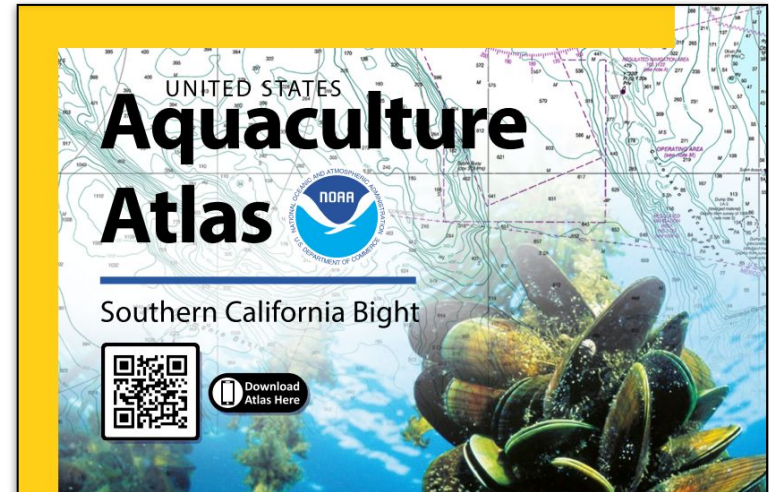


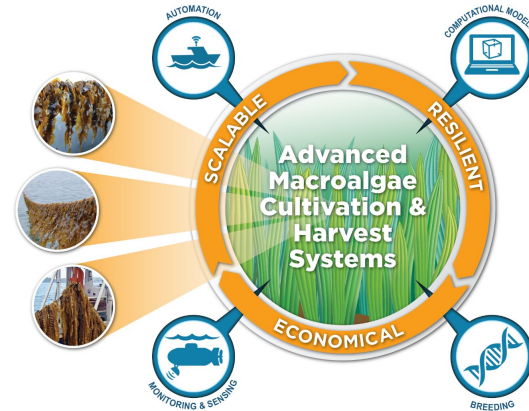
NOAA Aquaculture Opportunity Atlas Results for Federal Waters of the Southern California Bight

Kenneth Riley

Marine Spatial Ecology Division
National Centers for Coastal Ocean Science
National Ocean Service



Support provided by.....



Macroalgae Biomass:
No Land
No Freshwater
No Fertilizer

MARINER creates new biomass production opportunities for the vast ocean resources of the United States.

Photos copyright: (top to bottom) Dana Rubino/National Geographic, The Island Institute, Ben Smith/Photography Post



CASS Leadership



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Marine Ecologist



Dr. James Morris
Marine Ecologist



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Program Analyst

AquaEnviro Team



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Aquaculture Biologist



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Engineer/Modeler



Gary Fisher
Biological Tech

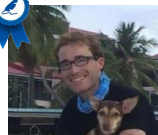


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Enviro Policy



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AquaSpatial Team



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Geospatial



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Geospatial



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TEAM

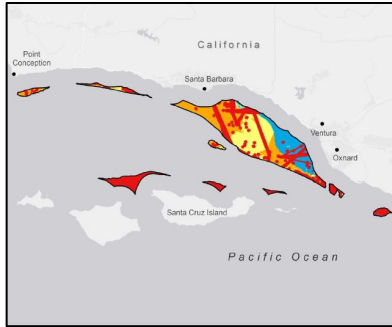
T TOGETHER
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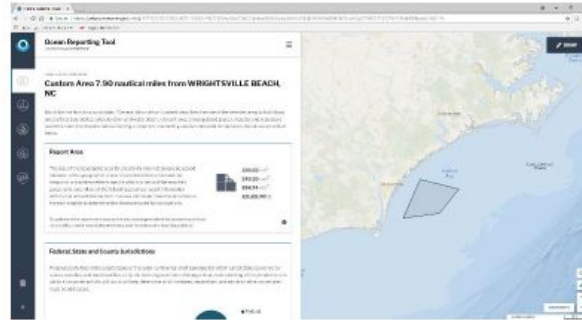
Authors

NOAA Has Built Significant National Spatial Planning Infrastructure!

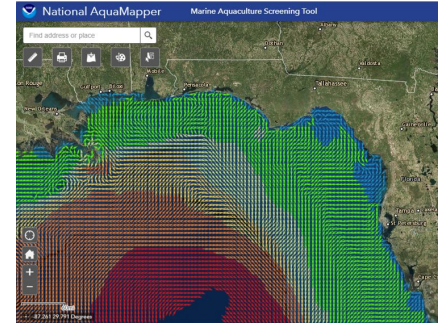
Spatial Modeling



OceanReports A BOEM/NOAA PARTNERSHIP



National AquaMapper

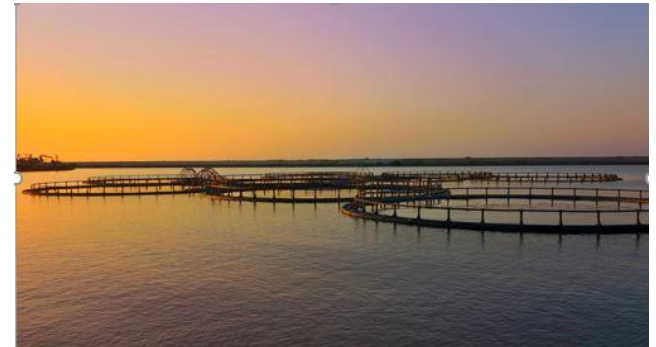
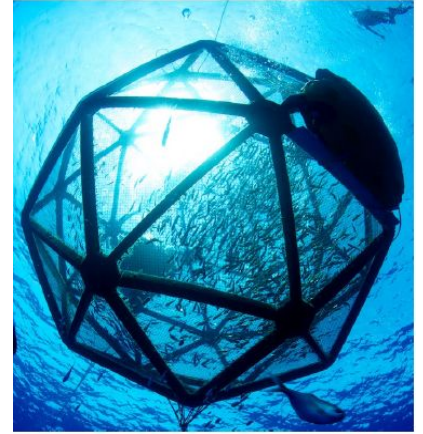


All Ocean Pioneers Will Benefit



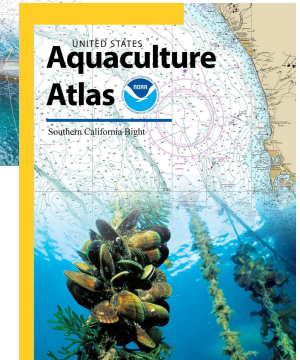
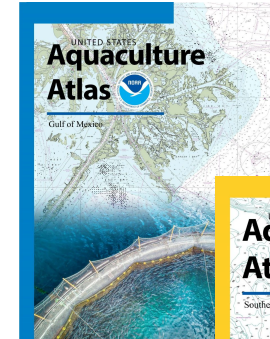
Atlases at a Glance

