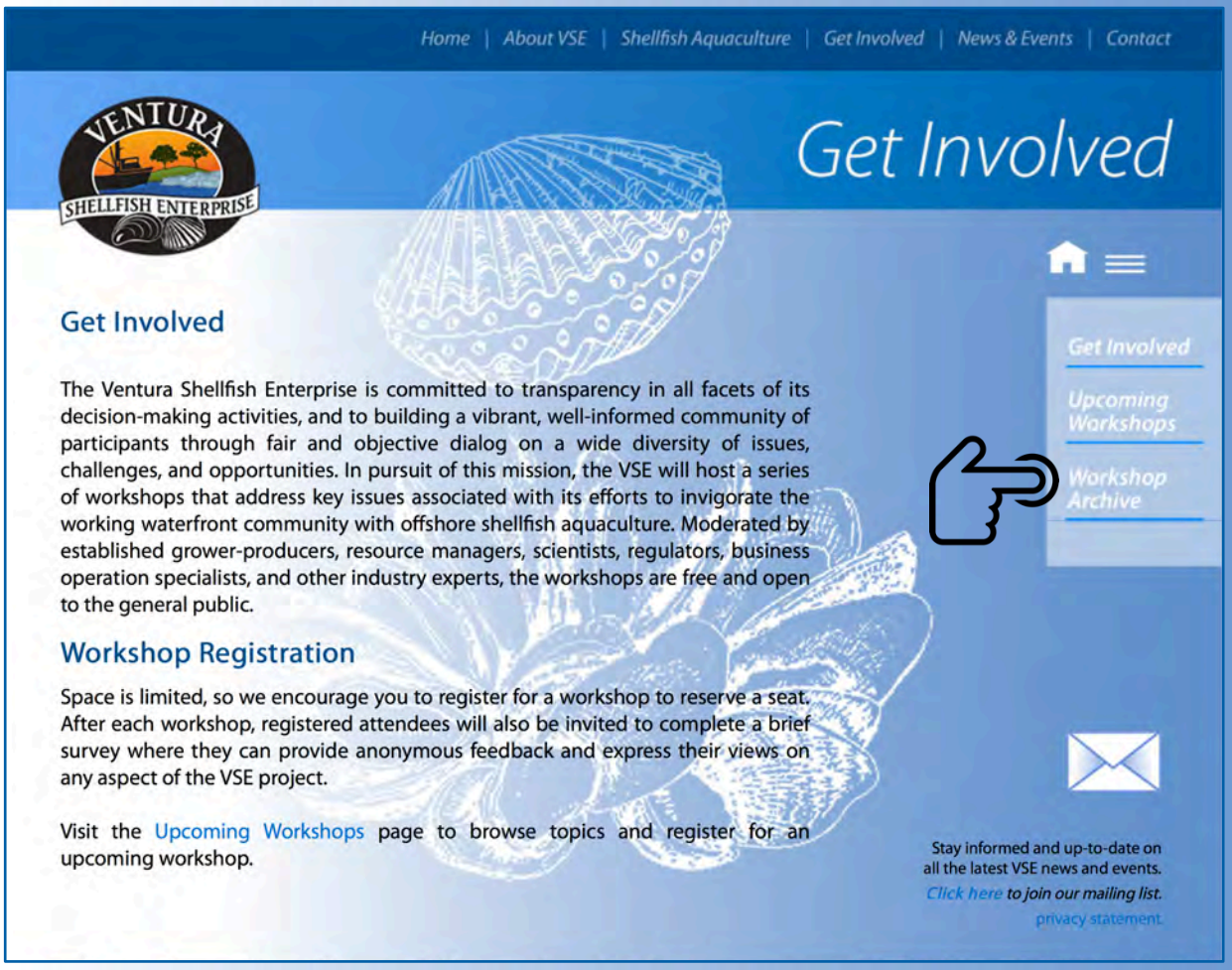

SUSTAINABLE
LOCAL
HEALTHY
VENTURA
SHELLFISH ENTERPRISE
Promoting healthy oceans with sustainable shellfish aquaculture
Aerial Photography Los Angeles

Workshop Materials

www.venturashellfishenterprise.com

Workshop videos and other materials are available on the ***Workshop Archive*** *page of the VSE website*



Workshop Materials

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Workshop Archive

Workshop Flyer Photo Gallery

Get Involved
Upcoming Workshops
Workshop Archive

Workshop 4: Environmental Effects and Best Management Practices

Date: April 11, 2017
Speaker: James Morris
Venue: Four Points Sheraton Conference Facilities at Ventura Harbor, Clipper Room East

Brief Description

This workshop focused on opportunities to minimize the risks of environmental impacts (including cumulative impacts or carrying capacity of the region for the project's planned production) and maximize the benefits of offshore shellfish production through management and design of grower regulations. As the VSE Project develops, growing site lessees will be required to meet or exceed Environmental Codes of Practice (ECP). ECPs will be compiled from one or more seafood stewardship groups (e.g. Monterey Bay Aquarium Seafood Watch program, the World Wildlife Fund Aquaculture Stewardship Council, the Global Aquaculture Alliance's Best Aquaculture Practices (BAP's), and Pacific Coast Shellfish Growers Environmental Codes of Practice) and will be tailored to local conditions. During this workshop, data from existing offshore bivalve shellfish operations was presented to help establish context for attendees.

Video Recording PowerPoint Presentation
Workshop Flyer Photo Gallery

Project Goals

Immediate Goal: *Secure leases for twenty 100-acre shellfish cultivation sites in state waters northwest of Ventura Harbor*

Local Impacts

Broader Impacts

Project Goals

Immediate Goal: *Secure leases for twenty 100-acre shellfish cultivation sites in state waters northwest of Ventura Harbor*

Local Impacts

Enhance the local economy and Ventura Harbor's working waterfront

Maintain Ventura Harbor's standing as a major west coast fishing port

Broader Impacts

Project Goals

Immediate Goal: *Secure leases for twenty 100-acre shellfish cultivation sites in state waters northwest of Ventura Harbor*

Local Impacts

Enhance the local economy and Ventura Harbor's working waterfront

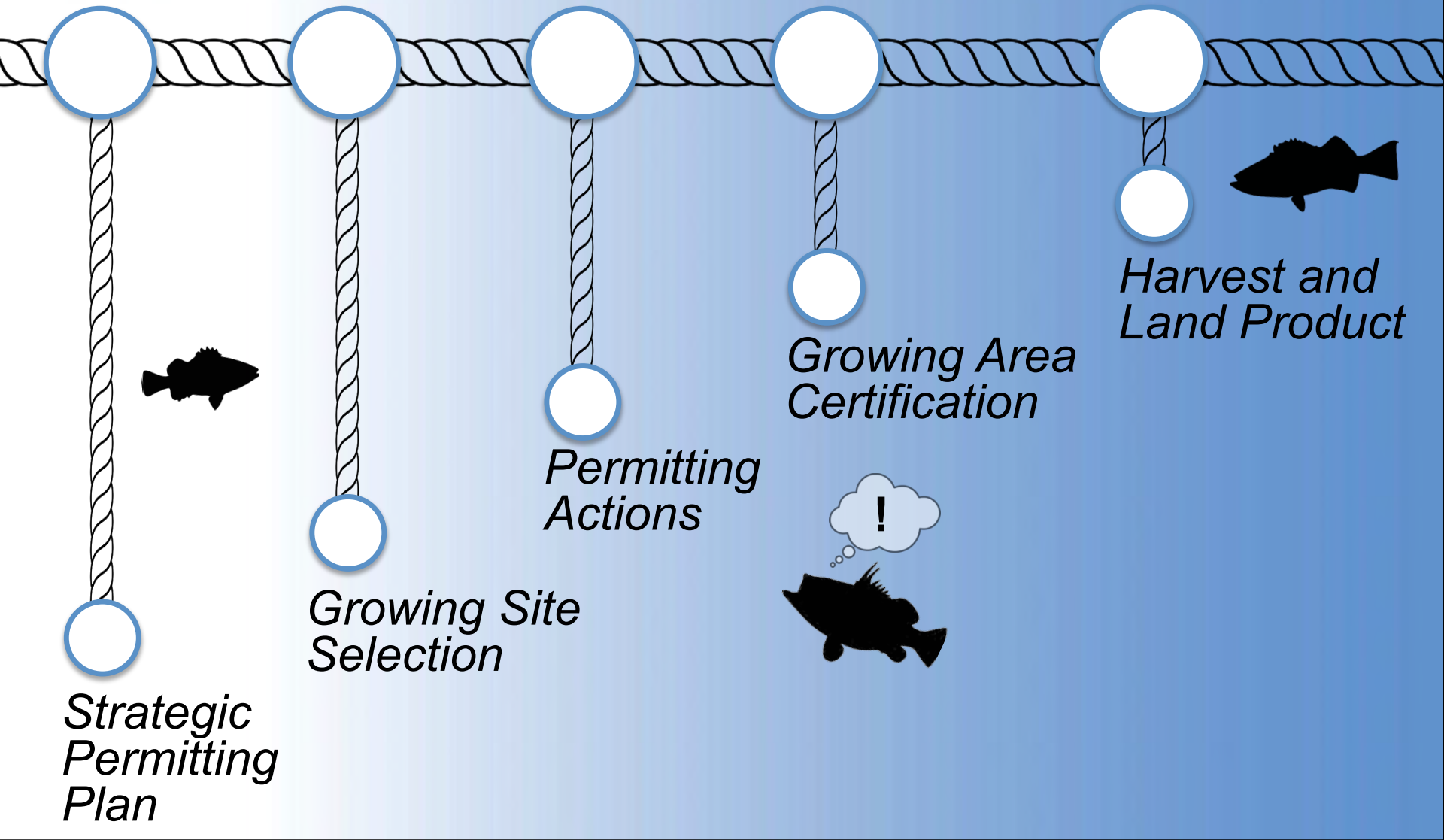
Maintain Ventura Harbor's standing as a major west coast fishing port

Broader Impacts

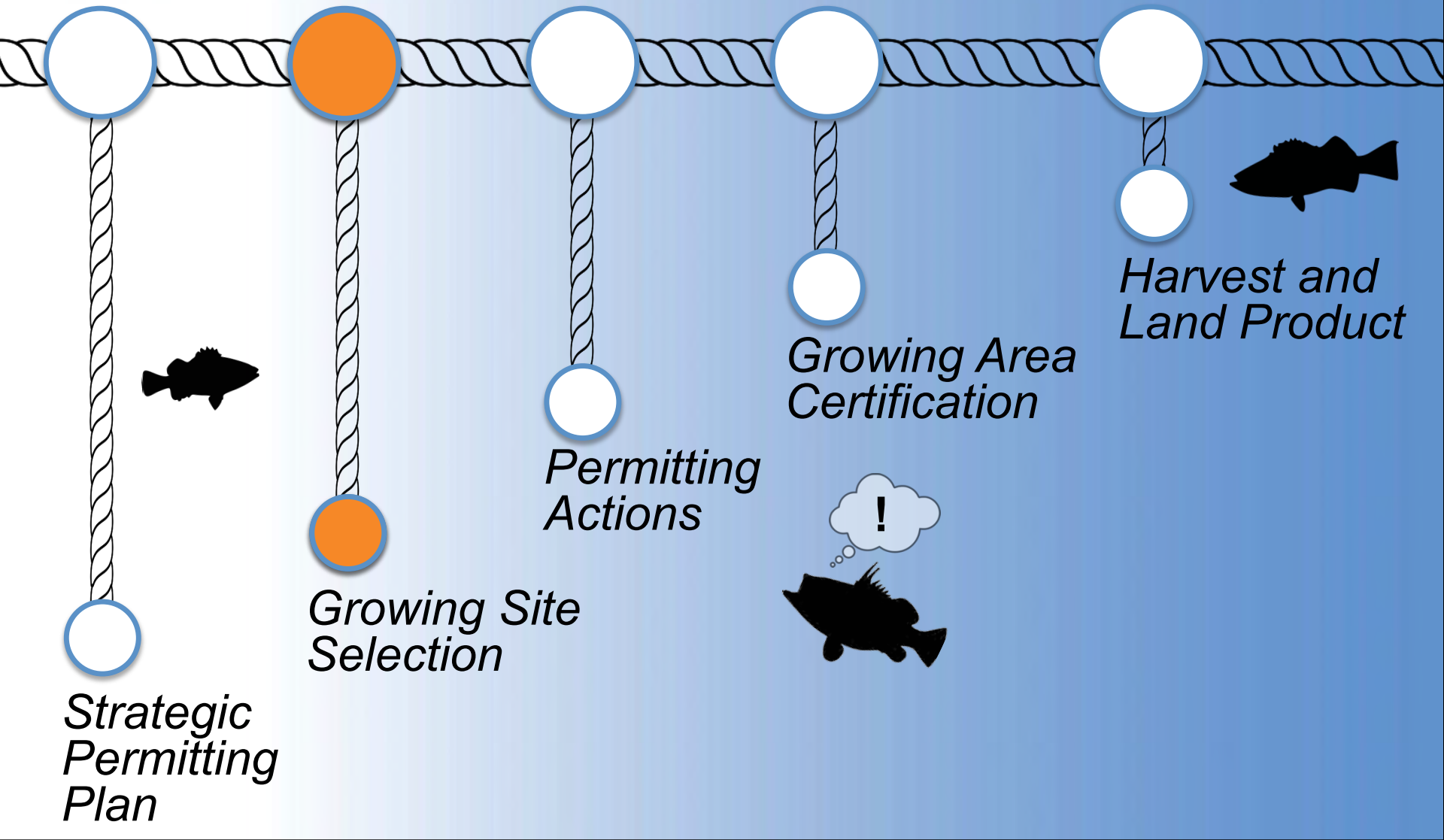
Establish a permitting blueprint for shellfish aquaculture in coastal CA communities

Address an escalating need for domestic seafood production

Project Sequence

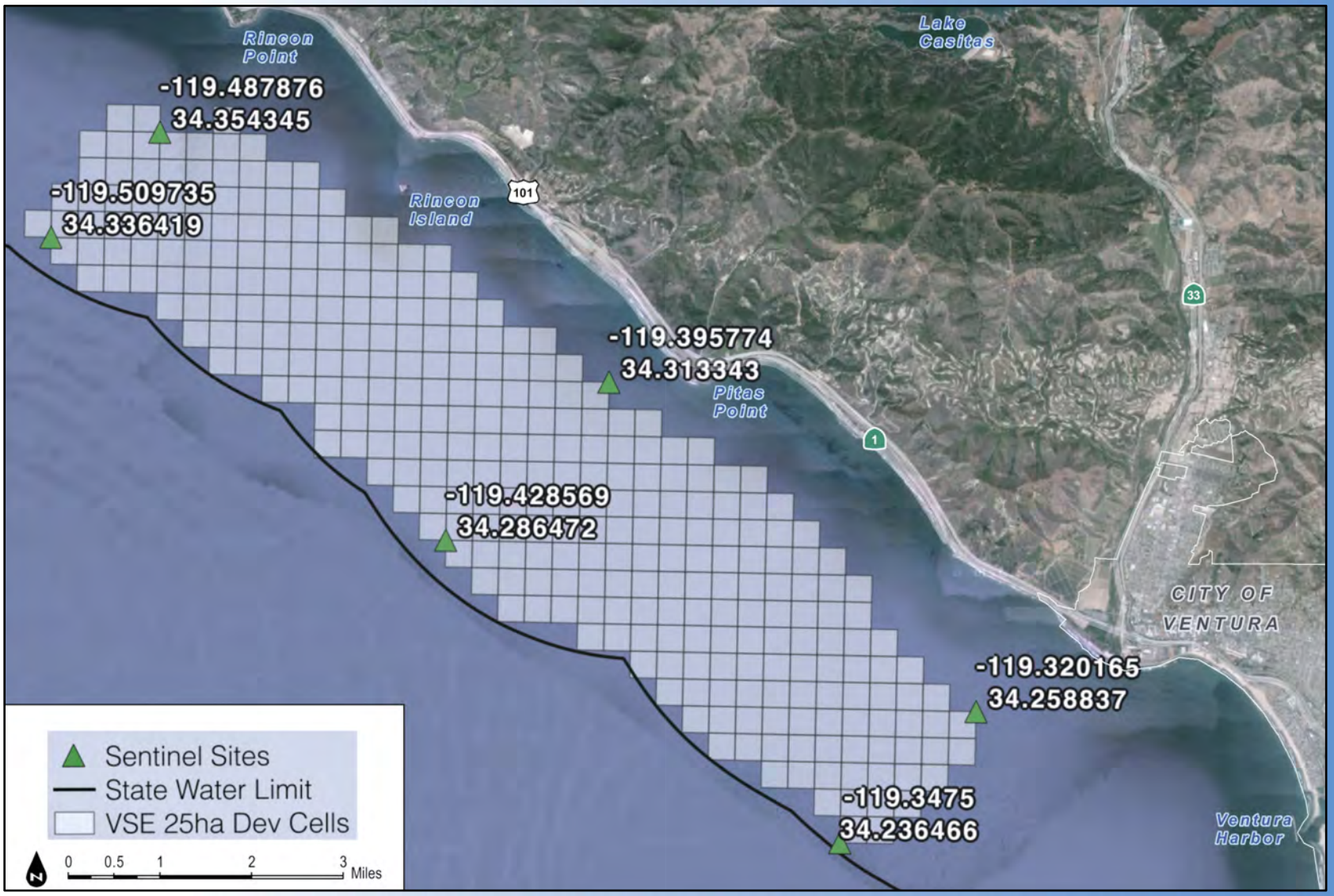


Project Sequence



Area of Interest

*a **starting point** for collaborative site planning*



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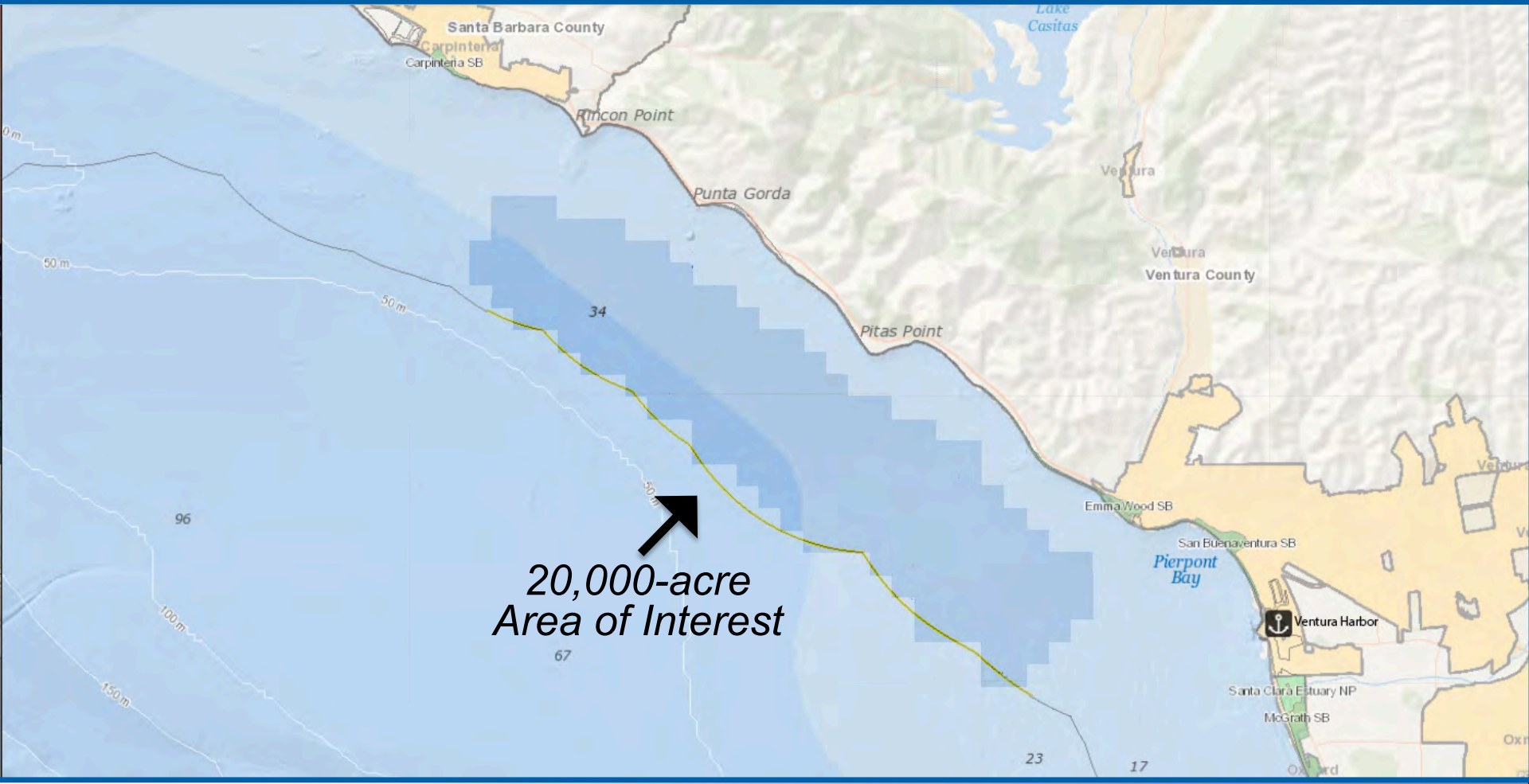

Map generated in MarineBIOS, a California Department of Fish and Wildlife Marine & Coastal Data Viewer

