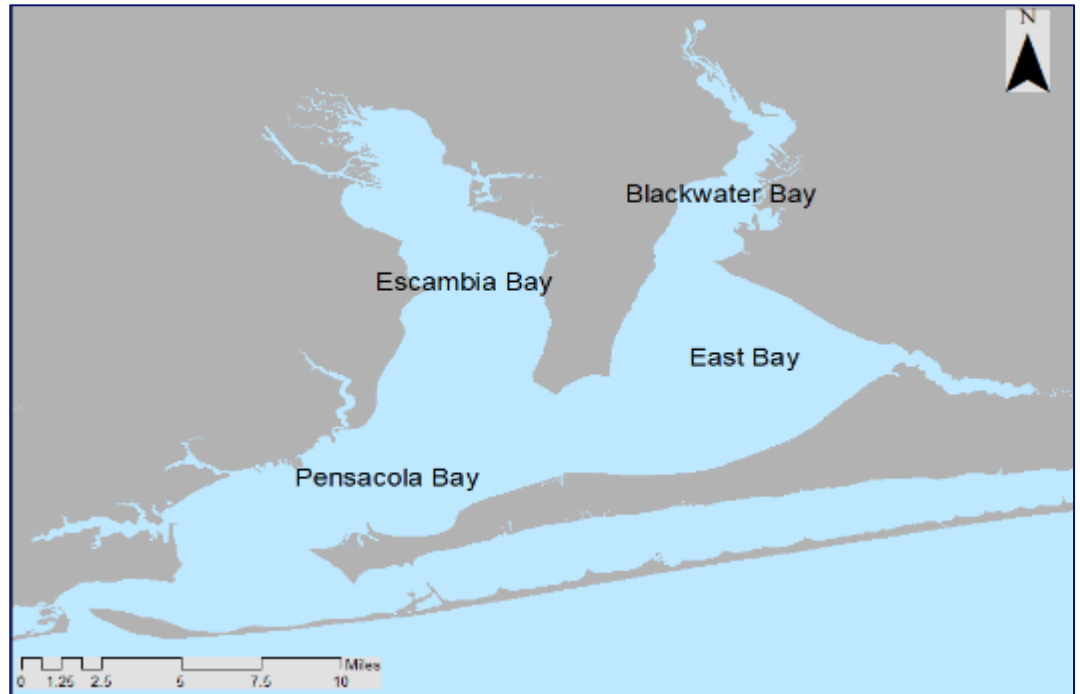# Creating an Oyster Fisheries and Habitat Management Plan for the Pensacola Bay System

Anne Birch
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abirch@tnc.org

Laura Geselbracht
Senior Marine Scientist
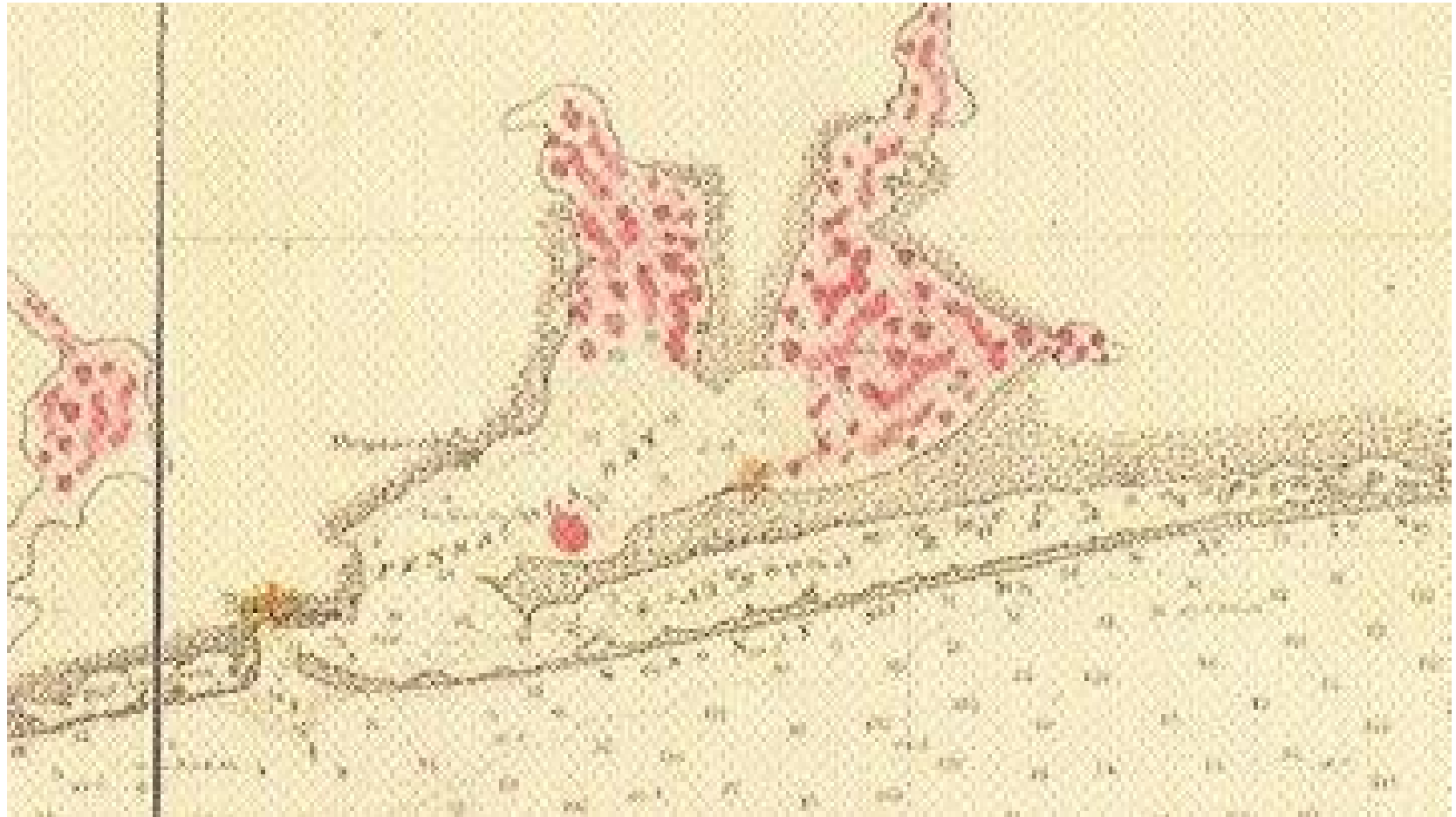lgeselbracht@tnc.org

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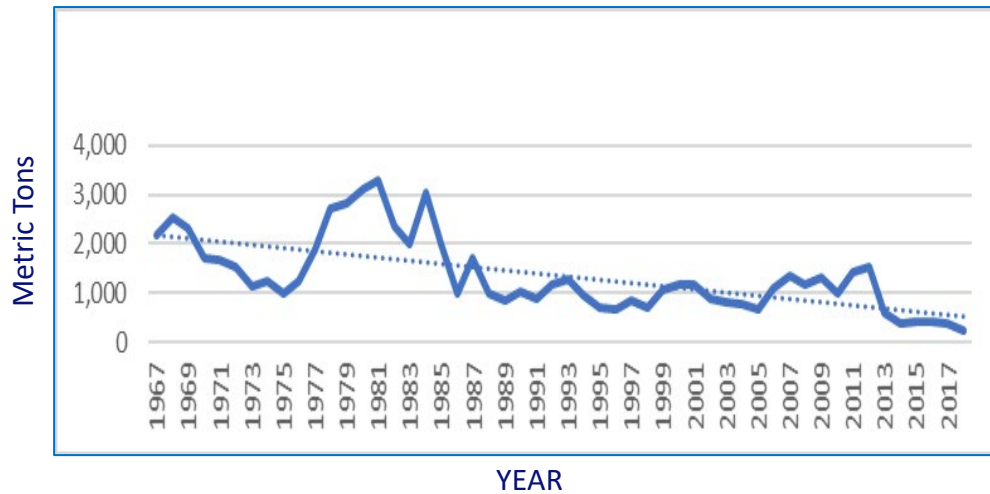
Pensacola Bay System