- Most comprehensive regional MSP ever conducted for US federal waters
- More than 200 data layers utilized in each atlas
- Over 150 maps in each atlas that describe the ocean in new and unique ways
- Comprehensive stakeholder engagement
- Built new relationships and trust for NOAA science
- Created a framework for future AOAs and other ocean pioneering industries



Center for Independent Experts

- Reviewers were highly skilled in marine spatial science
- Reviews were very comprehensive (>300 comments)
- No major flaws were identified
- Reviewers praised the work as “robust” and “state-of-the-art”



“The methodological workflow is robust, and the application of geospatial instruments is well advanced...” -Depellegrin

“...the amount of data layers is impressive, and it suggests that the authors carried out an excellent and thorough search.” - Filgueira

“...the work described in both reports is of high scientific and technical quality and fulfils the goals that were set out.” -Galparsoro

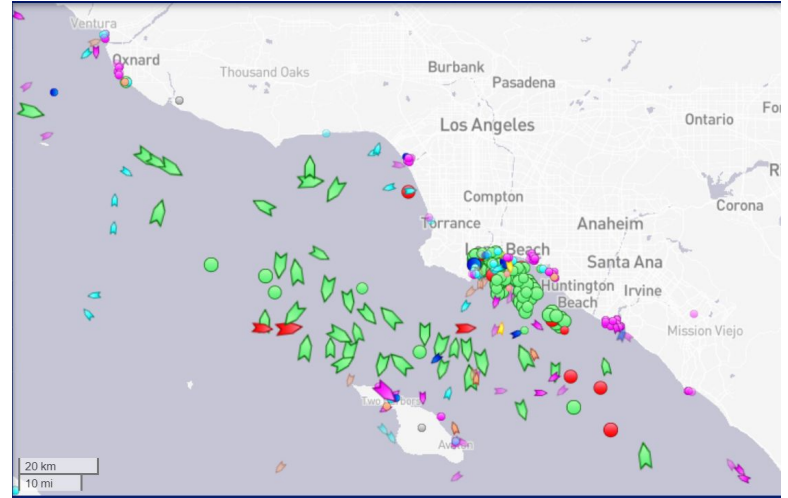
Recommendations

- Add some detail to methods
- Further discuss assumptions and limitations
- Incorporate uncertainty analyses
- Address metadata structure and compliances
- Clarify this work as MSP in the sense of spatial analytics. It is not allocating space for aquaculture or ocean uses as is often observed with other countries.

Atlas Story - Ship Parking Lots

A record number of cargo ships are stuck outside LA. What's happening?

Port complex of Los Angeles and Long Beach, already the busiest in the US, has seen major traffic this week as imports boom



What we learned....

- Overflow parking lots for ships may not be charted!
- Covid related supply chain backup issues
- Worked with NOAA Office of Coast Survey to chart
- Incorporated buffer areas in AOA analyses

Atlas Story - Fishing Data

- Deep collaboration with NMFS Sustainable Fisheries, Highly Migratory Species, Fishery Management Councils, State Agencies, Industry
- Assessed relative suitability based on fishing effort
- California model included 23 fisheries; 3 aquaculture operations
- Gulf of Mexico model included 6 fisheries; 1 aquaculture operation



...we found that the analytical approach to spatial planning applied by the National Ocean Service (NOS) in that AOA initiative to be the most useful tool for supporting this critical decision-making. - SSA



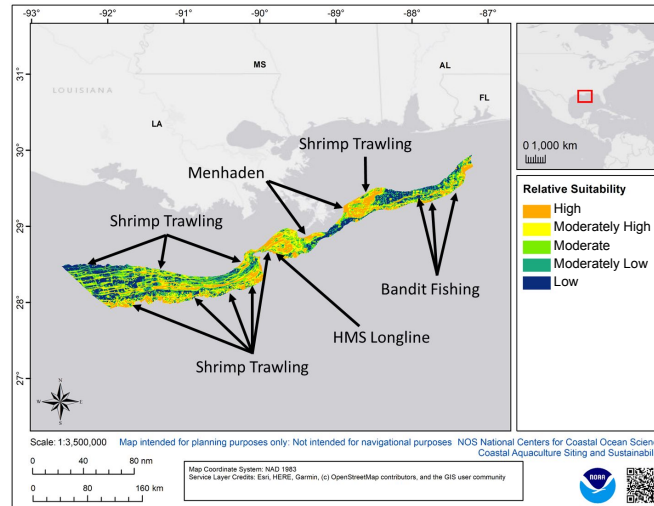
Southern Shrimp Alliance
P.O. Box 1577 Tarpon Springs, FL 34688
955 E. MLK Dr. Suite D Tarpon Springs, FL 34689
727-934-5090 Fax 727-934-5362

September 28, 2021

The Honorable Richard W. Spinrad
Administrator
National Oceanic and Atmospheric Administration
1401 Constitution Avenue, NW
Washington, D.C. 20230

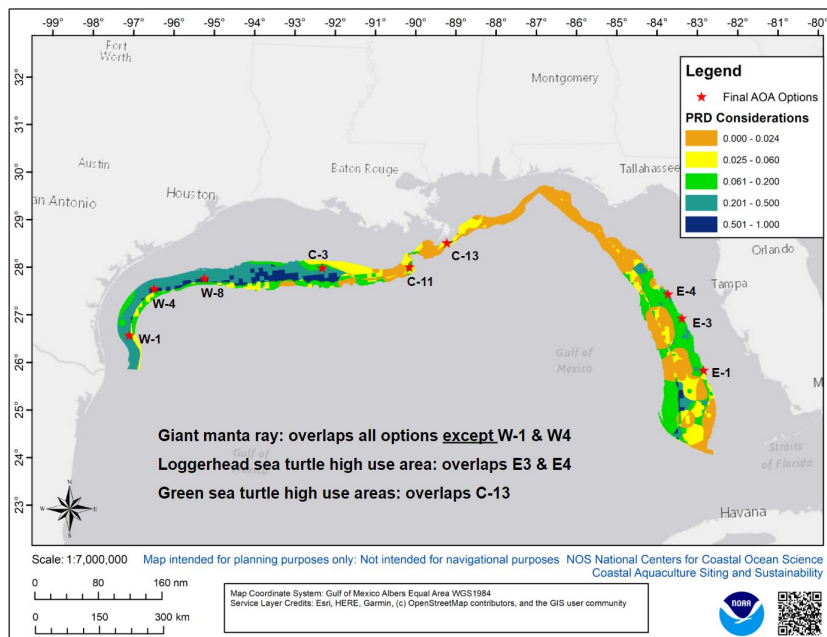
Dear Administrator Spinrad,

The Southern Shrimp Alliance (SSA) would like to draw your attention to what we believe is the critical role the National Oceanic and Atmospheric Administration (NOAA) must play in the development of offshore wind energy in the Gulf of Mexico (GOM) as part of the Biden Administration's commitment to advancing clean, renewable energy in the United States.



