

**OYSTER ECOSYSTEM-BASED FISHERY MANAGEMENT PLAN (O-EBFM)  
FOR THE GREATER PENSACOLA BAY SYSTEM (GPBS)  
GPBS STAKEHOLDER WORKING GROUP**

**MEETING V—MEETING SUMMARY**

**MAY 19, 2020**

**HOST: THE NATURE CONSERVANCY, FLORIDA**

**FACILITATOR: FACILITATED SOLUTIONS, LLC**

**ZOOM ONLINE MEETING**

*Convened by:*

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May 19, 2020 Meeting of the  
GPBS Oyster EBFM Planning Working Group  
(shows a portion of the Working Group + project team members)

# GPBS STAKEHOLDER WORKING GROUP

## MEETING V—MEETING SUMMARY

May 19, 2020

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**MEETING V EXECUTIVE SUMMARY  
May 19, 2020**

Anne Birch, Florida Marine Program Manager, The Nature Conservancy, welcomed the Stakeholder Working Group members to the online Zoom 5<sup>th</sup> meeting. Anne introduced the Zoom technology and introduced the GPBS facilitation team of Jeff Blair and Bob Jones with Facilitated Solutions LLC. Members introduced themselves and the facilitator reviewed the meeting objectives and agenda which members agreed to follow. Members also approved, without changes, the April 9, 2020 facilitator's meeting summary.

The following are brief overviews of the four presentations. More in-depth notes of each are provided the full summary.

Beth Fugate, director of the Northwest Florida Aquatic Preserves Office and GPBS Working Group member, presented on the FDEP roles and responsibilities regarding oyster management in Florida. FDEP is involved in restoration and Enhancement projects and their implementation. In this context FDEP creates partnerships to maximize funding and community restoration efforts. In terms of oyster monitoring and research FDEP conducts project monitoring and submerged source monitoring in aquatic preserves. In resource management FDEP works with stakeholders to ensure protection of resources and habitats and convenes and participates in partnerships to enhance resources, maximize funding and plan for future management of resources and habitats. The Northwest Florida Aquatic Preserves office manages 2 aquatic preserves in the planning area: The Yellow River Marsh Aquatic Preserve and Fort Pickens Aquatic Preserve. Finally, FWC and FDACS fill the primary role in terms of oyster regulations. FDEP regulates use of oysters for restoration, research and shoreline stabilization and assists with Board of Trustees authorizations for aquaculture.

The Working Group comments covered the following topics: maps of the aquatic preserves incorporated into GPBS; multifaced management of the aquatic preserves; identify areas for more regulations; and clarify agencies responsible in various GPBS areas.

Thomas Soniat, Department of Biological Sciences and Gulf States Center for Environmental Informatics, University of New Orleans presented on oyster shell budget modeling that was initially developed for the Louisiana oyster fishery ten years ago. Louisiana Department of Wildlife and Fisheries annual stock assessment data on oyster density, oyster numbers by size, cultch density and reef area are inputs to the model. The model, which has a sustainability goal of no net shell (cultch) loss, simulates growth, natural and fishing mortality, and cultch loss or gain.

Tom then provided a shell budget demonstration designed to determine whether reef cultch is gained or lost. The simulation was configured with the following components: growth; mortality; dead oyster shell; dissolution; and fishing or restoration (set restoration/no fishing). Since 2000

oysters and oyster reefs in GPBS have experienced decline, but the recruitment didn't decline. Cultch planting is a way to get out of the negative loop. Tom noted the Gulf-wide application of shell-budget modeling partners include Alabama Department of Conservation and Natural Resources, Florida Fish and Wildlife Conservation Commission, Louisiana Department of Wildlife and Fisheries, Mississippi Department of Marine Resources Texas Parks and Wildlife Department, and the NOAA Saltonstall-Kennedy Program.

The Working Group comments covered the following topics: cultch defined; reef depth and ideal level of cultch; recovery times for a "sustainable" reef; FWC working with the model in its reef management approach; model requires relatively simple and affordable data requirements

Bill Huth, Marketing, Supply Chain Logistics, and Economics Department at the University of West Florida presented on market and non-market economic valuation, ecosystem service, and possible frameworks and modeling. He noted the GPBS watershed has the lowest circulation of any Bay in Florida with the Escambia River flowing to Pensacola Bay and the Blackwater and Yellow Rivers flowing into to East Bay. He highlighted the research regarding restoration goals and ecosystem services.

In terms of economic valuation, he noted a dearth of economic studies on the GPBS. Indirect and non-use values (e.g. harvested meats, improved water quality, sediment stabilization, and organism habitat) dwarf direct use economic value. He reviewed several possible market frameworks and modeling including the Fishery Performance Indicators: A Management Tool for Triple Bottom Line Outcomes; the US Geological Survey InVEST Model; the REMI Economic Impact Model; and the Travel Cost Model (TCM) -Recreation Demand. He noted the following non-market economic valuations approaches: public good; consumer surplus; and economic impact.

The Working Group comments covered the following topics: economic research needed for GPBS; aerial video seagrass surveys in GPBS; water quality and flushing in GPBS; and oyster vibrio concerns and studies.

Laura Geselbracht, Florida Senior Marine Scientist for The Nature Conservancy, provided an update of the habitat suitability model with revisions of dissolved oxygen model using bottom and surface data. The model uses seven factors including dissolved oxygen, contemporary reefs, historical reefs, seagrass, sediments. She pointed out the model has quantified the # of acres in each of suitability areas for the years 2015-2020: for bottom dissolved oxygen it is 12,000 acres that are most suitable; for Surface DO there are 13,000 acres most suitable.

The Working Group comments covered the following topics: dissolved oxygen data; and DO for restoration vs. aquaculture.

The Working Group agreed on the "vision of success" themes that were drawn from the questionnaire responses, reviewed and rated at the October 9 and November 15 Working Group meetings and formed the basis for the goal framework. The vision themes represent key topical issue areas that together characterize the desirable future for the oyster reef ecosystem and the

Greater Pensacola Bay System. The goals, outcomes and objectives were developed at the January and April meetings of the Working Group.

#### GPBS STAKEHOLDER WORKING GROUP GOAL FRAMEWORK

A. A HEALTHY AND PRODUCTIVE OYSTER REEF ECOSYSTEM	B. THE MANAGEMENT AND REGULATION OF THE OYSTER FISHERY AND AQUACULTURE INDUSTRY
C. THRIVING ECONOMY CONNECTED TO THE GREATER PENSACOLA BAY SYSTEM	D. AN ENGAGED AND INFORMED PUBLIC

The **Healthy and Productive Oyster Reef Ecosystem** vision theme, goal, outcomes are set forth in Appendix 5. The goal for this theme is, “The Greater Pensacola Bay System sustains a healthy and productive oyster reef ecosystem.” There are nine objectives covering: oyster populations; ecosystem services; substrate; and future conditions.

The Working Group at its January 2020 meeting reviewed and agreed on a definition for a strategy as a method or plan of action or policy that can be tested to determine whether it solves a problem and helps to achieve objectives and goals in the context of bringing about a desired future for the Greater Pensacola Bay System.

The following strategies were reviewed and agreed to during the meeting in concept subject to further refinement. The Working Groups comments and questions are set forth in the detailed summary starting on p. 16.

1. Manage oyster populations, using annual stock assessment data combined with comprehensive shell budget models.
2. ~~Develop~~ Update a spatial data base map and create a prioritized list of restoration projects with a variety of objectives.
3. Establish restoration and management targets for functional oyster habitat using 1 – 3 ecological health indicators (e.g., amount of water filtered by oysters, amount of juvenile fish enhancement by reefs).
4. Implement policies and programs to return of shell back to the system to support oyster population and demographic targets and thresholds.
5. Manage silt and sedimentation to the estuary impacting the oyster reef ecosystem.
6. Design and implement local community incentive initiatives for growing oysters for the ecosystem services (i.e., Mobile Bay oyster gardening).
7. Utilize models and other relevant information on climate change impacts to influence sustainable reef management.
8. Allocate sufficient funding for habitat restoration based on the oyster restoration suitability model.

#### Other Strategies

- Cataloguing the data collection piece

The **Management and Regulation of the Oyster Fishery and Aquaculture Industry** vision theme, goal, outcomes and objectives are set forth in Appendix 5. The goal for this theme is, A

productive, and sustainably managed and regulated oyster reef fishery and ecosystem and aquaculture industry in the Greater Pensacola Bay System. There are three objectives.

1. Establish and follow a biological threshold for harvest that provides for a sustainable commercial and recreational wild oyster fishery.
2. Growth and expansion of the oyster aquaculture industry in the GPSBS uses best management practices that has broad support of the industry and community and enables economic opportunities, while maximizing beneficial services of aquaculture, and preventing negative effects to the GPBS and its users.
3. Sustainable production thresholds and targets for wild harvest and aquaculture, respectively, are considered adaptable and re-assessed on a periodic basis to account for changes in climate and other future environmental conditions.