Area of Interest

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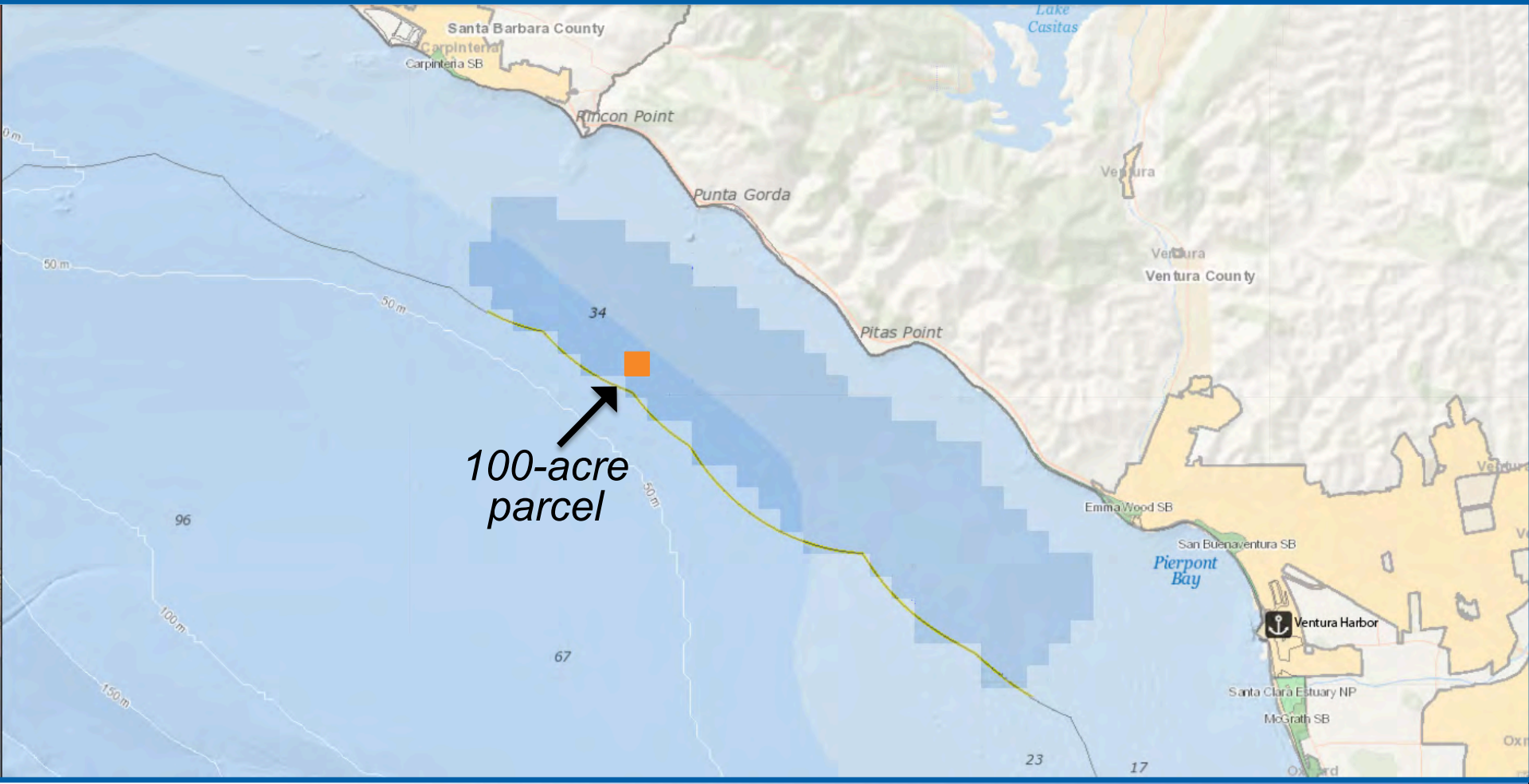

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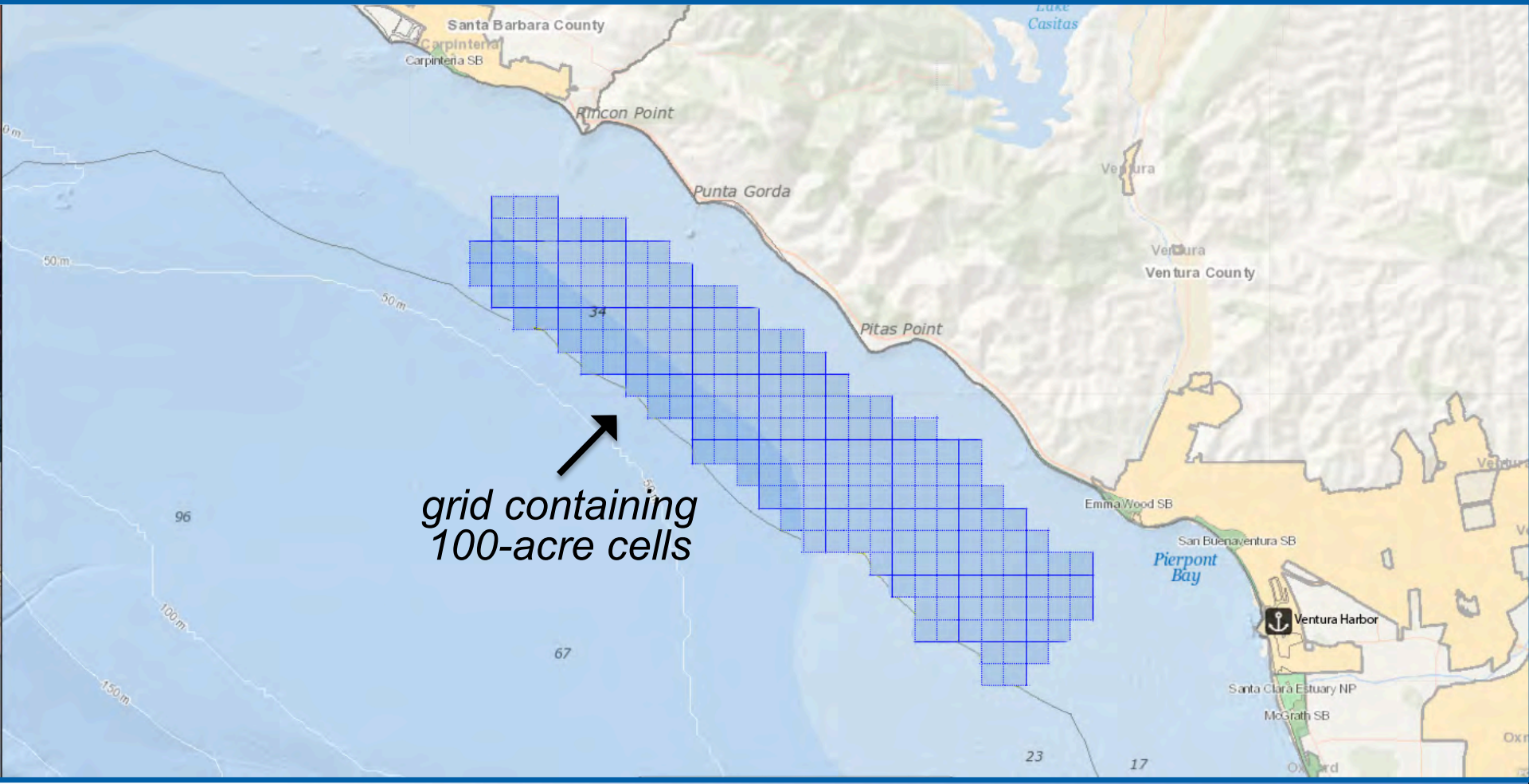

Map generated in MarineBIOS, a California Department of Fish and Wildlife Marine & Coastal Data Viewer

Area of Interest

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The following slides are for demonstration purposes only

(this is only an exercise)

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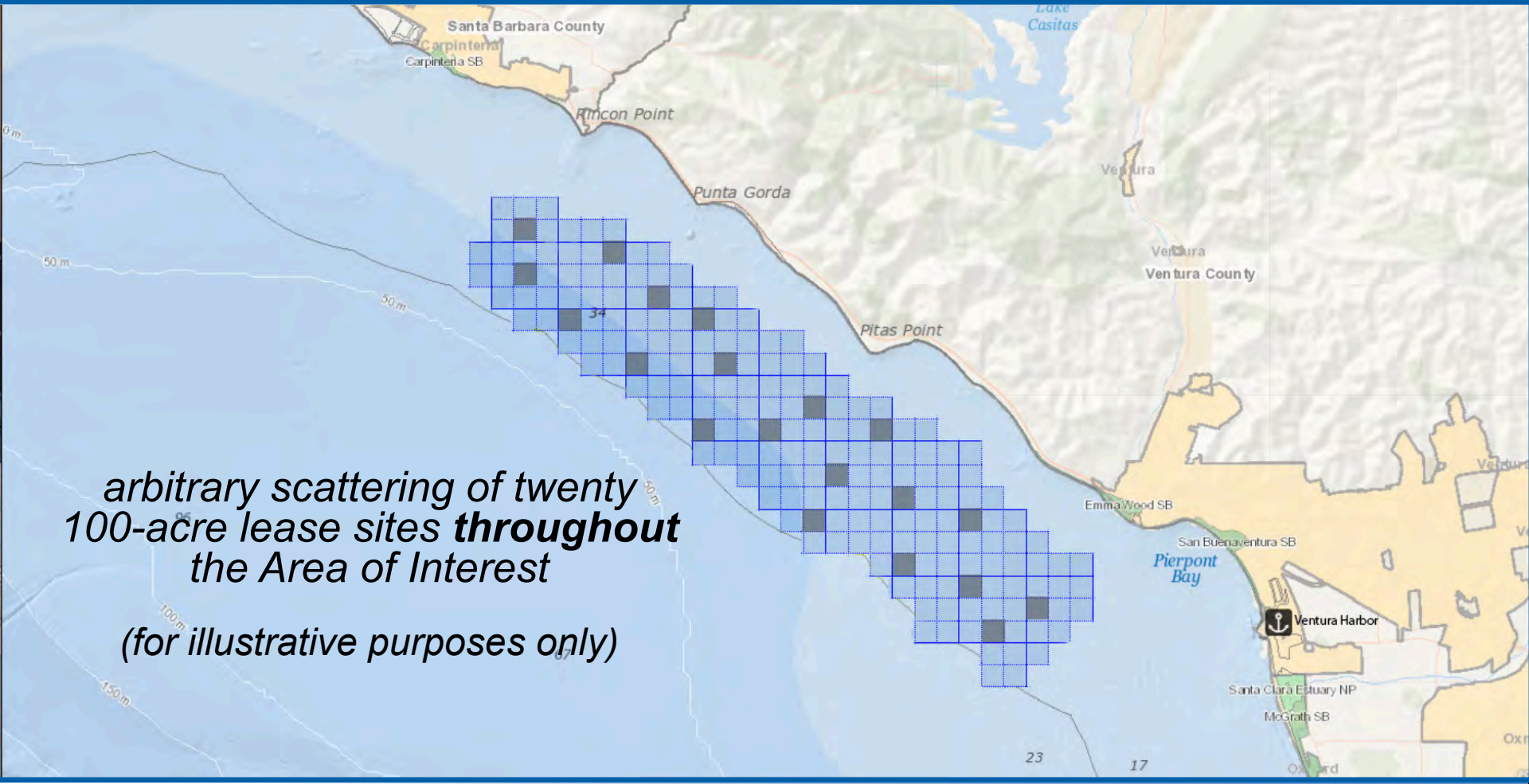
Area of Interest

*a **starting point** for collaborative site planning*



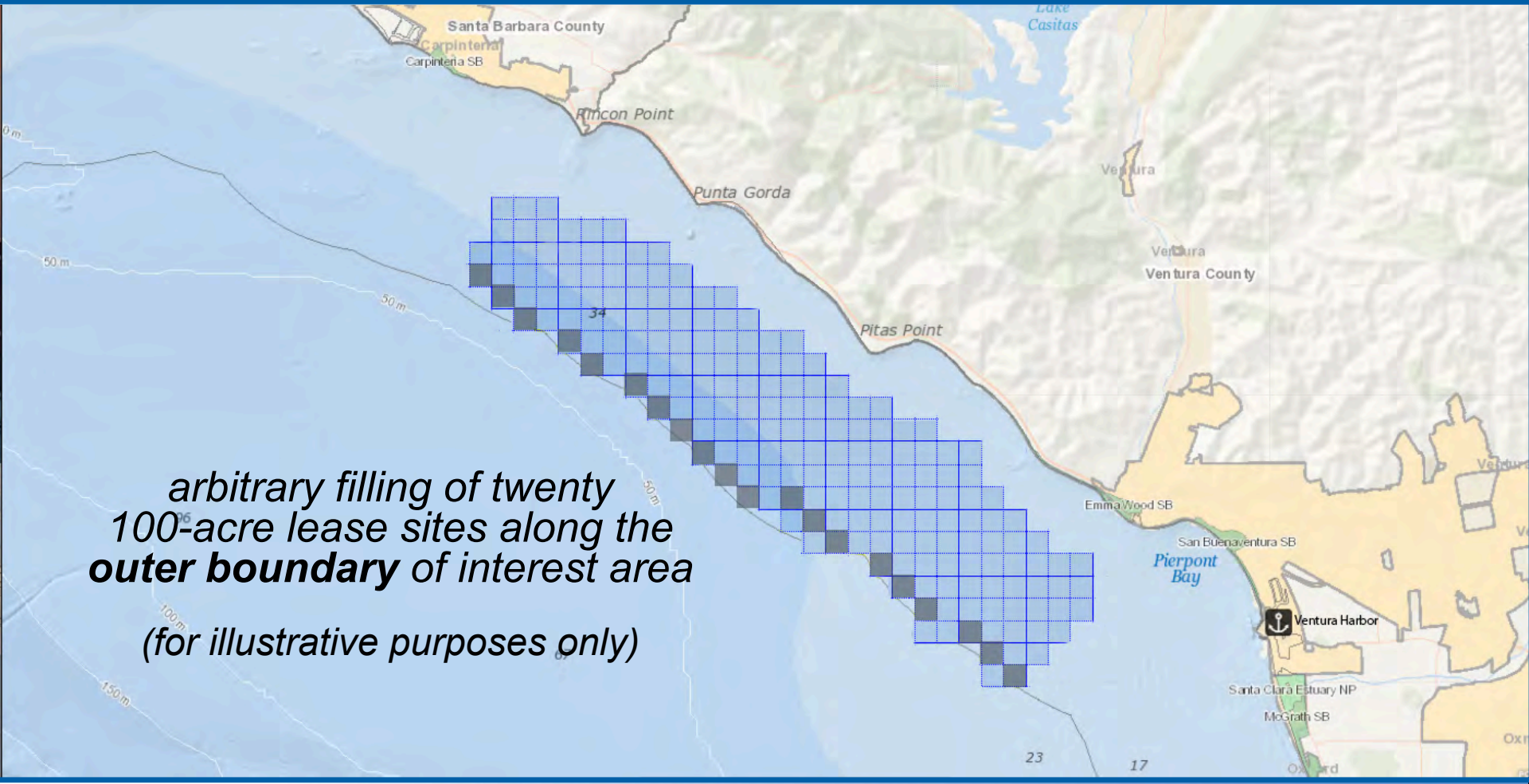
*arbitrary scattering of twenty 100-acre lease sites **throughout** the Area of Interest*

(for illustrative purposes only)

Map generated in MarineBIOS, a California Department of Fish and Wildlife Marine & Coastal Data Viewer

Area of Interest

a **starting point** for collaborative site planning



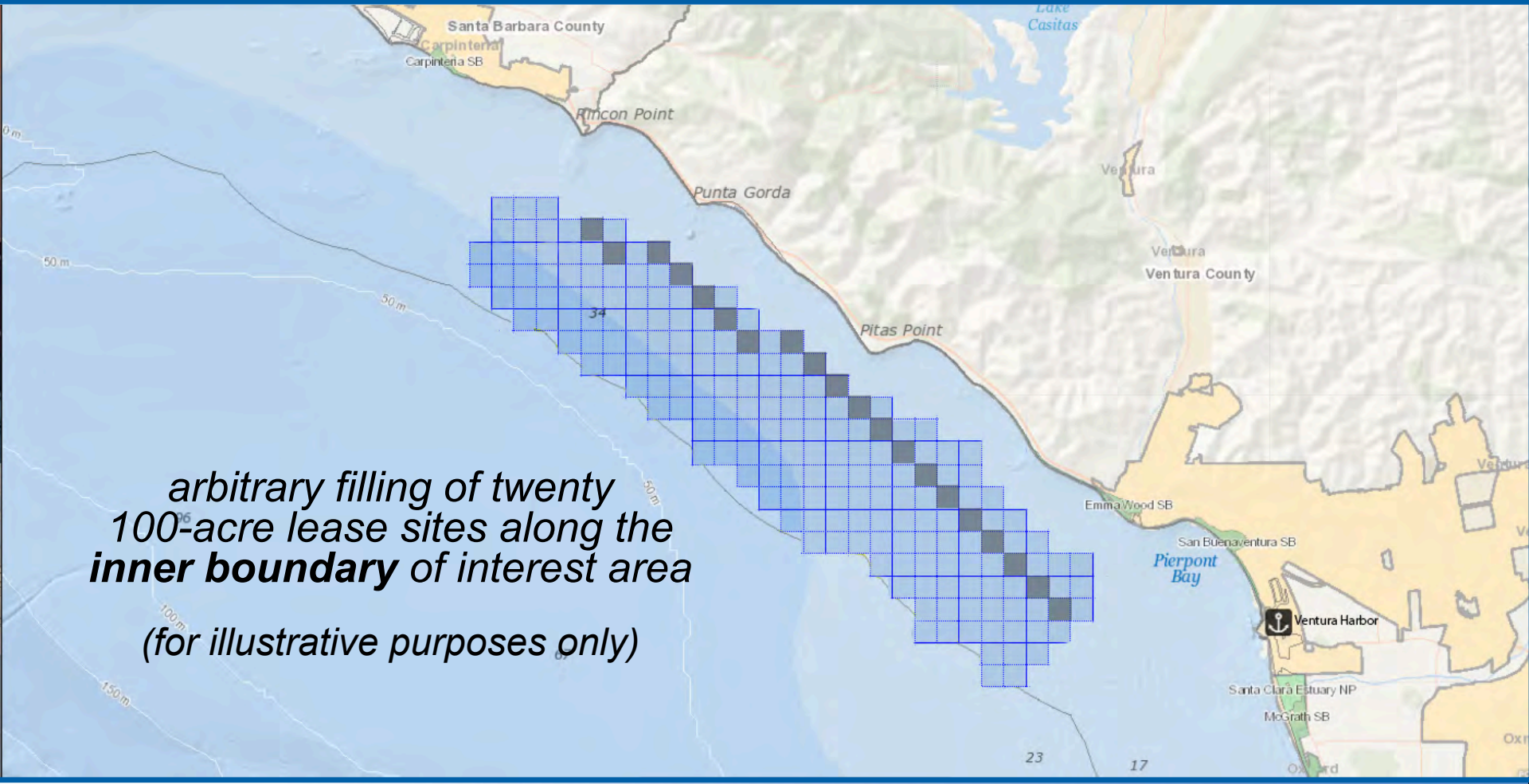
arbitrary filling of twenty 100-acre lease sites along the ***outer boundary*** *of interest area*

(for illustrative purposes only)

Map generated in MarineBIOS, a California Department of Fish and Wildlife Marine & Coastal Data Viewer

Area of Interest

a **starting point** for collaborative site planning



*arbitrary filling of twenty 100-acre lease sites along the **inner boundary** of interest area*

(for illustrative purposes only)

Map generated in MarineBIOS, a California Department of Fish and Wildlife Marine & Coastal Data Viewer

Site Planning Workshops

Site planning workshop flyers are available on the registration table (two-sided)

seasketch

VENTURA PORT DISTRICT

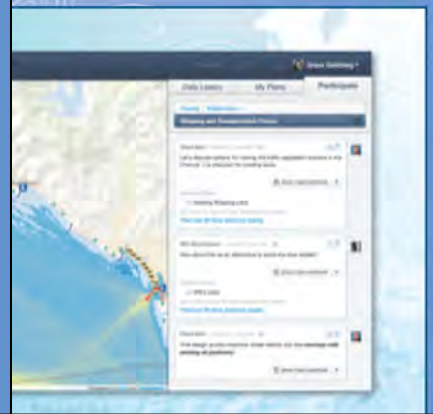
Ventura Shellfish Enterprise Site Planning Meetings

The Ventura Shellfish Enterprise (VSE) is a collaborative effort to secure leases for twenty 100-acre parcels from the California Fish and Game Commission for offshore shellfish cultivation. The Ventura Port District will hold the leases for growing areas and grant subleases to commercial shellfish growers. Individual growing sites will be located in state waters (within three miles of the coast) and be placed only in areas with sandy bottom and sufficient depth for the deployment of growing lines. As a first step toward defining individual growing sites, an approximately 20,000-acre Area of Interest suitable for shellfish cultivation was identified using a geographic information system-based spatial planning program (Fig. 1).

