, gopher	66	5	0	0	50	51	107	35	247	220	38	171	989
Rockfish, grass	492	238	0	0	2,341	1,037	1,642	239	2,207	139	951	614	9,899
Rockfish, greenblotched	0	4	0	0	0	21	6	0	9	16	0	2	59
Rockfish, greenspotted	105	87	0	0	300	249	246	150	267	292	410	376	2,481
Rockfish, greenstriped	5	0	0	0	15	14	13	11	1	24	73	29	185
Rockfish, group nearshore	0	0	0	0	0	0	0	0	0	0	0	58	58
Rockfish, group red	0	0	0	0	0	0	0	0	0	523	0	0	523
Rockfish, group shelf	2	0	0	0	0	0	0	0	0	0	0	0	2
Rockfish, kelp	40	24	0	0	36	2	43	56	70	76	27	36	409
Rockfish, olive	0	47	0	0	0	0	0	0	5	8	0	3	63
Rockfish, rosy	4	5	0	0	11	0	0	0	0	0	0	0	20
Rockfish, speckled	31	59	0	0	15	76	140	32	49	113	52	21	586
Rockfish, splitnose	0	0	2	2	0	0	13	6	0	6	0	0	29
Rockfish, squarespot	10	11	0	0	1	1	0	0	0	0	0	0	22
Rockfish, starry	35	22	0	0	186	34	112	67	71	43	121	30	720
Rockfish, treefish	25	14	0	0	29	11	51	87	101	19	10	29	375
Rockfish, unspecified	2	0	3	0	0	0	56	53	39	181	0	0	334
Rockfish, vermilion	2,273	4,689	0	0	4,740	7,518	8,564	6,820	7,887	5,191	6,601	9,402	63,684
Rockfish, widow	6	2	0	0	3	15	45	1	0	15	0	2	88
Rockfish, yellowtail	47	171	0	0	41	81	95	157	159	127	209	190	1,277
Sablefish	23,594	21,537	14,377	21,459	36,394	10,241	15,543	21,358	22,818	46,424	50,850	43,703	328,296
Salmon, Chinook	0	0	0	0	131	499	0	0	0	0	0	0	630
Sanddab	47	224	57	392	305	110	88	59	187	491	749	419	3,126
Sardine, Pacific	1,157	0	0	13	2,305	107,777	1,538	0	0	58,841	19,786	12,363	203,780
Sargo	0	0	0	0	0	0	0	0	0	0	1	0	1
Scorpionfish, California	49	22	0	0	223	96	21	28	37	71	62	65	673
Seabass, white	782	448	8,438	388	281	41,420	54,100	13,132	55	1,856	758	421	122,078
Shark, Pacific angel	1,834	1,261	1,338	1,251	1,667	3,081	3,905	2,043	427	451	670	765	18,693
Shark, bigeye thresher	0	0	0	0	0	0	0	0	133	0	0	242	375

Table 12 - Monthly Landings In Pounds In The Santa Barbara Area During 2017

Species	January	February	March	April	May	June	July	August	September	October	November	December	Total Landings
California Waters													
Fishes													
Shark, blue	0	0	0	0	25	0	12	0	0	0	0	0	37
Shark, brown smoothhound	31	19	18	26	164	34	18	3	0	0	0	7	320
Shark, gray smoothhound	0	0	0	0	7	0	0	0	0	0	0	0	7
Shark, leopard	211	1,444	470	201	439	65	64	283	104	38	21	184	3,523
Shark, pelagic thresher	0	0	0	0	0	0	0	12	0	0	0	0	12
Shark, sevengill	0	0	0	0	0	0	0	38	35	0	0	0	73
Shark, shortfin mako	170	0	131	0	286	1,657	1,257	331	594	585	1,260	1,300	7,571
Shark, soupfin	139	551	597	445	781	45	377	259	344	347	2,041	2,050	7,977
Shark, spiny dogfish	80	18	8	5	10	25	101	0	95	5	0	0	347
Shark, swell	15	129	0	0	0	0	0	0	0	0	0	0	143
Shark, thresher	4,973	0	0	238	1,981	2,459	4,714	1,035	596	341	4,612	5,087	26,035
Shark, unspecified	506	708	285	275	140	190	671	427	490	415	230	0	4,336
Shark, white	0	0	0	0	0	0	0	0	0	0	0	130	130
Sheephead, California	2,052	907	0	0	3,141	3,061	4,580	1,344	3,435	378	432	1,225	20,554
Skate, California	9	0	11	0	0	0	0	0	12	0	0	0	32
Skate, longnose	331	103	202	302	262	245	244	277	125	329	116	174	2,710
Skate, unspecified	619	163	270	118	240	215	270	127	760	520	473	498	4,273
Sole, Dover	40	0	0	7	11	19	45	48	33	67	2	51	323
Sole, English	148	262	224	265	257	150	233	62	61	274	264	339	2,538
Sole, bigmouth	1	0	0	0	0	0	0	0	0	0	0	0	1
Sole, curlfin	0	0	0	0	0	0	0	0	19	0	0	6	25
Sole, fantail	89	98	136	20	32	213	523	575	281	34	55	78	2,132
Sole, petrale	52	65	98	255	330	247	277	249	233	179	175	162	2,322
Sole, rock	31	20	21	36	91	200	93	71	75	69	57	101	865
Sole, sand	0	0	0	0	0	86	32	86	4	21	0	0	228
Sole, unspecified	256	68	116	232	379	56	221	92	69	292	124	79	1,985
Splittail	0	601	0	0	0	0	0	0	0	0	0	0	601
Stingray	0	0	0	0	0	950	300	0	99	1,062	17	22	2,450
Surfperch, barred	274	0	192	96	0	0	0	56	14	57	119	0	808
Surfperch, rainbow	0	4	4	0	10	13	2	1	2	0	3	0	39
Surfperch, rubberlip	0	0	0	0	0	0	0	5	0	0	0	0	5
Swordfish	8,807	0	0	0	0	0	4,844	3,139	4,791	6,894	11,917	41,499	81,890
Thornyhead, longspine	2,172	1,262	1,006	2,062	3,146	1,251	2,844	1,846	725	875	1,283	865	19,336
Thornyhead, shortspine	27,502	14,845	18,273	24,105	35,177	12,312	27,872	16,272	13,606	18,754	30,455	21,433	260,605
Thornyheads	0	0	0	0	0	0	12	0	12	0	0	31	55
Trawled fish, unspecified	8	0	0	0	0	0	0	50	0	0	0	0	58

Table 12 - Monthly Landings In Pounds In The Santa Barbara Area During 2017

Species	January	February	March	April	May	June	July	August	September	October	November	December	Total Landings
California Waters													
Fishes													
Triggerfish	0	0	0	0	0	0	0	0	0	0	4	0	4
Tuna, albacore	0	0	0	0	0	0	0	0	0	1,528	0	0	1,528
Tuna, bluefin	0	0	0	0	0	0	15	227	0	0	0	0	242
Tuna, yellowfin	0	0	0	0	0	0	0	0	351	0	0	0	351
Turbot, hornyhead	0	0	0	0	0	0	2	0	0	0	0	0	2
Turbot	0	0	0	0	0	0	5	4	0	0	0	0	9
Whitefish, ocean	747	74	242	128	356	30	433	247	332	214	584	815	4,203
Whiting, Pacific	31	6	10	30	32	0	0	0	0	0	40	0	148
Yellowtail	0	0	81	475	3,245	6,965	3,245	728	1,888	2,202	11,412	18,046	48,287
Crustaceans													
Crab, Dungeness	0	0	0	2,725	3,710	5,646	0	0	0	0	0	794	12,875
Crab, armed box	0	0	0	0	0	0	9	0	0	0	0	0	9
Crab, box	107	550	1,210	1,408	1,958	4,784	12,744	10,970	2,289	2,524	3,846	5,492	47,882
Crab, brown rock	8,192	10,178	8,184	10,331	5,519	11,713	9,996	9,333	13,430	7,790	6,270	6,921	107,857
Crab, claws	5	0	0	0	0	0	28	0	82	118	71	21	325
Crab, king	0	0	0	28	470	17	137	22	472	492	408	617	2,663
Crab, pelagic red	0	0	0	0	0	0	1,936	0	0	0	0	0	1,936
Crab, red rock	32,156	31,128	30,034	36,301	35,328	57,007	71,605	65,991	44,091	29,096	32,413	31,675	496,826
Crab, rock unspecified	3,564	5,431	4,937	6,087	3,967	3,211	4,730	3,756	1,934	4,208	3,475	3,564	48,864
Crab, southern kelp	0	0	0	0	0	0	0	0	6	5	20	121	153
Crab, spider	5,997	6,680	3,762	3,009	1,600	1,385	3,768	3,938	4,320	7,378	5,955	4,045	51,836
Crab, spider/sheep claws	91	0	0	0	0	0	0	6	0	0	0	0	97
Crab, tanner	0	0	0	0	0	0	0	0	0	0	0	7	7
Crab, yellow rock	10,294	8,887	11,763	13,065	16,238	23,100	34,678	35,089	33,708	22,198	19,317	23,622	251,956
Crustacean, unspecified	354	63	0	0	0	0	0	0	0	0	0	0	417
Lobster, California spiny	70,507	38,129	32,140	0	0	0	0	0	0	83,099	54,617	49,720	328,213
Prawn, golden	0	0	780	0	0	0	0	0	0	0	0	0	780
Prawn, ridgeback	45,449	37,985	66,722	44,149	32,149	544	0	0	0	57,894	40,715	43,181	368,787
Prawn, spot	10	17,393	13,631	5,991	14,621	10,934	14,828	16,131	13,554	29,702	25	106	136,926
Shrimp, mantis	0	0	11	14	0	0	0	0	0	0	0	0	25
Shrimp, unspecified	0	0	1,012	67	0	0	0	0	0	0	0	19	1,098
Echinoderms													
Bat star	0	0	0	0	0	0	938	0	0	0	0	0	938
Sea cucumber, giant red	74	208	1,088	985	352	3,500	21,524	6,962	2,363	1,099	219	101	38,474
Sea cucumber, unspecified	27	5	50	0	0	0	0	15	0	45	532	0	674
Sea cucumber, warty	270	4,332	17,641	12,189	14,395	8,892	8,343	3,116	302	2	0	110	69,591

Table 12 - Monthly Landings In Pounds In The Santa Barbara Area During 2017

Species	January	February	March	April	May	June	July	August	September	October	November	December	Total Landings
California Waters													
Echinoderms													
Sea urchin, purple	3	0	0	0	0	0	30	100	35	47	174	11	400
Sea urchin, red	342,621	227,183	286,516	142,375	228,540	67,342	283,626	248,546	241,964	170,871	268,727	259,786	2,768,096
Mollusks													
Clam, unspecified	0	224	0	0	0	0	0	0	0	0	0	0	224
Limpet, keyhole	0	0	10	8	10	0	5	101	2	4	0	0	140
Mussel	0	0	0	0	0	0	0	0	0	0	120	0	120
Octopus, unspecified	1	18	2	34	20	2	40	1	8	41	11	37	216
Snail, top	0	0	0	0	0	0	160	405	0	8	0	0	573
Snails, moon	72	197	56	87	123	76	77	218	247	266	240	287	1,946
Squid, market	1,053,293	12	38,971	8,119,115	2,850,369	5,303,390	968,654	110,710	543,755	7,079,949	30,182,570	31,210,238	87,461,026
Whelk, Kellet's	6,525	4,359	4,591	0	0	0	5,843	4,625	5,294	5,824	2,876	3,040	42,975
Worms													
Invertebrate Unspecified	0	21	115	5	0	0	0	0	0	0	0	0	141
Spiders, sea	258	307	0	0	0	0	0	0	0	0	0	0	565
Waters Area Total:	1,753,994	461,010	604,234	8,484,659	3,382,657	5,786,759	1,620,370	618,158	990,077	8,218,272	30,888,301	31,907,844	94,716,336
Other Waters													
Fishes													
Dolphin (fish)	53	0	100	0	90	0	0	0	0	0	0	0	243
Escolar	74	0	403	0	269	0	0	0	0	0	0	0	746
Fish, unspecified	632	0	590	0	442	0	0	0	0	0	0	0	1,664
Goby, yellowfin	0	0	0	27	0	0	0	0	0	0	0	0	27
Opah	5,925	0	5,349	0	7,210	0	0	0	0	0	0	0	18,484
Shark, shortfin mako	102	0	0	0	549	0	0	0	0	0	0	0	651
Swordfish	246	0	287	0	1,506	0	0	0	0	0	0	0	2,039
Tuna, bigeye	3,644	0	12,833	0	26,144	0	0	0	0	0	0	0	42,621
Tuna, skipjack	257	0	40	0	181	0	0	0	0	0	0	0	478
Tuna, yellowfin	1,150	0	856	238	2,493	0	0	0	0	0	0	0	4,737
Wahoo	189	0	221	70	935	0	0	0	0	0	0	0	1,415
Crustaceans													
Crab, brown rock	0	0	0	357	0	0	0	0	0	0	0	0	357
Crab, red rock	0	0	0	801	0	0	0	0	0	0	0	0	801
Lobster, California spiny	0	0	0	0	0	0	0	0	0	0	284	0	284
Mollusks													
Squid, market	0	0	0	0	0	0	0	0	0	0	13,950	178,336	192,286
Waters Area Total:	12,272	0	20,679	1,493	39,819	0	0	0	0	0	14,234	178,336	266,833

Table 12 - Monthly Landings In Pounds In The Santa Barbara Area During 2017

Species		January	February	March	April	May	June	July	August	September	October	November	December	Total Landings
	Grand Total:	1,766,266	461,010	624,913	8,486,152	3,422,476	5,786,759	1,620,370	618,158	990,077	8,218,272	30,902,535	32,086,180	94,983,169

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End of Report

Total Records: 24,196

System: CFIS
Tables16_21_pub

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Table 19PUB - Poundage And Value Of Landings By Port, Santa Barbara Area During 2017

Page: 1
Date: 06/13/2018

Species	Pounds	Value
VENTURA		
Squid, market	52,045,559	$25,988,613
Lobster, California spiny	78,380	$1,467,925
Prawn, spot	85,400	$1,205,760
Prawn, ridgeback	302,735	$708,534
Halibut, California	52,431	$312,878
Sea urchin, red	96,921	$267,961
Tuna, bigeye	42,621	$164,006
Swordfish	29,436	$147,157
Seabass, white	27,334	$108,674
Bonito, Pacific	220,973	$66,383
Crab, yellow rock	27,115	$50,937
Thornyhead, shortspine	4,855	$39,374
Crab, rock unspecified	23,590	$39,344
Mackerel, Pacific	320,879	$34,534
Opah	21,544	$32,096
Crab, Dungeness	5,646	$29,642
Lizardfish, California	44,018	$26,141
Sea cucumber, warty	4,991	$24,955
Yellowtail	7,545	$24,367
Shark, Pacific angel	10,154	$18,209
Tuna, yellowfin	4,870	$17,999
Sea cucumber, giant red	3,706	$17,590
Croaker, white	23,552	$14,556
Sheephead, California	3,366	$14,088
Crab, red rock	2,934	$12,430
Cabezon	1,532	$12,011
Sablefish	3,920	$11,239
Shark, shortfin mako	4,397	$6,606
Lingcod	2,187	$5,785
Sanddab	2,424	$5,139
Rockfish, grass	455	$4,882
Sole, petrale	2,247	$4,111
Shark, thresher	2,485	$4,033
Guitarfish, shovelnose	2,362	$3,793
Bass, giant sea	1,148	$3,789

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California Department of Fish and Wildlife

Table 19PUB - Poundage And Value Of Landings By Port, Santa Barbara Area During 2017

Species	Pounds	Value
VENTURA		
Wahoo	1,415	$3,711
Whitefish, ocean	1,420	$3,592
Rockfish, vermilion	2,814	$3,574
Shrimp, unspecified	1,098	$2,477
Ray, bat	4,503	$2,190
Crab, spider	2,808	$1,977
Snails, moon	1,946	$1,936
Fish, unspecified	1,697	$1,928
Butterfish (Pacific pompano)	1,916	$1,811
Sole, English	2,396	$1,736
Prawn, golden	780	$1,716
Skate, unspecified	2,873	$1,664
Crab, brown rock	888	$1,600
Rockfish, greenspotted	1,073	$1,172
Scorpionfish, California	660	$1,068
Sole, fantail	1,319	$1,047
Escolar	746	$894
Thornyhead, longspine	431	$832
Whelk, Kellet's	937	$773
Dolphin (fish)	243	$729
Sole, rock	725	$725
Rockfish, bocaccio	622	$540
Spiders, sea	258	$516
Tuna, skipjack	478	$478
Mackerel, jack	6,030	$394
Ray, Pacific electric	101	$282
Rockfish, yellowtail	90	$277
Rockfish, chilipepper	290	$277
Crab, box	109	$264
Sole, unspecified	544	$263
Crab, king	90	$247
Crab, claws	110	$247
Rockfish, gopher	45	$225
Rockfish, greenstriped	178	$218
Mackerel, unspecified	118	$206

Species	Pounds	Value
VENTURA		
Rockfish, copper	72	$206
Shark, swell	129	$193
Rockfish, treefish	17	$170
Shark, brown smoothhound	156	$148
Opaleye	240	$144
Octopus, unspecified	122	$128
Mussel	120	$120
Rockfish, canary	62	$117
Shrimp, mantis	14	$84
Goby, yellowfin	27	$81
Stingray	150	$75
Sardine, Pacific	182,677	$63
Shark, unspecified	72	$61
Rockfish, starry	98	$54
Sea urchin, purple	11	$50
Rockfish, flag	51	$49
Rockfish, brown	22	$32
Thornyheads	31	$31
Anchovy, northern	998	$27
Sole, Dover	28	$24
Shark, leopard	78	$21
Crab, pelagic red	1,936	$19
Ray, unspecified	37	$19
Rockfish, blue	9	$14
Sole, curlfin	25	$13
Barracuda, California	36	$12
Grenadier	24	$12
Rockfish, kelp	7	$11
Skate, longnose	20	$8
Crab, southern kelp	7	$7
Crab, spider/sheep claws	6	$6
Rockfish, black	4	$4
Rockfish, widow	3	$3
Rockfish, speckled	14	$3
Mullet, striped	2	$2

Table 19PUB - Poundage And Value Of Landings By Port, Santa Barbara Area During 2017

Species	Pounds	Value
VENTURA		
Rockfish, greenblotched	2	$2
Sole, sand	127	$1
Shark, soupfin	3	$1
Rockfish, squarespot	1	$1
Shark, spiny dogfish	25	$0
Shark, gray smoothhound	7	$0
Sea cucumber, unspecified	27	$0
Tuna, bluefin	15	$0
Crustacean, unspecified	2	$0
Port Totals:	53,742,966	$30,939,138
PORT HUENEME		
Squid, market	35,555,303	$17,775,392
Prawn, spot	46,266	$645,813
Anchovy, northern	92,864	$32,268
Mackerel, Pacific	213,871	$20,616
Thornyhead, shortspine	431	$2,997
Sardine, Pacific	21,075	$1,743
Sablefish	515	$1,552
Sea cucumber, giant red	111	$555
Sea urchin, red	790	$395
Stingray	2,300	$65
Mackerel, jack	2,601	$22
Bonito, Pacific	205	$21
Shark, thresher	58	$1
Barracuda, California	13	$0
Port Totals:	35,936,403	$18,481,438
SANTA BARBARA HARBOR		
Shark, brown smoothhound	164	
Lobster, California spiny	200,909	$3,876,550
Sea urchin, red	1,788,795	$3,064,420
Thornyhead, shortspine	214,583	$1,833,995
Crab, red rock	491,716	$834,274
Sablefish	288,662	$830,501
Halibut, California	57,391	$326,601
Crab, yellow rock	188,130	$320,362
Crab, brown rock	106,972	$197,184
Prawn, ridgeback	66,039	$172,532

California Department of Fish and Wildlife

Table 19PUB - Poundage And Value Of Landings By Port, Santa Barbara Area During 2017

Species	Pounds	Value
SANTA BARBARA HARBOR		
Sea cucumber, giant red	32,383	$159,158
Crab, box	47,557	$134,391
Rockfish, vermilion	42,131	$130,613
Rockfish, grass	9,445	$108,399
Seabass, white	26,126	$103,499
Sea cucumber, warty	16,945	$86,187
Swordfish	22,006	$80,663
Yellowtail	34,181	$76,003
Crab, spider	39,321	$62,897
Thornyhead, longspine	14,332	$62,189
Rockfish, copper	8,690	$58,017
Whelk, Kellet's	42,038	$49,641
Hagfishes	38,074	$39,983
Crab, rock unspecified	22,587	$38,637
Cabezon	4,346	$34,829
Lingcod	8,088	$29,354
Crab, Dungeness	6,435	$29,298
Sheephead, California	7,105	$28,172
Shark, thresher	10,484	$14,834
Crab, king	1,941	$12,995
Rockfish, blackgill	4,730	$12,224
Rockfish, bocaccio	4,044	$10,057
Shark, soupfin	7,413	$8,454
Rockfish, blue	2,110	$8,407
Ray, bat	8,131	$7,361
Prawn, spot	578	$7,359
Rockfish, gopher	909	$7,134
Salmon, Chinook	630	$6,534
Shark, Pacific angel	5,749	$6,166
Whitefish, ocean	2,169	$4,560
Clam, unspecified	224	$4,480
Tuna, albacore	1,528	$4,248
Bass, giant sea	817	$3,778
Rockfish, black-and-yellow	429	$3,416

Species	Pounds	Value
SANTA BARBARA HARBOR		
Opah	2,173	$3,162
Rockfish, yellowtail	812	$3,014
Rockfish, treefish	355	$2,885
Bonito, Pacific	1,097	$2,880
Rockfish, kelp	374	$2,615
Croaker, white	4,614	$2,500
Rockfish, greenspotted	984	$2,408
Rockfish, canary	831	$2,186
Shark, shortfin mako	1,409	$2,084
Mackerel, unspecified	626	$1,842
Rockfish, group red	523	$1,832
Sole, unspecified	1,396	$1,760
Halibut, unspecified	351	$1,704
Sea cucumber, unspecified	592	$1,659
Sole, fantail	614	$1,530
Sanddab	540	$1,509
Snail, top	573	$1,395
Rockfish, bank	501	$1,289
Rockfish, starry	499	$1,288
Lizardfish, California	1,670	$1,099
Skate, longnose	1,311	$1,047
Spiders, sea	307	$998
Shark, unspecified	4,210	$987
Splittail	601	$902
Shark, leopard	813	$838
Crustacean, unspecified	415	$810
Sea urchin, purple	389	$770
Crab, southern kelp	146	$587
Invertebrate Unspecified	141	$423
Limpet, keyhole	140	$411
Squid, market	364	$364
Rockfish, speckled	154	$363
Octopus, unspecified	94	$304
Grenadier	727	$282
Sole, rock	138	$270

California Department of Fish and Wildlife
Table 19PUB - Poundage And Value Of Landings By Port, Santa Barbara Area During 2017

Species	Pounds	Value
SANTA BARBARA HARBOR		
Rockfish, brown	74	$248
Fish, unspecified	378	$236
Crab, claws	215	$215
Surfperch, rainbow	39	$197
Sole, sand	101	$186
Crab, spider/sheep claws	91	$159
Rockfish, greenblotched	48	$156
Louvar	28	$154
Shark, bigeye thresher	242	$130
Shark, spiny dogfish	234	$130
Skate, unspecified	1,349	$125
Sole, English	143	$125
Mackerel, Pacific	21	$117
Sole, petrale	76	$115
Rockfish, widow	30	$88
Rockfish, unspecified	334	$84
Rockfish, squarespot	22	$74
Shark, sevengill	73	$73
Sole, Dover	225	$69
Barracuda, California	53	$67
Rockfish, aurora	70	$66
Rockfish, flag	27	$64
Rockfish, chilipepper	25	$61
Mackerel, jack	14	$58
Shrimp, mantis	11	$56
Whiting, Pacific	141	$50
Surfperch, barred	12	$42
Rockfish, splitnose	23	$34
Kelpfish, giant	4	$32
Butterfish (Pacific pompano)	162	$32
Trawled fish, unspecified	58	$30
Rockfish, olive	8	$26
Skate, California	20	$25
Thornyheads	12	$24
Rockfish, Mexican	8	$23

Species	Pounds	Value
SANTA BARBARA HARBOR		
Shark, swell	15	$16
Ray, unspecified	25	$15
Rockfish, rosy	4	$14
Turbot	9	$14
Rockfish, greenstriped	3	$13
Croaker, unspecifed	53	$8
Scorpionfish, California	2	$6
Rockfish, China	1	$6
Turbot, hornyhead	2	$4
Rockfish, group shelf	2	$2
Shark, blue	12	$0
Queenfish	16	$0
Rockfish, group nearshore	30	$0
Crab, armed box	9	$0
Sardine, Pacific	28	$0
Eel, California moray	8	$0
Port Totals:	3,912,104	$12,943,816
OXNARD		
Lobster, California spiny	49,049	$941,960
Sea urchin, red	881,590	$807,390
Thornyhead, shortspine	40,337	$290,334
Seabass, white	65,925	$268,202
Sea cucumber, warty	47,655	$242,979
Halibut, California	36,072	$196,968
Swordfish	32,487	$142,887
Sablefish	35,199	$111,992
Prawn, spot	4,682	$68,761
Rockfish, vermilion	17,216	$54,217
Sheephead, California	10,084	$49,764
Squid, market	51,552	$25,776
Yellowtail	6,085	$19,877
Crab, yellow rock	36,711	$18,149
Crab, spider	9,706	$17,029
Shark, thresher	12,884	$12,911

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California Department of Fish and Wildlife

Table 19PUB - Poundage And Value Of Landings By Port, Santa Barbara Area During 2017

Species	Pounds	Value
OXNARD		
Sea cucumber, giant red	2,274	$11,570
Thornyhead, longspine	4,550	$9,931
Bass, giant sea	2,450	$7,663
Rockfish, blackgill	3,908	$4,678
Lingcod	1,265	$3,994
Crab, Dungeness	794	$3,970
Shark, Pacific angel	2,790	$3,749
Crab, rock unspecified	2,687	$3,633
Crab, king	632	$3,551
Crab, red rock	2,977	$3,405
Opah	2,883	$2,612
Rockfish, bocaccio	1,702	$2,530
Shark, shortfin mako	2,207	$2,149
Shark, leopard	2,539	$2,037
Rockfish, canary	471	$1,604
Rockfish, greenspotted	425	$1,299
Skate, longnose	1,378	$1,273
Rockfish, speckled	419	$1,197
Whitefish, ocean	279	$909
Tuna, bluefin	227	$908
Tuna, yellowfin	218	$872
Rockfish, copper	141	$862
Rockfish, yellowtail	374	$843
Sanddab	162	$658
Crab, box	216	$648
Cabezon	112	$529
Shark, white	130	$501
Bat star	938	$469
Shark, bigeye thresher	133	$399
Rockfish, blue	175	$376
Sole, Dover	70	$203
Rockfish, starry	50	$167
Rockfish, widow	56	$167
Rockfish, gopher	35	$166
Shark, soupfin	165	$144

Species	Pounds	Value
OXNARD		
Sole, fantail	199	$124
Rockfish, kelp	28	$116
Bonito, Pacific	121	$102
Sea cucumber, unspecified	55	$100
Halibut, unspecified	62	$92
Shark, unspecified	55	$83
Rockfish, flag	18	$76
Crab, brown rock	354	$75
Rockfish, rosy	16	$73
Mackerel, unspecified	21	$64
Rockfish, brown	26	$63
Rockfish, group nearshore	28	$56
Rockfish, bank	60	$49
Scorpionfish, California	11	$44
Barracuda, California	384	$33
Rockfish, olive	55	$28
Prawn, ridgeback	13	$26
Triggerfish	4	$22
Rockfish, chilipepper	11	$21
Guitarfish, shovelnose	14	$21
Mackerel, Pacific	20	$20
Rockfish, treefish	3	$18
Rockfish, greenblotched	9	$14
Sole, rock	2	$11
Sole, unspecified	45	$9
Fish, unspecified	9	$9
Whiting, Pacific	7	$7
Rockfish, splitnose	6	$6
Sargo	1	$6
Surfperch, rubberlip	5	$5
Rockfish, greenstriped	5	$5
Rockfish, aurora	1	$2
Sole, bigmouth	1	$1
Shark, spiny dogfish	88	$1
Ray, bat	89	$1

Species	Pounds	Value
OXNARD		
Skate, California	12	$0
Thornyheads	12	$0
Shark, pelagic thresher	12	$0
Shark, blue	25	$0
Crab, tanner	7	$0
Croaker, white	4	$0
Skate, unspecified	50	$0
Port Totals:	1,379,011	$3,350,242
GOLETA BEACH		
Thornyhead, shortspine	399	$3,392
Seabass, white	1,009	$3,344
Shark, shortfin mako	150	$225
Yellowtail	26	$105
Shark, leopard	72	$96
Shark, thresher	33	$92
Thornyhead, longspine	23	$46
Port Totals:	1,712	$7,299
SURF BEACH		
Lobster, California spiny	158	$3,000
Surfperch, barred	546	$1,911
Port Totals:	704	$4,911
ALL OTHER PORTS		
Halibut, California	2,869	$11,993
Seabass, white	1,684	$6,641
Rockfish, vermilion	1,524	$4,478
Lingcod	959	$2,953
Bonito, Pacific	724	$1,935
Yellowtail	449	$1,348
Whitefish, ocean	335	$1,006
Surfperch, barred	250	$839
Shark, soupfin	396	$791
Rockfish, bocaccio	194	$573
Squid, market	534	$395
Shark, thresher	92	$230
Rockfish, starry	74	$221
Shark, shortfin mako	60	$180

California Department of Fish and Wildlife

Table 19PUB - Poundage And Value Of Landings By Port, Santa Barbara Area During 2017

Species	Pounds	Value
ALL OTHER PORTS		
Mackerel, jack	52	$139
Mackerel, unspecified	30	$60
Mackerel, Pacific	22	$58
Shark, leopard	21	$41
Port Totals:	10,268	$33,881
Santa Barbara Area Totals	94,983,169	$65,760,724

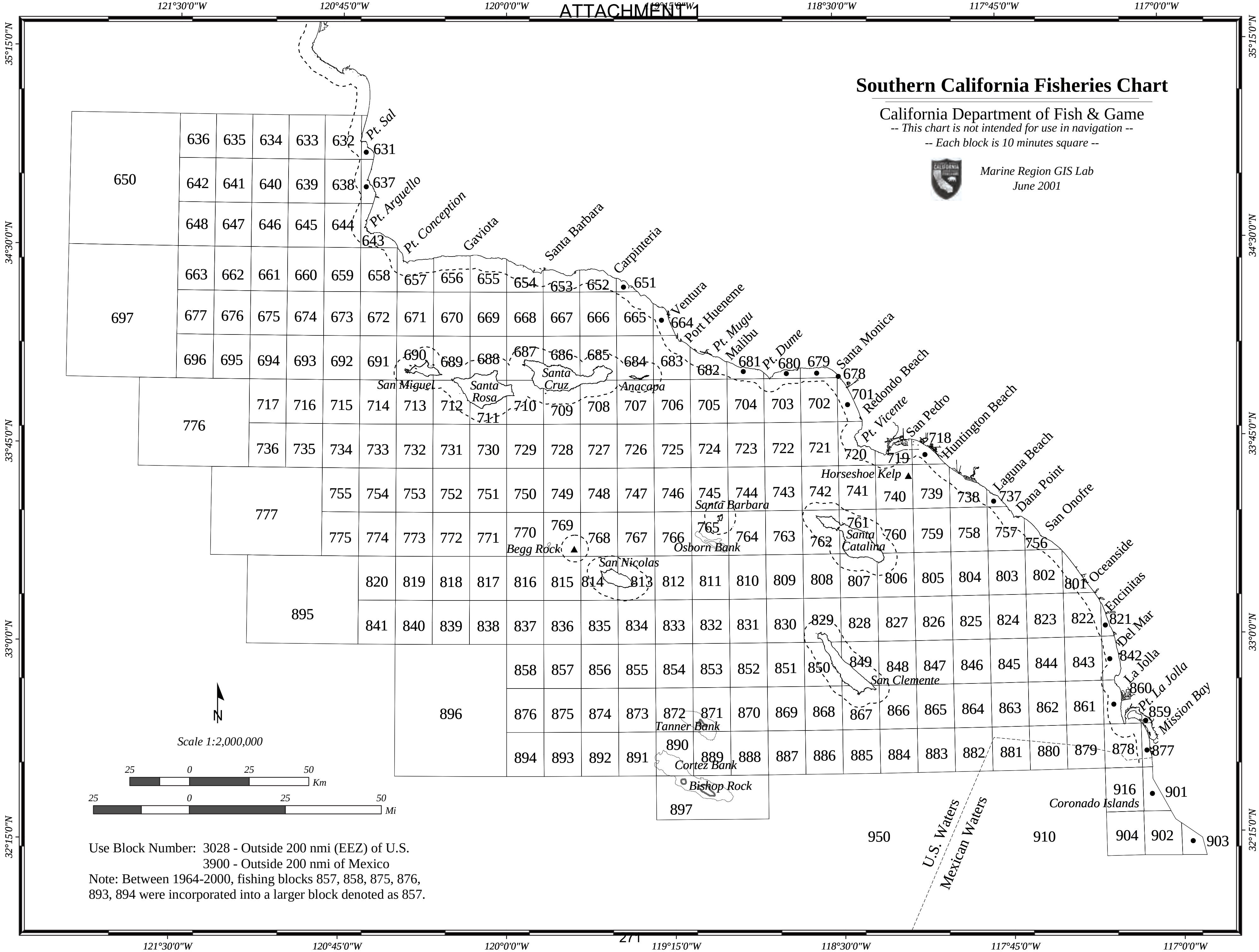
******************** Total Records: 24,196

End of Report

ATTACHMENT 1

APPENDIX C

Commercial Fisheries Data for Blocks 0664 and 0665


Southern California Fisheries Chart
California Department of Fish & Game
-- This chart is not intended for use in navigation --
-- Each block is 10 minutes square --
Marine Region GIS Lab
June 2001
121°30'0"W
120°45'0"W
120°0'0"W
119°15'0"W
118°30'0"W
117°45'0"W
117°0'0"W
35°15'0"N
34°30'0"N
33°45'0"N
33°0'0"N
32°15'0"N
Pt. Sal
Pt. Arguello
Pt. Conception
Gaviota
Santa Barbara
Carpinteria
Ventura
Port Hueneme
Pt. Mugu
Malibu
Pt. Dume
Santa Monica
Redondo Beach
Pt. Vicente
San Pedro
Huntington Beach
Laguna Beach
Dana Point
San Onofre
Oceanside
Encinitas
Del Mar
La Jolla
Pt. La Jolla
Mission Bay
San Miguel
Santa Rosa
Santa Cruz
Anacapa
Horseshoe Kelp
Santa Barbara
Santa Catalina
Begg Rock
Osborn Bank
San Nicolas
San Clemente
Tanner Bank
Cortez Bank
Bishop Rock
Coronado Islands
U.S. Waters
Mexican Waters
N
Scale 1:2,000,000
25 0 25 50 Km
25 0 25 50 Mi
Use Block Number: 3028 - Outside 200 nmi (EEZ) of U.S.
3900 - Outside 200 nmi of Mexico
Note: Between 1964-2000, fishing blocks 857, 858, 875, 876, 893, 894 were incorporated into a larger block denoted as 857.

ATTACHMENT 1

Year	Block	Species	Value	Pounds
2016	665	711	1583.2	1792
2016	665	80	164	157
2016	665	473	1084.2	1896
2016	665	803	1035.5	997.13
2016	665	238	6	15
2016	665	823	25	25
2016	665	165	2911.37	1735.12
2016	665	222	54.45	9.9
2016	665	130	6549.78	7518
2016	665	803	10320.25	7784.3
2016	665	347	2.19	219
2016	665	999	2.38	238
2016	665	803	1.26	126
2016	665	203	332	326
2016	665	211	71	81
2016	665	155	84	48
2016	665	820	150826.4	7078.9
2016	665	342	122	61
2016	665	731	17.5	17.5
2016	665	803	682	341
2016	664	712	0	3.3
2016	665	222	20	4
2016	664	204	4	4
2016	665	175	39	65
2016	665	225	197.6	464
2016	665	175	195.6	512.51
2016	665	174	390.7	242
2016	665	262	0	14
2016	665	400	3664.7	538.2
2016	665	155	303.7275	192.05
2016	665	801	657.955	427.9
2016	665	222	69.54	570
2016	665	801	6829	4551
2016	665	222	28.97	2897
2016	665	803	0.32	32
2016	665	400	2082.15	396.6
2016	665	813	925.6	356
2016	664	400	3572.8	928
2016	665	253	6	5
2016	664	40	22.5	15
2016	665	222	1104	184
2016	665	155	157.96	136
2016	665	400	1125	225
2016	665	40	65	26
2016	665	820	10235.5	660.3
2016	665	815	7287.5	549

2016	665	175	54	27
2016	664	249	995.4	199.08
2016	664	195	675.5	135.1
2016	665	222	102587.7	19817.45
2016	665	249	37	37
2016	665	809	23.3	23.3
2016	665	50	0.8	2
2016	665	100	6	15
2016	665	249	197.1	65.7
2016	665	253	41.2125	23.55
2016	665	222	81.15	14.3
2016	665	165	28.02	23.7
2016	665	343	651.32	1164
2016	665	457	1594	1594
2016	665	222	5580	984
2016	665	165	395.9	393.6
2016	665	686	0.38	38
2016	664	165	109.62	73.08
2016	665	91	912.75	182.55
2016	665	130	18	9
2016	665	400	156.5	41
2016	665	711	22303.5	44607
2016	665	165	46.5	31
2016	665	222	25056	4260
2016	665	151	1.75	175
2016	665	154	0.33	33
2016	664	803	246	123
2016	665	174	12	8
2016	665	806	0	0.5
2016	665	801	7787.5	5990.12
2016	665	260	176	107
2016	665	256	22.875	9.15
2016	665	254	7.2625	4.15
2016	665	280	384	64
2016	665	165	98.175	89.25
2016	665	153	114.77	417
2016	665	165	42	42
2016	664	711	6613	13226
2016	665	3	0.88	88
2016	665	342	10.83	1083
2016	665	222	2.32	232
2016	665	280	1.11	111
2016	665	801	0.27	27
2016	665	813	15398	7796
2016	665	473	0	20
2016	665	495	7	7
2016	665	165	7418.4	3808

2016	665	400	32388.16	5422
2016	665	400	438	73
2016	665	130	0.07	7
2016	665	206	400.6	522
2016	665	153	10	20
2016	665	222	13442.29	2425.98
2016	665	153	21.56	15.4
2016	665	341	397.6275	1728.15
2016	665	801	7474.5	4983
2016	665	151	0.62	62
2016	665	820	84078.19	4094.45
2016	665	804	0.2	20
2016	665	686	0.58	58
2016	665	222	0.18	18
2016	665	159	1.58	158
2016	665	40	0.16	16
2016	665	815	1227	102
2016	664	151	47.6	34
2016	664	155	22	22
2016	665	754	4504	2252
2016	665	754	8322	4161
2016	664	253	160.8	32.16
2016	665	150	22.5	31.5
2016	665	736	528.6	579
2016	665	712	14	10
2016	665	209	886.6	524
2016	665	200	2323.292	4132.32
2016	665	222	1008	168
2016	665	155	369	246
2016	665	155	579.81	1465
2016	665	341	0.62	62
2016	665	3	1.5	150
2016	665	151	0.21	21
2016	665	151	2.25	225
2016	665	804	0.02	2
2016	665	252	4	2
2016	665	153	18	64
2016	665	165	1735.5	890
2016	665	342	866.8	492
2016	665	802	6	6
2016	665	803	614	307
2016	665	342	209.6	131
2016	664	400	8396	2271
2016	665	813	98574.92	40702.05
2016	665	802	62	62
2016	665	159	20.6	26
2016	665	997	15	15

2016	665	250	12.32	9.8
2016	665	195	611.2125	225.7
2016	665	159	78.12	55.8
2016	665	165	78.76	71.6
2016	665	813	292.5	117
2016	665	342	5043.885	30543.5
2016	665	400	103482.8	27758
2016	665	155	4.24	424
2016	665	130	0.7	70
2016	665	155	2.65	265
2016	665	686	0.44	44
2016	665	130	0.6	60
2016	665	40	0.76	76
2016	665	171	313	313
2016	665	51	13.5	9
2016	664	400	4495.3	1299
2016	665	222	7267	1236
2016	664	110	7679	21940
2016	665	155	1188.46	700
2016	665	165	458.25	235
2016	665	803	12	12
2016	665	174	0.17	17
2016	665	815	720	48
2016	665	803	188	94
2016	664	155	160.1	124
2016	665	473	94.2	157
2016	665	435	712.2	1435.5
2016	665	204	404.3	644.78
2016	665	804	99.5	50
2016	665	151	20	20
2016	665	755	66	32
2016	665	154	46.8	60
2016	665	222	11926.2	2073.75
2016	665	153	65.45	46.75
2016	665	159	42.98	30.7
2016	665	159	363.37	1044
2016	665	209	0.22	22
2016	665	400	1674.76	1093
2016	665	400	0.88	88
2016	665	435	0	15
2016	665	165	81.66	54.44
2016	664	222	2185.04	348.09
2016	665	467	377.6	94.4
2016	664	165	25.5	17
2016	665	686	13	13
2016	665	802	0.02	2
2016	665	801	64	32

2016	664	820	21445.8	1028.67
2016	664	222	94.5	21
2016	665	810	0	10
2016	665	813	2235	894

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Year	Block	Species	Value	Pounds
2015	665	206	260.6	263
2015	665	238	15.5	31
2015	665	510	68.25	39
2015	665	222	120.55	24.1
2015	665	222	1259.5	228.1
2015	665	400	2497.5	518
2015	665	155	3145.85	4880.4
2015	665	400	1.77	177
2015	665	343	2.82	282
2015	665	280	147.87	423
2015	665	222	0.92	92
2015	665	803	404.5	529
2015	664	110	32406.5	92590
2015	664	42	240	400
2015	664	110	3089.45	8827
2015	665	686	74	74
2015	665	815	2025	153
2015	665	820	4600	184
2015	665	263	112	16
2015	664	757	5382.75	1083
2015	665	813	453	151
2015	665	150	0	5
2015	665	711	723	781
2015	665	222	100818.5	19908
2015	665	204	29.5	59
2015	665	400	6567.9	1139.9
2015	665	165	34.54	31.4
2015	665	400	213458.4	52691
2015	665	400	38172.22	8768
2015	665	130	3.87	387
2015	665	803	104.49	275
2015	665	130	0.05	5
2015	665	179	66	66
2015	665	203	289	289
2015	665	130	228	114
2015	665	342	2505.99	1936
2015	665	820	305505.8	15195.97
2015	665	222	1401.25	295
2015	665	803	464.1	275
2015	665	820	19960.1	1030.2
2015	664	731	0	6.5
2015	665	754	337.5	75
2015	665	184	3	1
2015	665	51	300	100
2015	664	820	4531.8	215.8
2015	665	211	93.99	415.65

2015	665	813	461872.3	187003
2015	665	80	38	62
2015	665	155	3599.725	1930.15
2015	665	222	3230	595.3
2015	665	190	1990	398
2015	665	342	313.4774	25091.74
2015	665	400	1.69	169
2015	665	400	0.11	11
2015	665	731	0.38	38
2015	665	259	1.22	122
2015	665	98	0.22	22
2015	664	801	3770	3029
2015	665	155	26	13
2015	665	209	1016	515
2015	665	154	63	63
2015	665	684	7	7
2015	665	50	26	26
2015	665	165	104.25	75.5
2015	665	222	1025	205
2015	665	686	16.04	20
2015	665	110	1803.75	7215
2015	664	820	51898.75	2779.6
2015	665	200	30	20
2015	665	435	565.24	989.08
2015	665	151	305.12	253
2015	664	165	59.4	54
2015	665	40	23.375	9.35
2015	665	98	359.5375	205.45
2015	664	151	168.5	142
2015	665	151	187	187
2015	665	400	480	80
2015	665	40	13	47
2015	665	801	362.5	290
2015	665	155	0.14	14
2015	665	813	9692	4026
2015	665	171	108	108
2015	665	801	3012.45	2850
2015	665	40	112	56
2015	665	174	53.8	79
2015	665	342	301.63	217
2015	665	280	132.5	53
2015	665	809	90	50
2015	665	802	89.2	144
2015	665	473	4379.4	8132
2015	665	222	2574.05	467.1
2015	665	813	741.65	211.9
2015	665	222	504.6	99.6

2015	665	165	85.7	80
2015	665	280	207	34.5
2015	664	400	17864	4466
2015	665	222	4770	795
2015	665	341	76.428	5054
2015	665	342	58.6	5860
2015	665	820	55214.16	2707.1
2015	665	40	0.22	22
2015	665	820	0.18	18
2015	665	342	0.9	90
2015	665	151	1402.55	832
2015	665	222	4443.3	730
2015	665	400	299	65
2015	665	711	18430.2	81912
2015	665	341	1.39	1
2015	664	820	17742.06	865.7
2015	665	652	407	37
2015	665	815	56688.4	4930.5
2015	665	809	0	1417
2015	665	712	3	5
2015	665	151	1079.06	633.5
2015	665	222	14134.22	6261.8
2015	665	40	5.83	583
2015	665	343	25.88	2588
2015	665	222	0.43	43
2015	665	130	0.25	25
2015	665	686	0.95	95
2015	665	342	2.12	212
2015	665	40	1.35	135
2015	665	804	1657.11	487
2015	665	341	0.2	20
2015	665	343	1.04	104
2015	665	343	845.9	640
2015	665	799	44	44
2015	664	341	0	5
2015	665	802	23	23
2015	665	261	433.5	51
2015	665	200	6107.4	11698
2015	665	754	0	15
2015	665	731	770	402.5
2015	665	225	120.6	205
2015	665	155	2018.108	1218.45
2015	665	153	11.5	11.5
2015	665	815	625.46	65
2015	665	222	28650.46	5379
2015	665	155	2544.36	1662
2015	665	801	20743.55	16414

2015	665	3	0.18	18
2015	665	752	10186.04	8328
2015	665	803	23	23
2015	665	803	3350	1675
2015	665	801	0	70
2015	665	222	313	59
2015	665	174	10	8
2015	665	145	99	18
2015	665	683	56	38
2015	665	420	3	1
2015	665	207	697.2	1577
2015	665	175	1299.64	2231.1
2015	665	165	4478	2687
2015	665	51	4.8	12
2015	665	400	5116.3	813.2
2015	664	222	2808.85	510.7
2015	665	40	186.5	74.6
2015	665	40	97.5	39
2015	665	222	3468	633
2015	664	400	3190	797.5
2015	665	803	263.07	2825
2015	665	341	15.16	1516
2015	665	260	4	2
2015	665	400	2566	635
2015	665	51	1.27	127
2015	665	165	4436.4	2279
2015	665	813	1366	683

ATTACHMENT 1

Species Code	Common Name	Scientific Name
1	Tuna, yellowfin	Thunnus albacares
2	Tuna, skipjack	Katsuwonus pelamis
3	Bonito, Pacific	Sarda chiliensis
4	Tuna, bluefin	Thunnus thynnus
5	Tuna, albacore	Thunnus alalunga
6	Tuna, unspecified	Scombridae
8	Tuna, bigeye	Thunnus obesus
9	Tuna, skipjack, black	Euthynnus lineatus
11	Tuna, longtail	Thunnus tonggol
12	Tuna, blackfin	Thunnus atlanticus
15	Escolar	Lepidocybium flavobrunneum
17	Oilfish	Ruvettus pretiosus
19	Mackerel, bullet	Auxis rochei
40	Yellowtail	Seriola lalandi
41	Jack, Pacific crevalle	Caranx caninus
42	Jacks, unspecified	Carangidae
43	Jack, almaco (amberjack)	Seriola rivoliana
50	Mackerel, unspecified	Scomber / Trachurus
51	Mackerel, Pacific	Scomber japonicus
52	Sierra, Pacific	Scomberomorus sierra
55	Mackerel, jack	Trachurus symmetricus
57	Wahoo	Acanthocybium solanderi
80	Butterfish (Pacific pompano)	Peprilus simillimus
81	Pomfret, Pacific	Brama japonica
91	Swordfish	Xiphias gladius
92	Marlin, striped	Tetrapturus audax
95	Sailfish	Istiophorus platypterus
96	Shark, white	Carcharodon carcharias
97	Shark, bigeye thresher	Alopias superciliosus
98	Shark, pelagic thresher	Alopias pelagicus
100	Sardine, Pacific	Sardinops sagax caeruleus
101	Sardine, juvenile	Sardinops sagax caeruleus
105	Herring, round	Etrumeus teres
110	Anchovy, northern	Engraulis mordax
111	Anchovy, deepbody	Anchoa compressa
113	Anchovy, slough	Anchoa delicatissima
121	Herring, Pacific	Clupea pallasi
122	Herring, Pacific - roe	Clupea pallasi
130	Barracuda, California	Sphyraena argentea
135	Mullet, striped	Mugil cephalus
144	Senorita	Oxyjulis californica
145	Sheephead, California	Semicossyphus pulcher
146	Wrasse, rock	Halichoeres semicinctus
147	Skate, longnose	Raja rhina
149	Shark, blacktip	Carcharhinus limbatus
150	Shark, unspecified	Selachii spp.

151	Shark, shortfin mako	Isurus oxyrinchus
152	Shark, spiny dogfish	Squalus acanthias
153	Shark, leopard	Triakis semifasciata
154	Shark, brown smoothhound	Mustelus henlei
155	Shark, thresher	Alopias vulpinus
156	Shark, basking	Cetorhinus maximus
158	Shark, smooth hammerhead	Sphyrna zygaena
159	Shark, soupfin	Galeorhinus zyopterus
160	Sharks, cow	Hexanchidae
161	Shark, sixgill	Hexanchus griseus
162	Shark, sevengill	Notorynchus cepedianus
163	Shark, swell	Cephaloscyllium ventriosum
164	Shark, dusky	Carcharhinus obscurus
165	Shark, Pacific angel	Squatina californica
166	Ratfish, spotted	Hydrolagus colliei
167	Shark, blue	Prionace glauca
168	Shark, salmon	Lamna ditropis
169	Shark, horn	Heterodontus francisci
170	Ray, unspecified	Rajiformes
171	Ray, bat	Myliobatis californica
172	Ray, Pacific electric	Torpedo californica
173	Stingray	Dasyatidae
174	Guitarfish, shovelnose	Rhinobatos productus
175	Skate, unspecified	Rajidae
176	Skate, big	Raja binoculata
177	Skate, California	Raja inornata
178	Skate, thornback	Platyrhinoidis triseriata
179	Shark, gray smoothhound	Mustelus californicus
180	Smelts, true	Osmeridae
181	Grunion, California	Leuresthes tenuis
182	Smelt, surf	Hypomesus pretiosus
184	Jacksmelt	Atherinopsis californiensis
185	Smelt, whitebait	Allosmerus elongatus
186	Topsmelt	Atherinops affinis
187	Smelt, night	Spirinchus starksi
188	Eulachon	Thaleichthys pacificus
189	Silversides	Atherinidae
190	Sablefish	Anoplopoma fimbria
191	Louvar	Luvarus imperialis
195	Lingcod	Ophiodon elongatus
196	Tomcod, Pacific	Microgadus proximus
197	Cod, Pacific	Gadus macrocephalus
198	Grenadier	Macrouridae
200	Sole, unspecified	Pleuronectiformes
201	Flounder, arrowtooth	Atheresthes stomias
202	Sole, bigmouth	Hippoglossina stomata
203	Sole, rock	Pleuronectes bilineata

204	Sole, fantail	Xystreurys liolepis
205	Sole, sand	Psettichthys melanostictus
206	Sole, English	Pleuronectes vetulus
207	Sole, rex	Errex zachirus
208	Sole, butter	Pleuronectes isolepis
209	Sole, petrale	Eopsetta jordani
210	Sole, slender	Eopsetta exilis
211	Sole, Dover	Microstomus pacificus
212	Sole, tongue	Symphurus atricauda
220	Halibut, unspecified	Pleuronectiformes
221	Halibut, Pacific	Hippoglossus stenolepis
222	Halibut, California	Paralichthys californicus
225	Sanddab	Citharichthys spp.
226	Sanddab, longfin	Citharichthys xanthostigma
227	Sanddab, Pacific	Citharichthys sordidus
228	Sanddab, speckled	Citharichthys stigmaeus
230	Flounder, unspecified	Pleuronectidae
231	Flounder, starry	Platichthys stellatus
235	Turbot, curlfin	Pleuronichthys decurrens
236	Turbot, diamond	Hypsopsetta guttulata
237	Sole, C-O	Pleuronichthys coenosus
238	Turbot, hornyhead	Pleuronichthys verticalis
239	Turbot, spotted	Pleuronichthys ritteri
240	Turbot	Pleuronectidae
245	Rockfish, cowcod	Sebastes levis
246	Rockfish, copper (whitebelly)	Sebastes caurinus
247	Rockfish, canary	Sebastes pinniger
249	Rockfish, vermilion	Sebastes miniatus
250	Rockfish, unspecified	Sebastes spp.
251	Rockfish, black-and-yellow	Sebastes chrysomelas
252	Rockfish, black	Sebastes melanops
253	Rockfish, bocaccio	Sebastes paucispinis
254	Rockfish, chilipepper	Sebastes goodei
255	Rockfish, greenspotted	Sebastes chlorostictus
256	Rockfish, starry	Sebastes constellatus
257	Rockfish, darkblotched	Sebastes crameri
258	Rockfish, China	Sebastes nebulosus
259	Rockfish, yellowtail	Sebastes flavidus
260	Scorpionfish, California	Scorpaena guttata
261	Cabezon	Scorpaenichthys marmoratus
262	Thornyheads	Sebastolobus spp.
263	Rockfish, gopher	Sebastes carnatus
264	Rockfish, pinkrose	Sebastes simulator
265	Rockfish, yelloweye	Sebastes ruberrimus
267	Rockfish, brown	Sebastes auriculatus
268	Rockfish, rosy	Sebastes rosaceus
269	Rockfish, widow	Sebastes entomelas

270	Rockfish, splitnose	Sebastes diploproa
271	Rockfish, Pacific ocean perch	Sebastes alutus
272	Sculpin, staghorn	Leptocottus armatus
273	Sculpin, yellowchin	Icelinus quadriseriatus
275	Bass, rock	Paralabrax spp.
276	Bass, spotted sand	Paralabrax maculatofasciatus
277	Bass, kelp	Paralabrax clathratus
278	Bass, barred sand	Paralabrax nebulifer
280	Bass, giant sea	Stereolepis gigas
289	Greenling, rock	Hexagrammos lagocephalus
290	Greenling, kelp	Hexagrammos decagrammus
291	Triggerfish	Balistidae
292	Sunfish, ocean	Mola mola
300	Salmon	Oncorhynchus spp.
301	Salmon, chum	Oncorhynchus keta
302	Salmon, Chinook	Oncorhynchus tshawytscha
303	Salmon, pink	Oncorhynchus gorbuscha
304	Salmon, coho	Oncorhynchus kisutch
306	Salmon, Roe (Chinook, Coho)	Oncorhynchus spp.
316	Trout, rainbow	Oncorhynchus mykiss
320	Catfish, unspecified	Siluriformes
322	Bullhead, brown	Ameiurus nebulosus
324	Shad, threadfin	Dorosoma petenense
325	Shad, American	Alosa sapidissima
335	Bass, striped	Morone saxatilis
340	Tilapia	Tilapia spp.
341	Crab, red rock	Cancer productus
342	Crab, yellow rock	Cancer anthonyi
343	Crab, brown rock	Cancer antennarius
345	Carp	Cyprinus carpio
346	Hardhead (freshwater)	Mylopharodon conocephalus
347	Splittail	Pogonichthys macrolepidotus
348	Hitch	Lavinia exilicauda
349	Blackfish, Sacramento	Orthodon microlepidotus
361	Stickleback, threespine	Gasterosteus aculeatus
365	Squawfish	Ptychocheilus grandis
375	Sucker	Catostomidae
400	Seabass, white	Atractoscion nobilis
410	Seabass, totuava	Totoaba macdonaldi
415	Snapper -Mexico-	Lutianidae
420	Croaker, unspecifed	Sciaenidae
421	Croaker, black	Cheilotrema saturnum
422	Croaker, spotfin	Roncador stearnsii
423	Croaker, yellowfin	Umbrina roncador
426	Corbina, California	Menticirrhus undulatus
427	Corvina, shortfin	Cynoscion parvipinnis
430	Grouper	Mycteroperca / Epinephelus

431	Cabrilla, spotted	Epinephelus analogus
432	Grouper, broomtail	Mycteroperca xenarcha
435	Croaker, white	Genyonemus lineatus
440	Queenfish	Seriphus politus
445	Flyingfish	Exocoetidae spp.
446	Saury, Pacific	Cololabis saira
450	Eel	Osteichthyes
451	Eel, blenny	Lumpenus anguillaris
452	Eel, California moray	Gymnothorax mordax
453	Lamprey, Pacific	Lampetra tridentata
454	Eel, wolf (wolf-eel)	Anarrhichthys ocellatus
455	Eel, spotted cusk-	Chilara taylori
456	Eel, monkeyface (prickleback)	Cebidichthys violaceus
457	Hagfishes	Eptatretus spp.
467	Opah	Lampris guttatus
470	Sturgeons	Acipenseridae
471	Sturgeon, green	Acipenser medirostris
472	Sturgeon, white	Acipenser transmontanus
473	Lizardfish, California	Synodus lucioceps
474	Perch-like, unspecified	Kyphosidae/Pomacentridae
475	Opaleye	Girella nigricans
476	Needlefish, California	Strongylura exilis
477	Bonefish	Albula vulpes
478	Halfmoon	Medialuna californiensis
479	Blacksmith	Chromis punctipinnis
480	Sargo	Anisotremus davidsonii
481	Dolphin (fish)	Coryphaena hippurus
482	Garibaldi	Hypsypops rubicundus
483	Mudsucker, longjaw	Gillichthys mirabilis
484	Salema	Xenistius californiensis
485	Midshipman, plainfin	Porichthys notatus
486	Goby, bluebanded	Lythrypnus dalli
487	Goby, yellowfin	Acanthogobius flavimanus
488	Goby, zebra	Lythrypnus zebra
490	Whitefish, ocean	Caulolatilus princeps
491	Killifish, California	Fundulus parvipinnis
495	Whiting, Pacific	Merluccius productus
501	Kelpfish, giant	Heterostichus rostratus
510	Kelpfishes	Gibbonsia spp.
550	Surfperch, unspecified	Embiotocidae
551	Surfperch, barred	Amphistichus argenteus
552	Surfperch, black	Embiotoca jacksoni
553	Surfperch, redtail	Amphistichus rhodoterus
554	Surfperch, shiner	Cymatogaster aggregata
555	Seaperch, striped	Embiotoca lateralis
556	Surfperch, white	Phanerodon furcatus
557	Surfperch, walleye	Hyperprosopon argenteum

558	Surfperch, rubberlip	Rhacochilus toxotes
559	Surfperch, pile	Rhacochilus vacca
560	Surfperch, calico	Amphistichus koelzi
561	Surfperch, dwarf	Micrometrus minimus
562	Surfperch, rainbow	Hypsurus caryi
563	Surfperch, pink	Zalembius rosaceus
564	Surfperch, silver	Hyperprosopon ellipticum
601	Kahawai	Annipis trutta
602	Zebraperch	Hermosilla azurea
650	Rougheye rockfish	Sebastes aleutianus
651	Rockfish, olive	Sebastes serranoides
652	Rockfish, grass	Sebastes rastrelliger
653	Rockfish, pink	Sebastes eos
654	Rockfish, greenstriped	Sebastes elongatus
655	Rockfish, copper	Sebastes caurinus
656	Blackspotted rockfish	Sebastes melanostictus
657	Rockfish, flag	Sebastes rubrivinctus
658	Rockfish, treefish	Sebastes serriceps
659	Rockfish, kelp	Sebastes atrovirens
660	Rockfish, honeycomb	Sebastes umbrosus
661	Rockfish, greenblotched	Sebastes rosenblatti
662	Rockfish, bronzespotted	Sebastes gilli
663	Rockfish, bank	Sebastes rufus
664	Rockfish, rosethorn	Sebastes helvomaculatus
665	Rockfish, blue	Sebastes mystinus
666	Rockfish, squarespot	Sebastes hopkinsi
667	Rockfish, blackgill	Sebastes melanostomus
668	Rockfish, stripetail	Sebastes saxicola
669	Rockfish, speckled	Sebastes ovalis
670	Rockfish, swordspine	Sebastes ensifer
671	Rockfish, calico	Sebastes dallii
672	Rockfish, shortbelly	Sebastes jordani
673	Rockfish, chameleon	Sebastes phillipsi
674	Rockfish, aurora	Sebastes aurora
675	Rockfish, redbanded	Sebastes babcocki
676	Rockfish, Mexican	Sebastes macdonaldi
677	Rockfish, shortraker	Sebastes borealis
678	Thornyhead, longspine	Sebastolobus altivelis
679	Thornyhead, shortspine	Sebastolobus alascanus
680	Anemones	Anthozoa
681	Jellyfish	Hydrozoa
682	Sea pansy	Renilla koellikeri
683	Limpet, keyhole	Megathura crenulata
684	Snail, tegula	Tegula spp.
685	Crab, hermit	Paguristes sp.
686	Crab, spider/sheep claws	Loxorhynchus spp.
687	Sand dollar	Dendraster excentricus

688	Bryozoan	Ectoprocta
689	Flatworm, marine	Platyhelminthes
690	Hornsnail	Cerithidea spp.
699	Invertebrate Unspecified	
700	Abalone	Haliotis spp.
701	Abalone, black	Haliotis cracherodii
702	Abalone, red	Haliotis rufescens
703	Abalone, green	Haliotis fulgens
704	Abalone, pink	Haliotis corrugata
705	Abalone, white	Haliotis sorenseni
706	Abalone, threaded	Haliotis assimilis
707	Abalone, pinto	Haliotis kamtschatkana
708	Abalone, flat	Haliotis walallensis
709	Limpet, unspecified	Archaeogastropoda
710	Squid, jumbo	Doscidicus gigas
711	Squid, market	Loligo opalescens
712	Octopus, unspecified	Octopus spp.
717	Scallop, weathervane	Patinopecten caurinus
718	Scallop, rock	Crassadoma gigantea
719	Scallop, unspecified	Pectinidae
720	Clam, unspecified	Bivalvia
721	Clam, common littleneck	Protothaca staminea
722	Clam, Pismo	Tivela stultorum
723	Clam, softshell	Mya arenaria
725	Clam, northern razor	Siliqua patula
726	Clam, gaper	Tresus nuttalli
727	Clam, common Washington	Saxidomus nuttalli
728	Clam, California jackknife	Tagelus californianus
729	Sea slug	Opisthobranchia
730	Mussel	Mytilus spp.
731	Whelk, Kellet's	Kelletia Kelleti
732	Snail, sea	Gastropoda
733	Clam, freshwater	Corbicula fluminea
734	Clam, purple	Nuttallia nuttallii
735	Clam, rosy razor	Solen sicarius
736	Snails, moon	Polinices spp.
737	Clam, northern quahog	Mercenaria mercenaria
740	Oyster, unspecified	Ostreidae
741	Oyster, eastern	Crassostrea virginica
742	Oyster, California native	Ostrea lurida
743	Oyster, giant Pacific	Crassostrea gigas
745	Oyster, european flat	Ostrea edulis
746	Snail, bubble	Bulla gouldiana
747	Snail, top	Astraea undosa
749	Sea hare	Aplysia spp.
750	Echinoderm, unspecified	Echinodermata
751	Sea stars	Asteroidea

752	Sea urchin, red	Strongylocentrotus franciscanu
753	Sea urchin, purple	Strongylocentrotus purpuratus
754	Sea cucumber, giant red	Parastichopus californicus
755	Sea cucumber, unspecified	Holothuroidea
756	Sea urchin, white	Lytechinus anamesus
757	Sea cucumber, warty	Parastichopus parvimensis
760	Sponges	Porifera
769	Invertebrates, colonial	Cnidaria
781	Snail, freshwater	Gastropoda
799	Mollusk, unspecified	Mollusca
800	Crab, Dungeness	Cancer magister
801	Crab, rock unspecified	Cancer spp.
802	Crab, claws	Cancer spp.
803	Crab, spider	Loxorhynchus spp.
804	Crab, king	Paralithodes spp.
805	Crab, sand	Emerita analoga
806	Crab, shore	Pachygrapsus crassipes
807	Crab, pelagic red	Pleuroncodes planipes
808	Crab, tanner	Chionoecetes tanneri
809	Crab, box	Lopholithodes foraminatus
810	Shrimp, bay	Crangonidae
811	Shrimp, ghost	Callianassa californiensis
812	Shrimp, ocean (pink)	Pandalus jordani
813	Prawn, ridgeback	Eusicyonia ingentus
814	Shrimp, unspecified	Crustacea
815	Prawn, spot	Pandalus platyceros
816	Prawn, golden	Penaeus Californiensis
817	Shrimp, coonstriped	Pandalus danae
818	Shrimp, red rock	Lysmata californica
819	Shrimp, brine	Artemia salina
820	Lobster, California spiny	Panulirus interruptus
821	Shrimp, mantis	Hemisquilla ensigera californiensis
823	Crab, armed box	Playmera gaudichaudi
825	Crayfish, signal	Pacifastacus leniusculus
826	Barnacle	Cirripedia
827	Crayfish, red swamp	Procambarus clarkii
828	Crayfish, unspecified	Astacidae
830	Spiders, sea	Pycnogonida
840	Tunicates	Urochordata
850	Worms, marine	Polychaeta
851	Themiste	Themiste spp.
860	Chiton, unspecified	Polyplacophora
899	Crustacean, unspecified	Crustacea
915	Lancelets, amphioxus	Branchiostoma californiense
920	Frog	Rana spp.
921	Frog, bull	Rana catesbiana
930	Turtle	Chelonia mydas

931	Terrapin	Malaclemys spp.
950	Kelp	Macrocystis spp.
951	Agar	Gelidium spp.
953	Algae, marine	Phycophyta
956	Rockfish, group bocaccio/chili	Sebastes/group
957	Rockfish, group bolina	Sebastes/group
958	Rockfish, group deepwater reds	Sebastes/group
959	Rockfish, group red	Sebastes/group
960	Rockfish, group small	Sebastes/group
961	Rockfish, group rosefish	Sebastes/group
962	Rockfish, group gopher	Sebastes/group
964	Rockfish, group rougheye/blackspotted	Sebastes/group
970	Rockfish, quillback	Sebastes maliger
971	Rockfish, group canary/vermili	Sebastes/group
972	Rockfish, group black/blue	Sebastes/group
973	Rockfish, group nearshore	Sebastes/group
974	Rockfish, group shelf	Sebastes/group
975	Rockfish, group slope	Sabastes/group
976	Rockfish, group deep nearshore	Sebastes/group
992	Trawled fish for animal food	Osteichthyes
995	Herring, Pacific - roe on kelp	Clupea/algae
997	Trawled fish, unspecified	Osteichthyes
999	Fish, unspecified	Osteichthyes

ATTACHMENT 1

APPENDIX D

Best Management Practices

Ventura Shellfish Enterprise
Proposed Best Management Practices to Mitigate Potential Adverse Project Impacts

Measure	Description of Measure	Responsible Party	Enforcing Agency
Seed supply – 1	**Cultivation of Spat Offsite.** Only hatchery-reared mussel spat grown at a facility certified by CDFW will be used in order to ensure that spat are free of introduced invasive species, parasites, and pathogens of concern; however, natural mussel spat collected on farm grow-out lines and buoys may also be harvested and cultivated.	Grower/Producer[1]	Ventura Port District (VPD) and CDFW
Sediment quality – 1	**Sediment Quality Monitoring Plan.** A Sediment Quality Monitoring Plan shall be developed requiring monitoring of sediment conditions within the project area, including monitoring the quantity, type, and distribution of biological materials (such as shellfish, shell material, and fouling organisms) that accumulate on the seafloor. Monitoring will also include an evaluation of any changes to oxygen demand of benthic infaunal and epifaunal communities, and changes to the chemical and biochemical conditions of seafloor sediments along with a description of performance standards to meet. If performance standards are not met, corrective actions will be outlined. The Plan will include reporting requirements, including annual report submittals to NOAA and NMFS for review. If performance standards are met for a period of time, the plan will provide for appropriately scaling down monitoring and intervals over time.	VPD to prepare plan Third-party consultant hired by VPD to conduct monitoring	NOAA and NMFS
Wildlife – 1	**Marine Wildlife Entanglement Plan.** No less than once per month, each grower/producer operating on a VPD lease shall visually inspect all ropes, cables, and equipment via depth/fish finders to determine if any entanglement of a marine mammal has occurred and to ensure that (a) no lines have been broken, lost or removed; (b) all longlines, anchor lines, and buoy lines remain taught and in good working condition; and (c) any derelict fishing gear or marine debris that collects in the growing gear is removed and disposed of at an identified onshore facility. All equipment and materials accidentally released or found to be missing from the facility during monthly inspections, including buoys, floats, lines, ropes, chains, cultivation trays, wires, fasteners, and clasps, shall be searched for, collected, properly disposed of onshore, and documented in the annual inspection report. Monitoring shall occur	Grower/Producer to inspect and respond VPD to identify disposal facility	VPD and NOAA Fisheries

[1] Note that all Grower/Producer responsibilities will be spelled out as conditions in grower/producer leases with VPD, thus establishing VPD enforcement authority for those conditions.

	monthly for the first two years following deployment and, in the event that there are no marine wildlife entanglements within the first two years, may be reduced to quarterly inspections thereafter. Inspections shall include recordings by depth/fish finder or ROV surveys of lines and/or monitoring performed by SCUBA divers. Recorded video shall be provided along with the annual report described above. Any maintenance issues including wear, loosening, or fatigue of materials shall be remedied as soon as possible. All incidents of observed whale entanglement shall be immediately reported to SOS WHALe. Any other marine wildlife (i.e., other marine mammals, turtles) observed to be entangled will be immediately reported to NOAA Fisheries Marine Mammal Stranding Network Coordinator, West Coast Region, Long Beach Office. Only personnel who have been authorized by NOAA Fisheries and who have training, experience, equipment, and support will attempt to disentangle marine wildlife. If possible, the grower/producer shall document and photograph entangled wildlife and the entangling gear material so as to modify gear and avoid any future entanglements.		
Wildlife – 2	Predator Control. Potential predator species will be identified. Specified humane methods of predator deterrence will be utilized, favoring non-lethal methods. No controls, other than non-lethal exclusion, shall be applied to species that are listed as threatened or endangered.	VPD to identify potential predator species and deterrence methods Grower/Producer to implement identified methods as necessary	Any methods of predator control are subject to prior approval of VPD, U.S. Fish and Wildlife Service, and NOAA Fisheries
Wildlife – 3	Marine Wildlife Observer. A Marine Wildlife Observer shall be present on each project construction vessel during all construction activities, including the installation of long lines and anchoring systems. The observer shall monitor and record the presence of all marine wildlife (marine mammals and sea turtles) within 100 yards of the work area. The observer shall have the authority to halt operations if marine wildlife are observed or anticipated to be near a work area and construction activities have the potential to result in injury or entanglement of marine wildlife. In addition, all work (including vessel motors) will be halted if a cetacean is observed within the monitoring area or if a pinniped or sea turtle is observed within 50 yards of the work area. Work may commence after the observed individuals have moved out of the monitoring area. Observers' reports on marine mammal monitoring during construction activities shall be prepared and submitted to NOAA Fisheries on a monthly basis. Reports shall include such information as the (1) number, type, and location of marine mammals observed; (2) the behavior of marine mammals in the area of potential sound effects during construction; (3) dates and times when observations and in-water project	VPD to identify qualified Marine Wildlife Observers and submit monthly observers' reports Growers/Producers to assure a qualified observer is present during construction activities and that observers' directives are heeded	VPD and NOAA Fisheries

	construction activities were conducted; and (4) dates and times when in-water construction activities were suspended because of marine mammals. VPD shall prepare a list of qualified marine wildlife observers who meet the following minimum qualifications: visual acuity in both eyes (correction is permissible) sufficient to discern moving targets at the water's surface with ability to estimate target size and distance; (2) use of binoculars or spotting scope may be necessary to correctly identify the target; (3) advanced education in biological science, wildlife management, mammalogy, or related fields (bachelor's degree or higher is preferred); (4) experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience); (5) experience or training in the field identification of marine mammals (cetaceans and pinnipeds) and sea turtles; and (6) ability to communicate orally, by radio or in person, with project personnel to provide real time information on marine wildlife observed in the area, as needed.		
Wildlife – 4	Entanglement Prevention. Grow-ropes will be attached to the head rope with a low-breaking-strength twine (4-millimeter (0.16-inch) diameter; <1,000 pounds), which will facilitate rapid detachment in the unlikely event of any interaction with the longline. A 1,100-pound breakaway link will be installed between surface marking buoys and the vertical lines.	Grower/Producer	VPD
Wildlife – 5	Marine Wildlife Education. Each grower/producer will be required to provide bi-annual (twice per year) marine wildlife education to its employees regarding proper procedures relating to marine wildlife. The training curriculum will include identifying the presence of specified marine wildlife and procedures for avoiding impacts to marine wildlife during operations. These procedures will include (1) reducing speed and observing the distances from marine life specified in Wildlife-7; (2) providing a safe path of travel for marine mammals that avoids encirclement or entrapment of the animal(s) between the vessel and growing apparatus; (3) if approached by a marine mammal, reducing speed, placing the vessel in neutral and waiting until the animal is observed clear of the vessel before making way; (4) avoiding sudden direction or speed changes when near marine mammals; (5) refraining from approaching, touching or feeding a marine mammal; and (6) immediately contacting their supervisor and other identified parties/agencies identified in Wildlife-1 should an employee observe an injured marine mammal.	VPD to prepare training curriculum Grower/Producer to provide training	VPD and NOAA Fisheries
Wildlife – 6	Lighting. All growing area operations shall be completed during daylight hours. No growing area operations will be conducted at night and no permanent artificial lighting of the shellfish cultivation facility shall occur, except for that associated with the use of navigational safety buoys required by the U.S. Coast Guard.	Grower/Producer	VPD and U.S. Coast Guard

Wildlife – 7	**Vessel Management.** Vessels in transit to and from the growing area shall maintain a distance of 100 yards from any observed cetacean and 50 yards between any observed pinniped or sea turtle. If cetaceans are observed within 100 yards or pinnipeds or sea turtles observed within 50 yards, the vessel shall reduce speeds to 12 knots or less until it is the appropriate distance (as required by this condition) from the particular marine life. If a cetacean is heading into the direct path of the vessel (i.e., approaching a moving vessel directly into the bow), the vessel shall shut off the engine until the cetacean is no longer approaching the bow and until a greater separation distance is observed. If small cetaceans are observed bow-riding, and the vessel is operating at speeds of 12 knots or less, the vessel shall remain parallel to the animal's course and avoid abrupt changes in direction until the cetaceans have left the area. Each sighting of a federally listed threatened or endangered whale or turtle shall be recorded and the following information shall be provided: a. Date, time, coordinates of vessel b. Visibility, weather, sea state c. Vector of sighting (distance, bearing) d. Duration of sighting e. Species and number of animals f. Observed behaviors (feeding, diving, breaching, etc.) g. Description of interaction with aquaculture facility	Grower/Producer	U.S. Coast Guard
Wildlife – 8	**Invasive Species.** Grower/producers operating in the project area shall be required to receive training from NMFS to identify potential invasive species and how to properly dispose of such invasive species if discovered.	Grower/Producer	NMFS or entity delegated by NMFS to conduct training
Storage and disposal of supplies – 1	**Spill Prevention and Response.** Discharges of feed, pesticides, or chemicals (including antibiotics and hormones) in ocean waters are prohibited. Fuel, lubricants and chemicals must be labeled, stored and disposed of in a safe and responsible manner, and marked with warning signs. Precautions shall be taken to prevent spills, fires and explosions, and procedures and supplies shall be readily available to manage chemical and fuel spills or leaks. Each grower/producer shall comply with the Spill Prevention and Response Plan (SPRP) for vessels and work barges that will be used during project construction and operations. Each grower/producer operating in the project area shall be trained in, and adhere to, the emergency procedures and spill prevention and response measures specified in the SPRP during all project operations. The SPRP shall provide for emergency response and spill control procedures to be taken to stop or control the source of the spill and to contain and clean up the spill. The SPRP shall include, at a minimum: (a) identification of potential spill sources and quantity estimates of a project specific reasonable worst case spill; (b) identification of prevention and response equipment and measures/procedures	VPD to prepare SPRP and provide training to growers/producers Growers/Producers to implement VPD-prepared SPRP	U.S. Army Corps of Engineers, U.S. Coast Guard, California Office of Emergency Services

	that will be taken to prevent potential spills and to protect marine and shoreline resources in the event of a spill. Spill prevention and response equipment shall be kept onboard project vessels at all times; (c) a prohibition on at-sea vessel or equipment fueling/refueling activities; and (d) emergency response and notification procedures, including a list of contacts to call in the event of a spill; (e) assurance that all hydraulic fluid to be used for installation, maintenance, planting, and harvesting activities shall be vegetable based.		
Storage and disposal of supplies – 2	Aquaculture Gear Monitoring and Escapement Plan. Include in overall management plan an aquaculture gear monitoring and escapement plan. Any farm gear that has broken loose from the farm location shall be retrieved. The farm site shall be visited at minimum twice per month to examine the aquaculture gear for potential loss or non-compliant deployment, including inspections for fouling organisms. Any organisms that have a potential to cover the sea floor will be removed and disposed of at an identified upland facility. A Marine Debris Management Plan shall also be prepared that includes (a) a plan for permanently marking all lines, ropes, buoys, and other facility infrastructure and floating equipment with the name and contact information of the grower/producer; (b) a description of the extent and frequency of maintenance operations necessary to minimize the loss of materials and equipment to the marine environment resulting from breakages and structural failures; and (c) a description of the search and cleanup measures that would be implemented if loss of shellfish cultivation facility materials, equipment, and/or infrastructure occurs.	VPD to prepare plan Growers/Producers to implement plan	VPD and U.S. Army Corps of Engineers
Storage and disposal of supplies -3	Decommissioning Plan. A decommissioning plan for the timely removal of all shellfish, structures, anchoring devices, equipment, and materials associated with the shellfish cultivation facility and documentation of completion of removal activities will be a requirement of each permit or sub-permit. Financial assurances to guarantee implementation of the plan will be in place and reviewed periodically.	Grower/Producer to prepare and implement approved plan VPD to approve plan	U.S. Army Corps of Engineers
Navigation -1	Update NOAA Charts. VPD to submit to the NOAA Office of Coast Survey: (a) the geographical coordinates of the facility boundaries obtained using a different geographic position unit or comparable navigational equipment; (b) as-built plans of the facility and associated buoys and anchors; (c) each grower/producer's point of contact and telephone number; and (d) any other information required by the NOAA Office of Coast Survey to accurately portray the location of the shellfish cultivation facility on navigational charts.	VPD	NOAA
Navigation -2	Notice to Mariners. No less than 15-days prior to the start of in-water activities associated with the installation phase of the project, VPD shall submit to (a) the U.S. Coast Guard (for publication in a Notice to Mariners); and (b) the harbormasters (for posting in their offices of public noticeboards), notices containing the anticipated start date of installation, the anticipated installation schedule, and the coordinates of the installation sites. During installation, VPD shall also make radio broadcast	VPD	U.S. Coast Guard

	announcements to the local fishers' emergency radio frequency that provide the current installation location and a phone number that can be called for additional information.		

APPENDIX B

Federally Protected Species Potential to Occur

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
Marine Mammals[2]				
Cetaceans				
Balarnoptera acutorostrata	Common minke whale	MMPA	Worldwide distribution. Polar, temperate, and tropical waters in both coastal and offshore habitats (NMFS 2018a).	**Moderate** potential to occur. Foraging and migration habitat is present in the Action Area. Some individuals are residents in California waters. Minke whales feed on euphausiids, copepods and small schooling fish, which are present in the Channel. In addition, this species has been recorded since 1988 in the Santa Barbara Channel and within 1 mile of the Action Area (PBCS 2018).
Balaenoptera borealis borealis	Sei whale	Endangered, MMPA	Worldwide distribution in subtropical, temperate, and subpolar waters. This species prefers deeper waters far from the coastline (NMFS 2018a). This species' habitat preference is the continental shelf edge and slope (NMFS 2018a).	Low potential to occur. This species may traverse through the Action Area during migration. In general, sei whales migrate annually from cool and subpolar waters in summer to temperate and subtropical waters for winter, where food is more abundant. Foraging resources (krill, copepods, small schooling fish, cephalopods) are likely present in the Action Area.
Balaenoptera edeni	Bryde's whale	Proposed Endangered, MMPA	Prefers highly productive tropical, subtropical and warm temperate waters worldwide.	Low potential to occur. This species may be found in all oceans from 40°S to 40°N; however, some populations migrate seasonally while others are resident and do not migrate (NMFS 2018). Year-round residents appear to be present along the west coast of Baja California, Mexico (Kenyon 1971). Foraging resources (krill, copepods, small schooling fish, crustaceans) are likely present in the Action Area. This species displays a preference for subtropical and tropical zones, inhabiting waters 16℃ (60°F) or warmer) (Jefferson et al. 2008).
Balaenoptera musculus musculus	Blue whale	Endangered, MMPA	Worldwide, from sub-polar to sub-tropical latitudes; generally occurs more offshore than other whales (NMFS 2018a).	Low potential to occur. This species has been observed migrating and feeding through the Santa Barbara Channel on many occasions, with several occurrences within the Action Area (PBCS 2018). In general, this species migrates poleward to feed in the summer and to the tropics to breed in the winter (Jefferson et al. 2008). Most occurrences are north of Santa Rosa and western Santa Cruz Island along the 200 meter isobath (Cascadia 2011), approximately 7.4 miles east of the Action Area. In addition, foraging resources (predominantly krill) are likely present in the Action Area.
Balaenoptera physalus physalus	Fin whale	Endangered, MMPA	Worldwide, primarily in temperate to polar latitudes and less common in the tropics.	**Moderate** potential to occur. This species has been observed migrating and feeding through the Santa Barbara Channel on many occasions, with one occurrence (12

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
				individuals) noted within 1 mile of the Action Area in 2011 (PBCS 2018; Cascadia 2011). This species' distribution is not well known, but it generally migrates poleward to feed in the summer and to the subtropics to breed in the winter (Jefferson et al. 2008). Resources (krill, small schooling fish, squid) are likely present in the Action Area. This species is more commonly associated with the 200 meter isobath, which is approximately 7.4 miles from the Action Area (Cascadia 2011)
Berardius bairdii	Baird's beaked whale	MMPA	Throughout the North Pacific Ocean and adjacent seas. This species prefers deep, cold waters of 3,000 feet (nearly 1,000 meters) or greater and may occur near shore along narrow continental shelves. Beaked whales are deep divers that prefer submarine canyons, seamounts, and continental slopes (NMFS 2018a).	Low potential to occur. Migration and distribution are poorly known (Jefferson et al. 2008). Suitable foraging resources (e.g., deep water and bottom-dwelling crustaceans, cephalopods, gadiform fish; Jefferson et al. 2008) are not likely present in the Action Area. This species prefers deep waters that are not present within the Action Area. This species has been observed far south of the Channel Islands, and west of Point Conception (Baumann-Pickering et al. 2013).
Delphinus capensis capensis	Long-beaked common dolphin	MMPA	Coastal habitats; prefers shallower tropical, subtropical, and warmer temperate to cool waters closer to the coast (within 50-100 nautical miles (90-180 km)) and the continental shelf (NMFS 2018a).	**High** potential to occur. Foraging resources (small schooling fish and squid) are likely present in the Action Area. This species has been recorded multiple times and in great numbers (e.g., occurrences with 1,500 individuals) in the Santa Barbara Channel, including the Action Area (PBCS 2018). This species displays a habitat preference for coastal waters, sometimes coming close to shore within waters that are only a few meters deep (Jefferson et al. 2008).
Delphinus delphis delphis	Short-beaked common dolphin	MMPA	Warm tropical to cool temperate waters, primarily oceanic and offshore. Species also occurs along the continental slope in waters 650-6,500 feet (200-2,000 m) deep (NMFS 2018a).	**Moderate** potential to occur. Foraging resources (small schooling fish and squid) are likely present in the Action Area. This species has been recorded multiple times and in great numbers (e.g., occurrences with 1,500 individuals) in Santa Barbara Channel and adjacent to the Action Area (PBCS 2018). This species is often associated with areas of upwelling and areas of steep sea-bottom (Jefferson, Webber and Pitman 2008).
Eschrichtius robustus	Gray whale (Eastern North Pacific stock)	MMPA	Occurs in coastal waters along the west coast of North America from Mexico to Alaska and in eastern Siberia. Usually feeds along the Bering, Chukchi, and Beaufort seas during the summer, and winters along breeding and calving areas off the coast of	**High** potential to occur. This species is a frequent visitor to the Ventura coastline and Santa Barbara Channel and commonly observed during migration, especially during the northward migration from Baja to Alaska. This species is a bottom feeder (epibenthic fauna such as mysids, amphipods, polychaete tube worms) and so are restricted

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
			Baja California. Calves are born from January to February (NMFS 2018a). During their northward migration from Baja to Alaska, cow-calf pairs stay particularly close to shore to avoid predation by orcas (NMFS 2014). Bottom feeder that consumes benthic amphipods.	to shallow continental shelf waters (Jefferson et al. 2008). Gray whales are often observed close to shore and has multiple occurrences in the Action Area (PBCS 2018).
Eubalaena glacialis	North Pacific right whale	Endangered, MMPA	Pacific Ocean between 20°N and 60°N latitude, from temperate to subpolar waters. Primarily occurs in shelf or coastal waters (NMFS 2018a).	Low potential to occur. Distribution is not well known but they appear to have a northward migration in the spring and a southward migration in the fall. This species is extremely rare with likely less than 50 individuals in U.S. waters (MMC 2018) and a scattered distribution throughout its range (NMFS 2018a). Suitable foraging resources (zooplankton) may be present within the Action Area. The most recent and closest occurrences for this species include 2 possible individuals sighted near San Miguel Island (February 2015), 10 individuals off Monterey (May 2016, PBCS 2018), and 1 individual off La Jolla (April 2017, MMC 2018). This species is historically known to inhabit offshore waters in depths sometimes greater than 2,000 m (Jefferson, Webber and Pitman 2008).
Grampus griseus	Risso's dolphin	MMPA	Temperate, subtropical, and tropical waters generally greater than 3,300 feet (1,000 m) and seaward of the continental shelf and slopes (NMFS 2018a).	Low potential to occur. Suitable foraging resources (cephalopods and crustaceans) may be present within the Action Area. This species has been observed in the Santa Barbara Channel, with many occurrences located south and northwest of the Action Area (PBCS 2018). This species prefers deeper waters on the continental shelf and slope, between 30° and 45° latitude (Jefferson et al. 2008), and is unlikely to occur in the Action Area.
Globicephala macrorhynchus	Short-finned pilot whale	MMPA	Prefers warmer tropical and temperate waters, typically within waters of 1,000 feet or more deep (NMFS 2018a).	Not expected to occur. Once common around the Channel Islands, a strong El Nino in 1982-1983 brought changes to the ecosystem affecting prey and this species disappeared from the area (Jefferson et al. 2008). This species inhabits areas with a high density of squid, their preferred prey. The most recent documented sighting occurred in October 2014 off Dana Point, Orange County, CA (OC Register 2018). This species prefers deep waters and is unlikely to occur in the Action Area.
Kogia breviceps	Pygmy sperm whale	MMPA	Worldwide distribution. Prefers tropical, sub-tropical and temperate waters. Most	Not expected to occur. In addition, based on shipboard surveys from 1991 to 2014, this species has only been

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
			common along waters seaward of the continental shelf edge and slope. Mostly forages in mid- and deep-water environments (NMFS 2018a).	sighted a handful of times (including unidentified *Kogia* sp.) off the coast of Central and Southern California (NMFS 2017a). This species prefers deep waters (outer continental shelf and beyond) and therefore is unlikely to occur in the Action Area.
Kogia sima	Dwarf sperm whale	MMPA	Worldwide; prefers tropical, sub-tropical, and temperate waters. Most common along the continental shelf edge and slope (NMFS 2018a).	Not expected to occur. This species inhabits warmer waters in offshore areas, and there is no evidence of migrations. Dwarf sperm whales feed on deep-water cephalopods (Jefferson, Webber and Pitman 2008). Based on shipboard surveys from 1991 to 2014, *Kogia* sp. have only been sighted a handful of times off the coast of central and southern California (NMFS 2017b). This species prefers deep waters and is unlikely to occur in the Action Area.
Lagenorhynchus obliquidens	Pacific white-sided dolphin	MMPA	North Pacific Ocean; cool, temperate waters from the continental shelf to the deep open ocean (NMFS 2018a).	**Moderate** potential to occur. Exhibits seasonal inshore/offshore and north/south movements. Foraging habitat is present in the Action Area. This species feeds mostly on cephalopods and small schooling fish in deep offshore waters but also on the continental shelf (Jefferson, Webber and Pitman 2008). In addition, this species has numerous occurrences within the Santa Barbara Channel and a few occurrences in the Action Area (PBCS 2018).
Lissodelphis borealis	Northern right-whale dolphin	MMPA	Endemic to deep, cold temperate waters of the North Pacific Ocean from Baja California to the Gulf of Alaska; generally in waters over the continental shelf and slope colder than 66°F (NMFS 2018a).	Low potential to occur. Although foraging habitat (i.e., for market squid) is present in the Action Area, this species has several scattered observations within the Santa Barbara Channel and no known observations within the Action Area (PBCS 2018). Northern right-whale dolphins are an open ocean species and are known only to come nearshore where there are deep submarine canyons (Jefferson, Webber and Pitman 2008).
Mesoplodon densirostris	Blainville's beaked whale	MMPA	Worldwide in temperate and tropical waters; prefers deep waters (WDC 2018).	Not expected to occur. Blainville's beaked whale has the most extensive distribution of the genus and inhabits depths between 200 to 1,000 m (Jefferson, Webber and Pitman 2008), where squid are plentiful. This species prefers deep waters and is unlikely to occur in the Action Area.
Mesoplodon stejnegeri	Stejneger's beaked whale	MMPA	North Pacific Ocean; prefer cold temperate and subarctic waters; generally found in	Not expected to occur. Inhabiting the North Pacific basin, this species is primarily oceanic but also inhabits the continental slope. It feeds on deep-water squid (Jefferson,

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
			deep, offshore waters from 2,500-5,000 feet deep (NMFS 2018a).	Webber and Pitman 2008). This species prefers deep waters and is unlikely to occur in the Action Area.
Megaptera novaeangliae	Humpback whale	Threatened (Mexico DPS) and Endangered (Central America DPS), MMPA	Worldwide distribution from the equator to sub-polar latitudes; feeding areas for the Mexico DPS occur off the coast of central California; Migrating individuals from the Central America DPS may migrate through the Action Area on their way to feeding grounds located off the Pacific Northwest (NMFS 2018a). This species stays near the surface of the ocean when migrating and prefers shallow waters when feeding and calving. This species can be seen close to shore when conditions allow for prey switching from krill to small schooling fish, which inhabit nearshore areas.	**Moderate to high** potential to occur. Foraging and migration habitat is present in the Action Area. Numerous observations of this species have been documented within the Santa Barbara Channel both close to shore and near the Channel Islands (PBCS 2018). In addition, this species is strongly associated with the 200 meter isobaths (Cascadia 2011).
Orcinus orca	Killer Whale (Southern Resident DPS – consisting of pods J, K, and L, Eastern North Pacific Transient Stock, and Eastern North Pacific Offshore Stock)	Endangered MMPA (all populations)	The Southern Resident DPS reside for part of the year in the inland waters of Washington State and British Columbia and have been known to travel to coastal sites as far south as central California (71 FR 69054-69070). Transient forms (Eastern North Pacific Transient Stock) of the species prefer coastal waters from Alaska through California, and offshore forms (Eastern North Pacific Offshore Stock) can be found from Mexico to Alaska (71 FR 69054-69070). In general, this species is most abundant in colder waters and high latitudes; fairly abundant in temperate waters; lower densities in tropical, subtropical, and offshore waters (NMFS 2018a, 70 FR 69903-69912).	Low potential to occur. Foraging resources (primarily fish) are present in the Action Area, which could be prey for offshore stocks that occasionally visit the area (feed primarily on sharks). Residents have only been observed as far south as Monterey Bay. However, transients (which prey on marine mammals) are more common in the Santa Barbara Channel, with more occurrences nearer to the islands than the shore (PBCS 2018).
Peponocephala electra	Melon-headed whale	MMPA	Primarily in deep waters throughout the tropical areas of the world (NMFS 2018a).	Not expected to occur. The Action Area is located outside of this species' known range. The closest habitat occurs in Baja. This species is rarely found nearshore. They feed on squid and small fish deep in the water column (Jefferson, Webber and Pitman 2008). This species prefers deep waters and is unlikely to occur in the Action Area.
Phoceonoides dalli	Dall's porpoise	MMPA	North Pacific open ocean, prefers temperate to boreal waters than are more than 600 feet	Low potential to occur. This species feeds on mid-water fish and squid in offshore waters, only using nearshore

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
			(180 meters) in depth and temperatures between 36-63°F (NMFS 2018a).	waters if there are deep-water features such as canyons (Jefferson, Webber and Pitman 2008). Although there are many scattered observations of this species in the Santa Barbara Channel (predominantly north of Santa Cruz Island), the closest occurrences near the Action Area occurred in 2007 (PBCS 2018). This species prefers deep waters and unlikely to occur in the Action Area.
Phocoena phocoena	Harbor porpoise	MMPA	North temperate and subarctic coastal and offshore waters; commonly found in bays, estuaries, harbors, and fjords less than 650 feet deep. Along the North American coast, range from central California to the Beaufort Sea (NMFS 2018a).	Not expected to occur. The Action Area is located outside of this species' known range. The Action Area may have their preferred prey species (cephalopods and small schooling fish) but the southern range of the species extends only to Point Conception. A shallow-water species, they normally inhabit waters less than 100 m (Jefferson, Webber and Pitman 2008). In addition, the closest incidental observation of the species were located along the Gaviota coast in 1992 (PBCS 2018).
Physeter catodon (=microcephalus)	Sperm whale	Endangered, MMPA	Worldwide; prefer deep waters and consumes deep water species (e.g., squid, sharks, skates, and fish) (NMFS 2018a)	Not expected to occur. A somewhat migratory species, sperm whales inhabit continental slope and oceanic waters with steep drop-offs where they prey on cephalopods (Jefferson, Webber and Pitman 2008). Although a few incidental observations of this species has occurred in the Santa Barbara Channel (dated 2002, 2004, and 2016; PBCS 2018), this species prefers deep waters and is unlikely to occur in the Action Area.
Pseudorca crassidens	False killer whale	MMPA	Ranges in the U.S. in Hawaii, along the west coast, and mid-Atlantic coast. Prefer tropical to temperate waters deeper than 3,300 feet (1,000 meters) (NMFS 2018a).	Not expected to occur. False killer whales are found in deep, offshore waters, and sometimes occur on the continental shelf (Jefferson, Webber and Pitman 2008). They feed on cephalopods and fish which are present in the Channel. However, this species prefers deep waters and is unlikely to occur in the Action Area.
Stenella coeruleoalba	Striped dolphin	MMPA	Mainly found seaward of the continental shelf from 50°N to 40°S latitude. Prefer highly productive tropical to warm temperate waters (52-84°F) that are oceanic and deep; often occurs in areas of upwelling and convergence zones (NMFS 2018a).	Not expected to occur. Primarily a warm water species that can be associated with convergence zones. They feed on fish in pelagic zones, along the continental slope or oceanic regions (Jefferson, Webber and Pitman 2008). This species prefers open oceans, has been recorded west of the Channel Islands (NMFS 2017c), and is unlikely to occur in the Action Area.
Steno bredanensis	Rough-toothed dolphin	MMPA	Worldwide; found primarily in deep waters throughout tropical and warmer temperate areas. Two recognized stock occur in Hawaii and Northern Gulf of Mexico (NMFS	Not expected to occur. This warm open ocean species rarely ranges north of 40° N (Jefferson, Webber and

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
			2018a). May be a specialist feeder on mahi mahi (*Coryphaena hippurus*).	Pitman 2008). Suitable deep water habitats are absent in the Action Area.
Tursiops truncatus	Common bottlenose dolphin	MMPA	Worldwide ranging from 45°N to 45°S latitude; found in temperate and tropical waters. Coastal populations migrate into bays, estuaries, and river mouths. Offshore populations inhabit pelagic waters along the continental shelf.	**High** potential to occur. A common coastal species and a generalist feeder (Jefferson, Webber and Pitman 2008). This species has many occurrences throughout the Santa Barbara Channel and within or directly adjacent to the Action Area (PBCS 2018). This species is also known to regularly occur within 1 kilometer of shore (Carretta et al. 1998).
Ziphius cavirostris	Cuvier's beaked whale	MMPA	Worldwide in temperate, subtropical, and tropical waters; prefer deep pelagic waters (typically 3,300 feet or deeper along the continental slope and edge or deep geologic features)(NMFS 2018a).	Not expected to occur. This widely distributed species is found in offshore waters, especially deep waters near the continental slope, necessary for catching deep-sea squid.(Jefferson, Webber and Pitman 2008). This species prefers deep waters and unlikely to occur in the Action Area.
Mustelids				
Enhydra lutris nereis	Southern sea otter	Threatened, MMPA	North Pacific Ocean; occurs in only two areas of California: the mainland coastline from San Mateo County to Santa Barbara County, and San Nicholas Island, Ventura County (USFWS 2015).	Low potential to occur. One of four disjunct remnant populations, the central/southern California population sea otters are found in shallow, nearshore waters along the coast (Jefferson, Webber and Pitman 2008). This species known range is both north and south of the Action Area and this species usually occurs within 2 kilometers (1.2 miles) of shore (USFWS 2015). However, it is possible that foraging/travelling individuals may traverse the Action Area.
Pinnipeds				
Arctocephalus philippii townsedii	Guadalupe fur seal	Threatened, MMPA	Tropical waters of the Southern California/Mexico region. This non-migratory species breeds along rocky coastal habitats and associated caves (NMFS 2018a).	Low potential to occur. This species has known haulouts and breeding colonies (rookeries) along the Channel Islands, San Miguel Island (CDFW 2009), and Guadalupe Island, Mexico (where most of the known rookeries are located)(NMFS 2018a). This species travels great distances to foraging areas for lanternfish and squid and therefore may traverse and/or forage in the Action Area. They are highly pelagic species and foraging areas are not well known. They prefer far offshore to deep oceanic areas for feeding (Jefferson, Webber and Pitman 2008).
Callorhinus ursinus	Northern fur seal	MMPA (Depleted – Eastern Pacific Stock)	Open ocean for foraging and rocky beaches for reproduction. Haul out habitat may include rocky or sandy beaches (NMFS 2018a).	Low potential to occur. Northern fur seals migrate from the Bering Sea southward to the North Pacific to feed in the winter. This species is known to haulout and breed at San Miguel Island (NMFS 2018a, CDFW 2009). This

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
				species has the potential to forage on fish and squid in the Action Area, however, they are one of the most pelagic pinnipeds and their foraging is usually offshore at the edge of the continental shelf and slope (Jefferson, Webber and Pitman 2008).
Eumetopias jubatus	Steller sea lion	Endangered (Western DPS) and Delisted due to Recovery (Eastern DPS), MMPA	North Pacific Ocean, mainly around coasts to outer continental shelf and slope. Prefer cold temperate to sub-arctic waters. Haul-outs and rookeries usually on beaches, ledges, and rocky reefs (NMFS 2018a).	Low potential to occur. On the west coast of North America, Steller sea lions range from the Aleutian Islands to Central California (formally southern California). This species is rarely seen south of Monterey Bay (Jefferson, Webber and Pitman 2008). Although foraging resources (fishes and cephalopods) are present in the Action Area, the closest known rookery is located at Año Nuevo Island off the coast of central California (Allen and Angliss 2014).
Mirounga augustirostris	Northern elephant seal	MMPA	Eastern and central North Pacific Ocean most of the year (9 months); prefer sandy beaches when on land. Range from Alaska to Mexico and typically breed in the Channel Islands or Baja California (NMFS 2018a).	Low potential to occur. This species migrates to and from their rookeries twice a year. Rookeries range from Baja to northern California (Jefferson, Webber and Pitman 2008). In addition, this species is known to haulout and breed at the Channel Islands (NMFS 2018a, Lowry et al. 2014, CDFW 2009). This species is a deep diver (300-800 meters) and prefers to forage in deeper pelagic waters, often with seamounts and other underwater features (Jefferson, Webber and Pitman 2008). Foraging resources (e.g., squid, fishes) are present in the Action Area. However, when present at the Channel Islands, they are spending their time molting. Their preferred foraging areas are north of the islands.
Phoca vitulina	Pacific harbor seal	MMPA	Generally non-migratory. On the U.S. west coast this species is found in coastal and estuarine waters from Canada to Baja California, Mexico. Temperate coastal habitats and uses rocks, reefs, beaches, and drifting glacial ice for hauling out and pupping sites (NMFS 2018a).	**High** potential to occur. This species is non-migratory and inhabits the coast to the continental slope (Jefferson, Webber and Pitman 2008). Harbor seals have known haulouts and rookeries at Rincon Point (Santa Barbara County) and Point Mugu (Ventura County); and haulouts from Point Conception to Santa Barbara and along all of the Channel Islands (CDFW 2009). Diving averages less than 35 meters and they are generalist feeders (Jefferson, Webber and Pitman 2008).
Zalophus californianus	California sea lion	MMPA	Eastern North Pacific Ocean from central Mexico to Canada; shallow coastal and estuarine waters; prefers sandy beaches for haul out sites but will also haul out on marina docks, jetties, and buoys (NMFS 2018a).	**High** potential to occur. This species is present along the west coast from Puerto Vallarta to Alaska. Males (adult, subadult and juveniles) undertake a northward migration to Central California and Washington after the breeding season in southern rookeries are generalist feeders (Jefferson, Webber and Pitman 2008).This species has

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
				known haulouts along all of the Channel Islands and rookeries at San Nicholas Island (CDFW 2009, NMFS 2018a). California sea lions are generalist opportunistic feeders and utilize the continental shelf and slope, but have also been observed in deeper oceanic waters (Jefferson, Webber and Pitman 2008).
Birds				
Brachyramphus marmoratus (nesting)	Marbled murrelet	Threatened	Breeds along the coast from Santa Cruz County north to Alaska. Nests in old-growth coastal forests, sea-facing talus slopes, or cliffs (Nelson 1997). During migration and winter (mostly July to February), occurs from Baja California to Alaska during the non-breeding season, in nearshore and protected coastal waters. Usually feeds nearshore within 5 kilometers (3 miles) and in waters less than 60 meters (197 feet) deep. Dives and pursues prey (opportunistic feeder) by flying underwater. This species is opportunistic and feeds on fish, crustaceans, and squid (Nelson 1997).	Low potential to feed. Suitable foraging habitat is present within the Action Area. However, while this species occurs regularly north of Point Conception, it occurs far less frequently farther south (CLO 2018, Lehman 2018, Garrett and Dunn 1991). In addition, the Action Area is located 3 miles off the coast of Ventura County, at the very edge of where this species potentially occurs. Not expected to nest. The Action Area occurs in open water, and nesting habitat is absent.
Phoebastria albatrus	Short-tailed albatross	Endangered	Nests on several isolated islands of the northwestern Pacific, but travels over much of the northern Pacific to forage in open waters for squid, fish, fish eggs, shrimp, and crustaceans.	Very low potential to forage. This species forages widely throughout the North Pacific Ocean and Bering Sea (USFWS 2018e). The global population is extremely low (approximately 1,200 individuals), and this species is an extremely rare visitor to offshore waters along the California coast, with only 43 records in the state since the 1970s (USFWS 2018e, CBRC 2018). The majority of occurrences are from north of Point Conception, but several have been observed farther south, with the nearest reports being of 1 subadult at Prisoner's Harbor, Santa Cruz Island, in July 2005, and 1 subadult at Santa Barbara Island in February and March 2002 (CBRC 2018). Not expected to nest. The Action Area occurs in open water, so nesting habitat is absent.
Sternula antillarum browni (nesting colony)	California least tern	Endangered	Breeding range extends from the San Francisco Bay Area south to Baja California, Mexico, including nesting colonies in coastal Santa Barbara and Ventura counties. May migrate coastally or over open water.	Low potential to forage. The site is farther from shore and in deeper water than where this species prefers to forage. Individuals may occasionally pass through the Action Area during migration.

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			Forages in shallow estuaries and lagoons. During the nesting season, foraging primarily takes places within 2 miles of shore and in waters less than 60 feet deep (USFWS 2006). Nests on sandy beaches or exposed tidal flats.	Not expected to nest. The Action Area is in open water, and nesting habitat is absent.
Sea Turtles[3]				
Caretta caretta	Loggerhead sea turtle (North Pacific Ocean DPS)	Endangered	Occurs in tropical to temperate waters in the Pacific Ocean. Nesting in the Pacific basin occurs along Japan and Australia, where it nests on ocean beaches, usually with high energy, narrow, steeply slopes, and coarse-grain sand. Migrates from nesting grounds in Japan and Australia to feeding grounds located along the west coast from central to north America. Baja California has the largest known aggregations of loggerhead sea turtles. Migrates along nearshore coastal waters (neritic zone). Typically feeds on benthic invertebrates in hard bottom habitats, although fish and plants are occasionally consumed (NMFS and USFWS 1998a).	**High** potential to feed and migrate. During ideal conditions (water temp/break), this species is known to migrate along the coast of California including the Santa Barbara Channel. Although there is no suitable feeding habitat (hard bottoms, benthic invertebrates) within the Action Area, during migration they may enter the Action Area. Sightings of this species along the U.S. west coast typically are of juveniles measuring 20-60 centimeter shell length (NMFS and USFWS 1998a). This species has also been observed at San Clemente Island (NMFS and USFWS 2007). This species has stranded on Ventura beaches in 2014 and 2017 (Dan Lawson, NMFS Protected Resources Division, 2018, pers. comm.). Not expected to nest. Nesting occurs mainly on open beaches or along narrow bays having suitable sand, and often in association with other species of sea turtles. No beach habitat is present in the Action Area and the Santa Barbara Channel is outside of nesting range. There are no known nesting habitats that occur along the western seaboard of the U.S. or Hawaii (NMFS and USFWS 1998a). The closest known loggerhead nesting beaches in the North Pacific Ocean are located in Japan (NMFS and USFWS 2007).
Chelonia mydas	Green sea turtle (East Pacific DPS)	Threatened	Eastern Pacific Ocean range. This species forages in the open ocean as well as shallow waters of lagoons, bays, estuaries, mangroves, eelgrass, and seaweed beds	**High** potential to occur. Green sea turtles are generally found in shallow waters except when migrating. They have been observed at Sterns Wharf in Santa Barbara harbor and at the Channel Islands. This species may migrate and/or forage in the Action Area. A regular visitor in the waters off the southwest coast of the US. Residents occur in the San Gabriel River, Long Beach (NMFS and USFWS 1998b). This species has stranded on Santa Barbara and

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
				Ventura beaches in 2014, 2015 and 2017 (Dan Lawson, NMFS Protected Resources Division, 2018, pers. comm.). Not expected to nest. This species requires open beaches with a sloping platform and minimal disturbance for nesting. The closest known nesting occurrences are in Mexico (NMFS and USFWS 1998b).
Dermochelys coriacea	Leatherback sea turtle (Western Pacific Population)	Endangered	Pacific Ocean pelagic marine waters; foraging habitat unknown. This population migrates from their nesting grounds in the Indo-Pacific to feeding areas off the Pacific coast of North America.	Not expected to occur. This species migrates to the west coast of North America to forage on jellyfish, salps and pyrosomes. They utilize both open ocean and coastal habitats. Despite the Channel Islands area not being within the Final Critical Designated Habitat for Leatherback sea turtles, this species could nonetheless migrate and/or forage in the Action Area. This species has been observed in Monterey Bay (NMFS and USFWS 1998c). Not expected to nest. Nesting for the Western Pacific Population occurs in Indonesia. Their preferred nesting beaches are typically on continent shores and have unobstructed, often deep offshore access (NMFS and USFWS 1998c).
Eretmochelys imbricata	Hawksbill sea turtle	Endangered	Circumtropical oceans (generally 30°N to 30°S latitude), including the Pacific Ocean pelagic marine waters	Not expected to occur. This species is rare to nonexistent in most localities (NMFS and USFWS 1998d) but may migrate and/or forage (specialist sponge carnivore) in Action Area. However, the Action Area is a sandy bottom habitat, and this species is typically found feeding in the vicinity of rock or reef habitats in shallow tropical waters. No sighting have been documented in recent history (NMFS and USFWS 1998d). Not expected to nest. Hawksbill sea turtles nest high up on the beach under/in dune vegetation, commonly in pocket beaches without a lot of sand. The largest remaining concentrations of nesting hawksbills occur on remote oceanic islands of Australia and the Indian Ocean. Other known nesting sites include Hawaii. American Samoa, Guam, Republic of Palau, Commonwealth of the Northern Mariana Islands, Republic of the Marshall Islands, and the Federated States of Micronesia (NMFS and USFWS 1998d).

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
Lepidochelys olivacea	Olive Ridley sea turtle	Threatened[4]	Pacific Ocean pelagic marine waters; foraging habitat unknown (NMFS and USFWS 1998d).	**Moderate** potential to occur. This species distribution ranges from Southern California to Northern Chile. Olive Ridley sea turtles are mostly pelagic but will also inhabit coastal areas. This species feeds on algae, lobster, crabs, tunicates, mollusks, shrimp, and fish. Olive Ridley sea turtles may migrate and/or forage in the Action Area. This species has been observed in the Los Angeles Harbor (NMFS and USFWS 1998e). This species has stranded on Santa Barbara County beaches in 2014 and 2015 (Dan Lawson, NMFS Protected Resources Division, 2018, pers. comm.). Not expected to nest. In the eastern Pacific, the largest nesting concentrations occur in southern Mexico and northern Costa Rica, with some nesting as far north as southern Baja California. This species nests on continental margins, and exhibits an unusual nesting habit called "arribada" whereby up to thousands of turtles come ashore at the same time to nest.
Sharks/Rays				
Carcharhinus longimanus	Oceanic whitetip shark	Threatened	Worldwide, in tropical and sub-tropical waters and found up to 30°N and 30°S latitude (USFWS 2018c). This species is pelagic, mostly offshore in open ocean or along the continental shelf. They are opportunistic feeders and top predators, and prefer fish and cephalopods (NMFS 2018a).	Not expected to occur. Action Area is outside of this species known range.
Cetorhinus maximus	Basking shark	NMFS Species of Concern	Inhabits tropical and arctic waters but most commonly observed in coastal temperate waters. This species is a filter feeder, forages at the surface, and consumes zooplankton (NMFS 2018b).	Low potential to occur. This species is not common, and has had a dramatic decline since the mid-1900's from fishing and the eastern Pacific population has not rebounded (NMFS 2018b). The Action Area is located at the southernmost extent of their range.
Manta birostris	Giant manta ray	Threatened	Inhabits temperate, subtropical and temperate waters, utilizing all habitats: offshore, oceanic and coastal areas.. This species feeds mainly on zooplankton and can be found diving to depths of 10 – 1,000 meters (NMFS 2018a).	Low potential to occur. Manta rays can be found in temperatures as low as 19°C (66.2°F). Santa Barbara Channel waters are not normally warm enough for this species. Last year in Ventura waters, only the month of August was warm enough for this species (NOAA 2018d).
Fish				

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
Acipenser medirostris	Green Sturgeon (southern DPS)	Threatened, NMFS Species of Concern	Ranges from Alaska to Mexico and spawns in the Rogue River, Klamath River Basin and the Sacramento River. Spawns in deep pools in large, turbulent, freshwater rivers; adults live in oceanic waters, bays, and estuaries, feeding on benthic invertebrates (NMFS 2015a).	Low potential to occur. Adults may migrate and/or forage in the project vicinity. There is very little data on green sturgeon use from Monterey south to the Mexican border. The area may be used minimally by the southern DPS (NOAA 2009).
Catostomus santaanae	Santa Ana Sucker	Threatened	Small, shallow, cool, clear streams less than 7 meters (23 feet) in width and a few centimeters to more than a meter (1.5 inches to more than 3 feet) in depth; substrates are generally coarse gravel, rubble, and boulder (USFWS 2011)	Not expected to occur. Habitat is unsuitable for this species. This species inhabits freshwater streams only.
Gadus microcephalus	Pacific cod (Salish Sea Population)	NMFS Species of Concern	This specific population inhabits Puget Sound, the Strait of Juan de Fuca and the Strait of Georgia. They feed on krill, shrimp, sand lance and crabs. They are often found over sandy bottoms and eelgrass may play a role in habitat selection (NMFS 2011a).	Not expected to occur. Although the Action Area is a sandy bottom substrate, no eelgrass is present at these depths. The Action Area not within the species known range.
Eucyclogobius newberryi	Tidewater goby	Endangered	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County, to the mouth of the Smith River (USFWS 2005).	Not expected to occur. Unsuitable habitat for tidewater goby, as they are a freshwater and brackish water species Rincon Creek, Santa Clara River and Ventura River are the closest known locations of this species to the Action Area.
Merluccius productus	Pacific hake (Georgia Basin DPS)	NMFS Species of Concern	The Georgia Basin DPS includes three stocks: the highly migratory stock that ranges from southern California to Queen Charlotte Sound, a central-south Puget Sound Stock and a Strait of Georgia stock (NMFS 2009a).	Not expected to occur. The highly migratory stock range includes southern California waters were the Action Area is located. The highly migratory stock spawns in the winter in California and migrates northward to feed as far north as Vancouver Island in the summer and spring. They are found at moderate depths of up to 3,000 feet (910 meters) (NMFS 2009a).
Oncorhynchus keta	Chum salmon	Threatened	Inhabits the lowermost reaches of rivers and streams, open ocean for anadromous form. Historical distribution included as far south as Monterey, however presently major spawning populations are found only as far south as Tillamook Bay, Oregon (NMFS 2017d).	Not expected to occur. The Action Area not within the species' known range.

