



**NOAA**  
**FISHERIES**



# Aquaculture Opportunity Areas Update

Gulf of Mexico Fishery Management Council,  
Shrimp Advisory Panel Meeting

March 23, 2021

# Topics

- Review Southern Shrimp Alliance Comments on NOAA's Request for Information (RFI) on AOAs
- Update on efforts to identify Aquaculture Opportunity Areas
- Questions & Discussion



# AOAs Request for Information

- The RFI requested specific input for NOAA to consider when identifying AOAs in the Gulf of Mexico. The SSA provided comments specific to:
  - Utilizing Electronic Logbook (ELB) Data
  - Siting AOAs in waters deeper than 90m
  - NOAA should continue to work with the Gulf shrimping industry throughout the AOAs process



# Status of AQ in Gulf Federal Waters

In August 2020, the Fifth Circuit [U.S. Court of Appeals for the Fifth Circuit] issued a decision affirming the district court's [U.S. District Court for the Eastern District of Louisiana's] ruling that the Gulf of Mexico aquaculture rule exceeds NOAA's statutory authority under the Magnuson-Stevens Act.

The U.S. DOJ did not appeal the Fifth Circuit's ruling and NOAA Fisheries is currently analyzing the implications of this decision.





# General AQ comments received by SSA

- Navigation & safety concerns over where farms may be sited
- Preventing damage from lost or damaged equipment
- Concerns re: disease and escapement of cultured fish; impacts to wild stocks
- Remediation, structural integrity of farms
- Facility decommissioning/removal of farm and equipment
- Use of drugs and chemicals (animal health)
- Federal Agencies with Permitting and other Authorities for aquaculture in Federal waters



# Spatial Planning for Aquaculture Opportunity Areas

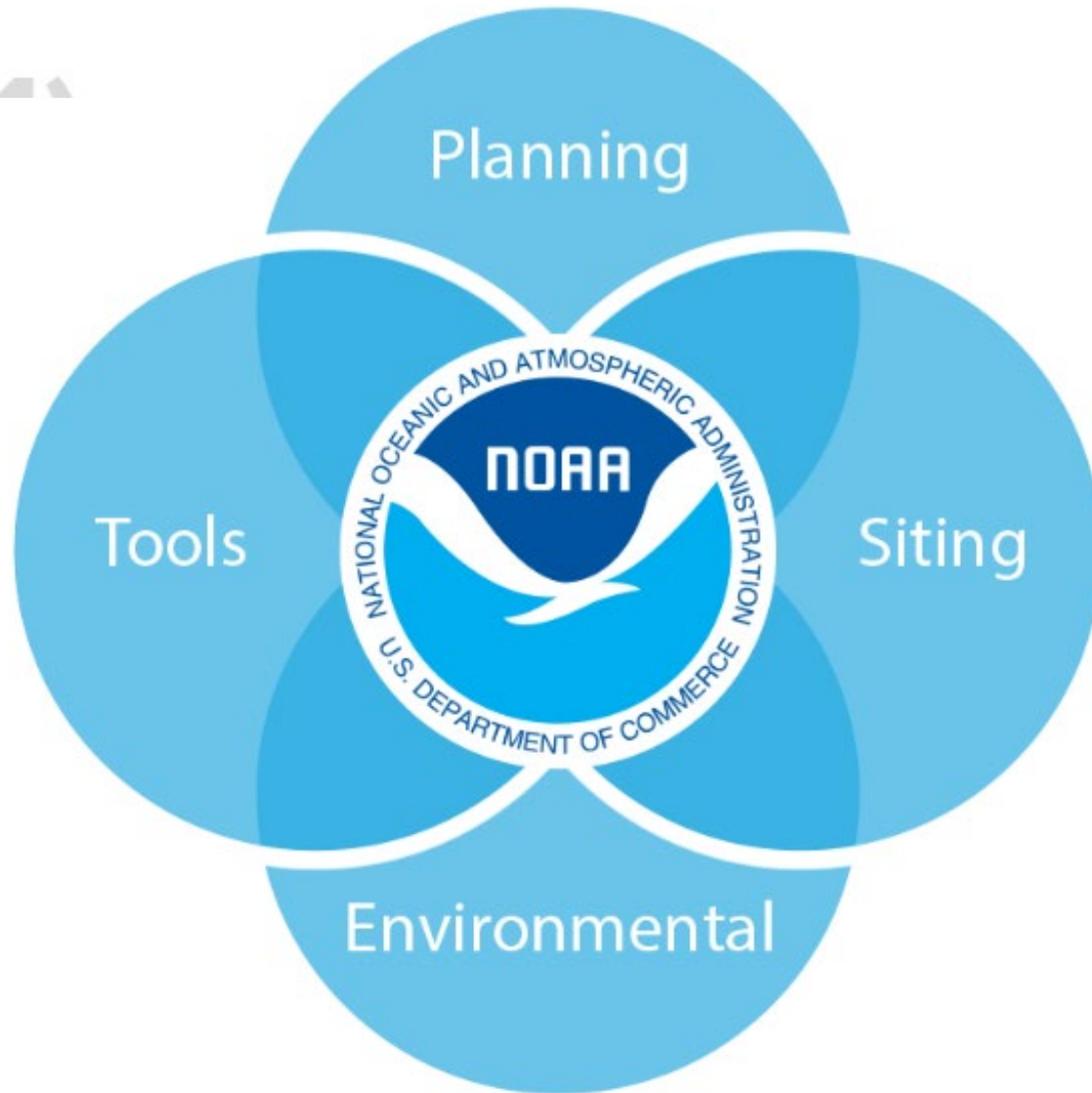
**Ken Riley, James Morris, and team  
members**

NOAA/NOS/NCCOS/Marine Spatial Ecology Division  
[ken.riley@noaa.gov](mailto:ken.riley@noaa.gov); [james.morris@noaa.gov](mailto:james.morris@noaa.gov)





# The Ocean Service AquaPortfolio



# Coastal Manager Support

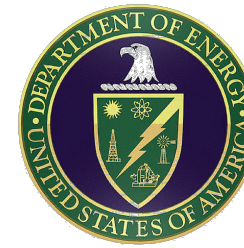
*We have developed a blended research and services portfolio. Services inform science; science inform services.*

## Types of support

Marine spatial planning  
Environmental modeling  
Environmental science advice  
Engineering review



## Customers - All federal and state agencies



**US Army Corps  
of Engineers®**



# Executive Order on Promoting American Seafood Competitiveness and Economic Growth

— ECONOMY & JOBS | Issued on: May 7, 2020



## Section 7: Aquaculture Opportunity Areas

- Calls for a total of 10 AOAs within 7 years
- AOAs can be in state or federal waters
- This is a planning exercise with intense spatial planning and environmental review
- Does not change the permitting process



**What is an Aquaculture Opportunity Area?**

**Aquaculture Opportunity Areas** show high potential for commercial aquaculture. A science and community-based approach to identifying these areas helps minimize interference with other enterprises, account for current fishing patterns, and protect the ecosystem.

AOAs will expand economic opportunities in coastal and rural areas, and increase our nation's seafood security.

AOAs use the best available science to find appropriate spaces for sustainable aquaculture.

AOAs minimize interactions with other users, such as shipping, fishing, and the military.

**Assessment and Use of AOAs**

Stakeholder input is essential in the design and location of AOAs and NOAA expects these areas will be shaped through a public process that allows constituents to share their community and stewardship goals, as well as critical insights.

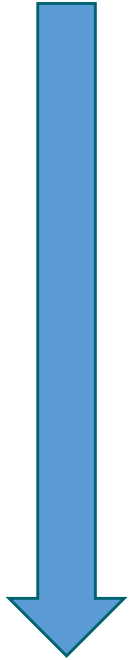
AOA size, exact location, and farm types will be determined through spatial analysis and public input to expand sustainable domestic seafood production while minimizing potential user conflicts. Farms will still need to go through the permitting process and environmental reviews.

Learn more: [fisheries.noaa.gov](https://fisheries.noaa.gov)