VSE recognizes that while the Area of Interest is ideal for shellfish aquaculture based on a variety of factors, it includes commercial and recreational fishing grounds, and is home to a broad array of sea life, including marine mammals, fishes, and seabirds. The interest area also receives marine traffic from commercial and recre-

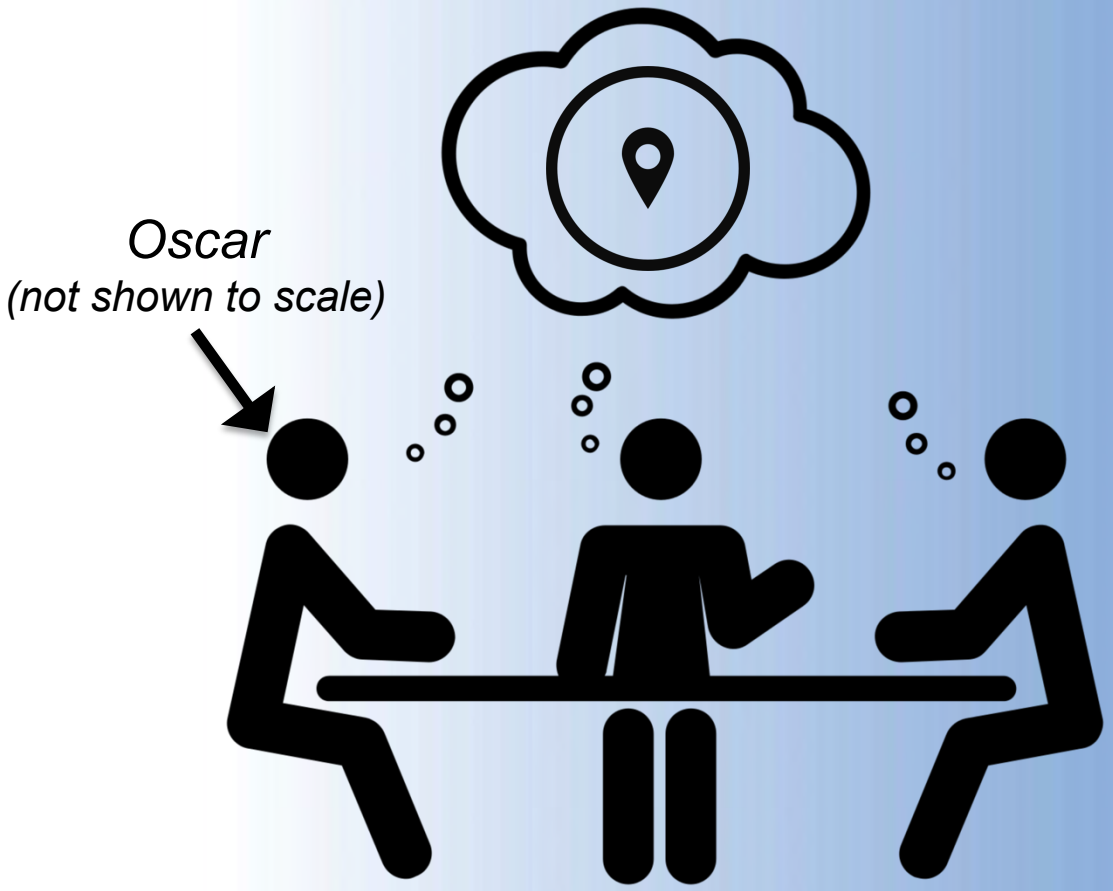
VENTURA PORT DISTRICT

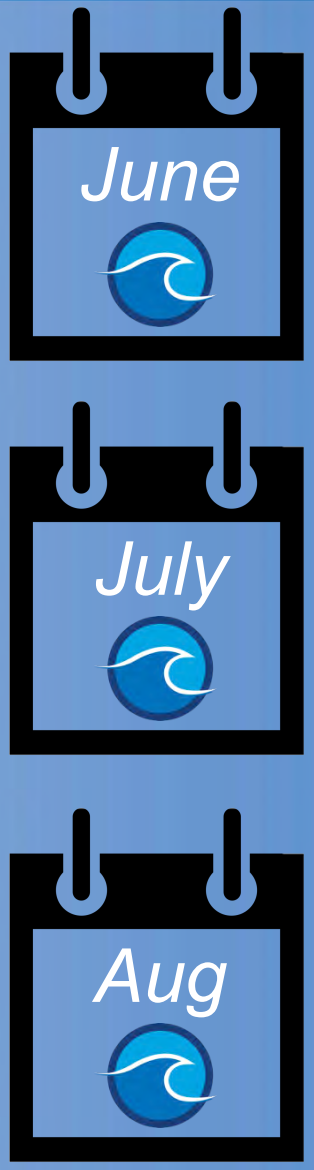
ions and was used by NOAA to
les migrating through the Santa
Service as the best available tool



Site Planning Workshops

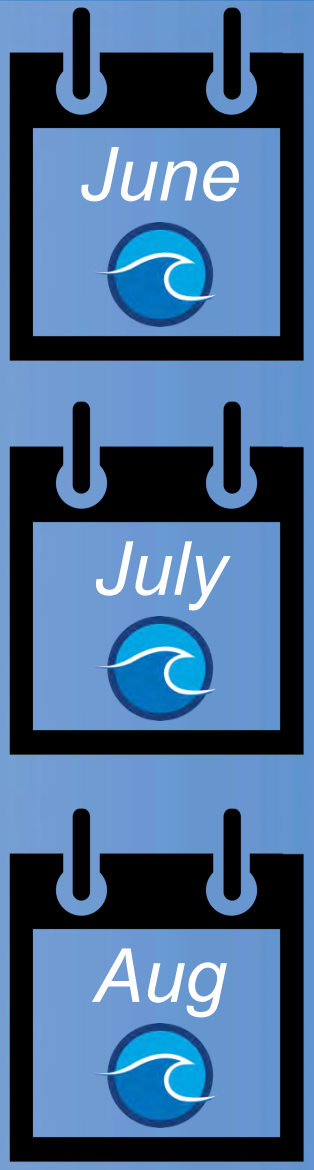
Dates, locations, and descriptions will be sent by email through the VSE database





Site Planning Workshops

seasketch



Workshop 5

VSE Production Site Selection

Developing Science to Support Participatory Planning for Offshore Aquaculture in Southern California

Carrie Kappel, Ph.D.

Researcher and Senior Fellow | National Center for Ecological Analysis and Synthesis (NCEAS) at UC Santa Barbara

Workshop 5

seasketch

www.seasketch.org

Grace Goldberg

Director of Operations for the SeaSketch Program at UC Santa Barbara

Developing science to support participatory planning for offshore aquaculture in Southern California

Carrie Kappel, PhD
National Center for Ecological Analysis and Synthesis, UC Santa Barbara

May 11, 2017
Ventura Shellfish Enterprise Workshop

Where we are headed…

1. Introduction
2. Developing scientific information and tools to support offshore aquaculture planning in the Southern California Bight
3. Initial application of those tools to the Ventura Shellfish Enterprise
4. Next steps (presented by Grace Goldberg)
   - Participatory planning and site selection using Seasketch
5. Question and answer session

Photo by Ken Lund

Ocean planning seeks to balance many needs















We need tools to integrate many different types of values and considerations

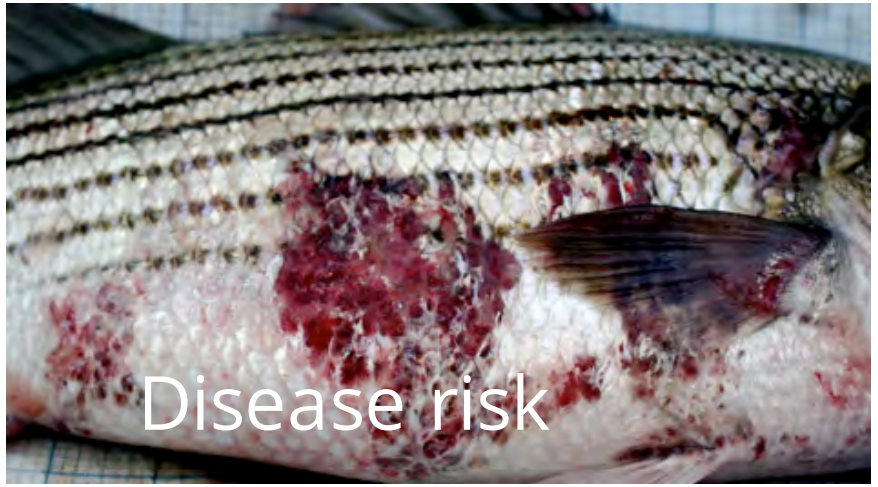
Case study:

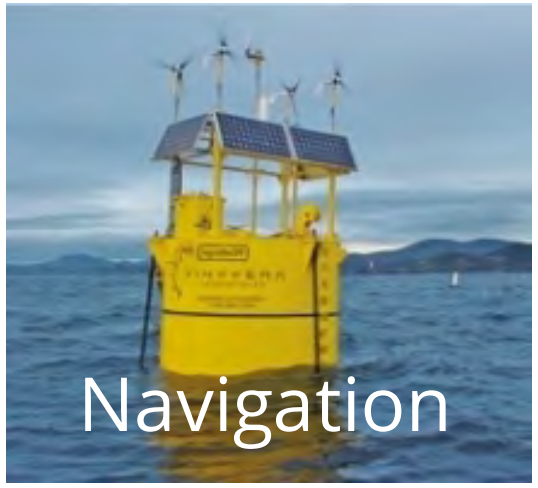
Open ocean aquaculture in the Southern California Bight

Lester et al. Nature Communications, *in review*

Map from Wikimedia Commons

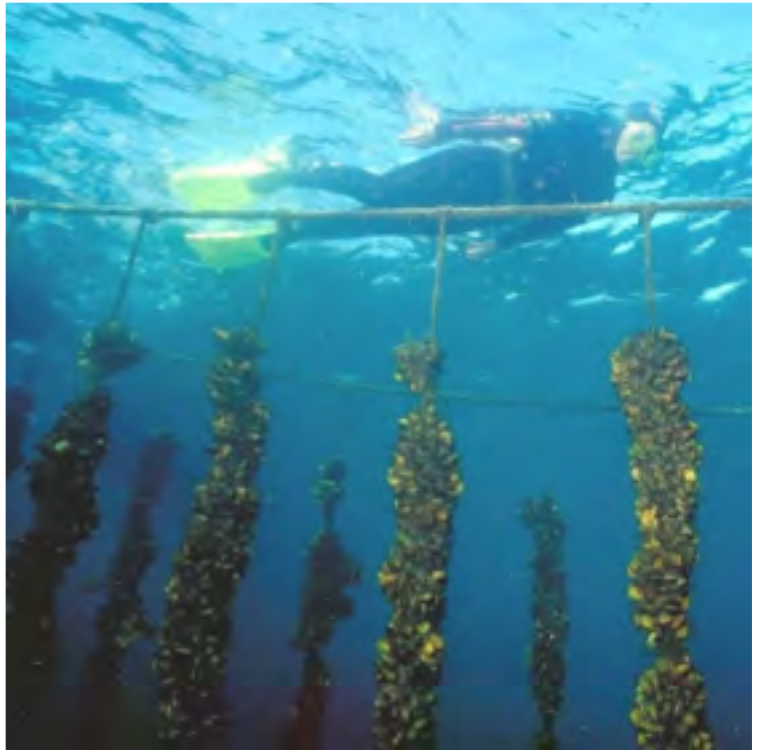
What are the potential conflicts and impacts?





What types of aquaculture are appropriate *where* in Southern California?

Finfish net pens
(Striped bass)



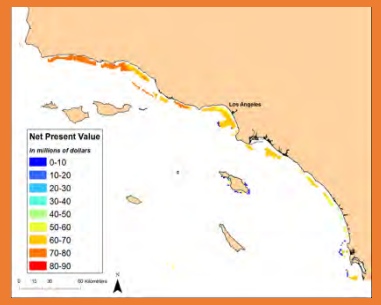
Shellfish long lines
(Mediterranean mussel)

Seaweed long lines
(Sugar kelp)

Planning for three aquaculture types

Compile spatial data to quantify:

1. Production potential for each type
2. Environmental impacts of each
3. Conflicts with other uses

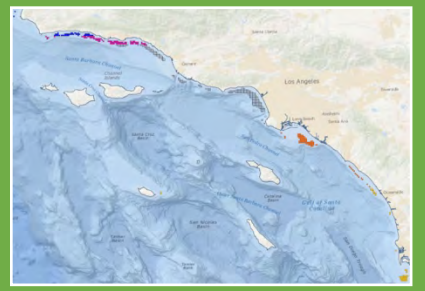


Develop a planning framework:

1. Define area of interest
2. Set depth range
3. Identify fixed constraints
4. Map production potential, impacts and other sectors
5. Identify interactions among them
6. Analyze options and identify win-wins

Identify the best options analytically:

Quantify and compare different development scenarios, taking other sectors and potential environmental impacts into account



Lester et al. Nature Communications, *in review;* Gentry et al. 2016 Ecology and Evolution

Study area and fixed constraints

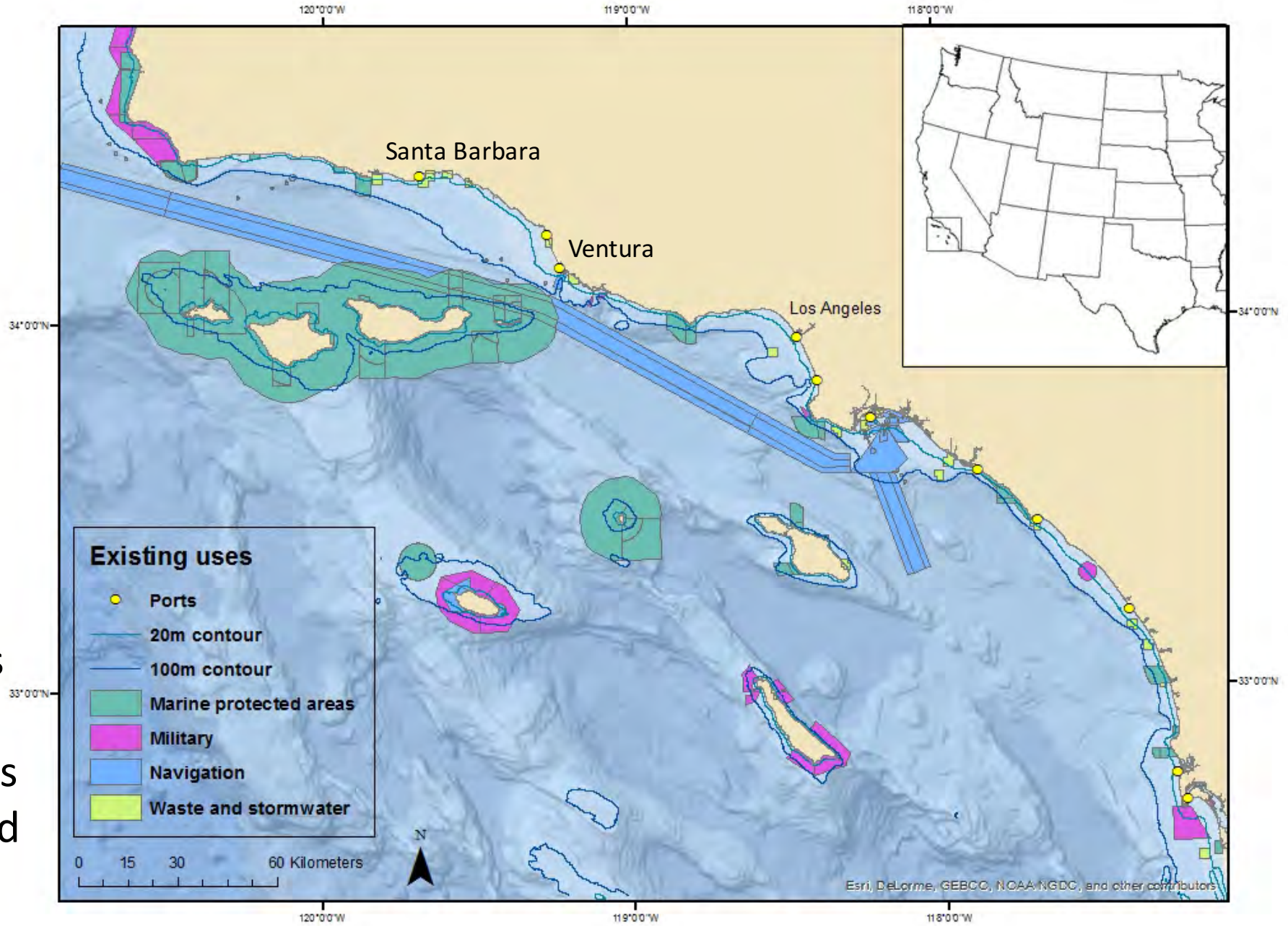
1km^2 planning grid

Depth range:

- 20-100m

Excluding:

- Marine protected areas
- Military zones
- Special navigation zones
- Wastewater outfalls and river mouths



Lester et al. Nature Communications, *in review*

Habitat

- Mapped soft and hard bottom using best available data from DFW, USGS and NOAA
- Excluded any 1km^2 cell with any hard bottom
- Result: 1061 developable cells

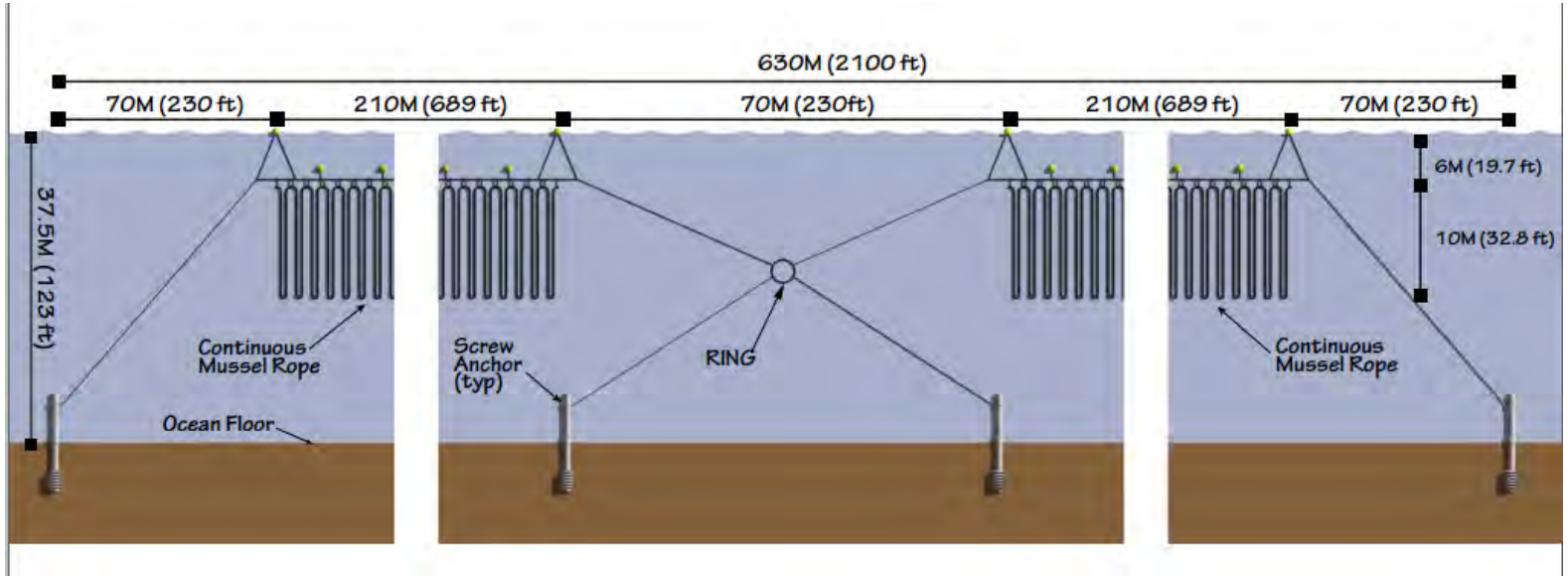
Lester et al. Nature Communications, *in review*

Modeling aquaculture production potential

Mussel aquaculture

- Farm design per 1km^2 cell
  - 100 longlines
  - 13,000 feet of fuzzy rope per line
  - 65,000 lbs of mussels per line

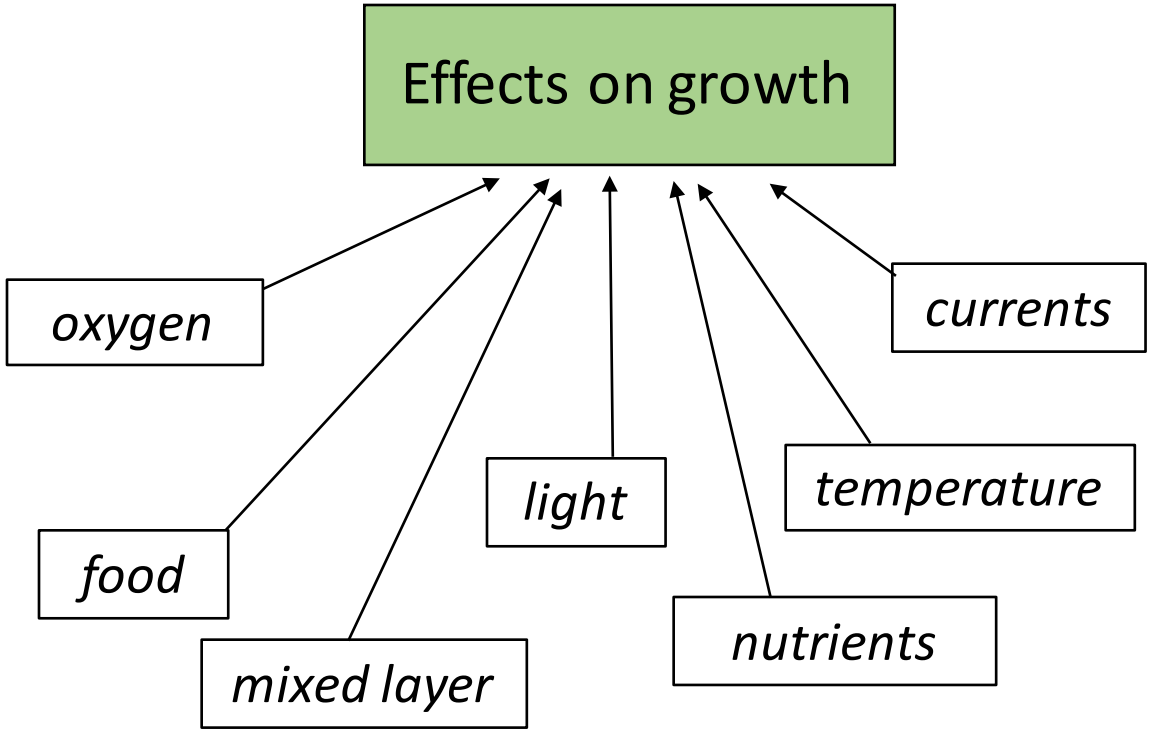
Mediterranean mussel, *Mytilus galloprovincialis*