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
Oncorhynchus kisutch	Coho salmon (Puget Sound/Strait of Georgia ESU)	NMFS Species of Concern	Inhabits streams and freshwater tributaries with gravel substrates, open ocean for anadromous form. This species distribution is from central California to Alaska (NMFS 2016a).	Not expected to occur. The Action Area not within the species' known range.
Oncorhynchus mykiss	Steelhead trout-Oregon Coast ESU	NMFS Species of Concern	Ranges from Asia, through Alaska and south to Southern California. This is a coastal species (NMFS 2008).	Not expected to occur. Oceanic range is unknown. However, spawning rivers only occur in rovers basins on the coast of Oregon from the Columbia River south to Cape Blanco (NMFS 2008).
Oncorhynchus mykiss irideus	Southern steelhead-Southern California DPS	NMFS Species of Concern	This DPS includes watersheds from the Santa Maria River to the U.S. Mexican border, coast and inland habitats. Clean, clear, cool, well-oxygenated streams; needs relatively deep pools in migration and gravelly substrate to spawn, open ocean for anadromous form (NMFS 2016b).	Low potential to occur. Adults may migrate and/or forage in project vicinity Steelhead were observed in 2017 occupying the Ventura River (A. Dransfield, pers. comm.).
Oncorhynchus nerka	Sockeye salmon (Snake River ESU and Ozette Lake ESU)	Endangered (Snake River) and Threatened (Ozette Lake)	In the U.S., these populations occur in Oregon and Washington, and critical habitat is designated for this species in Snake River and Ozette Lake. This species inhabits riverine, marine and lake environments (lakes are a requirement), and feed on aquatic insects and plankton (NMFS 2015b).	Not expected to occur. The Action Area is outside of species range.
Oncorhynchus tshawytscha	Chinook salmon (Central Valley Fall, Late-fall run ESU)	NMFS Species of Concern	In the U.S., Chinook salmon ranges from Alaska to California. This ESU spawns in the Sacramento River and San Joaquin River. Chinook salmon require deeper and larger freshwater streams than other salmonids; open ocean for anadromous form. They range from Alaska to Southern California, and feed on aquatic insects, amphipods, crustaceans, and, once they are large enough, fish (NMFS 2010).	Not expected to occur. The Action Area not within the species' known range.
Sebastes levis	Cowcod	NMFS Species of Concern	The species ranges from central Oregon to central Baja California and Guadalupe Island, Mexico. Inhabits deep shelf and upper continental slope, inhabiting depths of 65 to 1,600 feet (20 to 500 meters) in rocky areas, and feeds on squid, octopus and other fish (NMFS 2009b).	Low potential to occur Unsuitable habitat for cowcod, individuals may migrate through the area. Southern California has been recognized as the center of distribution of the species since the 1880s (Eigenmann and Beeson 1894).

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
Sebastes paucispinus	Bocaccio (Southern DPS)	NMFS Species of Concern	Ranges from Baja California to Alaska; most common between 160-820 feet in depth, but found up to 1,560 feet in depth. This species feeds on other fish species (mainly other rockfish) (NMFS 2007b).	Not expected to occur. This species prefers deep waters and is unlikely to occur in the Action Area.
Sebastes ruberrimus	Yelloweye rockfish	Threatened	Yelloweye rockfish range from northern Baja California to Alaska. This species is associated with rocky reefs, kelp canopies, and artificial structures like oil platforms. Adults prefer deeper waters and rocky bottoms. This species is commonly found in depths of 300 to 590 feet (91 to 180 meters)(NMFS 2017e).	Not expected to occur. This species prefers deep waters, is more common from Central California northward, and is unlikely to occur in the Action Area.
Sphyrna lewini	Scalloped hammerhead shark	Threatened	In the east Pacific, scalloped hammerhead sharks range from southern California to Ecuador. Inhabits coastal warm temperate and tropical seas, ranging from intertidal to depths of up to 1000 meters. Adults are common at seamounts (Miller et al. 2013).	Low potential to occur Adults may migrate and/or forage in the project vicinity.
Thaleichthys pacificus	Pacific eulachon (Southern DPS)	Threatened	Ranges from Northern California to Alaska and into the southeastern Bering Sea. Critical habitat is designated for the Southern DPS in northern California in Mad River, Redwood Creek and Klamath River. Anadromous fish, endemic to northeastern Pacific Ocean. In the US, most euchalon production originates in the Columbia River Basin (NMFS 2011b).	Not expected to occur. The Action Area is outside of this species' known range. No records at the Channel Islands, Critical habitat extends as far south as the Mad River, Northern California (NMFS 2011b).
Invertebrates				
Haliotis corrugate	Pink abalone	NMFS Species of Concern	Ranges from Point Conception to Baja California. This species required sheltered waters with depths from 20 to 118 feet (6 - 36 m) (NMFS 2007c).	Not expected to occur. Suitable habitat not present. Very low population numbers.
Haliotis cracherodii	Black abalone	Endangered	This species feeds predominantly on kelp and inhabits rocky, low intertidal zones up to 6 meters deep (NMFS 2009c) Their range extends from Point Area in Mendocino County to Northern Baja California.	Not expected to occur. Suitable habitat not present. Very low population numbers. The nearest critical habitat to the Action Area is at Anacapa Island (NMFS 2011c).
Haliotis fulgens	Green abalone	NMFS Species of Concern	Ranges from Point Conception to Baja California. This species is found in rock crevices in shallow water on exposed coast	Not expected to occur. Suitable habitat not present. Very low population numbers.

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
			from the low intertidal to depths of 60 feet (18 m) (NMFS 2009d).	
Haliotis kamtschatkana	Pinto abalone	NMFS Species of Concern	Ranges from Sitka, Alaska to Point Conception. This species is usually found in the tidal zone up to 30 feet but can be at depths of up to 330 feet. Pinto Abalone are associated with kelp beds in exposed areas (NMFS 2014).	Not expected to occur. Suitable habitat not present. Very low population numbers. The Action Area is not within this species known range.
Haliotis sorenseni	White abalone	Endangered	Open low- or high-relief rock or bolder areas interspersed with sand channels. This species inhabits rocky pinnacles and deep reefs in Southern California; especially those off the Channel Islands (Hobday and Tegner 2000).	Not expected to occur. Suitable habitat not present. Observed along the coastline in Santa Barbara County and the Channel Islands. They usually occur at depths of 20-60 meters and to be most abundant between 25-30 meters (80-100 feet)(Hobday and Tegner 2000).

Notes:

[1] **Federal Status:** MMPA = Marine Mammal Protection Act (50 CFR Part 216); Depleted species population stock is below optimum sustainable populations; NMFS Species of Concern = National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) Species of Concern (not federally listed or protected under the Endangered Species Act).

[2] The best potential to occur assessment has been provided given the paucity of information available for marine mammals, especially whales. Low potentials to occur do not negate the possibility of a given whale species occurring in the Action Area.

[3] Sea turtles are highly migratory and much of their geographic range and/or foraging habitat in the Pacific Ocean is unknown (e.g., see NMFS and USFWS 1998a)

[4] Endangered status provided to the breeding colony populations on the Pacific Coast of Mexico.

APPENDIX C

Phytoplankton Population Impact Analysis

Appendix C

PHYTOPLANKTON POPULATION IMPACT ANALYSIS

The proposed project could potentially affect phytoplankton populations in and near the project site, which could affect food resources for other marine resources. Cultured shellfish consume natural foods suspended in the water column, including phytoplankton and other organic matter, and potentially compete with other filter feeders for food. Therefore, this analysis has been prepared to determine what impact the project will have on food resources available to filter feeding organisms. The methodology to evaluate this impact was adapted from the mitigated negative declaration associated with Santa Barbara Mariculture Company's offshore mussel aquaculture farm prepared by the California Department of Fish and Wildlife to estimate the maximum effect of a mussel farm on phytoplankton (CDFG 2018).

Estimating the Maximum Effect of the Project on Phytoplankton:

The methodology: (1) identifies the maximum clearance rates of mussels; (2) applies this rate to the estimated maximum mussel production for the project; (3) using minimum flow rates, assesses how much phytoplankton is removed by the mussel farm; and (4) compares the turnover rate to the flow rate of seawater through the project site to determine the maximum estimated effect of the project on phytoplankton amounts.

The maximum clearance rate (CR_max) for mussels is defined in Brigolin *et al.,* (2009) as 107 liters/day (g DW). Brigolin *et al.,* (2009) also provides conversion ratios for wet to dry weight (17.4:1 including the shell weight).

The project anticipates growing a maximum of 22,000,000 pounds of mussels at a time. This is an extremely conservative estimate that assumes that all plots are leased, and all arrays are at the grow-out stage simultaneously. This is equivalent to 9,979,032 kg or 573,507 kg DW. The maximum clearance rate for mussels grown as part of the project would therefore be 573,507 kg DW x 107 liters/day, or 61,365,249 liters/day. This assumes the mussels are filtering seawater at their maximum rate.

The next step is to identify how long it takes the entire volume of seawater at the farm to go through mussels, which is known as the turnover time. This is determined by the total volume of water in the farm area (the area multiplied by water depth) divided by the maximum clearance rate.

Water Volume = Area (2000 acres) x Average Depth (30m) = 2000 acres[1] = 242,811,600 m^3. The total water volume divided by the CR_max (61,365,249 m^3/day) = Approximately 4 days.

The next step is to compare the turnover time to how long seawater resides in the project area. This is calculated using the minimum flow velocity in the project site area (3.43 cm/s) to assess the maximum residence time within the proposed farm. The minimum flow rate estimate comes from wave data from buoy Station 46217 (Anacapa Passage) and the National Date Buoy Center. The minimum annual average wave period for this station is 3.43 cm/s. This is an average wave period that is calculated in 30 minute increments.

Max_res_time = Farm_size(sqrt(2000acres)) / Min_Speed (3.43 cm/s)
= (sqrt(8.09 sqkm) / 0.0000343 km/s
= 2.84 km / 2.96 km/day
= 0.9594 day

[1] One acre = 4,046.86 m^2.

= 23 hours

Note that the time scales differ by orders of magnitude (23 hours & 4 days) and the mussels will not clear much of the water passing through the farm.

The phytoplankton concentration entering the farm will likely range from 1 to 20 mgChl/m3 (average from the Plumes and Blooms program). Given the extremely low residence time within the project site, over the 0.95 days of transit of a water parcel through the farm, the mussels will filter a small amount of seawater based upon the maximum total farm clearance rate calculation above.

Since these two time scales described above differ by more than two orders of magnitude, it was determined that the total production of the reconfigured farm at full build-out would have an inconsequential impact on phytoplankton and zooplankton populations in the Channel. Furthermore, nutrient regeneration in the water column within mussel farms is high, as phytoplankton consumed by the mussels results in released nutrients supporting new phytoplankton production. In conclusion, no adverse effect on phytoplankton population is anticipated with this project.

Appendix B

Predator Control Management Plan for the Ventura Shellfish Enterprise Project*

* Any revisions to the management plans will be updated after receiving comments from relevant regulatory agencies.

ATTACHMENT 1

PREDATOR CONTROL MANAGEMENT PLAN

FOR THE VENTURA SHELLFISH ENTERPRISE PROJECT

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ATTACHMENT 1

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1 INTRODUCTION

The Predator Control Management Plan (PCMP) describes predator-prey relationships, possible predator interactions with the shellfish farm, and means of controlling predation on the Ventura Shellfish Enterprise (VSE) aquaculture farm. This plan was developed in consultation with National Oceanic and Atmospheric Administration (NOAA) Fisheries, the VSE Project Management Team, and Project Stakeholders. The VSE project will establish a commercial offshore bivalve aquaculture operation based from the Ventura Harbor in Ventura, California, focused on the cultivation of Mediterranean mussels (*Mytilus galloprovincialis*). Specified humane methods of predator deterrence will be utilized, favoring non-lethal methods. No controls, other than non-lethal exclusion, shall be applied to species that are listed as threatened or endangered.

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2 SITE DESCRIPTION

2.1 Project Description

The project consists of twenty 100-acre plots (total of 2,000 acres) located in open federal waters of the Santa Barbara Channel (Channel) in the Southern California Bight (SCB), northwest of Ventura Harbor, with approximate depths at the project site ranging from 80 to 114 feet below sea level, with an average depth of 98 feet. The plot locations are shown in Figure 1, with latitude and longitude coordinates for the outer corners indicated. Each of the 20 plots are 2,299.5 feet by 1,899.5 feet, for an average plot size of 100.27 acres. Each plot will contain up to 24 lines (12 end-to-end pairs), with each line consisting of 575 feet of backbone length and 250 feet of horizontal scope on each end. There will be a 50 foot setback on each end of the pairs (for a total of 100 feet of spacing between lines of adjacent parcels) and 50 foot spacing between the two center pins. Parallel lines will be spaced 150 feet apart, with a 125 foot setback at each of the long sides (for a total of 250 feet of spacing between lines of adjacent parcels) (Fig. 2, 3A, 3B). The mussels will be grown and harvested by grower/producers who would sub-permit the plots from Ventura Port District (VPD), and the mussel product will be landed at Ventura Harbor.

2.2 Project Location

The project's twenty 100-acre plots are approximately 3.53 miles from the shore. The closest distance from the plots to the 3-mile nautical line is a minimum of 2,900 feet, with an average closest distance of over 3,000 feet. The closest distance from the growing area to the City of Ventura city limit is 4.5 miles. Ventura Harbor is 4.1 miles from the closest plot (8 miles from the most distant plot). The sub-permit sites are located on sandy bottom habitat outside of any rocky reef habitat, as evaluated in Gentry et al. 2017 and illustrated by NOAA United States West Coast nautical charts (NOAA 2017a).

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3 PREDATOR CONTROL PLAN

3.1 Overview of the Predator Control Management Plan

This PCMP has been developed as a comprehensive wildlife damage control program that addresses a range of non-lethal preferred management actions. The most effective, selective, and humane techniques available to deter or remove individual predators or species that threaten mussel farm productivity will be implemented. Predator control is not anticipated to be necessary for the aquaculture farm due to location, depth and project design features, and farmed species. The submerged long lines will be located between 15 to 45 feet below the ocean surface. The mussel growing socks will hang an additional 10 to 16 feet below the long lines (Figure 2). Many seabirds, including the double-crested cormorant (*Phalacrocorax auritus*), dive for prey, primarily various fish species and market squid (*Doryteuthis opalescens*), in the upper water column (i.e., less than 30 feet deep) of the Santa Barbara Channel. The project is designed so that the longlines can be lowered to avoid predation at these depths. While the Brant's cormorant (*Phalacrocorax penicillatus*) can dive and feed off of the seafloor at depths greater than 150 feet deep, they are piscivorous (fish eaters) and are unlikely predators of the mussel farm (Table 1). The procedures outlined here in the PCMP are to be utilized if predation becomes an issue for the VSE aquaculture farm.

3.2 Scope of the Predator Control Management Plan

The implementation of this plan is intended to increase the productivity of the VSE's mussel farm.

3.3 Objectives of the Predator Control Management Plan

The objectives of the PCMP are as follows:

- Increase the productivity of the mussel farm by reducing predators, if necessary.
- Employ only approved methods of predator control, favoring non-lethal methods.
- Only non-lethal exclusion can be applied to special status species.

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4 AUTHORITY AND RESPONSIBILITY

Grower/producers are responsible for implementing procedures and are encouraged to seek guidance from the VPD. It is the grower/producer's responsibility to attend predator control trainings, be informed regarding procedures and following all rules and regulations pertaining to special status species and approved methods of predator control. Specified humane methods of predator deterrence will be utilized, favoring non-lethal methods. No controls, other than non-lethal exclusion, shall be applied to species that are listed as threatened or endangered.

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5 REGULATORY SETTING

5.1 Federal Endangered Species Act (1973)

The federal Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 et seq.), as amended, is administered by the U.S. Fish & Wildlife Service (USFWS) and NOAA Fisheries. This legislation is intended to provide a means to conserve the ecosystems upon which endangered and threatened species depend and provide programs for the conservation of those species, thus preventing extinction of plants and wildlife. The ESA defines an endangered species as "any species that is in danger of extinction throughout all or a significant portion of its range." A threatened species is defined as "any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Under the provisions of Section 9(a)(1)(B) of the ESA (16 U.S.C. 1531 et seq.), it is unlawful to "take" any listed species. Take is defined in Section 3(19) of the ESA as, "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." A Final Rule published in the Federal Register on November 8, 1999 (64 FR 60727–60731), further defines "harm" as any act that kills or injures fish or wildlife, and emphasizes that such acts may include significant habitat modification or degradation that significantly impairs essential behavioral patterns (e.g., nesting or reproduction) of fish or wildlife. Further, the USFWS, through regulation, has interpreted the terms "harm" and "harass" to include certain types of habitat modification that result in injury to or death of species, which therefore are defined as forms of take. These interpretations, however, are generally considered and applied on a case-by-case basis and often vary from species to species.

In a case where a property owner seeks permission from a federal agency for an action that could affect a federally listed plant or wildlife species, the property owner and agency are required to consult with USFWS. Take prohibitions in Section 9 of the ESA (16 U.S.C. 1531 et seq.) do not expressly encompass all plants. Property owners may take listed plant species without violating the take prohibition if:

- The proposed development is private and does not require federal authorization or permit.
- There are no special federal regulations under Section 4(d) that prohibit take of the plant species.
- There are no state laws prohibiting take of the plant species.

Section 9(a)(2) of the ESA (16 U.S.C. 1531 et seq.) addresses the protections afforded to listed plants. In addition, the ESA provides protection to invertebrate species by listing them as threatened or endangered.

5.2 Marine Mammal Protection Act (1972)

The Marine Mammal Protection Act of 1972 (MMPA), as amended, establishes a federal responsibility for the protection and conservation of marine mammal species by prohibiting the "take" of any marine mammal. The MMPA defines "take" as the act of hunting, killing, capture, and/or harassment of any marine mammal, or the attempt at such. The MMPA also imposes a moratorium on the import, export, or sale of any marine mammals, parts, or products within the

U.S. The USFWS and NOAA Fisheries are jointly responsible for implementation of the MMPA; USFWS is responsible for the protection of sea otters, and NOAA Fisheries is responsible for protecting pinnipeds (seals and sea lions) and cetaceans (whales and dolphins).

Under Section 101(a)(5)(D) of the MMPA, an incidental harassment permit may be issued for activities other than commercial fishing that may impact small numbers of marine mammals. An incidental harassment permit covers activities that extend for periods of not more than 1 year, and that will have a negligible impact on the impacted species. Amendments to the MMPA in 1994 statutorily defined two levels of harassment. Level A harassment is defined as any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal in the wild. Level B harassment is defined as harassment having potential to disturb marine mammals by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

5.3 Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act)

The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. Sections 1801−1884) of 1976, as amended in 1996 and reauthorized in 2007, is intended to protect fisheries resources and fishing activities within 200 miles of shore. The amended law, also known as the Sustainable Fisheries Act (Public Law 104-297), requires all federal agencies to consult with the Secretary of Commerce on proposed projects authorized, funded, or undertaken by that agency that may adversely affect Essential Fish Habitat (EFH). The main purpose of the EFH provisions is to avoid loss of fisheries due to disturbance and degradation of the fisheries habitat. Managed fish found in the project vicinity include, but are not limited to, salmonid species, rockfish, roundfish, and flatfish (URS Corporation, May 2013).

5.4 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) prohibits the take of any migratory bird or any part, nest, or eggs of any such bird. Under the MBTA, "take" is defined as pursue, hunt, shoot, wound, kill trap, capture, or collect, or any attempt to carry out these activities (16 U.S.C. 703 et seq.). The number of bird species covered by the MBTA is extensive; the species are listed in Title 50 of the Code of Federal Regulations (CFR), Part 10.13. The regulatory definition of "migratory bird" is broad and includes any mutation or hybrid of a listed species, and also includes any part, egg, or nest of such birds (50 CFR 10.12). The MBTA, which is enforced by USFWS, makes it unlawful "by any means or in any manner, to pursue, hunt, take, capture, [or] kill" any migratory bird or attempt such actions, except as permitted by regulation. The applicable regulations prohibit the take, possession, import, export, transport, sale, purchase, barter, or offering of these activities, except under a valid permit or as permitted in the implementing regulations (50 CFR 21.11). Additionally, Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds," requires that any project with federal involvement address impacts of federal actions on migratory birds with the purpose of promoting conservation of migratory bird populations (66 FR 3853–3856). The Executive Order requires federal agencies to work with USFWS to develop a memorandum of understanding. USFWS reviews actions that might affect these species. Currently, birds are considered to be nesting under the MBTA only when there are eggs or chicks, which are dependent on the nest.

5.5 Requirements for Federal Permits

Responsible aquaculture should employ non-lethal deterrents as a primary course of action and should not unreasonably disrupt wildlife or their use of important marine habitats. If predation becomes an issue and lethal action is necessary, consultation with VPD, the U.S. Army Corps of Engineers (USACE), and USFWS is required prior to permitting.

The most likely predators of offshore mussel farms in California are diving ducks and seabirds, which are a vital part of marine ecosystems and are valuable indicators for ecosystem health. Most seabirds are protected by the MBTA, and some are endangered or threatened under the ESA. Guidelines governing permit issuance for migratory birds are authorized by the MBTA and subsequent regulations (50 CFR Parts 13 and 21) (USFWS 2003). Specifically, Part 21.41 of Subpart D of these regulations outlines procedures for issuing permits for the control of depredating birds. These regulations state that all private individuals, organizations, and Federal and State agencies seeking to control migratory birds must file an application for a depredation permit that contains the following information: (1) a description of the area where depredations are occurring; (2) the nature of the crops or other interests being injured; (3) the extent of such injury; and (4) the particular species of migratory birds committing the injury (USFWS 2003).

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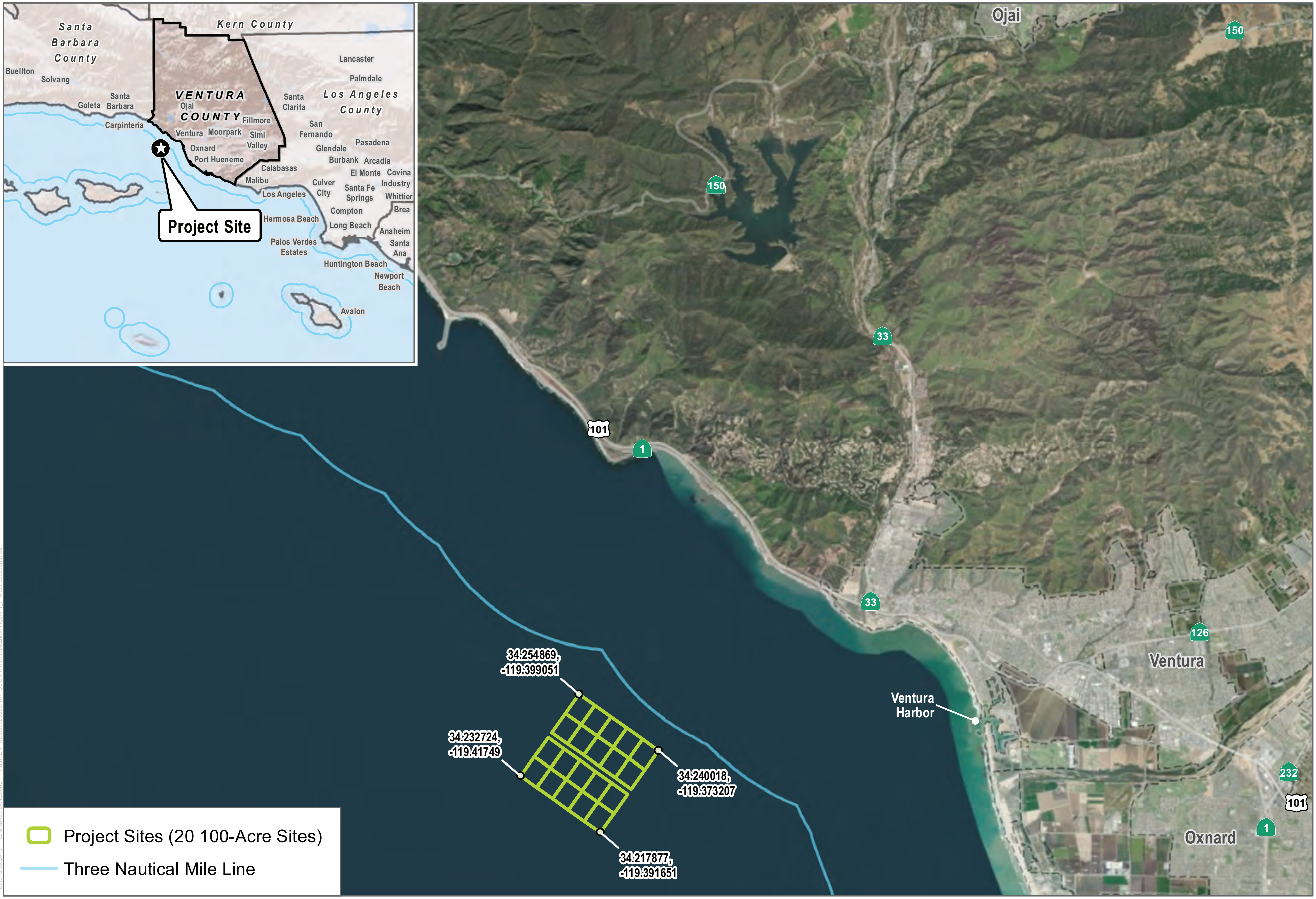

SOURCE: NAIP 2016
DATE OF PREPARATION: 8/30/2018

DUDEK

0 6,250 12,500 Feet

FIGURE 1
Project Location
Ventura Shellfish Enterprise Project

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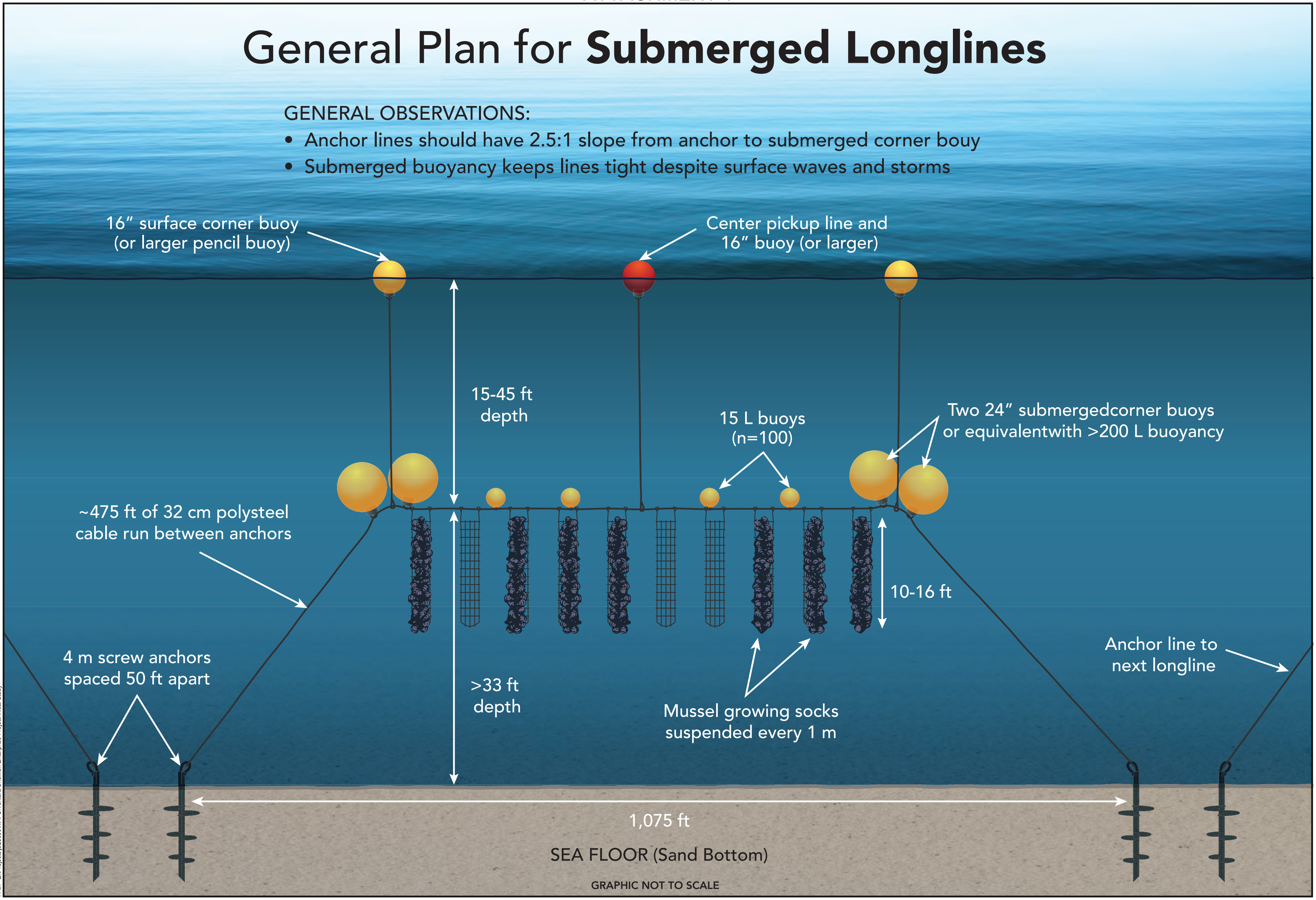

PAth - Z:\Projects\j925000\MAPS\Ventura Shellfish Enterprise Project Initial Study

FIGURE 2

Detailed Plan for Shellfish Longlines

Biological Assessment for the Ventura Shellfish Enterprise Project

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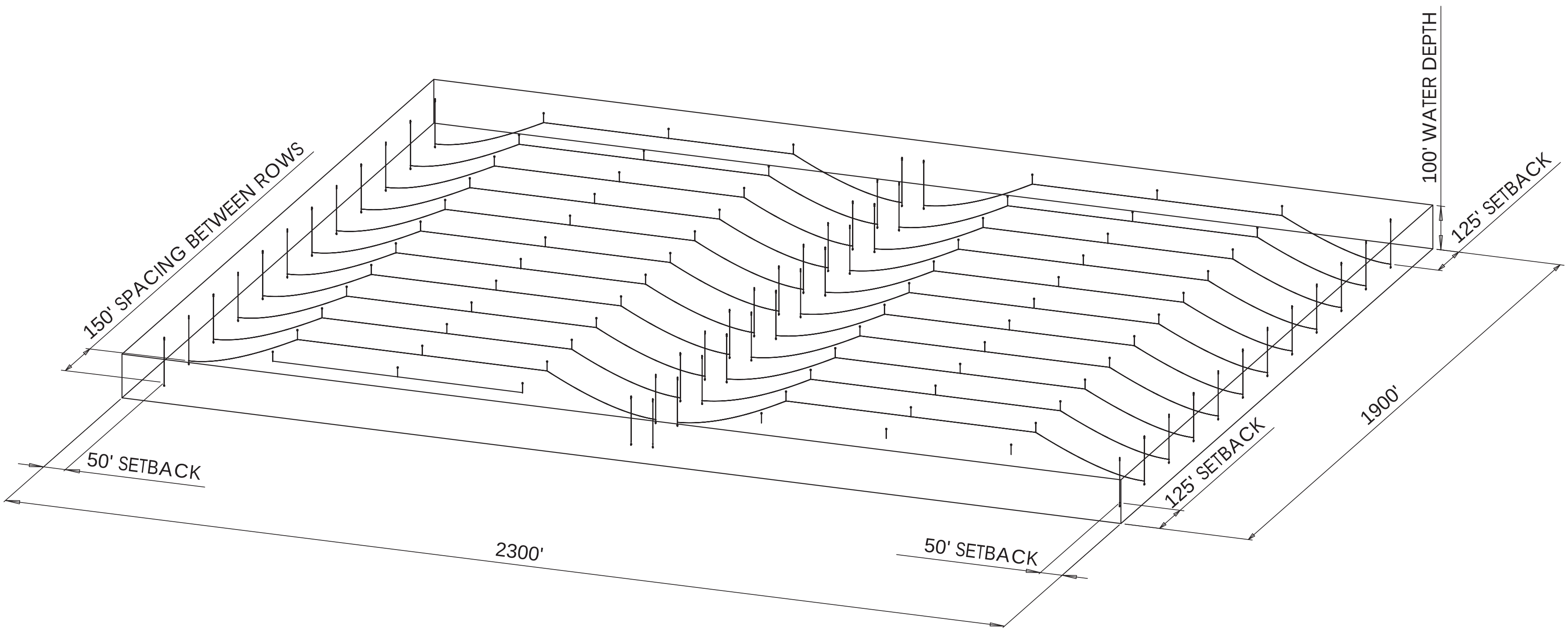

FIGURE **3A**

Parcel Array Overview

Biological Assessment for the Ventura Shellfish Enterprise Project

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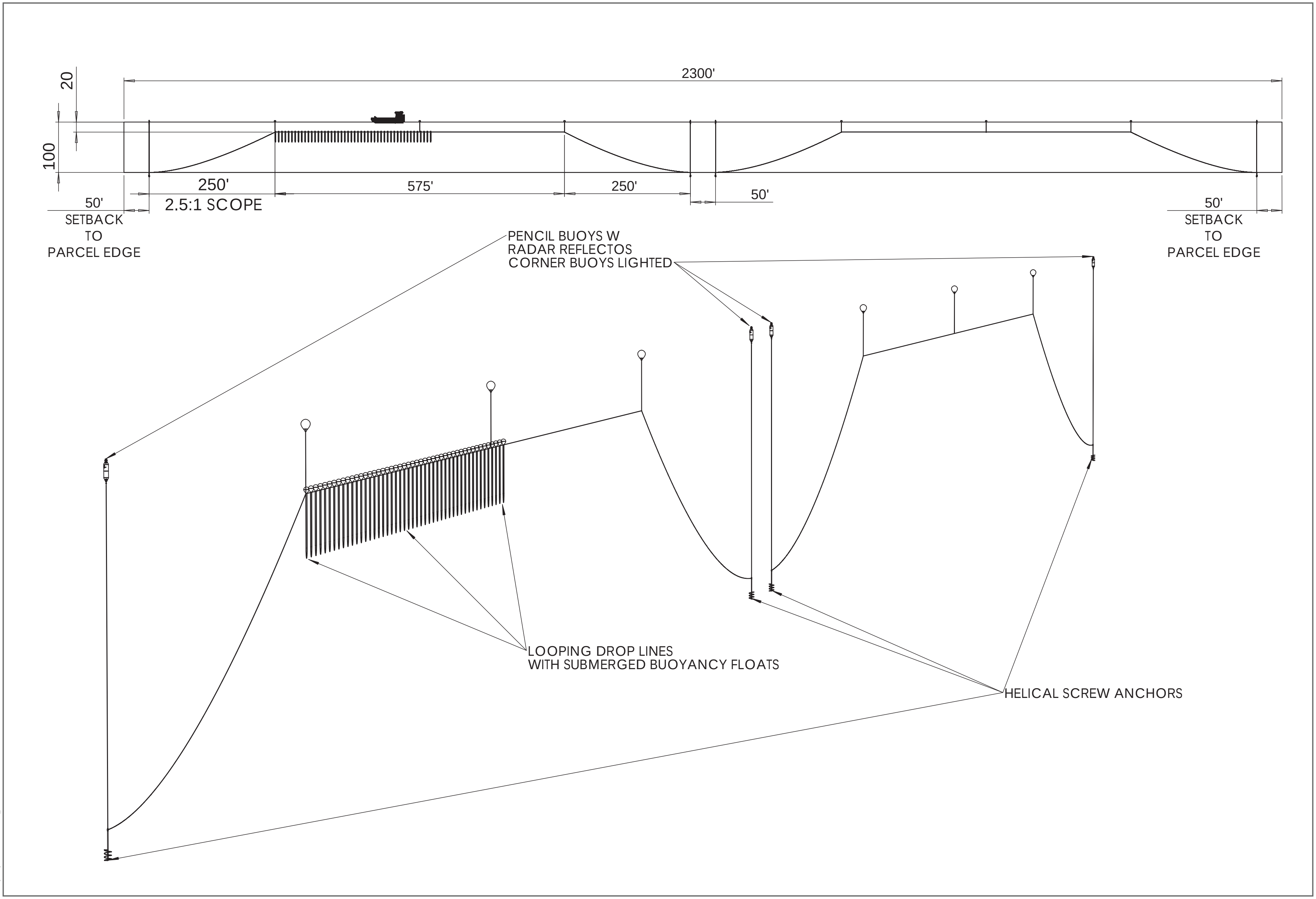

SOURCE: VSE 2018

FIGURE **3B**

Backbone Details

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6 RESOURCES FOR IMPLEMENTATION OF THE PLAN

There are numerous sources of wildlife control management supplies, equipment, and commercial vendors that can be employed for uses as described within this PCMP. Grower/producers are responsible for purchasing their own equipment for wildlife control, if needed. Only grower/producers who have attended predator control training are authorized to use non-lethal wildlife control methods. Equipment for wildlife control may include field guides for species identification, binoculars, pyrotechnic launchers and ammunition, and visual deterrents.

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7 POTENTIAL PREDATORY SPECIES

Increased abundances of a number of seabirds have been found in areas of mussel aquaculture (Roycroft et al. 2007). Predation of cultivated mussels by diving ducks has been recorded in almost every area where mussels are cultivated (Canada, United States of America, Scotland, Germany, Holland, Norway) (Dunthorn 1971; Glude and Chew 1980; Milne and Galbraith 1986; Meixner 1986; Rueggeberg and Booth 1989; Thompson and Gillis 2001). The main issues for shellfish farms are diving ducks like eiders and scoters (Table 1, Bevan et al. 2002) (which do not occur on the California coast) and scoters (Bevan et al. 2002). Although other species such as cormorants and gulls show increased abundance near long-line mussel farms (Roycroft et al. 2007), they have not been observed predating on the mussels and instead use the above water structure for perching and preening. The diving duck species, however, are able to consume a large amount of shellfish in one day and often feed in large groups. Mussels also fall off the ropes while ducks are foraging (pulling on the lines). Mussel farms may experience a yearly increase in predation since migrating birds can recall mussel sites and lead more individuals the following year (Robertson and Cooke 1999). Crabs and seas stars are also known to ascend long lines from the sea floor to consume mussels at aquaculture facilities. However, due to the mussel aquaculture array design in deeper water, with minimal attractive floats, and arrays suspended in the water column (minimal access to sea floor predators; Fig. 2, 3A, 3B), predation at VSE is not likely to be an issue.

Table 1 Potential Predators for California Offshore Commercial Shellfish Aquaculture

Predator Type	Common Name	Scientific Name	Impact on Shellfish Aquaculture
Mammal	Sea Otter	*Enhydra lutris*	Low
Crustaceans	Crabs	*Crustacea* spp.	Moderate
Echinoderms	Sea Stars	*Asteroidea* spp.	Low
Birds	Double-crested cormorant	*Phalacrocorax auritus*	Low
	Brant's cormorant	*Phalacrocorax penicillatus*	Low
	Common loon	*Gavia immer*	Low
	Pacific loon	*Gavia pacifica*	Low
	Red-throated loon	*Gavia stellata*	Low
	Western grebe	*Aechmophorus occidentalis*	Low
	Eared grebe	*Podiceps nigricollis*	Low
	Gulls and Terns	*Larus and Sternula* spp.	Low

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8 PREDATOR MANAGEMENT APPROACH

8.1 Means of Controlling Predation

There are many different techniques to reduce predation on mussel farms (Table 2; Bevan et al. 2002). Total exclusion is the only completely effective method for eliminating bird predation at aquaculture facilities (a complete enclosure around the aquaculture farm). In the case of VSE, this method is impractical for a farm of this size and very costly. Another commonly used method for bird control is electric wires and fencing which is also impractical for this project. Results from non-exclusion techniques vary, and the use of a single technique is rarely effective (Curtis et al. 1996). Usually, several control methods combined is required. Price et al (2016) describes six options for reducing predation impacts on logline mussel farms: harassment, aversive condition, exclusion, nonlethal removal, lethal removal and population control.

In many locations, mussel farming operators have taken measures to control or eliminate predation by the use of acoustic harassment devices, water cannons, and other hazing methods. Frightening techniques rely on sight and/or sound stimuli to discourage birds from remaining at a site and include the following methods (Curtis et al. 1996):

a) Noise making devices:
   - Species-specific distress calls
   - Pyrotechnic devices: cracker shells, whistle bombs, screamers, screamer rockets and bangers, rope fire crackers, electronic noisemakers
b) Visual scare devices:
   - Lights: construction flashers, area lights, revolving beacons
   - Scarecrows, effigies and predator models
   - Mirrors, reflectors and streamers
c) Remote-controlled airplanes/boats
d) Water spray devices
e) Patrols and being present onsite

Harassment by chasing, explosives, and deterrent devices have not been particularly effective, with the target animal becoming habituated over time. Ross et al. (2001) conducted trials using an underwater playback system on mussel farms in Scotland, but this deterrent had an effective range of less than 100 m (Thompson and Gillis 2001). Noise harassment devices may actually become attractants to habituated individuals who come to recognize the sound as an indicator for food. Acoustic deterrents such as propane canons achieve similar results and also disturb surrounding residents. Boat chasing appears to be the most effective scare tactic but is an unsatisfactory solution due to high costs. Boat chasing can also be disruptive for other wildlife. This solution is ineffective for bird species that forage at night.

Visual deterrents such as scarecrows usually result in rapid habituation by the birds (Ross et al. 2001; Thompson and Gillis 2001). Ross (2000) studied the use of a powerful laser light with promising results, but the laser does not work in bright light and has an effective range of approximately 100 m.

Another solution is to use a protective socking material (Barbeau et al. 2006). This material consists of the standard polypropylene sock with a biodegradable protective layer stitched around it. When mussels are put into socks and hung in the water, they start migrating toward the outside of the sock in order to filter feed properly, making them more vulnerable to predation by diving ducks. Hence the second layer, with its smaller mesh openings, prevents mussels from migrating outside of the sock, therefor offering protection from predators, and the socking material is eventually biodegradable. However, this method has mixed results. Williams et al. (2018) lost fewer medium-sized (20 mm) mussels to greater scaup *Aythya marila* predation than un-sleeved socks. Losses were similar for small (14 mm) and large (26 mm) mussels, but more small mussels migrated through sleeved socks (thus more vulnerable to predation) (Williams et al. 2018).

Table 2 Methods of Predator Control

Control Method	Control Examples	Predator Type
Exclusion and barriers	Perimeter nets	Birds and Mammals
	Overhead wires	Birds
Deterrents	Acoustic deterrent devices	Birds and Mammals
	Lights	Birds
	Alarm (distress calls; species specific)	Birds and Mammals
	Pyrotechnic dispersal devices	Birds
	Water spray devices	Birds
	Scarecrows, reflectors	Birds
	Human activity; boat chasing	Birds and Mammals
	System design: increased water depth, remove possible perches	Birds
Removal	Trapping and relocation	Birds and Mammals
	Killing	Birds and Mammals

8.2 Recommendations for Predator Control

Predator control is not permitted unless in direct response to evidence of predation. If predation is affecting profits, the following actions are recommended to reduce diving duck and seabird predation, adapted from Richman et al. (2013).

- Be active on the farm. Human activity on the farm site has been shown to reduce the presence of birds.
- Buoys can attract ducks to the site. Do not add additional buoys to the arrays for marking purposes if feasible.
- Protect spat lines as they are the preferred size of all species of ducks; although larger species can and will eat larger mussels. If possible, use protective socking around spat lines.

No further predator control methods are approved without prior review and approval by the VPD, USACE, and USFWS.

9 EVALUATION AND REVIEW OF THE PLAN

In the event that any predator management is required, implementation of this predator management plan will be monitored, and a report will be prepared annually describing the actions taken to control predation and the numbers and types of predators controlled. In addition, the report will include documented incidents of predation, recommendations on how predation might be further reduced, and an evaluation of how the current year's predator management actions (if any) relate to the objectives established for this plan.

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10 PERSONNEL WILDLIFE CONTROL TRAINING

Predator control training will be made available to all grower/producers and will be provided by the VPD or a third-party consultant. Training is required in order to be informed of rules and regulations and identify appropriate methods of predator control if predation becomes an issue.

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11 FEDERALLY PROTECTED SPECIES

Federally protected species have the potential to occur on site. Methods used for predator control are not to cause harm to special status species. The following resources were used to determine which federally listed, proposed, or federally recognized (i.e., National Marine Fisheries Service ("NMFS") Species of Concern) species had a potential to occur on site: NOAA California Species List Tools (NOAA 2018a), NOAA Find a Species Website (NMFS 2018a, filtered for West Coast Region), Channel Islands Bird Checklist (Collins 2011), USFWS Information for Planning and Consulting (USFWS 2018a), USFWS Environmental Conservation Online System (USFWS 2018b), the NOAA Section 6 Program Website (NOAA 2018b), NMFS Species of Concern (NMFS 2018), and California Natural Diversity Database (CNDDB; CDFW 2018). The NOAA Species List Tools (NOAA 2018a) and CNDDB (CDFW 2018) were queried for the 7.5-minute U.S. Geological Survey quadrangle that bordered the Pacific Ocean from the Ventura County line south to Port Hueneme, which included Pitas Point, White Ledge Peak, Ventura, Oxnard, and Oxnard OE W. Appendix A lists all special status species with potential to occur on site.

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12 CONCLUSION

The Predator Control Management Plan for the Ventura Shellfish Enterprise provides guidelines and decision pathways in the unlikely chance of predation on the mussel farm. If followed by growers/producers, with cooperation and guidance from VPD staff, grower/producers will be able to reduce predation while minimizing potential impacts to wildlife.

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APPENDIX A

Federally Protected Species Potential to Occur

ATTACHMENT 1

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
Marine Mammals[2]				
Cetaceans				
Balarnoptera acutorostrata	Common minke whale	MMPA	Worldwide distribution. Polar, temperate, and tropical waters in both coastal and offshore habitats (NMFS 2018a).	**Moderate** potential to occur. Foraging and migration habitat is present in the Action Area. Some individuals are residents in California waters. Minke whales feed on euphausiids, copepods and small schooling fish, which are present in the Channel. In addition, this species has been recorded since 1988 in the Santa Barbara Channel and within 1 mile of the Action Area (PBCS 2018).
Balaenoptera borealis borealis	Sei whale	Endangered, MMPA	Worldwide distribution in subtropical, temperate, and subpolar waters. This species prefers deeper waters far from the coastline (NMFS 2018a). This species' habitat preference is the continental shelf edge and slope (NMFS 2018a).	Low potential to occur. This species may traverse through the Action Area during migration. In general, sei whales migrate annually from cool and subpolar waters in summer to temperate and subtropical waters for winter, where food is more abundant. Foraging resources (krill, copepods, small schooling fish, cephalopods) are likely present in the Action Area.
Balaenoptera edeni	Bryde's whale	Proposed Endangered, MMPA	Prefers highly productive tropical, subtropical and warm temperate waters worldwide.	Low potential to occur. This species may be found in all oceans from 40°S to 40°N; however, some populations migrate seasonally while others are resident and do not migrate (NMFS 2018). Year-round residents appear to be present along the west coast of Baja California, Mexico (Kenyon 1971). Foraging resources (krill, copepods, small schooling fish, crustaceans) are likely present in the Action Area. This species displays a preference for subtropical and tropical zones, inhabiting waters 16°C (60°F) or warmer) (Jefferson et al. 2008).
Balaenoptera musculus musculus	Blue whale	Endangered, MMPA	Worldwide, from sub-polar to sub-tropical latitudes; generally occurs more offshore than other whales (NMFS 2018a).	Low potential to occur. This species has been observed migrating and feeding through the Santa Barbara Channel on many occasions, with several occurrences within the Action Area (PBCS 2018). In general, this species migrates poleward to feed in the summer and to the tropics to breed in the winter (Jefferson et al. 2008). Most occurrences are north of Santa Rosa and western Santa Cruz Island along the 200 meter isobath (Cascadia 2011), approximately 7.4 miles east of the Action Area. In addition, foraging resources (predominantly krill) are likely present in the Action Area.
Balaenoptera physalus physalus	Fin whale	Endangered, MMPA	Worldwide, primarily in temperate to polar latitudes and less common in the tropics.	**Moderate** potential to occur. This species has been observed migrating and feeding through the Santa Barbara Channel on many occasions, with one occurrence (12

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
				individuals) noted within 1 mile of the Action Area in 2011 (PBCS 2018; Cascadia 2011). This species' distribution is not well known, but it generally migrates poleward to feed in the summer and to the subtropics to breed in the winter (Jefferson et al. 2008). Resources (krill, small schooling fish, squid) are likely present in the Action Area. This species is more commonly associated with the 200 meter isobath, which is approximately 7.4 miles from the Action Area (Cascadia 2011)
Berardius bairdii	Baird's beaked whale	MMPA	Throughout the North Pacific Ocean and adjacent seas. This species prefers deep, cold waters of 3,000 feet (nearly 1,000 meters) or greater and may occur near shore along narrow continental shelves. Beaked whales are deep divers that prefer submarine canyons, seamounts, and continental slopes (NMFS 2018a).	Low potential to occur. Migration and distribution are poorly known (Jefferson et al. 2008). Suitable foraging resources (e.g., deep water and bottom-dwelling crustaceans, cephalopods, gadiform fish; Jefferson et al. 2008) are not likely present in the Action Area. This species prefers deep waters that are not present within the Action Area. This species has been observed far south of the Channel Islands, and west of Point Conception (Baumann-Pickering et al. 2013).
Delphinus capensis capensis	Long-beaked common dolphin	MMPA	Coastal habitats; prefers shallower tropical, subtropical, and warmer temperate to cool waters closer to the coast (within 50-100 nautical miles (90-180 km)) and the continental shelf (NMFS 2018a).	**High** potential to occur. Foraging resources (small schooling fish and squid) are likely present in the Action Area. This species has been recorded multiple times and in great numbers (e.g., occurrences with 1,500 individuals) in the Santa Barbara Channel, including the Action Area (PBCS 2018). This species displays a habitat preference for coastal waters, sometimes coming close to shore within waters that are only a few meters deep (Jefferson et al. 2008).
Delphinus delphis delphis	Short-beaked common dolphin	MMPA	Warm tropical to cool temperate waters, primarily oceanic and offshore. Species also occurs along the continental slope in waters 650-6,500 feet (200-2,000 m) deep (NMFS 2018a).	**Moderate** potential to occur. Foraging resources (small schooling fish and squid) are likely present in the Action Area. This species has been recorded multiple times and in great numbers (e.g., occurrences with 1,500 individuals) in Santa Barbara Channel and adjacent to the Action Area (PBCS 2018). This species is often associated with areas of upwelling and areas of steep sea-bottom (Jefferson, Webber and Pitman 2008).
Eschrichtius robustus	Gray whale (Eastern North Pacific stock)	MMPA	Occurs in coastal waters along the west coast of North America from Mexico to Alaska and in eastern Siberia. Usually feeds along the Bering, Chukchi, and Beaufort seas during the summer, and winters along breeding and calving areas off the coast of	**High** potential to occur. This species is a frequent visitor to the Ventura coastline and Santa Barbara Channel and commonly observed during migration, especially during the northward migration from Baja to Alaska. This species is a bottom feeder (epibenthic fauna such as mysids, amphipods, polychaete tube worms) and so are restricted

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
			Baja California. Calves are born from January to February (NMFS 2018a). During their northward migration from Baja to Alaska, cow-calf pairs stay particularly close to shore to avoid predation by orcas (NMFS 2014). Bottom feeder that consumes benthic amphipods.	to shallow continental shelf waters (Jefferson et al. 2008). Gray whales are often observed close to shore and has multiple occurrences in the Action Area (PBCS 2018).
Eubalaena glacialis	North Pacific right whale	Endangered, MMPA	Pacific Ocean between 20°N and 60°N latitude, from temperate to subpolar waters. Primarily occurs in shelf or coastal waters (NMFS 2018a).	Low potential to occur. Distribution is not well known but they appear to have a northward migration in the spring and a southward migration in the fall. This species is extremely rare with likely less than 50 individuals in U.S. waters (MMC 2018) and a scattered distribution throughout its range (NMFS 2018a). Suitable foraging resources (zooplankton) may be present within the Action Area. The most recent and closest occurrences for this species include 2 possible individuals sighted near San Miguel Island (February 2015), 10 individuals off Monterey (May 2016, PBCS 2018), and 1 individual off La Jolla (April 2017, MMC 2018). This species is historically known to inhabit offshore waters in depths sometimes greater than 2,000 m (Jefferson, Webber and Pitman 2008).
Grampus griseus	Risso's dolphin	MMPA	Temperate, subtropical, and tropical waters generally greater than 3,300 feet (1,000 m) and seaward of the continental shelf and slopes (NMFS 2018a).	Low potential to occur. Suitable foraging resources (cephalopods and crustaceans) may be present within the Action Area. This species has been observed in the Santa Barbara Channel, with many occurrences located south and northwest of the Action Area (PBCS 2018). This species prefers deeper waters on the continental shelf and slope, between 30° and 45° latitude (Jefferson et al. 2008), and is unlikely to occur in the Action Area.
Globicephala macrorhynchus	Short-finned pilot whale	MMPA	Prefers warmer tropical and temperate waters, typically within waters of 1,000 feet or more deep (NMFS 2018a).	Not expected to occur. Once common around the Channel Islands, a strong El Nino in 1982-1983 brought changes to the ecosystem affecting prey and this species disappeared from the area (Jefferson et al. 2008). This species inhabits areas with a high density of squid, their preferred prey. The most recent documented sighting occurred in October 2014 off Dana Point, Orange County, CA (OC Register 2018). This species prefers deep waters and is unlikely to occur in the Action Area.
Kogia breviceps	Pygmy sperm whale	MMPA	Worldwide distribution. Prefers tropical, sub-tropical and temperate waters. Most	Not expected to occur. In addition, based on shipboard surveys from 1991 to 2014, this species has only been

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
			common along waters seaward of the continental shelf edge and slope. Mostly forages in mid- and deep-water environments (NMFS 2018a).	sighted a handful of times (including unidentified *Kogia* sp.) off the coast of Central and Southern California (NMFS 2017a). This species prefers deep waters (outer continental shelf and beyond) and therefore is unlikely to occur in the Action Area.
Kogia sima	Dwarf sperm whale	MMPA	Worldwide; prefers tropical, sub-tropical, and temperate waters. Most common along the continental shelf edge and slope (NMFS 2018a).	Not expected to occur. This species inhabits warmer waters in offshore areas, and there is no evidence of migrations. Dwarf sperm whales feed on deep-water cephalopods (Jefferson, Webber and Pitman 2008). Based on shipboard surveys from 1991 to 2014, *Kogia* sp. have only been sighted a handful of times off the coast of central and southern California (NMFS 2017b). This species prefers deep waters and is unlikely to occur in the Action Area.
Lagenorhynchus obliquidens	Pacific white-sided dolphin	MMPA	North Pacific Ocean; cool, temperate waters from the continental shelf to the deep open ocean (NMFS 2018a).	**Moderate** potential to occur. Exhibits seasonal inshore/offshore and north/south movements. Foraging habitat is present in the Action Area. This species feeds mostly on cephalopods and small schooling fish in deep offshore waters but also on the continental shelf (Jefferson, Webber and Pitman 2008). In addition, this species has numerous occurrences within the Santa Barbara Channel and a few occurrences in the Action Area (PBCS 2018).
Lissodelphis borealis	Northern right-whale dolphin	MMPA	Endemic to deep, cold temperate waters of the North Pacific Ocean from Baja California to the Gulf of Alaska; generally in waters over the continental shelf and slope colder than 66°F (NMFS 2018a).	Low potential to occur. Although foraging habitat (i.e., for market squid) is present in the Action Area, this species has several scattered observations within the Santa Barbara Channel and no known observations within the Action Area (PBCS 2018). Northern right-whale dolphins are an open ocean species and are known only to come nearshore where there are deep submarine canyons (Jefferson, Webber and Pitman 2008).
Mesoplodon densirostris	Blainville's beaked whale	MMPA	Worldwide in temperate and tropical waters; prefers deep waters (WDC 2018).	Not expected to occur. Blainville's beaked whale has the most extensive distribution of the genus and inhabits depths between 200 to 1,000 m (Jefferson, Webber and Pitman 2008), where squid are plentiful. This species prefers deep waters and is unlikely to occur in the Action Area.
Mesoplodon stejnegeri	Stejneger's beaked whale	MMPA	North Pacific Ocean; prefer cold temperate and subarctic waters; generally found in	Not expected to occur. Inhabiting the North Pacific basin, this species is primarily oceanic but also inhabits the continental slope. It feeds on deep-water squid (Jefferson,

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			deep, offshore waters from 2,500-5,000 feet deep (NMFS 2018a).	Webber and Pitman 2008). This species prefers deep waters and is unlikely to occur in the Action Area.
Megaptera novaeangliae	Humpback whale	Threatened (Mexico DPS) and Endangered (Central America DPS), MMPA	Worldwide distribution from the equator to sub-polar latitudes; feeding areas for the Mexico DPS occur off the coast of central California; Migrating individuals from the Central America DPS may migrate through the Action Area on their way to feeding grounds located off the Pacific Northwest (NMFS 2018a). This species stays near the surface of the ocean when migrating and prefers shallow waters when feeding and calving. This species can be seen close to shore when conditions allow for prey switching from krill to small schooling fish, which inhabit nearshore areas.	**Moderate to high** potential to occur. Foraging and migration habitat is present in the Action Area. Numerous observations of this species have been documented within the Santa Barbara Channel both close to shore and near the Channel Islands (PBCS 2018). In addition, this species is strongly associated with the 200 meter isobaths (Cascadia 2011).
Orcinus orca	Killer Whale (Southern Resident DPS – consisting of pods J, K, and L, Eastern North Pacific Transient Stock, and Eastern North Pacific Offshore Stock)	Endangered MMPA (all populations)	The Southern Resident DPS reside for part of the year in the inland waters of Washington State and British Columbia and have been known to travel to coastal sites as far south as central California (71 FR 69054-69070). Transient forms (Eastern North Pacific Transient Stock) of the species prefer coastal waters from Alaska through California, and offshore forms (Eastern North Pacific Offshore Stock) can be found from Mexico to Alaska (71 FR 69054-69070). In general, this species is most abundant in colder waters and high latitudes; fairly abundant in temperate waters; lower densities in tropical, subtropical, and offshore waters (NMFS 2018a, 70 FR 69903-69912).	Low potential to occur. Foraging resources (primarily fish) are present in the Action Area, which could be prey for offshore stocks that occasionally visit the area (feed primarily on sharks). Residents have only been observed as far south as Monterey Bay. However, transients (which prey on marine mammals) are more common in the Santa Barbara Channel, with more occurrences nearer to the islands than the shore (PBCS 2018).
Peponocephala electra	Melon-headed whale	MMPA	Primarily in deep waters throughout the tropical areas of the world (NMFS 2018a).	Not expected to occur. The Action Area is located outside of this species' known range. The closest habitat occurs in Baja. This species is rarely found nearshore. They feed on squid and small fish deep in the water column (Jefferson, Webber and Pitman 2008). This species prefers deep waters and is unlikely to occur in the Action Area.
Phoceonoides dalli	Dall's porpoise	MMPA	North Pacific open ocean, prefers temperate to boreal waters than are more than 600 feet	Low potential to occur. This species feeds on mid-water fish and squid in offshore waters, only using nearshore

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			(180 meters) in depth and temperatures between 36-63°F (NMFS 2018a).	waters if there are deep-water features such as canyons (Jefferson, Webber and Pitman 2008). Although there are many scattered observations of this species in the Santa Barbara Channel (predominantly north of Santa Cruz Island), the closest occurrences near the Action Area occurred in 2007 (PBCS 2018). This species prefers deep waters and unlikely to occur in the Action Area.
Phocoena phocoena	Harbor porpoise	MMPA	North temperate and subarctic coastal and offshore waters; commonly found in bays, estuaries, harbors, and fjords less than 650 feet deep. Along the North American coast, range from central California to the Beaufort Sea (NMFS 2018a).	Not expected to occur. The Action Area is located outside of this species' known range. The Action Area may have their preferred prey species (cephalopods and small schooling fish) but the southern range of the species extends only to Point Conception. A shallow-water species, they normally inhabit waters less than 100 m (Jefferson, Webber and Pitman 2008). In addition, the closest incidental observation of the species were located along the Gaviota coast in 1992 (PBCS 2018).
Physeter catodon (=microcephalus)	Sperm whale	Endangered, MMPA	Worldwide; prefer deep waters and consumes deep water species (e.g., squid, sharks, skates, and fish) (NMFS 2018a)	Not expected to occur. A somewhat migratory species, sperm whales inhabit continental slope and oceanic waters with steep drop-offs where they prey on cephalopods (Jefferson, Webber and Pitman 2008). Although a few incidental observations of this species has occurred in the Santa Barbara Channel (dated 2002, 2004, and 2016; PBCS 2018), this species prefers deep waters and is unlikely to occur in the Action Area.
Pseudorca crassidens	False killer whale	MMPA	Ranges in the U.S. in Hawaii, along the west coast, and mid-Atlantic coast. Prefer tropical to temperate waters deeper than 3,300 feet (1,000 meters) (NMFS 2018a).	Not expected to occur. False killer whales are found in deep, offshore waters, and sometimes occur on the continental shelf (Jefferson, Webber and Pitman 2008). They feed on cephalopods and fish which are present in the Channel. However, this species prefers deep waters and is unlikely to occur in the Action Area.
Stenella coeruleoalba	Striped dolphin	MMPA	Mainly found seaward of the continental shelf from 50°N to 40°S latitude. Prefer highly productive tropical to warm temperate waters (52-84°F) that are oceanic and deep; often occurs in areas of upwelling and convergence zones (NMFS 2018a).	Not expected to occur. Primarily a warm water species that can be associated with convergence zones. They feed on fish in pelagic zones, along the continental slope or oceanic regions (Jefferson, Webber and Pitman 2008). This species prefers open oceans, has been recorded west of the Channel Islands (NMFS 2017c), and is unlikely to occur in the Action Area.
Steno bredanensis	Rough-toothed dolphin	MMPA	Worldwide; found primarily in deep waters throughout tropical and warmer temperate areas. Two recognized stock occur in Hawaii and Northern Gulf of Mexico (NMFS	Not expected to occur. This warm open ocean species rarely ranges north of 40° N (Jefferson, Webber and

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
			2018a). May be a specialist feeder on mahi mahi (*Coryphaena hippurus*).	Pitman 2008). Suitable deep water habitats are absent in the Action Area.
Tursiops truncatus	Common bottlenose dolphin	MMPA	Worldwide ranging from 45°N to 45°S latitude; found in temperate and tropical waters. Coastal populations migrate into bays, estuaries, and river mouths. Offshore populations inhabit pelagic waters along the continental shelf.	**High** potential to occur. A common coastal species and a generalist feeder (Jefferson, Webber and Pitman 2008). This species has many occurrences throughout the Santa Barbara Channel and within or directly adjacent to the Action Area (PBCS 2018). This species is also known to regularly occur within 1 kilometer of shore (Carretta et al. 1998).
Ziphius cavirostris	Cuvier's beaked whale	MMPA	Worldwide in temperate, subtropical, and tropical waters; prefer deep pelagic waters (typically 3,300 feet or deeper along the continental slope and edge or deep geologic features)(NMFS 2018a).	Not expected to occur. This widely distributed species is found in offshore waters, especially deep waters near the continental slope, necessary for catching deep-sea squid.(Jefferson, Webber and Pitman 2008). This species prefers deep waters and unlikely to occur in the Action Area.
Mustelids				
Enhydra lutris nereis	Southern sea otter	Threatened, MMPA	North Pacific Ocean; occurs in only two areas of California: the mainland coastline from San Mateo County to Santa Barbara County, and San Nicholas Island, Ventura County (USFWS 2015).	Low potential to occur. One of four disjunct remnant populations, the central/southern California population sea otters are found in shallow, nearshore waters along the coast (Jefferson, Webber and Pitman 2008). This species known range is both north and south of the Action Area and this species usually occurs within 2 kilometers (1.2 miles) of shore (USFWS 2015). However, it is possible that foraging/travelling individuals may traverse the Action Area.
Pinnipeds				
Arctocephalus philippii townsedii	Guadalupe fur seal	Threatened, MMPA	Tropical waters of the Southern California/Mexico region. This non-migratory species breeds along rocky coastal habitats and associated caves (NMFS 2018a).	Low potential to occur. This species has known haulouts and breeding colonies (rookeries) along the Channel Islands, San Miguel Island (CDFW 2009), and Guadalupe Island, Mexico (where most of the known rookeries are located)(NMFS 2018a). This species travels great distances to foraging areas for lanternfish and squid and therefore may traverse and/or forage in the Action Area. They are highly pelagic species and foraging areas are not well known. They prefer far offshore to deep oceanic areas for feeding (Jefferson, Webber and Pitman 2008).
Callorhinus ursinus	Northern fur seal	MMPA (Depleted – Eastern Pacific Stock)	Open ocean for foraging and rocky beaches for reproduction. Haul out habitat may include rocky or sandy beaches (NMFS 2018a).	Low potential to occur. Northern fur seals migrate from the Bering Sea southward to the North Pacific to feed in the winter. This species is known to haulout and breed at San Miguel Island (NMFS 2018a, CDFW 2009). This

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				species has the potential to forage on fish and squid in the Action Area, however, they are one of the most pelagic pinnipeds and their foraging is usually offshore at the edge of the continental shelf and slope (Jefferson, Webber and Pitman 2008).
Eumetopias jubatus	Steller sea lion	Endangered (Western DPS) and Delisted due to Recovery (Eastern DPS), MMPA	North Pacific Ocean, mainly around coasts to outer continental shelf and slope. Prefer cold temperate to sub-arctic waters. Haul-outs and rookeries usually on beaches, ledges, and rocky reefs (NMFS 2018a).	Low potential to occur. On the west coast of North America, Steller sea lions range from the Aleutian Islands to Central California (formally southern California). This species is rarely seen south of Monterey Bay (Jefferson, Webber and Pitman 2008). Although foraging resources (fishes and cephalopods) are present in the Action Area, the closest known rookery is located at Año Nuevo Island off the coast of central California (Allen and Angliss 2014).
Mirounga augustirostris	Northern elephant seal	MMPA	Eastern and central North Pacific Ocean most of the year (9 months); prefer sandy beaches when on land. Range from Alaska to Mexico and typically breed in the Channel Islands or Baja California (NMFS 2018a).	Low potential to occur. This species migrates to and from their rookeries twice a year. Rookeries range from Baja to northern California (Jefferson, Webber and Pitman 2008). In addition, this species is known to haulout and breed at the Channel Islands (NMFS 2018a, Lowry et al. 2014, CDFW 2009). This species is a deep diver (300-800 meters) and prefers to forage in deeper pelagic waters, often with seamounts and other underwater features (Jefferson, Webber and Pitman 2008). Foraging resources (e.g., squid, fishes) are present in the Action Area. However, when present at the Channel Islands, they are spending their time molting. Their preferred foraging areas are north of the islands.
Phoca vitulina	Pacific harbor seal	MMPA	Generally non-migratory. On the U.S. west coast this species is found in coastal and estuarine waters from Canada to Baja California, Mexico. Temperate coastal habitats and uses rocks, reefs, beaches, and drifting glacial ice for hauling out and pupping sites (NMFS 2018a).	**High** potential to occur. This species is non-migratory and inhabits the coast to the continental slope (Jefferson, Webber and Pitman 2008). Harbor seals have known haulouts and rookeries at Rincon Point (Santa Barbara County) and Point Mugu (Ventura County); and haulouts from Point Conception to Santa Barbara and along all of the Channel Islands (CDFW 2009). Diving averages less than 35 meters and they are generalist feeders (Jefferson, Webber and Pitman 2008).
Zalophus californianus	California sea lion	MMPA	Eastern North Pacific Ocean from central Mexico to Canada; shallow coastal and estuarine waters; prefers sandy beaches for haul out sites but will also haul out on	**High** potential to occur. This species is present along the west coast from Puerto Vallarta to Alaska. Males (adult, subadult and juveniles) undertake a northward migration to Central California and Washington after the breeding season in southern rookeries are generalist feeders

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			marina docks, jetties, and buoys (NMFS 2018a).	(Jefferson, Webber and Pitman 2008).This species has known haulouts along all of the Channel Islands and rookeries at San Nicholas Island (CDFW 2009, NMFS 2018a). California sea lions are generalist opportunistic feeders and utilize the continental shelf and slope, but have also been observed in deeper oceanic waters (Jefferson, Webber and Pitman 2008).
Birds				
Brachyramphus marmoratus (nesting)	Marbled murrelet	Threatened	Breeds along the coast from Santa Cruz County north to Alaska. Nests in old-growth coastal forests, sea-facing talus slopes, or cliffs (Nelson 1997). During migration and winter (mostly July to February), occurs from Baja California to Alaska during the non-breeding season, in nearshore and protected coastal waters. Usually feeds nearshore within 5 kilometers (3 miles) and in waters less than 60 meters (197 feet) deep. Dives and pursues prey (opportunistic feeder) by flying underwater. This species is opportunistic and feeds on fish, crustaceans, and squid (Nelson 1997).	Low potential to feed. Suitable foraging habitat is present within the Action Area. However, while this species occurs regularly north of Point Conception, it occurs far less frequently farther south (CLO 2018, Lehman 2018, Garrett and Dunn 1991). In addition, the Action Area is located 3 miles off the coast of Ventura County, at the very edge of where this species potentially occurs. Not expected to nest. The Action Area occurs in open water, and nesting habitat is absent.
Phoebastria albatrus	Short-tailed albatross	Endangered	Nests on several isolated islands of the northwestern Pacific, but travels over much of the northern Pacific to forage in open waters for squid, fish, fish eggs, shrimp, and crustaceans.	Very low potential to forage. This species forages widely throughout the North Pacific Ocean and Bering Sea (USFWS 2018e). The global population is extremely low (approximately 1,200 individuals), and this species is an extremely rare visitor to offshore waters along the California coast, with only 43 records in the state since the 1970s (USFWS 2018e, CBRC 2018). The majority of occurrences are from north of Point Conception, but several have been observed farther south, with the nearest reports being of 1 subadult at Prisoner's Harbor, Santa Cruz Island, in July 2005, and 1 subadult at Santa Barbara Island in February and March 2002 (CBRC 2018). Not expected to nest. The Action Area occurs in open water, so nesting habitat is absent.
Sternula antillarum browni (nesting colony)	California least tern	Endangered	Breeding range extends from the San Francisco Bay Area south to Baja California, Mexico, including nesting colonies in coastal Santa Barbara and Ventura counties. May	Low potential to forage. The site is farther from shore and in deeper water than where this species prefers to forage.

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			migrate coastally or over open water. Forages in shallow estuaries and lagoons. During the nesting season, foraging primarily takes places within 2 miles of shore and in waters less than 60 feet deep (USFWS 2006). Nests on sandy beaches or exposed tidal flats.	Individuals may occasionally pass through the Action Area during migration. Not expected to nest. The Action Area is in open water, and nesting habitat is absent.
Sea Turtles[3]				
Caretta caretta	Loggerhead sea turtle (North Pacific Ocean DPS)	Endangered	Occurs in tropical to temperate waters in the Pacific Ocean. Nesting in the Pacific basin occurs along Japan and Australia, where it nests on ocean beaches, usually with high energy, narrow, steeply slopes, and coarse-grain sand. Migrates from nesting grounds in Japan and Australia to feeding grounds located along the west coast from central to north America. Baja California has the largest known aggregations of loggerhead sea turtles. Migrates along nearshore coastal waters (neritic zone). Typically feeds on benthic invertebrates in hard bottom habitats, although fish and plants are occasionally consumed (NMFS and USFWS 1998a).	**High** potential to feed and migrate. During ideal conditions (water temp/break), this species is known to migrate along the coast of California including the Santa Barbara Channel. Although there is no suitable feeding habitat (hard bottoms, benthic invertebrates) within the Action Area, during migration they may enter the Action Area. Sightings of this species along the U.S. west coast typically are of juveniles measuring 20-60 centimeter shell length (NMFS and USFWS 1998a). This species has also been observed at San Clemente Island (NMFS and USFWS 2007). This species has stranded on Ventura beaches in 2014 and 2017 (Dan Lawson, NMFS Protected Resources Division, 2018, pers. comm.). Not expected to nest. Nesting occurs mainly on open beaches or along narrow bays having suitable sand, and often in association with other species of sea turtles. No beach habitat is present in the Action Area and the Santa Barbara Channel is outside of nesting range. There are no known nesting habitats that occur along the western seaboard of the U.S. or Hawaii (NMFS and USFWS 1998a). The closest known loggerhead nesting beaches in the North Pacific Ocean are located in Japan (NMFS and USFWS 2007).
Chelonia mydas	Green sea turtle (East Pacific DPS)	Threatened	Eastern Pacific Ocean range. This species forages in the open ocean as well as shallow waters of lagoons, bays, estuaries, mangroves, eelgrass, and seaweed beds	**High** potential to occur. Green sea turtles are generally found in shallow waters except when migrating. They have been observed at Sterns Wharf in Santa Barbara harbor and at the Channel Islands. This species may migrate and/or forage in the Action Area. A regular visitor in the waters off the southwest coast of the US. Residents occur in the San Gabriel River, Long Beach (NMFS and USFWS 1998b). This species has stranded on

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				Santa Barbara and Ventura beaches in 2014, 2015 and 2017 (Dan Lawson, NMFS Protected Resources Division, 2018, pers. comm.). Not expected to nest. This species requires open beaches with a sloping platform and minimal disturbance for nesting. The closest known nesting occurrences are in Mexico (NMFS and USFWS 1998b).
Dermochelys coriacea	Leatherback sea turtle (Western Pacific Population)	Endangered	Pacific Ocean pelagic marine waters; foraging habitat unknown. This population migrates from their nesting grounds in the Indo-Pacific to feeding areas off the Pacific coast of North America.	Not expected to occur. This species migrates to the west coast of North America to forage on jellyfish, salps and pyrosomes. They utilize both open ocean and coastal habitats. Despite the Channel Islands area not being within the Final Critical Designated Habitat for Leatherback sea turtles, this species could nonetheless migrate and/or forage in the Action Area. This species has been observed in Monterey Bay (NMFS and USFWS 1998c). Not expected to nest. Nesting for the Western Pacific Population occurs in Indonesia. Their preferred nesting beaches are typically on continent shores and have unobstructed, often deep offshore access (NMFS and USFWS 1998c).
Eretmochelys imbricata	Hawksbill sea turtle	Endangered	Circumtropical oceans (generally 30°N to 30°S latitude), including the Pacific Ocean pelagic marine waters	Not expected to occur. This species is rare to nonexistent in most localities (NMFS and USFWS 1998d) but may migrate and/or forage (specialist sponge carnivore) in Action Area. However, the Action Area is a sandy bottom habitat, and this species is typically found feeding in the vicinity of rock or reef habitats in shallow tropical waters. No sighting have been documented in recent history (NMFS and USFWS 1998d). Not expected to nest. Hawksbill sea turtles nest high up on the beach under/in dune vegetation, commonly in pocket beaches without a lot of sand. The largest remaining concentrations of nesting hawksbills occur on remote oceanic islands of Australia and the Indian Ocean. Other known nesting sites include Hawaii. American Samoa, Guam, Republic of Palau, Commonwealth of the Northern Mariana Islands, Republic of the Marshall

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				Islands, and the Federated States of Micronesia (NMFS and USFWS 1998d).
Lepidochelys olivacea	Olive Ridley sea turtle	Threatened[4]	Pacific Ocean pelagic marine waters; foraging habitat unknown (NMFS and USFWS 1998d).	**Moderate** potential to occur. This species distribution ranges from Southern California to Northern Chile. Olive Ridley sea turtles are mostly pelagic but will also inhabit coastal areas. This species feeds on algae, lobster, crabs, tunicates, mollusks, shrimp, and fish. Olive Ridley sea turtles may migrate and/or forage in the Action Area. This species has been observed in the Los Angeles Harbor (NMFS and USFWS 1998e). This species has stranded on Santa Barbara County beaches in 2014 and 2015 (Dan Lawson, NMFS Protected Resources Division, 2018, pers. comm.). Not expected to nest. In the eastern Pacific, the largest nesting concentrations occur in southern Mexico and northern Costa Rica, with some nesting as far north as southern Baja California. This species nests on continental margins, and exhibits an unusual nesting habit called "arribada" whereby up to thousands of turtles come ashore at the same time to nest.
Sharks/Rays				
Carcharhinus longimanus	Oceanic whitetip shark	Threatened	Worldwide, in tropical and sub-tropical waters and found up to 30°N and 30°S latitude (USFWS 2018c). This species is pelagic, mostly offshore in open ocean or along the continental shelf. They are opportunistic feeders and top predators, and prefer fish and cephalopods (NMFS 2018a).	Not expected to occur. Action Area is outside of this species known range.
Cetorhinus maximus	Basking shark	NMFS Species of Concern	Inhabits tropical and arctic waters but most commonly observed in coastal temperate waters. This species is a filter feeder, forages at the surface, and consumes zooplankton (NMFS 2018b).	Low potential to occur. This species is not common, and has had a dramatic decline since the mid-1900's from fishing and the eastern Pacific population has not rebounded (NMFS 2018b). The Action Area is located at the southernmost extent of their range.
Manta birostris	Giant manta ray	Threatened	Inhabits temperate, subtropical and temperate waters, utilizing all habitats: offshore, oceanic and coastal areas.. This species feeds mainly on zooplankton and can be found diving to depths of 10 – 1,000 meters (NMFS 2018a).	Low potential to occur. Manta rays can be found in temperatures as low as 19°C (66.2°F). Santa Barbara Channel waters are not normally warm enough for this species. Last year in Ventura waters, only the month of August was warm enough for this species (NOAA 2018d).

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Fish				
Acipenser medirostris	Green Sturgeon (southern DPS)	Threatened, NMFS Species of Concern	Ranges from Alaska to Mexico and spawns in the Rogue River, Klamath River Basin and the Sacramento River. Spawns in deep pools in large, turbulent, freshwater rivers; adults live in oceanic waters, bays, and estuaries, feeding on benthic invertebrates (NMFS 2015a).	Low potential to occur. Adults may migrate and/or forage in the project vicinity. There is very little data on green sturgeon use from Monterey south to the Mexican border. The area may be used minimally by the southern DPS (NOAA 2009).
Catostomus santaanae	Santa Ana Sucker	Threatened	Small, shallow, cool, clear streams less than 7 meters (23 feet) in width and a few centimeters to more than a meter (1.5 inches to more than 3 feet) in depth; substrates are generally coarse gravel, rubble, and boulder (USFWS 2011)	Not expected to occur. Habitat is unsuitable for this species. This species inhabits freshwater streams only.
Gadus microcephalus	Pacific cod (Salish Sea Population)	NMFS Species of Concern	This specific population inhabits Puget Sound, the Strait of Juan de Fuca and the Strait of Georgia. They feed on krill, shrimp, sand lance and crabs. They are often found over sandy bottoms and eelgrass may play a role in habitat selection (NMFS 2011a).	Not expected to occur. Although the Action Area is a sandy bottom substrate, no eelgrass is present at these depths. The Action Area not within the species known range.
Eucyclogobius newberryi	Tidewater goby	Endangered	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County, to the mouth of the Smith River (USFWS 2005).	Not expected to occur. Unsuitable habitat for tidewater goby, as they are a freshwater and brackish water species Rincon Creek, Santa Clara River and Ventura River are the closest known locations of this species to the Action Area.
Merluccius productus	Pacific hake (Georgia Basin DPS)	NMFS Species of Concern	The Georgia Basin DPS includes three stocks: the highly migratory stock that ranges from southern California to Queen Charlotte Sound, a central-south Puget Sound Stock and a Strait of Georgia stock (NMFS 2009a).	Not expected to occur. The highly migratory stock range includes southern California waters were the Action Area is located. The highly migratory stock spawns in the winter in California and migrates northward to feed as far north as Vancouver Island in the summer and spring. They are found at moderate depths of up to 3,000 feet (910 meters) (NMFS 2009a).
Oncorhynchus keta	Chum salmon	Threatened	Inhabits the lowermost reaches of rivers and streams, open ocean for anadromous form. Historical distribution included as far south as Monterey, however presently major spawning populations are found only as far south as Tillamook Bay, Oregon (NMFS 2017d).	Not expected to occur. The Action Area not within the species' known range.

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Oncorhynchus kisutch	Coho salmon (Puget Sound/Strait of Georgia ESU)	NMFS Species of Concern	Inhabits streams and freshwater tributaries with gravel substrates, open ocean for anadromous form. This species distribution is from central California to Alaska (NMFS 2016a).	Not expected to occur. The Action Area not within the species' known range.
Oncorhynchus mykiss	Steelhead trout-Oregon Coast ESU	NMFS Species of Concern	Ranges from Asia, through Alaska and south to Southern California. This is a coastal species (NMFS 2008).	Not expected to occur. Oceanic range is unknown. However, spawning rivers only occur in rovers basins on the coast of Oregon from the Columbia River south to Cape Blanco (NMFS 2008).
Oncorhynchus mykiss irideus	Southern steelhead-Southern California DPS	NMFS Species of Concern	This DPS includes watersheds from the Santa Maria River to the U.S. Mexican border, coast and inland habitats. Clean, clear, cool, well-oxygenated streams; needs relatively deep pools in migration and gravelly substrate to spawn, open ocean for anadromous form (NMFS 2016b).	Low potential to occur. Adults may migrate and/or forage in project vicinity Steelhead were observed in 2017 occupying the Ventura River (A. Dransfield, pers. comm.).
Oncorhynchus nerka	Sockeye salmon (Snake River ESU and Ozette Lake ESU)	Endangered (Snake River) and Threatened (Ozette Lake)	In the U.S., these populations occur in Oregon and Washington, and critical habitat is designated for this species in Snake River and Ozette Lake. This species inhabits riverine, marine and lake environments (lakes are a requirement), and feed on aquatic insects and plankton (NMFS 2015b).	Not expected to occur. The Action Area is outside of species range.
Oncorhynchus tshawytscha	Chinook salmon (Central Valley Fall, Late-fall run ESU)	NMFS Species of Concern	In the U.S., Chinook salmon ranges from Alaska to California. This ESU spawns in the Sacramento River and San Joaquin River. Chinook salmon require deeper and larger freshwater streams than other salmonids; open ocean for anadromous form. They range from Alaska to Southern California, and feed on aquatic insects, amphipods, crustaceans, and, once they are large enough, fish (NMFS 2010).	Not expected to occur. The Action Area not within the species' known range.
Sebastes levis	Cowcod	NMFS Species of Concern	The species ranges from central Oregon to central Baja California and Guadalupe Island, Mexico. Inhabits deep shelf and upper continental slope, inhabiting depths of 65 to 1,600 feet (20 to 500 meters) in rocky areas, and feeds on squid, octopus and other fish (NMFS 2009b).	Low potential to occur Unsuitable habitat for cowcod, individuals may migrate through the area. Southern California has been recognized as the center of distribution of the species since the 1880s (Eigenmann and Beeson 1894).

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
Sebastes paucispinus	Bocaccio (Southern DPS)	NMFS Species of Concern	Ranges from Baja California to Alaska; most common between 160-820 feet in depth, but found up to 1,560 feet in depth. This species feeds on other fish species (mainly other rockfish) (NMFS 2007b).	Not expected to occur. This species prefers deep waters and is unlikely to occur in the Action Area.
Sebastes ruberrimus	Yelloweye rockfish	Threatened	Yelloweye rockfish range from northern Baja California to Alaska. This species is associated with rocky reefs, kelp canopies, and artificial structures like oil platforms. Adults prefer deeper waters and rocky bottoms. This species is commonly found in depths of 300 to 590 feet (91 to 180 meters)(NMFS 2017e).	Not expected to occur. This species prefers deep waters, is more common from Central California northward, and is unlikely to occur in the Action Area.
Sphyrna lewini	Scalloped hammerhead shark	Threatened	In the east Pacific, scalloped hammerhead sharks range from southern California to Ecuador. Inhabits coastal warm temperate and tropical seas, ranging from intertidal to depths of up to 1000 meters. Adults are common at seamounts (Miller et al. 2013).	Low potential to occur Adults may migrate and/or forage in the project vicinity.
Thaleichthys pacificus	Pacific eulachon (Southern DPS)	Threatened	Ranges from Northern California to Alaska and into the southeastern Bering Sea. Critical habitat is designated for the Southern DPS in northern California in Mad River, Redwood Creek and Klamath River. Anadromous fish, endemic to northeastern Pacific Ocean. In the US, most euchalon production originates in the Columbia River Basin (NMFS 2011b).	Not expected to occur. The Action Area is outside of this species' known range. No records at the Channel Islands, Critical habitat extends as far south as the Mad River, Northern California (NMFS 2011b).
Invertebrates				
Haliotis corrugate	Pink abalone	NMFS Species of Concern	Ranges from Point Conception to Baja California. This species required sheltered waters with depths from 20 to 118 feet (6 - 36 m) (NMFS 2007c).	Not expected to occur. Suitable habitat not present. Very low population numbers.
Haliotis cracherodii	Black abalone	Endangered	This species feeds predominantly on kelp and inhabits rocky, low intertidal zones up to 6 meters deep (NMFS 2009c) Their range extends from Point Area in Mendocino County to Northern Baja California.	Not expected to occur. Suitable habitat not present. Very low population numbers. The nearest critical habitat to the Action Area is at Anacapa Island (NMFS 2011c).
Haliotis fulgens	Green abalone	NMFS Species of Concern	Ranges from Point Conception to Baja California. This species is found in rock crevices in shallow water on exposed coast	Not expected to occur. Suitable habitat not present. Very low population numbers.

Scientific Name	Common Name	Federal Status[1]	Distribution and Primary Habitat Associations	Potential to Occur
			from the low intertidal to depths of 60 feet (18 m) (NMFS 2009d).	
Haliotis kamtschatkana	Pinto abalone	NMFS Species of Concern	Ranges from Sitka, Alaska to Point Conception. This species is usually found in the tidal zone up to 30 feet but can be at depths of up to 330 feet. Pinto Abalone are associated with kelp beds in exposed areas (NMFS 2014).	Not expected to occur. Suitable habitat not present. Very low population numbers. The Action Area is not within this species known range.
Haliotis sorenseni	White abalone	Endangered	Open low- or high-relief rock or bolder areas interspersed with sand channels. This species inhabits rocky pinnacles and deep reefs in Southern California; especially those off the Channel Islands (Hobday and Tegner 2000).	Not expected to occur. Suitable habitat not present. Observed along the coastline in Santa Barbara County and the Channel Islands. They usually occur at depths of 20-60 meters and to be most abundant between 25-30 meters (80-100 feet)(Hobday and Tegner 2000).

Notes:

[1] **Federal Status:** MMPA = Marine Mammal Protection Act (50 CFR Part 216); Depleted species population stock is below optimum sustainable populations; NMFS Species of Concern = National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) Species of Concern (not federally listed or protected under the Endangered Species Act).

[2] The best potential to occur assessment has been provided given the paucity of information available for marine mammals, especially whales. Low potentials to occur do not negate the possibility of a given whale species occurring in the Action Area.

[3] Sea turtles are highly migratory and much of their geographic range and/or foraging habitat in the Pacific Ocean is unknown (e.g., see NMFS and USFWS 1998a)

[4] Endangered status provided to the breeding colony populations on the Pacific Coast of Mexico.

Appendix C

Sediment and Water Quality Management Plan for the Ventura Shellfish Enterprise Project*

* Any revisions to the management plans will be updated after receiving comments from relevant regulatory agencies.

ATTACHMENT 1

SEDIMENT AND WATER QUALITY MANAGEMENT PLAN

FOR THE VENTURA SHELLFISH ENTERPRISE PROJECT

PREPARED FOR:

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PREPARED BY:

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AUGUST 2019

ATTACHMENT 1

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
BA	Biological Assessment
BEI	Benthic Enrichment Index
CASS	Coastal Aquaculture Siting Analysis and Sustainability Analysis
CCC	California Coastal Commission
CDP	Coastal Development Permit
CDPH	California Department of Public Health
COC	Chain of Custody
DO	Dissolved Oxygen
EFH	Essential Fish Habitat
ESA	Endangered Species Act
HAPC	Habitat Area of Particular Concern
LOE	Lines of Evidence
MLOE	Multiple Lines of Evidence
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
ORP	Oxidation Reduction Potential
PAHS	Polycyclic Aromatic Hydrocarbons
PCBS	Polychlorinated Biphenyls
POM	Percent Organic Matter
QA	Quality Assurance
QC	Quality Control
ROV	Remote Operated Vehicle
SCAMIT	Southern California Association of Marine Invertebrate Taxonomists
SCB	Southern California Bight
SCUBA	Self-Contained Underwater Breathing Apparatus
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
USACE	United States Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VPD	Ventura Port District
VSE	Ventura Shellfish Enterprise

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1 INTRODUCTION

This Sediment and Water Quality Management Plan has been prepared for the Ventura Port District (VPD, project applicant). The project, supported in part through the NOAA 2015 and 2018 Sea Grant Aquaculture Extension and Technology Transfer to California Sea Grant (NOAA Sea Grant Program), will establish a commercial offshore aquaculture operation based from the Ventura Harbor in Ventura, California, focused on the cultivation of Mediterranean mussels (*Mytilus galloprovincialis*). This Sediment and Water Quality Management Plan presents the methodology and analysis for determining project effects of the marine environment during build-out and operation of the mussel farm.

1.1 Project Location

The project's twenty 100-acre plots are approximately 3.53 miles from the shore (Figure 1). The closest distance from the growing area to the City of Ventura city limit is 4.5 miles. Ventura Harbor is 4.1 miles from the closest plot (8 miles from the most distant plot). The sites are located on sandy bottom habitat outside of any rocky reef habitat, as evaluated in Gentry et al. 2017 and illustrated by NOAA United States West Coast nautical charts (NOAA 2017).

The project site is situated within the northern portion of the Southern California Bight (SCB), which stretches along the curved coastline of Southern California from Point Conception south to Cape Colnett in Baja California and includes the Channel Islands and the Pacific Ocean. The habitats and biological communities of the SCB are influenced by dynamic relationships among climate, ecology, and oceanography (e.g., currents) (Leet et al. 2001). The SCB provides essential nutrients and marine habitats for a range of species and organisms. Submarine canyons, ridges, basins, and seamounts provide unique deep water habitats within the region. The basins provide habitats for a significant number of mid-water and benthic deep-sea fish near the Channel Islands, whereas nearshore areas provide habitats for kelp and seagrass communities. The project site is characterized by a gradually sloping sandy/soft bottom habitat. This particular habitat type and location was intentionally selected through rigorous analysis with multiple stakeholders to avoid sensitive resources such as rocky reef, a Habitat Area of Particular Concern (HAPC) and Essential Fish Habitat (EFH). The site selection process is described in detail in the BA and EFH analysis (Dudek 2018a,b), as well as the Coastal Aquaculture Siting Analysis and Sustainability Analysis (CASS) Report (NOAA 2018).

1.2 Project Description

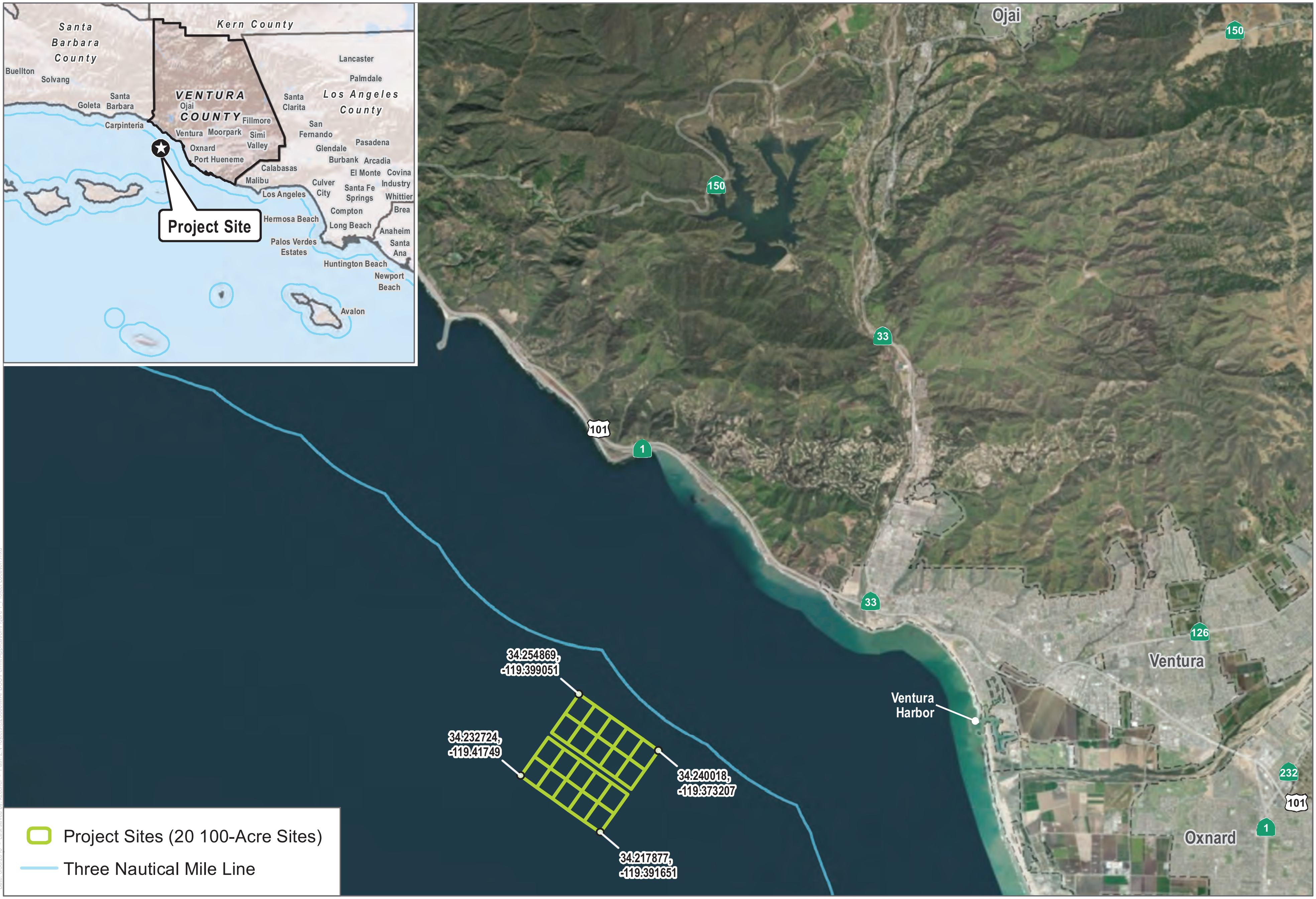
The project consists of twenty 100-acre plots (total of 2,000 acres) located in open federal waters of the Santa Barbara Channel (Channel) in the SCB, northwest of Ventura Harbor, with approximate depths at the project site ranging from 80 to 114 feet below sea level, with an average depth of 98 feet. The plot locations are shown in Figure 1, with latitude and longitude coordinates for the outer corners indicated. Each of the 20 plots are 2,299.5 feet by 1,899.5 feet, for an average plot size of 100.27 acres. Each plot will contain up to 24 horizontal lines (12 end-to-end pairs), with each line consisting of 575 feet of backbone length and 250 feet of horizontal scope on each end (Figure 2).

There will be a 50 foot setback on each end of the pairs (for a total of 100 feet of spacing between lines of adjacent parcels) and 50 foot spacing between the two center pins. Parallel lines will be spaced 150 feet apart, with a 125 foot setback at each of the long sides (for a total of 250 feet of spacing between lines of adjacent parcels). The mussels will be grown and harvested by grower/producers who would sub-permit the plots from Ventura Port District (VPD), and the mussel product will be landed at Ventura Harbor.

Buoys marking the corners of each parcel will identify the cultivation area for navigational safety and will comply with all regulations for height, illumination, and visibility, including radar reflection. As shown in Figure 2, permanent surface buoys for each longline will consist of two 16-inch surface corner buoys (one corner buoy supporting and marking either end of the backbone), as well as one 16-inch buoy supporting and marking the center pickup line, for a total of three surface buoys per longline. Simulated views of parcel arrays at the surface and underwater are provided in Figures 3 through 6. All surface buoys will be marked with the grower/producer name and phone number. Buoys attached to the central horizontal portion of the backbone line support the line, provide a means of lifting the backbone line to access the cultivation ropes, and determine the depth of the submerged backbone, which will vary seasonally from 15 to 45 feet below the surface. Additionally, a combination of surface and submerged buoys attached to the backbone line will be used during the mussel production cycle to maintain tension on the structural backbone line as the weight of the mussel crop increases. These will consist of 24-inch (or equivalent, with greater than 200 L buoyancy) buoys attached at required intervals along the surface and connecting to the backbone line, in combination with smaller submerged buoys affixed directly to the backbone line. The combination of surface and submerged buoyancy is designed to create a tensioned but flexible structure that is capable of responding dynamically to surface waves and storms.

The longline configuration produces a fairly rigid tensioned structure from which the cultivation ropes, or "fuzzy ropes" are attached. Fuzzy ropes are characterized by extra filaments that provide settlement substrate for mussels to attach. Fuzzy ropes may be attached to and suspended from the backbone rope either as individual lengths or as a continuous looping single length that drapes up and down over the backbone. The length of each section or loop of fuzzy rope will be approximately 20 feet but the actual length depends on the lifting capacity of the servicing vessel. The length of the central horizontal section of backbone line will be approximately 575 feet, which will support approximately 8,000 feet of fuzzy cultivation line. Given a water depth of 100 feet, the distance from the surface to the backbone would be 20 feet, and the height from the seafloor to the backbone would be 80 feet. Given the length of the fuzzy ropes are 20 feet long, the distance from the end of the fuzzy ropes to the sea floor will be approximately 60 feet.

ATTACHMENT 1



SOURCE: NAIP 2016
DATE OF PREPARATION: 8/30/2018

DUDEK

0 6,250 12,500 Feet

FIGURE 1
Project Location
Ventura Shellfish Enterprise Project

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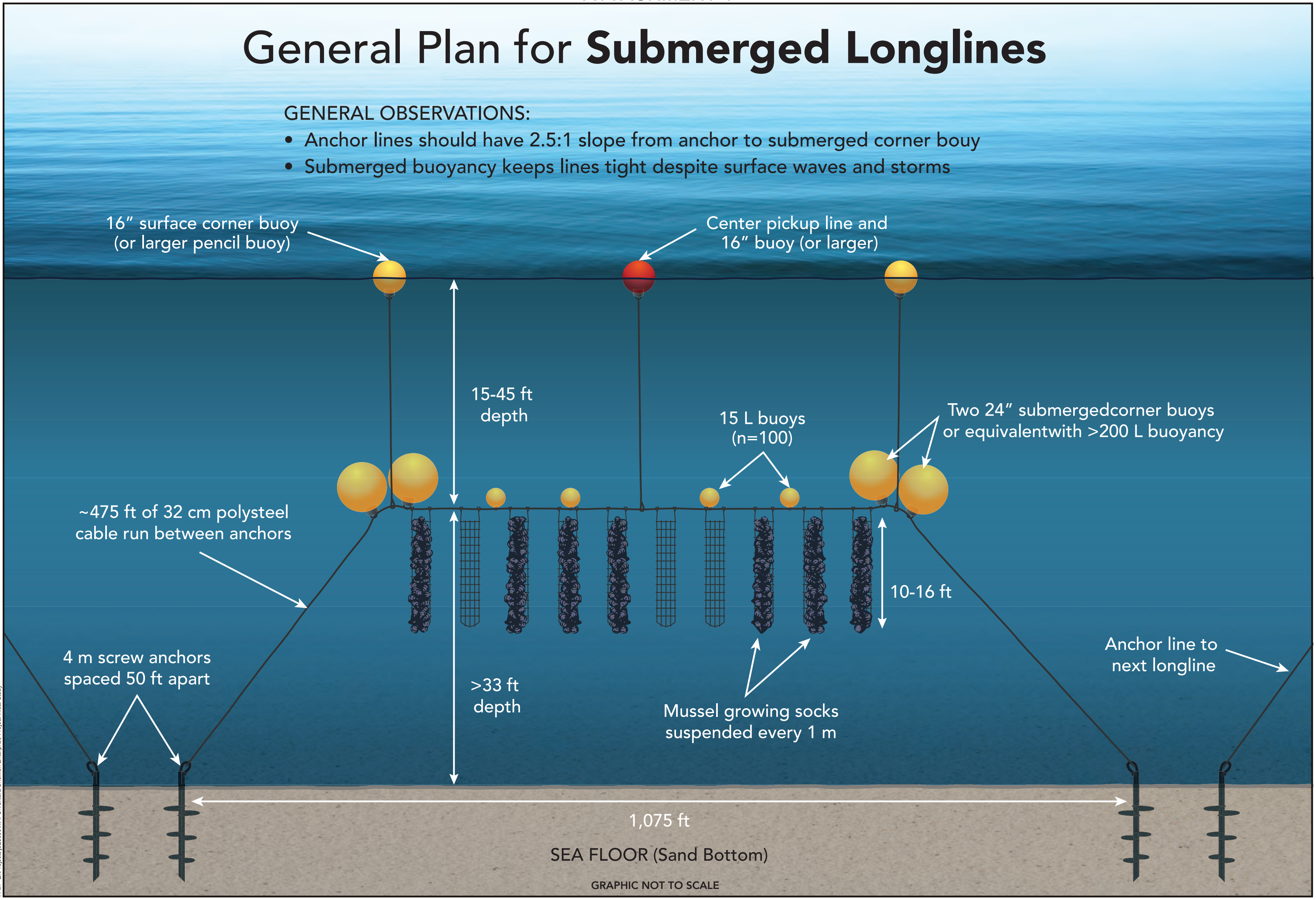

FIGURE 2

Detailed Plan for Shellfish Longlines

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A more detailed project description is provided in the Biological Assessment (Dudek 2018a), the Essential Fish Habitat (EFH) Assessment (Dudek 2018b), and the Coastal Development Permit (CDP) application prepared for the VPD for the VSE mussel farm.

1.3 Potential Impacts to the Environment

Sediment composition underneath shellfish aquaculture gear could be significantly altered from biodeposits and shift(s) in the benthic invertebrate assemblage and population abundance and structure. The project actions have the potential to alter the seafloor habitat through the deposition of biological materials resulting from dislodged or discharged shells, shell fragments, and deposits from the growing operation accumulating on the seafloor beneath the aquaculture structures. Such material typically includes feces and pseudofeces from the cultivated shellfish, as well as fouling organisms such as algae, barnacles, sponges, and other invertebrates that accumulate on the project equipment and subsequently become dislodged by natural processes, or due to harvesting or cleaning operations. Pseudofeces are a specialized method of expulsion that filter-feeding bivalve mollusks use in order to get rid of suspended particles such as particles of grit which cannot be used as food, and which have been rejected by the animal. The rejected particles are wrapped in mucus, and are then expelled without having passed through the digestive tract. Thus, although they may closely resemble the mollusk's real feces, they are not actually feces, hence the name pseudofeces, meaning false feces. Cultivated shellfish or shells can also be dislodged from the structure during growth, storm events, predation by marine wildlife, and cleaning and harvesting activities. The combination of biodeposit sources and their ultimate settling in the benthic substrate under and adjacent to the mussel farm could affect the native marine biota.

The accumulation of material including shell fragments, intact shells, fouling organisms, and feces can alter the physical and chemical characteristics of the bottom substrate, and can affect the benthic community and sediment-dwelling organisms that may be sensitive to conditions such as substrate composition and chemistry. Accumulation of material could also attract organisms that would change the composition of the benthic community (Sowles 2003). Other potential benthic impacts can include increased loads on sediment dissolved oxygen and redox conditions, and changes to nutrient cycling resulting in a decrease in benthic species abundance and sediment porosity (Pearson and Rosenberg 1978; Wilding and Nickell 2013; Wilding 2012). The effect on benthic nitrogen cycling is determined by biogeochemical and physical variables, such as water depth, current velocities, and bottom type and composition (CFGC 2018). Shellfish are able to alter the biogeochemical process in the water column by stimulating nitrification (Souchu et al. 2001).

Given the site characteristics of deeper, offshore waters with currents, and considering the project configuration whereby the fuzzy ropes will be approximately 40 to 60 feet from the ocean floor, the accumulation of materials is expected to have a negligible effect on the habitat. Findings in a study by Hartstein and Rowden (2004) indicates that aquaculture farms with high hydrodynamic energy (i.e., open ocean or offshore) results in biodeposits being transported over a much greater distance from the point of origin before arriving on the seabed (using an average fecal pellet falling velocity of 3.54 cm/s, average current speed of 10.0 cm/s as calculated 3 m above the bed and an average water depth of 12m). The study concluded that no organic enrichment of the sediment and subsequent alteration of the macroinvertebrate assemblage took place in comparison to aquaculture farms with low hydrodynamic energy (i.e., bays, harbors, or inshore) (Hartstein and Rowden 2004).

Monitoring the ecological effects of aquaculture are essential components of the process of planning and regulating aquaculture to achieve sustainable outcomes (Donnan 2001; Silvert & Cromey 2001). Properly designed monitoring programs provide a method to determine whether there are detrimental effects on the environment; whether the effects are significant, or acceptable and reversible; and how any effects can be minimized (Fernandes et al. 2001).

2 OBJECTIVES

The primary objective is to monitor benthic communities, water quality and aquatic life within and in the vicinity of the plots. As per NOAA guidance for aquaculture in Federal waters, and in alignment with NOAA Aquaculture Policy which applies broadly to all marine aquaculture-related activities at NOAA, this plan seeks to uphold the following overarching goal (NOAA 2011):

Goal 1. Ecosystem compatibility- Aquaculture development in federal waters is compatible with the functioning of healthy, productive, and resilient marine ecosystems.

NOAA will achieve this goal by:

- Developing, implementing, and enforcing ecosystem-based conservation and management measures for aquaculture that fulfill the agency's marine stewardship responsibilities to protect and restore healthy coastal and ocean ecosystems and to conserve living marine resources, their habitats, and other protected areas;
- Developing, implementing, and enforcing conservation and management measures for aquaculture designed to maintain the health, genetics, habitats, and populations of wild species; maintain water quality; and avoid harmful interactions with marine mammals, birds, and protected species;
- Taking into account the cumulative impacts of aquaculture throughout all trophic levels of the marine environment and in combination with the impacts of other activities.

The following Sediment and Water Quality Monitoring Plan describes the sediment and water quality sample collection and analysis that will be implemented during the Permit term. As required by the Permit, this Sediment and Water Quality Monitoring Plan describes in detail the field sampling, sampling design, laboratory procedures, analytical methods, quality control/assurance measures, data management, stressor identification, reporting and schedule. The integration of data from this management plan will enable regulatory agencies and the general public to confirm whether the permit will result in adverse impacts to the surrounding benthic environment or water column. The overall Plan objectives are as follows (Dutch et al. 2008; Striplin 1988).

Sediment and Water Quality Monitoring Plan Objectives:

1. To establish a baseline of environmental conditions at the aquaculture farm.
2. To collect long-term data documenting changes over time in physical, chemical, and biogeochemical sediment characteristics and benthos assemblage structure measured for the monitoring stations and reference sites, including data during initial project installation and build-out.
3. To provide data for use by the VPD and other relevant regulatory agencies concerned with sediment and water quality.
4. Evaluate changes over time in physical, chemical, and biogeochemical sediment characteristics and in benthos assemblage structure at the plots in relation to changes in natural and human-related environmental drivers and pressures, and implement adaptive management, if needed.

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3 METHODOLOGY

3.1 Field Sample Collection

3.1.1 SAMPLE STATIONS

The project's twenty 100-acre plots are approximately 3.53 miles from the shore, located in federal waters of the Channel. As described above, the aquaculture site substrate is anticipated to be homogeneous, with a sandy substrate. Through California State Waters mapping, it was determined that the continental shelf is underlain by variable amounts of upper Quaternary shelf, estuarine, and fluvial sediments deposited as sea level fluctuated in the late Pleistocene (USGS 2013). Seafloor habitats in the Channel consist of significant amounts of soft sediment that support a variety of communities in deep water. The potential marine benthic habitat types are directly related to the Channel's Quaternary geologic history, geomorphology, and active sedimentary processes. These potential habitats, at the project location, are soft, unconsolidated sediment. This seafloor composition provides habitat for a multitude of marine benthic organisms (USGS 2013).

Baseline monitoring will be required prior to implementation of the following sampling methodology, to ascertain the substrate is indeed homogeneous. In this instance homogenous is defined as uniform substrate and biota, meaning the substrate and biota, on average, is distributed more or less equally across an area, in this case, the mussel farm. Statistically, in a normal distribution, homogenous implies a low variance and small standard deviation (i.e., samples are quantitatively similar to each other and don't deviate much to the population mean). For instance, the sediment size and abundance and diversity of invertebrates are expected to be more or less the same in samples taken across a 100-acre plot or the entire 2,000 acre aquaculture farm. If the substrate is not homogeneous and is more variable than expected, then more sample sites will need to be added to the sampling design to capture overall habitat variability of the project site essential for a robust data analysis. If rocky reef or other Essential Fish Habitat(s) or Habitat Areas of Particular Concern (HAPC) are observed during baseline surveys, then the EFH will be mapped and completely avoided (Dudek 2018b). Assuming a homogeneous sandy substrate, each of the twenty 100 acre active plots will have a minimum of three (3) random sampling locations within each plot. The number of sampling locations per plot will be determined using the pre-construction Sampling Power Curve, which is a way to determine the appropriate sample size for the area (See Section 3.1.2). Prior to sampling, each plot will be divided into 1 acre boxes in ArcGIS and a nonbiased selection of the sampling location would occur using ESRI software. The three samples will be combined into one sample to represent the 100 acre plot.

The aquaculture farm will have at least two (2) reference stations. Reference stations will be established 100 to 300 meters from the parcel boundary of the outermost aquaculture unit along an isocline (Figure 7). For example, during build-out of the aquiculture operation, assuming the nearest 100 acre parcels are constructed, the reference site would be similar distance from shore as the first string of farms are being construction with bathymetry or depth considered, but completely outside of the mussel farm boundaries at build out (i.e., non-use sub-permit leases cannot be used as a reference site). Reference samples will be collected from a similar depth and sediment type to sub-permit stations. Following completion of the aquiculture farm, the two reference sites would be sampled randomly. Please refer to Figure 7 as an example. Note that baseline monitoring may preclude use of select areas as reference site if there is a significant difference between the mussel farm and proposed reference site. The mussel farm and reference sites will need to be similar to meet the selection criteria for future use during construction and operation of the project.

3.1.2 PRE-CONSTRUCTION SAMPLING POWER CURVE

A power curve is used to establish sampling size. The number of sampling locations per plot will be determined using the pre-construction Sampling Power Curve which is a way to determine the appropriate sample size for the area. Assumptions are that data collected from the samples will be of normal distribution, low variability, and a small standard deviation. The power curve represents every combination of power and difference for each sample size when the significance level and the standard deviation are held constant. Essentially, this test determines how many observations in your sample are required to achieve adequate statistical power. On the other hand, the sample size cannot be so large as to waste time and money on unnecessary sampling or to falsely detect unimportant differences to be statistically significant. A minimum sample size of three (3) samples per 100-acres is set from this aquaculture project.

3.1.3 VSE BUILDOUT MONITORING DURATION

The scale of the VSE aquaculture project necessitates that the twenty 100-acre plots will have an adaptive monitoring plan. This plan will commence upon installation of the first 100-acre plot but also requires 3 years of monitoring at 80% capacity for the aquaculture site. The monitoring plan is dependent on the length of time it takes to attain full occupancy of all of the plots. Hence, if the project site takes two years to develop to 80% capacity, and along with the 3-year monitoring requirement at that capacity, then the monitoring plan will have a duration of 5 years total.

3.1.4 MONITORING FREQUENCY

Pre-construction sampling is required prior to installation of the aquaculture plots in order to obtain a baseline of habitat conditions. Pre-construction sampling is required at least once prior to the commencement of construction. Baseline environmental monitoring is important to confirm habitat and sediment conditions and understand existing environmental conditions prior to the start of construction. If any changes to conditions occur during the future construction or operations of project, the baseline data gained from the following monitoring activities will assist in understanding the cause, so that any changes can be managed. As such, future samples collected at the project site will be compared to this baseline for analysis. After construction is complete within the plot, monitoring will occur on a bi-annual basis.

3.1.5 SAMPLING OVERVIEW

3.1.5.1 Sampling Vessels and Navigation

Vessels used to collect sediment samples will be stable and maneuverable, conducive to utilizing sampling equipment and/or suitable for SCUBA diving purposes. The vessels will be equipped with a side or rear davit (Weston Solutions 2014) from which to deploy and retrieve surface sampling equipment, and will accommodate a minimum of two persons in addition to all appropriate sampling and safety equipment. If conducting sampling by SCUBA divers, there is a minimum requirement of two scientific divers and one non-captain or crew person acting as surface support for safety requirements. All sampling station locations will be pre-determined and coordinates provided prior to field sampling activities, for use on any vessel navigation system.

3.1.5.2 Sediment Sampling Procedures

Sampling of benthic sediments will be conducted to determine redox potential, total dissolved sulfide, porosity and sediment organic matter. Although sulfide is the main regulatory determinant, the other three variables are used to validate and confirm accuracy of sulfide results via empirical relationships of measured variables (Hargrave, 2010) and the Benthic Enrichment Index (BEI) (Hargrave, 1994). Samples will be collected using either SCUBA diver or grab sampling equipment, described further below. The sampling methodology for using a diver to collect sediment samples is outlined in Wildish *et al.*, (1999 and 2004). The main goal is to use an appropriate sampling method and device, which maintains an intact sediment-water interface. To ensure acceptable results, VPD approval must be obtained prior to the use of non-approved equipment and methodologies for sediment sample collection and sub-sampling not described herein. Any deviations from the approved equipment and methodologies must be justified and described in the final submission.

Sediment and benthos samples will be collected in a consistent, repeatable manner following these procedures. A double 0.1 square meter (m^2) stainless-steel modified van Veen or Ekman or Ponar grab sampler will be used, which allows sediment for physical, biogeochemistry, chemistry, and toxicity samples to be collected simultaneously with benthic infaunal samples. The grab will be attached to the vessel's cable and winch system and lowered to 2-3 meters above the sediment surface. The vessel will be maneuvered into position above the target location. The grab will then be lowered to the bottom where it will trigger and close upon contact with the sediment surface, and a sample will be collected. The grab will then be raised back up to the vessel and landed on a grab stand. The collected sediment sample will be visually inspected. Any grab sample lacking fine-grained particles in the sediment (i.e., composed of all cobble, shell hash, or wood, etc.) or for which the jaws of the grab do not close completely will be rejected. Any grab sample that has either a less-than-adequate penetration depth or significant over-penetration will be discarded. If a sample is rejected for any reason, it is dumped overboard after the vessel has been repositioned away from the target location. If a station is rejected, an alternate station with a new station number will be sampled in its place. For sediment sampling, the following best practices will be utilized (NSFA 2014):

- A temperature logger must be used to record, at least every 30 minutes, the temperature of the environment where sediment samples are stored (i.e., cooler and refrigerator). The same temperature data logger must measure the storage temperature throughout the lifecycle of each set of sediment samples (i.e., from the onset of sediment collection to the completion of analysis).

- Rinse all sampling equipment with saltwater between deployments to remove all debris and sediment.
- Siphon (do not pour) the overlying water from the sample. It is important to maintain an undisturbed sediment sample and avoid getting surface water in the syringe.
- If the sample is spoiled at any point during the collection (e.g., leakage from sampling device, sediment surface layer not intact, equipment malfunction, human error etc.), collect a new sample.
- If an appropriate grab sampler for the site-specific benthic conditions is used and is unsuccessful (lack of sufficient quantity of sediment) after the 3rd sediment collection attempt, another sampling location can be chosen. Collect a new waypoint and provide a justification for choosing a new sampling site.
- Excess sediment from grabs must be discarded down current, away from the sampling location.

