Manna Fish Farms, Gulf of Mexico Finfish Farm Operations

Presenter: Kelly Lucas

Agent, University of Southern Mississippi

Overview

- Team introductions
- Applicant introduction, Manna Fish Farms
- Site requirements and species information
- Site screening
- Bathymetric Survey
- Cage information
- Farm Design and gear information
- Production plan and feed usage

Introductions

- Donna Lanzetta (CEO and founder), Mike Meeker, (COO & inventor Storm Safe Submersible Cage), Zach Davonski, Ocean Engineer, Manna Fish Farms
- Reg Blaylock & Angelos Apeitos, University of Southern Mississippi
- Stephanie Showalter Otts & Kristina Alexander, University of Mississippi, MS-AL Sea Grant & Sea Grant Law Center
- Michael Chambers, University of New Hampshire & NH Sea Grant
- Ken Riley, James Morris Jr., Lisa C. Wickliffe, & Jon Jossart - NOAA, National Centers for Coastal Ocean Science

Manna Fish Farms

- Committed to:
  - Sustainability
  - Transparency
  - Best Aquaculture Practices
- Permitting Finfish Farms
  - Gulf of Mexico, off Pensacola FL
  - Northeast, off Eastern Long Island NY
- Learn more:
  - www.mannafishfarms.com

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MANNA OCEAN FOUNDATION™

Partnerships and Collaborations

CURRENT RESEARCH PARTNERS

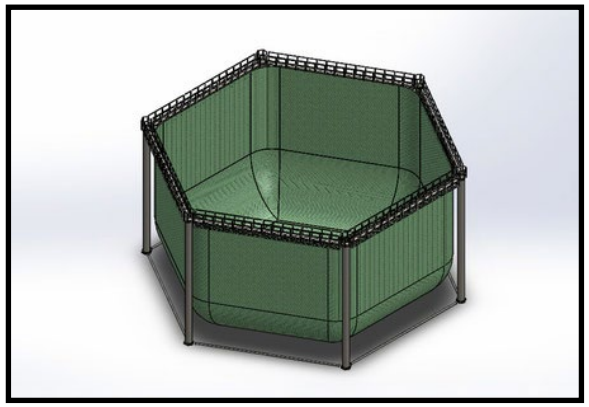
- WHOI – Nick Rypkema / Affordable robotics to support offshore aquaculture
- Pacific Northwest National Lab – Potential for colocation of offshore aquaculture and renewable energy
- MIT – Development workshop participant regarding offshore aquaculture research center
- UNH – Dr. David Berlinsky / Genetic research of striped bass
- Sandy Hook National Lab – Aquaculture Exhibit Prototype development for aquariums
- IBM – Manna Seafood Blockchain / Pilot project to convene a blockchain network for the seafood industry
- Manna Restaurant
- Manna Aquaculture Innovation Center

RESEARCH PROPOSALS/PARTNERSHIPS PENDING

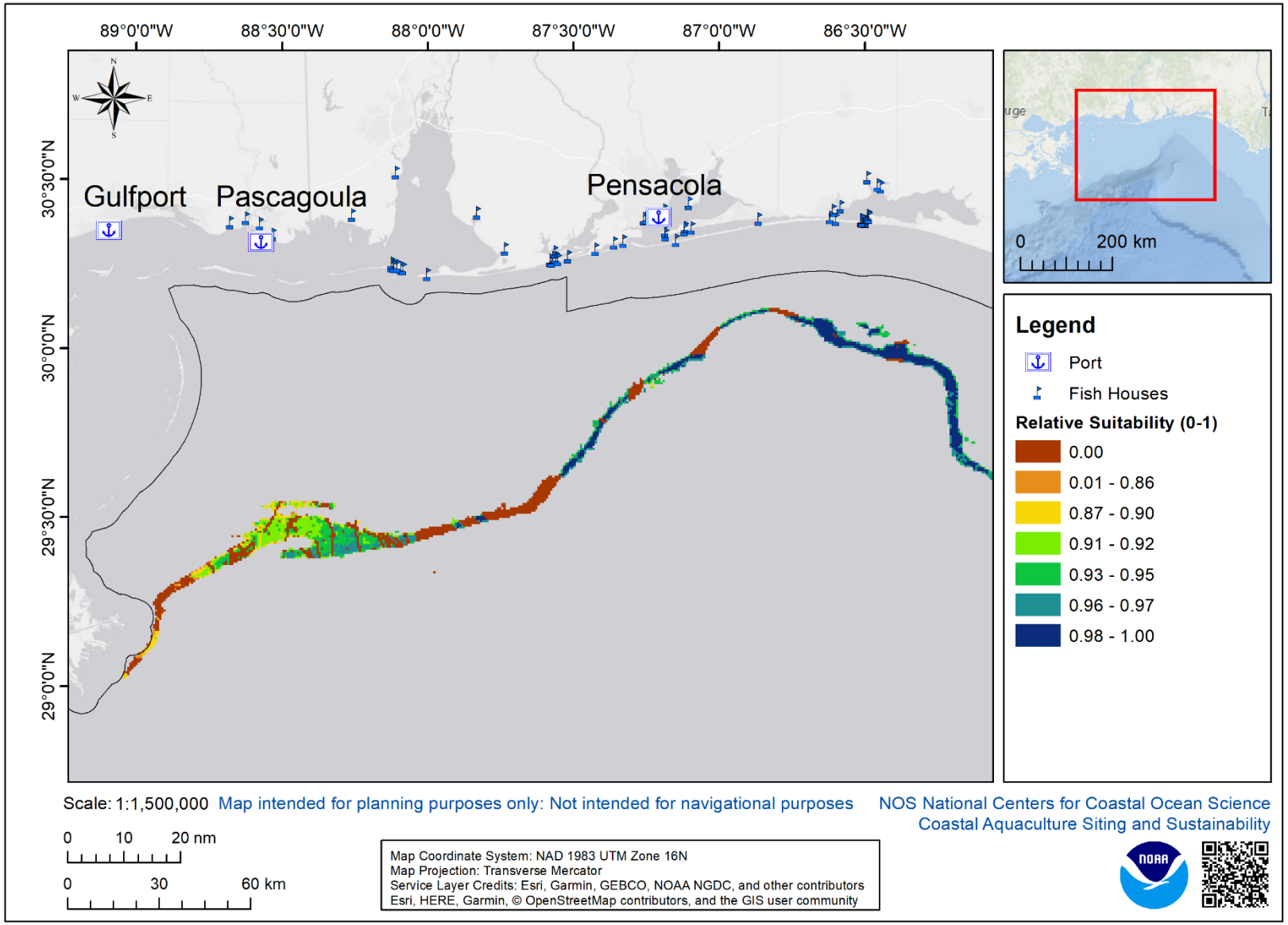
- MOTE Marine Lab - Kevan Main - Florida Sea Grant project - Improving fingerling production of Almaco Jack, Seriola rivoliana, in sustainable aquaculture systems: The role of probiotics and light properties.
- Synthetik – Josh Hatfield / AI to monitor marine mammals and potentially mitigate entanglements

Manna Fish Farms Offshore Demonstration Project

- Commercial-scale aquaculture demonstration project
- **Area of interest**: Mississippi, Alabama, Florida panhandle
- **Depth requirements**: 50 – 55 meters
- **Preferred Ports**: Pascagoula/Gulfport, MS or Pensacola, FL (Minimize farm to port distance and user conflicts)
- **Sea water temperature**: 6 – 30 °C
- **Current Speed**: > 0.15 m/s
- **Species**: *Red drum (Sciaenops ocellatus)
  Almaco jack (Seriola rivoliana)
  Striped bass *(*Morone saxatilis*) and others.*



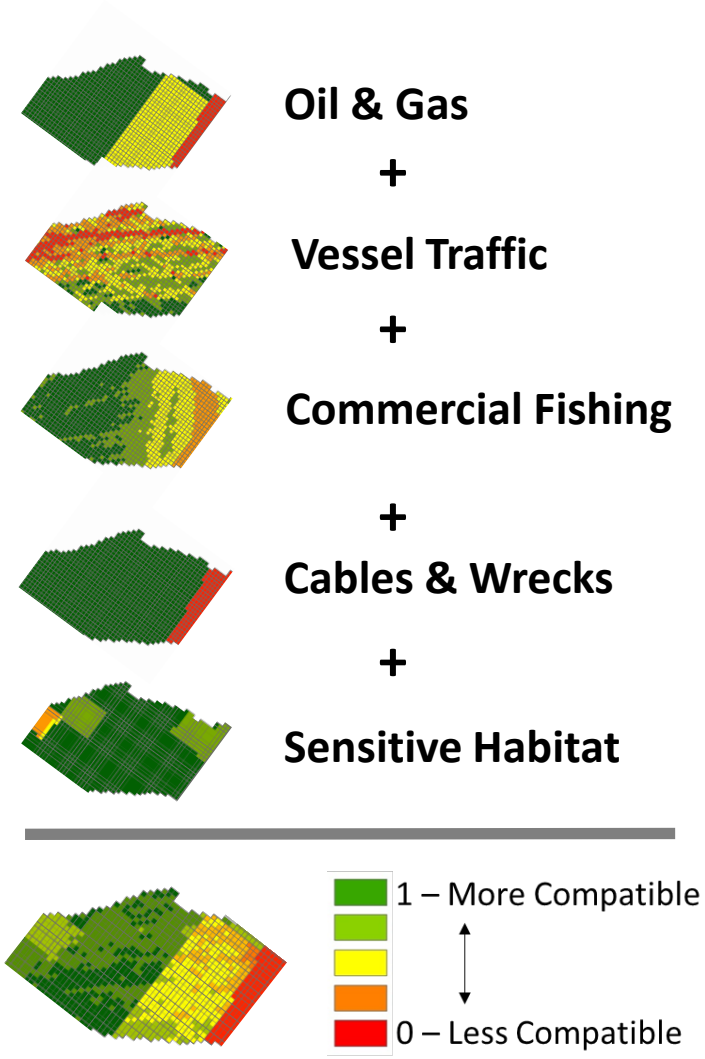
Relative Suitability within Area of Interest