# AOA Year 1 Steps

**August 2020**



**May 2021**

## What:

Announced Gulf of Mexico and Southern CA as first two regions to look for AOAs

Data collection for siting analysis

Continued outreach – introduce AOA concept

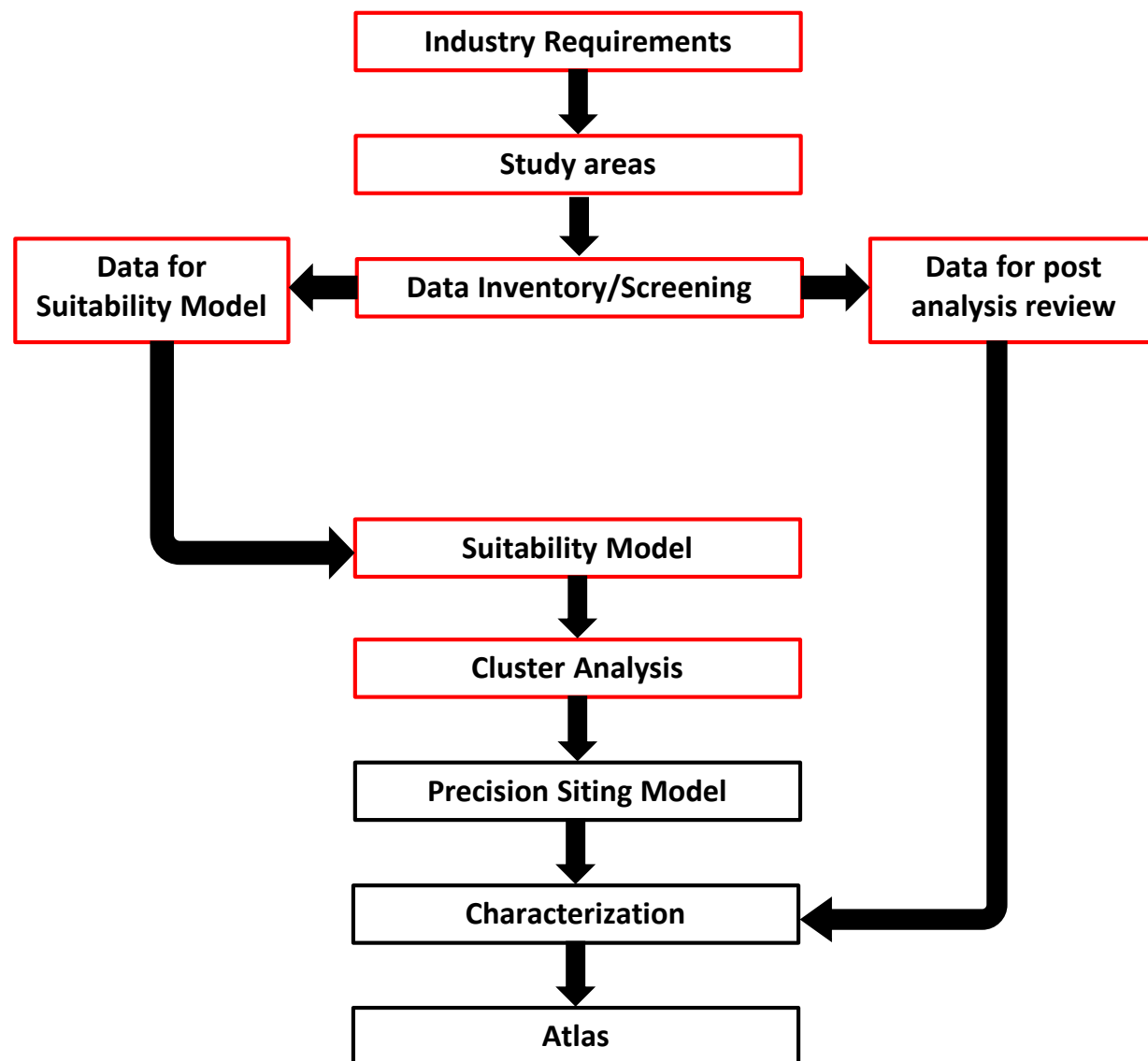
**Public Notice: request input on siting in 2 initial areas AND national to begin thinking about where to focus for next 8**

Draft “Aquaculture Opportunity Atlas”

Combine public input and results of Atlas to identify potential AOAs

Announce preliminary AOA alternatives to consider in more detail in Programmatic Environmental Impact Statement

# Spatial Planning Workflow

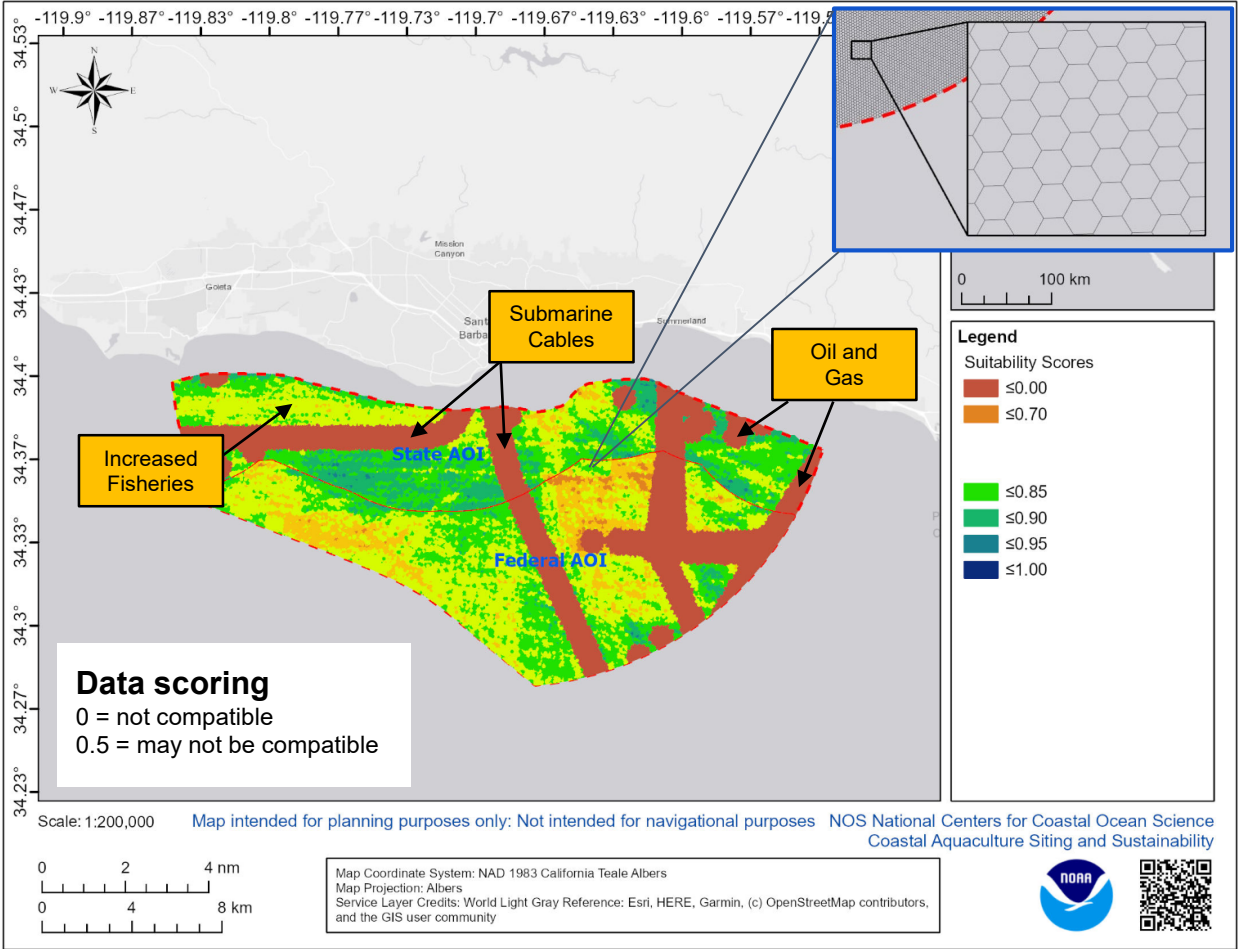


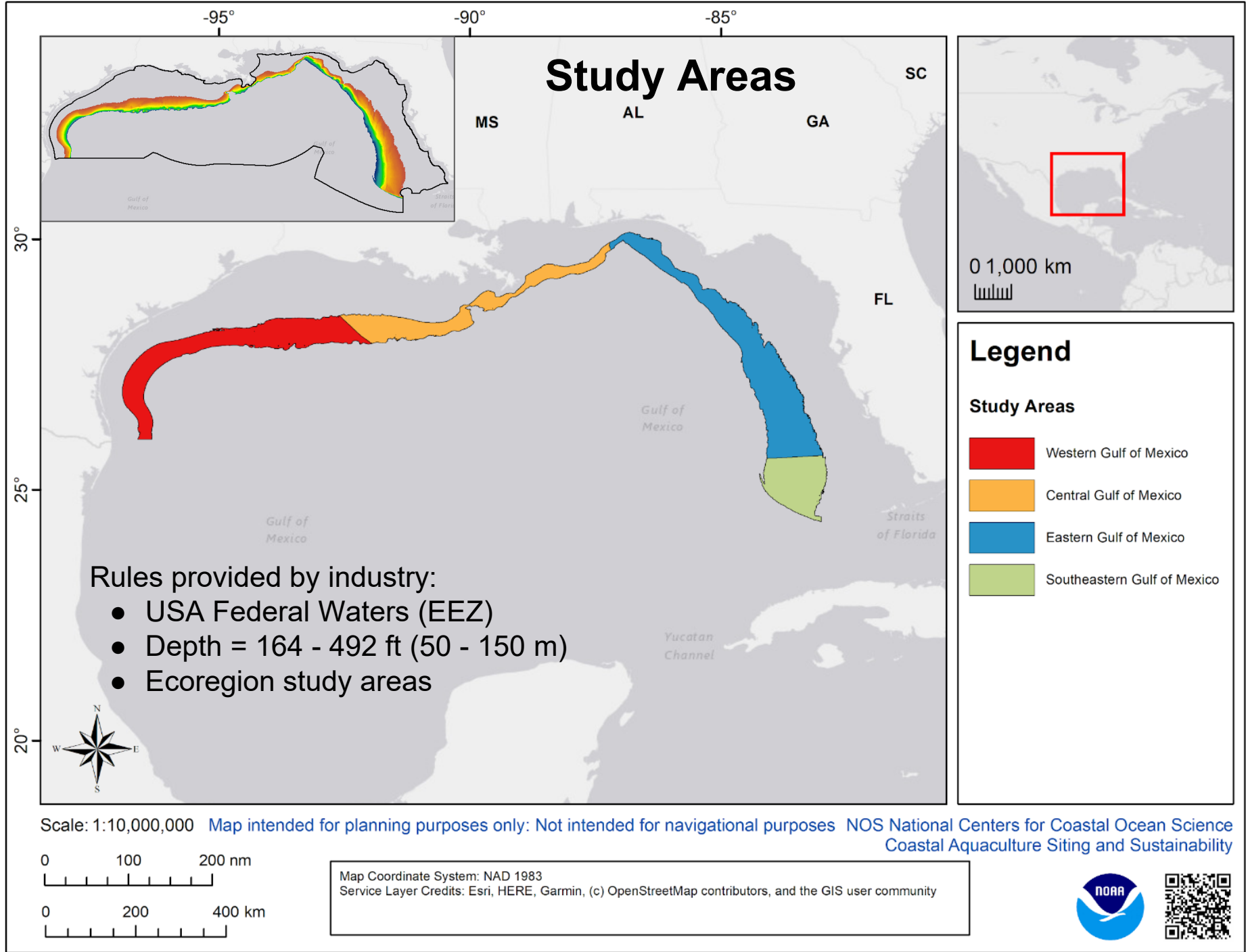
# Suitability model

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

Data	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
Submarine Cables (500 m buffer)	0
Unexploded Ordnance	0.5
Wastewater Discharge (500 m buffer)	0
Vessel Traffic (continuous data)	0 - 1
Commercial Fishing (continuous data)	0 - 1

A **suitability model** is a **model** that weights locations relative to each other based on given criteria. A **common scale** allows for meaningful values to be produced when the criteria are combined. **Data** must be **transformed** into a common scale so the criteria can be compared. We are using a 0 to 1 scale.