The following strategies were reviewed and agreed to during the meeting in concept subject to further refinement. The Working Groups comments and questions are set forth in the detailed summary starting on p. 20.

1. Estuary-specific oyster population and demographic targets are developed, using routine monitoring data combined with shell budget models.
2. Enhance the monitoring and accuracy of commercial and recreational oyster harvest data collection and reporting methods through co-management of the resource by agencies and watermen.
3. Enhance the monitoring and accuracy of aquaculture stock and harvest data collection for inclusion in ecosystem benefits and sustainability targets.

The Working Group stopped after the discussion of Strategy #3. They agreed to review and refine the remaining strategies (#4-11) for this goal and for Goals C and D at the July 2020 meeting.

The facilitators invited members of the public to comment and there was no one who offered public comments. They then reviewed possible agenda items for the Meeting VI, which will take place July 22, 2020 in a zoom virtual meeting format. The TNC Team agreed to review the comments and address in revised strategies and send out in advance an updated Worksheet document. The next several meetings will review and refine strategies and actions. The Working Group members were invited to the meeting with Watermen that is being scheduled on June 5 in the evening from 6:30-8:30 pm CDT. The meeting concluded with a Zoom evaluation.

*The meeting adjourned at 12:30 p.m. CT*



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MEETING V DETAILED SUMMARY- May 19, 2020**

*This section provides a more detailed summary of the meeting with additional data from the presentations and verbatim comments from the Working Group members during review and discussion of the Themes.*

## **I. INTRODUCTION**

### **A. WELCOME AND AGENDA AND PROCEDURES REVIEW**

Anne Birch, Florida Marine Program Manager, the Nature Conservancy, welcomed the Stakeholder Working Group members to the online Zoom 5<sup>th</sup> meeting. She introduced Shawn Brown with Visit Pensacola as a new Working Group member replacing Jack Brown who was the Interim Director of Visit Pensacola.

Anne introduced the GPBS facilitation team of Jeff Blair and Bob Jones with Facilitated Solutions LLC. Members introduced themselves (*See Appendix #2*) and the facilitator reviewed the meeting objectives and agenda which members agreed to follow (*See Appendix #1*). Members also approved, without changes, the April 9, 2020 facilitator's meeting summary which members had received in advance of the April 9 meeting. Jeff then reviewed guidelines for GPBS virtual meetings.

## **II. PRESENTATIONS ON THE GREATER PENSACOLA BAY SYSTEM**

### **A. FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION OYSTER MANAGEMENT-ROLES AND RESPONSIBILITIES**

Beth Fugate, director of the Northwest Florida Aquatic Preserves Office and GPBS Working Group member, presented on the FDEP roles and responsibilities regarding oyster management in Florida. In terms of restoration, FDEP is involved in restoration and Enhancement projects and their implementation. In this context FDEP creates partnerships to maximize funding and community restoration efforts.

In terms of oyster monitoring and research FDEP conducts project monitoring and submerged source monitoring in aquatic preserves. Beth indicated the program fills in data gaps. FDEP works with other agencies and university research centers and professors to find and support innovative projects as well as ideas and research regarding oysters and their habitat.

In resource management FDEP works with stakeholders to ensure protection of resources and habitats and convenes and participates in partnerships to enhance resources, maximize funding and plan for future management of resources and habitats.

The agency also implements 41 Aquatic Preserves and Management Plans which typically address oyster and oyster reef management. The Northwest Florida Aquatic Preserves office manages 2 aquatic preserves in the planning area. The Yellow River Marsh Aquatic Preserve was designated in 1970 consisting of about 11,000 acres of the Yellow River, Blackwater Bay and East Bay. It includes marsh, forested wetlands and seagrass beds which provide filtration from pollutants and serve as flood control. Recreational and commercial fishing are major activities within the preserve with anglers catching variety of fish including bass, bream and bluegill, catfish, redfish, flounder, blue crab, mullet, and more than 100 other types of fresh and brackish water fish. Volunteers are pictured building a living shoreline with fossilized oyster shell providing a solid surface for oysters to grow on.



Fort Pickens Aquatic Preserve is the other preserve in Pensacola Bay and undertakes water quality monitoring and has initiated and funded for a seagrass restoration project.

Finally, FWC and FDACS fill the primary role in terms of oyster regulations. FDEP regulates use of oysters for restoration, research and shoreline stabilization and assists with Board of Trustees authorizations for aquaculture.

#### *5-19 Working Group Comments/Questions:*

- Is there a map which show the location of the Aquatic Preserves? Can we show overlap maps for the GPBS area? Not clear who is responsible for Aquatic Preserves.  
*A: Depends. It is a multifaceted management effort with DEP roles in habitat protection and submerged waters.*
- We should identify areas in which areas in the GPBS needing more regulations.



- Met with DEP Director of the Northwest Office, Shawn Hamilton regarding Indian Bayou and a red clay plum washing into good seagrass, choking it all out. Not clear of the roles DEP, the NWWMD and counties.
- The agencies could help us determine who is responsible in various GPBS areas.

## **B. SHELL-BUDGET MODELING FOR OYSTER REEF RESTORATION AND SUSTAINABLE FISHING**

Thomas Soniat, Department of Biological Sciences and Gulf States Center for Environmental Informatics, University of New Orleans presented on oyster shell budget modeling which was Initially developed for Louisiana oyster fishery ten years ago. Louisiana Department of Wildlife and Fisheries annual stock assessment data on oyster density, oyster numbers by size, cultch density and reef area are inputs to the model. The model, which has a sustainability goal of no net shell (cultch) loss, simulates growth, natural and fishing mortality, and cultch loss or gain. The model provides:

- Shells of dead oysters are added to the reef and shells of fished oysters are debited;
- Growth and mortality are size and time dependent;
- Fishing can occur for seed and/or sack oysters; and
- Fishing rate is time dependent.

Tom then provided a shell budget demonstration designed to determine whether reef cultch is gained or lost. The simulation was configured with the following components: growth; mortality; dead oyster shell; dissolution; and fishing or restoration (set restoration/no fishing). Since 2000 oysters and oyster reefs in GPBS have experienced decline, but the recruitment didn't decline. Cultch planting is a way to get out of the negative loop.

Going forward, Tom noted the Gulf-wide application of shell-budget modeling partners include Alabama Department of Conservation and Natural Resources, Florida Fish and Wildlife Conservation Commission, Louisiana Department of Wildlife and Fisheries, Mississippi Department of Marine Resources Texas Parks and Wildlife Department, and the NOAA Saltonstall-Kennedy Program.

### *5-19 Working Group Comments/Questions:*

- Cultch and reef morphology? Reef Depth, etc.,  
*A: The model doesn't deal with topography (i.e. above the mudline). But looking at reef footprint there is an implied vertical accretion.*
- Ideal level of cultch?  
*A: Measure of reef accretion is a possible way to go.*
- Why did 9 reefs perform better?  
*A: They were reefs with more oysters, more boxes, and a history of productive reefs.*
- What are recovery times for becoming a sustainable reef?  
*A: It will depend, but if all goes well it could be 18 months to 2 years to produce sack size oysters. Oysters have to grow to a sufficient size and die in place. In a no fishing context the model shows you need a 10% growth of oysters on a reef.*

- A layman's definition of cultch and recruitment is any hard bottom. Recruitment to the reef or fisheries. Addition of larvae to the reef.
- FWC working with model (Melanie Parker) and plans on using this approach for managing reefs.
- Good summary of model and there are relatively simple data requirements. This model can help determine what reefs need to be rehabilitated and what reefs are doing well.

## Shell Budget Model Demonstration

### 1 Introduction

Welcome to the shell budget model demonstration. This model applies to the northern Gulf of Mexico only.

In this demo, you will be able to input oyster counts and cultch density (clean oyster shell weight) of an oyster reef.

Then, you'll be able to input a fishing rate, growth rate and mortality rate as variables of the simulation. From that, you will be able to determine if reef cultch is lost or gained.

### & Initial Reef Resources

Enter the acreage, oyster density, and cultch density of the simulated reef.

**Acreage** 1

Enter the total size of the reef, in acres.

**Oyster Density** 1

Enter the oyster density below for each oyster size group. You may enter as many size classes as needed.