Data Considered

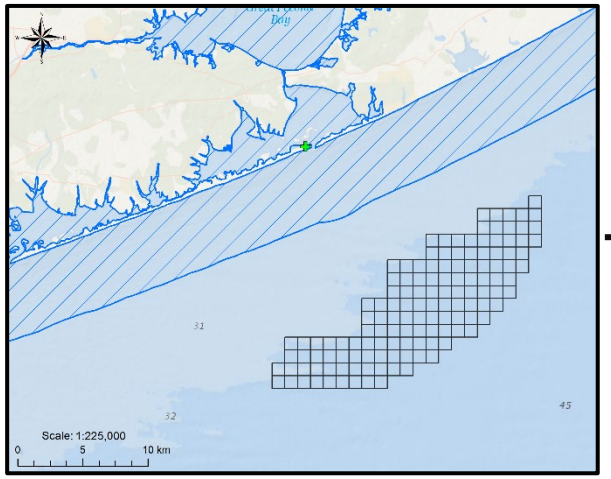
- Bathymetry
- Military
- Unexploded Ordnance
- Shipping Lanes
- AIS Vessel Traffic
- Shrimp Vessel Activity
- Submarine Cables
- Artificial Reefs
- Lightering Zones
- Oil & Gas Platforms
- Oil & Gas Well
- Oil & Gas Active Leases
- Oil & Gas Pipelines
- Shipwrecks and obstructions
- Deep Sea Coral

Siting Model

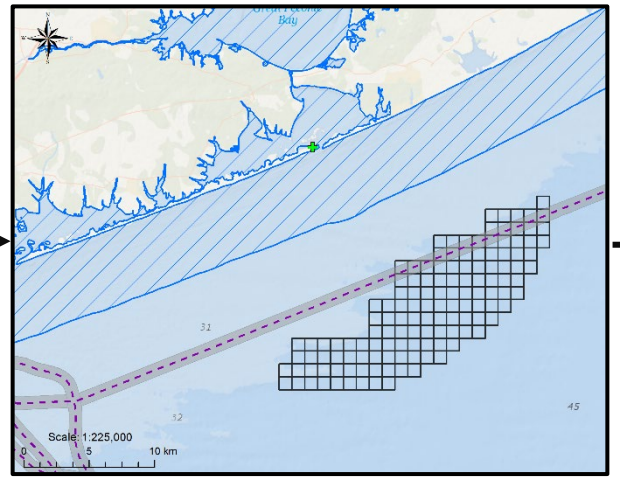


Suitability Model Methodology

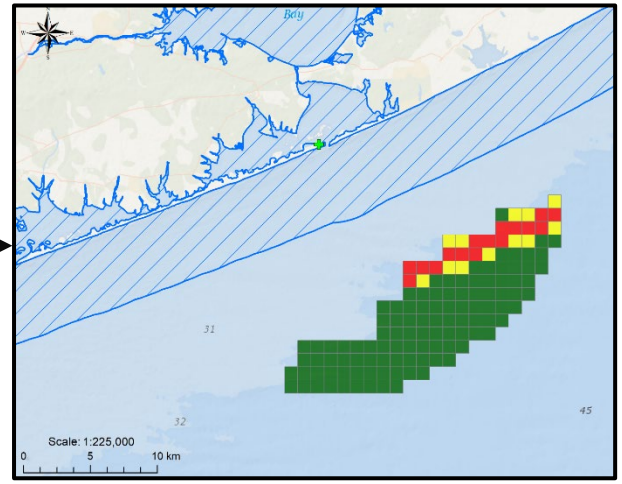
Gridded area of interest

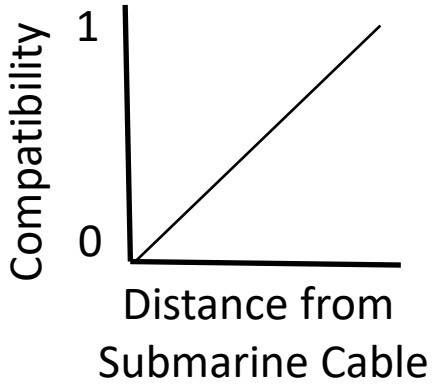


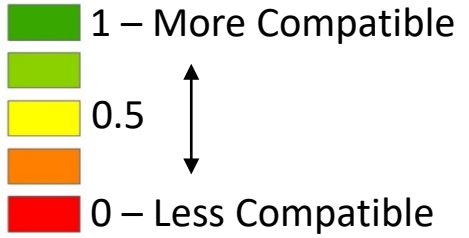
Submarine cable intersects area of interest



Grid cells far from submarine cable are assigned higher weights than those nearby

