

**APALACHICOLA BAY SYSTEM INITIATIVE COMMUNITY ADVISORY BOARD
KEY TOPICAL ISSUES—STRATEGIES ACCEPTABILITY RATING WORKSHEET**

APALACHICOLA BAY SYSTEM INITIATIVE COMMUNITY ADVISORY BOARD GOAL STATEMENT

The overarching goal of the Apalachicola Bay System Initiative Community Advisory Board is to develop a package of consensus recommendations informed by the best available science, data, and stakeholders' experiences for the management and restoration of the Apalachicola Bay System, and to ensure there is a reliable mechanism and process for the monitoring, funding, and implementation of the Apalachicola Bay System Ecosystem-Based Adaptive Management and Restoration Plan.

STRATEGIES WORKSHEET OVERVIEW

This Worksheet will be used to guide discussions at Apalachicola Bay System Initiative (ABSI) Community Advisory Board (CAB) meetings. **All strategies** that were proposed by CAB members and the ABSI Project Team (scientists and facilitators) were evaluated by the Team and organized into the following **categories**:

SECTION I: ABSI CAB DRAFT STRATEGIES*

- Goal A: A Healthy and Productive Bay Ecosystem [4 Objectives and 8 Strategies]
- Goal B: Sustainable Management of Oyster Resources [2 Objectives and 11 Strategies]
- Goal C: Ecosystem-Based Adaptive Management and Restoration Plan Supported by Apalachicola Bay System Stakeholders [2 Objectives and 4 Strategies]
- Goal D: An Engaged Stakeholder Community and Informed Public [2 Objectives and 3 Strategies]

**A lead entity and key partners will be identified for implementation of strategies and actions*

SECTION II: STRATEGIES* TO BE REFERRED TO OTHER PROGRAMS OR ENTITIES

- Goal E (Outside of ABSI Scope): A Thriving Economy Connected to a Restored Apalachicola Bay System [4 Objectives and 10 Strategies]
- Additional Strategies Outside of the ABSI Scope [5 Strategies]

**A lead entity and key partners will be identified for implementation of strategies and actions*

SECTION III: STRATEGIES RATED AS NOT ACHIEVING CONSENSUS

SECTION IV: PRIORITIZATION OF STRATEGIES

SECTION V: PERFORMANCE MEASURES **AND ESTUARINE METRICS**

SECTION VI: TERMS AND DEFINITIONS AND PROJECT BOUNDARY

SECTION VII: KEY TO COMMON ABBREVIATIONS

Note: All items highlighted in yellow are proposed revisions to the previous Worksheet draft.

ACCEPTABILITY RATING OF STRATEGIES THAT DON'T HAVE UNANIMOUS SUPPORT

Any strategy where there is not unanimous support for by the CAB may be rated for acceptability, and if rated with a 75% or greater number of 4s and 3s in proportion to 2s and 1s (\geq an 3.0 average rating) the strategy will be considered a consensus level recommendation for inclusion in the final package of recommendations for the Apalachicola Bay System Ecosystem-Based Adaptive Management and Restoration Plan. A list of any proposed strategies not meeting the consensus acceptability threshold level or determined not to be viable will be included in an appendix to the final report. **A lead entity and key implementation steps will be identified for each consensus level strategy.**

~~In addition to recommending strategies and actions, the CAB will recommend a lead entity and key partners responsible for implementation of the strategies and associated actions.~~

<i>Lead:</i>	<i>Partners:</i>
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The following is a proposed description of “Lead” and “Partner” for the CAB’s consideration:

Lead: Lead entities will coordinate and guide the partners in implementing a Strategy or Action and identify other entities interested in participating. The lead will gain support from their organization for their role in the Strategy or Action.

Partner: Partner entities will engage in meetings called by the Lead and actively participate in implementation of the Strategy or Action. The partners will gain support from their respective organization for their role in the Strategy or Action.

At any point during the process, any strategy may be re-evaluated and rated at the request of any CAB or ABSI Project Team member. The status of a strategy will not be final until the final CAB meeting, when a vote will be taken on the entire package of consensus level recommendations for inclusion in the Apalachicola Bay System Ecosystem-Based Adaptive Management and Restoration Plan.

The following scale will be utilized for acceptability rating exercises:

ACCEPTABILITY RATING SCALE	4 = Acceptable, I agree	3 = Acceptable, I agree with minor reservations	2 = Not Acceptable, I don't agree unless major reservations addressed	1 = Not Acceptable
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CAB members should be prepared to state their minor and major reservations when asked, and to offer proposed refinements to the strategy to address their concerns. If they are not able to offer refinements to make the strategy acceptable (4) or acceptable with minor reservations (3) they should rate the strategy with a 1 (not acceptable).