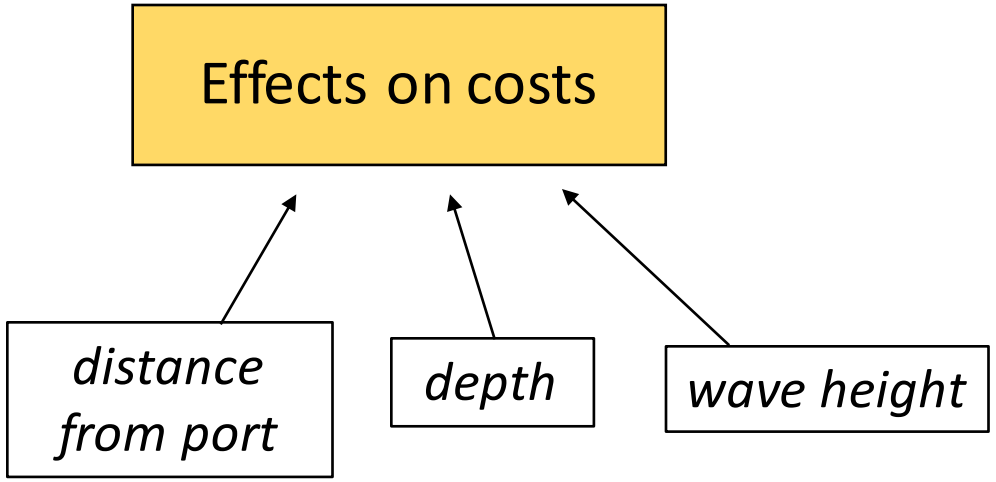


Lester et al. Nature Communications, *in review*

Modeling aquaculture production potential

Mussel aquaculture

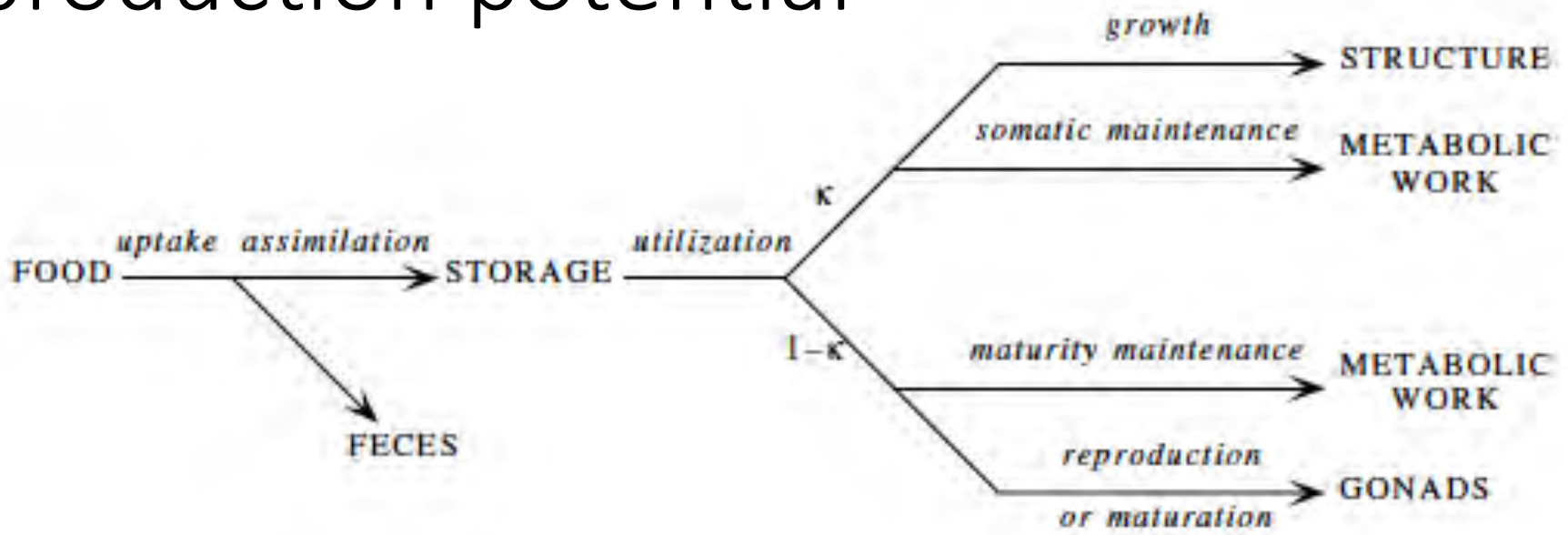




Lester et al. Nature Communications, *in review*

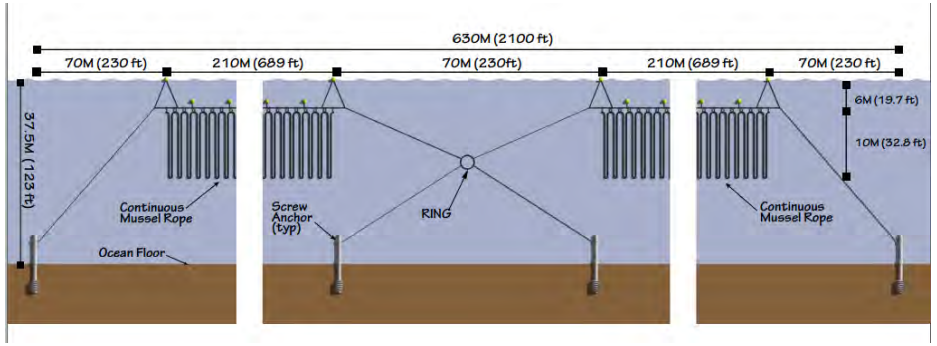
Modeling aquaculture production potential

Mussel aquaculture



Inputs:

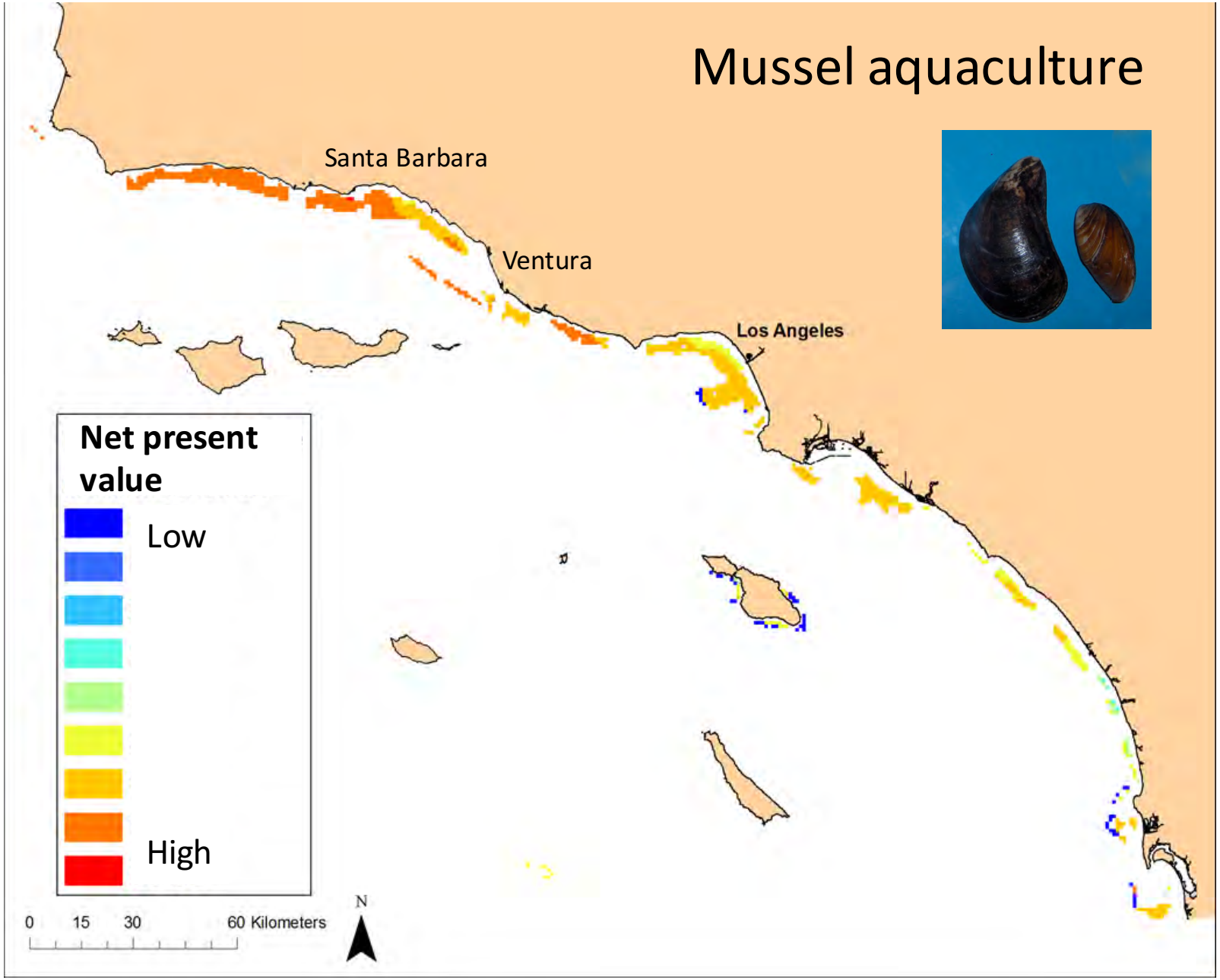
- Current Speed
- Particulate Organic Carbon (mussel food)
- Temperature
- Mixed Layer Depth



Scaled up from individual to farm

Production potential

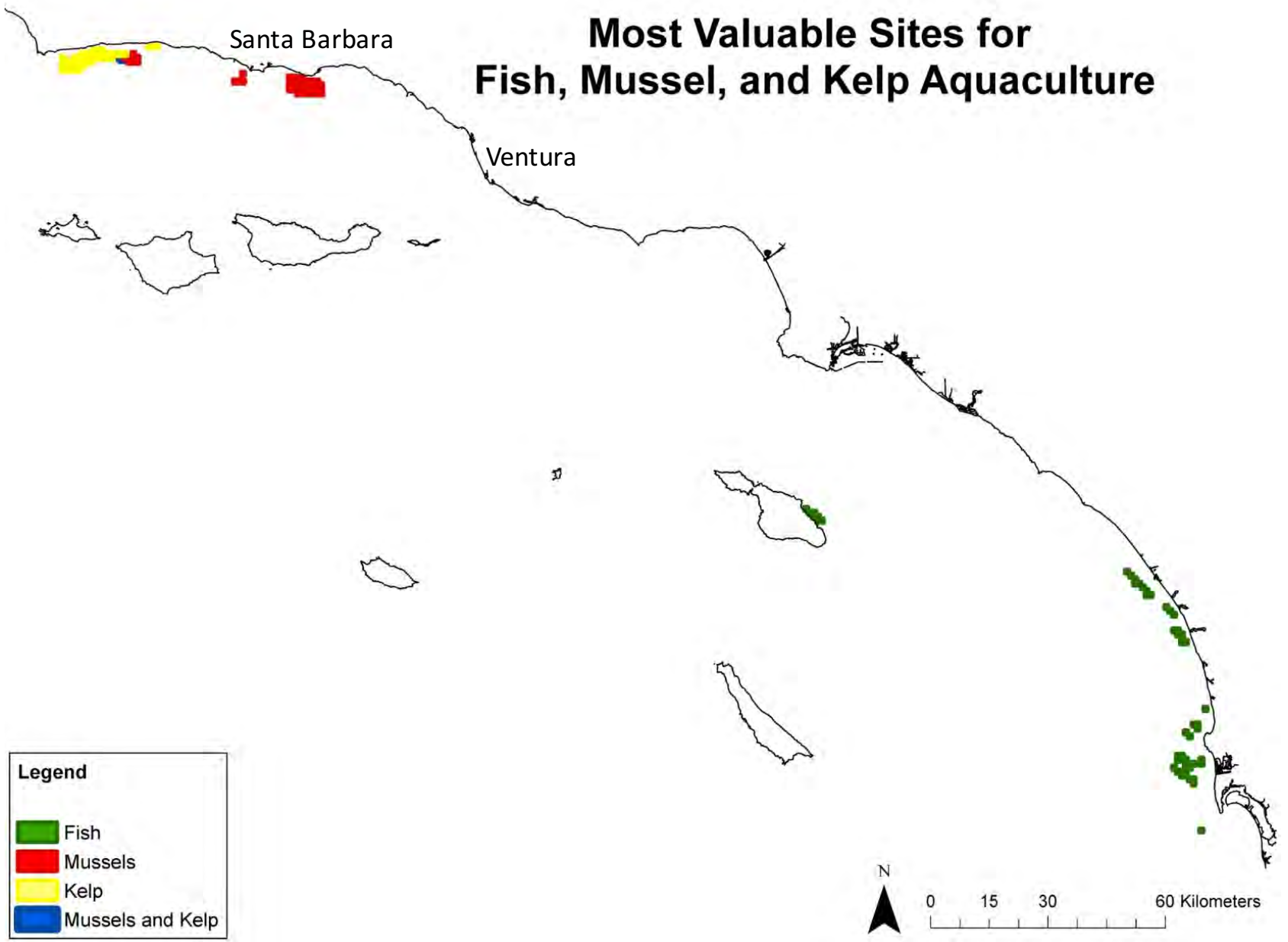
- Large swaths of the study region would be productive for mussel farming
- Production potential is higher in the northern part of the Bight, especially off the Santa Barbara/Ventura coast



Lester et al. Nature Communications, *in review*

Most valuable locations

- Top 50 1km^2 cells for each aquaculture type
- Could produce:
  - Mussels: ~200,000 MT
  - Fish: ~100,000 MT
  - Kelp: ~50,000 MT

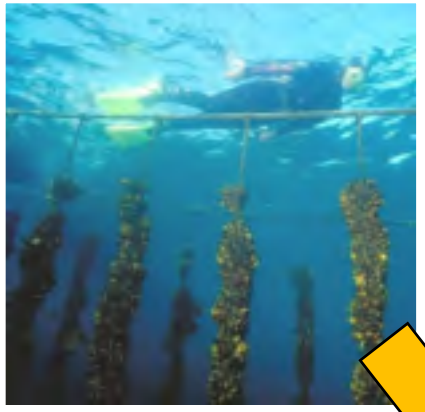


Lester et al. Nature Communications, *in review*

Environmental impacts

FINFISH

Potential negative effect



MUSSELS

Minimal or no effect

KELP

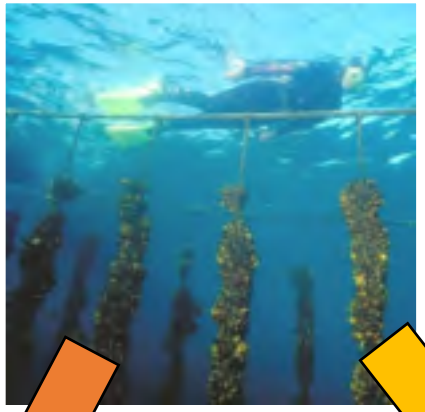
No effect

Disease risk

Benthic impacts

Conflicts with other uses

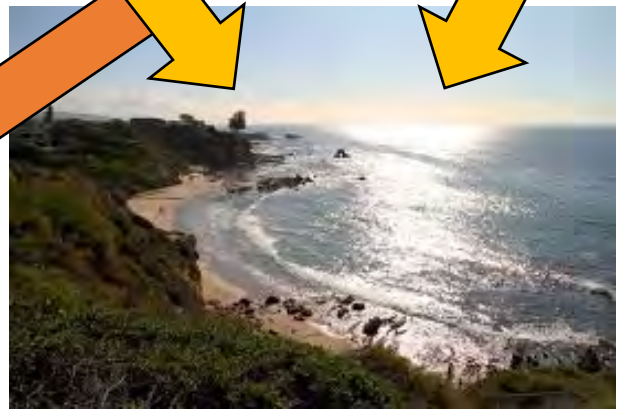
FINFISH



MUSSELS

KELP

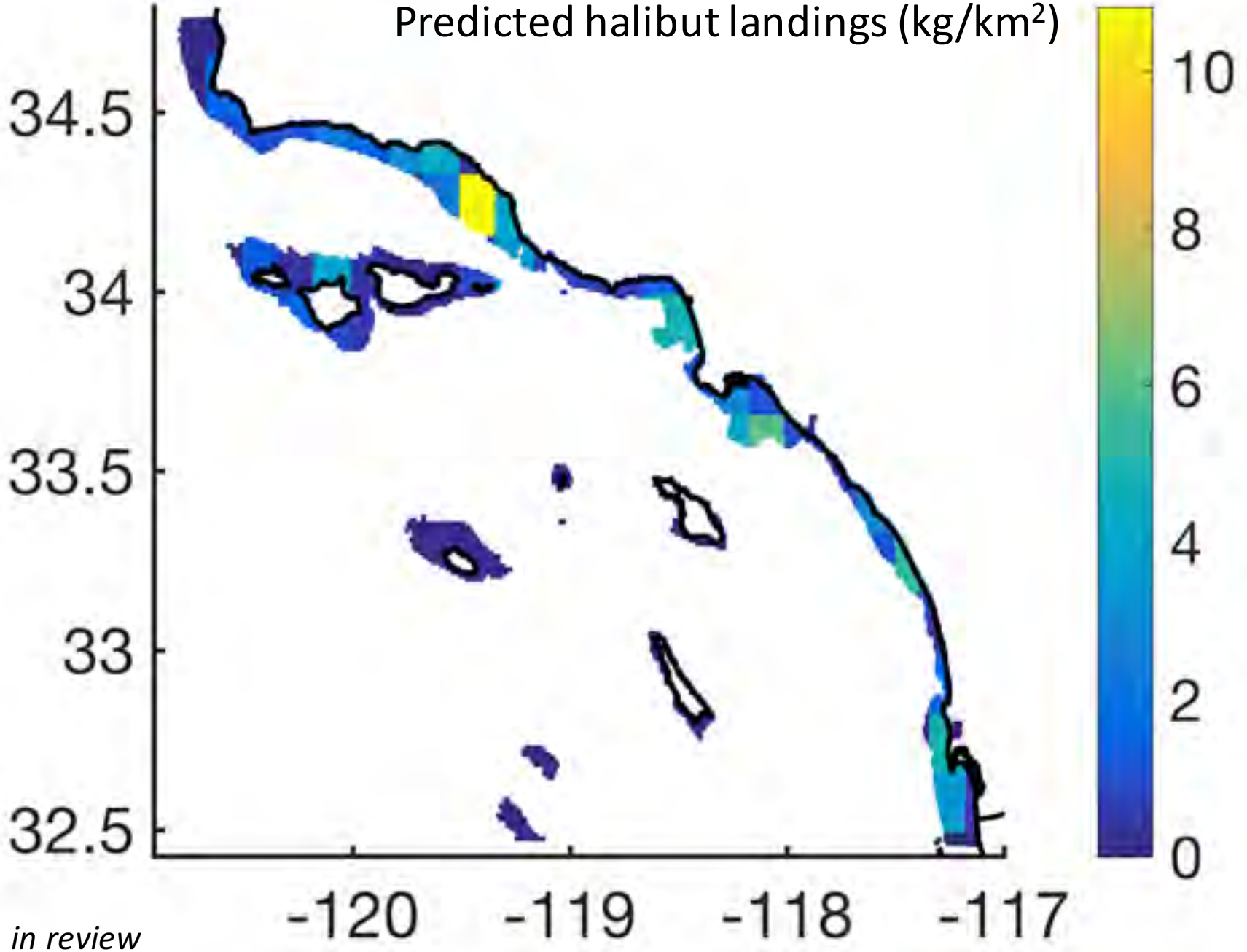
Fisheries



Coastal views

Bioeconomic model of commercial and recreational halibut fisheries

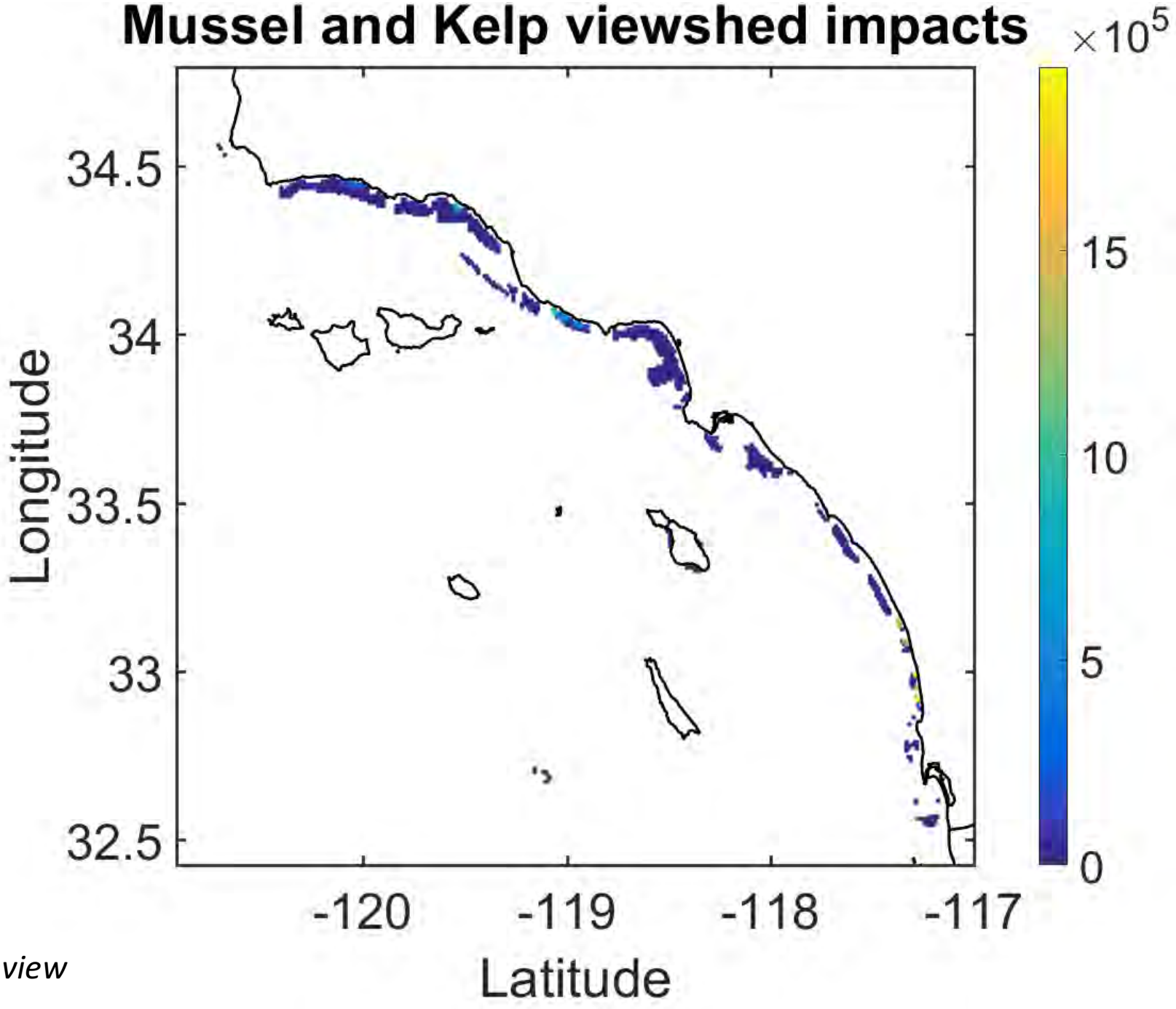
- Based on depth, habitat quality, distance from port, closed areas and other regulations, fleet economics, and halibut biology
- Tuned so that model outputs match reported landings well