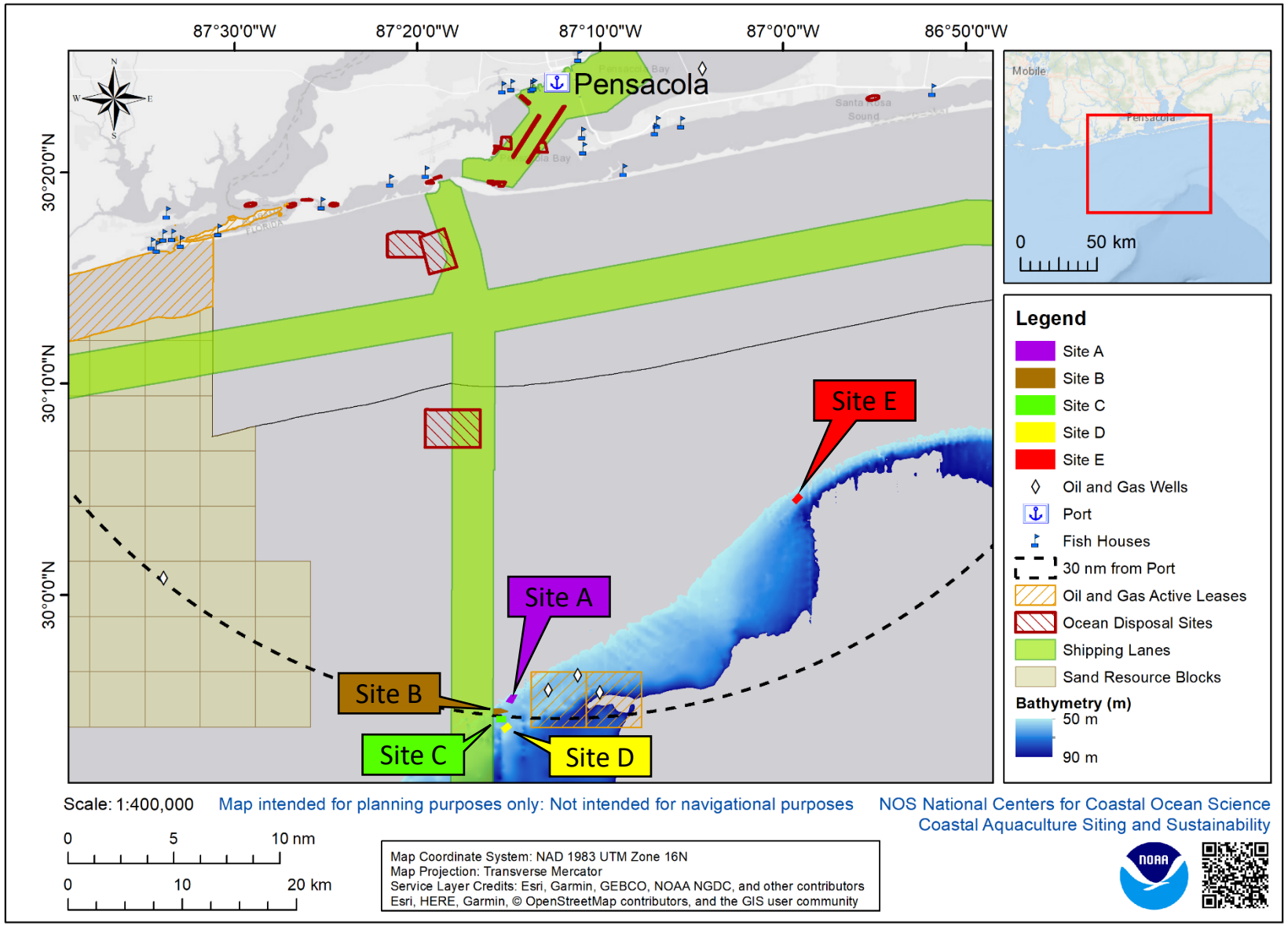




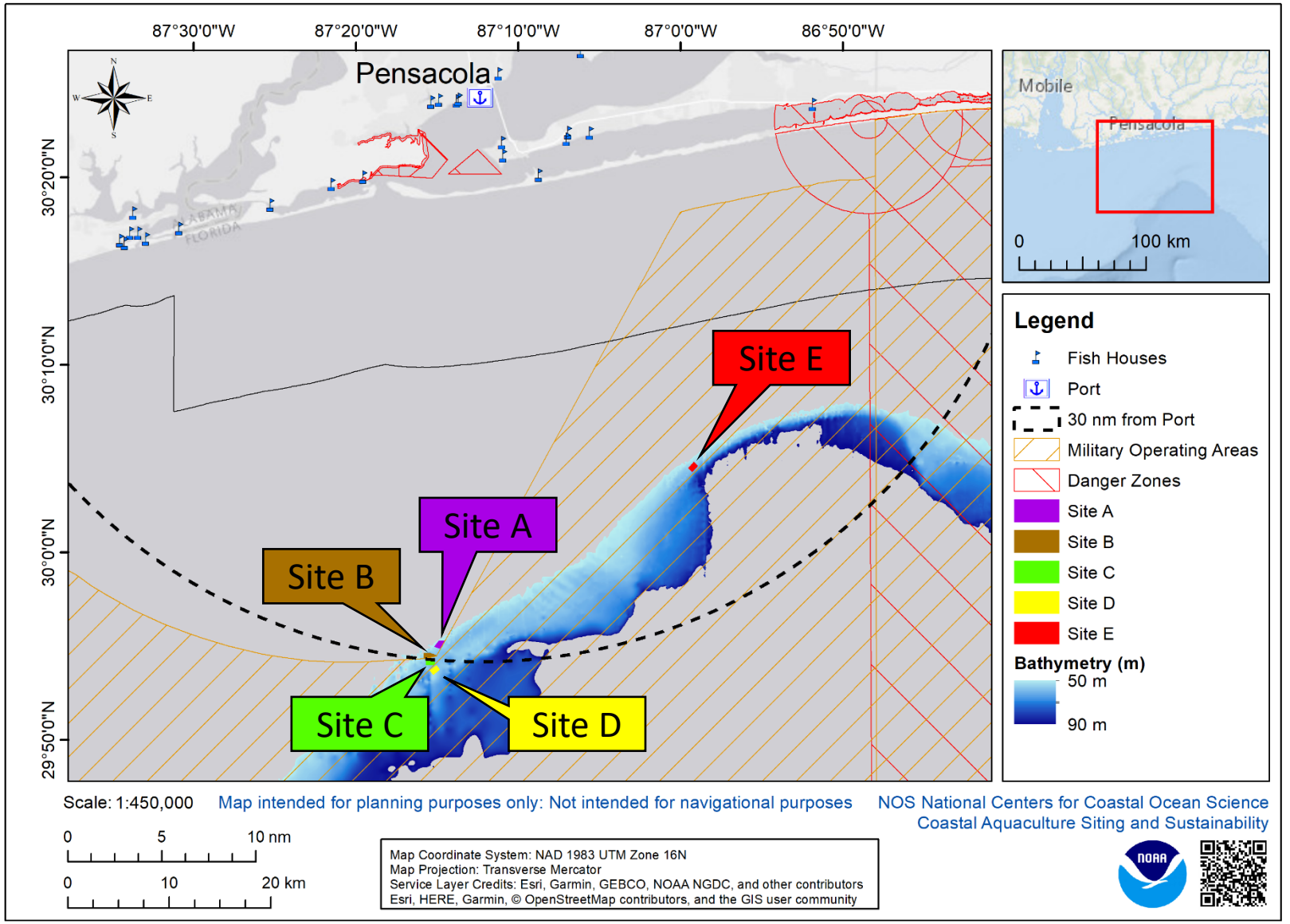


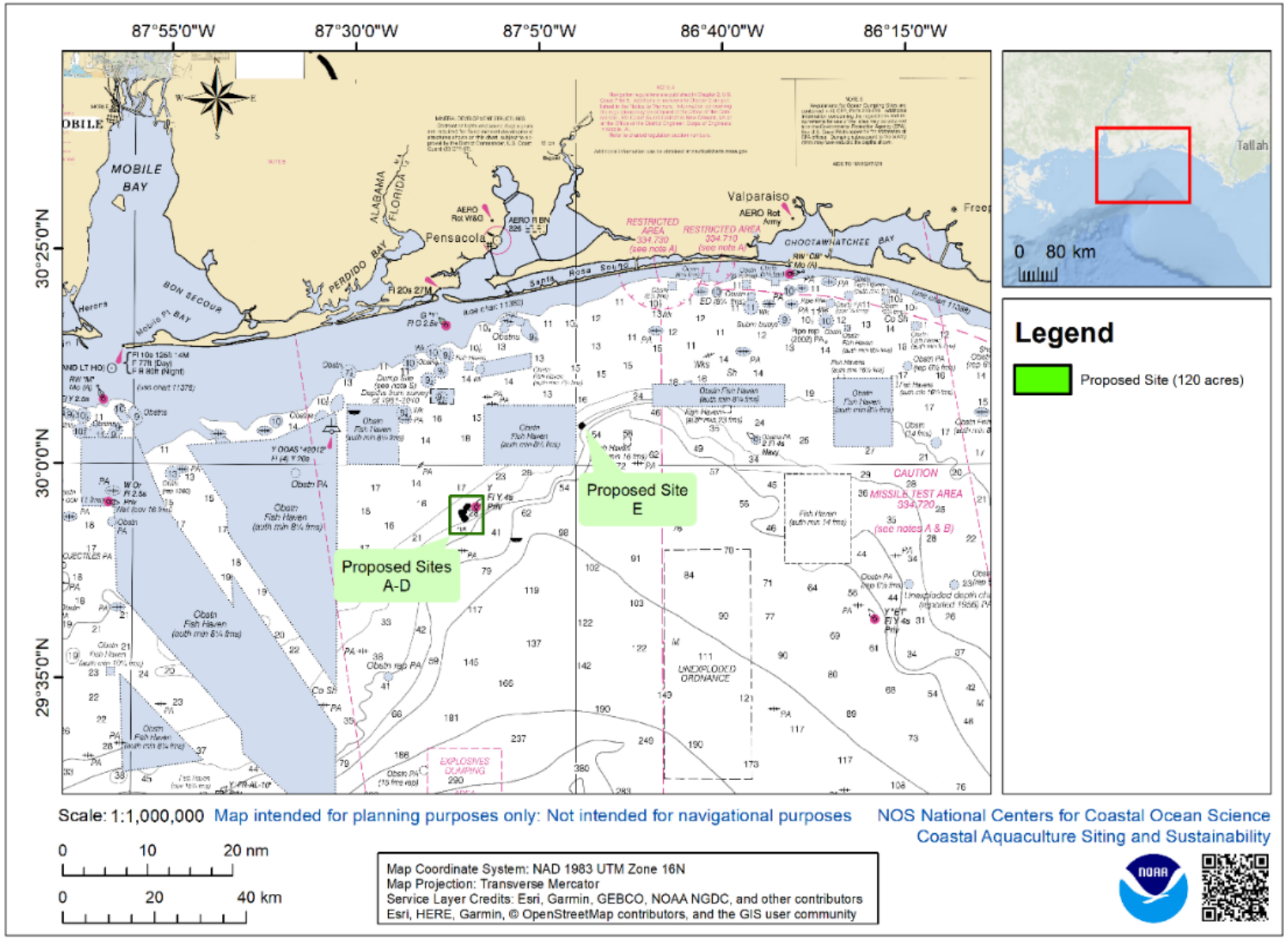
For demonstration purposes only

Navigation and Other Factors

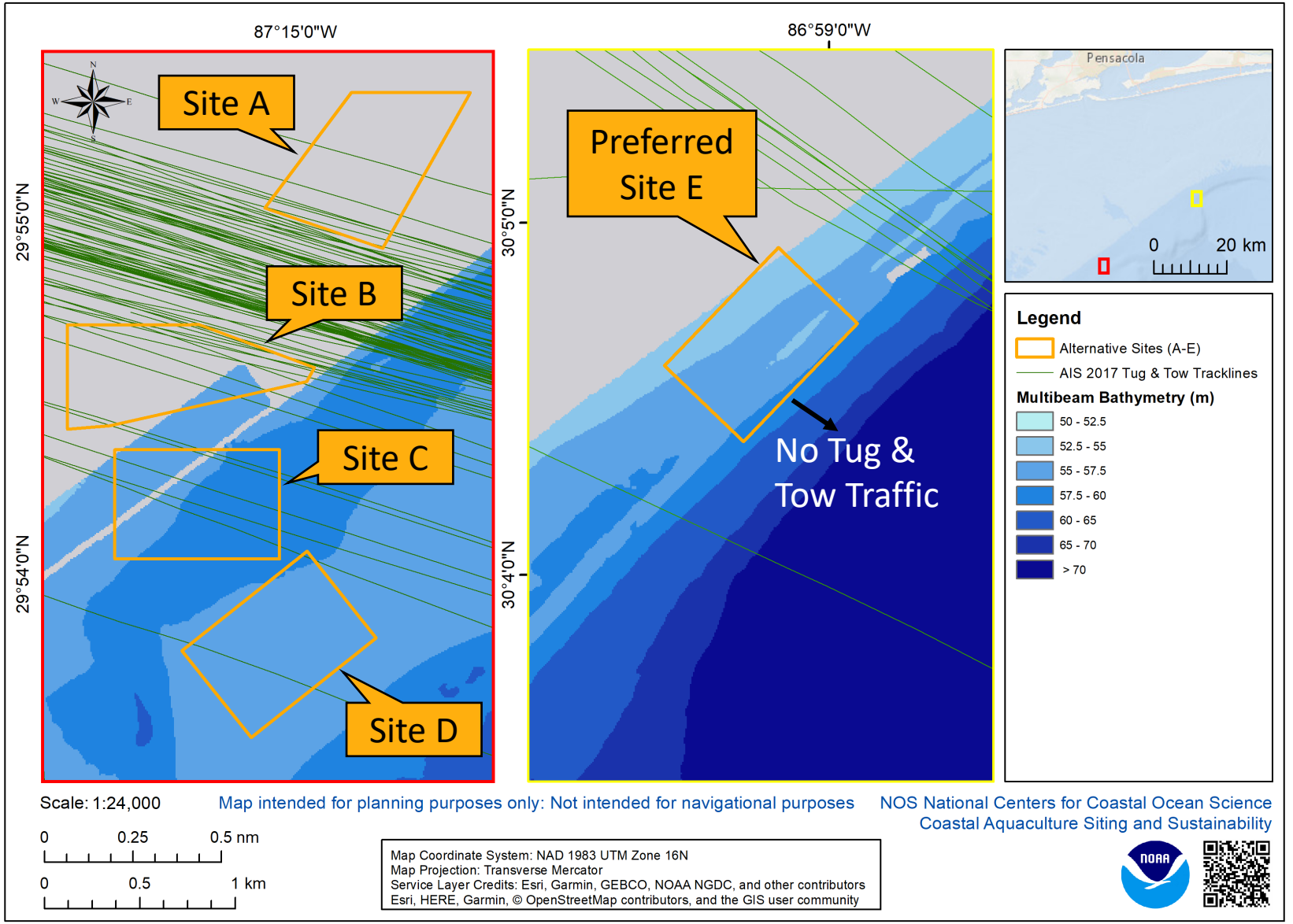


Sites (50-m depth)