Atlas Story - Protected Resources

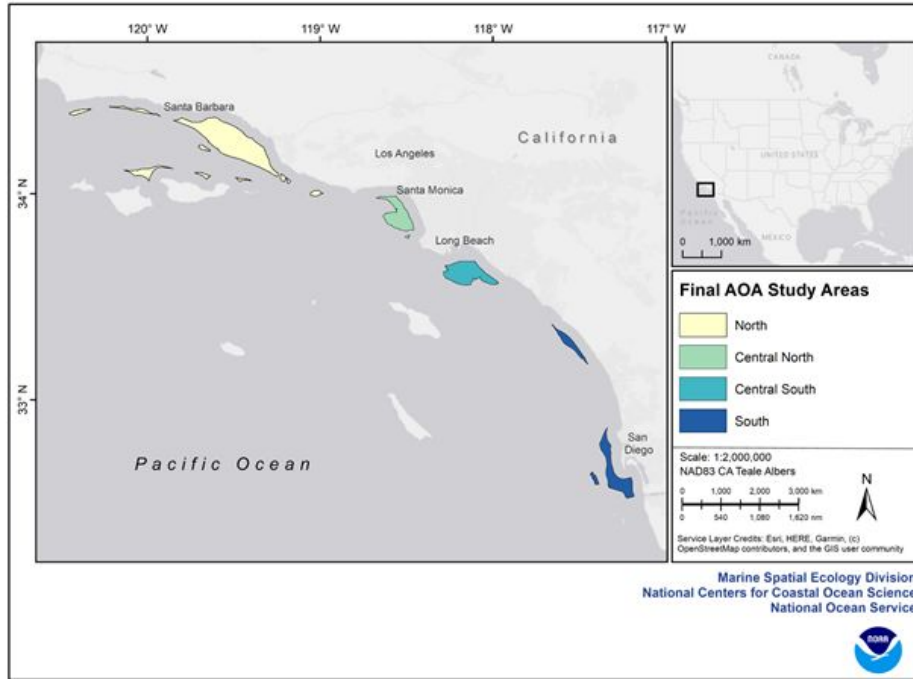
- Developed novel scoring approach based on status and trends
- Partnership with NMFS Protected Resources
- California model included 3 large whale species
- Gulf of Mexico included 8 species (whales, turtles, fish)



Status	Trend	Score	Converted scores for model
Endangered	declining, small population ² or both	9	0.10
Endangered	stable or unknown	8	0.20
Endangered	increasing	7	0.30
Threatened	Declining or unknown	6	0.40
Threatened	stable or increasing	5	0.50
Strategic MMPA Stock	declining or unknown	3	0.60
MMPA Stock	small population	2	0.70
MMPA Stock	large population	1	0.80

Study Areas

Southern California



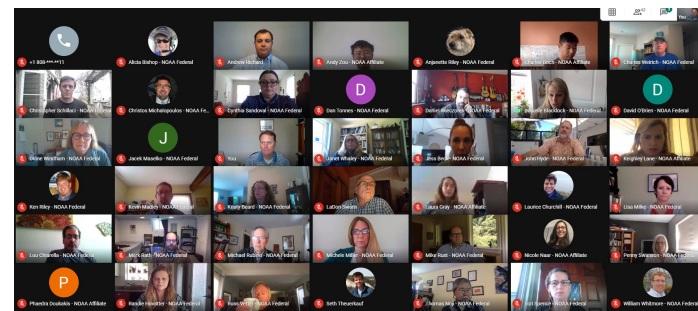
Foundational rules

- USA Federal Waters (EEZ)
- Depth = 10 - 150 m
- Maximum distance to shore: 25 nautical miles
- All types of aquaculture



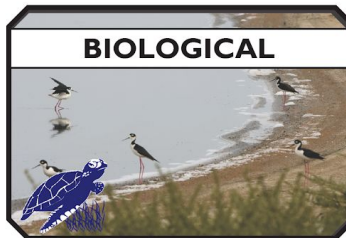
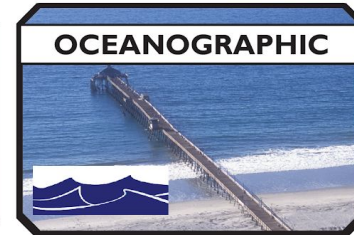
Stakeholder engagement

Stakeholder meetings		
Gulf of Mexico and Southern California	Number	Attendees
Military	40	161
Natural Resources	157	787
Regional Planning Bodies	24	302
Industries	42	134
Navigation	12	45
Governance & Boundaries	66	256
Social & Cultural	14	50
Research Community	10	19
ENGOS	7	15
Human Health	23	79
Totals	395	1,848
Public meetings		
	Date	
National AOA public listening session #1	11/5/20	
Southern CA AOA listening session	11/12/20	
Gulf of Mexico listening session	11/17/20	
National AOA public listening session #2	11/19/20	
Gulf of Mexico listening session (Fishing Stakeholders)	12/3/20	