Lester et al. Nature Communications, *in review*

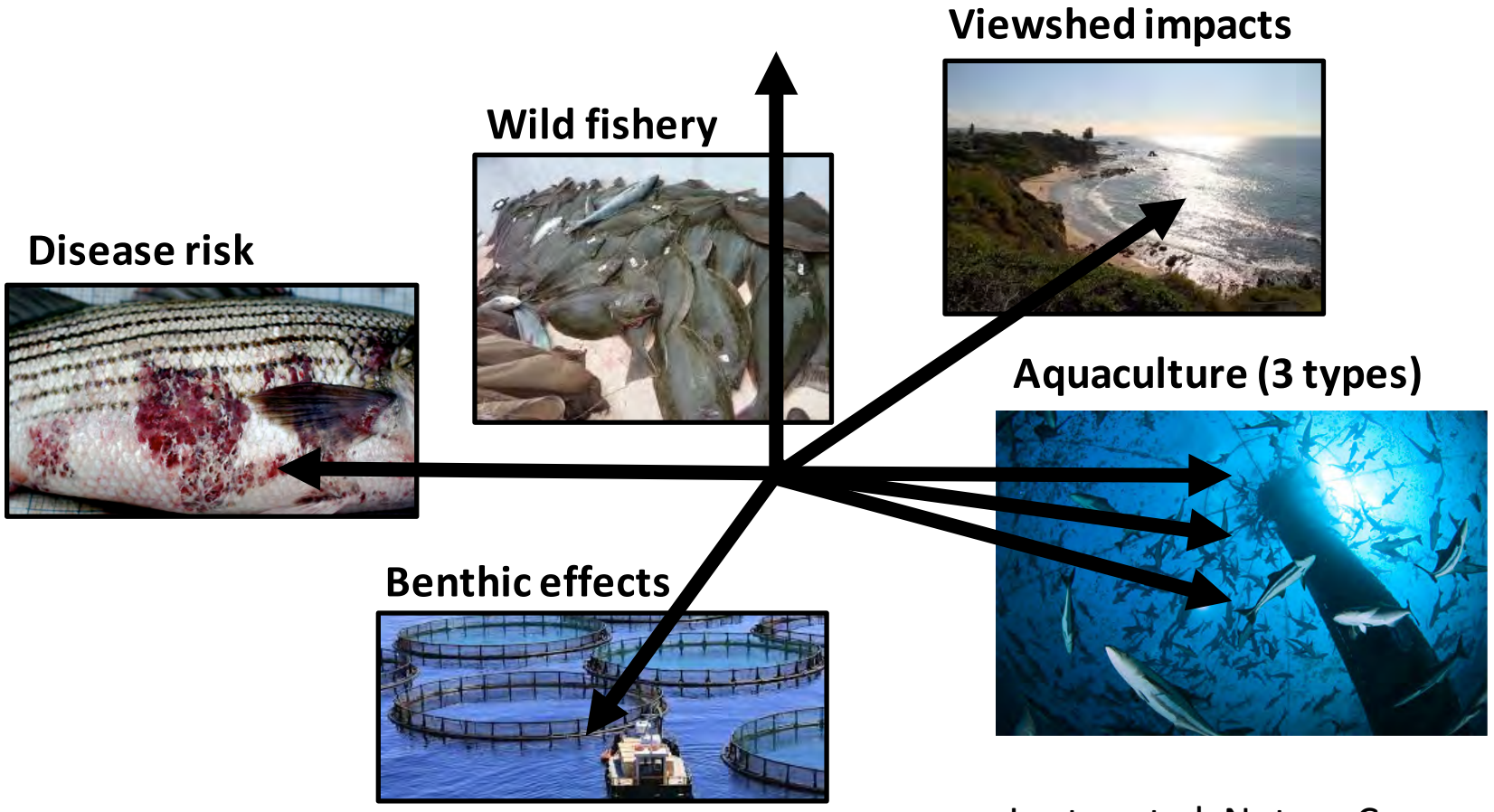
Viewshed model

- Based on how many people living on the coast and how many visitors to State parks and beaches would be able to see each cell
- We assume that beyond 3km (for mussel or kelp) or 8km (for finfish) a farm will not be visible



Lester et al. Nature Communications, *in review*

Integrated planning model to weigh tradeoffs

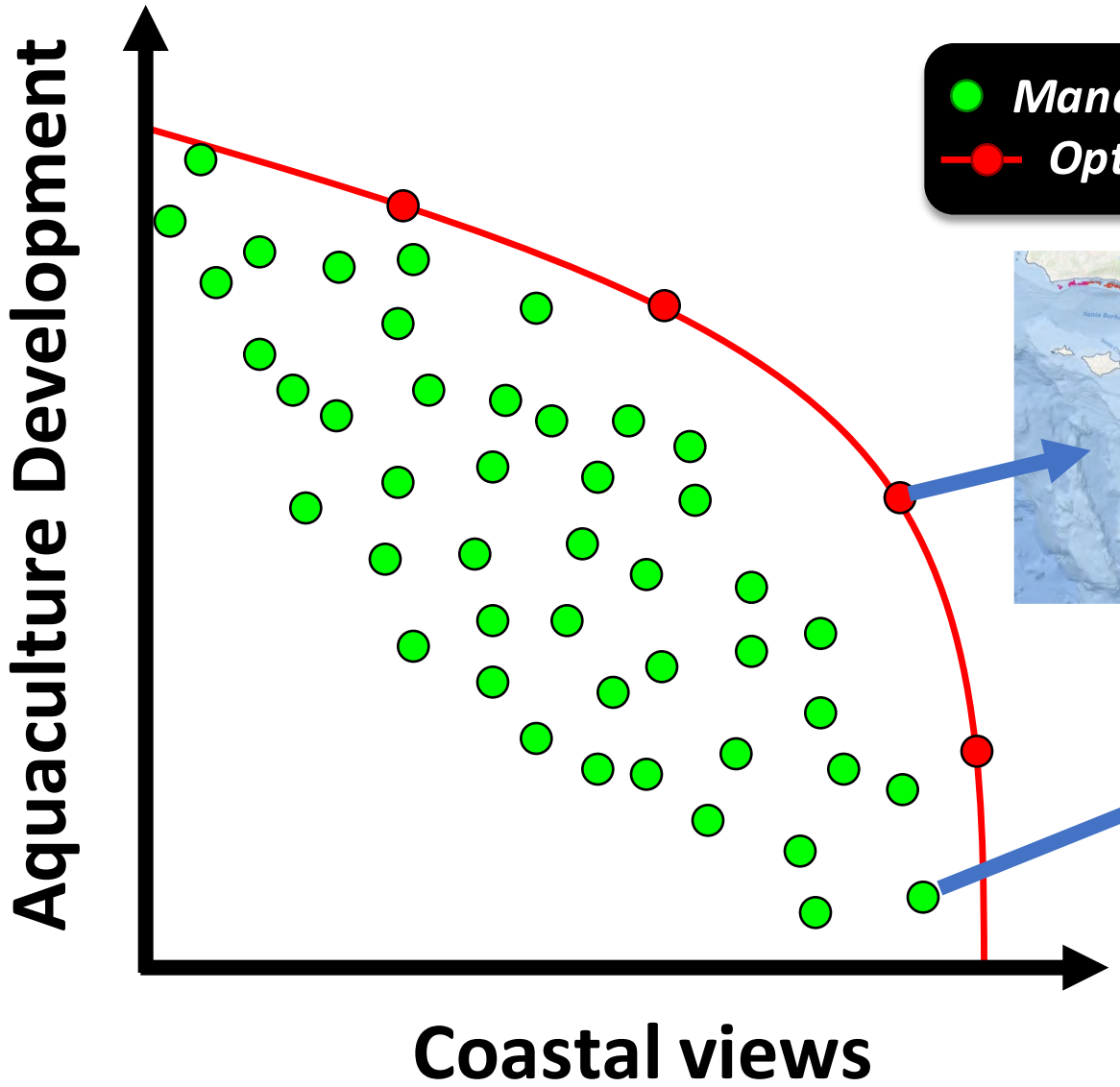


Lester et al. Nature Communications, *in review*

Integrated planning model to weigh tradeoffs

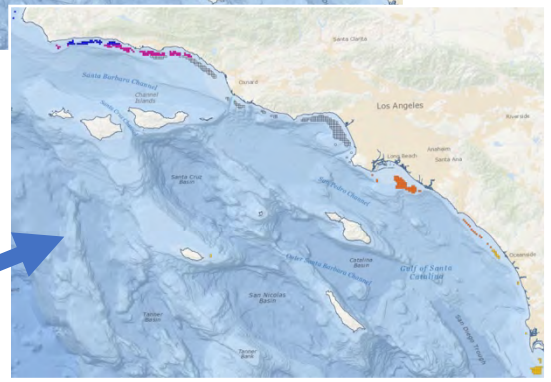
- You don’t have to weigh the tradeoffs in terms of dollars
- Each sector’s values can be accounted for in a currency that makes sense to them
- The model’s search algorithm looks for win-win solutions that maximize benefits and minimize conflicts and environmental impacts
- In a study region this size, there are millions of different alternatives and thousands of optimal plans – too many to work out in your head!

Integrated planning model to weigh tradeoffs



Management outcome

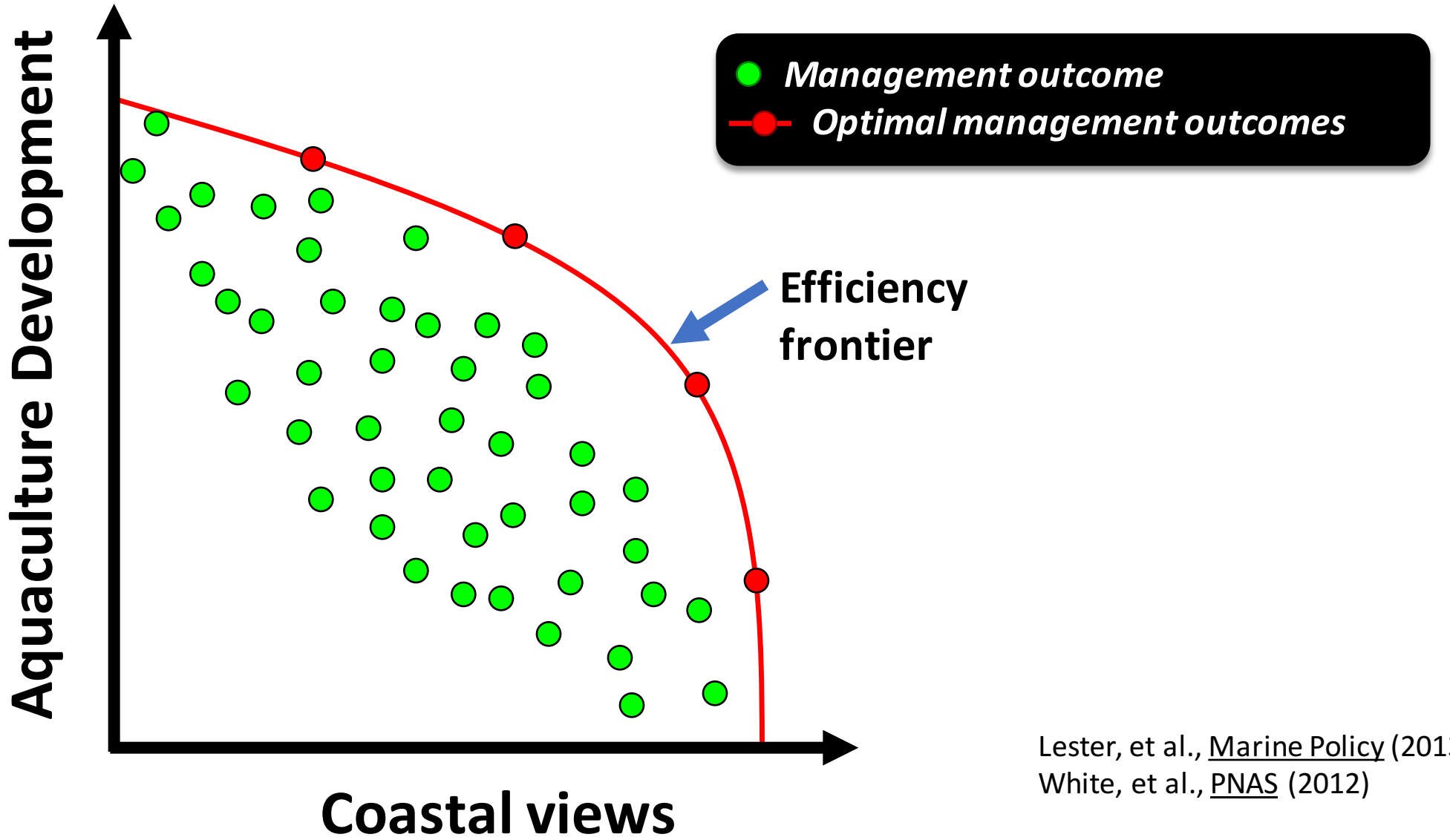
Optimal management outcomes



Each dot represents a unique ocean plan

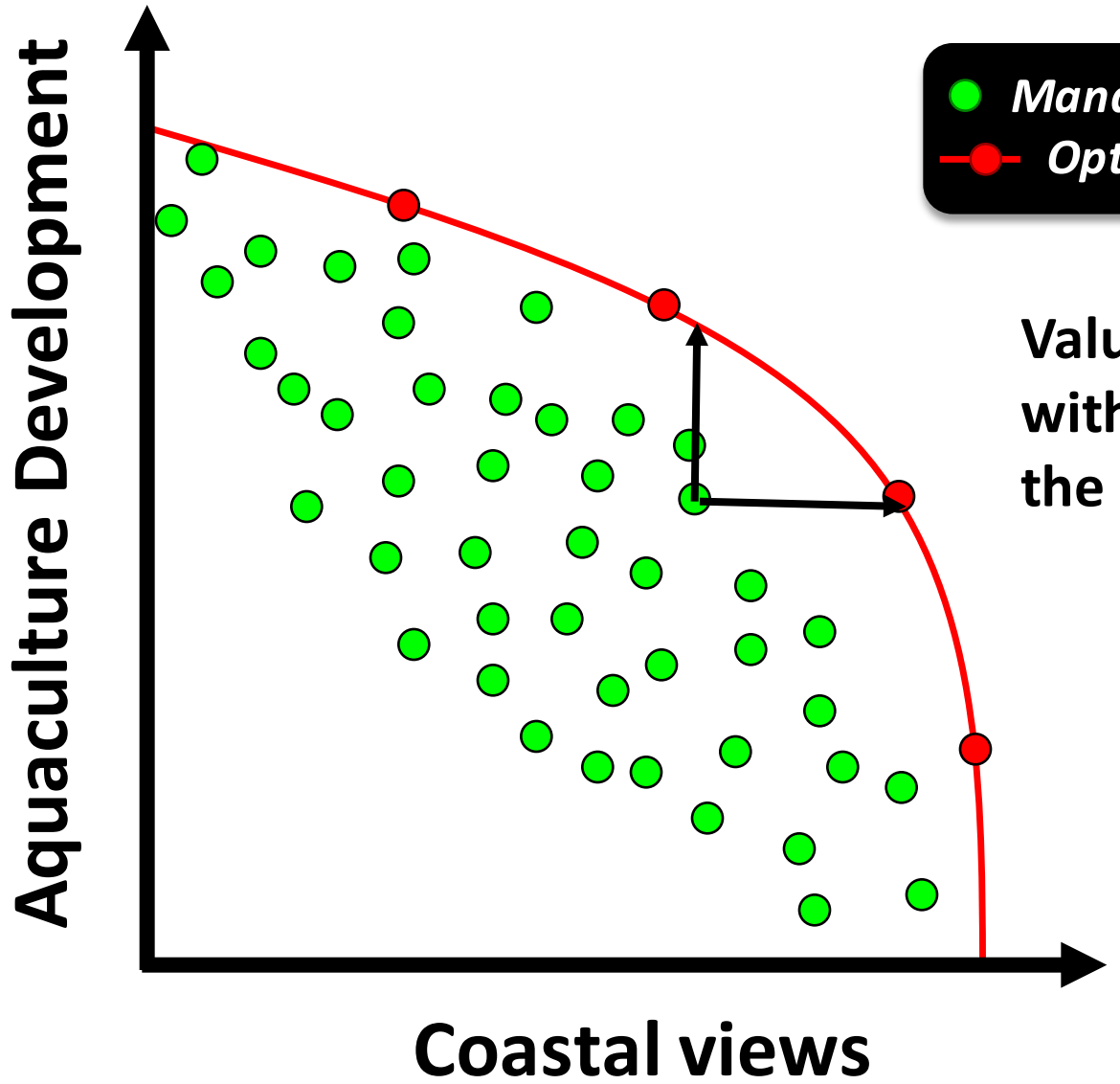
Lester, et al., Marine Policy (2013)
White, et al., PNAS (2012)

Integrated planning model to weigh tradeoffs



Lester, et al., Marine Policy (2013)
White, et al., PNAS (2012)

Integrated planning model to weigh tradeoffs

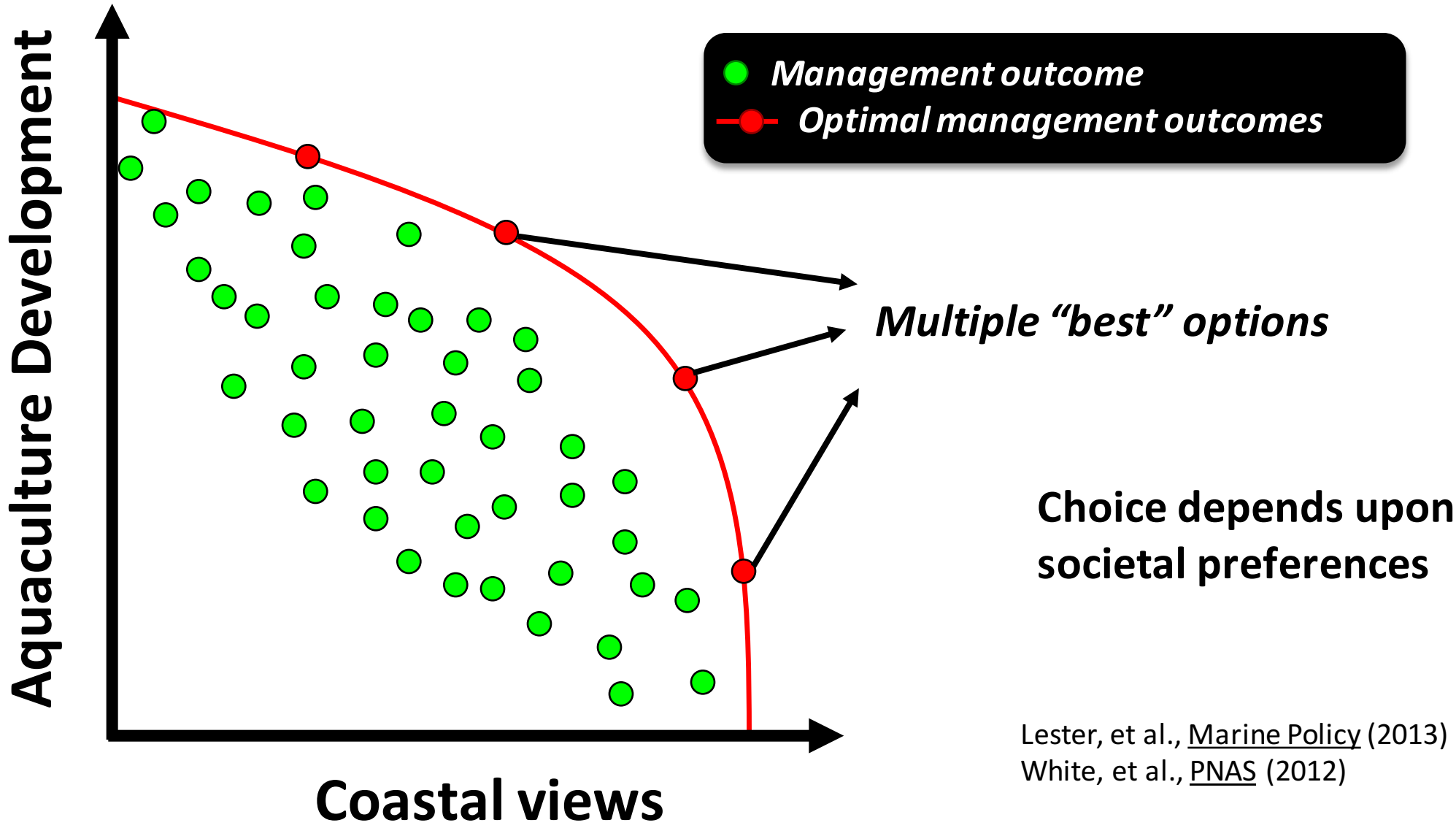


Management outcome
Optimal management outcomes

Value that could be gained with no additional cost to the other sector

Lester, et al., Marine Policy (2013)
White, et al., PNAS (2012)