The strategies listed for Goals A - E are draft strategies under consideration by the CAB, and will not be considered recommendations until after the CAB votes for the final package of recommendations for inclusion in the Apalachicola Bay System Ecosystem-Based Adaptive Management and Restoration Plan at their November 17, 2021 meeting.

CAB FACILITATED DISCUSSION WORKSHEET

OVERARCHING GOAL DEVELOPED BY THE ABSI CAB: The overarching goal of the Apalachicola Bay System Initiative (ABSI) Community Advisory Board (CAB) is to develop a package of consensus recommendations informed by the best available science, data, and stakeholders' experiences for the management and restoration of the Apalachicola Bay System, and to ensure there is a reliable mechanism and process for the monitoring, funding, and implementation of the Apalachicola Bay System Ecosystem-Based Adaptive Management and Restoration Plan.

GOAL B OUTCOME—SUSTAINABLE MANAGEMENT OF OYSTER RESOURCES: By 2030, an engaged and collaborative group of stakeholders will have contributed to and helped spearhead a fully funded science-driven plan to sustainably manage oyster resources in the Apalachicola Bay System.

Discussion of Specific Management Alternatives/ Approaches:

There are a number of approaches that have been used here or elsewhere to successfully manage oyster populations and support a sustainable wild harvest fishery.

From your observations, experience and stakeholder perspective please give your thoughts on the following management approaches for a sustainable wild oyster fishery:

- Summer fishing closures.
- Rotational closures (e.g., summer bars vs. winter bars, partial bar closures).
- Managing harvest areas to prevent the concentration of effort in specific locations.
- Limited entry fishery.
- Permanent refuge non-harvest (no fishing) areas.
- Stock-based temporary closures.
- Managing oyster reef harvest with a metric (e.g., 300 bushels per acre).
- Daily harvest limits vs. fishery or individual quotas.
- Elimination of the 'buffer' (5% allowance for undersized) oysters for seafood dealers.

The CAB did not discuss the following approaches during the February 24, 2021 meeting:

- Reduced bag limits
- Bag tags.
- Relaying oysters from intertidal to subtidal locations within the Bay as a management strategy.
- 5-day work weeks.
- Implement annual fisheries dependent and independent stock assessments.
- Enforcement – What is needed from FWC Law Enforcement.
- Other strategies?

SECTION I COMMUNITY ADVISORY GROUP DRAFT ABSI STRATEGIES

OVERARCHING APPROACHES

1. Use the following ABSI-approved name for the developing management and restoration plan: the Apalachicola Bay System Ecosystem-Based Adaptive Management and Restoration Plan (Plan).
2. Include commercial fishermen in discussions of and to help work on restoration design and implementation (locations, size, total coverage, cultching, etc.), establishment of permanent closed areas, shell recycling, shelling, mentoring, and workforce entry development.
3. Incorporate scientifically-derived and coordinated long-term monitoring guidelines and metrics for assessing the overall health of the ABS system with a focus on oyster resources.
4. Use only the best available science (including information derived from scientists, agency personnel and stakeholders) for all components of ongoing research, modeling exercises, and development of the Plan, including relevant information on adaptation to climate change impacts.
5. Identify local partners to coordinate and collaborate with the lead entities on the implementation of strategies (stakeholders: e.g., watermen, citizen scientists, advocacy groups, NGOs, universities, counties and other local governments, etc.).

GOAL A A HEALTHY AND PRODUCTIVE BAY ECOSYSTEM

VISION THEME A: The Apalachicola Bay System, including its oyster reef resources, is sustainably managed. Water resources and affected habitats are afforded adequate protection to ensure that essential ecosystem functions are maintained and a full suite of economic opportunities are realized.

GOAL A: The Apalachicola Bay System is a healthy and productive ecosystem that supports a vibrant and sustainable oyster fishery and other economically viable activities.

OUTCOME: By 2030, the Apalachicola Bay System is a healthy, productive and sustainably managed ecosystem that supports a viable oyster fishery while providing a broad suite of ecosystem services that, in turn, afford additional opportunities for sustainable economic development.

GOAL A OBJECTIVES

A1) To use observations, monitoring, experiments and modeling conducted through ABSI and related efforts to create decision support tools that can inform how a range of natural and human influenced factors will affect the ABS ecosystem.

A2) To help establish a comprehensive monitoring plan to evaluate the health of the ABS oyster resource and its measurable ecosystem services with clearly defined performance measures and strong coordination among the various entities conducting research in the region.

A3) To use existing and new research, and decision support tools to identify viable strategies for restoration and management of the ABS oyster resources and the function of the ABS ecosystem.

A4) To define measurable ecosystem services that can be used to determine the level of change in ecological health (e.g. oyster fishery harvest, habitat for other fishery species, abundance and condition indices for oyster reef and population health) and societal benefit derived from Apalachicola Bay System management and restoration efforts, with target and threshold levels identified.