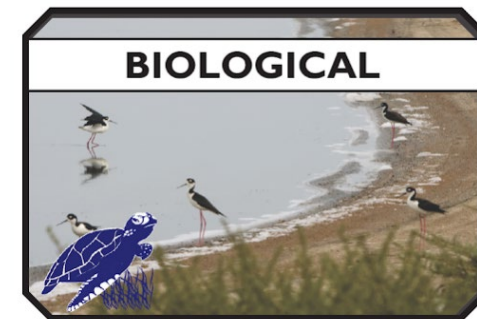
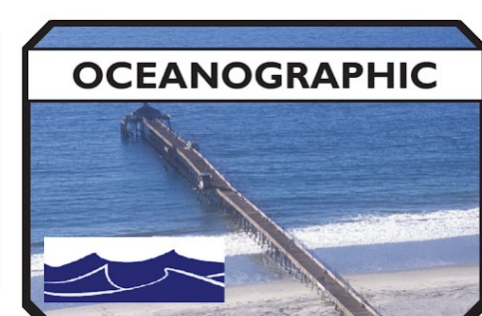




# Data Inventory Results

## Gulf of Mexico

Submodels	Model	Characterization	Total
National Security	41	12	53
Natural Resources	19	54	73
Industry, Navigation, and Transportation	23	35	58
Commercial Fishing and Aquaculture	7	4	11
<b>Total layers</b>	<b>90</b>	<b>105</b>	<b>195</b>

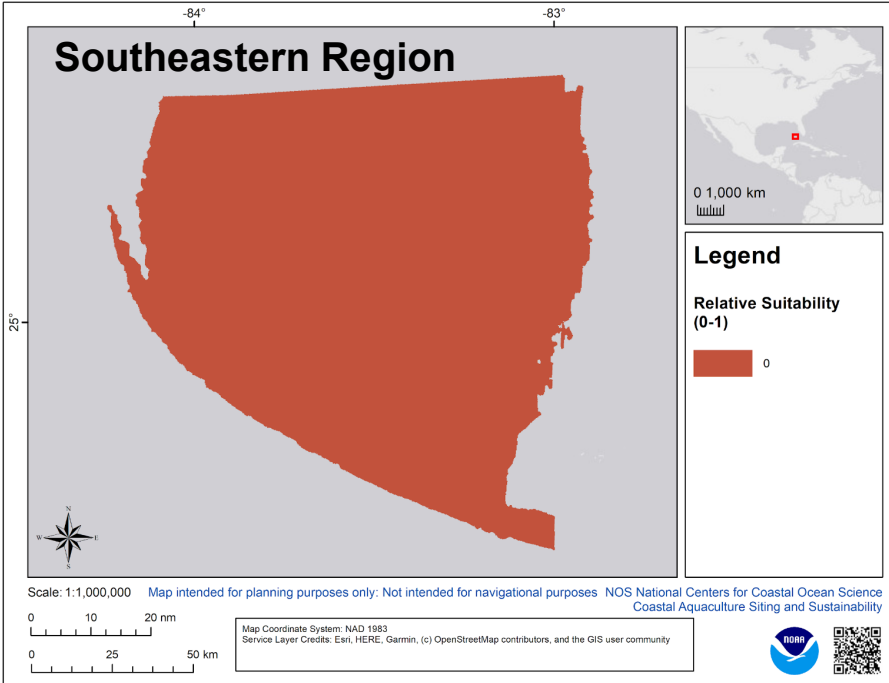
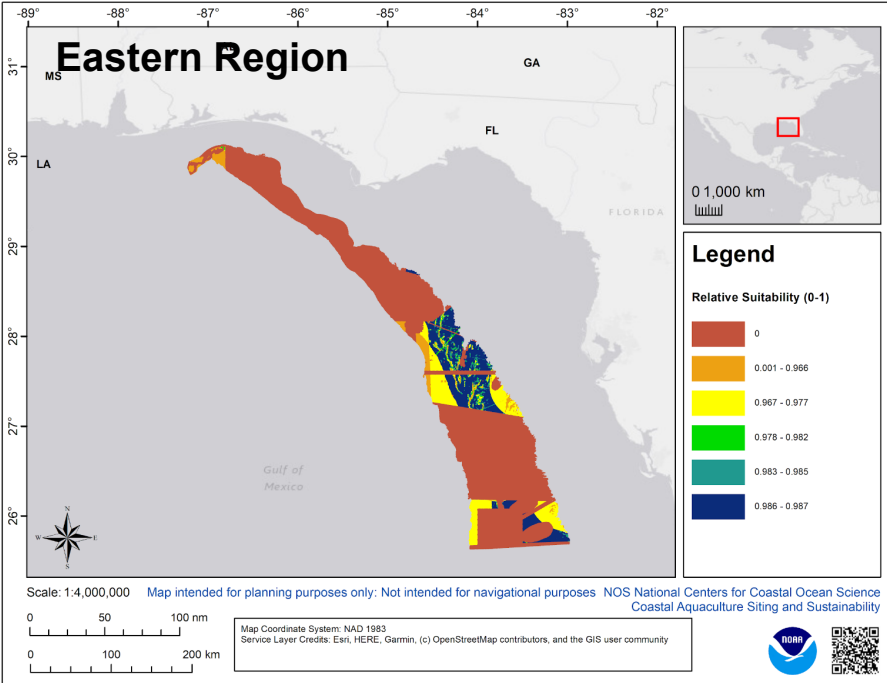
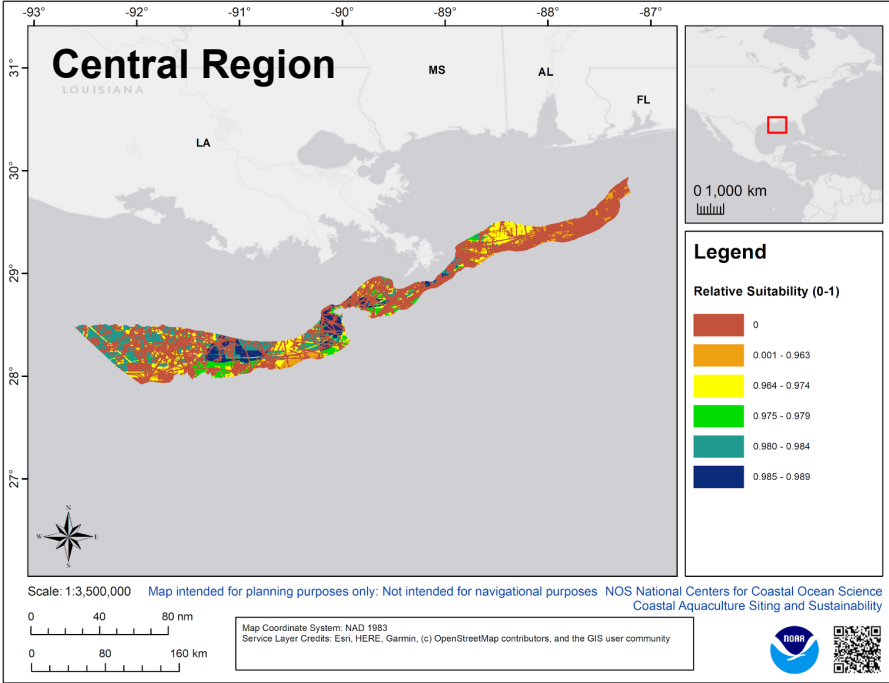
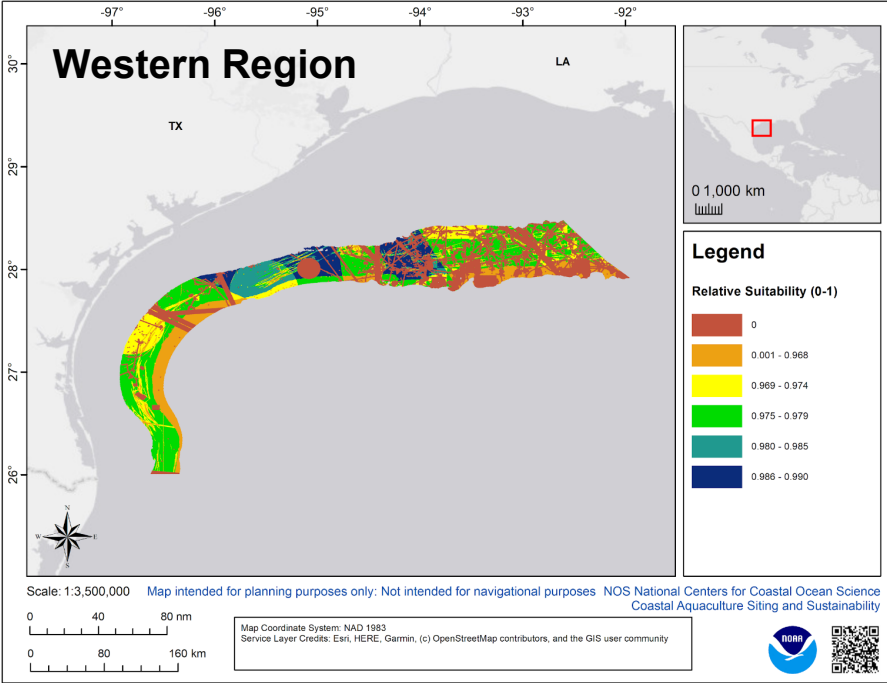


