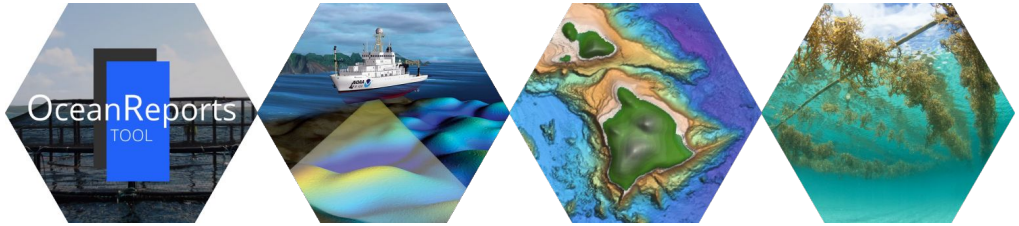

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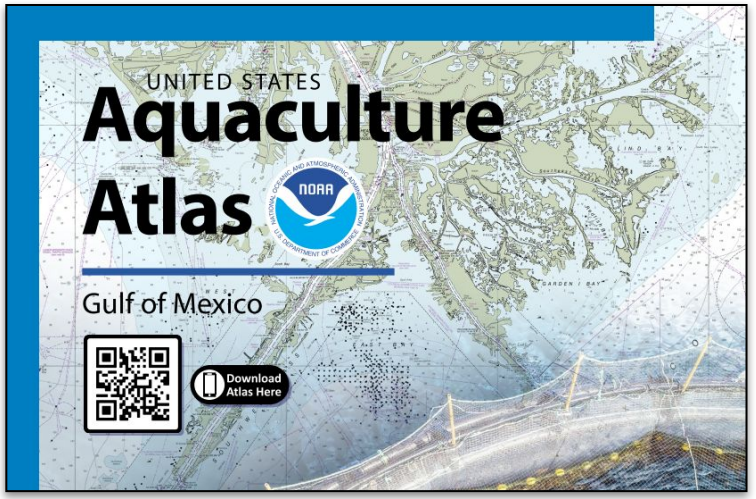
NOAA Aquaculture Opportunity Atlas Results for Federal Waters of the Gulf of Mexico

Kenneth Riley

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



Support provided by…..

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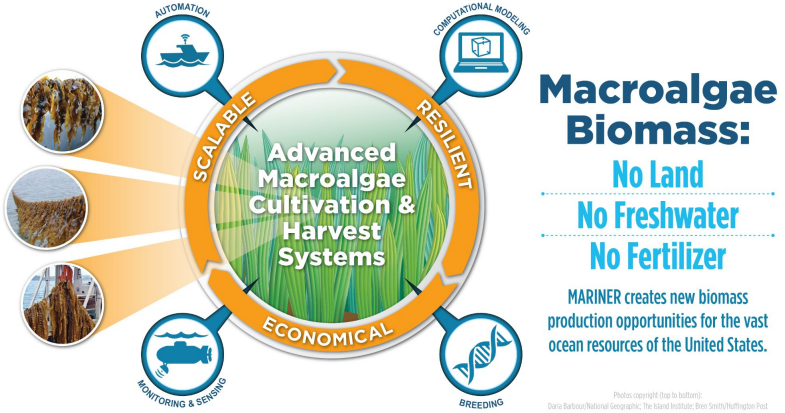
NOAA FISHERIES 150TH ANNIVERSARY 1871-2021

U.S. DEPARTMENT OF ENERGY

arpa·e

CHANGING WHAT'S POSSIBLE



CASS Leadership


Dr. Ken Riley
Marine Ecologist


Dr. James Morris
Marine Ecologist


Meghan Balling
Program Analyst

TEAM
T TOGETHER
E EVERYONE
A ACHIEVES
M MORE

AquaEnviro Team


Troy Rezek
Aquaculture Biologist

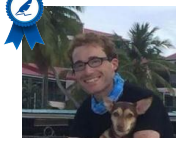

Barry King, P.E.
Engineer/Modeler


Gary Fisher
Biological Tech


Dr. Gretchen Bath
Enviro Policy


Dr. Matt Campbell
Ocean Engineer

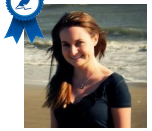
AquaSpatial Team


Jon Jossart
Geospatial


Dr. Lisa Wickliffe
Geospatial


Amit Malhotra
Geospatial


Jonathan MacKay
Geospatial


Alyssa Randall
Geospatial

Authors

NOAA Has Built Significant National Spatial Planning Infrastructure!

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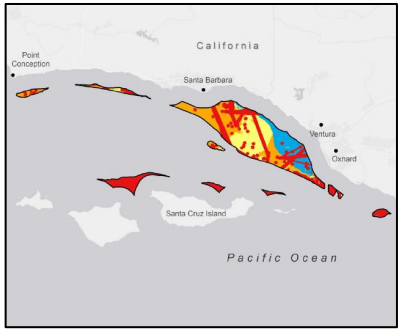
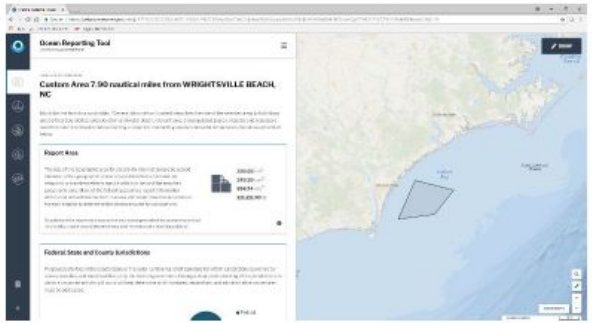
Spatial Modeling