PENSACOLA BAY HISTORIC OYSTER REEFS
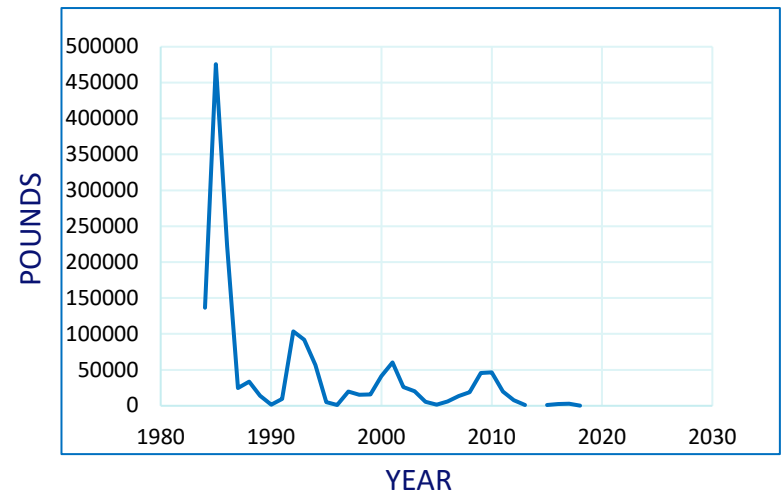## US Fish Commission, 1883

FL OYSTER FISHERIES DECLINE

Oysters Landed in Florida 1984-2018

Oysters Landed in Pensacola 1984-2020

Data Source: FWC

Overfishing

Poor Management

Disease

Water Quality

Dredging

Climate Change

OYSTER REEFS

"One of the Imperiled Marine Habitats in the World"

85% loss
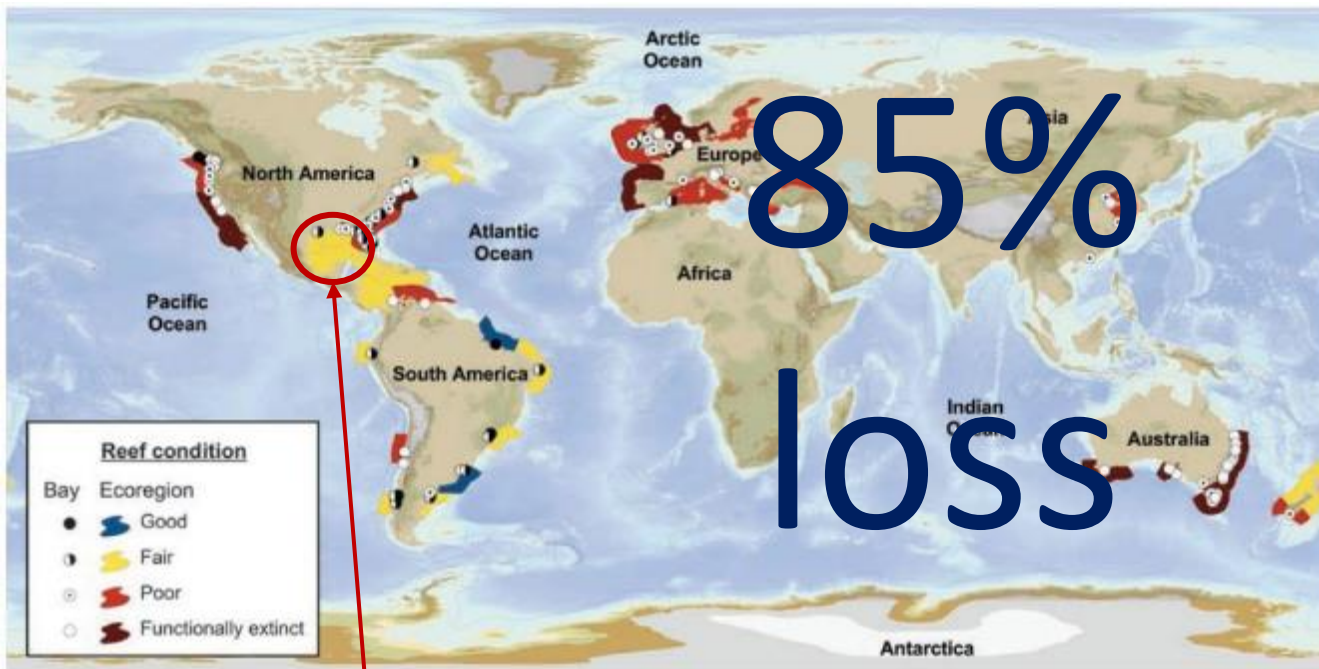
Figure 1. The global condition of oyster reefs in bays and ecoregions. The condition ratings of good, fair, poor, and functionally extinct are based on the percentage of current to historical abundance of oyster reefs remaining: less than 50% lost (good), 50% to 89% lost (fair), 90% to 99% lost (poor), more than 99% lost (functionally extinct). Ecoregion boundaries are from Spalding and colleagues (2007). Not all regions with oysters could be assessed because of a lack of data (see text).

(Beck et al, 2011)

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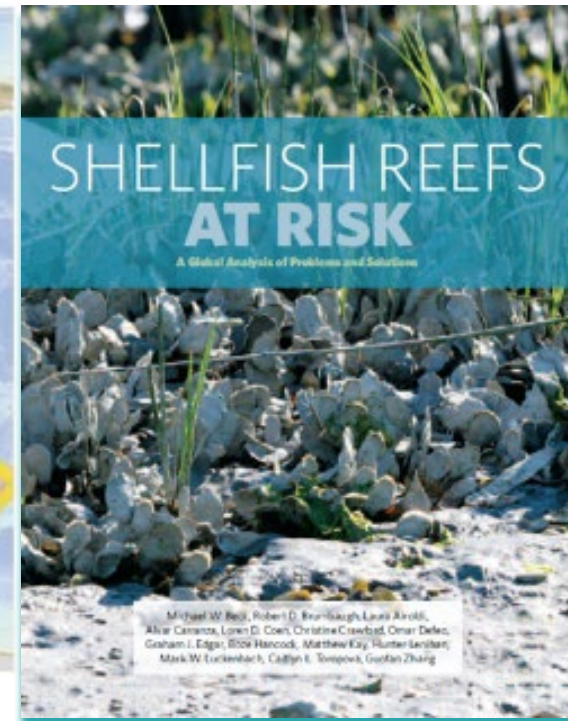
Excerpts from OIMPP Chapter 2

"Pensacola Bay provides appropriate salinity and temperature ranges for oyster habitat."

"There are an estimated 95-99 ha (235-245 ac) of oyster reef within Pensacola Bay."

"Water quality in the bay improved significantly since the passage of the Clean Water Act and implementation of best land-use practices within the watershed."

(Konchar et al., 2019)

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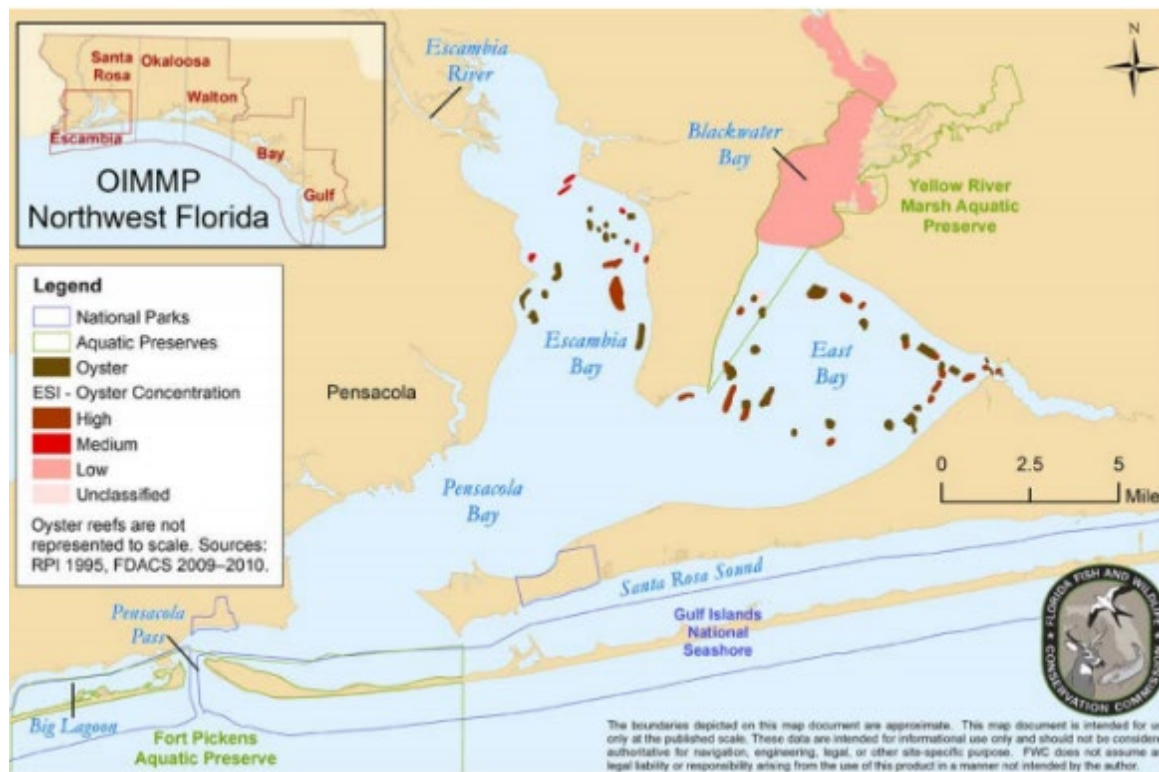
WHAT DOES EFFECTIVE MGT REQUIRE?