Length (mm) 1	Count (oysters/m <sup>2</sup> ) 1	Actions
<input type="text" value="25"/>	<input type="text" value="20"/>	Remove
<input type="text" value="75"/>	<input type="text" value="10"/>	Remove
<input type="text" value="100"/>	<input type="text" value="5"/>	Remove
<input type="text"/>	<input type="text"/>	Remove
<input type="text"/>	<input type="text"/>	Remove

+ Sample

## C. AN ECONOMIC RESEARCH AGENDA FOR THE GPBS.

Bill Huth, Marketing, Supply Chain Logistics, and Economics Department at the University of West Florida presented on market and non-market economic valuation, ecosystem service, and possible frameworks and modeling.

The Greater Pensacola Bay System watershed has the lowest circulation of any Bay in Florida with the Escambia River flowing to Pensacola Bay and the Blackwater and Yellow Rivers flowing into to East Bay. In terms of Oyster Habitat Ecosystem Service Restoration Goals, Bill referred to a study by Baggett et al (2007) which set forth four restoration goals:

1. Brood stock and oyster population enhancement.
2. Habitat enhancement for resident and transient species.
3. Enhancement of adjacent habitats.
4. Water clarity improvement.

He also highlighted research conducted by Grabowski and Petersen (2007) on ecosystem services that offered the following seven categories of Oyster Ecosystem Services: Production of oysters; Water filtration and concentration of bio-deposits; Provision of habitat for epibenthic fishes (and other vertebrates and invertebrates); Carbon sequestration; Augmentation of fishery resources in general; Stabilization of benthic or intertidal habitat (e.g. marsh); Increase in landscape diversity.

In terms of economic valuation, he noted a dearth of economic studies on the GPBS. Indirect and non-use values (e.g. harvested meats, improved water quality, sediment stabilization, and organism habitat) dwarf direct use economic value. Lewis, et al (2016). "Environmental Quality of the Pensacola Bay System: Future Resource Management and Rehabilitation." US EPA Chapter 19 estimated the direct economic annual value per hectare to be approximately \$11,000 per ha (2.54 acres) with 96 ha to 162 ha. That is a \$1m to \$1.8m annual value. 343 ha of oyster reef existed in the 1987-1992 period.

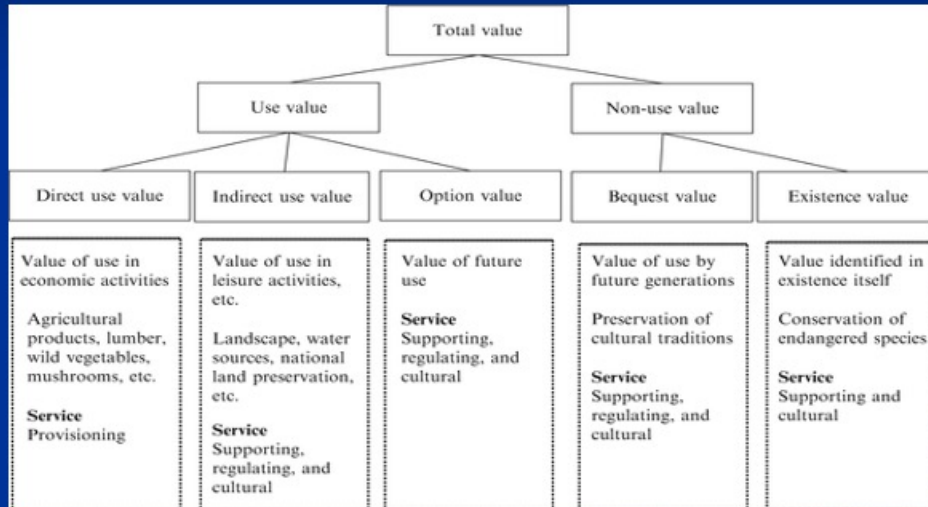
Bill indicated that management requires measurement and one important measure everyone understands is money. He noted Lewis et al. offered 20 recommendations, including:

- Fund a local entity to manage the research, monitoring, and management functions and maintain the data in formats available to the public.
- Determine the ecological and economic benefits of successful restorations for a cost benefit assessment.
- Conduct a thorough economic analysis for the environmental services and goods provided by the GPBS.
- Invest in environmental education.

He reviewed several possible market frameworks and modeling including:

- Anderson et al. (2015) The Fishery Performance Indicators: A Management Tool for Triple Bottom Line Outcomes. The Triple Bottom Line includes tools for ecology, economics, and community.
- US Geological Survey InVEST Model
- REMI Economic Impact Model with Four Major Segments (Input/Output: 23, 70, and 169 Industry Sectors; CGE: Markets Clear (Supply and Demand); Econometric: 6,000 plus equation model; and Economic Geography: labor force. The model covers all 67 Florida Counties (available at UWF).
- The Travel Cost Model (TCM) -Recreation Demand

# Estimating Economic Values



Note: tangibility decreases as you move from left to right.  
Source: OECD

He noted that non-market economic valuations approaches include:

- **Public Good:** A good that is non-rival and non-excludable. Your consumption doesn't reduce mine and we can consume it at will. Also, a common property resource (tragedy of the commons). Contingent valuation using survey research.
- **Consumer Surplus:** The benefit to consumers from paying a price less than what they were willing to pay for a product or service. Travel Cost, Hedonic Models, Contingent Valuation, InVEST.
- **Economic Impact:** Direct impact is the expenditure injection, indirect/induced impacts are multiples of the initial expenditure and when combined produce a total impact measure. Models: Implan and REMI.

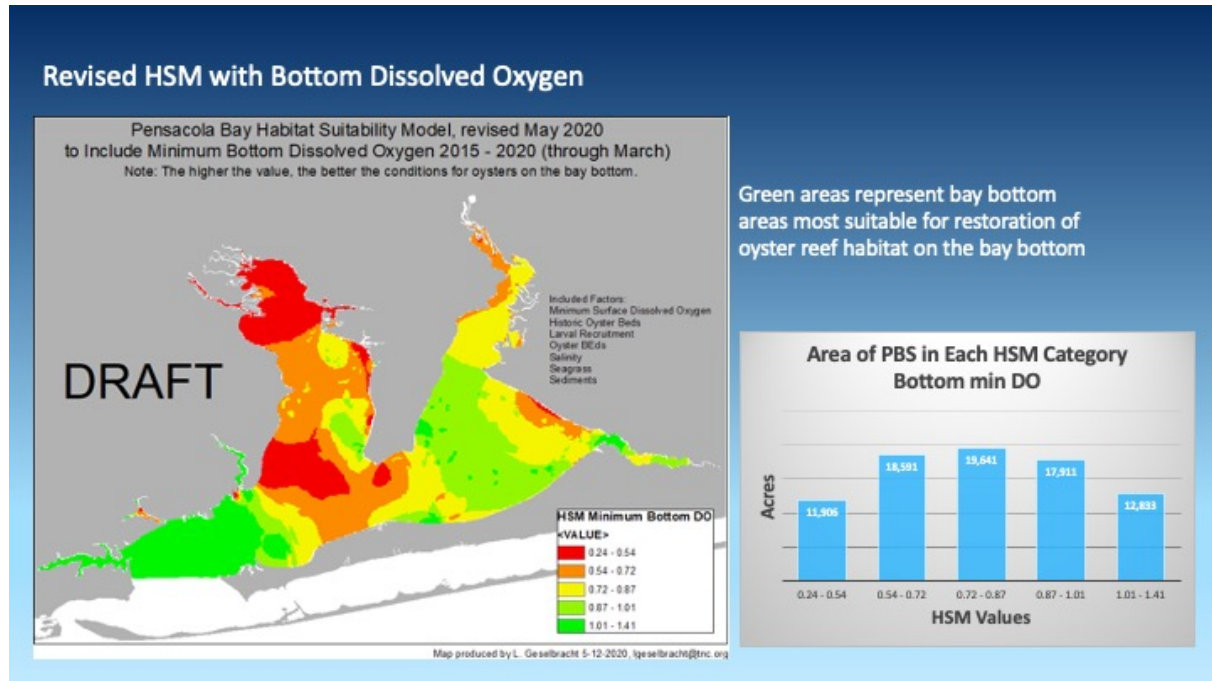
## 5-19 Working Group Comments/Questions:

- Lots of research to be done on economic side
- Very interested in the aerial video surveys of seagrass for the Estuary program
- Water quality and flushing. Consider reopening Navarre pass. Cut between Fort Pickens
- What do we know coastal historic vs current impacts on Bay flushing.
- In terms of vibrio concerns in Escambia, UWF research team headed by Lisa Wagner has a study in progress due out in the Fall of 2020.