3.1.5.3 SCUBA Diving Sampling Procedures

When locations and conditions allow cores to be collected by divers, cores must be inserted into the sediment, while minimizing disturbance of the sediment surface (NSFA 2014). Open-ended cores should be slowly inserted into the bottom with a gentle twisting action to minimize sediment compression. Cores should have drilled holes at least every 2 cm's to allow lateral sub-sampling of the surface layer closest to the sediment-water interface using a minimum 5-mL cut-off plastic syringe (NSFA 2014). Once sediment is in the core, the diver seals the upper end with a cap to maintain overlying water above the undisturbed sediment surface. Vertically intact cores must be brought to the surface in an upright position. Clarity of overlying water can be used to visually confirm that the sediment surface is as undisturbed as possible. Intact sediment cores should be stored upright in an ice-filled cooler. The required subsample volume must equal a minimum of 5 mL per core. Each core and corresponding syringe must be labeled with a sample ID (NSFA 2014).

3.1.5.4 Video Collection Procedures

Video must be collected at every sampling site and reference site using a submersible video camera (drop camera, ROV, or SCUBA diver operated) using an acceptable high-resolution format (i.e., AVI) (NSFA 2014). Video must be obtained before grab samples to show undisturbed sediment. The field of view must include a visible reference scale. Each station must be clearly labeled on the video by using a placard (sub-permittee name/#, date, sample station ID) prior to submersion. The drop camera video must be equipped with a digital overlay detailing real time latitude and longitude (WGS84 or NAD83, decimal degrees) of the sampling location (NSFA 2014). Video requirements include continuous footage of initial descent, impact with the seafloor, camera ascent and retrieval on deck. Once at the bottom, the camera will hover just off bottom and gently contact sediment to indicate consistency. Each station requires a minimum of 2 minutes of seafloor footage, covering a minimum area of 5 m^2, achieved either by drift of vessel, movement of the handler along the vessel deck, or SCUBA diver swim. Video image quality must be sufficient to recognize and identify sediment type, condition, and benthic species present (NSFA 2014). Sufficient lighting must be used when the visibility is poor.

3.1.5.5 Water Quality Sampling Procedures

Water quality sampling will be conducted both within the plots and outside of the plots (reference sites) for comparison as biological communities exist in equilibrium in the marine environment and any changes in seawater characteristics can result in potentially adverse impacts to the marine environment. Water column measurements of physical and chemical characteristics of seawater such as water temperature, hydrogen ion (pH) concentration, and salinity are reliable indicators of the water quality of the marine ecosystem. Water quality sampling will be conducted at each pre-determined sampling location in conjunction with the sediment sampling (2 sampling sites within each aquaculture sub-permit parcel, and 2 outside of the sub-permit parcel as reference sites) consisting of surface, mid-water and sea floor sampling. Water quality sampling will employ a Multi-Parameter Water Quality Meter, deployed into the water column from the vessel. This instrument allows for a comprehensive profile of water properties at the sampling sites and reference sites.

Field Observations

General field reporting datasheets are required to be filled out, which presents an overview of the site conditions on, around and beneath a farm site. There is a requirement to collect and submit field observations. A sample log sheet is provided in Appendix A. Log sheets will be used for QA/QC during VPD review. Field observations must be recorded during each sampling event and will include (NSFA 2014):

- Sampling water body, site name and sub-permit number
- Relative descriptions/estimates of ambient weather conditions, including wind speed and direction, Beaufort's sea state, and direction and strength of the current and tide schedule
- Sampling station coordinates
- Station ID
- Time and date of each sample collection
- Type of vessel used for sampling
- Type of sampling equipment and any modifications
- Water depth at each sampling station (ft) and the depth of collected sediment (cm)
- Water temperature (°F)
- Name(s) of personnel collecting the samples
- Number of sediment collection attempts at each station
- Details pertaining to unusual or unpredicted events that might have occurred during the operation of the grab sampler (e.g., equipment failure, unusual appearance of sediment integrity, etc.)
- Deviations from standard operating procedures

For benthic sampling, the following must be recorded:

- Description of the sediment type, consistency, color and odor
- Presence of flora and fauna
- Presence of gas bubbles
- Presence of shellfish feces/pseudofeces

3.1.6 CHAIN OF CUSTODY

Chain of custody (COC) will commence when each benthic and water quality sample is collected. While in the field, all samples will be under direct possession and control of the contractor or certified and qualified field staff. For chain of custody purposes, the research vessel will be considered a "controlled area." For both the chemistry/physical samples and the infauna samples, all sample information will be recorded on a daily COC form. This form will be completed in the field and will accompany all samples during transport and delivery to the laboratory. Minimum documentation of sample handling and custody will include the following (Appendix B; Weston Solutions 2014):

- Sample identification.
- Sample collection date and time.
- Any special notations on sample characteristics.
- Initials of the person collecting the sample.
- Date the sample was sent to the laboratory.
- Shipping company information.

The completed COC form will be placed in a sealable plastic envelope that will travel inside the ice chest containing the listed samples. Upon arrival at the laboratory, the sample delivery person will relinquish all samples. The date and time of sample delivery will be recorded and both parties will then sign off in the appropriate sections on the COC form at this time. Once completed, original COC forms will be archived. Samples delivered after regular business hours will be stored in a secure chain of custody refrigerator until the next day.

3.2 Laboratory Testing

To evaluate habitat conditions within the aquaculture sub-permit area and reference sites, analysis of sediment samples will include sediment grain size, percent organic matter, sediment porosity, redox potential, sulfide concentration, toxicity testing, infauna taxonomic analysis, as well as water quality sampling. Samples will be tested in accordance with EPA standards at a NOAA Fisheries Office of Aquaculture and California Department of Public Health (CDPH) approved facility. For this study, we use an approach in which the lines of evidence (LOE) are sediment toxicity, sediment chemistry, benthic community condition, and water quality which evaluates the severity of biological effects to provide a final overall assessment of each sample site. The results of the analysis are based on a multiple lines of evidence (MLOE) approach in which the LOE's are combined into one habitat value per plot. Hence, this approach evaluates the severity of all effects to provide a final aquaculture plot-level assessment.

3.2.1 SEDIMENT CHEMISTRY

Analysis of sediment samples, as described in Wildish et al. (1999, 2004), includes redox, sulfide, sediment porosity, and sediment percent organic matter. Oxidation-reduction potential (redox) analysis is a measure of oxidation reduction potential in sediments and is an indirect indicator of aerobic versus anaerobic conditions in the sediment. For sulfide analysis, the total dissolved sulfide is measured. This is a measure of the accumulation of soluble sulfides (a product of reduction that occurs in anaerobic conditions). The total dissolved sulfide is an indicator of habitat degradation from organic loading. Sediment porosity is the percentage of pore volume (void space) within the benthic sediments. It is an indirect measure of grain size and is used to detect changes in sediment consistency which can occur from shellfish feces or pseudofeces. Sediment percent organic matter (POM) is a measure of the portion of sediment that is biological (plant or animal) in origin, which describes organic loading. Chemical analyses of sediment will include total organic carbon (TOC), and the select trace metals, chlorinated pesticides, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs). Individual parameters and reporting limits are listed in Appendix C (Weston Solutions 2014).

3.2.2 SEDIMENT TOXICITY

Toxicity testing involves a short-term survival test, a sublethal endpoint test, and an assessment of sediment toxicity. Amphipod bioassay procedures will be followed as outlined in published protocols (PSEP, 1995; ASTM, 2004a). These include use of both a non-toxic (negative) control using clean, nontoxic sediments; toxic (positive) controls using a reference toxicant in a dilution series, use of healthy test organisms; observance of sediment holding times, proper equipment-cleaning procedures, and standard laboratory procedures; measurement and maintenance of water quality, and blind testing. The laboratory will be responsible for the identifying, collecting, and testing a non-toxic control sediment. These sediments must be un-contaminated, collected outside the study area, and shown from previous tests to be not toxic to sensitive organisms. The negative controls must be tested with each batch of samples from the field using the same methods applied to the test samples and at least the same number of replicates. The results from tests of the negative controls are highly important, because they will be used in statistical analyses to classify samples as either toxic or non-toxic. The maximum holding time for the samples shall be no more than 10 days from the date of collection. Categorization values are listed in Appendix C.

3.2.3 BENTHIC COMMUNITY

The benthic infauna samples will be stored in a formalin solution for initial preservation for transportation to the laboratory. The samples will then be transferred from formalin to 70% ethanol for laboratory processing. The organisms will be sorted to taxonomic group using a dissecting and high-power compound microscope (Michelson 2009) into five major phyletic groups: polychaetes, crustaceans, mollusks, echinoderms, and miscellaneous minor phyla. A qualified taxonomist will identify each organism to species or to the lowest practical taxonomic level (Michelson 2009). Taxonomists will use the most recent version (12^{th} Edition) of the Southern California Association of Marine Invertebrate Taxonomists (SCAMIT) taxonomic listing for nomenclature and orthography. Categorization values are listed in Appendix C.

3.2.4 WATER QUALITY

As described above, water column measurements of physical and chemical characteristics of seawater such as water temperature, hydrogen ion (pH) concentration, and salinity are reliable indicators of the water quality of the marine ecosystem. Water quality parameters measured include: temperature (°C), pH, pH(mV), Oxidation Reduction Potential (ORP) (mu), conductivity (ms/cm), turbidity (NTU), Dissolved Oxygen (DO) (mg/L), percent DO, Total Dissolved Solids (TDS) (g/L), salinity (ppt), and Seawater Specific Gravity (σt). Water quality parameters will be sent to the lab, along with the benthic samples, for analysis. Thresholds for water quality parameters follow EPA water quality standards.

4 DATA ANALYSIS

4.1 Data Review and Management

Field data and observations recorded on field logs will be kept in the project binder aboard the research vessel during sampling. A new log will be completed for every plot. Samples will be averaged in order to have one set of values per plot. All logs will be reviewed after each station is sampled for QA/QC. This information will be entered into a VSE database upon completion of sampling, and original data logs will be provided to VPD. All entries will be independently verified for accuracy by another individual on the VPD or an independent VPD contractor, and necessary corrections will be made.

4.2 Sediment Toxicity

Toxicity analysis from the contract toxicology lab will include: data values for all parameters measured at each station; measures of within sample variability, sample and test organism holding time, and test organism lengths; a report noting methods used; quality control results; and an electronic version of the data. Sediment toxicity test results from each station will be statistically compared to control test results; normalized to the control survival; and categorized as nontoxic, low, moderate, or high toxicity.

4.3 Sediment Chemistry

All sediment chemistry data will be reported in QA1 format (PTI Environmental Services 1989), as used by USACE to establish if data are acceptable for determining the suitability of sediments for unconfined open-water disposal. The final QA1 report will contain the following information and deliverables: a QA1 narrative discussing data quality in relation to study objectives and data criteria; all associated QC data (LIMS QC reports and worklists), copies of field sheets and COC forms; and a comprehensive report containing all analytical and field data, and indicating any levels that are above standard limits.

4.4 Benthic Community

The mean abundance and richness of each major benthic taxon for both sampling sites and reference sites will be reported. Various diversity indices will also be calculated for each sampling station. Data will be compared to regional benthic data for the Ventura region and the Southern California Bight. A narrative explaining the results, including any anomalies and statistical evaluations, will be included.

4.5 Water Quality

Water quality parameters for both sampling sites and reference sites will be reported. Data will be compared to regional water quality data for the Ventura region and the Southern California Bight. A narrative explaining the results, including any anomalies and statistical evaluations, will be included.

4.6 Statistical Analysis

A non-parametric multivariate approach was used to test the proposed hypotheses because it provides a way to determine and explore any observed differences in assemblage composition (Hartstein and Rowden 2004). Spatial and temporal fluctuations in sediment toxicity, sediment chemistry, the benthic community, and water quality parameters, will be modelled. Sampling stations and reference stations are considered as the spatial factor whereas the sampling period (month, year) represents the temporal factor. Interaction effects between station and season will be taken into account. When a significant difference ($p<0.05$) for an effect is observed, the means will be analyzed by multiple comparison tests. Akaike's information criterion (AIC), and collinearity will also be investigated. All statistical analyses will be carried out using a statistical software package capable of multivariate analysis.

5 STRESSOR IDENTIFICATION

5.1 Pollutant Confirmation, Source Identification and Management

Each aquaculture plot will be evaluated based on the analysis above and a sub-permit assessment will be provided indicating any biological effects on the environment determined by the toxicity, chemistry, water quality and benthic community condition. Based on the severity of biological effects, a sub-permit-level assessment will be made with the following categorical assignments (Weston Solutions 2014):

- **Unimpacted**: High confidence that that mussel aquaculture is not resulting in adverse impacts to the habitat and marine life.
- **Likely Unimpacted**: Aquaculture activities are not causing adverse impacts to aquatic life, but some disagreement among the LOE reduces the certainty that the station is unimpacted.
- **Possibly Impacted**: Aquaculture activities at the sub-permit site may be causing adverse impacts to aquatic life, but the impacts are either small or uncertain due to disagreement among the LOE.
- **Likely Impacted**: Evidence for aquaculture-related impacts to aquatic life at the sub-permit is persuasive, even if there is some disagreement among the LOE.
- **Impacted**: results show that mussel aquaculture is causing adverse impacts to the habitat and marine life.
- **Inconclusive**: Additional information is needed before a determination can be made.

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6 REPORTING

VPD staff or an independent VPD contractor will be responsible for analyzing annual sediment and benthos data, water quality data, summarizing data, and producing annual reports. These reports will be a high-level overview of work and conclusions, with detailed data summarizing figures and tables attached as appendices. A variety of traditional formal and informal reporting formats will be used, with the data made available to NOAA Fisheries Office of Aquaculture and other regulatory agencies. The annual report will evaluate methods, interpret data, provide an aquaculture impact assessment and include recommendations for adaptive management, as necessary.

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7 CONCLUSION

There is growing international awareness of the need for aquaculture to be ecologically sustainable (Black 2001) and the VPD recognizes that aquaculture in the marine environment needs to be undertaken in an informed, controlled and ecologically sustainable and responsible manner. An ecologically sustainable industry should only utilize environmental resources in ways that do not interfere with other users of the environment; do not reduce the scope for future users to benefit from the environmental resources; and do not significantly alter environmental quality and biodiversity (Black 2001). The proposed monitoring program has been designed to identify if any significant changes to the marine benthic environment within or immediately adjacent to the project site are occurring due to the presence of the farm and will provide the baseline conditions/parameters against which project conditions can be assessed. This monitoring program will be reviewed after two years of sampling to determine if reported impacts warrant modifications to the sampling protocol. If, during the monitoring program, significant impacts are found, then appropriate adaptive management regimes will be employed to ameliorate these impacts. Such adaptive management will depend on the character, severity, and frequency of impacts, as well as whether the impact is project-wide or isolated within a particular sub-permit area or areas.

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APPENDIX A

Standard Field Sheet

ATTACHMENT 1

Appendix A

Field Data Sheet: Video and Grab Samples

Date:		**Wind direction and speed:**	
Water body:		**Wave action:**	
Lease name and #:		**Direction and speed of current:**	
Sampling Station ID:		**Tide schedule:**	
Latitude (decimal degrees):		**Comments:** (e.g., differences between observed seafloor conditions and grab sample, notes regarding sampling difficulties, weather issues, deviations from the SOP, etc.)	
Longitude (decimal degrees):			
Dist. and dir. from WP:			
Time:			
Recorder name:			
Sample collector:			
Type of sediment sampler:		**Benthic Descriptor Key:**	
Station Depth (m):		1. Oxic layer thickness, gas bubbles, feed, faeces, sediment: colour, type and consistency	
Water Temperature (°C):		2. Degree of odour (strong, slight, none)	
Video (y/n):		3. Flora/Fauna (e.g., eel grass, kelp, lobster, crab, starfish, beggiatoa, polychaetes etc.)	
Number of grab attempts:			

Sediment Samples	**Sample (y/n)**	**Sample ID**	**Sediment Description[1]**	**Grab Depth (cm)**	**Odour[2]**	**Flora / Fauna[3]**
Benthic Replicate A						
Benthic Replicate B						
Benthic Replicate C						

ATTACHMENT 1

APPENDIX B

Chain of Custody Form

ATTACHMENT 1

DUDEK

621 Chapala Street
Santa Barbara, CA 93101
Tel: 805-963-0651
Fax: 805-963-2074

ATTACHMENT 1

Chain of Custody

Laboratory:	Lab Job #:
Lab Contact:	Shipping Method:
Dudek Project Manager:	Dudek PM Email: @dudek.com

Project Name:	Project Number:
Sampled by:	Sampler Signature:

Sample ID	Sample Collection		Matrix			Method Preserved				Container Types and No.					Analysis											TAT		Notes
	Date	Time	Water	Soil		HCl	HNO_3	NONE		40 mL glass VOA	___oz. Glass Jar	___ Amber	___ Poly		VOCs 8260B	TPH carbon chain 8015M	TPH(g)/ BTEX/ MTBE 8015M	TPH (d) 8015M	SVOCs 8270	Pesticides 8081A	6010/ 7000 Title 22 Metals					Standard Turn-Around Time	Other: 24 hr 48 hr 72 hr	
Total # of containers per type															Total Containers:													

Relinquished by:	Company	Date	Time	Received by:	Company	Date	Time	Sample Receipt
								☐ Samples Intact
								☐ Cooler Temp: __________
								☐ Conforms to COC

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ATTACHMENT 1

APPENDIX C

Laboratory Method Detection Limits and Recommended Practical Quantitation Limits for all Testing Parameters: Sediment Chemistry, Sediment Toxicity, Benthic Community, and Water Quality

ATTACHMENT 1

Appendix C

Parameters and Reporting Limits

Chemical and Physical Parameters for Sediment Samples

Parameter	Reporting Limit
Physical Tests	
Grain Size	1.00%
Percent Solids	0.10%
Total Organic Carbon (TOC)	0.01%
Metals	
Cadmium (Cd)	0.09 mg/kg
Copper (Cu)	52.8 mg/kg
Lead (Pb)	25.0 mg/kg
Mercury (Hg)	0.09 mg/kg
Zinc (Zn)	60.0 mg/kg
Organochlorine Pesticides	
2,4'-DDD	0.50 µ g/kg
2,4'-DDE	0.50 µ g/kg
2,4'-DDT	0.50 µ g/kg
4,4'-DDD	0.50 µ g/kg
4,4'-DDE	0.50 µ g/kg
4,4'-DDT	0.50 µ g/kg
Chlordane-alpha	0.50 µ g/kg
Chlordane-gamma	0.54 µ g/kg
Dieldrin	2.5 µ g/kg
trans-Nonachlor	4.6 µ g/kg
PCB Congeners	
2,4'-Dichlorobiphenyl	3.0 µ g/kg
2,2',5-Trichlorobiphenyl	3.0 µ g/kg
2,4,4'-Trichlorobiphenyl	3.0 µ g/kg
2,2',3,5'-Tetrachlorobiphenyl	3.0 µ g/kg
2,2',5,5'-Tetrachlorobiphenyl	3.0 µ g/kg
2,3',4,4'-Tetrachlorobiphenyl	3.0 µ g/kg
2,2',4,5,5'-Pentachlorobiphenyl	3.0 µ g/kg
2,3,3',4,4'-Pentachlorobiphenyl	3.0 µ g/kg
2,3',4,4',5-Pentachlorobiphenyl	3.0 µ g/kg
2,2',3,3',4,4'-Hexachlorobiphenyl	3.0 µ g/kg
2,2',3,4,4',5'-Hexachlorobiphenyl	3.0 µ g/kg
2,2',4,4',5,5'-Hexachlorobiphenyl	3.0 µ g/kg
2,2',3,3',4,4',5-Heptachlorobiphenyl	3.0 µ g/kg
2,2',3,4,4',5,5'-Heptachlorobiphenyl	3.0 µ g/kg

2,2',3,4',5,5',6-Heptachlorobiphenyl	3.0 µ g/kg
2,2',3,3',4,4',5,6-Octachlorobiphenyl	3.0 µ g/kg
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	3.0 µ g/kg
Decachlorobiphenyl	3.0 µ g/kg
PAHs (low molecular weight)	
Acenaphthene	20.0 µ g/kg
Anthracene	20.0 µ g/kg
Phenanthrene	20.0 µ g/kg
Biphenyl	20.0 µ g/kg
Naphthalene	20.0 µ g/kg
2,6-Dimethylnaphthalene	20.0 µ g/kg
Fluorene	20.0 µ g/kg
1-Methylnaphthalene	20.0 µ g/kg
2-Methylnaphthalene	20.0 µ g/kg
1-Methylphenanthrene	20.0 µ g/kg
PAHs (high molecular weight)	
Benzo(a)anthracene	80.0 µ g/kg
Benzo(a)pyrene	80.0 µ g/kg
Benzo(e)pyrene	80.0 µ g/kg
Chrysene	80.0 µ g/kg
Dibenzo(a,h)anthracene	80.0 µ g/kg
Fluoranthene	80.0 µ g/kg
Perylene	80.0 µ g/kg
Pyrene	80.0 µ g/kg

DDD Dichlorodiphenyldichloroethane
DDE dichlorodiphenyldichloroethylene
DDT dichlorodiphenyltrichloroethane
mg/kg milligrams per kilogram
µ g/kg micrograms per kilogram

Summary of Conditions for 10-Day Whole Sediment Amphipod Bioassay

Test Conditions			
10-Day Whole Sediment Bioassay			
Test Species[1]	E. estuarius	L. plumulosus	R. abronius
Test Procedures	USEPA (1994); ASTM E1367-03 (2006)		
Test Type	Static - Acute Whole Sediment		
Test Duration	10 days		
Storage Conditions	4 °C, dark, minimal head space		
Age/Size Class	3-5 mm	2-4 mm; immature	3-5 mm
Grain Size Tolerance	0.6-100% sand	0-100% sand	10-100% sand
Temperature	15 ± 1 °C	25 ± 1 °C	15 ± 1 °C
Salinity	20 ± 2 ppt	20 ± 2 ppt	28 ± 2 ppt
Dissolved Oxygen	Maintaining 90% saturation		
Total Ammonia	< 60 mg/L	< 60 mg/L	< 30 mg/L
Test Chamber	1 L glass		
Exposure Volume	2 cm sediment, 800 mL seawater		
Replicates/Sample	5		
Number of Organisms/Replicate	20		
Photoperiod	Continuous light		
Feeding	None		
Water Renewal	None		
Aeration	Constant gentle aeration		
Acceptability Criteria	Mean control survival > 90%; >80% survival in each replicate		

[1] Test species will depend on species found on-site and the characteristics of the sediment sample such as grain size, salinity and constituents.
mg/L - milligrams per liter

Summary of Conditions for 48-Hour *M. galloprovincialis* Sediment-Water Interface Bioassay

Test Conditions	
48-Hour *M. galloprovincialis* Sediment-Water Interface Bioassay	
Test Species	M. galloprovincialis
Test Procedures	USEPA (1995), Anderson et al. (1996)
Test Type	Static - Acute sediment-water interface
Duration	48 hours
Sample Storage Conditions	4 °C, dark, minimal head space
Age/Size Class	< 4 hour old larvae
Temperature	15 ± 1 °C
Salinity	32 ± 2 ppt
Dissolved Oxygen	Maintaining 90% saturation
Total Ammonia	< 4 mg/L
Test Chamber	Polycarbonate core tube 7.3-cm inner diameter, 16 cm high
Exposure Volume	5 cm sediment, 300 mL water
Replicates/Sample	4
Number of Organisms/Replicate	Approximately 250 larvae
Photoperiod	16 hours light: 8 hours dark
Feeding	None
Water Renewal	None
Aeration	Constant gentle aeration
Acceptability Criteria	Mean control normal-alive > 80%

Summary of Conditions for 28-Day Whole Sediment *N. arenaceodentata* Bioassay

Test Conditions	
28-Day Whole Sediment *N. arenaceodentata* Bioassay	
Test Species	*N. arenaceodentata*
Test Procedures	ASTM E1562 (2002), Farrar and Bridges (2011)
Test Type	Static - Acute Whole Sediment/28 days
Duration	4 °C, dark, minimal head space
Sample Storage Conditions	< 7 days post-emergence
Age/Size Class	5-100% sand
Temperature	20 ± 1 °C
Salinity	30 ± 2 ppt
Dissolved Oxygen	Maintaining 90% saturation
Total Ammonia	< 20 mg/L
Test Chamber	300 mL glass
Exposure Volume	2 cm sediment, 125 mL seawater
Replicaes/Sample	10
Number of Organisms/Replicate	1
Photoperiod	12 hours light: 12 hours dark
Feeding	Twice per week
Water Renewal	Weekly
Aeration	Constant gentle aeration
Acceptability Criteria	Mean control survival > 80%

Sediment Toxicity Characterization Values

Test Type	Endpoint	Statistical Significance	Nontoxic[1]	Low Toxicity[2]	Moderate Toxicity[2]	High Toxicity[2]
Shot-Term Survival Tests	E. estuaries Survival	Significant	90 to 100	82 to 89	59 to 81	<59
		Not significant	82 to 100	59 to 81		<59
	L. plumulosus Survival	Significant	90 to 100	78 to 89	56 to 77	<56
		Not significant	78 to 100	56 to 77		<56
	R. abronius Survival	Significant	90 to 100	83 to 89	70 to 82	<70
		Not significant	83 to 100	70 to 82		<70
Sublethal Tests	N. arenaceodentata Growth	Significant	90 to 100	68 to 90	46 to 67	<46
		Not significant	68 to 100	46 to 67		<46
	M. galloprovincialis Normal-Alive	Significant	80 to 100	77 to 79	42 to 76	<42
		Not significant	77 to 79	72 to 76		<42

[1] Expressed as a percent.

[2] Expressed as a percent of control.

Sediment Chemistry Characterization Values

Sediment Chemistry Guideline		Sediment LOE Category
California Logistic Regression Model	Chemical Score Index	
<0.33	>1.69	Minimal Exposure
0.33 - 0.49	1.69 - 2.33	Low Exposure
0.50 - 0.66	2.34 - 2.99	Moderate Exposure
>0.66	>2.99	High Exposure

Benthic Index Characterization Values

Benthic Community Guideline				Index
Benthic Response Index	Relative Benthic Index	Index of Biotic Integrity	River Invertebrate Prediction and Classification System	
<39.96	0	>0.27	>0.90 to <1.10	Reference
39.96 - 49.14	1	0.17 - 0.27	0.75 - 0.90 or 1.10 - 1.25	Low Disturbance
49.15 - 73.26	2	0.09 - 0.16	0.33 - 0.74 or >1.25	Moderate Disturbance
>73.26	3	<0.09	<0.33	High Disturbance

(Weston Solutions 2014)

Appendix D

Spill Prevention and Response Plan*

* Any revisions to the management plans will be updated after receiving comments from relevant regulatory agencies.

ATTACHMENT 1

SPILL PREVENTION AND RESPONSE PLAN

FOR THE VENTURA SHELLFISH ENTERPRISE PROJECT

PREPARED FOR:

VENTURA PORT DISTRICT
1603 Anchors Way
Ventura, California 93001
Contact: Brian Pendleton

PREPARED BY:

DUDEK
621 Chapala Street
Santa Barbara, California 93101
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805.252.7996

AUGUST 2019

ATTACHMENT 1

ATTACHMENT 1

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TABLE

1 INTRODUCTION

The Spill Prevention and Response Plan (SPRP) defines the Ventura Shellfish Enterprise (VSE) permittee obligations with respect to preventing and reporting spills. This plan was developed in consultation with National Oceanic and Atmospheric Administration (NOAA) Fisheries, the VSE Project Management Team, and Project Stakeholders. The VSE project will establish a commercial offshore bivalve aquaculture operation based from the Ventura Harbor in Ventura, California, focused on the cultivation of Mediterranean mussels (*Mytilus galloprovincialis*). Each grower/producer shall comply with the SPRP for vessels and work barges that will be used during project construction and operations. Each grower/producer operating in the project area shall be trained in, and adhere to, the emergency procedures and spill prevention and response measures specified in the SPRP during all project operations.

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2 SITE DESCRIPTION

2.1 Project Description

The project consists of twenty 100-acre plots (total of 2,000 acres) located in open federal waters of the Santa Barbara Channel (Channel) in the Southern California Bight (SCB), northwest of Ventura Harbor, with approximate depths at the project site ranging from 80 to 114 feet below sea level, with an average depth of 98 feet. The plot locations are shown in Figure 1, with latitude and longitude coordinates for the outer corners indicated. Each of the 20 plots are 2,299.5 feet by 1,899.5 feet, for an average plot size of 100.27 acres. Each plot will contain up to 24 lines (12 end-to-end pairs), with each line consisting of 575 feet of backbone length and 250 feet of horizontal scope on each end. There will be a 50 foot setback on each end of the pairs (for a total of 100 feet of spacing between lines of adjacent parcels) and 50 foot spacing between the two center pins. Parallel lines will be spaced 150 feet apart, with a 125 foot setback at each of the long sides (for a total of 250 feet of spacing between lines of adjacent parcels). The mussels will be grown and harvested by grower/producers who would sub-permit the plots from Ventura Port District (VPD), and the mussel product will be landed at Ventura Harbor.

2.2 Project Location

The project's twenty 100-acre plots are approximately 3.53 miles from the shore. The closest distance from the plots to the 3-mile nautical line is a minimum of 2,900 feet, with an average closest distance of over 3,000 feet. The closest distance from the growing area to the City of Ventura city limit is 4.5 miles. Ventura Harbor is 4.1 miles from the closest plot (8 miles from the most distant plot). The sub-permit sites are located on sandy bottom habitat outside of any rocky reef habitat, as evaluated in Gentry et al. 2017 and illustrated by NOAA United States West Coast nautical charts (NOAA 2017a).

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3 PROJECT OPERATIONS

3.1 Potential Spill Sources

Spills are defined as discharges of hazardous substances that adversely impact or threaten to adversely impact, human health, welfare or the environment and require an immediate response. Many spills must be reported to Federal and State agencies and require cleanup. Substances commonly subject to these requirements when spilled include petroleum, solvents, and oils. Discharges into secondary containment structures are not considered discharges to the environment. Potential spill sources during construction and regular operation at the aquaculture farm may be fuel (diesel), oil, hydraulic fluid and any boat-based chemicals.

3.2 Spill Quantity Estimates

Vessels used in regular maintenance and harvesting operations have varied fuel capacities based on boat length/type (boat length 25-40 feet) corresponding to a fuel capacity of 100-500 gallons, and may have additional fuel (diesel) containers of approximately 5-10 gallons on board for skiffs and for emergencies. For example, a Radon commercial vessel that will likely be used for project activities have a fuel capacity of 300 to 500 gallons. Barges that will be used during construction will have considerably more fuel capacity, with additional oil and fuel canisters on board. For example, an Arapaho Derrick Barge at 350 foot by 100 foot has a fuel capacity of 360,000 gallons.

3.3 Effects on Wildlife and the Environment

Oil spills can cause catastrophic damage to the environment and our economy. Habitats affected by oil spills can take decades to recover. Impacts to the fishing industry can be severe, as short-term closures can limit access to fishing grounds and impacts from the spill make their way through the food web (SBCK 2019). Regions such as Ventura County whose economies rely on tourism and recreation are particularly vulnerable as beach closures and environmental damage reduce tourism rates.

Wildlife can face short-term and long-term impacts ranging from behavior modification, limited food availability, and hypothermia to organ damage, reduced reproduction, neurological deficits, and death (OR&R 2019a, Santa Barbara Channel Keepers [SBCK] 2019). In seabirds, the primary issue is hypothermia. When oil comes in contact with feathers, it breaks down the interlocking structure, that keeps cold water out and warm air in. As seabirds preen themselves, internal organs can also be affected. Ingesting oil can harm the gastrointestinal tract. If the volatile components of the oil are inhaled, they can lead to pneumonia, neurological damage, or absorption of chemicals that can lead to cancer (Office of Spill Prevention and Response [OSPR] 2015). If oil reaches eggs, it can cause death or developmental defects. Sea otters are similar in that they can also become hypothermic. In other marine mammals such as pinnipeds and cetaceans, oil exposure affects the internal organs and causes reproductive failure (OSPR 2015). Species most affected by oil spills are sea otters and seabirds (NOAA's Office of Response and Restoration [OR&R] 2019a).

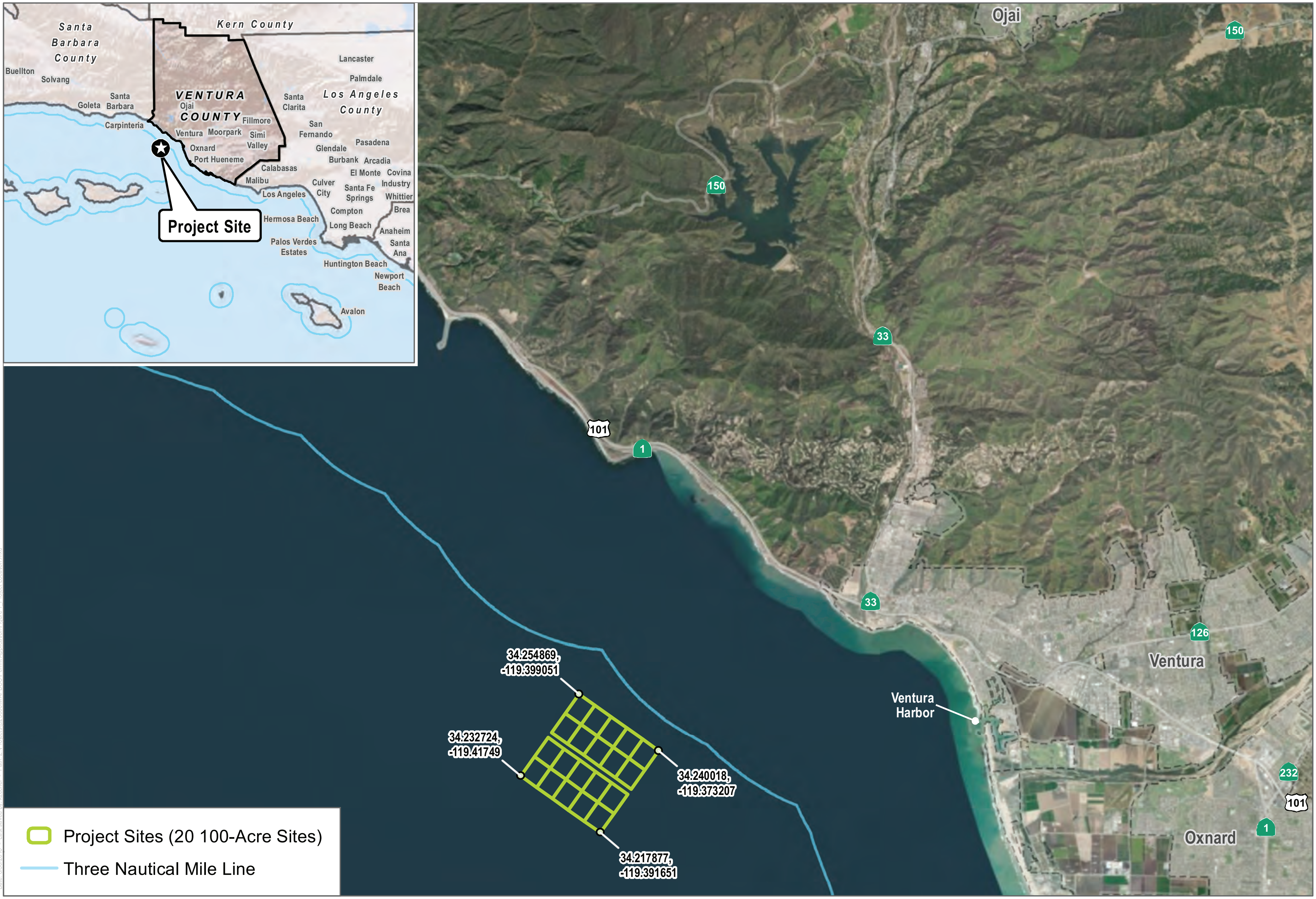
The Ventura County coastline has several Environmentally Sensitive Sites, as described by the California Department of Fish and Wildlife (CDFW), each site has ranking index developed in order to identify the relative sensitivities of these sites to oil and therefore determine protection priority in the case of a spill (Figure 2). In relation to the Project Site, the Environmentally Sensitive Sites that are closest to the aquaculture farm include 4-740-A Ventura River, 4-740-C Ventura Harbor, and 4-743-A San Buena Ventura State Beach[1] (CDFW 2018).

3.4 Effects on Aquaculture

After a chemical spill (such as an oil spill) near aquaculture operations, there is a concern regarding contaminated seafood. Some seafood species are more likely than others to accumulate polycyclic aromatic hydrocarbons (PAHs), some of which may cause cancer or cause a disagreeable flavor in seafood (Office of Environmental Health Hazard Assessment [OEHHA] 2015). Unfortunately, due to their sessile nature, mussels cannot escape from spills and are more likely than other species to retain PAHs. Therefore, oil spills can significantly impact the project, as they could result in the shellfish grown on the project site becoming unmarketable and result in the project site losing its classification as an approved shellfish growing area. An oil spill can also trigger regulatory and enforcement action by the U.S. Food and Drug Administration (FDA), U.S. Environmental Protection Agency and/or the California Department of Public Health (CDPH).

1 Environmental Sensitivity Ranking: Category A- Extremely Sensitive; Category B- Very Sensitive and Category C- Sensitive.

ATTACHMENT 1



SOURCE: NAIP 2016
DATE OF PREPARATION: 8/30/2018

DUDEK

0 6,250 12,500 Feet

FIGURE 1
Project Location
Ventura Shellfish Enterprise Project

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Figure 2: Environmentally Sensitive Sites

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4 LAWS AND REGULATIONS

4.1 Federal

Oil Pollution Act

The Oil Pollution Act (OPA) of 1990 streamlined and strengthened the US Environmental Protection Agency's (EPA) ability to prevent and respond to catastrophic oil spills. A trust fund financed by a tax on oil is available to clean up spills when the responsible party is incapable or unwilling to do so. The OPA requires oil storage facilities and vessels to submit plans detailing how they will respond to large discharges. The OPA also requires the development of Area Contingency Plans to prepare and plan for oil spill response on a regional scale.

Clean Water Act

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Under the CWA, EPA has implemented pollution control programs such as setting wastewater standards for industry. EPA has also developed national water quality criteria recommendations for pollutants in surface waters. The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained.

Federal Endangered Species Act

The federal Endangered Species Act (ESA) of 1973 (16 USC 1531 et seq.), as amended, is administered by the U.S. Fish and Wildlife Service (USFWS) and NOAA Fisheries. This legislation is intended to provide a means to conserve the ecosystems upon which endangered and threatened species depend and provide programs for the conservation of those species, thus preventing extinction of plants and wildlife. Under provisions of Section 9(a)(1)(B) of FESA, it is unlawful to "take" any listed species. "Take" is defined in Section 3(19) of FESA as, "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Additionally, Section 7(a)(2) of the ESA directs federal agencies to consult with the USFWS or NOAA Fisheries for any actions that "may affect" listed species.

FESA provides for designation of Critical Habitat, defined in Section 3(5)(A) as specific areas within the geographical range occupied by a species where physical or biological features "essential to the conservation of the species" are found and "which may require special management considerations or protection." Critical Habitat may also include areas outside the current geographical area occupied by the species that are nonetheless "essential for the conservation of the species."

National Environmental Policy Act

The national commitment to the environment was formalized through the passage of the National Environmental Policy Act (NEPA) of 1969. NEPA establishes a national environmental policy and provides a framework for environmental planning and decision making by Federal agencies. NEPA directs Federal agencies, when planning projects or issuing permits, to conduct environmental reviews to consider the potential impacts on the environment by their proposed actions. NEPA established a supplemental mandate for Federal agencies to consider the potential environmental consequences of their proposals, document the analysis, and make this information available to the public for comment prior to implementation. The environmental protection policy established in NEPA, Section 101, is supported by a set of "action forcing" provisions in Section 102 that form the basic framework for Federal decision making and the NEPA process. While NEPA established the basic framework for integrating environmental considerations into Federal decision making, it did not provide the details of the process for which it would be accomplished. Federal implementation of NEPA is the charge of the Council on Environmental Quality (CEQ), which interpreted the law and addressed NEPA's action forcing provisions in the form of regulations and guidance.

Marine Mammal Protection Act

All marine mammals are afforded protection under the Marine Mammal Protection Act (16 USC 1361 et. seq.). With limited exception, the Act makes it illegal to "take" a marine mammal without authorization granted by the NOAA Fisheries. "Take" is defined as harassing, hunting, capturing, or killing, or attempting to harass, hunt, capture, or kill any marine mammal. "Harassment" is defined as pursuit, torment, or annoyance, which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering. Take authorization must be granted by the NOAA Fisheries.

4.2 State

Lempert-Keene-Seastrand Oil Spill Prevention and Response Act

California's Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (1990) covers all aspects of marine oil spill prevention and response in California. It established the OSPR and gave the agency very broad powers to provide best achievable protection of California's natural resources by preventing, preparing for, and responding to oil spills and enhancing affected resources.

California Coastal Act

The California Coastal Commission (CCC) was established by voter initiative in 1972 and was made permanent by the California Legislature through the adoption of the CCA of 1976 (Public Resources Code Section 30000 et seq.). The CCC, in partnership with coastal cities and counties, plans and regulates the use of land and water in the coastal zone. Under the CCA, cities and counties are responsible for preparing a Local Coastal Plan (LCP) in order to obtain authority to issue a Coastal Development Permit (CDP) for projects within their jurisdiction. LCPs consist of land use plans, zoning ordinances, zoning maps, and other implementing actions that conform to CCA policies. Until an agency has a fully certified LCP, the CCC is responsible for issuing CDPs. County of Ventura (County) has a fully certified LCP that was last updated in April 2017, but is currently completing a series of amendments to the LCP, which is the document that defines the County's goals, policies, programs, and land use regulations for the coastal zone.. The jurisdiction of the Ventura County LCP includes Ventura Harbor and a portion of the transit associated with the project within the Coastal Zone, but the project site is outside the LCP jurisdiction in federal waters.

Under the CCA, Section 30107.5, environmentally sensitive habitat areas are areas within the coastal zone that are "designated based on the presence of rare habitats or areas that support populations of rare, sensitive, or especially valuable species or habitats." In addition, the CCC regulates impacts to coastal wetlands defined in Section 30121 of the CCA as, "lands within the coastal zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens." The CCA requires that most development avoid and buffer coastal wetland resources in accordance with Sections 301231 and 30233, including limiting the filling of wetlands to certain allowable uses.

California Endangered Species Act

The CDFW administers California Endangered Species Act (CESA) (California Fish and Game Code, Section 2050 et seq.), which prohibits the "take" of plant and animal species designated by the Fish and Game Commission as endangered or threatened in the State of California. Under CESA Section 86, take is defined as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA Section 2053 stipulates that state agencies may not approve projects that will "jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available consistent with conserving the species or its habitat which would prevent jeopardy."

CESA Sections 2080 through 2085 address the taking of threatened, endangered, or candidate species by stating, "No person shall import into this state, export out of this state, or take, possess, purchase, or sell within this state, any species, or any part or product thereof, that the Commission determines to be an endangered species or a threatened species, or attempt any of those acts, except as otherwise provided in this chapter, the Native Plant Protection Act (Fish and Game Code, Sections 1900–1913), or the California Desert Native Plants Act (Food and Agricultural Code, Section 80001)."

California Fish and Game Code

According to Sections 3511 and 4700 of the Fish and Game Code, which regulate birds and mammals, respectively, a "fully protected" species may not be taken or possessed without a permit from the Fish and Game Commission, and "incidental takes" of these species are not authorized.

5 SPILL PREVENTION MEASURES AND EQUIPMENT

5.1 Measures for Spill Prevention

5.1.1 VESSEL MAINTENANCE

- Maintain engine to manufacturer's specifications.
- Replace cracked or worn hydraulic lines and fittings before they fail. Lines can wear out from sun and heat exposure or abrasion.
- Routinely inspect engine for signs of a potential oil leak, and properly repair as needed.
- Use a bilge sock out of oil absorbent pads to prevent oily water discharge.
- Use an absorbent pad or a fuel collar to catch drips when using chemicals or fuel.
- Fuel, lubricants and chemicals must be labeled, stored and disposed of in a safe and responsible manner, and marked with warning signs.
- All hydraulic fluid to be used for installation, maintenance, planting, and harvesting activities shall be vegetable based.
- Spill prevention and response equipment shall be kept onboard project vessels at all times.

5.1.2 FUELING UP AT THE PUMP

- Avoid overflows while refueling by knowing the capacity of your tank and leaving some room for fuel expansion.
- Shut off your bilge pump while refueling.
- Use an absorbent pad or a fuel collar to catch drips.

5.1.3 VESSEL UNDERWAY AND DURING CONSTRUCTION ACTIVITIES

- Provide secondary containment for all oils stored in quantities greater than 5 gallons.
- Use an absorbent pad or a fuel collar to catch drips when using chemicals or fuel.
- At-sea vessel or equipment fueling/refueling activities is prohibited.
- Spill prevention and response equipment shall be kept onboard project vessels at all times.
- Precautions shall be taken to prevent spills, fires and explosions, and procedures and supplies shall be readily available to manage chemical and fuel spills or leaks.

5.2 Spill Response Equipment

General purpose spill kits, such as sorbent kits, will be used in regular operations vessels as a precaution. Sorbent kits consists of various types of sorbents such as booms, pillows and pads for use at any oil spill location on board a vessel. Chemical absorbing pads are also a part of the kit.

The spill kit for vessels for all commercial vessels involved in the placing of anchors should contain sorbents with a total absorbing capacity of 1/2 barrel of oil together with appropriate personal protective equipment and instructions on proper oil spill response procedures. A spill kit for vessels engaged in aquaculture shall include absorbent pads or other media that can be accommodated within a five gallon commercial spill kit, together with appropriate personal protective equipment and instructions on proper oil spill response procedures.

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6 EMERGENCY RESPONSE PROCEDURES

All significant releases or threatened releases of a hazardous material, including oil and radioactive materials, requires emergency notification to government agencies. Reportable spills of hazardous substances include those that:

- Impact or threaten to impact human health;
- Impact or threaten to impact the environment;
- Create a fire, explosion or safety hazard;
- Are not immediately cleaned up or evaporated; or
- Exceed state or federal reportable quantities.

6.1 Responsible Party

The person who possesses or controls the hazardous substance or who causes the discharge is known as the responsible party and is responsible for notification and cleanup.

Requirements for immediate notification of all significant spills or threatened releases cover: owners, operators, licensees, persons in charge, and employers. Notification is required regarding significant releases from: facilities, vehicles, vessels, pipelines and railroads.

State law: Handlers, any employees, authorized representatives, agent or designees of handlers shall, upon discovery, immediately report any release or threatened release of hazardous materials (Health and Safety Code §25510).

Federal law: Notification to the National Response Center is required for all releases that equal or exceed federal reporting quantities:

- (EPCRA) Owners and Operators to report, and
- (CERCLA) Person in Charge to report

6.2 When to Notify

California law requires that anyone who spills a substance that could endanger humans or wildlife in or near California waters must report (Cal OES 2014). Anyone who witnesses a spill is encouraged to report it as well. Report spills as quickly as possible, since rapid response helps to lessen the damage. All significant spills or threatened releases of hazardous materials, including oil and radioactive materials must be immediately reported. Notification must be made by telephone. Written Follow-Up Reports (Section 304) are required within 7 days if the release equals or exceeds the Federal Reportable Quantities (Cal OES 2014; Appendix A; EPA 2002).

6.3 Information to Provide

State notification requirements for a spill or threatened release to include:

- Identity of caller
- Exact location, date and time of spill, release or threatened release
- Substance (i.e. oil, gas, diesel, etc.), quantity involved, and isotope if necessary
- Chemical name (if known, it should be reported if the chemical is extremely hazardous)
- Description of what happened
- If oiled or threatened wildlife are present
- Information or thoughts on who spilled the material
- Any suspicious activity observed at the spill site

Federal notification requires additional information for spills (CERCLA chemicals (EPA 2015)) that exceed federal reporting requirements (Appendix A), which includes:

- Medium or media impacted by the release
- Time and duration of the release
- Proper precautions to take
- Known or anticipated health risks
- Name and phone number for more information

6.4 Emergency Notification Contact List

6.4.1 PETROLEUM (OIL) OR CHEMICAL SPILL EMERGENCY

1. Stop the spill and warn others in the area immediately.
2. Shut off any ignition sources, including cigarettes.
3. Contain the spill using absorbent materials if the spill is relatively small in nature and after the spilled chemical and its hazardous properties have been properly identified and assessed. Collect absorbent materials and treat as hazardous waste and dispose of materials accordingly as required under State and Federal law.
4. Cover or block any drains to contain the spill to the vessel.
5. First call: the U.S. Coast Guard followed by 911 (or local emergency response agency)

6. Then report the spill immediately to:
   - State Law: 1-800-852-7550 Cal OES State Warning Center
     Who reports: handlers, any employees, authorized representatives, agent or designees of handlers shall, upon discovery, immediately report any release or threatened release of hazardous materials.
   - Federal Law: 1-800-424-8802 National Response Center. Notification to the National Response Center is required for all releases that equal or exceed federal reporting quantities.
     Who reports: (EPCRA) Owners and Operators to report, and (CERCLA) Person in Charge to report.

Spills of oil or hazardous materials to water must be reported immediately to help reduce impacts to the environment. Failure to report a spill could result in penalties. There are no penalties for reporting a spill unnecessarily, but there can be significant penalties for not reporting one.

6.4.2 ADDITIONAL SPILL REPORTING

Spill geographic location and type of spill dictates the agencies that need to be contacted. For VSE, which includes coastal areas, harbors, and state and federal waters, the primary contact agency for reporting spills will be the U.S. Coast Guard and Cal OES. Table 1 indicates required contacts to notify in the event of a spill, with the primary contact highlighted in bold type. See Appendix B for a list of important phone numbers.

State Agencies: California Office of Emergency Services, California Department of Public Health, State Emergency Response Commission (SERC), Office of Spill Prevention and Response, California Department of Fish and Wildlife. The California State Emergency Response Commission (SERC) established six emergency planning districts having the same boundaries as the Mutual Aid Regions. The SERC appointed a Local Emergency Planning Committee (LEPC) for each planning district, known as regions, and supervises and coordinates their activities. LEPC Region I is comprised of Los Angeles, Orange, San Luis Obispo, Santa Barbara, and Ventura.

Federal Agencies: U.S. Environmental Protection Agency, U.S. Department of Fish and Wildlife, U.S. Food and Drug Administration, U.S. Coast Guard, and NOAA. Under the National Contingency Plan and the National Response Plan, NOAA is responsible for providing scientific support to the Federal On-Scene Coordinator, often the U.S. Coast Guard, for oil and hazardous material spills. While the U.S. Coast Guard oversees all responses to oil spills and chemical accidents in U.S. navigable waters, NOAA's Office of Response and Restoration (OR&R) provides them with the science-based expertise and support they need to make informed decisions during these emergency responses (OR&R 2019b).

Table 1: Reporting Requirements for Different Types of Spills

<table>
<tr><th>Type of spill</th><th>Reporting requirements</th><th>Required contacts</th></tr>
<tr><td colspan="3">First call: 911 (or local emergency response agency)
Then call: Cal OES State Warning Center (for spills in State waters and onshore)
(800) 852-7550 or (916) 845-8911
Then refer to the table below for other agencies to contact based on the type of spill.</td></tr>
<tr><td>Petroleum (oil) discharges and hazardous substance spills in waterways</td><td>• Report it immediately.
• Report spills that occur anywhere in California by calling these State and federal phone numbers that are available 24 hours a day:</td><td>• The National Response Center: 1-800-424-8802 (if the spill equals or exceeds CERCLA Federal Reportable Quantities, Appendix A)
• United States Coast Guard, Sector: Los Angeles/Long Beach: (310) 521-3805
• OSPR West Coast Spill Hotline: 1-800-OILS-911
• California Department of Fish and Wildlife's CalTIP line: 1-888-DFG-CALTip (1-888-334-2258)
• US Food and Drug Administration: 866-300-4374
• California Department of Public Health Preharvest Shellfish Program: 510-412-4635</td></tr>
<tr><td>Release of hazardous or extremely hazardous substance</td><td>• Report it immediately.
• See full EPCRA reporting requirements (Appendix C).</td><td>• United States Coast Guard, Sector: Los Angeles/Long Beach: (310) 521-3805
• The National Response Center: 1-800-424-8802 (if the spill equals or exceeds CERCLA Federal Reportable Quantities, Appendix A)
• The State Emergency Response Commission (SERC) at 1-800-258-5990
• Your Local Emergency Planning Committee (LEPC)- Cal OES, Southern Region: 1-562-795-2937
• US Food and Drug Administration: 866-300-4374
• California Department of Public Health Preharvest Shellfish Program: 510-412-4635</td></tr>
</table>

Table 1: Reporting Requirements for Different Types of Spills

Type of spill	Reporting requirements	Required contacts
Hazardous waste	• Report it immediately.	• United States Coast Guard, Sector: Los Angeles/Long Beach: (310) 521-3805 • The National Response Center: 1-800-424-8802 (if the spill equals or exceeds CERCLA Federal Reportable Quantities, Appendix A) • OSPR West Coast Spill Hotline: 1-800-OILS-911 • US Food and Drug Administration: 866-300-4374 • California Department of Public Health Preharvest Shellfish Program: 510-412-4635
Sewage releases	• Report it immediately.	• United States Coast Guard, Sector: Los Angeles/Long Beach: (310) 521-3805 • California Governor's Office of Emergency Services, California State Warning Center: (800) 852-7550 or (916) 845-8911 (state waters, spills of 1000 gallons or more) • US Food and Drug Administration: 866-300-4374 • California Department of Public Health Preharvest Shellfish Program: 510-412-4635

6.4.3 OILED WILDLIFE

To report oiled or sick wildlife during a spill, please contact the Oiled Wildlife Care Network (OWCN) at (877) UCD-OWCN.

6.4.4 SICK OR INJURED WILDLIFE THAT IS NOT OILED

To report inured or sick wildlife that is not oiled please contact the Channel Islands Marine and Wildlife Institute (CIMWI) at (805) 567-1505 for any marine mammals (seals, sea lions, dolphins, otters, etc.) or the Santa Barbara Wildlife Care Network (SBWCN) at (805) 681-1080 for all other animals. For stranded whales, dolphins or porpoise call Channel Islands Cetacean Research Unit (CICRU) at (805) 896-0858.6.4.5 Written Reports

Different laws have different time requirements and criteria for submitting written reports (Cal OES 2014). After a spill or release of hazardous materials, including oil and radioactive materials, immediate verbal emergency notification should be followed up as soon as possible with a Written Follow-Up Report, if required, to the following agencies:

1. California Governor's Office of Emergency Services
   Section 304 Follow Up Report.
2. The responsible regulating agency such as:
   - California Department of Health Services, Radiological Health Branch, Radiological Incident Reporting.
   - Department of Toxic Substances Control, Facility Incident or Tank System Release Report.
   - Cal/OSHA, serious injury or harmful exposure to workers.
3. U.S. DOT and DOE, transportation-related incidents.

6.4.6 PENALTIES

Federal and state laws provide for administrative penalties of up to $25,000 per day for each violation of emergency notification requirements. Criminal penalties may also apply (Cal OES 2014).

6.5 Personal Safety

Exposure to oil, associated fumes, and other chemicals can be extremely dangerous to your health, with effects ranging from eye and skin irritation to breathing problems to serious life-threating health conditions. Specialized training and equipment are necessary to safely and appropriately respond to spills. It is imperative that people remain out of the affected area and allow official trained response agency personnel to access the area and respond. Handling wildlife can be dangerous to both you and the animal. Therefore, oiled wildlife requires special care to maximize survival and recovery potential (SBCK 2019). When cleaning up a small spill, use appropriate protective equipment, including protective gloves and goggles.

7 CONCLUSION

The Spill Prevention and Response Plan for the Ventura Shellfish Enterprise provides guidelines and contact numbers in the event of a spill and will, as followed by owners/operators, allow for quick and decisive action to protect the marine environment and our natural resources.

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APPENDIX A

Federal Reportable Quantities

ATTACHMENT 1

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 302

[SW H–FRL–7241–8]

RIN 2050–AE88

Correction of Typographical Errors and Removal of Obsolete Language in Regulations on Reportable Quantities

AGENCY: Environmental Protection Agency (EPA).

ACTION: Direct final rule.

SUMMARY: The Environmental Protection Agency (EPA or ''the Agency'') is correcting errors and removing obsolete or redundant language in regulations regarding notification requirements for releases of hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Consistent with ongoing regulatory reinvention initiatives within the Agency, EPA has reviewed the CERCLA release reporting regulations and has identified several categories of errors, including: typographical errors in the table of CERCLA hazardous substances; definitions made legally obsolete because of changes in CERCLA's statutory provisions; and redundant or unnecessary information.

DATES: This rule is effective on September 9, 2002, unless EPA receives written adverse comments by August 8, 2002. If the effective date is delayed, timely notice will be published in the **Federal Register**.

ADDRESSES: *Comments:* Interested parties may submit an original and two copies of comments referencing docket number 102RQ–CORRECT to (1) if using regular U.S. Postal Service mail: Docket Coordinator, Superfund Docket Office, (Mail Code 5201G), U.S. Environmental Protection Agency Headquarters, Ariel Rios Building, 1200 Pennsylvania Avenue, NW., Washington, DC 20460; or (2) if using special delivery such as overnight express service: Superfund Docket Office, Crystal Gateway One, 1st Floor, 1235 Jefferson Davis Highway, Arlington, VA 22202.

Release Notification: The toll-free telephone number of the National Response Center is 800/424–8802; in the Washington, DC metropolitan area, the number is 202/267–2675. The facsimile number for the National Response Center is 202/267–2165 and the telex number is 892427.

Docket: You may inspect copies of materials relevant to this rulemaking at the U.S. EPA Superfund Docket Office, located at Crystal Gateway One, 1st Floor, 1235 Jefferson Davis Highway, Arlington, VA 22202 [Docket Number 102RQ–CORRECT]. The docket is open from 9:00 a.m. to 4:00 p.m., Monday through Friday, excluding Federal holidays. To review docket materials, we recommend that you make an appointment by calling 703/603–9232. You may copy a maximum of 100 pages from any regulatory docket at no cost. Additional copies cost $0.15 per page. The Docket Office will mail copies of materials to you if you are located outside the Washington, DC metropolitan area.

FOR FURTHER INFORMATION CONTACT: For general information, contact the RCRA, Superfund, and EPCRA Hotline at 800/424–9346 (in the Washington, DC metropolitan area, contact 703/412–9810). The Telecommunications Device for the Deaf (TDD) Hotline number is 800/553–7672 (in the Washington, DC metropolitan area, contact 703/412–3323). For information on specific aspects of the rule, contact Lynn Beasley of the Office of Emergency and Remedial Response (5204G), U.S. Environmental Protection Agency, Ariel Rios Building, 1200 Pennsylvania Avenue, NW., Washington, DC 20460. Ms. Beasley's e-mail address is *beasley.lynn@epa.gov* and her telephone number is 703/603–9086.

SUPPLEMENTARY INFORMATION: *Outline of This Document:* The contents of this preamble are listed in the following outline:

I. Introduction

A. *Who Potentially Will Be Affected by This Final Rule?*

This final rule may affect the following entities: (1) Persons in charge of vessels or facilities that may release CERCLA hazardous substances into the environment; and (2) entities that plan for or respond to such releases.

POTENTIALLY AFFECTED ENTITIES

Type of entity	Examples of affected entities
Industry	Manufacturers, handlers, transporters, and other users of CERCLA hazardous substances.
State, Local, or Tribal Governments	State Emergency Response Commissions, and Local Emergency Planning Committees.
Federal Government	National Response Center, and any Federal agency that may release or respond to releases of these substances.

EPA does not intend for this table to be exhaustive, but rather to provide a guide for readers regarding entities likely to be affected by this action. Other entities not listed in the table may also be affected. You can determine whether your organization is affected by examining the changes being made to 40 CFR part 302. If you have questions about the applicability of this action to a particular entity, consult the contact names and phone numbers listed in the preceding **FOR FURTHER INFORMATION CONTACT** section of this preamble.

B. What Are the Reporting Requirements Under CERCLA and EPCRA?

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. 9601 *et seq.*, as amended, gives the Federal government broad authority to respond to releases or threats of releases of hazardous substances from vessels and facilities. The term ''hazardous substance'' is defined in section 101(14) of CERCLA by reference to various Federal environmental statutes.

Under CERCLA section 103(a), the person in charge of a vessel or facility from which a CERCLA hazardous substance has been released in a quantity that equals or exceeds its reportable quantity (RQ) must immediately notify the National Response Center (NRC) of the release. A release is reportable if an RQ or more is released within a 24-hour period (see 40 CFR 302.6). In addition to the reporting requirements under CERCLA section 103, section 304 of the Emergency Planning and Community Right-to-Know Act of 1986, 42 U.S.C. 11001 *et seq.*, requires owners or operators of certain facilities to report releases of extremely hazardous substances and CERCLA hazardous substances to State and local authorities (see 40 CFR 355.40). After the release of a hazardous substance in a quantity equal to or greater than its RQ, facility owners or operators must immediately notify the community emergency coordinator for each local emergency planning committee for any area likely to be affected by the release, and the State emergency response commission of any State likely to be affected by the release.

Section 102(b) of CERCLA establishes RQs of one pound (''statutory RQs'') for releases of most CERCLA hazardous substances. Under section 102(a) of CERCLA, the Administrator of EPA has the authority to adjust these RQs by regulation (''adjusted RQs''). The list of CERCLA hazardous substances and RQs is codified in Table 302.4 of 40 CFR 302.4.

C. What Is the Purpose of This Rule?

EPA and other Federal agencies periodically review the regulations they administer to identify those rules that are obsolete or unduly burdensome. For example, on June 29, 1995, EPA published a final rule (60 FR 33912) eliminating a number of legally obsolete regulations. Now we are taking another step in the ongoing review of our rules. EPA has reviewed 40 CFR part 302 and is correcting typographical errors in the table of hazardous substances. We also are revising regulatory text to make it more concise, conform more closely to statutory language, and eliminate text that is redundant or legally obsolete. All of these changes are editorial and do not affect any substantive aspects of the CERCLA release reporting program.

Because these corrections are editorial, EPA does not anticipate that any costs will be associated with this rulemaking. Rather, we expect that these corrections will serve to reduce confusion among the regulated community and government authorities about release reporting regulations contained in 40 CFR part 302 and, therefore, reduce the burden of complying with these regulations.

D. Why Is EPA Making These Changes in a Final Rule, Without Prior Opportunity for Comment?

EPA is publishing this rule without prior proposal because we view these changes as noncontroversial amendments and anticipate no adverse comment. Section 553 of the Administrative Procedure Act, 5 U.S.C. 553(b)(3)(B), provides that, when an agency for good cause finds that notice and public procedure is impracticable, unnecessary, or contrary to the public interest, the agency may issue a rule without providing notice and an opportunity for public comment. EPA has determined that there is good cause for making today's rule final without prior proposal and opportunity for comment because the removals and revisions contained in this final rule are editorial and do not affect any substantive aspects of the CERCLA release reporting program. Thus, notice and public comment procedure are unnecessary. EPA finds that this constitutes good cause under 5 U.S.C. 553(b)(3)(B). For the same reason, EPA has also determined that it has good cause under 5 U.S.C. 553(d) to make the rule effective upon publication.

II. Corrections and Other Changes Made to 40 CFR Part 302 in Today's Rulemaking

The following section describes the specific corrections that EPA is making to 40 CFR part 302 in today's rulemaking.

A. Revisions to 40 CFR 302.2 (Abbreviations)

EPA believes that listing abbreviations in 40 CFR 302.2 is unnecessary, because these terms: (1) Are defined elsewhere in 40 CFR part 302 (as is the case with ''CASRN'' and ''kg''); (2) are not used in this CFR part (as in the case of ''lb'' for pound); or (3) would more appropriately be defined when the term is first used (such as ''RQ'' and ''RCRA''). For these reasons, EPA is removing and reserving 40 CFR 302.2.

B. Revisions to 40 CFR 302.3 (Definitions)

The definition of ''release'' in 40 CFR 302.3 was, at the time we codified it in the CFR in 1985, the same as the statutory definition of this term in CERCLA section 101(22). The Superfund Amendments and Reauthorization Act of 1986 (SARA), however, changed the statutory definition; for this reason, we are revising the definition of ''release'' in 40 CFR 302.3 to reflect these amendments, which included language regarding abandonment or discarding of containers. EPA proposed this change in a July 19, 1988, proposed rule (53 FR 27268) and did not receive any adverse comments on this issue.

In addition, the definition of ''reportable quantity'' in 40 CFR 302.3 is being changed to add the abbreviation ''(RQ)'' so that the term is defined when first used in 40 CFR part 302.

C. Revisions to 40 CFR 302.5 (Determination of Reportable Quantities)

Section 302.5(b) refers to toxicity identified in the Resource Conservation and Recovery Act (RCRA) regulations at 40 CFR 261.24. In 1990, EPA revised 40 CFR 261.24 as well as Table 302.4 to delete references to the terms ''extraction procedure'' and ''EP'' toxicity. To be consistent with these changes, EPA is revising paragraph (b) of 40 CFR 302.5 to delete references to ''EP'' toxicity.

D. Revisions to 40 CFR 302.6 (Notification Requirements)

An additional Washington phone number ((202) 267–2675), a facsimile number ((202) 267–2165), and a telex number (892427) are being added to the list of National Response Center (NRC) phone numbers in paragraph (a) of 40 CFR 302.6.

E. Revisions to 40 CFR 302.7 (Penalties)

The penalty description in 40 CFR 302.7(a)(3) was, at the time we codified it in the CFR in 1985, consistent with the penalty provisions in CERCLA section 103(b). In 1986, however, SARA changed CERCLA section 103(b) to include language regarding submission of false information. EPA proposed this change in the July 19, 1988 proposed rule and did not receive any adverse comments on this issue. Thus, EPA is revising paragraph (a)(3) of 40 CFR

302.7 to conform to the revised language of CERCLA section 103(b).

F. Revisions to 40 CFR 302.8 (Continuous Releases)

The reference to paragraph (a) in 40 CFR 302.8(e)(1)(iv)(H) and 40 CFR 302.8(f)(4)(viii) is incorrect, and is being changed to reference paragraph (b).

G. Revisions to 40 CFR 302.4 (Designation of Hazardous Substances)

Because corrections and other changes to Table 302.4 that are described below are numerous and pervasive, we are reprinting Table 302.4 in its entirety in today's rule. We hope that this reprint of Table 302.4 will prove to be a useful resource for the public and the regulated community until such time as the revised volume of 40 CFR part 302 that contains these changes is published. Amendatory instruction 5 in today's direct final rule accounts for the removal of the previous version of Table 302.4, and its replacement with the version published in today's final rule.

1. Formatting Changes to Table 302.4

Three columns in Table 302.4 of 40 CFR 302.4 contain information that is duplicated elsewhere in the table or is no longer relevant to the listing of hazardous substances and reportable quantities. For this reason, EPA is deleting these columns from Table 302.4 in today's rulemaking.

We believe that deleting these columns will serve to: (1) Simplify the table and reduce confusion among the regulated community and government authorities about its use; (2) reduce the number of typographical and other errors that are introduced into the table; and (3) allow the table to be printed in a ''portrait'' rather than ''landscape'' format, resulting in a reduction in the number of CFR pages. A description of each of the columns identified for deletion is included below.

a. Regulatory Synonyms Column

EPA lists substances in Table 302.4 by the names used in certain other environmental statutes (e.g., RCRA, the CWA, or the Clean Air Act (CAA)) or in their implementing regulations. When the substance is known by different names in different regulatory programs, EPA lists these names as separate entries in Table 302.4's Hazardous Substance column. In addition, Appendix A to Table 302.4 lists these synonyms together, by Chemical Abstracts Service Registry Number (CASRN).

Because the synonyms are all listed alphabetically in the Hazardous Substance column, and because Appendix A provides a per-substance grouping of all these synonyms, the Regulatory Synonyms column includes only unnecessary duplicative information. Therefore, EPA is deleting this column from Table 302.4 in today's final rule.

b. Statutory RQ Column

When Table 302.4 was first published in the **Federal Register** in 1985, the Statutory RQ column served a useful purpose because (1) CWA hazardous substances generally had different statutory RQs than other CERCLA hazardous substances; and (2) the Agency had not yet adjusted many of the statutory RQs for these substances.

Today, however, all of the statutory RQs for the CWA hazardous substances have been adjusted and, for any new substance added to Table 302.4, the statutory RQ is always one pound. When new substances are added to the list, footnote ''##'' is added to the Final RQ Pounds column indicating that the substance has a one-pound statutory RQ; thus, the Statutory RQ column provides only redundant or obsolete information. In addition, this column can be a source of errors; for example, at least seven substances have had incorrect information in the Statutory RQ column. EPA is deleting the Statutory RQ column from Table 302.4 in today's final rule.

c. Final RQ Category Column

The ''Final RQ Category'' column was used in Table 302.4 in the first CERCLA reporting program final rule on April 4, 1985, because members of the regulated community were familiar with a similar association between letter categories and numerical RQs (X = 1 pound, A = 10 pounds, B = 100 pounds, etc.) in the Clean Water Act (CWA) hazardous substance regulations (40 CFR part 117). The CWA categories, however, correspond to ranges of aquatic toxicity, while the CERCLA categories are simply another way of expressing the RQ value. EPA originally proposed the CWA categories (A, B, C, and D) in 1975, based on the hazardous material classification system for a 1973 international convention. A 1978 final rule for CWA RQs added another category (X).

The Category column provides little or no useful information on the CERCLA list of hazardous substances in Table 302.4, because the next column gives the RQ in pounds. Today, the category is a source of errors and confusion. For example, prior to today's rulemaking, the category for six substances was incorrectly listed as X, even though the RQs are 10, 100, or 1000 pounds. EPA is deleting the Category column from Table 302.4 in today's final rule.

2. Revisions to the Note Preceding Table 302.4

Because EPA is removing the Regulatory Synonyms, Statutory Code, and Final RQ Category columns from Table 302.4 in today's rulemaking, we are revising the note that precedes Table 302.4 to remove references to these columns. The revised note will also identify Appendix A to Section 302.4 as a source for identifying regulatory synonyms of substances that appear on the CERCLA list of hazardous substances.

3. Corrections to Errors in Table 302.4

EPA has identified other errors in Table 302.4. The majority of these errors are either typographical or the result of inadvertent omissions; the scope of what is regulated and how it is regulated will not change. Therefore, these corrections qualify for the ''good cause'' exemption as ''minor or technical amendments.''

a. What Corrections Are Being Made to Entries for Individual Substances?

The most commonly found errors in Table 302.4 are inadvertent discrepancies between an individual hazardous substance name that appears on the CERCLA list and the same name as it appears in other statutes (i.e., RCRA section 3001, CWA sections 307 and 311, and CAA section 112) and their implementing regulations. In today's rule, EPA is making corrections to the hazardous substance names of a number of CERCLA entries to make them consistent with names that appear in these other regulatory lists. Many of these corrections are simple and involve, for example, the deletion of an unnecessary hyphen or the addition of parentheses. In addition, to help make each entry more readable, we are changing all of the CASRNs listed in Table 302.4 to include hyphens in the appropriate places (e.g., changing ''50000'' to ''50–00–0'' for formaldehyde). Other types of corrections to Table 302.4 included in today's rule that require more explanation are described below.

TABLE 1.—CORRECTIONS TO ENTRIES FOR INDIVIDUAL SUBSTANCES IN TABLE 302.4

Current entry in Table 302.4 of 40 CFR 302.4	Change needed to correct error
Acetic acid, (2,4,5-trichlorophenoxy) Pentachlorophenol Phenol, pentachloro- Phenol, 2,3,4,6-tetrachloro- Phenol, 2,4,5-trichloro- Phenol, 2,4,6-trichloro- Silvex (2,4,5-TP) 2,4,5-T 2,4,5-T acid 2,3,4,6-Tetrachlorophenol 2,4,5-TP acid	RCRA ''U'' waste numbers are no longer associated with these substances in the RCRA regulations at 40 CFR part 261; rather, each of the RCRA waste numbers for these substances has been replaced with the following note: ''See F027.'' Conforming changes are being made to these entries in Table 302.4.
2,4,5-Trichlorophenol 2,4,6-Trichlorophenol	Each of these substances is listed twice in Table 302.4. We are removing the duplicative entries from Table 302.4 in today's rule. In addition, because these substances appear in CAA section 112, a ''3'' is being added to the statutory code column for these entries in Table 302.4. Also, ''U'' waste numbers are no longer associated with these substances and have been replaced with: ''See F027.''
Propionic acid, 2-(2,4,5-trichlorophenoxy)-	To be consistent with RCRA regulations, the spelling of this substance name is being changed in Table 302.4 to ''Propanoic acid, 2-(2,4,5-trichlorophenoxy).'' In addition, RCRA waste number ''U233'' is no longer associated with this substance and has been replaced with: ''See F027.''
Arsenic acid H3AsO4 Arsenic acid	''Arsenic acid'' with CASRN 1327–52–2 is not listed in RCRA, the CAA, the CWA, or their implementing regulations. Thus, the entry for ''Arsenic acid'' is being deleted from Table 302.4. In addition, CASRN 1327–52–2 is being deleted from the ''Arsenic acid H3AsO4'' listing. Arsenic acid H3AsO4 with CASRN 7778–39–4 remains listed in Table 302.4.
Cyanogen bromide(CN)Br Cyanogen bromide	''Cyanogen bromide'' is not listed in RCRA, the CAA, the CWA, or their implementing regulations, although its synonym ''Cyanogen bromide(CN)Br'' is listed in the RCRA regulations. Thus, the entry for ''Cyanogen bromide'' is being deleted from Table 302.4.
Aroclors PCBs POLYCHLORINATED BIPHENYLS	Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260 are listed as separate entries in Table 302.4. These seven aroclors also appear indented beneath the entries for ''Aroclors,'' ''PCBs,'' and ''POLYCHLORINATED BIPHENYLS.'' The duplicative indented entries for the seven aroclors are being deleted. In addition, conforming changes are being made to the Appendix A entries for these seven aroclors.
Bis(2-ethylhexyl) phthalate	This substance is listed in the CAA, but a ''3'' was never added to the statutory code column. A ''3'' is being added to the column in today's rule.
Calcium cyanide Copper cyanide Cyanogen chloride Hydrogen sulfide Nickel carbonyl Nickel cyanide Potassium cyanide Selenium sulfide Silver cyanide Sodium cyanide Thallium (I) chloride Zinc cyanide Zinc phosphide	Each of these substances is listed twice (once with a chemical formula and once without the formula) in the RCRA or CWA regulations and in Table 302.4. In the interest of avoiding duplicative entries in Table 302.4, the non-formula entries for these substances are being removed in today's rule.
1,10-(1,2-Phenylene)pyrene Methyl chloroformate Muscimol Tetrachloroethene Benzene, hydroxy- Benzo [j,k] fluorene 1,2-Benzphenanthrene Camphene, octachloro- 4-Chloro-m-cresol 1,4-Diethylenedioxide Hexachlorocyclohexane (gamma isomer) Trichloroethene	These synonyms are not listed in RCRA, the CAA, the CWA, or their implementing regulations and are being removed from Table 302.4 and Appendix A in today's rule. Other names for these same substances remain listed in Table 302.4 and Appendix A.
Carbaryl Carbofuran Mercaptodimethur Mexacarbate Propoxur (Baygon) Triethylamine	These six substances appear in Table 302.4 by virtue of their listing on the Clean Water Act or Clean Air Act. In a February 9, 1995 final rule (60 FR 7824), EPA added a number of synonyms to the RCRA regulations for these substances. To be consistent, the synonyms for these substances are being added to Table 302.4 and Appendix A in today's rule. In addition, a ''4'' is being added to the statutory code column for these entries in Table 302.4.

TABLE 1.—CORRECTIONS TO ENTRIES FOR INDIVIDUAL SUBSTANCES IN TABLE 302.4—Continued

Current entry in Table 302.4 of 40 CFR 302.4	Change needed to correct error
2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenyl-butyl)-, & salts, when present at concentrations greater than 0.3%.	The RCRA regulations include two listings for this substance: (1) One when present at concentrations greater than 0.3% (P001); and (2) another when present at concentrations of 0.3% or less (U248). Only the first currently appears on Table 302.4. This entry is being deleted from Table 302.4 and replaced with an entry that covers both RCRA listings, as follows: ''2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts'' In addition to ''P001,'' ''U248'' is being added to this entry as an additional RCRA waste number.
Warfarin, & salts, when present at concentrations greater than 0.3%.	The RCRA regulations include two listings for this substance: (1) One when present at concentrations greater than 0.3% (P001); and (2) another when present at concentrations of 0.3% or less (U248). Only the first currently appears on Table 302.4. This entry is being deleted from Table 302.4 and replaced with an entry that covers both RCRA listings, as follows: ''Warfarin, & salts'' In addition to ''P001,'' ''U248'' is being added to this entry as an additional RCRA waste number.
Zinc phosphide Zn3P2, when present at concentrations greater than 10%.	The RCRA regulations include two listings for this substance: (1) One when present at concentrations greater than 10% (P122); and (2) another when present at concentrations of 10% or less (U249). Only the first currently appears on Table 302.4. This entry is being deleted from Table 302.4 and replaced with an entry that covers both RCRA listings, as follows: ''Zinc phosphide Zn3P2'' In addition to ''P122,'' ''U249'' is being added to this entry as an additional RCRA waste number.
Beryllium powder	Prior to 1994, the Table listed Beryllium (from the CAA), BERYLLIUM AND COMPOUNDS (from the CWA), and Beryllium dust (from the RCRA regulations). On June 20, 1994, EPA changed the term Beryllium dust to Beryllium powder in 40 CFR part 261 (RCRA). At the same time, this change was also made in Table 302.4 and Appendix A, but the listing for Beryllium was removed inadvertently. The listing for Beryllium is being restored in Table 302.4 in today's rule.
Methane, bromo-	Although synonyms for bromomethane (e.g., methane, bromo-) appear in Table 302.4, ''Bromomethane'' does not appear as a separate listing in the hazardous substance column in Table 302.4. However, bromomethane is listed in section 112 of the CAA. Thus, a new entry for the synonym ''Bromomethane'' is being added.
Dichloromethyl ether	Although a synonym (dichloromethyl ether) for bis(chloromethyl) ether appears in Table 302.4, ''Bis(chloromethyl) ether'' does not appear as a separate listing. However, this chemical name is included in section 112 of the CAA. Thus, a new entry for the synonym ''Bis(chloromethyl) ether'' is being added.
CHLORDANE (TECHNICAL MIXTURE AND METABOLITES)	Two entries for ''CHLORDANE (TECHNICAL MIXTURE AND METABOLITES)'' appear in Table 302.4: (1) one with no CASRN and no RQ; and (2) another entry with CASRN 57749 and an RQ of one pound. In a June 12, 1995 final rule, EPA intended to remove the first entry and replace it with the second one; however, the first entry was never removed. The first entry with no CASRN or RQ is being removed in today's rule.
m-, o-, and p-isomers for Benzene, dimethyl and Cresylic acid.	CAA section 112 lists individual isomers for Cresol and Xylenes, but not for these synonyms. To be consistent with the underlying source lists, entries for the m-, o-, and p-isomers that were indented beneath the entries for Benzene, dimethyl and Cresylic acid are being deleted from Table 302.4.
Multi Source Leachate	In a June 1, 1990 final rule (55 FR 22720), EPA erroneously listed waste stream F039 on Table 302.4 as ''Multi Source Leachate'' alphabetically listed under the letter ''M.'' In today's rule, EPA is deleting the entry for ''Multi Source Leachate'' and adding the correct entry for ''F039'' to Table 302.4, immediately following the entry for waste stream F038.
Bromoform	This substance is listed in the CAA, but a ''3'' was never added to the Statutory Code column. A ''3'' is being added to the column in today's rule.
1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5alpha, 8alpha,.	A correction to this listing is needed because of a typesetting mistake; the entry should end with ''8abeta)-.'' This final portion was inadvertantly moved to the beginning of the next entry on Table 302.4. Other minor editorial corrections are also being made.
8abeta)-1,4,5,8-Dimethanonaphthalene,1,2,3,4, 10,10-hexachloro-1,4,4a,5,8,8a-hexahydro,(1alpha,4alpha,4abeta,5abeta,8beta,.	Again, corrections are needed because of a typesetting mistake; the entry should begin with ''1,4,5 . . .'' and should end with ''8abeta)-.''
8abeta)-2,7:3,6-Dimethanonaphth [2,3-b]oxirene,3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-,(1aalpha,2beta, 2aalpha,3beta,6beta,.	Again, corrections are needed because of a typesetting mistake.
6aalpha,7beta,7aalpha)-2,7:3,6-Dimethanonaphth[2,3-b] oxirene,3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octa-hydro-,(1aalpha,2beta,2abeta,3alpha, 6alpha,.	Again, corrections are needed because of a typesetting mistake. In addition, the words ''& metabolites'' are being added to the end of the entry to be consistent with the entry for this substance in the RCRA regulations.
6abeta,7beta,7aalpha)-Dimethoate	Again, corrections are needed because of a typesetting mistake.

TABLE 1.—CORRECTIONS TO ENTRIES FOR INDIVIDUAL SUBSTANCES IN TABLE 302.4—Continued

Current entry in Table 302.4 of 40 CFR 302.4	Change needed to correct error
1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide	To be consistent with the listing for this substance in the RCRA regulations, the words "& salts" are being added to the end of this entry.
Creosote	Because the RCRA regulations do not list a CASRN for this listing, CASRN 8001589 is being removed from 302.4 and replaced with "N.A."
Cyanides (soluble salts and complexes) not otherwise specified.	Because the RCRA regulations do not list a CASRN for this listing, CASRN 57125 is being removed from 302.4 and replaced with "N.A."
Pyridine, 3-(1-methyl-2-pyrrolidinyl)-,(S)-	To be consistent with the listing for this substance in the RCRA regulations, the words "& salts" are being added to the end of this entry.
Strychnidin-10-one	To be consistent with the listing for this substance in the RCRA regulations, the words "& salts" are being added to the end of this entry.

b. What Corrections Are Being Made to Entries for the F- and K-Waste Streams?

The most commonly found errors in the entries for hazardous waste streams (i.e., F- and K-waste streams) in Table 302.4 are inadvertent discrepancies between the waste stream description that appears on the CERCLA list and the description for the same waste stream as it appears in the RCRA regulations at 40 CFR 261.31 and 261.32. In the years since Table 302.4 was first published in the CFR in 1985, EPA has amended the descriptions of several waste streams in the RCRA regulations, but did not make conforming changes to these entries in 40 CFR 302.4. EPA does not intend to retain two different descriptions of the same waste stream in the RCRA and CERCLA regulations; thus, we are removing obsolete descriptions of certain waste streams from Table 302.4 and replacing them with the current descriptions from 40 CFR part 261. Some of these corrections are simple; other types of corrections that require more explanation are described below.

TABLE 2.—CORRECTIONS TO ENTRIES FOR F- AND K-WASTE STREAMS IN TABLE 302.4

Current entry in Table 302.4 of 40 CFR 302.4	Change needed to correct error
F024 * * * Wastes, including but not limited to distillation residues, heavy ends, tars, and reactor cleanout wastes, from the production of chlorinated aliphatic hydrocarbons, having carbon content from one to five, utilizing free radical catalyzed processes. (This listing does not include light ends, spent filters and filter aids, spent dessicants(sic), wastewater, wastewater treatment sludges, spent catalysts, and wastes listed in § 261.32).	To be consistent with the listing for this waste stream in the RCRA regulations, the waste stream description in Table 302.4 should be changed to read as follows: "F024 * * * Process wastes, including but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes, from the production of certain chlorinated aliphatic hydrocarbons by free redical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution. (This listing does not include wastewaters, wastewater treatment sludges, spent catalysts, and wastes listed in 40 CFR 261.31 or 261.32)."
K069 * * * Emission control dust/sludge from secondary lead smelting	40 CFR 261.32 contains a note about an administrative stay for K069. To be consistent, the following note will be added to the end of this entry in Table 302.4: "(NOTE: This listing is stayed administratively for sludge generated from secondary acid scrubber systems. The stay will remain in effect until further administrative action is taken. If EPA takes further action effecting this stay, EPA will publish a notice of the action in the **Federal Register**.)"
K083 * * * Distillation bottoms from aniline extraction	To be consistent with the listing for this waste stream in the RCRA regulations, the word "extraction" should be changed to read "production."
K117 * * * Wastewater from the reaction vent gas scrubber in the production of ethylene bromide via bromination of ethene.	To be consistent with the listing for this waste stream in the RCRA regulations, the word "reaction" should be changed to "reactor" and the word "bromide" should be changed to "dibromide."
K118 * * * Spent absorbent solids from purification of ethylene dibromide in the production of ethylene dibromide.	To be consistent with the listing for this waste stream in the RCRA regulation, the word "absorbent" should be changed to "adsorbent" and "via bromination of ethene" should be added to the end of the entry.
K131 * * * Wastewater from the reactor and spent sulfuric acid from the acid dryer in the production of methyl bromide.	To be consistent with the listing for this waste stream in the RCRA regulations, "in the production" should be changed to read "from the production."
K132 * * * Spent absorbent and wastewater solids from the production of methyl bromide.	To be consistent with the listing for this waste stream in the RCRA regulations, the word "separator" should be added between "wastewater" and "solids."
K141 * * * Process related from the recovery of coal tar, including, but not limited to, tar collecting sump residues from the production of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludge from coking operations.).	To be consistent with the listing for this waste stream in the RCRA regulations, the waste stream description in Table 302.4 should be changed to read as follows: "K141 * * * Process residues from the recovery of coal tar, including, but not limited to, collecting sump residues from the production of coke from coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludges from coking operations)."

c. What Corrections Are Being Made to Footnotes in Table 302.4?

Because EPA is removing three columns from Table 302.4, two footnotes to the table have to be changed. Footnote ''1*,'' which ''indicates that the 1-pound RQ is a CERCLA statutory RQ,'' only appears in the Statutory RQ column. Because this column is being removed from Table 302.4, footnote ''1*'' also should be removed. In addition, footnote ''##'' is being revised to clarify that statutory RQs are set at one pound.

In addition, information contained in footnotes ''1,'' ''2,'' ''3,'' and ''4'' is repetitive of information included in the note that precedes Table 302.4. Thus, these four footnotes are being removed in today's rule. Footnote ''†'' is being revised to indicate that the statutory sources are defined by 1, 2, 3, and 4, as described in the note that precedes Table 302.4.

d. Why Are Other Errors in Table 302.4 Not Addressed in Today's Rule?

It is important to note that EPA is aware of additional errors in Table 302.4 that are not addressed in today's rulemaking. Because these errors appear to be more than just typographical in nature, we believe that correcting them in a final rule without notice and comment may be inappropriate. For example, the hazardous waste descriptions for F003, F004, and F005 need to be changed to be consistent with the descriptions for these wastes as they appear in the RCRA regulations. However, these waste description changes may necessitate a change in the RQs for these waste streams. Changing the RQ for these wastes would be more appropriately addressed in a notice and comment rulemaking. Although more study of these and other errors is needed, EPA may propose to make additional error corrections in a future rulemaking. EPA is soliciting information from the public identifying any additional errors in Table 302.4 not covered in today's rulemaking and how such errors should be corrected. Comments received that identify such additional errors will not be considered adverse comments on today's rulemaking; rather, these comments may be considered by the Agency in any future error correction rule.

To submit such comments, send an original and two copies of comments referencing docket number 102 RQ–CORRECT to (1) if using regular U.S. Postal Service mail: Docket Coordinator, Superfund Docket Office, (Mail Code 5201G), U.S. Environmental Protection Agency Headquarters, Ariel Rios Building, 1200 Pennsylvania Avenue, NW., Washington, DC 20460; or (2) if using special delivery such as overnight express service: Superfund Docket Office, Crystal Gateway One, 1st Floor, 1235 Jefferson Davis Highway, Arlington, VA 22202.

H. Revisions to Appendix A of 40 CFR 302.4

On June 12, 1995 (60 FR 30926), EPA published a final rule that, among other things, added 47 individual CAA hazardous air pollutants to Table 302.4 and adjusted their statutory one-pound RQs. In the same rule, EPA intended to add these 47 substances to, and revise several related entries in, Appendix A to Table 302.4. Unfortunately, the table containing these Appendix A additions and revisions was inadvertently left out of the version of the rule that was published in the **Federal Register**.

Although several correction notices were developed immediately after publication of the rule, the Appendix A corrections were not included among them. EPA is making the Appendix A corrections for the June 12, 1995 final rule in today's rulemaking.

In addition, several other corrections are being made to typographical errors in Appendix A, as indicated in the table below. Many of these corrections are necessary to be consistent with corresponding changes to Table 302.4 that were described previously in this preamble.

TABLE 3.—CORRECTIONS TO ENTRIES IN APPENDIX A TO 40 CFR 302.4

Current entry in Appendix A to 40 CFR 302.4	Change needed to correct error
Appendix A:	
1,2,3-Trichloropropane (CASRN 96–18–4)	These substances do not appear in Table 302.4 and are being removed from Appendix A.
Diphenylamine (CASRN 122–39–4)	
n-2,3&-Dichloropropanol (CASRN 616–23–9)	
1,10-(1,2-Phenylene)pyrene (CASRN 193–39–5)	As noted previously, this synonym is no longer listed in the RCRA regulations and is being removed from Table 302.4 and Appendix A. Another name for this same substance (''Indeno(1,2,3-cd)pyrene'') remains listed in Appendix A.
CAS #108101	The synonym ''Hexone,'' which already appears in Table 302.4, is being added to this entry in Appendix A.
Arsenic Acid H_3As0_4 (CASRN 1327522)	As described in Table 1, these CASRNs are removed from Table 302.4 and, thus, also are being removed from Appendix A.
Creosote (CASRN 8001589)	
Cyanides (soluble salts and complexes) not otherwise specified (CASRN 57125)	
CAS #492808	The second chemical name listed should be ''Benzenamine, 4,4′-carbonimidoylbis (N,N- dimethyl-.'' The rest of the entry, ''(N,N-D,methyl-)-,'' is incorrect and is being removed in today's rule.

Amendatory instruction 7, which immediately precedes appendix A to 40 CFR 302.4 in today's direct final rule, accounts for the addition of the corrected entries for all of these listings, and amendatory instruction 6 accounts for the removal of the previously listed entries that contain errors.

III. Administrative Requirements

Under Executive Order 12866 (58 FR 51735, October 4, 1993), this action is not a ''significant regulatory action'' and is therefore not subject to review by the Office of Management and Budget. Because the agency has made a ''good cause'' finding that this action is not subject to notice-and-comment requirements under the Administrative Procedure Act or any other statute (see Section I.D of today's preamble), it is not subject to the regulatory flexibility provisions of the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*), or to sections 202 and 205 of the Unfunded Mandates Reform Act of 1995 (UMRA) (Pub. L. 104–4). In addition, this action does not significantly or uniquely affect small governments or impose a significant intergovernmental mandate, as described in sections 203 and 204 of UMRA. This rule also does not significantly or uniquely affect the communities of tribal governments, as specified by Executive Order 13084 (63 FR 27655, May 10, 1998). This rule will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132 (64 FR 43255, August 10, 1999). This rule also is not subject to Executive Order 13045 (62 FR 19885, April 23, 1997), because it is not economically significant.

This technical correction action does not involve technical standards; thus, the requirements of section 12(d) of the National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note) do not apply. The rule also does not involve special consideration of environmental justice related issues as required by Executive Order 12898 (59 FR 7629, February 16, 1994). In issuing this rule, EPA has taken the necessary steps to eliminate drafting errors and ambiguity, minimize potential litigation, and provide a clear legal standard for affected conduct, as required by section 3 of Executive Order 12988 (61 FR 4729, February 7, 1996). EPA has complied with Executive Order 12630 (53 FR 8859, March 15, 1988) by examining the takings implications of the rule in accordance with the ''Attorney General's Supplemental Guidelines for the Evaluation of Risk and Avoidance of Unanticipated Takings'' issued under the executive order. This rule does not impose an information collection burden under the provisions of the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*).

The Congressional Review Act (5 U.S.C. 801 et seq.), as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. Section 808 allows the issuing agency to make a rule effective sooner than otherwise provided by the CRA if the Agency makes a good cause finding that notice and public procedure is impracticable, unnecessary or contrary to the public interest. This determination must be supported by a brief statement. 5 U.S.C. 808(2).

As stated previously (see Section I.D of today's preamble), EPA has made a good cause finding for this final rule and established an effective date of September 9, 2002. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. This action is not a major rule as defined by 5 U.S.C. 804(2).

List of Subjects in 40 CFR Part 302

Air pollution control, Chemicals, Emergency Planning and Community Right-to-Know Act, Extremely hazardous substances, Hazardous chemicals, Hazardous materials, Hazardous materials transportation, Hazardous substances, Hazardous wastes, Intergovernmental relations, Natural resources, Pesticides and pests, Reporting and recordkeeping requirements, Superfund, Waste treatment and disposal, Water pollution control, Water supply.

Dated: June 28, 2002.

Christine Todd Whitman,

Administrator.

For the reasons set out in the preamble, Chapter I of title 40 of the Code of Federal Regulations is amended as follows:

PART 302—DESIGNATION, REPORTABLE QUANTITIES, AND NOTIFICATION

1. The authority citation for part 302 continues to read as follows:

Authority: 42 U.S.C. 9602, 9603, and 9604; 33 U.S.C. 1321 and 1361.

2. Section 302.2 is removed and reserved.

§ 302.2 [Removed and Reserved]

3. Section 302.3 is amended by revising the definitions for ''Release'' and ''Reportable quantity'' to read as follows:

§ 302.3 Definitions.

* * * * *

Release means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing any hazardous substance or pollutant or contaminant), but excludes:

(1) Any release which results in exposure to persons solely within a workplace, with respect to a claim which such persons may assert against the employer of such persons;

(2) Emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine;

(3) Release of source, byproduct, or special nuclear material from a nuclear incident, as those terms are defined in the Atomic Energy Act of 1954, if such release is subject to requirements with respect to financial protection established by the Nuclear Regulatory Commission under section 170 of such Act, or for the purposes of section 104 of the Comprehensive Environmental Response, Compensation, and Liability Act or any other response action, any release of source, byproduct, or special nuclear material from any processing site designated under section 102(a)(1) or 302(a) of the Uranium Mill Tailings Radiation Control Act of 1978; and

(4) The normal application of fertilizer;

Reportable quantity (''RQ'') means that quantity, as set forth in this part, the release of which requires notification pursuant to this part;

* * * * *

4. Section 302.4 is amended by revising the note that precedes Table 302.4 and by revising table 302.4 to read as follows:

§ 302.4 Designation of hazardous substances.

* * * * *

Note: The numbers under the column headed ''CASRN'' are the Chemical Abstracts Service Registry Numbers for each hazardous substance. The ''Statutory Code'' column indicates the statutory source for designating each substance as a CERCLA hazardous substance: ''1'' indicates that the statutory source is section 311(b)(2) of the Clean Water Act, ''2'' indicates that the source is section 307(a) of the Clean Water Act, ''3'' indicates that the source is section 112 of the Clean Air Act, and ''4'' indicates that the source is section 3001 of the Resource Conservation and Recovery Act (RCRA). The ''RCRA Waste Number'' column provides the waste identification numbers assigned to various substances by RCRA regulations. The ''Pounds (kg)'' column provides the reportable quantity adjustment for each hazardous substance in pounds and kilograms. Appendix A to § 302.4, which lists CERCLA hazardous substances in sequential order by CASRN, provides a per-substance grouping of regulatory synonyms (i.e., names by which each hazardous substance is identified in other statutes and their implementing regulations).