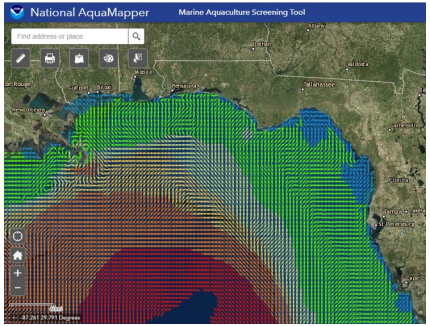


OceanReports

A BOEM/NOAA PARTNERSHIP



National AquaMapper

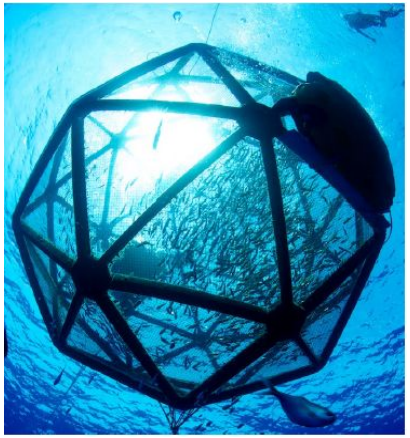


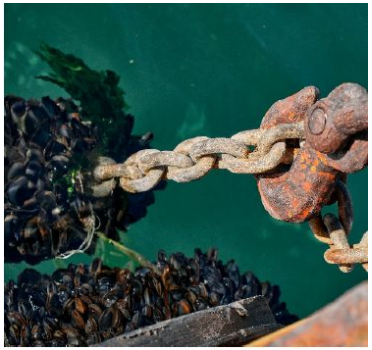
All Ocean Pioneers Will Benefit

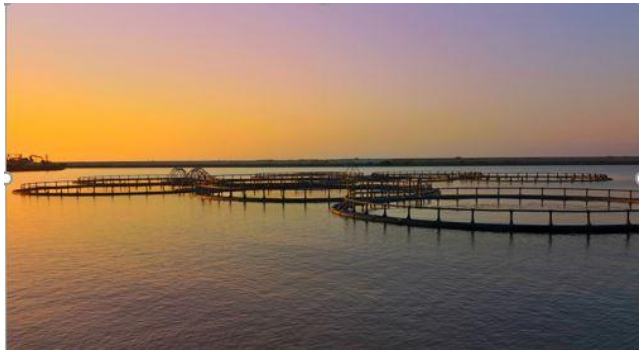
Atlases at a Glance

NCCOS | NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE

- 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



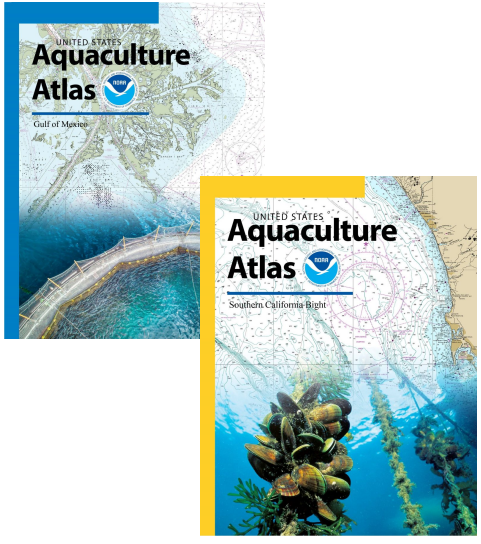




Center for Independent Experts

NCCOS | NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE

- 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

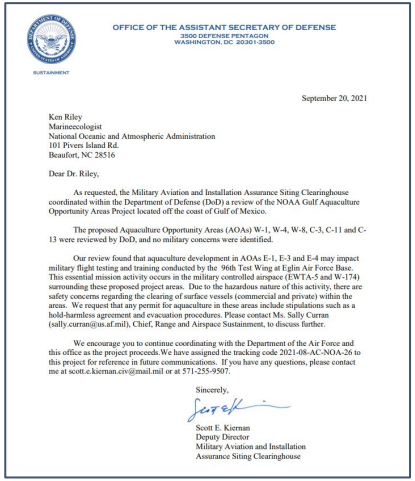
- Add some detail to methods
- Further discuss assumptions and limitations
- Incorporate uncertainty analyses
- Address metadata structure and compliances
- Clarify this work as MSP in the sense of spatial analytics. It is not allocating space for aquaculture or ocean uses as is often observed with other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

UNIVERSITY OF EXETER | DALHOUSIE UNIVERSITY | AZTI MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

The Center for Independent Experts

Atlas Story - Preserving National Security

- Collaborated with DOD HQ and Regional Leadership, and the Military Aviation and Installation Assurance Siting Clearinghouse
- Included coordination with USCG, Space Force, NASA, SpaceX
- Established framework for handling sensitive data in spatial planning
- Analyses considered risks to national security, impacts to military operations, and identified mitigation strategies



OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
3500 DEFENSE PENTAGON
WASHINGTON, DC 20301-3500

SUSTAINMENT

September 20, 2021

Ken Riley
Marineecologist
National Oceanic and Atmospheric Administration
101 Pivers Island Rd.
Beaufort, NC 28516

Dear Dr. Riley,

As requested, the Military Aviation and Installation Assurance Siting Clearinghouse coordinated within the Department of Defense (DoD) a review of the NOAA Gulf Aquaculture Opportunity Areas Project located off the coast of Gulf of Mexico.

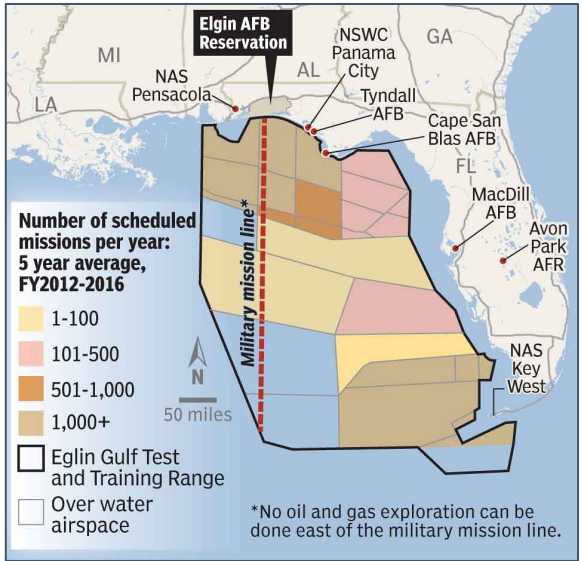
The proposed Aquaculture Opportunity Areas (AOAs) W-1, W-4, W-8, C-3, C-11 and C-13 were reviewed by DoD, and no military concerns were identified.