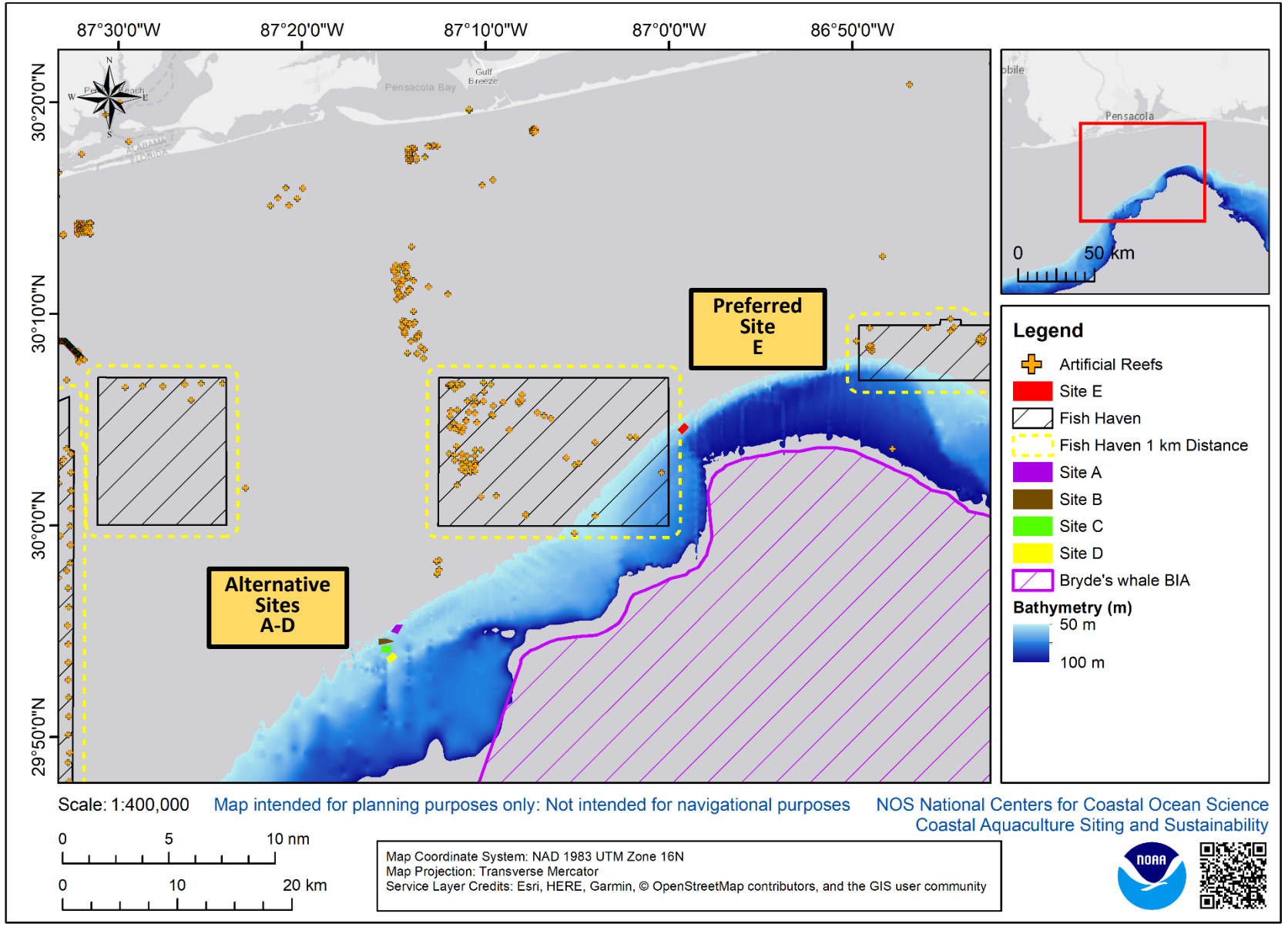



87°55'0"W
87°30'0"W
87°5'0"W
86°40'0"W
86°15'0"W
30°25'0"N
30°0'0"N
29°35'0"N
MOBILE BAY
Pensacola
Valparaiso
PERDIDO BAY
ALABAMA
FLORIDA
BON SECOUR
CHOCTAWHATCHEE BAY
Santa Rosa Sound
Proposed Site E
Proposed Sites A-D
MISSILE TEST AREA
UNDERWATER ORDNANCE
EXPLOSIVES DUMPING
0 80 km
Legend
Proposed Site (120 acres)
Scale: 1:1,000,000
Map intended for planning purposes only: Not intended for navigational purposes
0 10 20 nm
0 20 40 km
Map Coordinate System: NAD 1983 UTM Zone 16N
Map Projection: Transverse Mercator
Service Layer Credits: Esri, Garmin, GEBCO, NOAA NGDC, and other contributors
Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
NOS National Centers for Coastal Ocean Science
Coastal Aquaculture Siting and Sustainability
NOAA

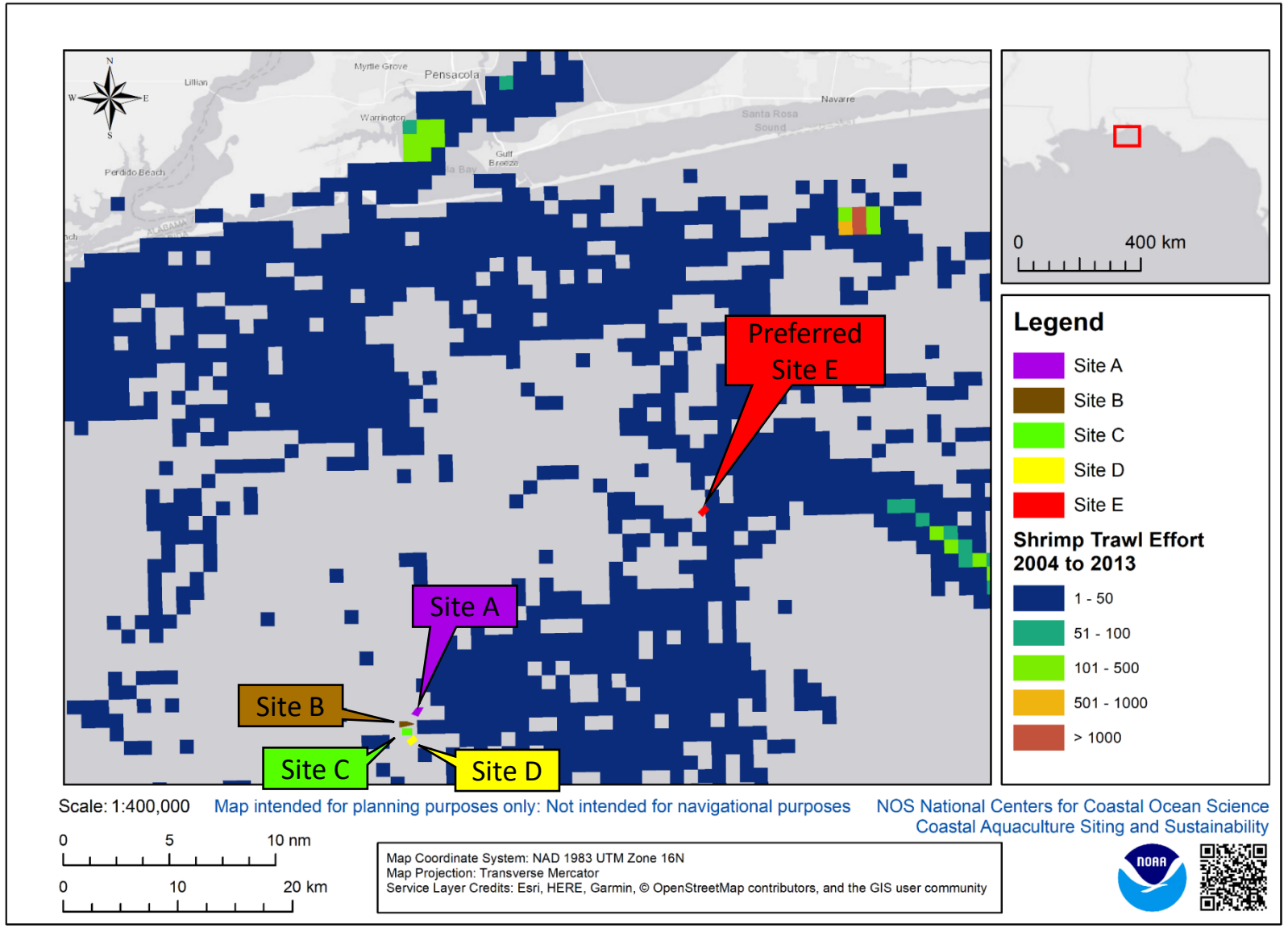
Vessel Traffic Assessment



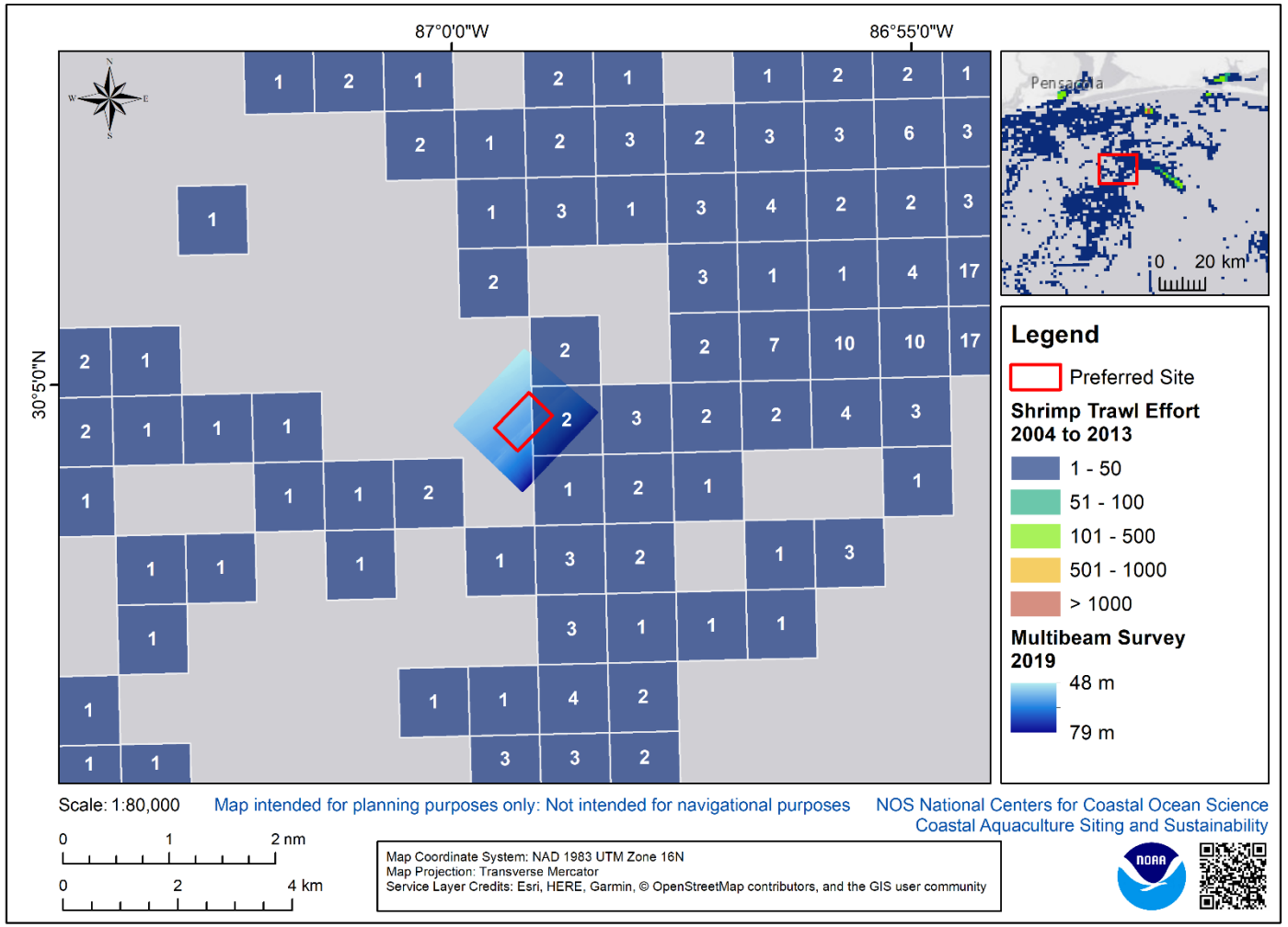
Preferred Site and Alternatives (MAP 2018*)