A: *The Holy Grail for the gulf coast oysters is the absence of vibrio.*

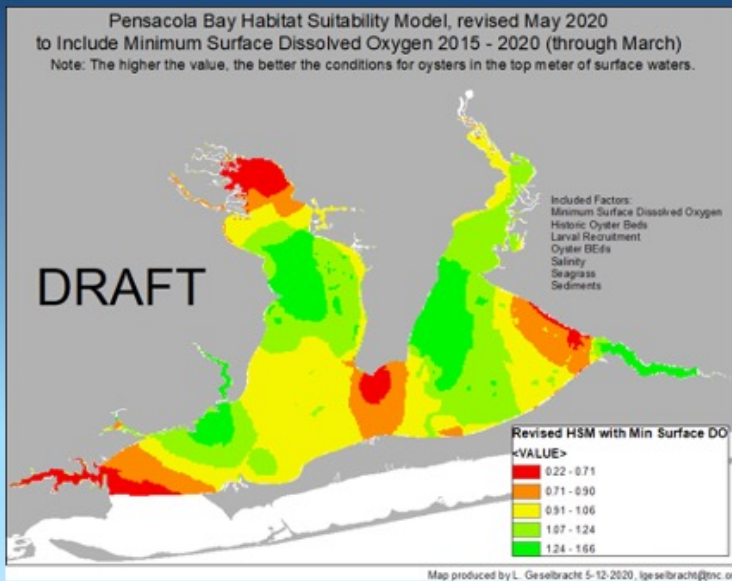
## D. UPDATE ON OYSTER HABITAT SUITABILITY MAPPING- UTILIZING BOTTOM AND SURFACE DISSOLVED OXYGEN

Laura Geselbracht, Florida Senior Marine Scientist for The Nature Conservancy, provided an update of the habitat suitability model with revisions of dissolved oxygen model using bottom and surface data. The model uses seven factors including dissolved oxygen, contemporary reefs, historical reefs, seagrass, sediments. She pointed out the model has quantified the # of acres in each of suitability areas for the years 2015-2020: for bottom dissolved oxygen it is 12,000 acres that are most suitable; for Surface DO there are 13,000 acres most suitable.

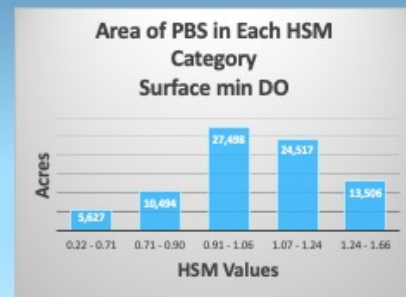




## Revised HSM with Surface Dissolved Oxygen



Green areas represent surface habitat most suitable for surface aquaculture and oyster gardening



### 5-19 Working Group Comments/Questions:

- There are 28 stations that measure and monitor bottom and top DO. You can get that DACS data.  
*A: The data is from all state agencies, Dr Caffrey, federal agencies going 5 years back to display how things have changed over time.*
- Is there a disparity DO benthic for restoration vs aquaculture? This could help in the long-term restoration and short-term functional operations.

## III. GREATER PENSACOLA BAY SYSTEM GOAL FRAMEWORK

The Working Group agreed on the “vision of success” themes that were drawn from the questionnaire responses, reviewed and rated at the October 9 and November 15 Working Group meetings and formed the basis for the goal framework. The vision themes represent key topical issue areas that together characterize the desirable future for the oyster reef ecosystem and the Greater Pensacola Bay System. The goals, outcomes and objectives were developed at the January and April meetings of the Working Group. (See Appendix #7)

### GPBS STAKEHOLDER WORKING GROUP GOAL FRAMEWORK

A. A Healthy and Productive Oyster Reef Ecosystem	B. The Management and Regulation of the Oyster Fishery and Aquaculture Industry
C. Thriving Economy Connected to the Greater Pensacola Bay System	D. An Engaged and Informed Public

## IV. HEALTHY AND PRODUCTIVE OYSTER REEF ECOSYSTEM

### A. VISION THEME, GOAL OUTCOMES & OBJECTIVES

**VISION THEME A:** The oyster reef ecosystem is managed in a manner that supports ecosystem services by protecting and enhancing the habitat and resource in a sustainable and productive manner.

**GOAL:** The Greater Pensacola Bay System sustains a healthy and productive oyster reef ecosystem.

**OUTCOME:** By 2030, the oyster reef ecosystem within the Greater Pensacola Bay is managed in a sustainable manner providing measurable ecosystem services.

### OBJECTIVES (9)

#### Oyster Populations

1. Measurements of oyster reef and population conditions (including larval production spat settlement, Spawning Stock Assessment, shell budgets) are defined and quantifiable, with target and threshold levels identified.
2. Oyster recruitment and survivorship occurs in the estuary on an annual basis at a level that sustains oyster harvest and ecosystem services from oyster reefs.
3. Spawning stock biomass and parental standing stock has increased across the ecological gradients (e.g., salinity, dissolved oxygen) appropriate for oyster growth and survival
4. A net positive shell-budget on both fished and non-fished reefs is sustained while oyster reef restoration is underway.

#### Ecosystem Service

5. Ecosystem services and ecological health indicators are defined and measurable, with identified target and threshold levels.

#### Substrate

6. Policies and programs are established and implemented that provide the means to return a significant portion of the harvested oyster shell back to the GPBS for substrate needed for larval recruitment to enhance population productivity.
7. Abundant oyster settlement substrate exists across the estuarine ecological gradients, where appropriate for oyster growth and survival.

#### Future Conditions

8. Climate-ready considerations are incorporated into restoration and management plans for the GPBS to consider changes in management and future environmental conditions, such as freshwater flow (quantity, timing, hydrodynamics), water quality (e.g., salinity and temperature), sea level, and habitat change.
9. Impacts and activities from future climate scenarios affecting the health and restoration of the GPBS ecosystem are considered and addressed to minimize negative effects to the GPBS ecosystem

## B. REVIEW OF DRAFT STRATEGIES

The Working Group at its January 2020 meeting reviewed and agreed on a definition for a strategy.

**STRATEGY:** A method or plan of action or policy that can be tested to determine whether it solves a problem and helps to achieve objectives and goals in the context of bringing about a desired future for the Greater Pensacola Bay System.

### *Overall Comments*

- Strategy analysis and data. What data proposed to collect? Where is the data collection piece?

*A: This may better fit into an action(s) under a strategy. Don't worry initially about overlapping strategies. We will combine some later*

### **1. Manage oyster populations, using annual stock assessment data combined with comprehensive shell budget models.**

#### *5-19 Working Group Comments/Questions:*

- Data collection and monitoring. Review where we have brought ourselves and quantify a catalogue of information.
- Include reference to other critical things such as salinity and water quality.
- “manage” generally is understood to refer to biology, not to water flow or salinity regimes.
- *Rankings: All 4s & 3s. No 2s & 1s*

### **2. ~~Develop~~ Update a spatial data base ~~map~~ and create a prioritized list of restoration projects with a variety of objectives.**

#### *5-19 Working Group Comments/Questions:*

- Maps are key- helps with primary objectives to explain to the public and stakeholders
- We should recommend developing and maintaining a spatial GIS data base.
- A prioritized list of projects is important to this strategy
- High level priority list on the data table
- This should be a part of the plan and our recommendations
- Is the spatial data available publicly? This is ideally the case
- The list should be broad in scope- a suite of projects to promote the goals and objectives.
- There is a variety of objectives addressed in this. Project bucketed into strategies
- “Update” vs “develop
- Select best sites for oysters first?
- Will the Working Group create a prioritized list of projects?  
*A: There might be recommendations, but the resulting plan will be incorporated into the Estuary Program's CCMP.*
- *Rankings: All 4s & 3s. No 2s & 1s*

**3. Establish restoration and management targets for functional oyster habitat using 1 – 3 ecological health indicators (e.g., amount of water filtered by oysters, amount of juvenile fish enhancement by reefs).**

*5-19 Working Group Comments/Questions:*

- Important to distinguish between a harvest vs a non-harvest reef
- We can recommend managing thresholds to allow the ecological functions to occur
- Harvest reefs wild, aquaculture contributions and restored or recruitment protected areas. We will use different calculators for each but need to meet Bay wide or segment wide. Overall management targets.
- This will be a complicated strategy for achieving overall goal
- What is the reason combining 2 buckets (harvest and non-harvest) under 1? It may be a confounding factor.
- What will be the monitoring approach for meeting targets?
- This is a high-level strategy. Need to be including different things. We are seeking success as a whole for oysters. Maybe we need to combine this all.
- Isn't it possible to have areas to be off limits for harvesting? At some point these could be re-opened when sustainable. Will these be fixed permanent protected areas?
- Apalachicola has had areas quickly cleaned out after opening closed areas? What can be harvested and when? Need to hear from FWC? Need sanctuary areas etc.
- Look to B for harvest management issues such as rotational harvest approach seasonally. In future concepts open for discussion. Closure, timing.
- In the FSU ABSI project, management options are on the table. Work group recommended closing the bay to wild harvesting at request of FWC.
- This group can make those recommendations. Dynamic process. Change is expected and we need to be adaptive.
- "Evaluating and potentially modifying the oyster management, is a book not a chapter."
- What is the current book? A: FWC regulations where and when you can harvest. FDACS regulates public health and aquaculture.
- There is no cost assessed per bag paid back to state. Should a bag tax be on the table?
- *Rankings: All 4s & 3s. No 2s & 1s*