Our review found that aquaculture development in AOAs E-1, E-3 and E-4 may impact military flight testing and training conducted by the 96th Test Wing at Eglin Air Force Base. This essential mission activity occurs in the military controlled airspace (EWTA-5 and W-174) surrounding these proposed project areas. Due to the hazardous nature of this activity, there are safety concerns regarding the clearing of surface vessels (commercial and private) within the areas. We request that any permit for aquaculture in these areas include stipulations such as a hold-harmless agreement and evacuation procedures. Please contact Ms. Sally Curran (sally.curran@us.af.mil), Chief, Range and Airspace Sustainment, to discuss further.

We encourage you to continue coordinating with the Department of the Air Force and this office as the project proceeds.We have assigned the tracking code 2021-08-AC-NOA-26 to this project for reference in future communications. If you have any questions, please contact me at scott.e.kiernan.civ@mail.mil or at 571-255-9507.

Sincerely,

Scott E. Kiernan
Deputy Director
Military Aviation and Installation
Assurance Siting Clearinghouse



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

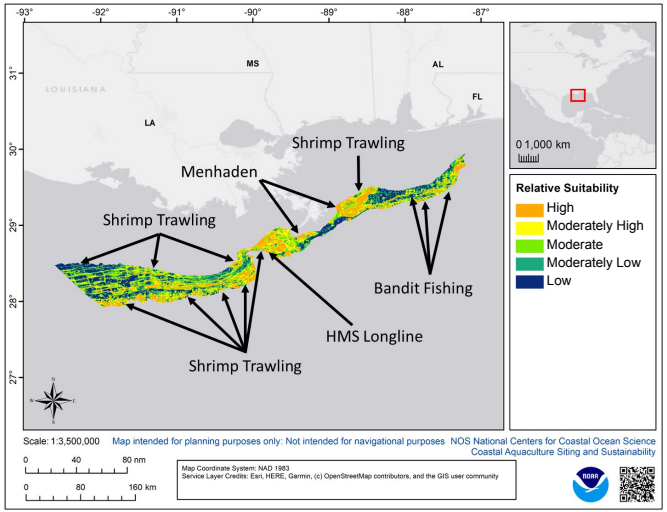
Southern Shrimp Alliance
P.O. Box 1577 Tarpon Springs, FL 34688
955 E. MLK Dr. Suite D Tarpon Springs, FL 34689
727-934-5090 Fax 727-934-5362

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,

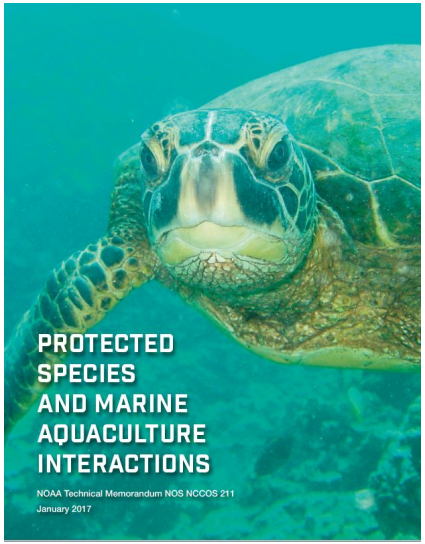
The Southern Shrimp Alliance (SSA) would like to draw your attention to what we believe is the critical role the National Oceanic and Atmospheric Administration (NOAA) must play in the development of offshore wind energy in the Gulf of Mexico (GOM) as part of the Biden Administration's commitment to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

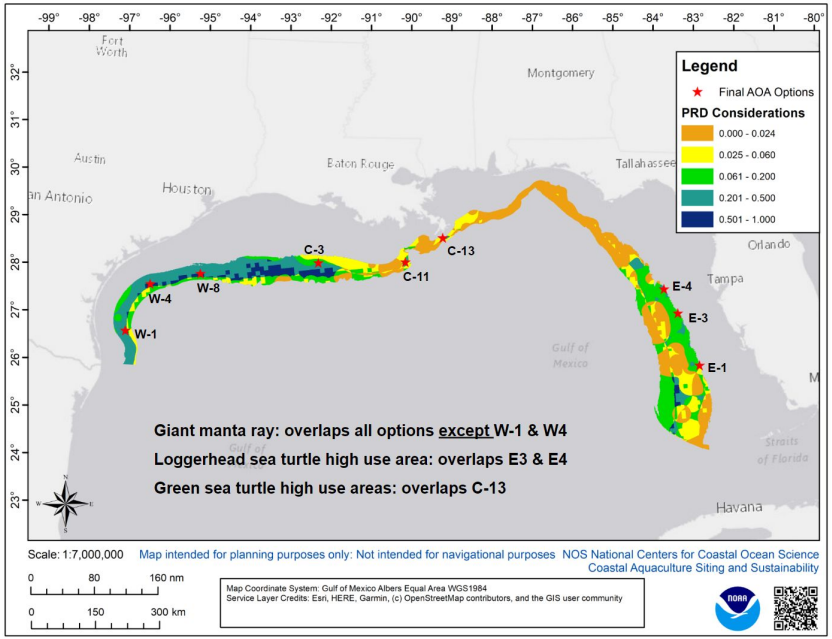


SEAFOOD HARVESTERS OF AMERICA

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

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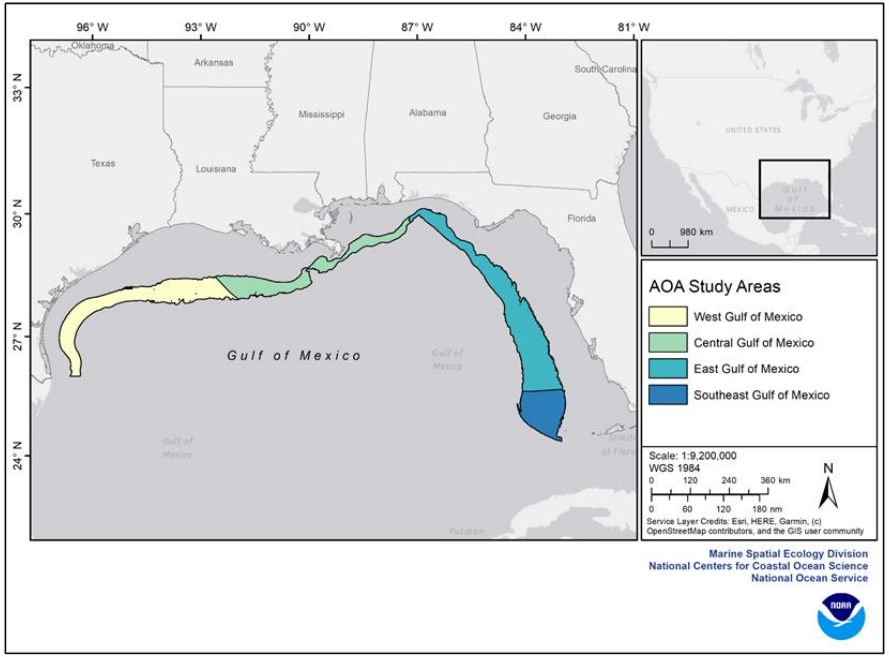
Gulf of Mexico