Shrimp Trawl Effort 2004 to 2013

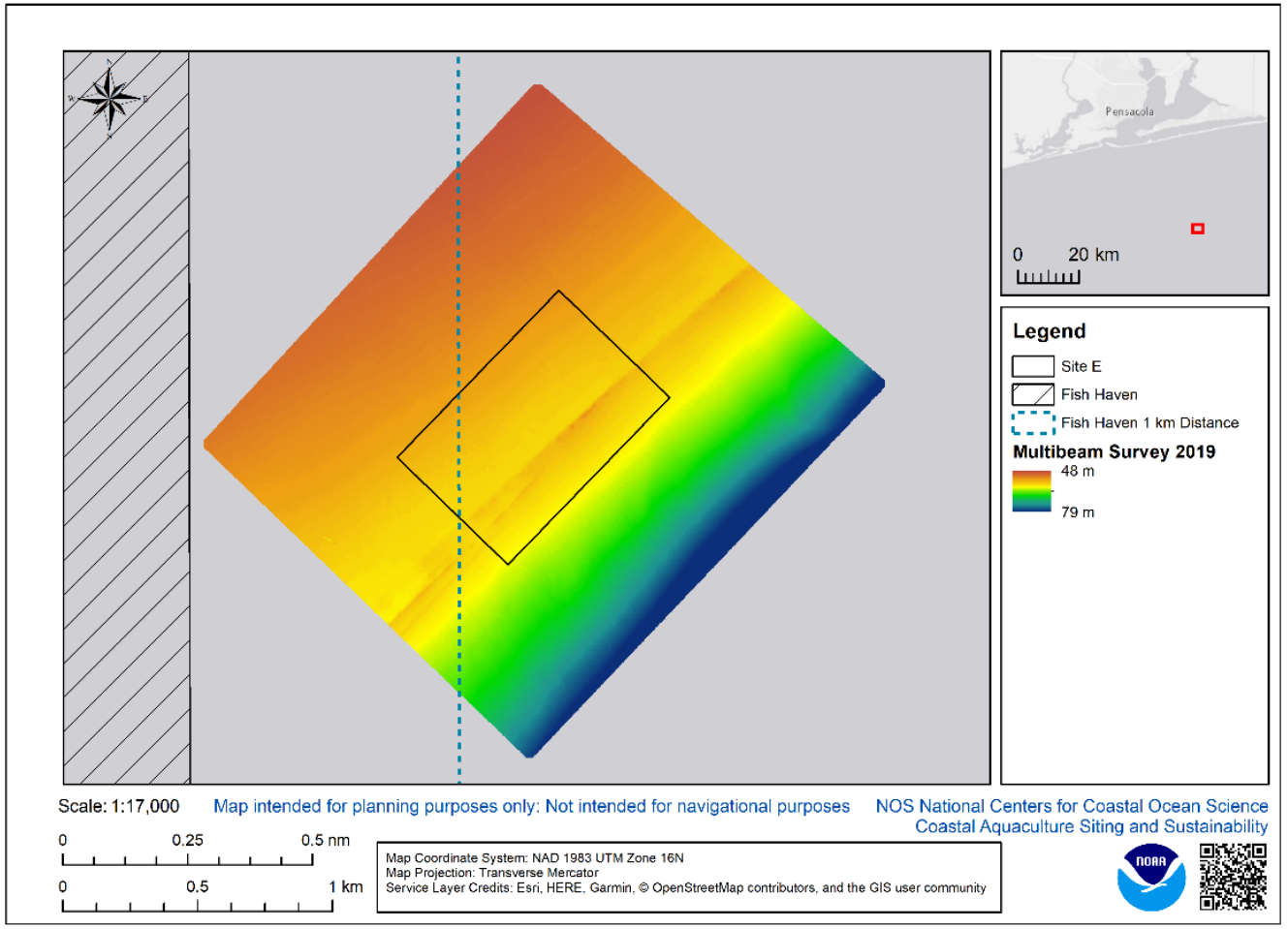


Shrimp trawl effort (sum 2004-2013) and preferred site



*More information on the shrimp data, which encompasses all species of shrimp important to Gulf of Mexico fisheries, can be found at: http://gulfcouncil.org/wp-content/uploads/A-7a-White-Paper-on-Artificial-Reefs.pdf (GMFMC 2015).

Preliminary Results 1st
Baseline Environmental Survey



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STORM SAFE Submersible Cage System

Results of multibeam survey completed April 2019

- Surveyed 0.5 km beyond area of interest
- 2-m resolution
- Depths confirmed 48-70m
- Minimal slope across site
- **Small ridge detected**
- Sand substrate

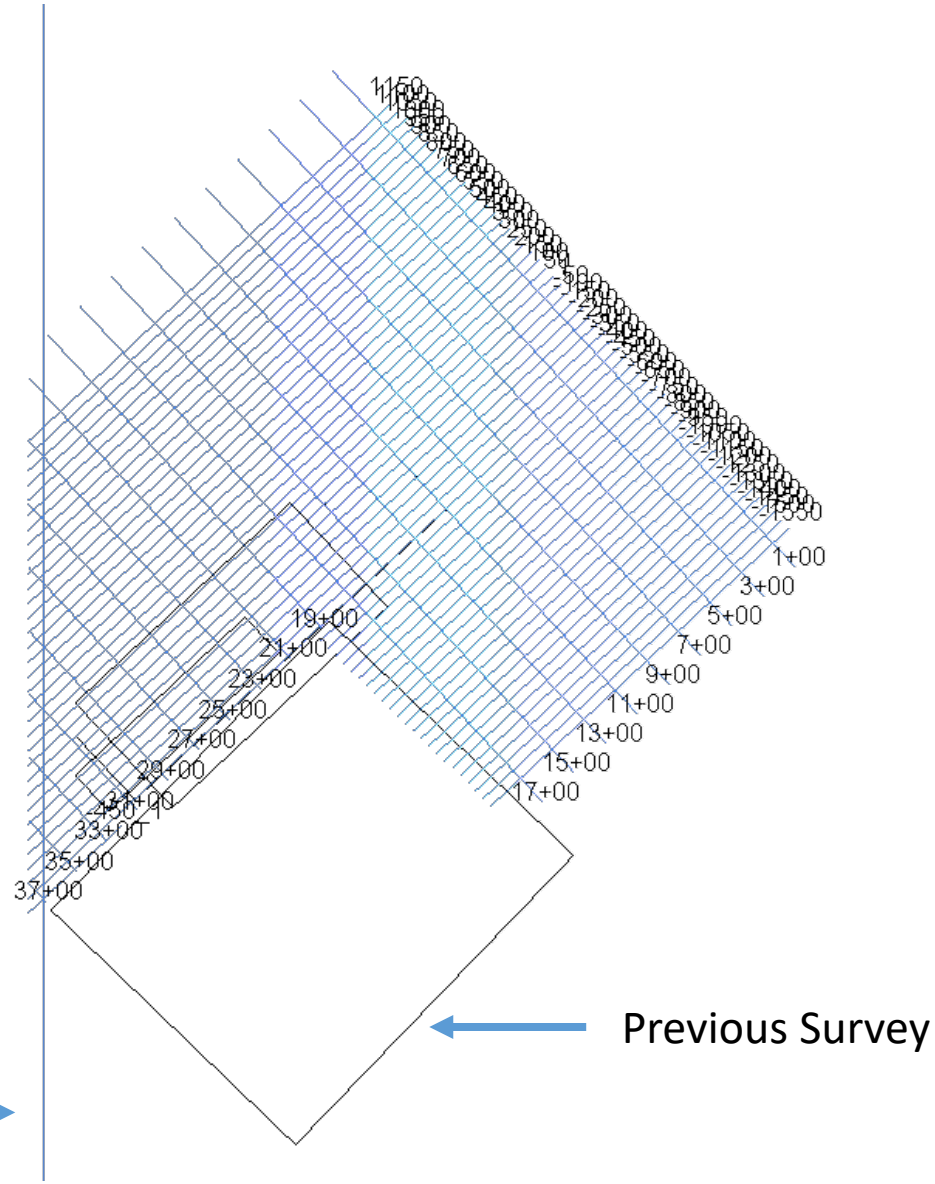
Side-scan and sub-bottom survey May 2019

Updated Information (Summer 2019)

- Hard bottom detected on ridge
- EPA notified team – Cages (nets) need to be 1000 m from any hard substrate (July 2019)
- Artificial Reef managers determines offset distance (500 ft) from boundary.
- NOAA Protected Resources produced new Bryde's Whale map (Aug. 2019)
  - Recent development: Rice's whale
- Precision siting analysis determines three possible farm configurations (Sept. 2019)
- New survey plan that is twice the size of previous survey