**Additional data will be included: boundaries, oceanography, weather, and social and cultural resources.**

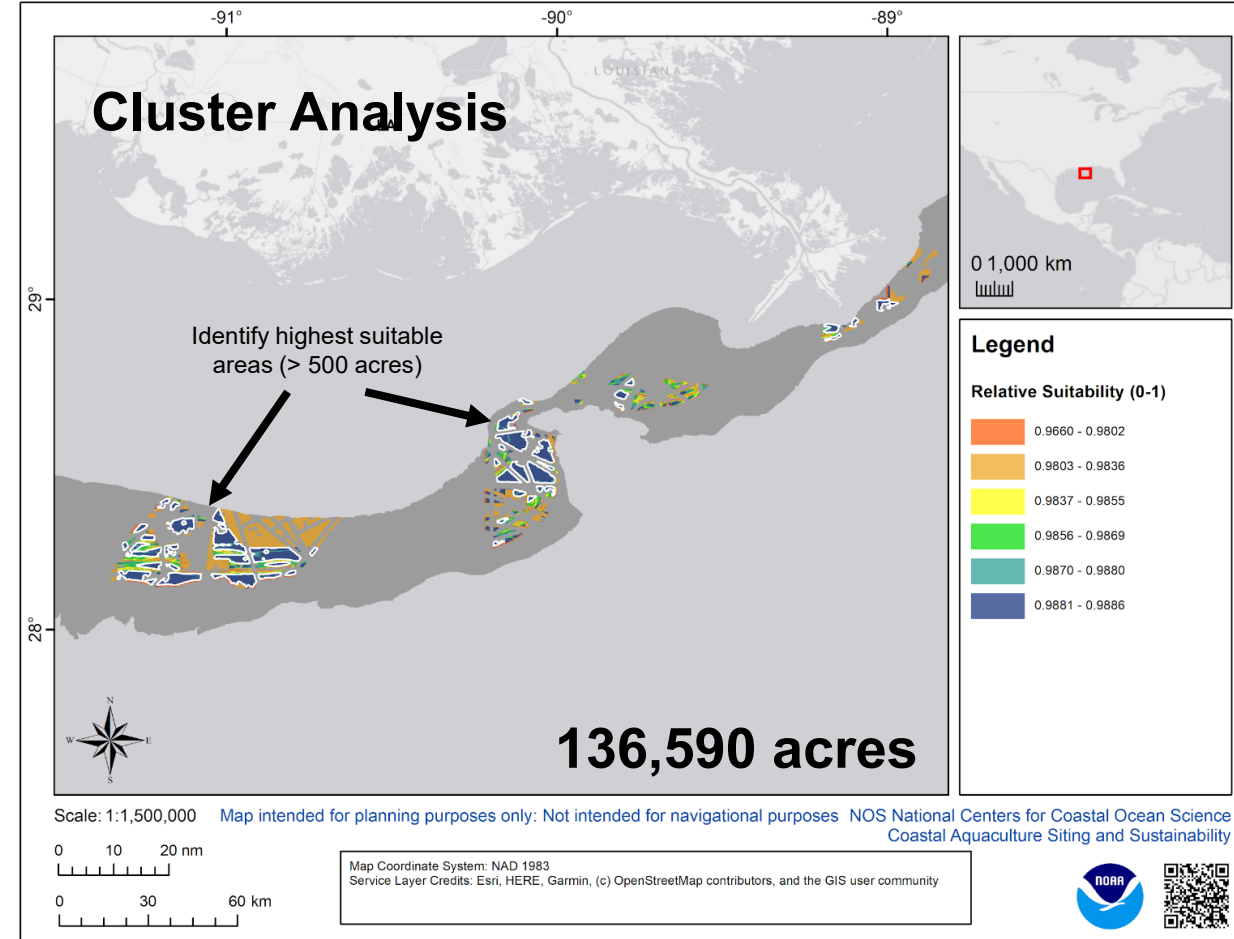
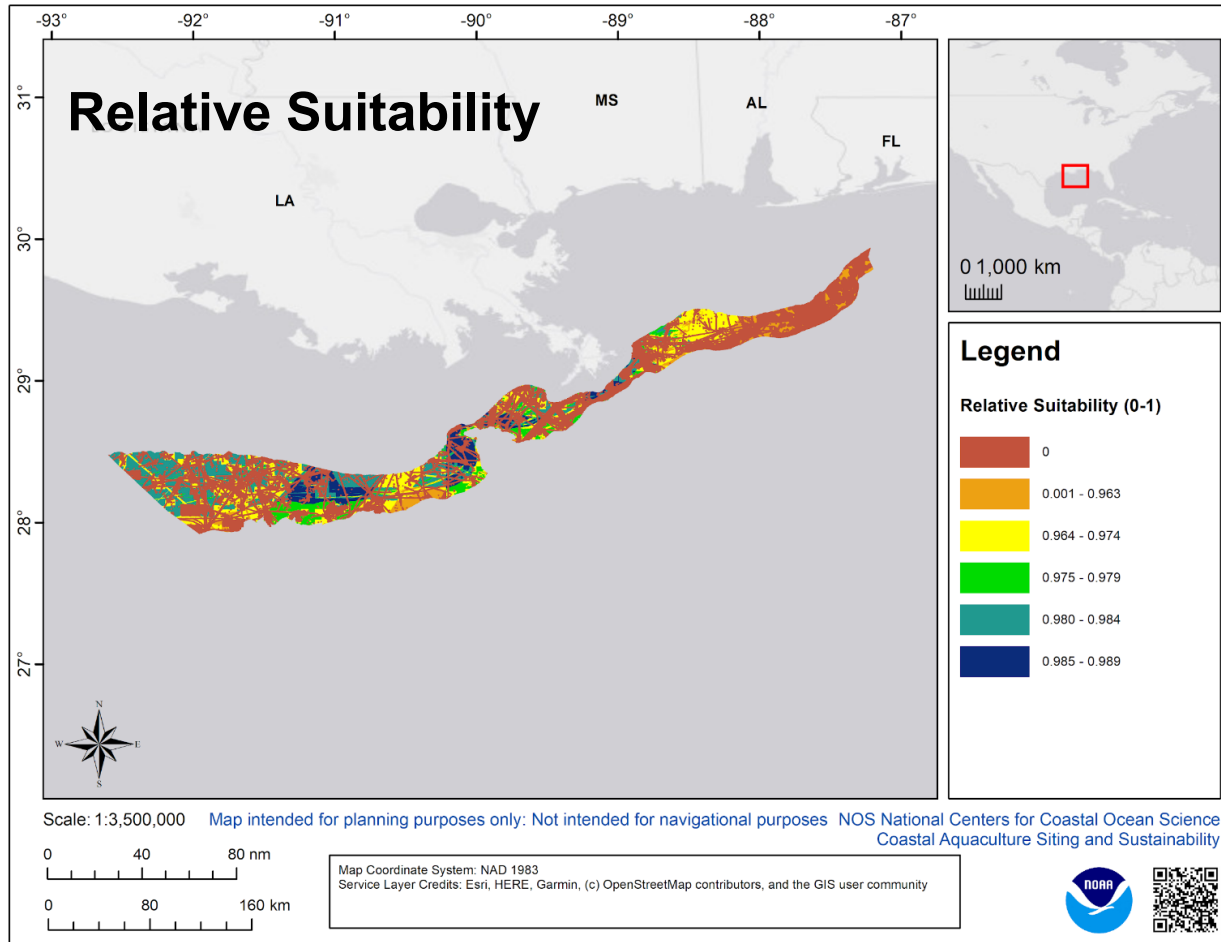


# Overall suitability (90 data layers)

- We aim to identify 3 AOA alternatives (500 to 2000 acres) per regional study area.
- We will not identify any AOAs in the southeastern region because of military activities.



# Next Steps: Locate Alternative Locations



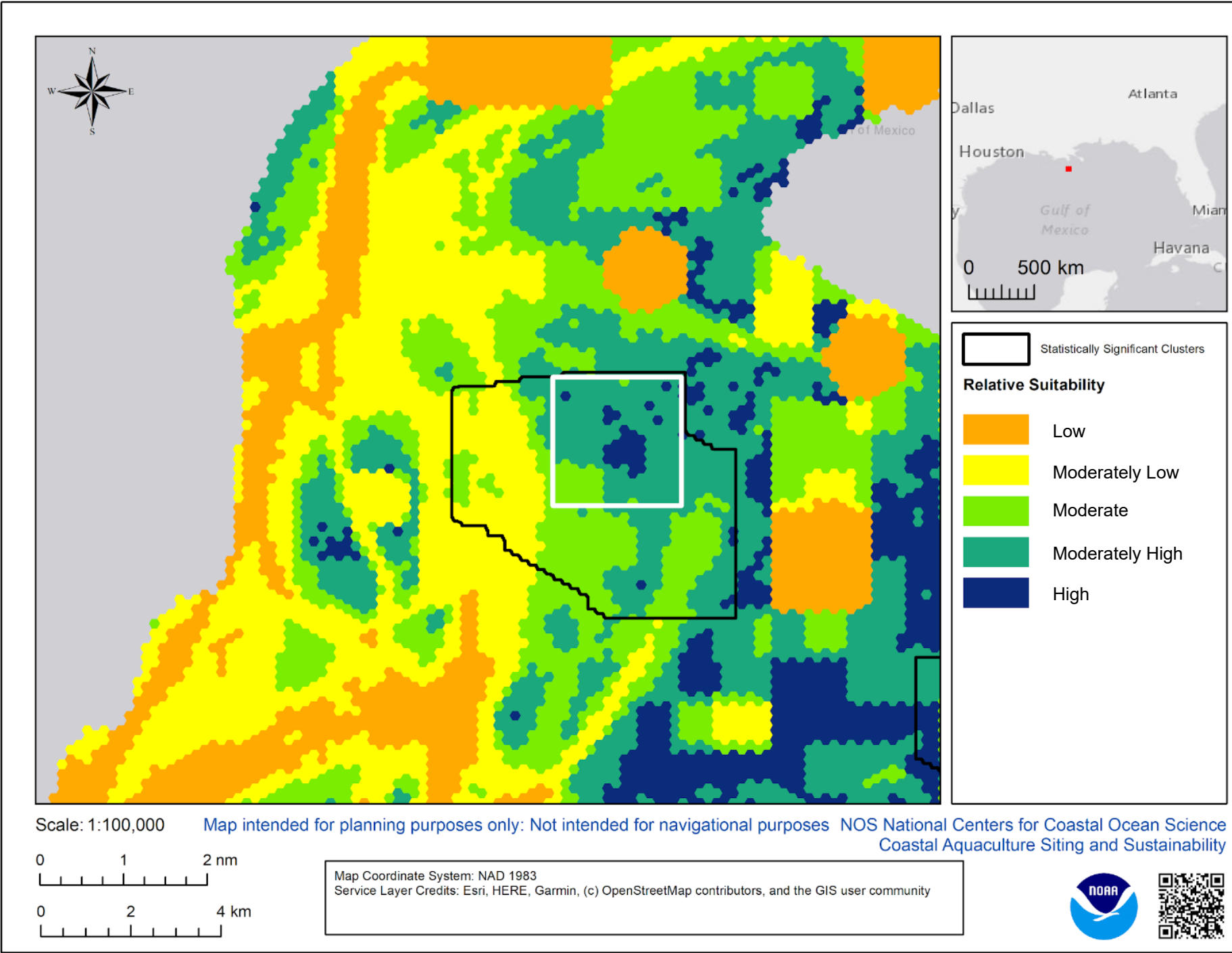
*Important: These are not AOAs. This area is where we might consider looking and using the precision siting model.*