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Acenaphthene	83–32–9	2		100 (45.4)
Acenaphthylene	208–96–8	2		5000 (2270)
Acetaldehyde	75–07–0	1,3,4	U001	1000 (454)
Acetaldehyde, chloro-	107–20–	4	P023	1000 (454)
Acetaldehyde, trichloro-	75–87–6	4	U034	5000 (2270)
Acetamide	60–35–5	3		100 (45.4)
Acetamide, N-(aminothioxomethyl)-	591–08–2	4	P002	1000 (454)
Acetamide, N-(4-ethoxyphenyl)-	62–44–2	4	U187	100 (45.4)
Acetamide, N-9H-fluoren-2-yl-	53–96–3	3,4	U005	1 (0.454)
Acetamide, 2-fluoro-	6417–640–19–7	4	P057	100 (45.4)
Acetic acid	64–19–7	1		5000 (2270)
Acetic acid, (2,4-dichlorophenoxy)-, salts & esters	94–75–7	1,3,4	U240	100 (45.4)
Acetic acid, ethyl ester	141–78–6	4	U112	5000 (2270)
Acetic acid, fluoro-, sodium salt	62–74–8	4	P058	10 (4.54)
Acetic acid, lead(2+) salt	301–04–2	1,4	U144	10 (4.54)
Acetic acid, thallium(1+) salt	563–68–8	4	U214	100 (45.4)
Acetic acid, (2,4,5-trichlorophenoxy)-	93–76–5	1,4	See F027	1000 (454)
Acetic anhydride	108–24–7	1		5000 (2270)
Acetone	67–64–1	4	U002	5000 (2270)
Acetone cyanohydrin	75–86–5	1,4	P069	10 (4.54)
Acetonitrile	75–05–8	3,4	U003	5000 (2270)
Acetophenone	98–86–2	3,4	U004	5000 (2270)
2-Acetylaminofluorene	53–96–3	3,4	U005	1 (0.454)
Acetyl bromide	506–96–7	1		5000 (2270)
Acetyl chloride	75–36–5	1,4	U006	5000 (2270)
1-Acetyl-2-thiourea	591–08–2	4	P002	1000 (454)
Acrolein	107–02–8	1,2,3,4	P003	1 (0.454)
Acrylamide	79–06–1	3,4	U007	5000 (2270)
Acrylic acid	79–10–7	3,4	U008	5000 (2270)
Acrylonitrile	107–13–1	1,2,3,4	U009	100 (45.4)
Adipic acid	124–04–9	1		5000 (2270)
Aldicarb	116–06–3	4	P070	1 (0.454)
Aldrin	309–00–2	1,2,4	P004	1 (0.454)
Allyl alcohol	107–18–6	1,4	P005	100 (45.4)
Allyl chloride	107–05–1	1,3		1000 (454)
Aluminum phosphide	20859–73–8	4	P006	100 (45.4)
Aluminum sulfate	10043–01–3	1		5000 (2270)
4-Aminobiphenyl	92–67–1	3		1 (0.454)
5-(Aminomethyl)-3-isoxazolol	2763–96–4	4	P007	1000 (454)
4-Aminopyridine	504–24–5	4	P008	1000 (454)
Amitrole	61–82–5	4	U011	10 (4.54)
Ammonia	7664–41–7	1		100 (45.4)
Ammonium acetate	631–61–8	1		5000 (2270)
Ammonium benzoate	1863–63–4	1		5000 (2270)
Ammonium bicarbonate	1066–33–7	1		5000 (2270)
Ammonium bichromate	7789–09–5	1		10 (4.54)
Ammonium bifluoride	1341–49–7	1		100 (45.4)
Ammonium bisulfilte	10192–30–0	1		5000 (2270)
Ammonium carbamate	1111–78–0	1		5000 (2270)
Ammonium carbonate	506–87–6	1		5000 (2270)
Ammonium chloride	12125–02–9	1		5000 (2270)
Ammonium chromate	7788–98–9	1		10 (4.54)
Ammonium citrate, dibasic	3012–65–5	1		5000 (2270)
Ammonium fluoborate	13826–83–0	1		5000 (2270)
Ammonium fluoride	12125–01–8	1		100 (45.4)
Ammonium hydroxide	1336–21–6	1		1000 (454)
Ammonium oxalate	6009–70–7 5972–73–6 14258–49–2	1		5000 (2270)
Ammonium picrate	131–74–8	4	P009	10 (4.54)
Ammonium silicofluoride	16919–19–0	1		1000 (454)
Ammonium sulfamate	7773–06–0	1		5000 (2270)
Ammonium sulfide	12135–76–1	1		100 (45.4)
Ammonium sulfite	10196–04–0	1		5000 (2270)
Ammonium tartrate	14307–43–8 3164–29–2	1		5000 (2270)
Ammonium thiocyanate	1762–95–4	1		5000 (2270)
Ammonium vanadate	7803–55–6	4	P119	1000 (454)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Amyl acetate	628–63–7	1		5000 (2270)
iso-Amyl acetate	123–92–2			
sec-Amyl acetate	626–38–0			
tert-Amyl acetate	625–16–1			
Aniline	62–53–3	1,3,4	U012	5000 (2270)
o-Anisidine	90–04–0	3		100 (45.4)
Anthracene	120–12–7	2		5000 (2270)
Antimony††	7440–36–0	2		5000 (2270)
ANTIMONY AND COMPOUNDS	N.A.	2,3		**
Antimony Compounds	N.A.	2,3		**
Antimony pentachloride	7647–18–9	1		1000 (454)
Antimony potassium tartrate	28300–74–5	1		100 (45.4)
Antimony tribromide	7789–61–9	1		1000 (454)
Antimony trichloride	10025–91–9	1		1000 (454)
Antimony trifluoride	7783–56–4	1		1000 (454)
Antimony trioxide	1309–64–4	1		1000 (454)
Argentate(1-), bis(cyano-C)-, potassium	506–61–6	4	P099	1 (0.454)
Aroclor 1016	12674–11–2	1,2,3		1 (0.454)
Aroclor 1221	11104–28–2	1,2,3		1 (0.454)
Aroclor 1232	11141–16–5	1,2,3		1 (0.454)
Aroclor 1242	53469–21–9	1,2,3		1 (0.454)
Aroclor 1248	12672–29–6	1,2,3		1 (0.454)
Aroclor 1254	11097–69–1	1,2,3		1 (0.454)
†Aroclor 1260	11096–82–5	1,2,3		1 (0.454)
Aroclors	1336–36–3	1,2,3		1 (0.454)
Arsenic††	7440–38–2	2,3		1 (0.454)
Arsenic acid H3AsO4	7778–39–4	4	P010	1 (0.454)
ARSENIC AND COMPOUNDS	N.A.	2,3		**
Arsenic Compounds (inorganic including arsine)	N.A.	2,3		**
Arsenic disulfide	1303–32–8	1		1 (0.454)
Arsenic oxide As2O3	1327–53–3	1,4	P012	1 (0.454)
Arsenic oxide As2O5	1303–28–2	1,4	P011	1 (0.454)
Arsenic pentoxide	1303–28–2	1,4	P011	1 (0.454)
Arsenic trichloride	7784–34–1	1		1 (0.454)
Arsenic trioxide	1327–53–3	1,4	P012	1 (0.454)
Arsenic trisulfide	1303–33–9	1		1 (0.454)
Arsine, diethyl-	692–42–2	4	P038	1 (0.454)
Arsinic acid, dimethyl-	75–60–5	4	U136	1 (0.454)
Arsonous dichloride, phenyl-	696–28–6	4	P036	1 (0.454)
Asbestos†††	1332–21–4	2,3		1 (0.454)
Auramine	492–80–8	4	U014	100 (45.4)
Azaserine	115–02–6	4	U015	1 (0.454)
Aziridine	151–56–4	3,4	P054	1 (0.454)
Aziridine, 2-methyl-	75–55–8	3,4	P067	1 (0.454)
Azirino[2',3':3,4]pyrrolo[1,2–a]indole-4,7-dione, 6-amino-8-[[(aminocarbonyl)oxy]methyl]-1,1a,2,8,8a,8b- hexahydro-8a-methoxy-5- methyl-,[1aS- (1aalpha,8beta,8aalpha, 8balpha)]-.	50–07–7	4	U010	10 (4.54)
Barium cyanide	542–62–1	1,4	P013	10 (4.54)
Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-	56–49–5	4	U157	10 (4.54)
Benz[c]acridine	225–51–4	4	U016	100 (45.4)
Benzal chloride	98–87–3	4	U017	5000 (2270)
Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-58–5 propynyl)-	23950–58–5	4	U192	5000 (2270)
Benz[a]anthracene	56–55–3	2,4	U018	10 (4.54)
1,2-Benzanthracene	56–55–3	2,4	U018	10 (4.54)
Benz[a]anthracene, 7,12-dimethyl-	57–97–6	4	U094	1 (0.454)
Benzenamine	62–53–3	1,3,4	U012	5000 (2270)
Benzenamine, 4,4'-carbonimidoylbis (N,N dimethyl-	492–80–8	4	U014	100 (45.4)
Benzenamine, 4-chloro-	106–47–8	4	P024	1000 (454)
Benzenamine, 4-chloro-2-methyl-, hydrochloride	3165–93–3	4	U049	100 (45.4)
Benzenamine, N,N-dimethyl-4-(phenylazo)-	60–11–7	3,4	U093	10 (4.54)
Benzenamine, 2-methyl-	95–53–4	3,4	U328	100 (45.4)
Benzenamine, 4-methyl-	106–49–0	4	U353	100 (45.4)
Benzenamine, 4,4'-methylenebis [2-chloro-	101–14–4	3,4	U158	10 (4.54)
Benzenamine, 2-methyl-,hydrochloride	636–21–5	4	U222	100 (45.4)
Benzenamine, 2-methyl-5-nitro-	99–55–8	4	U181	100 (45.4)
Benzenamine, 4-nitro-	100–01–6	4	P077	5000 (2270)
Benzene [a]	71–43–2	1,2,3,4	U019	10 (4.54)
Benzeneacetic acid, 4-chloro-α-(4-chlorophenyl)- α-hydroxy-, ethyl ester	510–15–6	3,4	U038	10 (4.54)
Benzene, 1-bromo-4-phenoxy-	101–55–3	2,4	U030	100 (45.4)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Benzenebutanoic acid, 4-[bis(2- chloroethyl)amino]-	305–03–3	4	U035	10 (4.54)
Benzene, chloro-	108–90–7	1,2,3,4	U037	100 (45.4)
Benzene, (chloromethyl)-	100–44–7	1,3,4	P028	100 (45.4)
Benzenediamine, ar-methyl-	95–80–7 496–72- 0 823–40- 5 25376- 45–8	3,4	U221	10 (4.54)
1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester	117–81–7	2,3,4	U028	100 (45.4)
1,2-Benzenedicarboxylic acid, dibutyl ester	84–74–2	1,2,3,4	U069	10 (4.54)
1,2-Benzenedicarboxylic acid, diethyl ester	84–66–2	2,4	U088	1000 (454)
1,2-Benzenedicarboxylic acid, dimethyl ester	131–11–3	2,3,4	U102	5000 (2270)
1,2-Benzenedicarboxylic acid, dioctyl ester	117–84–0	2,4	U107	5000 (2270)
Benzene, 1,2-dichloro-	95–50–1	1,2,4	U070	100 (45.4)
Benzene, 1,3-dichloro-	541–73–1	2,4	U071	100 (45.4)
Benzene, 1,4-dichloro-	106–46–7	1,2,3,4	U072	100 (45.4)
Benzene, 1,1'-(2,2-dichloroethylidene) bis[4-chloro-	72–54–8	1,2,4	U060	1 (0.454)
Benzene, (dichloromethyl)-	98–87–3	4	U017	5000 (2270)
Benzene, 1,3-diisocyanatomethyl-	91–08–7 584–84–9 26471–62–5	3,4	U223	100 (45.4)
Benzene, dimethyl-	1330–20–7	1,3,4	U239	100 (45.4)
1,3-Benzenediol	108–46–3	1,4	U201	5000 (2270)
1,2-Benzenediol,4-[1-hydroxy-2-(methyl amino)ethyl]-	51–43–4	4	P042	1000 (454)
Benzeneethanamine, alpha,alpha-dimethyl-	122–09–8	4	P046	5000 (2270)
Benzene, hexachloro-	118–74–1	2,3,4	U127	10 (4.54)
Benzene, hexahydro-	110–82–7	1,4	U056	1000 (454)
Benzene, methyl-	108–88–3	1,2,3,4	U220	1000 (454)
Benzene, 1-methyl-2,4-dinitro-	121–14–2	1,2,3,4	U105	10 (4.54)
Benzene, 2-methyl-1,3-dinitro-	606–20–2	1,2,4	U106	100 (45.4)
Benzene, (1-methylethyl)-	98–82–8	3,4	U055	5000 (2270)
Benzene, nitro-	98–95–3	1,2,3,4	U169	1000 (454)
Benzene, pentachloro-	608–93–5	4	U183	10 (4.54)
Benzene, pentachloronitro-	82–68–8	3,4	U185	100 (45.4)
Benzenesulfonic acid chloride	98–09–9	4	U020	100 (45.4)
Benzenesulfonyl chloride	98–09–9	4	U020	100 (45.4)
Benzene,1,2,4,5-tetrachloro-	95–94–3	4	U207	5000 (2270)
Benzenethiol	108–98–5	4	P014	100 (45.4)
Benzene,1,1'-(2,2,2-trichloroethylidene) bis[4-chloro-	50–29–3	1,2,4	U061	1 (0.454)
Benzene,1,1'-(2,2,2-trichloroethylidene) bis[4-methoxy-	72–43–5	1,3,4	U247	1 (0.454)
Benzene, (trichloromethyl)-	98–07–7	3,4	U023	10 (4.54)
Benzene, 1,3,5-trinitro-	99–35–4	4	U234	10 (4.54)
Benzidine	92–87–5	2,3,4	U021	1 (0.454)
1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide, & salts	81–07–2	4	U202	100 (45.4)
Benzo[a]anthracene	56–55–3	2,4	U018	10 (4.54)
1,3-Benzodioxole, 5-(1-propenyl)-1	120–58–1	4	U141	100 (45.4)
1,3-Benzodioxole, 5-(2-propenyl)-	94–59–7	4	U203	100 (45.4)
1,3-Benzodioxole, 5-propyl-	94–58–6	4	U090	10 (4.54)
1,3-Benzodioxol-4-ol, 2,2-dimethyl-, (Bendiocarb phenol)	22961–82–6	4	U364	##
1,3-Benzodioxol-4-ol, 2,2-dimethyl-, methyl carbamate (Bendiocarb)	22781–23–3	4	U278	##
Benzo[b]fluoranthene	205–99–2	2		1 (0.454)
Benzo(k)fluoranthene	207–08-9	2		5000 (2270)
7-Benzofuranol, 2,3-dihydro-2,2-dimethyl- (Carbofuran phenol)	1563–38–8	4	U367	##
7-Benzofuranol, 2,3-dihydro-2,2- dimethyl-, methylcarbamate	1563–66–2	1,4	P127	10 (4.54)
Benzoic acid	65–85–0	1		5000 (2270)
Benzoic acid, 2-hydroxy-, compd. with (3aS- cis)-1,2,3,3a,8,8a- hexahydro-1,3a,8- trimethylpyrrolo [2,3- b]indol-5-yl methylcarbamate ester (1:1) (Physostigmine salicylate).	57–64–7	4	P188	##
Benzonitrile	100–47–0	1	—	5000 (2270)
Benzo[rst]pentaphene	189–55–9	4	U064	10 (4.54)
Benzo[ghi]perylene	191–24-2	—	—	5000 (2270)
2H–1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo- 1-phenylbutyl)-, & salts	81–81–2	4	P001 U248	100 (45.4)
Benzo[a]pyrene	50–32–8	2,4	U022	1 (0.454)
3,4-Benzopyrene	50–32–8	2,4	U022	1 (0.454)
ρ-Benzoquinone	106–51–4	3,4	U197	10 (4.54)
Benzotrichloride	98–07–7	3,4	U023	10 (4.54)
Benzoyl chloride	98–88–4	1	—	1000 (454)
Benzyl chloride	100–44–7	1,3,4	P028	100 (45.4)
Beryllium ††	7440–41–7	2,3,4	P015	10 (4.54)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
BERYLLIUM AND COMPOUNDS	N.A.	2,3		**
Beryllium chloride	7787–47–5	1		1 (0.454)
Beryllium compounds	N.A.	2,3		**
Beryllium fluoride	7787–49–7	1		1 (0.454)
Beryllium nitrate	13597–99–4	1		1 (0.454)
	7787–55–5			
Beryllium powder ††	7440–41–7	2,3,4	P015	10 (4.54)
alpha-BHC	319–84–6	2		10 (4.54)
beta-BHC	319–85–7	2		1 (0.454)
delta-BHC	319–86–8	2		1 (0.454)
gamma-BHC	58–89–9	1,2,3,4	U129	1 (0.454)
2,2′-Bioxirane	1464–53–5	4	U085	10 (4.54)
Biphenyl	92–52–4	3		100 (45.4)
[1,1′-Biphenyl]-4,4′-diamine	92–87–5	2,3,4	U021	1 (0.454)
[1,1′-Biphenyl]-4,4′-diamine,3,3′-dichloro-	91–94–1	2,3,4	U073	1 (0.454)
[1,1′-Biphenyl]-4,4′-diamine,3,3′-dimethoxy-	119–90–4	3,4	U091	100 (45.4)
[1,1′-Biphenyl]-4,4′-diamine,3,3′-dimethyl-	119–93–7	3,4	U095	10 (4.54)
Bis(2-chloroethoxy) methane	111–91–1	2,4	U024	1000 (454)
Bis(2-chloroethyl) ether	111–44–4	2,3,4	U025	10 (4.54)
Bis(chloromethyl) ether	542–88–1	2,3,4	P016	10 (4.54)
Bis(2-ethylhexyl) phthalate	117–81–7	3,4	U028	100 (45.4)
Bromoacetone	598–31–2	4	P017	1000 (454)
Bromoform	75–25–2	2,3,4	U225	100 (45.4)
Bromomethane	74–83–9	2,3,4	U029	1000 (454)
4-Bromophenyl phenyl ether	101–55–3	2,4	U030	100 (45.4)
Brucine	357–57–3	4	P018	100 (45.4)
1,3-Butadiene	106–99–0	3		10 (4.54)
1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	87–68–3	2,3,4	U128	1 (0.454)
1-Butanamine, N-butyl-N-nitroso-	924–16–3	4	U172	10 (4.54)
1-Butanol	71–36–3	4	U031	5000 (2270)
2-Butanone	78–93–3	3,4	U159	5000 (2270)
2-Butanone, 3,3-dimethyl-1(methylthio)-, O-[(methylamino)carbonyl] oxime	39196–18–4	4	P045	100 (45.4)
2-Butanone peroxide	1338–23–4	4	U160	10 (4.54)
2-Butenal	123–73–9	1,4	U053	100 (45.4)
	4170–30–3			
2-Butene, 1,4-dichloro-	764–41–0	4	U074	1 (0.454)
2-Butenoic acid, 2-methyl-, 7-[[2,3-dihydroxy-2-(1-methoxyethyl)-3- methyl-1-oxobutoxy] methyl]-2,3, 5,7a-tetrahydro- 1H-pyrrolizin-1-yl ester, [1S-[1alpha(Z), 7(2S*,3R*),7aalpha]]-.	303–34–4	4	U143	10 (4.54)
Butyl acetate	123–86–4	1		5000 (2270)
iso-Butyl acetate	110–19–0			
sec-Butyl acetate	105–46–4			
tert-Butyl acetate	540–88–5			
n-Butyl alcohol	71–36–3	4	U031	5000 (2270)
Butylamine	109–73–9	1		1000 (454)
iso-Butylamine	78–81–9			
sec-Butylamine	513–49–5			
	13952-84–6			
tert-Butylamine	75–64–9			
Butyl benzyl phthalate	85–68–7	2		100 (45.4)
n-Butyl phthalate	84–74–2	1,2,3,4	U069	10 (4.54)
Butyric acid	107–92–6	1		5000 (2270)
iso-Butyric acid	79–31–2			
Cacodylic acid	75–60–5	4	U136	1 (0.454)
Cadmium ††	7440–43–9	2		10 (4.54)
Cadmium acetate	543–90–8	1		10 (4.54)
CADMIUM AND COMPOUNDS	N.A.	2,3		**
Cadmium bromide	7789–42–6	1		10 (4.54)
Cadmium chloride	10108–64–2	1		10 (4.54)
Cadmium compounds	N.A.	2,3		**
Calcium arsenate	7778–44–1	1		1 (0.454)
Calcium arsenite	52740–16–6	1		1 (0.454)
Calcium carbide	75–20–7	1		10 (4.54)
Calcium chromate	13765–19–0	1,4	U032	10 (4.54)
Calcium cyanamide	156–62–7	3		1000 (454)
Calcium cyanide Ca(CN)2	592–01–8	1,4	P021	10 (4.54)
Calcium dodecylbenzenesulfonate	26264–06–2	1		1000 (454)
Calcium hypochlorite	7778–54–3	1		10 (4.54)
Captan	133–06–2	1,3		10 (4.54)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Carbamic acid, 1H-benzimidazol-2-yl, methyl ester (Carbendazim)	10605–21–7	4	U372	##
Carbamic acid, [1-[(butylamino)carbonyl]-1H-benzimidazol-2-yl]-, methyl ester (Benomyl).	17804–35–2	4	U271	##
Carbamic acid, (3-chlorophenyl)-, 4-chloro-2-butynyl ester (Barban)	101–27–9	4	U280	##
Carbamic acid, [(dibutylamino)thio]methyl-, 2,3-dihydro-2,2-dimethyl-7-benzofuranyl ester (Carbosulfan).	55285–14–8	4	P189	##
Carbamic acid, dimethyl-,1-[(dimethylamino)carbonyl]-5-methyl-1H-pyrazol-3-yl ester (Dimetilan).	644–64–4	4	P191	##
Carbamic acid, dimethyl-, 3-methyl-1-(1-methylethyl)-1H-pyrazol-5-yl ester (Isolan).	119–38–0	4	P192	##
Carbamic acid, ethyl ester	51–79–6	3,4	U238	100 (45.4)
Carbamic acid, methyl-, 3-methylphenyl ester (Metolcarb)	1129–41–5	4	P190	##
Carbamic acid, methylnitroso-, ethyl ester	615–53–2	4	U178	1 (0.454)
Carbamic acid, [1,2-phenylenebis(iminocarbonothioyl)] bis-, dimethyl ester (Thiophanate-methyl).	23564–05–8	4	U409	##
Carbamic acid, phenyl-, 1-methylethyl ester (Propham)	122–42–9	4	U373	##
Carbamic chloride, dimethyl-	79–44–7	3,4	U097	1 (0.454)
Carbamodithioic acid, 1,2-ethanediylbis-, salts & esters	111–54–6	4	U114	5000 (2270)
Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2- propenyl) ester	2303–16–4	4	U062	100 (45.4)
Carbamothioic acid, bis(1-methylethyl)-, S-(2,3,3-trichloro-2- propenyl) ester (Triallate).	2303–17–5	4	U389	##
Carbamothioic acid, dipropyl-, S - (phenylmethyl) ester (Prosulfocarb)	52888–80–9	4	U387	##
Carbaryl	63–25–2	1,3,4	U279	100 (45.4)
Carbofuran	1563–66–2	1,4	P127	10 (4.54)
Carbon disulfide	75–15–0	1,3,4	P022	100 (45.4)
Carbonic acid, dithallium(1+) salt	6533–73–9	4	U215	100 (45.4)
Carbonic dichloride	75–44–5	1,3,4	P095	10 (4.54)
Carbonic difluoride	353–50–4	4	U033	1000 (454)
Carbonochloridic acid, methyl ester	79–22–1	4	U156	1000 (454)
Carbon oxyfluoride	353–50–4	4	U033	1000 (454)
Carbon tetrachloride	56–23–5	1,2,3,4	U211	10 (4.54)
Carbonyl sulfide	463–58–1	3		100 (45.4)
Catechol	120–80–9	3		100 (45.4)
Chloral	75–87–6	4	U034	5000 (2270)
Chloramben	133–90–4	3		100 (45.4)
Chlorambucil	305–03–3	4	U035	10 (4.54)
Chlordane	57–74–9	1,2,3,4	U036	1 (0.454)
Chlordane, alpha & gamma isomers	57–74–9	1,2,3,4	U036	1 (0.454)
CHLORDANE (TECHNICAL MIXTURE AND METABOLITES)	57–74–9	1,2,3,4	U036	1 (0.454)
CHLORINATED BENZENES	N.A.	2		**
Chlorinated camphene	8001–35–2	1,2,3,4	P123	1 (0.454)
CHLORINATED ETHANES	N.A.	2		**
CHLORINATED NAPHTHALENE	N.A.	2		**
CHLORINATED PHENOLS	N.A.	2		**
Chlorine	7782–50–5	1,3		10 (4.54)
Chlornaphazine	494–03–1	4	U026	100 (45.4)
Chloroacetaldehyde	107–20–0	4	P023	1000 (454)
Chloroacetic acid	79–11–8	3		100 (45.4)
2-Chloroacetophenone	532–27–4	3		100 (45.4)
CHLOROALKYL ETHERS	N.A.	2		**
p-Chloroaniline	106–47–8	4	P024	1000 (454)
Chlorobenzene	108–90–7	1,2,3,4	U037	100 (45.4)
Chlorobenzilate	510–15–6	3,4	U038	10 (4.54)
p-Chloro-m-cresol	59–50–7	2,4	U039	5000 (2270)
Chlorodibromomethane	124–48–1	2		100 (45.4)
1-Chloro-2,3-epoxypropane	106–89–8	1,3,4	U041	100 (45.4)
Chloroethane	75–00–3	2,3		100 (45.4)
2-Chloroethyl vinyl ether	110–75–8	2,4	U042	1000 (454)
Chloroform	67–66–3	1,2,3,4	U044	10 (4.54)
Chloromethane	74–87–3	2,3,4	U045	100 (45.4)
Chloromethyl methyl ether	107–30–2	3,4	U046	10 (4.54)
beta-Chloronaphthalene	91–58–7	2,4	U047	5000 (2270)
2-Chloronaphthalene	91–58–7	2,4	U047	5000 (2270)
2-Chlorophenol	95–57–8	2,4	U048	100 (45.4)
o-Chlorophenol	95–57–8	2,4	U048	100 (45.4)
4-Chlorophenyl phenyl ether	7005–72–3	2		5000 (2270)
1-(o-Chlorophenyl)thiourea	5344–82–1	4	P026	100 (45.4)
Chloroprene	126–99–8	3		100 (45.4)
3-Chloropropionitrile	542–76–7	4	P027	1000 (454)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Chlorosulfonic acid	7790–94–5	1		1000 (454)
4-Chloro-o-toluidine, hydrochloride	3165–93–3	4	U049	100 (45.4)
Chlorpyrifos	2921–88–2	1		1 (0.454)
Chromic acetate	1066–30–4	1		1000 (454)
Chromic acid	11115–74–5 7738–94–5	1		10 (4.54)
Chromic acid H2CrO4, calcium salt	13765–19–0	1,4	U032	10 (4.54)
Chromic sulfate	10101–53–8	1		1000 (454)
Chromium ††	7440–47–3	2		5000 (2270)
CHROMIUM AND COMPOUNDS	N.A.	2,3		**
Chromium Compounds	N.A.	2,3		**
Chromous chloride	10049–05–5	1		1000 (454)
Chrysene	218–01–9	2,4	U050	100 (45.4)
Cobalt Compounds	N.A.	3		**
Cobaltous bromide	7789–43–7	1		1000 (454)
Cobaltous formate	544–18–3	1		1000 (454)
Cobaltous sulfamate	14017–41–5	1		1000 (454)
Coke Oven Emissions	N.A.	3		1 (0.454)
Copper ††	7440–50–8	2		5000 (2270)
COPPER AND COMPOUNDS	N.A.	2		**
Copper cyanide Cu(CN)	544–92–3	4	P029	10 (4.54)
Coumaphos	56–72–4	1		10 (4.54)
Creosote	N.A.	4	U051	1 (0.454)
Cresol (cresylic acid)	1319–77–3	1,3,4	U052	100 (45.4)
m-Cresol	108–39–4	3		100 (45.4)
o-Cresol	95–48–7	3		100 (45.4)
p-Cresol	106–44–5	3		100 (45.4)
Cresols (isomers and mixture)	1319–77–3	1,3,4	U052	100 (45.4)
Cresylic acid (isomers and mixture)	1319–77–3	1,3,4	U052	100 (45.4)
Crotonaldehyde	123–73–9 4170–30–3	1,4	U053	100 (45.4)
Cumene	98–82–8	3,4	U055	5000 (2270)
Cupric acetate	142–71–2	1		100 (45.4)
Cupric acetoarsenite	12002–03–8	1		1 (0.454)
Cupric chloride	7447–39–4	1		10 (4.54)
Cupric nitrate	3251–23–8	1		100 (45.4)
Cupric oxalate	589366–3	1		100 (45.4)
Cupric sulfate	7758–98–7	1		10 (4.54)
Cupric sulfate, ammoniated	10380–29–7	1		100 (45.4)
Cupric tartrate	815–82–7	1		100 (45.4)
Cyanide Compounds	N.A.	2,3		**
CYANIDES	N.A.	2,3		**
Cyanides (soluble salts and complexes) not otherwise specified	N.A.	4	P030	10 (4.54)
Cyanogen	460–19–5	4	P031	100 (45.4)
Cyanogen bromide (CN)Br	506–68–3	4	U246	1000 (454)
Cyanogen chloride (CN)Cl	506–77–4	1,4	P033	10 (4.54)
2,5-Cyclohexadiene-1,4-dione	106–51–4	3,4	U197	10 (4.54)
Cyclohexane	110–82–7	1,4	U056	1000 (454)
Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1α, 2α, 3β, 4α, 5α, 6β)	58–89–9	1,2,3,4	U129	1 (0.454)
Cyclohexanone	108–94–1	4	U057	5000 (2270)
2-Cyclohexyl-4,6-dinitrophenol	131–89–5	4	P034	100 (45.4)
1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	77–47–4	1,2,3,4	U130	10 (4.54)
Cyclophosphamide	50–18–0	4	U058	10 (4.54)
2,4-D Acid	94–75–7	1,3,4	U240	100 (45.4)
2,4-D Ester	94–11–1 94–79–1 94–80–4 1320–18–9 1928–38–7 1928–61–6 1929–73–3 2971–38–2 25168–26–7 53467–11–1	1		100 (45.4)
2,4-D, salts and esters	94–75–7	1,3,4	U240	100 (45.4)
Daunomycin	20830–81–3	4	U059	10 (4.54)
DDD	72–54–8	1,2,4	U060	1 (0.454)
4,4′-DDD	72–54–8	1,2,4	U060	1 (0.454)
DDE [b]	72–55–9	2		1 (0.454)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
DDE [b]	3547–04–4	3		5000 (2270)
4,4′-DDE	72–55–9	2		1 (0.454)
DDT	50–29–3	1,2,4	U061	1 (0.454)
4,4′-DDT	50–29–3	1,2,4	U061	1 (0.454)
DDT AND METABOLITES	N.A.	2		**
DEHP	117–81–7	2,3,4	U028	100 (45.4)
Diallate	2303–16–4	4	U062	100 (45.4)
Diazinon	333–41–5	1		1 (0.454)
Diazomethane	334–88–3	3		100 (45.4)
Dibenz[a,h]anthracene	53–70–3	2,4	U063	1 (0.454)
1,2:5,6-Dibenzanthracene	53–70–3	2,4	U063	1 (0.454)
Dibenzo[a,h]anthracene	53–70–3	2,4	U063	1 (0.454)
Dibenzofuran	132–64–9	3		100 (45.4)
Dibenzo[a,i]pyrene	189–55–9	4	U064	10 (4.54)
1,2-Dibromo-3-chloropropane	96–12–8	3,4	U066	1 (0.454)
Dibromoethane	106–93–4	1,3,4	U067	1 (0.454)
Dibutyl phthalate	84–74–2	1,2,3,4	U069	10 (4.54)
Di-n-butyl phthalate	84–74–2	1,2,3,4	U069	10 (4.54)
Dicamba	1918–00–9	1		1000 (454)
Dichlobenil	1194–1–65–6	1		100 (45.4)
Dichlone	117–80–6	1		1 (0.454)
Dichlorobenzene	25321–22–6	1		100 (45.4)
1,2-Dichlorobenzene	95–50–1	1,2,4	U070	100 (45.4)
1,3-Dichlorobenzene	541–73–1	2,4	U071	100 (45.4)
1,4-Dichlorobenzene	106–46–7	1,2,3,4	U072	100 (45.4)
m-Dichlorobenzene	541–73–1	2,4	U071	100 (45.4)
o-Dichlorobenzene	95–50–1	1,2,4	U070	100 (45.4)
p-Dichlorobenzene	106–46–7	1,2,3,4	U072	100 (45.4)
DICHLOROBENZIDINE	N.A.	2		**
3,3′-Dichlorobenzidine	91–94–1	2,3,4	U073	1 (0.454)
Dichlorobromomethane	75–27–4	2		5000 (2270)
1,4-Dichloro-2-butene	764–41–0	4	U074	1 (0.454)
Dichlorodifluoromethane	75–71–8	4	U075	5000 (2270)
1,1-Dichloroethane	75–34–3	2,3,4	U076	1000 (454)
1,2-Dichloroethane	107–06–2	1,2,3,4	U077	100 (45.4)
1,1-Dichloroethylene	75–35–4	1,2,3,4	U078	100 (45.4)
1,2-Dichloroethylene	156–60–5	2,4	U079	1000 (454)
Dichloroethyl ether	111–44–4	2,3,4	U025	10 (4.54)
Dichloroisopropyl ether	108–60–1	2,4	U027	1000 (454)
Dichloromethane	75–09–2	2,3,4	U080	1000 (454)
Dichloromethoxyethane	111–91–1	2,4	U024	1000 (454)
Dichloromethyl ether	542–88–1	2,3,4	P016	10 (4.54)
2,4-Dichlorophenol	120–83–2	2,4	U081	100 (45.4)
2,6-Dichlorophenol	87–65–0	4	U082	100 (45.4)
Dichlorophenylarsine	696–28–6	4	P036	1 (0.454)
Dichloropropane	26638–19–7	1		1000 (454)
1,1-Dichloropropane	78–99–9			
1,3-Dichloropropane	142–28–9			
1,2-Dichloropropane	78–87–5	1,2,3,4	U083	1000 (454)
Dichloropropane—Dichloropropene (mixture)	8003–19–8	1		100 (45.4)
Dichloropropene	26952–23–8	1		100 (45.4)
2,3-Dichloropropene	78–88–6			
1,3-Dichloropropene	542–75–6	1,2,3,4	U084	100 (45.4)
2,2-Dichloropropionic acid	75–99–0	1		5000 (2270)
Dichlorvos	62–73–7	1,3		10 (4.54)
Dicofol	115–32–2	1		10 (4.54)
Dieldrin	60–57–1	1,2,4	P037	1 (0.454)
1,2:3,4-Diepoxybutane	1464–53–5	4	U085	10 (4.54)
Diethanolamine	111–42–2	3		100 (45.4)
Diethylamine	109–89–7	1		100 (45.4)
N,N-Diethylaniline	91–66–7	3		1000 (454)
Diethylarsine	692–42–2	4	P038	1 (0.454)
1,4-Diethyleneoxide	123–91–1	3,4	U108	100 (45.4)
Diethylhexyl phthalate	117–81–7	2,3,4	U028	100 (45.4)
N,N′-Diethylhydrazine	1615–80–1	4	U086	10 (4.54)
O,O-Diethyl S-methyl dithiophosphate	3288–58–2	4	U087	5000 (2270)
Diethyl-p-nitrophenyl phosphate	311–45–5	4	P041	100 (45.4)
Diethyl phthalate	84–66–2	2,4	U088	1000 (454)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
O,O-Diethyl O-pyrazinyl phosphorothioate	297–97–2	4	P040	100 (45.4)
Diethylstilbestrol	56–53–1	4	U089	1 (0.454)
Diethyl sulfate	64–67–5	3		10 (4.54)
Dihydrosafrole	94–58–6	4	U090	10 (4.54)
Diisopropylfluorophosphate (DFP)	55–91–4	4	P043	100 (45.4)
1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5alpha, 8alpha,8abeta)-.	309–00–2	1,2,4	P004	1 (0.454)
1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro- 1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta, 5beta,8beta,8abeta)-.	465–73–6	4	P060	1 (0.454)
2,7:3,6-Dimethanonaphth[2,3- b]oxirene,3,4,5,6,9,9- hexachloro-1a,2,2a,3,6,6a,7,7a- octahydro-,(1aalpha,2beta, 2aalpha,3beta,6beta,6aalpha, 7beta,7aalpha)-.	60–57–1	1,2,4	P037	1 (0.454)
2,7:3,6-Dimethanonaphth[2, 3-b]oxirene,3,4,5,6,9,9- hexachloro-1a,2,2a,3,6,6a,7,7a- octahydro-,(1aalpha,2beta, 2abeta,3alpha,6alpha, 6abeta,7beta,7aalpha)-, & metabolites.	72–20–8	1,2,4	P051	1 (0.454)
Dimethoate	60–51–5	4	P044	10 (4.54)
3,3′-Dimethoxybenzidine	119–90–4	3,4	U091	100 (45.4)
Dimethylamine	124–40–3	1,4	U092	1000 (454)
Dimethyl aminoazobenzene	60–11–7	3,4	U093	10 (4.54)
p-Dimethylaminoazobenzene	60–11–7	3,4	U093	10 (4.54)
N,N-Dimethylaniline	121–69–7	3		100 (45.4)
7,12-Dimethylbenz[a]anthracene	57–97–6	4	U094	1 (0.454)
3,3′-Dimethylbenzidine	119–93–7	3,4	U095	10 (4.54)
alpha,alpha-Dimethylbenzylhydroperoxide	80–15–9	4	U096	10 (4.54)
Dimethylcarbamoyl chloride	79–44–7	3,4	U097	1 (0.454)
Dimethylformamide	68–12–2	3		100 (45.4)
1,1-Dimethylhydrazine	57–14–7	3,4	U098	10 (4.54)
1,2-Dimethylhydrazine	540–73–8	4	U099	1 (0.454)
alpha,alpha-Dimethylphenethylamine	122–09–8	4	P046	5000 (2270)
2,4-Dimethylphenol	105–67–9	2,4	U101	100 (45.4)
Dimethyl phthalate	131–11–3	2,3,4	U102	5000 (2270)
Dimethyl sulfate	77–78–1	3,4	U103	100 (45.4)
Dinitrobenzene (mixed)	25154–54–5	1		100 (45.4)
m-Dinitrobenzene	99–65–0			
o-Dinitrobenzene	528–29–0			
p-Dinitrobenzene	100–25–4			
4,6-Dinitro-o-cresol, and salts	534–52–1	2,3,4	P047	10 (4.54)
Dinitrophenol	25550–58–7	1		10 (4.54)
2,5-Dinitrophenol	329–71–5			
2,6-Dinitrophenol	573–56–8			
2,4-Dinitrophenol	51–28–5	1,2,3,4	P048	10 (4.54)
Dinitrotoluene	25321–14–6	1,2		10 (4.54)
3,4-Dinitrotoluene	610–39–9			
2,4-Dinitrotoluene	121–14–2	1,2,3,4	U105	10 (4.54)
2,6-Dinitrotoluene	606–20–2	1,2,4	U106	100 (45.4)
Dinoseb	88–85–7	4	P020	1000 (454)
Di-n-octyl phthalate	117–84–0	2,4	U107	5000 (2270)
1,4-Dioxane	123–91–1	3,4	U108	100 (45.4)
DIPHENYLHYDRAZINE	N.A.	2		**
1,2-Diphenylhydrazine	122–66–7	2,3,4	U109	10 (4.54)
Diphosphoramide, octamethyl-	152–16–9	4	P085	100 (45.4)
Diphosphoric acid, tetraethyl ester	107–49–3	1,4	P111	10 (4.54)
Dipropylamine	142–84–7	4	U110	5000 (2270)
Di-n-propylnitrosamine	621–64–7	2,4	U111	10 (4.54)
Diquat	85–00–7 2764–72–9	1		1000 (454)
Disulfoton	298–04–4	1,4	P039	1 (0.454)
Dithiobiuret	541–53–7	4	P049	100 (45.4)
1,3-Dithiolane-2- carboxaldehyde, 2,4- dimethyl-O- [(methylamino)carbonyl] oxime (Tirpate).	26419–73–8	4	P185	##
Diuron	330–54–1	1		100 (45.4)
Dodecylbenzenesulfonic acid	27176–87–0	1		1000 (454)
Endosulfan	115–29–7	1,2,4	P050	1 (0.454)
alpha-Endosulfan	959–98–8	2		1 (0.454)
beta-Endosulfan	33213–65–9	2		1 (0.454)
ENDOSULFAN AND METABOLITES	N.A.	2		**
Endosulfan sulfate	1031–07–8	2		1 (0.454)
Endothall	145–73–3	4	P088	1000 (454)
Endrin	72–20–8	1,2,4	P051	1 (0.454)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Endrin aldehyde	7421–93–4	2		1 (0.454)
ENDRIN AND METABOLITES	N.A.	2		**
Endrin, & metabolites	72–20–8	1,2,4	P051	1 (0.454)
Epichlorohydrin	106–89–8	1,3,4	U041	100 (45.4)
Epinephrine	51–43–4	4	P042	1000 (454)
1,2-Epoxybutane	106–88–7	3		100 (45.4)
Ethanal	75–07–0	1,3,4	U001	1000 (454)
Ethanamine, N,N-diethyl-	121–44–8	1,3,4	U404	5000 (2270)
Ethanamine, N-ethyl-N-nitroso-	55–18–5	4	U174	1 (0.454)
1,2-Ethanediamine, N,N-dimethyl-N′-2- pyridinyl-N′-(2- thienylmethyl)-	91–80–5	4	U155	5000 (2270)
Ethane, 1,2-dibromo-	106–93–4	1,3,4	U067	1 (0.454)
Ethane, 1,1-dichloro-	75–34–3	2,3,4	U076	1000 (454)
Ethane, 1,2-dichloro-	107–06–2	1,2,3,4	U077	100 (45.4)
Ethanedinitrile	460–19–5	4	P031	100 (45.4)
Ethane, hexachloro-	67–72–1	2,3,4	U131	100 (45.4)
Ethane, 1,1′-[methylenebis(oxy)]bis[2- chloro-	111–91–1	2,4	U024	1000 (454)
Ethane, 1,1′-oxybis-	60–29–7	4	U117	100 (45.4)
Ethane, 1,1′-oxybis[2-chloro-	111–44–4	2,3,4	U025	10 (4.54)
Ethane, pentachloro-	76–01–7	4	U184	10 (4.54)
Ethane, 1,1,1,2-tetrachloro-	630–20–6	4	U208	100 (45.4)
Ethane, 1,1,2,2-tetrachloro-	79–34–5	2,3,4	U209	100 (45.4)
Ethanethioamide	62–55–5	4	U218	10 (4.54)
Ethane, 1,1,1-trichloro-	71–55–6	2,3,4	U226	1000 (454)
Ethane, 1,1,2-trichloro-	79–00–5	2,3,4	U227	100 (45.4)
Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo-, methyl ester (A2213).	30558–43–1	4	U394	##
Ethanimidothioic acid, 2-(dimethylamino)-N-[[(methylamino)carbonyl]oxy]-2-oxo-, methyl ester (Oxamyl).	23135–22–0	4	P194	##
Ethanimidothioic acid, N-[[(methylamino) carbonyl]oxy]-, methyl ester	16752–77–5	4	P066	100 (45.4)
Ethanimidothioic acid, N,N′[thiobis[(methylimino) carbonyloxy]]bis-, dimethyl ester (Thiodicarb).	59669–26–0	4	U410	##
Ethanol, 2-ethoxy-	110–80–5	4	U359	1000 (454)
Ethanol, 2,2′-(nitrosoimino)bis-	1116–54–7	4	U173	1 (0.454)
Ethanol, 2,2′-oxybis-, dicarbamate (Diethylene glycol, dicarbamate)	5952–26–1	4	U395	##
Ethanone, 1-phenyl-	98–86–2	3,4	U004	5000 (2270)
Ethene, chloro-	75–01–4	2,3,4	U043	1 (0.454)
Ethene, (2-chloroethoxy)-	110–75–8	2,4	U042	1000 (454)
Ethene, 1,1-dichloro-	75–35–4	1,2,3,4	U078	100 (45.4)
Ethene, 1,2-dichloro-(E)	156–60–5	2,4	U079	1000 (454)
Ethene, tetrachloro-	127–18–4	2,3,4	U210	100 (45.4)
Ethene, trichloro-	79–01–6	1,2,3,4	U228	100 (45.4)
Ethion	563–12–2	1		10 (4.54)
Ethyl acetate	141–78–6	4	U112	5000 (2270)
Ethyl acrylate	140–88–5	3,4	U113	1000 (454)
Ethylbenzene	100–41–4	1,2,3		1000 (454)
Ethyl carbamate	51–79–6	3,4	U238	100 (45.4)
Ethyl chloride	75–00–3	2,3		100 (45.4)
Ethyl cyanide	107–12–0	4	P101	10 (4.54)
Ethylenebisdithiocarbamic acid, salts & esters	111–54–6	4	U114	5000 (2270)
Ethylenediamine	107–15–3	1		5000 (2270)
Ethylenediamine-tetraacetic acid (EDTA)	60–00–4	1		5000 (2270)
Ethylene dibromide	106–93–4	1,3,4	U067	1 (0.454)
Ethylene dichloride	107–06–2	1,2,3,4	U077	100 (45.4)
Ethylene glycol	107–21–1	3		5000 (2270)
Ethylene glycol monoethyl ether	110–80–5	4	U359	1000 (454)
Ethylene oxide	75–21–8	3,4	U115	10 (4.54)
Ethylenethiourea	96–45–7	3,4	U116	10 (4.54)
Ethylenimine	151–56–4	3,4	P054	1 (0.454)
Ethyl ether	60–29–7	4	U117	100 (45.4)
Ethylidene dichloride	75–34–3	2,3,4	U076	1000 (454)
Ethyl methacrylate	97–63–2	4	U118	1000 (454)
Ethyl methanesulfonate	62–50–0	4	U119	1 (0.454)
Famphur	52–85–7	4	P097	1000 (454)
Ferric ammonium citrate	1185–57–5	1		1000 (454)
Ferric ammonium oxalate	2944–67–4 55488–87–4	1		1000 (454)
Ferric chloride	7705–08–0	1		1000 (454)
Ferric fluoride	7783–50–8	1		100 (45.4)
Ferric nitrate	10421–48–4	1		1000 (454)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Ferric sulfate	10028–22–5	1		1000 (454)
Ferrous ammonium sulfate	10045–89–3	1		1000 (454)
Ferrous chloride	7758–94–3	1		100 (45.4)
Ferrous sulfate	7720–78–7 7782– 63–0	1		1000 (454)
Fine mineral fibers [c]	N.A.	3		**
Fluoranthene	206–44–0	2,4	U120	100 (45.4)
Fluorene	86–73–7	2		5000 (2270)
Fluorine	7782–41–4	4	P056	10 (4.54)
Fluoroacetamide	640–19–7	4	P057	100 (45.4)
Fluoroacetic acid, sodium salt	62–74–8	4	P058	10 (4.54)
Formaldehyde	50–00–0	1,3,4	U122	100 (45.4)
Formic acid	64–18–6	1,4	U123	5000 (2270)
Fulminic acid, mercury(2+)salt	628–86–4	4	P065	10 (4.54)
Fumaric acid	110–17–8	1		5000 (2270)
Furan	110–00–9	4	U124	100 (45.4)
2-Furancarboxaldehyde	98–01–1	1,4	U125	5000 (2270)
2,5-Furandione	108–31–6	1,3,4	U147	5000 (2270)
Furan, tetrahydro-	109–99–9	4	U213	1000 (454)
Furfural	98–01–1	1,4	U125	5000 (2270)
Furfuran	110–00–9	4	U124	100 (45.4)
Glucopyranose, 2-deoxy-2–(3-methyl-3-nitrosoureido)-,D-	18883–66–4	4	U206	1 (0.454)
D-Glucose, 2-deoxy-2-[[(methylnitrosoamino)-carbonyl]amino]-	18883–66–4	4	U206	1 (0.454)
Glycidylaldehyde	765–34–4	4	U126	10 (4.54)
Glycol ethers [d]	N.A.	3		**
Guanidine, N-methyl-N'-nitro-N-nitroso-	70–25–7	4	U163	10 (4.54)
Guthion	86–50–0	1		1 (0.454)
HALOETHERS	N.A.	2		**
HALOMETHANES	N.A.	2		**
Heptachlor	76–44–8	1,2,3,4	P059	1 (0.454)
HEPTACHLOR AND METABOLITES	N.A.	2		**
Heptachlor epoxide	1024–57–3	2		1 (0.454)
Hexachlorobenzene	118–74–1	2,3,4	U127	10 (4.54)
Hexachlorobutadiene	87–68–3	2,3,4	U128	1 (0.454)
HEXACHLOROCYCLOHEXANE (all isomers)	608–73–1	2		**
Hexachlorocyclopentadiene	77–47–4	1,2,3,4	U130	10 (4.54)
Hexachloroethane	67–72–1	2,3,4	U131	100 (45.4)
Hexachlorophene	70–30–4	4	U132	100 (45.4)
Hexachloropropene	1888–71–7	4	U243	1000 (454)
Hexaethyl tetraphosphate	757–58–4	4	P062	100 (45.4)
Hexamethylene-1,6–diisocyanate	822–06–0	3		100 (45.4)
Hexamethylphosphoramide	680–31–9	3		1 (0.454)
Hexane	110–54–3	3		5000 (2270)
Hexone	108–10–1	3,4	U161	5000 (2270)
Hydrazine	302–01–2	3,4	U133	1 (0.454)
Hydrazinecarbothioamide	79–19–6	4	P116	100 (45.4)
Hydrazine, 1,2-diethyl-	1615–80–1	4	U086	10 (4.54)
Hydrazine, 1,1-dimethyl-	57–14–7	3,4	U098	10 (4.54)
Hydrazine, 1,2-dimethyl-	540–73–8	4	U099	1 (0.454)
Hydrazine, 1,2-diphenyl-	122–66–7	2,3,4	U109	10 (4.54)
Hydrazine, methyl-	60–34–4	3,4	P068	10 (4.54)
Hydrochloric acid	7647–01–0	1,3		5000 (2270)
Hydrocyanic acid	74–90–8	1,4	P063	10 (4.54)
Hydrofluoric acid	7664–39–3	1,3,4	U134	100 (45.4)
Hydrogen chloride	7647–01–0	1,3		5000 (2270)
Hydrogen cyanide	74–90–8	1,4	P063	10 (4.54)
Hydrogen fluoride	7664–39–3	1,3,4	U134	100 (45.4)
Hydrogen phosphide	7803–51–2	3,4	P096	100 (45.4)
Hydrogen sulfide H2S	7783–06–4	1,4	U135	100 (45.4)
Hydroperoxide, 1-methyl-1-phenylethyl-	80–15–9	4	U096	10 (4.54)
Hydroquinone	123–31–9	3		100 (45.4)
2-Imidazolidinethione	96–45–7	3,4	U116	10 (4.54)
Indeno(1,2,3-cd)pyrene	193–39–5	2,4	U137	100 (45.4)
Iodomethane	74–88–4	3,4	U138	100 (45.4)
1,3-Isobenzofurandione	85–44–9	3,4	U190	5000 (2270)
Isobutyl alcohol	78–83–1	4	U140	5000 (2270)
Isodrin	465–73–6	4	P060	1 (0.454)
Isophorone	78–59–1	2,3		5000 (2270)
Isoprene	78–79–5	1		100 (45.4)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Isopropanolamine dodecylbenzenesulfonate	42504–46–1	1		1000 (454)
Isosafrole	120–58–1	4	U141	100 (45.4)
3(2H)-Isoxazolone, 5–(aminomethyl)-	2763–96–4	4	P007	1000 (454)
Kepone	143–50–0	1,4	U142	1 (0.454)
Lasiocarpine	303–34–4	4	U143	10 (4.54)
Lead‡‡	7439–92–1	2		10 (4.54)
Lead acetate	301–04–2	1,4	U144	10 (4.54)
LEAD AND COMPOUNDS	N.A.	2,3		**
Lead arsenate	7784–40–9 7645–25–2 10102–48–4	1		1 (0.454)
Lead, bis(acetato-O)tetrahydroxytri-	1335–32–6	4	U146	10 (4.54)
Lead chloride	7758–95–4	1		10 (4.54)
Lead compounds	N.A.	2,3		**
Lead fluoborate	13814–96–5	1		10 (4.54)
Lead fluoride	7783–46–2	1		10 (4.54)
Lead iodide	10101–63–0	1		10 (4.54)
Lead nitrate	10099–74–8	1		10 (4.54)
Lead phosphate	7446–27–7	4	U145	10 (4.54)
Lead stearate	1072–35–1 7428–48–0 52652–59–2 56189–09–4	1		10 (4.54)
Lead subacetate	1335–32–6	4	U146	10 (4.54)
Lead sulfate	7446–14–2 15739–80–7	1		10 (4.54)
Lead sulfide	1314–87–0	1		10 (4.54)
Lead thiocyanate	592–87–0	1		10 (4.54)
Lindane	58–89–9	1,2,3,4	U129	1 (0.454)
Lindane (all isomers)	58–89–9	1,2,3,4	U129	1 (0.454)
Lithium chromate	14307–35–8	1		10 (4.54)
Malathion	121–75–5	1		100 (45.4)
Maleic acid	110–16–7	1		5000 (2270)
Maleic anhydride	108–31–6	1,3,4	U147	5000 (2270)
Maleic hydrazide	123–33–1	4	U148	5000 (2270)
Malononitrile	109–77–3	4	U149	1000 (454)
Manganese, bis(dimethylcarbamodithioato-S,S′)-Manganese dimethyldithiocarbamate).	15339–36–3	4	P196	##
Manganese Compounds	N.A.	3		**
MDI	101–68–8	3		5000 (2270)
MEK	78–93–3	3,4	U159	5000 (2270)
Melphalan	148–82–3	4	U150	1 (0.454)
Mercaptodimethur	2032–65–7	1,4	P199	10 (4.54)
Mercuric cyanide	592–04–1	1		1(0.454)
Mercuric nitrate	10045–94–0	1		10 (4.54)
Mercuric sulfate	7783–35–9	1		10 (4.54)
Mercuric thiocyanate	592–85–8	1		10 (4.54)
Mercurous nitrate	10415–75–5	1		10 (4.54)
Mercury	7782–86–7 7439–97–6	2,3,4	U151	1 (0.454)
MERCURY AND COMPOUNDS	N.A.	2,3		**
Mercury, (acetato-O)phenyl-	62–38–4	4	P092	100 (45.4)
Mercury Compounds	N.A.	2,3		**
Mercury fulminate	628–86–4	4	P065	10 (4.54)
Methacrylonitrile	126–98–7	4	U152	1000 (454)
Methanamine, N-methyl-	124–40–3	1,4	U092	1000 (454)
Methanamine, N-methyl-N-nitroso-	62–75–9	2,3,4	P082	10 (4.54)
Methane, bromo-	74–83–9	2,3,4	U029	1000 (454)
Methane, chloro-	74–87–3	2,3,4	U045	100 (45.4)
Methane, chloromethoxy-	107–30–2	3,4	U046	10 (4.54)
Methane, dibromo-	74–95–3	4	U068	1000 (454)
Methane, dichloro-	75–09–2	2,3,4	U080	1000 (454)
Methane, dichlorodifluoro-	75–71–8	4	U075	5000 (2270)
Methane, iodo-	74–88–4	3,4	U138	100 (45.4)
Methane, isocyanato-	624–83–9	3,4	P064	10 (4.54)
Methane, oxybis(chloro-	542–88–1	2,3,4	P016	10 (4.54)
Methanesulfenyl chloride, trichloro-	594–42–3	4	P118	100 (45.4)
Methanesulfonic acid, ethyl ester	62–50–0	4	U119	1 (0.454)
Methane, tetrachloro-	56–23–5	1,2,3,4	U211	10 (4.54)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Methane, tetranitro-	509–14–8	4	P112	10 (4.54)
Methanethiol	74–93–1	1,4	U153	100 (45.4)
Methane, tribromo-	75–25–2	2,3,4	U225	100 (45.4)
Methane, trichloro-	67–66–3	1,2,3,4	U044	10 (4.54)
Methane, trichlorofluoro-	75–69–4	4	U121	5000 (2270)
Methanimidamide, N,N-dimethyl-N′-[3-[[(methylamino)carbonyl]oxy]phenyl]-, monohydrochloride (Formetanate hydrochloride).	23422–53–9	4	P198	##
Methanimidamide, N,N-dimethyl-N′-[2-methyl-4-[[(methylamino)carbonyl]oxy]phenyl]-(Formparanate).	17702–57–7	4	P197	##
6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro- 1,5,5a,6,9,9a-hexahydro-, 3-oxide.	115–29–7	1,2,4	P050	1 (0.454)
4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-	76–44–8	1,2,3,4	P059	1 (0.454)
4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro- 2,3,3a,4,7,7a-hexahydro-—	57–74–9	1,2,3,4	U036	1 (0.454)
Methanol	67–56–1	3,4	U154	5000 (2270)
Methapyrilene	91–80–5	4	U155	5000 (2270)
1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-0one, 1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-.	143–50–0	1,4	U142	1 (0.454)
Methiocarb	2032–65–7	1,4	P199	10 (4.54)
Methomyl	16752–77–5	4	P066	100 (45.4)
Methoxychlor	72–43–5	1,3,4	U247	1 (0.454)
Methyl alcohol	67–56–1	3,4	U154	5000 (2270)
2-Methyl aziridine	75–55–8	3,4	P067	1 (0.454)
Methyl bromide	74–83–9	2,3,4	U029	1000 (454)
1-Methylbutadiene	504–60–9	4	U186	100 (45.4)
Methyl chloride	74–87–3	2,3,4	U045	100 (45.4)
Methyl chlorocarbonate	79–22–1	4	U156	1000 (454)
Methyl chloroform	71–55–6	2,3,4	U226	1000 (454)
3-Methylcholanthrene	56–49–5	4	U157	10 (4.54)
4,4′-Methylenebis(2-chloroaniline)	101–14–4	3,4	U158	10 (4.54)
Methylene bromide	74–95–3	4	U068	1000 (454)
Methylene chloride	75–09–2	2,3,4	U080	1000 (454)
4,4′-Methylenedianiline	101–77–9	3		10 (4.54)
Methylene diphenyl diisocyanate	101–68–8	3		5000 (2270)
Methyl ethyl ketone	78–93–3	3,4	U159	5000 (2270)
Methyl ethyl ketone peroxide	1338–23–4	4	U160	10 (4.54)
Methyl hydrazine	60–34–4	3,4	P068	10 (4.54)
Methyl iodide	74–88–4	3,4	U138	100 (45.4)
Methyl isobutyl ketone	108–10–1	3,4	U161	5000 (2270)
Methyl isocyanate	624–83–9	3,4	P064	10 (4.54)
2-Methyllactonitrile	75–86–5	1,4	P069	10 (4.54)
Methyl mercaptan	74–93–1	1,4	U153	100 (45.4)
Methyl methacrylate	80–62–6	1,3,4	U162	1000 (454)
Methyl parathion	298–00–0	1,4	P071	100 (45.4)
4-Methyl-2-pentanone	108–10–1	3,4	U161	5000 (2270)
Methyl tert-butyl ether	1634–04–4	3		1000 (454)
Methylthiouracil	56–04–2	4	U164	10 (4.54)
Mevinphos	7786–34–7	1		10 (4.54)
Mexacarbate	315–18–4	1,4	P128	1000 (454)
Mitomycin C	50–07–7	4	U010	10 (4.54)
MNNG	70–25–7	4	U163	10 (4.54)
Monoethylamine	75–04–7	1		100 (45.4)
Monomethylamine	74–89–5	1		100 (45.4)
Naled	300–76–5	1		10 (4.54)
5,12-Naphthacenedione, 8-acetyl-10-[(3-amino-2,3,6-trideoxy-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-.	20830–81–3	4	U059	10 (4.54)
1-Naphthalenamine	134–32–7	4	U167	100 (45.4)
2-Naphthalenamine	91–59–8	4	U168	10 (4.54)
Naphthalenamine, N,N'-bis(2-chloroethyl)-	494–03–1	4	U026	100 (45.4)
Naphthalene	91–20–3	1,2,3,4	U165	100 (45.4)
Naphthalene, 2-chloro-	91–58–7	2,4	U047	5000 (2270)
1,4-Naphthalenedione	130–15–4	4	U166	5000 (2270)
2,7-Naphthalenedisulfonic acid, 3,3‡-[(3,3‡-dimethyl-(1,1‡-biphenyl)-4,4‡-diyl)-bis(azo)]bis(5-amino-4-hydroxy)-tetrasodium salt.	72–57–1	4	U236	10 (4.54)
1-Naphthalenol, methylcarbamate	63–25–2	1,3,4	U279	100 (45.4)
Naphthenic acid	1338–24–5	1		100 (45.4)
1,4-Naphthoquinone	130–15–4	4	U166	5000 (2270)
alpha-Naphthylamine	134–32–7	4	U167	100 (45.4)
beta-Naphthylamine	91–59–8	4	U168	10 (4.54)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
alpha-Naphthylthiourea	86–88–4	4	P072	100 (45.4)
Nickel‡‡	7440–02–0	2		100 (45.4)
Nickel ammonium sulfate	15699–18–0	1		100 (45.4)
NICKEL AND COMPOUNDS	N.A.	2,3		**
Nickel carbonyl Ni(CO)4, (T-4)-	13463–39–3	4	P073	10 (4.54)
Nickel chloride	7718–54–9 37211–05–5	1		100 (45.4)
Nickel compounds	N.A.	2,3		**
Nickel cyanide Ni(CN)2	557–19–7	4	P074	10 (4.54)
Nickel hydroxide	12054–48–7	1		10 (4.54)
Nickel nitrate	14216–75–2	1		100 (45.4)
Nickel sulfate	7786–81–4	1		100 (45.4)
Nicotine, & salts	54–11–5	4	P075	100 (45.4)
Nitric acid	7697–37–2	1		1000 (454)
Nitric acid, thallium (1+) salt	10102–45–1	4	U217	100 (45.4)
Nitric oxide	10102–43–9	4	P076	10 (4.54)
p-Nitroaniline	100–01–6	4	P077	5000 (2270)
Nitrobenzene	98–95–3	1,2,3,4	U169	1000 (454)
4-Nitrobiphenyl	92–93–3	3		10 (4.54)
Nitrogen dioxide	10102–44–0 10544–72–6	1,4	P078	10 (4.54)
Nitrogen oxide NO	10102–43–9	4	P076	10 (4.54)
Nitrogen oxide NO2	10102–44–0 10544–72–6	1,4	P078	10 (4.54)
Nitroglycerine	55–63–0	4	P081	10 (4.54)
Nitrophenol (mixed)	25154–55–6	1		100 (45.4)
m-Nitrophenol	554–84–7	....		....
o-Nitrophenol	88–75–5	1,2		100 (45.4)
p-Nitrophenol	100–02–7	1,2,3,4	U170	100 (45.4)
2-Nitrophenol	88–75–5	1,2		100 (45.4)
4-Nitrophenol	100–02–7	1,2,3,4	U170	100 (45.4)
NITROPHENOLS	N.A.	2		**
2-Nitropropane	79–46–9	3,4	U171	10 (4.54)
NITROSAMINES	N.A.	2		**
N-Nitrosodi-n-butylamine	924–16–3	4	U172	10 (4.54)
N-Nitrosodiethanolamine	1116–54–7	4	U173	1 (0.454)
N-Nitrosodiethylamine	55–18–5	4	U174	1 (0.454)
N-Nitrosodimethylamine	62–75–9	2,3,4	P082	10 (4.54)
N-Nitrosodiphenylamine	86–30–6	2		100 (45.4)
N-Nitroso-N-ethylurea	759–73–9	4	U176	1 (0.454)
N-Nitroso-N-methylurea	684–93–5	3,4	U177	1 (0.454)
N-Nitroso-N-methylurethane	615–53–2	4	U178	1 (0.454)
N-Nitrosomethylvinylamine	4549–40–0	4	P084	10 (4.54)
N-Nitrosomorpholine	59–89–2	3		1 (0.454)
N-Nitrosopiperidine	100–75–4	4	U179	10 (4.54)
N-Nitrosopyrrolidine	930–55–2	4	U180	1 (0.454)
Nitrotoluene	1321–12–6	1		1000 (454)
m-Nitrotoluene	99–08–1	....		....
o-Nitrotoluene	88–72–2	....		....
p-Nitrotoluene	99–99–0	....		....
5-Nitro-o-toluidine	99–55–8	4	U181	100 (45.4)
Octamethylpyrophosphoramide	152–16–9	4	P085	100 (45.4)
Osmium oxide OsO4, (T–4)–	20816–12–0	4	P087	1000 (454)
Osmium tetroxide	20816–12–0	4	P087	1000 (454)
7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid	145–73–3	4	P088	1000 (454)
1,2-Oxathiolane, 2,2-dioxide	1120–71–4	3,4	U193	10 (4.54)
2H-1,3,2-Oxazaphosphorin-2–amine, N,N- bis(2-chloroethyl)tetrahydro-, 2-oxide	50–18–0	4	U058	10 (4.54)
Oxirane	75–21–8	3,4	U115	10 (4.54)
Oxiranecarboxyaldehyde	765–34–4	4	U126	10 (4.54)
Oxirane, (chloromethyl)-	106–89–8	1,3,4	U041	100 (45.4)
Paraformaldehyde	30525–89–4	1		1000 (454)
Paraldehyde	123–63–7	4	U182	1000 (454)
Parathion	56–38–2	1,3,4	P089	10 (4.54)
PCBs	1336–36–3	1,2,3		1 (0.454)
PCNB	82–68–8	3,4	U185	100 (45.4)
Pentachlorobenzene	608–93–5	4	U183	10 (4.54)
Pentachloroethane	76–01–7	4	U184	10 (4.54)
Pentachloronitrobenzene	82–68–8	3,4	U185	100 (45.4)
Pentachlorophenol	87–86–5	1,2,3,4	See F027	10 (4.54)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
1,3-Pentadiene	504–60–9	4	U186	100 (45.4)
Perchloroethylene	127–18–4	2,3,4	U210	100 (45.4)
Phenacetin	62–44–2	4	U187	100 (45.4)
Phenanthrene	85–01–8	2		5000 (2270)
Phenol	108–95–2	1,2,3,4	U188	1000 (454)
Phenol, 2-chloro-	95–57–8	2,4	U048	100 (45.4)
Phenol, 4-chloro-3-methyl-	59–50–7	2,4	U039	5000 (2270)
Phenol, 2-cyclohexyl-4,6-dinitro-	131–89–5	4	P034	100 (45.4)
Phenol, 2,4-dichloro-	120–83–2	2,4	U081	100 (45.4)
Phenol, 2,6-dichloro-	87–65–0	4	U082	100 (45.4)
Phenol, 4,4′-(1,2-diethyl-1,2-ethenediyl)bis-, (E)	56–53–1	4	U089	1 (0.454)
Phenol, 2,4-dimethyl-	105–67–9	2,4	U101	100 (45.4)
Phenol, 4-(dimethylamino)-3,5-dimethyl-, 4 methylcarbamate (ester)	315–18–4	1,4	P128	1000 (454)
Phenol, (3,5-dimethyl-4-(methylthio)-, methylcarbamate	2032–65–7	1,4	P199	10 (4.54)
Phenol, 2,4-dinitro-	51–28–5	1,2,3,4	P048	10 (4.54)
Phenol, methyl-	1319–77–3	1,3,4	U052	100 (45.4)
Phenol, 2-methyl-4,6-dinitro-, & salts	534–52–1	2,3,4	P047	10 (4.54)
Phenol, 2,2′-methylenebis[3,4,6- trichloro-	70–30–4	4	U132	100 (45.4)
Phenol, 2-(1-methylethoxy)-, methylcarbamate	114–26–1	3,4	U411	100 (45.4)
Phenol, 3-(1-methylethyl)-, methyl carbamate (m-Cumenyl methylcarbamate)	64–00–6	4	P202	##
Phenol, 3-methyl-5-(1-methylethyl)-, methyl carbamate (Promecarb)	2631-37–0	4	P201	##
Phenol, 2-(1-methylpropyl)-4,6-dinitro-	88–85–7	4	P020	1000 (454)
Phenol, 4-nitro-	100–02–7	1,2,3,4	U170	100 (45.4)
Phenol, pentachloro-	87–86–5	1,2,3,4	See F027	10 (4.54)
Phenol, 2,3,4,6-tetrachloro-	58–90–2	4	See F027	10 (4.54)
Phenol, 2,4,5-trichloro-	95–95–4	1,3,4	See F027	10 (4.54)
Phenol, 2,4,6-trichloro-	88–06–2	1,2,3,4	See F027	10 (4.54)
Phenol, 2,4,6-trinitro-, ammonium salt	131–74–8	4	P009	10 (4.54)
L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-	148–82–3	4	U150	1 (0.454)
p-Phenylenediamine	106–50–3	3		5000 (2270)
Phenylmercury acetate	62–38–4	4	P092	100 (45.4)
Phenylthiourea	103–85–5	4	P093	100 (45.4)
Phorate	298–02–2	4	P094	10 (4.54)
Phosgene	75–44–5	1,3,4	P095	10 (4.54)
Phosphine	7803–51–2	3,4	P096	100 (45.4)
Phosphoric acid	7664–38–2	1		5000 (2270)
Phosphoric acid, diethyl 4-nitrophenyl ester	311–45–5	4	P041	100 (45.4)
Phosphoric acid, lead(2+) salt (2:3)	7446–27–7	4	U145	10 (4.54)
Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester	298–04–4	1,4	P039	1 (0.454)
Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester	298–02–2	4	P094	10 (4.54)
Phosphorodithioic acid, O,O-diethyl S-methyl ester	3288-58–2	4	U087	5000 (2270)
Phosphorodithioic acid, O,O-dimethyl S-[2(methylamino)-2-oxoethyl] ester	60–51–5	4	P044	10 (4.54)
Phosphorofluoridic acid, bis(1-methylethyl) ester	55–91–4	4	P043	100 (45.4)
Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester	56–38–2	1,3,4	P089	10 (4.54)
Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester	297–97–2	4	P040	100 (45.4)
Phosphorothioic acid, O-[4-[(dimethylamino) sulfonyl]phenyl] O,O-dimethyl ester	52–85–7	4	P097	1000 (454)
Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester	298–00–0	1,4	P071	100 (45.4)
Phosphorus	7723–14–0	1,3		1 (0.454)
Phosphorus oxychloride	10025–87–3	1		1000 (454)
Phosphorus pentasulfide	1314–80–3	1,4	U189	100 (45.4)
Phosphorus sulfide	1314–80–3	1,4	U189	100 (45.4)
Phosphorus trichloride	7719–12–2	1		1000 (454)
PHTHALATE ESTERS	N.A.	2		**
Phthalic anhydride	85–44–9	3,4	U190	5000 (2270)
2-Picoline	109–06–8	4	U191	5000 (2270)
Piperidine, 1-nitroso-	100–75–4	4	U179	10 (4.54)
Plumbane, tetraethyl-	78–00–2	1,4	P110	10 (4.54)
POLYCHLORINATED BIPHENYLS	1336–36–3	1,2,3		1 (0.454)
Polycyclic Organic Matter [e]	N.A.	3		**
POLYNUCLEAR AROMATIC HYDROCARBONS	N.A.	2		**
Potassium arsenate	7784–41–0	1		1 (0.454)
Potassium arsenite	10124–50–2	1		1 (0.454)
Potassium bichromate	7778–50–9	1		10 (4.54)
Potassium chromate	7789–00–6	1		10 (4.54)
Potassium cyanide K(CN)	151–50–8	1,4	P098	10 (4.54)
Potassium hydroxide	1310–58–3	1		1000 (454)
Potassium permanganate	7722–64–7	1		100 (45.4)
Potassium silver cyanide	506–61–6	4	P099	1 (0.454)
Pronamide	23950–58–5	4	U192	5000 (2270)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Propanal, 2-methyl-2-(methylsulfonyl)-, O-[(methylamino)carbonyl] oxime (Aldicarb sulfone).	1646–88–4	4	P203	##
Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime	116–06–3	4	P070	1 (0.454)
1-Propanamine	107–10–8	4	U194	5000 (2270)
1-Propanamine, N-propyl-	142–84–7	4	U110	5000 (2270)
1-Propanamine, N-nitroso-N-propyl-	621–64–7	2,4	U111	10 (4.54)
Propane, 1,2-dibromo-3-chloro-	96–12–8	3,4	U066	1 (0.454)
Propane, 1,2-dichloro-	78–87–5	1,2,3,4	U083	1000 (454)
Propanedinitrile	109–77–3	4	U149	1000 (454)
Propanenitrile	107–12–0	4	P101	10 (4.54)
Propanenitrile, 3-chloro-	542–76–7	4	P027	1000 (454)
Propanenitrile, 2-hydroxy-2-methyl-	75–86–5	1,4	P069	10 (4.54)
Propane, 2-nitro-	79–46–9	3,4	U171	10 (4.54)
Propane, 2,2'-oxybis[2-chloro-	108–60–1	2,4	U027	1000 (454)
1,3-Propane sultone	1120–71–4	3,4	U193	10 (4.54)
1,2,3-Propanetriol, trinitrate	55–63–0	4	P081	10 (4.54)
Propanoic acid, 2-(2,4,5-trichlorophenoxy)-	93–72–1	1,4	See F027	100 (45.4)
1-Propanol, 2,3-dibromo-, phosphate (3:1)	126–72–7	4	U235	10 (4.54)
1-Propanol, 2-methyl-	78–83–1	4	U140	5000 (2270)
2-Propanone	67–64–1	4	U002	5000 (2270)
2-Propanone, 1-bromo-	598–31–2	4	P017	1000 (454)
Propargite	2312–35–8	1		10 (4.54)
Propargyl alcohol	107–19–7	4	P102	1000 (454)
2-Propenal	107–02–8	1,2,3,4	P003	1 (0.454)
2-Propenamide	79–06–1	3,4	U007	5000 (2270)
1-Propene, 1,3-dichloro-	542–75–6	1,2,3,4	U084	100 (45.4)
1-Propene, 1,1,2,3,3,3-hexachloro-	1888–71–7	4	U243	1000 (454)
2-Propenenitrile	107–13–1	1,2,3,4	U009	100 (45.4)
2-Propenenitrile, 2-methyl-	126–98–7	4	U152	1000 (454)
2-Propenoic acid	79–10–7	3,4	U008	5000 (2270)
2-Propenoic acid, ethyl ester	140–88–5	3,4	U113	1000 (454)
2-Propenoic acid, 2-methyl-, ethyl ester	97–63–2	4	U118	1000 (454)
2-Propenoic acid, 2-methyl-, methyl ester	80–62–6	1,3,4	U162	1000 (454)
2-Propen-1-ol	107–18–6	1,4	P005	100 (45.4)
beta-Propiolactone	57–57–8	3		10 (4.54)
Propionaldehyde	123–38–6	3	1000 (454)	
Propionic acid	79–09–4	1		5000 (2270)
Propionic anhydride	123–62–6	1		5000 (2270)
Propoxur (Baygon)	114–26–1	3,4	U411	100 (45.4)
n-Propylamine	107–10–8	4	U194	5000 (2270)
Propylene dichloride	78–87–5	1,2,3,4	U083	1000 (454)
Propylene oxide	75–56–9	1,3		100 (45.4)
1,2-Propylenimine	75–55–8	3,4	P067	1 (0.454)
2-Propyn-1-ol	107–19–7	4	P102	1000 (454)
Pyrene	129–00–0	2		5000 (2270)
Pyrethrins	121–29–9 121–21–1 8003–34–7	1		1 (0.454)
3,6-Pyridazinedione, 1,2-dihydro-	123–33–1	4	U148	5000 (2270)
4-Pyridinamine	504–24–5	4	P008	1000 (454)
Pyridine	110–86–1	4	U196	1000 (454)
Pyridine, 2-methyl-	109–06–8	4	U191	5000 (2270)
Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, & salts	54–11–5	4	P075	100 (45.4)
2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2- chloroethyl)amino]-	66–75–1	4	U237	10 (4.54)
4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-	56–04–2	4	U164	10 (4.54)
Pyrrolidine, 1-nitroso-	930–55–2	4	U180	1 (0.454)
Pyrrolo[2,3-b] indol-5-ol, 1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethyl-, methylcarbamate (ester), (3aS-cis)-(Physostigmine).	57–47–6	4	P204	##
Quinoline	91–22–5	1,3		5000 (2270)
Quinone	106–51–4	3,4	U197	10 (4.54)
Quintobenzene	82–68–8	3,4	U185	100 (45.4)
Radionuclides (including radon)	N.A.	3		§
Reserpine	50–55–5	4	U200	5000 (2270)
Resorcinol	108–46–3	1,4	U201	5000 (2270)
Saccharin, & salts	81–07–2	4	U202	100 (45.4)
Safrole	94–59–7	4	U203	100 (45.4)
Selenious acid	7783–00–8	4	U204	10 (4.54)
Selenious acid, dithallium (1+) salt	12039–52–0	4	P114	1000 (454)
Selenium††	7782–49–2	2		100 (45.4)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
SELENIUM AND COMPOUNDS	N.A.	2,3		**
Selenium Compounds	N.A.	2,3		**
Selenium dioxide	7446–08–4	1,4	U204	10 (4.54)
Selenium oxide	7446–08–4	1,4	U204	10 (4.54)
Selenium sulfide SeS2	7488–56–4	4	U205	10 (4.54)
Selenourea	630–10–4	4	P103	1000 (454)
L-Serine, diazoacetate (ester)	115–02–6	4	U015	1 (0.454)
Silver ††	7440–22–4	2		1000 (454)
SILVER AND COMPOUNDS	N.A.	2		**
Silver cyanide Ag(CN)	506–64–9	4	P104	1 (0.454)
Silver nitrate	7761–88–8	1		1 (0.454)
Silvex (2,4,5-TP)	93–72–1	1,4	See F027	100 (45.4)
Sodium	7440–23–5	1		10 (4.54)
Sodium arsenate	7631–89–2	1		1 (0.454)
Sodium arsenite	7784–46–5	1		1 (0.454)
Sodium azide	26628–22–8	4	P105	1000 (454)
Sodium bichromate	10588–01–9	1		10 (4.54)
Sodium bifluoride	1333–83–1	1		100 (45.4)
Sodium bisulfite	7631–90–5	1		5000 (2270)
Sodium chromate	7775–11–3	1		10 (4.54)
Sodium cyanide Na(CN)	143–33–9	1,4	P106	10 (4.54)
Sodium dodecylbenzenesulfonate	25155–30–0	1		1000 (454)
Sodium fluoride	7681–49–4	1		1000 (454)
Sodium hydrosulfide	16721–80–5	1		5000 (2270)
Sodium hydroxide	1310–73–2	1		1000 (454)
Sodium hypochlorite	7681–52–9 10022–70–5	1		100 (45.4)
Sodium methylate	124–41–4	1		1000 (454)
Sodium nitrite	7632–00–0	1		100 (45.4)
Sodium phosphate, dibasic	7558–79–4 10039–32–4 10140–65–5	1		5000 (2270)
Sodium phosphate, tribasic	7601–54–9 7758–29–4 7785–84–4 10101–89–0 10124–56–8 10361–89–4	1		5000 (2270)
Sodium selenite	7782–82–3 10102–18–8	1		100 (45.4)
Streptozotocin	18883–66–4	4	U206	1 (0.454)
Strontium chromate	7789–06–2	1		10 (4.54)
Strychnidin-10-one, & salts	57–24–9	1,4	P108	10 (4.54)
Strychnidin-10-one, 2,3-dimethoxy-	357–57–3	4	P018	100 (45.4)
Strychnine, & salts	57–24–9	1,4	P108	10 (4.54)
Styrene	100–42–5	1,3		1000 (454)
Styrene oxide	96–09–3	3		100 (45.4)
Sulfuric acid	7664–93–9 8014–95–7	1		1000 (454)
Sulfuric acid, dimethyl ester	77–78–1	3,4	U103	100 (45.4)
Sulfuric acid, dithallium (1+) salt	7446–18–6 10031–59–1	1,4	P115	100 (45.4)
Sulfur monochloride	12771–08–3	1		1000 (454)
Sulfur phosphide	1314–80–3	1,4	U189	100 (45.4)
2,4,5-T	93–76–5	1,4	See F027	1000 (454)
2,4,5-T acid	93–76–5	1,4	See F027	1000 (454)
2,4,5-T amines	2008–46–0 1319–72–8 3813–14–7 6369–96–6 6369–97–7	1		5000 (2270)
2,4,5-T esters	93–79–8 1928–47–8 2545–59–7 25168–15–4 61792–07–2	1		1000 (454)
2,4,5-T salts	13560–99–1	1		1000 (454)
TCDD	1746–01–6	2,3		1 (0.454)
TDE	72–54–8	1,2,4	U060	1 (0.454)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
1,2,4,5-Tetrachlorobenzene	95–94–3	4	U207	5000 (2270)
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746–01–6	2,3		1 (0.454)
1,1,1,2-Tetrachloroethane	630–20–6	4	U208	100 (45.4)
1,1,2,2-Tetrachloroethane	79–34–5	2,3,4	U209	100 (45.4)
Tetrachloroethylene	127–18–4	2,3,4	U210	100 (45.4)
2,3,4,6-Tetrachlorophenol	58–90–2	4	See F027	10 (4.54)
Tetraethyl pyrophosphate	107–49–3	1,4	P111	10 (4.54)
Tetraethyl lead	78–00–2	1,4	P110	10 (4.54)
Tetraethyldithiopyrophosphate	3689–24–5	4	P109	100 (45.4)
Tetrahydrofuran	109–99–9	4	U213	1000 (454)
Tetranitromethane	509–14–8	4	P112	10 (4.54)
Tetraphosphoric acid, hexaethyl ester	757–58–4	4	P062	100 (45.4)
Thallic oxide	1314–32–5	4	P113	100 (45.4)
Thallium ††	7440–28–0	2		1000 (454)
THALLIUM AND COMPOUNDS	N.A.	2		**
Thallium (I) acetate	563–68–8	4	U214	100 (45.4)
Thallium (I) carbonate	6533–73–9	4	U215	100 (45.4)
Thallium chloride TlCl	7791–12–0	4	U216	100 (45.4)
Thallium (I) nitrate	10102–45–1	4	U217	100 (45.4)
Thallium oxide Tl2O3	1314–32–5	4	P113	100 (45.4)
Thallium (l) selenite	12039–52–0	4	P114	1000 (454)
Thallium (I) sulfate	7446–18–6 10031–59–1	1,4	P115	100 (45.4)
Thioacetamide	62–55–5	4	U218	10 (4.54)
Thiodiphosphoric acid, tetraethyl ester	3689–24–5	4	P109	100 (45.4)
Thiofanox	39196–18–4	4	P045	100 (45.4)
Thioimidodicarbonic diamide [(H2N)C(S)] 2NH	541–53–7	4	P049	100 (45.4)
Thiomethanol	74–93–1	1,4	U153	100 (45.4)
Thioperoxydicarbonic diamide [(H2N)C(S)] 2S2, tetramethyl-	137–26–8	4	U244	10 (4.54)
Thiophenol	108–98–5	4	P014	100 (45.4)
Thiosemicarbazide	79–19–6	4	P116	100 (45.4)
Thiourea	62–56–6	4	U219	10 (4.54)
Thiourea, (2-chlorophenyl)-	5344–82–1	4	P026	100 (45.4)
Thiourea, 1-naphthalenyl-	86–88–4	4	P072	100 (45.4)
Thiourea, phenyl-	103–85–5	4	P093	100 (45.4)
Thiram	137–26–8	4	U244	10 (4.54)
Titanium tetrachloride	7550–45–0	3		1,2,41000 (454)
Toluene	108–88–3	1,2,3,4	U220	1000 (454)
Toluenediamine	95–80–7 496–72–0 823–40–5 25376–45–8	3,4	U221	10 (4.54)
2,4-Toluene diamine	95–80–7 496–72–0 823–40–5 25376–45–8	3,4	U221	10 (4.54)
Toluene diisocyanate	91–08–7 584–84–9 26471–62–5	3,4	U223	100 (45.4)
2,4-Toluene diisocyanate	91–08–7 584–84–9 26471–62–5	3,4	U223	100 (45.4)
o-Toluidine	95–53–4	3,4	U328	100 (45.4)
p-Toluidine	106–49–0	4	U353	100 (45.4)
o-Toluidine hydrochloride	636–21–5	4	U222	100 (45.4)
Toxaphene	8001–35–2	1,2,3,4	P123	1 (0.454)
2,4,5-TP acid	93–72–1	1,4	See F027	100 (45.4)
2,4,5-TP esters	32534–95–5	1		100 (45.4)
1H-1,2,4-Triazol-3-amine	61–82–5	4	U011	10 (4.54)
Trichlorfon	52–68–6	1		100 (45.4)
1,2,4-Trichlorobenzene	120–82–1	2,3		100 (45.4)
1,1,1-Trichloroethane	71–55–6	2,3,4	U226	1000 (454)
1,1,2-Trichloroethane	79–00–5	2,3,4	U227	100 (45.4)
Trichloroethylene	79–01–6	1,2,3,4	U228	100 (45.4)
Trichloromethanesulfenyl chloride	594–42–3	4	P118	100 (45.4)
Trichloromonofluoromethane	75–69–4	4	U121	5000 (2270)
Trichlorophenol	25167–82–2	1		10 (4.54)
2,3,4-Trichlorophenol	15950–66–0			

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
2,3,5-Trichlorophenol	933–78–8			
2,3,6-Trichlorophenol	933–75–5			
3,4,5-Trichlorophenol	609–19–8			
2,4,5-Trichlorophenol	95–95–4	1,3,4	See F027	10 (4.54)
2,4,6-Trichlorophenol	88–06–2	1,2,3,4	See F027	10 (4.54)
Triethanolamine dodecylbenzenesulfonate	27323–41–7	1		1000 (454)
Triethylamine	121–44–8	1,3,4	U404	5000 (2270)
Trifluralin	1582–09–8	3		10 (4.54)
Trimethylamine	75–50–3	1		100 (45.4)
2,2,4-Trimethylpentane	540–84–1	3		1000 (454)
1,3,5-Trinitrobenzene	99–35–4	4	U234	10 (4.54)
1,3,5-Trioxane, 2,4,6-trimethyl-	123–63–7	4	U182	1000 (454)
Tris(2,3-dibromopropyl) phosphate	126–72–7	4	U235	10 (4.54)
Trypan blue	72–57–1	4	U236	10 (4.54)
Unlisted Hazardous Wastes Characteristic of Corrosivity	N.A.	4	D002	100 (45.4)
Unlisted Hazardous Wastes Characteristic of Ignitability	N.A.	4	D001	100 (45.4)
Unlisted Hazardous Wastes Characteristic of Reactivity	N.A.	4	D003	100 (45.4)
Unlisted Hazardous Wastes Characteristic of Toxicity:				
Arsenic (D004)	N.A.	4	D004	1 (0.454)
Barium (D005)	N.A.	4	D005	1000 (454)
Benzene (D018)	N.A.	1,2,3,4	D018	10 (4.54)
Cadmium (D006)	N.A.	4	D006	10 (4.54)
Carbon tetrachloride (D019)	N.A.	1,2,4	D019	10 (4.54)
Chlordane (D020)	N.A.	1,2,4	D020	1 (0.454)
Chlorobenzene (D021)	N.A.	1,2,4	D021	100 (45.4)
Chloroform (D022)	N.A.	1,2,4	D022	10 (4.54)
Chromium (D007)	N.A.	4	D007	10 (4.54)
o-Cresol (D023)	N.A.	4	D023	100 (45.4)
m-Cresol (D024)	N.A.	4	D024	100 (45.4)
p-Cresol (D025)	N.A.	4	D025	100 (45.4)
Cresol (D026)	N.A.	4	D026	100 (45.4)
2,4-D (D016)	N.A.	1,4	D016	100 (45.4)
1,4-Dichlorobenzene (D027)	N.A.	1,2,4	D027	100 (45.4)
1,2-Dichloroethane (D028)	N.A.	1,2,4	D028	100 (45.4)
1,1-Dichloroethylene (D029)	N.A.	1,2,4	D029	100 (45.4)
2,4-Dinitrotoluene (D030)	N.A.	1,2,4	D030	10 (4.54)
Endrin (D012)	N.A.	1,4	D012	1 (0.454)
Heptachlor (and epoxide) (D031)	N.A.	1,2,4	D031	1 (0.454)
Hexachlorobenzene (D032)	N.A.	2,4	D032	10 (4.54)
Hexachlorobutadiene (D033)	N.A.	2,4	D033	1 (0.454)
Hexachloroethane (D034)	N.A.	2,4	D034	100 (45.4)
Lead (D008)	N.A.	4	D008	10 (4.54)
Lindane (D013)	N.A.	1,4	D013	1 (0.454)
Mercury (D009)	N.A.	4	D009	1 (0.454)
Methoxychlor (D014)	N.A.	1,4	D014	1 (0.454)
Methyl ethyl ketone (D035)	N.A.	4	D035	5000 (2270)
Nitrobenzene (D036)	N.A.	1,2,4	D036	1000 (454)
Pentachlorophenol (D037)	N.A.	1,2,4	D037	10 (4.54)
Pyridine (D038)	N.A.	4	D038	1000 (454)
Selenium (D010)	N.A.	4	D010	10 (4.54)
Silver (D011)	N.A.	4	D011	1 (0.454)
Tetrachloroethylene (D039)	N.A.	2,4	D039	100 (45.4)
Toxaphene (D015)	N.A.	1,4	D015	1 (0.454)
Trichloroethylene (D040)	N.A.	1,2,4	D040	100 (45.4)
2,4,5-Trichlorophenol (D041)	N.A.	1,4	D041	10 (4.54)
2,4,6-Trichlorophenol (D042)	N.A.	1,2,4	D042	10 (4.54)
2,4,5-TP (D017)	N.A.	1,4	D017	100 (45.4)
Vinyl chloride (D043)	N.A.	2,3,4	D043	1 (0.454)
Uracil mustard	66–75–1	4	U237	10 (4.54)
Uranyl acetate	541–09–3	1		100 (45.4)
Uranyl nitrate	10102–06–4 36478–76–9	1		100 (45.4)
Urea, N-ethyl-N-nitroso-	759–73–9	4	U176	1 (0.454)
Urea, N-methyl-N-nitroso-	684–93–5	3,4	U177	1 (0.454)
Urethane	51–79–6	3,4	U238	100 (45.4)
Vanadic acid, ammonium salt	7803–55–6	4	P119	1000 (454)
Vanadium oxide V2O5	1314–62–1	1,4	P120	1000 (454)
Vanadium pentoxide	1314–62–1	1,4	P120	1000 (454)
Vanadyl sulfate	27774–13–6	1		1000 (454)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Vinyl acetate	108–05–4	1,3		5000 (2270)
Vinyl acetate monomer	108–05–4	1,3		5000 (2270)
Vinylamine, N-methyl-N-nitroso-	4549–40–0	4	P084	10 (4.54)
Vinyl bromide	593–60–2	3		100 (45.4)
Vinyl chloride	75–01–4	2,3,4	U043	1 (0.454)
Vinylidene chloride	75–35–4	1,2,3,4	U078	100 (45.4)
Warfarin, & salts	81–81–2	4	P001, U248	100 (45.4)
Xylene	1330–20–7	1,3,4	U239	100 (45.4)
m-Xylene	108–38–3	3		1000 (454)
o-Xylene	95–47–6	3		1000 (454)
p-Xylene	106–42–3	3		100 (45.4)
Xylene (mixed)	1330–20–7	1,3,4	U239	100 (45.4)
Xylenes (isomers and mixture)	1330–20–7	1,3,4	U239	100 (45.4)
Xylenol	1300–71–6	1		1000 (454)
Yohimban-16-carboxylic acid,11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-, methyl ester (3beta,16beta,17alpha, 18beta,20alpha).	50–55–54	4	U200	5000 (2270)
Zinc ††	7440–66–6	2		1000 (454)
ZINC AND COMPOUNDS	N.A.	2		**
Zinc acetate	557–34–6	1		1000 (454)
Zinc ammonium chloride	52628–25–8 14639–97–5 14639–98–6	1		1000 (454)
Zinc, bis(dimethylcarbamodithioato-S,S')-, (Ziram)	137–30–4	4	P205	##
Zinc borate	1332–07–6	1		1000 (454)
Zinc bromide	7699–45–8	1		1000 (454)
Zinc carbonate	3486–35–9	1		1000 (454)
Zinc chloride	7646–85–7	1		1000 (454)
Zinc cyanide Zn(CN)2	557–21–1	1,4	P121	10 (4.54)
Zinc fluoride	7783–49–5	1		1000 (454)
Zinc formate	557–41–5	1		1000 (454)
Zinc hydrosulfite	7779–86–4	1		1000 (454)
Zinc nitrate	7779–88–6	1		1000 (454)
Zinc phenolsulfonate	127–82–2	1		5000 (2270)
Zinc phosphide Zn3P2	1314–84–7	1,4	P122, U249	100 (45.4)
Zinc silicofluoride	16871–71–9	1		5000 (2270)
Zinc sulfate	7733–02–0	1		1000 (454)
Zirconium nitrate	13746–89–9	1		5000 (2270)
Zirconium potassium fluoride	16923–95–8	1		1000 (454)
Zirconium sulfate	14644–61–2	1		5000 (2270)
Zirconium tetrachloride	10026–11–6	1		5000 (2270)
F001	....	4	F001	10 (4.54)
The following spent halogenated solvents used in degreasing; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the halogenated solvents listed below or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.				
(a) Tetrachloroethylene	127–18–4	2,3,4	U210	100 (45.4)
(b) Trichloroethylene	79–01–6	1,2,3,4	U228	100 (45.4)
(c) Methylene chloride	75–09–2	2,3,4	U080	1000 (454)
(d) 1,1,1-Trichloroethane	71–55–6	2,3,4	U226	1000 (454)
(e) Carbon tetrachloride	56–23–5	1,2,3,4	U211	10 (4.54)
(f) Chlorinated fluorocarbons	N.A.	....		5000 (2270)
F002	....	4	F002	10 (4.54)
The following spent halogenated solvents; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the halogenated solvents listed below or those solvents listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.				
(a) Tetrachloroethylene	127–18–4	2,3,4	U210	100 (45.4)
(b) Methylene chloride	75–09–2	2,3,4	U080	1000 (454)
(c) Trichloroethylene	79–01–6	1,2,3,4	U228	100 (45.4)
(d) 1,1,1-Trichloroethane	71–55–6	2,3,4	U226	1000 (454)
(e) Chlorobenzene	108–90–7	1,2,3,4	U037	100 (45.4)
(f) 1,1,2-Trichloro-1,2,2-trifluoroethane	76–13–1	....		5000 (2270)
(g) o-Dichlorobenzene	95–50–1	1,2,4	U070	100 (45.4)
(h) Trichlorofluoromethane	75–69–4	4	U121	5000 (2270)
(i) 1,1,2-Trichloroethane	79–00–5	2,3,4	U227	100 (45.4)
F003	....	4	F003	100 (45.4)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents.				
(a) Xylene	1330-20–7			1000 (454)
(b) Acetone	67–64–1			5000 (2270)
(c) Ethyl acetate	141–78–6			5000 (2270)
(d) Ethylbenzene	100–41–4			1000 (454)
(e) Ethyl ether	60–29–7			100 (45.4)
(f) Methyl isobutyl ketone	108–10–1			5000 (2270)
(g) n-Butyl alcohol	71–36–3			5000 (2270)
(h) Cyclohexanone	108–94–1			5000 (2270)
(i) Methanol	67–56–1			5000 (2270)
F004		4	F004	100 (45.4)
The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents:				
(a) Cresols/Cresylic acid	1319–77–3	1,3,4	U052	100 (45.4)
(b) Nitrobenzene	98–95–3	1,2,3,4	U169	1000 (454)
F005		4	F005	100 (45.4)
The following spent non-halogenated solvents and the still bottoms from the recovery of these solvents:				
(a) Toluene	108–88–3	1,2,3,4	U220	1000 (454)
(b) Methyl ethyl ketone	78–93–3	3,4	U159	5000 (2270)
(c) Carbon disulfide	75–15–0	1,3,4	P022	100 (45.4)
(d) Isobutanol	78–83–1	4	U140	5000 (2270)
(e) Pyridine	110–86–1	4	U196	1000 (454)
F006		4	F006	10 (4.54)
Wastewater treatment sludges from electroplating operations except from the following processes: (1) sulfuric acid anodizing of aluminum, (2) tin plating on carbon steel, (3) zinc plating (segregated basis) on carbon steel, (4) aluminum or zinc-aluminum plating on carbon steel, (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel, and (6) chemical etching and milling of aluminum.				
F007		4	F007	10 (4.54)
Spent cyanide plating bath solutions from electroplating operations.				
F008		4	F008	10 (4.54)
Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.				
F009		4	F009	10 (4.54)
Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.				
F010		4	F010	10 (4.54)
Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.				
F011		4	F011	10 (4.54)
Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.				
F012		4	F012	10 (4.54)
Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process.				
F019		4	F019	10 (4.54)
Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process.				
F020		4	F020	1 (0.454)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of hexachlorophene from highly purified 2,4,5-trichlorophenol.)				
F021		4	F021	1 (0.454)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol or of intermediates used to produce its derivatives.				
F022		4	F022	1 (0.454)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions.				

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
F023		4	F023	1 (0.454)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or a component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of hexachlorophene from highly purified 2,4,5-trichlorophenol.)				
F024		4	F024	1 (0.454)
Process wastes, including but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes, from the production of certain chlorinated aliphatic hydrocarbons by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution. (This listing does not include wastewaters, wastewater treatment sludges, spent catalysts, and wastes listed in 40 CFR 261.31 or 261.32.)				
F025		4	F025	1 (0.454)
Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.				
F026		4	F026	1 (0.454)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions.				
F027		4	F027	1 (0.454)
Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing hexachlorophene synthesized from prepurified 2,4,5- trichlorophenol as the sole component.)				
F028		4	F028	1 (0.454)
Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027.				
F032		4	F032	1 (0.454)
Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that currently use or have previously used chlorophenolic formulations (except potentially cross-contaminated wastes that have had the F032 waste code deleted in accordance with § 261.35 of this chapter or potentially cross-contaminated wastes that are otherwise currently regulated as hazardous wastes (i.e., F034 or F035), and where the generator does not resume or initiate use of chlorophenolic formulations). This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.				
F034		4	F034	1 (0.454)
Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.				
F035		4	F035	1 (0.454)
Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use inorganic preservatives containing arsenic or chromium. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.				
F037		4	F037	1 (0.454)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Petroleum refinery primary oil/water/solids separation sludge-Any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to those generated in oil/water/solids separators; tanks and impoundments; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow. Sludges generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges generated in aggressive biological treatment units as defined in § 261.31(b)(2) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and K051 wastes are not included in this listing. This listing does include residuals generated from processing or recycling oil-bearing hazardous secondary materials excluded under § 261.4(a)(12)(i), if those residuals are to be disposed of.				
F038	....	4	F038	1 (0.454)
Petroleum refinery secondary (emulsified) oil/water/solids separation sludge-Any sludge and/or float generated from the physical and/or chemical separation of oil/water/solids in process wastewaters and oily cooling wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in: induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. Sludges generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges and floats generated in aggressive biological treatment units as defined in § 261.31(b)(2) (including sludges and floats generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and F037, K048, and K051 wastes are not included in this listing.				
F039	....	4	F039	1 (0.454)
Leachate (liquids that have percolated through land disposed wastes) resulting from the disposal of more than one restricted waste classified as hazardous under subpart D of 40 CFR part 261. (Leachate resulting from the disposal of one or more of the following EPA Hazardous Wastes and no other hazardous wastes retains its EPA Hazardous Waste Number(s): F020, F021, F022, F026, F027, and/or F028.)				
K001	....	4	K001	1 (0.454)
Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol.				
K002	....	4	K002	10 (4.54)
Wastewater treatment sludge from the production of chrome yellow and orange pigments.				
K003	....	4	K003	10 (4.54)
Wastewater treatment sludge from the production of molybdate orange pigments.				
K004	....	4	K004	10 (4.54)
Wastewater treatment sludge from the production of zinc yellow pigments.				
K005	....	4	K005	10 (4.54)
Wastewater treatment sludge from the production of chrome green pigments.				
K006	....	4	K006	10 (4.54)
Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated).				
K007	....	4	K007	10 (4.54)
Wastewater treatment sludge from the production of iron blue pigments.				
K008	....	4	K008	10 (4.54)
Oven residue from the production of chrome oxide green pigments.				
K009	....	4	K009	10 (4.54)
Distillation bottoms from the production of acetaldehyde from ethylene.				
K010	....	4	K010	10 (4.54)
Distillation side cuts from the production of acetaldehyde from ethylene.				
K011	....	4	K011	10 (4.54)
Bottom stream from the wastewater stripper in the production of acrylonitrile.				
K013	....	4	K013	10 (4.54)
Bottom stream from the acetonitrile column in the production of acrylonitrile.				
K014	....	4	K014	5000 (2270)
Bottoms from the acetonitrile purification column in the production of acrylonitrile.				
K015	....	4	K015	10 (4.54)
Still bottoms from the distillation of benzyl chloride.				

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
K016		4	K016	1 (0.454)
Heavy ends or distillation residues from the production of carbon tetrachloride.				
K017		4	K017	10 (4.54)
Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin.				
K018		4	K018	1 (0.454)
Heavy ends from the fractionation column in ethyl chloride production.				
K019		4	K019	1 (0.454)
Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production.				
K020		4	K020	1 (0.454)
Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production.				
K021		4	K021	10 (4.54)
Aqueous spent antimony catalyst waste from fluoromethanes production.				
K022		4	K022	1 (0.454)
Distillation bottom tars from the production of phenol/acetone from cumene.				
K023		4	K023	5000 (2270)
Distillation light ends from the production of phthalic anhydride from naphthalene.				
K024		4	K024	5000 (2270)
Distillation bottoms from the production of phthalic anhydride from naphthalene.				
K025		4	K025	10 (4.54)
Distillation bottoms from the production of nitrobenzene by the nitration of benzene.				
K026		4	K026	1000 (454)
Stripping still tails from the production of methyl ethyl pyridines.				
K027		4	K027	10 (4.54)
Centrifuge and distillation residues from toluene diisocyanate production.				
K028		4	K028	1 (0.454)
Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane.				
K029		4	K029	1 (0.454)
Waste from the product steam stripper in the production of 1,1,1- trichloroethane.				
K030		4	K030	1 (0.454)
Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene.				
K031		4	K031	1 (0.454)
By-product salts generated in the production of MSMA and cacodylic acid.				
K032		4	K032	10 (4.54)
Wastewater treatment sludge from the production of chlordane.				
K033		4	K033	10 (4.54)
Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane.				
K034		4	K034	10 (4.54)
Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane.				
K035		4	K035	1 (0.454)
Wastewater treatment sludges generated in the production of creosote.				
K036		4	K036	1 (0.454)
Still bottoms from toluene reclamation distillation in the production of disulfoton.				
K037		4	K037	1 (0.454)
Wastewater treatment sludges from the production of disulfoton.				
K038		4	K038	10 (4.54)
Wastewater from the washing and stripping of phorate production.				
K039		4	K039	10 (4.54)
Filter cake from the filtration of diethylphosphorodithioic acid in the production of phorate.				
K040		4	K040	10 (4.54)
Wastewater treatment sludge from the production of phorate.				
K041		4	K041	1 (0.454)
Wastewater treatment sludge from the production of toxaphene.				
K042		4	K042	10 (4.54)
Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T.				
K043		4	K043	10 (4.54)
2,6-Dichlorophenol waste from the production of 2,4-D.				
K044		4	K044	10 (4.54)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Wastewater treatment sludges from the manufacturing and processing of explosives.				
K045		4	K045	10 (4.54)
Spent carbon from the treatment of wastewater containing explosives.				
K046		4	K046	10 (4.54)
Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds.				
K047		4	K047	10 (4.54)
Pink/red water from TNT operations.				
K048		4	K048	10 (4.54)
Dissolved air flotation (DAF) float from the petroleum refining industry.				
K049		4	K049	10 (4.54)
Slop oil emulsion solids from the petroleum refining industry.				
K050		4	K050	10 (4.54)
Heat exchanger bundle cleaning sludge from the petroleum refining industry.				
K051		4	K051	10 (4.54)
API separator sludge from the petroleum refining industry.				
K052		4	K052	10 (4.54)
Tank bottoms (leaded) from the petroleum refining industry.				
K060		4	K060	1 (0.454)
Ammonia still lime sludge from coking operations.				
K061		4	K061	10 (4.54)
Emission control dust/sludge from the primary production of steel in electric furnaces.				
K062		4	K062	10 (4.54)
Spent pickle liquor generated by steel finishing operations of facilities within the iron and steel industry (SIC Codes 331 and 332).				
K064		4	K064	10 (4.54)
Acid plant blowdown slurry/sludge resulting from the thickening of blowdown slurry from primary copper production.				
K065		4	K065	10 (4.54)
Surface impoundment solids contained in and dredged from surface impoundments at primary lead smelting facilities.				
K066		4	K066	10 (4.54)
Sludge from treatment of process wastewater and/or acid plant blowdown from primary zinc production.				
K069		4	K069	10 (4.54)
Emission control dust/sludge from secondary lead smelting. (Note: This listing is stayed administratively for sludge generated from secondary acid scrubber systems. The stay will remain in effect until further administrative action is taken. If EPA takes further action effecting the stay, EPA will publish a notice of the action in the **Federal Register**.)				
K071	....	4	K071	1 (0.454)
Brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used.				
K073	....	4	K073	10 (4.54)
Chlorinated hydrocarbon waste from the purification step of the diaphragm cellprocess using graphite anodes in chlorine production.				
K083	....	4	K083	100 (45.4)
Distillation bottoms from aniline production.				
K084	....	4	K084	1 (0.454)
Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.				
K085	....	4	K085	10 (4.54)
Distillation or fractionation column bottoms from the production of chlorobenzenes.				
K086	....	4	K086	10 (4.54)
Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead.				
K087	....	4	K087	100 (45.4)
Decanter tank tar sludge from coking operations.				
K088	....	4	K088	10 (4.54)
Spent potliners from primary aluminum reduction.				
K090	....	4	K090	10 (4.54)
Emission control dust or sludge from ferrochromiumsilicon production.				
K091	....	4	K091	10 (4.54)
Emission control dust or sludge from ferrochromium production.				
K093	....	4	K093	5000 (2270)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Distillation light ends from the production of phthalic anhydride from ortho-xylene.				
K094	....	4	K094	5000 (2270)
Distillation bottoms from the production of phthalic anhydride from ortho-xylene.				
K095	....	4	K095	100 (45.4)
Distillation bottoms from the production of 1,1,1-trichloroethane.				
K096	....	4	K096	100 (45.4)
Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane.				
K097	....	4	K097	1 (0.454)
Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane.				
K098	....	4	K098	1 (0.454)
Untreated process wastewater from the production of toxaphene.				
K099	....	4	K099	10 (4.54)
Untreated wastewater from the production of 2,4-D.				
K100	....	4	K100	10 (4.54)
Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.				
K101	....	4	K101	1 (0.454)
Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.				
K102	....	4	K102	1 (0.454)
Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.				
K103	....	4	K103	100 (45.4)
Process residues from aniline extraction from the production of aniline.				
K104	....	4	K104	10 (4.54)
Combined wastewater streams generated from nitrobenzene/aniline production.				
K105	....	4	K105	10 (4.54)
Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes.				
K106	....	4	K106	1 (0.454)
Wastewater treatment sludge from the mercury cell process in chlorine production.				
K107	....	4	K107	10 (4.54)
Column bottoms from product separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazines.				
K108	....	4	K108	10 (4.54)
Condensed column overheads from product separation and condensed reactor vent gases from the production of 1,1- dimethylhydrazine (UDMH) from carboxylic acid hydrazides.				
K109	....	4	K109	10 (4.54)
Spent filter cartridges from product purification from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.				
K110	....	4	K110	10 (4.54)
Condensed column overheads from intermediate separation from the production of 1,1- dimethylhydrazine (UDMH) from carboxylic acid hydrazides.				
K111	....	4	K111	10 (4.54)
Product washwaters from the production of dinitrotoluene via nitration of toluene.				
K112	....	4	K112	10 (4.54)
Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene.				
K113	....	4	K113	10 (4.54)
Condensed liquid light ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.				
K114	....	4	K114	10 (4.54)
Vicinals from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.				
K115	....	4	K115	10 (4.54)
Heavy ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.				
K116	....	4	K116	10 (4.54)
Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation of toluenediamine.				
K117	....	4	K117	1 (0.454)

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
Wastewater from the reactor vent gas scrubber in the production of ethylene dibromide via bromination of ethene.				
K118	....	4	K118	1 (0.454)
Spent adsorbent solids from purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.				
K123	....	4	K123	10 (4.54)
Process wastewater (including supernates, filtrates, and washwaters) from the production of ethylenebisdithiocarbamic acid and its salts.				
K124	....	4	K124	10 (4.54)
Reactor vent scrubber water from the production of ethylenebisdithiocarbamic acid and its salts.				
K125	....	4	K125	10 (4.54)
Filtration, evaporation, and centrifugation solids from the production of ethylenebisdithiocarbamic acid and its salts.				
K126	....	4	K126	10 (4.54)
Baghouse dust and floor sweepings in milling and packaging operations from the production or formulation of ethylenebisdithiocarbamic acid and its salts.				
K131	....	4	K131	100 (45.4)
Wastewater from the reactor and spent sulfuric acid from the acid dryer from the production of methyl bromide.				
K132	....	4	K132	1000 (454)
Spent absorbent and wastewater separator solids from the production of methyl bromide.				
K136	....	4	K136	1 (0.454)
Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.				
K141	....	4	K141	1 (0.454)
Process residues from the recovery of coal tar, including, but not limited to, collecting sump residues from the production of coke from coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludges from coking operations).				
K142	....	4	K142	1 (0.454)
Tar storage tank residues from the production of coke from coal or from the recovery of coke by-products produced from coal.				
K143	....	4	K143	1 (0.454)
Process residues from the recovery of light oil, including, but not limited to, those generated in stills, decanters, and wash oil recovery units from the recovery of coke by- products produced from coal.				
K144	....	4	K144	1 (0.454)
Wastewater sump residues from light oil refining, including, but not limited to, intercepting or contamination sump sludges from the recovery of coke by-products produced from coal.				
K145	....	4	K145	1 (0.454)
Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal.				
K147	....	4	K147	1 (0.454)
Tar storage tank residues from coal tar refining.				
K148	....	4	K148	1 (0.454)
Residues from coal tar distillation, including, but not limited to, still bottoms.				
K149	....	4	K149	10 (4.54)
Distillation bottoms from the production of alpha-(or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups. [This waste does not include still bottoms from the distillation of benzyl chloride.]				
K150	....	4	K150	10 (4.54)
Organic residuals, excluding spent carbon adsorbent, from the spent chlorine gas and hydrochloric acid recovery processes associated with the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.				
K151	....	4	K151	10 (4.54)
Wastewater treatment sludges, excluding neutralization and biological sludges, generated during the treatment of waste-waters from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.				
K156	....	4	K156	##
Organic waste (including heavy ends, still bottoms, light ends, spent solvents, filtrates, and decantates) from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.)				

TABLE 302.4.—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES—Continued

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code†	RCRA waste No.	Final RQ pounds (Kg)
K157		4	K157	##
Wastewaters (including scrubber waters, condenser waters, washwaters, and separation waters) from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.)				
K158		4	K158	##
Bag house dusts and filter/separation solids from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.)				
K159		4	K159	##
Organics from the treatment of thiocarbamate wastes.				
K161		4	K161	##
Purification solids (including filtration, evaporation, and centrifugation solids), baghouse dust and floor sweepings from the production of dithiocarbamate acids and their salts. (This does not include K125 or K126.)				
K169[f]		4	K169	10 (4.54)
Crude oil storage tank sediment from petroleum refining operations.				
K170[f]		4	K170	1 (0.454)
Clarified slurry oil tank sediment and/or in-line filter/separation solids from petroleum refining operations.				
K171[f]		4	K171	1 (0.454)
Spent hydrotreating catalyst from petroleum refining operations. (This listing does not include inert support media.)				
K172[f]		4	K172	1 (0.454)
Spent hydrorefining catalyst from petroleum refining operations. (This listing does not include inert support media.)				
K174[f]		4	K174	1 (0.454)
K175[f]		4	K175	1 (0.454)
K176				
Baghouse filters from the production of antimony oxide, including filters from the production of intermediates (e.g., antimony metal or crude antimony oxide)		4	K176	1 (0.454)
K177				
Slag from the production of antimony oxide that is speculatively accumulated or disposed, including slag from the production of intermediates (e.g., antimony metal or crude antimony oxide)		4	K177	5,000 (2270)
K178				
Residues from manufacturing and manufacturing-site storage of ferric chloride from acids formed during the production of titanium dioxide using the chloride ilmenite process		4	K178	1 (0.454)

† Indicates the statutory source defined by 1,2,3, and 4, as described in the note preceding Table 302.4.

†† No reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers (0.004 inches).

††† The RQ for asbestos is limited to friable forms only.

The Agency may adjust the statutory RQ for this hazardous substance in a future rulemaking; until then the statutory one-pound RQ applies.

§ The adjusted RQs for radionuclides may be found in Appendix B to this table.

** Indicates that no RQ is being assigned to the generic or broad class.

[a] Benzene was already a CERCLA hazardous substance prior to the CAA Amendments of 1990 and received an adjusted 10-pound RQ based on potential carcinogenicity in an August 14, 1989, final rule (54 FR 33418). The CAA Amendments specify that ''benzene (including benzene from gasoline)'' is a hazardous air pollutant and, thus, a CERCLA hazardous substance.

[b] The CAA Amendments of 1990 list DDE (3547–04–4) as a CAA hazardous air pollutant. The CAS number, 3547–04–4, is for the chemical, p,p'dichlorodiphenylethane. DDE or p,p'-dichlorodiphenyldichloroethylene, CAS number 72–55–9, is already listed in Table 302.4 with a final RQ of 1 pound. The substance identified by the CAS number 3547–04–4 has been evaluated and listed as DDE to be consistent with the CAA section 112 listing, as amended.

[c] Includes mineral fiber emissions from facilities manufacturing or processing glass, rock, or slag fibers (or other mineral derived fibers) of average diameter 1 micrometer or less.

[d] Includes mono- and di-ethers of ethylene glycol, diethylene glycol, and triethylene glycol R-(OCH2CH2)n-OR' where:

n = 1, 2, or 3;
R = alkyl C7 or less; or
R = phenyl or alkyl substituted phenyl;
R' = H or alkyl C7 or less; or
OR' consisting of carboxylic acid ester, sulfate, phosphate, nitrate, or sulfonate.

[e] Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100°C.

[f] See 40 CFR 302.6(b)(1) for application of the mixture rule to this hazardous waste.

5. Appendix A to § 302.4 is amended by:

a. removing the following entries: 50293, 52857, 54115, 55630, 55914, 57125, 57249, 57976, 58899, 59507, 60117, 63252, 72208, 72548, 74931, 79016, 79221, 81072, 81812, 88857, 91941, 92875, 93721, 93765, 94757, 95476, 95487, 96184, 98873, 100447, 101144, 106423, 106445, 106503, 106934, 108101, 108383, 108394, 108952, 110758, 111444, 111546, 111911, 116063, 119904, 119937, 120581, 121448, 122394, 123911, 126998, 127184, 143339, 143500, 148823, 151508, 151564, 189559, 193395, 206440, 218019, 298022, 298044, 303344, 309002, 315184, 465736, 492808, 506616, 506649, 506683, 506774, 542881, 544923, 557197, 557211, 592018, 606202, 616239, 684935, 1314847, 1319773, 1327522, 1330207, 1563662, 2032657, 2763964, 7440417, 7488564, 7778394, 7783064, 7791120, 8001352, 8001589, 11096825, 11097691, 11104282, 11141165, 12039520, 12672296, 12674112, 13463393, 16752775, 17804352, 18883664, 20816120, 20830813, 23135220, 39196184, and 53469219.

b. adding the following entries: 50293, 52857, 54115, 55630, 55914, 57249, 57578, 57976, 58899, 59507, 59892, 60117, 60355, 63252, 64675, 68122, 72208, 72548, 74931, 79016, 79118, 79221, 81072, 81812, 88857, 90040, 91667, 91941, 92524, 92671, 92875, 92933, 93721, 93765, 94757, 95476, 95487, 96093, 98873, 100447, 101144, 101688, 101779, 106423, 106445, 106503, 106887, 106934, 106990, 107211, 108101, 108383, 108394, 108952, 110543, 110758, 111422, 111444, 111546, 111911, 114261, 116063, 119904, 119937, 120581, 120809, 121448, 121697, 123319, 123386, 123911, 126998, 127184, 132649, 133904, 143339, 143500, 148823, 151508, 151564, 156627, 189559, 193395, 206440, 218019, 298022, 298044, 303344, 309002, 315184, 334883, 463581, 465736, 492808, 506616, 506649, 506683, 506774, 532274, 540841, 542881, 544923, 557197, 557211, 592018, 593602, 606202, 680319, 684935, 822060, 1314847, 1319773, 1330207, 1563662, 1582098, 1634044, 2032657, 2763964, 3547044, 7440417, 7488564, 7550450, 7778394, 7783064, 7791120, 8001352, 11096825, 11097691, 11104282, 11141165, 12039520, 12672296, 12674112, 13463393, 16752775, 17804352, 18883664, 20816120, 20830813, 23135220, 39196184, and 53469219.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES

CASRN	Hazardous Substance
* * *	* * * *
50293	Benzene, 1,1′-(2,2,2- trichloroethylidene)bis[4-chloro-. DDT. 4,4′-DDT.
* * *	* * * *
52857	Famphur. Phosphorothioic acid, O-[4-[(dimethylamino)sulfonyl]phenyl] O,O-dimethyl ester.
* * *	* * * *
54115	Nicotine, & salts. Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, & salts.
* * *	* * * *
55630	Nitroglycerine. 1,2,3-Propanetriol, trinitrate.
55914	Diisopropylfluorophosphate (DFP). Phosphorofluororidic acid, bis(1-methylethyl) ester.
* * *	* * * *
57249	Strychnidin-10-one, & salts. Strychnine, & salts.
* * *	* * * *
57578	beta-Propiolactone.
* * *	* * * *
57976	Benz[a]anthracene, 7,12-dimethyl-. 7,12-Dimethylbenz[a]anthracene.
58899	γ-BHC. Cyclohexane, 1,2,3,4,5,6-hexachloro-(1α,2α,3β,4α,5α,6β)-. Lindane. Lindane (all isomers).
* * *	* * * *
59507	p-Chloro-m-cresol. Phenol, 4-chloro-3-methyl-.
59892	N-Nitrosomorpholine.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
*	* * * * * *
60117	Benzenamine, N,N-dimethyl-4-(phenylazo)-.
	Dimethyl aminoazobenzene.
	p-Dimethylaminoazobenzene.
*	* * * * * *
60355	Acetamide.
*	* * * * * *
63252	Carbaryl.
	1-Naphthalenol, methylcarbamate.
*	* * * * * *
64675	Diethyl sulfate.
*	* * * * * *
68122	Dimethylformamide.
72208	Endrin.
	Endrin, & metabolites.
	2,7:3.6-Dimethanonaphth[2,3-b]oxirene,3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2abeta,3alpha, 6alpha,6abeta,7beta,7aalpha)-, & metabolites.
*	* * * * * *
72548	Benzene, 1,1′-(2,2-dichloroethylidene)bis[4-chloro-.
	DDD.
	TDE.
	4,4′-DDD.
*	* * * * * *
74931	Methanethiol.
	Methyl mercaptan.
	Thiomethanol.
*	* * * * * *
79016	Ethene, trichloro-.
	Trichloroethylene.
*	* * * * * *
79118	Chloroacetic acid.
*	* * * * * *
79221	Carbonochloridic acid, methyl ester.
	Methyl chlorocarbonate.
*	* * * * * *
81072	Saccharin, & salts.
	1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide, & salts.
81812	Warfarin, & salts.
	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts.
*	* * * * * *
88857	Dinoseb.
	Phenol, 2-(1-methylpropyl)-4,6-dinitro-.
90040	o-Anisidine.
*	* * * * * *
91667	N,N-Diethylaniline.
91941	[1,1′-Biphenyl]-4,4′-diamine,3,3′-dichloro-.
	3,3′-Dichlorobenzidine.
92524	Biphenyl.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
92671	4-Aminobiphenyl.
92875	Benzidine.
	[1,1′-Biphenyl]-4,4′-diamine.
92933	4-Nitrobiphenyl.
	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-.
	Silvex (2,4,5-TP).
	2,4,5-TP acid.
93765	Acetic acid, (2,4,5-trichlorophenoxy)-.
	2,4,5-T.
	2,4,5-T acid.
* * * * * * *	
94757	Acetic acid, (2,4-dichlorophenoxy)-, salts & esters.
	2,4-D Acid.
	2,4-D, salts and esters.
* * * * * * *	
95476	o-Xylene.
95487	o-Cresol.
* * * * * * *	
96093	Styrene oxide.
* * * * * * *	
98873	Benzal chloride.
	Benzene, (dichloromethyl)-.
* * * * * * *	
100447	Benzene, (chloromethyl)-.
	Benzyl chloride.
* * * * * * *	
101144	Benzenamine, 4,4′-methylenebis[2-chloro-.
	4,4′-Methylenebis(2-chloroaniline).
* * * * * * *	
101688	MDI.
	Methylene diphenyl diisocyanate.
101779	4,4′-Methylenedianiline.
* * * * * * *	
106423	p-Xylene.
106445	p-Cresol.
* * * * * * *	
106503	p-Phenylenediamine.
* * * * * * *	
106887	1,2-Epoxybutane.
* * * * * * *	
106934	Dibromoethane.
	Ethane, 1,2-dibromo-.
	Ethylene dibromide.
106990	1,3-Butadiene.
* * * * * * *	
107211	Ethylene glycol.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
* * *	* * * *
108101	Hexone. Methyl isobutyl ketone. 4-Methyl-2-pentanone.
* * *	* * * *
108383	m-Xylene.
108394	m-Cresol.
* * *	* * * *
108952	Phenol.
* * *	* * * *
110543	Hexane.
110758	Ethene, (2-chloroethoxy)-. 2-Chloroethyl vinyl ether.
* * *	* * * *
111422	Diethanolamine.
111444	Bis(2-chloroethyl) ether. Dichloroethyl ether. Ethane, 1,1′-oxybis[2-chloro-.
111546	Carbamodithioic acid, 1,2-ethanediylbis-, salts & esters. Ethylenebisdithiocarbamic acid, salts & esters.
111911	Bis(2-chloroethoxy) methane. Dichloromethoxyethane. Ethane, 1,1′-[methylenebis(oxy)]bis(2-chloro-.
114261	Phenol, 2-(1-methylethoxy)-, methylcarbamate. Propoxur (Baygon).
* * *	* * * *
116063	Aldicarb. Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime.
* * *	* * * *
119904	[1,1′-Biphenyl]-4,4′-diamine,3,3′-dimethoxy-. 3,3′-Dimethoxybenzidine.
119937	[1,1′-Biphenyl]-4,4′-diamine,3,3′- dimethyl-. 3,3′-Dimethylbenzidine.
* * *	* * * *
120581	Isosafrole. 1,3-Benzodioxole, 5-(1-propenyl)-.
120809	Catechol.
* * *	* * * *
121448	Ethanamine, N,N-diethyl-. Triethylamine.
121697	N,N-Dimethylaniline.
* * *	* * * *
123319	Hydroquinone.
* * *	* * * *
123386	Propionaldehyde.
* * *	* * * *
123911	1,4-Diethyleneoxide. 1,4-Dioxane.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
*	* * * * * *
126998	Chloroprene.
127184	Ethene, tertrachloro-.
	Perchloroethylene.
	Tetrachloroethylene.
*	* * * * * *
132649	Dibenzofuran.
*	* * * * * *
133904	Chloramben.
*	* * * * * *
143339	Sodium cyanide Na(CN).
143500	Kepone.
	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one,1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-.
*	* * * * * *
148823	L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-.
	Melphalan.
151508	Potassium cyanide K(CN).
151564	Aziridine.
	Ethylenimine.
*	* * * * * *
156627	Calcium cyanamide.
189559	Benzo[rst]pentaphene.
	Dibenzo[a,i]pyrene.
*	* * * * * *
193395	Indeno(1,2,3-cd)pyrene.
*	* * * * * *
206440	Fluoranthene.
*	* * * * * *
218019	Chrysene.
*	* * * * * *
298022	Phorate.
	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio) methyl] ester.
298044	Disulfoton.
	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester.
*	* * * * * *
303344	Lasiocarpine.
	2-Butenoic acid, 2-methyl-, 7-[[2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy]methyl]-2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S-[1alpha(Z),7(2S*,3R*), 7aalpha]]-.
*	* * * * * *
309002	Aldrin.
	1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5alpha,8alpha,8abeta)-.
*	* * * * * *
315184	Mexacarbate.
	Phenol, 4-(dimethylamino)-3,5-dimethyl-, methylcarbamate (ester).

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
*	* * * * * *
334883	Diazomethane.
*	* * * * * *
463581	Carbonyl sulfide.
465736	Isodrin.
	1,4:5,8-Dimethanonaphthalene,1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5beta,8beta, 8abeta)-.
492808	Auramine.
	Benzenamine, 4,4′-carbonimidoylbis[N,N-dimethyl-.
*	* * * * * *
506616	Argentate(1-), bis(cyano-C)-, potassium.
	Potassium silver cyanide.
506649	Silver cyanide Ag(CN).
506683	Cyanogen bromide (CN)Br.
506774	Cyanogen chloride (CN)Cl.
*	* * * * * *
532274	2-Chloroacetophenone.
*	* * * * * *
540841	2,2,4-Trimethylpentane.
*	* * * * * *
542881	Bis(chloromethyl)ether.
	Dichloromethyl ether.
	Methane, oxybis(chloro-.
*	* * * * * *
544923	Copper cyanide Cu(CN).
*	* * * * * *
557197	Nickel cyanide $Ni(CN)_2$.
557211	Zinc cyanide $Zn(CN)_2$.
*	* * * * * *
592018	Calcium cyanide $Ca(CN)_2$.
*	* * * * * *
593602	Vinyl bromide.
*	* * * * * *
606202	Benzene, 2-methyl-1,3-dinitro-.
	2,6-Dinitrotoluene.
*	* * * * * *
680319	Hexamethylphosphoramide.
684935	N-Nitroso-N-methylurea.
	Urea, N-methyl-N-nitroso-.
*	* * * * * *
822060	Hexamethylene-1,6-diisocyanate.
*	* * * * * *
1314847	Zinc phosphide Zn_3P_2.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
*	* * * * * *
1319773	Cresol (cresylic acid).
	Cresols (isomers and mixture).
	Cresylic acid (isomers and mixture).
	Phenol, methyl-.
*	* * * * * *
1330207	Benzene, dimethyl-.
	Xylene.
	Xylene (mixed).
	Xylenes (isomers and mixture).
*	* * * * * *
1563662	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-, methylcarbamate.
	Carbofuran.
1582098	Trifluralin.
*	* * * * * *
1634044	Methyl tert-butyl ether.
*	* * * * * *
2032657	Mercaptodimethur.
	Methiocarb.
	Phenol, (3,5-dimethyl-4-(methylthio)-, methylcarbamate.
*	* * * * * *
2763964	3(2H)-Isoxazolone, 5-(aminomethyl)-.
	5-(Aminomethyl)-3-isoxazolol.
*	* * * * * *
3547044	DDE.
*	* * * * * *
7440417	Beryllium.
	Beryllium powder.
*	* * * * * *
7488564	Selenium sulfide SeS_2.
7550450	Titanium tetrachloride.
*	* * * * * *
7778394	Arsenic acid H_3AsO_4.
*	* * * * * *
7783064	Hydrogen sulfide H_2S.
*	* * * * * *
7791120	Thallium chloride TlCl.
*	* * * * * *
8001352	Chlorinated camphene.
	Toxaphene.
11096825	Aroclor 1260.
11097691	Aroclor 1254.
11104282	Aroclor 1221.
*	* * * * * *
11141165	Aroclor 1232.

APPENDIX A TO § 302.4—SEQUENTIAL CAS REGISTRY NUMBER LIST OF CERCLA HAZARDOUS SUBSTANCES—Continued

CASRN	Hazardous Substance
* * * * * * *	
12039520	Selenious acid, dithallium(1+) salt.
	Thallium (I) selenite.
* * * * * * *	
12672296	Aroclor 1248.
12674112	Aroclor 1016.
* * * * * * *	
13463393	Nickel carbonyl $Ni(CO)_4$, (T–4)-.
* * * * * * *	
16752775	Ethanimidothioic acid, N-[[(methylamino)carbonyl] oxy]-, methyl ester.
	Methomyl.
* * * * * * *	
17804352	Carbamic acid, [1-[(butylamino)carbonyl]-1H-benzimidazol-2-yl]-, methyl ester (Benomyl).
18883664	D-Glucose, 2-deoxy-2[[(methylnitrosoamino)-carbonyl]amino]-.
	Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-, D-.
	Streptozotocin.
20816120	Osmium oxide OsO_4, (T–4)-.
	Osmium tetroxide.
20830813	Daunomycin.
	5,12-Naphthacenedione, 8-acetyl-10-[(3-amino-2,3,6-trideoxy-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-.
* * * * * * *	
23135220	Ethanimidothioic acid, 2-(dimethylamino)-N-[[(methylamino)carbonyl]oxy]-2-oxo-, methyl ester (Oxamyl).
* * * * * * *	
39196184	Thiofanox.
	2-Butanone, 3,3-dimethyl-1-(methylthio)-,O-[(methylamino)carbonyl] oxime.
* * * * * * *	
53469219	Aroclor 1242.

6. Section 302.5 is amended by revising paragraph (b) to read as follows:

§ 302.5 Determination of reportable quantities.

* * * * *

(b) *Unlisted hazardous substances.* Unlisted hazardous substances designated by 40 CFR 302.4(b) have the reportable quantity of 100 pounds, except for those unlisted hazardous wastes which exhibit toxicity identified in 40 CFR 261.24. Unlisted hazardous wastes which exhibit toxicity have the reportable quantities listed in Table 302.4 for the contaminant on which the characteristic of toxicity is based. The reportable quantity applies to the waste itself, not merely to the toxic contaminant. If an unlisted hazardous waste exhibits toxicity on the basis of more than one contaminant, the reportable quantity for that waste shall be the lowest of the reportable quantities listed in Table 302.4 for those contaminants. If an unlisted hazardous waste exhibits the characteristic of toxicity and one or more of the other characteristics referenced in 40 CFR 302.4(b), the reportable quantity for that waste shall be the lowest of the applicable reportable quantities.

7. Section 302.6 is amended by revising paragraph (a) to read as follows:

§ 302.6 Notification requirements.

(a) Any person in charge of a vessel or an offshore or an onshore facility shall, as soon as he or she has knowledge of any release (other than a federally permitted release or application of a pesticide) of a hazardous substance from such vessel or facility in a quantity equal to or exceeding the reportable quantity determined by this part in any 24-hour period, immediately notify the National Response Center ((800) 424–8802; in Washington, DC (202) 426–2675 or (202) 267–2675; the facsimile number is (202) 267–2165; and the telex number is 892427).

* * * * *

8. Section 302.7 is amended by revising paragraph (a)(3) to read as follows:

§ 302.7 Penalties.

(a) * * *

(3) In charge of a facility from which a hazardous substance is released, other than a federally permitted release, in a quantity equal to or greater than that reportable quantity determined under this part who fails to notify immediately the National Response Center as soon as he or she has knowledge of such release

or who submits in such a notification any information which he knows to be false or misleading shall be subject to all of the sanctions, including criminal penalties, set forth in section 103(b) of the Act.

* * * * *

9. Section 302.8 is amended by revising paragraphs (e)(1)(iv)(H) and (f)(4)(viii) to read as follows:

§ 302.8 Continuous releases.

* * * * *

(e) * * *

(1) * * *

(iv) * * *

(H) A signed statement that the hazardous substance release(s) described is(are) continuous and stable in quantity and rate under the definitions in paragraph (b) of this section and that all reported information is accurate and current to the best knowledge of the person in charge.

(f) * * *

(4) * * *

(viii) A signed statement that the hazardous substance release(s) is(are) continuous and stable in quantity and rate under the definitions in paragraph (b) of this section and that all reported information is accurate and current to the best knowledge of the person in charge.

* * * * *

[FR Doc. 02–16866 Filed 7–8–02; 8:45 am]
BILLING CODE 6560–50–P

CORPORATION FOR NATIONAL AND COMMUNITY SERVICE

45 CFR Parts 2510, 2520, 2521, 2522, 2524, 2525, 2526, 2528, and 2550

RIN 3045–AA32

AmeriCorps Grant Regulations

AGENCY: Corporation for National and Community Service.

ACTION: Final rule.

SUMMARY: The Corporation for National and Community Service (hereinafter the ''Corporation'') is amending several provisions relating to the AmeriCorps national service program, including requirements for AmeriCorps grants and rules on how AmeriCorps members may use the AmeriCorps education award. This final rule will eliminate several unnecessary and burdensome requirements in the AmeriCorps grants program, and conform the Corporation's regulations to changes in law.

DATES: The amendments are effective August 8, 2002.

FOR FURTHER INFORMATION CONTACT: Gary Kowalczyk, Coordinator of National Service Programs, Corporation for National and Community Service, (202) 606–5000, ext. 340. T.D.D. (202) 565–2799. This is not a toll-free number. This final rule may be requested in an alternative format for persons with visual impairments.

SUPPLEMENTARY INFORMATION:

Background

Pursuant to the National and Community Service Act of 1990, as amended (42 U.S.C. 12501 *et seq.*), the Corporation makes grants to support service performed by AmeriCorps members. In addition, the Corporation, through the National Service Trust, provides education awards and certain interest payments to AmeriCorps members who successfully complete a term of service in an approved national service position.