Science Based

Fisheries
Wild & Aquaculture

Community Driven

Habitat
Ecosystem Services

Actionable

OYSTER MGT. PLANS

Species

- Oyster population
- Not driven by either fishery or ecological outcomes

Habitat

- Ecological outcomes (e.g., water clarity, fish habitat)

Fishery

- Oyster landings
- Ecological outcomes are not explicit in management goal

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ECOSYSTEM-BASED FISHERIES MGT IN PENSACOLA

Wild Harvest + Oyster Aquaculture + Oyster Habitat

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Photo: Anne Birch

Thriving System

Healthy **Oysters**

Healthy **Habitat**

Healthy **Fishery**

Healthy **Waters**

Healthy **Economy**

Healthy **Uplands and Rivers**

EBFM

TNC TEAM

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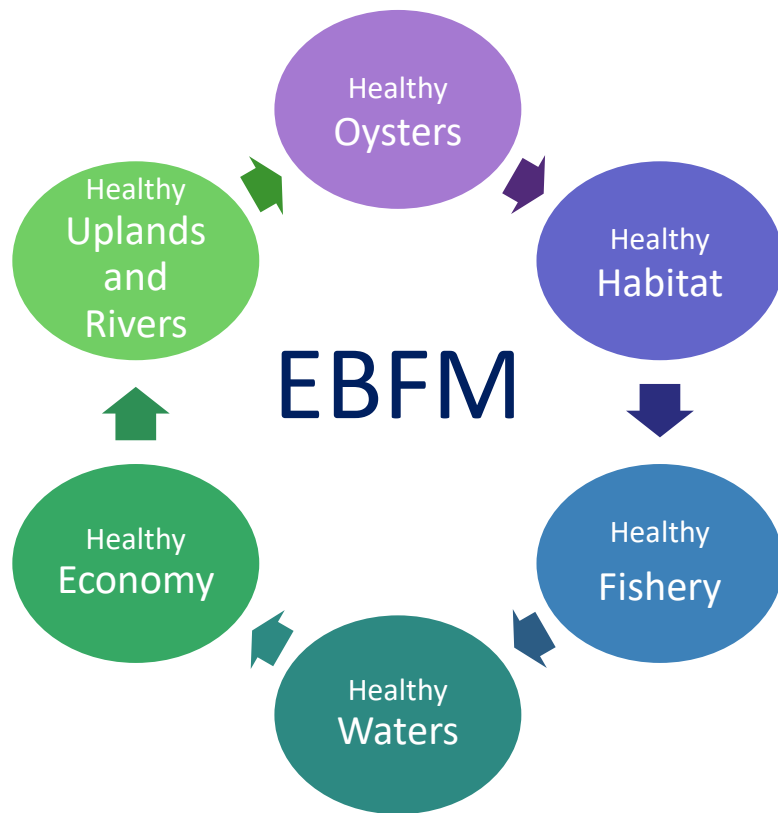
FACILITATION TEAM

Jeff Blair

Bob Jones

WHAT DO YOU THINK?

"IT'S ABOUT TIME"

STAKEHOLDER WORKING GROUP

GOVERNMENT
- City of Pensacola
- Escambia County
- FL Dept. of Environmental Protection
- FL Division of Aquaculture
- FL Fish & Wildlife Conservation Commission
- Northwest FL Water Mgt. District
- Pensacola and Perdido Bays Estuary Program
- Santa Rosa County

COMMUNITY & SCIENCE
- Construction/Development Industry
- Environmental Attorney
- Healthy Gulf
- University of FL/IFAS
- University of West Florida
- Wetland Scientists

OYSTER INDUSTRY
- Oyster Watermen
- Oyster Aquaculture Farmers
- Recreational Angler

Consensus-Based Process

Oyster Fisheries & Habitat Management Plan for the Pensacola Bay System
ABSI CAB Meeting August 18, 2021

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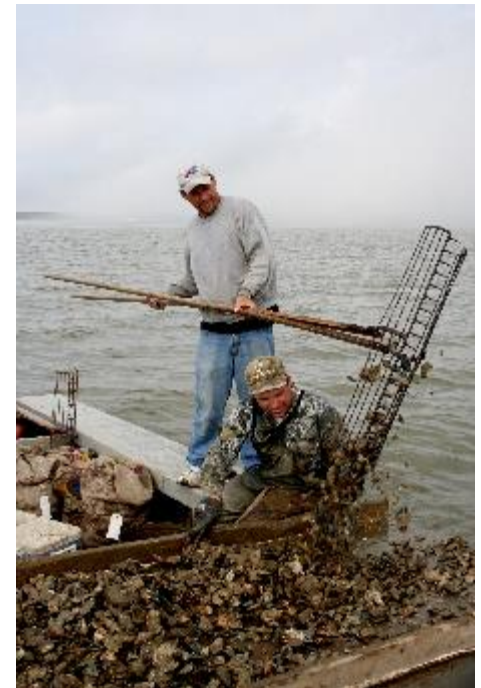Pensacola Bay System Oyster Fisheries and Management Plan, All Conservation Staff M...

SCIENCE DECISION SUPPORT ANALYSES

- Oyster Habitat Suitability Index Model
- Spatial Management Plan for Restoring Oyster Habitat & Fisheries
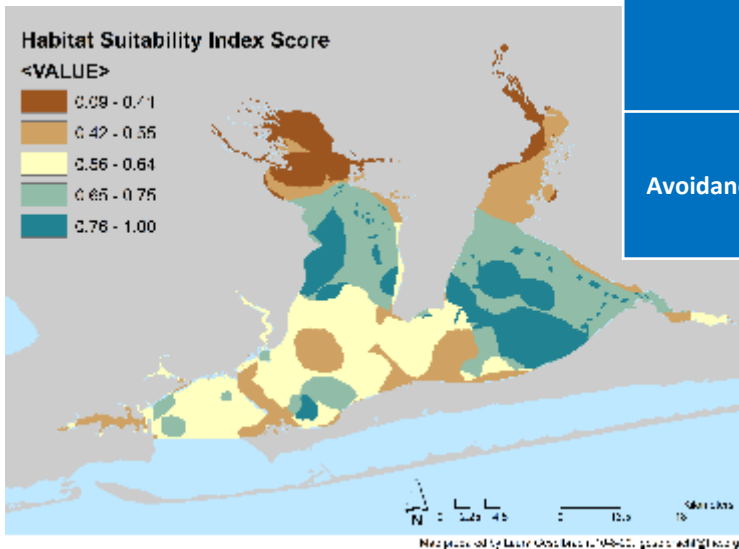- Oyster Water Filtration Model

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HABITAT SUITABILITY INDEX MODEL