**4. Implement policies and programs to return of shell back to the system to support oyster population and demographic targets and thresholds.**

*5-19 Working Group Comments/Questions:*

- Beyond shell recycling programs, require policy and regulation changes
- Manpower and resources are needed for this strategy to be implemented
- *Rankings: All 4s & 3s. No 2s & 1s*

**5. Manage silt and sedimentation to the estuary impacting the oyster reef ecosystem.**

*5-19 Working Group Comments/Questions:*

- Supportive. Need to identify issues. Look to 1-2 efforts, e.g. NRDA/DEP reduction effort in Choctawhatchee Bay
- Direct result of inland and upland thru rivers and creek. Identify sources of problems.
- Low lying lands need adequate filters and buffers in place
- This is a water shed issue, not in the in water per se. We may recognize this as a problem and not have recommendations on this. We may urge the Estuary Program EP to consider managing sedimentation.
- This area does need a concerted research effort on sedimentation. There are no studies on this.
- A watershed level view is needed for our plan.
- *Rankings: All 4s & 3s. No 2s & 1s*

**6. Design and implement local community incentive initiatives for growing oysters for the ecosystem services (i.e., Mobile Bay oyster gardening).**

*5-19 Working Group Comments/Questions:*

- Make sure this occurs and is organized and environmentally friendly. Review the Sea Grant best practices programs in this area.
- Interest in oysters is declining. Getting community involved is important
- Best mgt practices. This may be really hard to do. The agency permitting process need to be addressed. It will be a huge lift to get it started
- Public education and engagement are covered in the 4<sup>th</sup> goal area
- Barbara Albrecht has managed a great effort and she has interesting information that can be used as a model for the GPBS area.
- *Rankings: All 4s & 3s. No 2s & 1s*

**7. Utilize models and other relevant information on climate change impacts to influence sustainable reef management.**

*5-19 Working Group Comments/Questions:*

- Estuary Program will be taking long term view in the CCMP
- Our plan has to be an adaptive plan
- *Rankings: All 4s & 3s. No 2s & 1s*

**8. Allocate sufficient funding for habitat restoration based on the oyster restoration suitability model.**

*5-19 Working Group Comments/Questions:*

- This funding needs to come from somewhere. Are we going to determine where the sources are? How do we add meat to these?  
*A: don't shy away from funding and changes. Identify the possible agency lead*
- Other strategies will need sufficient funding. Should funding be another section of the Plan?



- The funding approach will identify the problems and tools needed to fix problems. Elected officials will need a high-end 1-2 page recommendation covering the current impact, ROI, etc.
- We can get seed funding to go to larger funding programs. Projects underway is powerful for making the case to funders
- Concern about wording “habitat restoration.” Are we suggesting funding its own piece?
- The plan will work together and recommend strategies for funding the plan implementation
- *Rankings: All 4s & 3s. No 2s & 1s*

#### **Other Strategies**

- Cataloguing the data collection piece
- Look at the objectives to see if we have strategies that addresses each
- Talk with colleagues. Do these strategies make sense?

## **IV. THE MANAGEMENT AND REGULATION OF THE OYSTER FISHERY AND AQUACULTURE INDUSTRY**

### **A. VISION THEME, GOAL, OUTCOMES & OBJECTIVES**

**VISION THEME B:** The management, regulation, restoration and enhancement of the oyster fishery and aquaculture industry is conducted by working collaboratively with stakeholders to create a plan that ensures that protection of the fishery and habitat is monitored and implemented in a manner that is supported by science, data, and field and industry experience and observation, and provides fair and equitable access to the oyster resource.

**GOAL:** A productive, and sustainably managed and regulated oyster reef fishery and ecosystem and aquaculture industry in the Greater Pensacola Bay System.

**OUTCOME:** By 2030, oyster reefs in the Greater Pensacola Bay System support a sustainably managed and productive fishery and an aquaculture industry and 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**

1. Establish and follow a biological threshold for harvest that provides for a sustainable commercial and recreational wild oyster fishery.
2. Growth and expansion of the oyster aquaculture industry in the GPSBS uses best management practices that has broad support of the industry and community and enables economic opportunities, while maximizing beneficial services of aquaculture, and preventing negative effects to the GPBS and its users.
3. Sustainable production thresholds and targets for wild harvest and aquaculture, respectively, are considered adaptable and re-assessed on a periodic basis to account for changes in climate and other future environmental conditions.

## B. REVIEW OF DRAFT STRATEGIES

1. **Estuary-specific oyster population and demographic targets are developed, using routine monitoring data combined with shell budget models.**

### *5-19 Working Group Comments/Questions:*

- Consider thresholds along with targets.
- “Minimum thresholds”- maybe qualify by adding minimum
- Not minimum, but biological thresholds. Going below those thresholds there would be a concern for sustainability of fishery.
- Build in buffer for uncertainties- e.g. provide for exciting fishery
- Should these thresholds and targets be estuary specific? Achieve objectives of fishery. Is estuary level fine enough scale to achieve objective?
- Be specific regarding recommendations for the two bodies of water under consideration for this plan: Escambia Bay and East Bay system. Specific
- Regulation of the Bays may need different strategies for water quality and system flushes.
- This will need monitoring throughout the estuary.
- Reef or bar level? Bar level monitoring, but not bar level management. Regulatory zone
- Co management is an important approach here.
- *Rankings: All 4s & 3s. No 2s & 1s*

2. **Enhance the monitoring and accuracy of commercial and recreational oyster harvest data collection and reporting methods through co-management of the resource by agencies and watermen.**

### *5-19 Working Group Comments/Questions:*

- Thumbs up. No recreational data is being collected presently
- What is the best method to monitor the recreational fishery? Is there no effective way to do? Thru MRIT program? Oyster monitoring would need funding through a permitting program? Need a program in place. Have to address public and private docks
- Logistics issue? Is there a license to fish oyster? A: It is a logistics issue. Don't know why this isn't done. Perhaps it is difficult to track
- Survey at public boat ramps. Sign to website to report their catch. Concerned about the fishery.
- *Rankings: All 4s & 3s. No 2s & 1s*

3. **Enhance the monitoring and accuracy of aquaculture stock and harvest data collection for inclusion in ecosystem benefits and sustainability targets.**

### *5-19 Working Group Comments/Questions:*

- Clarify what this means? Difficult to enforce. What are we trying to achieve this?
- Crediting the different sources for oysters- lease holders- e.g. water filtration targets, etc.
- Ecosystem service benefits vs. or and sustainability

- Market for services. E.g. carbon sequestration
- E.g. Oyster gardening- mitigation credits for the industry for ecosystem service for his crops
- Farmers wouldn't be concerned about sharing data for harvestable- but may have privacy concerns
- Method to recognize submerged lands as a source. Help with raising capital.
- State collects data on genetics, where it came from and where it goes. Very measurable. Lot of constraints- open areas- not permissible areas for sustainable farming.
- Protect area but not sell. Need a good flush system. Tolerate salinity for a week, not more.
- Historic restrictions on a wrack system off bottom 6 feet to deal with silt.
- Aquaculture benefits are comparable to sanctuaries. Floating farm regular for fish, e.g. Tarpon in the farm chasing mullet.
- Bottom culture. ACOE- 6 inches off bottom, water column lease possible. Some gulf sturgeon habitat. USFWS- FDACs don't have potential.
- As conditions change. Locations of historic bars may shift.
- Whole coast is sturgeon habitat. FWC marking buoys to determine the GS coming out of Escambia. A lot of work.
- All ecological services contributing to the overall system
- *Rankings: All 4s & 3s. No 2s & 1s*

*The Working Group stopped after discussion of **Strategy #3**.*

- 
4. Management of oyster resources are enforced through co-management oversight by agencies and watermen.
  5. Allocate sufficient funding for restoration of harvested reefs and aquaculture farms based on the oyster restoration suitability model.
  6. Traditional and novel policies and programs are implemented to support return of shell back to the system to support oyster population and demographic targets and thresholds.
  7. Institute additional management strategies that support the current industry members (e.g., rotational harvest, Territorial Use Rights of Fishing, limited entry, regulations).
  8. Create a public/private program to cooperatively manage specific harvested reefs.
  9. Review and revise state management agency regulations and management goals in consultation with oyster resource stakeholders to ensure they are clear and enforceable and include a working feedback loop with the regulated public to refine the program and enhance compliance.
  10. Develop aquaculture growth strategies and Spatial Area Management Plans that define the growth potential for aquaculture in the system.
  11. Develop "future oyster farmers" program that helps locals in the area learn about aquaculture and the potential for making a living growing oysters in the system.