The Corporation published a proposed rule on March 26, 2002 (67 FR 13738) with the goal of eliminating several unnecessary and burdensome requirements in the AmeriCorps grants program, and conforming the Corporation's regulations to changes in law.

Discussion of the Final Rule

The Corporation received comments from nine individuals and organizations in response to the proposed rule. As a general matter, only one of the comments the Corporation received resulted in a change to the proposed rule. Consequently, other than § 2520.30, the final rule is identical to the proposed rule as published on March 26, 2002.

Flexibility in Types of AmeriCorps Activities

One commenter specifically approved of the Corporation's proposal to broaden the circumstances under which AmeriCorps members may engage in activities that provide an indirect benefit to their community. The Corporation may approve such activities with respect to disaster relief, homeland defense, and other compelling community needs.

Eligibility of Religious Organizations for AmeriCorps Grants

Two commenters specifically endorsed the Corporation's references to religious organizations in several lists of types of organizations eligible to apply for AmeriCorps grants. A basic purpose of these amendments is to clarify that religious organizations are eligible on the same basis as any other private nonprofit organization to apply for AmeriCorps grants and operate AmeriCorps programs.

Elimination of ''Six Month Rule''

Five commenters wrote in support of eliminating the ''six month rule.'' The final rule, thus, eliminates a requirement under which grantees could not select any prospective AmeriCorps member who is or was previously employed by a prospective project sponsor within six months of the member's enrollment in the program. The commenters agreed that there are more effective and efficient ways to ensure that grantees are complying with rules against displacement, without imposing a blanket ''six month rule.'' By continuing to require grantees to show how a proposed project will address unmet needs and by enforcing existing rules against displacement, the Corporation can ensure that any former employees enrolled as AmeriCorps members will perform service that goes well beyond—in both degree and kind—their former job duties.

Use of Education Award for Educational Courses Offered by Title IV Institutions of Higher Education

Three commenters supported the Corporation's expansion of the use of the education award to allow AmeriCorps members to use their education award to pay any current educational expenses at institutions of higher education that have entered into program participation agreements with the U.S. Department of Education under Title IV of the Higher Education Act (HEA).

Refunds to the National Service Trust

The Corporation received no comments relating to the proposed rule on refunds to the National Service Trust.

Declaration Sufficient Documentation of Member's Attainment of High School Diploma

Three commenters specifically supported the Corporation's proposal to allow self-declaration as sufficient documentation of a member's attainment of a high school diploma or its equivalent. The final rule provides that an individual's written declaration under penalty of law is sufficient to establish this element of eligibility without additional documentation.

One commenter suggested that the Corporation replace the current regulations relating to documentation of citizenship, nationality, and lawful permanent resident alien status by authorizing grantees to use the I–9 to document eligibility for AmeriCorps.

APPENDIX B

Important Contact Information

ATTACHMENT 1

Appendix B

IMPORTANT CONTACT INFORMATION

Agency Name	**Phone Number/ Email**
Ventura Port District (VPD): **Brian Pendleton, MRED** General Manager	(805) 642-8538 bpendleton@venturaharbor.com
California State Warning Center (Cal OES)	(800) 852-7550 or (916) 845-8911
National Response Center	1-800-424-8802
United States Coast Guard Los Angeles/Long Beach Sector	(310) 521-3805
Unified Program Agency (UPA) - Liaison Hotline	1-888-988-7058
California Occupational Safety and Health Administration – Call Center	844 LABOR-DIR (or 1-844-522-6734)
Department of Toxic Substances and Control (DTSC) – Emergency Response	(800) 260-3972 or (916) 255-6504 (Mon – Fri only; after hours, weekends or holidays call Cal OES)
California Department of Public Health Preharvest Shellfish Program	(510) 412-4635
US Food and Drug Administration	(866) 300-4374
California Department of Health Services, Radiological Health Branch – Los Angeles	(213) 351-7897
Department of Conservation- Sacramento	(916) 322-1080
California Public Utilities Commission (PUC)- Los Angeles	(213) 576-7000
Department of Fish and Wildlife, Office of Spill Prevention and Response (OSPR)- West Coast Spill Hotline	(800) OILS-911
Regional Water Quality Control Board (RWQCB) - Regional Board 4: Los Angeles	(213) 576-6600

ATTACHMENT 1

APPENDIX C

EPCRA Reporting Requirements

ATTACHMENT 1

Appendix C

EPCRA and CERCLA REPORTING REQUIREMENTS

United States
Environmental Protection
Agency

Office of Solid Waste
and
Emergency Response

EPA 550-B-15-001
March 2015
www.epa.gov/emergencies

LIST OF LISTS

Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-To-Know Act (EPCRA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Section 112(r) of the Clean Air Act

- EPCRA Section 302 Extremely Hazardous Substances
- CERCLA Hazardous Substances
- EPCRA Section 313 Toxic Chemicals
- CAA 112(r) Regulated Chemicals for Accidental Release Prevention

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LIST OF LISTS

Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act (EPCRA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Section 112(r) of the Clean Air Act

This consolidated chemical list includes chemicals subject to reporting requirements under the Emergency Planning and Community Right-to-Know Act (EPCRA), also known as Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and section 112(r) of the Clean Air Act (CAA). This consolidated list does not include all hazardous chemicals subject to the reporting requirements in EPCRA sections 311 and 312, for which material safety data sheets (MSDS) must be developed under the Hazard Communication Standard (29 CFR1910.1200). These hazardous chemicals are identified by broad criteria, rather than by enumeration. There are over 500,000 products that satisfy the criteria. See 40 CFR Part 370 for more information. This consolidated list has been prepared to help firms handling chemicals determine whether they need to submit reports under sections 302 and 313 of EPCRA and determine if releases of chemicals are reportable under section 102 and 103 of CERCLA and section 304 of EPCRA. It will also help firms determine whether they will be subject to accident prevention regulations under CAA section 112(r). Separate lists are also provided of Resource Conservation and Recovery Act (RCRA) waste streams and unlisted hazardous wastes, of radionuclides reportable under CERCLA and of definitions or explanation of chemical categories listed under EPCRA section 313 and CERCLA. These lists should be used as a reference tool, not as a definitive source of compliance information. Compliance information for EPCRA is published in the Code of Federal Regulations (CFR), 40 CFR parts 355, 370, and 372. Compliance information for CERCLA is published in 40 CFR part 302 and for CAA section 112(r) is published in 40 CFR part 68.

The chemicals on the consolidated list are ordered both by the Chemical Abstracts Service (CAS) registry number and alphabetically. Categories of chemicals which generally do not have CAS registry numbers, but which are cited under CERCLA, have Not Applicable (N.A.) listed in place of the CAS number. If the category of chemical is an EPCRA section 313, then the section 313 category code is also included in the CAS number column.

The lists include chemicals referenced under five federal statutory provisions, discussed below. More than one chemical name may be listed for one CAS number because the same chemical may appear on different lists under different names. For example, for CAS number 8001-35-2, the names toxaphene (from the section 313 list), camphechlor (from the section 302 list), and camphene, octachloro-(from the CERCLA list) all appear on this consolidated list. The chemical names on the consolidated lists generally are those names used in the regulatory programs developed under EPCRA, CERCLA, and CAA section 112(r), but each chemical may have other synonyms that do not appear on these lists.

(1) **EPCRA Section 302 Extremely Hazardous Substances (EHSs)**

The presence of Extremely Hazardous Substances (EHSs) in quantities at or above the Threshold Planning Quantity (TPQ) requires certain emergency planning activities to be conducted. The EHSs and their TPQs are listed in 40 CFR part 355, Appendices A and B. For section 302 EHSs, Local Emergency Planning Committees (LEPCs) must develop emergency response plans and facility owner or operator must notify the State Emergency Response Commission (SERC) or Tribal Emergency Response Commission (TERC) and their LEPC if a chemical is present at the facility or above the EHS's TPQ. Additionally, if the TPQ is equaled or exceeded, facilities with a listed EHS are subject to the reporting requirements of EPCRA section 311 (provide material safety data sheet or a list of covered chemicals to the SERC or TERC, LEPC, and local fire department) and section 312 (submit inventory form -Tier I or Tier II). The minimum threshold for section 311-312 reporting for EHS substances is 500 pounds or the TPQ, whichever is less.

TPQ. The consolidated list presents the TPQ (in pounds) for section 302 chemicals in the column following the CAS number. For chemicals that are solids, there are two TPQs given (e.g., 500/10,000). In these cases, the lower quantity applies for solids in powder form with particle size less than 100 microns, or if the substance is in solution or in molten form. Otherwise, the 10,000 pound TPQ applies. If a solid EHS is in molten form, the facility must multiply the amount of EHS on-site by 0.3 before comparing to the lower listed TPQ. If a solid EHS is in solution form, the facility must multiply amount EHS on-site by 0.2 before comparing to the lower listed TPQ. The reducing factors of 0.3 for molten solids and 0.2 for solids in solution are not to be used for the 12 solid reactive chemicals are noted by footnote "a" in Appendix A and B in 40 CFR part 355. These twelve chemicals are not listed with two TPQs and higher threshold quantity of 10,000 pounds; they only have one TPQ.

EHS RQ. Releases of reportable quantities (RQ) of EHSs are subject to state and local reporting under section 304 of EPCRA. EPA has adjusted RQs for EHSs without CERCLA RQs to levels equal to their TPQs. The EHS RQ column lists these adjusted RQs for EHSs not listed under CERCLA and the CERCLA RQs for those EHSs that are CERCLA hazardous substances (see the next section for a discussion of CERCLA RQs).

Note that ammonium hydroxide is not covered under section 302; the EHS RQ is based on anhydrous ammonia. Ammonium hydroxide (which is also known as aqueous ammonia) is subject to CERCLA, with its own RQ.

(2) **CERCLA Hazardous Substances**

Releases of CERCLA hazardous substances, in quantities equal to or greater than their reportable quantity (RQ), are subject to reporting to the National Response Center under CERCLA. Notification requirements for these releases are found in 40 CFR 302. Such releases are also subject to state and local reporting under section 304 of EPCRA. CERCLA hazardous substances, and their reportable quantities, are listed in 40 CFR part 302, Table 302.4. Radionuclides listed under CERCLA are provided in a separate list in Appendix B of this document, with RQs in Curies. Chemical categories under CERCLA (including metal compound categories), which have N.A. listed for the CAS Number in the consolidated table, are also listed in Appendix E of this document with further explanation of each chemical category, where information was available.

RQ. The CERCLA RQ column in the consolidated list shows the RQs (in pounds) for chemicals that are CERCLA hazardous substances.

Metals. For metals listed under CERCLA (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, and zinc), no reporting of releases of the solid form is required if the mean diameter of the pieces of the solid metal released is greater than 100 micrometers (0.004 inches) (Ref: Footnote after Table 302.4 in 40 CFR 302.4). The RQs shown on the consolidated list apply to smaller particles.

Note that the consolidated list does not include all CERCLA regulatory synonyms. See 40 CFR part 302, Table 302.4 for a complete list.

Sulfur monochloride. (formula S_2Cl_2) is listed with an incorrect CAS number of 12771-08-3, which is found on the CERCLA Hazardous Substances list. The correct CAS number should be 10025-67-9, however, the List of Lists will still include the CAS number of 12771-08-3 because it has not been changed on the CERCLA list. According to the Chemical Abstract Services which assigns CAS numbers, the correct CAS number for sulfur monochloride is 10025-67-9, which is now included on the List of Lists with an explanatory footnote.

CAS number 12771-08-3 is assigned to the substance sulfur chloride (formula SCl^-) which was listed as a synonym for sulfur monochloride when EPA finalized the Clean Water Act Designation of Hazardous Substances rule (43 FR 10474, March 13, 1978). The CAS number 10025-67-9 is used for sulfur monochloride on EPA's TSCA Inventory and EPA's Substance Registry Services lists.

(3) **CAA Section 112(r) List of Substances for Accidental Release Prevention**

Under the accident prevention provisions of section 112(r) of the CAA, EPA developed a list of 77 toxic substances and 63 flammable substances. Threshold quantities (TQs) were established for these substances. The list and TQs identify processes subject to accident prevention regulations. The list of substances and TQs and the requirements for risk management programs for accidental release prevention are found in 40 CFR part 68. This consolidated list includes both the common name for each listed chemical under section 112(r) and the chemical name, if different from the common name, as separate listings.

The CAA section 112(r) list includes several substances in solution that are covered only in concentrations above a specified level. These substances include ammonia (concentration 20% or greater) (CAS number 7664-41-7); hydrochloric acid (37% or greater) (7647-01-0); hydrogen fluoride/hydrofluoric acid (50% or greater) (7664-39-3); and nitric acid (80% or greater) (7697-37-2). Hydrogen chloride (anhydrous) and ammonia (anhydrous) are listed, in addition to the solutions of these substances, with different TQs. Only the anhydrous form of sulfur dioxide

(7446-09-5) is covered. These substances are presented on the consolidated list with the concentration limit or specified form (e.g., anhydrous), as they are listed under CAA section 112(r). Flammable fuels used as a fuel or held for sale as a fuel at a retail facility are not subject to the rule.

TQ. The CAA section 112(r) TQ column in the consolidated list shows the TQs (in pounds) for chemicals listed for accidental release prevention. The TQ applies to the quantity of substance in a process, not at the facility as a whole.

(4) **EPCRA Section 313 Toxic Chemicals (a.k.a Toxics Release Inventory (TRI) Chemicals)**

Emissions, transfers, and waste management data for chemicals listed under section 313 must be reported annually as part of the community right-to-know provisions of EPCRA (40 CFR part 372). These reports are also known as Toxics Release Inventory (TRI) reports.

Section 313. The notation “313” in the column for section 313 indicates that the chemical is subject to reporting under section 313 and section 6607 of the Pollution Prevention Act under the name listed. In cases where a chemical is listed under section 313 with a second name in parentheses or brackets, the second name is included on this consolidated list with an “X” in the section 313 column. An “X” in this column also may indicate that the same chemical with the same CAS number appears on another list with a different chemical name. The “X” listed with the chemical name “Ammonia (anhydrous)” and “Ammonia (concentration of 20% or greater)” does not mean that the section 313 reporting for these substances are limited to those forms, but it does include them.

Diisocyanates, Dioxins and Dioxin-like Compounds, and PACs. In the November 30, 1994, expansion of the section 313 list, 20 specific chemicals were added as members of the diisocyanate category, and 19 specific chemicals were added as members of the polycyclic aromatic compounds (PAC) category. The PAC category was expanded to 25 total chemicals by additions made in October 1999 and November 2010. In October 1999, EPA added a category of dioxin and dioxin-like compounds that includes 17 specific chemicals. These chemicals are included in the CAS order listing on this consolidated list, although chemicals belonging to these categories are reportable under section 313 by category, rather than by individual chemical name. The symbol “#” following the “313” notation in the section 313 column identifies diisocyanates, the symbol “!” identifies the dioxin and dioxin-like compounds, and the symbol “+” identifies PACs, as noted in the Summary of Codes.

Ammonium Salts. The EPCRA section 313 listing for ammonia includes the following qualifier “includes anhydrous ammonia and aqueous ammonia from water dissociable ammonium salts and other sources; 10 percent of total aqueous ammonia is reportable under this listing.” The qualifier for ammonia means that anhydrous forms of ammonia are 100% reportable and aqueous forms are limited to 10% of total aqueous ammonia. Therefore, when determining threshold and releases and other waste management quantities all anhydrous ammonia is included but only 10% of total aqueous ammonia is included. Any evaporation of ammonia from aqueous ammonia solutions is considered anhydrous ammonia and should be included in threshold determinations and release and other waste management calculations.

In this document ammonium salts are not specifically identified as being reportable EPCRA section 313 chemicals. However, water dissociable ammonia salts, such as ammonium chloride, are reportable if they are placed in water. When ammonium salts are placed in water, reportable aqueous ammonia is manufactured. As indicated in the ammonia qualifier, all aqueous ammonia solutions from water dissociable ammonium salts are covered by the ammonia listing. For example, ammonium chloride is a water-dissociable ammonium salt and reportable aqueous ammonia will be manufactured when it is placed in water.

Unlike other ammonium salts, ammonium hydroxide is specifically identified as being a reportable EPCRA section 313 chemical. This is because the chemical ammonium hydroxide (NH4OH) is a misnomer. It is a common name used to describe a solution of ammonia in water (i.e., aqueous ammonia), typically a concentrated solution of 28 to 30 percent ammonia. EPA has consistently responded to questions regarding the reportability of these purported ammonium hydroxide solutions under the EPCRA section 313 ammonia listing by stating that these are 28 to 30 percent solutions of ammonia in water and that the solutions are reportable under the EPCRA section 313 ammonia listing. For a more detailed discussion, see page 34175 of the Federal Register final rule of June 30, 1995 (60 FR 34172). (See also EPA's EPCRA section 313, *Guidance for Reporting Aqueous Ammonia*, EPA 745-R00-005, http://www2.epa.gov/toxics-release-inventory-tri-program/guidance-aqueous-ammonia

Stayed TRI Chemicals. There are two EPRCA section 313 chemicals that are listed in the CFR but for which the Agency has issued an administrative stay that excludes them from reporting until the stays are lifted. These chemicals, identified by "313s" in the Sec. 313 table column, are methyl mercaptan (CAS number 74-93-1), and 2, 2-dibromo-3nitrilopropionamide (CAS number 10222-01-2). Check the TRI website http://www2.epa.gov/toxics-release-inventory-tri-program/tri-listed-chemicals for updated regulatory information. On October 11, 2011, EPA reinstated the TRI reporting requirements for hydrogen sulfide (CAS number 7783-06-4). This action is effective for the 2012 TRI reporting year, with the first 2012 TRI reports due from facilities by July 1, 2013. For more information, see http://www2.epa.gov/toxics-release-inventory-tri-program/hydrogen-sulfide-lifting-administrative-stay

New TRI Chemical, o-Nitrotoluene. On November 7, 2013, the chemical o-nitrotoluene (CAS number 88-72-2) to the TRI list (78 FR 66848). The action is effective for the 2014 TRI reporting year with the first reports due from facilities by July 1, 2015. For more information, see http://www2.epa.gov/toxics-release-inventory-tri-program/addition-ortho-nitrotoluene-final-rule

New TRI Category, Nonylphenols. On September 20, 2014, the category of nonylphenol (Category code N530) was added to the TRI chemical list (79 FR 58686). The action is effective for the 2015 TRI reporting year with the first reports due from facilities by July 1, 2016. For more information, see http://www2.epa.gov/toxics-release-inventory-tri-program/addition-nonylphenol-category-final-rule. The nonylphenol category covers six specific chemicals identified by chemical name and CAS number. These chemicals are included in the CAS order listing on this consolidated list, although chemicals belonging to these categories are reportable under section 313 by category, rather than by individual chemical name. The symbol "$" following the "313" notation in the section 313 column identifies nonylphenols, as noted in the Summary of Codes.

TRI Reporting Thresholds. Reporting under EPCRA section 313 is triggered by the quantity of a chemical that is manufactured, processed, or otherwise used during the calendar year. For most TRI chemicals, the thresholds are 25,000 pounds manufactured or processed or 10,000 pound otherwise used. Sixteen TRI chemicals and four TRI chemical categories that meet the criteria for persistence and bioaccumulation have lower thresholds, such as 10 or 100 pounds and 0.1 grams. These 20 chemical listings and their reporting thresholds can be found at http://www2.epa.gov/toxics-release-inventory-tri-program/persistent-bioaccumulative-toxic-pbt-chemicals-covered-tri

(5) **Chemical Categories**

The CERCLA and EPCRA section 313 lists include a number of chemical categories as well as specific chemicals. Categories appear on this consolidated list at the beginning of the CAS number order listing. The specific chemicals or substances that are included in the CERCLA category Radionuclides can be found in Appendix B. Appendix D contains explanations and definitions for the EPCRA section 313 (TRI) chemical categories. For the CERCLA listed categories reported with CAS number of N.A., Appendix E contains information available on the CERCLA chemical categories from their original statutory and regulatory sources.

Specific chemicals listed as members of the diisocyanates, dioxin and dioxin-like compounds, nonylphenol, and PAC categories under EPCRA section 313 are included in the list of specific chemicals by CAS number, not in the category listing.

EPA has attempted to identify those chemicals on the consolidated list that are clearly reportable under one or more of the EPCRA section 313 (TRI) chemical categories. For example, mercuric acetate (CAS number 1600-27-7), listed under section 302, is not specifically listed under section 313, but is reportable under the section 313 "Mercury Compounds" category (no CAS number). Listed chemicals that have been identified as being reportable under one or more EPCRA section 313 categories are identified by "313c" in the Sec. 313 table column.

The chemicals on the consolidated list have not been systematically evaluated to determine whether they fall into any of the CERCLA listed categories. Some chemicals not specifically listed under CERCLA may be subject to CERCLA reporting as part of a category. For example, strychnine sulfate (CAS number 60-41-3), listed under EPCRA section 302, is not individually listed on the CERCLA list, but is subject to CERCLA reporting under the listing for strychnine and salts (CAS number 57-24-9), with an RQ of 10 pounds. Similarly, nicotine sulfate (CAS number 65-30-5) is subject to CERCLA reporting under the listing for nicotine and salts (CAS number 54-11-5, RQ 100 pounds), and warfarin sodium (CAS number 129-06-6) is subject to CERCLA reporting under the listing for warfarin and salts, concentration >0.3% (CAS number 81-81-2, RQ 100 pounds).

Note that some CERCLA listings, although they include CAS numbers, are for general categories and are not restricted to the specific CAS number (e.g., warfarin and salts). The CERCLA list also includes a number of generic categories that have not been assigned RQs; chemicals falling into these categories are considered CERCLA hazardous substances, but they are not required to be reported under CERCLA unless otherwise listed under CERCLA with an RQ.

(6) **RCRA Hazardous Wastes**

The consolidated list includes specific chemicals from the RCRA P and U lists only (40 CFR 261.33). This listing is provided as an indicator that companies may already have data on a specific chemical that may be useful for EPCRA reporting. It is not intended to be a comprehensive list of RCRA P and U chemicals. RCRA hazardous wastes consisting of waste streams on the F and K lists, and wastes exhibiting the characteristics of ignitability, corrosivity, reactivity, and toxicity, are provided in Appendix C in this document. This list also includes K181 hazardous waste with a statutory one-pound RQ (indicated by an asterisk "*" following the RQ. The descriptions of the F and K waste streams have been abbreviated; see 40 CFR part 302, Table 302.4, or 40 CFR part 261 for complete descriptions.

RCRA Code. The letter-and-digit code in the RCRA Code column is the chemical's RCRA hazardous waste code.

Summary of Codes

Codes in Section 313 column

+	Member of EPCRA Section 313 PAC category.
#	Member of EPCRA Section 313 diisocyanate category.
c	Although not listed by name and CAS number, this chemical is reportable under one or more of the EPCRA section 313 chemical categories.
s	Indicates that this chemical is currently under an administrative stay of the EPCRA section 313 reporting requirements, therefore, no Toxics Release Inventory reports are required until the stay is removed.
!	Member of the EPCRA section 313 dioxin and dioxin-like compounds category.
X	Indicates that this is a second name for an EPCRA section 313 chemical already included on this consolidated list. May also indicate that the same chemical with the same CAS number appears on another list with a different chemical name.
$	Member of the EPCRA section 313 nonylphenol category.

Codes in CERCLA RQ column

*	The Agency may adjust the statutory RQ for this RCRA hazardous substance (K181 waste) in a future rulemaking; until then the statutory one-pound RQ applies.
PMN	This EHS chemical was identified from a Premanufacture Review Notice (PMN) submitted to EPA. The submitter has claimed certain information on the submission to be confidential, including specific chemical identity.
&	Indicates that no RQ is assigned to this generic or broad class, although the class is a CERCLA hazardous substance. See 50 Federal Register 13456 (April 4, 1985).
@	Releases in amounts less than 1,000 pounds per 24 hours of nitrogen oxide or nitrogen dioxide to the air that are the result of combustion and combustion related activities are exempt from the notification requirements of EPCRA section 304 and CERCLA.

ATTACHMENT 1

Top

LIST OF LISTS

CONSOLIDATED LIST OF CHEMICALS (BY CAS NUMBER) SUBJECT TO EPCRA, CERCLA AND CAA SECTION 112(r)

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Chlordane (Technical Mixture and Metabolites)	N.A.			&			
Chlorinated Benzenes	N.A.			&			
Chlorinated Ethanes	N.A.			&			
Chlorinated Naphthalene	N.A.			&			
Chloroalkyl Ethers	N.A.			&			
Coke Oven Emissions	N.A.			1			
Creosote	N.A.			1		U051	
Cyanides (soluble salts and complexes), not otherwise specified	N.A.			10	313c	P030	
DDT and Metabolites	N.A.			&			
Dichlorobenzidine	N.A.			&			
Diphenylhydrazine	N.A.			&			
Endosulfan and Metabolites	N.A.			&			
Endrin and Metabolites	N.A.			&			
Fine mineral fibers	N.A.			&			
Haloethers	N.A.			&			
Halomethanes	N.A.			&			
Heptachlor and Metabolites	N.A.			&			
Nitrophenols	N.A.			&			
Nitrosamines	N.A.			&			
Phthalate Esters	N.A.			&			
Polycyclic organic matter	N.A.			&			
Polynuclear Aromatic Hydrocarbons	N.A.			&			
Antimony Compounds	N010			&	313		
Arsenic Compounds	N020			&	313		
Barium Compounds	N040				313		
Beryllium Compounds	N050			&	313		
Cadmium Compounds	N078			&	313		
Chlorinated Phenols	N084			&	313		
Chlorophenols	N084			&	313		
Chromium Compounds	N090			&	313		
Cobalt Compounds	N096			&	313		
Copper Compounds	N100			&	313		
Cyanide Compounds	N106			&	313		
Diisocyanates (includes only 20 chemicals)	N120				313		
Dioxin and dioxin-like compounds (includes only 17 chemicals)	N150				313		
Ethylenebisdithiocarbamic acid, salts and esters	N171				313		
Glycol Ethers	N230			&	313		
Lead Compounds	N420			&	313		
Manganese Compounds	N450			&	313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Mercury Compounds	N458			&	313		
Nickel Compounds	N495			&	313		
Nicotine and salts	N503				313		
Nitrate compounds (water dissociable)	N511				313		
Nonylphenol (includes only 6 chemicals)	N530				313		
Polybrominated Biphenyls (PBBs)	N575				313		
Polychlorinated alkanes (C10 to C13)	N583				313		
Polycyclic aromatic compounds (includes only 23 chemicals)	N590				313		
Selenium Compounds	N725			&	313		
Silver Compounds	N740			&	313		
Strychnine and salts	N746				313		
Thallium Compounds	N760			&	313		
Vanadium Compounds	N770				313		
Warfarin and salts	N874				313		
Zinc Compounds	N982			&	313		
Organorhodium Complex (PMN-82-147)	0	10/10,000	10	PMN			
Formaldehyde	50-00-0	500	100	100	313	U122	15,000
Formaldehyde (solution)	50-00-0	500	100	100	X	U122	15,000
Mitomycin C	50-07-7	500/10,000	10	10		U010	
Ergocalciferol	50-14-6	1,000/10,000	1,000				
Cyclophosphamide	50-18-0			10		U058	
DDT	50-29-3			1		U061	
Benzo[a]pyrene	50-32-8			1	313+	U022	
Reserpine	50-55-5			5,000		U200	
Piperonyl butoxide	51-03-6				313		
Fluorouracil	51-21-8	500/10,000	500		313		
5-Fluorouracil	51-21-8	500/10,000	500		X		
2,4-Dinitrophenol	51-28-5			10	313	P048	
Epinephrine	51-43-4			1,000		P042	
2-Chloro-N-(2-chloroethyl)-N-methylethanamine	51-75-2	10	10		X		
Mechlorethamine	51-75-2	10	10		X		
Nitrogen mustard	51-75-2	10	10		313		
Carbamic acid, ethyl ester	51-79-6			100	X	U238	
Ethyl carbamate	51-79-6			100	X	U238	
Urethane	51-79-6			100	313	U238	
Carbachol chloride	51-83-2	500/10,000	500				
Phosphonic acid, (2,2,2-trichloro-1-hydroxyethyl)-,dimethyl ester	52-68-6			100	X		
Trichlorfon	52-68-6			100	313		
Famphur	52-85-7			1,000	313	P097	
Dibenz[a,h]anthracene	53-70-3			1	313+	U063	
2-Acetylaminofluorene	53-96-3			1	313	U005	
Nicotine	54-11-5	100	100	100	313c	P075	
Nicotine and salts	54-11-5			100	313c	P075	
Pyridine, 3-(1-methyl-2-pyrrolidinyl)-	54-11-5	100	100	100		P075	

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
,(S)-							
Aminopterin	54-62-6	500/10,000	500				
N-Nitrosodiethylamine	55-18-5			1	313	U174	
Benzamide	55-21-0				313		
O,O-Dimethyl O-(3-methyl-4-(methylthio) phenyl) ester, phosphorothioic acid	55-38-9				X		
Fenthion	55-38-9				313		
Nitroglycerin	55-63-0			10	313	P081	
Diisopropylfluorophosphate	55-91-4	100	100	100		P043	
Isofluorphate	55-91-4	100	100	100		P043	
Methylthiouracil	56-04-2			10		U164	
Carbon tetrachloride	56-23-5			10	313	U211	
Cantharidin	56-25-7	100/10,000	100				
Bis(tributyltin) oxide	56-35-9				313		
Parathion	56-38-2	100	10	10	313	P089	
Phosphorothioic acid, O,O-diethyl-O-(4-nitrophenyl) ester	56-38-2	100	10	10	X	P089	
3-Methylcholanthrene	56-49-5			10	313+	U157	
Diethylstilbestrol	56-53-1			1		U089	
Benz[a]anthracene	56-55-3			10	313+	U018	
Coumaphos	56-72-4	100/10,000	10	10			
1,1-Dimethyl hydrazine	57-14-7	1,000	10	10	313	U098	15,000
Dimethylhydrazine	57-14-7	1,000	10	10	X	U098	15,000
Hydrazine, 1,1-dimethyl-	57-14-7	1,000	10	10	X	U098	15,000
Strychnine	57-24-9	100/10,000	10	10	313c	P108	
Strychnine, and salts	57-24-9			10	313c	P108	
Pentobarbital sodium	57-33-0				313		
Phenytoin	57-41-0				313		
Physostigmine	57-47-6	100/10,000	100	100		P204	
beta-Propiolactone	57-57-8	500	10	10	313		
Physostigmine, salicylate (1:1)	57-64-7	100/10,000	100	100		P188	
Chlordane	57-74-9	1,000	1	1	313	U036	
4,7-Methanoindan, 1,2,3,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-	57-74-9	1,000	1	1	X	U036	
7,12-Dimethylbenz[a]anthracene	57-97-6			1	313+	U094	
Phenoxarsine, 10,10'-oxydi-	58-36-6	500/10,000	500				
Cyclohexane, 1,2,3,4,5,6-hexachloro-,(1.alpha.,2.alpha.,3.beta.,4.alpha.,5.alpha.,6.beta.)-	58-89-9	1,000/10,000	1	1	X	U129	
Hexachlorocyclohexane (gamma isomer)	58-89-9	1,000/10,000	1	1	X	U129	
Lindane	58-89-9	1,000/10,000	1	1	313	U129	
2,3,4,6-Tetrachlorophenol	58-90-2			10	313c		
p-Chloro-m-cresol	59-50-7			5,000		U039	
Phenylhydrazine hydrochloride	59-88-1	1,000/10,000	1,000				
N-Nitrosomorpholine	59-89-2			1	313		
Ethylenediamine-tetraacetic acid (EDTA)	60-00-4			5,000			

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
4-Aminoazobenzene	60-09-3				313		
4-Dimethylaminoazobenzene	60-11-7			10	313	U093	
Dimethylaminoazobenzene	60-11-7			10	X	U093	
Ethane, 1,1'-oxybis-	60-29-7			100		U117	10,000
Ethyl ether	60-29-7			100		U117	10,000
Hydrazine, methyl-	60-34-4	500	10	10	X	P068	15,000
Methyl hydrazine	60-34-4	500	10	10	313	P068	15,000
Acetamide	60-35-5			100	313		
Strychnine, sulfate	60-41-3	100/10,000	10	10	313c		
Dimethoate	60-51-5	500/10,000	10	10	313	P044	
Dieldrin	60-57-1			1		P037	
Amitrole	61-82-5			10	313	U011	
Phenylmercuric acetate	62-38-4	500/10,000	100	100	313c	P092	
Phenylmercury acetate	62-38-4	500/10,000	100	100	313c	P092	
Phenacetin	62-44-2			100		U187	
Ethyl methanesulfonate	62-50-0			1		U119	
Aniline	62-53-3	1,000	5,000	5,000	313	U012	
Thioacetamide	62-55-5			10	313	U218	
Thiourea	62-56-6			10	313	U219	
Dichlorvos	62-73-7	1,000	10	10	313		
Phosphoric acid, 2-dichloroethenyl dimethyl ester	62-73-7	1,000	10	10	X		
Fluoroacetic acid, sodium salt	62-74-8	10/10,000	10	10	X	P058	
Sodium fluoroacetate	62-74-8	10/10,000	10	10	313	P058	
Methanamine, N-methyl-N-nitroso-	62-75-9	1,000	10	10	X	P082	
N-Nitrosodimethylamine	62-75-9	1,000	10	10	313	P082	
Nitrosodimethylamine	62-75-9	1,000	10	10	X	P082	
Carbaryl	63-25-2			100	313	U279	
1-Naphthalenol, methylcarbamate	63-25-2			100	X	U279	
Phenol, 3-(1-methylethyl)-, methylcarbamate	64-00-6	500/10,000	10	10		P202	
Formic acid	64-18-6			5,000	313	U123	
Acetic acid	64-19-7			5,000			
Diethyl sulfate	64-67-5			10	313		
Tetracycline hydrochloride	64-75-5				313		
Colchicine	64-86-8	10/10,000	10				
Nicotine sulfate	65-30-5	100/10,000	100	100	313c		
Benzoic acid	65-85-0			5,000			
Uracil mustard	66-75-1			10		U237	
Cycloheximide	66-81-9	100/10,000	100				
Methanol	67-56-1			5,000	313	U154	
Isopropyl alcohol (mfg-strong acid process)	67-63-0				313		
Acetone	67-64-1			5,000		U002	
Chloroform	67-66-3	10,000	10	10	313	U044	20,000
Methane, trichloro-	67-66-3	10,000	10	10	X	U044	20,000
Hexachloroethane	67-72-1			100	313	U131	
Dimethylformamide	68-12-2			100	X		
N,N-Dimethylformamide	68-12-2			100	313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
2,5-Cyclohexadiene-1,4-dione, 2,3,5-tris(1-aziridinyl)-	68-76-8				X		
Triaziquone	68-76-8				313		
Guanidine, N-methyl-N'-nitro-N-nitroso-	70-25-7			10		U163	
Hexachlorophene	70-30-4			100	313	U132	
Propiophenone, 4'-amino	70-69-9	100/10,000	100				
n-Butyl alcohol	71-36-3			5,000	313	U031	
Benzene	71-43-2			10	313	U019	
Methyl chloroform	71-55-6			1,000	X	U226	
1,1,1-Trichloroethane	71-55-6			1,000	313	U226	
Digitoxin	71-63-6	100/10,000	100				
Endrin	72-20-8	500/10,000	1	1		P051	
Benzene, 1,1'-(2,2,2-trichloroethylidene)bis [4-methoxy-	72-43-5			1	X	U247	
Methoxychlor	72-43-5			1	313	U247	
DDD	72-54-8			1		U060	
DDE	72-55-9			1			
Trypan blue	72-57-1			10	313	U236	
Methane	74-82-8						10,000
Bromomethane	74-83-9	1,000	1,000	1,000	313	U029	
Methyl bromide	74-83-9	1,000	1,000	1,000	X	U029	
Ethane	74-84-0						10,000
Ethene	74-85-1				X		10,000
Ethylene	74-85-1				313		10,000
Acetylene	74-86-2						10,000
Ethyne	74-86-2						10,000
Chloromethane	74-87-3			100	313	U045	10,000
Methane, chloro-	74-87-3			100	X	U045	10,000
Methyl chloride	74-87-3			100	X	U045	10,000
Methyl iodide	74-88-4			100	313	U138	
Methanamine	74-89-5			100			10,000
Monomethylamine	74-89-5			100			10,000
Hydrocyanic acid	74-90-8	100	10	10	X	P063	2,500
Hydrogen cyanide	74-90-8	100	10	10	313	P063	2,500
Methanethiol	74-93-1	500	100	100	X	U153	10,000
Methyl mercaptan	74-93-1	500	100	100	313s	U153	10,000
Thiomethanol	74-93-1	500	100	100	X	U153	10,000
Methylene bromide	74-95-3			1,000	313	U068	
Propane	74-98-6						10,000
1-Propyne	74-99-7						10,000
Propyne	74-99-7						10,000
Chloroethane	75-00-3			100	313		10,000
Ethane, chloro-	75-00-3			100	X		10,000
Ethyl chloride	75-00-3			100	X		10,000
Ethene, chloro-	75-01-4			1	X	U043	10,000
Vinyl chloride	75-01-4			1	313	U043	10,000
Ethene, fluoro-	75-02-5						10,000
Vinyl fluoride	75-02-5				313		10,000

ATTACHMENT 1

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Ethanamine	75-04-7			100			10,000
Monoethylamine	75-04-7			100			10,000
Acetonitrile	75-05-8			5,000	313	U003	
Acetaldehyde	75-07-0			1,000	313	U001	10,000
Ethanethiol	75-08-1						10,000
Ethyl mercaptan	75-08-1						10,000
Dichloromethane	75-09-2			1,000	313	U080	
Methylene chloride	75-09-2			1,000	X	U080	
Carbon disulfide	75-15-0	10,000	100	100	313	P022	20,000
Cyclopropane	75-19-4						10,000
Calcium carbide	75-20-7			10			
Ethylene oxide	75-21-8	1,000	10	10	313	U115	10,000
Oxirane	75-21-8	1,000	10	10	X	U115	10,000
Bromoform	75-25-2			100	313	U225	
Tribromomethane	75-25-2			100	X	U225	
Dichlorobromomethane	75-27-4			5,000	313		
Isobutane	75-28-5						10,000
Propane, 2-methyl	75-28-5						10,000
Isopropyl chloride	75-29-6						10,000
Propane, 2-chloro-	75-29-6						10,000
Isopropylamine	75-31-0						10,000
2-Propanamine	75-31-0						10,000
1,1-Dichloroethane	75-34-3			1,000	X	U076	
Ethylidene Dichloride	75-34-3			1,000	313	U076	
1,1-Dichloroethylene	75-35-4			100	X	U078	10,000
Ethene, 1,1-dichloro-	75-35-4			100	X	U078	10,000
Vinylidene chloride	75-35-4			100	313	U078	10,000
Acetyl chloride	75-36-5			5,000		U006	
Difluoroethane	75-37-6						10,000
Ethane, 1,1-difluoro-	75-37-6						10,000
Ethene, 1,1-difluoro-	75-38-7						10,000
Vinylidene fluoride	75-38-7						10,000
Dichlorofluoromethane	75-43-4				313		
HCFC-21	75-43-4				X		
Carbonic dichloride	75-44-5	10	10	10	X	P095	500
Phosgene	75-44-5	10	10	10	313	P095	500
Chlorodifluoromethane	75-45-6				313		
HCFC-22	75-45-6				X		
Methanamine, N,N-dimethyl-	75-50-3			100			10,000
Trimethylamine	75-50-3			100			10,000
Nitromethane	75-52-5				313		
Aziridine, 2-methyl	75-55-8	10,000	1	1	X	P067	10,000
Propyleneimine	75-55-8	10,000	1	1	313	P067	10,000
Oxirane, methyl-	75-56-9	10,000	100	100	X		10,000
Propylene oxide	75-56-9	10,000	100	100	313		10,000
Cacodylic acid	75-60-5			1		U136	
Bromotrifluoromethane	75-63-8				313		
Halon 1301	75-63-8				X		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
tert-Butylamine	75-64-9			1,000			
tert-Butyl alcohol	75-65-0				313		
1-Chloro-1,1-difluoroethane	75-68-3				313		
HCFC-142b	75-68-3				X		
CFC-11	75-69-4			5,000	X	U121	
Trichlorofluoromethane	75-69-4			5,000	313	U121	
Trichloromonofluoromethane	75-69-4			5,000	X	U121	
CFC-12	75-71-8			5,000	X	U075	
Dichlorodifluoromethane	75-71-8			5,000	313	U075	
CFC-13	75-72-9				X		
Chlorotrifluoromethane	75-72-9				313		
Plumbane, tetramethyl-	75-74-1	100	100				10,000
Tetramethyllead	75-74-1	100	100		313c		10,000
Silane, tetramethyl-	75-76-3						10,000
Tetramethylsilane	75-76-3						10,000
Silane, chlorotrimethyl-	75-77-4	1,000	1,000				10,000
Trimethylchlorosilane	75-77-4	1,000	1,000				10,000
Dimethyldichlorosilane	75-78-5	500	500				5,000
Silane, dichlorodimethyl-	75-78-5	500	500				5,000
Methyltrichlorosilane	75-79-6	500	500				5,000
Silane, trichloromethyl-	75-79-6	500	500				5,000
Acetone cyanohydrin	75-86-5	1,000	10	10	X	P069	
2-Methyllactonitrile	75-86-5	1,000	10	10	313	P069	
Acetaldehyde, trichloro-	75-87-6			5,000		U034	
2-Chloro-1,1,1-trifluoroethane	75-88-7				313		
HCFC-133a	75-88-7				X		
2,2-Dichloropropionic acid	75-99-0			5,000			
Pentachloroethane	76-01-7			10	313	U184	
Trichloroacetyl chloride	76-02-8	500	500		313		
Chloropicrin	76-06-2				313		
Ethane, 1,1,2-trichloro-1,2,2,-trifluoro-	76-13-1				X		
Freon 113	76-13-1				313		
CFC-114	76-14-2				X		
Dichlorotetrafluoroethane	76-14-2				313		
CFC-115	76-15-3				X		
Monochloropentafluoroethane	76-15-3				313		
Heptachlor	76-44-8			1	313	P059	
1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methano-1H-indene	76-44-8			1	X	P059	
Triphenyltin hydroxide	76-87-9				313		
Phenolphthalein	77-09-8				313		
Hexachlorocyclopentadiene	77-47-4	100	10	10	313	U130	
Dicyclopentadiene	77-73-6				313		
Dimethyl sulfate	77-78-1	500	100	100	313	U103	
Tabun	77-81-6	10	10				
Tetraethyl lead	78-00-2	100	10	10	313c	P110	
Dioxathion	78-34-2	500	500				
DEF	78-48-8				X		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
S,S,S-Tributyltrithiophosphate	78-48-8				313		
Amiton	78-53-5	500	500				
Isophorone	78-59-1			5,000			
Oxetane, 3,3-bis(chloromethyl)-	78-71-7	500	500				
Butane, 2-methyl-	78-78-4						10,000
Isopentane	78-78-4						10,000
1,3-Butadiene, 2-methyl-	78-79-5			100			10,000
Isoprene	78-79-5			100	**313**		10,000
iso-Butylamine	78-81-9			1,000			
Isobutyronitrile	78-82-0	1,000	1,000				20,000
Propanenitrile, 2-methyl-	78-82-0	1,000	1,000				20,000
Isobutyl alcohol	78-83-1			5,000		U140	
Isobutyraldehyde	78-84-2				313		
1,2-Dichloropropane	78-87-5			1,000	313	U083	
Propane 1,2-dichloro-	78-87-5			1,000	X	U083	
2,3-Dichloropropene	78-88-6			100	313		
sec-Butyl alcohol	78-92-2				313		
Methyl ethyl ketone	78-93-3			5,000		U159	
Methyl vinyl ketone	78-94-4	10	10				
Lactonitrile	78-97-7	1,000	1,000				
1,1-Dichloropropane	78-99-9			1,000			
1,1,2-Trichloroethane	79-00-5			100	313	U227	
Trichloroethylene	79-01-6			100	313	U228	
Acrylamide	79-06-1	1,000/10,000	5,000	5,000	313	U007	
Propionic acid	79-09-4			5,000			
Acrylic acid	79-10-7			5,000	313	U008	
Chloroacetic acid	79-11-8	100/10,000	100	100	313		
Thiosemicarbazide	79-19-6	100/10,000	100	100	313	P116	
Ethaneperoxoic acid	79-21-0	500	500		X		10,000
Peracetic acid	79-21-0	500	500		313		10,000
Carbonochloridic acid, methylester	79-22-1	500	1,000	1,000	X	U156	5,000
Methyl chlorocarbonate	79-22-1	500	1,000	1,000	313	U156	5,000
Methyl chloroformate	79-22-1	500	1,000	1,000	X	U156	5,000
iso-Butyric acid	79-31-2			5,000			
1,1,2,2-Tetrachloroethane	79-34-5			100	313	U209	
Ethene, chlorotrifluoro-	79-38-9						10,000
Trifluorochloroethylene	79-38-9						10,000
Dimethylcarbamyl chloride	79-44-7			1	313	U097	
2-Nitropropane	79-46-9			10	313	U171	
Tetrabromobisphenol A	79-94-7				313		
4,4'-Isopropylidenediphenol	80-05-7				313		
Cumene hydroperoxide	80-15-9			10	313	U096	
Hydroperoxide, 1-methyl-1-phenylethyl-	80-15-9			10	X	U096	
Methyl methacrylate	80-62-6			1,000	313	U162	
Methyl 2-chloroacrylate	80-63-7	500	500				
Saccharin (manufacturing)	81-07-2			100	313	U202	
Saccharin and salts	81-07-2			100		U202	

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
1-Amino-2,4-dibromoanthraquinone	81-49-2				313		
Warfarin	81-81-2	500/10,000	100	100	X 313c	P001	
Warfarin, & salts, conc.>0.3%	81-81-2			100	X 313c	P001	
C.I. Food Red 15	81-88-9				313		
1-Amino-2-methylanthraquinone	82-28-0				313		
Diphacinone	82-66-6	10/10,000	10				
PCNB	82-68-8			100	X	U185	
Pentachloronitrobenzene	82-68-8			100	X	U185	
Quintozene	82-68-8			100	313	U185	
Acenaphthene	83-32-9			100			
Diethyl phthalate	84-66-2			1,000		U088	
n-Butyl phthalate	84-74-2			10	X	U069	
Dibutyl phthalate	84-74-2			10	313	U069	
Diquat	85-00-7			1,000			
Phenanthrene	85-01-8			5,000	313		
Phthalic anhydride	85-44-9			5,000	313	U190	
Butyl benzyl phthalate	85-68-7			100			
N-Nitrosodiphenylamine	86-30-6			100	313		
Azinphos-methyl	86-50-0	10/10,000	1	1			
Guthion	86-50-0	10/10,000	1	1			
Fluorene	86-73-7			5,000			
ANTU	86-88-4	500/10,000	100	100		P072	
Thiourea, 1-naphthalenyl-	86-88-4	500/10,000	100	100		P072	
2,6-Xylidine	87-62-7				313		
2,6-Dichlorophenol	87-65-0			100		U082	
Hexachloro-1,3-butadiene	87-68-3			1	313	U128	
Hexachlorobutadiene	87-68-3			1	X	U128	
PCP	87-86-5			10	X		
Pentachlorophenol	87-86-5			10	313		
Aniline, 2,4,6-trimethyl-	88-05-1	500	500				
2,4,6-Trichlorophenol	88-06-2			10	313		
o-Nitrotoluene	88-72-2			1,000	313		
2-Nitrophenol	88-75-5			100	313		
Dinitrobutyl phenol	88-85-7	100/10,000	1,000	1,000	313	P020	
Dinoseb	88-85-7	100/10,000	1,000	1,000	X	P020	
Picric acid	88-89-1				313		
o-Anisidine	90-04-0			100	313		
2-Phenylphenol	90-43-7				313		
Michler's ketone	90-94-8				313		
Benzene, 1,3-diisocyanato-2-methyl-	91-08-7	100	100	100	X		10,000
Toluene-2,6-diisocyanate	91-08-7	100	100	100	313		10,000
Naphthalene	91-20-3			100	313	U165	
Quinoline	91-22-5			5,000	313		
o-Nitroanisole	91-23-6				313		
2-Chloronaphthalene	91-58-7			5,000		U047	
beta-Naphthylamine	91-59-8			10	313	U168	
N,N-Diethylaniline	91-66-7			1,000			
Methapyrilene	91-80-5			5,000		U155	

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
3,3'-Dimethoxybenzidine-4,4'-diisocyanate	91-93-0				313#		
3,3'-Dichlorobenzidine	91-94-1			1	313	U073	
3,3'-Dimethyl-4,4'-diphenylene diisocyanate	91-97-4				313#		
Biphenyl	92-52-4			100	313		
4-Aminobiphenyl	92-67-1			1	313		
Benzidine	92-87-5			1	313	U021	
4-Nitrobiphenyl	92-93-3			10	313		
Methyleugenol	93-15-2				313		
Mecoprop	93-65-2				313		
Silvex (2,4,5-TP)	93-72-1			100			
2,4,5-T acid	93-76-5			1,000			
2,4,5-T esters	93-79-8			1,000			
2,4-D Esters	94-11-1			100	X		
2,4-D isopropyl ester	94-11-1			100	313		
Benzoyl peroxide	94-36-0				313		
Dihydrosafrole	94-58-6			10	313	U090	
Safrole	94-59-7			100	313	U203	
(4-Chloro-2-methylphenoxy) acetic acid	94-74-6				X		
MCPA	94-74-6				X		
Methoxone	94-74-6				313		
Acetic acid, (2,4-dichlorophenoxy)-	94-75-7			100	X	U240	
2,4-D	94-75-7			100	313	U240	
2,4-D Acid	94-75-7			100	X	U240	
2,4-D, salts and esters	94-75-7			100		U240	
2,4-D Esters	94-79-1			100			
2,4-D butyl ester	94-80-4			100	313		
2,4-D Esters	94-80-4			100	X		
2,4-DB	94-82-6				313		
Benzene, o-dimethyl-	95-47-6			1,000	X	U239	
o-Xylene	95-47-6			1,000	313	U239	
o-Cresol	95-48-7	1,000/10,000	100	100	313	U052	
o-Dichlorobenzene	95-50-1			100	X	U070	
1,2-Dichlorobenzene	95-50-1			100	313	U070	
o-Toluidine	95-53-4			100	313	U328	
1,2-Phenylenediamine	95-54-5				313		
2-Chlorophenol	95-57-8			100		U048	
1,2,4-Trimethylbenzene	95-63-6				313		
p-Chloro-o-toluidine	95-69-2				313		
2,4-Diaminotoluene	95-80-7			10	313		
1,2,4,5-Tetrachlorobenzene	95-94-3			5,000		U207	
2,4,5-Trichlorophenol	95-95-4			10	313		
Styrene oxide	96-09-3			100	313		
DBCP	96-12-8			1	X	U066	
1,2-Dibromo-3-chloropropane	96-12-8			1	313	U066	
1,2,3-Trichloropropane	96-18-4				313		
Methyl acrylate	96-33-3				313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Ethylene thiourea	96-45-7			10	313	U116	
Dichlorophene	97-23-4				313		
2,2'-Methylenebis(4-chlorophenol	97-23-4				X		
C.I. Solvent Yellow 3	97-56-3				313		
Ethyl methacrylate	97-63-2			1,000		U118	
Furfural	98-01-1			5,000		U125	
Benzenearsonic acid	98-05-5	10/10,000	10				
Benzoic trichloride	98-07-7	100	10	10	313	U023	
Benzotrichloride	98-07-7	100	10	10	X	U023	
Benzenesulfonyl chloride	98-09-9			100		U020	
Trichlorophenylsilane	98-13-5	500	500				
Benzenamine, 3-(trifluoromethyl)-	98-16-8	500	500				
Cumene	98-82-8			5,000	313	U055	
Acetophenone	98-86-2			5,000	313	U004	
Benzal chloride	98-87-3	500	5,000	5,000	313	U017	
Benzoyl chloride	98-88-4			1,000	313		
Nitrobenzene	98-95-3	10,000	1,000	1,000	313	U169	
m-Nitrotoluene	99-08-1			1,000			
Dichloran	99-30-9				313		
2,6-Dichloro-4-nitroaniline	99-30-9				X		
1,3,5-Trinitrobenzene	99-35-4			10		U234	
5-Nitro-o-toluidine	99-55-8			100	313	U181	
5-Nitro-o-anisidine	99-59-2				313		
m-Dinitrobenzene	99-65-0			100	313		
Dimethyl-p-phenylenediamine	99-98-9	10/10,000	10				
p-Nitrotoluene	99-99-0			1,000			
p-Nitroaniline	100-01-6			5,000	313	P077	
4-Nitrophenol	100-02-7			100	313	U170	
p-Nitrophenol	100-02-7			100	X	U170	
Benzene, 1-(chloromethyl)-4-nitro-	100-14-1	500/10,000	500				
p-Dinitrobenzene	100-25-4			100	313		
Ethylbenzene	100-41-4			1,000	313		
Styrene	100-42-5			1,000	313		
Benzyl chloride	100-44-7	500	100	100	313	P028	
Benzonitrile	100-47-0			5,000			
N-Nitrosopiperidine	100-75-4			10	313	U179	
Anilazine	101-05-3				313		
4,6-Dichloro-N-(2-chlorophenyl)-1,3,5-triazin-2-amine	101-05-3				X		
MBOCA	101-14-4			10	X	U158	
4,4'-Methylenebis(2-chloroaniline)	101-14-4			10	313	U158	
Barban	101-27-9			10		U280	
4-Bromophenyl phenyl ether	101-55-3			100		U030	
4,4'-Methylenebis(N,N-dimethyl)benzenamine	101-61-1				313		
MDI	101-68-8			5,000	X		
Methylenebis(phenylisocyanate)	101-68-8			5,000	313#		
4,4'-Methylenedianiline	101-77-9			10	313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
4,4'-Diaminodiphenyl ether	101-80-4				313		
Diglycidyl resorcinol ether	101-90-6				313		
Isocyanic acid, 3,4-dichlorophenyl ester	102-36-3	500/10,000	500				
Phenylthiourea	103-85-5	100/10,000	100	100		P093	
p-Chlorophenyl isocyanate	104-12-1				313		
4-Nonylphenol	104-40-5				313$		
1,4-Phenylene diisocyanate	104-49-4				313#		
p-Anisidine	104-94-9				313		
sec-Butyl acetate	105-46-4			5,000			
2,4-Dimethylphenol	105-67-9			100	313	U101	
Benzene, p-dimethyl-	106-42-3			100	X	U239	
p-Xylene	106-42-3			100	313	U239	
p-Cresol	106-44-5			100	313	U052	
1,4-Dichlorobenzene	106-46-7			100	313	U072	
p-Chloroaniline	106-47-8			1,000	313	P024	
p-Toluidine	106-49-0			100		U353	
p-Phenylenediamine	106-50-3			5,000	313		
p-Benzoquinone	106-51-4			10	X	U197	
Quinone	106-51-4			10	313	U197	
1,2-Butylene oxide	106-88-7			100	313		
Epichlorohydrin	106-89-8	1,000	100	100	313	U041	20,000
Oxirane, (chloromethyl)-	106-89-8	1,000	100	100	X	U041	20,000
1,2-Dibromoethane	106-93-4			1	313	U067	
Ethylene dibromide	106-93-4			1	X	U067	
Propargyl bromide	106-96-7	10	10				
Butane	106-97-8						10,000
1-Butene	106-98-9						10,000
1,3-Butadiene	106-99-0			10	313		10,000
1-Butyne	107-00-6						10,000
Ethyl acetylene	107-00-6						10,000
2-Butene	107-01-7						10,000
Acrolein	107-02-8	500	1	1	313	P003	5,000
2-Propenal	107-02-8	500	1	1	X	P003	5,000
Allyl chloride	107-05-1			1,000	313		
1,2-Dichloroethane	107-06-2			100	313	U077	
Ethylene dichloride	107-06-2			100	X	U077	
Chloroethanol	107-07-3	500	500				
n-Propylamine	107-10-8			5,000		U194	
Allylamine	107-11-9	500	500		313		10,000
2-Propen-1-amine	107-11-9	500	500		X		10,000
Ethyl cyanide	107-12-0	500	10	10		P101	10,000
Propanenitrile	107-12-0	500	10	10		P101	10,000
Propionitrile	107-12-0	500	10	10		P101	10,000
Acrylonitrile	107-13-1	10,000	100	100	313	U009	20,000
2-Propenenitrile	107-13-1	10,000	100	100	X	U009	20,000
1,2-Ethanediamine	107-15-3	10,000	5,000	5,000			20,000
Ethylenediamine	107-15-3	10,000	5,000	5,000			20,000

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Formaldehyde cyanohydrin	107-16-4	1,000	1,000				
Allyl alcohol	107-18-6	1,000	100	100	313	P005	15,000
2-Propen-1-ol	107-18-6	1,000	100	100	X	P005	15,000
Propargyl alcohol	107-19-7			1,000	313	P102	
Chloroacetaldehyde	107-20-0			1,000		P023	
Ethylene glycol	107-21-1			5,000	313		
Ethene, methoxy-	107-25-5						10,000
Vinyl methyl ether	107-25-5						10,000
Chloromethyl methyl ether	107-30-2	100	10	10	313	U046	5,000
Methane, chloromethoxy-	107-30-2	100	10	10	X	U046	5,000
Formic acid, methyl ester	107-31-3						10,000
Methyl formate	107-31-3						10,000
Sarin	107-44-8	10	10				
TEPP	107-49-3	100	10	10		P111	
Tetraethyl pyrophosphate	107-49-3	100	10	10		P111	
Butyric acid	107-92-6			5,000			
Acetic acid ethenyl ester	108-05-4	1,000	5,000	5,000	X		15,000
Vinyl acetate	108-05-4	1,000	5,000	5,000	313		15,000
Vinyl acetate monomer	108-05-4	1,000	5,000	5,000	X		15,000
Methyl isobutyl ketone	108-10-1			5,000	313	U161	
Carbonochloridic acid, 1-methylethyl ester	108-23-6	1,000	1,000				15,000
Isopropyl chloroformate	108-23-6	1,000	1,000				15,000
Acetic anhydride	108-24-7			5,000			
Maleic anhydride	108-31-6			5,000	313	U147	
Benzene, m-dimethyl-	108-38-3			1,000	X	U239	
m-Xylene	108-38-3			1,000	313	U239	
m-Cresol	108-39-4			100	313	U052	
1,3-Phenylenediamine	108-45-2				313		
Resorcinol	108-46-3			5,000		U201	
Bis(2-chloro-1-methylethyl)ether	108-60-1			1,000	313	U027	
Dichloroisopropyl ether	108-60-1			1,000	X	U027	
Toluene	108-88-3			1,000	313	U220	
Chlorobenzene	108-90-7			100	313	U037	
Cyclohexanamine	108-91-8	10,000	10,000				15,000
Cyclohexylamine	108-91-8	10,000	10,000				15,000
Cyclohexanol	108-93-0				313		
Cyclohexanone	108-94-1			5,000		U057	
Phenol	108-95-2	500/10,000	1,000	1,000	313	U188	
Benzenethiol	108-98-5	500	100	100		P014	
Thiophenol	108-98-5	500	100	100		P014	
2-Methylpyridine	109-06-8			5,000	313	U191	
2-Picoline	109-06-8			5,000	X	U191	
Carbonochloridic acid, propylester	109-61-5	500	500				15,000
Propyl chloroformate	109-61-5	500	500				15,000
Pentane	109-66-0						10,000
1-Pentene	109-67-1						10,000
Butylamine	109-73-9			1,000			

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Malononitrile	109-77-3	500/10,000	1,000	1,000	313	U149	
2-Methoxyethanol	109-86-4				313		
Diethylamine	109-89-7			100			
Ethene, ethoxy-	109-92-2						10,000
Vinyl ethyl ether	109-92-2						10,000
Ethyl nitrite	109-95-5						10,000
Nitrous acid, ethyl ester	109-95-5						10,000
Furan, tetrahydro-	109-99-9			1,000		U213	
Furan	110-00-9	500	100	100	313	U124	5,000
Maleic acid	110-16-7			5,000			
Fumaric acid	110-17-8			5,000			
iso-Butyl acetate	110-19-0			5,000			
Hexane	110-54-3			5,000	X		
n-Hexane	110-54-3			5,000	313		
trans-1,4-Dichloro-2-butene	110-57-6	500	500		313		
trans-1,4-Dichlorobutene	110-57-6	500	500		X		
2-Chloroethyl vinyl ether	110-75-8			1,000		U042	
Ethanol, 2-ethoxy-	110-80-5			1,000	X	U359	
2-Ethoxyethanol	110-80-5			1,000	313	U359	
Cyclohexane	110-82-7			1,000	313	U056	
Pyridine	110-86-1			1,000	313	U196	
Piperidine	110-89-4	1,000	1,000				15,000
Diethanolamine	111-42-2			100	313		
Bis(2-chloroethyl) ether	111-44-4	10,000	10	10	313	U025	
Dichloroethyl ether	111-44-4	10,000	10	10	X	U025	
Ethylenebisdithiocarbamic acid, salts & esters	111-54-6			5,000	X	U114	
Adiponitrile	111-69-3	1,000	1,000				
Bis(2-chloroethoxy) methane	111-91-1			1,000	313	U024	
Phenol, 2-(1-methylethoxy)-, methylcarbamate	114-26-1			100	X	U411	
Propoxur	114-26-1			100	313	U411	
Azaserine	115-02-6			1		U015	
Propene	115-07-1				X		10,000
1-Propene	115-07-1				X		10,000
Propylene	115-07-1				313		10,000
Methane, oxybis-	115-10-6						10,000
Methyl ether	115-10-6						10,000
2-Methylpropene	115-11-7						10,000
1-Propene, 2-methyl-	115-11-7						10,000
Trichloroethylsilane	115-21-9	500	500				
Dimefox	115-26-4	500	500				
Chlorendic acid	115-28-6				313		
Endosulfan	115-29-7	10/10,000	1	1		P050	
Benzenemethanol, 4-chloro-.alpha.-4-chlorophenyl)-.alpha.-(trichloromethyl)-	115-32-2			10	X		
Dicofol	115-32-2			10	313		
Fensulfothion	115-90-2	500	500				

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Aldicarb	116-06-3	100/10,000	1	1	313	P070	
Ethene, tetrafluoro-	116-14-3						10,000
Tetrafluoroethylene	116-14-3				313		10,000
2-Aminoanthraquinone	117-79-3				313		
Dichlone	117-80-6			1			
Bis(2-ethylhexyl)phthalate	117-81-7			100	X	U028	
DEHP	117-81-7			100	X	U028	
Di(2-ethylhexyl) phthalate	117-81-7			100	313	U028	
Di-n-octyl phthalate	117-84-0			5,000		U107	
n-Dioctylphthalate	117-84-0			5,000		U107	
Hexachlorobenzene	118-74-1			10	313	U127	
Isopropylmethylpyrazolyl dimethylcarbamate	119-38-0	500	100	100		P192	
3,3'-Dimethoxybenzidine	119-90-4			100	313	U091	
3,3'-Dimethylbenzidine	119-93-7			10	313	U095	
o-Tolidine	119-93-7			10	X	U095	
Anthracene	120-12-7			5,000	313		
2,4-DP	120-36-5				313		
Isosafrole	120-58-1			100	313	U141	
p-Cresidine	120-71-8				313		
Catechol	120-80-9			100	313		
1,2,4-Trichlorobenzene	120-82-1			100	313		
2,4-Dichlorophenol	120-83-2			100	313	U081	
2,4-Dinitrotoluene	121-14-2			10	313	U105	
Pyrethrins	121-21-1			1			
Pyrethrins	121-29-9			1			
Triethylamine	121-44-8			5,000	313	U404	
N,N-Dimethylaniline	121-69-7			100	313		
Malathion	121-75-5			100	313		
Benzeneethanamine, alpha,alpha-dimethyl-	122-09-8			5,000		P046	
Simazine	122-34-9				313		
Diphenylamine	122-39-4				313		
Propham	122-42-9			1,000		U373	
1,2-Diphenylhydrazine	122-66-7			10	313	U109	
Hydrazine, 1,2-diphenyl-	122-66-7			10	X	U109	
Hydrazobenzene	122-66-7			10	X	U109	
Hydroquinone	123-31-9	500/10,000	100	100	313		
Maleic hydrazide	123-33-1			5,000		U148	
Propionaldehyde	123-38-6			1,000	313		
1,3-Phenylene diisocyanate	123-61-5				313#		
Propionic anhydride	123-62-6			5,000			
Paraldehyde	123-63-7			1,000	313	U182	
Butyraldehyde	123-72-8				313		
2-Butenal, (e)-	123-73-9	1,000	100	100		U053	20,000
Crotonaldehyde, (E)-	123-73-9	1,000	100	100		U053	20,000
Butyl acetate	123-86-4			5,000			
1,4-Dioxane	123-91-1			100	313	U108	

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
iso-Amyl acetate	123-92-2			5,000			
Adipic acid	124-04-9			5,000			
Dimethylamine	124-40-3			1,000	313	U092	10,000
Methanamine, N-methyl-	124-40-3			1,000	X	U092	10,000
Sodium methylate	124-41-4			1,000			
Chlorodibromomethane	124-48-1			100			
Sodium cacodylate	124-65-2	100/10,000	100				
Dibromotetrafluoroethane	124-73-2				313		
Halon 2402	124-73-2				X		
Picrotoxin	124-87-8	500/10,000	500				
Tris(2,3-dibromopropyl) phosphate	126-72-7			10	313	U235	
Methacrylonitrile	126-98-7	500	1,000	1,000	313	U152	10,000
2-Propenenitrile, 2-methyl-	126-98-7	500	1,000	1,000	X	U152	10,000
Chloroprene	126-99-8			100	313		
Perchloroethylene	127-18-4			100	X	U210	
Tetrachloroethylene	127-18-4			100	313	U210	
Zinc phenolsulfonate	127-82-2			5,000	313c		
Potassium dimethyldithiocarbamate	128-03-0				313		
Sodium dimethyldithiocarbamate	128-04-1				313		
C.I. Vat Yellow 4	128-66-5				313		
Pyrene	129-00-0	1,000/10,000	5,000	5,000			
Warfarin sodium	129-06-6	100/10,000	100	100	313c		
1,4-Naphthoquinone	130-15-4			5,000		U166	
Dimethyl phthalate	131-11-3			5,000	313	U102	
Sodium pentachlorophenate	131-52-2				313		
Ammonium picrate	131-74-8			10		P009	
2-Cyclohexyl-4,6-dinitrophenol	131-89-5			100		P034	
Sodium o-phenylphenoxide	132-27-4				313		
Dibenzofuran	132-64-9			100	313		
Captan	133-06-2			10	313		
1H-Isoindole-1,3(2H)-dione, 3a,4,7,7a-tetrahydro-2-[(trichloromethyl)thio]-	133-06-2			10	X		
Folpet	133-07-3				313		
Benzoic acid, 3-amino-2,5-dichloro-	133-90-4			100	X		
Chloramben	133-90-4			100	313		
o-Anisidine hydrochloride	134-29-2				313		
alpha-Naphthylamine	134-32-7			100	313	U167	
Benzeneamine, N-hydroxy-N-nitroso, ammonium salt	135-20-6				X		
Cupferron	135-20-6				313		
Dipropyl isocinchomeronate	136-45-8				313		
Thiram	137-26-8			10	313	U244	
Ziram	137-30-4			10		P205	
Potassium N-methyldithiocarbamate	137-41-7				313		
Metham sodium	137-42-8				313		
Sodium methyldithiocarbamate	137-42-8				X		
Disodium cyanodithioimidocarbonate	138-93-2				313		
Nitrilotriacetic acid	139-13-9				313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
3,3'-Dimethyldiphenylmethane-4,4'-diisocyanate	139-25-3				313#		
4,4'-Thiodianiline	139-65-1				313		
Benzyl cyanide	140-29-4	500	500				
Pyridine, 2-methyl-5-vinyl-	140-76-1	500	500				
Ethyl acrylate	140-88-5			1,000	313	U113	
Butyl acrylate	141-32-2				313		
Dicrotophos	141-66-2	100	100				
Ethyl acetate	141-78-6			5,000		U112	
1,3-Dichloropropane	142-28-9			1,000			
Nabam	142-59-6				313		
Cupric acetate	142-71-2			100	313c		
Dipropylamine	142-84-7			5,000		U110	
Sodium cyanide (Na(CN))	143-33-9	100	10	10	313c	P106	
Kepone	143-50-0			1		U142	
Fluoroacetic acid	144-49-0	10/10,000	10				
Endothall	145-73-3			1,000		P088	
Thiabendazole	148-79-8				313		
2-(4-Thiazolyl)-1H-benzimidazole	148-79-8				X		
Melphalan	148-82-3			1		U150	
MBT	149-30-4				X		
2-Mercaptobenzothiazole	149-30-4				313		
Dichloromethylphenylsilane	149-74-6	1,000	1,000				
Merphos	150-50-5				313		
Monuron	150-68-5				313		
Methoxyethylmercuric acetate	151-38-2	500/10,000	500		313c		
Potassium cyanide	151-50-8	100	10	10	313c	P098	
Aziridine	151-56-4	500	1	1	X	P054	10,000
Ethyleneimine	151-56-4	500	1	1	313	P054	10,000
Diphosphoramide, octamethyl-	152-16-9	100	100	100		P085	
p-Nitrosodiphenylamine	156-10-5				313		
1,2-Dichloroethylene	156-60-5			1,000		U079	
Calcium cyanamide	156-62-7			1,000	313		
Benzo(rst)pentaphene	189-55-9			10	313+	U064	
Dibenz[a,i]pyrene	189-55-9			10	X	U064	
Dibenzo(a,h)pyrene	189-64-0				313+		
Benzo[g,h,i]perylene	191-24-2			5,000	313		
Dibenzo(a,l)pyrene	191-30-0				313+		
Dibenzo(a,e)pyrene	192-65-4				313+		
Indeno(1,2,3-cd)pyrene	193-39-5			100	313+	U137	
7H-Dibenzo(c,g)carbazole	194-59-2				313+		
Benzo(j)fluoranthene	205-82-3				313+		
Benzo[b]fluoranthene	205-99-2			1	313+		
Fluoranthene	206-44-0			100	X	U120	
Benzo(k)fluoranthene	207-08-9			5,000	313+		
Acenaphthylene	208-96-8			5,000			
Benzo(a)phenanthrene	218-01-9			100	313+	U050	
Chrysene	218-01-9			100	X	U050	

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Dibenz(a,j)acridine	224-42-0				313+		
Benz[c]acridine	225-51-4			100		U016	
Dibenz(a,h)acridine	226-36-8				313+		
Isobenzan	297-78-9	100/10,000	100				
O,O-Diethyl O-pyrazinyl phosphorothioate	297-97-2	500	100	100		P040	
Thionazin	297-97-2	500	100	100		P040	
Methyl parathion	298-00-0	100/10,000	100	100	313	P071	
Parathion-methyl	298-00-0	100/10,000	100	100	X	P071	
Phorate	298-02-2	10	10	10		P094	
Disulfoton	298-04-4	500	1	1		P039	
Amphetamine	300-62-9	1,000	1,000				
Naled	300-76-5			10	313		
Lead acetate	301-04-2			10	313c	U144	
S-(2-(Ethylsulfinyl)ethyl) O,O-dimethyl ester phosphorothioic acid	301-12-2				X		
Oxydemeton methyl	301-12-2				313		
Hydrazine	302-01-2	1,000	1	1	313	U133	15,000
Lasiocarpine	303-34-4			10		U143	
Chlorambucil	305-03-3			10		U035	
2,2-Dichloro-1,1,1-trifluoroethane	306-83-2				313		
HCFC-123	306-83-2				X		
Aldrin	309-00-2	500/10,000	1	1	313	P004	
1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-(1.alpha.,4.alpha.,4a.beta.,5.alpha.,8.alpha.,8a.beta.)-	309-00-2	500/10,000	1	1	X	P004	
Diethyl-p-nitrophenyl phosphate	311-45-5			100		P041	
Bromacil	314-40-9				313		
5-Bromo-6-methyl-3-(1-methylpropyl)-2,4-(1H,3H)-pyrimidinedione	314-40-9				X		
Mexacarbate	315-18-4	500/10,000	1,000	1,000		P128	
Emetine, dihydrochloride	316-42-7	1/10,000	1				
alpha-BHC	319-84-6			10	X		
alpha-Hexachlorocyclohexane	319-84-6			10	313		
beta-BHC	319-85-7			1			
delta-BHC	319-86-8			1			
Trichloronate	327-98-0	500	500				
2,5-Dinitrophenol	329-71-5			10			
Diuron	330-54-1			100	313		
Linuron	330-55-2				313		
Diazinon	333-41-5			1	313		
Diazomethane	334-88-3			100	313		
Boron trifluoride compound with methyl ether (1:1)	353-42-4	1,000	1,000				15,000
Boron, trifluoro[oxybis[methane]]-, (T-4)-	353-42-4	1,000	1,000				15,000
Carbonic difluoride	353-50-4			1,000		U033	
Bromochlorodifluoromethane	353-59-3				313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Halon 1211	353-59-3				X		
HCFC-121a	354-11-0				X		
1,1,1,2-Tetrachloro-2-fluoroethane	354-11-0				313		
HCFC-121	354-14-3				X		
1,1,2,2-Tetrachloro-1-fluoroethane	354-14-3				313		
1,2-Dichloro-1,1,2-trifluoroethane	354-23-4				313		
HCFC-123a	354-23-4				X		
1-Chloro-1,1,2,2-tetrafluoroethane	354-25-6				313		
HCFC-124a	354-25-6				X		
Brucine	357-57-3			100	313	P018	
Fluoroacetyl chloride	359-06-8	10	10				
Ethylene fluorohydrin	371-62-0	10	10				
Ergotamine tartrate	379-79-3	500/10,000	500				
1,2-Dichloro-1,1,2,3,3-pentafluoropropane	422-44-6				313		
HCFC-225bb	422-44-6				X		
2,3-Dichloro-1,1,1,2,3-pentafluoropropane	422-48-0				313		
HCFC-225ba	422-48-0				X		
3,3-Dichloro-1,1,1,2,2-pentafluoropropane	422-56-0				313		
HCFC-225ca	422-56-0				X		
1,2-Dichloro-1,1,3,3,3-pentafluoropropane	431-86-7				313		
HCFC-225da	431-86-7				X		
Cyanogen	460-19-5			100		P031	10,000
Ethanedinitrile	460-19-5			100		P031	10,000
3-Chloro-1,1,1-trifluoropropane	460-35-5				313		
HCFC-253fb	460-35-5				X		
1,2-Propadiene	463-49-0						10,000
Propadiene	463-49-0						10,000
Carbon oxide sulfide (COS)	463-58-1			100	X		10,000
Carbonyl sulfide	463-58-1			100	313		10,000
2,2-Dimethylpropane	463-82-1						10,000
Propane, 2,2-dimethyl-	463-82-1						10,000
Isodrin	465-73-6	100/10,000	1	1	313	P060	
Chlorfenvinfos	470-90-6	500	500				
Auramine	492-80-8			100	X	U014	
C.I. Solvent Yellow 34	492-80-8			100	313	U014	
Chlornaphazine	494-03-1			100		U026	
Diaminotoluene	496-72-0			10		U221	
Methylmercuric dicyanamide	502-39-6	500/10,000	500		313c		
4-Aminopyridine	504-24-5	500/10,000	1,000	1,000		P008	
Pyridine, 4-amino-	504-24-5	500/10,000	1,000	1,000		P008	
1,3-Pentadiene	504-60-9			100		U186	10,000
Ethane, 1,1'-thiobis[2-chloro-	505-60-2	500	500		X		
Mustard gas	505-60-2	500	500		313		
Potassium silver cyanide	506-61-6	500	1	1	313c	P099	
Silver cyanide	506-64-9			1	313c	P104	

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Cyanogen bromide	506-68-3	500/10,000	1,000	1,000	313c	U246	
Cyanogen chloride	506-77-4			10	313c	P033	10,000
Cyanogen iodide	506-78-5	1,000/10,000	1,000		313c		
Ammonium carbonate	506-87-6			5,000			
Acetyl bromide	506-96-7			5,000			
1,3-Dichloro-1,1,2,2,3-pentafluoropropane	507-55-1				313		
HCFC-225cb	507-55-1				X		
Methane, tetranitro-	509-14-8	500	10	10		P112	10,000
Tetranitromethane	509-14-8	500	10	10	**313**	P112	10,000
Benzeneacetic acid, 4-chloro-.alpha.-(4-chlorophenyl)-.alpha.-hydroxy-, ethyl ester	510-15-6			10	X	U038	
Chlorobenzilate	510-15-6			10	313	U038	
sec-Butylamine	513-49-5			1,000			
Dithiazanine iodide	514-73-8	500/10,000	500				
o-Dinitrobenzene	528-29-0			100	313		
2-Chloroacetophenone	532-27-4			100	313		
Dazomet	533-74-4				313		
Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione	533-74-4				X		
Bis(chloromethyl) ketone	534-07-6	10/10,000	10				
4,6-Dinitro-o-cresol	534-52-1	10/10,000	10	10	313	P047	
Dinitrocresol	534-52-1	10/10,000	10	10	X	P047	
4,6-Dinitro-o-cresol and salts	534-52-1			10		P047	
Crimidine	535-89-7	100/10,000	100				
Ethylbis(2-chloroethyl)amine	538-07-8	500	500				
1,2-Dichloroethylene	540-59-0				313		
Hydrazine, 1,2-dimethyl-	540-73-8			1		U099	
2,2,4-Trimethylpentane	540-84-1			1,000			
tert-Butyl acetate	540-88-5			5,000			
Uranyl acetate	541-09-3			100			
Lewisite	541-25-3	10	10				
Ethyl chloroformate	541-41-3				313		
Dithiobiuret	541-53-7	100/10,000	100	100	X	P049	
2,4-Dithiobiuret	541-53-7	100/10,000	100	100	313	P049	
1,3-Dichlorobenzene	541-73-1			100	313	U071	
Barium cyanide	542-62-1			10	313c	P013	
1,3-Dichloropropene	542-75-6			100	X	U084	
1,3-Dichloropropylene	542-75-6			100	313	U084	
3-Chloropropionitrile	542-76-7	1,000	1,000	1,000	313	P027	
Propionitrile, 3-chloro-	542-76-7	1,000	1,000	1,000	X	P027	
Bis(chloromethyl) ether	542-88-1	100	10	10	313	P016	1,000
Chloromethyl ether	542-88-1	100	10	10	X	P016	1,000
Dichloromethyl ether	542-88-1	100	10	10	X	P016	1,000
Methane, oxybis[chloro-	542-88-1	100	10	10	X	P016	1,000
Ethylthiocyanate	542-90-5	10,000	10,000				
Cadmium acetate	543-90-8			10	313c		
Cobaltous formate	544-18-3			1,000	313c		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Copper cyanide	544-92-3			10	313c	P029	
Lithium carbonate	554-13-2				313		
m-Nitrophenol	554-84-7			100			
Tris(2-chloroethyl)amine	555-77-1	100	100				
Glycidol	556-52-5				313		
Isothiocyanatomethane	556-61-6	500	500		X		
Methyl isothiocyanate	556-61-6	500	500		313		
Methyl thiocyanate	556-64-9	10,000	10,000				20,000
Thiocyanic acid, methyl ester	556-64-9	10,000	10,000				20,000
Nickel cyanide	557-19-7			10	313c	P074	
Zinc cyanide	557-21-1			10	313c	P121	
Zinc acetate	557-34-6			1,000	313c		
Zinc formate	557-41-5			1,000	313c		
2-Chloropropylene	557-98-2						10,000
1-Propene, 2-chloro-	557-98-2						10,000
Methanesulfonyl fluoride	558-25-8	1,000	1,000				
Ethion	563-12-2	1,000	10	10			
Semicarbazide hydrochloride	563-41-7	1,000/10,000	1,000				
3-Methyl-1-butene	563-45-1						10,000
2-Methyl-1-butene	563-46-2						10,000
3-Chloro-2-methyl-1-propene	563-47-3				313		
Thallium(I) acetate	563-68-8			100	313c	U214	
C.I. Basic Green 4	569-64-2				313		
2,6-Dinitrophenol	573-56-8			10			
Benzene, 2,4-diisocyanato-1-methyl-	584-84-9	500	100	100	X		10,000
Toluene-2,4-diisocyanate	584-84-9	500	100	100	313		10,000
2-Butene-cis	590-18-1						10,000
1-Chloropropylene	590-21-6						10,000
1-Propene, 1-chloro-	590-21-6						10,000
1-Acetyl-2-thiourea	591-08-2			1,000		P002	
Calcium cyanide	592-01-8			10	313c	P021	
Mercuric cyanide	592-04-1			1	313c		
Mercuric thiocyanate	592-85-8			10	313c		
Lead thiocyanate	592-87-0			10	313c		
Vinyl bromide	593-60-2			100	313		
Methanesulfenyl chloride, trichloro-	594-42-3	500	100	100	X		10,000
Perchloromethyl mercaptan	594-42-3	500	100	100	313		10,000
Trichloromethanesulfenyl chloride	594-42-3	500	100	100	X		10,000
Tetraethyltin	597-64-8	100	100				
Bromoacetone	598-31-2			1,000		P017	
Bromotrifluoroethylene	598-73-2						10,000
Ethene, bromotrifluoro-	598-73-2						10,000
2,6-Dinitrotoluene	606-20-2			100	313	U106	
Hexachlorocyclohexane (all isomers)	608-73-1			&			
Pentachlorobenzene	608-93-5			10	313	U183	
3,4,5-Trichlorophenol	609-19-8			10			
3,4-Dinitrotoluene	610-39-9			10			
3,3'-Dimethylbenzidine	612-82-8				313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
dihydrochloride							
o-Tolidine dihydrochloride	612-82-8				X		
3,3'-Dichlorobenzidine dihydrochloride	612-83-9				313		
Thiourea, (2-methylphenyl)-	614-78-8	500/10,000	500				
2,4-Diaminoanisole	615-05-4				313		
1,2-Phenylenediamine dihydrochloride	615-28-1				313		
N-Nitroso-N-methylurethane	615-53-2			1		U178	
Di-n-propylnitrosamine	621-64-7			10	X	U111	
N-Nitrosodi-n-propylamine	621-64-7			10	313	U111	
1,4-Phenylenediamine dihydrochloride	624-18-0				313		
2-Butene, (E)	624-64-6						10,000
2-Butene-trans	624-64-6						10,000
Methane, isocyanato-	624-83-9	500	10	10	X	P064	10,000
Methyl isocyanate	624-83-9	500	10	10	313	P064	10,000
tert-Amyl acetate	625-16-1			5,000			
sec-Amyl acetate	626-38-0			5,000			
Chloroethyl chloroformate	627-11-2	1,000	1,000				
2-Pentene, (Z)-	627-20-3						10,000
Amyl acetate	628-63-7			5,000			
Mercury fulminate	628-86-4			10	313c	P065	
Selenourea	630-10-4			1,000		P103	
Ethane, 1,1,1,2-tetrachloro-	630-20-6			100	X	U208	
1,1,1,2-Tetrachloroethane	630-20-6			100	313	U208	
Ouabain	630-60-4	100/10,000	100				
Ammonium acetate	631-61-8			5,000			
o-Toluidine hydrochloride	636-21-5			100	313	U222	
Triphenyltin chloride	639-58-7	500/10,000	500		313		
Fluoroacetamide	640-19-7	100/10,000	100	100		P057	
Dimetilan	644-64-4	500/10,000	1	1		P191	
2-Pentene, (E)-	646-04-8						10,000
Cyanuric fluoride	675-14-9	100	100		313c		
Methyl phosphonic dichloride	676-97-1	100	100				
Hexamethylphosphoramide	680-31-9			1	313		
N-Nitroso-N-methylurea	684-93-5			1	313	U177	
1-Buten-3-yne	689-97-4						10,000
Vinyl acetylene	689-97-4						10,000
Diethylarsine	692-42-2			1		P038	
Dichlorophenylarsine	696-28-6	500	1	1		P036	
Phenyl dichloroarsine	696-28-6	500	1	1		P036	
N-(3,4-Dichlorophenyl)propanamide	709-98-8				X		
Propanil	709-98-8				313		
Hexaethyl tetraphosphate	757-58-4			100		P062	
N-Nitroso-N-ethylurea	759-73-9			1	313	U176	
EPTC	759-94-4				X		
Ethyl dipropylthiocarbamate	759-94-4				313		
Methacrylic anhydride	760-93-0	500	500				
2-Butene, 1,4-dichloro-	764-41-0			1	X	U074	
1,4-Dichloro-2-butene	764-41-0			1	313	U074	

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Glycidylaldehyde	765-34-4			10		U126	
Carbophenothion	786-19-6	500	500				
1,1-Dichloro-1,2,2-trifluoroethane	812-04-4				313		
HCFC-123b	812-04-4				X		
Diethyl chlorophosphate	814-49-3	500	500				
Acrylyl chloride	814-68-6	100	100				5,000
2-Propenoyl chloride	814-68-6	100	100				5,000
Cupric tartrate	815-82-7			100	313c		
Hexamethylene-1,6-diisocyanate	822-06-0			100	313#		
Diaminotoluene	823-40-5			10		U221	
Trimethylolpropane phosphite	824-11-3	100/10,000	100				
Ametryn	834-12-8				313		
N-Ethyl-N'-(1-methylethyl)-6-(methylthio)-1,3,5,-triazine-2,4-diamine	834-12-8				X		
C.I. Solvent Yellow 14	842-07-9				313		
N-Methyl-2-pyrrolidone	872-50-4				313		
Stannane, acetoxytriphenyl-	900-95-8	500/10,000	500				
Demeton-S-methyl	919-86-8	500	500				
Methacryloyl chloride	920-46-7	100	100				
N-Nitrosodi-n-butylamine	924-16-3			10	313	U172	
N-Methylolacrylamide	924-42-5				313		
N-Nitrosopyrrolidine	930-55-2			1		U180	
2,3,6-Trichlorophenol	933-75-5			10	313c		
2,3,5-Trichlorophenol	933-78-8			10	313c		
Fonofos	944-22-9	500	500				
Phosfolan	947-02-4	100/10,000	100				
Mephosfolan	950-10-7	500	500				
Methidathion	950-37-8	500/10,000	500				
Diphenamid	957-51-7				313		
alpha - Endosulfan	959-98-8			1			
Phosphoric acid, 2-chloro-1-(2,3,5-trichlorophenyl) ethenyl dimethyl ester	961-11-5				X		
Tetrachlorvinphos	961-11-5				313		
C.I. Basic Red 1	989-38-8				313		
Norbormide	991-42-4	100/10,000	100				
Triethoxysilane	998-30-1	500	500				
Chlormequat chloride	999-81-5	100/10,000	100				
Heptachlor epoxide	1024-57-3			1			
Endosulfan sulfate	1031-07-8			1			
Triamiphos	1031-47-6	500/10,000	500				
Chromic acetate	1066-30-4			1,000	313c		
Ammonium bicarbonate	1066-33-7			5,000			
Trimethyltin chloride	1066-45-1	500/10,000	500				
Lead stearate	1072-35-1			10	313c		
Ammonium carbamate	1111-78-0			5,000			
Butylethylcarbamothioic acid S-propyl ester	1114-71-2				X		
Pebulate	1114-71-2				313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
N-Nitrosodiethanolamine	1116-54-7			1		U173	
Propane sultone	1120-71-4			10	313	U193	
1,3-Propane sultone	1120-71-4			10	X	U193	
Nitrocyclohexane	1122-60-7	500	500				
Pyridine, 4-nitro-, 1-oxide	1124-33-0	500/10,000	500				
Metolcarb	1129-41-5	100/10,000	1,000	1,000		P190	
Cycloate	1134-23-2				313		
Decabromodiphenyl oxide	1163-19-5				313		
Ferric ammonium citrate	1185-57-5			1,000			
Dichlobenil	1194-65-6			100			
Xylenol	1300-71-6			1,000			
Arsenic pentoxide	1303-28-2	100/10,000	1	1	313c	P011	
Arsenic disulfide	1303-32-8			1	313c		
Arsenic trisulfide	1303-33-9			1	313c		
Cadmium oxide	1306-19-0	100/10,000	100		313c		
Antimony trioxide	1309-64-4			1,000	313c		
Potassium hydroxide	1310-58-3			1,000			
Sodium hydroxide	1310-73-2			1,000			
Molybdenum trioxide	1313-27-5				313		
Thorium dioxide	1314-20-1				313		
Thallic oxide	1314-32-5			100	313c	P113	
Vanadium pentoxide	1314-62-1	100/10,000	1,000	1,000	313c	P120	
Sulfur phosphide	1314-80-3			100		U189	
Zinc phosphide	1314-84-7	500	100	100	313c	P122	
Zinc phosphide (conc. <= 10%)	1314-84-7	500	100	100	313c	U249	
Zinc phosphide (conc. > 10%)	1314-84-7	500	100	100	313c	P122	
Lead sulfide	1314-87-0			10	313c		
2,4,5-T amines	1319-72-8			5,000			
Cresol (mixed isomers)	1319-77-3			100	313	U052	
2,4-D Esters	1320-18-9			100	X		
2,4-D propylene glycol butyl ether ester	1320-18-9			100	313		
Nitrotoluene	1321-12-6			1,000			
Arsenic trioxide	1327-53-3	100/10,000	1	1	313c	P012	
Arsenous oxide	1327-53-3	100/10,000	1	1	313c	P012	
Xylene (mixed isomers)	1330-20-7			100	313	U239	
Zinc borate	1332-07-6			1,000	313c		
Asbestos (friable)	1332-21-4			1	313		
Hydrogen	1333-74-0						10,000
Sodium bifluoride	1333-83-1			100			
Lead subacetate	1335-32-6			10	313c	U146	
Hexachloronaphthalene	1335-87-1				313		
Ammonium hydroxide	1336-21-6			1,000	X		
PCBs	1336-36-3			1	X		
Polychlorinated biphenyls	1336-36-3			1	313		
Methyl ethyl ketone peroxide	1338-23-4			10		U160	
Naphthenic acid	1338-24-5			100			
Ammonium bifluoride	1341-49-7			100			

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Aluminum oxide (fibrous forms)	1344-28-1				313		
Antimycin A	1397-94-0	1,000/10,000	1,000				
Dinoterb	1420-07-1	500/10,000	500				
2,2'-Bioxirane	1464-53-5	500	10	10	X	U085	
Diepoxybutane	1464-53-5	500	10	10	313	U085	
Trichloro(chloromethyl)silane	1558-25-4	100	100				
Carbofuran phenol	1563-38-8			10		U367	
Carbofuran	1563-66-2	10/10,000	10	10	313	P127	
Benezeneamine, 2,6-dinitro-N,N-dipropyl-4-(trifluoromethyl)-	1582-09-8			10	X		
Trifluralin	1582-09-8			10	313		
Mercuric acetate	1600-27-7	500/10,000	500		313c		
Hydrazine, 1,2-diethyl-	1615-80-1			10		U086	
Ethanesulfonyl chloride, 2-chloro-	1622-32-8	500	500				
Methyl tert-butyl ether	1634-04-4			1,000	313		
Aldicarb sulfone	1646-88-4			100		P203	
1,2-Dichloro-1,1-difluoroethane	1649-08-7				313		
HCFC-132b	1649-08-7				X		
Bromoxynil	1689-84-5				313		
3,5-Dibromo-4-hydroxybenzonitrile	1689-84-5				X		
Bromoxynil octanoate	1689-99-2				313		
Octanoic acid, 2,6-dibromo-4-cyanophenyl ester	1689-99-2				X		
1,1-Dichloro-1-fluoroethane	1717-00-6				313		
HCFC-141b	1717-00-6				X		
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746-01-6			1	313!		
Acetone thiosemicarbazide	1752-30-3	1,000/10,000	1,000				
Ammonium thiocyanate	1762-95-4			5,000			
Benzene, 2,4-dichloro-1-(4-nitrophenoxy)-	1836-75-5				X		
Nitrofen	1836-75-5				313		
Benfluralin	1861-40-1				313		
N-Butyl-N-ethyl-2,6-dinitro-4-(trifluoromethyl) benzenamine	1861-40-1				X		
Ammonium benzoate	1863-63-4			5,000			
Hexachloropropene	1888-71-7			1,000		U243	
1,3-Benzenedicarbonitrile, 2,4,5,6-tetrachloro-	1897-45-6				X		
Chlorothalonil	1897-45-6				313		
Paraquat dichloride	1910-42-5	10/10,000	10		313		
Atrazine	1912-24-9				313		
6-Chloro-N-ethyl-N'-(1-methylethyl)-1,3,5-triazine-2,4-diamine	1912-24-9				X		
Dicamba	1918-00-9			1,000	313		
3,6-Dichloro-2-methoxybenzoic acid	1918-00-9			1,000	X		
Picloram	1918-02-1				313		
2-Chloro-N-(1-methylethyl)-N-phenylacetamide	1918-16-7				X		
Propachlor	1918-16-7				313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
2,4-D Esters	1928-38-7			100			
2,4-D 2-ethylhexyl ester	1928-43-4				313		
2,4,5-T esters	1928-47-8			1,000			
2,4-D Esters	1928-61-6			100			
2,4-D butoxyethyl ester	1929-73-3			100	313		
2,4-D Esters	1929-73-3			100	X		
2-Chloro-6-(trichloromethyl)pyridine	1929-82-4				X		
Nitrapyrin	1929-82-4				313		
C.I. Direct Black 38	1937-37-7				313		
Chloroxuron	1982-47-4	500/10,000	500				
3,6-Dichloro-2-methoxybenzoic acid, sodium salt	1982-69-0				X		
Sodium dicamba	1982-69-0				313		
Tributyltin fluoride	1983-10-4				313		
Valinomycin	2001-95-8	1,000/10,000	1,000				
2,4,5-T amines	2008-46-0			5,000			
Mercaptodimethur	2032-65-7	500/10,000	10	10	X	P199	
Methiocarb	2032-65-7	500/10,000	10	10	313	P199	
Paraquat methosulfate	2074-50-2	10/10,000	10				
Phenylsilatrane	2097-19-0	100/10,000	100				
EPN	2104-64-5	100/10,000	100				
Tributyltin methacrylate	2155-70-6				313		
Dipotassium endothall	2164-07-0				313		
7-Oxabicyclo(2.2.1)heptane-2,3-dicarboxylic acid, dipotassium salt	2164-07-0				X		
Fluometuron	2164-17-2				313		
Urea, N,N-dimethyl-N'-[3-(trifluoromethyl)phenyl]-	2164-17-2				X		
1H-Azepine-1 carbothioic acid, hexahydro-S-ethyl ester	2212-67-1				X		
Molinate	2212-67-1				313		
Cadmium stearate	2223-93-0	1,000/10,000	1,000		313c		
Thiocarbazide	2231-57-4	1,000/10,000	1,000				
Octachloronaphthalene	2234-13-1				313		
Diglycidyl ether	2238-07-5	1,000	1,000				
Prothoate	2275-18-5	100/10,000	100				
Dimethylamine dicamba	2300-66-5				313		
Carbamothioic acid, bis(1-methylethyl)-S-(2,3-dichloro-2-propenyl)ester	2303-16-4			100	X	U062	
Diallate	2303-16-4			100	313	U062	
Triallate	2303-17-5			100	313	U389	
Propargite	2312-35-8			10	313		
Chinomethionat	2439-01-2				313		
6-Methyl-1,3-dithiolo[4,5-b]quinoxalin-2-one	2439-01-2				X		
Dodecylguanidine monoacetate	2439-10-3				X		
Dodine	2439-10-3				313		
Oxydisulfoton	2497-07-6	500	500				

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Dimethyl chlorothiophosphate	2524-03-0	500	500		313		
Dimethyl phosphorochloridothioate	2524-03-0	500	500		X		
Formothion	2540-82-1	100	100				
2,4,5-T esters	2545-59-7			1,000			
1,4-Cyclohexane diisocyanate	2556-36-7				313#		
Pentadecylamine	2570-26-5	100/10,000	100				
Phosphorothioic acid, O,O-dimethyl-5-(2-(methylthio)ethyl)ester	2587-90-8	500	500				
C.I. Direct Blue 6	2602-46-2				313		
Promecarb	2631-37-0	500/10,000	1,000	1,000		P201	
Cyanophos	2636-26-2	1,000	1,000				
Azinphos-ethyl	2642-71-9	100/10,000	100				
2,3,5-Trimethylphenyl methylcarbamate	2655-15-4				313		
Phosphonothioic acid, methyl-, O-(4-nitrophenyl) O-phenyl ester	2665-30-7	500	500				
Sulfuryl fluoride	2699-79-8				313		
Vikane	2699-79-8				X		
2,4-D sodium salt	2702-72-9				313		
Phosphonothioic acid, methyl-, O-ethyl O-(4-(methylthio)phenyl) ester	2703-13-1	500	500				
Thallous malonate	2757-18-8	100/10,000	100				
5-(Aminomethyl)-3-isoxazolol	2763-96-4	500/10,000	1,000	1,000		P007	
Muscimol	2763-96-4	500/10,000	1,000	1,000		P007	
Diquat	2764-72-9			1,000			
Endothion	2778-04-3	500/10,000	500				
C.I. Disperse Yellow 3	2832-40-8				313		
2-Chloro-1,1,1,2-tetrafluoroethane	2837-89-0				313		
HCFC-124	2837-89-0				X		
Chlorpyrifos	2921-88-2			1			
Ferric ammonium oxalate	2944-67-4			1,000			
2,4-D chlorocrotyl ester	2971-38-2			100	313		
2,4-D Esters	2971-38-2			100	X		
Ammonium citrate, dibasic	3012-65-5			5,000			
Silane, (4-aminobutyl)diethoxymethyl-	3037-72-7	1,000	1,000				
C.I. Solvent Orange 7	3118-97-6				313		
Ammonium tartrate	3164-29-2			5,000			
4-Chloro-o-toluidine, hydrochloride	3165-93-3			100		U049	
1,5-Naphthalene diisocyanate	3173-72-6				313#		
Cupric nitrate	3251-23-8			100	313c		
Phosphoric acid, dimethyl 4-(methylthio) phenyl ester	3254-63-5	500	500				
1,2,3,4,6,7,8,9-octachlorodibenzo-p-dioxin	3268-87-9				313!		
O,O-Diethyl S-methyl dithiophosphate	3288-58-2			5,000		U087	
2,2-bis(Bromomethyl)-1,3-propanediol	3296-90-0				313		
Temephos	3383-96-8				313		
Zinc carbonate	3486-35-9			1,000	313c		
DDE	3547-04-4			5,000			

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Sulfoxide, 3-chloropropyl octyl	3569-57-1	500	500				
Benzimidazole, 4,5-dichloro-2-(trifluoromethyl)-	3615-21-2	500/10,000	500				
(4-Chloro-2-methylphenoxy) acetate sodium salt	3653-48-3				X		
Methoxone sodium salt	3653-48-3				313		
Sulfotep	3689-24-5	500	100	100		P109	
Tetraethyldithiopyrophosphate	3689-24-5	500	100	100		P109	
Chlorophacinone	3691-35-8	100/10,000	100				
5-Methylchrysene	3697-24-3				313+		
Amiton oxalate	3734-97-2	100/10,000	100				
Methyl phenkapton	3735-23-7	500	500				
C.I. Food Red 5	3761-53-3				313		
2,4,5-T amines	3813-14-7			5,000			
Fuberidazole	3878-19-1	100/10,000	100				
Bitoscanate	4044-65-9	500/10,000	500				
1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride	4080-31-3				313		
Isophorone diisocyanate	4098-71-9	500	500		313#		
Phosacetim	4104-14-7	100/10,000	100				
Dichlorosilane	4109-96-0						10,000
Silane, dichloro-	4109-96-0						10,000
4,4'-Diisocyanatodiphenyl ether	4128-73-8				313#		
2-Butenal	4170-30-3	1,000	100	100	X	U053	20,000
Crotonaldehyde	4170-30-3	1,000	100	100	313	U053	20,000
Fluenetil	4301-50-2	100/10,000	100				
Phenol, 2,2'-thiobis[4-chloro-6-methyl-	4418-66-0	100/10,000	100				
N-Nitrosomethylvinylamine	4549-40-0			10	313	P084	
C.I. Acid Green 3	4680-78-8				313		
Hexamethylenediamine, N,N'-dibutyl-	4835-11-4	500	500				
1,1'-Methylene bis(4-isocyanatocyclohexane)	5124-30-1				313#		
Carboxin	5234-68-4				313		
5,6-Dihydro-2-methyl-N-phenyl-1,4-oxathiin-3-carboxamide	5234-68-4				X		
Thiourea, (2-chlorophenyl)-	5344-82-1	100/10,000	100	100		P026	
Dibenzo(a,e)fluoranthene	5385-75-1				313+		
1-Nitropyrene	5522-43-0				313+		
Chlorpyrifos methyl	5598-13-0				313		
O,O-Dimethyl-O-(3,5,6-trichloro-2-pyridyl)phosphorothioate	5598-13-0				X		
Coumatetralyl	5836-29-3	500/10,000	500				
Cupric oxalate	5893-66-3			100	313c		
5-Chloro-3-(1,1-dimethylethyl)-6-methyl-2,4(1H,3H)-pyrimidinedione	5902-51-2				X		
Terbacil	5902-51-2				313		
Ethanol, 2,2'-oxybis-, dicarbamate	5952-26-1			5,000		U395	
Ammonium oxalate	5972-73-6			5,000			
Ammonium oxalate	6009-70-7			5,000			

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
2,4,5-T amines	6369-96-6			5,000			
2,4,5-T amines	6369-97-7			5,000			
C.I. Acid Red 114	6459-94-5				313		
Thallium(I) carbonate	6533-73-9	100/10,000	100	100	313c	U215	
Thallous carbonate	6533-73-9	100/10,000	100	100	313c	U215	
Monocrotophos	6923-22-4	10/10,000	10				
4-Chlorophenyl phenyl ether	7005-72-3			5,000			
N,N'-Bis(1-methylethyl)-6-methylthio-1,3,5-triazine-2,4-diamine	7287-19-6				X		
Prometryn	7287-19-6				313		
Endrin aldehyde	7421-93-4			1			
Lead stearate	7428-48-0			10	313c		
Aluminum (fume or dust)	7429-90-5				313		
Lead	7439-92-1			10	313		
Manganese	7439-96-5				313		
Mercury	7439-97-6			1	313	U151	
Nickel	7440-02-0			100	313		
Silver	7440-22-4			1,000	313		
Sodium	7440-23-5			10			
Thallium	7440-28-0			1,000	313		
Antimony	7440-36-0			5,000	313		
Arsenic	7440-38-2			1	313		
Barium	7440-39-3				313		
Beryllium	7440-41-7			10	313	P015	
Cadmium	7440-43-9			10	313		
Chromium	7440-47-3			5,000	313		
Cobalt	7440-48-4				313		
Copper	7440-50-8			5,000	313		
Vanadium (except when contained in an alloy)	7440-62-2				313		
Zinc (fume or dust)	7440-66-6			1,000	313		
Zinc	7440-66-6			1,000			
Selenium dioxide	7446-08-4			10	313c		
Sulfur dioxide	7446-09-5	500	500				
Sulfur dioxide (anhydrous)	7446-09-5	500	500				5,000
Sulfur trioxide	7446-11-9	100	100				10,000
Lead sulfate	7446-14-2			10	313c		
Thallium(I) sulfate	7446-18-6	100/10,000	100	100	313c	P115	
Thallous sulfate	7446-18-6	100/10,000	100	100	313c	P115	
Lead phosphate	7446-27-7			10	313c	U145	
Cupric chloride	7447-39-4			10	313c		
Mercuric chloride	7487-94-7	500/10,000	500		313c		
Selenium sulfide	7488-56-4			10	313c	U205	
6-Nitrochrysene	7496-02-8				313+		
Titanium chloride (TiCl4) (T-4)-	7550-45-0	100	1,000	1,000	X		2,500
Titanium tetrachloride	7550-45-0	100	1,000	1,000	313		2,500
Sodium phosphate, dibasic	7558-79-4			5,000			
Lithium hydride	7580-67-8	100	100				

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Sodium phosphate, tribasic	7601-54-9			500			
Sodium arsenate	7631-89-2	1,000/10,000	1	1	313c		
Sodium bisulfite	7631-90-5			5,000			
Sodium nitrite	7632-00-0			100	313		
Borane, trifluoro-	7637-07-2	500	500		X		5,000
Boron trifluoride	7637-07-2	500	500		313		5,000
Lead arsenate	7645-25-2			1	313c		
Zinc chloride	7646-85-7			1,000	313c		
Hydrochloric acid	7647-01-0			5,000			
Hydrochloric acid (conc 37% or greater)	7647-01-0			5,000			15,000
Hydrochloric acid (aerosol forms only)	7647-01-0			5,000	313		
Hydrogen chloride (anhydrous)	7647-01-0	500	5,000	5,000	X		5,000
Hydrogen chloride (gas only)	7647-01-0	500	5,000	5,000	X		5,000
Antimony pentachloride	7647-18-9			1,000			
Phosphoric acid	7664-38-2			5,000			
Hydrofluoric acid	7664-39-3	100	100	100	X	U134	
Hydrofluoric acid (conc. 50% or greater)	7664-39-3	100	100	100	X	U134	1,000
Hydrogen fluoride	7664-39-3	100	100	100	313	U134	
Hydrogen fluoride (anhydrous)	7664-39-3	100	100	100	X	U134	1,000
Ammonia	7664-41-7	500	100	100			
Ammonia (anhydrous)	7664-41-7	500	100	100	X		10,000
Ammonia (conc 20% or greater)	7664-41-7			See ammonium hydroxide	X		20,000
Ammonia (includes anhydrous ammonia and aqueous ammonia from water dissociable ammonium salts and other sources; 10 percent of total aqueous ammonia is reportable under this listing)	7664-41-7				313		
Sulfuric acid (aerosol forms only)	7664-93-9	1,000	1,000	1,000	313		
Sulfuric acid	7664-93-9	1,000	1,000	1,000			
Sodium fluoride	7681-49-4			1,000			
Sodium hypochlorite	7681-52-9			100			
2,2-Dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylic acid (1,3,4,5,6,7-hexahydro-1,3-dioxo-2H-isoindol-2-yl)methyl ester	7696-12-0				X		
Tetramethrin	7696-12-0				313		
Nitric acid	7697-37-2	1,000	1,000	1,000	313		
Nitric acid (conc 80% or greater)	7697-37-2	1,000	1,000	1,000	X		15,000
Zinc bromide	7699-45-8			1,000	313c		
Ferric chloride	7705-08-0			1,000			
Nickel chloride	7718-54-9			100	313c		
Phosphorous trichloride	7719-12-2	1,000	1,000	1,000			15,000
Phosphorus trichloride	7719-12-2	1,000	1,000	1,000			15,000
Ferrous sulfate	7720-78-7			1,000			
Potassium permanganate	7722-64-7			100	313c		
Hydrogen peroxide (Conc.> 52%)	7722-84-1	1,000	1,000				
Phosphorus (yellow or white)	7723-14-0	100	1	1	313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Phosphorus	7723-14-0	100	1	1			
Bromine	7726-95-6	500	500		313		10,000
Zinc sulfate	7733-02-0			1,000	313c		
Chromic acid	7738-94-5			10	313c		
Potassium bromate	7758-01-2				313		
Ferrous chloride	7758-94-3			100			
Lead chloride	7758-95-4			10	313c		
Cupric sulfate	7758-98-7			10	313c		
Silver nitrate	7761-88-8			1	313c		
Ammonium sulfamate	7773-06-0			5,000			
Sodium chromate	7775-11-3			10	313c		
Arsenic acid	7778-39-4			1	313c	P010	
Calcium arsenate	7778-44-1	500/10,000	1	1	313c		
Potassium bichromate	7778-50-9			10	313c		
Calcium hypochlorite	7778-54-3			10			
Zinc hydrosulfite	7779-86-4			1,000	313c		
Zinc nitrate	7779-88-6			1,000	313c		
Fluorine	7782-41-4	500	10	10	313	P056	1,000
Selenium	7782-49-2			100	313		
Chlorine	7782-50-5	100	10	10	313		2,500
Ferrous sulfate	7782-63-0			1,000			
Sodium selenite	7782-82-3			100	313c		
Mercurous nitrate	7782-86-7			10	313c		
Selenious acid	7783-00-8	1,000/10,000	10	10	313c	U204	
Hydrogen sulfide	7783-06-4	500	100	100	313	U135	10,000
Hydrogen selenide	7783-07-5	10	10		313c		500
Mercuric sulfate	7783-35-9			10	313c		
Lead fluoride	7783-46-2			10	313c		
Zinc fluoride	7783-49-5			1,000	313c		
Ferric fluoride	7783-50-8			100			
Antimony trifluoride	7783-56-4			1,000	313c		
Sulfur fluoride (SF4), (T-4)-	7783-60-0	100	100				2,500
Sulfur tetrafluoride	7783-60-0	100	100				2,500
Antimony pentafluoride	7783-70-2	500	500		313c		
Tellurium hexafluoride	7783-80-4	100	100				
Arsenous trichloride	7784-34-1	500	1	1	313c		15,000
Lead arsenate	7784-40-9			1	313c		
Potassium arsenate	7784-41-0			1	313c		
Arsine	7784-42-1	100	100				1,000
Sodium arsenite	7784-46-5	500/10,000	1	1	313c		
Mevinphos	7786-34-7	500	10	10	313		
Nickel sulfate	7786-81-4			100	313c		
Beryllium chloride	7787-47-5			1	313c		
Beryllium fluoride	7787-49-7			1	313c		
Beryllium nitrate	7787-55-5			1	313c		
Ammonium chromate	7788-98-9			10	313c		
Potassium chromate	7789-00-6			10	313c		
Strontium chromate	7789-06-2			10	313c		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Ammonium bichromate	7789-09-5			10	313c		
Cadmium bromide	7789-42-6			10	313c		
Cobaltous bromide	7789-43-7			1,000	313c		
Antimony tribromide	7789-61-9			1,000	313c		
Chlorosulfonic acid	7790-94-5			1,000			
Thallium chloride TlCl	7791-12-0	100/10,000	100	100	313c	U216	
Thallous chloride	7791-12-0	100/10,000	100	100	313c	U216	
Chlorine monoxide	7791-21-1						10,000
Chlorine oxide	7791-21-1						10,000
Selenium oxychloride	7791-23-3	500	500		313c		
Phosphine	7803-51-2	500	100	100	313	P096	5,000
Ammonium vanadate	7803-55-6			1,000	313c	P119	
Silane	7803-62-5						10,000
Camphechlor	8001-35-2	500/10,000	1	1	X	P123	
Camphene, octachloro-	8001-35-2	500/10,000	1	1	X	P123	
Toxaphene	8001-35-2	500/10,000	1	1	313	P123	
Creosote	8001-58-9				313		
Dichloropropane - Dichloropropene (mixture)	8003-19-8			100			
Pyrethrins	8003-34-7			1			
Oleum (fuming sulfuric acid)	8014-95-7			1,000			10,000
Sulfuric acid (fuming)	8014-95-7			1,000			10,000
Sulfuric acid, mixture with sulfur trioxide	8014-95-7			1,000			10,000
Demeton	8065-48-3	500	500				
Metiram	9006-42-2				313		
Polymeric diphenylmethane diisocyanate	9016-87-9				313#		
Sodium hypochlorite	10022-70-5			100			
Sulfur monochloride	[1]10025-67-9			1,000			
Chromic chloride	10025-73-7	1/10,000	1		313c		
Silane, trichloro-	10025-78-2						10,000
Trichlorosilane	10025-78-2						10,000
Phosphorus oxychloride	10025-87-3	500	1,000	1,000			5,000
Phosphoryl chloride	10025-87-3	500	1,000	1,000			5,000
Antimony trichloride	10025-91-9			1,000	313c		
Zirconium tetrachloride	10026-11-6			5,000			
Phosphorus pentachloride	10026-13-8	500	500				
Ozone	10028-15-6	100	100		313		
Ferric sulfate	10028-22-5			1,000			
Thallium sulfate	10031-59-1	100/10,000	100	100	313c		
Hydrazine sulfate	10034-93-2				313		
Sodium phosphate, dibasic	10039-32-4			5,000			
Aluminum sulfate	10043-01-3			5,000			
Ferrous ammonium sulfate	10045-89-3			1,000			
Mercuric nitrate	10045-94-0			10	313c		

[1] This is correct CAS number but not the same CAS number used on the CERCLA list. See Introduction for further explanation.