GOAL A DRAFT STRATEGIES

1) Restore and create reef structures suitable for sustained oyster settlement that enhance ecosystem services in designated restoration areas.

Action 1-A.): Design and implement projects to achieve multiple ecosystem service targets (e.g., commercial and recreational fishing, shoreline protection).

Action 1-B.): Implement restoration projects simultaneously rather than sequentially.

Lead: FWC | **Partners:** FSU, UF, local gov., FDOT, NGOs, coastal property owners, CAB

2) Use experimental evidence and habitat suitability analyses to determine the most suitable substrate (e.g., limestone, granite, spat-on-shell, artificial structures) for restoring, enhancing, and/or developing new reef structures that will increase productivity in the Apalachicola Bay oyster ecosystem.

• *Action 2-A.):* Conduct restoration experiments to test efficacy of different materials.

• *Action 2-B.):* Use knowledge gained from experiments to recommend best practices for broad scale restoration in the ABS.

Lead: FSU | **Partners:** UF, FWC, CAB

3) Develop criteria for restoring specific reefs or reef systems damaged by environmental conditions or natural disasters.

• *Action 3-A.):* Evaluate degree of damage and potential for recovery.

• *Action 3-B.):* Develop an approach for mitigating damage (e.g., physical repair, spat supplements, or some combination of both).

• *Action 3-C.):* Determine periodicity of hatchery-produced spat addition (e.g., annually or longer) with a specific timeline for continuing the approach. This approach is not intended to create a put-and-take fishery.

Lead: FSU | **Partners:** UF, FWC, CAB

4) Determine area (acres or km²) of oyster reefs that currently support live oysters as well as the area needed to ensure sufficient spat production that will support sustainability of oyster reefs and sustainability of a wild oyster fishery throughout the ABS.

Action 4-A.): Map existing oyster reefs using multibeam sonar and backscatter, and ground-truth for accuracy.

Action 4-B.): Apply model that uses reproductive output, recruitment, natural mortality rates and fishery harvest to assess oyster population dynamics.

Lead: FWC	Partners: FSU, UF
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5) Identify monitoring needs for assessing the health of oyster populations (including disease), and detecting changes in environmental conditions and habitat quality (for oysters and other reef-associated species) over time.

Action 5-A.): Continue monitoring intertidal and begin monitoring sub-tidal reefs monthly and bi-annually using same protocols as FWC sub-tidal monitoring. Adjust to add metrics as needed. Data will be shared between FWC and ABSI.

Action 5-B.): Continue monitoring intertidal and begin monitoring sub-tidal habitats using same protocols as FWC. Data will be shared between FWC and ABSI.

Action 5-C.): Conduct ‘spot-checks’ at a large number (TBD) of different locations in the Bay to supplement the more intensive monitoring data. Document volume of rock/shell/oysters, number of spat, medium and market sized live oysters and boxes together with environmental data.

Action 5-D.): Collect long term in situ environmental data using ABSI instruments and integrate ANERR environmental and nutrient data as correlates with oyster metrics.

Action 5-E.): Generate health indicators for ABSI using monitoring data, and other ecological factors (e.g. oyster-associated communities and structural complexity).

Lead: FSU	Partners: FWC, ANERR
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6) Develop ecosystem models that forecast future environmental conditions and oyster population status.

- *Action 6-A.):* Collect data needed by the models, and follow up with testing the models to refine accuracy of output.

- *Action 6-B.):* Coordinate with appropriate state and federal agencies, pertinent out of state user groups, and other initiatives working on both geographically-constrained and basin-wide water-flow alterations and management strategies that contribute positively to the health of the ABS.

Lead: UF	Partners: FWC, FSU
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7) Assess existing ecosystem services metrics used for other oyster studies, and develop a list of ABSI specific metrics to assess change over time.

- *Action 7-A.):* Conduct literature review and work with Florida Oyster Recovery Science (FORS) working group to identify measurable indicators of changes in ecosystem services

- *Action 7-B.):* Integrate ecosystem services metrics into monitoring program.

Lead: FSU	Partners: UF, FWC, universities, government agencies
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8) Seagrass and other SAV, and wetland and riparian habitat should be restored concurrently to work synergistically with oyster habitat restoration to enhance restoration of the ABS.

Lead: Franklin Co.	Partners: DEP
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GOAL B

SUSTAINABLE MANAGEMENT OF OYSTER RESOURCES

VISION THEME B: A restored Apalachicola Bay System has resulted in a sustainably managed and adequately enforced wild harvest oyster fishery while also providing opportunities for other economically viable and complementary industries, including tourism and aquaculture. This is accomplished by working collaboratively with stakeholders to create, monitor and fund a plan that ensures that protection of the habitat and the fishery it supports is supported by science, stakeholder input, and industry experience, and is implemented in a manner that provides both fair and equitable access to and protection for the resource.