Previously presented to ABSI

Component	Parameter	Metric	Reference	Model Scoring
Biological, Chemical And Physical	Contemporary Oyster Beds	Presence	USFI	Present = 1 Absent = 0
	Historical Oyster Beds	Presence	US Fish Commission	Present = 1 Absent = 0
	Dissolved Oxygen	ppm	Patterson *et al.* 2014	DO Conc. < 2 mg/l = 0 DO Conc. 2 - 4 mg/l = 0.5 DO Conc. ≥ 4 mg/l =1
	Seagrass	Presence	FWRI	Present = 0 Absent = 1
	Sediments	Type	EPA	Mud = 0 Muddy Sand = 0.25 Sand = 0.5
	Salinity	ppt	EPA	S < 5 = 0.5 S ≥ 5 = 1.0
	Recruitment	Recruits/Shell	Arnold *et al.* 2017	variable from 0 -1
Avoidances	Aquaculture, Shellfish Leases	Presence	FDACS	informational only
	Navigation channels with buffer	Presence	NOAA	informational only

Adapted from Johnston et al. 2019

Habitat Suitability Index Score
<VALUE>
- 0.09 - 0.41
- 0.42 - 0.55
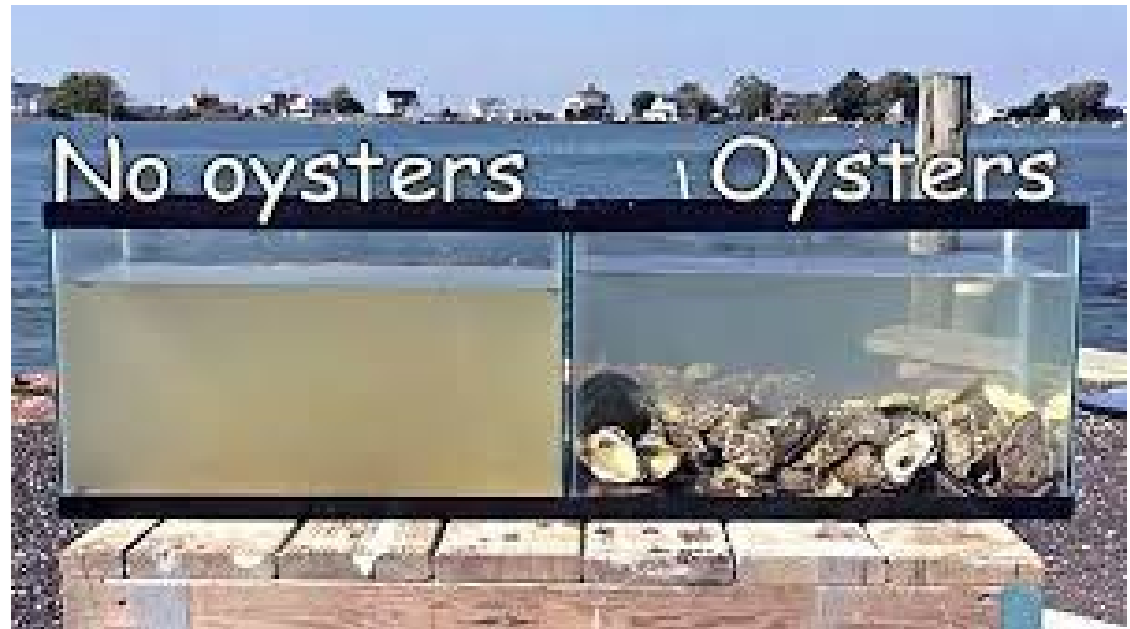- 0.56 - 0.64
- 0.65 - 0.75
- 0.76 - 1.00

High Score = More Suitable

Oyster Water Filtration Model

Oysters/Oyster Reefs Provide
Many Ecosystem Services
- Food
- Employment
- Fish and Invertebrate Habitat
- Recreation (sportfishing)
- Water Filtration
- Nitrogen Removal
- Shoreline/Habitat Stabilization
- etc.

Oysters are Filter Feeders

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Oyster Water Filtration Model, cont'd

Project Team:

Dr. Philine zu Ermgassen, University of Edinburgh (lead)

Jonathan Gair, AEI-MPG, Berlin,

Dr. Brandon Jarvis, USEPA

Bryan DeAngelis, TNC California

Laura Geselbracht, TNC Florida Chapter

4 Steps:

- ID probable restoration areas (use HSI) and recent reef area.

- ID credible oyster densities and sizes classes within restoration areas (2 scenarios)

- Apply length to dry weight conversions

- Use a hydrodynamic model and previously determined oyster clearance rate information to model water filtration throughout the system.

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Oyster Water Filtration Model, cont'd Terms, etc.

Clearance Rate (CR) – Rate particles are cleared from the water

Variables Known to Affect CR:
- Temperature
- Salinity
- Dissolved oxygen
- Particle size
- Seston concentration
- Flow rate
- Oyster size

Addt'l particle drawdown on oyster reefs:
- Physical structure slows water flow/traps particles
- Associated organisms filter particles

zu Ermgassen et al. 2013 determined the CR of oysters *in situ* to be $8.02W^{0.58}$, where *W* is the dry tissue weight of the oyster in grams.

Oyster Water Filtration Model
Methods Summary

Modeling Potential Reef Restoration Areas

- Used Habitat Suitability Index and oyster reef extent data to model potential areas of reef restoration for both high and medium suitable areas within each grid cell.
- High suitability areas, 0.177 probability
- Medium suitability areas, 0.110 probability

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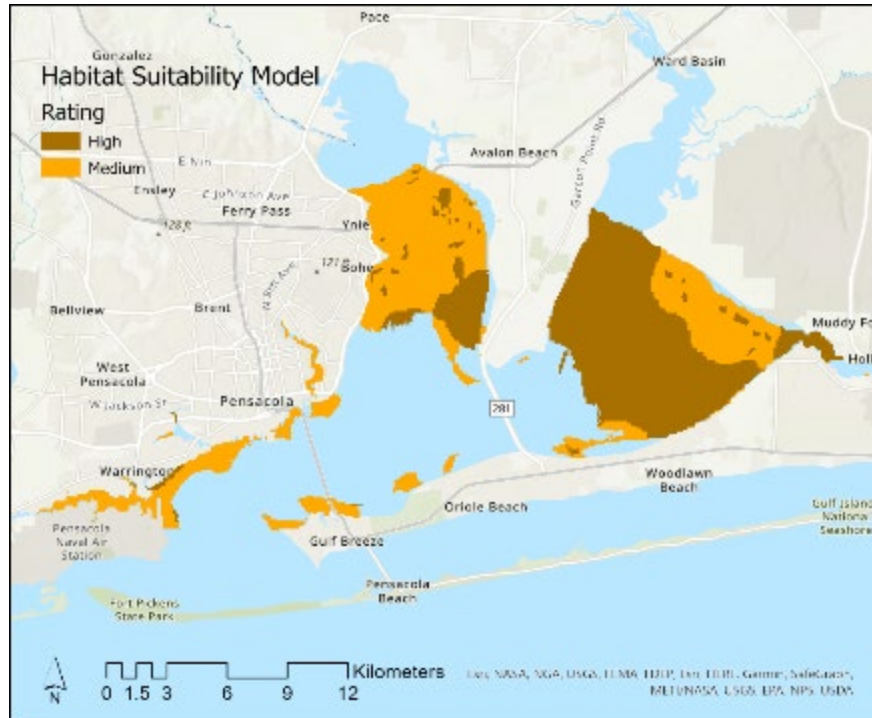
Oyster Water Filtration Model
Methods, cont'd

Fine-scale 3-D Hydro-Dynamic Simulation Model

- Environmental Fluid Dynamics Code (EFDC) - state-of-the-art and based on turbulence-averaged governing equations

- Previously developed by USEPA for the PBS.