Foundational rules

- USA Federal Waters (EEZ)
- Depth = 50 - 150 m
- Minimize distance from shore
- All types of aquaculture

Stakeholder engagement

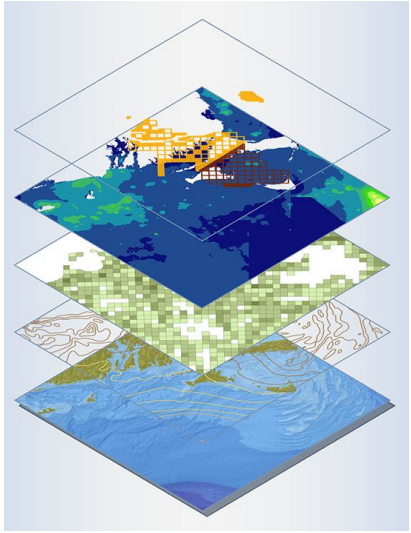
Stakeholder meetings Gulf of Mexico and Southern California	Number	Attendees
Military	40	161
Natural Resources	157	787
Regional Planning Bodies	24	302
Industries	42	134
Navigation	12	45
Governance & Boundaries	66	256
Social & Cultural	14	50
Research Community	10	19
ENGOs	7	15
Human Health	23	79
Totals	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	