*Example for demonstration only*

# Next Steps: Precision Siting Analysis

Example of how the  
precision siting  
model seeks to  
optimally site a  
potential AOA

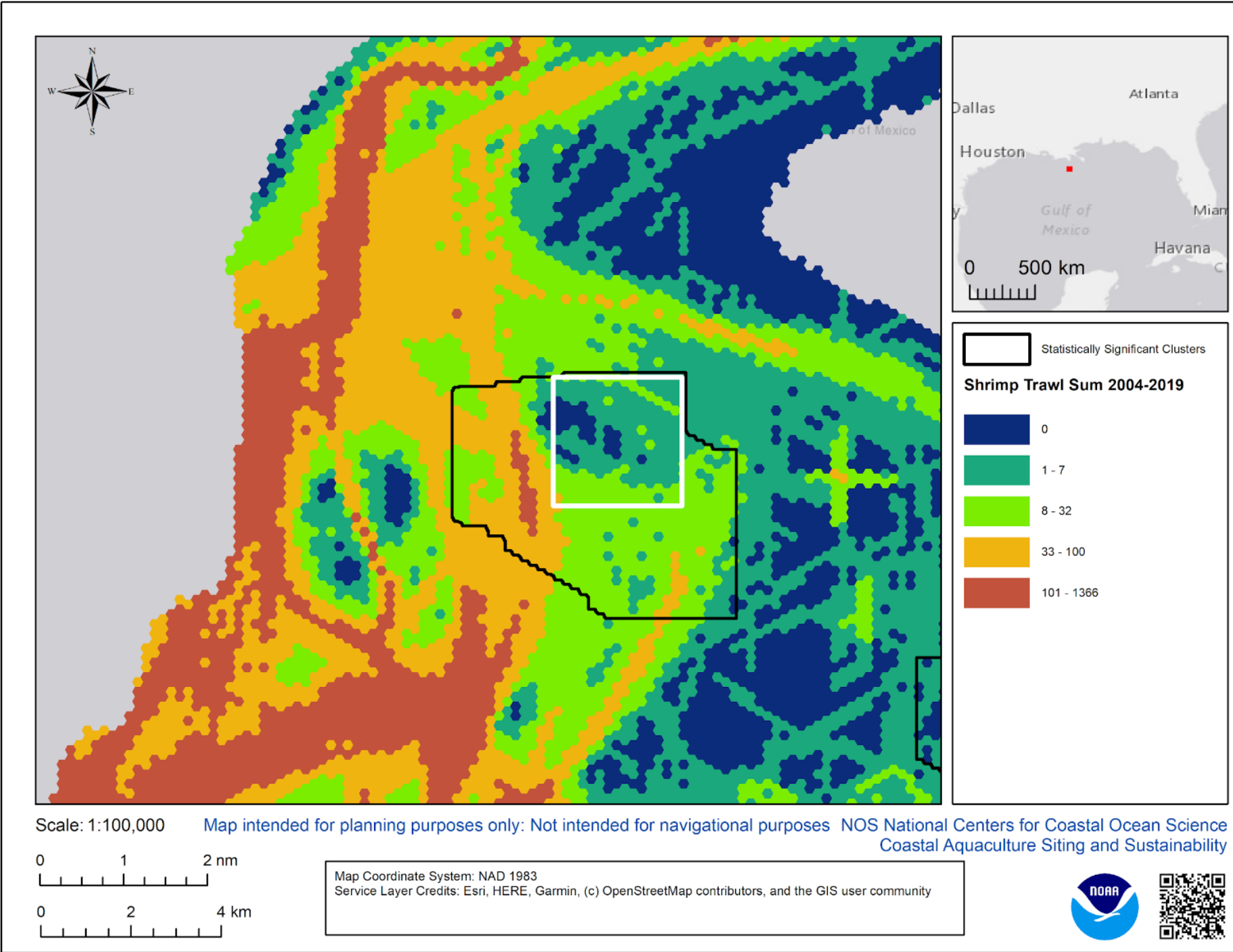
White box is a  
2000 acre site



# Next Steps: Precision Siting Analysis

Example of how the  
precision siting  
model seeks to  
minimize interactions  
with shrimp trawling

White box is a  
2000 acre site



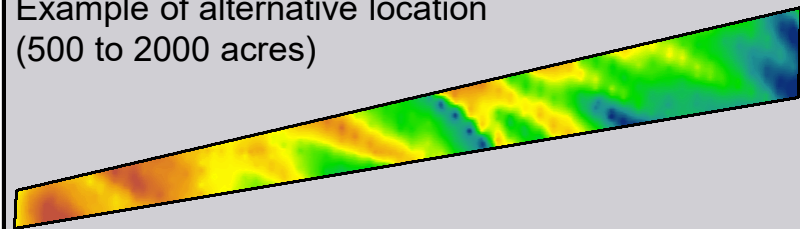
# Next Steps: Characterize alternative locations



Parameter	Location A	Location B	Location C	Location D
Area (Acres)	390	1630	2640	840
Mean Suitability Score	0.86	0.86	0.84	0.86
Mean Bathymetry	44	39	37	33
Mean Slope	0.30	0.43	0.71	0.47
Mean Sediment grain size	0.29	0.68	0.43	0.32
Wave Height hours	50	54	68	58
Temperature hours	3933	3924	3908	3904
Mean VMS Traffic (2009-2019)	23	24	17	12
AIS 2017 Other vessel transits per 1 ha	1.66	2.31	1.90	2.84
AIS 2017 Tug/Tow vessel transits per 1 ha	0.24	0.13	0.33	0.45
AIS 2017 Tanker vessel transits per 1 ha	0	0	0	0
AIS 2017 Pleasure vessel transits per 1 ha	3.66	1.37	1.43	4.04
AIS 2017 Passenger vessel transits per 1 ha	1.03	5.50	3.66	0.57
AIS 2017 Cargo vessel transits per 1 ha	0	0	0	0
AIS 2017 Fishing vessel transits per 1 ha	0.43	1.21	2.38	0.50
Closest Port	Rye Harbor	Hampton Harbor	Newburyport	Newburyport
EPA Region	1	1	1	1
Coast Guard District	1	1	1	1
US Army Corps of Engineers District	New England	New England	New England	New England
Unexploded Ordnance	Yes	No	No	No

EXAMPLE

Example of alternative location  
(500 to 2000 acres)





# Next Steps: Develop the atlas



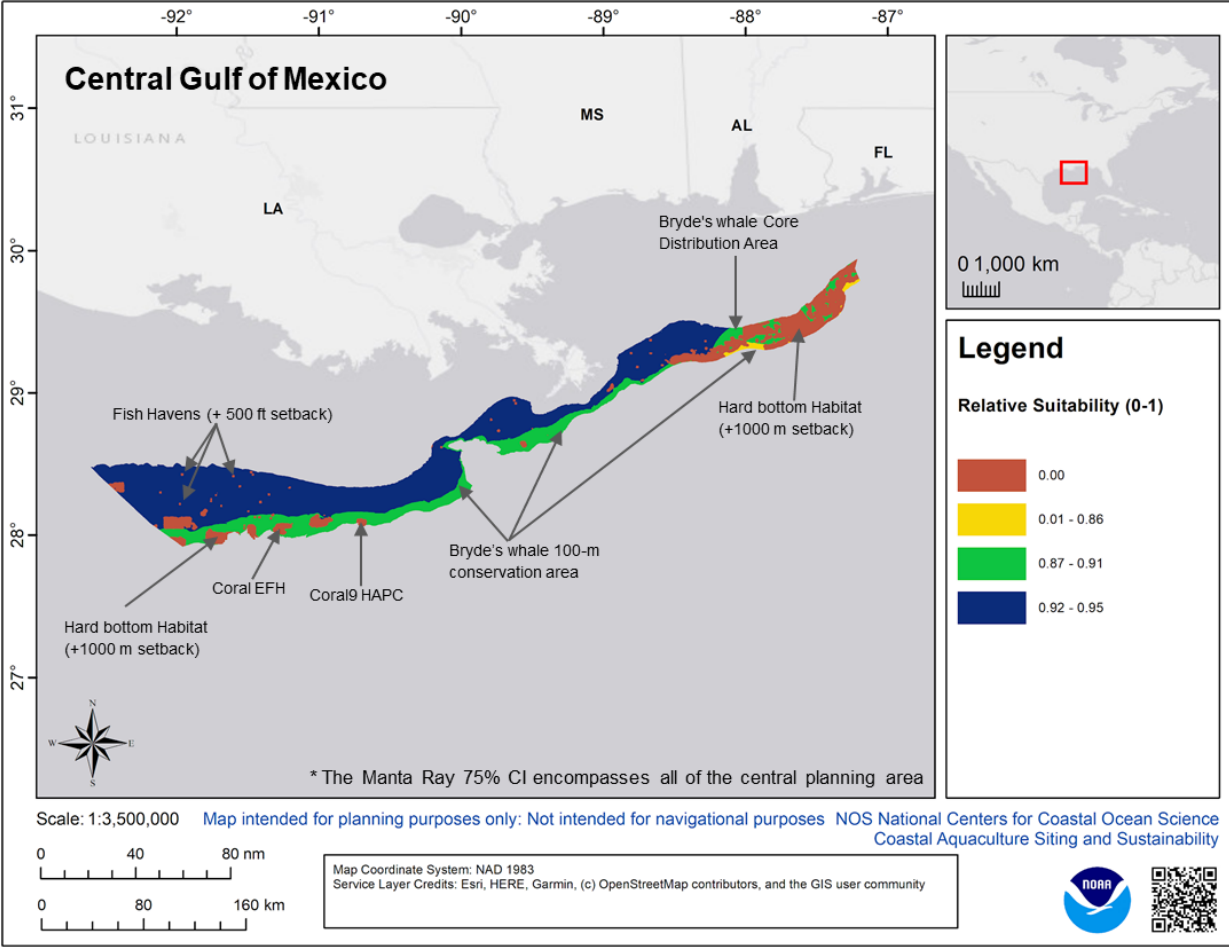
## Additional Steps:

- Model vetting with stakeholders
- DOD Mission Compatibility Assessment
- Precision siting analysis
- Characterization of alternatives
- Atlas review and revision
- Atlas publication

# Natural Resources Submodel

## Central Gulf of Mexico

Dataset	#cells	Area in AOI (ac)	Percentage
Manta Ray Core Distribution Area	436,647	4,366,470	100
Bryde's Whale 100-m depth conservation area	97,586	975,860	22
Bryde's Whale Core Distribution Area	56,411	564,110	13
Hard bottom and coral reef predictive model (with 1000-m buffer)	56,686	566,860	13
Fish Havens (with 500-ft buffer)	15,540	155,400	4
Coral EFH	13,978	139,780	3
BOEM (No Activity Zone, 1000-m buffer)	3,285	32,850	1
Coral 9 HAPC Regulated areas	2,836	28,360	1
Coral 9 HAPC	2,521	25,210	1
Deep Sea Coral Observations (1985 - present)	1,995	19,950	< 1
Artificial reefs (with 500-ft buffer)	994	9,940	< 1



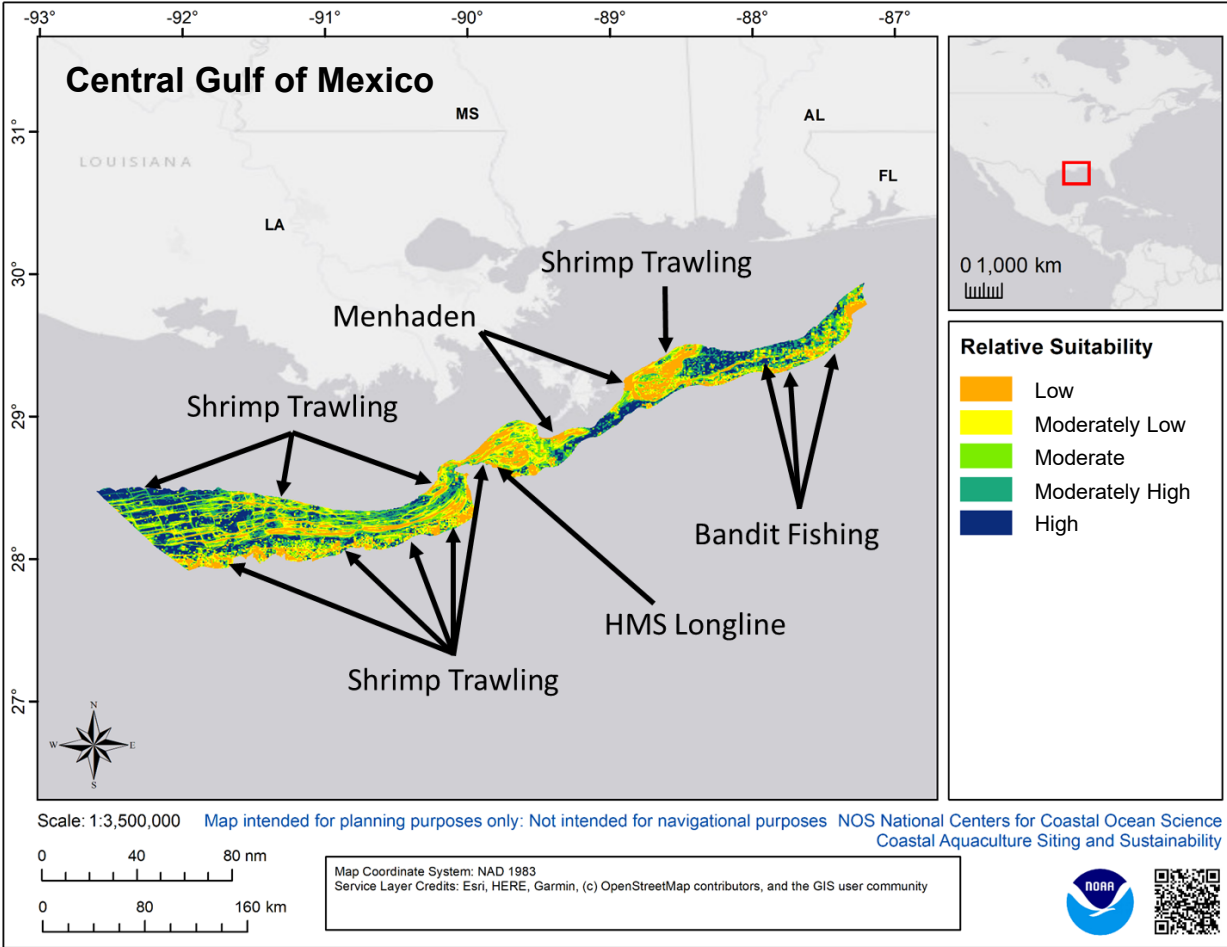
### Important:

- We examined 4,366,470 acres in the Central Gulf of Mexico study area
- We aim to identify up to 3 AOA alternatives (500 to 2000 acres) in this study area
- Equates to less than 0.05% of the study area

# Fishing and Aquaculture Submodel

## Central Gulf of Mexico

Dataset	#cells	Area in AOI (ac)	Percentage
Shrimp Trawling Electronic Logbook (2004 - 2019)	340,349	3,403,490	78
Bandit Reef Fish (2007 - 2019)	282,046	2,820,460	65
Longline Reef Fish Point Data (2007 - 2019)	134,037	1,340,370	31
SE Region Headboat Survey (2014 - 2020)	30,451	304,510	7
Menhaden Catch Records (2000 - 2016)	4,773	47,730	1
Highly Migratory Species Longline (1993 – 2019)	900	9,000	< 1



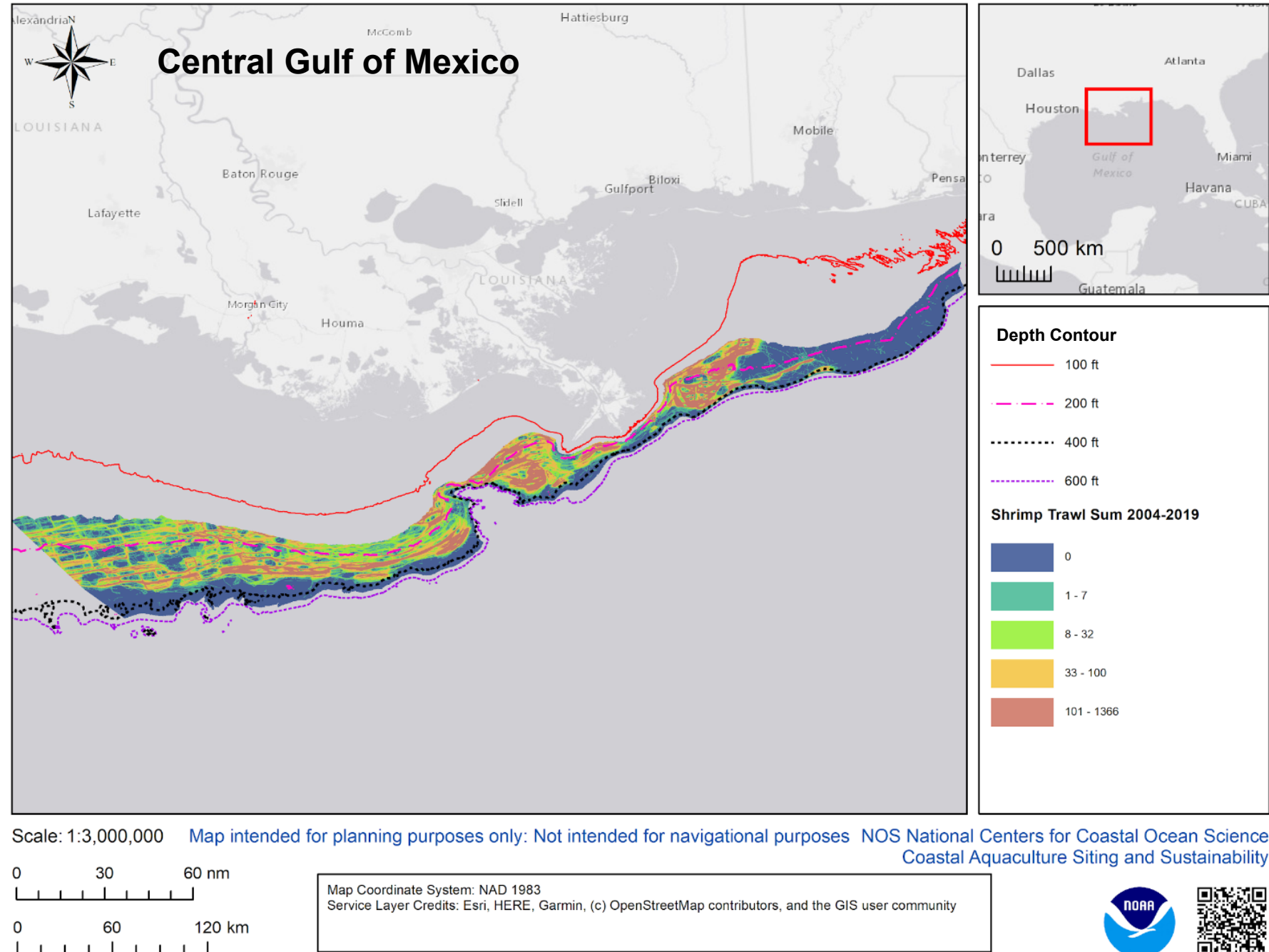
### Important:

- We examined 4,366,470 acres in the Central Gulf of Mexico study area
- We aim to identify up to 3 AOA alternatives (500 to 2000 acres) in this study area
- Equates to less than 0.05% of the study area

# Data Example

## Commercial Shrimp Fishery

- Data collected Gulf Shrimp Electronic Logbook Program
- The number of participants varies annually, with a range of 30% to 50% of of SPGM permits included
- Trawling was assumed at speeds ranging from 2.0 to 3.8 knots
- Red corresponds to high trawl counts, while blue represents relatively low counts over 15 year period

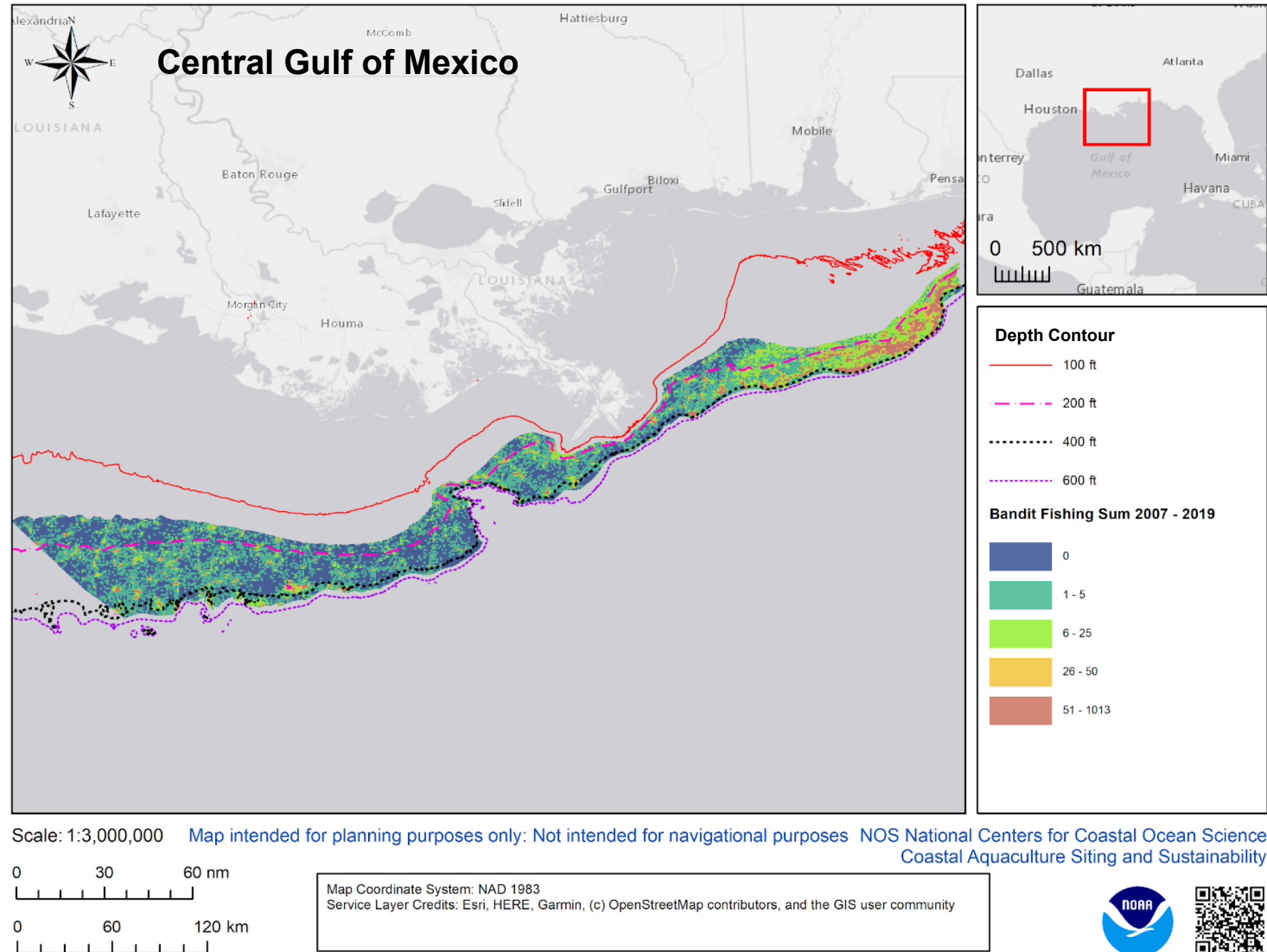




# Data Example

## Commercial Bandit Reef Fish Fishery

- Data represent Federally permitted vessels
- Primary gear includes vertical lines (bandit or handline)
- Many reef fish species retained, but primarily targets snappers (*Lutjanus* spp.) and groupers (*Epinepheus* spp.)
- Certain areas for reef fish are closed or restricted based on gear type.

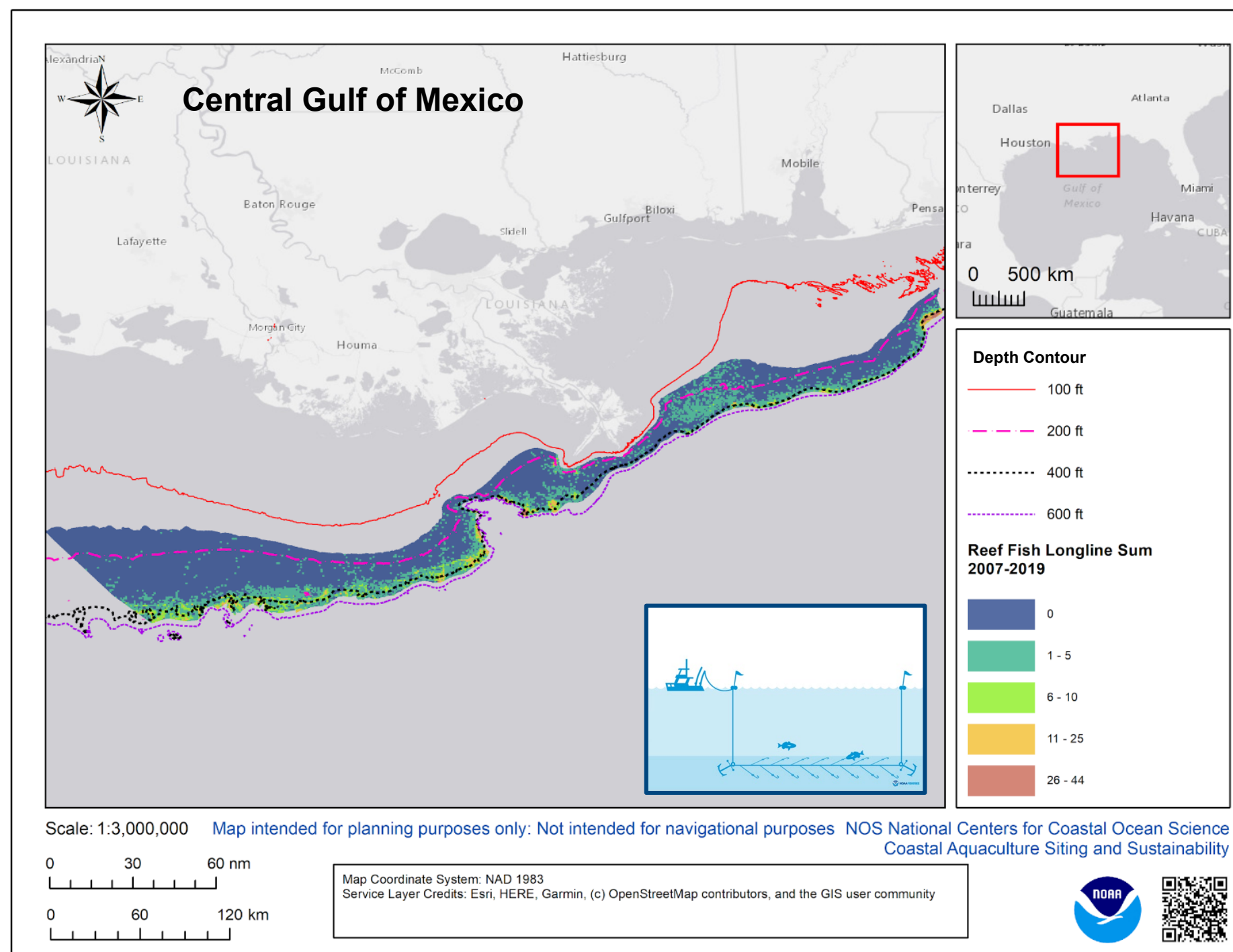




# Data Example

## Reef Fish Longline

- Data represent Federally permitted vessels
- Primary gear includes bottom longline
- Many reef fish species retained, but primarily targets snappers (*Lutjanus* spp.) and groupers (*Epinepheus* spp.)
- Certain areas for reef fish are closed or restricted based on gear type.