GOAL B: productive, sustainably, and adaptively managed Apalachicola Bay System supports sustainable oyster resources.

OUTCOME: By 2030, an engaged and collaborative group of stakeholders will have contributed to and helped spearhead a fully funded science-driven plan to sustainably manage oyster resources in the Apalachicola Bay System.

GOAL B OBJECTIVES

B1) To develop through a transparent and inclusive process a science-based ABS oyster recovery and adaptive management plan for both commercial and recreational industries that includes: broad stakeholder and community support; a long-term, comprehensive monitoring plan that will be carried out by state agencies and their contractors; a regulatory framework that allows for rapid modifications when needed to address changing environmental conditions; and enforceable regulations that contain penalties sufficient to deter violations and harm to the resource. It is imperative that this Plan be constructed with the direct involvement of entities within the State of Florida (e.g., FWC, FDACS, State Legislature) in cooperation with other relevant agencies to enhance the likelihood of its implementation.

B2) To make recommendations to FDACS for oyster aquaculture best management practices that allow for the unimpeded recovery of oysters reefs, the oyster fishery, and the ecological and societal health of the ABS ecosystem while providing economic opportunities to the aquaculture industry.

GOAL B RECOMMENDATION

Closing the Apalachicola Bay to Wild Oyster Harvest. At the March 11, 2020 ABSI CAB meeting the CAB's FWC representative requested that the CAB recommend whether to close Apalachicola Bay to all wild harvest of oysters (commercial and recreational). The CAB discussed the issue and unanimously recommended to FWC that they immediately close Apalachicola Bay to all wild harvest of oysters. This recommendation was reviewed and accepted by FWC, and the closure of the Bay to recreational and commercial wild oyster harvest proactively went into effect on August 1, 2020 via Executive Order pending approval of final rules. The oyster fishery closed area has well-defined boundaries (set by FWC in consultation with FDACS) and contained within the Apalachicola Bay

System as defined in FWC’s Rule 68B-27, F.A.C.¹ At the December 16, 2020 meeting the FWC approved the final rules to temporarily suspend all wild oyster harvest and to prohibit on-the-water possession of wild oyster harvesting equipment (tongs) from Apalachicola Bay through December 31, 2025.

The CAB agreed that in subsequent meetings, it would make science-based recommendations for the criteria and performance metrics that should be met before reopening the Bay to wild oyster harvest. Under consideration are the following strategies related to closing the wild oyster fishery.

GOAL B DRAFT STRATEGIES

1. Recommend specific criteria and/or conditions, with related performance measures for the reopening of Apalachicola Bay to limited wild oyster harvesting.
 - *Action 1-A.):* Use ABSI ecosystem health metrics and FWC/UF models to develop criteria for opening and closing wild oyster harvest and for determining sustainable harvest.
 - *Action 1-B.):* Work with FWC and FDACS to ensure that definitions of oyster population health are not only based on harvest metrics.

2. Conduct an oyster stock assessment for the ABS with periodic updates.

Lead: FWC	Partners: FSU, UF, NGOs, citizen scientists, watermen
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3. Evaluate the development of a policy that would require setting sustainable harvest goals and placing limitations on or a complete closure to harvesting based on the results of data (e.g., stock assessment) collected and evaluated under a comprehensive monitoring program designed to sustainably manage the resource.
 - *Action 3-A.):* Use a co-management advisory committee to assess and make a recommendation to the state.

Lead: FWC	Partners: FDACS, FSU, UF, local governments
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4. Use decision-support tools to develop a system of potential closed areas that are well defined in terms of size, location, and longevity and include rotational and seasonal harvest areas, as well as long-term closed areas in strategic locations to provide habitat for year-round protection for brood stock and enhanced spawning opportunities.
 - *Action 4-A.):* Engage local stakeholders in determining total coverage (how much to protect), placement (where to protect), and size (how large) of all types of potential closed areas using gridded maps as well as distributions of selected fishery and ecologically important species.

5. Manage the commercial oyster industry and recreational oyster fishing to provide for sustainable spat production and spawning and the recovery of oyster populations.

¹ FWC’s Rule 68B-27.013, F.A.C. (as modified in the proposed draft rule language presented at the July 22, 2020, commission hearing): “Apalachicola Bay” or “Bay” means all waters within St. George Sound, East Bay in Franklin County, Apalachicola Bay, St. Vincent Sound in Franklin County, and Indian Lagoon in Gulf County, including canals, channels, rivers and creeks.

- *Action 5-A.):* Evaluate management scenarios (e.g., seasonal (summer) closure to wild harvesting, rotational closures, 5-day work weeks, non-harvested spawning reefs (permanent closures), limited entry, transferable license program, closures based on stock levels (stock assessment), reduced bag limits, bag tags, relaying oysters to better habitat, additional enforcement presence, manage harvest areas to prevent the concentration of effort in specific locations (open larger areas)).
- *Action 5-B.):* Evaluate existing allowable and minimally destructive alternative gear type options and harvest methods, including the use of experimental gear for wild oyster harvesting.