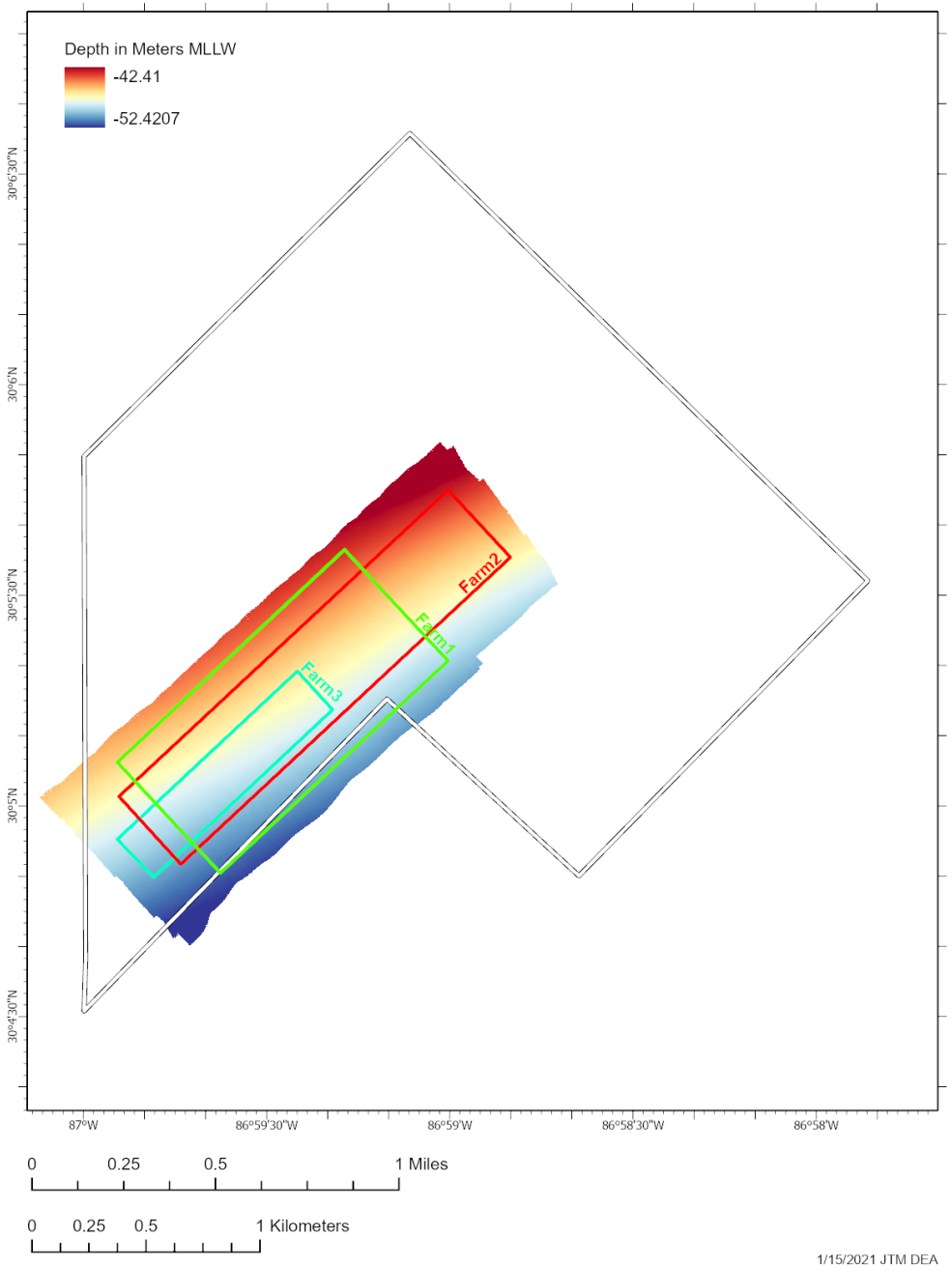
Updated Survey Plan

- Move to north for greater distance from known Bryde's whale locations.
- 500 ft from LARS boundary
- Depths closer to optimal (50m)



Multibeam bathymetry (1m grid)

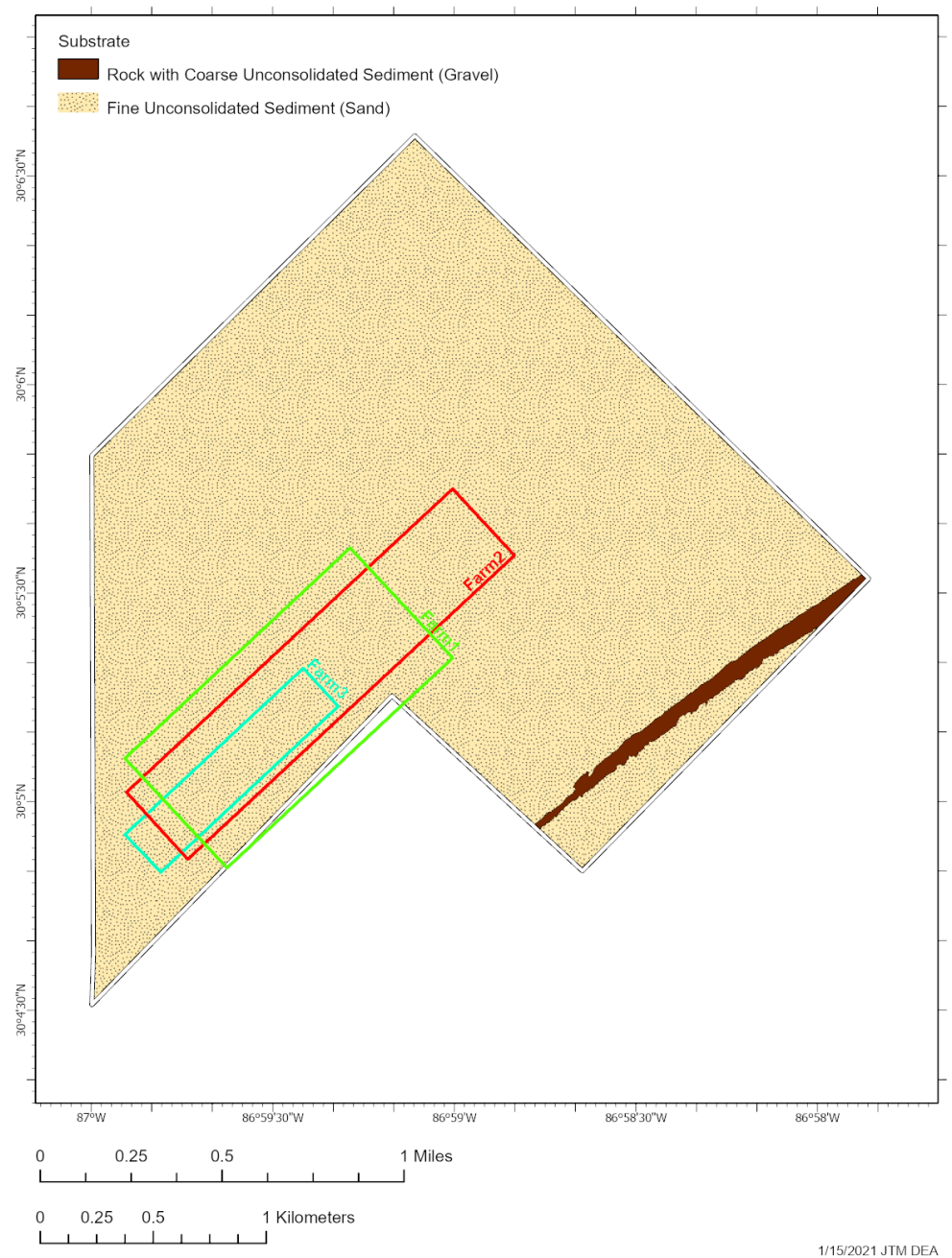
PRELIMINARY



1/15/2021 JTM DEA

Surficial Substrate

PRELIMINARY



1/15/2021 JTM DEA

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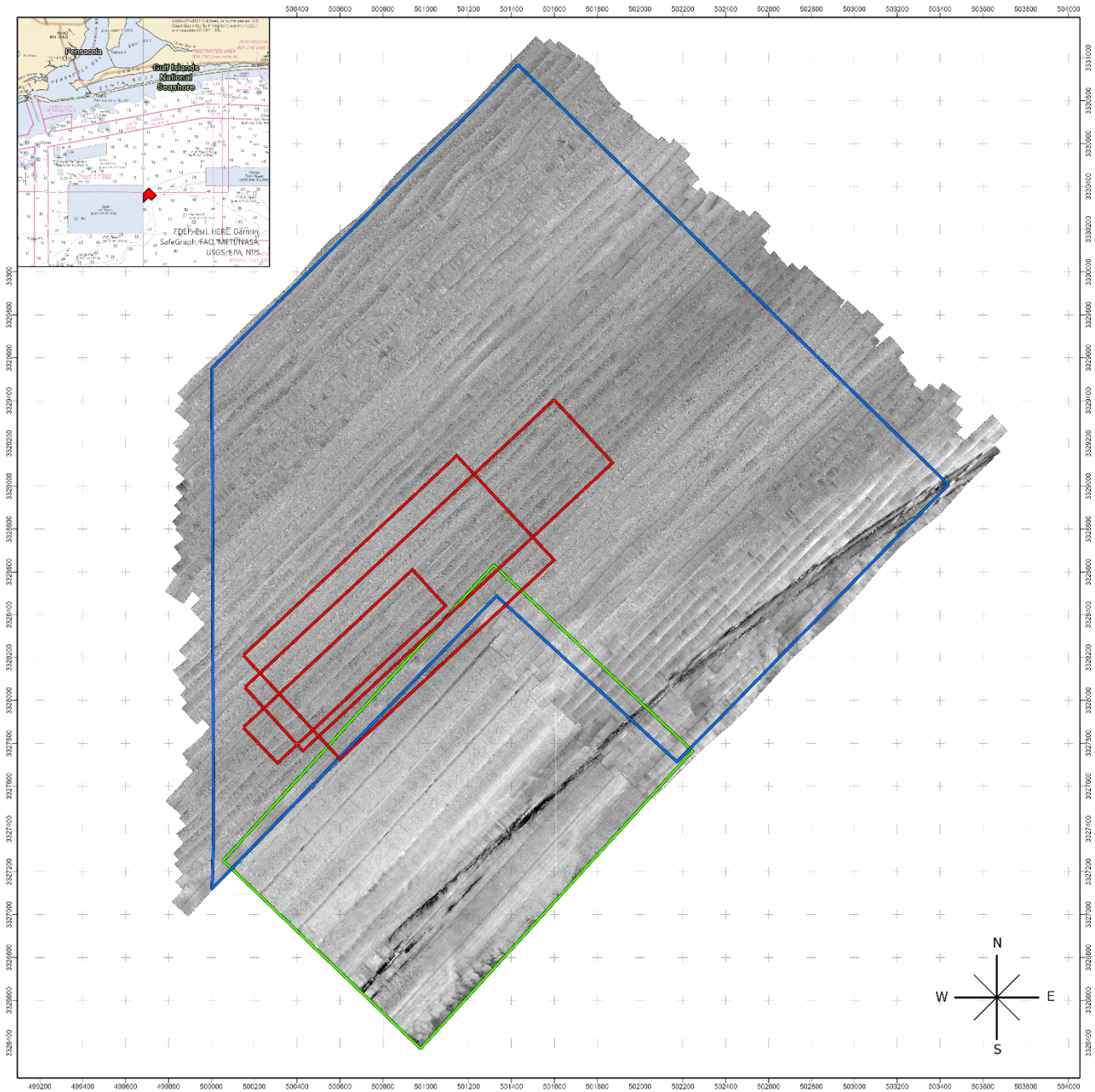

Manna Fish Farms Offshore Aquaculture Site

Gulf of Mexico

Baseline Environmental Surveys: 2019-2020

SIDE SCAN SONAR DATA MAP COMPILATION

LEGEND

- Outline of 2020 Survey Area (DEA) (100% Side Scan Coverage)
- Outline of 2019 Survey Area (USM) (100% Side Scan Coverage)
- Outline of Proposed Aquaculture Sites

NOTES

1. 2020 Baseline Environmental Survey conducted 8-10 December 2020 by the Marine Services Division of David Evans and Associates, Inc.