The Working Group agreed to continue reviewing and refining the remaining strategies for this goal and for Goals C and D at the July 2020 meeting.

## VI. PUBLIC COMMENT AND NEXT STEPS

The facilitators invited members of the public to comment and there was no one who offered public comments.

They then reviewed possible agenda items for the Meeting VI, which will take place July 22, 2020 in a Zoom virtual meeting format. The TNC Team agreed to review the comments and address in revised strategies and send out in advance an updated Worksheet document. The next several meetings will review and refine strategies and actions. The Working Group members were invited to the meeting with Watermen that is being scheduled on June 4 in the evening from 6:30-8:30 pm. The meeting concluded with a Zoom evaluation. *(See Appendix #3)*

*The meeting adjourned at 12:30 p.m. CT.*

## Appendix #1 - Meeting Agenda

**OYSTER ECOSYSTEM-BASED FISHERY MANAGEMENT PLAN  
FOR THE GREATER PENSACOLA BAY SYSTEM  
GPBS STAKEHOLDER WORKING GROUP  
MEETING V MAY 19, 2020—8:30 AM CST  
VIRTUAL MEETING VIA ZOOM  
HOST: THE NATURE CONSERVANCY, FLORIDA  
FACILITATOR: FACILITATED SOLUTIONS, LLC**

### MEETING V OBJECTIVES

- ✓ To Approve Regular Procedural Topics (Agenda and Meeting IV Summary Report)
- ✓ To Review Meeting Schedule and Updated Workplan
- ✓ To Receive Requested Presentations
- ✓ To Review, Clarify, and Refine Objectives and Strategies to Achieve Goals
- ✓ To Review, Clarify, and Refine Draft Performance Measures to Assess Strategies
- ✓ To Identify Needed: Next Steps, Information, Presentations, and Agenda Items for July Meeting

### GPBS STAKEHOLDER WORKING GROUP MEETING V AGENDA—MAY 19, 2020

<b>8:30 AM CST</b>		<b>CALL TO ORDER</b>
<b>1.</b>	<b>8:30</b>	<b>WELCOME, REVIEW OF VIRTUAL MEETING PARTICIPATION GUIDELINES, AND ROLL CALL</b>
<b>2.</b>	<b>8:40</b>	<b>REVIEW AND APPROVAL of Agenda</b>
<b>3.</b>	<b>8:45</b>	<b>APPROVAL OF FACILITATORS' SUMMARY REPORT (APRIL 9, 2020 MEETING)</b>
<b>4.</b>	<b>8:50</b>	<b>REVIEW OF PROJECT MEETING SCHEDULE AND UPDATED WORKPLAN</b>
<b>5.</b>	<b>9:05</b>	<b>STAKEHOLDER REQUESTED PRESENTATIONS AND BRIEFINGS (15 MINUTES/PRESENTATION)</b> <ul style="list-style-type: none"> <li>• Overview of FDEP Responsibilities in Oyster and Estuarine Management in Florida. Beth Fugate, FDEP</li> <li>• Shell-budget modeling for oyster reef restoration and sustainable fishing. Tom Soniat, University of Louisiana</li> <li>• An Economic Research Agenda for the GPBS. Bill Huth, University of West Florida</li> </ul>
<b>10:00 AM CST</b>		<b>BREAK</b>
<b>6.</b>	<b>10:15</b>	<b>A.) A HEALTHY AND PRODUCTIVE OYSTER REEF ECOSYSTEM</b>
<b>7.</b>	<b>10:45</b>	<b>B.) THE MANAGEMENT AND REGULATION OF THE OYSTER FISHERY AND AQUACULTURE</b>
<b>11:15 PM CST</b>		<b>BREAK</b>
<b>8.</b>	<b>11:30</b>	<b>C.) A Thriving Economy Connected to the Greater Pensacola Bay System</b>
<b>9.</b>	<b>12:00</b>	<b>D.) An Engaged and Informed Public</b>
<b>10.</b>	<b>12:15</b>	<b>PUBLIC COMMENT</b>
<b>11.</b>	<b>12:25</b>	<b>NEXT STEPS, INFORMATION NEEDS, PRESENTATIONS, AND AGENDA ITEMS FOR THE NEXT MEETING</b> <ul style="list-style-type: none"> <li>• Review of action items and assignments</li> <li>• Identify needed information and presentations for the next meeting</li> <li>• Identify agenda items for the next meeting</li> <li>• Meeting evaluation</li> </ul>
<b>12:30 PM CST</b>		<b>ADJOURN</b>



## Appendix #2 -Working Group Members, Project Team, Facilitators & Public Participating

(**Bold** = members who attended the April 9, 2020 meeting. When two people are listed on the same line the first person listed is the Working Group member and the second person listed is their Alternate)

GPBS STAKEHOLDER WORKING GROUP MEMBERS AND PUBLIC ATTENDANCE	
MEMBER	AFFILIATION
<b>Building/Development</b>	
1. Shelby Johnson	Johnson Construction of Pensacola, Inc.
2. <b>Glen Miley</b>	biome Consulting Group
<b>Business/Real Estate/Economic Development/Tourism</b>	
3. <b>Will Dunaway</b>	Environmental Lawyer
4. <b>Donnie McMahon/ Thomas Derbes</b>	Business and Aquaculture
<b>Environmental/Citizen</b>	
5. <b>Christian Wagley</b>	Healthy Gulf
<b>Local Government</b>	
6. <b>Shelley Alexander</b>	Santa Rosa County Environmental Programs
7. <b>Chips Kirschenfeld</b>	Escambia County Natural Resources Management
8. <b>Matt Posner/ Whitney Scheffel</b>	Pensacola and Perdido Bays Estuary Program
9. Keith Wilkins/ Cynthia Carlson	Pensacola City Administrator
<b>Recreational Fishing</b>	
10. Chris Phillips	Hot Spot Charters
<b>Seafood Industry</b>	
11. <b>Pasco Gibson</b>	Seafood Industry/Waterman
12. Josh Neese	Aquaculture
13. Pete Nichols	Seafood Industry/Waterman
14. <b>Tommy Pugh</b>	Seafood Dealer
15. Phil Rollo	Seafood Dealer
16. Calvin Sullivan	Oyster Harvester
17. William (Hub) Williamson	Oyster Harvester
<b>State Government</b>	
18. <b>Beth Fugate</b>	FDEP/Aquatic Preserves (presented)
19. <b>Kent Smith/Katie Konchar</b>	FWC Division of Habitat and Species Conservation
20. <b>Mike Norberg</b>	FWC Division of Marine Fisheries Management
21. <b>Portia Sapp/Michelle Smith</b>	FDACS Division of Aquaculture
22. <b>Paul Thurman</b>	NFWFMD
<b>Tourism</b>	
23. <b>Shawn Brown</b>	Visit Pensacola
<b>University/Research</b>	
24. <b>Jane Caffrey</b>	UWF
25. Rick O'Connor	UF/IFAS Escambia County
26. <b>Chris Verlinde</b>	UF/IFAS/Sea Grant Santa Rosa County
<b>PROJECT TEAM AND FACILITATORS</b>	
<b>THE NATURE CONSERVANCY</b>	
<b>Anne Birch</b>	Marine Program Manager, Florida
<b>Bryan DeAngelis</b>	Marine Habitat Scientist, North America
<b>Laura Geselbracht</b>	Sr. Marine Scientist, Florida
<b>Andrea Graves</b>	Marine Projects Coordinator, Florida
<b>FACILITATED SOLUTIONS, LLC</b>	
<b>Jeff Blair</b>	Working Group Facilitator
<b>Robert Jones</b>	Working Group Facilitator

PUBLIC	
1. Barbara Albrecht	Community
2. Nicole Gislason	UWF
3. Stephen Hanks	Wood PLC
4. L.D. Henderson	Seafood Industry/Oysterman
5. Richard Hawkins	Univ. of West Florida (UWF)
6. Bill Huth	UWF, Presenter
7. Tanya Linzy	Santa Rosa County
8. Amy Newburn	UWF
9. Jennifer Sagan	Wood PLC
10. Tom Soniat	Univ. of New Orleans, Presenter

### Appendix #3- Zoom Working Group Member Meeting Evaluation, May 19, 2020

#### 1. The meeting objectives were clearly communicated at the beginning

Average Rating	5.Strongly Agree	4.Agree	3.Not Sure	2.Disagree	1.Strongly Disagree
4.7 of 5	8	4	0	0	0