Lead: FWC	Partners: oystermen, FSU, UF, Sea Grant
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6. Restore and create reef structures suitable for sustained oyster settlement and production for harvesting.

- *Action 6-A.):* Include oystermen in discussions to evaluate cultching techniques and materials for growing oysters (e.g., historical non-traditional, trees), adding spat on shell or other substrates.
- *Action 6-B.):* Include oystermen in discussions on spatial configuration of reefs (height, width, contours, etc.), locations (existing reefs and hard bottom), use of larger rock to protect restored reefs from siltation and sedimentation from prevailing currents and storms.

Lead: FWC	Partners: FSU, UF, Sea Grant, watermen and aquaculture organizations, local county programs
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- *Action 6-C.):* Design and implement projects to achieve oyster fishery production targets.
- *Action 6-D.):* Design projects that include both fished and non-fished reefs.

Lead: FWC	Partners: FSU, UF, NOAA for funding
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7. Recommend policies and actions that retain and recycle shell for habitat replenishment in the ABS.

- *Action 7-A.):* Develop agency rules and policy that require shell retention and recycling for habitat replenishment through a fee or incentive program.
- *Action 7-B.):* Obtain legislative support for statutes that support or require shell recycling and oyster habitat replenishment. (e.g., Texas House Bill 51 (2017); [North Carolina General Statute §130A-309.10](#) (2010); Maryland House Bill 184; Florida statute Chapter 157 (McClellan 1881).
- *Action 7-C.):* Establish partnerships with local organizations, stakeholder groups, industry, universities in shell recycling programs.

8. Investigate oyster shell and oyster relay programs to move both cultch and live oysters to more favorable habitat.

- *Action 8-A.):* Use model and mapping information on larval source areas and environmental conditions to inform the potential programs.
- *Action 8-B.):* Research similar relay programs in other areas as potential models and cautionary tales.

Lead: FDACS/FWC	Partners: FSU, UF, Sea Grant, FDEP, FDOH, stakeholders (oystermen)
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9. Use ecological quantitative modeling and other decision support tools to evaluate strategies and actions, and define performance criteria for an oyster population that can sustain a pre-determined level of wild oyster harvest, with a stipulated number of harvesters (limited entry), and protocols to ensure sustainability.

- *Action 9-A.):* Use model outputs to identify the oyster population abundance that can support sustainable harvest.
- *Action 9-B.):* Use model outputs to identify percentage of productive reef area required to support sustainable harvest.
- *Action 9-C.):* Use model outputs to identify annual; recruitment required to support sustainable harvest.
- *Action 9-D.):* Use model outputs to determine amount and frequency of habitat replacement to maintain productive oyster reefs.

Lead: FSU/UF	Partners: FWC, stakeholders
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10. Work with FDACS to ensure that oyster aquaculture practices and locations in the Bay are compatible with the goals and strategies for restoration and management of the ecosystem and are compatible with a wild fisheries and the important cultural role of a working waterfront and seafood industry.

- *Action 10-A.):* Develop maps using FDACS data showing all aquaculture activities in the ABS, superimposed on existing maps of essential fish habitat and fishing activities to identify potential conflicts.
- *Action 10-B.):* Utilize habitat and activity maps from *Action 5. A.* to identify potential new oyster restoration areas and areas that could be used as spawning reefs to enhance recruitment and productivity nearby harvested reefs.

Lead: FDACS	Partners: FSU, UF, FWC, oystermen
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11. Work with FWC Law Enforcement to develop enforcement strategies and appropriate penalties sufficient to deter harvest or sale of undersized oysters as well as violations that harm wild or leased oyster reefs and other natural resources, and that will support restoration efforts in the ABS.

- *Action 11-A.):* Develop strategies to increase FWC enforcement presence and number of checkpoints.
- *Action 11-B.):* Develop strategies to ensure uniformity in the harvestable and marketable size of oysters.
- *Action 11-C.):* Develop strategies to potentially limit oyster harvest to periods outside of peak spawning season.
- *Action 11-D.):* Develop standards for a potential limited entry fishery.
- *Action 11-E.):* Propose strategies to FWC and FDACS for implementation.
- *Action 11-F.):* Convene an Oyster Advisory Board within FWC to review and make recommendations on management and enforcement of the oyster fishery once wild oyster harvesting resumes in Apalachicola Bay.