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Chlorine dioxide	10049-04-4				313		1,000
Chlorine oxide (ClO2)	10049-04-4				X		1,000
Chromous chloride	10049-05-5			1,000	313c		
trans-1,3-Dichloropropene	10061-02-6				313		
Lead nitrate	10099-74-8			10	313c		
Chromic sulfate	10101-53-8			1,000	313c		
Lead iodide	10101-63-0			10	313c		
Sodium phosphate, tribasic	10101-89-0			5,000			
Uranyl nitrate	10102-06-4			100			
Sodium selenite	10102-18-8	100/10,000	100	100	313c		
Sodium tellurite	10102-20-2	500/10,000	500				
Nitric oxide	10102-43-9	100	10	10 @		P076	10,000
Nitrogen oxide (NO)	10102-43-9	100	10	10 @		P076	10,000
Nitrogen dioxide	10102-44-0	100	10	10 @		P078	
Thallium(I) nitrate	10102-45-1			100	313c	U217	
Lead arsenate	10102-48-4			1	313c		
Cadmium chloride	10108-64-2			10	313c		
Potassium arsenite	10124-50-2	500/10,000	1	1	313c		
Sodium phosphate, dibasic	10140-65-5			5,000			
Ethanol, 1,2-dichloro-, acetate	10140-87-1	1,000	1,000				
Ammonium bisulfite	10192-30-0			5,000			
Ammonium sulfite	10196-04-0			5,000			
Cobalt carbonyl	10210-68-1	10/10,000	10		313c		
2,2-Dibromo-3-nitrilopropionamide	10222-01-2				313s		
Methamidophos	10265-92-6	100/10,000	100				
Borane, trichloro-	10294-34-5	500	500		X		5,000
Boron trichloride	10294-34-5	500	500		313		5,000
Dialifor	10311-84-9	100/10,000	100				
1,4-Bis(methylisocyanate)cyclohexane	10347-54-3				313#		
Sodium phosphate, tribasic	10361-89-4			5,000			
Cupric sulfate, ammoniated	10380-29-7			100	313c		
Mercurous nitrate	10415-75-5			10	313c		
Ferric nitrate	10421-48-4			1,000			
5-(Phenylmethyl)-3-furanyl)methyl 2,2-dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylate	10453-86-8				X		
Resmethrin	10453-86-8				313		
Methacrolein diacetate	10476-95-6	1,000	1,000				
Nitrogen dioxide	10544-72-6			10 @			
Sodium bichromate	10588-01-9			10	313c		
Carbendazim	10605-21-7			10		U372	
Isononylphenol	11066-49-2				313$		
Aroclor 1260	11096-82-5			1			
Aroclor 1254	11097-69-1			1			
Aroclor 1221	11104-28-2			1			
Chromic acid	11115-74-5			10	313c		
Aroclor 1232	11141-16-5			1			
Cupric acetoarsenite	12002-03-8	500/10,000	1	1	313c		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Paris green	12002-03-8	500/10,000	1	1			
Selenious acid, dithallium(1+) salt	12039-52-0			1,000	313c	P114	
Nickel hydroxide	12054-48-7			10	313c		
Manganese, tricarbonyl methylcyclopentadienyl	12108-13-3	100	100		313c		
Carbamodithioic acid, 1,2-ethanediylbis-, zinc complex	12122-67-7				X		
Zineb	12122-67-7				313		
Ammonium fluoride	12125-01-8			100			
Ammonium chloride	12125-02-9			5,000			
Ammonium sulfide	12135-76-1			100			
Carbamodithioic acid, 1,2-ethanediylbis-, manganese complex	12427-38-2				X		
Maneb	12427-38-2				313		
Aroclor 1248	12672-29-6			1			
Aroclor 1016	12674-11-2			1			
Sulfur monochloride	[2]12771-08-3			1,000			
Terbufos	13071-79-9	100	100				
Phosphamidon	13171-21-6	100	100				
Ethoprop	13194-48-4	1,000	1,000		313		
Ethoprophos	13194-48-4	1,000	1,000		X		
Phosphorodithioic acid O-ethyl S,S-dipropyl ester	13194-48-4	1,000	1,000		X		
Fenbutatin oxide	13356-08-6				313		
Hexakis(2-methyl-2-phenylpropyl)distannoxane	13356-08-6				X		
Sodium selenate	13410-01-0	100/10,000	100		313c		
Gallium trichloride	13450-90-3	500/10,000	500				
Nickel carbonyl	13463-39-3	1	10	10	313c	P073	1,000
Iron carbonyl (Fe(CO)5), (TB-5-11)-	13463-40-6	100	100		X		2,500
Iron, pentacarbonyl-	13463-40-6	100	100		313		2,500
1,1-Dichloro-1,2,2,3,3-pentafluoropropane	13474-88-9				313		
HCFC-225cc	13474-88-9				X		
2,4,5-T salts	13560-99-1			1,000			
Beryllium nitrate	13597-99-4			1	313c		
Desmedipham	13684-56-5				313		
Zirconium nitrate	13746-89-9			5,000			
Calcium chromate	13765-19-0			10	313c	U032	
Lead fluoborate	13814-96-5			10	313c		
Ammonium fluoborate	13826-83-0			5,000			
sec-Butylamine	13952-84-6			1,000			
Cobaltous sulfamate	14017-41-5			1,000	313c		
Salcomine	14167-18-1	500/10,000	500				
Nickel nitrate	14216-75-2			100	313c		
Ammonium oxalate	14258-49-2			5,000			
Lithium chromate	14307-35-8			10	313c		

[2] CAS Number should be 10025-67-9. See Introduction for further explanation.

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Ammonium tartrate	14307-43-8			5,000			
Ferbam	14484-64-1				313		
Tris(dimethylcarbamodithioato-S,S')iron	14484-64-1				X		
Zinc ammonium chloride	14639-97-5			1,000	313c		
Zinc ammonium chloride	14639-98-6			1,000	313c		
Zirconium sulfate	14644-61-2			5,000			
Bicyclo[2.2.1]heptane-2-carbonitrile, 5-chloro-6-((((methylamino)carbonyl)oxy)imino)-,(1-alpha,2-beta,4-alpha,5-alpha,6E))-	15271-41-7	500/10,000	500				
Manganese, bis(dimethylcarbamodithioato-S,S')-	15339-36-3			10	313c	P196	
2,4,4-Trimethylhexamethylene diisocyanate	15646-96-5				313#		
Nickel ammonium sulfate	15699-18-0			100	313c		
Lead sulfate	15739-80-7			10	313c		
2,3,4-Trichlorophenol	15950-66-0			10	313c		
Alachlor	15972-60-8				313		
C.I. Direct Brown 95	16071-86-6				313		
N-Nitrosonornicotine	16543-55-8				313		
Sodium hydrosulfide	16721-80-5			5,000			
Ethanimidothioic acid, N-[[methylamino)carbonyl]	16752-77-5	500/10,000	100	100		P066	
Methomyl	16752-77-5	500/10,000	100	100		P066	
Zinc silicofluoride	16871-71-9			5,000	313c		
Ammonium silicofluoride	16919-19-0			1,000			
Zirconium potassium fluoride	16923-95-8			1,000			
2,2,4-Trimethylhexamethylene diisocyanate	16938-22-0				313#		
Decaborane(14)	17702-41-9	500/10,000	500				
Formparanate	17702-57-7	100/10,000	100	100		P197	
Benomyl	17804-35-2			10	313	U271	
Streptozotocin	18883-66-4			1		U206	
4-(Dipropylamino)-3,5-dinitrobenzenesulfonamide	19044-88-3				X		
Oryzalin	19044-88-3				313		
Diborane	19287-45-7	100	100				2,500
Diborane(6)	19287-45-7	100	100				2,500
1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	19408-74-3				313!		
Pentaborane	19624-22-7	500	500				
3-(2,4-Dichloro-5-(1-methylethoxy)phenyl)-5-(1,1-dimethylethyl)-1,3,4-oxadiazol-2(3H)-one	19666-30-9				X		
Oxydiazon	19666-30-9				313		
o-Dianisidine dihydrochloride	20325-40-0				X		
3,3'-Dimethoxybenzidine dihydrochloride	20325-40-0				313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
2-(3,4-Dichlorophenyl)-4-methyl-1,2,4-oxadiazolidine-3,5-dione	20354-26-1				X		
Methazole	20354-26-1				313		
Osmium oxide OsO4 (T-4)-	20816-12-0			1,000	X	P087	
Osmium tetroxide	20816-12-0			1,000	313	P087	
Digoxin	20830-75-5	10/10,000	10				
Daunomycin	20830-81-3			10		U059	
Aluminum phosphide	20859-73-8	500	100	100	313	P006	
Metribuzin	21087-64-9				313		
Fosthietan	21548-32-3	500	500				
Leptophos	21609-90-5	500/10,000	500				
Cyanazine	21725-46-2				313		
Mercuric oxide	21908-53-2	500/10,000	500		313c		
Chlorthiophos	21923-23-9	500	500				
Fenamiphos	22224-92-6	10/10,000	10				
Bendiocarb	22781-23-3			100	313	U278	
2,2-Dimethyl-1,3-benzodioxol-4-ol methylcarbamate	22781-23-3			100	X	U278	
Bendiocarb phenol	22961-82-6			1,000		U364	
Oxamyl	23135-22-0	100/10,000	100	100		P194	
Formetanate hydrochloride	23422-53-9	500/10,000	100	100		P198	
Pirimifos-ethyl	23505-41-1	1,000	1,000				
Thiophanate-methyl	23564-05-8			10	313	U409	
(1,2-Phenylenebis(iminocarbonothioyl)) biscarbamic acid diethyl ester	23564-06-9				X		
Thiophanate ethyl	23564-06-9				313		
Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl	23950-58-5			5,000	X	U192	
Pronamide	23950-58-5			5,000	313	U192	
Triazofos	24017-47-8	500	500				
Chlormephos	24934-91-6	500	500				
Nonylphenol	25154-52-3				313$		
Dinitrobenzene (mixed isomers)	25154-54-5			100			
Nitrophenol (mixed isomers)	25154-55-6			100			
Sodium dodecylbenzenesulfonate	25155-30-0			1,000			
Butene	25167-67-3						10,000
Trichlorophenol	25167-82-2			10	313c		
2,4,5-T esters	25168-15-4			1,000			
2,4-D Esters	25168-26-7			100			
2-((Ethoxyl((1-methylethyl)amino]phosphinothioyl]oxy) benzoic acid 1-methylethyl ester	25311-71-1				X		
Isofenphos	25311-71-1				313		
Dinitrotoluene (mixed isomers)	25321-14-6			10	313		
Dichlorobenzene	25321-22-6			100	X		
Dichlorobenzene (mixed isomers)	25321-22-6			100	313		
Diaminotoluene (mixed isomers)	25376-45-8			10	313	U221	
Toluenediamine	25376-45-8			10	X	U221	

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Dinitrophenol	25550-58-7			10			
2,2-Dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylic acid (3-phenoxyphenyl)methyl ester	26002-80-2				X		
Phenothrin	26002-80-2				313		
Calcium dodecylbenzenesulfonate	26264-06-2			1,000			
Carbamic acid, methyl-, O-(((2,4-dimethyl-1,3-dithiolan-2-yl)methylene)amino)-	26419-73-8	100/10,000	100	100		P185	
Benzene, 1,3-diisocyanatomethyl-	26471-62-5			100	X	U223	10,000
Toluenediisocyanate (mixed isomers)	26471-62-5			100	313	U223	10,000
Toluene diisocyanate (unspecified isomer)	26471-62-5			100	X	U223	10,000
4-Isononylphenol	26543-97-5				313$		
Sodium azide (Na(N3))	26628-22-8	500	1,000	1,000	313	P105	
Dichloropropane	26638-19-7			1,000			
N,N'-(1,4-Piperazinediylbis(2,2,2-trichloroethylidene)) bisformamide	26644-46-2				X		
Triforine	26644-46-2				313		
Dichloropropene	26952-23-8			100			
Trichloro(dichlorophenyl)silane	27137-85-5	500	500				
Dodecylbenzenesulfonic acid	27176-87-0			1,000			
4-Chloro-5-(methylamino)-2-[3-(trifluoromethyl)phenyl]-3(2H)-pyridazinone	27314-13-2				X		
Norflurazon	27314-13-2				313		
Triethanolamine dodecylbenzene sulfonate	27323-41-7			1,000			
Vanadyl sulfate	27774-13-6			1,000	313c		
d-trans-Allethrin	28057-48-9				313		
d-trans-Chrysanthemic acid of d-allethrone	28057-48-9				X		
Carbamic acid, diethylthio-, S-(p-chlorobenzyl)	28249-77-6				X		
Thiobencarb	28249-77-6				313		
Antimony potassium tartrate	28300-74-5			100	313c		
Xylylene dichloride	28347-13-9	100/10,000	100				
C.I. Direct Blue 218	28407-37-6				313		
Bromadiolone	28772-56-7	100/10,000	100				
Octachlorostyrene	29082-74-4				313		
O-(2-(Diethylamino)-6-methyl-4-pyrimidinyl)-O,O-dimethyl phosphorothioate	29232-93-7				X		
Pirimiphos methyl	29232-93-7				313		
Paraformaldehyde	30525-89-4			1,000			
Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo-, methyl ester	30558-43-1			5,000		U394	
Acephate	30560-19-1				313		
Acetylphosphoramidothioic acid O,S-dimethyl ester	30560-19-1				X		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Methacryloyloxyethyl isocyanate	30674-80-7	100	100				
3-((Ethylamino)methoxyphosphinothioyl) oxy)-2-butenoic acid, 1-methylethyl ester	31218-83-4				X		
Propetamphos	31218-83-4				313		
2,4,5-TP esters	32534-95-5			100			
Amitraz	33089-61-1				313		
beta - Endosulfan	33213-65-9			1			
N-(5-(1,1-Dimethylethyl)-1,3,4-thiadiazol-2-yl)-N,N'-dimethylurea	34014-18-1				X		
Tebuthiuron	34014-18-1				313		
Dichlorotrifluoroethane	34077-87-7				313		
Diflubenzuron	35367-38-5				313		
O-Ethyl O-(4-(methylthio)phenyl)phosphorodithioic acid S-propyl ester	35400-43-2				X		
Sulprofos	35400-43-2				313		
1-(2-(2,4-Dichlorophenyl)-2-(2-propenyloxy)ethyl)-1H-imidazole	35554-44-0				X		
Imazalil	35554-44-0				313		
1-Bromo-1-(bromomethyl)-1,3-propanedicarbonitrile	35691-65-7				313		
1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	35822-46-9				313!		
Uranyl nitrate	36478-76-9			100			
Nickel chloride	37211-05-5			100	313c		
1,3-Bis(methylisocyanate)cyclohexane	38661-72-2				313#		
Diethatyl ethyl	38727-55-8				313		
1,2,3,4,6,7,8,9-octachlorodibenzofuran	39001-02-0				313!		
2,4-Diaminoanisole sulfate	39156-41-7				313		
Thiofanox	39196-18-4	100/10,000	100	100		P045	
1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	39227-28-6				313!		
Dinocap	39300-45-3				313		
Fenpropathrin	39515-41-8				313		
2,2,3,3-Tetramethylcyclopropane carboxylic acid cyano(3-phenoxyphenyl)methyl ester	39515-41-8				X		
1,2,3,7,8-pentachlorodibenzo-p-dioxin	40321-76-4				313!		
N-(1-Ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine	40487-42-1				X		
Pendimethalin	40487-42-1				313		
O-(4-Bromo-2-chlorophenyl)-O-ethyl-S-propylphosphorothioate	41198-08-7				X		
Profenofos	41198-08-7				313		
3,3'-Dimethylbenzidine dihydrofluoride	41766-75-0				313		
o-Tolidine dihydrofluoride	41766-75-0				X		
1,6-Dinitropyrene	42397-64-8				313+		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
1,8-Dinitropyrene	42397-65-9				313+		
Isopropanolamine dodecylbenzene sulfonate	42504-46-1			1,000			
Oxyfluorfen	42874-03-3				313		
1-(4-Chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone	43121-43-3				X		
Triadimefon	43121-43-3				313		
3-(3,5-Dichlorophenyl)-5-ethenyl-5-methyl-2,4-oxazolidinedione	50471-44-8				X		
Vinclozolin	50471-44-8				313		
Phosphonothioic acid, methyl-, S-(2-(bis(1-methylethyl)amino)ethyl) O-ethyl ester	50782-69-9	100	100				
2,3,7,8-tetrachlorodibenzofuran	51207-31-9				313!		
Hexazinone	51235-04-2				313		
2-(4-(2,4-Dichlorophenoxy)phenoxy)propanoic acid, methyl ester	51338-27-3				X		
Diclofop methyl	51338-27-3				313		
4-Chloro-alpha-(1-methylethyl)benzeneacetic acid cyano(3-phenoxyphenyl)methyl ester	51630-58-1				X		
Fenvalerate	51630-58-1				313		
Zinc ammonium chloride	52628-25-8			1,000	313c		
3-(2,2-Dichloroethenyl)-2,2-dimethylcyclopropane carboxylic acid, (3-phenoxy-phenyl)methyl ester	52645-53-1				X		
Permethrin	52645-53-1				313		
Lead stearate	52652-59-2			10	313c		
Calcium arsenite	52740-16-6			1	313c		
Carbamothioic acid, dipropyl-, S-(phenylmethyl) ester	52888-80-9			5,000		U387	
Bromacil, lithium salt	53404-19-6				313		
2,4-(1H,3H)-Pyrimidinedione, 5-bromo-6-methyl-3-(1-methylpropyl), lithium salt	53404-19-6				X		
2,4-D 2-ethyl-4-methylpentyl ester	53404-37-8				313		
Dazomet, sodium salt	53404-60-7				313		
Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione, ion(1-), sodium	53404-60-7				X		
2,4-D Esters	53467-11-1			100			
Aroclor 1242	53469-21-9			1			
Pyriminil	53558-25-1	100/10,000	100				
Carbosulfan	55285-14-8			1,000		P189	
2,3,-Dihydro-5,6-dimethyl-1,4-dithiin 1,1,4,4-tetraoxide	55290-64-7				X		
Dimethipin	55290-64-7				313		
3-Iodo-2-propynyl butylcarbamate	55406-53-6				313		
Ferric ammonium oxalate	55488-87-4			1,000			
1,2,3,4,7,8,9-heptachlorodibenzofuran	55673-89-7				313!		
Lead stearate	56189-09-4			10	313c		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
2,3,4,7,8-pentachlorodibenzofuran	57117-31-4				313!		
1,2,3,7,8-pentachlorodibenzofuran	57117-41-6				313!		
1,2,3,6,7,8-hexachlorodibenzofuran	57117-44-9				313!		
Triclopyr triethylammonium salt	57213-69-1				313		
1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	57653-85-7				313!		
4–Nitropyrene	57835-92-4				313+		
Zinc, dichloro(4,4-dimethyl-5((((methylamino)carbonyl)oxy)imino) pentanenitrile)-, (T-4)-	58270-08-9	100/10,000	100		313c		
Thiodicarb	59669-26-0			100	313	U410	
.alpha.-(2-Chlorophenyl)-.alpha.-4-chlorophenyl)-5-pyrimidinemethanol	60168-88-9				X		
Fenarimol	60168-88-9				313		
1-(2-(2,4-Dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl)-methyl-1H-1,2,4,-triazole	60207-90-1				X		
Propiconazole	60207-90-1				313		
2,3,4,6,7,8-hexachlorodibenzofuran	60851-34-5				313!		
2,4,5-T esters	61792-07-2			1,000			
Cobalt, ((2,2'-(1,2-ethanediylbis(nitrilomethylidyne))bis(6-fluorophenylato))(2-)-N,N',O,O')-	62207-76-5	100/10,000	100		313c		
Acifluorfen, sodium salt	62476-59-9				313		
5-(2-Chloro-4-(trifluoromethyl)phenoxy)-2-nitrobenzoic acid, sodium salt	62476-59-9				X		
Chlorotetrafluoroethane	63938-10-3				313		
2-Chloro-N-(((4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl)benzenesulfonamide	64902-72-3				X		
Chlorsulfuron	64902-72-3				313		
3,3'-Dichlorobenzidine sulfate	64969-34-2				313		
2-(4-((6-Chloro-2-benzoxazolylen)oxy)phenoxy)propanoic acid, ethyl ester	66441-23-4				X		
Fenoxaprop ethyl	66441-23-4				313		
Hydramethylnon	67485-29-4				313		
Tetrahydro-5,5-dimethyl-2(1H)-pyrimidinone(3-(4-(trifluoromethyl)phenyl)-1-(2-(4-(trifluoromethyl)phenyl)ethenyl)-2-propenylidene)hydrazone	67485-29-4				X		
1,2,3,4,6,7,8-heptachlorodibenzofuran	67562-39-4				313!		
3-(2-Chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylic acid cyano(3-phenoxyphenyl) methyl ester	68085-85-8				X		
Cyhalothrin	68085-85-8				313		
Cyfluthrin	68359-37-5				313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
3-(2,2-Dichloroethenyl)-2,2-dimethylcyclopropanecarboxylic acid, cyano(4-fluoro-3-phenoxyphenyl)methyl ester	68359-37-5				X		
N-(2-Chloro-4-(trifluoromethyl)phenyl)-DL-valine(+)-cyano(3-phenoxyphenyl)methyl ester	69409-94-5				X		
Fluvalinate	69409-94-5				313		
Fluazifop butyl	69806-50-4				313		
2-(4-((5-(Trifluoromethyl)-2-pyridinyl)oxy)-phenoxy)propanoic acid, butyl ester	69806-50-4				X		
1,2,3,4,7,8-hexachlorodibenzofuran	70648-26-9				313!		
Abamectin	71751-41-2				313		
Avermectin B1	71751-41-2				X		
5-(2-Chloro-4-(trifluoromethyl)phenoxy)-N-methylsulfonyl)-2-nitrobenzamide	72178-02-0				X		
Fomesafen	72178-02-0				313		
Fenoxycarb	72490-01-8				313		
(2-(4-Phenoxyphenoxy)ethyl carbamic acid ethyl ester	72490-01-8				X		
1,2,3,7,8,9-hexachlorodibenzofuran	72918-21-9				313!		
2-(1-(Ethoxyimino) butyl)-5-(2-(ethylthio)propyl)-3-hydroxyl-2-cyclohexen-1-one	74051-80-2				X		
Sethoxydim	74051-80-2				313		
4-Methyldiphenylmethane-3,4-diisocyanate	75790-84-0				313#		
2,4'-Diisocyanatodiphenyl sulfide	75790-87-3				313#		
2-(4-((6-Chloro-2-quinoxalinyl)oxy]phenoxy) propanoic acid ethyl ester	76578-14-8				X		
Quizalofop-ethyl	76578-14-8				313		
Benzoic acid, 5-(2-chloro-4-(trifluoromethyl)phenoxy)-2-nitro-, 2-ethoxy-1-methyl-2-oxethyl ester	77501-63-4				313		
5-(2-Chloro-4-(trifluoromethyl)phenoxy)-2-nitro-2-ethoxy-1-methyl-2-oxoethyl ester	77501-63-4				X		
Lactofen	77501-63-4				313		
Bifenthrin	82657-04-3				313		
4-Nonylphenol, branched	84852-15-3				313$		
.alpha.-Butyl-.alpha.-(4-chlorophenyl)-1H-1,2,4-triazole-1-propanenitrile	88671-89-0				X		
Myclobutanil	88671-89-0				313		
Dichloro-1,1,2-trifluoroethane	90454-18-5				313		
Nonylphenol, branched	90481-04-2				313$		
Chlorimuron ethyl	90982-32-4				313		
Ethyl-2-(((((4-chloro-6-methoxyprimidin-2-yl)amino)carbonyl)amino)sulfonyl)ben	90982-32-4				X		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
zoate							
2-(4-Methoxy-6-methyl-1,3,5-triazin-2-yl)-methylamino)carbonyl)amino)sulfonyl) benzoic acid, methyl ester	101200-48-0				X		
Tribenuron methyl	101200-48-0				313		
1,1-Dichloro-1,2,3,3,3-pentafluoropropane	111512-56-2				313		
HCFC-225eb	111512-56-2				X		
o-Dianisidine hydrochloride	111984-09-9				X		
3,3'-Dimethoxybenzidine hydrochloride	111984-09-9				313		
Dichloropentafluoropropane	127564-92-5				313		
2,2-Dichloro-1,1,1,3,3-pentafluoropropane	128903-21-9				313		
HCFC-225aa	128903-21-9				X		
Diethyldiisocyanatobenzene	134190-37-7				313#		
1,3-Dichloro-1,1,2,3,3-pentafluoropropane	136013-79-1				313		
HCFC-225ea	136013-79-1				X		

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APPENDIX A

LIST OF LISTS
CONSOLIDATED LIST OF CHEMICALS (BY ALPHBETICAL NAME)
SUBJECT TO EPCRA, CERCLA AND CAA SECTION 112(r)

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Abamectin	71751-41-2				313		
Acenaphthene	83-32-9			100			
Acenaphthylene	208-96-8			5,000			
Acephate	30560-19-1				313		
Acetaldehyde	75-07-0			1,000	313	U001	10,000
Acetaldehyde, trichloro-	75-87-6			5,000		U034	
Acetamide	60-35-5			100	313		
Acetic acid	64-19-7			5,000			
Acetic acid, (2,4-dichlorophenoxy)-	94-75-7			100	X	U240	
Acetic acid ethenyl ester	108-05-4	1,000	5,000	5,000	X		15,000
Acetic anhydride	108-24-7			5,000			
Acetone	67-64-1			5,000		U002	
Acetone cyanohydrin	75-86-5	1,000	10	10	X	P069	
Acetone thiosemicarbazide	1752-30-3	1,000/10,000	1,000				
Acetonitrile	75-05-8			5,000	313	U003	
Acetophenone	98-86-2			5,000	313	U004	
2-Acetylaminofluorene	53-96-3			1	313	U005	
Acetyl bromide	506-96-7			5,000			
Acetyl chloride	75-36-5			5,000		U006	
Acetylene	74-86-2						10,000
Acetylphosphoramidothioic acid O,S-dimethyl ester	30560-19-1				X		
1-Acetyl-2-thiourea	591-08-2			1,000		P002	
Acifluorfen, sodium salt	62476-59-9				313		
Acrolein	107-02-8	500	1	1	313	P003	5,000
Acrylamide	79-06-1	1,000/10,000	5,000	5,000	313	U007	
Acrylic acid	79-10-7			5,000	313	U008	
Acrylonitrile	107-13-1	10,000	100	100	313	U009	20,000
Acrylyl chloride	814-68-6	100	100				5,000
Adipic acid	124-04-9			5,000			
Adiponitrile	111-69-3	1,000	1,000				
Alachlor	15972-60-8				313		
Aldicarb	116-06-3	100/10,000	1	1	313	P070	
Aldicarb sulfone	1646-88-4			100		P203	
Aldrin	309-00-2	500/10,000	1	1	313	P004	
d-trans-Allethrin	28057-48-9				313		
Allyl alcohol	107-18-6	1,000	100	100	313	P005	15,000
Allylamine	107-11-9	500	500		313		10,000
Allyl chloride	107-05-1			1,000	313		
Aluminum (fume or dust)	7429-90-5				313		
Aluminum oxide (fibrous forms)	1344-28-1				313		
Aluminum phosphide	20859-73-8	500	100	100	313	P006	
Aluminum sulfate	10043-01-3			5,000			
Ametryn	834-12-8				313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
2-Aminoanthraquinone	117-79-3				313		
4-Aminoazobenzene	60-09-3				313		
4-Aminobiphenyl	92-67-1			1	313		
1-Amino-2,4-dibromoanthraquinone	81-49-2				313		
1-Amino-2-methylanthraquinone	82-28-0				313		
5-(Aminomethyl)-3-isoxazolol	2763-96-4	500/10,000	1,000	1,000		P007	
Aminopterin	54-62-6	500/10,000	500				
4-Aminopyridine	504-24-5	500/10,000	1,000	1,000		P008	
Amiton	78-53-5	500	500				
Amiton oxalate	3734-97-2	100/10,000	100				
Amitraz	33089-61-1				313		
Amitrole	61-82-5			10	313	U011	
Ammonia	7664-41-7	500	100	100			
Ammonia (anhydrous)	7664-41-7	500	100	100	X		10,000
Ammonia (conc 20% or greater)	7664-41-7			See ammonium hydroxide	X		20,000
Ammonia (includes anhydrous ammonia and aqueous ammonia from water dissociable ammonium salts and other sources; 10 percent of total aqueous ammonia is reportable under this listing)	7664-41-7				313		
Ammonium acetate	631-61-8			5,000			
Ammonium benzoate	1863-63-4			5,000			
Ammonium bicarbonate	1066-33-7			5,000			
Ammonium bichromate	7789-09-5			10	313c		
Ammonium bifluoride	1341-49-7			100			
Ammonium bisulfite	10192-30-0			5,000			
Ammonium carbamate	1111-78-0			5,000			
Ammonium carbonate	506-87-6			5,000			
Ammonium chloride	12125-02-9			5,000			
Ammonium chromate	7788-98-9			10	313c		
Ammonium citrate, dibasic	3012-65-5			5,000			
Ammonium fluoborate	13826-83-0			5,000			
Ammonium fluoride	12125-01-8			100			
Ammonium hydroxide	1336-21-6			1,000	X		
Ammonium oxalate	5972-73-6			5,000			
Ammonium oxalate	6009-70-7			5,000			
Ammonium oxalate	14258-49-2			5,000			
Ammonium picrate	131-74-8			10		P009	
Ammonium silicofluoride	16919-19-0			1,000			
Ammonium sulfamate	7773-06-0			5,000			
Ammonium sulfide	12135-76-1			100			
Ammonium sulfite	10196-04-0			5,000			
Ammonium tartrate	3164-29-2			5,000			
Ammonium tartrate	14307-43-8			5,000			
Ammonium thiocyanate	1762-95-4			5,000			
Ammonium vanadate	7803-55-6			1,000	313c	P119	
Amphetamine	300-62-9	1,000	1,000				
Amyl acetate	628-63-7			5,000			
iso-Amyl acetate	123-92-2			5,000			
sec-Amyl acetate	626-38-0			5,000			
tert-Amyl acetate	625-16-1			5,000			

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Anilazine	101-05-3				313		
Aniline	62-53-3	1,000	5,000	5,000	313	U012	
Aniline, 2,4,6-trimethyl-	88-05-1	500	500				
o-Anisidine	90-04-0			100	313		
p-Anisidine	104-94-9				313		
o-Anisidine hydrochloride	134-29-2				313		
Anthracene	120-12-7			5,000	313		
Antimony	7440-36-0			5,000	313		
Antimony Compounds	N010			&	313		
Antimony pentachloride	7647-18-9			1,000			
Antimony pentafluoride	7783-70-2	500	500		313c		
Antimony potassium tartrate	28300-74-5			100	313c		
Antimony tribromide	7789-61-9			1,000	313c		
Antimony trichloride	10025-91-9			1,000	313c		
Antimony trifluoride	7783-56-4			1,000	313c		
Antimony trioxide	1309-64-4			1,000	313c		
Antimycin A	1397-94-0	1,000/10,000	1,000				
ANTU	86-88-4	500/10,000	100	100		P072	
Aroclor 1016	12674-11-2			1			
Aroclor 1221	11104-28-2			1			
Aroclor 1232	11141-16-5			1			
Aroclor 1242	53469-21-9			1			
Aroclor 1248	12672-29-6			1			
Aroclor 1254	11097-69-1			1			
Aroclor 1260	11096-82-5			1			
Arsenic	7440-38-2			1	313		
Arsenic acid	7778-39-4			1	313c	P010	
Arsenic Compounds	N020			&	313		
Arsenic disulfide	1303-32-8			1	313c		
Arsenic pentoxide	1303-28-2	100/10,000	1	1	313c	P011	
Arsenic trioxide	1327-53-3	100/10,000	1	1	313c	P012	
Arsenic trisulfide	1303-33-9			1	313c		
Arsenous oxide	1327-53-3	100/10,000	1	1	313c	P012	
Arsenous trichloride	7784-34-1	500	1	1	313c		15,000
Arsine	7784-42-1	100	100				1,000
Asbestos (friable)	1332-21-4			1	313		
Atrazine	1912-24-9				313		
Auramine	492-80-8			100	X	U014	
Avermectin B1	71751-41-2				X		
Azaserine	115-02-6			1		U015	
1H-Azepine-1 carbothioic acid, hexahydro-S-ethyl ester	2212-67-1				X		
Azinphos-ethyl	2642-71-9	100/10,000	100				
Azinphos-methyl	86-50-0	10/10,000	1	1			
Aziridine	151-56-4	500	1	1	X	P054	10,000
Aziridine, 2-methyl	75-55-8	10,000	1	1	X	P067	10,000
Barban	101-27-9			10		U280	
Barium	7440-39-3				313		
Barium Compounds	N040				313		
Barium cyanide	542-62-1			10	313c	P013	
Bendiocarb	22781-23-3			100	313	U278	
Bendiocarb phenol	22961-82-6			1,000		U364	

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Benezeneamine, 2,6-dinitro-N,N-dipropyl-4-(trifluoromethyl)-	1582-09-8			10	X		
Benfluralin	1861-40-1				313		
Benomyl	17804-35-2			10	313	U271	
Benz[c]acridine	225-51-4			100		U016	
Benzal chloride	98-87-3	500	5,000	5,000	313	U017	
Benzamide	55-21-0				313		
Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl	23950-58-5			5,000	X	U192	
Benz[a]anthracene	56-55-3			10	313+	U018	
Benzenamine, 3-(trifluoromethyl)-	98-16-8	500	500				
Benzene	71-43-2			10	313	U019	
Benzeneacetic acid, 4-chloro-.alpha.-(4-chlorophenyl)-.alpha.-hydroxy-, ethyl ester	510-15-6			10	X	U038	
Benzeneamine, N-hydroxy-N-nitroso, ammonium salt	135-20-6				X		
Benzenearsonic acid	98-05-5	10/10,000	10				
Benzene, 1-(chloromethyl)-4-nitro-	100-14-1	500/10,000	500				
1,3-Benzenedicarbonitrile, 2,4,5,6-tetrachloro-	1897-45-6				X		
Benzene, 2,4-dichloro-1-(4-nitrophenoxy)-	1836-75-5				X		
Benzene, 2,4-diisocyanato-1-methyl-	584-84-9	500	100	100	X		10,000
Benzene, 1,3-diisocyanato-2-methyl-	91-08-7	100	100	100	X		10,000
Benzene, 1,3-diisocyanatomethyl-	26471-62-5			100	X	U223	10,000
Benzene, m-dimethyl-	108-38-3			1,000	X	U239	
Benzene, o-dimethyl-	95-47-6			1,000	X	U239	
Benzene, p-dimethyl-	106-42-3			100	X	U239	
Benzeneethanamine, alpha,alpha-dimethyl-	122-09-8			5,000		P046	
Benzenemethanol, 4-chloro-.alpha.-4-chlorophenyl)-.alpha.-(trichloromethyl)-	115-32-2			10	X		
Benzenesulfonyl chloride	98-09-9			100		U020	
Benzenethiol	108-98-5	500	100	100		P014	
Benzene, 1,1'-(2,2,2-trichloroethylidene)bis [4-methoxy-	72-43-5			1	X	U247	
Benzidine	92-87-5			1	313	U021	
Benzimidazole, 4,5-dichloro-2-(trifluoromethyl)-	3615-21-2	500/10,000	500				
Benzo[b]fluoranthene	205-99-2			1	313+		
Benzo(j)fluoranthene	205-82-3				313+		
Benzo(k)fluoranthene	207-08-9			5,000	313+		
Benzoic acid	65-85-0			5,000			
Benzoic acid, 3-amino-2,5-dichloro-	133-90-4			100	X		
Benzoic acid, 5-(2-chloro-4-(trifluoromethyl)phenoxy)-2-nitro-, 2-ethoxy-1-methyl-2-oxethyl ester	77501-63-4				313		
Benzoic trichloride	98-07-7	100	10	10	313	U023	
Benzonitrile	100-47-0			5,000			
Benzo(rst)pentaphene	189-55-9			10	313+	U064	

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Benzo[g,h,i]perylene	191-24-2			5,000	313		
Benzo(a)phenanthrene	218-01-9			100	313+	U050	
Benzo[a]pyrene	50-32-8			1	313+	U022	
p-Benzoquinone	106-51-4			10	X	U197	
Benzotrichloride	98-07-7	100	10	10	X	U023	
Benzoyl chloride	98-88-4			1,000	313		
Benzoyl peroxide	94-36-0				313		
Benzyl chloride	100-44-7	500	100	100	313	P028	
Benzyl cyanide	140-29-4	500	500				
Beryllium	7440-41-7			10	313	P015	
Beryllium chloride	7787-47-5			1	313c		
Beryllium Compounds	N050			&	313		
Beryllium fluoride	7787-49-7			1	313c		
Beryllium nitrate	7787-55-5			1	313c		
Beryllium nitrate	13597-99-4			1	313c		
alpha-BHC	319-84-6			10	X		
beta-BHC	319-85-7			1			
delta-BHC	319-86-8			1			
Bicyclo[2.2.1]heptane-2-carbonitrile, 5-chloro-6-((((methylamino)carbonyl)oxy)imino)-,(1-alpha,2-beta,4-alpha,5-alpha,6E))-	15271-41-7	500/10,000	500				
Bifenthrin	82657-04-3				313		
2,2'-Bioxirane	1464-53-5	500	10	10	X	U085	
Biphenyl	92-52-4			100	313		
2,2-bis(Bromomethyl)-1,3-propanediol	3296-90-0				313		
Bis(2-chloroethoxy) methane	111-91-1			1,000	313	U024	
Bis(2-chloroethyl) ether	111-44-4	10,000	10	10	313	U025	
Bis(chloromethyl) ether	542-88-1	100	10	10	313	P016	1,000
Bis(2-chloro-1-methylethyl)ether	108-60-1			1,000	313	U027	
Bis(chloromethyl) ketone	534-07-6	10/10,000	10				
Bis(2-ethylhexyl)phthalate	117-81-7			100	X	U028	
N,N'-Bis(1-methylethyl)-6-methylthio-1,3,5-triazine-2,4-diamine	7287-19-6				X		
1,4-Bis(methylisocyanate)cyclohexane	10347-54-3				313#		
1,3-Bis(methylisocyanate)cyclohexane	38661-72-2				313#		
Bis(tributyltin) oxide	56-35-9				313		
Bitoscanate	4044-65-9	500/10,000	500				
Borane, trichloro-	10294-34-5	500	500		X		5,000
Borane, trifluoro-	7637-07-2	500	500		X		5,000
Boron trichloride	10294-34-5	500	500		313		5,000
Boron trifluoride	7637-07-2	500	500		313		5,000
Boron trifluoride compound with methyl ether (1:1)	353-42-4	1,000	1,000				15,000
Boron, trifluoro[oxybis[methane]]-, (T-4)-	353-42-4	1,000	1,000				15,000
Bromacil	314-40-9				313		
Bromacil, lithium salt	53404-19-6				313		
Bromadiolone	28772-56-7	100/10,000	100				
Bromine	7726-95-6	500	500		313		10,000

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Bromoacetone	598-31-2			1,000		P017	
1-Bromo-1-(bromomethyl)-1,3-propanedicarbonitrile	35691-65-7				313		
Bromochlorodifluoromethane	353-59-3				313		
O-(4-Bromo-2-chlorophenyl)-O-ethyl-S-propylphosphorothioate	41198-08-7				X		
Bromoform	75-25-2			100	313	U225	
Bromomethane	74-83-9	1,000	1,000	1,000	313	U029	
5-Bromo-6-methyl-3-(1-methylpropyl)-2,4-(1H,3H)-pyrimidinedione	314-40-9				X		
4-Bromophenyl phenyl ether	101-55-3			100		U030	
Bromotrifluoroethylene	598-73-2						10,000
Bromotrifluoromethane	75-63-8				313		
Bromoxynil	1689-84-5				313		
Bromoxynil octanoate	1689-99-2				313		
Brucine	357-57-3			100	313	P018	
1,3-Butadiene	106-99-0			10	313		10,000
1,3-Butadiene, 2-methyl-	78-79-5			100			10,000
Butane	106-97-8						10,000
Butane, 2-methyl-	78-78-4						10,000
2-Butenal	4170-30-3	1,000	100	100	X	U053	20,000
2-Butenal, (e)-	123-73-9	1,000	100	100		U053	20,000
Butene	25167-67-3						10,000
1-Butene	106-98-9						10,000
2-Butene	107-01-7						10,000
2-Butene-cis	590-18-1						10,000
2-Butene, 1,4-dichloro-	764-41-0			1	X	U074	
2-Butene, (E)	624-64-6						10,000
2-Butene-trans	624-64-6						10,000
1-Buten-3-yne	689-97-4						10,000
2,4-D butoxyethyl ester	1929-73-3			100	313		
Butyl acetate	123-86-4			5,000			
iso-Butyl acetate	110-19-0			5,000			
sec-Butyl acetate	105-46-4			5,000			
tert-Butyl acetate	540-88-5			5,000			
Butyl acrylate	141-32-2				313		
n-Butyl alcohol	71-36-3			5,000	313	U031	
sec-Butyl alcohol	78-92-2				313		
tert-Butyl alcohol	75-65-0				313		
Butylamine	109-73-9			1,000			
iso-Butylamine	78-81-9			1,000			
sec-Butylamine	513-49-5			1,000			
sec-Butylamine	13952-84-6			1,000			
tert-Butylamine	75-64-9			1,000			
Butyl benzyl phthalate	85-68-7			100			
.alpha.-Butyl-.alpha.-(4-chlorophenyl)-1H-1,2,4-triazole-1-propanenitrile	88671-89-0				X		
1,2-Butylene oxide	106-88-7			100	313		
Butylethylcarbamothioic acid S-propyl ester	1114-71-2				X		
N-Butyl-N-ethyl-2,6-dinitro-4-(trifluoromethyl) benzenamine	1861-40-1				X		

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n-Butyl phthalate	84-74-2			10	X	U069	
1-Butyne	107-00-6						10,000
Butyraldehyde	123-72-8				313		
Butyric acid	107-92-6			5,000			
iso-Butyric acid	79-31-2			5,000			
Cacodylic acid	75-60-5			1		U136	
Cadmium	7440-43-9			10	313		
Cadmium acetate	543-90-8			10	313c		
Cadmium bromide	7789-42-6			10	313c		
Cadmium chloride	10108-64-2			10	313c		
Cadmium Compounds	N078			&	313		
Cadmium oxide	1306-19-0	100/10,000	100		313c		
Cadmium stearate	2223-93-0	1,000/10,000	1,000		313c		
Calcium arsenate	7778-44-1	500/10,000	1	1	313c		
Calcium arsenite	52740-16-6			1	313c		
Calcium carbide	75-20-7			10			
Calcium chromate	13765-19-0			10	313c	U032	
Calcium cyanamide	156-62-7			1,000	313		
Calcium cyanide	592-01-8			10	313c	P021	
Calcium dodecylbenzenesulfonate	26264-06-2			1,000			
Calcium hypochlorite	7778-54-3			10			
Camphechlor	8001-35-2	500/10,000	1	1	X	P123	
Camphene, octachloro-	8001-35-2	500/10,000	1	1	X	P123	
Cantharidin	56-25-7	100/10,000	100				
Captan	133-06-2			10	313		
Carbachol chloride	51-83-2	500/10,000	500				
Carbamic acid, diethylthio-, S-(p-chlorobenzyl)	28249-77-6				X		
Carbamic acid, ethyl ester	51-79-6			100	X	U238	
Carbamic acid, methyl-, O-(((2,4-dimethyl-1,3-dithiolan-2-yl)methylene)amino)-	26419-73-8	100/10,000	100	100		P185	
Carbamodithioic acid, 1,2-ethanediylbis-, manganese complex	12427-38-2				X		
Carbamodithioic acid, 1,2-ethanediylbis-, zinc complex	12122-67-7				X		
Carbamothioic acid, bis(1-methylethyl)-S-(2,3-dichloro-2-propenyl)ester	2303-16-4			100	X	U062	
Carbamothioic acid, dipropyl-, S-(phenylmethyl) ester	52888-80-9			5,000		U387	
Carbaryl	63-25-2			100	313	U279	
Carbendazim	10605-21-7			10		U372	
Carbofuran	1563-66-2	10/10,000	10	10	313	P127	
Carbofuran phenol	1563-38-8			10		U367	
Carbon disulfide	75-15-0	10,000	100	100	313	P022	20,000
Carbonic difluoride	353-50-4			1,000		U033	
Carbonic dichloride	75-44-5	10	10	10	X	P095	500
Carbonochloridic acid, methylester	79-22-1	500	1,000	1,000	X	U156	5,000
Carbonochloridic acid, 1-methylethyl ester	108-23-6	1,000	1,000				15,000
Carbonochloridic acid, propylester	109-61-5	500	500				15,000

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Carbon oxide sulfide (COS)	463-58-1			100	X		10,000
Carbon tetrachloride	56-23-5			10	313	U211	
Carbonyl sulfide	463-58-1			100	313		10,000
Carbophenothion	786-19-6	500	500				
Carbosulfan	55285-14-8			1,000		P189	
Carboxin	5234-68-4				313		
Catechol	120-80-9			100	313		
CFC-11	75-69-4			5,000	X	U121	
CFC-12	75-71-8			5,000	X	U075	
CFC-114	76-14-2				X		
CFC-115	76-15-3				X		
CFC-13	75-72-9				X		
Chinomethionat	2439-01-2				313		
Chloramben	133-90-4			100	313		
Chlorambucil	305-03-3			10		U035	
Chlordane	57-74-9	1,000	1	1	313	U036	
Chlordane (Technical Mixture and Metabolites)	N.A.			&			
Chlorendic acid	115-28-6				313		
Chlorfenvinfos	470-90-6	500	500				
Chlorimuron ethyl	90982-32-4				313		
Chlorinated Benzenes	N.A.			&			
Chlorinated Ethanes	N.A.			&			
Chlorinated Naphthalene	N.A.			&			
Chlorinated Phenols	N084			&	313		
Chlorine	7782-50-5	100	10	10	313		2,500
Chlorine dioxide	10049-04-4				313		1,000
Chlorine monoxide	7791-21-1						10,000
Chlorine oxide	7791-21-1						10,000
Chlorine oxide (ClO2)	10049-04-4				X		1,000
Chlormephos	24934-91-6	500	500				
Chlormequat chloride	999-81-5	100/10,000	100				
Chlornaphazine	494-03-1			100		U026	
Chloroacetaldehyde	107-20-0			1,000		P023	
Chloroacetic acid	79-11-8	100/10,000	100	100	313		
2-Chloroacetophenone	532-27-4			100	313		
Chloroalkyl Ethers	N.A.			&			
1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride	4080-31-3				313		
p-Chloroaniline	106-47-8			1,000	313	P024	
Chlorobenzene	108-90-7			100	313	U037	
Chlorobenzilate	510-15-6			10	313	U038	
2-(4-((6-Chloro-2-benzoxazolylen)oxy)phenoxy)propanoic acid, ethyl ester	66441-23-4				X		
2-Chloro-N-(2-chloroethyl)-N-methylethanamine	51-75-2	10	10		X		
p-Chloro-m-cresol	59-50-7			5,000		U039	
2,4-D chlorocrotyl ester	2971-38-2			100	313		
Chlorodibromomethane	124-48-1			100			
1-Chloro-1,1-difluoroethane	75-68-3				313		
Chlorodifluoromethane	75-45-6				313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
5-Chloro-3-(1,1-dimethylethyl)-6-methyl-2,4(1H,3H)-pyrimidinedione	5902-51-2				X		
Chloroethane	75-00-3			100	313		10,000
Chloroethanol	107-07-3	500	500				
Chloroethyl chloroformate	627-11-2	1,000	1,000				
6-Chloro-N-ethyl-N'-(1-methylethyl)-1,3,5-triazine-2,4-diamine	1912-24-9				X		
2-Chloroethyl vinyl ether	110-75-8			1,000		U042	
Chloroform	67-66-3	10,000	10	10	313	U044	20,000
Chloromethane	74-87-3			100	313	U045	10,000
2-Chloro-N-(((4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl)benzenesulfonamide	64902-72-3				X		
4-Chloro-5-(methylamino)-2-[3-(trifluoromethyl)phenyl]-3(2H)-pyridazinone	27314-13-2				X		
Chloromethyl ether	542-88-1	100	10	10	X	P016	1,000
4-Chloro-alpha-(1-methylethyl)benzeneacetic acid cyano(3-phenoxyphenyl)methyl ester	51630-58-1				X		
2-Chloro-N-(1-methylethyl)-N-phenylacetamide	1918-16-7				X		
Chloromethyl methyl ether	107-30-2	100	10	10	313	U046	5,000
(4-Chloro-2-methylphenoxy) acetate sodium salt	3653-48-3				X		
(4-Chloro-2-methylphenoxy) acetic acid	94-74-6				X		
3-Chloro-2-methyl-1-propene	563-47-3				313		
2-Chloronaphthalene	91-58-7			5,000		U047	
Chlorophacinone	3691-35-8	100/10,000	100				
2-Chlorophenol	95-57-8			100		U048	
Chlorophenols	N084			&	313		
1-(4-Chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone	43121-43-3				X		
.alpha.-(2-Chlorophenyl)-.alpha.-4-chlorophenyl)-5-pyrimidinemethanol	60168-88-9				X		
p-Chlorophenyl isocyanate	104-12-1				313		
4-Chlorophenyl phenyl ether	7005-72-3			5,000			
Chloropicrin	76-06-2				313		
Chloroprene	126-99-8			100	313		
3-Chloropropionitrile	542-76-7	1,000	1,000	1,000	313	P027	
2-Chloropropylene	557-98-2						10,000
1-Chloropropylene	590-21-6						10,000
2-(4-((6-Chloro-2-quinoxalinyl)oxy]phenoxy) propanoic acid ethyl ester	76578-14-8				X		
Chlorosulfonic acid	7790-94-5			1,000			
Chlorotetrafluoroethane	63938-10-3				313		
1-Chloro-1,1,2,2-tetrafluoroethane	354-25-6				313		
2-Chloro-1,1,1,2-tetrafluoroethane	2837-89-0				313		
Chlorothalonil	1897-45-6				313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
p-Chloro-o-toluidine	95-69-2				313		
4-Chloro-o-toluidine, hydrochloride	3165-93-3			100		U049	
2-Chloro-6-(trichloromethyl)pyridine	1929-82-4				X		
2-Chloro-1,1,1-trifluoroethane	75-88-7				313		
Chlorotrifluoromethane	75-72-9				313		
5-(2-Chloro-4-(trifluoromethyl)phenoxy)-2-nitrobenzoic acid, sodium salt	62476-59-9				X		
5-(2-Chloro-4-(trifluoromethyl)phenoxy)-N-methylsulfonyl)-2-nitrobenzamide	72178-02-0				X		
5-(2-Chloro-4-(trifluoromethyl)phenoxy)-2-nitro-2-ethoxy-1-methyl-2-oxoethyl ester	77501-63-4				X		
N-(2-Chloro-4-(trifluoromethyl)phenyl)-DL-valine(+)-cyano(3-phenoxyphenyl)methyl ester	69409-94-5				X		
3-Chloro-1,1,1-trifluoropropane	460-35-5				313		
3-(2-Chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylic acid cyano(3-phenoxyphenyl) methyl ester	68085-85-8				X		
Chloroxuron	1982-47-4	500/10,000	500				
Chlorpyrifos	2921-88-2			1			
Chlorpyrifos methyl	5598-13-0				313		
Chlorsulfuron	64902-72-3				313		
Chlorthiophos	21923-23-9	500	500				
Chromic acetate	1066-30-4			1,000	313c		
Chromic acid	7738-94-5			10	313c		
Chromic acid	11115-74-5			10	313c		
Chromic chloride	10025-73-7	1/10,000	1		313c		
Chromic sulfate	10101-53-8			1,000	313c		
Chromium	7440-47-3			5,000	313		
Chromium Compounds	N090			&	313		
Chromous chloride	10049-05-5			1,000	313c		
d-trans-Chrysanthemic acid of d-allethrone	28057-48-9				X		
Chrysene	218-01-9			100	X	U050	
C.I. Acid Green 3	4680-78-8				313		
C.I. Acid Red 114	6459-94-5				313		
C.I. Basic Green 4	569-64-2				313		
C.I. Basic Red 1	989-38-8				313		
C.I. Direct Black 38	1937-37-7				313		
C.I. Direct Blue 218	28407-37-6				313		
C.I. Direct Blue 6	2602-46-2				313		
C.I. Direct Brown 95	16071-86-6				313		
C.I. Disperse Yellow 3	2832-40-8				313		
C.I. Food Red 5	3761-53-3				313		
C.I. Food Red 15	81-88-9				313		
C.I. Solvent Orange 7	3118-97-6				313		
C.I. Solvent Yellow 3	97-56-3				313		
C.I. Solvent Yellow 14	842-07-9				313		

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C.I. Solvent Yellow 34	492-80-8			100	313	U014	
C.I. Vat Yellow 4	128-66-5				313		
Cobalt	7440-48-4				313		
Cobalt carbonyl	10210-68-1	10/10,000	10		313c		
Cobalt Compounds	N096			&	313		
Cobalt, ((2,2'-(1,2-ethanediylbis(nitrilomethylidyne))bis(6-fluorophenylato))(2-)-N,N',O,O')-	62207-76-5	100/10,000	100		313c		
Cobaltous bromide	7789-43-7			1,000	313c		
Cobaltous formate	544-18-3			1,000	313c		
Cobaltous sulfamate	14017-41-5			1,000	313c		
Coke Oven Emissions	N.A.			1			
Colchicine	64-86-8	10/10,000	10				
Copper	7440-50-8			5,000	313		
Copper Compounds	N100			&	313		
Copper cyanide	544-92-3			10	313c	P029	
Coumaphos	56-72-4	100/10,000	10	10			
Coumatetralyl	5836-29-3	500/10,000	500				
Creosote	N.A.			1		U051	
Creosote	8001-58-9				313		
p-Cresidine	120-71-8				313		
m-Cresol	108-39-4			100	313	U052	
o-Cresol	95-48-7	1,000/10,000	100	100	313	U052	
p-Cresol	106-44-5			100	313	U052	
Cresol (mixed isomers)	1319-77-3			100	313	U052	
Crimidine	535-89-7	100/10,000	100				
Crotonaldehyde	4170-30-3	1,000	100	100	313	U053	20,000
Crotonaldehyde, (E)-	123-73-9	1,000	100	100		U053	20,000
Cumene	98-82-8			5,000	313	U055	
Cumene hydroperoxide	80-15-9			10	313	U096	
Cupferron	135-20-6				313		
Cupric acetate	142-71-2			100	313c		
Cupric acetoarsenite	12002-03-8	500/10,000	1	1	313c		
Cupric chloride	7447-39-4			10	313c		
Cupric nitrate	3251-23-8			100	313c		
Cupric oxalate	5893-66-3			100	313c		
Cupric sulfate	7758-98-7			10	313c		
Cupric sulfate, ammoniated	10380-29-7			100	313c		
Cupric tartrate	815-82-7			100	313c		
Cyanazine	21725-46-2				313		
Cyanide Compounds	N106			&	313		
Cyanides (soluble salts and complexes), not otherwise specified	N.A.			10	313c	P030	
Cyanogen	460-19-5			100		P031	10,000
Cyanogen bromide	506-68-3	500/10,000	1,000	1,000	313c	U246	
Cyanogen chloride	506-77-4			10	313c	P033	10,000
Cyanogen iodide	506-78-5	1,000/10,000	1,000		313c		
Cyanophos	2636-26-2	1,000	1,000				
Cyanuric fluoride	675-14-9	100	100		313c		
Cycloate	1134-23-2				313		
2,5-Cyclohexadiene-1,4-dione, 2,3,5-tris(1-aziridinyl)-	68-76-8				X		

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Cyclohexanamine	108-91-8	10,000	10,000				15,000
Cyclohexane	110-82-7			1,000	313	U056	
1,4-Cyclohexane diisocyanate	2556-36-7				313#		
Cyclohexane, 1,2,3,4,5,6-hexachloro-,(1.alpha.,2.alpha.,3.beta.,4.alpha.,5.alpha.,6.beta.)-	58-89-9	1,000/10,000	1	1	X	U129	
Cyclohexanol	108-93-0				313		
Cyclohexanone	108-94-1			5,000		U057	
Cycloheximide	66-81-9	100/10,000	100				
Cyclohexylamine	108-91-8	10,000	10,000				15,000
2-Cyclohexyl-4,6-dinitrophenol	131-89-5			100		P034	
Cyclophosphamide	50-18-0			10		U058	
Cyclopropane	75-19-4						10,000
Cyfluthrin	68359-37-5				313		
Cyhalothrin	68085-85-8				313		
2,4-D	94-75-7			100	313	U240	
2,4-D Acid	94-75-7			100	X	U240	
2,4-D butyl ester	94-80-4			100	313		
2,4-D Esters	94-11-1			100	X		
2,4-D Esters	94-79-1			100			
2,4-D Esters	94-80-4			100	X		
2,4-D Esters	1320-18-9			100	X		
2,4-D Esters	1928-38-7			100			
2,4-D Esters	1928-61-6			100			
2,4-D Esters	1929-73-3			100	X		
2,4-D Esters	2971-38-2			100	X		
2,4-D Esters	25168-26-7			100			
2,4-D Esters	53467-11-1			100			
2,4-D isopropyl ester	94-11-1			100	313		
2,4-D propylene glycol butyl ether ester	1320-18-9			100	313		
2,4-D, salts and esters	94-75-7			100		U240	
Daunomycin	20830-81-3			10		U059	
Dazomet	533-74-4				313		
Dazomet, sodium salt	53404-60-7				313		
2,4-DB	94-82-6				313		
DBCP	96-12-8			1	X	U066	
DDD	72-54-8			1		U060	
DDE	72-55-9			1			
DDE	3547-04-4			5,000			
DDT	50-29-3			1		U061	
DDT and Metabolites	N.A.			&			
Decaborane(14)	17702-41-9	500/10,000	500				
Decabromodiphenyl oxide	1163-19-5				313		
DEF	78-48-8				X		
DEHP	117-81-7			100	X	U028	
Demeton	8065-48-3	500	500				
Demeton-S-methyl	919-86-8	500	500				
Desmedipham	13684-56-5				313		
2,4-D 2-ethylhexyl ester	1928-43-4				313		
2,4-D 2-ethyl-4-methylpentyl ester	53404-37-8				313		
Dialifor	10311-84-9	100/10,000	100				

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Diallate	2303-16-4			100	313	U062	
2,4-Diaminoanisole	615-05-4				313		
2,4-Diaminoanisole sulfate	39156-41-7				313		
4,4'-Diaminodiphenyl ether	101-80-4				313		
Diaminotoluene	496-72-0			10		U221	
Diaminotoluene	823-40-5			10		U221	
2,4-Diaminotoluene	95-80-7			10	313		
Diaminotoluene (mixed isomers)	25376-45-8			10	313	U221	
o-Dianisidine dihydrochloride	20325-40-0				X		
o-Dianisidine hydrochloride	111984-09-9				X		
Diazinon	333-41-5			1	313		
Diazomethane	334-88-3			100	313		
Dibenz(a,h)acridine	226-36-8				313+		
Dibenz(a,j)acridine	224-42-0				313+		
Dibenz[a,h]anthracene	53-70-3			1	313+	U063	
7H-Dibenzo(c,g)carbazole	194-59-2				313+		
Dibenzo(a,e)fluoranthene	5385-75-1				313+		
Dibenzofuran	132-64-9			100	313		
Dibenzo(a,e)pyrene	192-65-4				313+		
Dibenzo(a,h)pyrene	189-64-0				313+		
Dibenzo(a,l)pyrene	191-30-0				313+		
Dibenz[a,i]pyrene	189-55-9			10	X	U064	
Diborane	19287-45-7	100	100				2,500
Diborane(6)	19287-45-7	100	100				2,500
1,2-Dibromo-3-chloropropane	96-12-8			1	313	U066	
1,2-Dibromoethane	106-93-4			1	313	U067	
3,5-Dibromo-4-hydroxybenzonitrile	1689-84-5				X		
2,2-Dibromo-3-nitrilopropionamide	10222-01-2				313s		
Dibromotetrafluoroethane	124-73-2				313		
Dibutyl phthalate	84-74-2			10	313	U069	
Dicamba	1918-00-9			1,000	313		
Dichlobenil	1194-65-6			100			
Dichlone	117-80-6			1			
Dichloran	99-30-9				313		
o-Dichlorobenzene	95-50-1			100	X	U070	
Dichlorobenzene	25321-22-6			100	X		
1,2-Dichlorobenzene	95-50-1			100	313	U070	
1,3-Dichlorobenzene	541-73-1			100	313	U071	
1,4-Dichlorobenzene	106-46-7			100	313	U072	
Dichlorobenzene (mixed isomers)	25321-22-6			100	313		
Dichlorobenzidine	N.A.			&			
3,3'-Dichlorobenzidine	91-94-1			1	313	U073	
3,3'-Dichlorobenzidine dihydrochloride	612-83-9				313		
3,3'-Dichlorobenzidine sulfate	64969-34-2				313		
Dichlorobromomethane	75-27-4			5,000	313		
trans-1,4-Dichloro-2-butene	110-57-6	500	500		313		
trans-1,4-Dichlorobutene	110-57-6	500	500		X		
1,4-Dichloro-2-butene	764-41-0			1	313	U074	
4,6-Dichloro-N-(2-chlorophenyl)-1,3,5-triazin-2-amine	101-05-3				X		
1,2-Dichloro-1,1-difluoroethane	1649-08-7				313		
Dichlorodifluoromethane	75-71-8			5,000	313	U075	

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
1,1-Dichloroethane	75-34-3			1,000	X	U076	
1,2-Dichloroethane	107-06-2			100	313	U077	
3-(2,2-Dichloroethenyl)-2,2-dimethylcyclopropane carboxylic acid, (3-phenoxy-phenyl)methyl ester	52645-53-1				X		
3-(2,2-Dichloroethenyl)-2,2-dimethylcyclopropanecarboxylic acid, cyano(4-fluoro-3-phenoxyphenyl)methyl ester	68359-37-5				X		
1,1-Dichloroethylene	75-35-4			100	X	U078	10,000
1,2-Dichloroethylene	156-60-5			1,000		U079	
1,2-Dichloroethylene	540-59-0				313		
Dichloroethyl ether	111-44-4	10,000	10	10	X	U025	
1,1-Dichloro-1-fluoroethane	1717-00-6				313		
Dichlorofluoromethane	75-43-4				313		
Dichloroisopropyl ether	108-60-1			1,000	X	U027	
Dichloromethane	75-09-2			1,000	313	U080	
3,6-Dichloro-2-methoxybenzoic acid	1918-00-9			1,000	X		
3,6-Dichloro-2-methoxybenzoic acid, sodium salt	1982-69-0				X		
Dichloromethyl ether	542-88-1	100	10	10	X	P016	1,000
3-(2,4-Dichloro-5-(1-methylethoxy)phenyl)-5-(1,1-dimethylethyl)-1,3,4-oxadiazol-2(3H)-one	19666-30-9				X		
Dichloromethylphenylsilane	149-74-6	1,000	1,000				
2,6-Dichloro-4-nitroaniline	99-30-9				X		
Dichloropentafluoropropane	127564-92-5				313		
2,2-Dichloro-1,1,1,3,3-pentafluoropropane	128903-21-9				313		
2,3-Dichloro-1,1,1,2,3-pentafluoropropane	422-48-0				313		
1,2-Dichloro-1,1,2,3,3-pentafluoropropane	422-44-6				313		
3,3-Dichloro-1,1,1,2,2-pentafluoropropane	422-56-0				313		
1,3-Dichloro-1,1,2,2,3-pentafluoropropane	507-55-1				313		
1,1-Dichloro-1,2,2,3,3-pentafluoropropane	13474-88-9				313		
1,2-Dichloro-1,1,3,3,3-pentafluoropropane	431-86-7				313		
1,3-Dichloro-1,1,2,3,3-pentafluoropropane	136013-79-1				313		
1,1-Dichloro-1,2,3,3,3-pentafluoropropane	111512-56-2				313		
Dichlorophene	97-23-4				313		
2,6-Dichlorophenol	87-65-0			100		U082	
2,4-Dichlorophenol	120-83-2			100	313	U081	
2-(4-(2,4-Dichlorophenoxy)phenoxy)propanoic acid, methyl ester	51338-27-3				X		
Dichlorophenylarsine	696-28-6	500	1	1		P036	

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
3-(3,5-Dichlorophenyl)-5-ethenyl-5-methyl-2,4-oxazolidinedione	50471-44-8				X		
2-(3,4-Dichlorophenyl)-4-methyl-1,2,4-oxadiazolidine-3,5-dione	20354-26-1				X		
N-(3,4-Dichlorophenyl)propanamide	709-98-8				X		
1-(2-(2,4-Dichlorophenyl)-2-(2-propenyloxy)ethyl)-1H-imidazole	35554-44-0				X		
1-(2-(2,4-Dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl)-methyl-1H-1,2,4,-triazole	60207-90-1				X		
Dichloropropane	26638-19-7			1,000			
Dichloropropane - Dichloropropene (mixture)	8003-19-8			100			
1,1-Dichloropropane	78-99-9			1,000			
1,2-Dichloropropane	78-87-5			1,000	313	U083	
1,3-Dichloropropane	142-28-9			1,000			
Dichloropropene	26952-23-8			100			
1,3-Dichloropropene	542-75-6			100	X	U084	
trans-1,3-Dichloropropene	10061-02-6				313		
2,3-Dichloropropene	78-88-6			100	313		
2,2-Dichloropropionic acid	75-99-0			5,000			
1,3-Dichloropropylene	542-75-6			100	313	U084	
Dichlorosilane	4109-96-0						10,000
Dichlorotetrafluoroethane	76-14-2				313		
Dichlorotrifluoroethane	34077-87-7				313		
Dichloro-1,1,2-trifluoroethane	90454-18-5				313		
1,1-Dichloro-1,2,2-trifluoroethane	812-04-4				313		
1,2-Dichloro-1,1,2-trifluoroethane	354-23-4				313		
2,2-Dichloro-1,1,1-trifluoroethane	306-83-2				313		
Dichlorvos	62-73-7	1,000	10	10	313		
Diclofop methyl	51338-27-3				313		
Dicofol	115-32-2			10	313		
Dicrotophos	141-66-2	100	100				
Dicyclopentadiene	77-73-6				313		
Dieldrin	60-57-1			1		P037	
Diepoxybutane	1464-53-5	500	10	10	313	U085	
Diethanolamine	111-42-2			100	313		
Diethatyl ethyl	38727-55-8				313		
Diethylamine	109-89-7			100			
O-(2-(Diethylamino)-6-methyl-4-pyrimidinyl)-O,O-dimethyl phosphorothioate	29232-93-7				X		
N,N-Diethylaniline	91-66-7			1,000			
Diethylarsine	692-42-2			1		P038	
Diethyl chlorophosphate	814-49-3	500	500				
Diethyldiisocyanatobenzene	134190-37-7				313#		
Di(2-ethylhexyl) phthalate	117-81-7			100	313	U028	
O,O-Diethyl S-methyl dithiophosphate	3288-58-2			5,000		U087	
Diethyl-p-nitrophenyl phosphate	311-45-5			100		P041	
Diethyl phthalate	84-66-2			1,000		U088	
O,O-Diethyl O-pyrazinyl phosphorothioate	297-97-2	500	100	100		P040	

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Diethylstilbestrol	56-53-1			1		U089	
Diethyl sulfate	64-67-5			10	313		
Diflubenzuron	35367-38-5				313		
Difluoroethane	75-37-6						10,000
Digitoxin	71-63-6	100/10,000	100				
Diglycidyl ether	2238-07-5	1,000	1,000				
Diglycidyl resorcinol ether	101-90-6				313		
Digoxin	20830-75-5	10/10,000	10				
2,3,-Dihydro-5,6-dimethyl-1,4-dithiin 1,1,4,4-tetraoxide	55290-64-7				X		
5,6-Dihydro-2-methyl-N-phenyl-1,4-oxathiin-3-carboxamide	5234-68-4				X		
Dihydrosafrole	94-58-6			10	313	U090	
Diisocyanates (includes only 20 chemicals)	N120				313		
4,4'-Diisocyanatodiphenyl ether	4128-73-8				313#		
2,4'-Diisocyanatodiphenyl sulfide	75790-87-3				313#		
Diisopropylfluorophosphate	55-91-4	100	100	100		P043	
Dimefox	115-26-4	500	500				
1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-(1.alpha.,4.alpha.,4a.beta.,5.alpha.,8.alpha.,8a.beta.)-	309-00-2	500/10,000	1	1	X	P004	
Dimethipin	55290-64-7				313		
Dimethoate	60-51-5	500/10,000	10	10	313	P044	
3,3'-Dimethoxybenzidine	119-90-4			100	313	U091	
3,3'-Dimethoxybenzidine dihydrochloride	20325-40-0				313		
3,3'-Dimethoxybenzidine-4,4'-diisocyanate	91-93-0				313#		
3,3'-Dimethoxybenzidine hydrochloride	111984-09-9				313		
Dimethylamine	124-40-3			1,000	313	U092	10,000
Dimethylamine dicamba	2300-66-5				313		
4-Dimethylaminoazobenzene	60-11-7			10	313	U093	
Dimethylaminoazobenzene	60-11-7			10	X	U093	
N,N-Dimethylaniline	121-69-7			100	313		
7,12-Dimethylbenz[a]anthracene	57-97-6			1	313+	U094	
3,3'-Dimethylbenzidine	119-93-7			10	313	U095	
3,3'-Dimethylbenzidine dihydrochloride	612-82-8				313		
3,3'-Dimethylbenzidine dihydrofluoride	41766-75-0				313		
2,2-Dimethyl-1,3-benzodioxol-4-ol methylcarbamate	22781-23-3			100	X	U278	
Dimethylcarbamyl chloride	79-44-7			1	313	U097	
Dimethyl chlorothiophosphate	2524-03-0	500	500		313		
Dimethyldichlorosilane	75-78-5	500	500				5,000
3,3'-Dimethyl-4,4'-diphenylene diisocyanate	91-97-4				313#		
3,3'-Dimethyldiphenylmethane-4,4'-diisocyanate	139-25-3				313#		

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N-(5-(1,1-Dimethylethyl)-1,3,4-thiadiazol-2-yl)-N,N'-dimethylurea	34014-18-1				X		
Dimethylformamide	68-12-2			100	X		
N,N-Dimethylformamide	68-12-2			100	313		
1,1-Dimethyl hydrazine	57-14-7	1,000	10	10	313	U098	15,000
Dimethylhydrazine	57-14-7	1,000	10	10	X	U098	15,000
O,O-Dimethyl O-(3-methyl-4-(methylthio) phenyl) ester, phosphorothioic acid	55-38-9				X		
2,2-Dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylic acid (1,3,4,5,6,7-hexahydro-1,3-dioxo-2H-isoindol-2-yl)methyl ester	7696-12-0				X		
2,2-Dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylic acid (3-phenoxyphenyl)methyl ester	26002-80-2				X		
2,4-Dimethylphenol	105-67-9			100	313	U101	
Dimethyl-p-phenylenediamine	99-98-9	10/10,000	10				
Dimethyl phosphorochloridothioate	2524-03-0	500	500		X		
Dimethyl phthalate	131-11-3			5,000	313	U102	
2,2-Dimethylpropane	463-82-1						10,000
Dimethyl sulfate	77-78-1	500	100	100	313	U103	
O,O-Dimethyl-O-(3,5,6-trichloro-2-pyridyl)phosphorothioate	5598-13-0				X		
Dimetilan	644-64-4	500/10,000	1	1		P191	
Dinitrobenzene (mixed isomers)	25154-54-5			100			
m-Dinitrobenzene	99-65-0			100	313		
o-Dinitrobenzene	528-29-0			100	313		
p-Dinitrobenzene	100-25-4			100	313		
Dinitrobutyl phenol	88-85-7	100/10,000	1,000	1,000	313	P020	
4,6-Dinitro-o-cresol	534-52-1	10/10,000	10	10	313	P047	
Dinitrocresol	534-52-1	10/10,000	10	10	X	P047	
4,6-Dinitro-o-cresol and salts	534-52-1			10		P047	
Dinitrophenol	25550-58-7			10			
2,4-Dinitrophenol	51-28-5			10	313	P048	
2,5-Dinitrophenol	329-71-5			10			
2,6-Dinitrophenol	573-56-8			10			
1,6-Dinitropyrene	42397-64-8				313+		
1,8-Dinitropyrene	42397-65-9				313+		
Dinitrotoluene (mixed isomers)	25321-14-6			10	313		
2,4-Dinitrotoluene	121-14-2			10	313	U105	
2,6-Dinitrotoluene	606-20-2			100	313	U106	
3,4-Dinitrotoluene	610-39-9			10			
Dinocap	39300-45-3				313		
Dinoseb	88-85-7	100/10,000	1,000	1,000	X	P020	
Dinoterb	1420-07-1	500/10,000	500				
Di-n-octyl phthalate	117-84-0			5,000		U107	
n-Dioctylphthalate	117-84-0			5,000		U107	
1,4-Dioxane	123-91-1			100	313	U108	
Dioxathion	78-34-2	500	500				
Dioxin and dioxin-like compounds (includes only 17 chemicals)	N150				313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Diphacinone	82-66-6	10/10,000	10				
Diphenamid	957-51-7				313		
Diphenylamine	122-39-4				313		
1,2-Diphenylhydrazine	122-66-7			10	313	U109	
Diphenylhydrazine	N.A.			&			
Diphosphoramide, octamethyl-	152-16-9	100	100	100		P085	
Dipotassium endothall	2164-07-0				313		
Dipropylamine	142-84-7			5,000		U110	
4-(Dipropylamino)-3,5-dinitrobenzenesulfonamide	19044-88-3				X		
Dipropyl isocinchomeronate	136-45-8				313		
Di-n-propylnitrosamine	621-64-7			10	X	U111	
Diquat	85-00-7			1,000			
Diquat	2764-72-9			1,000			
Disodium cyanodithioimidocarbonate	138-93-2				313		
Disulfoton	298-04-4	500	1	1		P039	
Dithiazanine iodide	514-73-8	500/10,000	500				
Dithiobiuret	541-53-7	100/10,000	100	100	X	P049	
2,4-Dithiobiuret	541-53-7	100/10,000	100	100	313	P049	
Diuron	330-54-1			100	313		
Dodecylbenzenesulfonic acid	27176-87-0			1,000			
Dodecylguanidine monoacetate	2439-10-3				X		
Dodine	2439-10-3				313		
2,4-DP	120-36-5				313		
2,4-D sodium salt	2702-72-9				313		
Emetine, dihydrochloride	316-42-7	1/10,000	1				
Endosulfan	115-29-7	10/10,000	1	1		P050	
alpha - Endosulfan	959-98-8			1			
beta - Endosulfan	33213-65-9			1			
Endosulfan and Metabolites	N.A.			&			
Endosulfan sulfate	1031-07-8			1			
Endothall	145-73-3			1,000		P088	
Endothion	2778-04-3	500/10,000	500				
Endrin	72-20-8	500/10,000	1	1		P051	
Endrin aldehyde	7421-93-4			1			
Endrin and Metabolites	N.A.			&			
Epichlorohydrin	106-89-8	1,000	100	100	313	U041	20,000
Epinephrine	51-43-4			1,000		P042	
EPN	2104-64-5	100/10,000	100				
EPTC	759-94-4				X		
Ergocalciferol	50-14-6	1,000/10,000	1,000				
Ergotamine tartrate	379-79-3	500/10,000	500				
Ethanamine	75-04-7			100			10,000
Ethane	74-84-0						10,000
Ethane, chloro-	75-00-3			100	X		10,000
1,2-Ethanediamine	107-15-3	10,000	5,000	5,000			20,000
Ethane, 1,1-difluoro-	75-37-6						10,000
Ethanedinitrile	460-19-5			100		P031	10,000
Ethane, 1,1'-oxybis-	60-29-7			100		U117	10,000
Ethaneperoxoic acid	79-21-0	500	500		X		10,000
Ethanesulfonyl chloride, 2-chloro-	1622-32-8	500	500				
Ethane, 1,1,1,2-tetrachloro-	630-20-6			100	X	U208	

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Ethane, 1,1'-thiobis[2-chloro-	505-60-2	500	500		X		
Ethanethiol	75-08-1						10,000
Ethane, 1,1,2-trichloro-1,2,2,-trifluoro-	76-13-1				X		
Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo-, methyl ester	30558-43-1			5,000		U394	
Ethanimidothioic acid, N-[[methylamino)carbonyl]	16752-77-5	500/10,000	100	100		P066	
Ethanol, 1,2-dichloro-, acetate	10140-87-1	1,000	1,000				
Ethanol, 2-ethoxy-	110-80-5			1,000	X	U359	
Ethanol, 2,2'-oxybis-, dicarbamate	5952-26-1			5,000		U395	
Ethene	74-85-1				X		10,000
Ethene, bromotrifluoro-	598-73-2						10,000
Ethene, chloro-	75-01-4			1	X	U043	10,000
Ethene, chlorotrifluoro-	79-38-9						10,000
Ethene, 1,1-dichloro-	75-35-4			100	X	U078	10,000
Ethene, 1,1-difluoro-	75-38-7						10,000
Ethene, ethoxy-	109-92-2						10,000
Ethene, fluoro-	75-02-5						10,000
Ethene, methoxy-	107-25-5						10,000
Ethene, tetrafluoro-	116-14-3						10,000
Ethion	563-12-2	1,000	10	10			
Ethoprop	13194-48-4	1,000	1,000		313		
Ethoprophos	13194-48-4	1,000	1,000		X		
2-Ethoxyethanol	110-80-5			1,000	313	U359	
2-(1-(Ethoxyimino) butyl)-5-(2-(ethylthio)propyl)-3-hydroxyl-2-cyclohexen-1-one	74051-80-2				X		
2-((Ethoxyl((1-methylethyl)amino]phosphinothioyl]oxy) benzoic acid 1-methylethyl ester	25311-71-1				X		
Ethyl acetate	141-78-6			5,000		U112	
Ethyl acetylene	107-00-6						10,000
Ethyl acrylate	140-88-5			1,000	313	U113	
3-((Ethylamino)methoxyphosphinothioyl)oxy)-2-butenoic acid, 1-methylethyl ester	31218-83-4				X		
Ethylbenzene	100-41-4			1,000	313		
Ethylbis(2-chloroethyl)amine	538-07-8	500	500				
Ethyl carbamate	51-79-6			100	X	U238	
Ethyl chloride	75-00-3			100	X		10,000
Ethyl chloroformate	541-41-3				313		
Ethyl-2-(((((4-chloro-6-methoxyprimidin-2-yl)amino)carbonyl)amino)sulfonyl)benzoate	90982-32-4				X		
Ethyl cyanide	107-12-0	500	10	10		P101	10,000
Ethyl dipropylthiocarbamate	759-94-4				313		
Ethylene	74-85-1				313		10,000
Ethylenebisdithiocarbamic acid, salts and esters	N171				313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Ethylenebisdithiocarbamic acid, salts & esters	111-54-6			5,000	X	U114	
Ethylenediamine	107-15-3	10,000	5,000	5,000			20,000
Ethylenediamine-tetraacetic acid (EDTA)	60-00-4			5,000			
Ethylene dibromide	106-93-4			1	X	U067	
Ethylene dichloride	107-06-2			100	X	U077	
Ethylene fluorohydrin	371-62-0	10	10				
Ethylene glycol	107-21-1			5,000	313		
Ethyleneimine	151-56-4	500	1	1	313	P054	10,000
Ethylene oxide	75-21-8	1,000	10	10	313	U115	10,000
Ethylene thiourea	96-45-7			10	313	U116	
Ethyl ether	60-29-7			100		U117	10,000
Ethylidene Dichloride	75-34-3			1,000	313	U076	
Ethyl mercaptan	75-08-1						10,000
Ethyl methacrylate	97-63-2			1,000		U118	
Ethyl methanesulfonate	62-50-0			1		U119	
N-Ethyl-N'-(1-methylethyl)-6-(methylthio)-1,3,5,-triazine-2,4-diamine	834-12-8				X		
O-Ethyl O-(4-(methylthio)phenyl)phosphorodithioic acid S-propyl ester	35400-43-2				X		
Ethyl nitrite	109-95-5						10,000
N-(1-Ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine	40487-42-1				X		
S-(2-(Ethylsulfinyl)ethyl) O,O-dimethyl ester phosphorothioic acid	301-12-2				X		
Ethylthiocyanate	542-90-5	10,000	10,000				
Ethyne	74-86-2						10,000
Famphur	52-85-7			1,000	313	P097	
Fenamiphos	22224-92-6	10/10,000	10				
Fenarimol	60168-88-9				313		
Fenbutatin oxide	13356-08-6				313		
Fenoxaprop ethyl	66441-23-4				313		
Fenoxycarb	72490-01-8				313		
Fenpropathrin	39515-41-8				313		
Fensulfothion	115-90-2	500	500				
Fenthion	55-38-9				313		
Fenvalerate	51630-58-1				313		
Ferbam	14484-64-1				313		
Ferric ammonium citrate	1185-57-5			1,000			
Ferric ammonium oxalate	2944-67-4			1,000			
Ferric ammonium oxalate	55488-87-4			1,000			
Ferric chloride	7705-08-0			1,000			
Ferric fluoride	7783-50-8			100			
Ferric nitrate	10421-48-4			1,000			
Ferric sulfate	10028-22-5			1,000			
Ferrous ammonium sulfate	10045-89-3			1,000			
Ferrous chloride	7758-94-3			100			
Ferrous sulfate	7720-78-7			1,000			
Ferrous sulfate	7782-63-0			1,000			

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Fine mineral fibers	N.A.			&			
Fluazifop butyl	69806-50-4				313		
Fluenetil	4301-50-2	100/10,000	100				
Fluometuron	2164-17-2				313		
Fluoranthene	206-44-0			100	X	U120	
Fluorene	86-73-7			5,000			
Fluorine	7782-41-4	500	10	10	313	P056	1,000
Fluoroacetamide	640-19-7	100/10,000	100	100		P057	
Fluoroacetic acid	144-49-0	10/10,000	10				
Fluoroacetic acid, sodium salt	62-74-8	10/10,000	10	10	X	P058	
Fluoroacetyl chloride	359-06-8	10	10				
Fluorouracil	51-21-8	500/10,000	500		313		
5-Fluorouracil	51-21-8	500/10,000	500		X		
Fluvalinate	69409-94-5				313		
Folpet	133-07-3				313		
Fomesafen	72178-02-0				313		
Fonofos	944-22-9	500	500				
Formaldehyde	50-00-0	500	100	100	313	U122	15,000
Formaldehyde cyanohydrin	107-16-4	1,000	1,000				
Formaldehyde (solution)	50-00-0	500	100	100	X	U122	15,000
Formetanate hydrochloride	23422-53-9	500/10,000	100	100		P198	
Formic acid	64-18-6			5,000	313	U123	
Formic acid, methyl ester	107-31-3						10,000
Formothion	2540-82-1	100	100				
Formparanate	17702-57-7	100/10,000	100	100		P197	
Fosthietan	21548-32-3	500	500				
Freon 113	76-13-1				313		
Fuberidazole	3878-19-1	100/10,000	100				
Fumaric acid	110-17-8			5,000			
Furan	110-00-9	500	100	100	313	U124	5,000
Furan, tetrahydro-	109-99-9			1,000		U213	
Furfural	98-01-1			5,000		U125	
Gallium trichloride	13450-90-3	500/10,000	500				
Glycidol	556-52-5				313		
Glycidylaldehyde	765-34-4			10		U126	
Glycol Ethers	N230			&	313		
Guanidine, N-methyl-N'-nitro-N-nitroso-	70-25-7			10		U163	
Guthion	86-50-0	10/10,000	1	1			
Haloethers	N.A.			&			
Halomethanes	N.A.			&			
Halon 1211	353-59-3				X		
Halon 1301	75-63-8				X		
Halon 2402	124-73-2				X		
HCFC-121	354-14-3				X		
HCFC-121a	354-11-0				X		
HCFC-123	306-83-2				X		
HCFC-123a	354-23-4				X		
HCFC-123b	812-04-4				X		
HCFC-124	2837-89-0				X		
HCFC-124a	354-25-6				X		
HCFC-132b	1649-08-7				X		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
HCFC-133a	75-88-7				X		
HCFC-141b	1717-00-6				X		
HCFC-142b	75-68-3				X		
HCFC-21	75-43-4				X		
HCFC-22	75-45-6				X		
HCFC-225aa	128903-21-9				X		
HCFC-225ba	422-48-0				X		
HCFC-225bb	422-44-6				X		
HCFC-225ca	422-56-0				X		
HCFC-225cb	507-55-1				X		
HCFC-225cc	13474-88-9				X		
HCFC-225da	431-86-7				X		
HCFC-225ea	136013-79-1				X		
HCFC-225eb	111512-56-2				X		
HCFC-253fb	460-35-5				X		
Heptachlor	76-44-8			1	313	P059	
Heptachlor and Metabolites	N.A.			&			
Heptachlor epoxide	1024-57-3			1			
1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	35822-46-9				313!		
1,2,3,4,7,8,9-heptachlorodibenzofuran	55673-89-7				313!		
1,2,3,4,6,7,8-heptachlorodibenzofuran	67562-39-4				313!		
1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methano-1H-indene	76-44-8			1	X	P059	
Hexachlorobenzene	118-74-1			10	313	U127	
Hexachloro-1,3-butadiene	87-68-3			1	313	U128	
Hexachlorobutadiene	87-68-3			1	X	U128	
Hexachlorocyclohexane (all isomers)	608-73-1			&			
alpha-Hexachlorocyclohexane	319-84-6			10	313		
Hexachlorocyclohexane (gamma isomer)	58-89-9	1,000/10,000	1	1	X	U129	
Hexachlorocyclopentadiene	77-47-4	100	10	10	313	U130	
1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	19408-74-3				313!		
1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	39227-28-6				313!		
1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	57653-85-7				313!		
1,2,3,6,7,8-hexachlorodibenzofuran	57117-44-9				313!		
2,3,4,6,7,8-hexachlorodibenzofuran	60851-34-5				313!		
1,2,3,4,7,8-hexachlorodibenzofuran	70648-26-9				313!		
1,2,3,7,8,9-hexachlorodibenzofuran	72918-21-9				313!		
Hexachloroethane	67-72-1			100	313	U131	
Hexachloronaphthalene	1335-87-1				313		
Hexachlorophene	70-30-4			100	313	U132	
Hexachloropropene	1888-71-7			1,000		U243	
Hexaethyl tetraphosphate	757-58-4			100		P062	
Hexakis(2-methyl-2-phenylpropyl)distannoxane	13356-08-6				X		
Hexamethylenediamine, N,N'-dibutyl-	4835-11-4	500	500				
Hexamethylene-1,6-diisocyanate	822-06-0			100	313#		
Hexamethylphosphoramide	680-31-9			1	313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Hexane	110-54-3			5,000	X		
n-Hexane	110-54-3			5,000	313		
Hexazinone	51235-04-2				313		
Hydramethylnon	67485-29-4				313		
Hydrazine	302-01-2	1,000	1	1	313	U133	15,000
Hydrazine, 1,2-diethyl-	1615-80-1			10		U086	
Hydrazine, 1,1-dimethyl-	57-14-7	1,000	10	10	X	U098	15,000
Hydrazine, 1,2-dimethyl-	540-73-8			1		U099	
Hydrazine, 1,2-diphenyl-	122-66-7			10	X	U109	
Hydrazine, methyl-	60-34-4	500	10	10	X	P068	15,000
Hydrazine sulfate	10034-93-2				313		
Hydrazobenzene	122-66-7			10	X	U109	
Hydrochloric acid	7647-01-0			5,000			
Hydrochloric acid (conc 37% or greater)	7647-01-0			5,000			15,000
Hydrochloric acid (aerosol forms only)	7647-01-0			5,000	313		
Hydrocyanic acid	74-90-8	100	10	10	X	P063	2,500
Hydrofluoric acid	7664-39-3	100	100	100	X	U134	
Hydrofluoric acid (conc. 50% or greater)	7664-39-3	100	100	100	X	U134	1,000
Hydrogen	1333-74-0						10,000
Hydrogen chloride (anhydrous)	7647-01-0	500	5,000	5,000	X		5,000
Hydrogen chloride (gas only)	7647-01-0	500	5,000	5,000	X		5,000
Hydrogen cyanide	74-90-8	100	10	10	313	P063	2,500
Hydrogen fluoride	7664-39-3	100	100	100	313	U134	
Hydrogen fluoride (anhydrous)	7664-39-3	100	100	100	X	U134	1,000
Hydrogen peroxide (Conc.> 52%)	7722-84-1	1,000	1,000				
Hydrogen selenide	7783-07-5	10	10		313c		500
Hydrogen sulfide	7783-06-4	500	100	100	313	U135	10,000
Hydroperoxide, 1-methyl-1-phenylethyl-	80-15-9			10	X	U096	
Hydroquinone	123-31-9	500/10,000	100	100	313		
Imazalil	35554-44-0				313		
Indeno(1,2,3-cd)pyrene	193-39-5			100	313+	U137	
3-Iodo-2-propynyl butylcarbamate	55406-53-6				313		
Iron carbonyl (Fe(CO)5), (TB-5-11)-	13463-40-6	100	100		X		2,500
Iron, pentacarbonyl-	13463-40-6	100	100		313		2,500
Isobenzan	297-78-9	100/10,000	100				
Isobutane	75-28-5						10,000
Isobutyl alcohol	78-83-1			5,000		U140	
Isobutyraldehyde	78-84-2				313		
Isobutyronitrile	78-82-0	1,000	1,000				20,000
Isocyanic acid, 3,4-dichlorophenyl ester	102-36-3	500/10,000	500				
Isodrin	465-73-6	100/10,000	1	1	313	P060	
Isofenphos	25311-71-1				313		
Isofluorphate	55-91-4	100	100	100		P043	
1H-Isoindole-1,3(2H)-dione, 3a,4,7,7a-tetrahydro-2-[(trichloromethyl)thio]-	133-06-2			10	X		
Isononylphenol	11066-49-2				313$		
4-Isononylphenol	26543-97-5				313$		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Isopentane	78-78-4						10,000
Isophorone	78-59-1			5,000			
Isophorone diisocyanate	4098-71-9	500	500		313#		
Isoprene	78-79-5			100	313		10,000
Isopropanolamine dodecylbenzene sulfonate	42504-46-1			1,000			
Isopropyl alcohol (mfg-strong acid process)	67-63-0				313		
Isopropylamine	75-31-0						10,000
Isopropyl chloride	75-29-6						10,000
Isopropyl chloroformate	108-23-6	1,000	1,000				15,000
4,4'-Isopropylidenediphenol	80-05-7				313		
Isopropylmethylpyrazolyl dimethylcarbamate	119-38-0	500	100	100		P192	
Isosafrole	120-58-1			100	313	U141	
Isothiocyanatomethane	556-61-6	500	500		X		
Kepone	143-50-0			1		U142	
Lactofen	77501-63-4				313		
Lactonitrile	78-97-7	1,000	1,000				
Lasiocarpine	303-34-4			10		U143	
Lead	7439-92-1			10	313		
Lead acetate	301-04-2			10	313c	U144	
Lead arsenate	7645-25-2			1	313c		
Lead arsenate	7784-40-9			1	313c		
Lead arsenate	10102-48-4			1	313c		
Lead chloride	7758-95-4			10	313c		
Lead Compounds	N420			&	313		
Lead fluoborate	13814-96-5			10	313c		
Lead fluoride	7783-46-2			10	313c		
Lead iodide	10101-63-0			10	313c		
Lead nitrate	10099-74-8			10	313c		
Lead phosphate	7446-27-7			10	313c	U145	
Lead stearate	1072-35-1			10	313c		
Lead stearate	7428-48-0			10	313c		
Lead stearate	52652-59-2			10	313c		
Lead stearate	56189-09-4			10	313c		
Lead subacetate	1335-32-6			10	313c	U146	
Lead sulfate	7446-14-2			10	313c		
Lead sulfate	15739-80-7			10	313c		
Lead sulfide	1314-87-0			10	313c		
Lead thiocyanate	592-87-0			10	313c		
Leptophos	21609-90-5	500/10,000	500				
Lewisite	541-25-3	10	10				
Lindane	58-89-9	1,000/10,000	1	1	313	U129	
Linuron	330-55-2				313		
Lithium carbonate	554-13-2				313		
Lithium chromate	14307-35-8			10	313c		
Lithium hydride	7580-67-8	100	100				
Malathion	121-75-5			100	313		
Maleic acid	110-16-7			5,000			
Maleic anhydride	108-31-6			5,000	313	U147	
Maleic hydrazide	123-33-1			5,000		U148	

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Malononitrile	109-77-3	500/10,000	1,000	1,000	313	U149	
Maneb	12427-38-2				313		
Manganese	7439-96-5				313		
Manganese, bis(dimethylcarbamodithioato-S,S')-	15339-36-3			10	313c	P196	
Manganese Compounds	N450			&	313		
Manganese, tricarbonyl methylcyclopentadienyl	12108-13-3	100	100		313c		
MBOCA	101-14-4			10	X	U158	
MBT	149-30-4				X		
MCPA	94-74-6				X		
MDI	101-68-8			5,000	X		
Mechlorethamine	51-75-2	10	10		X		
Mecoprop	93-65-2				313		
Melphalan	148-82-3			1		U150	
Mephosfolan	950-10-7	500	500				
2-Mercaptobenzothiazole	149-30-4				313		
Mercaptodimethur	2032-65-7	500/10,000	10	10	X	P199	
Mercuric acetate	1600-27-7	500/10,000	500		313c		
Mercuric chloride	7487-94-7	500/10,000	500		313c		
Mercuric cyanide	592-04-1			1	313c		
Mercuric nitrate	10045-94-0			10	313c		
Mercuric oxide	21908-53-2	500/10,000	500		313c		
Mercuric sulfate	7783-35-9			10	313c		
Mercuric thiocyanate	592-85-8			10	313c		
Mercurous nitrate	7782-86-7			10	313c		
Mercurous nitrate	10415-75-5			10	313c		
Mercury	7439-97-6			1	313	U151	
Mercury Compounds	N458			&	313		
Mercury fulminate	628-86-4			10	313c	P065	
Merphos	150-50-5				313		
Methacrolein diacetate	10476-95-6	1,000	1,000				
Methacrylic anhydride	760-93-0	500	500				
Methacrylonitrile	126-98-7	500	1,000	1,000	313	U152	10,000
Methacryloyl chloride	920-46-7	100	100				
Methacryloyloxyethyl isocyanate	30674-80-7	100	100				
Methamidophos	10265-92-6	100/10,000	100				
Metham sodium	137-42-8				313		
Methanamine	74-89-5			100			10,000
Methanamine, N,N-dimethyl-	75-50-3			100			10,000
Methanamine, N-methyl-	124-40-3			1,000	X	U092	10,000
Methanamine, N-methyl-N-nitroso-	62-75-9	1,000	10	10	X	P082	
Methane	74-82-8						10,000
Methane, chloro-	74-87-3			100	X	U045	10,000
Methane, chloromethoxy-	107-30-2	100	10	10	X	U046	5,000
Methane, isocyanato-	624-83-9	500	10	10	X	P064	10,000
Methane, oxybis-	115-10-6						10,000
Methane, oxybis[chloro-	542-88-1	100	10	10	X	P016	1,000
Methanesulfenyl chloride, trichloro-	594-42-3	500	100	100	X		10,000
Methanesulfonyl fluoride	558-25-8	1,000	1,000				
Methane, tetranitro-	509-14-8	500	10	10		P112	10,000
Methanethiol	74-93-1	500	100	100	X	U153	10,000

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Methane, trichloro-	67-66-3	10,000	10	10	X	U044	20,000
4,7-Methanoindan, 1,2,3,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-	57-74-9	1,000	1	1	X	U036	
Methanol	67-56-1			5,000	313	U154	
Methapyrilene	91-80-5			5,000		U155	
Methazole	20354-26-1				313		
Methidathion	950-37-8	500/10,000	500				
Methiocarb	2032-65-7	500/10,000	10	10	313	P199	
Methomyl	16752-77-5	500/10,000	100	100		P066	
Methoxone	94-74-6				313		
Methoxone sodium salt	3653-48-3				313		
Methoxychlor	72-43-5			1	313	U247	
2-Methoxyethanol	109-86-4				313		
Methoxyethylmercuric acetate	151-38-2	500/10,000	500		313c		
2-(4-Methoxy-6-methyl-1,3,5-triazin-2-yl)-methylamino)carbonyl)amino)sulfonyl) benzoic acid, methyl ester	101200-48-0				X		
Methyl acrylate	96-33-3				313		
Methyl bromide	74-83-9	1,000	1,000	1,000	X	U029	
2-Methyl-1-butene	563-46-2						10,000
3-Methyl-1-butene	563-45-1						10,000
Methyl chloride	74-87-3			100	X	U045	10,000
Methyl 2-chloroacrylate	80-63-7	500	500				
Methyl chlorocarbonate	79-22-1	500	1,000	1,000	313	U156	5,000
Methyl chloroform	71-55-6			1,000	X	U226	
Methyl chloroformate	79-22-1	500	1,000	1,000	X	U156	5,000
3-Methylcholanthrene	56-49-5			10	313+	U157	
5-Methylchrysene	3697-24-3				313+		
4-Methyldiphenylmethane-3,4-diisocyanate	75790-84-0				313#		
6-Methyl-1,3-dithiolo[4,5-b]quinoxalin-2-one	2439-01-2				X		
4,4'-Methylenebis(2-chloroaniline)	101-14-4			10	313	U158	
2,2'-Methylenebis(4-chlorophenol	97-23-4				X		
4,4'-Methylenebis(N,N-dimethyl)benzenamine	101-61-1				313		
1,1'-Methylene bis(4-isocyanatocyclohexane)	5124-30-1				313#		
Methylenebis(phenylisocyanate)	101-68-8			5,000	313#		
Methylene bromide	74-95-3			1,000	313	U068	
Methylene chloride	75-09-2			1,000	X	U080	
4,4'-Methylenedianiline	101-77-9			10	313		
Methyl ether	115-10-6						10,000
Methyl ethyl ketone	78-93-3			5,000		U159	
Methyl ethyl ketone peroxide	1338-23-4			10		U160	
Methyleugenol	93-15-2				313		
Methyl formate	107-31-3						10,000
Methyl hydrazine	60-34-4	500	10	10	313	P068	15,000
Methyl iodide	74-88-4			100	313	U138	
Methyl isobutyl ketone	108-10-1			5,000	313	U161	
Methyl isocyanate	624-83-9	500	10	10	313	P064	10,000

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Methyl isothiocyanate	556-61-6	500	500		313		
2-Methyllactonitrile	75-86-5	1,000	10	10	313	P069	
Methyl mercaptan	74-93-1	500	100	100	313s	U153	10,000
Methylmercuric dicyanamide	502-39-6	500/10,000	500		313c		
Methyl methacrylate	80-62-6			1,000	313	U162	
N-Methylolacrylamide	924-42-5				313		
Methyl parathion	298-00-0	100/10,000	100	100	313	P071	
Methyl phenkapton	3735-23-7	500	500				
Methyl phosphonic dichloride	676-97-1	100	100				
2-Methylpropene	115-11-7						10,000
2-Methylpyridine	109-06-8			5,000	313	U191	
N-Methyl-2-pyrrolidone	872-50-4				313		
Methyl tert-butyl ether	1634-04-4			1,000	313		
Methyl thiocyanate	556-64-9	10,000	10,000				20,000
Methylthiouracil	56-04-2			10		U164	
Methyltrichlorosilane	75-79-6	500	500				5,000
Methyl vinyl ketone	78-94-4	10	10				
Metiram	9006-42-2				313		
Metolcarb	1129-41-5	100/10,000	1,000	1,000		P190	
Metribuzin	21087-64-9				313		
Mevinphos	7786-34-7	500	10	10	313		
Mexacarbate	315-18-4	500/10,000	1,000	1,000		P128	
Michler's ketone	90-94-8				313		
Mitomycin C	50-07-7	500/10,000	10	10		U010	
Molinate	2212-67-1				313		
Molybdenum trioxide	1313-27-5				313		
Monochloropentafluoroethane	76-15-3				313		
Monocrotophos	6923-22-4	10/10,000	10				
Monoethylamine	75-04-7			100			10,000
Monomethylamine	74-89-5			100			10,000
Monuron	150-68-5				313		
Muscimol	2763-96-4	500/10,000	1,000	1,000		P007	
Mustard gas	505-60-2	500	500		313		
Myclobutanil	88671-89-0				313		
Nabam	142-59-6				313		
Naled	300-76-5			10	313		
Naphthalene	91-20-3			100	313	U165	
1,5-Naphthalene diisocyanate	3173-72-6				313#		
1-Naphthalenol, methylcarbamate	63-25-2			100	X	U279	
Naphthenic acid	1338-24-5			100			
1,4-Naphthoquinone	130-15-4			5,000		U166	
alpha-Naphthylamine	134-32-7			100	313	U167	
beta-Naphthylamine	91-59-8			10	313	U168	
Nickel	7440-02-0			100	313		
Nickel ammonium sulfate	15699-18-0			100	313c		
Nickel carbonyl	13463-39-3	1	10	10	313c	P073	1,000
Nickel chloride	7718-54-9			100	313c		
Nickel chloride	37211-05-5			100	313c		
Nickel Compounds	N495			&	313		
Nickel cyanide	557-19-7			10	313c	P074	
Nickel hydroxide	12054-48-7			10	313c		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Nickel nitrate	14216-75-2			100	313c		
Nickel sulfate	7786-81-4			100	313c		
Nicotine	54-11-5	100	100	100	313c	P075	
Nicotine and salts	N503				313		
Nicotine and salts	54-11-5			100	313c	P075	
Nicotine sulfate	65-30-5	100/10,000	100	100	313c		
Nitrapyrin	1929-82-4				313		
Nitrate compounds (water dissociable)	N511				313		
Nitric acid	7697-37-2	1,000	1,000	1,000	313		
Nitric acid (conc 80% or greater)	7697-37-2	1,000	1,000	1,000	X		15,000
Nitric oxide	10102-43-9	100	10	10 @		P076	10,000
Nitrilotriacetic acid	139-13-9				313		
p-Nitroaniline	100-01-6			5,000	313	P077	
5-Nitro-o-anisidine	99-59-2				313		
Nitrobenzene	98-95-3	10,000	1,000	1,000	313	U169	
4-Nitrobiphenyl	92-93-3			10	313		
6-Nitrochrysene	7496-02-8				313+		
Nitrocyclohexane	1122-60-7	500	500				
Nitrofen	1836-75-5				313		
Nitrogen dioxide	10102-44-0	100	10	10 @		P078	
Nitrogen dioxide	10544-72-6			10 @			
Nitrogen mustard	51-75-2	10	10		313		
Nitrogen oxide (NO)	10102-43-9	100	10	10 @		P076	10,000
Nitroglycerin	55-63-0			10	313	P081	
Nitromethane	75-52-5				313		
Nitrophenol (mixed isomers)	25154-55-6			100			
2-Nitrophenol	88-75-5			100	313		
4-Nitrophenol	100-02-7			100	313	U170	
m-Nitrophenol	554-84-7			100			
p-Nitrophenol	100-02-7			100	X	U170	
Nitrophenols	N.A.			&			
2-Nitropropane	79-46-9			10	313	U171	
1-Nitropyrene	5522-43-0				313+		
4–Nitropyrene	57835-92-4				313+		
Nitrosamines	N.A.			&			
N-Nitrosodi-n-butylamine	924-16-3			10	313	U172	
N-Nitrosodiethanolamine	1116-54-7			1		U173	
N-Nitrosodiethylamine	55-18-5			1	313	U174	
N-Nitrosodimethylamine	62-75-9	1,000	10	10	313	P082	
Nitrosodimethylamine	62-75-9	1,000	10	10	X	P082	
N-Nitrosodiphenylamine	86-30-6			100	313		
p-Nitrosodiphenylamine	156-10-5				313		
N-Nitrosodi-n-propylamine	621-64-7			10	313	U111	
N-Nitroso-N-ethylurea	759-73-9			1	313	U176	
N-Nitroso-N-methylurea	684-93-5			1	313	U177	
N-Nitroso-N-methylurethane	615-53-2			1		U178	
N-Nitrosomethylvinylamine	4549-40-0			10	313	P084	
N-Nitrosomorpholine	59-89-2			1	313		
N-Nitrosonornicotine	16543-55-8				313		
N-Nitrosopiperidine	100-75-4			10	313	U179	
N-Nitrosopyrrolidine	930-55-2			1		U180	

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Nitrotoluene	1321-12-6			1,000			
m-Nitrotoluene	99-08-1			1,000			
o-Nitrotoluene	88-72-2			1,000	313		
p-Nitrotoluene	99-99-0			1,000			
5-Nitro-o-toluidine	99-55-8			100	313	U181	
Nitrous acid, ethyl ester	109-95-5						10,000
Nonylphenol (includes only 6 chemicals)	N530				313		
Nonylphenol	25154-52-3				313$		
Nonylphenol, branched	90481-04-2				313$		
4-Nonylphenol	104-40-5				313$		
4-Nonylphenol, branched	84852-15-3				313$		
Norbormide	991-42-4	100/10,000	100				
Norflurazon	27314-13-2				313		
1,2,3,4,6,7,8,9-octachlorodibenzo-p-dioxin	3268-87-9				313!		
1,2,3,4,6,7,8,9-octachlorodibenzofuran	39001-02-0				313!		
Octachloronaphthalene	2234-13-1				313		
Octachlorostyrene	29082-74-4				313		
Octanoic acid, 2,6-dibromo-4-cyanophenyl ester	1689-99-2				X		
Oleum (fuming sulfuric acid)	8014-95-7			1,000			10,000
o-Nitroanisole	91-23-6				313		
Organorhodium Complex (PMN-82-147)	0	10/10,000	10	PMN			
Oryzalin	19044-88-3				313		
Osmium oxide OsO4 (T-4)-	20816-12-0			1,000	X	P087	
Osmium tetroxide	20816-12-0			1,000	313	P087	
Ouabain	630-60-4	100/10,000	100				
7-Oxabicyclo(2.2.1)heptane-2,3-dicarboxylic acid, dipotassium salt	2164-07-0				X		
Oxamyl	23135-22-0	100/10,000	100	100		P194	
Oxetane, 3,3-bis(chloromethyl)-	78-71-7	500	500				
Oxirane	75-21-8	1,000	10	10	X	U115	10,000
Oxirane, (chloromethyl)-	106-89-8	1,000	100	100	X	U041	20,000
Oxirane, methyl-	75-56-9	10,000	100	100	X		10,000
Oxydemeton methyl	301-12-2				313		
Oxydiazon	19666-30-9				313		
Oxydisulfoton	2497-07-6	500	500				
Oxyfluorfen	42874-03-3				313		
Ozone	10028-15-6	100	100		313		
Paraformaldehyde	30525-89-4			1,000			
Paraldehyde	123-63-7			1,000	313	U182	
Paraquat dichloride	1910-42-5	10/10,000	10		313		
Paraquat methosulfate	2074-50-2	10/10,000	10				
Parathion	56-38-2	100	10	10	313	P089	
Parathion-methyl	298-00-0	100/10,000	100	100	X	P071	
Paris green	12002-03-8	500/10,000	1	1			
PCBs	1336-36-3			1	X		
PCNB	82-68-8			100	X	U185	
PCP	87-86-5			10	X		

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Pebulate	1114-71-2				313		
Pendimethalin	40487-42-1				313		
Pentaborane	19624-22-7	500	500				
Pentachlorobenzene	608-93-5			10	313	U183	
1,2,3,7,8-pentachlorodibenzo-p-dioxin	40321-76-4				313!		
2,3,4,7,8-pentachlorodibenzofuran	57117-31-4				313!		
1,2,3,7,8-pentachlorodibenzofuran	57117-41-6				313!		
Pentachloroethane	76-01-7			10	313	U184	
Pentachloronitrobenzene	82-68-8			100	X	U185	
Pentachlorophenol	87-86-5			10	313		
Pentadecylamine	2570-26-5	100/10,000	100				
1,3-Pentadiene	504-60-9			100		U186	10,000
Pentane	109-66-0						10,000
1-Pentene	109-67-1						10,000
2-Pentene, (E)-	646-04-8						10,000
2-Pentene, (Z)-	627-20-3						10,000
Pentobarbital sodium	57-33-0				313		
Peracetic acid	79-21-0	500	500		313		10,000
Perchloroethylene	127-18-4			100	X	U210	
Perchloromethyl mercaptan	594-42-3	500	100	100	313		10,000
Permethrin	52645-53-1				313		
Phenacetin	62-44-2			100		U187	
Phenanthrene	85-01-8			5,000	313		
Phenol	108-95-2	500/10,000	1,000	1,000	313	U188	
Phenol, 2-(1-methylethoxy)-, methylcarbamate	114-26-1			100	X	U411	
Phenol, 3-(1-methylethyl)-, methylcarbamate	64-00-6	500/10,000	10	10		P202	
Phenolphthalein	77-09-8				313		
Phenol, 2,2'-thiobis[4-chloro-6-methyl-	4418-66-0	100/10,000	100				
Phenothrin	26002-80-2				313		
Phenoxarsine, 10,10'-oxydi-	58-36-6	500/10,000	500				
(2-(4-Phenoxyphenoxy)ethyl carbamic acid ethyl ester	72490-01-8				X		
Phenyl dichloroarsine	696-28-6	500	1	1		P036	
(1,2-Phenylenebis(iminocarbonothioyl)) biscarbamic acid diethyl ester	23564-06-9				X		
1,2-Phenylenediamine	95-54-5				313		
p-Phenylenediamine	106-50-3			5,000	313		
1,3-Phenylenediamine	108-45-2				313		
1,2-Phenylenediamine dihydrochloride	615-28-1				313		
1,4-Phenylenediamine dihydrochloride	624-18-0				313		
1,4-Phenylene diisocyanate	104-49-4				313#		
1,3-Phenylene diisocyanate	123-61-5				313#		
Phenylhydrazine hydrochloride	59-88-1	1,000/10,000	1,000				
Phenylmercuric acetate	62-38-4	500/10,000	100	100	313c	P092	
Phenylmercury acetate	62-38-4	500/10,000	100	100	313c	P092	
5-(Phenylmethyl)-3-furanyl)methyl 2,2-dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylate	10453-86-8				X		
2-Phenylphenol	90-43-7				313		

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Phenylsilatrane	2097-19-0	100/10,000	100				
Phenylthiourea	103-85-5	100/10,000	100	100		P093	
Phenytoin	57-41-0				313		
Phorate	298-02-2	10	10	10		P094	
Phosacetim	4104-14-7	100/10,000	100				
Phosfolan	947-02-4	100/10,000	100				
Phosgene	75-44-5	10	10	10	313	P095	500
Phosphamidon	13171-21-6	100	100				
Phosphine	7803-51-2	500	100	100	313	P096	5,000
Phosphonic acid, (2,2,2-trichloro-1-hydroxyethyl)-,dimethyl ester	52-68-6			100	X		
Phosphonothioic acid, methyl-, O-ethyl O-(4-(methylthio)phenyl) ester	2703-13-1	500	500				
Phosphonothioic acid, methyl-, S-(2-(bis(1-methylethyl)amino)ethyl) O-ethyl ester	50782-69-9	100	100				
Phosphonothioic acid, methyl-, O-(4-nitrophenyl) O-phenyl ester	2665-30-7	500	500				
Phosphoric acid	7664-38-2			5,000			
Phosphoric acid, 2-chloro-1-(2,3,5-trichlorophenyl) ethenyl dimethyl ester	961-11-5				X		
Phosphoric acid, 2-dichloroethenyl dimethyl ester	62-73-7	1,000	10	10	X		
Phosphoric acid, dimethyl 4-(methylthio) phenyl ester	3254-63-5	500	500				
Phosphorodithioic acid O-ethyl S,S-dipropyl ester	13194-48-4	1,000	1,000		X		
Phosphorothioic acid, O,O-diethyl-O-(4-nitrophenyl) ester	56-38-2	100	10	10	X	P089	
Phosphorothioic acid, O,O-dimethyl-5-(2-(methylthio)ethyl)ester	2587-90-8	500	500				
Phosphorous trichloride	7719-12-2	1,000	1,000	1,000			15,000
Phosphorus (yellow or white)	7723-14-0	100	1	1	313		
Phosphorus	7723-14-0	100	1	1			
Phosphorus oxychloride	10025-87-3	500	1,000	1,000			5,000
Phosphorus pentachloride	10026-13-8	500	500				
Phosphorus trichloride	7719-12-2	1,000	1,000	1,000			15,000
Phosphoryl chloride	10025-87-3	500	1,000	1,000			5,000
Phthalate Esters	N.A.			&			
Phthalic anhydride	85-44-9			5,000	313	U190	
Physostigmine	57-47-6	100/10,000	100	100		P204	
Physostigmine, salicylate (1:1)	57-64-7	100/10,000	100	100		P188	
Picloram	1918-02-1				313		
2-Picoline	109-06-8			5,000	X	U191	
Picric acid	88-89-1				313		
Picrotoxin	124-87-8	500/10,000	500				
N,N'-(1,4-Piperazinediylbis(2,2,2-trichloroethylidene)) bisformamide	26644-46-2				X		
Piperidine	110-89-4	1,000	1,000				15,000
Piperonyl butoxide	51-03-6				313		
Pirimifos-ethyl	23505-41-1	1,000	1,000				
Pirimiphos methyl	29232-93-7				313		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Plumbane, tetramethyl-	75-74-1	100	100				10,000
Polybrominated Biphenyls (PBBs)	N575				313		
Polychlorinated alkanes (C10 to C13)	N583				313		
Polychlorinated biphenyls	1336-36-3			1	313		
Polycyclic aromatic compounds (includes only 23 chemicals)	N590				313		
Polycyclic organic matter	N.A.			&			
Polymeric diphenylmethane diisocyanate	9016-87-9				313#		
Polynuclear Aromatic Hydrocarbons	N.A.			&			
Potassium arsenate	7784-41-0			1	313c		
Potassium arsenite	10124-50-2	500/10,000	1	1	313c		
Potassium bichromate	7778-50-9			10	313c		
Potassium bromate	7758-01-2				313		
Potassium chromate	7789-00-6			10	313c		
Potassium cyanide	151-50-8	100	10	10	313c	P098	
Potassium dimethyldithiocarbamate	128-03-0				313		
Potassium hydroxide	1310-58-3			1,000			
Potassium N-methyldithiocarbamate	137-41-7				313		
Potassium permanganate	7722-64-7			100	313c		
Potassium silver cyanide	506-61-6	500	1	1	313c	P099	
Profenofos	41198-08-7				313		
Promecarb	2631-37-0	500/10,000	1,000	1,000		P201	
Prometryn	7287-19-6				313		
Pronamide	23950-58-5			5,000	313	U192	
Propachlor	1918-16-7				313		
1,2-Propadiene	463-49-0						10,000
Propadiene	463-49-0						10,000
2-Propanamine	75-31-0						10,000
Propane	74-98-6						10,000
Propane, 2-chloro-	75-29-6						10,000
Propane 1,2-dichloro-	78-87-5			1,000	X	U083	
Propane, 2,2-dimethyl-	463-82-1						10,000
Propane, 2-methyl	75-28-5						10,000
Propanenitrile	107-12-0	500	10	10		P101	10,000
Propanenitrile, 2-methyl-	78-82-0	1,000	1,000				20,000
Propane sultone	1120-71-4			10	313	U193	
1,3-Propane sultone	1120-71-4			10	X	U193	
Propanil	709-98-8				313		
Propargite	2312-35-8			10	313		
Propargyl alcohol	107-19-7			1,000	313	P102	
Propargyl bromide	106-96-7	10	10				
2-Propenal	107-02-8	500	1	1	X	P003	5,000
2-Propen-1-amine	107-11-9	500	500		X		10,000
Propene	115-07-1				X		10,000
1-Propene	115-07-1				X		10,000
1-Propene, 1-chloro-	590-21-6						10,000
1-Propene, 2-chloro-	557-98-2						10,000
1-Propene, 2-methyl-	115-11-7						10,000
2-Propenenitrile	107-13-1	10,000	100	100	X	U009	20,000
2-Propenenitrile, 2-methyl-	126-98-7	500	1,000	1,000	X	U152	10,000
2-Propen-1-ol	107-18-6	1,000	100	100	X	P005	15,000

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
2-Propenoyl chloride	814-68-6	100	100				5,000
Propetamphos	31218-83-4				313		
Propham	122-42-9			1,000		U373	
Propiconazole	60207-90-1				313		
beta-Propiolactone	57-57-8	500	10	10	313		
Propionaldehyde	123-38-6			1,000	313		
Propionic acid	79-09-4			5,000			
Propionic anhydride	123-62-6			5,000			
Propionitrile	107-12-0	500	10	10		P101	10,000
Propionitrile, 3-chloro-	542-76-7	1,000	1,000	1,000	X	P027	
Propiophenone, 4'-amino	70-69-9	100/10,000	100				
Propoxur	114-26-1			100	313	U411	
n-Propylamine	107-10-8			5,000		U194	
Propyl chloroformate	109-61-5	500	500				15,000
Propylene	115-07-1				313		10,000
Propyleneimine	75-55-8	10,000	1	1	313	P067	10,000
Propylene oxide	75-56-9	10,000	100	100	313		10,000
1-Propyne	74-99-7						10,000
Propyne	74-99-7						10,000
Prothoate	2275-18-5	100/10,000	100				
Pyrene	129-00-0	1,000/10,000	5,000	5,000			
Pyrethrins	121-21-1			1			
Pyrethrins	121-29-9			1			
Pyrethrins	8003-34-7			1			
Pyridine	110-86-1			1,000	313	U196	
Pyridine, 4-amino-	504-24-5	500/10,000	1,000	1,000		P008	
Pyridine, 3-(1-methyl-2-pyrrolidinyl)-,(S)-	54-11-5	100	100	100		P075	
Pyridine, 2-methyl-5-vinyl-	140-76-1	500	500				
Pyridine, 4-nitro-, 1-oxide	1124-33-0	500/10,000	500				
2,4-(1H,3H)-Pyrimidinedione, 5-bromo-6-methyl-3-(1-methylpropyl), lithium salt	53404-19-6				X		
Pyriminil	53558-25-1	100/10,000	100				
Quinoline	91-22-5			5,000	313		
Quinone	106-51-4			10	313	U197	
Quintozene	82-68-8			100	313	U185	
Quizalofop-ethyl	76578-14-8				313		
Reserpine	50-55-5			5,000		U200	
Resmethrin	10453-86-8				313		
Resorcinol	108-46-3			5,000		U201	
Saccharin (manufacturing)	81-07-2			100	313	U202	
Saccharin and salts	81-07-2			100		U202	
Safrole	94-59-7			100	313	U203	
Salcomine	14167-18-1	500/10,000	500				
Sarin	107-44-8	10	10				
Selenious acid	7783-00-8	1,000/10,000	10	10	313c	U204	
Selenious acid, dithallium(1+) salt	12039-52-0			1,000	313c	P114	
Selenium	7782-49-2			100	313		
Selenium Compounds	N725			&	313		
Selenium dioxide	7446-08-4			10	313c		
Selenium oxychloride	7791-23-3	500	500		313c		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Selenium sulfide	7488-56-4			10	313c	U205	
Selenourea	630-10-4			1,000		P103	
Semicarbazide hydrochloride	563-41-7	1,000/10,000	1,000				
Sethoxydim	74051-80-2				313		
Silane	7803-62-5						10,000
Silane, (4-aminobutyl)diethoxymethyl-	3037-72-7	1,000	1,000				
Silane, chlorotrimethyl-	75-77-4	1,000	1,000				10,000
Silane, dichloro-	4109-96-0						10,000
Silane, dichlorodimethyl-	75-78-5	500	500				5,000
Silane, tetramethyl-	75-76-3						10,000
Silane, trichloro-	10025-78-2						10,000
Silane, trichloromethyl-	75-79-6	500	500				5,000
Silver	7440-22-4			1,000	313		
Silver Compounds	N740			&	313		
Silver cyanide	506-64-9			1	313c	P104	
Silver nitrate	7761-88-8			1	313c		
Silvex (2,4,5-TP)	93-72-1			100			
Simazine	122-34-9				313		
Sodium	7440-23-5			10			
Sodium arsenate	7631-89-2	1,000/10,000	1	1	313c		
Sodium arsenite	7784-46-5	500/10,000	1	1	313c		
Sodium azide (Na(N3))	26628-22-8	500	1,000	1,000	313	P105	
Sodium bichromate	10588-01-9			10	313c		
Sodium bifluoride	1333-83-1			100			
Sodium bisulfite	7631-90-5			5,000			
Sodium cacodylate	124-65-2	100/10,000	100				
Sodium chromate	7775-11-3			10	313c		
Sodium cyanide (Na(CN))	143-33-9	100	10	10	313c	P106	
Sodium dicamba	1982-69-0				313		
Sodium dimethyldithiocarbamate	128-04-1				313		
Sodium dodecylbenzenesulfonate	25155-30-0			1,000			
Sodium fluoride	7681-49-4			1,000			
Sodium fluoroacetate	62-74-8	10/10,000	10	10	313	P058	
Sodium hydrosulfide	16721-80-5			5,000			
Sodium hydroxide	1310-73-2			1,000			
Sodium hypochlorite	7681-52-9			100			
Sodium hypochlorite	10022-70-5			100			
Sodium methylate	124-41-4			1,000			
Sodium methyldithiocarbamate	137-42-8				X		
Sodium nitrite	7632-00-0			100	313		
Sodium pentachlorophenate	131-52-2				313		
Sodium o-phenylphenoxide	132-27-4				313		
Sodium phosphate, dibasic	7558-79-4			5,000			
Sodium phosphate, dibasic	10039-32-4			5,000			
Sodium phosphate, dibasic	10140-65-5			5,000			
Sodium phosphate, tribasic	7601-54-9			5,000			
Sodium phosphate, tribasic	10101-89-0			5,000			
Sodium phosphate, tribasic	10361-89-4			5,000			
Sodium selenate	13410-01-0	100/10,000	100		313c		
Sodium selenite	7782-82-3			100	313c		
Sodium selenite	10102-18-8	100/10,000	100	100	313c		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Sodium tellurite	10102-20-2	500/10,000	500				
Stannane, acetoxytriphenyl-	900-95-8	500/10,000	500				
Streptozotocin	18883-66-4			1		U206	
Strontium chromate	7789-06-2			10	313c		
Strychnine and salts	N746				313		
Strychnine	57-24-9	100/10,000	10	10	313c	P108	
Strychnine, and salts	57-24-9			10	313c	P108	
Strychnine, sulfate	60-41-3	100/10,000	10	10	313c		
Styrene	100-42-5			1,000	313		
Styrene oxide	96-09-3			100	313		
Sulfotep	3689-24-5	500	100	100		P109	
Sulfoxide, 3-chloropropyl octyl	3569-57-1	500	500				
Sulfur dioxide	7446-09-5	500	500				
Sulfur dioxide (anhydrous)	7446-09-5	500	500				5,000
Sulfur fluoride (SF4), (T-4)-	7783-60-0	100	100				2,500
Sulfuric acid (aerosol forms only)	7664-93-9	1,000	1,000	1,000	313		
Sulfuric acid	7664-93-9	1,000	1,000	1,000			
Sulfuric acid (fuming)	8014-95-7			1,000			10,000
Sulfuric acid, mixture with sulfur trioxide	8014-95-7			1,000			10,000
Sulfur monochloride	[1]12771-08-3			1,000			
Sulfur monochloride	[2]10025-67-9			1,000			
Sulfur phosphide	1314-80-3			100		U189	
Sulfur tetrafluoride	7783-60-0	100	100				2,500
Sulfur trioxide	7446-11-9	100	100				10,000
Sulfuryl fluoride	2699-79-8				313		
Sulprofos	35400-43-2				313		
2,4,5-T acid	93-76-5			1,000			
2,4,5-T amines	1319-72-8			5,000			
2,4,5-T amines	2008-46-0			5,000			
2,4,5-T amines	3813-14-7			5,000			
2,4,5-T amines	6369-96-6			5,000			
2,4,5-T amines	6369-97-7			5,000			
2,4,5-T esters	93-79-8			1,000			
2,4,5-T esters	1928-47-8			1,000			
2,4,5-T esters	2545-59-7			1,000			
2,4,5-T esters	25168-15-4			1,000			
2,4,5-T esters	61792-07-2			1,000			
2,4,5-T salts	13560-99-1			1,000			
Tabun	77-81-6	10	10				
Tebuthiuron	34014-18-1				313		
Tellurium hexafluoride	7783-80-4	100	100				
Temephos	3383-96-8				313		
TEPP	107-49-3	100	10	10		P111	
Terbacil	5902-51-2				313		
Terbufos	13071-79-9	100	100				
Tetrabromobisphenol A	79-94-7				313		

[1] CAS Number should be 10025-67-9. See Introduction for further explanation.
[2] This is correct CAS number but not the same CAS number used on the CERCLA list. See Introduction for further explanation.