#### 2. The meeting objectives were met.

Average Rating	5.Strongly Agree	4.Agree	3.Not Sure	2.Disagree	1.Strongly Disagree
4.6 of 5	7	5	0	0	0

#### 3. The facilitation of the meeting was effective for achieving the stated objectives

Average Rating	5.Strongly Agree	4.Agree	3.Not Sure	2.Disagree	1.Strongly Disagree
4.8 of 5	10	2	0	0	0

#### 4. Follow-up actions were clearly summarized at the end of the meeting

Average Rating	5.Strongly Agree	4.Agree	3.Not Sure	2.Disagree	1.Strongly Disagree
4.3 of 5	3	7	0	0	0

#### 5. The facilitators accurately documented the Working Group Member input

Average Rating	5.Strongly Agree	4.Agree	3.Not Sure	2.Disagree	1.Strongly Disagree
4.1 of 5	2	7	1	0	0

#### 6. The meeting was the appropriate length of time.

Average Rating	5.Strongly Agree	4.Agree	3.Not Sure	2.Disagree	1.Strongly Disagree
4.5 of 5	6	3	1	0	0

#### 7. Working Group Members had the opportunity to participate and be heard.

Average Rating	5.Strongly Agree	4.Agree	3.Not Sure	2.Disagree	1.Strongly Disagree
5.0 of 5	10	0	0	0	0

#### 8. What do you think worked well using the virtual Zoom platform for the meeting?

- It was fine (3)
- Low carbon footprint!!
- Taking turns to speak, seems to flow well this way
- I think approaching the strategies individually was effective while still being able to see everyone. (2)
- Chat works well!
- Taking it slowly. Listen to all; raise your hand

- I think it went well.
- Presentations were informative and easy to follow on Zoom.
- No need to travel (a.k.a. start my day at 4 am)

**9. How could the virtual meeting format be improved for future meetings?**

- Anne's artwork is very relaxing!
- Virtual chocolate?
- We did have Milton Bakery donuts
- NO FAIR CHRIS!!!!
- Strong facilitation is key
- Maybe another quick break. Being home means extra tasks (kids)
- Another break or so.
- Think things are working pretty well. agree with Chris, another short break would be good
- I am not sure there are many improvements. I just feel 4 hours is the max amount of time where I can be engaged.
- Yes, I agree 4 hours is about right
- Timing is key. Agree with the length of time considerations.
- I actually prefer zoom for the tasks we are involved in over in-person meeting!
- Because we optioned for speaker view, we didn't get to see live documentation...
- Can't think of anything major. It worked well today.

**10. Other comments**

- Good meeting, thanks to all
- You know we could all chip in like \$5 and have a llama at our next zoom meeting ;)
- We are flexible on the June 4 meeting, but the 5:30 time frame is best. (3)

## Appendix #4 - Project Schedule & Workplan

*Meetings Dates are Subject to Change*

GPBS STAKEHOLDER WORKING GROUP MEETING SCHEDULE AND WORKPLAN		
STANDING UP AND ORGANIZATION OF THE GPBS STAKEHOLDER WORKING GROUP		
Meeting I. Studer Institute	Oct. 9, 2019	Scoping and organizational meeting, review of the assessment report and questionnaire, and review and refinement of overall project purpose, vision and goal framework.
Meeting II. UF/IFAS SRC Extension	Nov. 15, 2019	Introduction to tools (e.g. oyster calculator, etc.) and member requested presentations on oyster ecology and restoration. Review and refinement of vision themes and goal framework.
SCOPING OF GPBS ISSUES, IDENTIFICATION OF PERFORMANCE MEASURES & OPTIONS		
Meeting III. Sanders Beach	Jan. 15, 2020	Presentations on regulatory management roles and framework for oysters, and strategic communications. Review and refinement of vision goals (4) framework continued. Introduction to potential performance measures to evaluate strategies.
Meeting IV. <a href="#">Zoom</a> <a href="#">Platform</a>	April 9, 2020	Presentations on Oyster Habitat Restoration Suitability Model, Pensacola & Perdido Bays Estuary Program (PPBEP) and <u>G</u> ulf of Mexico <u>E</u> cosystem Service Logic Models & <u>S</u> ocio-Economic Indicators-GEMS Project. Review of draft vision theme and objectives, identification of strategies and related performance measures to evaluate strategies.
Meeting V. <a href="#">Zoom</a> <a href="#">Platform</a>	May 19, 2020	Member requested presentations on FDEP Responsibilities in Oyster and Estuarine Management in Florida, An Economic Research Agenda for the GPBS, and Shell Budget Briefing. Review testing acceptability and refinement of strategies in the 4 goal areas, review performance measures for evaluating strategies, and identify potential Plan implementation actions and steps.
Watermen Workshop <a href="#">Zoom</a> <a href="#">Platform</a>	June 4, 2020	Workshop with watermen to review and provide recommendations on progress to date including Plan outline, draft objectives, strategies and potential actions.
BUILDING CONSENSUS ON GPBS OYSTER ECOSYSTEM-BASED FISHERIES MANAGEMENT PLAN		
Meeting VI. <a href="#">Zoom</a> <a href="#">Platform</a> or UF/IFAS SRC Extension	July 22, 2020	Member requested presentations. Review of comments and suggestions from Watermen Workshop. Review testing acceptability and refinement of strategies in the 4 goal areas, review performance measures for evaluating strategies, and identify potential Plan implementation actions and steps.
Update and Presentations to PPBEP	July 2020	Presentations by TNC to the Pensacola & Perdido Bays Estuary Program's Policy Board, and the Technical,



		Education and Economic Committees on the Plan goals and framework.
Meeting VII. <a href="#">Zoom</a> <a href="#">Platform</a> or Studer Institute	Sept. 16, 2020	Review of comments and suggestions from the PPBEP presentations, test acceptability and refinement of strategies in the 4 goal areas, review performance measures for evaluating strategies, and identify potential plan implementation actions and steps. Review of Draft Plan outline.
Public Workshop	October 2020	Review and seek input on the GPBS Oyster Ecosystem-Based Fisheries Management Plan outline, and on the goals, objectives, strategies and actions.
<b>FINALIZING CONSENSUS ON GPBS OYSTER ECOSYSTEM-BASED FISHERIES MANAGEMENT PLAN</b>		
Meeting VIII. <a href="#">Zoom</a> <a href="#">Platform</a> or UF/IFAS	Nov. 18, 2020	Review of comments and suggestions from the Public Workshop. Initial review, refinement and consensus testing of Draft Plan's 4 goals, objectives, strategies and actions and implementation recommendations.
Update and Presentations to PPBEP	December 2021	Presentations by TNC to the Pensacola & Perdido Bays Estuary Program's Policy Board, and the Technical, Education and Economic Committees on the Plan's progress and the Estuary Program's role in implementing the Plan.
Meeting IX. <a href="#">Zoom</a> <a href="#">Platform</a> or Studer Institute	Jan. 27, 2021	Review and consensus testing of Draft Plan and implementation guidance and agreement on Workshop Draft Plan.
Public Workshops (2) Escambia & Santa Rosa counties	February 2021	Review and seek input on GPBS Oyster Ecosystem-Based Fisheries Management Plan and implementation guidance.
Meeting X. <a href="#">Zoom</a> <a href="#">Platform</a> or UF/IFAS SRC Extension	March 17, 2021	Review of public comment, refinement and agreement on the GPBS Oyster Ecosystem-Based Fisheries Management Plan and implementation guidance.

## Appendix #5- Vision Themes, Goals, Outcomes & Objectives

The GPBS Working Groups agreed to the following statements at the October & December 2019, and January & April 2020 meetings.

### **THEME A. A HEALTHY AND PRODUCTIVE OYSTER REEF ECOSYSTEM (ECOLOGICAL)**

**VISION THEME A:** The oyster reef ecosystem is managed in a manner that supports ecosystem services by protecting and enhancing the habitat and resource in a sustainable and productive manner.

**GOAL:** The Greater Pensacola Bay System sustains a healthy and productive oyster reef ecosystem.

**Outcome:** By 2030, the oyster reef ecosystem within the Greater Pensacola Bay is managed in a sustainable manner providing measurable ecosystem services.

**Key Topical Issues:** At the November 15, 2019 meeting members brainstormed key topical issues including: Identifiable and achievable targets; Growth; Public understanding and support; Best practices as a framework for recommendations; Link the Plan to the Estuary Program; Model successes from other estuaries and scale up faster; Leverage and support funding for advance wastewater treatment facilities; Geo spatial mapping; Integrate and build on existing management plans; Identify existing and planned projects; Resiliency and adaptive management as guiding principles; and, Clarify and mitigate potential impacts to sustainably managing the PBS.