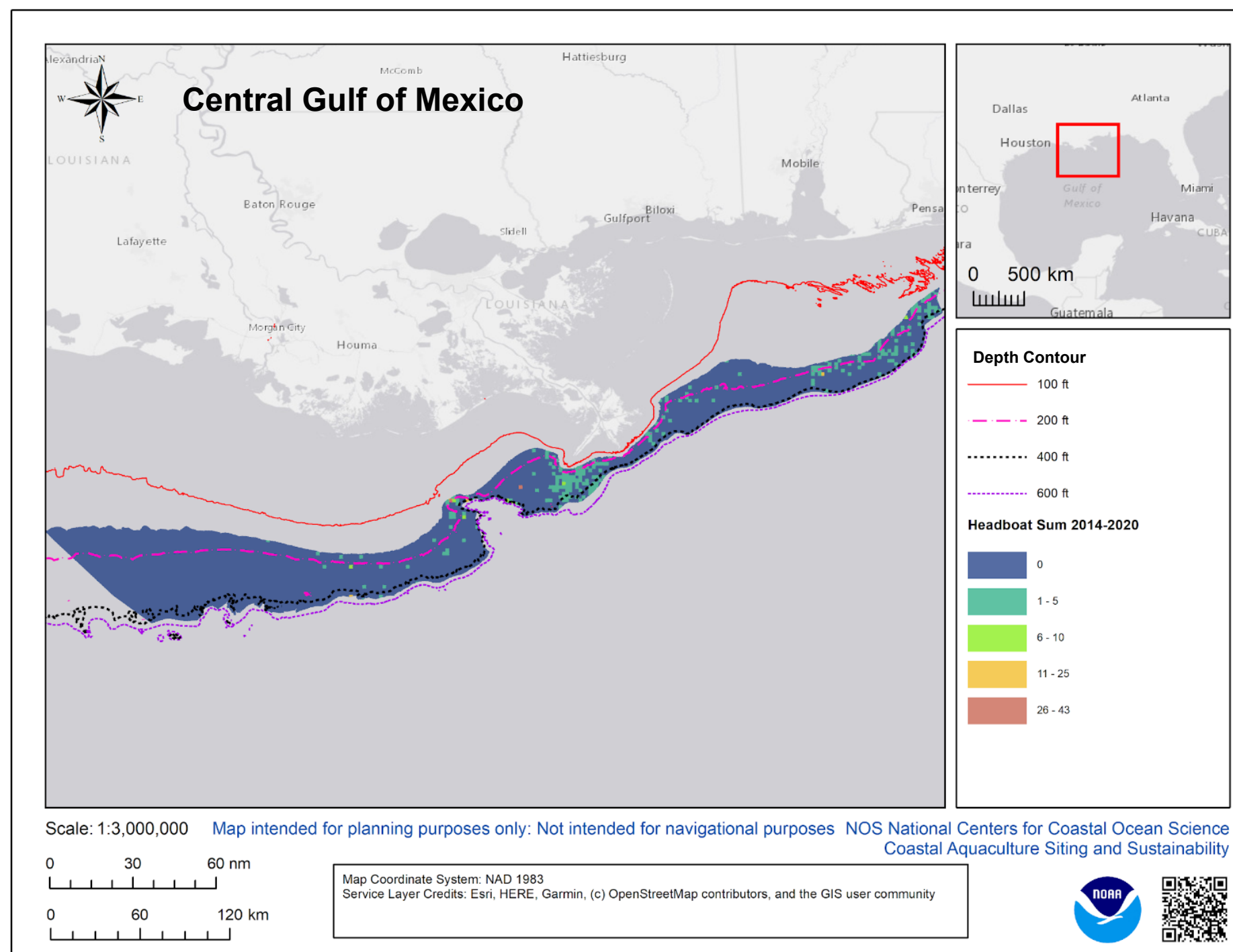


# Data Example

## NMFS Southeast Region Headboat Survey

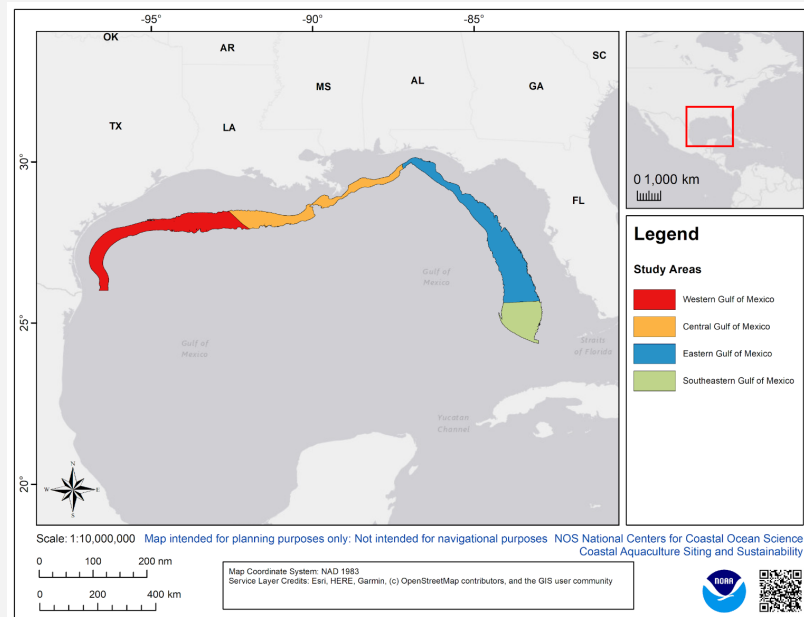
- Fishery represents vessels that allow recreational anglers to pay a per person fee for full day or partial day trips
- Operations target species among reef fish complex and coastal migratory pelagics
- Fishing occurs near naturally occurring reefs, hard bottom, rocky formations, artificial reefs, or other constructed materials whose structure favors accumulation of reef fish

More information available at:  
<https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/mfr7911.pdf>

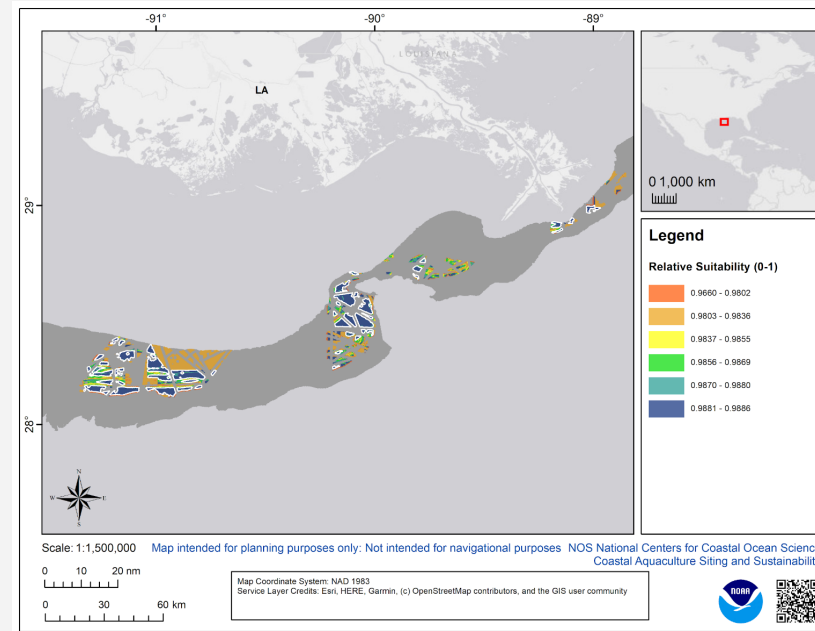


# Reminder: These are not potential AOAs. NOAA has not yet identified potential AOAs or alternatives.

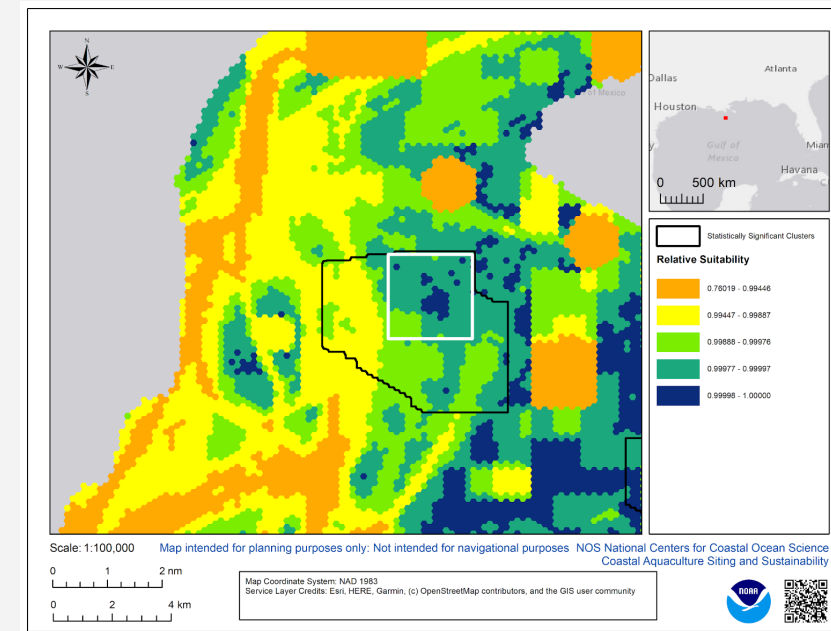
## Study Areas



## Cluster Analysis Example



## Precision Siting Example



- AOAs focus on spatial analysis and environmental planning. They are not regulatory; NMFS is not permitting or authorizing aquaculture through AOAs.
- The identification of AOAs would not prohibit other legal activities from occurring within AOAs.
- AOAs are not related to any specific permit application.



# Questions and Discussion



**James Morris**  
Program Lead  
POC: Southern California AOAs  
[james.morris@noaa.gov](mailto:james.morris@noaa.gov)  
252.728.8782

**Kenneth Riley**  
POC: Gulf of Mexico AOAs  
[ken.riley@noaa.gov](mailto:ken.riley@noaa.gov)  
252.728.8750