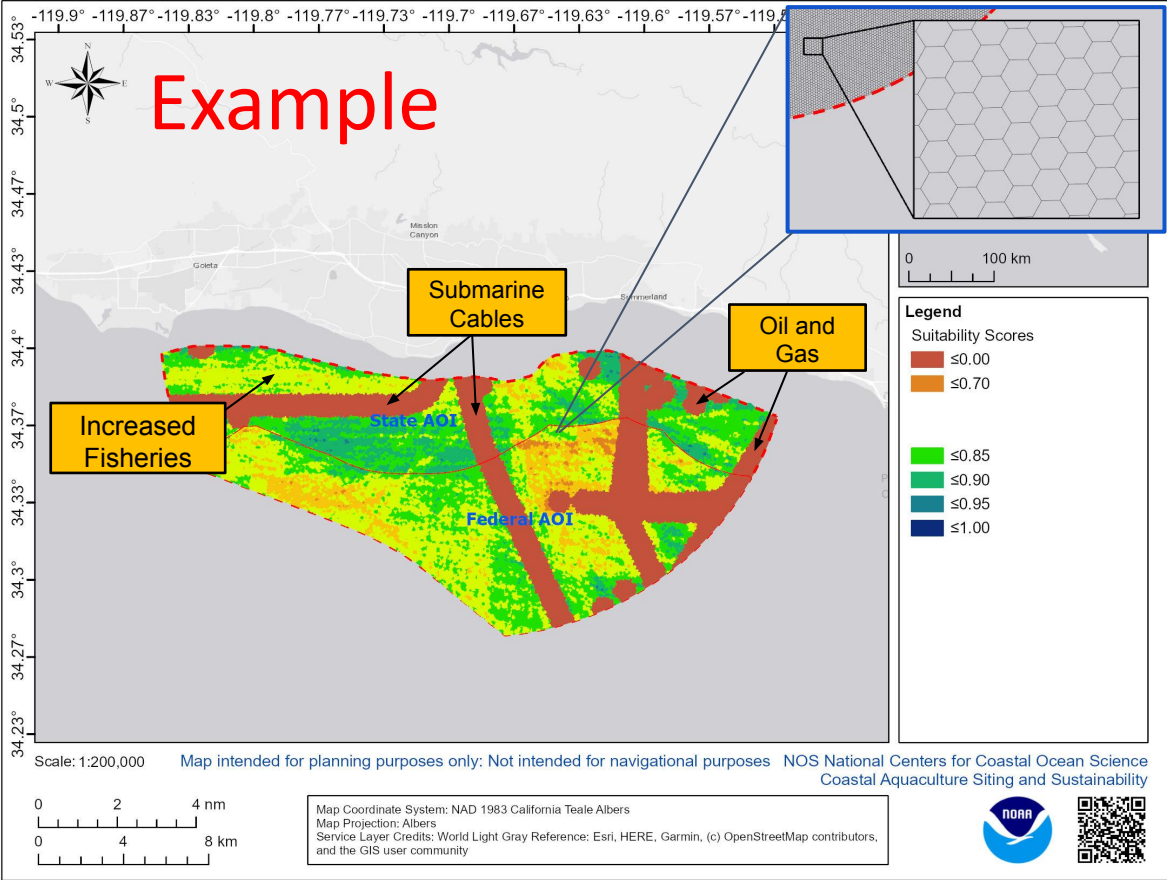
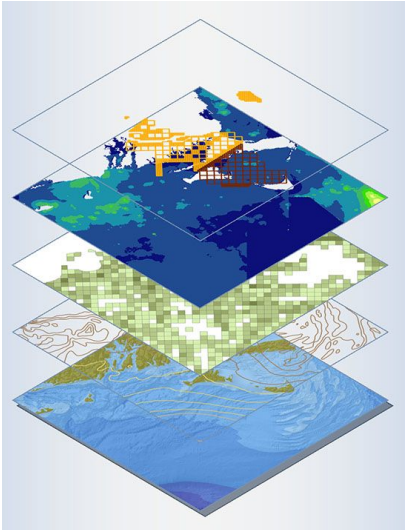
Data inventory results

Data Layers	SoCal	GoMex
National Security	35	54
Natural Resources	77	92
Industry, Navigation, and Transportation	42	60
Fishing and Aquaculture	50	14
Total layers	204	220



Suitability modeling

We identify areas of **highest opportunity** for aquaculture. Areas that provide highest conservation and lowest conflict with other users.

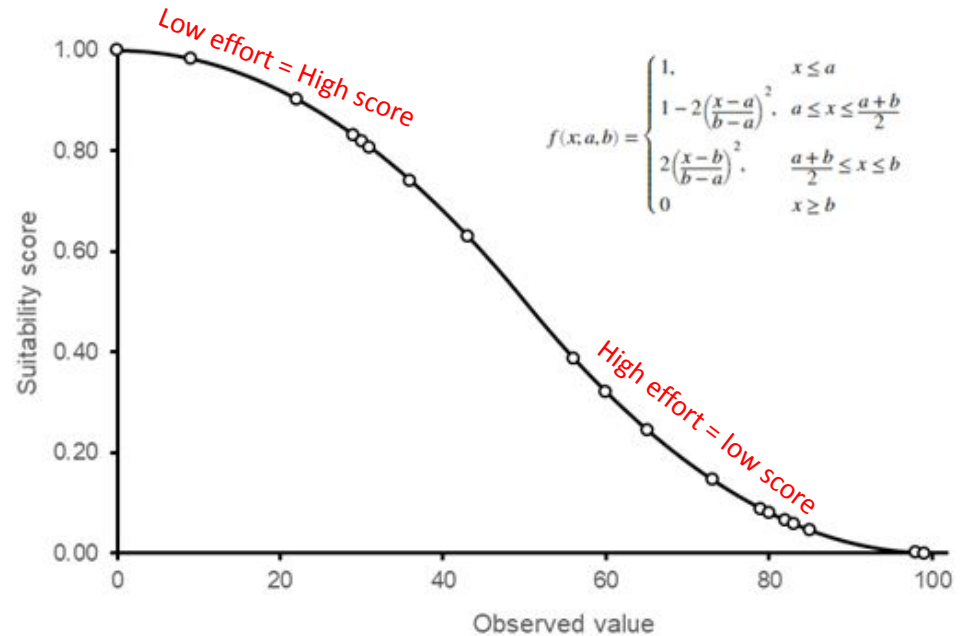


Categorical data

Data	Example	Score
Hard Bottom Habitat		0
Marine Protected Areas & Preserves		0.5
Habitat Area of Particular Concern		0.5
Deep sea corals		0
Oil and Gas Pipelines (500 m buffer)		0
Oil and Gas Wells (500 m buffer)		0
Shipwrecks (500 m buffer)		0
Unexploded Ordnance		0.5
Wastewater Discharge (500 m buffer)		0