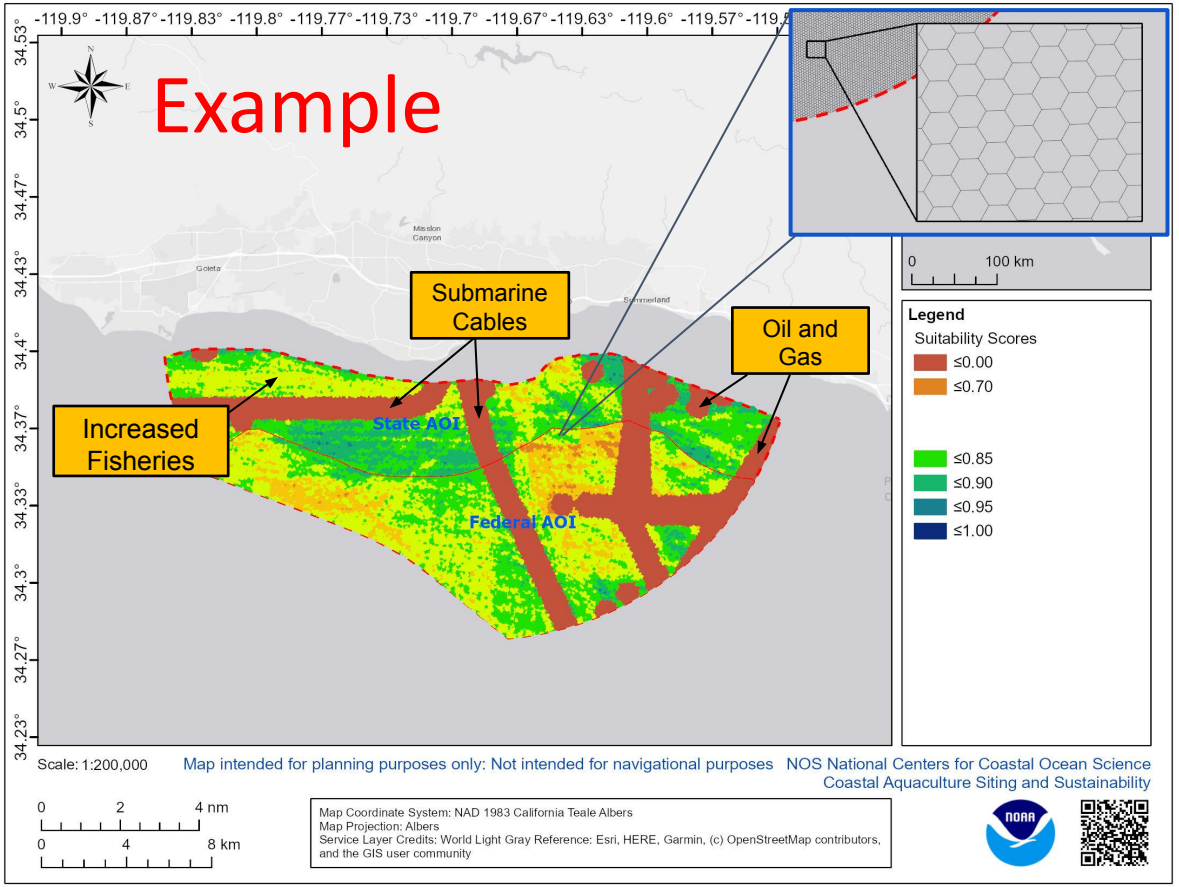
Data inventory results

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.*



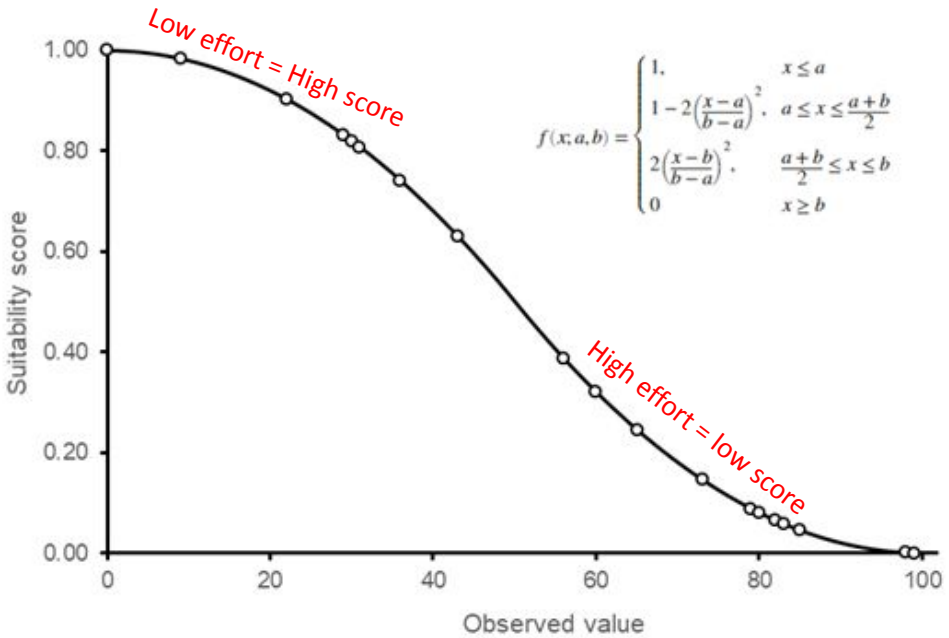


Categorical data

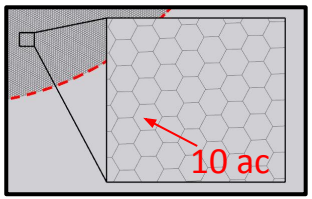
Data Example	Score
Hard Bottom Habitat	0
Marine Protected Areas & Preserves	0.5
Habitat Area of Particular Concern	0.5
Deep sea corals	0
Oil and Gas Pipelines (500 m buffer)	0
Oil and Gas Wells (500 m buffer)	0
Shipwrecks (500 m buffer)	0
Unexploded Ordnance	0.5
Wastewater Discharge (500 m buffer)	0

Continuous data

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

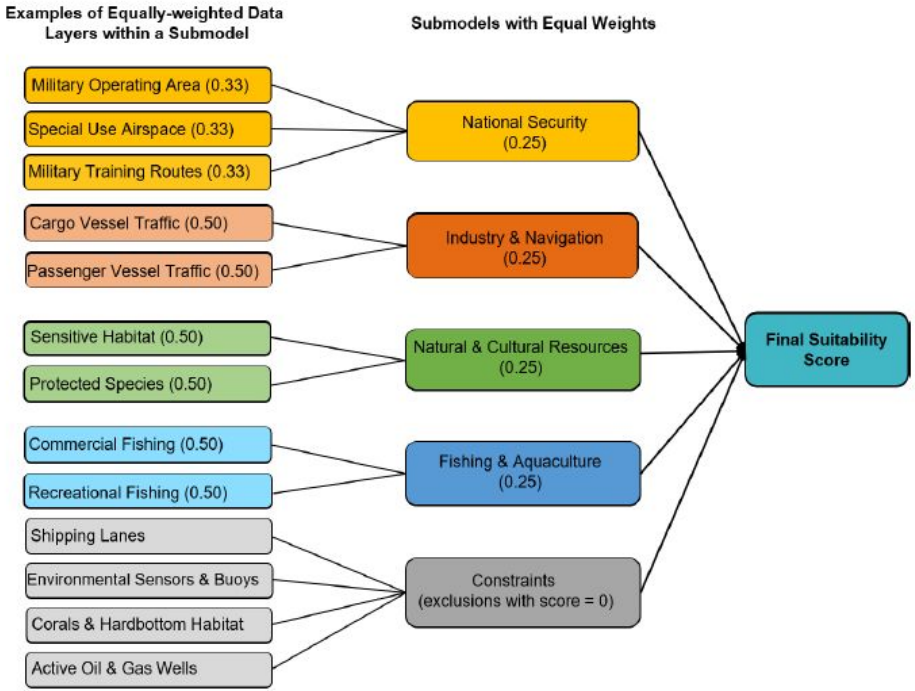


Cell scoring
Layer = not compatible = 0
Layer = may not be compatible = 0.5
No layer = 1

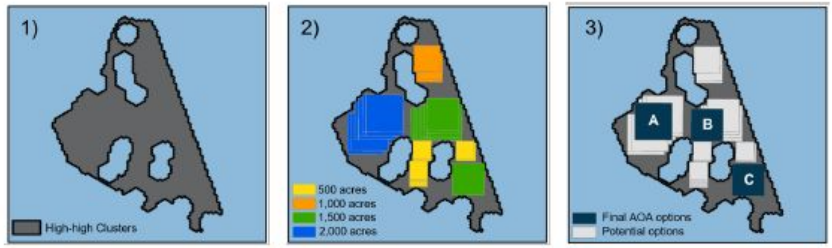


Modeling process

Suitability Model

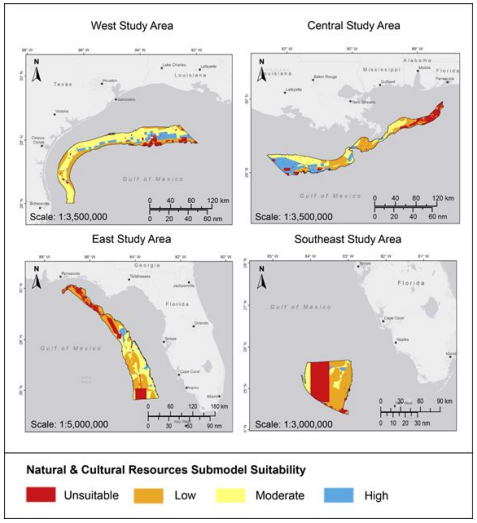


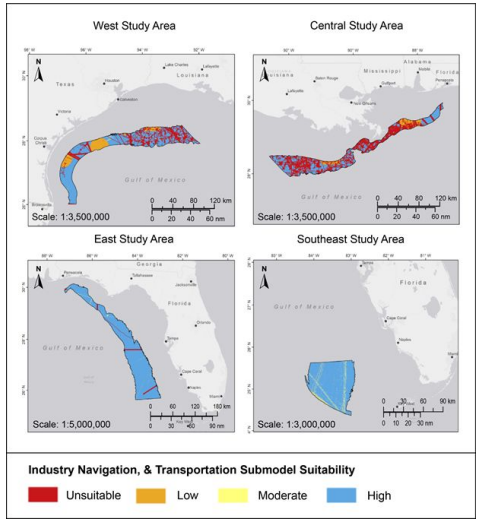
Cluster Analysis and Precision Siting Model