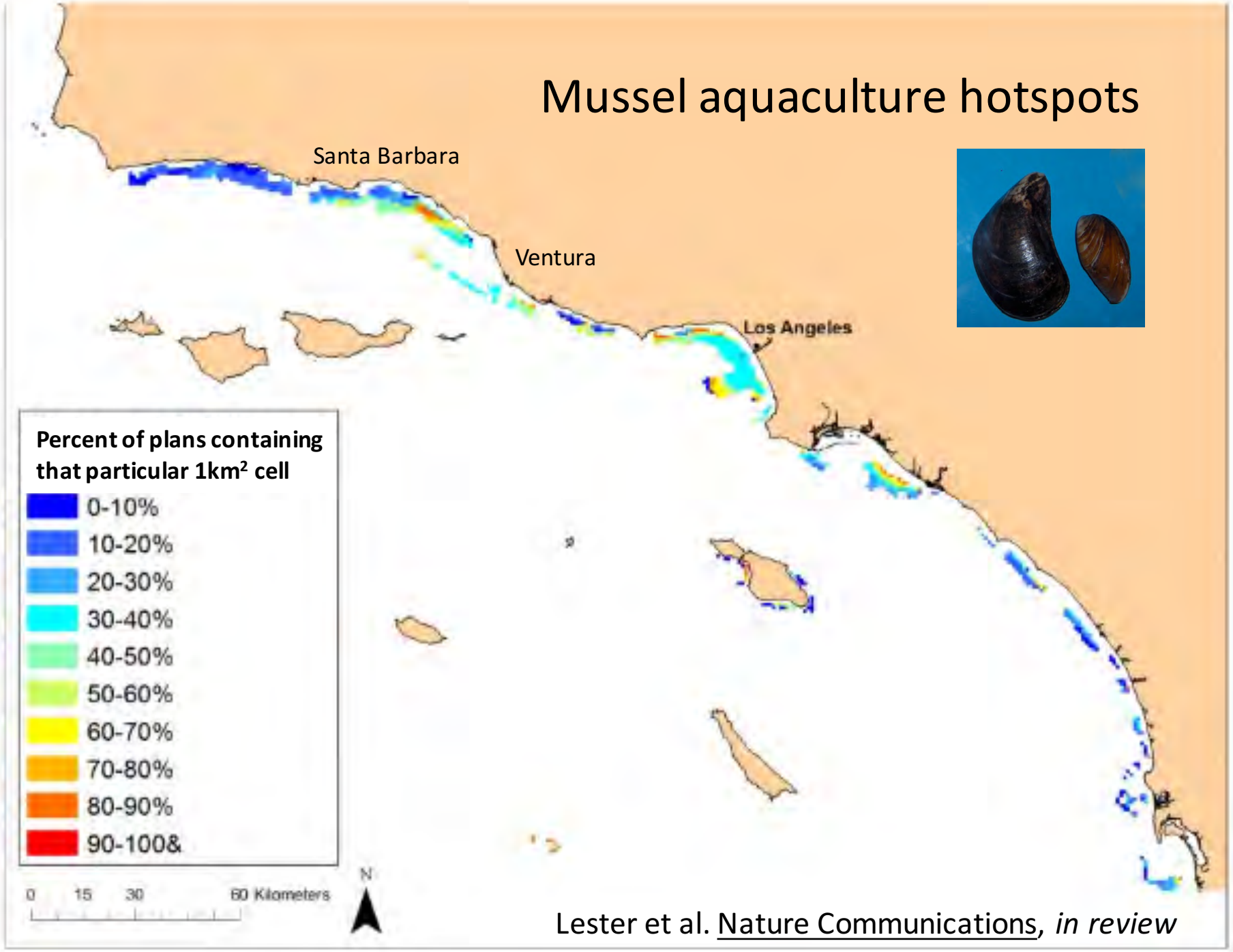
Integrated planning model to weigh tradeoffs



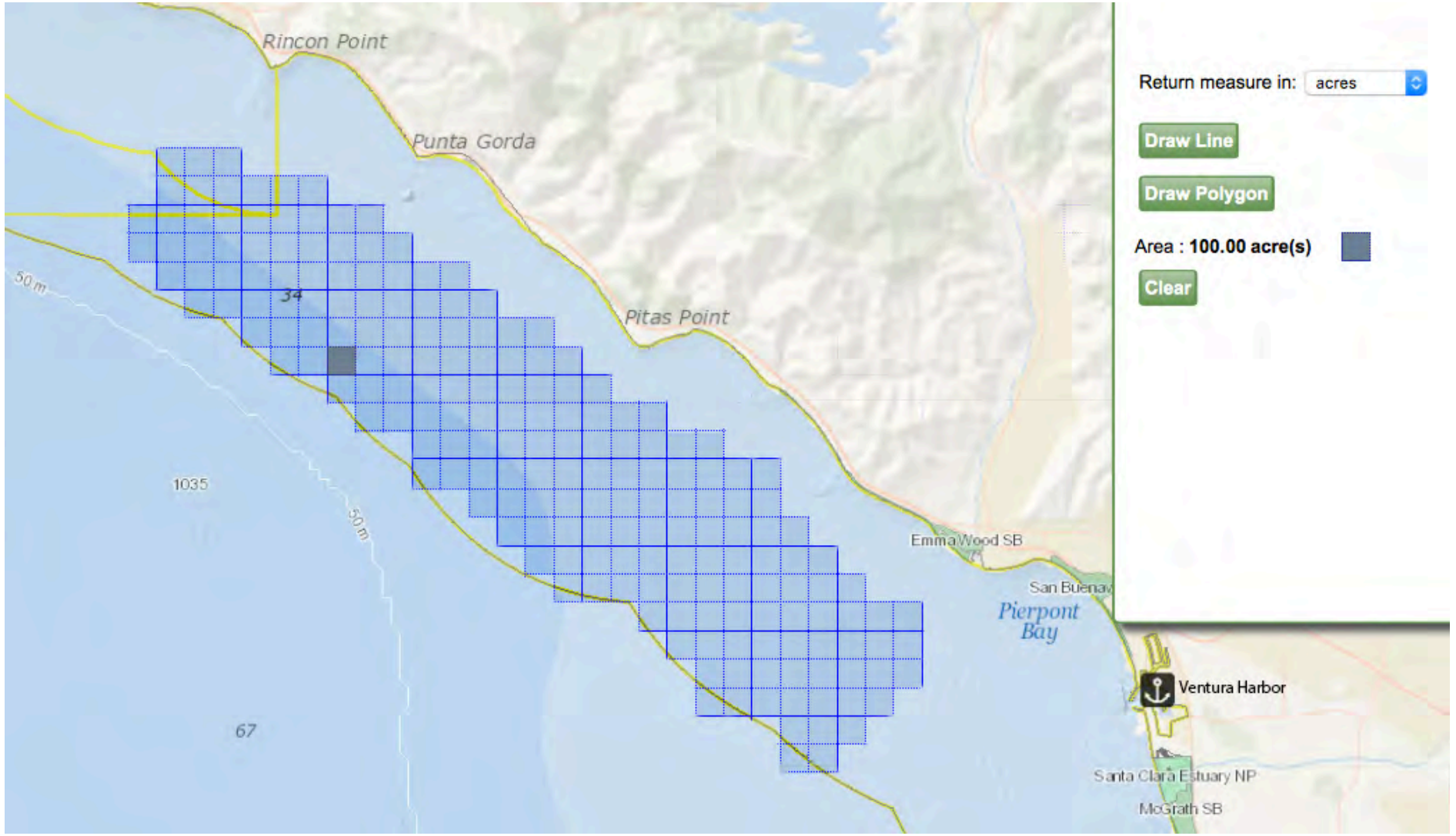
Lester, et al., Marine Policy (2013)
White, et al., PNAS (2012)

Lots of aquaculture potential, minimal impact if well sited

- >250,000 plans with high compatibility and minimal impacts (often <1%)



Applying our data and framework to Ventura

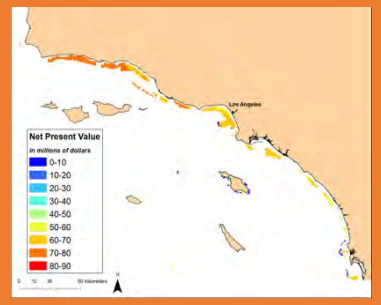


Steps in the process

Potential future step

Start with the spatial data we had already compiled:

1. Production potential
2. ~~Environmental impacts~~
3. Conflicts with other uses



Apply the planning framework:

1. Define area of interest
2. Set depth range
3. Identify fixed constraints
4. Map production potential, impacts and other sectors
5. Identify potential interactions
6. ~~Analyze options and identify win-wins~~

X

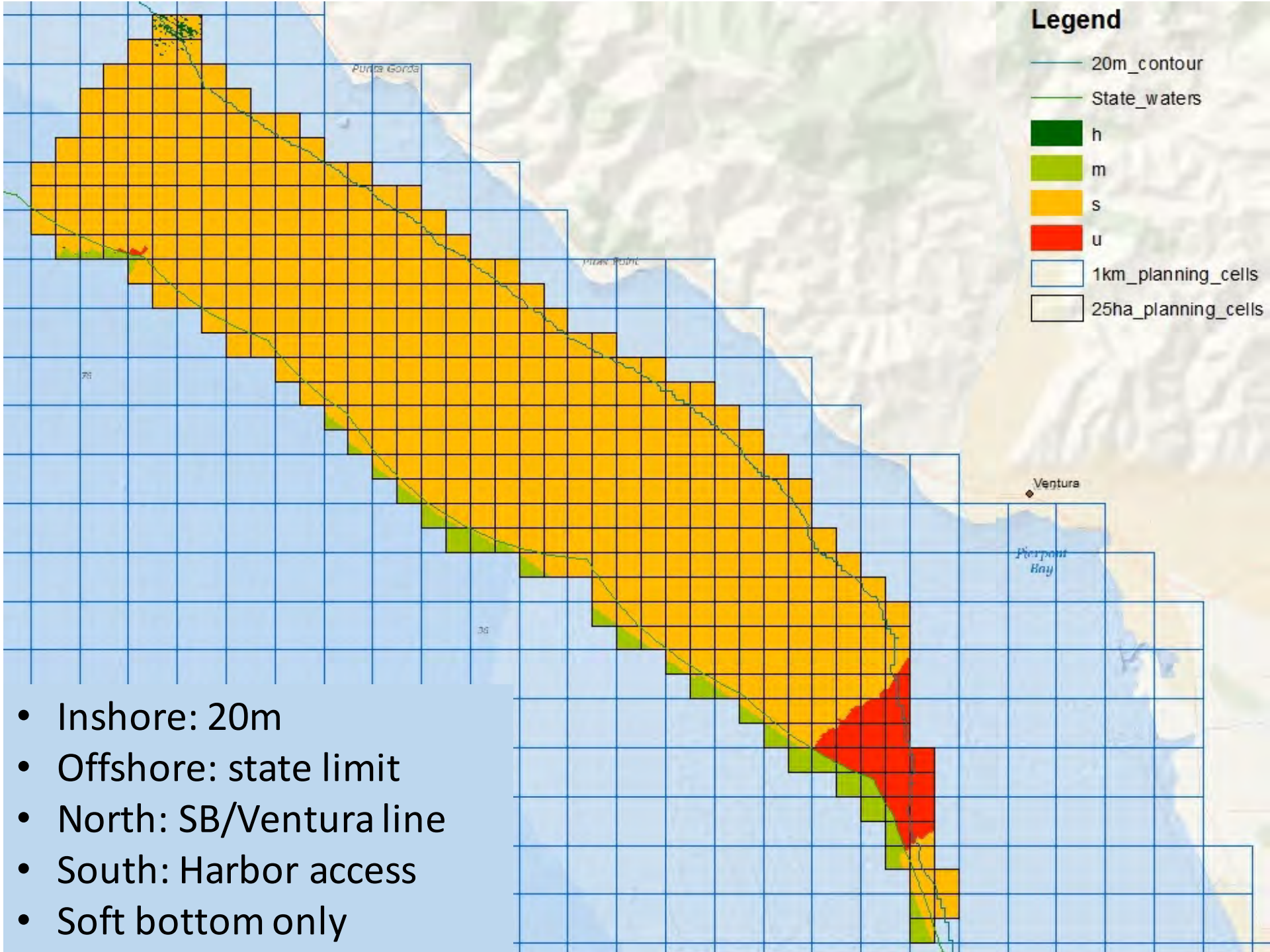
Identify the best options analytically:

Quantify and compare different development scenarios, taking other sectors and potential environmental impacts into account

Defining Area of Interest

Starting parameters from the VSE

- Inshore: 20m
- Offshore: state limit
- North: SB/Ventura line
- South: Harbor access
- Soft bottom only



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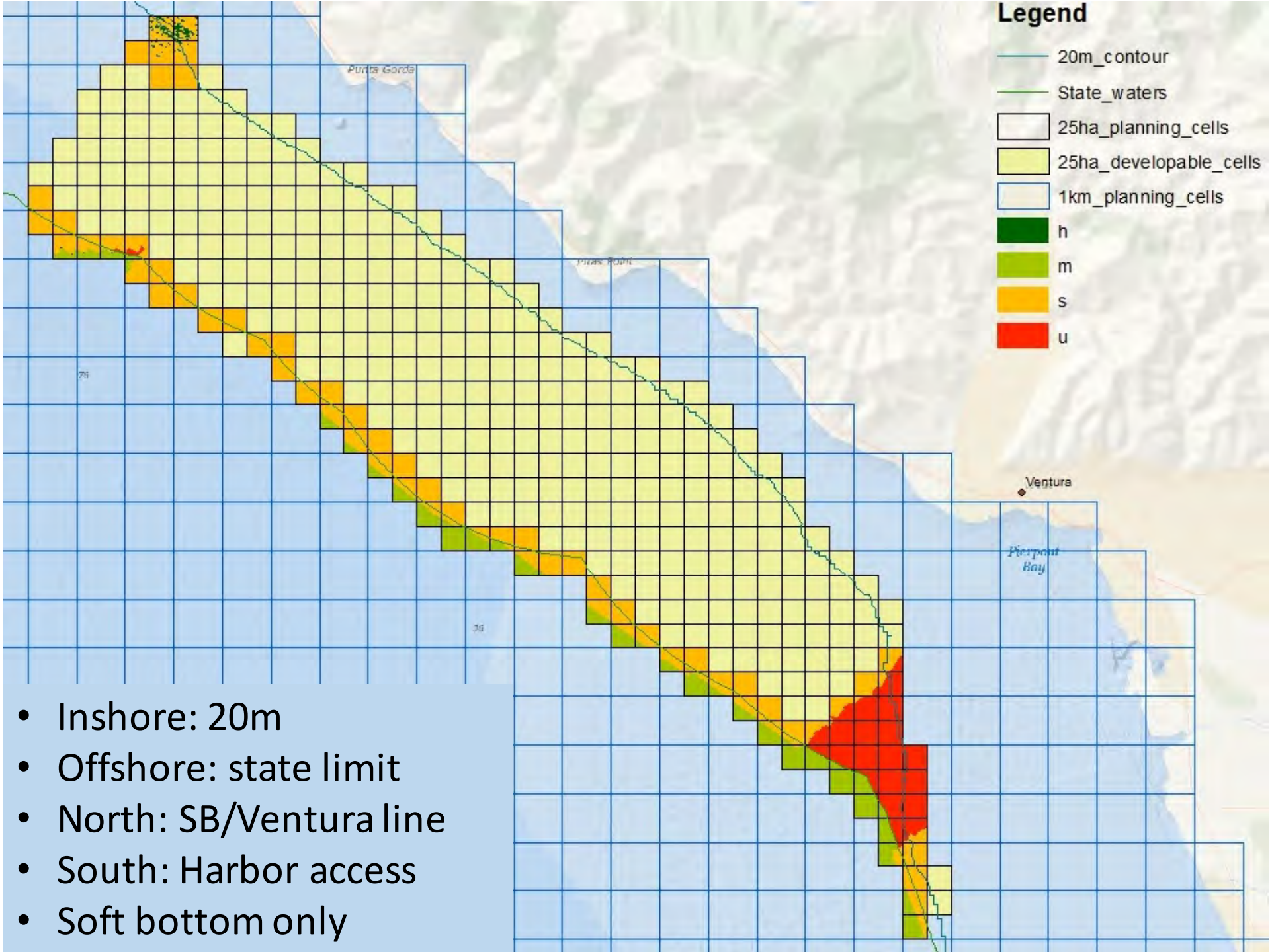
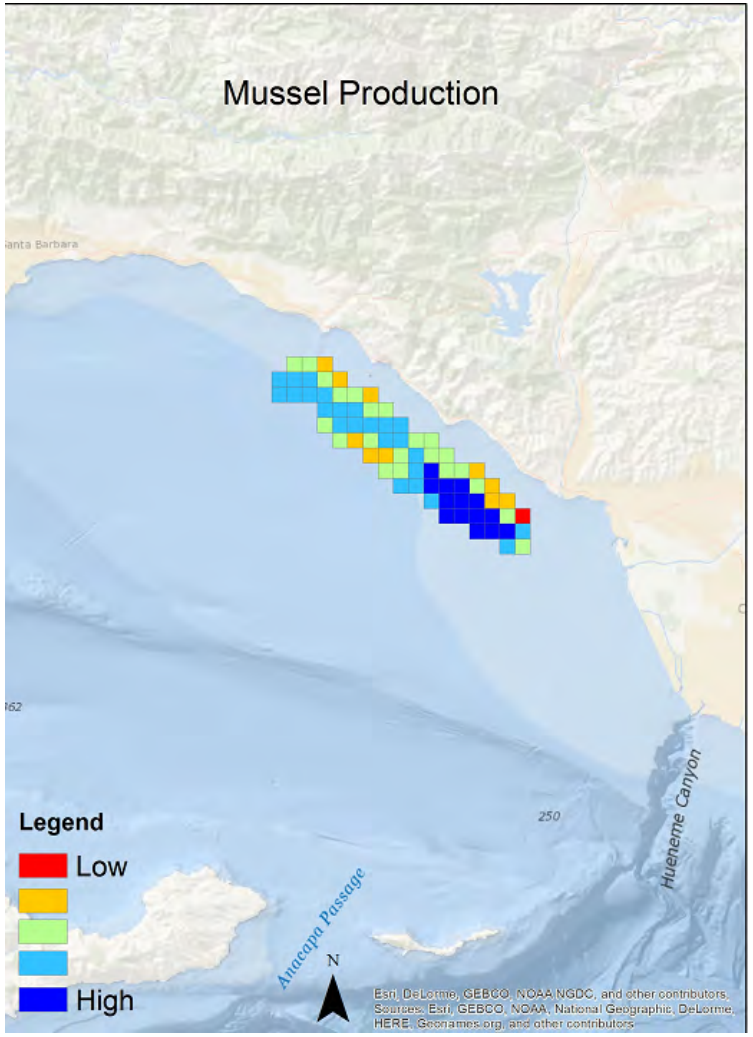
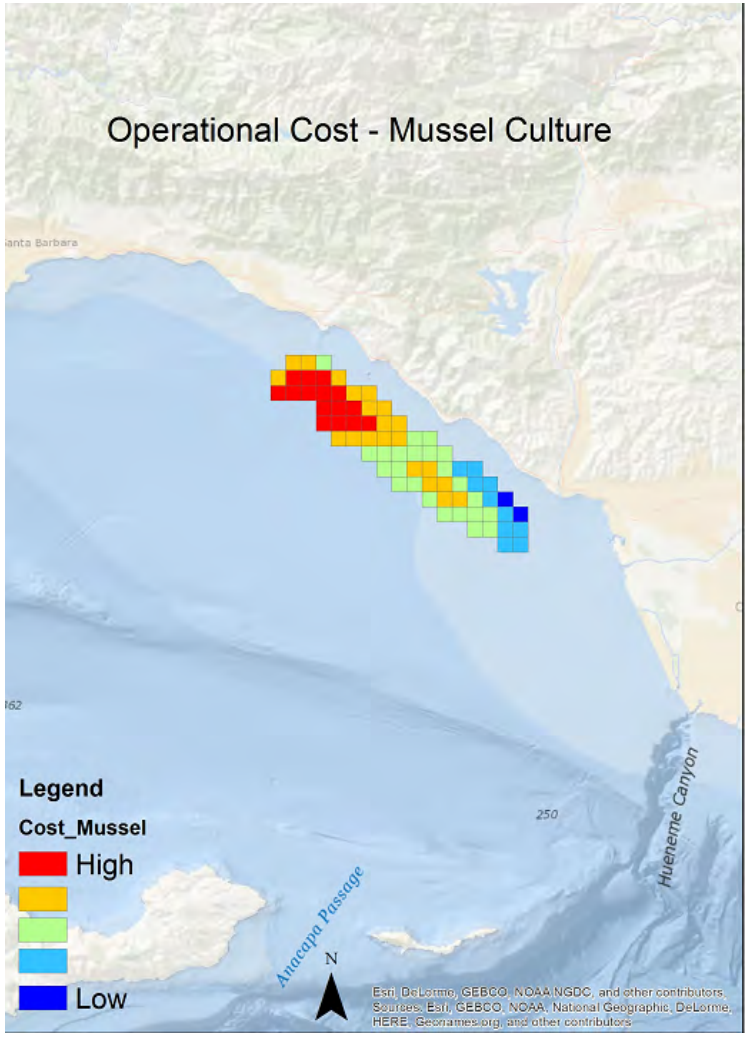
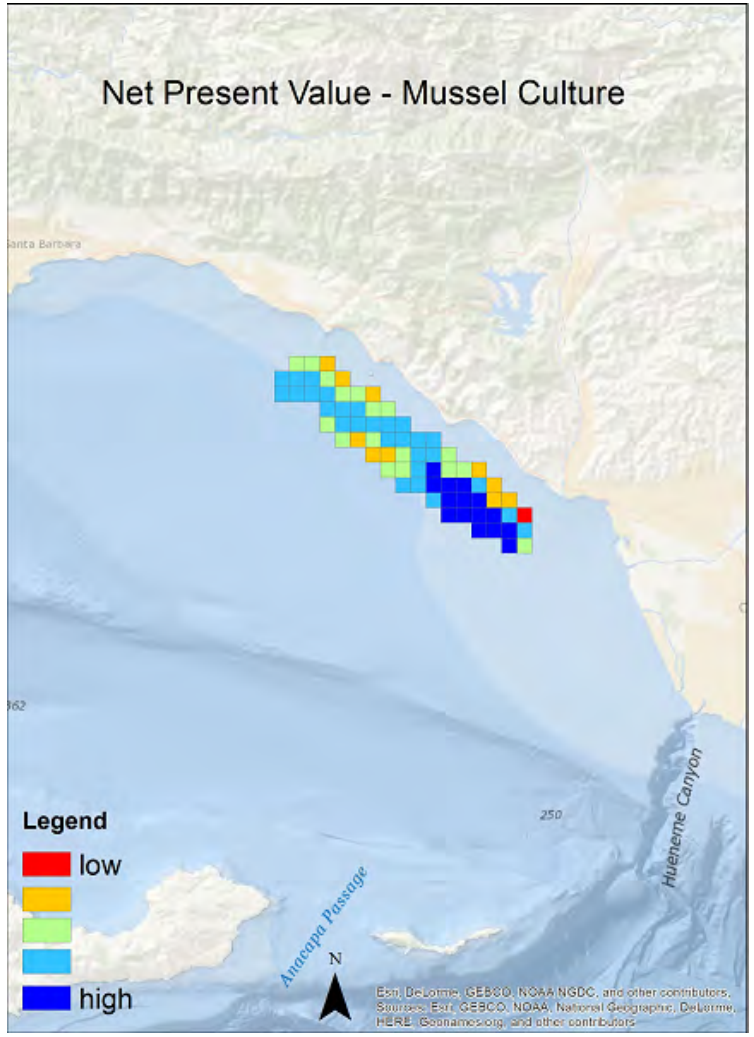