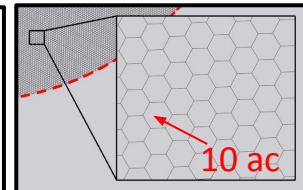
Continuous data

E.g., Fishing data, Vessel traffic, Wave climate



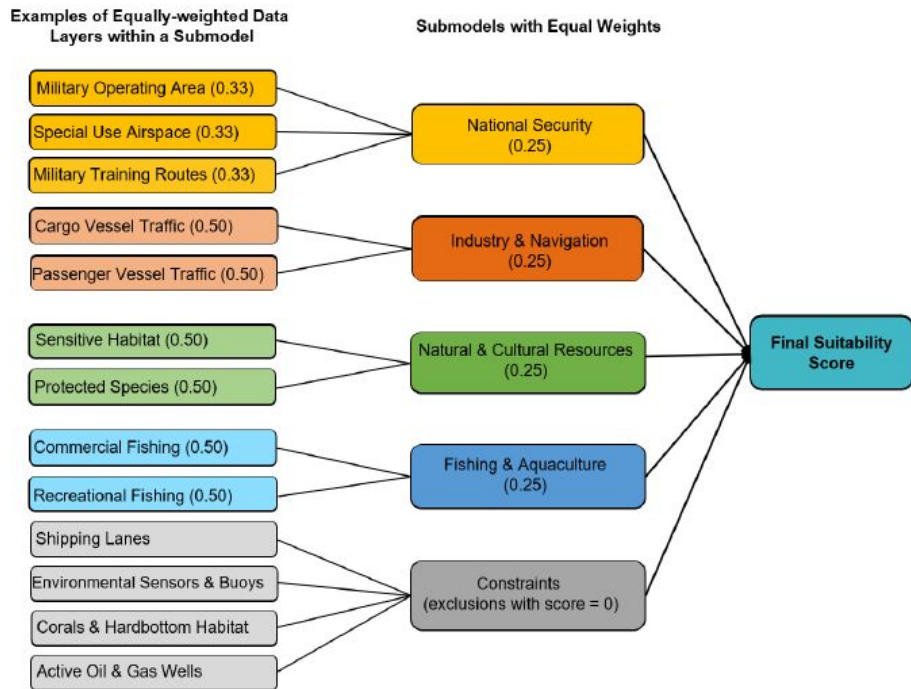
Cell scoring

Layer = not compatible = 0
 Layer = may not be compatible = 0.5
 No layer = 1

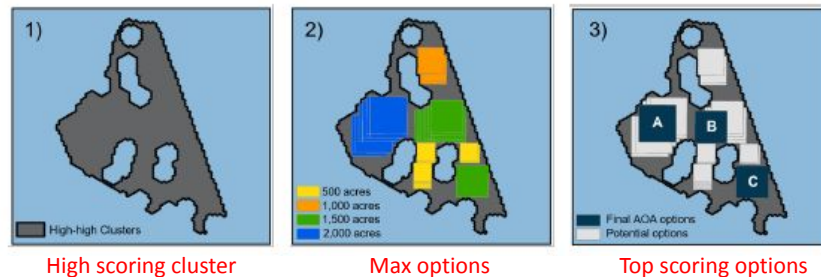


Modeling process

Suitability Model

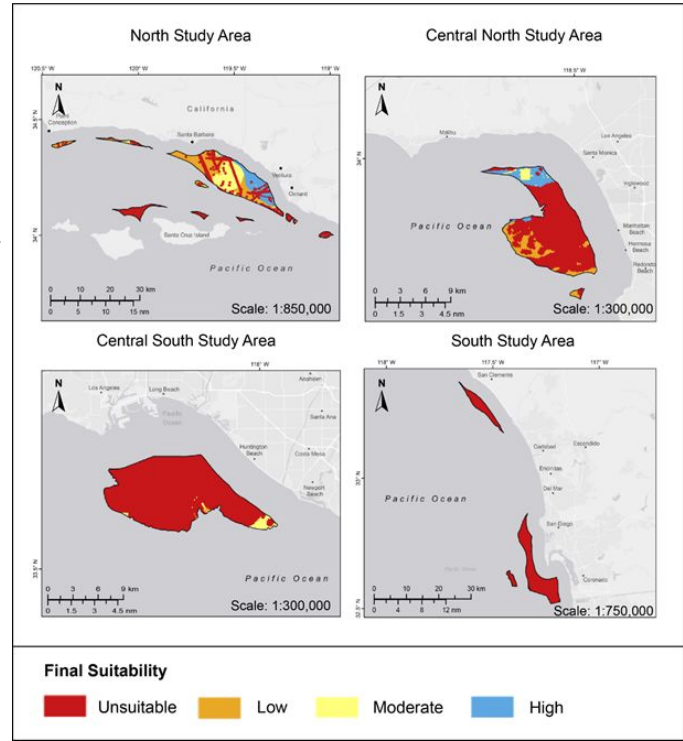
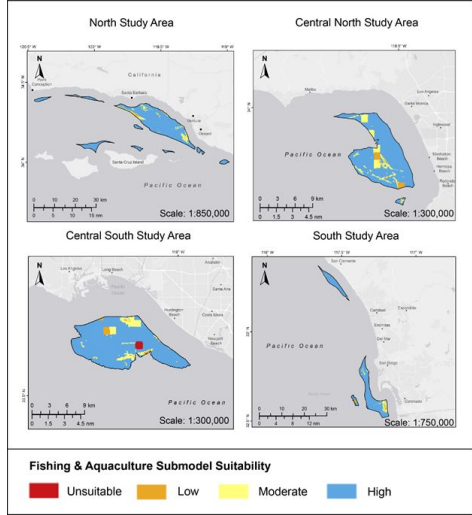
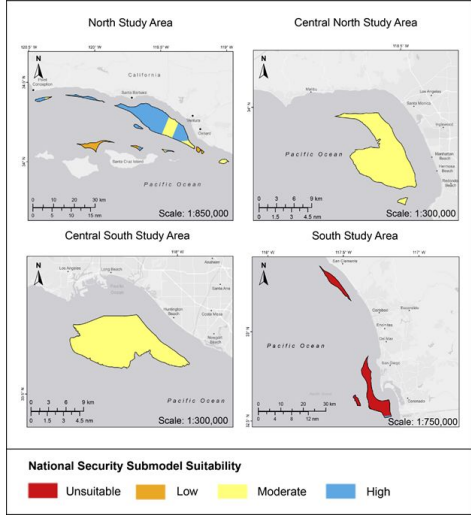
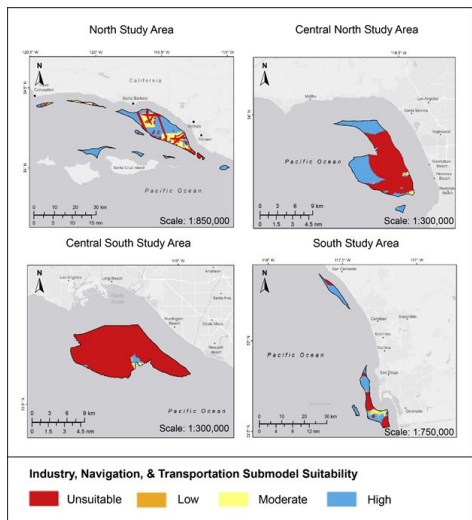
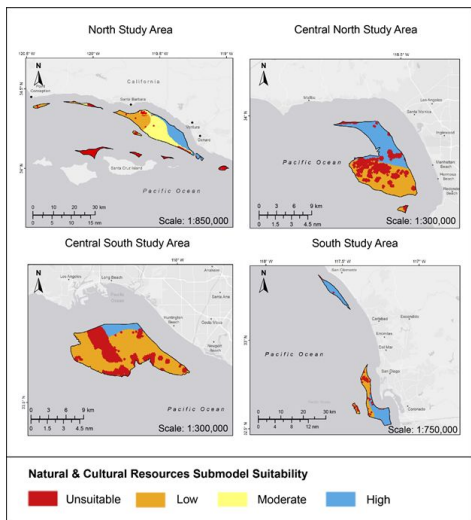