- Suitable for application in FW and coastal ecosystems, including tidal estuaries

- 3,299 cells; 5 vertical layers; Ave. grid area = 8.8 km2

- Simulated particle movements through PBS for 1 year, 2015

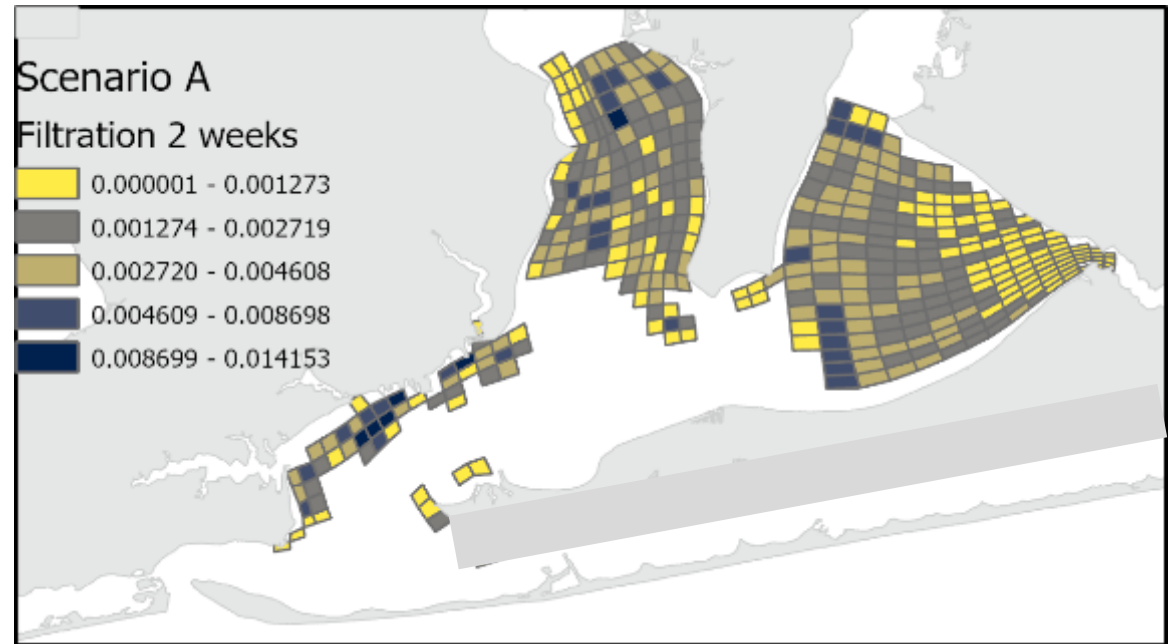- Used 2,000 randomly placed particles throughout central PBS

Oyster Water Filtration Model, cont'd
Sample Results – Two Scenarios
Identified best grid cells to restore in high & medium habitat suitability areas

Scenario A

- Assumes highly successful restoration of pre-DWH spill reefs.
- Optimal filtration was found to be reached in about 2 weeks

Scenario A
Filtration 2 weeks

☐	0.000001 - 0.001273
☐	0.001274 - 0.002719
☐	0.002720 - 0.004608
☐	0.004609 - 0.008698
☐	0.008699 - 0.014153

Oyster size class	Mean SH (mm)	Reference	Mean density m^{-2}	Reference
mean <25mm	9	La Peyre et al. 2014	431	La Peyre et al. 2014b
mean 25-75mm	56	Nevin et al. 2014	227	La Peyre et al. 2014b
mean >75mm	98	Nevin et al. 2014	80	La Peyre et al. 2014b

Oyster Water Filtration Model, cont'd
Identified best grid cells to restore in high & medium habitat suitability areas

Scenario B

- Assumes successful restoration
- Based on 2 weeks of filtration
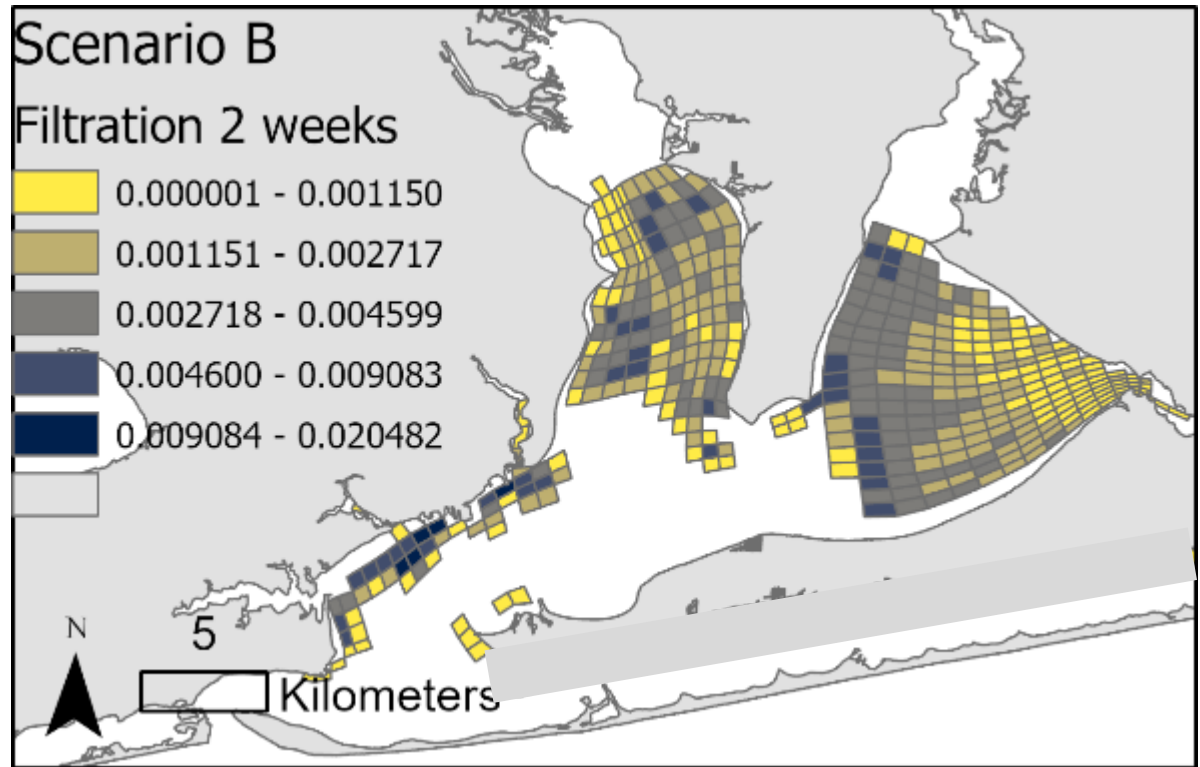
Oyster size class	Mean SH (mm)	Reference	Mean density m^{-2}	Reference
mean <25mm	9	La Peyre et al. 2014	94	La Peyre et al. 2014b
mean 25-75mm	56	Nevin et al. 2014	94	La Peyre et al. 2014b
mean >75mm	98	Nevin et al. 2014	33	La Peyre et al. 2014b

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SPATIAL PLAN for Restoring Oyster Reefs
Considerations (not comprehensive)

- Best locations for producing larval oysters
- Where oyster fishers would like to see restored reefs for commercial harvest
- Best areas for aquaculture
- Where sportfishers would like to see reefs for sportfishing
- Best locations for water filtration
- Best locations for oyster habitat expansion
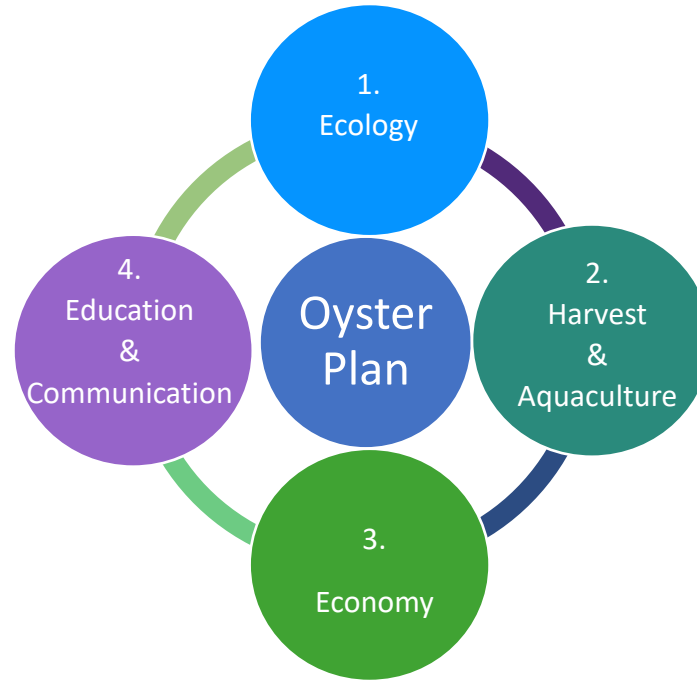- Areas to avoid – boat channels, existing aquaculture, etc.