Lead: FWC/FDACS	Partners: FSU-CAB, oystermen, oyster dealers
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GOAL C
A FULLY FUNDED ECOSYSTEM-BASED ADAPTIVE MANAGEMENT AND RESTORATION PLAN SUPPORTED BY APALACHICOLA BAY SYSTEM STAKEHOLDERS

VISION THEME C: The Apalachicola Bay System Ecosystem-Based Adaptive Management and Restoration Plan is science-based and developed with engagement and support from the Apalachicola Bay System stakeholders, and is fully funded.

GOAL C: The Apalachicola Bay System Ecosystem-Based Adaptive Management and Restoration Plan is supported by the Apalachicola Bay System stakeholders, and is fully funded.

OUTCOME: By 2030, the Apalachicola Bay System is a productive and sustainably managed ecosystem. A fully funded and well-executed science-based Ecosystem-Based Adaptive Management and Restoration Plan that incorporates the monitoring necessary for evaluation and adaptation is broadly supported by Apalachicola Bay System stakeholders with guidance from a permanent stakeholder advisory board.

GOAL C OBJECTIVES

C1) To establish a fully funded permanent, representative stakeholder process to monitor the long-term implementation of the Plan.

C2) To support efforts to identify funding sources and define mechanisms for full implementation of the Plan.

GOAL C DRAFT STRATEGIES

CAB Proposed Strategies During the ABSI Process

- 1) The ABSI Team and the CAB will continue to have an open and transparent process for the development of the Plan with many opportunities for stakeholder engagement and input in a variety of forums (e.g., workshops, online, public/ government meetings) for generating awareness and support while incorporating any changes the CAB deems appropriate and necessary to fulfill the goals and objectives.
 - *Action 1-A.):* Continue CAB meetings and public workshops as outlined in the FCRC proposal for 2021.

- 2) During 2021, the ABSI Team will form a sub-committee within the CAB to evaluate the efficacy of forming a CAB successor group. The intent of a successor group would be to ensure continuity between the CAB members and the agencies responsible for oyster management. [Status: initiated]
 - *Action 2-A.):* The subcommittee will define a plausible scope of work for the successor group, including evaluating regulatory processes and engaging with and being accountable to decision-makers and the public for the actions laid out in the Plan and the implementation thereof.
 - *Action 2-B.):* The subcommittee will evaluate the best organizational structure for ensuring longevity of the successor group, including working under the auspices of a state agency, an estuary program, or private/public partnerships.

- 3) A successor group to the CAB will be developed and in place by the time the Plan is completed.
- *Action 3-A.):* The successor group actively engages with state programs to encourage their adoption of ABSI'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.
 - *Action 3-B.):* The successor group will monitor the Plan's implementation and make recommendations for revisions required to adaptively respond to changing conditions.
 - *Action 3-C.):* The successor group encourages agencies to prioritize the Plan's recommendations for investing more funding in the management and restoration of oyster resources.
 - *Action 3-D.):* The successor group should evaluate whether to initiate the development of an Apalachicola Bay Estuary Program (ABEP) to coordinate and lead in the implementation and monitoring of the Apalachicola Bay System Ecosystem-Based Adaptive Management and Restoration Plan. The successor group should explore whether it's a better model to be a part of EPA's National Estuary Program or to model the ABEP after the EPA program with funding provided from other entities as was done with the St. Andrew and St. Joe Bays Estuary Program.

Lead: FSU	Partners: CAB, CAB sub-committee, other stakeholders
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- 4) Create a comprehensive funding approach for the Apalachicola Bay System Ecosystem-Based Adaptive Management and Restoration Plan implementation including a comprehensive analysis for future grant funding for strategies, including support for sustainable monitoring deriving from the Plan.
- *Action 4-A.):* Evaluate **and seek** funding sources for implementation of management and restoration strategies included in the Apalachicola Bay System Ecosystem-Based Adaptive Management and Restoration Plan (e.g., state agencies, region-wide Gulf trustee implementation group for NRDA funding.)
 - *Action 4-B.):* Evaluate **and seek** grant opportunities from recommendations included in the Apalachicola Bay System Ecosystem-Based Adaptive Management and Restoration Plan.
 - *Action 4-C.):* Allocate sufficient funding for habitat restoration based on oyster habitat suitability mapping and modeling and restoration and management targets (e.g., Develop funding source for cultch used in oyster reef restoration.)
 - *Action 4-D.):* Allocate sufficient funding for restoration of harvested reefs and aquaculture farms based on oyster habitat suitability mapping and modeling.
 - *Action 4-E.):* Evaluate **and seek** funding sources to generate awareness, education, and support for a healthy oyster and ABS ecosystem.
 - *Action 4-F.):* 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.
 - *Action 4-G.):* Work across estuary programs to fund and leverage large scale monitoring for the Panhandle Region – Perdido to Suwanee.
 - *Action 4-H.):* Develop and seek a funding source to provide cultch for habitat restoration.