Cluster Analysis and Precision Siting Model



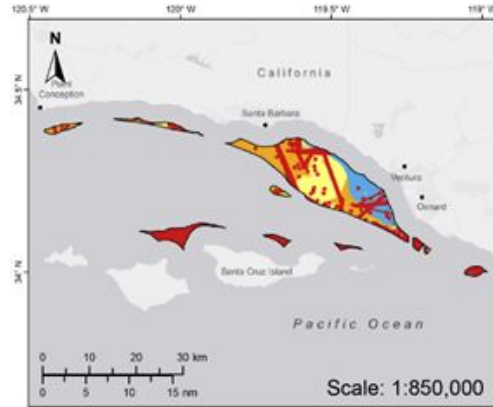
Southern California

Final Suitability

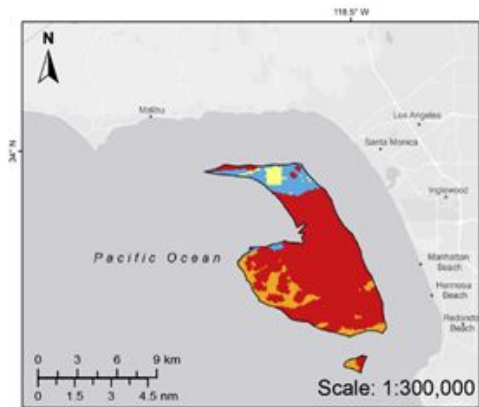


Suitability Modeling Results

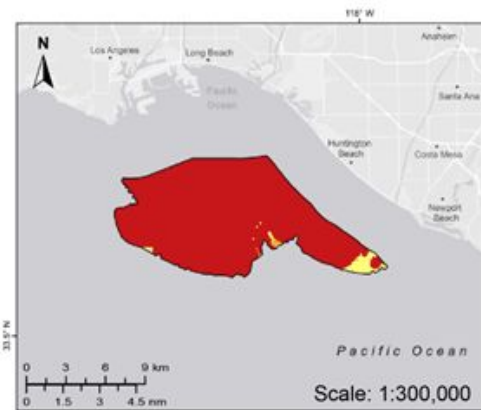
North Study Area



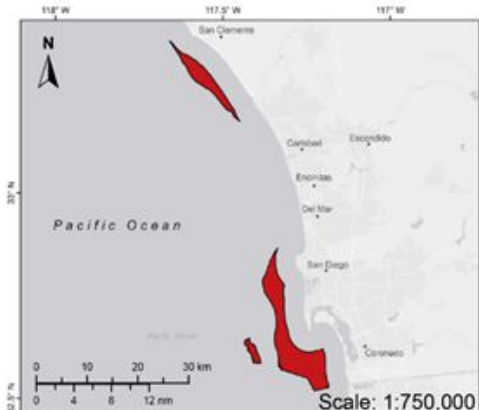
Central North Study Area



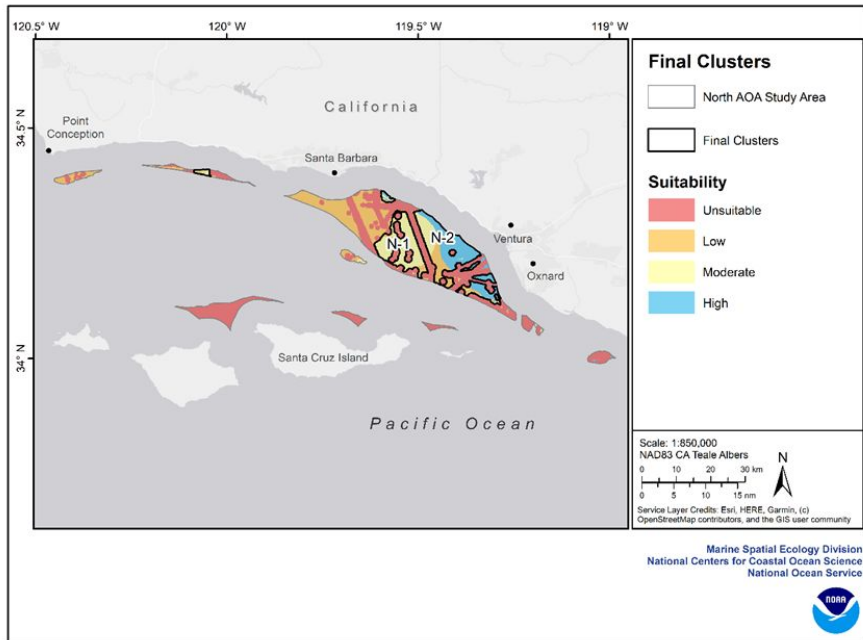
Central South Study Area