Mussel production potential is good







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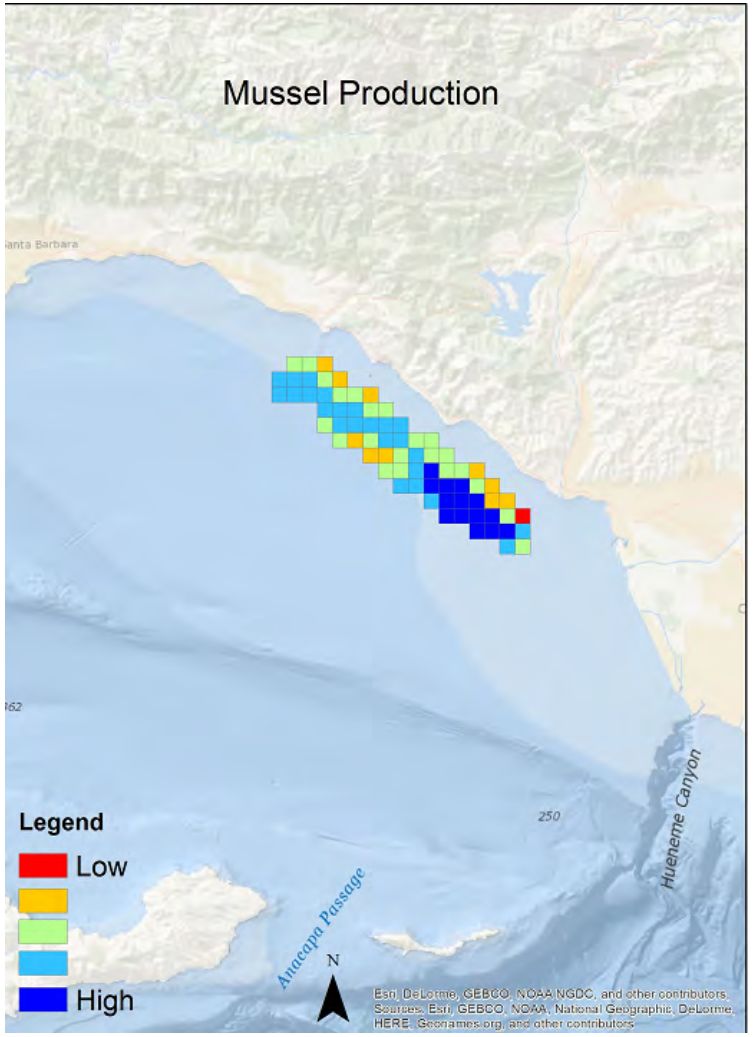
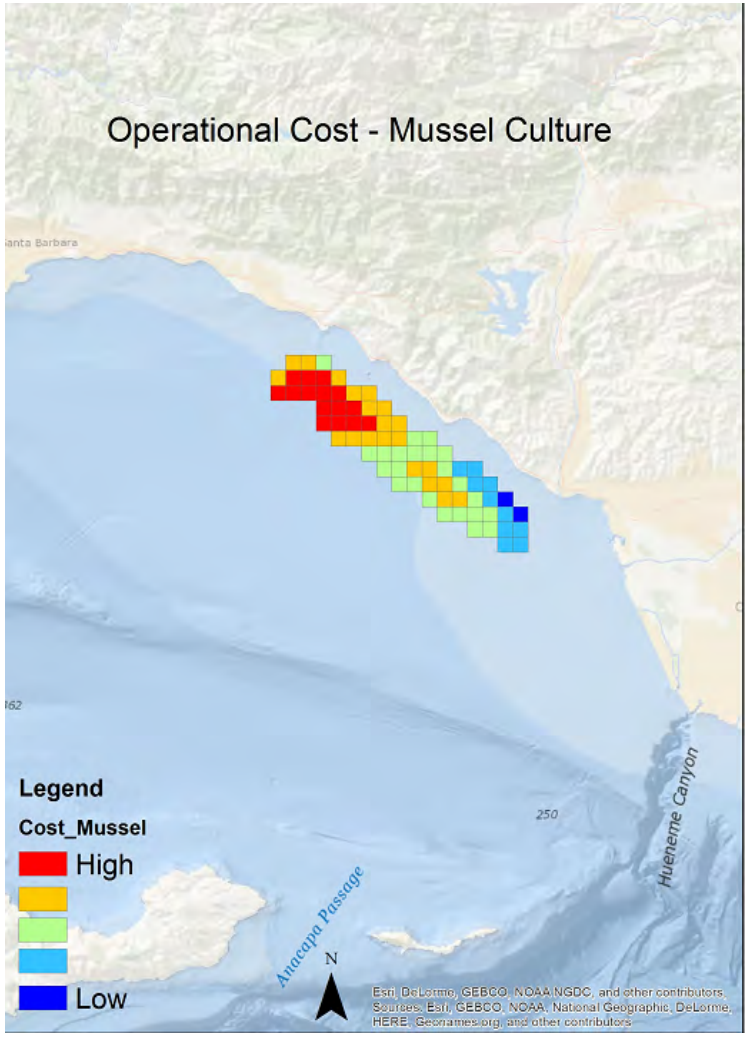
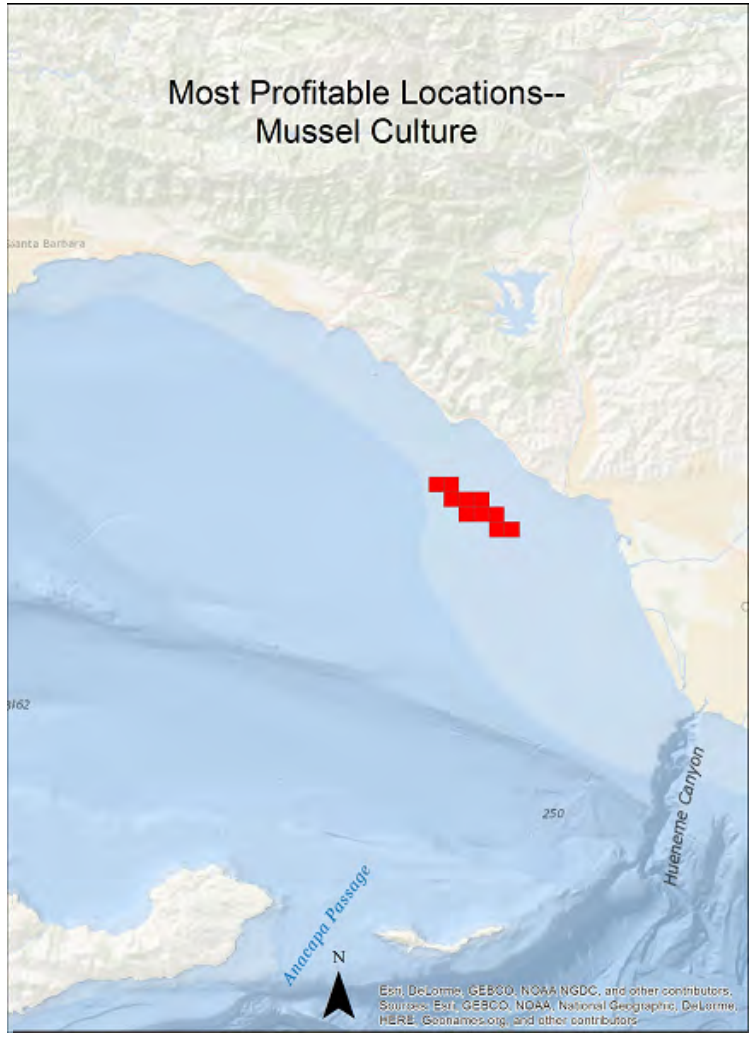
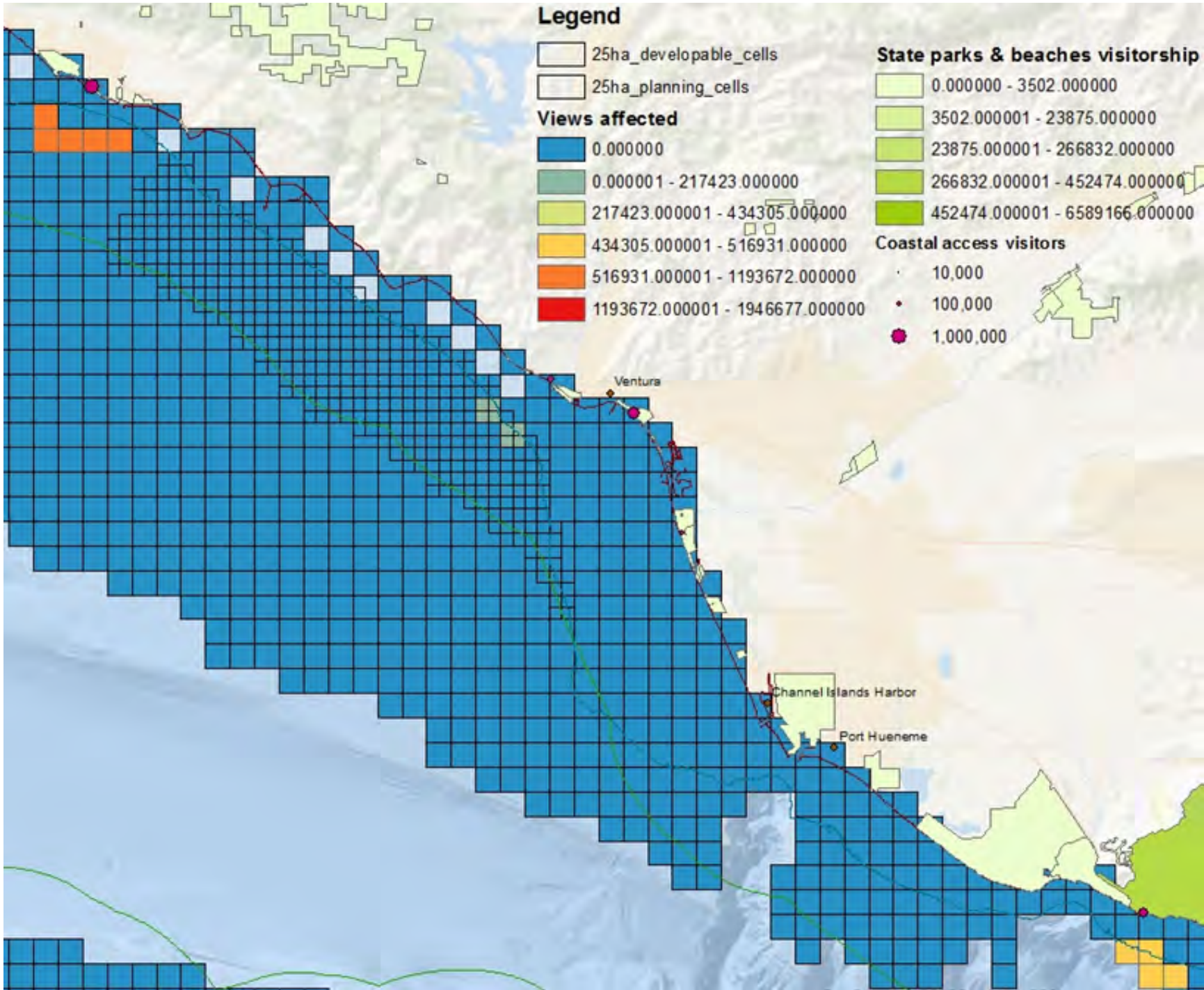




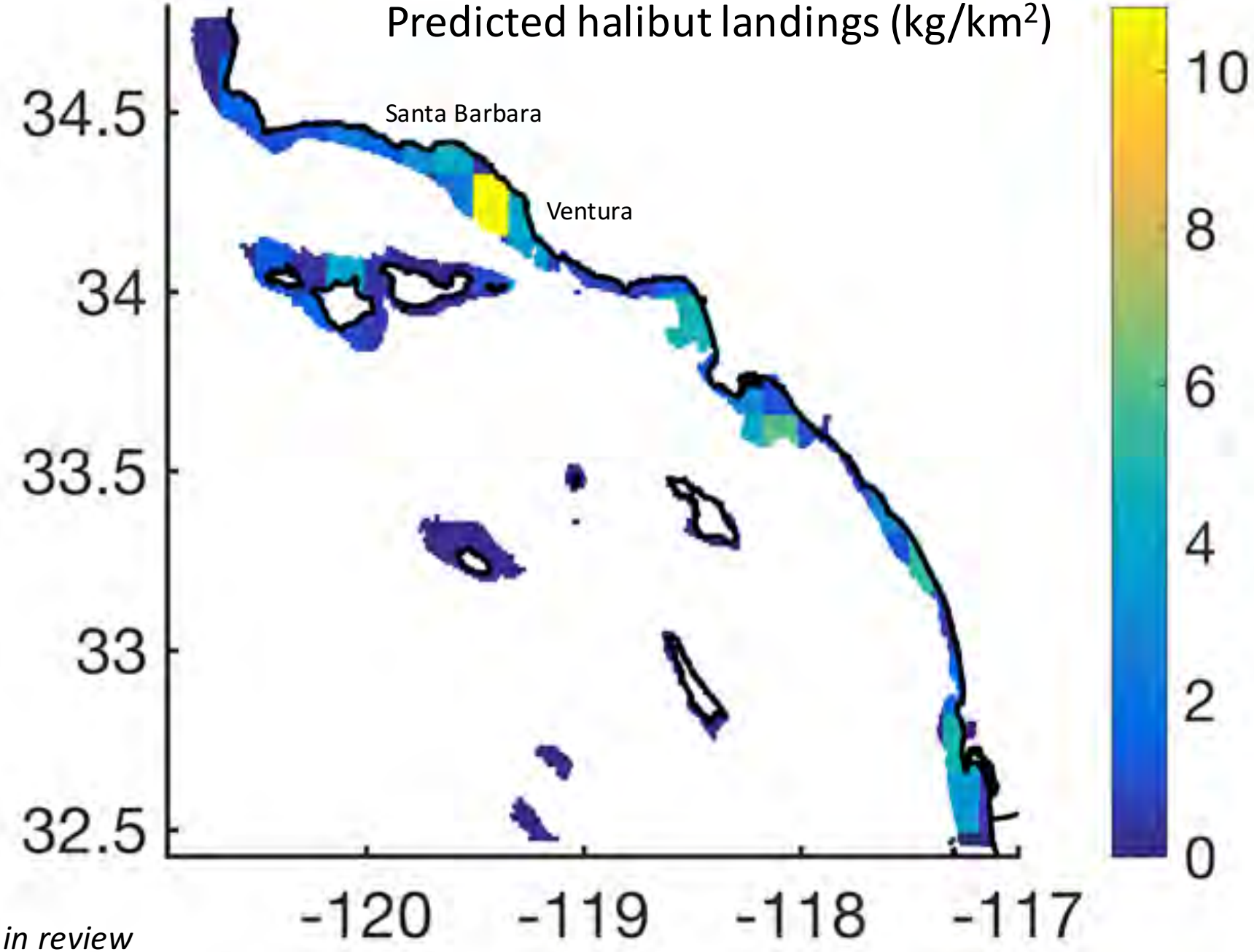


Impacts on coastal views are likely to be limited



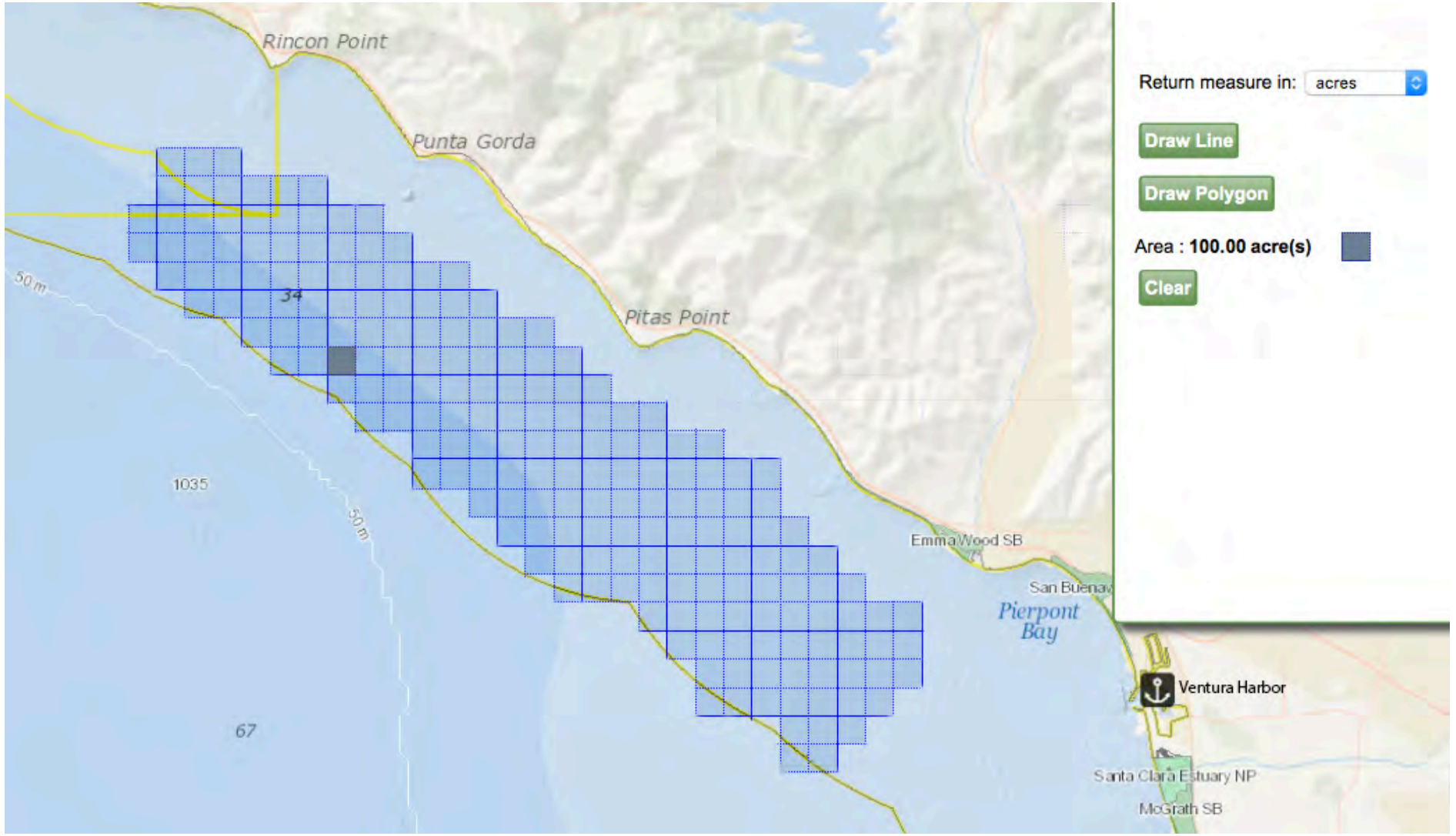
Potential fisheries conflict

Stakeholder engagement and participatory planning needed to better understand and minimize potential impacts