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
1,2,4,5-Tetrachlorobenzene	95-94-3			5,000		U207	
2,3,7,8-tetrachlorodibenzofuran	51207-31-9				313!		
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746-01-6			1	313!		
1,1,2,2-Tetrachloroethane	79-34-5			100	313	U209	
1,1,1,2-Tetrachloroethane	630-20-6			100	313	U208	
Tetrachloroethylene	127-18-4			100	313	U210	
1,1,2,2-Tetrachloro-1-fluoroethane	354-14-3				313		
1,1,1,2-Tetrachloro-2-fluoroethane	354-11-0				313		
2,3,4,6-Tetrachlorophenol	58-90-2			10	313c		
Tetrachlorvinphos	961-11-5				313		
Tetracycline hydrochloride	64-75-5				313		
Tetraethyldithiopyrophosphate	3689-24-5	500	100	100		P109	
Tetraethyl lead	78-00-2	100	10	10	313c	P110	
Tetraethyl pyrophosphate	107-49-3	100	10	10		P111	
Tetraethyltin	597-64-8	100	100				
Tetrafluoroethylene	116-14-3				313		10,000
Tetrahydro-5,5-dimethyl-2(1H)-pyrimidinone(3-(4-(trifluoromethyl)phenyl)-1-(2-(4-(trifluoromethyl)phenyl)ethenyl)-2-propenylidene)hydrazone	67485-29-4				X		
Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione	533-74-4				X		
Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione, ion(1-), sodium	53404-60-7				X		
Tetramethrin	7696-12-0				313		
2,2,3,3-Tetramethylcyclopropane carboxylic acid cyano(3-phenoxyphenyl)methyl ester	39515-41-8				X		
Tetramethyllead	75-74-1	100	100		313c		10,000
Tetramethylsilane	75-76-3						10,000
Tetranitromethane	509-14-8	500	10	10	313	P112	10,000
Thallic oxide	1314-32-5			100	313c	P113	
Thallium	7440-28-0			1,000	313		
Thallium(I) acetate	563-68-8			100	313c	U214	
Thallium(I) carbonate	6533-73-9	100/10,000	100	100	313c	U215	
Thallium chloride TlCl	7791-12-0	100/10,000	100	100	313c	U216	
Thallium Compounds	N760			&	313		
Thallium(I) nitrate	10102-45-1			100	313c	U217	
Thallium(I) sulfate	7446-18-6	100/10,000	100	100	313c	P115	
Thallium sulfate	10031-59-1	100/10,000	100	100	313c		
Thallous carbonate	6533-73-9	100/10,000	100	100	313c	U215	
Thallous chloride	7791-12-0	100/10,000	100	100	313c	U216	
Thallous malonate	2757-18-8	100/10,000	100				
Thallous sulfate	7446-18-6	100/10,000	100	100	313c	P115	
Thiabendazole	148-79-8				313		
2-(4-Thiazolyl)-1H-benzimidazole	148-79-8				X		
Thioacetamide	62-55-5			10	313	U218	
Thiobencarb	28249-77-6				313		
Thiocarbazide	2231-57-4	1,000/10,000	1,000				
Thiocyanic acid, methyl ester	556-64-9	10,000	10,000				20,000

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
4,4'-Thiodianiline	139-65-1				313		
Thiodicarb	59669-26-0			100	313	U410	
Thiofanox	39196-18-4	100/10,000	100	100		P045	
Thiomethanol	74-93-1	500	100	100	X	U153	10,000
Thionazin	297-97-2	500	100	100		P040	
Thiophanate ethyl	23564-06-9				313		
Thiophanate-methyl	23564-05-8			10	313	U409	
Thiophenol	108-98-5	500	100	100		P014	
Thiosemicarbazide	79-19-6	100/10,000	100	100	313	P116	
Thiourea	62-56-6			10	313	U219	
Thiourea, (2-chlorophenyl)-	5344-82-1	100/10,000	100	100		P026	
Thiourea, (2-methylphenyl)-	614-78-8	500/10,000	500				
Thiourea, 1-naphthalenyl-	86-88-4	500/10,000	100	100		P072	
Thiram	137-26-8			10	313	U244	
Thorium dioxide	1314-20-1				313		
Titanium chloride (TiCl4) (T-4)-	7550-45-0	100	1,000	1,000	X		2,500
Titanium tetrachloride	7550-45-0	100	1,000	1,000	313		2,500
o-Tolidine	119-93-7			10	X	U095	
o-Tolidine dihydrochloride	612-82-8				X		
o-Tolidine dihydrofluoride	41766-75-0				X		
Toluene	108-88-3			1,000	313	U220	
Toluenediamine	25376-45-8			10	X	U221	
Toluene-2,4-diisocyanate	584-84-9	500	100	100	313		10,000
Toluene-2,6-diisocyanate	91-08-7	100	100	100	313		10,000
Toluenediisocyanate (mixed isomers)	26471-62-5			100	313	U223	10,000
Toluene diisocyanate (unspecified isomer)	26471-62-5			100	X	U223	10,000
o-Toluidine	95-53-4			100	313	U328	
p-Toluidine	106-49-0			100		U353	
o-Toluidine hydrochloride	636-21-5			100	313	U222	
Toxaphene	8001-35-2	500/10,000	1	1	313	P123	
2,4,5-TP esters	32534-95-5			100			
Triadimefon	43121-43-3				313		
Triallate	2303-17-5			100	313	U389	
Triamiphos	1031-47-6	500/10,000	500				
Triaziquone	68-76-8				313		
Triazofos	24017-47-8	500	500				
Tribenuron methyl	101200-48-0				313		
Tribromomethane	75-25-2			100	X	U225	
Tributyltin fluoride	1983-10-4				313		
Tributyltin methacrylate	2155-70-6				313		
S,S,S-Tributyltrithiophosphate	78-48-8				313		
Trichlorfon	52-68-6			100	313		
Trichloroacetyl chloride	76-02-8	500	500		313		
1,2,4-Trichlorobenzene	120-82-1			100	313		
Trichloro(chloromethyl)silane	1558-25-4	100	100				
Trichloro(dichlorophenyl)silane	27137-85-5	500	500				
1,1,1-Trichloroethane	71-55-6			1,000	313	U226	
1,1,2-Trichloroethane	79-00-5			100	313	U227	
Trichloroethylene	79-01-6			100	313	U228	
Trichloroethylsilane	115-21-9	500	500				
Trichlorofluoromethane	75-69-4			5,000	313	U121	

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Trichloromethanesulfenyl chloride	594-42-3	500	100	100	X		10,000
Trichloromonofluoromethane	75-69-4			5,000	X	U121	
Trichloronate	327-98-0	500	500				
Trichlorophenol	25167-82-2			10	313c		
2,3,4-Trichlorophenol	15950-66-0			10	313c		
2,3,5-Trichlorophenol	933-78-8			10	313c		
2,3,6-Trichlorophenol	933-75-5			10	313c		
2,4,5-Trichlorophenol	95-95-4			10	313		
2,4,6-Trichlorophenol	88-06-2			10	313		
3,4,5-Trichlorophenol	609-19-8			10			
Trichlorophenylsilane	98-13-5	500	500				
1,2,3-Trichloropropane	96-18-4				313		
Trichlorosilane	10025-78-2						10,000
Triclopyr triethylammonium salt	57213-69-1				313		
Triethanolamine dodecylbenzene sulfonate	27323-41-7			1,000			
Triethoxysilane	998-30-1	500	500				
Triethylamine	121-44-8			5,000	313	U404	
Trifluorochloroethylene	79-38-9						10,000
2-(4-((5-(Trifluoromethyl)-2-pyridinyl)oxy)-phenoxy)propanoic acid, butyl ester	69806-50-4				X		
Trifluralin	1582-09-8			10	313		
Triforine	26644-46-2				313		
Trimethylamine	75-50-3			100			10,000
1,2,4-Trimethylbenzene	95-63-6				313		
Trimethylchlorosilane	75-77-4	1,000	1,000				10,000
2,4,4-Trimethylhexamethylene diisocyanate	15646-96-5				313#		
2,2,4-Trimethylhexamethylene diisocyanate	16938-22-0				313#		
Trimethylolpropane phosphite	824-11-3	100/10,000	100				
2,2,4-Trimethylpentane	540-84-1			1,000			
2,3,5-Trimethylphenyl methylcarbamate	2655-15-4				313		
Trimethyltin chloride	1066-45-1	500/10,000	500				
1,3,5-Trinitrobenzene	99-35-4			10		U234	
Triphenyltin chloride	639-58-7	500/10,000	500		313		
Triphenyltin hydroxide	76-87-9				313		
Tris(2-chloroethyl)amine	555-77-1	100	100				
Tris(2,3-dibromopropyl) phosphate	126-72-7			10	313	U235	
Tris(dimethylcarbamodithioato-S,S')iron	14484-64-1				X		
Trypan blue	72-57-1			10	313	U236	
Uracil mustard	66-75-1			10		U237	
Uranyl acetate	541-09-3			100			
Uranyl nitrate	10102-06-4			100			
Uranyl nitrate	36478-76-9			100			
Urea, N,N-dimethyl-N'-[3-(trifluoromethyl)phenyl]-	2164-17-2				X		
Urethane	51-79-6			100	313	U238	
Valinomycin	2001-95-8	1,000/10,000	1,000				

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Vanadium (except when contained in an alloy)	7440-62-2				313		
Vanadium Compounds	N770				313		
Vanadium pentoxide	1314-62-1	100/10,000	1,000	1,000	313c	P120	
Vanadyl sulfate	27774-13-6			1,000	313c		
Vikane	2699-79-8				X		
Vinclozolin	50471-44-8				313		
Vinyl acetate	108-05-4	1,000	5,000	5,000	313		15,000
Vinyl acetate monomer	108-05-4	1,000	5,000	5,000	X		15,000
Vinyl acetylene	689-97-4						10,000
Vinyl bromide	593-60-2			100	313		
Vinyl chloride	75-01-4			1	313	U043	10,000
Vinyl ethyl ether	109-92-2						10,000
Vinyl fluoride	75-02-5				313		10,000
Vinylidene chloride	75-35-4			100	313	U078	10,000
Vinylidene fluoride	75-38-7						10,000
Vinyl methyl ether	107-25-5						10,000
Warfarin	81-81-2	500/10,000	100	100	X 313c	P001	
Warfarin and salts	N874				313		
Warfarin, & salts, conc.>0.3%	81-81-2			100	X 313c	P001	
Warfarin sodium	129-06-6	100/10,000	100	100	313c		
m-Xylene	108-38-3			1,000	313	U239	
o-Xylene	95-47-6			1,000	313	U239	
p-Xylene	106-42-3			100	313	U239	
Xylene (mixed isomers)	1330-20-7			100	313	U239	
Xylenol	1300-71-6			1,000			
2,6-Xylidine	87-62-7				313		
Xylylene dichloride	28347-13-9	100/10,000	100				
Zinc (fume or dust)	7440-66-6			1,000	313		
Zinc	7440-66-6			1,000			
Zinc acetate	557-34-6			1,000	313c		
Zinc ammonium chloride	14639-97-5			1,000	313c		
Zinc ammonium chloride	14639-98-6			1,000	313c		
Zinc ammonium chloride	52628-25-8			1,000	313c		
Zinc borate	1332-07-6			1,000	313c		
Zinc bromide	7699-45-8			1,000	313c		
Zinc carbonate	3486-35-9			1,000	313c		
Zinc chloride	7646-85-7			1,000	313c		
Zinc Compounds	N982			&	313		
Zinc cyanide	557-21-1			10	313c	P121	
Zinc, dichloro(4,4-dimethyl-5((((methylamino)carbonyl)oxy)imino) pentanenitrile)-, (T-4)-	58270-08-9	100/10,000	100		313c		
Zinc fluoride	7783-49-5			1,000	313c		
Zinc formate	557-41-5			1,000	313c		
Zinc hydrosulfite	7779-86-4			1,000	313c		
Zinc nitrate	7779-88-6			1,000	313c		
Zinc phenolsulfonate	127-82-2			5,000	313c		
Zinc phosphide	1314-84-7	500	100	100	313c	P122	
Zinc phosphide (conc. <= 10%)	1314-84-7	500	100	100	313c	U249	
Zinc phosphide (conc. > 10%)	1314-84-7	500	100	100	313c	P122	
Zinc silicofluoride	16871-71-9			5,000	313c		

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(r) TQ
Zinc sulfate	7733-02-0			1,000	313c		
Zineb	12122-67-7				313		
Ziram	137-30-4			10		P205	
Zirconium nitrate	13746-89-9			5,000			
Zirconium potassium fluoride	16923-95-8			1,000			
Zirconium sulfate	14644-61-2			5,000			
Zirconium tetrachloride	10026-11-6			5,000			

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APPENDIX B

RADIONUCLIDES LISTED UNDER CERCLA
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SEE CFR PART 302, TABLE 302.4, APPENDIX B., FOR MORE INFORMATION

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Radionuclides@		1&(3.7E 10)
Actinium-224	89	100 (3.7E 12)
Actinium-225	89	1 (3.7E 10)
Actinium-226	89	10 (3.7E 11)
Actinium-227	89	0.001 (3.7E 7)
Actinium-228	89	10 (3.7E 11)
Aluminum-26	13	10 (3.7E 11)
Americium-237	95	1000 (3.7E 13)
Americium-238	95	100 (3.7E 12)
Americium-239	95	100 (3.7E 12)
Americium-240	95	10 (3.7E 11)
Americium-241	95	0.01 (3.7E 8)
Americium-242m	95	0.01 (3.7E 8)
Americium-242	95	100 (3.7E 12)
Americium-243	95	0.01 (3.7E 8)
Americium-244m	95	1000 (3.7E 13)
Americium-244	95	10 (3.7E 11)
Americium-245	95	1000 (3.7E 13)
Americium-246m	95	1000 (3.7E 13)
Americium-246	95	1000 (3.7E 13)
Antimony-115	51	1000 (3.7E 13)
Antimony-116m	51	100 (3.7E 12)
Antimony-116	51	1000 (3.7E 13)
Antimony-117	51	1000 (3.7E 13)
Antimony-118m	51	10 (3.7E 11)
Antimony-119	51	1000 (3.7E 13)
Antimony-120 (16 min)	51	1000 (3.7E 13)
Antimony-120 (5.76 day)	51	10 (3.7E 11)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Antimony-122	51	10 (3.7E 11)
Antimony-124m	51	1000 (3.7E 13)
Antimony-124	51	10 (3.7E 11)
Antimony-125	51	10 (3.7E 11)
Antimony-126m	51	1000 (3.7E 13)
Antimony-126	51	10 (3.7E 11)
Antimony-127	51	10 (3.7E 11)
Antimony-128 (10.4 min)	51	1000 (3.7E 13)
Antimony-128 (9.01 hr)	51	10 (3.7E 11)
Antimony-129	51	100 (3.7E 12)
Antimony-130	51	100 (3.7E 12)
Antimony-131	51	1000 (3.7E 13)
Argon-39	18	1000 (3.7E 13)
Argon-41	18	10 (3.7E 11)
Arsenic-69	33	1000 (3.7E 13)
Arsenic-70	33	100 (3.7E 12)
Arsenic-71	33	100 (3.7E 12)
Arsenic-72	33	10 (3.7E 11)
Arsenic-73	33	100 (3.7E 12)
Arsenic-74	33	10 (3.7E 11)
Arsenic-76	33	100 (3.7E 12)
Arsenic-77	33	1000 (3.7E 13)
Arsenic-78	33	100 (3.7E 12)
Astatine-207	85	100 (3.7E 12)
Astatine-211	85	100 (3.7E 12)
Barium-126	56	1000 (3.7E 13)
Barium-128	56	10 (3.7E 11)
Barium-131m	56	1000 (3.7E 13)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Barium-131	56	10 (3.7E 11)
Barium-133m	56	100 (3.7E 12)
Barium-133	56	10 (3.7E 11)
Barium-135m	56	1000 (3.7E 13)
Barium-139	56	1000 (3.7E 13)
Barium-140	56	10 (3.7E 11)
Barium-141	56	1000 (3.7E 13)
Barium-142	56	1000 (3.7E 13)
Berkelium-245	97	100 (3.7E 12)
Berkelium-246	97	10 (3.7E 11)
Berkelium-247	97	0.01 (3.7E 8)
Berkelium-249	97	1 (3.7E 10)
Berkelium-250	97	100 (3.7E 12)
Beryllium-7	4	100 (3.7E 12)
Beryllium-10	4	1 (3.7E 10)
Bismuth-200	83	100 (3.7E 12)
Bismuth-201	83	100 (3.7E 12)
Bismuth-202	83	1000 (3.7E 13)
Bismuth-203	83	10 (3.7E 11)
Bismuth-205	83	10 (3.7E 11)
Bismuth-206	83	10 (3.7E 11)
Bismuth-207	83	10 (3.7E 11)
Bismuth-210m	83	0.1 (3.7E 9)
Bismuth-210	83	10 (3.7E 11)
Bismuth-212	83	100 (3.7E 12)
Bismuth-213	83	100 (3.7E 12)
Bismuth-214	83	100 (3.7E 12)
Bromine-74m	35	100 (3.7E 12)
Bromine-74	35	100 (3.7E 12)
Bromine-75	35	100 (3.7E 12)
Bromine-76	35	10 (3.7E 11)
Bromine-77	35	100 (3.7E 12)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Bromine-80m	35	1000 (3.7E 13)
Bromine-80	35	1000 (3.7E 13)
Bromine-82	35	10 (3.7E 11)
Bromine-83	35	1000 (3.7E 13)
Bromine-84	35	100 (3.7E 12)
Cadmium-104	48	1000 (3.7E 13)
Cadmium-107	48	1000 (3.7E 13)
Cadmium-109	48	1 (3.7E 10)
Cadmium-113m	48	0.1 (3.7E 9)
Cadmium-113	48	0.1 (3.7E 9)
Cadmium-115m	48	10 (3.7E 11)
Cadmium-115	48	100 (3.7E 12)
Cadmium-117m	48	10 (3.7E 11)
Cadmium-117	48	100 (3.7E 12)
Calcium-41	20	10 (3.7E 11)
Calcium-45	20	10 (3.7E 11)
Calcium-47	20	10 (3.7E 11)
Californium-244	98	1000 (3.7E 13)
Californium-246	98	10 (3.7E 11)
Californium-248	98	0.1 (3.7E 9)
Californium-249	98	0.01 (3.7E 8)
Californium-250	98	0.01 (3.7E 8)
Californium-251	98	0.01 (3.7E 8)
Californium-252	98	0.1 (3.7E 9)
Californium-253	98	10 (3.7E 11)
Californium-254	98	0.1 (3.7E 9)
Carbon-11	6	1000 (3.7E 13)
Carbon-14	6	10 (3.7E 11)
Cerium-134	58	10 (3.7E 11)
Cerium-135	58	10 (3.7E 11)
Cerium-137m	58	100 (3.7E 12)
Cerium-137	58	1000 (3.7E 13)

APPENDIX B – RADIONUCLIDES LISTED UNDER CERCLA

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Cerium-139	58	100 (3.7E 12)
Cerium-141	58	10 (3.7E 11)
Cerium-143	58	100 (3.7E 12)
Cerium-144	58	1 (3.7E 10)
Cesium-125	55	1000 (3.7E 13)
Cesium-127	55	100 (3.7E 12)
Cesium-129	55	100 (3.7E 12)
Cesium-130	55	1000 (3.7E 13)
Cesium-131	55	1000 (3.7E 13)
Cesium-132	55	10 (3.7E 11)
Cesium-134m	55	1000 (3.7E 13)
Cesium-134	55	1 (3.7E 10)
Cesium-135m	55	100 (3.7E 12)
Cesium-135	55	10 (3.7E 11)
Cesium-136	55	10 (3.7E 11)
Cesium-137	55	1 (3.7E 10)
Cesium-138	55	100 (3.7E 12)
Chlorine-36	17	10 (3.7E 11)
Chlorine-38	17	100 (3.7E 12)
Chlorine-39	17	100 (3.7E 12)
Chromium-48	24	100 (3.7E 12)
Chromium-49	24	1000 (3.7E 13)
Chromium-51	24	1000 (3.7E 13)
Cobalt-55	27	10 (3.7E 11)
Cobalt-56	27	10 (3.7E 11)
Cobalt-57	27	100 (3.7E 12)
Cobalt-58m	27	1000 (3.7E 13)
Cobalt-58	27	10 (3.7E 11)
Cobalt-60m	27	1000 (3.7E 13)
Cobalt-60	27	10 (3.7E 11)
Cobalt-61	27	1000 (3.7E 13)
Cobalt-62m	27	1000 (3.7E 13)
Copper-60	29	100 (3.7E 12)
Copper-61	29	100 (3.7E 12)
Copper-64	29	1000 (3.7E 13)
Copper-67	29	100 (3.7E 12)
Curium-238	96	1000 (3.7E 13)
Curium-240	96	1 (3.7E 10)
Curium-241	96	10 (3.7E 11)
Curium-242	96	1 (3.7E 10)
Curium-243	96	0.01 (3.7E 8)
Curium-244	96	0.01 (3.7E 8)
Curium-245	96	0.01 (3.7E 8)
Curium-246	96	0.01 (3.7E 8)
Curium-247	96	0.01 (3.7E 8)
Curium-248	96	0.001 (3.7E 7)
Curium-249	96	1000 (3.7E 13)
Dysprosium-155	66	100 (3.7E 12)
Dysprosium-157	66	100 (3.7E 12)
Dysprosium-159	66	100 (3.7E 12)
Dysprosium-165	66	1000 (3.7E 13)
Dysprosium-166	66	10 (3.7E 11)
Einsteinium-250	99	10 (3.7E 11)
Einsteinium-251	99	1000 (3.7E 13)
Einsteinium-253	99	10 (3.7E 11)
Einsteinium-254m	99	1 (3.7E 10)
Einsteinium-254	99	0.1 (3.7E 9)
Erbium-161	68	100 (3.7E 12)
Erbium-165	68	1000 (3.7E 13)
Erbium-169	68	100 (3.7E 12)
Erbium-171	68	100 (3.7E 12)
Erbium-172	68	10 (3.7E 11)
Europium-145	63	10 (3.7E 11)
Europium-146	63	10 (3.7E 11)

APPENDIX B – RADIONUCLIDES LISTED UNDER CERCLA

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Europium-147	63	10 (3.7E 11)
Europium-148	63	10 (3.7E 11)
Europium-149	63	100 (3.7E 12)
Europium-150 (12.6 hr)	63	1000 (3.7E 13)
Europium-150 (34.2 yr)	63	10 (3.7E 11)
Europium-152m	63	100 (3.7E 12)
Europium-152	63	10 (3.7E 11)
Europium-154	63	10 (3.7E 11)
Europium-155	63	10 (3.7E 11)
Europium-156	63	10 (3.7E 11)
Europium-157	63	10 (3.7E 11)
Europium-158	63	1000 (3.7E 13)
Fermium-252	100	10 (3.7E 11)
Fermium-253	100	10 (3.7E 11)
Fermium-254	100	100 (3.7E 12)
Fermium-255	100	100 (3.7E 12)
Fermium-257	100	1 (3.7E 10)
Fluorine-18	9	1000 (3.7E 13)
Francium-222	87	100 (3.7E 12)
Francium-223	87	100 (3.7E 12)
Gadolinium-145	64	100 (3.7E 12)
Gadolinium-146	64	10 (3.7E 11)
Gadolinium-147	64	10 (3.7E 11)
Gadolinium-148	64	0.001 (3.7E7)
Gadolinium-149	64	100 (3.7E 12)
Gadolinium-151	64	100 (3.7E 12)
Gadolinium-152	64	0.001 (3.7E 7)
Gadolinium-153	64	10 (3.7E 11)
Gadolinium-159	64	1000 (3.7E 13)
Gallium-65	31	1000 (3.7E 13)
Gallium-66	31	10 (3.7E 11)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Gallium-67	31	100 (3.7E 12)
Gallium-68	31	1000 (3.7E 13)
Gallium-70	31	1000 (3.7E 13)
Gallium-72	31	10 (3.7E 11)
Gallium-73	31	100 (3.7E 12)
Germanium-66	32	100 (3.7E 12)
Germanium-67	32	1000 (3.7E 13)
Germanium-68	32	10 (3.7E 11)
Germanium-69	32	10 (3.7E 11)
Germanium-71	32	1000 (3.7E 13)
Germanium-75	32	1000 (3.7E 13)
Germanium-77	32	10 (3.7E 11)
Germanium-78	32	1000 (3.7E 13)
Gold-193	79	100 (3.7E 12)
Gold-194	79	10 (3.7E 11)
Gold-195	79	100 (3.7E 12)
Gold-198m	79	10 (3.7E 11)
Gold-198	79	100 (3.7E 12)
Gold-199	79	100 (3.7E 12)
Gold-200m	79	10 (3.7E 11)
Gold-200	79	1000 (3.7E 13)
Gold-201	79	1000 (3.7E 13)
Hafnium-170	72	100 (3.7E 12)
Hafnium-172	72	1 (3.7E 10)
Hafnium-173	72	100 (3.7E 12)
Hafnium-175	72	100 (3.7E 12)
Hafnium-177m	72	1000 (3.7E 13)
Hafnium-178m	72	0.1 (3.7E 9)
Hafnium-179m	72	100 (3.7E 12)
Hafnium-180m	72	100 (3.7E 12)
Hafnium-181	72	10 (3.7E 11)
Hafnium-182m	72	100 (3.7E 12)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Hafnium-182	72	0.1 (3.7E 9)
Hafnium-183	72	100 (3.7E 12)
Hafnium-184	72	100 (3.7E 12)
Holmium-155	67	1000 (3.7E 13)
Holmium-157	67	1000 (3.7E 13)
Holmium-159	67	1000 (3.7E 13)
Holmium-161	67	1000 (3.7E 13)
Holmium-162m	67	1000 (3.7E 13)
Holmium-162	67	1000 (3.7E 13)
Holmium-164m	67	1000 (3.7E 13)
Holmium-164	67	1000 (3.7E 13)
Holmium-166m	67	1 (3.7E 10)
Holmium-166	67	100 (3.7E 12)
Holmium-167	67	100 (3.7E 12)
Hydrogen-3	1	100 (3.7E 12)
Indium-109	49	100 (3.7E 12)
Indium-110 (69.1 min)	49	100 (3.7E 12)
Indium-110 (4.9 hr)	49	10 (3.7E 11)
Indium-111	49	100 (3.7E 12)
Indium-112	49	1000 (3.7E 13)
Indium-113m	49	1000 (3.7E 13)
Indium-114m	49	10 (3.7E 11)
Indium-115m	49	100 (3.7E 12)
Indium-115	49	0.1 (3.7E 9)
Indium-116m	49	100 (3.7E 12)
Indium-117m	49	100 (3.7E 12)
Indium-117	49	1000 (3.7E 13)
Indium-119m	49	1000 (3.7E 13)
Iodine-120m	53	100 (3.7E 12)
Iodine-120	53	10 (3.7E 11)
Iodine-121	53	100 (3.7E 12)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Iodine-123	53	10 (3.7E 11)
Iodine-124	53	0.1 (3.7E 9)
Iodine-125	53	0.01 (3.7E 8)
Iodine-126	53	0.01 (3.7E 8)
Iodine-128	53	1000 (3.7E 13)
Iodine-129	53	0.001 (3.7E 7)
Iodine-130	53	1 (3.7E 10)
Iodine-131	53	0.01 (3.7E 8)
Iodine-132m	53	10 (3.7E 11)
Iodine-132	53	10 (3.7E 11)
Iodine-133	53	0.1 (3.7E 9)
Iodine-134	53	100 (3.7E 12)
Iodine-135	53	10 (3.7E 11)
Iridium-182	77	1000 (3.7E 13)
Iridium-184	77	100 (3.7E 12)
Iridium-185	77	100 (3.7E 12)
Iridium-186	77	10 (3.7E 11)
Iridium-187	77	100 (3.7E 12)
Iridium-188	77	10 (3.7E 11)
Iridium-189	77	100 (3.7E 12)
Iridium-190m	77	1000 (3.7E 13)
Iridium-190	77	10 (3.7E 11)
Iridium-192m	77	100 (3.7E 12)
Iridium-192	77	10 (3.7E 11)
Iridium-194m	77	10 (3.7E 11)
Iridium-194	77	100 (3.7E 12)
Iridium-195m	77	100 (3.7E 12)
Iridium-195	77	1000 (3.7E 13)
Iron-52	26	100 (3.7E 12)
Iron-55	26	100 (3.7E 12)
Iron-59	26	10 (3.7E 11)
Iron-60	26	0.1 (3.7E 9)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Krypton-74	36	10 (3.7E 11)
Krypton-76	36	10 (3.7E 11)
Krypton-77	36	10 (3.7E 11)
Krypton-79	36	100 (3.7E 12)
Krypton-81	36	1000 (3.7E 13)
Krypton-83m	36	1000 (3.7E 13)
Krypton-85m	36	100 (3.7E 12)
Krypton-85	36	1000 (3.7E 13)
Krypton-87	36	10 (3.7E 11)
Krypton-88	36	10 (3.7E 11)
Lanthanum-131	57	1000 (3.7E 13)
Lanthanum-132	57	100 (3.7E 12)
Lanthanum-135	57	1000 (3.7E 13)
Lanthanum-137	57	10 (3.7E 11)
Lanthanum-138	57	1 (3.7E 10)
Lanthanum-140	57	10 (3.7E 11)
Lanthanum-141	57	1000 (3.7E 13)
Lanthanum-142	57	100 (3.7E 12)
Lanthanum-143	57	1000 (3.7E 13)
Lead-195m	82	1000 (3.7E 13)
Lead-198	82	100 (3.7E 12)
Lead-199	82	100 (3.7E 12)
Lead-200	82	100 (3.7E 12)
Lead-201	82	100 (3.7E 12)
Lead-202m	82	10 (3.7E 11)
Lead-202	82	1 (3.7E 10)
Lead-203	82	100 (3.7E 12)
Lead-205	82	100 (3.7E 12)
Lead-209	82	1000 (3.7E 13)
Lead-210	82	0.01 (3.7E 8)
Lead-211	82	100 (3.7E 12)
Lead-212	82	10 (3.7E 11)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Lead-214	82	100 (3.7E 12)
Lutetium-169	71	10 (3.7E 11)
Lutetium-170	71	10 (3.7E 11)
Lutetium-171	71	10 (3.7E 11)
Lutetium-172	71	10 (3.7E 11)
Lutetium-173	71	100 (3.7E 12)
Lutetium-174m	71	10 (3.7E 11)
Lutetium-174	71	10 (3.7E 11)
Lutetium-176m	71	1000 (3.7E 13)
Lutetium-176	71	1 (3.7E 10)
Lutetium-177m	71	10 (3.7E 11)
Lutetium-177	71	100 (3.7E 12)
Lutetium-178m	71	1000 (3.7E 13)
Lutetium-178	71	1000 (3.7E 13)
Lutetium-179	71	1000 (3.7E 13)
Magnesium-28	12	10 (3.7E 11)
Manganese-51	25	1000 (3.7E 13)
Manganese-52m	25	1000 (3.7E 13)
Manganese-52	25	10 (3.7E 11)
Manganese-53	25	1000 (3.7E 13)
Manganese-54	25	10 (3.7E 11)
Manganese-56	25	100 (3.7E 12)
Mendelevium-257	101	100 (3.7E 12)
Mendelevium-258	101	1 (3.7E 10)
Mercury-193m	80	10 (3.7E 11)
Mercury-193	80	100 (3.7E 12)
Mercury-194	80	0.1 (3.7E 9)
Mercury-195m	80	100 (3.7E 12)
Mercury-195	80	100 (3.7E 12)
Mercury-197m	80	1000 (3.7E 13)
Mercury-197	80	1000 (3.7E 13)
Mercury-199m	80	1000 (3.7E 13)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Mercury-203	80	10 (3.7E 11)
Molybdenum-90	42	100 (3.7E 12)
Molybdenum-93m	42	10 (3.7E 11)
Molybdenum-93	42	100 (3.7E 12)
Molybdenum-99	42	100 (3.7E 12)
Molybdenum-101	42	1000 (3.7E 13)
Neodymium-136	60	1000 (3.7E 13)
Neodymium-138	60	1000 (3.7E 13)
Neodymium-139m	60	100 (3.7E 12)
Neodymium-139	60	1000 (3.7E 13)
Neodymium-141	60	1000 (3.7E 13)
Neodymium-147	60	10 (3.7E 11)
Neodymium-149	60	100 (3.7E 12)
Neodymium-151	60	1000 (3.7E 13)
Neptunium-232	93	1000 (3.7E 13)
Neptunium-233	93	1000 (3.7E 13)
Neptunium-234	93	10 (3.7E 11)
Neptunium-235	93	1000 (3.7E 13)
Neptunium-236 (1.2 E 5 yr)	93	0.1 (3.7E 9)
Neptunium-236 (22.5 hr)	93	100 (3.7E 12)
Neptunium-237	93	0.01 (3.7E 8)
Neptunium-238	93	10 (3.7E 11)
Neptunium-239	93	100 (3.7E 12)
Neptunium-240	93	100 (3.7E 12)
Nickel-56	28	10 (3.7E 11)
Nickel-57	28	10 (3.7E 11)
Nickel-59	28	100 (3.7E 12)
Nickel-63	28	100 (3.7E 12)
Nickel-65	28	100 (3.7E 12)
Nickel-66	28	10 (3.7E 11)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Niobium-88	41	100 (3.7E 12)
Niobium-89 (66 min)	41	100 (3.7E 12)
Niobium-89 (122 min)	41	100 (3.7E 12)
Niobium-90	41	10 (3.7E 11)
Niobium-93m	41	100 (3.7E 12)
Niobium-94	41	10 (3.7E 11)
Niobium-95m	41	100 (3.7E 12)
Niobium-95	41	10 (3.7E 11)
Niobium-96	41	10 (3.7E 11)
Niobium-97	41	100 (3.7E 12)
Niobium-98	41	1000 (3.7E 13)
Osmium-180	76	1000 (3.7E 13)
Osmium-181	76	100 (3.7E 12)
Osmium-182	76	100 (3.7E 12)
Osmium-185	76	10 (3.7E 11)
Osmium-189m	76	1000 (3.7E 13)
Osmium-191m	76	1000 (3.7E 13)
Osmium-191	76	100 (3.7E 12)
Osmium-193	76	100 (3.7E 12)
Osmium-194	76	1 (3.7E 10)
Palladium-100	46	100 (3.7E 12)
Palladium-101	46	100 (3.7E 12)
Palladium-103	46	100 (3.7E 12)
Palladium-107	46	100 (3.7E 12)
Palladium-109	46	1000 (3.7E 13)
Phosphorus-32	15	0.1 (3.7E 9)
Phosphorus-33	15	1 (3.7E 10)
Platinum-186	78	100 (3.7E 12)
Platinum-188	78	100 (3.7E 12)
Platinum-189	78	100 (3.7E 12)
Platinum-191	78	100 (3.7E 12)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Platinum-193m	78	100 (3.7E 12)
Platinum-193	78	1000 (3.7E 13)
Platinum-195m	78	100 (3.7E 12)
Platinum-197m	78	1000 (3.7E 13)
Platinum-197	78	1000 (3.7E 13)
Platinum-199	78	1000 (3.7E 13)
Platinum-200	78	100 (3.7E 12)
Plutonium-234	94	1000 (3.7E 13)
Plutonium-235	94	1000 (3.7E 13)
Plutonium-236	94	0.1 (3.7E 9)
Plutonium-237	94	1000 (3.7E 13)
Plutonium-238	94	0.01 (3.7E 8)
Plutonium-239	94	0.01 (3.7E 8)
Plutonium-240	94	0.01 (3.7E 8)
Plutonium-241	94	1 (3.7E 10)
Plutonium-242	94	0.01 (3.7E 8)
Plutonium-243	94	1000 (3.7E 13)
Plutonium-244	94	0.01 (3.7E 8)
Plutonium-245	94	100 (3.7E 12)
Polonium-203	84	100 (3.7E 12)
Polonium-205	84	100 (3.7E 12)
Polonium-207	84	10 (3.7E 11)
Polonium-210	84	0.01 (3.7E 8)
Potassium-40	19	1 (3.7E 10)
Potassium-42	19	100 (3.7E 12)
Potassium-43	19	10 (3.7E 11)
Potassium-44	19	100 (3.7E 12)
Potassium-45	19	1000 (3.7E 13)
Praseodymium-136	59	1000 (3.7E 13)
Praseodymium-137	59	1000 (3.7E 13)
Praseodymium-138m	59	100 (3.7E 12)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Praseodymium-139	59	1000 (3.7E 13)
Praseodymium-142m	59	1000 (3.7E 13)
Praseodymium-142	59	100 (3.7E 12)
Praseodymium-143	59	10 (3.7E 11)
Praseodymium-144	59	1000 (3.7E 13)
Praseodymium-145	59	1000 (3.7E 13)
Praseodymium-147	59	1000 (3.7E 13)
Promethium-141	61	1000 (3.7E 13)
Promethium-143	61	100 (3.7E 12)
Promethium-144	61	10 (3.7E 11)
Promethium-145	61	100 (3.7E 12)
Promethium-146	61	10 (3.7E 11)
Promethium-147	61	10 (3.7E 11)
Promethium-148m	61	10 (3.7E 11)
Promethium-148	61	10 (3.7E 11)
Promethium-149	61	100 (3.7E 12)
Promethium-150	61	100 (3.7E 12)
Promethium-151	61	100 (3.7E 12)
Protactinium-227	91	100 (3.7E 12)
Protactinium-228	91	10 (3.7E 11)
Protactinium-230	91	10 (3.7E 11)
Protactinium-231	91	0.01 (3.7E 8)
Protactinium-232	91	10 (3.7E 11)
Protactinium-233	91	100 (3.7E 12)
Protactinium-234	91	10 (3.7E 11)
Radium-223	88	1 (3.7E 10)
Radium-224	88	10 (3.7E 11)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Radium-225	88	1 (3.7E 10)
Radium-226Φ	88	0.1 (3.7E 9)
Radium-227	88	1000 (3.7E 13)
Radium-228	88	0.1 (3.7E 9)
Radon-220	86	0.1 (3.7E 9)
Radon-222	86	0.1 (3.7E 9)
Rhenium-177	75	1000 (3.7E 13)
Rhenium-178	75	1000 (3.7E 13)
Rhenium-181	75	100 (3.7E 12)
Rhenium-182 (12.7 hr)	75	10 (3.7E 11)
Rhenium-182 (64.0 hr)	75	10 (3.7E 11)
Rhenium-184m	75	10 (3.7E 11)
Rhenium-184	75	10 (3.7E 11)
Rhenium-186m	75	10 (3.7E 11)
Rhenium-186	75	100 (3.7E 12)
Rhenium-187	75	1000 (3.7E 13)
Rhenium-188m	75	1000 (3.7E 13)
Rhenium-188	75	1000 (3.7E 13)
Rhenium-189	75	1000 (3.7E 13)
Rhodium-99m	45	100 (3.7E 12)
Rhodium-99	45	10 (3.7E 11)
Rhodium-100	45	10 (3.7E 11)
Rhodium-101m	45	100 (3.7E 12)
Rhodium-101	45	10 (3.7E 11)
Rhodium-102m	45	10 (3.7E 11)
Rhodium-102	45	10 (3.7E 11)
Rhodium-103m	45	1000 (3.7E 13)
Rhodium-105	45	100 (3.7E 12)
Rhodium-106m	45	10 (3.7E 11)
Rhodium-107	45	1000 (3.7E 13)
Rubidium-79	37	1000 (3.7E 13)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Rubidium-81m	37	1000 (3.7E 13)
Rubidium-81	37	100 (3.7E 12)
Rubidium-82m	37	10 (3.7E 11)
Rubidium-83	37	10 (3.7E 11)
Rubidium-84	37	10 (3.7E 11)
Rubidium-86	37	10 (3.7E 11)
Rubidium-88	37	1000 (3.7E 13)
Rubidium-89	37	1000 (3.7E 13)
Rubidium-87	37	10 (3.7E 11)
Ruthenium-94	44	1000 (3.7E 13)
Ruthenium-97	44	100 (3.7E 12)
Ruthenium-103	44	10 (3.7E 11)
Ruthenium-105	44	100 (3.7E 12)
Ruthenium-106	44	1 (3.7E 10)
Samarium-141m	62	1000 (3.7E 13)
Samarium-141	62	1000 (3.7E 13)
Samarium-142	62	1000 (3.7E 13)
Samarium-145	62	100 (3.7E 12)
Samarium-146	62	0.01 (3.7E 8)
Samarium-147	62	0.01 (3.7E 8)
Samarium-151	62	10 (3.7E 11)
Samarium-153	62	100 (3.7E 12)
Samarium-155	62	1000 (3.7E 13)
Samarium-156	62	100 (3.7E 12)
Scandium-43	21	1000 (3.7E 13)
Scandium-44m	21	10 (3.7E 11)
Scandium-44	21	100 (3.7E 12)
Scandium-46	21	10 (3.7E 11)
Scandium-47	21	100 (3.7E 12)
Scandium-48	21	10 (3.7E 11)
Scandium-49	21	1000 (3.7E 13)
Selenium-70	34	1000 (3.7E 13)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Selenium-73m	34	100 (3.7E 12)
Selenium-73	34	10 (3.7E 11)
Selenium-75	34	10 (3.7E 11)
Selenium-79	34	10 (3.7E 11)
Selenium-81m	34	1000 (3.7E 13)
Selenium-81	34	1000 (3.7E 13)
Selenium-83	34	1000 (3.7E 13)
Silicon-31	14	1000 (3.7E 13)
Silicon-32	14	1 (3.7E 10)
Silver-102	47	100 (3.7E 12)
Silver-103	47	1000 (3.7E 13)
Silver-104m	47	1000 (3.7E 13)
Silver-104	47	1000 (3.7E 13)
Silver-105	47	10 (3.7E 11)
Silver-106m	47	10 (3.7E 11)
Silver-106	47	1000 (3.7E 13)
Silver-108m	47	10 (3.7E 11)
Silver-110m	47	10 (3.7E 11)
Silver-111	47	10 (3.7E 11)
Silver-112	47	100 (3.7E 12)
Silver-115	47	1000 (3.7E 13)
Sodium-22	11	10 (3.7E 11)
Sodium-24	11	10 (3.7E 11)
Strontium-80	38	100 (3.7E 12)
Strontium-81	38	1000 (3.7E 13)
Strontium-83	38	100 (3.7E 12)
Strontium-85m	38	1000 (3.7E 13)
Strontium-85	38	10 (3.7E 11)
Strontium-87m	38	100 (3.7E 12)
Strontium-89	38	10 (3.7E 11)
Strontium-90	38	0.1 (3.7E 9)
Strontium-91	38	10 (3.7E 11)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Strontium-92	38	100 (3.7E 12)
Sulfur-35	16	1 (3.7E 10)
Tantalum-172	73	100 (3.7E 12)
Tantalum-173	73	100 (3.7E 12)
Tantalum-174	73	100 (3.7E 12)
Tantalum-175	73	100 (3.7E 12)
Tantalum-176	73	10 (3.7E 11)
Tantalum-177	73	1000 (3.7E 13)
Tantalum-178	73	1000 (3.7E 13)
Tantalum-179	73	1000 (3.7E 13)
Tantalum-180m	73	1000 (3.7E 13)
Tantalum-180	73	100 (3.7E 12)
Tantalum-182m	73	1000 (3.7E 13)
Tantalum-182	73	10 (3.7E 11)
Tantalum-183	73	100 (3.7E 12)
Tantalum-184	73	10 (3.7E 11)
Tantalum-185	73	1000 (3.7E 13)
Tantalum-186	73	1000 (3.7E 13)
Technetium-93m	43	1000 (3.7E 13)
Technetium-93	43	100 (3.7E 12)
Technetium-94m	43	100 (3.7E 12)
Technetium-94	43	10 (3.7E 11)
Technetium-96m	43	1000 (3.7E 13)
Technetium-96	43	10 (3.7E 11)
Technetium-97m	43	100 (3.7E 12)
Technetium-97	43	100 (3.7E 12)
Technetium-98	43	10 (3.7E 11)
Technetium-99m	43	100 (3.7E 12)
Technetium-99	43	10 (3.7E 11)
Technetium-101	43	1000 (3.7E 13)
Technetium-104	43	1000 (3.7E 13)
Tellurium-116	52	1000 (3.7E 13)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Tellurium-121m	52	10 (3.7E 11)
Tellurium-121	52	10 (3.7E 11)
Tellurium-123m	52	10 (3.7E 11)
Tellurium-123	52	10 (3.7E 11)
Tellurium-125m	52	10 (3.7E 11)
Tellurium-127m	52	10 (3.7E 11)
Tellurium-127	52	1000 (3.7E 13)
Tellurium-129m	52	10 (3.7E 11)
Tellurium-129	52	1000 (3.7E 13)
Tellurium-131m	52	10 (3.7E 11)
Tellurium-131	52	1000 (3.7E 13)
Tellurium-132	52	10 (3.7E 11)
Tellurium-133m	52	1000 (3.7E 13)
Tellurium-133	52	1000 (3.7E 13)
Tellurium-134	52	1000 (3.7E 13)
Terbium-147	65	100 (3.7E 12)
Terbium-149	65	100 (3.7E 12)
Terbium-150	65	100 (3.7E 12)
Terbium-151	65	10 (3.7E 11)
Terbium-153	65	100 (3.7E 12)
Terbium-154	65	10 (3.7E 11)
Terbium-155	65	100 (3.7E 12)
Terbium-156m (5.0 hr)	65	1000 (3.7E 13)
Terbium-156m (24.4 hr)	65	1000 (3.7E 13)
Terbium-156	65	10 (3.7E 11)
Terbium-157	65	100 (3.7E 12)
Terbium-158	65	10 (3.7E 11)
Terbium-160	65	10 (3.7E 11)
Terbium-161	65	100 (3.7E 12)
Thallium-194m	81	100 (3.7E 12)
Thallium-194	81	1000 (3.7E 13)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Thallium-195	81	100 (3.7E 12)
Thallium-197	81	100 (3.7E 12)
Thallium-198m	81	100 (3.7E 12)
Thallium-198	81	10 (3.7E 11)
Thallium-199	81	100 (3.7E 12)
Thallium-200	81	10 (3.7E 11)
Thallium-201	81	1000 (3.7E 13)
Thallium-202	81	10 (3.7E 11)
Thallium-204	81	10 (3.7E 11)
Thorium-226	90	100 (3.7E 12)
Thorium-227	90	1 (3.7E 10)
Thorium-228	90	0.01 (3.7E 8)
Thorium-229	90	0.001 (3.7E 7)
Thorium-230	90	0.01 (3.7E 8)
Thorium-231	90	100 (3.7E 12)
Thorium-232Φ	90	0.001 (3.7E 7)
Thorium-234	90	100 (3.7E 12)
Thulium-162	69	1000 (3.7E 13)
Thulium-166	69	10 (3.7E 11)
Thulium-167	69	100 (3.7E 12)
Thulium-170	69	10 (3.7E 11)
Thulium-171	69	100 (3.7E 12)
Thulium-172	69	100 (3.7E 12)
Thulium-173	69	100 (3.7E 12)
Thulium-175	69	1000 (3.7E 13)
Tin-110	50	100 (3.7E 12)
Tin-111	50	1000 (3.7E 13)
Tin-113	50	10 (3.7E 11)
Tin-117m	50	100 (3.7E 12)
Tin-119m	50	10 (3.7E 11)
Tin-121m	50	10 (3.7E 11)
Tin-121	50	1000 (3.7E 13)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Tin-123m	50	1000 (3.7E 13)
Tin-123	50	10 (3.7E 11)
Tin-125	50	10 (3.7E 11)
Tin-126	50	1 (3.7E 10)
Tin-127	50	100 (3.7E 12)
Tin-128	50	1000 (3.7E 13)
Titanium-44	22	1 (3.7E 10)
Titanium-45	22	1000 (3.7E 13)
Tungsten-176	74	1000 (3.7E 13)
Tungsten-177	74	100 (3.7E 12)
Tungsten-178	74	100 (3.7E 12)
Tungsten-179	74	1000 (3.7E 13)
Tungsten-181	74	100 (3.7E 12)
Tungsten-185	74	10 (3.7E 11)
Tungsten-187	74	100 (3.7E 12)
Tungsten-188	74	10 (3.7E 11)
Uranium-230	92	1 (3.7E 10)
Uranium-231	92	1000 (3.7E 13)
Uranium-232	92	0.01 (3.7E 8)
Uranium-233	92	0.1 (3.7E 9)
Uranium-234φ	92	0.1 (3.7E 9)
Uranium-235φ	92	0.1 (3.7E 9)
Uranium-236	92	0.1 (3.7E 9)
Uranium-237	92	100 (3.7E 12)
Uranium-238φ	92	0.1& (3.7E 9)
Uranium-239	92	1000 (3.7E 13)
Uranium-240	92	1000 (3.7E 13)
Vanadium-47	23	1000 (3.7E 13)
Vanadium-48	23	10 (3.7E 11)
Vanadium-49	23	1000 (3.7E 13)
Xenon-120	54	100 (3.7E 12)
Xenon-121	54	10 (3.7E 11)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Xenon-122	54	100 (3.7E 12)
Xenon-123	54	10 (3.7E 11)
Xenon-125	54	100 (3.7E 12)
Xenon-127	54	100 (3.7E 12)
Xenon-129m	54	1000 (3.7E 13)
Xenon-131m	54	1000 (3.7E 13)
Xenon-133m	54	1000 (3.7E 13)
Xenon-133	54	1000 (3.7E 13)
Xenon-135m	54	10 (3.7E 11)
Xenon-135	54	100 (3.7E 12)
Xenon-138	54	10 (3.7E 11)
Ytterbium-162	70	1000 (3.7E 13)
Ytterbium-166	70	10 (3.7E 11)
Ytterbium-167	70	1000 (3.7E 13)
Ytterbium-169	70	10 (3.7E 11)
Ytterbium-175	70	100 (3.7E 12)
Ytterbium-177	70	1000 (3.7E 13)
Ytterbium-178	70	1000 (3.7E 13)
Yttrium-86m	39	1000 (3.7E 13)
Yttrium-86	39	10 (3.7E 11)
Yttrium-87	39	10 (3.7E 11)
Yttrium-88	39	10 (3.7E 11)
Yttrium-90m	39	100 (3.7E 12)
Yttrium-90	39	10 (3.7E 11)
Yttrium-91m	39	1000 (3.7E 13)
Yttrium-91	39	10 (3.7E 11)
Yttrium-92	39	100 (3.7E 12)
Yttrium-93	39	100 (3.7E 12)
Yttrium-94	39	1000 (3.7E 13)
Yttrium-95	39	1000 (3.7E 13)
Zinc-62	30	100 (3.7E 12)
Zinc-63	30	1000 (3.7E 13)

Radionuclide Name	Atomic Number	Final RQ Curies (Bq)
Zinc-65	30	10 (3.7E 11)
Zinc-69m	30	100 (3.7E 12)
Zinc-69	30	1000 (3.7E 13)
Zinc-71m	30	100 (3.7E 12)
Zinc-72	30	100 (3.7E 12)
Zirconium-86	40	100 (3.7E 12)
Zirconium-88	40	10 (3.7E 11)
Zirconium-89	40	100 (3.7E 12)
Zirconium-93	40	1 (3.7E 10)
Zirconium-95	40	10 (3.7E 11)
Zirconium-97	40	10 (3.7E 11)

NOTES:

Ci—Curie. The curie represents a rate of radioactive decay. One curie is the quantity of any radioactive nuclide which undergoes 3.7E 10 disintegrations per second.

Bq—Becquerel. The becquerel represents a rate of radioactive decay. One becquerel is the quantity of any radioactive nuclide which undergoes one disintegration per second. One curie is equal to 3.7E 10 becquerel.

@—Final RQs for all radionuclides apply to chemical compounds containing the radionuclides and elemental forms regardless of the diameter of pieces of solid material.

&—The adjusted RQ of one curie applies to all radionuclides not otherwise listed. Whenever the RQs in the Consolidated List of Chemicals subject to EPCRA, CERCLA and Section 112(r) of CAA and this Appendix B are in conflict, the lowest RQ shall apply. For example, uranyl acetate and uranyl nitrate have adjusted RQs shown in the CAS number ordered chemical list and the alphabetical chemical list (Appendix A) of 100 pounds, equivalent to about one-tenth the RQ level for uranium-238 listed in this appendix.

E—Exponent to the base 10. For example, 1.3E 2 is equal to 130 while 1.3E 3 is equal to 1300.

m—Signifies a nuclear isomer which is a radionuclide in a higher energy metastable state relative to the parent isotope.

φ—Notification requirements for releases of mixtures or solutions of radionuclides can be found in 40 CFR §302.6(b)(2). Final RQs for the following four common radionuclide mixtures are provided: radium-226 in secular equilibrium with its daughters (0.053 curie); natural uranium (0.1 curie); natural uranium in secular equilibrium with its daughters (0.052 curie); and natural thorium in secular equilibrium with its daughters (0.011 curie).

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APPENDIX C

THE LIST BELOW CONTAINS RCRA WASTE STREAMS AND UNLISTED HAZARDOUS WASTES. THE DESCRIPTIONS OF THE WASTE STREAMS HAVE BEEN TRUNCATED. THE LIST SHOULD BE USED FOR REFERENCE ONLY. COMPLIANCE INFORMATION CAN BE FOUND IN 40 CFR PART 302 AND TABLE 302.4

RCRA CODE	RQ	NAME
F001	10	The following spent halogenated solvents used in degreasing:
	100	(a) Tetrachloroethylene (CAS No. 127-18-4, RCRA Waste No. U210)
	100	(b) Trichloroethylene (CAS No. 79-01-6, RCRA Waste No. U228)
	1,000	(c) Methylene chloride (CAS No. 75-09-2, RCRA Waste No. U080)
	1,000	(d) 1,1,1-Trichloroethane (CAS No. 71-55-6, RCRA Waste No. U226)
	10	(e) Carbon tetrachloride (CAS No. 56-23-5, RCRA Waste No. U211)
	5,000	(f) Chlorinated fluorocarbons
F002	10	The following spent halogenated solvents:
	100	(a) Tetrachloroethylene (CAS No. 127-18-4, RCRA Waste No. U210)
	1,000	(b) Methylene chloride (CAS No. 75-09-2, RCRA Waste No. U080)
	100	(c) Trichloroethylene (CAS No. 79-01-6, RCRA Waste No. U228)
	1,000	(d) 1,1,1-Trichloroethane (CAS No. 71-55-6, RCRA Waste No. U226)
	100	(e) Chlorobenzene (CAS No. 108-90-7, RCRA Waste No. U037)
	5,000	(f) 1,1,2-Trichloro-1,2,2-trifluoroethane (CAS No. 76-13-1)
	100	(g) o-Dichlorobenzene (CAS No. 95-50-1, RCRA Waste No. U070)
	5,000	(h) Trichlorofluoromethane (CAS No. 75-69-4, RCRA Waste No. U121)
	100	(i) 1,1,2-Trichloroethane (CAS No. 79-00-5, RCRA Waste No. U227)
F003	100	The following spent non-halogenated solvents and still bottoms from recovery:
	1,000	(a) Xylene (CAS No. 1330-20-7, RCRA Waste No. U239)
	5,000	(b) Acetone (CAS No. 67-64-1, RCRA Waste No. U002)
	5,000	(c) Ethyl acetate (CAS No. 141-78-6, RCRA Waste No. U112)
	1,000	(d) Ethylbenzene (CAS No. 100-41-4)
	100	(e) Ethyl ether (CAS No. 60-29-7, RCRA Waste No. U117)
	5,000	(f) Methyl isobutyl ketone (CAS No. 108-10-1, RCRA Waste No. U161)
	5,000	(g) n-Butyl alcohol (CAS No. 71-36-3, RCRA Waste No. U031)
	5,000	(h) Cyclohexanone (CAS No. 108-94-1, RCRA Waste No. U057)
	5,000	(i) Methanol (CAS No. 67-56-1, RCRA Waste No. U154)
F004	100	The following spent non-halogenated solvents and still bottoms from recovery:
	100	(a) Cresols/cresylic acid (CAS No. 1319-77-3, RCRA Waste No. U052)
	1,000	(b) Nitrobenzene (CAS No. 98-95-3, RCRA Waste No. U169)
F005	100	The following spent non-halogenated solvents and still bottoms from recovery:
	1,000	(a) Toluene (CAS No. 108-88-3, RCRA Waste No. U220)
	5,000	(b) Methyl ethyl ketone (CAS No. 78-93-3, RCRA Waste No. U159)
	100	(c) Carbon disulfide (CAS No. 75-15-0, RCRA Waste No. P022)
	5,000	(d) Isobutanol (CAS No. 78-83-1, RCRA Waste No. U140)
	1,000	(e) Pyridine (CAS No. 110-86-1, RCRA Waste No. U196)

RCRA CODE	RQ	NAME
F006	10	Wastewater treatment sludges from electroplating operations (w/some exceptions)
F007	10	Spent cyanide plating bath solns. from electroplating
F008	10	Plating bath residues from electroplating where cyanides are used
F009	10	Spent stripping/cleaning bath solns. from electroplating where cyanides are used
F010	10	Quenching bath residues from metal heat treating where cyanides are used
F011	10	Spent cyanide soln. from salt bath pot cleaning from metal heat treating
F012	10	Quenching wastewater sludges from metal heat treating where cyanides are used
F019	10	Wastewater treatment sludges from chemical conversion aluminum coating
F020	1	Wastes from production or use of tri/tetrachlorophenol or derivative intermediates
F021	1	Wastes from production or use of pentachlorophenol or intermediates for derivatives
F022	1	Wastes from use of tetra/penta/hexachlorobenzenes under alkaline conditions
F023	1	Wastes from mat. production on equipment previously used for tri\tetrachlorophenol
F024	1	Wastes from production of chlorinated aliphatic hydrocarbons (C1-C5)
F025	1	Lights ends, filters from production of chlorinated aliphatic hydrocarbons (C1-C5)
F026	1	Waste from equipment previously used to production tetra/penta/hexachlorobenzenes
F027	1	Discarded formulations containing tri/tetra/pentachlorophenols or derivatives
F028	1	Residues from incineration of soil contaminated w/ F020,F021,F022,F023,F026,F027
F032	1	Wastewaters, process residuals from wood preserving using chlorophenolic solns.
F034	1	Wastewaters, process residuals from wood preserving using creosote formulations
F035	1	Wastewaters, process residuals from wood preserving using arsenic or chromium
F037	1	Petroleum refinery primary oil/water/solids separation sludge
F038	1	Petroleum refinery secondary (emulsified) oil/water/solids separation sludge
F039	1	Multisource leachate
K001	1	Wastewater treatment sludge from creosote/pentachlorophenol wood preserving
K002	10	Wastewater treatment sludge from production of chrome yellow and orange pigments
K003	10	Wastewater treatment sludge from production of molybdate orange pigments
K004	10	Wastewater treatment sludge from production of zinc yellow pigments
K005	10	Wastewater treatment sludge from production of chrome green pigments
K006	10	Wastewater treatment sludge from production of chrome oxide green pigments
K007	10	Wastewater treatment sludge from production of iron blue pigments
K008	10	Oven residue from production of chrome oxide green pigments
K009	10	Dist. bottoms from production of acetaldehyde from ethylene
K010	10	Dist. side cuts from production of acetaldehyde from ethylene
K011	10	Bottom stream from wastewater stripper in acrylonitrile production
K013	10	Bottom stream from acetonitrile column in acrylonitrile production
K014	5,000	Bottoms from acetonitrile purification column in acrylonitrile production
K015	10	Still bottoms from the dist. of benzyl chloride
K016	1	Heavy ends or dist. residues from production of carbon tetrachloride
K017	10	Heavy ends from the purification column in epichlorohydrin production
K018	1	Heavy ends from the fractionation column in ethyl chloride production
K019	1	Heavy ends from the dist. of ethylene dichloride during its production
K020	1	Heavy ends from the dist. of vinyl chloride during production of the monomer

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RCRA CODE	RQ	NAME
K021	10	Aqueous spent antimony catalyst waste from fluoromethanes production
K022	1	Dist. bottom tars from production of phenol/acetone from cumene
K023	5,000	Dist. light ends from production of phthalic anhydride from naphthalene
K024	5,000	Dist. bottoms from production of phthalic anhydride from naphthalene
K025	10	Dist. bottoms from production of nitrobenzene by nitration of benzene
K026	1,000	Stripping still tails from the production of methyl ethyl pyridines
K027	10	Centrifuge/dist. residues from toluene diisocyanate production
K028	1	Spent catalyst from hydrochlorinator reactor in production of 1,1,1-trichloroethane
K029	1	Waste from product steam stripper in production of 1,1,1-trichloroethane
K030	1	Column bottoms/heavy ends from production of trichloroethylene and perchloroethylene
K031	1	By-product salts generated in the production of MSMA and cacodylic acid
K032	10	Wastewater treatment sludge from the production of chlordane
K033	10	Wastewaster/scrubwater from chlorination of cyclopentadiene in chlordane production
K034	10	Filter solids from filtration of hexachlorocyclopentadiene in chlordane production
K035	1	Wastewater treatment sludges from the production of creosote
K036	1	Still bottoms from toluene reclamation distillation in disulfoton production
K037	1	Wastewater treatment sludges from the production of disulfoton
K038	10	Wastewater from the washing and stripping of phorate production
K039	10	Filter cake from filtration of diethylphosphorodithioic adid in phorate production
K040	10	Wastewater treatment sludge from the production of phorate
K041	1	Wastewater treatment sludge from the production of toxaphene
K042	10	Heavy ends/residues from dist. of tetrachlorobenzene in 2,4,5-T production
K043	10	2,6-Dichlorophenol waste from the production of 2,4-D
K044	10	Wastewater treatment sludge from manuf. and processing of explosives
K045	10	Spent carbon from treatment of wastewater containing explosives
K046	10	Wastewater sludge from manuf., formulating, loading of lead-based initiating compd
K047	10	Pink/red water from TNT operations
K048	10	Dissolved air flotation (DAF) float from the petroleum refining industry
K049	10	Slop oil emulsion solids from the petroleum refining industry
K050	10	Heat exchanger bundle cleaning sludge from petroleum refining industry
K051	10	API separator sludge from the petroleum refining industry
K052	10	Tank bottoms (leaded) from the petroleum refining industry
K060	1	Ammonia still lime sludge from coking operations
K061	10	Emission control dust/sludge from primary production of steel in electric furnaces
K062	10	Spent pickle liquor generated by steel finishing (SIC codes 331 and 332)
K064	10	Acid plant blowdown slurry/sludge from blowdown slurry from primary copper production
K065	10	Surface impoundment solids at primary lead smelting facilities
K066	10	Sludge from treatment of wastewater/acid plant blowdown from primary zinc production
K069	10	Emission control dust/sludge from secondary lead smelting
K071	1	Brine purification muds from mercury cell process in chlorine production
K073	10	Chlorinated hydrocarbon waste from diaphragm cell process in chlorine production
K083	100	Distillation bottoms from aniline extraction

RCRA CODE	RQ	NAME
K084	1	Wastewater sludges from production of veterinary pharm. from arsenic compds.
K085	10	Distillation or fractionation column bottoms in production of chlorobenzenes
K086	10	Wastes/sludges from production of inks from chromium and lead-containing substances
K087	100	Decanter tank tar sludge from coking operations
K088	10	Spent potliners from primary aluminum reduction
K090	10	Emission control dust/sludge from ferrochromiumsilicon production
K091	10	Emission control dust/sludge from ferrochromium production
K093	5,000	Dist. light ends from production of phthalic anhydride by ortho-xylene
K094	5,000	Dist. bottoms in production of phthalic anhydride by ortho-xylene
K095	100	Distillation bottoms in production of 1,1,1-trichloroethane
K096	100	Heavy ends from dist. column in production of 1,1,1-trichloroethane
K097	1	Vacuum stripper discharge from the chlordane chlorinator in production of chlordane
K098	1	Untreated process wastewater from the production of toxaphene
K099	10	Untreated wastewater from the production of 2,4-D
K100	10	Waste leaching soln from emission control dust/sludge in secondary lead smelting
K101	1	Dist. tar residue from aniline in production of veterinary pharm. from arsenic compd.
K102	1	Residue from activated carbon in production of veterinary pharm. from arsenic compds.
K103	100	Process residues from aniline extraction from the production of aniline
K104	10	Combined wastewater streams generated from production of nitrobenzene/aniline
K105	10	Aqueous stream from washing in production of chlorobenzenes
K106	1	Wastewater treatment sludge from mercury cell process in chlorine production
K107	10	Column bottoms from separation in production of UDMH from carboxylic acid hydrazides
K108	10	Condensed column overheads and vent gas from production of UDMH from -COOH hydrazides
K109	10	Spent filter cartridges from purif. of UDMH production from carboxylic acid hydrazides
K110	10	Condensed column overheads from separation in UDMH production from -COOH hydrazides
K111	10	Product washwaters from production of dinitrotoluene via nitration of toluene
K112	10	Reaction by-product water from drying in toluenediamine prod from dinitrotoluene
K113	10	Condensed liquid light ends from purification of toluenediamine during its production
K114	10	Vicinals from purification of toluenediamine during its production from dinitrotoluene
K115	10	Heavy ends from toluenediamine purification during production from dinitrotoluene
K116	10	Organic condensate from solvent recovery system in production of toluene diisocyanate
K117	1	Wastewater from vent gas scrubber in ethylene bromide prod by ethene bromination
K118	1	Spent absorbent solids in purification of ethylene dibromide in its production
K123	10	Process wastewater from the production of ethylenebisdithiocarbamic acid and salts
K124	10	Reactor vent scrubber water from prod of ethylenebisdithiocarbamic acid and salts
K125	10	Filtration/other solids from production of ethylenebisdithiocarbamic acid and salts
K126	10	Dust/sweepings from the production of ethylenebisdithiocarbamic acid and salts
K131	100	Wastewater and spent sulfuric acid from the production of methyl bromide
K132	1,000	Spent absorbent and wastewater solids from the production of methyl bromide
K136	1	Still bottoms from ethylene dibromide purif. in production by ethene bromination
K141	1	Process residues from coal tar recovery in coking

RCRA CODE	RQ	NAME
K142	1	Tar storage tank residues from coke production from coal or recovery of coke by-prods
K143	1	Process residues from recovery of light oil in coking
K144	1	Wastewater residues from light oil refining in coking
K145	1	Residues from naphthalene collection and recovery from coke by-products
K147	1	Tar storage tank residues from coal tar refining in coking
K148	1	Residues from coal tar distillation, including still bottoms, in coking
K149	10	Distillation bottoms from the production of chlorinated toluenes/benzoyl chlorides
K150	10	Organic residuals from Cl gas and HCl recovery from chlorinated toluene production
K151	10	Wastewater treatment sludge from production of chlorotoluenes/benzoyl chlorides
K156	10	Organic waste from production of carbamates and carbamoyl oximes
K157	10	Wastewaters from production of carbamates and carbamoyl oximes (not sludges)
K158	10	Bag house dusts & filter/separation solids from prod of carbamates, carb oximes
K159	10	Organics from treatment of thiocarbamate waste
K161	1	Purif. solids/bag house dust/sweepings from prod of dithiocarbamate acids/salts
K169	10	Crude oil storage tank sediment from refining operations
K170	1	Clarified slurry oil tank sediment of in-line filter/separation solids
K171	1	Spent hydrotreating catalyst
K172	1	Spent hydrorefining catalyst
K174	1	Wastewater treatment sludges from the production of ethylene dichloride or vinyl chloride monomer, (including sludges that result from commingled EDC or VCM wastewater and other wastewater), unless the sludges meet certain disposal conditions. (See 40 CFR 261.32)
K175	1	Wastewater treatment sludges from the production vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process (See 40 CFR 261.32)
K176	1	Baghouse filters from the production of antimony oxide, including filters from the production of intermediates (e.g., antimony metal or crude antimony oxide)
K177	5000	Slag from the production of antimony oxide that is speculatively accumulated or disposed, including slag from the production of intermediates (e.g., antimony metal or crude antimony oxide)
K178	1000	Residues from manufacturing and manufacturing-site storage of ferric chloride from acids formed during the production of titanium dioxide using the chloride-ilmenite process
K181	1*	Non-wastewaters generated from the production of certain dyes, pigments, and FD&C colorants, exceeding constituent mass loading levels, subject to disposal exceptions in 40 CFR 261.32
D001	100	Unlisted hazardous wastes characteristic of ignitability
D002	100	Unlisted hazardous wastes characteristic of corrosivity
D003	100	Unlisted hazardous wastes characteristic of reactivity
		Unlisted hazardous wastes characteristic of toxicity:
D004	1	Arsenic
D005	1,000	Barium
D006	10	Cadmium
D007	10	Chromium
D008	10	Lead
D009	1	Mercury
D010	10	Selenium
D011	1	Silver

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RCRA CODE	RQ	NAME
D012	1	Endrin
D013	1	Lindane
D014	1	Methoxychlor
D015	1	Toxaphene
D016	100	2,4-D
D017	100	2,4,5-TP
D018	10	Benzene
D019	10	Carbon tetrachloride
D020	1	Chlordane
D021	100	Chlorobenzene
D022	10	Chloroform
D023	100	o-Cresol
D024	100	m-Cresol
D025	100	p-Cresol
D026	100	Cresol
D027	100	1,4-Dichlorobenzene
D028	100	1,2-Dichloroethane
D029	100	1,1-Dichloroethylene
D030	10	2,4-Dinitrotoluene
D031	1	Heptachlor (and epoxide)
D032	10	Hexachlorobenzene
D033	1	Hexachlorobutadiene
D034	100	Hexachloroethane
D035	5,000	Methyl ethyl ketone
D036	1,000	Nitrobenzene
D037	10	Pentachlorophenol
D038	1,000	Pyridine
D039	100	Tetrachloroethylene
D040	100	Trichloroethylene
D041	10	2,4,5-Trichlorophenol
D042	10	2,4,6-Trichlorophenol
D043	1	Vinyl chloride

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APPENDIX D

EPCRA SECTION 313, TOXIC RELEASE INVENTORY (TRI) CHEMICAL CATEGORIES

The EPCRA Section 313, Toxic Release Inventory (TRI) has 31 chemical categories (including four categories containing 68 specifically-listed chemicals). Each chemical category is listed below with its category code and category name.

Source: http://www2.epa.gov/toxics-release-inventory-tri-program/tri-listed-chemicals
Also see 40 CFR 372.65.

N010 Antimony Compounds. *Includes any unique chemical substance that contains antimony as part of that chemical's infrastructure.*

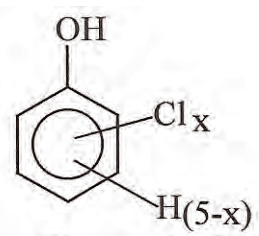
N020 Arsenic Compounds. *Includes any unique chemical substance that contains arsenic as part of that chemical's infrastructure.*

N040 Barium Compounds. *Includes any unique chemical substance that contains barium as part of that chemical's infrastructure. This category does not include: Barium sulfate CAS Number 7727-43-7*

N050 Beryllium Compounds. *Includes any unique chemical substance that contains beryllium as part of that chemical's infrastructure.*

N078 Cadmium Compounds. *Includes any unique chemical substance that contains cadmium as part of that chemical's infrastructure.*

N084 Chlorophenols. *Includes any chemical substance with the following chemical formula:*



Where x = 1 to 5

N090 Chromium Compounds. *Includes any unique chemical substance that contains chromium as part of that chemical's infrastructure* **(except for chromite ore mined in the Transvaal Region of South Africa and the unreacted ore component of the chromite ore processing residue (COPR). COPR is the solid waste remaining after aqueous extraction of oxidized chromite ore that has been combined with soda ash and kiln roasted at approximately 2,000 deg.F.)**

N096 Cobalt Compounds. *Includes any unique chemical substance that contains cobalt as part of that chemical's infrastructure.*

N100 Copper Compounds. *Includes any unique chemical substance that contains copper as part of that chemical's infrastructure. This category does not include copper phthalocyanine compounds that are substituted with only hydrogen, and/or chlorine, and/or bromine.*

N106 Cyanide Compounds. *Includes any chemical substance with the following chemical formula:*

$X^{+} CN^{-}$ *where* $X = H^{+}$ *or any other group where a formal dissociation can be made. For example* KCN *or* $Ca(CN)^{2}$.

N120 Diisocyanates *This category includes only those chemicals listed below.*

CAS Number	**Diisocyanate Chemical Name**
38661-72-2	1,3-Bis(methylisocyanate)-cyclohexane
10347-54-3	1,4-Bis(methylisocyanate)-cyclohexane
2556-36-7	1,4-Cyclohexanediisocyanate
134190-37-7	Diethyldiisocyanatobenzene
4128-73-8	4,4'-Diisocyanatodiphenyl ether
75790-87-3	2,4'-Diisocyanatodiphenyl sulfide
91-93-0	3,3'-Dimethoxybenzidine-4,4'-diisocyanate
91-97-4	3,3'-Dimethyl-4,4'-diphenylene diisocyanate
139-25-3	3,3'-Dimethyldiphenyl methane-4,4'-diisocyanate
822-06-0	Hexamethylene-1,6-diisocyanate
4098-71-9	Isophorone diisocyanate
75790-84-0	4-Methyldiphenylmethane-3,4-diisocyanate
5124-30-1	1,1-Methylenebis(4-isocyanatocyclohexane)
101-68-8	Methylenebis(phenylisocyanate) (MDI)
3173-72-6	1,5-Naphthalene diisocyanate

123-61-5	1,3-Phenylene diisocyanate
104-49-4	1,4-Phenylene diisocyanate
9016-87-9	Polymeric diphenylmethane diisocyanate
16938-22-0	2,2,4-Trimethylhexamethylenediisocyanate
15646-96-5	2,4,4-Trimethylhexamethylene diisocyanate

N150 Dioxin and Dioxin-Like Compounds
(Manufacturing; and the processing or otherwise use of dioxin and dioxin-like compounds if the dioxin and dioxin-like compounds are present as contaminants in a chemical and if they were created during the manufacturing of that chemical.) This category includes only those chemicals listed below.

CAS Number	**Dioxin Chemical Name**
1746-01-6	2,3,7,8- Tetrachlorodibenzo-*p*-dioxin
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-*p*-dioxin
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-*p*-dioxin
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-*p*-dioxin
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-*p*-dioxin
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-*p*-dioxin
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran
70648-26-9	1,2,3,4,7,8-Hexachlorod-benzofuran
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran

67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran

N171 Ethylenebisdithiocarbamic acid, salts and esters (EBDCs). *Includes any unique chemical substance that contains an EBDC or an EBDC salt as part of that chemical's infrastructure.*

N230 Certain Glycol Ethers. *Includes any chemical substance with the following chemical formula:*

$R\text{-}(OCH_2CH_2)\ n\text{-}OR'$

where n = 1, 2, or 3
R = alkyl C7 or less; or
R = phenyl or alkyl substituted phenyl;
R' = H, or alkyl C7 or less; or
OR' = consisting of carboxylic acid ester, sulfate, phosphate, nitrate, or sulfonate.

N420 Lead Compounds. *Includes any unique chemical substance that contains lead as part of that chemical's infrastructure.*

N450 Manganese Compounds. *Includes any unique chemical substance that contains manganese as part of that chemical's infrastructure.*

N458 Mercury Compounds. *Includes any unique chemical substance that contains mercury as part of that chemical's infrastructure.*

N495 Nickel Compounds. *Includes any unique chemical substance that contains nickel as part of that chemical's infrastructure.*

N503 Nicotine and salts. *Includes any unique chemical substance that contains nicotine or a nicotine salt as part of that chemical's infrastructure.*

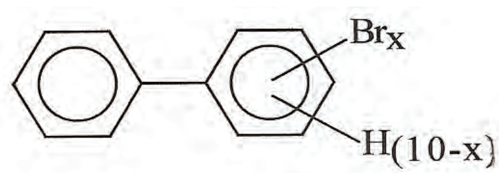
N511 Nitrate compounds (water dissociable; reportable only when in aqueous solution)

N530 Nonylphenyol. *This category includes only those chemicals listed below.*

This category was added to the TRI chemical list in September 2014. Facilities that meet TRI reporting thresholds for nonylphenol should begin collecting release information on January 1, 2015 (reporting forms due July 1, 2016).

CAS Number	Nonylphenol Name
104-40-5	4-Nonylphenol
11066-49-2	Isononylphenol
25154-52-3	Nonylphenol
26543-97-5	4-Isononylphenol
84852-15-3	4-Nonylphenol, branched
90481-04-2	Nonylphenol, branched

N575 Polybrominated Biphenyls (PBBs). *Includes any chemical substance with the following chemical formula:*



Where x = 1 to 10

N583 Polychlorinated alkanes (C10 to C13) (except for those members of the category that have an average chain length of 12 carbons and contain an average chlorine content of 60% by weight which are subject to the 0.1% *de minimis*). *Includes any chemical substance with the following chemical formula:*

$C_x H_{2x+2-y} Cl_y$
where x = 10 to 13;
y = 3 to 12; and
the average chlorine content ranges from 40-70% with the limiting molecular formulas C10H19Cl3 and C13H16Cl12.

N590 Polycyclic aromatic compounds (PACs). *This category includes the chemicals listed below.*

CAS Number	PAC Chemical Name
56-55-3	Benz(a)anthracene
205-99-2	Benzo(b)fluoranthene

205-82-3	Benzo(j)fluoranthene
207-08-9	Benzo(k)fluoranthene
206-44-0	Benzo(j,k)fluorene
189-55-9	Benzo(r,s,t)pentaphene
218-01-9	Benzo(a)phenanthrene
50-32-8	Benzo(a)pyrene
226-36-8	Dibenz(a,h)acridine
224-42-0	Dibenz(a,j)acridine
53-70-3	Dibenzo(a,h)anthracene
194-59-2	7H-Dibenzo(c,g)carbazole
5385-75-1	Dibenzo(a,e)fluoranthene
192-65-4	Dibenzo(a,e)pyrene
189-64-0	Dibenzo(a,h)pyrene
191-30-0	Dibenzo(a,l)pyrene
57-97-6	7,12-Dimethylbenz(a)-anthracene
42397-64-8	1,6-Dinitropyrene
42397-65-9	1,8-Dinitropyrene
193-39-5	Indeno(1,2,3-cd)pyrene
56-49-5	3-Methylcholanthrene
3697-24-3	5-Methylchrysene
7496-02-8	6-Nitrochrysene
5522-43-0	1-Nitropyrene
57835-92-4	4-Nitropyrene

N725 Selenium Compounds. *Includes any unique chemical substance that contains selenium as part of that chemical's infrastructure.*

N740 Silver Compounds. *Includes any unique chemical substance that contains silver as part of that chemical's infrastructure.*

N746 Strychnine and salts. *Includes any unique chemical substance that contains strychnine or a strychnine salt as part of that chemical's infrastructure.*

N760 Thallium Compounds. *Includes any unique chemical substance that contains thallium as part of that chemical's infrastructure.*

N770 Vanadium Compounds. *Includes any unique chemical substance that contains vanadium as part of that chemical's infrastructure.*

N874 Warfarin and salts. *Includes any unique chemical substance that contains warfarin or a warfarin salt as part of that chemical's infrastructure.*

N982 Zinc Compounds. *Includes any unique chemical substance that contains zinc as part of that chemical's infrastructure.*

For more details on how to report TRI chemicals and chemical categories, see http://www2.epa.gov/toxics-release-inventory-tri-program/reporting-tri-facilities

EPA has more detailed chemical-specific guidance documents for the EPCRA Section 313 chemical categories on its webpage http://www2.epa.gov/toxics-release-inventory-tri-program/guidance-documents-tri-reporting#chemical_sp. Documents are available for:

- Lead and Lead Compounds
- Mercury and Mercury Compounds
- Polycyclic Aromatic Compounds
- Pesticides and Other Persistent Bioaccumulative Toxic (PBT) Chemicals
- Dioxin and Dioxin-like Compounds Category
- Aqueous Ammonia
- Nitrate compounds
- Hydrochloric acid aerosols
- Sulfuric acid aerosols
- Certain glycol ethers
- Chlorophenols
- List of Toxic Chemicals within Ethylenebisdithiocarbamic Acid, Salts and Esters Category and List of Mixtures that Contain the Individually listed Chemicals Maneb, Metiram, Nabam, and Zineb
- Nicotine and salts
- Polychlorinated alkanes
- Strychnine and salts
- Warfarin and salts

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APPENDIX E

CERCLA Hazardous Substances - Chemical Categories

This appendix provides further definition or clarification, where available, of CERCLA chemical categories that are listed with N.A. as the CAS Registry Number in the consolidated list. Dichlorobenzidine and diphenylhydrazine are also included in this appendix for completeness sake because they are listed on the consolidated list with CAS No. of N.A., although technically each is not considered a category containing several chemical substances. Many chemicals that are also members of a category may also be listed separately as a CERCLA chemical with its own RQ. For example, cobaltous bromide, CAS 7789-43-7, appears on the CERCLA list separately.

Radionuclides listed under CERCLA are provided in a separate list in Appendix B of this document, with RQs in Curies. EPCRA section 313 (TRI) Chemical Category definitions are found in Appendix C.

Each CERCLA chemical category in this appendix was designated as a CERCLA hazardous substance based on a statutory source (See NOTE following 40 CFR 302.4 (b)). The statutory Codes (1), (2), (3), or (4), shown after each category name, refers to a statutory source, listed in the table below.

Statutory Code	Statutory Source	Applicable CFR citation
(1)	Section 311(b)(2) of the Clean Water Act	Hazardous Substances 40 CFR 116.4
(2)	Section 307(a) of the Clean Water Act	Priority Toxic Pollutants 40 CFR 401.15
(3)	Section 112 of the Clean Air Act	Hazardous Air Pollutants List- Section 112(b)(1) of CAA Revisions to List 40 CFR 60.60-63
(4)	Section 3001 of RCRA	Hazardous Wastes 40 CFR 261.33(e) and (f) (“P” and “U” Haz. Waste chemicals)

Endnote reference letters refer to sources of information used to define or clarify the category. These endnote references appear at the end of the appendix.

Arsenic and Compounds (2), (3)

Unless otherwise specified, this listing is defined as including any unique chemical substance that contains arsenic as part of that chemical's infrastructure.[a]

Arsenic Compounds (inorganic including arsine)[b]

Antimony and Compounds (2), (3)

Unless otherwise specified, this listing is defined as including any unique chemical substance that contains antimony as part of that chemical's infrastructure.[a] For antimony and compounds, the term *compounds* shall include organic and inorganic compounds. [c]

Beryllium and Compounds (2), (3)

Unless otherwise specified, this listing is defined as including any unique chemical substance that contains beryllium as part of that chemical's infrastructure.[a]

Cadmium and Compounds (2), (3)

Unless otherwise specified, this listing is defined as including any unique chemical substance that contains cadmium as part of that chemical's infrastructure.[a]

Chromium and Compounds (2), (3)

Unless otherwise specified, this listing is defined as including any unique chemical substance that contains chromium as part of that chemical's infrastructure.[a]

Chlorinated Benzenes (2)

Chlorobenzene[d]
1,2-dichlorobenzene[d]
1,3-dichlorobenzene[d]
1,4-dichlorobenzene[d]
1,2,4-trichlorobenzene[d]
Hexachlorobenzene[d]

Chlorinated Ethanes (2)

Chloroethane[d]
l,l-dichloroethane[d]
1,2-dichloroethane[d]
l,l,l-trichloroethane[d]
1,1,2-trichloroethane[d]
1,1,2,2-tetrachloroethane[d]
Hexachloroethane[d]

Chlorinated Phenols (2)

2-chlorophenol[d]
2,4-dichlorophenol[d]
2,4,6-trichlorophenol[d]
Parametachlorocresol (4-chloro-3-methyl phenol)[d]

Chloroalkyl Ethers (2)

Bis(2-chloroethoxy)methane[d]
Bis(2-chloroethyl) ether[d]
2-chloroethyl vinyl ether (mixed)[d]

Cobalt and Compounds (3)

Unless otherwise specified, this listing is defined as including any unique chemical substance that contains cobalt as part of that chemical's infrastructure.[a]

Coke Oven Emissions (3)

Copper and Compounds (2)

Creosote (4)

RCRA Toxic hazardous waste code U051 40 CFR 261.33(f)

Creosote, as defined by the American Wood Preservers Association, is a distillate derived from coal tar, derived by the high temperature carbonization of bituminous coal. Creosote consists primarily of liquid, solid polycyclic aromatic hydrocarbons (PAHs), other heteronuclear aromatic substances, and some tar acids and bases. Creosote Oil (Common Name) has the following active ingredients:

Coal Tar	CAS Number 8007-45-2
Creosote Oil	CAS Number 61789-28-4
Coal Tar Creosote	CAS No. 8001-58-9

Currently there are thirteen creosote industrial wood preservative products registered as pesticides with USEPA under FIFRA. All have "creosote" as part of the product name.[e]

Cyanides (2), (3)

Cyanide and Compounds (2), (3)

X'CN where X = H' or any other group where a formal dissociation may occur. For example KCN or $Ca(CN)_2$.[f]

Cyanides (soluble salts and complexes, not otherwise specified) P030 Haz. Waste (4)

DDT and Metabolites (2)

4,4-DDT[d]
4.4-DDE (p,p-DDX)[d]
4,4-DDD (p,p-TDE)[d]

DDT means the compounds DDT, DDD, and DDE as identified by the chemical names:(DDT)-1,1,1-trichloro-2,2-bis(p-chlorophenyl) ethane and some o,p′-isomers; (DDD) or (TDE)-1,1-dichloro-2,2-bis(p-chlorophenyl) ethane and some o,p′-isomers; (DDE)-1,1-dichloro-2,2-bis(p-chlorophenyl) ethylene.[g]

Dichlorobenzidine (2)

3,3-dichlorobenzidine[d]

Diphenylhydrazine (2)

1,1-diphenylhydrazine[d]

Endosulfan and Metabolites (2)

Alpha-endosulfan[d]
Beta-endosulfan[d]
Endosulfan sulfate[d]

Endrin and metabolites (2)

Endrin[d]
Endrin aldehyde[d]

Endrin means the compound endrin as identified by the chemical name 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo-5,8-endodimethanonaphthalene.[g]

Fine Mineral Fibers (3)

Includes mineral fiber emissions from facilities manufacturing or processing glass, rock, or slag fibers (or other mineral derived fibers) of average diameter 1 micrometer or less.[f]

Glycol Ethers (3)

Glycol ethers include mono- and di-ethers of ethylene glycol, diethylene glycol, and triethylene glycol $R\text{-}(OCH_2CH_2)_n\text{-}OR'$. Where:

n = 1, 2, or 3;
R = alkyl C7 or less; or
R = phenyl or alkyl substituted phenyl;
R′= H or alkyl C7 or less; or
OR′ consisting of carboxylic acid ester, sulfate, phosphate, nitrate, or sulfonate.[h]

The substance ethylene glycol monobutyl ether (EGBE,2-Butoxyethanol) (CAS Number 111–76–2) is deleted from the list of hazardous air pollutants established by 42 U.S.C. 7412(b)(1)[Section 112(b)(1) of CAA].[i]

Haloethers (2)

4-chlorophenyl phenyl ether[d]
2-bromophenyl phenyl ether[d]
Bis(2-chloroisopropyl) ether[d]

Haloethers (other than those listed elsewhere; includes chlorophenylphenyl ethers, bromophenylphenyl ether, bis(dichloroisopropyl) ether, bis-(chloroethoxy) methane and polychlorinated diphenyl ethers).[j]

Halomethanes (2)

Methylene chloride (dichloromethane)[d]
Methyl chloride (chloromethane)[d]
Methyl Bromide (bromomethane)[d]
Bromoform (tribromomethane)[d]
Dichlorobromomethane[d]
Chlorodibromomethane[d]

Halomethanes (other than those listed elsewhere; includes methylene chloride, methylchloride, methylbromide, bromoform, dichlorobromomethane.[j]

Heptachlor and Metabolites (2)

Heptachlor[d]
Heptachlor epoxide (BHC-hexachlorocyclohexane)[d]

Lead and Compounds (2), (3)

Unless otherwise specified, this listing is defined as including any unique chemical substance that contains lead as part of that chemical's infrastructure.[a]

Manganese and Compounds (3)

Unless otherwise specified, this listing is defined as including any unique chemical substance that contains manganese as part of that chemical's infrastructure.[a]

Mercury and Compounds (2), (3)

Unless otherwise specified, this listing is defined as including any unique chemical substance that contains mercury as part of that chemical's infrastructure.[a]

Nickel and Compounds (2), (3)

Unless otherwise specified, this listing is defined as including any unique chemical substance that contains nickel as part of that chemical's infrastructure.[a]

Nitrosamines (2)

N-nitrosodimethylamine[d]
N-nitrosodiphenylamine[d]
N-nitrosodi-n-propylamine[d]

Nitrophenols (other than chlorinated) (2)

2-nitrophenol[d]
4-nitrophenol[d]
2,4-dinitrophenol[d]
4,6-dinitro-o-cresol (4,6-dinitro-2-methylphenol)[d]
Pentachlorophenol[d]
Phenol[d]
2,4-dimethylphenol[d] Nitrophenols (including 2,4-dinitrophenol, dinitrocresol).[j]

Phthalate Esters (2)

Bis(2-ethylhexyl)phthalate[d]
Butyl benzyl phthalate[d]
Di-N-butyl phthalate[d]
Di-n-octyl phthalate[d]
Diethyl phthalate[d]
Dimethyl phthalate[d]

Polychlorinated Biphenyls (PCBs) (1), (2), (3)

PCB-1242 (Arochlor 1242)[d]
PCB-1254 (Arochlor 1254)[d]
PCB-1221 (Arochlor 1221)[d]
PCB-1232 (Arochlor 1232)[d]
PCB-1248 (Arochlor 1248)[d]
PCB-1260 (Arochlor 1260)[d]
PCB-1016 (Arochlor 1016)[d]

Polychlorinated Biphenyls (PCBs) means a mixture of compounds composed of the biphenyl molecule which has been chlorinated to varying degrees.[g]

Polycyclic Organic Matter (3)

Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100º C.[f]

Polynuclear Aromatic Hydrocarbons (PAHs) (2)

Acenaphthene[d]
1,2-benzanthracene (benzo(a) anthracene)[d]
Benzo(a)pyrene (3,4-benzo-pyrene)[d]
3,4-benzofluoranthene (benzo(b) fluoranthene)[d]
11,12-benzofluoranthene (benzo(k) fluoranthene)[d]
Chrysene[d]
Acenaphthalene[d]
Anthracene[d]
1,12-benzoperylene (benzo (ghi) perylene)[d]
Fluorene[d]
Fluoranthene[d]
Phenanthrene[d]
1,2,5,6-bibenzanthracene (dibenzo(ah) anthracene)[d]
Indeno (1,2,3-cd) pyrene (2,3-o-phenylene pyrene)[d]
Pyrene[d]

Polynuclear aromatic hydrocarbons (including benzanthracenes, benzopyrenes, benzofluoranthene, chrysenes, dibenz-anthracenes, and indenopyrenes).[j]

Radionuclides (3) See Appendix B in this document.

A type of atom which spontaneously undergoes radioactive decay.[f]

Selenium and Compounds (2), (3)

Unless otherwise specified, this listing is defined as including any unique chemical substance that contains selenium as part of that chemical's infrastructure.[a]

Silver and Compounds (2), (3)

Unless otherwise specified, this listing is defined as including any unique chemical substance that contains silver as part of that chemical's infrastructure.[a]

Thallium and Compounds (2)

Zinc and Compounds (2)

Endnote References

[a] 42 U.S.C. 7412(b)(1)-[Section 112(b)(1) of CAA] "NOTE" after the Initial List of Pollutants: *For all listings above which contain the word "compounds" … the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (i.e., antimony, arsenic, etc.) as part of that chemical's infrastructure.*

[b] 42 U.S.C. 7412(b)(1)-[Section 112(b)(1) of CAA] Initial List of Pollutants.

[c] 40 CFR 401.15 footnote 2 (for antimony and compounds only).

[d] USEPA. 1994. Water Quality Standards Handbook, Second Edition, Appendix P- List of 126 CWA Section 307(a) Priority Toxic Pollutants. http://water.epa.gov/scitech/swguidance/standards/handbook/

[e] USEPA. Sept 2008. Reregistration Eligibility Decision for Creosote (Case 0139). http://www.epa.gov/oppsrrd1/reregistration/REDs/creosote_red.pdf

[f] 42 U.S.C. 7412(b)(1)-[Section 112(b)(1) of CAA] Footnotes after Initial List of Pollutants.

[g] 40 CFR 129.4 Toxic Pollutants.

[h] 40 CFR 63.62 Redefinition of glycol ethers.

[i] 40 CFR 63.63 Hazardous Air Pollutants.

[j] 40 CFR 401.15 Toxic Pollutants List.

Appendix E

Aquaculture Gear Monitoring & Marine Debris, and Wildlife Entanglement Plan for the Ventura Shellfish Enterprise Project*

* Any revisions to the management plans will be updated after receiving comments from relevant regulatory agencies.

ATTACHMENT 1

ATTACHMENT 1

AQUACULTURE GEAR MONITORING & MARINE DEBRIS, AND WILDLIFE ENTANGLEMENT PLAN

FOR THE VENTURA SHELLFISH ENTERPRISE PROJECT

PREPARED FOR:

VENTURA PORT DISTRICT

1603 Anchors Way
Ventura, California 93001
Contact: Brian Pendleton

PREPARED BY:

DUDEK

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AUGUST 2019

ATTACHMENT 1

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1 INTRODUCTION

The Aquaculture Gear Monitoring, Escapement, and Entanglement Plan defines the Ventura Shellfish Enterprise (VSE) permittee obligations with respect to regular aquaculture gear monitoring, managing marine debris, and wildlife entanglement protocols. This plan was developed in consultation with National Oceanic and Atmospheric Administration (NOAA) Fisheries, the Ventura Shellfish Enterprise (VSE) Project Management Team, and Project Stakeholders. The VSE project will establish a commercial offshore bivalve aquaculture operation in federal waters based from the Ventura Harbor in Ventura, California, focused on the cultivation of Mediterranean mussels (*Mytilus galloprovincialis*).

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2 SITE DESCRIPTION

2.1 Project Description

The project consists of twenty 100-acre plots (total of 2,000 acres) located in open federal waters of the Santa Barbara Channel (Channel) in the Southern California Bight (SCB), northwest of Ventura Harbor, with approximate depths at the project site ranging from 80 to 114 feet Mean Lower-Low Water (MLLW), with an average depth of 98 feet MLLW. The plot locations are shown in Figure 1, with latitude and longitude coordinates for the outer corners indicated. Each of the 20 plots are 2,299.50 feet by 1,899.50 feet, for an average plot size of 100.27 acres. Each plot will contain up to 24 lines (12 end-to-end pairs), with each line consisting of 575 feet of backbone length and 250 feet of horizontal scope on each end. There will be a 50 foot setback on each end of the pairs (for a total of 100 feet of spacing between lines of adjacent parcels) and 50 foot spacing between the two center pins. Parallel lines will be spaced 150 feet apart, with a 125 foot setback at each of the long sides (for a total of 250 feet of spacing between lines of adjacent parcels). The sites will be used for growing the Mediterranean mussel via submerged long lines. The mussels will be grown and harvested by grower/producers who would sub-permit the plots from Ventura Port District (VPD), and the mussel product will be landed at Ventura Harbor.

2.2 Project Location

The project's twenty 100-acre plots are approximately 3.53 miles from the shore. The closest distance from the plots to the 3-mile nautical line is a minimum of 2,900 feet, with an average closest distance of over 3,000 feet. The closest distance from the growing area to the City of Ventura city limit is 4.5 miles. Ventura Harbor is 4.1 miles from the closest plot (8 miles from the most distant plot). The sub-permit sites are located on sandy bottom habitat outside of any rocky reef habitat, as evaluated in Gentry et al. 2017 and illustrated by NOAA United States West Coast nautical charts (NOAA 2017a).

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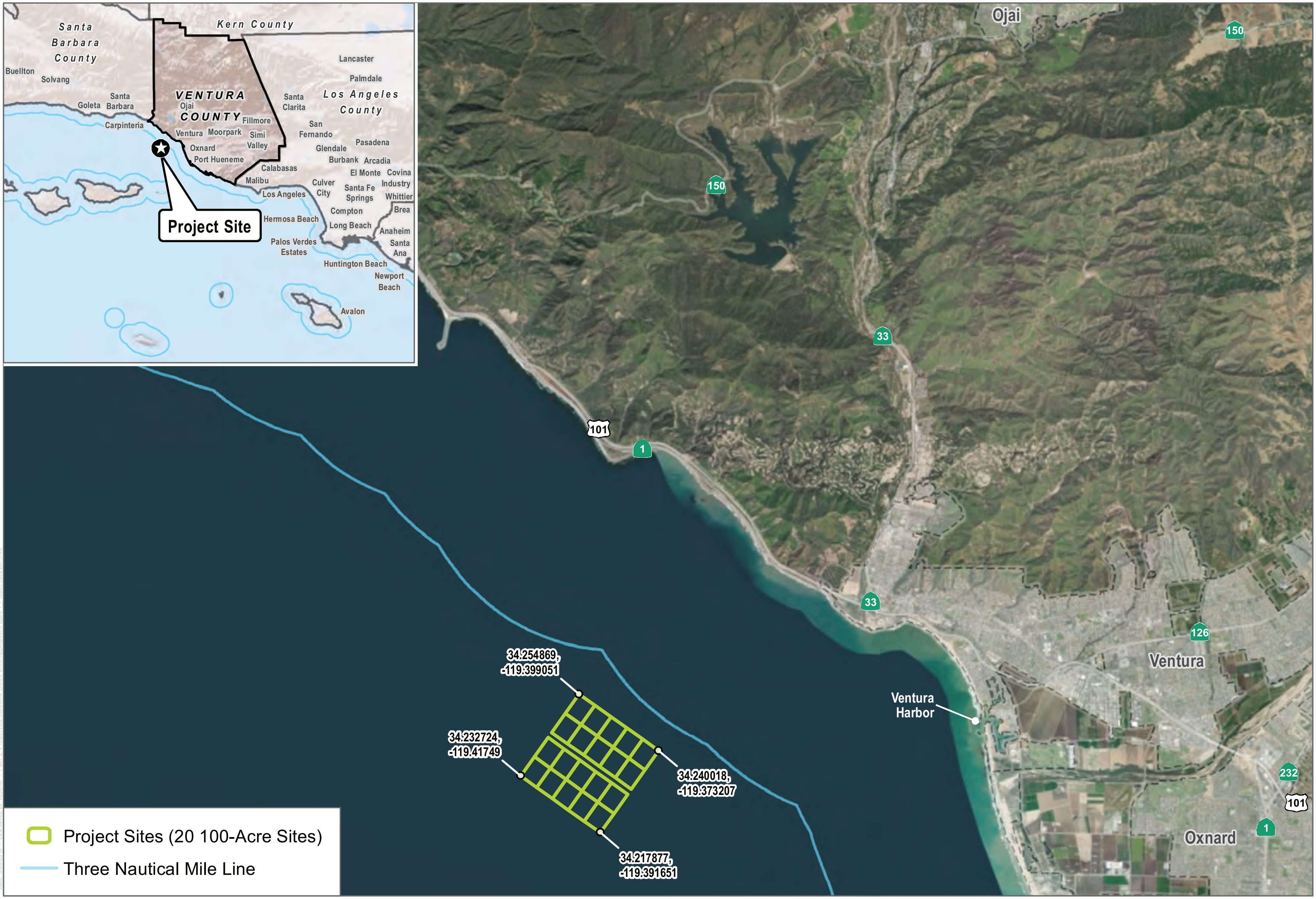

SOURCE: NAIP 2016
DATE OF PREPARATION: 8/30/2018

DUDEK

0 6,250 12,500 Feet

FIGURE 1

Project Location

Ventura Shellfish Enterprise Project

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3 PLAN GOALS & OBJECTIVES

This plan addresses potential species entanglement issues, set protocols for aquaculture gear checks, provide clear notification pathways for personnel with gear issues, and define action thresholds. The plan goal is to keep aquaculture arrays in good working condition by following best management practices and account for any lost gear; to provide a clear way of handling incidents with derelict marine debris; and provide protocols to follow in the unlikely case of marine wildlife entanglement.

3.1 Marine Debris and Wildlife Entanglement

The project has the potential to create marine debris if aquaculture gear breaks free through poor maintenance or damage from storm or wave activity. Entanglement may occur if aquaculture gear comes loose, washes away, or otherwise escapes into the environment because of tide, wind, or wave action. Additional risk may occur if derelict fishing gear, lines, and other materials become entangled in the longline arrays of this project, which could compromise structural integrity and/or exacerbate the risk of marine wildlife entanglements. There is also a risk that marine debris could be ingested by marine wildlife.

Mussel aquaculture utilizes various ropes in the water column that may pose an entanglement risk to cetaceans and sea turtles. In contrast to fishing gear, however, there are far fewer documented entanglement cases in mussel aquaculture gear. Interactions and entanglements with longline aquaculture gear worldwide are rare, and close approaches by protected species are seldom documented (Price et al. 2016). West coast entanglement summaries for 2015 and 2016 report no entanglements from mussel aquaculture fisheries (NOAA 2017b). There have been no reported marine mammal entanglements associated with Santa Barbara Mariculture, which has operated a 25-acre mussel aquaculture farm in the Santa Barbara Channel, using similar cultivation techniques, for over a decade (CFGC 2018).

Reported entanglements are predominantly from crab, gillnet and spiny lobster fisheries. Fixed fisheries gear (e.g., pot and trap gear) is the most commonly recognized and reported gear type causing entanglements since 2000. Documented entangled animals and disentanglement efforts in the Pacific Northwest have mostly involved gray whales and humpback whales and have involved both gill nets and crab gear. While not as common, both fin and blue whales are sometimes entangled in gill nets and crab gear based on a few stranded animals and scarring on live animals (NOAA 2014). More recently, from 2014 to 2017, the majority of the whale entanglements involved humpback whales and most of the entanglements were from commercial Californian and Washington Dungeness crab traps, and gillnet fisheries (NOAA 2017b). Large whale species appear to be more vulnerable to entanglement than smaller cetacean species, such as dolphins and porpoises, which are more prone to be caught as bycatch in nets due to their smaller size (Benjamins et al. 2014). Furthermore, juveniles are more likely to be entangled due to their inquisitive nature and inexperience. The proposed mussel culture techniques have some significant differences as compared to crab and fishing gear that reduce the potential for marine mammal entanglement. As opposed to fishery gear, the mussel aquaculture gear is stationary, the lines are larger, and the gear is not designed to catch or ensnare fish. Further, as described below, the lines will be highly tensioned, which reduces the risk of marine mammals being caught in slack lines. Therefore, the project design is expected to pose a much smaller risk to marine mammal entanglement compared to longline fishing methods or crab traps.

Ocean-based sources of debris, including fishing and aquaculture gear, contribute to the problem of ocean debris along the West Coast (Sheavly 2007). Lost or abandoned fishing and aquaculture gear can result in ghost fishing and habitat impacts, causing ongoing harm to marine ecosystems. "Ghost fishing" is a part of the global marine debris issue that impacts marine organisms and the environment. Lost or discarded fishing gear that is no longer under a fisherman's control becomes known as derelict fishing gear, and it can continue to trap and kill fish, crustaceans, marine mammals, sea turtles, and seabirds. Factors that cause gear to become derelict gear include poor weather conditions, gear conflicts with other vessels or bottom topography, gear overuse, and too much gear being used. Economic impact studies show fisheries can be negatively affected by a variety of factors, including costs of replacing lost gear, and costs of buying new gear to comply with new regulations.

3.2 Best Management Practices for Entanglement Prevention

The mussel grow-out ropes for the VSE project are typically planted with seed 3-inches thick and may grow to be stiff with byssus at diameters of 10-inches or more at harvest, thus making them very unlikely sources of entanglement. As an additional precaution, grow ropes will be attached to the headrope with a low-breaking-strength twine (4-millimeter (0.16-inch diameter), which will facilitate rapid detachment in the unlikely event of any interaction with the longline. To further minimize entanglement potential, a 1,100 pound breakaway link will be installed between the surface buoys and vertical lines, similar to strategies used to mitigate potential entanglement in trap fisheries in the northeastern United States (NOAA 2008). Buoy lines between the surface and headrope are generally under tension partially equivalent (0 to 10 kilograms (0 to 22 pounds)) to their full buoyancy (42 kilograms (93 pounds)). Lines with spat or mature mussels will be freely hanging or single continuous grow ropes, thereby allowing wildlife to traverse through the area. These lines will likely be heavy enough and are designed and operate under sufficient tension to prevent loose lines from becoming entangled and forming loops or knots along the longline. In addition, it is anticipated that when mussels are harvested, the lines will either be removed from the water or re-seeded with spat. All mussel spat will be provided by land-based hatcheries certified by the California Department of Fish and Wildlife (CDFW) (or collected from grow-out lines) and spat collector ropes, which carry a greater risk of entanglement, are prohibited. Project design specifications are also proposed to minimize protected marine mammal and sea turtle entanglement.

Prior to installation, all buoys and other floating equipment will have permanent markers or an attached metal or plastic tag with the name and contact information of the grower/producer. Markings shall be securely attached and robust enough to remain attached and legible after an extended period in the marine environment (e.g. heat transfer, hot stamp, etching, painted on, etc.). Markers on gear aid in returning lost gear and helps the general public to understand that lost aquaculture gear is not trash, it can be retrieved and given back to the owner. It also helps identify and track any grower/producers having difficulty properly maintaining their gear.

4 METHODS

4.1 Equipment

Growers/operators will utilize a remote operated vehicle (ROV), certified SCUBA divers, and/or fish/depth finders for the detection of derelict gear. ROVs, if utilized, will be equipped with a video camera for all deployments, and a manipulator skid, grabber arm, and rotary disc cutter or other cutting device for gear removal deployments. Successful removal of deep-water fishing gear using ROVs has been documented (NRC 2013). Alternatively, removal of derelict gear can be performed by certified SCUBA divers equipped with cameras to document removal efforts.

4.2 Monitoring Frequency and Protocols

The extent and frequency of maintenance operations necessary to minimize the loss of materials and equipment to the marine environment resulting from breakages and structural failures, as well as monitoring for wildlife entanglement issues, is on a monthly basis. No less than twice per month, each grower/producer operating on a VSE site shall visually inspect all ropes, cables, and equipment via depth/fish finders, ROV surveys, and/or monitoring performed by SCUBA divers in order to determine if any entanglement of a marine mammal has occurred and to ensure that:

a) No lines have been broken, lost or removed;

b) Gear deployed is in permit compliance: all longlines, anchor lines, and buoy lines remain taught and in good working condition;

c) Any derelict fishing gear or marine debris that collects in the growing gear is removed and disposed of at an identified onshore facility;

Gear shall also be checked after significant swell events when wave heights reach greater than 2.44 meters (8.0 feet) at the NOAA Station 46217 - Anacapa Passage, CA (111), located approximately 6.5 miles southwest from the project site. Monitoring shall occur monthly for the first two years following deployment and, in the event that there are no marine wildlife entanglements or significant marine debris generated by the project within the first two years, upon concurrence by NOAA Fisheries and the U.S. Army Corps of Engineers (USACE), monitoring may be reduced to quarterly inspections thereafter. Recorded video, if any, shall be provided to USACE, NOAA Fisheries, and California Coastal Commission (CCC) along with an annual report detailing any marine mammal entanglements and/or marine debris. Any maintenance issues recorded during the inspection whether by ROV, SCUBA divers, or visual observations, including wear, loosening, or fatigue of materials shall be remedied as soon as possible. Marine debris and any other fouling organisms that have a potential to cover the sea floor below will be removed and disposed of at an identified upland facility. All grower/producer employees associated with cultivation, harvesting, and maintenance operations, as well as any contractors hired to conduct the monitoring described herein, will first be provided training regarding the marine debris issues described herein, including how to identify culture gear or associated materials that are loose or at risk of becoming loose, proper gear repair methods, how to identify and remove invasive species, and how to completely remove gear if gear becomes dislodged or is otherwise taken out of production.