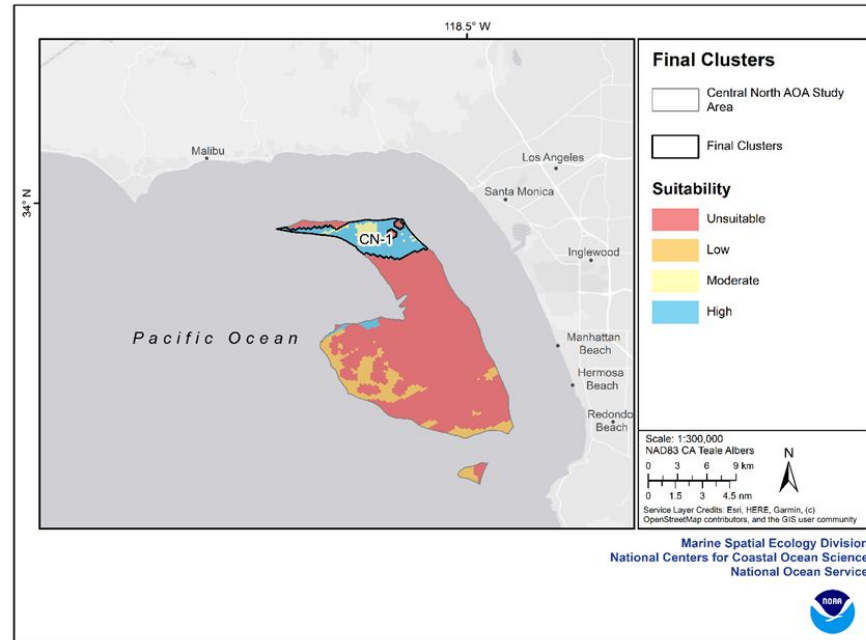
South Study Area



Cluster analysis

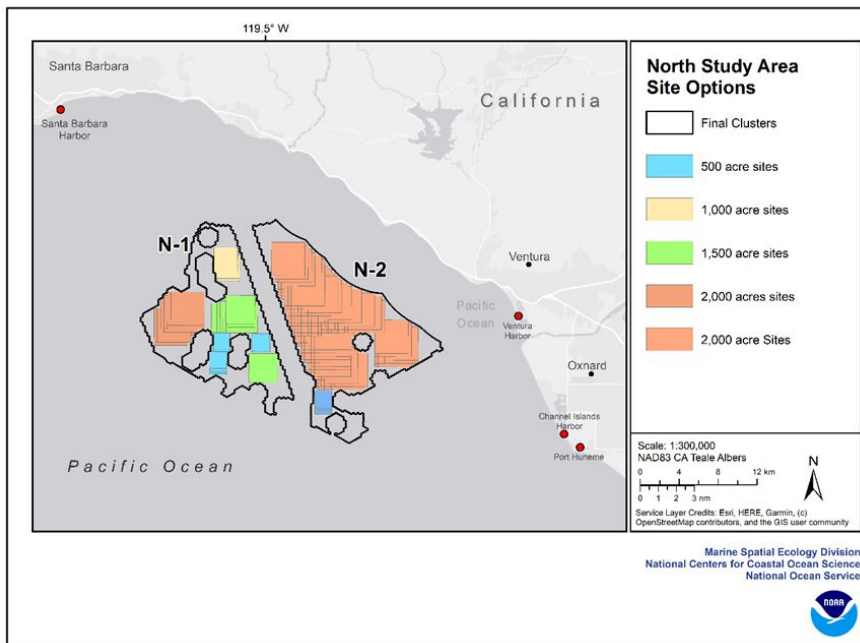


7 clusters totally 60,347 acres
Only 2 clusters large enough for AOAs

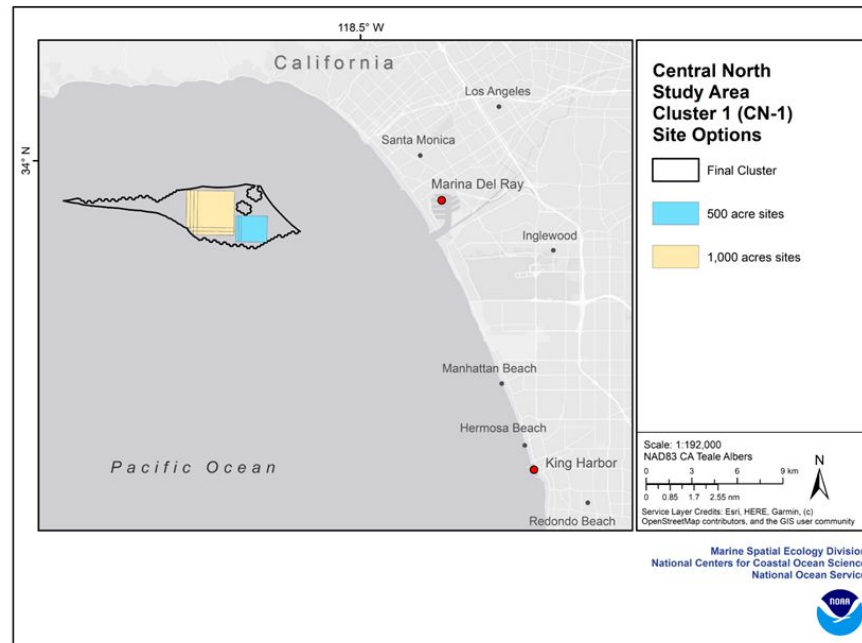


1 cluster totally 4,665 acres

Precision siting model



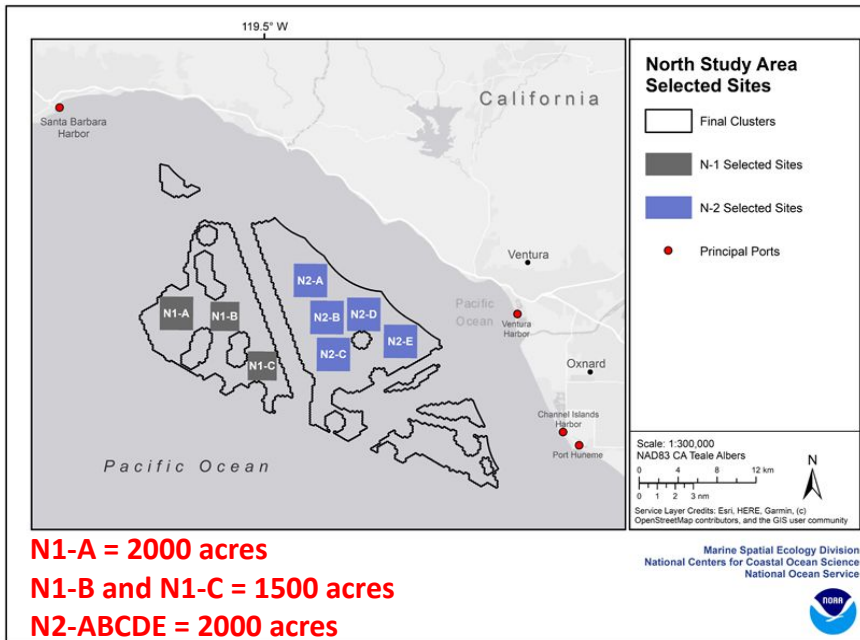
N-1 cluster is 21,173 acres = 38 AOA options
N-2 cluster is 11,679 acres = 246 AOA options