Management Areas and Avoidances

- Prohibited Harvest
- Most Suitable
- May be Suitable in Some Locations
- Less Suitable. Further Site-Specific Evaluation Needed
- Likely Not Suitable for Restoration
- ▲ Watermen Identified Recent Oyster Reefs
- Watermen Low DO Caution Area
- Navigation Channels
- Aquaculture Leases

Map created by Laura Geselbracht, lgeselbracht@tnc.org, 4-14-2021

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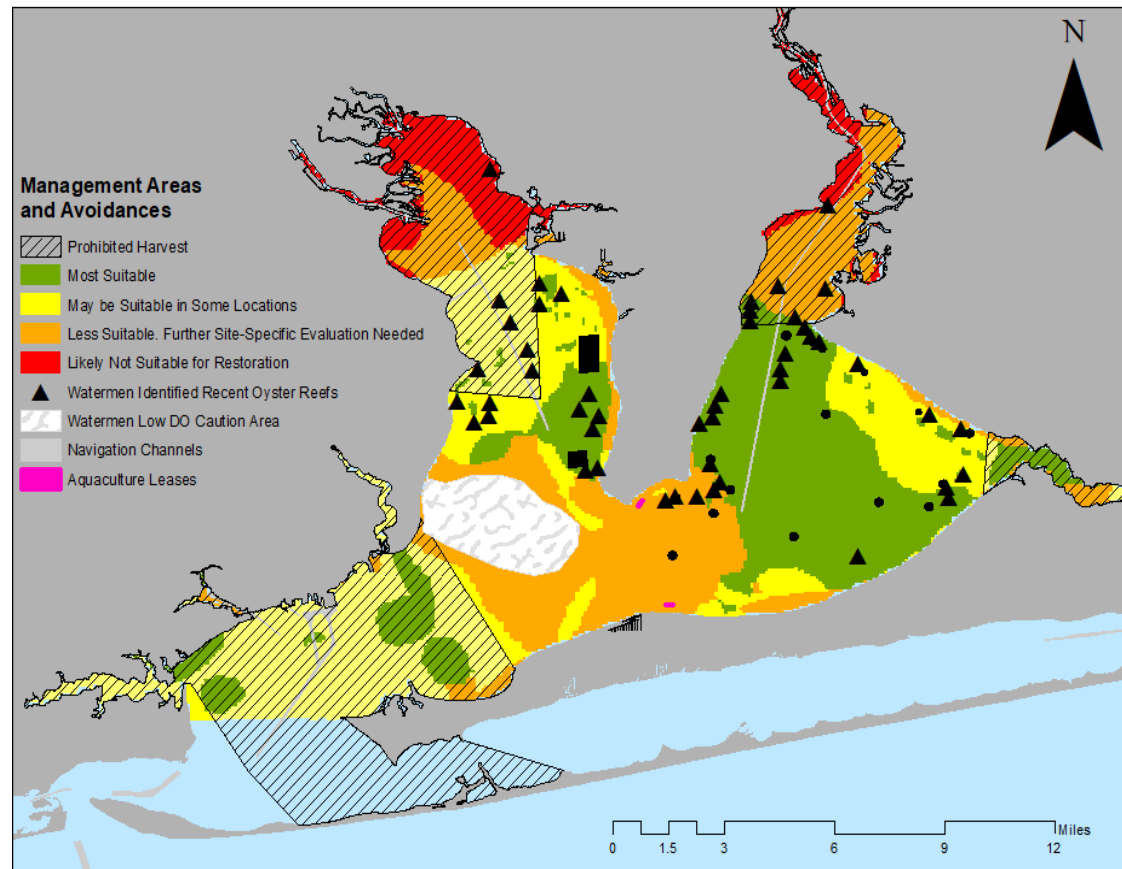
OYSTER FISHERIES AND HABITAT MANAGEMENT PLAN for the Pensacola Bay System

May 2021

- 1. Ecology
- 2. Harvest & Aquaculture
- 3. Economy
- 4. Education & Communication

Oyster Plan

4 themes
26 strategies
57 actions

Strategy Prioritization Ranking

Priority 1 - Important To Do Now — 20 strategies

Priority 2 - Important But Less Time Sensitive — 6 strategies

Priority 3 - As Time and Resources Allow — 0 strategies

Oyster Fisheries & Habitat Management Plan for the Pensacola Bay System
ABSI CAB Meeting August 18, 2021

Oyster Fisheries and Habitat Management Plan for the Pensacola Bay System
ABSI Community Advisory Board Meeting August 18, 2021

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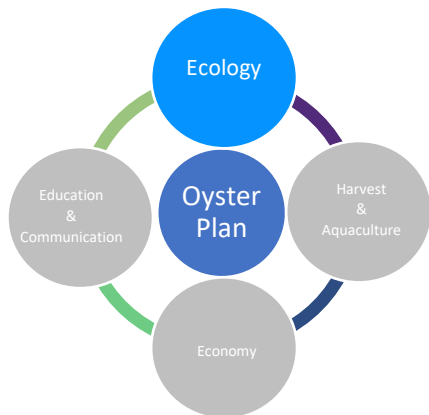
Theme A: Ecological
A Healthy and Productive Oyster Reef Ecosystem

Goal: The Pensacola Bay System sustains a healthy and productive oyster reef ecosystem. **Outcome:** By 2030, the oyster reef ecosystem within the Pensacola Bay is managed in a sustainable manner providing measurable ecosystem services.

Objectives

Oyster Populations
Reef area is expanding, and population variables are improving.

Oyster recruitment and survivorship increases throughout the PBS.

Oyster standing stock and biomass are increasing across appropriate ecological gradients in the PBS.

Net shell budgets are positive and increasing on all reef types.

Ecosystem Services
Ecosystem service and health indicator metrics are increasing/improving.

Substrate
Oyster shell returned to the system is increasing across ecological gradients as appropriate.

Future Condition
Water regime (quantity, timing, hydrodynamics) and water quality inputs into the PBS as well as changes in PBS water and habitat quality are improving in terms of their impact on oyster resources.

PBS O-EBFM Plan is adaptable to climate change and other management considerations.

Metrics

Oyster Populations - Ecosystem Services – Substrate -Future Conditions

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PRIORITY 1 - ECOLOGY

STRATEGIES (7)	ACTIONS (14)
A1 - Use data collection, monitoring, annual status of oyster assessment data, and comprehensive shell budget models to inform management of oyster populations.	**A1.1** - Develop and implement a monitoring plan that references methodologies used. **A1.2** - Develop shell budget model scenarios. **A1.3** - Implement a spat collection program throughout the bay to inform restoration of the habitat and fishery
A2 - Enhance the monitoring and accuracy of harvested and non-harvested reefs and aquaculture stock data collection and reporting methods for inclusion in recovery targets (restoration and management).	**A.2.1** - Design and implement a program(s) to supplement state monitoring activities
A3 - Establish restoration and management targets for functional harvested and non-harvested oyster reefs using 1-3 ecological health indicators (e.g., amount of water filtered by oysters, amount of juvenile fish enhancement by reefs; seagrass habitat and other adjacent ecosystems established or restored).	**A3.1** - Create and manage a prioritized list with spatially explicit maps of restoration projects for the bay system based on the Habitat Suitability Model and restoration and management targets **A3.2** - Establish ecosystem service targets to manage the Bay System (e.g., water filtration, rec. fishing, and denitrification)
A4 - Implement policies and programs for the return of sufficient oyster shell back to the PBS to support sustainable oyster populations and demographic targets and thresholds.	**A4.1.** - Examine existing laws and create novel policies and programs to support return of shell back to the system (e.g., TX law requires return of material to the water). **A4.2**. - Examine if policies should also apply to the State's fossil shell sources. **A4.3** - Demonstrate the benefits of shell recycling programs to return shell back into the System. **A4.4** Identify the current location, quantity, and fate of shell material as a by-product of shucking.
A5 - Manage and remediate sources of sedimentation to the estuary and sediment sinks in the estuary impacting the oyster reef ecosystem.	**A5.1.** - Identify sources of sediment into estuary. **A-5.2.** Identify how sediment sinks in the bay system affects oysters
A6 - Restore and create reef structures suitable for sustained oyster settlement that enhance ecosystem services in designated restoration areas.	**A6.1 -** Design and implement projects to achieve multiple ecosystem service targets (e.g., recreational fishing, shoreline protection). **A6.2 -** Implement restoration projects simultaneously rather than sequentially.
A7 - Evaluate the effects of land use changes in the watershed on the health of oysters (e.g., floodplain forests, marshes, open spaces).	**A7.1** - Track land use changes over time (retrospectively and prospectively) to determine if future changes could adversely affect oyster viability in the system. **A7.2** - Proactively address potential adverse impacts.
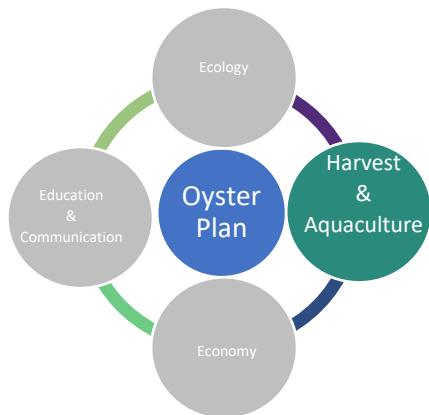
Theme B: Wild Harvest and Aquaculture – The Management and Regulation of the Oyster Fishery and Aquaculture Industry