2. 2019 Baseline Environmental Survey conducted 21 and 28 May 2019 by the University of Southern Mississippi.

2. Coordinates are in meters relative to North American Datum of 1983 (NAD83), Universal Transverse Mercator (UTM) Zone 16 North.

3. Overview map is National Oceanic and Atmospheric Administration (NOAA) chart 11360 with depths in fathoms.

0 750 1,500 2,250 3,000
Distance in US Feet

0 250 500 750 1,000
Distance in Meters

Map Scale 1:12,000

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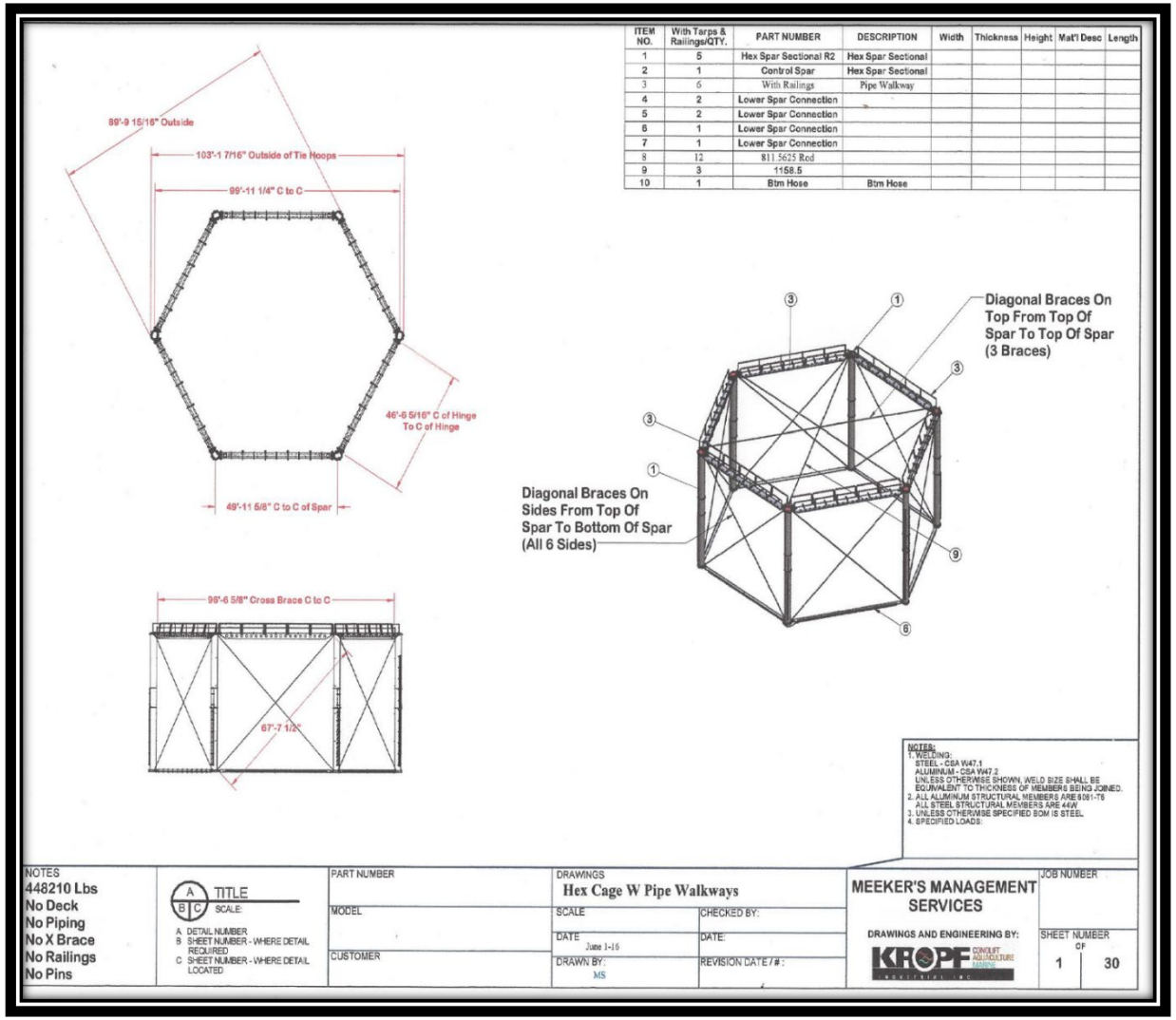
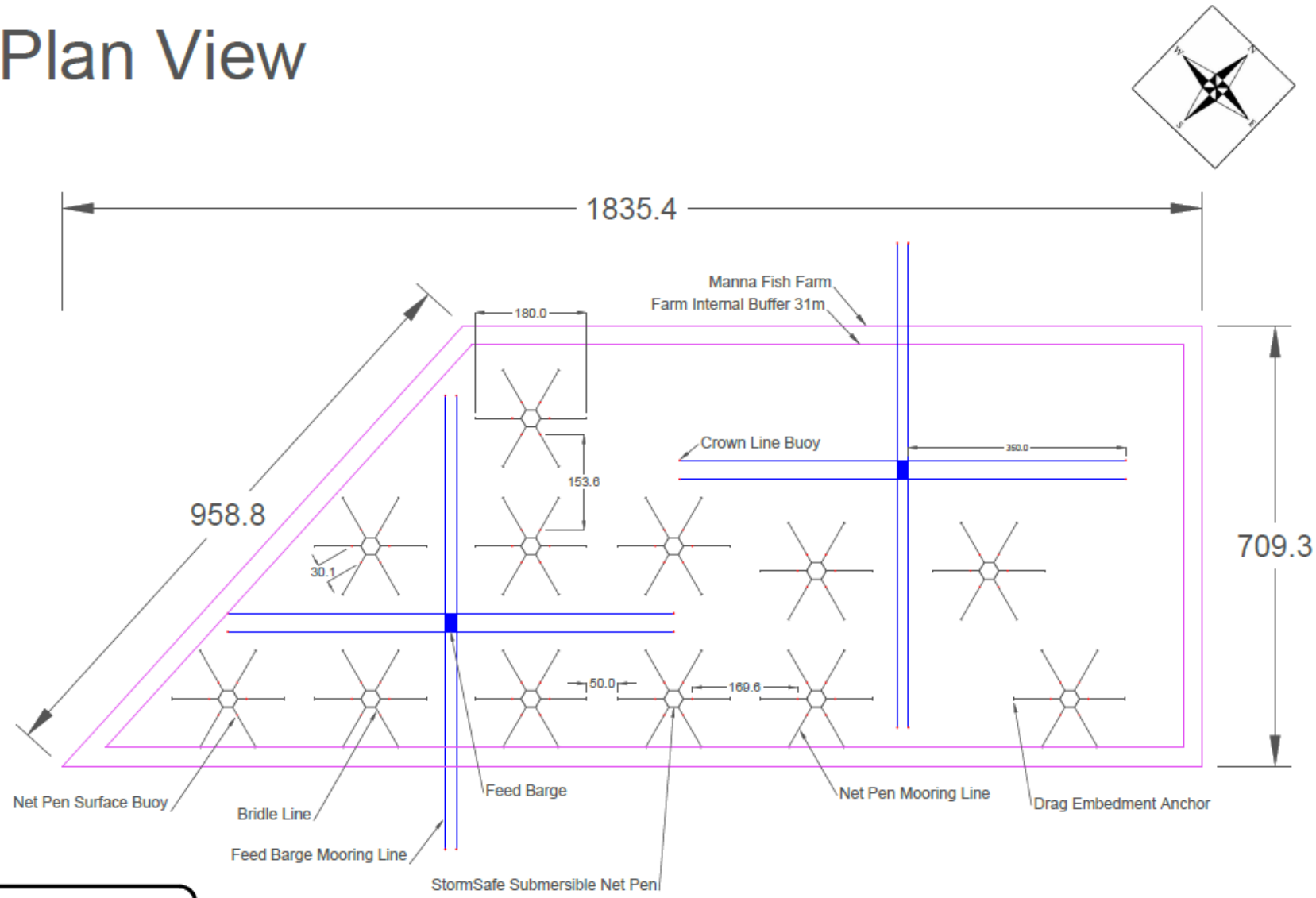
www.deainc.com

Storm Safe Submersible

STORM SAFE
Submersible Cage System



Plan View



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General Notes

- Full 12 pen deployment
- 265 acres

- StormSafe Submersible Net Pens
  - Individually moored with 1 drag embedment anchor per pen corner
  - 1.2:1 mooring line scope
  - 6 surface buoys per pen

- 30x18m Feed Barges
  - 2 barges
  - Assumes mooring line scope of 7:1
  - Assumes 8 drag embedment anchors
  - Crown line with surface buoy above each anchor

Units are Meters

No.1	Drawn By: ZD	5/19/21

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Manna Fish Farms - Gulf of Mexico