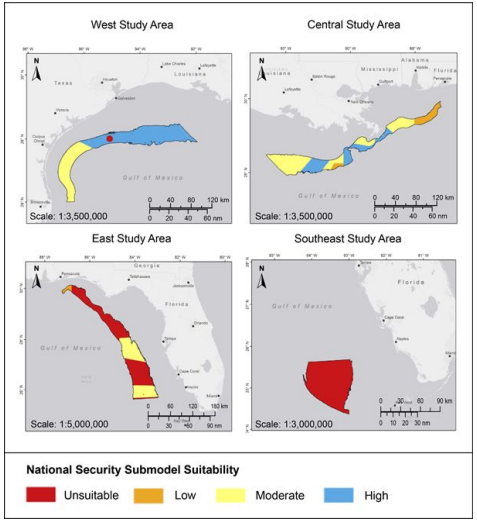


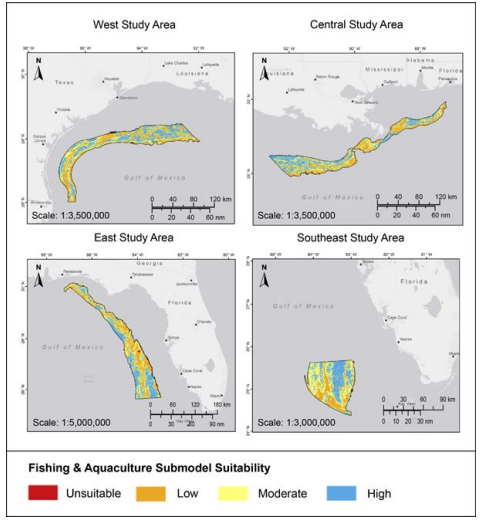
High scoring cluster | Max options | Top scoring options