CN-1 cluster is 4,665 acres = 12 AOA options

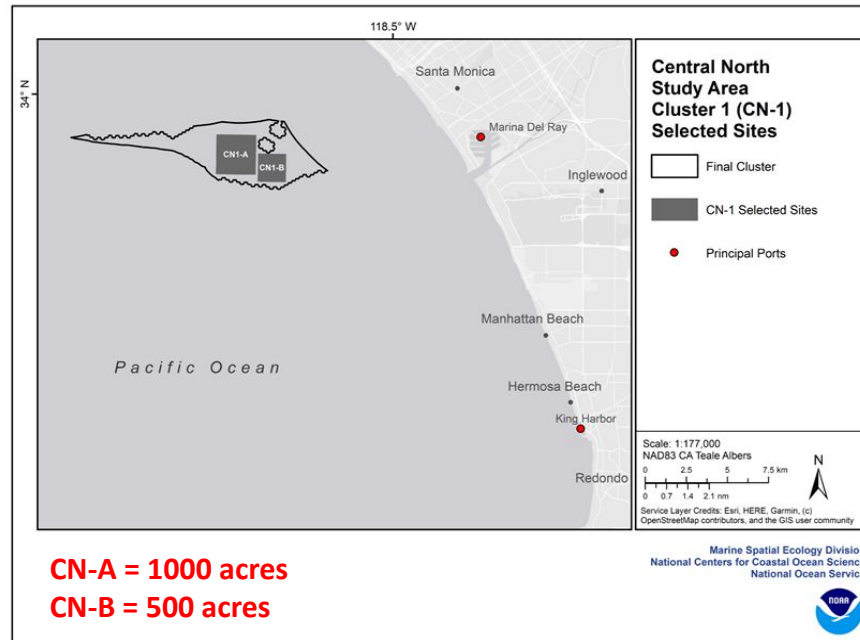
296 total AOA options evaluated!

Top 10 ranked AOA options



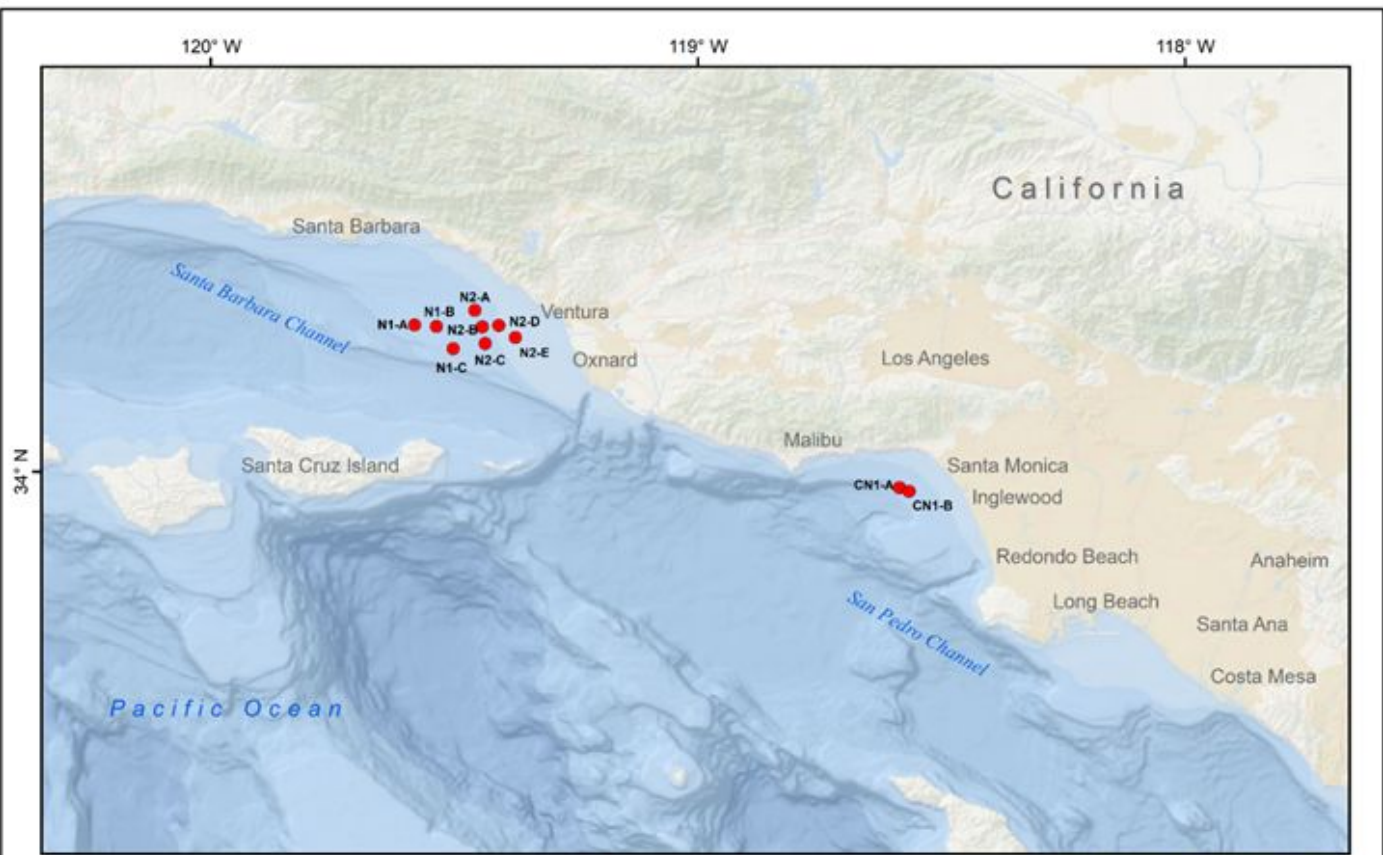
N1-A = 2000 acres
N1-B and N1-C = 1500 acres
N2-ABCDE = 2000 acres

4.6 - 19 nm from nearest harbors
Ventura Harbor, Santa Barbara Harbor, and Oxnard

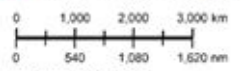


CN-A = 1000 acres
CN-B = 500 acres

5.3 - 11.3 nm from nearest harbors
Marina del Ray, King Harbor



● Options for Aquaculture Opportunity Areas



Scale: 1:1,100,000
 Coordinate System: NAD83 CA Teale Albers

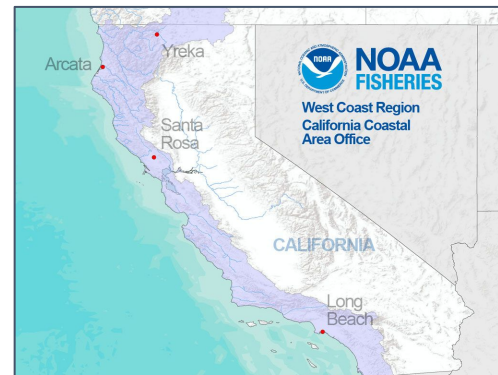


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Marine Spatial Ecology Division
 National Centers for Coastal Ocean Science
 National Ocean Service



Questions about marine aquaculture development in California?



Diane Windham

**NMFS Regional Aquaculture Coordinator
for California**



Thanks!