Project: Manna GOM	Sheet: 1 of 2
Date: 5/19/21	
Scale: 1:6.834	

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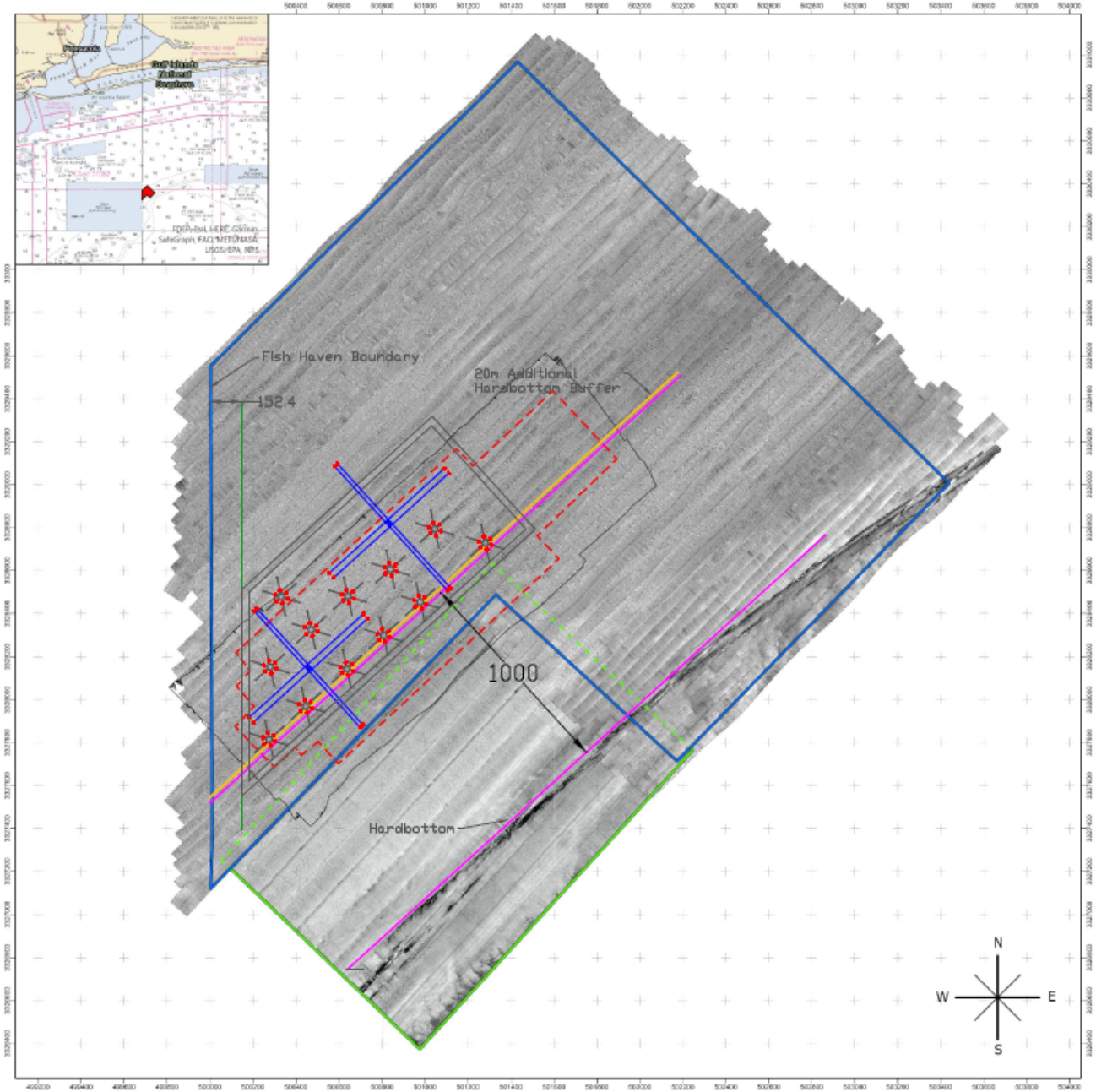
Manna Fish Farms Offshore Aquaculture Site

Gulf of Mexico

Baseline Environmental Surveys: 2019-2020

SIDE SCAN SONAR DATA MAP COMPILATION



LEGEND

- Outline of 2020 Survey Area (DEA) (100% Side Scan Coverage)
- Outline of 2020 Survey Area (DEA) (100% Multibeam Bathymetry Coverage)
- Outline of 2019 Survey Area (USM) (100% Side Scan and Multibeam Bathymetry Coverage)
- Outline of Proposed Aquaculture Sites

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Primary Gear List and Deployment Phases

Equipment	Associated Gear	Dimensions of Gear	Quantity (per net pen system)
StormSafe Submersible Net Pen		31.4 m diameter hexagon, 15.2 m height, 9000 m^3 volume	1
	Drag Embedment Anchors	3000 kg Jeyco Stingray	6
	Anchor Chains	27.4 m length, 45-51 mm (1.75-2.0") studless or stud-link	6
	Anchor Lines	58.3 m length, 51-102 mm (2.0-4.0") diameter, subject to material type	6
	Bridle Lines	14.9 m length, 51-102 mm (2.0-4.0") diameter, subject to material type	6
	Surface Buoys	Spar shaped, 5000 kg net buoyancy	6
Equipment	**Associated Gear**	**Dimensions of Gear**	**Quantity (per farm)**
Feed Barge		30 x 18 m 450 metric ton capacity	2
	Drag Embedment Anchors	Jeyco Stingray, size TBD	16
	Anchor Lines	TBD	16
	Crown Lines	TBD	16
	Crown Line Buoys	TBD	16

*Line lengths and barge dimensions are approximate

Production Timeline

Year(s)	No. of Cages Stocked	Cages/fish production stage	Production (lbs/year)*
Year 0 - 1	2	2	936,000
Years 1 - 2	4	3	1,421,000
		1	
Years 2 - 4	8	2	2,842,000
		2	
		2	
		2	
Years 4 - 5	12	4	3,812,000
		4	
		4	

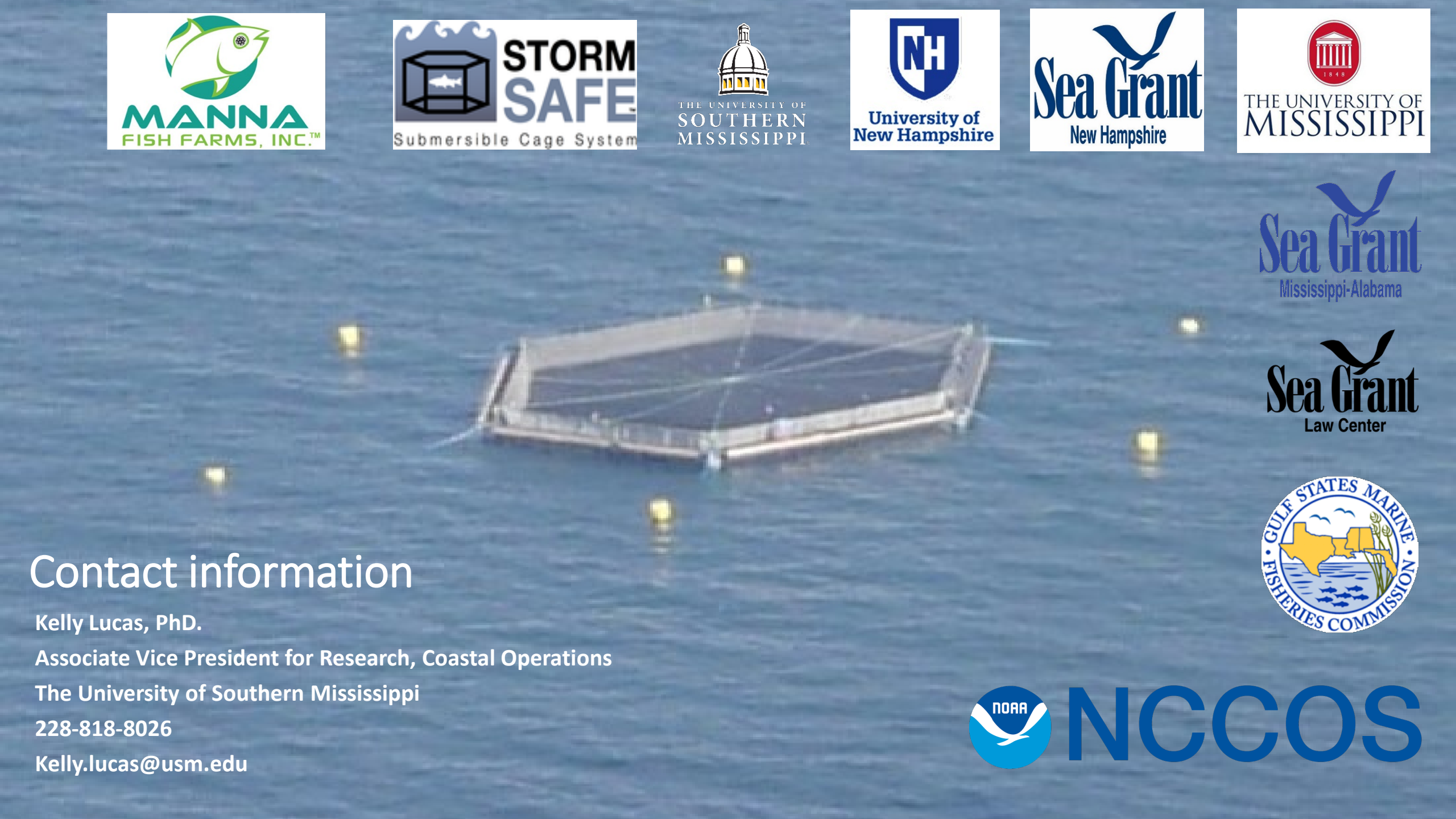
*Projections assume a year-round harvest/sale and a conservative 20% mortality rate at all production stages

Feed Information

Type	Slow sinking pellet with estimated 44% protein and 13% lipid
Mechanism	Feeding by vessel in the beginning moving to feed buoy or barge
Feed Frequency	Will vary by species and biomass. Feed calculations were calculated at a feed conversion rate (FCR) of 1.7.
Stock (9000 m^3 cage)	Weight of fingerlings at stocking = 50 g Total weight at initial stocking = 9500 kg Target harvest density = 25 kg/m^3
Amount (9000 m^3 cage)	Daily feeding amount at initial biomass = 646 kg Daily feeding amount at max biomass = 14,470 kg

Next Steps

- Develop Plans:
  - Best Management Practices Plan (EPA and Florida Guidance)
    - Operations and maintenance
    - Health (includes biosecurity)
    - Feed management
    - Record management
  - Environmental Monitoring Plan (Includes baseline sampling)
  - Emergency Response Plan
  - Quality Assurance Plan
- Submit for EPA, NPDES Permit
- Submit for USACE, Section 10 Permit and CG 2554 Authorization



Contact information

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