Lester et al. Nature Communications, *in review*

Applying our data and framework to Ventura



Conclusions

- Many options exist in the Bight that could generate significant aquaculture value with minimal or no impacts to existing sectors or the environment
- Our planning framework and data can help inform the Ventura Shellfish Enterprise and other aquaculture planning processes in Southern California
- Now is the time for stakeholder input – What else needs to be considered? How should our data be refined?
- Tradeoff models could support the site selection process

Photo by Ken Lund

Thank you!

kappel@nceas.ucsb.edu

CO-AUTHORS Sarah Lester, Rebecca Gentry, Crow White, Joel Stevens, Tom Bell, Steve Gaines, Chris Costello, Libe Washburn, Rachel Simons, Casey Maue, Dale Kiefer, Jack Rensel

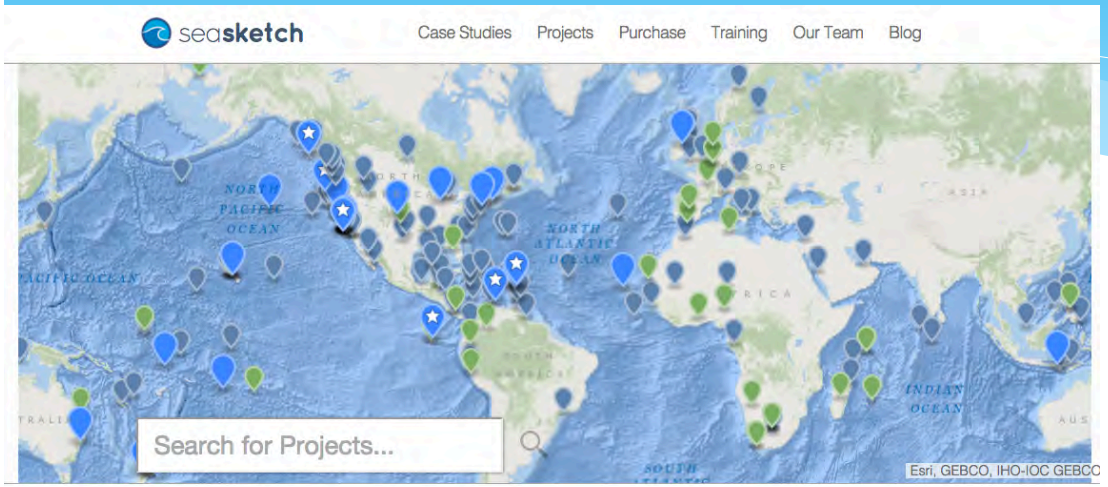
NCEAS

UCSB

Sea Grant

VENTURA SHELLFISH ENTERPRISE

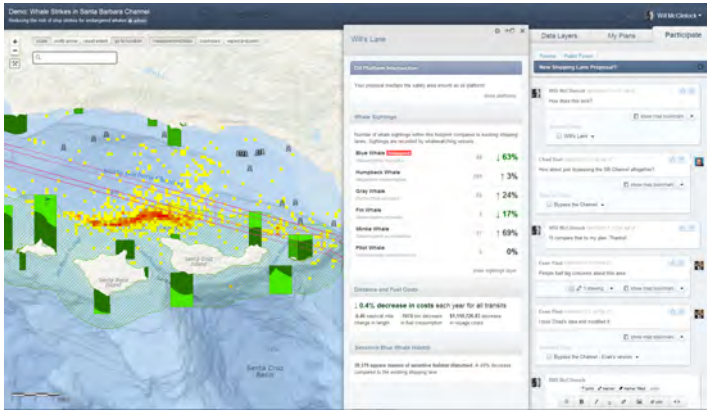
seasketch



Show 10 entries

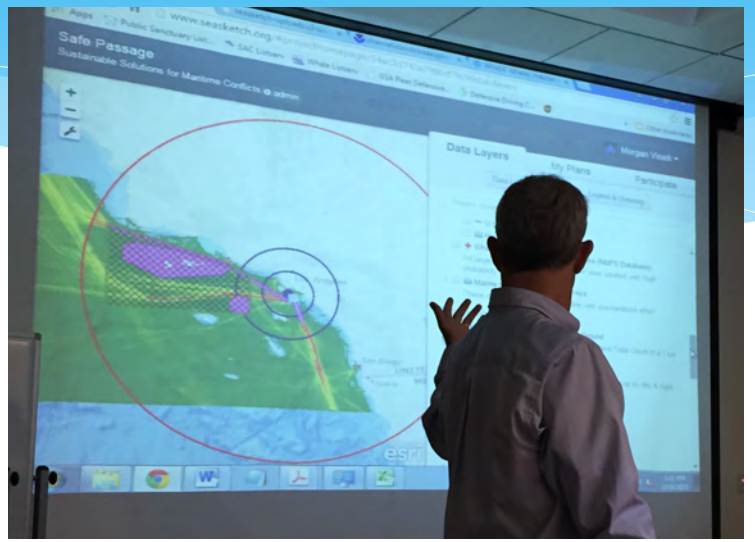
- **Blue Halo Barbuda** — featured
  Comprehensive Ocean Zoning and Sustainable Fishing
- **Oregon Ocean Uses Atlas** — featured
  A Joint BOEM/NOAA Initiative
- **MaPP Marine Planning Portal** — featured
  Marine Planning Partnership for the North Pacific Coast
- **Reserva Marina de Galápagos.** — featured
  Áreas Protegidas de Galápagos.
- **Safe Passage** — featured
  Sustainable Solutions for Maritime Conflicts
- **Sea Change - Tai Timu Tai Pari** — featured
  Hauraki Gulf Marine Spatial Plan
- **South-East Marine Protection Forum** — featured

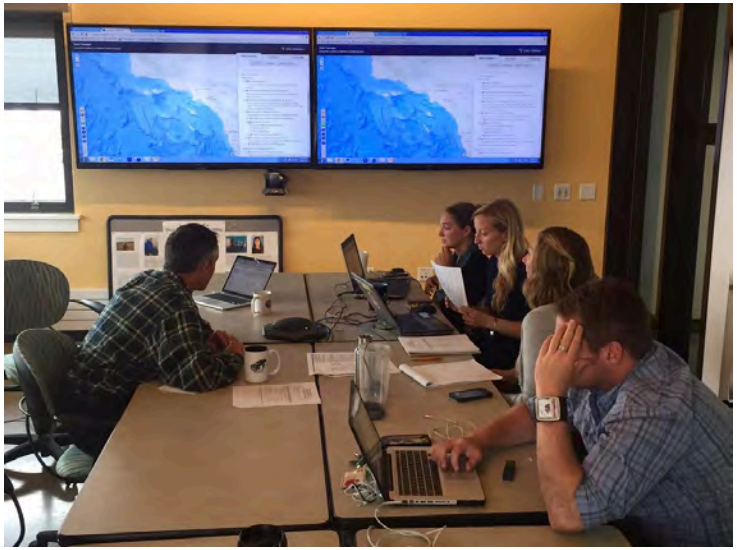
Visit seasketch.org
to see a full list of projects.



Above: User interface.
safepassage.seasketch.org

Marine Shipping Working Group

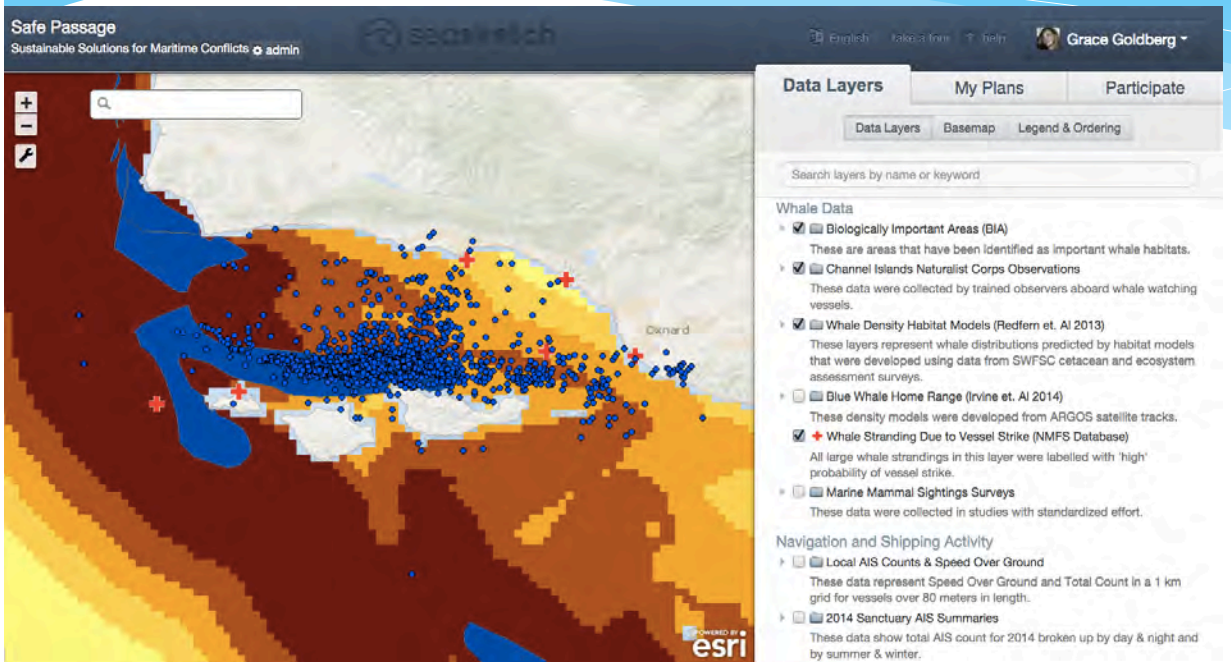


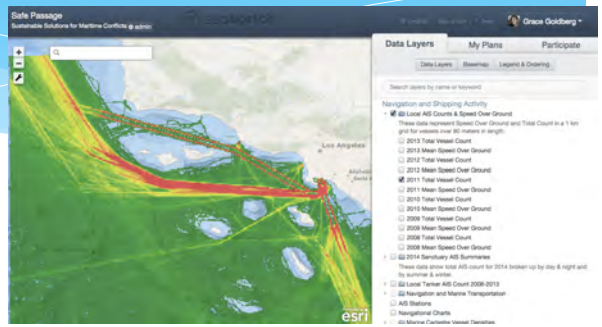


* **Collaborative planning** meetings with stakeholder representatives.
* **Remote engagement** on SeaSketch and webinar meetings.

The Layer Tree

What data and information will support decision-making?

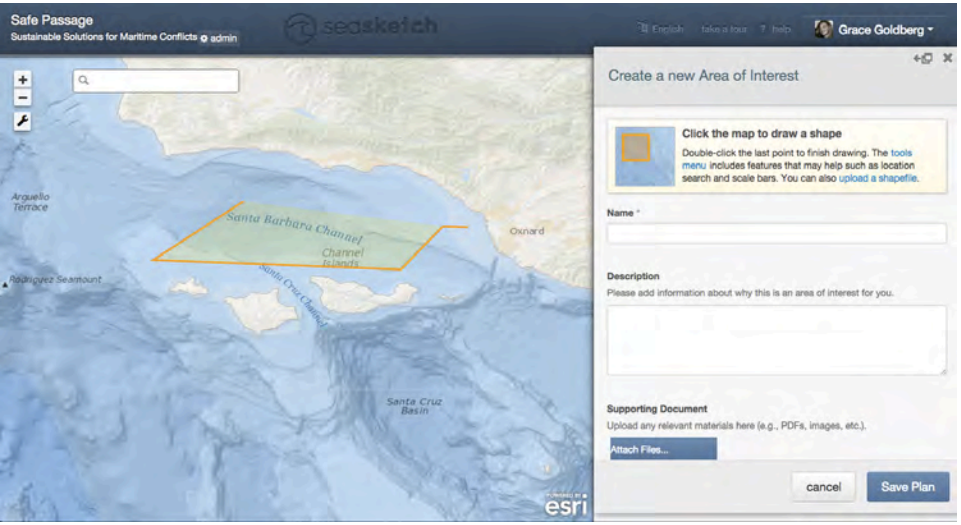




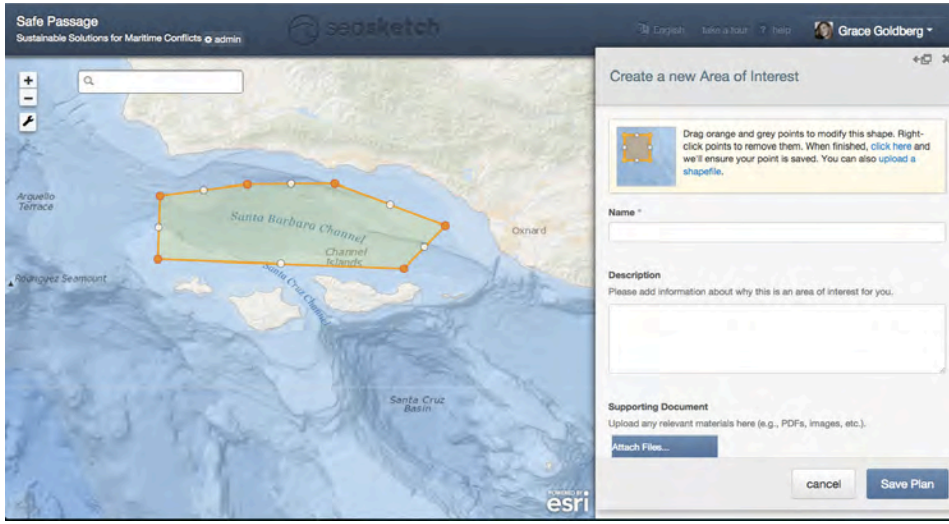
* MarineCadastre.gov & CDFW public Map Services
* Sanctuary & NMFS available GIS layers
* External data requested by stakeholders

Sketch Site Ideas

Create an account, log in, and click on the map to start creating your own site selection plan. You may place multiple site zones in a folder representing the full plan.



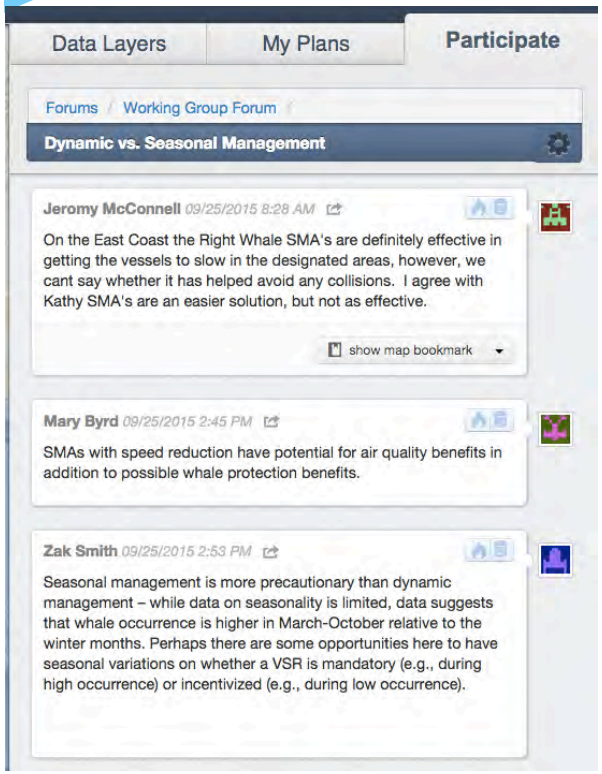
Create a sketch.



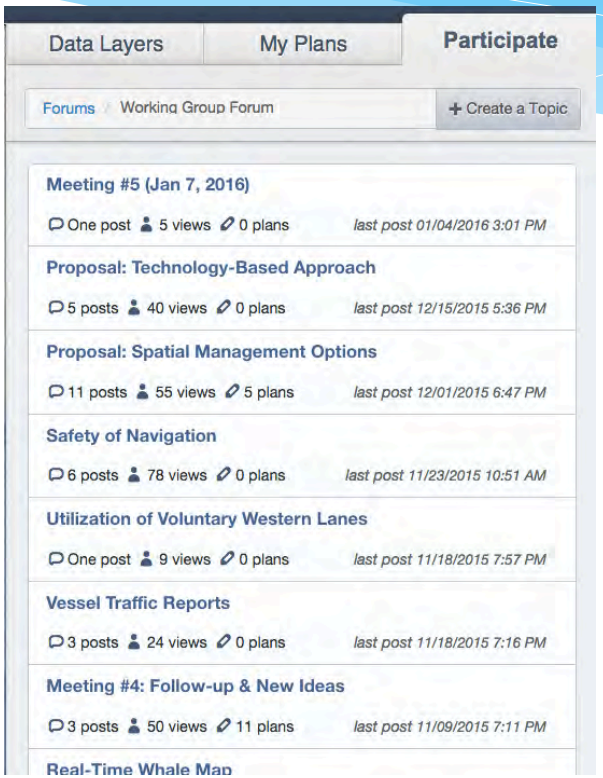
Edit a sketch.

Discussion Forums & Surveys

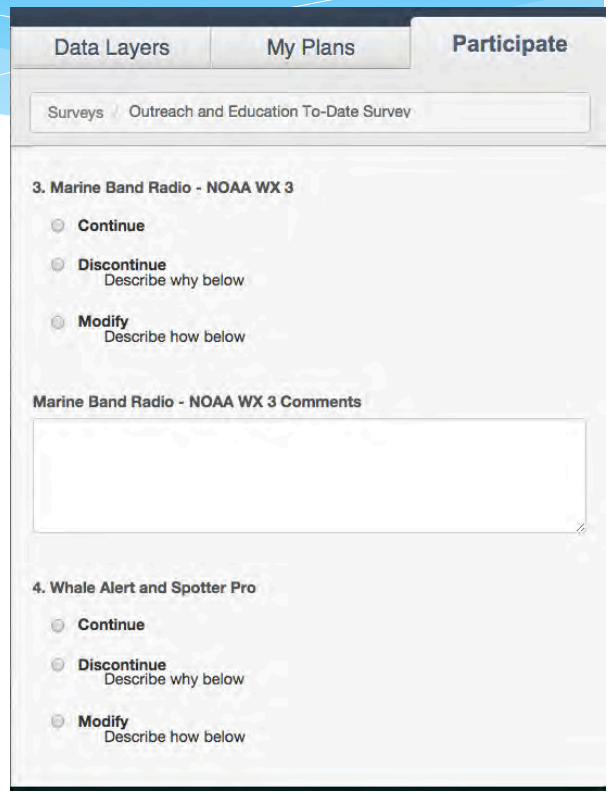
Facilitating remote collaboration.



DMA vs. SMA Topic
Sept. 2015



Working Group Forum
as of Feb. 2016



Edu/Outreach Survey

Read more about the survey tool in Marine Policy: Jarvis, et. Al 2015

Grace Goldberg

SeaSketch Director of Operations
University of California Santa Barbara
grace.goldberg@ucsb.edu
lab: 805-893-8782

Thank you!

Twitter: @SeaSktch

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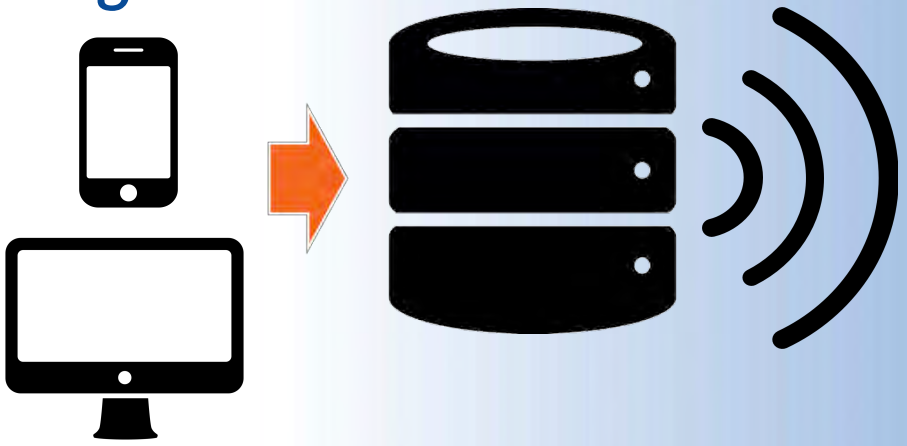
Enter the VSE Database

Register

VSE Database



Survey system

Announcements

Resources

Invitations to special interest workshops