Gulf of Mexico

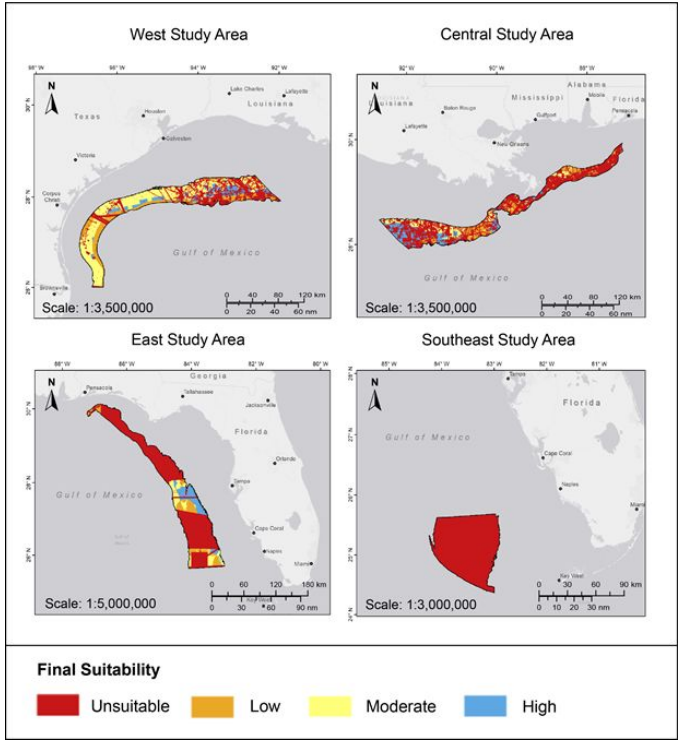




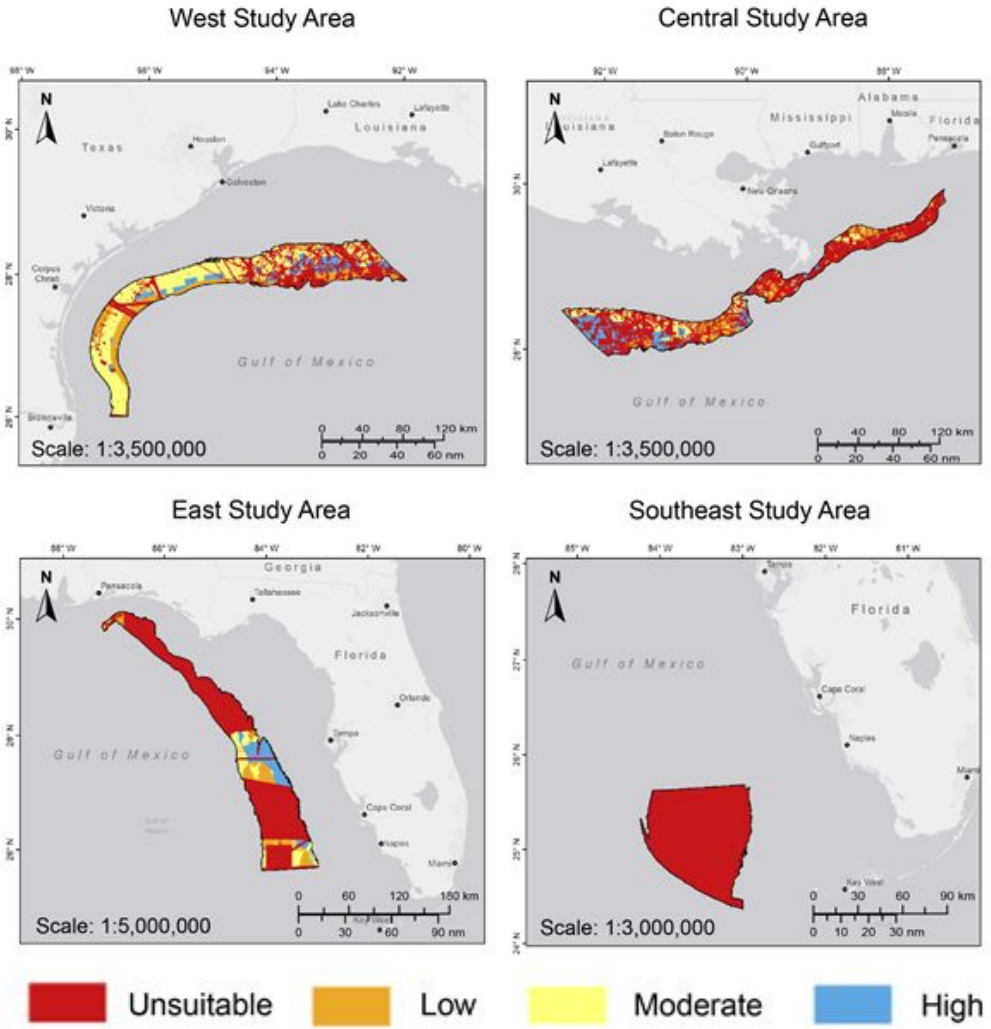




Final Suitability

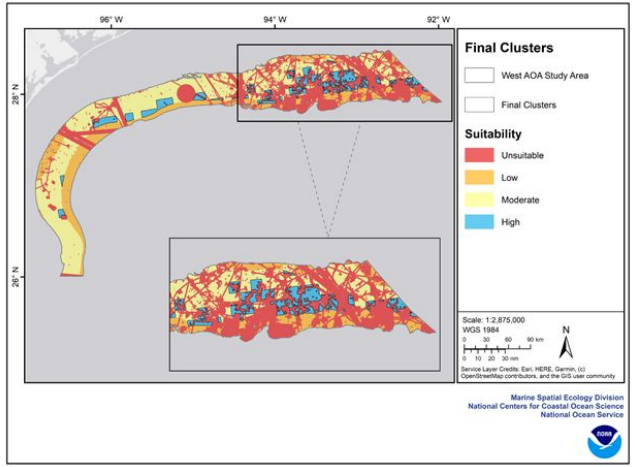


Suitability Modeling Results



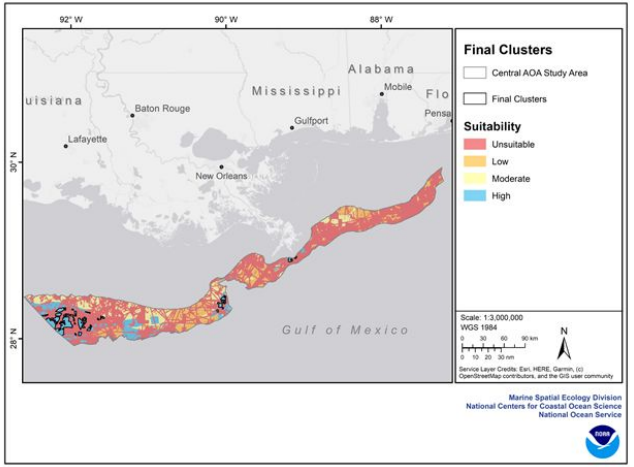
Cluster analysis

West Region



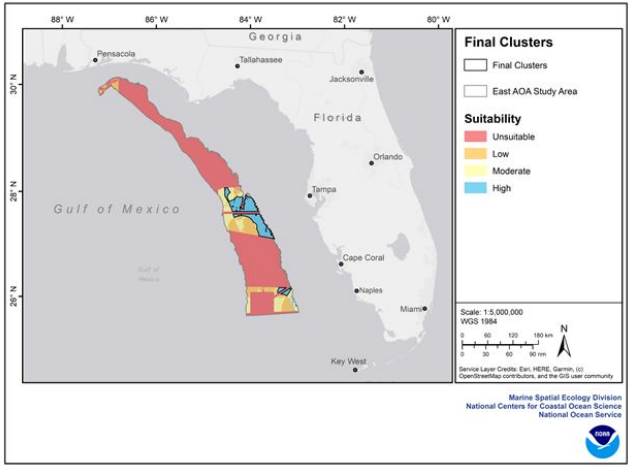
43 clusters
5,033 AOA options
339,755 acres

Central Region



13 clusters
1,056 AOA options
93,220 acres

East Region



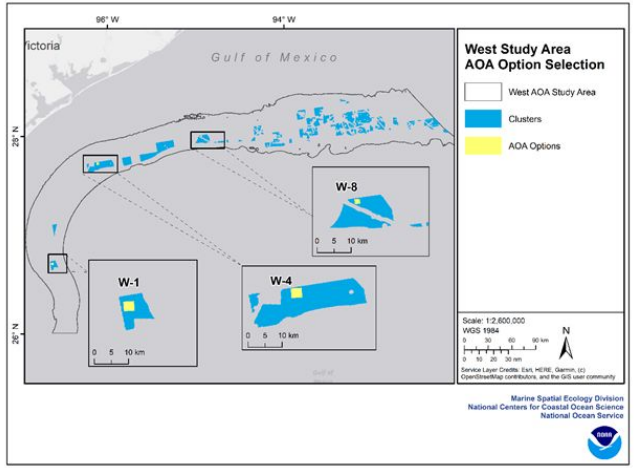
4 clusters
23,750 AOA options
722,900 acres

60 clusters
29,839 AOA Options Considered

Precision Siting Model

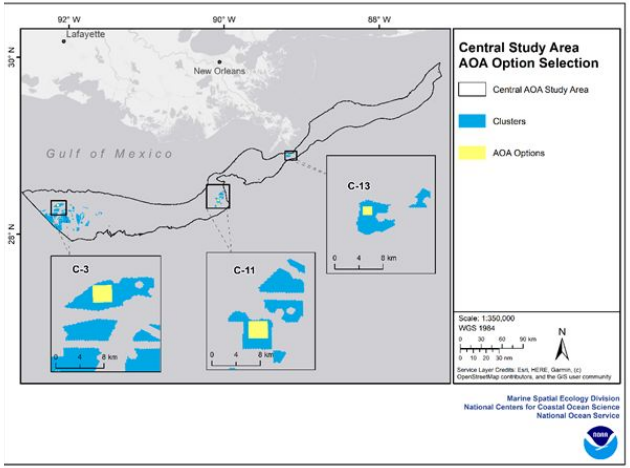
Top 9 AOA options identified
A 30-nm dispersion rule applied to avoid overlap
13,500 acres