Goal: A productive, and sustainably managed and regulated oyster reef fishery and aquaculture industry in the Pensacola Bay System.

Outcome: By 2030, oyster reefs in the Pensacola Bay System support a sustainably managed and productive fishery and aquaculture industry supported by stakeholders, using the best available science and monitoring to manage and regulate fishery and aquaculture activities in a fair and equitable manner.

Objectives

Wild Harvest Goals
Oyster stocks and harvest levels are improving to meet the established targets for oyster fishery enhancements.

Adaptable Management Goal
Oyster managers are knowledgeable about how changes in climate and other future environmental conditions are changing and could impact oyster resources

Aquaculture Industry Goal
Industry and community support for growth and expansion of the oyster aquaculture industry in the PBS is high.

Metrics

Wild Harvest Production - Environmental Conditions– Aquaculture Expansion

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PRIORITY 1 - WILD HARVEST AND AQUACULTURE

STRATEGIES (8)	ACTIONS (15)
B1 - Annually assess the status of oysters in the PBS and provide regular updates	No Actions identified yet
B2 - Develop a shell budget model	No Actions identified yet
B3 - Develop oyster population and demographic targets and biological thresholds (at the smallest scale that makes sense to inform harvest targets).	**B3.1** - Apply routine monitoring data and shell budget models. **B3.2** - Define the scale used for the specific boundaries.
B4 - Manage the commercial oyster industry and recreational oyster fishing to provide for sustainable spat production and spawning and the recovery of oyster populations.	**B4.1** - Evaluate management scenarios (e.g., closures, rotational harvest, non-harvested spawning reefs, Territorial Use Rights of Fishing, limited entry, regulations, transferable license program). **B4.2** - Evaluate existing allowable and minimally destructive alternative gear type options and harvest methods, including the use of experimental gear for wild oyster harvesting.
B5 - Enhance the monitoring and accuracy of commercial and recreational oyster harvest and aquaculture stock data collection and reporting methods for inclusion in fisheries management targets.	**B5.1** - Develop and implement a monitoring plan that references methodologies used. **B5.2** - Develop shell budget model scenarios. **B5.3** - Collect annual estimate of aquaculture harvest (implement via FDACS). **B5.4** - Evaluate whether recreational data should be monitored, how it would be implemented, and in relation to a cost/benefit analysis for collecting the data.
B6 - Restore and create reef structures suitable for sustained oyster settlement and production for harvesting.	**B6.1 -** Work with watermen to evaluate cultching techniques for growing oysters (e.g., historical non-traditional, trees). **B6.2 -** Design and implement projects to achieve oyster fishery production targets. **B6.3 -** Design projects that include both fished and non-fished reefs.
B7 - Support and prepare for the expected growth of aquaculture in the PBS.	**B7.1 -** Develop an aquaculture growth plan that outlines and defines optimal expansion of the aquaculture industry. **B7.2 -** Develop Spatial Area Management Plan that maps ideal areas for current and future growth using abiotic (DO, salinity, temperature, etc.) and social variables (proximity to docks, exclusion zones, etc.). **B7.3 -** Establish Aquaculture Use Zones (AUZ).
B8 - Characterize and quantify current biological (e.g., red tide) and chemical hotspots (e.g., pesticides, heavy metals) and inputs into the PBS and their effect on oysters.	**B8.1 -** Commission studies to collect and analyze data.

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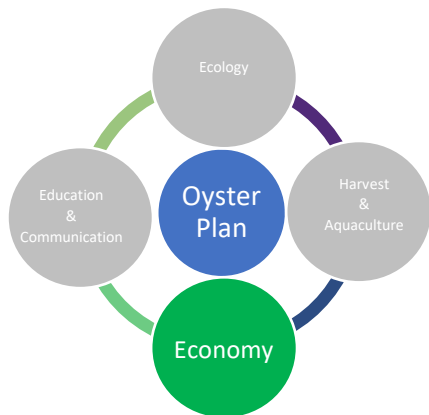
Theme C: Economy – A Thriving Economy Connected to the Pensacola Bay System

Goal: A healthy Bay System contributes measurably to a thriving economy for the Pensacola Bay region.

Outcome: By 2030, recovery of the Pensacola Bay ecosystem spurred by restoration of oyster reef ecosystems and a sustainable oyster fishery and development of aquaculture has led to a thriving economy that provides opportunities for sustainable and responsible industry, development, business, recreation and tourism.

Objectives

Oysters: Key Pieces to the Economy
Recognition and value of oyster habitat, oyster harvesting, and oyster aquaculture as key components of the local economy and cultural heritage is high or increasing in the PBS community and state

The commercial oyster fishery, aquaculture industry and associated industries in the PBS are viable and growing.

Participation in the oyster fishery and oyster aquaculture industries are growing and creating sustainable careers.

Invest in Water Management
Water quality parameters of importance to oysters in the PBS are sufficient for supporting vibrant fished and farmed oyster industries.

Compatible Policies & Regulations
Government policies, plans and regulations affecting oysters are increasingly compatible with a healthy and well-managed ecosystem while maintaining a thriving economy and supporting cultural heritage

Metrics
Attitudes-Jobs-Investments-Etc...

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PRIORITY 1 – THRIVING ECONOMY

| STRATEGIES (2)	ACTIONS (3)
C1 - Demonstrate the economic and social benefits derived from the ecosystem services provided by oyster fisheries and restored/natural reef habitat	**C1.1** - Compile information on the economic and social benefits accruing from restored reefs (fished and non-fished). **C1.2** - Seek out partnerships with researchers that have been doing this work.
C2 - Align local and state government policies and practices that support oyster restoration, fisheries and aquaculture	**C2.1 -** Evaluate existing policies and practices and recommend adjustments.

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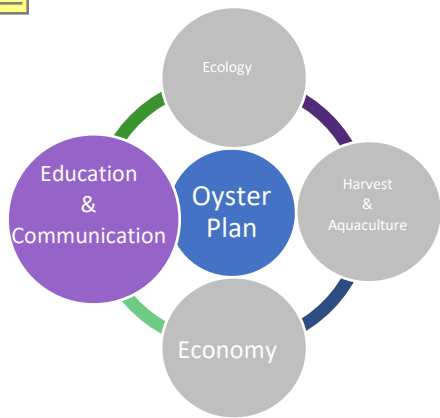
Theme D: Public Education and Communication - An Engaged and Informed Public and Decision-Makers

Goal: The oyster reef ecosystem of the Pensacola Bay System is supported and protected by an engaged and informed public, and decision-makers

Outcome: By 2030, the Pensacola Bay System stakeholders are informed of the importance of sustaining the health of the Bay System, and work actively to invest in and implement the Plan.

Objectives

Increase Public and Awareness and Support
The implemented outreach and education plans increase public and stakeholder awareness and support for a healthy and well-managed oyster resources and PBS ecosystem.