Lead: FSU-ABSI	Partners: Restoration Partners Working Group; Successor Group
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GOAL D

AN ENGAGED STAKEHOLDER COMMUNITY AND INFORMED PUBLIC

VISION THEME D: Stakeholders of the Apalachicola Bay System are committed to working together to disseminate relevant information and advocate for a sustainably managed oyster-based ecosystem. In so doing, the group will facilitate innovative research, development and implementation of best management practices and serve as a hub for information exchange as well as new innovation, education and communication opportunities.

GOAL D: A productive and well-managed Apalachicola Bay System is supported by an actively engaged and informed stakeholder community and public.

OUTCOME: By 2030, stakeholders, private and nonprofit civic leaders, and the public are informed of the importance of sustaining the health of the Apalachicola Bay System, and are engaged and working actively together along with elected and appointed leaders and managers to invest in and implement the Plan.

GOAL D OBJECTIVES

D1) To coordinate community engagement efforts to increase public awareness of and support for a healthy and well-managed ABS ecosystem; and to ensure that businesses, industries, non-profits, and local governments are supportive and included in these efforts.

D2) To measure public and stakeholder understanding of the issues important to the health and restoration of the Bay and socio-economic indicators.

GOAL D DRAFT STRATEGIES

- 1) Develop a Community Advisory Board (CAB) for the ABS Initiative that provides critical information and perspective to the ABSI leadership and whose members recognize the importance of their role as ambassadors for the initiative. [Status: initiated]
- 2) Build, with the help of the CAB, community support and stewardship by educating stakeholders on the importance of maintaining healthy oyster reefs and by engaging them in the Bay restoration through a variety of hands-on programs.
 - *Action 2-A.):* Form a sub-committee within the CAB that can spearhead an outreach and community engagement effort and develop a community outreach strategy intended to inform and educate stakeholders and the public about the research, the Plan developing through ABSI, and focusing on a healthy ABS ecosystem. The intended audience includes local city, county, and state government officials, businesses and organizations, citizens of every age, and other interested stakeholder groups.
 - *Action 2-B.):* Define what makes a successful shell recycling program, and work with local groups, businesses and other stakeholders to help initiate its development.
 - *Action 2-C.):* Develop a “Bay Stewards” program to honor, reward, and provide incentives for businesses and individuals that demonstrate their stewardship of the resource.

- 3) Support and participate in providing educational opportunities for students at all levels (primary & secondary school through college) to understand the value of their coastal ecosystems, importance of stewardship and the role oysters play in ecosystem health and fisheries.

Action 3-A.): Work with existing entities (e.g., [WeatherStem](#), [Scientist in Ever Florida School \(Florida Museum\)](#)) to expose more K-12 students to the research being conducted by ABSI.

Action: 3-B.): Provide training and financial support for new workforce entrants in the Franklin County Community through an aquaculture internship program.

Action 3-C.): Provide research opportunities for undergraduate and graduate students in science that supports the ABSI mission.

Lead: CAB outreach subcommittee	Partners: FSU, CAB, other stakeholders
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SECTION II
STRATEGIES OUTSIDE THE SPECIFIC SCOPE OF ABSI AND TO BE
REFERRED TO OTHER PROGRAMS OR ENTITIES

The strategies that are not a part of the Ecological (Goal A), Sustainable Management of Oyster Resources (Goal B), The Management and Restoration Plan (Goal C), and An Engaged Stakeholder Community and Informed Public (Goal D) components of the Apalachicola Bay System Ecosystem-Based Adaptive Management and Restoration Plan including: training, marketing, education, communication, economic development, and funding are being moved to this category. They will be included as recommendations in an appendix, and the CAB should identify a responsible entity to refer the recommendations to for their development, implementation, monitoring, and maintenance.

GOAL E
A THRIVING ECONOMY CONNECTED TO A
RESTORED APALACHICOLA BAY SYSTEM

VISION THEME E: A restored Apalachicola Bay System sustains a vibrant commercial oyster fishery, a thriving aquaculture industry and recreational and tourism-related activities and development opportunities that underpin a strong local economy and resilient coastal community.

GOAL E: The broader Apalachicola Bay Region is thriving economically as a result of a fully-restored Apalachicola Bay System.

OUTCOME: By 2030, the broader Apalachicola Bay Region is thriving economically as a result of a restored Apalachicola Bay System that reflects a unique coastal cultural heritage, based on a vibrant oyster fishery, while simultaneously providing new opportunities for sustainable and responsible development, business, recreation and tourism.

GOAL E OBJECTIVES

E1) To ensure that economic indicators of the commercial oyster fishery and associated industries in the ABS demonstrate increasing viability and growth.

E2) To ensure that industries and businesses within the ABS are compatible with a healthy and well-managed ABS ecosystem.

E3) To develop growth management policies, plans and regulations affecting the ABS that are compatible with a healthy and well-managed ABS ecosystem while maintaining a thriving economy and supporting cultural heritage.