#### **OBJECTIVES**

##### **Oyster Populations**

1. Measurements of oyster reef and population conditions (including larval production spat settlement, Spawning Stock Assessment, shell budgets) are defined and quantifiable, with target and threshold levels identified.
2. Oyster recruitment and survivorship occurs in the estuary on an annual basis at a level that sustains oyster harvest and ecosystem services from oyster reefs.
3. Spawning stock biomass and parental standing stock has increased across the ecological gradients (e.g., salinity, dissolved oxygen) appropriate for oyster growth and survival
4. A net positive shell-budget on both fished and non-fished reefs is sustained while oyster reef restoration is underway.

##### **Ecosystem Service**

5. Ecosystem services and ecological health indicators are defined and measurable, with identified target and threshold levels.

##### **Substrate**

6. Policies and programs are established and implemented that provide the means to return a significant portion of the harvested oyster shell back to the GPBS for substrate needed for larval recruitment to enhance population productivity.
7. Abundant oyster settlement substrate exists across the estuarine ecological gradients, where appropriate for oyster growth and survival.

#### **Future Conditions**

8. Climate-ready considerations are incorporated into restoration and management plans for the GPBS to consider changes in management and future environmental conditions, such as freshwater flow (quantity, timing, hydrodynamics), water quality (e.g., salinity and temperature), sea level, and habitat change.
9. Impacts and activities from future climate scenarios affecting the health and restoration of the GPBS ecosystem are considered and addressed to minimize negative effects to the GPBS ecosystem

## **THEME B. THE MANAGEMENT AND REGULATION OF THE OYSTER FISHERY AND AQUACULTURE INDUSTRY (WILD HARVEST AND AQUACULTURE)**

**VISION THEME B:** The management, regulation, restoration and enhancement of the oyster fishery and aquaculture industry is conducted by working collaboratively with stakeholders to create a plan that ensures that protection of the fishery and habitat is monitored and implemented in a manner that is supported by science, data, and field and industry experience and observation, and provides fair and equitable access to the oyster resource.

**GOAL:** A productive, and sustainably managed and regulated oyster reef fishery and ecosystem and aquaculture industry in the Greater Pensacola Bay System.

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

**KEY TOPICAL ISSUES:** Ongoing funding for management; Ecological restoration principles; Fish and oyster production objectives; Adapt for future changes and circumstances; Incorporate state vetted plans; Address enforcement of regulation; Manage wild harvest differently than aquaculture; Regulation of aquaculture; define fair and equitable; and, Consider providing access to the fishery through changes in licensing requirements, building in a preference for locals or specific user types.

#### **OBJECTIVES**

1. Establish and follow a biological threshold for harvest that provides for a sustainable commercial and recreational wild oyster fishery.
2. Growth and expansion of the oyster aquaculture industry in the GPSBS uses best management practices that has broad support of the industry and community and enables

economic opportunities, while maximizing beneficial services of aquaculture, and preventing negative effects to the GPBS and its users.

3. Sustainable production thresholds and targets for wild harvest and aquaculture, respectively, are considered adaptable and re-assessed on a periodic basis to account for changes in climate and other future environmental conditions.

## **THEME C. A THRIVING ECONOMY CONNECTED TO THE GREATER PENSACOLA BAY SYSTEM (THRIVING ECONOMY)**

**VISION THEME C:** The Greater Pensacola Bay System oyster fishery, aquaculture, and oyster reef ecosystem serve as key components of the region's cultural heritage and economic viability and serve to sustain an economically viable and thriving fishery, recreation and tourism industry.

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

**OUTCOME:** By 2030, recovery of the Greater 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.

**KEY TOPICAL ISSUES:** Growth and conflicts among users; Aquaculture regulation and user conflicts; Aquaculture Use Zones; Economic activities that rely on a healthy bay; Social science; Controlling runoff; Public pushback for living seashore projects; Revenue generation and the plan; Local government involvement; Access opportunities to the water; Maintaining working waterfronts; and, Promotion and branding of aquaculture and oysters and the health of the Bay.

### **OBJECTIVES**

1. Develop a Marketing Strategy to promote wild harvest and cultured oysters and the ecosystem services provided by improved oyster populations in the GPBS.
2. Oyster reefs, oyster fishing and oyster aquaculture are recognized as key components of the local economy and Panhandle region, including supporting diverse and healthy fisheries, ecotourism, and other recreational activities.
3. Economic indicators of the commercial oyster fishery, aquaculture industry and associated industries in the GPBS demonstrate increasing viability and growth over X years.
4. Key water quality management investments are being made with the goal of protecting and enabling the oyster fishery and oyster aquaculture industry (including land use impacts).
5. The wild harvest fishery and oyster aquaculture industries provide economic and career growth opportunities.
6. Industries, and businesses within the GPBS are supportive and compatible with a healthy and well-managed GPBS ecosystem.

7. Growth management policies, plans and regulations affecting the GPBS are compatible with a healthy and well-managed ecosystem while maintaining a thriving economy and supporting cultural heritage.

## **THEME D: AN ENGAGED AND INFORMED PUBLIC AND DECISION-MAKERS (PUBLIC EDUCATION COMMUNICATION)**

**VISION THEME D:** Stakeholders of the Greater Pensacola Bay System are committed to working together collaboratively to serve as a hub for best practices and research, and provide education and communication on the importance of maintaining the health and productivity of the oyster reef ecosystem, fishery, and aquaculture, and the role they play in ensuring a thriving community.

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

**OUTCOME:** By 2030, the Greater Pensacola Bay System, stakeholders, private and nonprofit civic leaders, the public, and decision-makers are informed of the importance of sustaining the health of the Bay System, and work actively together along with elected and appointed leaders and managers to invest in and implement the Plan.

**KEY TOPICAL ISSUES:** A communication strategy to bring the PBS back to health; Marine habitats-out of sight out of mind; Plan should fit into the Estuary CCMP; Local government support; Unique community/state partnership; Distrust of science; and, Lack of information and measures on benefits to the community for a restored system.

### **OBJECTIVES**

1. Establish a coordinated outreach and education plan to increase public awareness and support for a healthy and well-managed GPBS ecosystem.
2. Businesses, industries, non-profits, and local governments are supportive and included in outreach and education efforts to generate and increase public awareness and support for a healthy and well-managed GPBS ecosystem.
3. Funding resources are identified and utilized to generate awareness, education, and support for a healthy oyster and GPBS ecosystem.
4. The new estuary program incorporates and promotes the recommendations of the new oyster plan.

## Appendix #6 Project Summary and Statement of Purpose

**PROJECT SUMMARY.** The Nature Conservancy (TNC) in Florida is convening stakeholders to develop an oyster ecosystem-based fisheries management plan for the Greater Pensacola Bay System (GPBS). For the purpose of this initiative the system is defined as Escambia, Pensacola, East and Blackwater Bays in Escambia and Santa Rosa Counties. TNC has been supporting and implementing projects in the GPBS for the past several years in collaboration with partners. Oysters and the once vibrant fishery are disappearing from the System. Significant funding as a result of the Deepwater Horizon oil spill is being dedicated to restoration of oysters throughout the Gulf of Mexico. This is a once-in-a-lifetime opportunity to reverse the trend and create a robust future for oysters and the fishery in Florida and the Gulf.

**STATEMENT OF PURPOSE.** The goal of the initiative is that by 2022 an oyster ecosystem-based fisheries management plan (Plan) for the GPBS is approved by the stakeholders. The Plan will be offered as a model for management of oyster resources throughout Florida's estuarine systems, the Gulf of Mexico and other regions. The intent is for the Plan to be developed, owned and implemented by the community and the State, not a "TNC plan".

The Working Group and the resulting Plan will seek to address and determine the priority of multiple objectives including wild harvest, oyster aquaculture, ecosystem service outcomes (i.e., clear water, more crabs and fish, nitrogen removal), and social benefits (e.g., recreational angling opportunities, and opportunity to participate in defining credible management processes) for the GPBS.

The Plan resulting from this initiative will help to define long-term estuary-scale goals for restoring and sustaining oysters in the estuary. It will work in the broader context of the Pensacola and Perdido Bays Estuary Program that received EPA funding in 2018 as part of the Deepwater Horizon oil spill settlement. The program hired an executive director in 2019 and is organizing to develop a Comprehensive Conservation and Management Plan (CCMP) for the Pensacola and Perdido Estuary System.

**PROJECT WEBPAGE (URL):** <https://myescambia.com/oyster-ebfm-plan>

**PROJECT FACILITATION:** Meetings are facilitated, and meeting reports drafted by Jeff Blair and Robert Jones from Facilitated Solutions, LLC. Information at: <http://facilitatedsolutions.org>.