Estuary Program Leadership
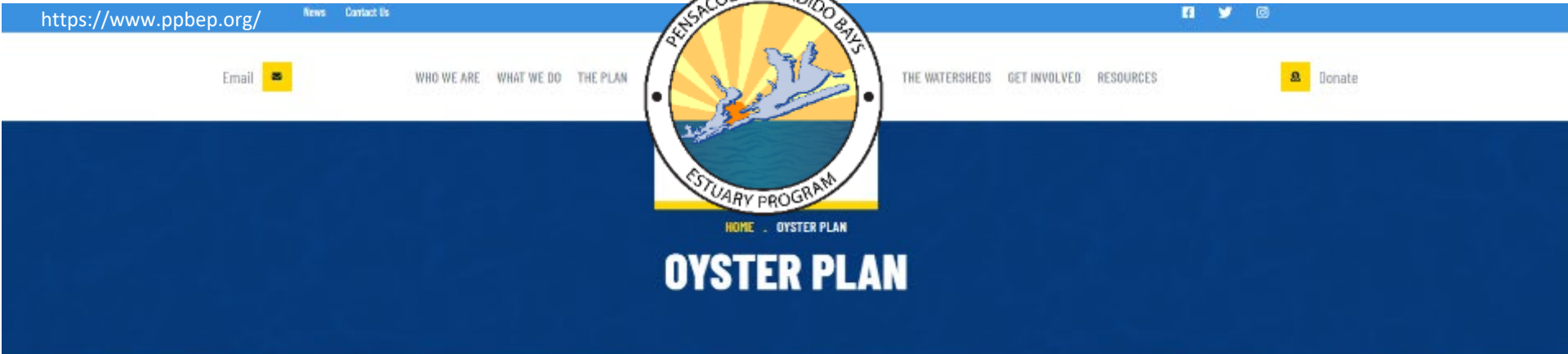The PPBEP increasingly incorporates and promotes recommendations of the PBS oyster plan.

Metrics

Participation – Funding – Outreach Implementation – Community Involvement

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PRIORITY 1 - Public Education and Communication

STRATEGIES (3)	ACTIONS (12)
D1 - Build a broad constituency to support outreach efforts that generate and increase public awareness and support for a healthy and well-managed oyster habitat and fisheries and the ecosystem services they provide.	**D1.1 -** Engage businesses, industries, non-profits, and local governments to gain their support and include them in outreach and education efforts **D1.2 -** Address both positive and negative consequences of depleted/lost oyster reef habitat respectively. **D1.3 -** Seek public buy-in for supporting restoration efforts by highlighting the benefits to and enlisting the support of recreational fishing, ecotourism, and water sports interests. **D1.4-** Establish an oral history project to document the history, present day circumstances, and future visions for oysters by the community in the Pensacola Bay System.
D2 - Promote sustainable wild harvest and cultured oysters and the value of ecosystem services provided by restored oyster populations in the PBS.	**D2.1 -** Develop and implement a marketing and communication plan, which celebrates oysters as an important feature of the area's cultural heritage. **D2.1 -** Promote and market certification programs and engage with certification agencies and organizations to certify Pensacola Bay oysters.
D3 - Expand existing or create new mentoring and education programs focused on restoration and monitoring of oyster habitat and fisheries and training for aquaculture farming that involves all sectors of the community.	**D3.1 -** Develop and support new and existing volunteer citizen-science programs for monitoring, data collection, and restoration efforts for oyster restoration projects at all levels (e.g., youth, adult, K-12, and colleges and universities). **D3.2 -** Demonstrate the benefits of shell recycling programs to return shell back into the System. **D3.3 -** Develop and support education programs that focus on oysters as drivers of restoration and management of the PBS. **D3.4 -** Develop education and mentoring programs to create a new oyster workforce for restoration and monitoring, wild harvest, and aquaculture industries. **D3.5 -** Design and implement local community initiatives for growing oysters for their ecosystem services (i.e., Mobile Bay oyster gardening), ensuring that science-based best practices are utilized **D3.6 -** Develop a "future farmers" program that helps locals in the area learn about aquaculture and the potential for making a living by growing oysters in the PBS. (e.g., Partner with existing programs such as Sea Grant MS/AL programs).

HOME FOR THE PLAN

https://www.ppbep.org/the-plan/oyster-plan
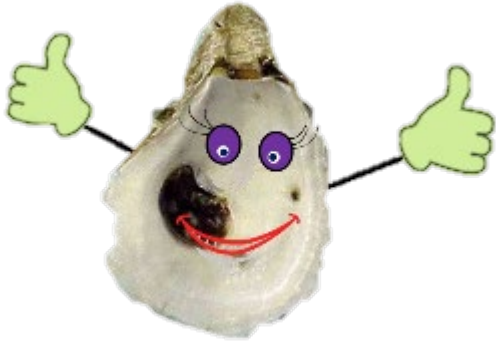
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PRIORITY 1 - Referred to PPBEP

STRATEGIES (4)	ACTIONS (14)
PPBEP 3 - Create a comprehensive funding approach for Plan implementation including a comprehensive analysis for future grant funding for strategies, including support for sustainable monitoring deriving from the Plan.	**PPBEP.1 -** Engage businesses, industries, non-profits, and local governments to gain their support and include them in outreach and education efforts.
PPBEP1 - Evaluate and ensure that the Plan works synergistically with and leverages the benefits of the other strategies, plans, and initiatives that are ongoing or planned for the PBS.	**PPBEP 2.1 -** Establish the Advisory Committee's organizational structure and define the committee's scope of work. **PPBEP 2.2 -** Meet to assess and report progress on meeting the Plan's objectives, outcomes, strategies, and actions in achieving the desired goals and modify the plan as needed to address gaps and issues that may arise. **PPBEP 2.3 -** Actively engage with state programs to encourage their adoption of the Plan's and PPBEP's long-term monitoring guidelines and metrics for assessing water quality, oyster abundance, and demographics and to regularly review and update these guidelines and metrics to maintain a healthy and sustainable oyster harvest and ecosystem. **PPBEP 2.4 -** Encourage agencies to prioritize the Plan's recommendations for investing more funding in the management and restoration of oyster resources. **PPBEP 2.5 -** Recommend changes and/or additions to the state's shellfish management policies to specifically address the needs of oyster recovery in the Pensacola Bay System.
PPBEP2 - Convene an advisory committee under the auspices of the Estuary Program to evaluate the effectiveness of the Plan. Composition: PPBEP, state management agencies (FWC, FDACS, FDEP, NWFWMD), watermen, and other key stakeholders.	**PPBEP 3.1 -** Evaluate funding sources for implementation of management and restoration strategies included in the PBS Ecosystem-Based Oyster Fisheries Management Plan (e.g., region-wide Gulf trustee implementation group for NRDA funding.) **PPBEP 3.2 -** Evaluate grant opportunities from recommendations included in the PBS Ecosystem-Based Oyster Fisheries Management Plan **PPBEP 3.3 -** Allocate sufficient funding for habitat restoration based on the oyster HSM and restoration and management targets (e.g., Develop funding source for cultch used in oyster reef restoration.) **PPBEP 3.4 -** Allocate sufficient funding for restoration of harvested reefs and aquaculture farms based on the oyster Habitat Suitability Model (HSM). **PPBEP 3.5 -** Evaluate funding sources to generate awareness, education, and support for a healthy oyster and PBS ecosystem. **PPBEP 3.6 -** Develop and seek long-term funding for a comprehensive monitoring program that is used across programs and projects with a dashboard on metrics and indicators to leverage resources, standardize the metrics and indicators measured, and to share data. **PPBEP 3.7 -** Work across estuary programs to fund and leverage large scale monitoring for the Panhandle Region – Perdido to Suwanee. **PPBEP 3.8 -** Develop and seek a funding source to provide cultch for habitat restoration.
PPBEP 4 - Develop a set of water quality strategies as common ground that can address pollution and sediment impacts on the oyster resource.	No Actions identified yet

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LESSONS LEARNED

Worked Well

- Diverse stakeholders
- Community and State agency support
- Impartial & knowledgeable facilitation
- In-person & virtual meetings
- Science
- Evening meetings for watermen
- Opened doors to a bigger estuary vision
- Estuary Program: A "Home" for the Plan

Modify

- Show desired 'end product' upfront
- Science (HSM) upfront
- Strawman of plan structure
- Field Day with Stakeholders
- Special sessions with expanded stakeholder interests
- Dedicated Funding Source

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Thank You!