4.3 Derelict Gear Search and Removal Protocols

All equipment and materials accidentally released or found to be missing from the aquaculture facility during monthly inspections, including buoys, floats, lines, ropes, and chains shall be searched for, collected, and either repaired or properly disposed of onshore, and documented in the annual inspection report. If the grower/producer discovers that aquaculture gear has broken loose, as soon as it is safe to do so (in the event of storm conditions), it will conduct a search of its aquaculture farm and the surrounding area to find the lost gear using the same methods described in Section 4.1 above. Gear removal will utilize "live boat" techniques and therefore will not require anchors. Upon removal, the derelict gear will be examined by a marine biologist. Species, size, and number of any trapped or entangled marine life observed by video and from observations of gear brought to surface will be recorded and reported to the VPD and other regulatory agencies, as described in Figure 2. Live mobile species entrapped within the derelict gear will be disentangled and returned to the ocean promptly, to the extent feasible. All equipment that cannot be repaired and placed back into service shall be properly recycled or properly disposed of at a certified onshore waste disposal facility. Grower/producers shall retrieve any escaped or damaged aquaculture equipment they encounter, even if such gear is not their own. If persistent discoveries of certain gear types are made, the grower/producer shall evaluate (and if feasible, implement use of) alternative gear types or practices that would reduce persistent sources of debris.

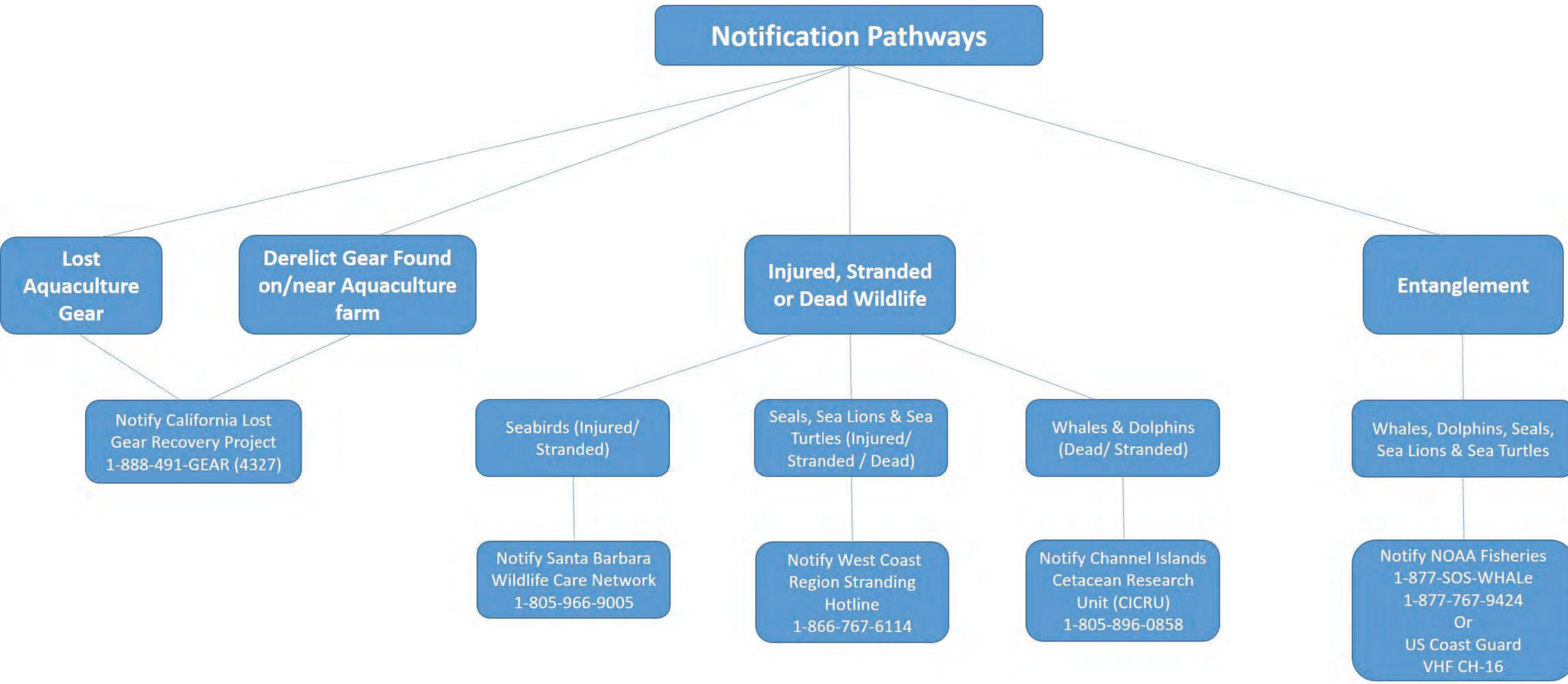
4.4 Wildlife Entanglement

All incidents of observed whale entanglement shall be immediately reported to SOS WHALe. Any other marine wildlife (i.e., other marine mammals, turtles) observed to be entangled will be immediately reported to NOAA Fisheries Marine Mammal Stranding Network Coordinator, West Coast Region, Long Beach Office. Only personnel who have been authorized by NOAA Fisheries and who have training, experience, equipment, and support will attempt to disentangle marine wildlife. If possible, the grower/producer shall document and photograph entangled wildlife and the entangling gear material so as to modify gear and avoid any future entanglements.

4.5 Cleanup Events

Each grower/producer will carry out quarterly cleanup events on nearby beaches between Ventura and Santa Barbara in coordination with other interested parties or organizations. Cleanup events shall include, but not be limited to, walking different beaches to pick up escaped shellfish gear and other trash (regardless of whether it is generated by the project). Cleanup events may also be organized to remove floating debris in areas where circulation patterns result in accumulation. The volume and type of shellfish gear collected, the cleanup location (marked on a map), and duration of cleanup activity shall be recorded and documented in the annual report.

ATTACHMENT 1



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4.6 Notification Protocols

The following notification protocols will be implemented in the event of wildlife entanglement or injury, if derelict gear is found on the aquaculture arrays, or if aquaculture gear is lost (Figure 2):

- For marine mammal entanglement (whale, dolphin, seal, sea lion, and sea turtle), immediately notify NOAA Fisheries by calling the 24-hour hotline: 877-SOS-WHALe (877-767-9425) or hail the US Coast Guard on VHF CH-16. Follow protocols listed in Appendix A. Notify VPD.
- For injured or entangled seabirds, call the Santa Barbara Wildlife Care Network: 805-966-9005. Notify VPD.
- If an injured, stranded, or dead marine mammal or sea turtle is observed anytime during any aspect of work (i.e. while traveling to/from the aquaculture farm, or observed near/at the aquaculture farm, etc.), immediately notify the West Coast Region Stranding Hotline: 1-866-767-6114. Notify VPD within one week. For dead stranded whales and dolphins, notify Channel Islands Cetacean Research Unit (CICRU) at (805) 896-0858.
- If derelict gear is found on the aquaculture arrays, notify California Lost Gear Recovery Project 1-888-491-GEAR and VPD within one week. Follow protocols in Appendix A.
- If aquaculture gear is lost, notify the California Lost Gear Recovery Project 1-888-491-GEAR and VPD within one week. Follow protocols in Appendix A.
- For law enforcement, harassment, and other violations of marine wildlife, call 1-800-853-1964.

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5 ADAPTIVE MANAGEMENT & REPORTING

In implementing this Plan, grower/producers and the Ventura Port District will consult with USACE and NOAA Fisheries as appropriate on the technical issues described above and data interpretation associated with the monitoring. Such consultation will include consideration of results from monitoring efforts and subsequent adjustments to monitoring methods. Adaptive management and adjustments to the Plan will occur following the triggers and subsequent actions below:

Adaptive Management Trigger 1: If monitoring shows that derelict gear has become ensnared or collected on any Project structure but there was no wildlife entanglement, the grower/producers will remove the derelict gear as soon as feasible and notify VPD within one week. If monitoring shows that aquaculture gear is lost, seek to collect the lost gear as soon as feasible in compliance with Section 4.3 and notify VPD within one week. In the event that derelict gear is a persistent issue for a certain grower/producer, or a certain type of gear is frequently lost, affected grower/producers and the VPD will consult with NOAA Fisheries and USACE in order to modify the Project and/or monitoring plan as necessary.

Adaptive Management Trigger 2: If monitoring shows non-listed species found entangled or otherwise impinged at the Project site, grower/producers will remove the derelict gear as soon as feasible, provide photographic or video documentation of the entanglement, notify VPD within one week, and provide a report to VPD. VPD and the grower/producer will consult with NOAA Fisheries and USACE in order to modify the Project and/or monitoring plan if necessary.

Adaptive Management Trigger 3: If monitoring shows marine mammals that are alive, but appearing debilitated, the grower/producer will record the sighting as part of their monitoring report as highlighted below in the Reporting Protocol for Injured or Stranded Marine Mammals. VPD and the grower/producer will consult with NOAA Fisheries and USACE in order to modify the Project and/or monitoring plan if necessary.

Adaptive Management Trigger 4: If monitoring shows live marine mammals/ protected species observed entangled in fishing gear or marine debris, the grower/producer will immediately contact NOAA Fisheries by calling the 24-hour hotline: 877-SOS-WHALe as highlighted below in the Reporting Protocol for Injured or Stranded Marine Mammals, and contact VPD, giving all available information on the case as highlighted below. The grower/producer and VPD will consult with NOAA Fisheries and USACE in order to modify the Project and/or monitoring plan.

VPD will develop and file an annual report to NOAA Fisheries, the Coastal Commission, and USACE fully describing its implementation of this Plan during the previous calendar year and a list of the proposed activities during the current calendar year. The annual report will provide the following:

- A summary of the monthly monitoring results.
- A summary of the results of any derelict gear removal effort and lost gear.
- A summary of any wildlife entanglement, if applicable.

- A summary of beach cleanup efforts.
- A summary of any issues or concerns identified during the year regarding implementation of the Plan.
- A list of any changes to the Plan proposed by VPD during the year, to be implemented the following year.

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APPENDIX A

Reporting Protocols

ATTACHMENT 1

Appendix A

Large Whale Entanglements

What to do if you find an entangled whale:

• Call - the NOAA Fisheries' Hotline at 877-SOS-WHALe (877-767-9425) to alert authorized responders .

• Monitor - if a response is possible, authorities may ask that you watch the animal from a safe distance (greater than 100 yards and not directly behind).

• Document - if possible take photos and video of animal and entanglement from a safe distance.

• Stay in the boat - never get in the water to help a whale.

• Wait for trained, authorized personnel - do not attempt to free a whale on your own. Disentangling a large whale is dangerous. Removing trailing lines and buoys may diminish the chances of freeing the animal of all gear, potentially leaving lethal wraps behind.

• For dead stranded whales and dolphins, notify Channel Islands Cetacean Research Unit (CICRU) at (805) 896-0858

Seals and Sea Lions

For injured/dead seals and sea lions, notify Channel Islands Marine & Wildlife Institute (CIMWI) at their Rescue Hotline: (805) 567-1505.

Report Derelict Fishing Gear

Report any derelict gear you encounter to California Lost Gear Recovery Project 1-888-491-GEAR and VSE.

When you encounter derelict fishing gear:

Do not attempt removal. Recreational divers are strongly cautioned to avoid the gear because of the inherent dangers.

Record as much information as you can while you're on-site including:

- **Location** - GPS coordinates/chart location (latitude/longitude), water depth, distance from nearby landmarks and/or common names for the area;
- **Type of Gear** - Nets (monofilament gillnet or twine-like purse seine, trawl or fish farm pens), Pots/Traps (round or square for crab or shrimp, singular or multiple), Ropes/Lines, Floats, Trawl Doors or others;
- **Details** - Date and time of sighting, your activity during sighting (fishing, diving, boating), type of seabed, size of the gear, number and type of invertebrates, fish, birds or marine mammals entangled or dead in the gear, perceived level of threat to humans or passing vessels;
- **Contact Name** - Your name, phone number, address, and/or email address will be very helpful should more information be needed. However, anonymous reports will be accepted;
- **Report what you see** - even if you're not sure the gear is lost or abandoned.

ATTACHMENT 1

Appendix F

Gear Removal Management Plan for the Ventura Shellfish Enterprise Project*

* Any revisions to the management plans will be updated after receiving comments from relevant regulatory agencies.

ATTACHMENT 1

GEAR REMOVAL MANAGEMENT PLAN

FOR THE VENTURA SHELLFISH ENTERPRISE PROJECT

PREPARED FOR:

VENTURA PORT DISTRICT
1603 Anchors Way
Ventura, California 93001
Contact: Brian Pendleton

PREPARED BY:

PLAUCHÉ & CARR, LLP.
1218 3rd Avenue, Suite 2000
Seattle, Washington 98101
Contact: Robert Smith

AUGUST 2019

ATTACHMENT 1

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1 INTRODUCTION

The Gear Removal Management Plan (GRMP) describes the requirements for the removal of aquaculture gear and other structures and personal property from the project area upon expiration and/or termination of a grower/producer's sub-permit or the overall permits associated with the VSE project. The VSE project will establish a commercial offshore bivalve aquaculture operation based from the Ventura Harbor in Ventura, California, focused on the cultivation of Mediterranean mussels (*Mytilus galloprovincialis*).

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2 SITE DESCRIPTION

2.1 Project Description

The project consists of twenty 100-acre plots (total of 2,000 acres) located in open federal waters of the Santa Barbara Channel (Channel) in the Southern California Bight (SCB), northwest of Ventura Harbor, with approximate depths at the project site ranging from 80 to 114 feet below sea level, with an average depth of 98 feet. The plot locations are shown in Figure 1, with latitude and longitude coordinates for the outer corners indicated. Each of the 20 plots are 2,299.5 feet by 1,899.5 feet, for an average plot size of 100.27 acres. Each plot will contain up to 24 lines (12 end-to-end pairs), with each line consisting of 575 feet of backbone length and 250 feet of horizontal scope on each end. There will be a 50 foot setback on each end of the pairs (for a total of 100 feet of spacing between lines of adjacent parcels) and 50 foot spacing between the two center pins. Parallel lines will be spaced 150 feet apart, with a 125 foot setback at each of the long sides (for a total of 250 feet of spacing between lines of adjacent parcels) (Figure 2). The mussels will be grown and harvested by grower/producers who would sub-permit the plots from Ventura Port District (VPD), and the mussel product will be landed at Ventura Harbor. The aquaculture gear installed for project operations will include the longlines, buoys used to maintain buoyancy and longline tension, and helical screw anchors.

2.2 Project Location

The project's twenty 100-acre plots are approximately 3.53 miles from the shore. The closest distance from the plots to the 3-mile nautical line is a minimum of 2,900 feet, with an average closest distance of over 3,000 feet. The closest distance from the growing area to the City of Ventura city limit is 4.5 miles. Ventura Harbor is 4.1 miles from the closest plot (8 miles from the most distant plot). The sub-permit sites are located on sandy bottom habitat outside of any rocky reef habitat, as evaluated in Gentry et al. 2017 and illustrated by NOAA United States West Coast nautical charts (NOAA 2017a).

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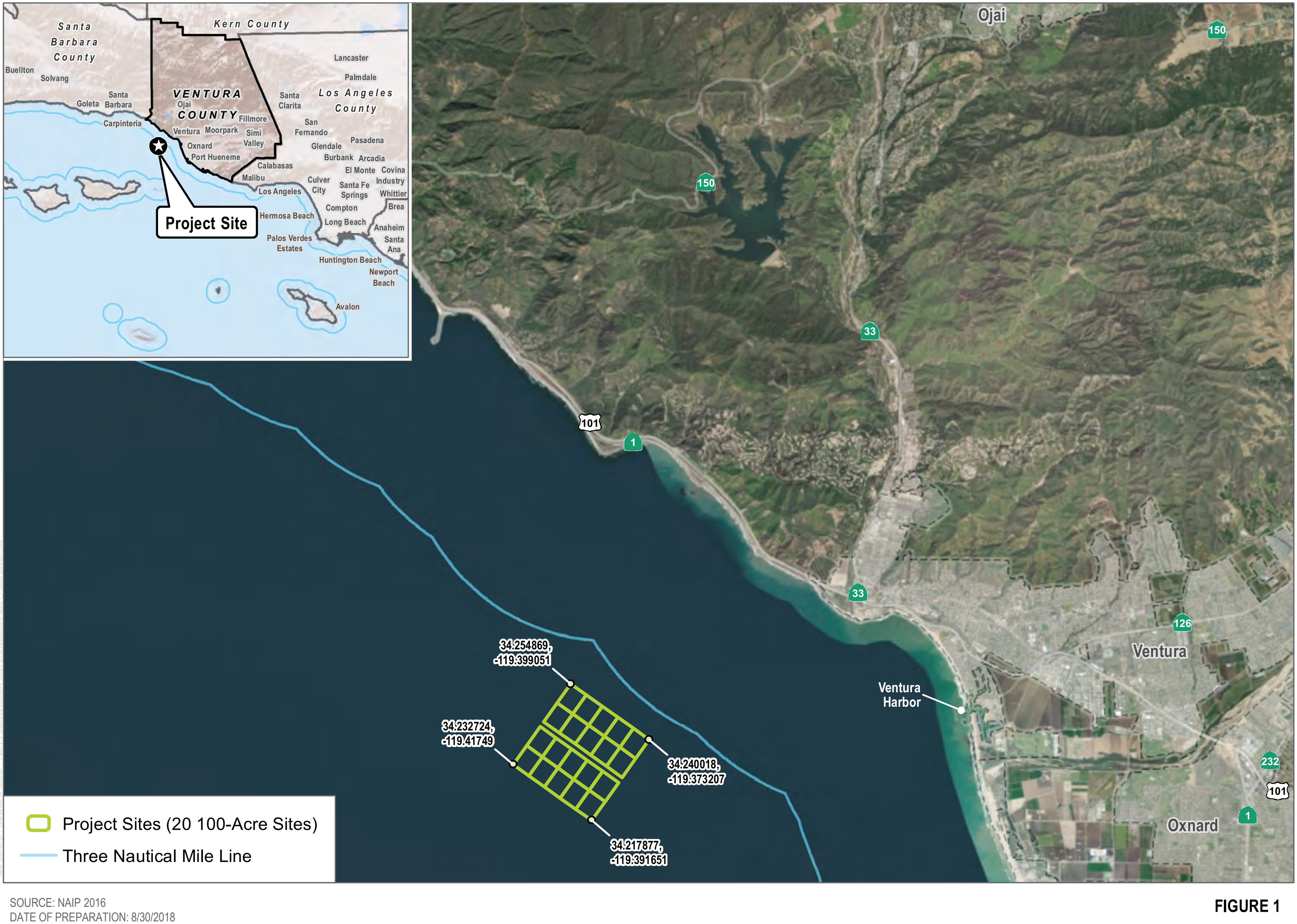

FIGURE 1

Project Location

Ventura Shellfish Enterprise Project

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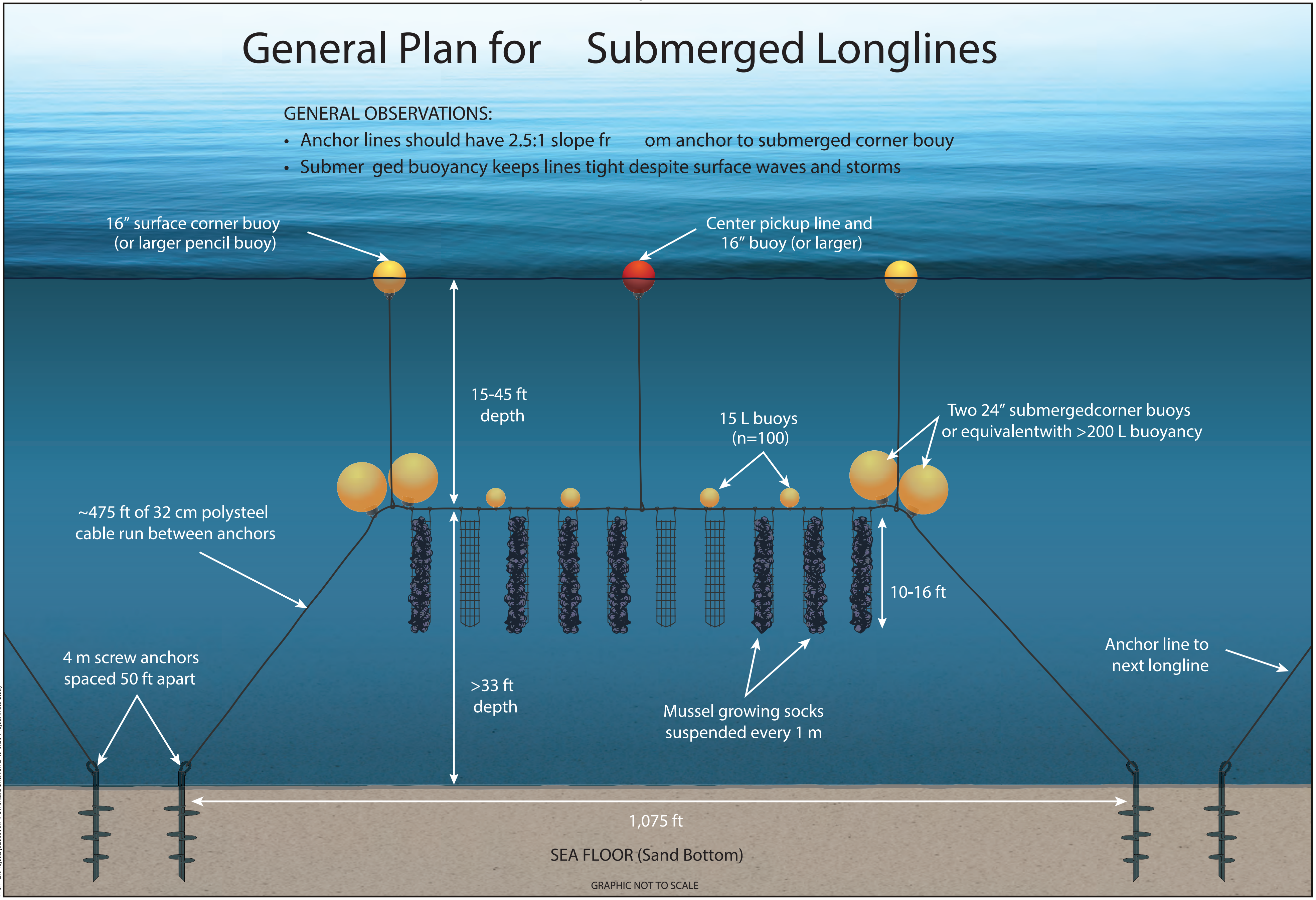

* Parcel corner buoys will be lighted consistent with U.S. Coast Guard standards and regulations

FIGURE 2

Detailed Plan for Shellfish Longlines

Ventura Shellfish Enterprise Project

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3 GEAR REMOVAL MANAGEMENT PLAN

3.1 Overview

This GRMP includes requirements for timely gear removal in the event of expiration or termination of a particular sub-permit of an individual grower/producer or expiration or termination of the overall permits for the VSE project. It is intended to provide a reasonable timeframe for gear removal and site cleanup, while acknowledging that the project includes personal property, including the cultivated shellfish, that may take additional time to properly remove. Grower/producers are solely responsible for implementing the procedures described herein and are encouraged to seek additional guidance from the VPD if necessary.

3.2 Bond Requirement

In California state waters, the California Coastal Commission and California Department of Fish and Wildlife often require a surety bond or letter of credit to ensure that there is sufficient funding to remove all aquaculture gear and site cleanup in the event that the grower/producer fails to do so. While the project is not within state waters, the VPD believes that this requirement should be incorporated into VSE project requirements. Therefore, prior to starting construction within the project site, the grower/producer must provide a surety bond or letter of credit to the VPD for $65,000, which is 110% of the estimated cost of gear removal and site cleanup for a 100-acre farm site. The VPD may revise the required bond amount as necessary based upon additional information regarding the actual costs of gear removal and site cleanup. The VPD can also increase or decrease the amount of the bond or letter of credit in the event that the grower/producer cultivates more, or less, than 100 acres. This requirement does not limit the VPD from seeking additional damages or reimbursement from a grower/producer who fails to remove its gear or cleanup its farm site, in the event that the bond or credit amount is insufficient to reimburse the VPD or a hired third-party for such cleanup work.

3.3 Gear Removal in the Event of a Permit Violation or Uncured Default

In the event that the grower/producer's gear is contributing to a permit violation or uncured default of any agreement associated with its shellfish farm, the grower/producer must immediately (provided it can be done safely) repair or remove the shellfish gear that is causing the permit violation or default. In the event that the grower/producer fails to do so, the VPD, as well as the U.S. Army Corps of Engineers and U.S. Coast Guard, reserve the right to immediately enter into the grower/producer's farm site to resolve the permit violation or uncured default and seek reimbursement from the grower/producer for any and all costs associated with such resolution. Unless it is an emergency situation, the VPD will provide notice to the grower/producer before undertaking efforts to resolve the permit violation or default.

In the event that the permit violation or uncured default is unrelated to the grower/producer's gear, but results in termination of his or her sub-permit, the grower/producer shall have 30 days to remove all gear and structures from the farm site, including but not limited to any cultivated shellfish and shellfish shells, and return the site to its original condition. The grower/producer must also remove any significant shell accumulation or marine debris from the seafloor under its farm site as well as any known debris from its farm site that is located beyond the farm boundaries.

In the event that the grower/producer fails to remove its gear and structures within 30 days of notice of the violation or default, such gear and structures shall become the property of the VPD, without payment by the VPD. VPD may elect to remove such gear and structures and the grower/producer must pay for the costs of removal and disposal. Alternatively, the VPD may sell any gear and structures left on the farm site. VPD shall apply sale proceeds first to VPD's administrative costs in conducting the sale, then to payment of amount that then may be due from the grower/producer to VPD. VPD shall pay the remainder, if any, to the grower/producer.

3.4 Gear Removal in the Event of a Permit or Sub-Permit Expiration

Upon expiration of the overall permits for the VSE project, or individual sub-permit held by a grower/producer, the grower/producer shall commence removal of all aquaculture gear and structures within 30 days of permit expiration. Gear and structures that are not being actively used for cultivation must be removed from the farm site within 30 days. The grower/producer shall not reseed or plant any new shellfish on the site after permit expiration. If a portion of the farm site is not ready to be harvested at the time of permit expiration, the grower/producer shall have a total of 90 days after permit expiration to harvest any and all remaining shellfish, remove all aquaculture gear and structures, remove any significant shell accumulation or marine debris from the seafloor under its farm site as well as any known debris from its farm site that is located beyond the farm boundaries, and return the site to its original condition.

In the event that the grower/producer fails to remove its gear and structures within 90 days of permit expiration, such gear and structures shall become the property of the VPD, without payment by the VPD. VPD may elect to remove such gear and structures and the grower/producer must pay for the costs of removal and disposal. Alternatively, the VPD may sell any gear and structures left on the farm site. VPD shall apply sale proceeds first to VPD's administrative costs in conducting the sale, then to payment of amount that then may be due from the grower/producer to VPD. VPD shall pay the remainder, if any, to the grower/producer.

3.5 Methodology for Gear Removal

Both longlines and anchors shall be removed, unless the VPD waives the anchor removal requirement in the event that the farm site is to be used by another sub-permittee that plans to use the anchors and gear. Longlines may be removed either by first detaching the longlines from anchors and then pulling them up to the vessel or cutting the longline backbone in half and then pulling the line and buoys into the vessel. All components will be recycled or appropriately disposed of on land.

3.6 Documentation and Reporting

The grower/producer shall provide photographic or video documentation of the site documenting its return to its original condition as well as a narrative description of its gear removal and cleanup efforts in a report submitted to the VPD and U.S. Army Corps of Engineers, within 90 days of termination or expiration of its sub-permit.

4 CONCLUSION

The Gear Removal Management Plan for the Ventura Shellfish Enterprise provides requirements for gear removal and site cleanup in the event of sub-permit (or master permit) termination or expiration. The individual grower/producers are solely responsible for such cleanup efforts, subject to review and confirmation by the VPD and U.S. Army Corps of Engineers. Installation of the above protocols is expected to significantly reduce the potential for shell deposition, "ghost" aquaculture gear, and marine debris.

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5 REFERENCES

NOAA. 2017a. United States West Coast, California. Port Hueneme to Santa Barbara. Mercator Projection. Nautical Chart. Washington, DC. U.S. Department of Commerce, NOAA, National Ocean Science, Coast Survey. 30th Ed. June 2013. Last correction 7/3/2017.

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ATTACHMENT 2

illuminas Consulting
STRATEGY | REAL ESTATE | URBAN ECONOMICS

Memorandum

To: Brian Pendleton, General Manager

From: Michael Wright

Date: August 28, 2020

Subject: Draft Economic and Fiscal Impacts of the Ventura Shellfish Enterprise Project

Introduction

The Ventura Port District (the District) is currently seeking permits for the Ventura Shellfish Enterprise project (VSE), a multi-party initiative to permit twenty 100-acre plots for growing the Mediterranean mussel (Mytilus galloprovincialis) via submerged long lines in waters within the Santa Barbara Channel northwest of Ventura Harbor. Project implementation will be phased such that a maximum of 500 acres of growing are will be installed per year, provided that the project meets certain identified thresholds and standards established by regulatory agencies as part of their approval of project permits and monitoring plans. The analysis contained herein is based upon the project descriptions submitted with the District's applications, as clarified based upon further discussions with the District.

The District has been the recipient of two NOAA California Sea Grant sub-awards that provide financial support for the VSE project. The first Sea Grant issued in 2015 provided funding for preparation of a strategic permitting plan, preparation of all required permit and entitlement applications, and an educational outreach program, including eight public workshops. The second Sea Grant issued in 2018 is providing funding for coordination of a permit assignment strategy with the regulatory agencies, environmental review, a seafood safety and quality assurance plan, and a grower/producer compliance training program and information dissemination. As the District works to complete these 2018 Sea Grant tasks, the District has simultaneously engaged Illuminas Consulting to estimate the local fiscal and economic impacts associated with the VSE program.

As the shellfish aquaculture industry grows on the west coast of the United States and around the world, growers and policymakers strive for a better appreciation of the industry's economic impact on local regions. Assessing an industry's economic impact is a way to gain a deeper understanding of the role that industry plays in the local economy, thereby helping industry representatives and local policy makers to make informed decisions.

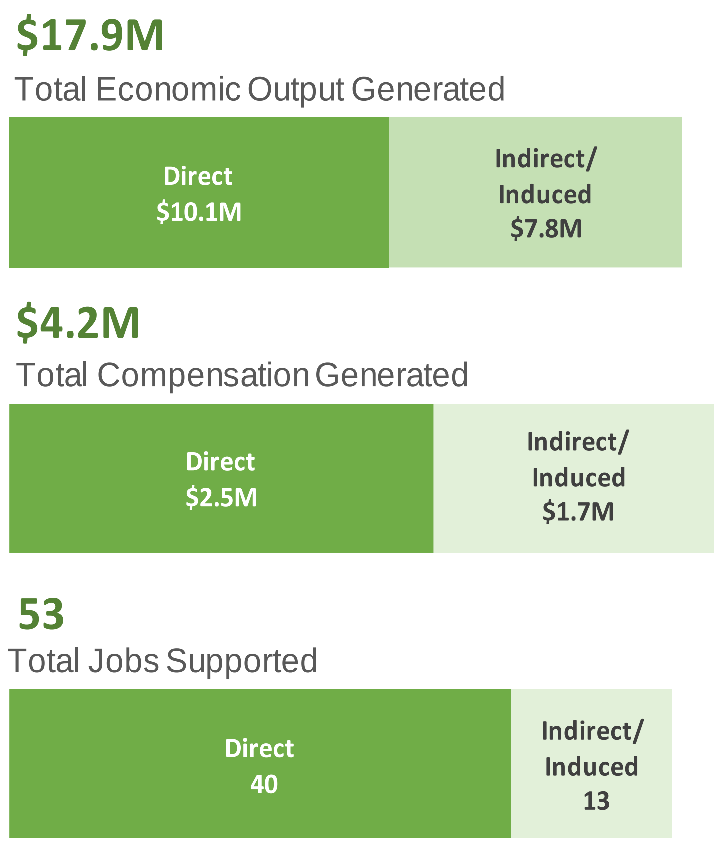
Summary of Results

Economic Impact of VSE Project

Economic impact measures the effects on the local economy by the introduction of new business operations to be located within the 2,000-acre VSE project area. Effects are measured as new economic output, jobs and overall growth in area wages due to this new activity.

By buildout of all four phases of the VSE project, the 20 onsite growers are projected to spend $10.1 million annually in Ventura County to purchase supplies and services necessary to run the aquaculture farms[1]. This spending will support approximately 40 onsite jobs with a collective wage impact of $2.5 million per year.

Exhibit 1
Total Ongoing Impacts of VSE Farm Operations in Ventura County
From Onsite Operations and Vendor Spending
Indirect and Induced Totals Represent Average of High and Low Estimates



[1] All costs are in current year 2020 dollars.

The grower business-to-business spending as well as farm employee consumer purchases will support an additional $7.8 million in indirect (business-to-business) and induced (consumer spending) impacts throughout the Ventura County area. This spending will support an average of 13 jobs with an associated wage impact of $1.7 million[2].

In addition to the ongoing effects of annual grower expense spending, each grower will invest in startup equipment necessary to operate their business. For all four phases, one-time equipment purchases are estimated to be $23.6 million. Equipment purchases will support an additional $13.3 million in indirect (business-to-business) and induced (consumer spending) impacts throughout the Ventura County area at the start of each of the four project phases.

Exhibit 2

Total One-Time Impacts of VSE Farm Capital Purchases in Ventura County (All Phases)

$23.6M	+	$13.3M	=	$36.9M
One-Time Spending for Startup Equipment		Indirect and Induced Output in Ventura County		Total Impact in Ventura County

Fiscal Impact of VSE Project

In addition to the economic output and job impacts associated with the VSE project, there are fiscal impacts associated with direct revenues and costs to the District as well as some indirect tax revenues that are likely to be captured by city jurisdictions located within Ventura County.

Over the first 10 years of operation, it is anticipated that all four phases of the VSE will be operational and will generate a cumulative net positive impact to the District of $10.8 million or $1.6 million annually by year 7. The District will collect revenues from slip and landing fees as well as payments by growers for compliance, monitoring and enforcement activities. District costs to run the VSE project include biological monitoring, information management services, and shellfish sanitation services, dedicated staff time for operations and monitoring of VSE businesses and planning costs associated with the pre-harvest period of the VSE project.

There will be tax revenues generated for cities located in Ventura County as well[3]. At the beginning of each phase when VSE operators invest in startup equipment, there will be a one-time local sales tax revenue generation of $58,890 to the city where the purchase of equipment is made[4]. Ongoing tax revenue impacts include sales tax and utility user's tax revenues from business supply purchases as well as consumer purchases from VSE employees. This will total $47,960 annually by year 5. Over

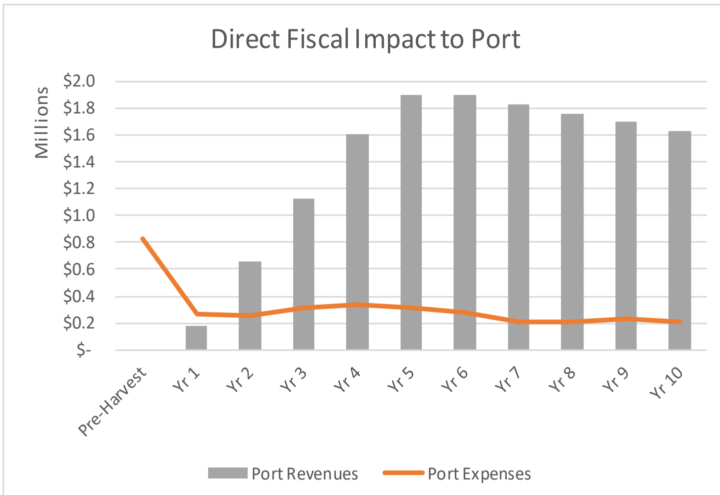
[2] Indirect and induced totals represent an average of high and low range estimates.

[3] The fiscal impact analysis focuses on impacts to cities in the County of Ventura where much of the vendor spending and employee consumer purchases are projected to take place. It does not project impacts accruing to the state or federal jurisdictions.

[4] Totals reflect point of purchase returns to the city where the sale takes place. This totals to 1.0 percent of the retail sales price.

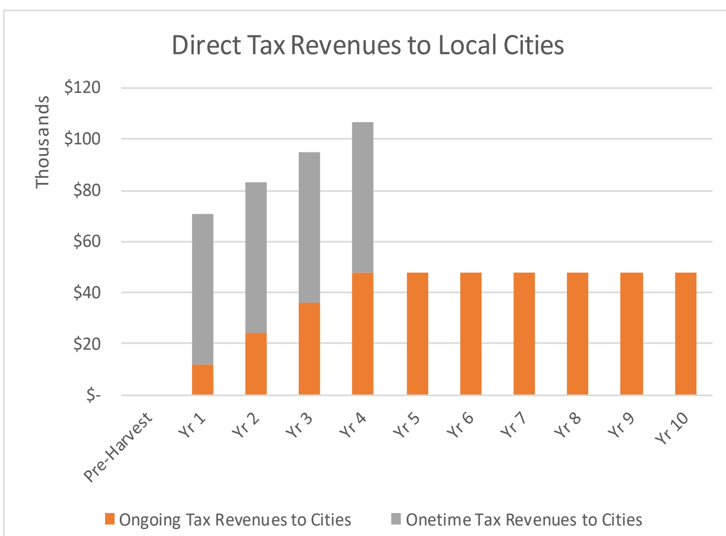
the first 10 years of operation, the VSE program will generate a cumulative net positive impact to surrounding cities of $643,000.

Exhibit 3
Direct Fiscal Impact to District



$10.8M
Net Impact to Port Over Ten Years

Exhibit 4
Tax Revenue Impact to Local Cities



$643,000
Tax Revenue to Local Cities Over Ten Years

Downstream Economic Impacts

While the main focus of this analysis are the impacts directly associated with VSE grower businesses, they are only the first step in a multi-level production chain that includes seafood processors, distributors, restaurants and grocery stores.

Mussels harvested in VSE plots will be transported to Ventura Harbor for sale and distribution. Growers will individually decide how their catch will be distributed. However as seen in other areas of California as well as other states with established shellfish operations, a portion of the catch typically winds up in local restaurants and grocery stores with the remaining portion going to local processing facilities for local or export sales.

For purposes of providing an illustration of the relative importance of capturing the downstream impacts locally, an analysis was developed to show the impacts associated with the chain of product distribution once the harvested mussels leave the Port property. Keeping production, distribution, processing and consumption "local" makes for a more sustainable system, less food miles traveled and more work for local employees.

Annual grower revenues for the VSE product are estimated to be $29.3 million by full buildout[5]. Even assuming that a significant portion of economic activity in processing and wholesale operations as well as restaurant and retail market sales occur at locations outside of Ventura County, the result is that for every VSE grower job, an additional 1.4 jobs could be supported in local businesses that process, distribute and sell the resulting shellfish product[6]. Accounting for the full effect of downstream business activity and all resulting economic multiplier activity, **the VSE project could support 97 jobs total within the greater Ventura County economy if there is a concerted effort to develop a local infrastructure to process, distribute and sell the shellfish product locally.**

Exhibit 5
Total Impact Including Downstream Economic Effects

Direct Grower Jobs	40	*Jobs associated with 20 farms by build out*
Up/Downstream Jobs	57	*Projected upstream and downstream jobs not including grower jobs*
Total Job Impact	97	*Direct VSE Jobs + all additional direct, indirect and induced jobs*
MULTIPLIER	2.4	*For every direct grower job, 1.4 additional jobs would be supported.*

[5] Estimated gross annual revenues of $1,462,500 per grower x 20 growers = $29.3 million.
[6] For this analysis, it is assumed that approximately 51 percent VSE shellfish product would remain within Ventura County for processing, distribution and consumption.

Overview of the Shellfish Aquaculture Economy in California

California has a rich history in shellfish aquaculture dating back to the 1860s. Currently, aquaculture facilities that produce food products are located up and down the coast, and in ponds and tanks inland. Although the majority of operations are within coastal waters, there are three active land-based facilities growing shellfish and/or seaweed for commercial sale and consumption, with a fourth longstanding operation in Cayucos near Morro Bay recently closed. Currently, a total of 4,960 acres of California public tidelands are utilized for marine aquaculture.[7]

Additionally, the California Department of Fish and Wildlife manages 17 active state water bottom leases for marine aquaculture totaling 907 acres, of which 267 acres are currently used. Aquaculture facilities without state water bottom leases include operations within Humboldt Bay, Monterey Bay, Agua Hedionda Lagoon, and San Diego Bay. These facilities account for an additional 4,053 acres set aside for marine aquaculture in California waters. Total shellfish production reported to California Department of Fish and Wildlife in 2018 was 495.2 metric tons for all species combined. In all, the total value of commercial production in 2018 was $15.3 million.[8]

Public demand for local shellfish has risen dramatically in recent decades. Worldwide, demand for farmed seafood has never been greater, as global farmed aquaculture exceeded beef production for the first time in 2012.[9] However, shellfish cultivation in the state has lagged far behind. While California is the third largest shellfish consuming state in the United States, state production meets less than half of this demand, contributing to a state and national seafood trade deficit and a lost opportunity for economic growth.[10]

California aquaculture development continues to face many challenges and opportunities, influenced by factors including rapid scientific and technical advances, global and local market forces, competing

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[7] *The Status of Commercial Marine Aquaculture in California* - California Department of Fish and Wildlife, March 2020. The map on this page indicates locations of commercial marine aquaculture facilities in California. Open circles show locations with facilities in state waters and closed circles show land-based facilities. Many facilities within state waters also have associated land-based facilities.
[8] These totals cover commercial production of mussels, Manila Clams, Red Abalone, Kumamoto Oysters, Pacific Oysters, Olympia Oysters, European Flat Oysters, and Eastern Oysters.
[9] National Geographic Ocean Views, "Farmed Fish Now More Popular Than Beef Worldwide", 6/19/13.
[10] California Shellfish Initiative - *A Position Paper of the Pacific Coast Shellfish Growers Association*, August 2013

stakeholder and land-use priorities, and the expense and complexity of environmental and regulatory review and administration.

One solution to the high cost and specialized expertise now needed to successfully navigate environmental review and permitting has been proposed through a number of creative, collective solutions. Various port and harbor districts have undertaken efforts to secure entitlements for aquaculture activity within their jurisdictions, by pre-permitting and business incubation initiatives. If successful, such efforts would enable aquaculture partners and sub-lessees to get started producing sooner, with a lower cost of entry, and with repayment to the districts over time. The cost savings of quicker startup and predictable permitting can provide the needed catalyst to build local aquaculture industries, benefiting surrounding economies (from local to state and federal levels), through added jobs and business activity, tax and license revenues, and the decrease of both carbon-footprint and trade deficit provided by locally-produced seafood.

The District's VSE project is an example of a special district-initiated program to facilitate the expansion of aquaculture farms that can help to boost local supplier networks for home-grown seafood in California. An additional benefit is that, if successful, the businesses started under the VSE program will contribute to ongoing economic growth in the greater Ventura County region.

Estimated Economic Impact of Ventura's VSE Project

Economic Impact Process

As the shellfish aquaculture industry grows on the west coast of the United States and around the world, growers and policymakers strive for a deeper understanding of the industry's economic impact on local regions. Assessing this impact is a way to gain a deeper understanding of the role that the industry plays in the local economy, thereby helping industry representatives and local policy makers to make informed decisions.

Economic impact measures the effects on the local economy by the introduction of new the business operations to be located within the 2,000-acre VSE project area. Effects are measured as new economic output, jobs and overall growth in area wages due to this new activity.

For this analysis, there are two stages of economic impact that are measured:

1. **The impact of aquaculture farming operations**. This encompasses one-time startup investment purchases as well as ongoing economic activity for the growers that will occupy the plots constituting the VSE project area.

   The ongoing economic activity encompasses direct business-to-business spending on supplies, utilities, fuel for vessels, repairs and maintenance, marketing, slip, landing fees and other lease fees and compliance, monitoring, enforcement costs. This business-to-business (and business-to-government) spending will largely occur within the local economy. Additionally, each operator is assumed to have full time as well as possibly part-time employees that will be paid wage incomes. It is assumed that these employees will in-turn spend a portion of their incomes at local businesses located within the County.

2. **Downstream impacts associated with the sale and distribution of harvested product -** Residents and tourists of west coast communities all enjoy and benefit from the supply of

fresh shellfish provided by the aquaculture industry. People purchase shellfish through retail markets, consume shellfish in restaurants, and enjoy local seafood fare at fundraisers and events.

Mussels harvested in VSE plots will be transported to Ventura Harbor for sale and distribution. Growers will individually decide how their catch will distributed. However as seen in some other areas of California as well as other states with established shellfish operations, a portion of the catch typically winds up in local restaurants and grocery stores with the remaining portion going to local processing facilities for local or export sales.[11] This distribution process creates its own economic impact process as the wholesale sales by shellfish growers move down the food chain, create additional value and involve the activity of additional business and as well as associated job impacts.

Impacts Associated with VSE Project

According to the VSE Operations Plan, the project will consist of twenty 100-acre plots (total of 2,000 acres) to be used for growing Mediterranean mussel Each of the 20 plots are approximately 100 acres in size. The installation of the 2,000 acres will be phased such that 500 acres per year will be installed, provided that the project meets certain identified thresholds and standards established by regulatory agencies as part of approval of project permits and monitoring plans.

The mussels will be grown and harvested by growers who operate the plots pursuant to an agreement with the District. Initial plantings of juvenile seed mussels, commonly referred to as spat, will be purchased from onshore hatcheries certified by the California Department of Fish and Wildlife (CDFW).

Once fully matured mussels have been harvested, they will be size-graded and bagged for landing as market-ready product. All mussels will be required to be landed at Ventura Harbor where they will be transported for offloading, sale, and distribution. All husbandry activities related to harvesting, grading, and restocking of mussels to cultivation lines will occur onboard the servicing vessel using specialized equipment for that purpose. Watercraft used for planting, inspections, and harvesting would likely be home ported at Ventura Harbor.

The process to estimate economic impacts from the VSE Grower project involves two generalized steps:

1. Estimating the direct economic output, employment and wages levels for the VSE project; and
2. Applying economic multipliers to each of these estimates to project the effect of new business-to-business and consumer spending on the local area.

Direct output, or business spending by a VSE grower has been estimated using information supplied by District staff. A detailed proforma was developed for the District to illustrate projected grower

[11] *Morro Bay Commercial Fisheries – 2015 Economic Impact Report* by Lisa Wise Consulting; *Maine Aquaculture – 2017 Economic Impact Report* by the University of Maine Aquaculture Research Institute; and *Massachusetts Shellfish Aquaculture Economic Impact Study (2015)* by The University of Massachusetts Dartmouth and the Charlton College of Business, Center for Marketing Research

costs and revenues associated with operating a 100-acre plot in the VSE area[12]. A summarized copy of this proforma is attached at the back of this memorandum as Exhibit A1.

Using the details from the grower proforma, it is assumed that by a stabilized year 5, each grower will spend approximately $596,000 in annual business expenses[13]. Of this amount, it is estimated that 85 percent will be spent locally within Ventura County (total of $504,239)[14]. In addition to ongoing annual expenses, each grower will purchase $877,800 in startup equipment[15] and will contribute to the purchase of a support vessel valued at $1.5 million[16]. Exhibit 6 below summarizes these impacts.

Exhibit 6

Summary of Direct Business Impacts – VSE Project by Phase

	Impacts are Cumulative by Phase /1			
	Phase 1	Phase 2	Phase 3	Phase 4
One-time Capital Purchases 2/	$ 5,889,040	$ 5,889,040	$ 5,889,040	$ 5,889,040
Economic Output 3/ (e.g. Local Spending by Growers)	$ 2,521,197	$ 5,042,395	$ 7,563,592	$ 10,084,789
Direct Employment (e.g. Onsite Jobs)	10	20	30	40
Direct Wage Income (e.g. Wages for Onsite Jobs)	$ 633,750	$ 1,267,500	$ 1,901,250	$ 2,535,000

Notes

1/ Each phase consists of five plots, each occupied by one grower

2/ Startup investment for each grower includes longlines, seeding and harvesting equipment. Investment also includes the purchase of 1 Harvest Vessel for every 5 growers.

3/ Purchases shown are assumed to occur within Ventura County. Seed purchases are assumed to occur outside of the area.

It is estimated that each grower will employ an average of 2.0 employees with a combined annual wage of $126,800 (rounded). Exhibit A2 at the back of this memorandum provides a detailed estimate of the direct grower impacts by project phase.

Multiplier Impacts Associated with the VSE Project

Aquaculture farming is a highly specialized business operation. In order to best project the local economic impacts of this type of business, it was decided to use industry specific economic multipliers developed for a research project sponsored by the Pacific Shellfish Institute (PSI) in

[12] Proforma developed by Scott Lindell, Research Specialist – APOE, Woods Hole Oceanographic Institution.
[13] Note, all costs are shown in current year 2020 dollars with no inflation assumptions applied.
[14] At this point in time, it is conservatively assumed that seed purchases by growers will occur at outlets located outside of Ventura County such as the nursery facilities located in Humboldt Bay. Should seed purchases be made within Ventura County, startup and ongoing investment in Ventura County from VSE growers would be greater than estimated here.
[15] Longlines, seeding and harvesting equipment and a service vessel.
[16] One support vessel is assumed to be shared by five growers.

2013.[17] Since the publication of this report, the PSI aquaculture grower multipliers have been referenced in conference materials and a Final Environmental Impact Report document[18].

The goal of the PSI study was to collect information needed to understand the economic impacts of the west coast shellfish aquaculture industry by gathering data directly from shellfish aquaculture growers. To that end, the study team surveyed growers in Washington, Oregon and California in order to assess industry levels of spending and associated multiplier impacts in each state.

To assess the economic impact of shellfish aquaculture in the three states, the researchers used the grower survey research to develop a detailed understanding of grower business operating costs. They then conducted an input-output analysis using IMPLAN™ software to estimate economic impacts to each state's economy[19]. Input-output analysis is a modeling tool developed to measure the economic effects of a project or industry using a matrix that tracks the flow of money between industries within a specified economic region of interest. Monetary flows include business-to-business spending as well as consumer spending generated by employee households.

An impact model measures how many times a dollar is respent in, or "ripples" through, an area's economy before it leaks out. The level of respending is captured in a multiplier number. A number greater than 1 indicates that there are a significant number of local businesses present to capture the needs of the industry in question. For example, in order to operate a shellfish farming business, the owner of the business will be need to hire employees, purchase start-up equipment and pay for ongoing supplies such as seed, gasoline for boats, repair and maintenance services, etc. Multiplier numbers that are approaching 1.7 to 2.0 in scale indicate that after the initial spending on wages and business supplies, more of that money is able to circulate among other local businesses before it "leaks" out of the area when purchases are made at businesses located in other regions.

Based on the survey data from shellfish growers and the input-output analysis of spending impacts on other local businesses, the PSI study derived the following industry-specific multipliers for California.

- Output multiplier – 1.97. Example, for every $1 in expenditures by a shellfish grower, the local economy generates $1.97 in total economic output. (e.g., $1 in direct spending + $0.97 in indirect and induced spending at other businesses within the area)[20].
- Job multiplier – 1.40. Example, for every 10 direct jobs created by a shellfish grower, there are a total of 14 jobs generated in the local economy. (10 direct jobs + 4 indirect and induced jobs).

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[17] *The Economic Impact of Shellfish Aquaculture in Washington, Oregon and California* – Pacific Shellfish Institute April 2013, prepared by Northern Economics.
[18] *Economic Impact of West Coast Shellfish Aquaculture* - Pacific Northwest Waterways Association Summer Conference (June 2013) and *Analysis of Project Economic Impacts* - Coast Seafoods Company Humboldt Bay Shellfish Aquaculture Permit Renewal and Expansion Project - Recirculated Draft EIR Appendices - Humboldt Bay Harbor District (July 2016)
[19] IMPLAN is a widely accepted economic model that many public agencies use to estimate the consequences of new investments or changes in an area economy.
[20] Direct spending in this case is by a shellfish grower for all inputs needed to run a business. Indirect spending are cost impacts associated with the grower's supply chain and induced effects are those created by the consumer spending of the directly and indirectly affected workers.

- Wage Multiplier – 1.85. Example, for $1 in wages paid by a shellfish grower, this economic activity generates $1.85 in total wage output. ($1 in direct wages + $0.85 indirect and induced income for a total of $1.85 in overall wage growth in the region).

Note, these multipliers assume that all purchases associated with VSE operator business expenses occur within the local economy. Because it is assumed that seed purchases will occur outside of Ventura County, the multipliers have been adjusted downward to account for this. Table 7 combines the direct spending and job estimates from the District's proforma analysis with the PSI impact multipliers, discussed above.

Exhibit 7

Ongoing Economic Impact of VSE Project

	Ongoing Impacts - All Phases 1/					
	OUTPUT		EMPLOYMENT		WAGE INCOME 2/	
	Low 3/	High	Low 3/	High	Low 3/	High
Direct	**$ 10,084,789**	**$ 10,084,789**	**40.0**	**40.0**	**$ 2,535,000**	**$ 2,535,000**
Indirect	$ 2,294,251	$ 2,577,810	4.5	5.1	$ 769,559	$ 864,673
Induced	$ 5,031,731	$ 5,653,630	7.5	8.5	$ 843,377	$ 947,614
Total	$ 17,410,771	$ 18,316,229	52.0	53.5	$ 4,147,936	$ 4,347,288
Full Multiplier	1.73	1.82	1.30	1.34	1.64	1.71

Notes

1/ Source for multipliers: "The Economic Impact of Shellfish Aquaculture in Washington, Oregon and California" – Pacific Shellfish Institute April 2013. PSI multipliers have been adjusted to account for some out of area purchases by growers.

2/ Wage income is a subset of Output.

3/ A deflator value of 0.89 was applied to the low end estimates to reflect the differences in purchasing power between 2013 and 2020.

Due to the age of the multipliers derived for the PSI study, it was decided to employ range estimates for the indirect and induced impacts. The high end of the range is the result of directly applying the PSI multipliers (adjusted for out-of-area seed purchases) to the direct output, job and wage projections. A low-end estimate was derived by using a deflator value of 0.89 to represent the difference in purchasing power between 2013 and 2020[21].

By buildout of all four phases, the 20 onsite growers are projected to spend $11.9 million annually to run their businesses, with $10.1 million of this total spent locally within Ventura County.[22] This spending will support approximately 40 onsite jobs with a collective wage impact of $2.5 million per year. The grower spending will support an additional average indirect (business-to-business) and induced (consumer spending) impact of $7.8 million throughout the Ventura County area. This

[21] Bureau of Labor Statistics - CPI Inflation Calculator

[22] All costs are shown in year 2020 dollars and are not inflated.

spending will support approximately 13 ongoing jobs with an associated average wage impact of $1.7 million.[23]

In addition to the ongoing effects of annual grower expense spending, each grower will invest in startup equipment necessary to operate their business. Exhibit 8 illustrates this impact. For all four phases, one-time equipment purchases are estimated to be $23.6 million. Equipment purchases will support an additional $13.3 million in indirect (business-to-business) and induced (consumer spending) impacts throughout the Ventura County area.

Exhibit 8

One-Time Impacts for Startup Equipment Purchases by VSE Project

	Onetime Investments - All Phases		
	Support Vessels	Long Lines and Seed/Harvest Equipment	Total Output Impacts
Direct	$ 12,000,000	$ 11,556,160	$ 23,556,160
Indirect	$ 4,440,000	$ 3,351,290	$ 7,791,290
Induced	$ 2,880,000	$ 2,657,920	$ 5,537,920
Total	$ 19,320,000	$ 17,565,370	$ 36,885,370
Full Multiplier	1.61	1.52	1.57

Notes

1/ Multipliers for capital investment are derived from IMPLAN. Support vessel purchases use multipliers for Boat Building. Long lines and Seeding/Harvesting Equipment use multipliers for Commercial Service Industrial Machinary Manufacturing.

Fiscal Impacts of Ventura's VSE Project

In addition to the economic output and job impacts associated with the VSE project, there are fiscal impacts associated with direct revenues and costs to the District as well as some indirect tax revenues that are likely to be captured by city jurisdictions located within Ventura County.

District Related Costs and Revenues

Based on information derived from the illustrative grower proforma[24], the District will collect revenues from VSE growers for slip and landing fees as well as payments associated with compliance, monitoring, enforcement. In turn, the District will incur a number of costs associated with VSE startup activities as well as ongoing operations. These include biological monitoring and information management services, as well as staff time dedicated to operations and monitoring of VSE

[23] Economic output, jobs and wage impacts represents the averages of indirect and induced range values shown in Exhibit 7.
[24] See Exhibit A1.

businesses[25]. Finally, District planning and development costs not otherwise covered by grant awards have been allocated as a cost item as well.

Over the first 10 years of operation, it is anticipated that all four phases of the VSE project will be operational and will generate a cumulative net positive impact to the District of $10.8 million or $1.6 million annually by year 7 (See Exhibit 9).

Tax Revenue Impact in Surrounding Jurisdictions

For this analysis the focus of tax revenues impacts are at the local city-level and constitute taxes collected by cities for activities involved in running a business operation as well as sales and use taxes associated with business and consumer purchases.

The purchase of startup equipment as well as ongoing purchases of supplies will generate retail sales in the local area. These sales will be subject to local sales taxes[26], of which 1.0 percent of the retail sales value is reimbursed to the location where the sale occurs. Retail purchases by employee households will also generate sales tax revenues for local cities such as Ventura and Oxnard.

Over the first 10 years of operation, it is anticipated that all four phases of the VSE will be operational and will generate a cumulative net positive impact to surrounding cities of $643,000. At the beginning of each phase when VSE operators invest in startup equipment, there will be a one-time local sales tax revenue generation of $58,890 to the city where the purchase of equipment is made. Ongoing tax revenue impacts include sales tax and utility user's tax revenues from business supply purchases as well as consumer purchases from VSE employees. This will total $47,960 annually by year 5.

[25] This includes staff time for the following job classifications: Business Operations Manager, Marina Manager, Harbor Patrol II, Courtesy Patrol and Accounting Manager.
[26] Ventura County sales tax rate is currently at 7.75 percent.

ATTACHMENT 2

Exhibit 9

Fiscal Impacts from VSE Operations

Captured within Ventura County

Year 2020 dollars (no inflation)

Year / Cumulative Acres Farmed	Pre-Harvest Period	Yr 1 500 ac	Yr 2 1,000 ac	Yr 3 1,500 ac	Yr 4 2,000 ac	Yr 5 2,000 ac	Yr 6 2,000 ac	Yr 7 2,000 ac	Yr 8 2,000 ac	Yr 9 2,000 ac	Yr 10 2,000 ac
DIRECT IMPACTS TO PORT DISTRICT											
Direct Revenues to Port District 1/											
SlipFees		30,385	72,164	113,943	155,722	167,116	167,116	167,116	167,116	167,116	167,116
Landing Fees		-	365,625	731,250	1,096,875	1,462,500	1,462,500	1,462,500	1,462,500	1,462,500	1,462,500
Compliance, Monitoring, Enforcement		150,280	217,400	284,520	351,640	268,480	268,480	201,360	134,240	67,120	-
Total Revenues - Port District	**$ -**	**$ 180,665**	**$ 655,189**	**$ 1,129,713**	**$ 1,604,237**	**$ 1,898,096**	**$ 1,898,096**	**$ 1,830,976**	**$ 1,763,856**	**$ 1,696,736**	**$ 1,629,616**
Direct Costs to Port District											
Biological Monitoring Services 2/	$ (76,015)	$ (138,645)	$ (155,015)	$ (171,385)	$ (155,720)	$ (103,220)	$ (103,220)	$ (28,940)	$ (28,940)	$ (28,940)	$ (28,940)
Information Management Services 3/	$ -	$ (57,050)	$ (9,620)	$ (9,620)	$ (9,620)	$ (9,620)	$ (9,620)	$ (9,620)	$ (9,620)	$ (9,620)	$ (9,620)
Shellfish Sanitation Services 4/	$ (150,800)	$ (26,800)	$ -	$ -	$ -	$ (26,800)	$ -	$ -	$ -	$ (26,800)	$ -
Staff Time Dedicated to VSE Activities 5/		$ (42,483)	$ (84,965)	$ (127,448)	$ (169,931)	$ (169,931)	$ (169,931)	$ (169,931)	$ (169,931)	$ (169,931)	$ (169,931)
Pre-Harvest Direct Costs to District 6/	$ (606,293)										
Total Costs - Port District	$ (833,108)	$ (264,978)	$ (249,600)	$ (308,453)	$ (335,271)	$ (309,571)	$ (282,771)	$ (208,491)	$ (208,491)	$ (235,291)	$ (208,491)
Net Cost to Port District	**$ (833,108)**	**$ (84,313)**	**$ 405,589**	**$ 821,260**	**$ 1,268,966**	**$ 1,588,525**	**$ 1,615,325**	**$ 1,622,485**	**$ 1,555,365**	**$ 1,461,445**	**$ 1,421,125**
CUMULATIVE 10-YEAR IMPACT	**$ 10,843,000** (rounded)										
IMPACTS TO LOCAL JURSIDICATIONS											
Tax Revenue to Local Jurisdictions											
Based on Ongoing Revenues 7/		$ 11,990	$ 23,980	$ 35,970	$ 47,960	$ 47,960	$ 47,960	$ 47,960	$ 47,960	$ 47,960	$ 47,960
Based on One-Time Capital Purchases 8/		$ 58,890	$ 58,890	$ 58,890	$ 58,890						
Total Tax Revenue to Local Jurisdictions	$ -	$ 70,880	$ 82,870	$ 94,860	$ 106,850	$ 47,960	$ 47,960	$ 47,960	$ 47,960	$ 47,960	$ 47,960
CUMULATIVE 10-YEAR IMPACT	**$ 643,000** (rounded)										

Notes

1/ Revenue estimates for slip and landing fees as well as payments to cover compliance, monitoring and enforcement activities are from the VSE proforma dated August 24, 2020.

2/ Source: Proposal for Biological Monitoring Services for the Ventura Shellfish Enterprise Project, Dudek - August 2020

3/ Information Management Services for the Ventura Shellfish Enterprise Project, Dudek - May 2020

4/ Shellfish Sanitation Services for the Ventura Shellfish Enterprise: Supporting Company/Harvester Compliance with Regulatory Guidelines for Shellfish Sanitation and Public Health Safety, Integrative Biosciences Program at Coastal Marine Biolabs - July 2020

5/ Based on information detailed in Section 9 of the Ventura Shellfish Enterprise Operations Plan and information regarding annual wages for Port District staff (Source: Ventura Port District)

6/ Source: Ventura Port District

7/ Includes sales tax on business supplies and employee retail spending captured in area. Assumes that the City of Ventura would assess utility users tax to VSE businesses.

8/ Sales tax on purchases of capital equipment

Prepared By: Illuminas Consulting

Date: 8/26/2020

Potential Downstream Impacts

While the main focus of this analysis are the impacts directly associated with VSE grower businesses, they are only the first step in a multi-level production chain that includes seafood processors, distributors, restaurants and grocery stores.

As previously noted, mussels harvested in VSE plots will be transported to Ventura Harbor for sale and distribution. Growers will individually decide how their catch will be distributed. However as seen in other areas of California as well as other states with established shellfish operations, a portion of the catch typically winds up in local restaurants and grocery stores with the remaining portion going to local processing facilities for local or export sales. For example, a large percentage of the oysters harvested in Morro Bay are shipped directly to the Santa Monica Seafood's processing plant in Atascadero (San Luis Obispo County)[27].

This distribution process creates its own economic impact activity as the wholesale sales by shellfish growers move down the food chain, create additional value and involve the activity of additional business and as well as associated job impacts. This process is illustrated in Exhibit 10 on the next page.

The relative shares of final VSE product that will ultimately be distributed among processing facilities and other associated sales outlets have yet to be determined. However, for purposes of providing an illustration of the relative importance of capturing the downstream impacts locally, information from a recent NOAA Technical Memorandum[28] has been used to provide a reasonable estimate of the chain of product distribution once the harvested mussels leave the Port property. Keeping production, distribution, processing and consumption "local" makes for a more sustainable system, less food miles traveled and more work for local employees.

Product Flow

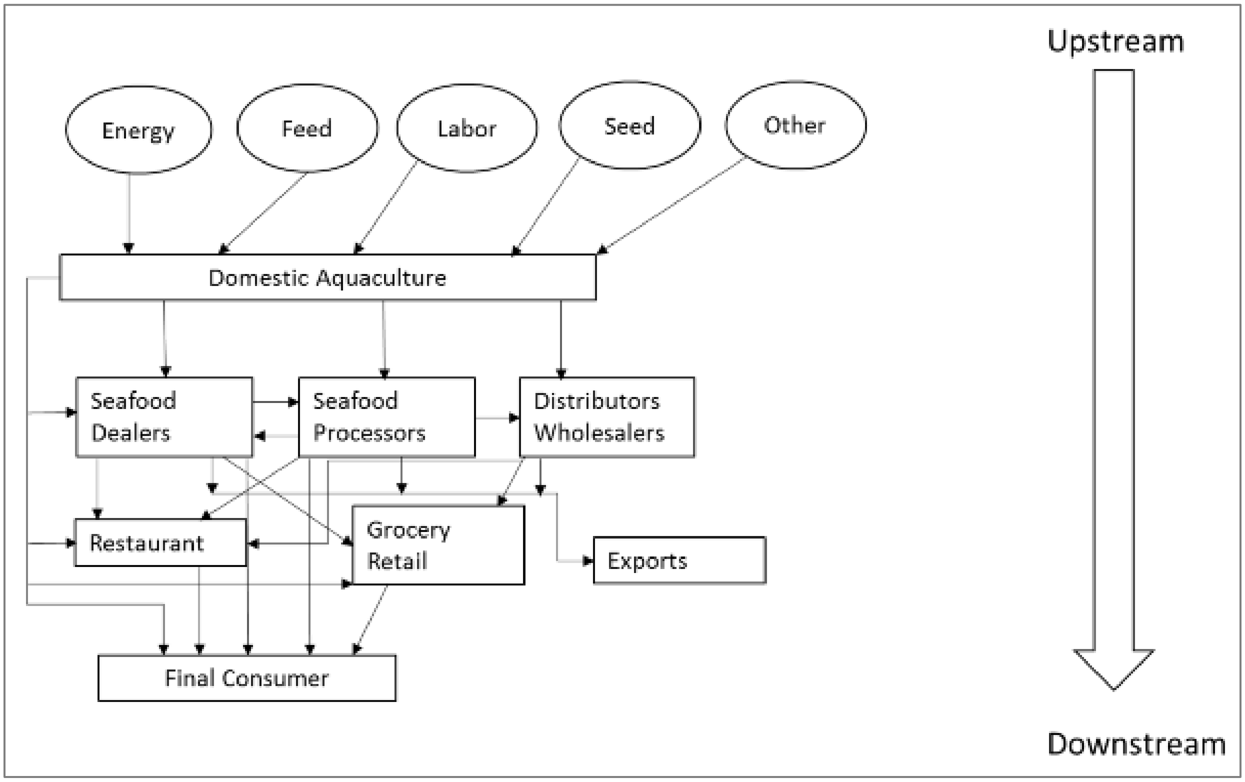
Product flow refers to the sale of fish and seafood products by harvesters, processors, and wholesalers/distributors. If fish or seafood products are sold to final consumers in the U.S. or exported, the opportunity for adding value and thereby creating new economic impacts ends.

Alternatively, when seafood products are sold to businesses that then add value, economic impacts are created. Product flow starts with harvesters who may sell to processors, wholesalers, grocers, restaurants, or directly to final consumers or exporters. Processors may sell to wholesalers, grocers, restaurants, or directly to final consumers or exporters.

[27] *Morro Bay Commercial Fisheries – 2015 Economic Impact Report* by Lisa Wise Consulting
[28] *An Approach to Determining Economic Impacts of U.S. Aquaculture* - U.S. Department of Commerce, National Oceanic and Atmospheric Administration and the National Marine Fisheries Service. September 2019. Authors - Doug Lipton, Matt Parker, John DuBerg, and Michael Rubino.

Exhibit 10

Schematic of the Domestic Aquaculture Seafood Market for Estimating Economic Impacts.



Source: *An Approach to Determining Economic Impacts of U.S. Aquaculture* - U.S. Department of Commerce, National Oceanic and Atmospheric Administration and the National Marine Fisheries Service. September 2019.

The NOAA Technical Memorandum references a study of seafood product flows for various types of products based on case studies in a number of regional markets[29]. In reality, flow of products is more complicated with product moving between processors or from processors to wholesalers to processors and so on. However, in the absence of other data, they represent the best picture of product flow currently available.

Potential Job Impacts of Downstream Activity

Exhibit 11 provides an illustration of the potential local employment impacts associated with downstream activity. The initial proformas developed to illustrate grower business plans assume that on average, each grower is expected to generate nearly $1.5 million in annual sales of product (all values are in year 2020 dollars). Collectively, all 20 plots should generate $29.3 million in annual sales.

[29] *The NMFS Commercial Fishing & Seafood Industry Input/Output Model* - Prepared for the National Marine Fisheries Service – August 2009. Author – James Kirkley, Virginia Institute of Marine Science.

Growers will likely sell their shellfish product to a number of sources including processors, wholesalers, direct sales to restaurants and retail markets and possibly directly to final consumers. Estimated shares for each of these segments follows the allocations suggested by the industry research reviewed in the NOAA Technical Memorandum. Note that these distributions are illustrative only and may not reflect the actual distribution pattern once the VSE project is operational.

The wholesale value allocated to each industry segment is adjusted by value markups typical for each type of business. For example, businesses involved in seafood wholesaling and distribution will typically mark up their purchases by 15 to 20 percent. In turn, if they sell product to restaurants, the restaurant will mark up their final sale price by 30 to 35 percent. On average for all segments, the value of the VSE shellfish product will increase by nearly 20 percent as it moves through processing and distribution to final consumption.

Finally, in order to provide a relatively conservative employment projection for the County, it is estimated 50 percent of the final shellfish product processing, 30 percent of wholesale and distribution activity and 25 percent restaurant, retail and final customer activity remain within Ventura. In total, it is assumed that 51 percent of direct economic impact associated with downstream activities remains within Ventura and 49 percent is exported outside the County either domestically or internationally.

The result, shown at the bottom of Exhibit 11, it that for every VSE grower job, an additional 1.4 jobs could be supported in local businesses that process, distribute and sell the resulting shellfish product. **Accounting for the effect of downstream business activity, grower vendor spending and farm employee consumer purchases, and all resulting economic multiplier activity, the VSE program could support approximately 97 jobs in total within the greater Ventura County economy if there is a concerted effort to develop a local infrastructure to process, distribute and sell the shellfish product locally.**

ATTACHMENT 2

Exhibit 11

Illustrative Employment Impact of Up and Downstream Activity

Totals Represent All Phases in Operation

Year 2020 dollars (no inflation)

	Distribution of Product Value		Price Margins - Final Sale	
	Share	Total	Est Margin % 1/	Value
Grower Gross Revenues		$ 29,250,000		
Distibution of Product 2/				
Processors	40.0%	$ 11,700,000	10%	$ 13,000,000
Wholesale / Distributors	45.0%	$ 13,162,500	15%	$ 15,485,294
Restaurants / Food Service	2.5%	$ 731,250	35%	$ 1,125,000
Groceries / Retail Markets	7.0%	$ 2,047,500	45%	$ 3,722,727
Final Customers	5.5%	$ 1,608,750	---	$ 1,608,750
Total	100.0%	$ 29,250,000	19.5%	$ 34,941,771

	Economic Impact - Output (*Grower impacts + downstream impacts*)			
	Direct	Indirect	Induced	Total
Growers 3/	$ 10,084,789	$ 2,577,810	$ 5,653,630	$ 18,316,229
Processors	$ 13,000,000	$ 4,035,653	$ 2,272,137	$ 19,307,790
Wholesale / Distributors	$ 15,485,294	$ 5,586,397	$ 4,687,350	$ 25,759,040
Restaurants / Food Service	$ 1,125,000	$ 378,795	$ 445,959	$ 1,949,754
Groceries / Retail Markets	$ 3,722,727	$ 1,122,419	$ 1,491,497	$ 6,336,644
Final Customers	$ 1,608,750			$ 1,608,750
	$ 45,026,560	$ 13,701,074	$ 14,550,573	$ 73,278,207

	Employment Impact			
Employment	Direct 3/	Indirect 4/	Induced 4/	Total
Growers (spending)	40.0	4.8	8.0	52.8
Processors	15.2	9.1	7.4	31.7
Wholesale / Distributors	3.6	2.1	1.6	7.2
Restaurants / Food Service	3.2	0.6	0.5	4.3
Groceries / Retail Markets	0.7	0.4	0.3	1.5
Final Customers	---	---	---	---
Total	62.7	16.9	17.9	97.4

Calcluated Ratio

Direct Grower Jobs	40	Jobs associated with 20 farms by build out
Downstream Jobs	57	Projected upstream + downstream jobs not including grower jobs
Full Multiplier	2.4	For every direct grower job, 1.4 additional jobs could be supported.

Notes

1/ Margin percentages represent the typical markup of prices for each business that purchases from the VSE growers. Restaurant margins include the final markup value from wholesale/distributors + an additional 20% to represent final restaurant prices. Grocery store margins include the final markup value from wholesale/distributors + an additional 30% to represent final grocery store prices.

2/ Source for illustrative distribution of wholesale aquaculture products - *The NMFS Commercial Fishing & Seafood Industry Input/Output Model* - Prepared for the National Marine Fisheries Service – August 2009

3/ Grower direct, indirect and induced impacts are from Exhibit 7.

4/ Indirect and induced impacts estimated using IMPLAN multipliers.

Prepared By: Illuminas Consulting

Date: 8/26/2020

Appendix Tables

Exhibit A1

Business Proforma for a 100-acre Site

Year 2020 dollars (no inflation)

Key Assumptions		
Number of Market Longlines harvested		22
Number of Nursery Longlines cycles		4
Total Long Lines installed		24
Annual Production		585,000 lbs
Wholesale price ($ /lbs.)		$2.50 per lb
Employees (FTE)		2.0
Direct Wages	$	126,750

Startup Investments (one-time purchases)		
Longlines	$	407,808
Seeding and harvesting equipment	$	170,000
Service Vessel	$	300,000
Harvest Vessel	$	1,500,000
Escrow account	$	80,000
	$	2,457,808

Operations	Estimate		Year 5 Expenses
Farming Expenses			
Wages, salaries, benefits	Stablized Yr	$	(126,750)
Administration	Stablized Yr	$	(15,000)
Seed costs	Stablized Yr	$	(92,160)
Property insurance - stock mortality	Stablized Yr	$	(73,125)
Property insurance - land based equipment	tbd	$	-
Boat and vehicle insurance	Avg of 10 Yrs	$	(18,626)
Utilities	Stablized Yr	$	(18,250)
Fuel	Stablized Yr	$	(72,000)
Repairs & maintenance	Stablized Yr	$	(88,047)
Marketing	tbd	$	-
Slip Fees	Stablized Yr	$	(8,356)
Landing Fees	Stablized Yr	$	(73,125)
Sub-Total		$	(585,439)
Compliance, monitoring, enforcement			
Start-up Ed/Training + Wildlife Monitering	Avg of 10 Yrs	$	(1,112)
Substrate Sampling + Lab Testing	Avg of 10 Yrs	$	(6,333)
Monitoring (Benthic + WQ Samples)	Avg of 10 Yrs	$	(1,529)
Project Coordination + Reporting	Avg of 10 Yrs	$	(744)
Sub-Total		$	(9,718)
Lease Fees			
ACOE Lease Fee		$	-
CDFG Privilege Tax		$	-
CDFW Aquaculture Registration	Stablized Yr	$	(1,243)
Royalties		$	-
Sub-Total		$	(1,243)
Total Operations Expense		**$**	**(596,399)**
Annual Debt Service	1st 10 Years	**$**	**(140,006)**
Annual Operating Costs		**$**	**(736,406)**

Resource Sharing	
Longlines	per grower
Seeding and harvesting equipment	per grower
Service Vessel	per grower
Harvest Vessel	1 per 5 growers
Escrow account	per grower

Proforma Summary (Stabilized Operations)		
Operating Costs	$	(736,406)
Revenues	$	1,462,500
Net Profit (after debt service)	$	726,094

Purchases Assumed Outside of Ventura County		
Seed costs	$	92,160
Other	$	-
Total Outside Area Purchases	$	92,160

Notes

Source: Scott Lindell, Research Specialist - AOPE. Woods Hole Oceanographic Institution. 10 Year Business Plan for 100 Acre Lease site, assuming a 1-year build out with a service vessel purchased capable of managing seeding and maintenance. Separate boat is contracted for installing all anchors and gear, and/or part owned for servicing and harvesting 500 acres. Total startup loan of $1,100,000 at 5% payed off at 10 years. Use 4 Nursery Longlines stocked once a year (in Q1, then each feeds 5 longlines beginning in Q2, 10 in Q3, 5 in Q4).

Exhibit A2

Direct Impacts from VSE - All Phases - Ventura County

Year 2020 dollars (no inflation)

Economic Inputs by Grower and Phase		Totals
Grower Expenses by Phase		
Expenses Per Grower 1/	$	504,239
Growers per Phase		5 growers
Expenses Per Phase	$	2,521,197
Startup Investments by Grower		
Longlines	$	407,808
Seeding and harvesting equipment	$	170,000
Service Vessel	$	300,000
Escrow account 2/	$	-
Purchases by Each Grower	$	877,808
Startup Investments by Phase		
Grower Equip / Service Vessels	$	4,389,040
Shared Harvest Vessel (1 required)	$	1,500,000
Total Startup Investments by Phase	$	5,889,040
Total All Phases	$	23,556,160
Jobs and Wages Per Phase		
Employment per Grower (100 ac plot)		2.0
Employment Per Phase		10.0
Wages Per Grower	$	126,750
Wages Per Phase	$	633,750

Direct Economic Output

	Phase 1 (Cum Site Area = 500 ac)		Phase 2 (Cum Site Area = 1,000 ac)		Phase 3 (Cum Site Area = 1,500 ac)		Phase 4 (Cum Site Area = 2,000 ac)	
Phases	One-Time Capital Invest	Annual Expenditures	One-Time Capital Invest	Annual Expenditures	One-Time Capital Invest	Annual Expenditures	One-Time Capital Invest	Annual Expenditures
Phase 1 operations	$ 5,889,040	$ 2,521,197		$ 2,521,197		$ 2,521,197		$ 2,521,197
Phase 2 operations			$ 5,889,040	$ 2,521,197		$ 2,521,197		$ 2,521,197
Phase 3 operations					$ 5,889,040	$ 2,521,197		$ 2,521,197
Phase 4 operations							$ 5,889,040	$ 2,521,197
Totals by Phase	$ 5,889,040	$ 2,521,197	$ 5,889,040	$ 5,042,395	$ 5,889,040	$ 7,563,592	$ 5,889,040	$ 10,084,789

Direct Employment

Phases	Phase 1 Onsite Jobs	Phase 2 Onsite Jobs	Phase 3 Onsite Jobs	Phase 4 Onsite Jobs
Phase 1 operations	10.0	10.0	10.0	10.0
Phase 2 operations		10.0	10.0	10.0
Phase 3 operations			10.0	10.0
Phase 4 operations				10.0
Totals by Phase	10.0	20.0	30.0	40.0

Direct Wages

Phases	Phase 1 Total Direct Wages	Phase 2 Total Direct Wages	Phase 3 Total Direct Wages	Phase 4 Total Direct Wages
Phase 1 operations	$ 633,750	$ 633,750	$ 633,750	$ 633,750
Phase 2 operations		$ 633,750	$ 633,750	$ 633,750
Phase 3 operations			$ 633,750	$ 633,750
Phase 4 operations				$ 633,750
Totals by Phase	$ 633,750	$ 1,267,500	$ 1,901,250	$ 2,535,000

Notes:

1/ Assumes that seed purchases are made outside of Ventura County. Operations expenses do not include debt service on loans.

2/ This is a one-time cost to fund an account that may be required of the commercial operation to support the removal of any installed gear at the end of the lease term. For purposes of the economic impact analysis, it has been zeroed out since is not clear when it will be spent and what level of spending will actually be required.

ATTACHMENT 3

10 Year Business Plan for 100 Acre Lease site, assuming a 1-year build out with a service vessel purchased capable of managing seeding and maintenance. Separte boat is contracted for installing all anchors and gear, and/or part owned for servicing and harvesting 500 acres. Total startup loan of $1,100,000 at 5% payed off at 10 years. Use 4 Nursery Longlines stocked once a year (in Q1, then each feeds 5 longlines beginning in Q2, 10 in Q3, 5 in Q4).

	0									
Description	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Key Assumptions										
er of Market Longlines harvested	0	20	20	20	20	20	20	20	20	20
nber of Nursery Longlines cycles	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Long Lines installed	24	24	24	24	24	24	24	24	24	24
Annual Production (lbs.)	-	585,000	585,000	585,000	585,000	585,000	585,000	585,000	585,000	585,000
Wholesale price ($ /lbs.)	$ 2.50	$ 2.50	$ 2.50	$ 2.50	$ 2.50	$ 2.50	$ 2.50	$ 2.50	$ 2.50	$ 2.50
itial Loan Amount at 5% interest		$ 1,100,000.00								
Start-up Investments	**Year 1**	**Year 2**								
Longlines	-$ 407,808.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
g (Y1) and Harvesting (Y2) Eqpt.	-$ 20,000.00	-$ 150,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Y1), 1/5th of Harvest vessel (Y2)	-$ 300,000.00	-$ 300,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
commissioning Escrow account	-$ 80,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Startup Investment	**-$ 807,808.00**	**-$ 450,000.00**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Operational Expenses										
Farming costs										
Wages, salaries, benefits	-$ 65,000.00	-$ 126,750.00	-$ 126,750.00	-$ 126,750.00	-$ 126,750.00	-$ 126,750.00	-$ 126,750.00	-$ 126,750.00	-$ 126,750.00	-$ 126,750.00
Administration	-$ 15,000.00	-$ 15,000.00	-$ 15,000.00	-$ 15,000.00	-$ 15,000.00	-$ 15,000.00	-$ 15,000.00	-$ 15,000.00	-$ 15,000.00	-$ 15,000.00
Seed costs	-$ 92,160.00	-$ 92,160.00	-$ 92,160.00	-$ 92,160.00	-$ 92,160.00	-$ 92,160.00	-$ 92,160.00	-$ 92,160.00	-$ 92,160.00	-$ 92,160.00
perty insurance - stock mortality	$ -	-$ 73,125.00	-$ 73,125.00	-$ 73,125.00	-$ 73,125.00	-$ 73,125.00	-$ 73,125.00	-$ 73,125.00	-$ 73,125.00	-$ 73,125.00
surance - land based equipment	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd
Hull & Machinery, + $1M of P & I)	-$ 11,600.00	-$ 24,700.00	-$ 22,336.00	-$ 21,830.98	-$ 20,994.71	-$ 19,875.23	-$ 18,534.28	-$ 17,041.70	-$ 15,469.43	-$ 13,885.91
Utilities	-$ 18,250.00	-$ 18,250.00	-$ 18,250.00	-$ 18,250.00	-$ 18,250.00	-$ 18,250.00	-$ 18,250.00	-$ 18,250.00	-$ 18,250.00	-$ 18,250.00
Fuel	-$ 72,000.00	-$ 72,000.00	-$ 72,000.00	-$ 72,000.00	-$ 72,000.00	-$ 72,000.00	-$ 72,000.00	-$ 72,000.00	-$ 72,000.00	-$ 72,000.00
Repairs & maintenance	$ -	-$ 56,546.56	-$ 88,046.56	-$ 88,046.56	-$ 88,046.56	-$ 88,046.56	-$ 88,046.56	-$ 88,046.56	-$ 88,046.56	-$ 88,046.56
Marketing	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd
Slip Fees	-$ 6,077.00	-$ 8,355.80	-$ 8,355.80	-$ 8,355.80	-$ 8,355.80	-$ 8,355.80	-$ 8,355.80	-$ 8,355.80	-$ 8,355.80	-$ 8,355.80
VPD Landing Fees	$ -	-$ 73,125.00	-$ 73,125.00	-$ 73,125.00	-$ 73,125.00	-$ 73,125.00	-$ 73,125.00	-$ 73,125.00	-$ 73,125.00	-$ 73,125.00
Sub-Total Farming costs	**-$ 280,087.00**	**-$ 560,012.36**	**-$ 589,148.36**	**-$ 588,643.34**	**-$ 587,807.07**	**-$ 586,687.59**	**-$ 585,346.64**	**-$ 583,854.06**	**-$ 582,281.79**	**-$ 580,698.27**
Monitoring & Compliance										
Start-up Education and Training	-$ 615.00	$ -								
Start-up Construction Wildlife Mo	-$ 10,500.00	$ -								
Baseline Substrate Sampling (pl	-$ 5,517.00	$ -								
Laboratory testing (water and se	-$ 9,636.00	-$ 9,636.00	-$ 9,636.00	-$ 9,636.00	-$ 9,636.00	-$ 9,636.00				
Monitoring (Benthic and WQ san	-$ 2,548.00	-$ 2,548.00	-$ 2,548.00	-$ 2,548.00	-$ 2,548.00	-$ 2,548.00				
Project Coordination, Analysis a	-$ 1,240.00	-$ 1,240.00	-$ 1,240.00	-$ 1,240.00	-$ 1,240.00	-$ 1,240.00				
Total Monitoring & Compliance	**-$ 30,056.00**	**-$ 13,424.00**	**-$ 13,424.00**	**-$ 13,424.00**	**-$ 13,424.00**	**-$ 13,424.00**	**$ -**	**$ -**	**$ -**	**$ -**
Lease Fees										
ACOE Lease Fee	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CDFW Aquaculture Registration	-$ 1,243.00	-$ 1,243.00	-$ 1,243.00	-$ 1,243.00	-$ 1,243.00	-$ 1,243.00	-$ 1,243.00	-$ 1,243.00	-$ 1,243.00	-$ 1,243.00
Sub-Total Lease Fees	**-$ 1,243.00**	**-$ 1,243.00**	**-$ 1,243.00**	**-$ 1,243.00**	**-$ 1,243.00**	**-$ 1,243.00**	**-$ 1,243.00**	**-$ 1,243.00**	**-$ 1,243.00**	**-$ 1,243.00**
Debt Repayment										
Yearly Payments	**-$ 140,006.48**	**-$ 140,006.48**	**-$ 140,006.48**	**-$ 140,006.48**	**-$ 140,006.48**	**-$ 140,006.48**	**-$ 140,006.48**	**-$ 140,006.48**	**-$ 140,006.48**	**-$ 140,006.48**
Total Operational Expenses	**-$ 451,392.48**	**-$ 714,685.84**	**-$ 743,821.84**	**-$ 743,316.82**	**-$ 742,480.55**	**-$ 741,361.07**	**-$ 726,596.12**	**-$ 725,103.54**	**-$ 723,531.27**	**-$ 721,947.75**
Total Revenue	**$ -**	**$ 1,462,500.00**	**$ 1,462,500.00**	**$ 1,462,500.00**	**$ 1,462,500.00**	**$ 1,462,500.00**	**$ 1,462,500.00**	**$ 1,462,500.00**	**$ 1,462,500.00**	**$ 1,462,500.00**
Pretax Profit	**-$ 1,259,200.48**	**$ 297,814.16**	**$ 718,678.16**	**$ 719,183.18**	**$ 720,019.45**	**$ 721,138.93**	**$ 735,903.88**	**$ 737,396.46**	**$ 738,968.73**	**$ 740,552.25**
Pretax Cumulative Profit	*-$ 1,259,200.48*	*-$ 961,386.32*	*-$ 242,708.16*	*$ 476,475.02*	*$ 1,196,494.47*	*$ 1,917,633.40*	*$ 2,653,537.28*	*$ 3,390,933.74*	*$ 4,129,902.47*	*$ 4,870,454.72*

Key assumptions made and ranges for 100 acre mussel farm.

Row #	INVESTMENT	Range	Assumption
1	Annual production per longline	**4-8 lbs. per foot - assume 6 lbs. on 12 mo. cycle from seed to market**	**29250.00**
2	Length of continuous mussel rope per longline (feet)	**2880 - 6720 feet**	**4875.00**
3	Length of seeded mussel rope per longline (feet)	**195 droppers at 30' each per nursery LL**	**5760.00**
4	Total number of longlines required	**Plant 4 seed nursery LL in Q1, transplant 5 grow lines in Q2, 10 in Q3, 5 in Q4**	**20**
5	Total number of nursery cycles required (1 cycle per line per year)	**4 nursery longlines with 1 cycle per year**	**4.0**
6	Longline (575'), all ropes, buoys, anchors	**$15,000 - 20,000 per longline (not including BOAT and specialty weights ($45**	**$ 16,992.00**
7	Seeding, harvesting equipment	**$120,000 -200,000**	**$ 170,000.00**
8	Service vessel (owned and operated by 100-acre farm)	**$200,000-400,000**	**$ 300,000.00**
9	Harvest vessel (shared & services 500 acres)	**$500,000-2,000,000 (assume $300K for service boat & $1.5M for harvest boat)**	**$ 1,500,000.00**
10	Decommisioning Escrow account^^	**$50,000 to $100,000**	**$ 80,000.00**
11	Permitting	**tbd**	**-**
	<u>FARMING COSTS</u>		
12	Seed Cost	**$4 /ft.**	**$ 4.00**
13	Seed assumption, 5:1, 5 final growout lines from 1 hatchery seed line	**3:1 - 5:1 (SBM est. 10' seed to 1K lbs harvest vs. Taylor est. 150 lbs harvest)**	**5.00**
	Insurance Costs		
14	General liability insurance	**tbd**	**tbd**
15	Property insurance - stock mortality	**4-5%**	**5.00%**
16	Property insurance - offshore rigging	**tbd**	**tbd**
17	Property insurance - land base equipment	**1-2%**	**2.00%**
18	Vessel insurance (Hull & Machinery, $1M of P & I)	**3% of value plus $2K P&I per vessel**	**3.00%**
	Farm Operations		
19	Av. annual staff pay + benefits	**$40,000 to $80,000**	**$ 65,000.00**
20	Productivity (lbs. / man year)	**100,000 to 500,000**	**300,000**
21	Annual farm office / administration	**10000-20000**	**$ 15,000.00**
22	Utilities $ per day	**25-50**	**$ 50.00**
23	CDFW Lease Fee (per acre) **-N/A for federal farm lease**	**$50**	
24	CDFW Privilege Tax **-N/A for federal farm lease?**	**$0.0625 per 100 mussels**	
25	Slip Fees	**Vessel length 35-80 feet, assume 40' service boat in Y1 (per farm), then purp**	**$ 11,394.00**
26	VPD Landing	**3 to 5% of gross - assume 5%**	**$ 0.13**
	Annual Consumable cost		
27	Fuel per farm day (200 days per year)	**$3/ gal x 20-40 GPH (2 hours full then 10 gph idle for 6 hours) = $360 per trip x**	**$ 360.00**
28	Repairs & maintenance (% of capital invest./ yr)	**5-10%**	**7%**
	Start-up and Annual Compliance, monitoring, testing		
29	Start-up Education and Training (1)	**$12,300 divided by 20 farms (one-time fee)**	**$ 615.00**
30	Start-up Construction Wildlife Monitoring (2)	**$10,500 over 5 days**	**$ 10,500.00**
32	Baseline Substrate Sampling (plus coordination and reporting) (3a + 4)	**$21,385 plus $6,200 per 500 acres one time**	**$ 5,517.00**
33	Laboratory testing (water and sediment quality, shellfish bio-toxin*) (4)	**$10,680 per 500 acres, Biotoxin ($144/sample incl. S&H, x 52 wks= $7,500)**	**$ 9,636.00**
33	Monitoring (Benthic and WQ sample collection, Gear Inspections^) (3b)	**$12,740 per 500 acres**	**$ 2,548.00**
34	Project Coordination, Analysis and Reporting (3c)	**$6,200 per 500 acres**	**$ 1,240.00**
35	CDFW Aquaculture Registration	**Not clear if these apply - R. Lovell is checking**	**$ 1,234.00**
36	**Debt Repayment**	**10 Year, $1,100,000 at 5% interest**	**$ 11,667.21**
37	**Depreciation (% of capital investment)**	**20% first year, 5% there after**	**20-5%**
38	**Wholesale landed price per lbs.**	**$2 - $3**	**$2.50**
39	Rate of Inflation	**2-5%**	**0.00%**

Phased expansion

2 nursery lines are planted in Q3 and seed 10 Prod. LL in Q4 — assumes nursery cycle of 4 to 6 months. So 2 nursery lines capable of seeding 22 LL

2 nursery lines are planted in Y2 Q1 and seed 10 Prod LL in Y2 Q2

2 other nursery lines are planted in Y2 Q3 and seed 10 Prod. LL in Y2 Q4

Can we depend on just 2 nursery lines? Depends on reliabllity of seed from hatchery.

May want to strategically order more seed than necessary in most reliable seasons.

Use nursery lines to buffer planting and harvest cycles

Or conservatively plan to stock 4 LL with nursery seed - see alternative Proforma projections

^^Biggest expense will be for removal of anchors; this requires a large boat with >20 ton winch. Est. $15K/d for 3 or 4 days (removal of 2 per h).

8/4/2020	Notes		Who pays?	
Task 1	Worker.farmer training	$12.3K	100% growers one time	615
Task 2	Marie Wildlife watching - construction	$10.5K per 100 acre farm assuming $1,530/per day for a 5-day construction schedule (consecutive or non-consecutive)		
Task 3	Bio-monitoring - Dudek estimate from May being revised in August 2020 for	$13K per sediment sampling event (once/year) x2 for semi-annual need?	50:50 shared with VPD	
Task 4	Gear Inspection - 3rd party est. ? See report			

1/20 Slip fees are $11.61/ft for 35 to 45' boats, and $12.66 for 55 to 80' boats

* based on use of CA State lab for biotoxin testing per est. costs for oyster farmer

^assumes no additional expense to farmer other than time conducting regular sonar/depth finder and surface surveys as part of farm maintenance

Water quality testing

ATTACHMENT 3

Deprecaition year 1	20.00%
Depreciation there after	2.00%

Year	1	2	3	4	5	6	7	8	9	10
Service vessel (40')	$ 300,000.00	$ 240,000.00	$ 235,200.00	$ 225,886.08	$ 212,602.17	$ 196,097.47	$ 177,256.58	$ 157,021.39	$ 136,314.28	$ 115,971.15
Harvest vessel (1/5th share)		$ 300,000.00	$ 240,000.00	$ 235,200.00	$ 225,886.08	$ 212,602.17	$ 196,097.47	$ 177,256.58	$ 157,021.39	$ 136,314.28
Equipment	$ 20,000.00	$ 150,000.00	$ 136,000.00	$ 133,280.00	$ 128,002.11	$ 120,474.56	$ 111,121.90	$ 100,445.40	$ 88,978.79	$ 77,244.76
Total Value	**$ 320,000**	**$ 690,000**	**$ 611,200**	**$ 594,366**	**$ 566,490**	**$ 529,174**	**$ 484,476**	**$ 434,723**	**$ 382,314**	**$ 329,530**

ATTACHMENT 3

10 Year Fixed Rate, compound interest of 5%, option for balloon payment

Annual Interest Rate	5.00%
Effective Interest Rate	0.42%
Duration of Loan	10
Monthly Payment	$11,667.21
Actual Monthly	
Number of Payments	120
Loan Amount	$1,100,000.00

Budget for Offshore Mussel Farm with 24 Longlines

INVESTMENT	Range	Assumption	Unit cost	Investment	15% more LL for droppers than design 2 Dropper length	# of droppers	lbs/ft yield	Notes
Annual production volume (pounds)		585000						
Longline (575' horizontal - 575' useable) installed	$15,000 to 20,000	16500	see Cap Cost sheet					Low, 15x4 Hi, 35x8
Annual production per line (pounds)	29250				25	195	6	Range: 11,520 53,760
Total number of longlines required		24	16,992		16.6 % lines (4) used just for nursery seed			Alternatively just 2 nursery lines can be used with seed deliveries in October and February (Gordon (King, Taylor Shellfish)
Investment in longlines				407,808				
Seeding,harvesting, bulk processing equipment	$100,000 to 200,000	150000		150,000				
Support vessel	500,000-2,000,000	1500000		1,500,000				
TOTAL FIXED CAPITAL INVESTMENT				2,057,808				
FARMING COSTS				Annual cost	% farm cost	% total cost		
Average wt mussel/line		29250						
Feet of hatchery seed per 1K lbs harvested	*10 to 70	40						
Number of LLs seeded by 1 hatchery LL		5.0						Assumes 195 seeded droppers 30' long 5760
Seed Price/Foot	$2 to $5	4						
Seed Cost per LL		4680						*Bernard's estimate is 10' of seed rope yields 1,000 lbs so need 576 droppers or 4 **data from 2016/17 - may need updating**
Annual cost of seed per farm (22 LL harvested)				93,600	11.7%	10.2%		Gordon King's estimate is 10' of seed rope yields 150 lbs.
Av. annual staff pay + benefits	$40,000 to $80,000	65000						
Productivity (lbs / man year)	100,000 to 500,000	300000						
Annual payroll cost			126,750	126,750	15.9%	13.8%		
Crop Insurance (% annual prod'n valued @ $.45/lb)	3% to 6%	4.00	0					w
Other insurance (% of capital investment)	1% to 3%	2.00	41,156					
Annual insurance cost				41,156	5.1%	4.5%		
Farm operations - fuel $ per day	$200-$400	360.00	72,000					Assumes weather and closures allows for 200 days per year (estimated need for 24 lines (approx. 4 d/wk)
Repairs & maintenance (% of capital invest./ yr)	5 to 10	7.00	144,047					
Other (utilities, monitoring) $ per day	25-50	50.00	18,250					
Lease Fee (100/acre)			10,000					
Annual cost of operations				244,297	30.6%	26.6%		
Annual farm office / administration	10000-20000	15000.00		15,000	1.9%	1.6%		
Depreciation (% of capital investment)	5% to 20%	10.00		205,781	25.7%	22.4%		
Farm profit margin %	5% to 30%	10.00		72,658	9.1%	7.9%		
TOTAL FARMING COSTS				799,242	100.0%	87.1%		
Cost of production including profit (bulk processed)			1.37					
POST HARVEST COSTS			Cost per lb	Annual cost	Farm/processor			
Raw material cost into processing			1.37	799,242				
Processing cost per finished lb	.015 to .03	0.015		8,775	8.75%	1.0%		
Packaging cost per finished lb	.01 to .02	0.015		8,775	8.75%	0.6%		
Finished goods production cost			1.40	816,792		89.0%		
Selling cost and general admin, % of production cos	3% to 10%	7.000		57,175	35.02%	6.2%		
Freight to wholesaler per lb	$0.05 - $0.10	0.075		43,875	43.77%	4.8%		
Delivered cost - wholesaler			1.57	917,842	96.29%	11.0%		
Selling price to wholesaler	$2.00 to $2.50	2.50		1,462,500				
Revenue minus costs				544,658				
Total profit (Farm +Process)				617,316				
Return on investment				22%				

Not including

Shoreside investments, docking, storage

Monitoring and sub-permit maintenance

Special anchor installation weight and rigging = $45K (one time cost for local contractor?)

ATTACHMENT 3

Equiptment	QTY	Unit Cost NZ '17	Unit Cost NZ '19	Total Cost '1	Total Cost '19	Total Cost USD '17	Total Cost USD '19	Comments
				0.7: 1	0.65:1			
Declumper Infeed Conveyer	1	$12,750.00		$12,750.00	$ 12,750.00	$8,925.00	$8,287.50	est. assume no change (except exchange rate)
AND600-W Declumper	1	$37,800.00	$48,800.00	$37,800.00	$ 48,800.00	$26,460.00	$ 31,720.00	4 to 6 ton/hr capacity
Davit-Double Winch	2	$24,600.00	$43,200.00	$49,200.00	$ 42,800.00	$34,440.00	$ 27,820.00	Each rated for 1,500 kg (3MT total)
Davit-Single Winch	1	$24,600.00		$24,600.00	$ 24,000.00	$17,220.00	$ 15,600.00	est. assume no change (except exchange rate)
ANG7/3 Cam Grader	1	$44,500.00	$41,800.00	$44,500.00	$ 41,800.00	$31,150.00	$ 27,170.00	-7000kg/hr capacity , -3x grades-fully adjustable (small, medium & large), -2x chutes either sides (smalls, mediums)
AND650 Seeder w/ Bag Frame	1	$18,850.00	$24,950.00	$18,850.00	$ 24,950.00	$13,195.00	$ 16,217.50	includes seed rope counter
Bag Filling Elevator	1	$18,900.00	26,500.00	$18,900.00	$ 26,500.00	$13,230.00	$ 17,225.00	
Single Driven Walking wheel	1	$9,500.00	$16,000.00	$9,500.00	$ 16,000.00	$6,650.00	$10,400.00	est.
Single Idler Walking wheel	2	$2,200.00	$4,000.00	$4,400.00	$ 4,000.00	$3,080.00	$5,200.00	est.for 2 units
Socking loading machine			4500				2925	
Hauling post, rope washer			10300				6695	
Grader outfeed conveyor			2800				1820	-2x conveyors (smalls, mediums)
				Sum		**$154,350.00**	$171,080.00	

Alternatve lower cost grader and declumper (save about $18,000)

Scroll Grader	26300	17095	Up to 3 tons/hr capacity (depending on product size) - 2 grade sizes. Option to grade straight into bags or bins via chutes (no conveyors)
AND450-W Declumper	36800	23920	2 ton/hr capacity

Capital costs of 1 longline	Units	Specs.	$ each	# req.	cost sum	Reference	x 24 (whole farm)		Notes
Anchors	Fixed	6m helix	1666.666667	48	80000	Fielder Marine 2(	$ 80,000		
	Variable						$ 43,000		travel, set up etc. (NOT INCLUDING BOAT, or $45K of specialty weights and rigging for anchor installation))
Chain		?							not needed?
Longline	feet	1.5" diam.``	0.36	1200	432	2015 QE, NZ	$ 10,368		See QE quote tab for aggregated 2019 pricing
Corner/Surface Buoys		300 L black	160	12	1920	Hesp 2017	$ 46,080		
Anchor Buoys		420 L black	250	2	500		$ 12,000		
Submerged Buoys		120 L black	100	40	4000	Hesp 2017	$ 96,000		
Buoy shipping						Hesp 2017	$ 15,000		
Hatchery Rope (Feet))		for 4 LL	$ 1.80	5800	10440	2015 QE, NZ	$ 41,760		See QE quote tab for aggregated 2019 pricing
Grow Ropes (feet)		for 20 LL	$ 1.10	5800	6380	2015 QE, NZ	$ 127,600		weighs 150kg per 500m
Expendables					800	2015 QE, NZ	$ 16,000		See QE quote tab for aggregated 2019 pricing
		Cotton socking							
		danlash	based on approx. 10% of rope costs						
							$ 407,808	per line $ 16,992.00	
Anchor Install. special equipment -			$ 45,000			Fielder Marine			
	one time local expense								

Table 3-1. The initial capital costs included for seaweed cultivation

From UCSB study of SB Mariculture

Materials	Cost
Longline	$76,532
Anchor rope	$43,633
Chain	$16,363
Buoy	$88,000
Trawl floats	$4,418
Shackles	$6,545
Tying rope	$16,363
Jeyco anchor	$120,000
Deployment	$8,175
Total	**$380,028**
Total (5-year discount)	**$297,762**

ATTACHMENT 3

QUALITY EQUIPMENT (1989) LIMITED
New Zealand Rope and Twine Manufacturers
Auckland Branch : 70 Hillside Road, Glenfield, P O Box 40154, Auckland, New Zealand.
Phone (09) 444 7742, Fax (09) 444 5872, www.qe.co.nz

PROFORMA QEVH190711 24LL

To: Ventura Harbour Project   Date: **11-Jul-19**

California
USA

We have pleasure in confirming the following products under the terms and conditions as stated.

1 Payment: TT When ready to ship

3 Loading: Auckland   4 Discharge: LA USA

5 shipping : TBA   Terms: CIF (Cost plus Sea freight.)

7 Origin: Made in New Zealand

Item	Description,	Quantity	Unit weight (KG)	Total weight (KG)	Unit price	NZ$ Dollars
	Mussel Fram full set up equipment.					
	Block set up. 24 MEDIUM density, 2000m Grow Out Lines.					
	(all simallar Rope formats as used on Catalina farm, but installed by professionals.)					
1	Anchor Lines x 65mtr	2				
	(suitable to max 24 mtr water depth)					
2	Mainline x 185mtr	1				
	(Must be spliced into Anchor Lines)					
3	Weighted Crop Rope x 2000mtrs	1				
	(Must be weighted if taken small hatchery seed due to light weight.)					
4	Dropper lashing	1				
	(needs to be cut at 1.8mtrs)					
5	Waka 220L Floats	32				
	(preferable used on the Vertical)					
6	Float strop for above.	1				
	(needs to be cut at about 7mtrs)					
	Total Mussel Farming Rope value per Long line.				$11,626.00	
A	Total for 24 Long Lines					$279,024.00
	My estimate for Hatchery Ropes as used by Whiskey Creek					
7	Cut Loop Weighted x 1000m	10				
B	Total to provide enough spats for 24 longs lines at 6mm seed.					$18,650.00
	Steel Screw Anchors as used by CSR and Offshore Devon.					
	FMS x Type 20,000kg Tuq.					
C	Total for 24 Long Lines					N/a
	Installation of Ropes and Anchors to be quoted seperately.					
	Vessel provided by others and importing and re exporting Drilling Rig.					
D	International Freight (I calculate total 5.5 x 40ft containers)				estimate	$ 24,750.00
		Total Quantity 0.00		Total Weight 0.00	Total CIF NZ$	$ 322,424.00

	$ 322,424.00	NZ	
	$ 210,000.00	US	
plus anchors and install	$ 123,000.00	US	from Fielder Marine
plus expendables	$ 16,000.00	US	cotton socking etc.
: TOTAL:	$ 349,000.00	divide by 24 LL =	**$14,540 per LL** Scott's calculations

Shipped as 5.5 x 40ft HC Container.
Container Number TBA
Seal Number TBA

VGM
The Gross Cargo Weight : TBA
The Dunnage Weight: TBA
The Tare Weight: TBA
The VGM : TBA

Seller
Quality Equipment Ltd
Joe Franklin
Director
Bank of New Zealand.
02 0278 0086400-00
Swift BKNZNZ22

ATTACHMENT 3

10 Year Business Plan for 100 Acre Lease site, assuming a 2 year build out with a service vessel purchased capable of installing all anchors and gear, and servicing 500 acres. Total startup loan of $1,700,000 at 5% with a balloon payment at 10 years. Use just 2 Nursery Longlines stocked twice a year (feeds 5 + longlines each beginning in Q1.

	0									
Description	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Key Assumptions										
Number of Market Longlines harvested	0	15	22	22	22	22	22	22	22	22
Number of Nursery Longlines cycles	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Long Lines installed	24	24	24	24	24	24	24	24	24	24
Annual Production (lbs.)	-	438,750	643,500	643,500	643,500	643,500	643,500	643,500	643,500	643,500
Wholesale price ($ /lbs.)	$ 2.50	$ 2.50	$ 2.50	$ 2.50	$ 2.50	$ 2.50	$ 2.50	$ 2.50	$ 2.50	$ 2.50
Vessel Purchase	-$ 500,000.00									
Initial Loan Amount at 5% interest	$ 1,100,000.00									
Startup Investment										
Longlines	-$ 407,808.00			$ -	$ -	$ -	$ -	$ -	$ -	$ -
Seeding, harvesting equipment	-$170,000.00		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Support vessel Year 1	-$ 500,000.00		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Escrow account	-$ 80,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Startup Investment	**-$ 1,157,808.00**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Operational Expenses										
Farming costs										
Wages, salaries, benefits	-$ 47,531.25	-$ 95,062.50	-$ 139,425.00	-$ 139,425.00	-$ 139,425.00	-$ 139,425.00	-$ 139,425.00	-$ 139,425.00	-$ 139,425.00	-$ 139,425.00
Administration	-$ 15,000.00	-$ 15,000.00	-$ 15,000.00	-$ 15,000.00	-$ 15,000.00	-$ 15,000.00	-$ 15,000.00	-$ 15,000.00	-$ 15,000.00	-$ 15,000.00
Seed costs	-$ 69,120.00	-$ 92,160.00	-$ 92,160.00	-$ 92,160.00	-$ 92,160.00	-$ 92,160.00	-$ 92,160.00	-$ 92,160.00	-$ 92,160.00	-$ 92,160.00
Property insurance - stock mortality	$ -	-$ 54,843.75	-$ 80,437.50	-$ 80,437.50	-$ 80,437.50	-$ 80,437.50	-$ 80,437.50	-$ 80,437.50	-$ 80,437.50	-$ 80,437.50
Property insurance - land based equipment	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd
Boat and vehicle insurance	-$ 9,000.00	-$ 7,200.00	-$ 7,056.00	-$ 6,776.58	-$ 6,378.07	-$ 5,882.92	-$ 5,317.70	-$ 4,710.64	-$ 4,089.43	$ -
Utilities	-$ 18,250.00	-$ 18,250.00	-$ 18,250.00	-$ 18,250.00	-$ 18,250.00	-$ 18,250.00	-$ 18,250.00	-$ 18,250.00	-$ 18,250.00	-$ 18,250.00
Fuel	-$ 72,000.00	-$ 72,000.00	-$ 72,000.00	-$ 72,000.00	-$ 72,000.00	-$ 72,000.00	-$ 72,000.00	-$ 72,000.00	-$ 72,000.00	-$ 72,000.00
Repairs & maintenance	-$ 63,546.56	-$ 63,546.56	-$ 63,546.56	-$ 63,546.56	-$ 63,546.56	-$ 63,546.56	-$ 63,546.56	-$ 63,546.56	-$ 63,546.56	-$ 63,546.56
Marketing	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd
Slip Fees	-$ 11,394.00	-$ 11,394.00	-$ 11,394.00	-$ 11,394.00	-$ 11,394.00	-$ 11,394.00	-$ 11,394.00	-$ 11,394.00	-$ 11,394.00	-$ 11,394.00
VPD Landing Fees	$ -	-$ 54,843.75	-$ 80,437.50	-$ 80,437.50	-$ 80,437.50	-$ 80,437.50	-$ 80,437.50	-$ 80,437.50	-$ 80,437.50	-$ 80,437.50
Sub-Total Farming costs	**-$ 305,841.81**	**-$ 484,300.56**	**-$ 579,706.56**	**-$ 579,427.14**	**-$ 579,028.63**	**-$ 578,533.48**	**-$ 577,968.26**	**-$ 577,361.20**	**-$ 576,739.99**	**-$ 572,650.56**
Compliance, monitoring, enforcement										
Laboratory testing	-$ 9,636.00	-$ 9,636.00	-$ 9,636.00	-$ 9,636.00	-$ 9,636.00	-$ 9,636.00	-$ 9,636.00	-$ 9,636.00	-$ 9,636.00	-$ 9,636.00
Monitoring	-$ 2,548.00	-$ 2,548.00	-$ 2,548.00	-$ 2,548.00	-$ 2,548.00	-$ 2,548.00	-$ 2,548.00	-$ 2,548.00	-$ 2,548.00	-$ 2,548.00
Enforcement	-$ 615.00	-$ 615.00	-$ 615.00	-$ 615.00	-$ 615.00	-$ 615.00	-$ 615.00	-$ 615.00	-$ 615.00	-$ 615.00
Enforcement Credit	$ 615.00	$ 615.00	$ 615.00	$ 615.00	$ 615.00	$ 615.00	$ 615.00	$ 615.00	$ 615.00	$ 615.00
Sub-Total Compliance, monitoring, enforcement	**-$ 12,799.00**	**-$ 12,799.00**	**-$ 12,799.00**	**-$ 12,799.00**	**-$ 12,799.00**	**-$ 12,799.00**	**-$ 12,799.00**	**-$ 12,799.00**	**-$ 12,799.00**	**-$ 12,799.00**
Lease Fees										
ACOE Lease Fee	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CDFW Aquaculture Registration	-$ 900.50	-$ 1,243.00	-$ 1,243.00	-$ 1,243.00	-$ 1,243.00	-$ 1,243.00	-$ 1,243.00	-$ 1,243.00	-$ 1,243.00	-$ 1,243.00
Sub-Total Lease Fees	**-$ 900.50**	**-$ 1,243.00**	**-$ 1,243.00**	**-$ 1,243.00**	**-$ 1,243.00**	**-$ 1,243.00**	**-$ 1,243.00**	**-$ 1,243.00**	**-$ 1,243.00**	**-$ 1,243.00**
Debt Repayment										
Yearly Payments	**-$ 140,006.48**	**-$ 140,006.48**	**-$ 140,006.48**	**-$ 140,006.48**	**-$ 140,006.48**	**-$ 140,006.48**	**-$ 140,006.48**	**-$ 140,006.48**	**-$ 140,006.48**	**-$ 140,006.48**
Balloon Payment										
Total Operational Expenses	**-$ 459,547.79**	**-$ 638,349.04**	**-$ 733,755.04**	**-$ 733,475.62**	**-$ 733,077.11**	**-$ 732,581.96**	**-$ 732,016.74**	**-$ 731,409.68**	**-$ 730,788.47**	**-$ 726,699.04**
Revenue										
Sales	$ -	$ 1,096,875.00	$ 1,608,750.00	$ 1,608,750.00	$ 1,608,750.00	$ 1,608,750.00	$ 1,608,750.00	$ 1,608,750.00	$ 1,608,750.00	$ 1,608,750.00
Total Revenue	**$ -**	**$ 1,096,875.00**	**$ 1,608,750.00**	**$ 1,608,750.00**	**$ 1,608,750.00**	**$ 1,608,750.00**	**$ 1,608,750.00**	**$ 1,608,750.00**	**$ 1,608,750.00**	**$ 1,608,750.00**
Pretax Profit	**-$ 1,617,355.79**	**$ 458,525.96**	**$ 874,994.96**	**$ 875,274.38**	**$ 875,672.89**	**$ 876,168.04**	**$ 876,733.26**	**$ 877,340.32**	**$ 877,961.53**	**$ 882,050.96**
Pretax Cumulative Profit	*-$ 1,617,355.79*	*-$ 1,158,829.83*	*-$ 283,834.87*	*$ 591,439.51*	*$ 1,467,112.40*	*$ 2,343,280.44*	*$ 3,220,013.70*	*$ 4,097,354.02*	*$ 4,975,315.55*	*$ 5,857,366.51*