West Region



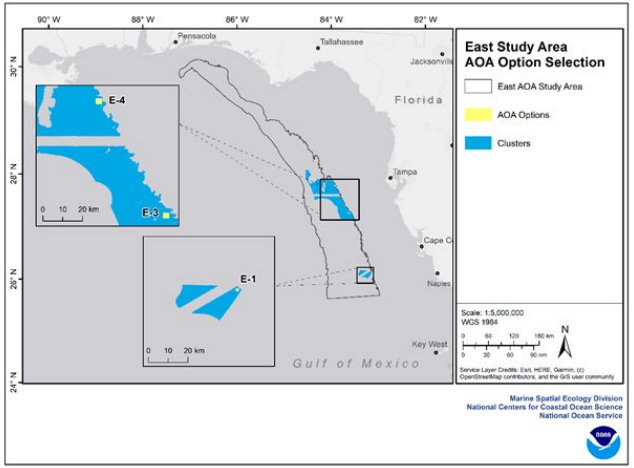
Site	Size (acres)	Depth Average (m)	Closest Inlet (nm)
W-1	2,000	91	35
W-4	2,000	84	42
W-8	500	81	58

Central Region

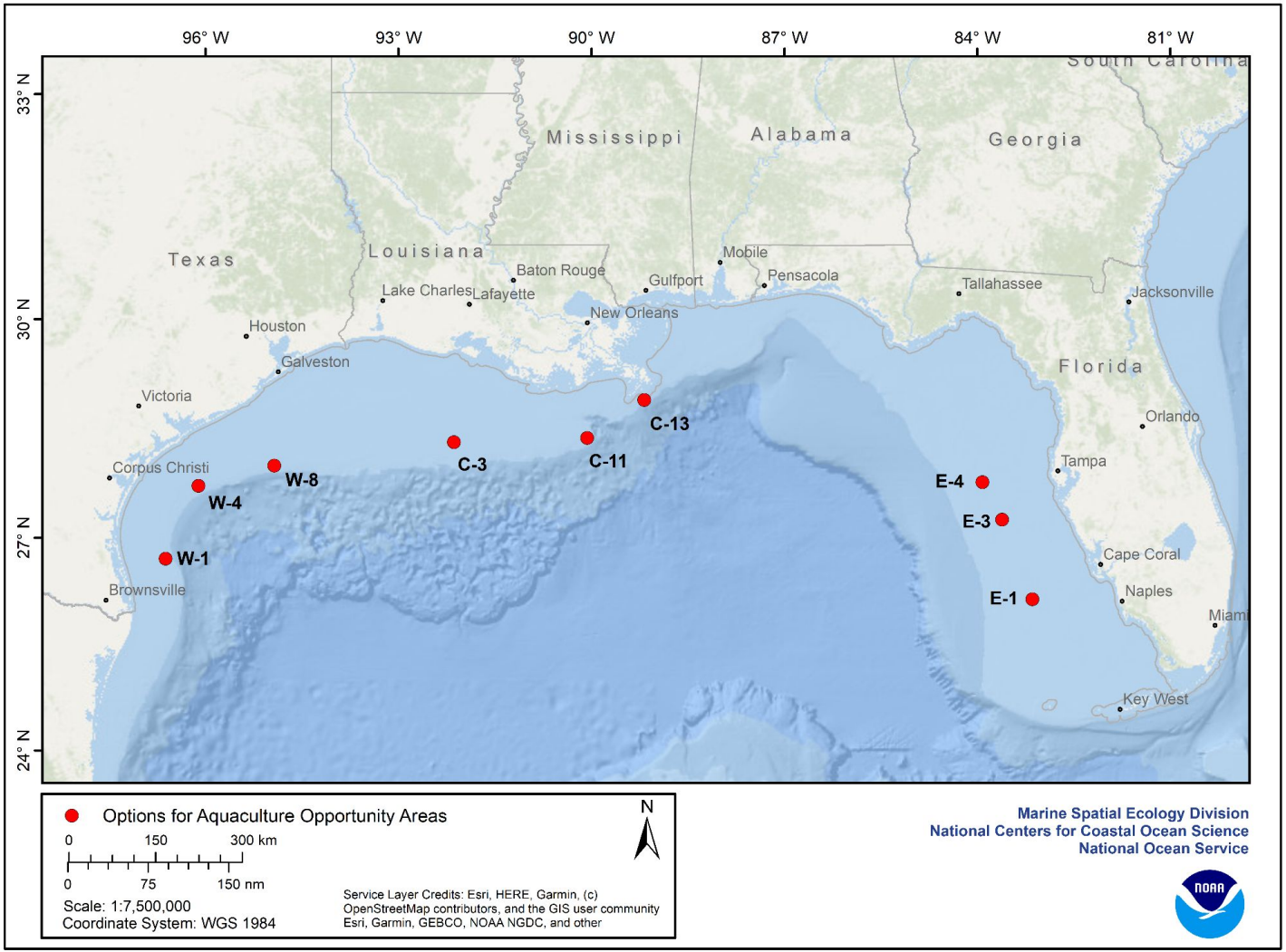


Site	Size (acres)	Depth Average (m)	Closest Inlet (nm)
C-3	2,000	61	72
C-11	2,000	82	41
C-13	500	62	5

East Region



Site	Size (acres)	Depth Average (m)	Closest Inlet (nm)
E-4	2,000	51	58
E-3	2,000	51	48
E-1	500	51	56


96° W
93° W
90° W
87° W
84° W
81° W
33° N
30° N
27° N
24° N
Mississippi
Alabama
Georgia
South Carolina
Texas
Louisiana
Florida
Mobile
Baton Rouge
Gulfport
Pensacola
Tallahassee
Jacksonville
Lake Charles
Lafayette
New Orleans
Houston
Galveston
Victoria
Corpus Christi
Brownsville
Orlando
Tampa
Cape Coral
Naples
Miami
Key West
C-13
C-3
C-11
W-8
W-4
W-1
E-4
E-3
E-1
Options for Aquaculture Opportunity Areas
0 150 300 km
0 75 150 nm
Scale: 1:7,500,000
Coordinate System: WGS 1984
N
Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Esri, Garmin, GEBCO, NOAA NGDC, and other
Marine Spatial Ecology Division
National Centers for Coastal Ocean Science
National Ocean Service
NOAA

Questions about aquaculture in the southeast region?

Southeast Regional Office

Andrew Richard

NMFS Regional Aquaculture Coordinator

Southeast Regional Office

NOAA FISHERIES

NCCOS | NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE

Thanks!

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NOAA
U.S. DEPARTMENT OF COMMERCE