E4) To develop an oyster aquaculture industry that provides economic opportunities and is complementary to the wild harvest fishery.

GOAL E DRAFT STRATEGIES

- 1) Work with existing partners (e.g., the Chamber of Commerce, Apalachee Regional Planning Council, and city and county staff) to monitor and report on the economic benefits of a restored ABS, including key economic indicators relevant to the commercial oyster fishery and associated industries in the region. This can be displayed as a dashboard that includes key economic indicators over time based on restoration efforts in the Apalachicola Bay System (ABS).
- 2) Recommend monitoring² and enforcement programs continue with appropriate metrics to measure output from and impact of harvest on oyster reefs.
- 3) Support planning tied to economic indicators that consider future conditions (climate, SLR, reduced river flow) and their effects on the ABS.
- 4) Work with oystermen and other community stakeholders to promote post-recovery Apalachicola oysters.
- 5) Develop complementary industries in wild oyster harvest and oyster aquaculture that provide new economic opportunities by building a network of experts that can help Franklin County citizens build successful programs through business training, identifying sources of funding for equipment, and developing products that will enhance and diversify local industries.
- 6) Develop new markets for selling oysters to areas within and outside of Florida in part by investing in location (Apalachicola Bay) branding.
- 7) Review land development regulations to provide flexibility while supporting and enhancing efforts to maintain and revitalize working waterfronts in Apalachicola and Eastpoint to ensure preservation of Franklin County's cultural heritage and a viable seafood industry.
- 8) Coordinate with the local business community and governing bodies (i.e., city and county commissions) to ensure that growth management plans, land use and development regulations meet

² Ongoing fisheries-dependent and fisheries-independent monitoring by FWRI, coupled with ABSI complementary data based on request of watermen. Both entities are sharing data with one another which is critical for ABSI model development. (We remain unable to get FWRI data)

strong standards that are compatible with and minimize the environmental impact of industry and business activities within the ABS and are conducive to a healthy ecosystem.

- 9) Engage commercial fishermen in the restoration of the bay and encourage future participation in restoration such as monitoring, shell recycling, shelling, and relaying.
- 10) Coordinate with and encourage recreational businesses and activities that recognize the importance of and support a sustainable commercial oyster fishery and the importance of the seafood industry to the Region’s cultural heritage.
 - *Action 10-A):* Coordinate and work with initiatives such as the Regional Recreation Economy Alliance to leverage resources to support the local economy.

Lead: ABSI CAB Successor Group	Partners: Stakeholder groups, Chamber of Commerce, local government
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**ADDITIONAL STRATEGIES OUTSIDE OF ABSI SCOPE
TO BE REFERRED TO OTHER PROGRAMS OR ENTITIES**

- 1) Develop surveys or other tools that can be used to measure and track changes in stakeholder and public understanding of the issues important to the health and restoration of the Bay.
- 2) Engage the general public (students, residents and tourists) in learning about the history and the ecological and economic importance of the Apalachicola Bay region, including the natural resources, and lumber, cotton shipping, and fishing industries.
- 3) Build Gulf-wide mechanism for communities interested in the restoration and revitalization of fisheries to exchange best practices and lessons learned. [Status: this is developed through FWC]
- 4) Provide training and financial support for new workforce entrants (particularly young entrants) interested in being employed in existing industries as well as and developing industries in new fisheries, aquaculture, and restoration science.
- 5) Work with State legislators and state agencies to develop funding strategies, and incentives for involving local watermen, seafood dealers, restaurants, aquaculture operations, and private citizens in oyster reef restoration efforts that will increase the viability of oyster resources.
 - *Action 5-A.):* Identify source of shell, or other restoration material.

Lead: ABSI CAB Successor Group	Partners: Stakeholder groups, Chamber of Commerce, local government
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**SECTION III
STRATEGIES RATED AS NOT ACHIEVING CONSENSUS AND ARCHIVED
(NONE TO DATE)**

SECTION IV PRIORITIZATION OF STRATEGIES

PRIORITIZATION RANKING EXERCISE INSTRUCTIONS

Please consider the seven criteria in Table 1 below to assist you in evaluating the priority of each strategy. Then when asked, rank each strategy with a number from 10 - 1 using the scale in Table 2, and based on whether the strategy is from the highest to the lowest level of priority from your perspective. In addition, each strategy should be ranked independently and on its own merit, and not in relation to the other strategies. You are not ranking one against the others, but each on its own relative merit.

Please Note the results will be considered preliminary and relative priorities and not absolute priorities. The priorities may be revised and changed as agreed to by the CAB. The Project Team will likely also propose changes to the priorities based on the ABSI project's goals and a logical sequencing for implementation from a science, technological, and potential funding perspective. In addition, all strategies within each Priority Level (1 – 3) are of equal priority and will be implemented based on a logical sequencing.

TABLE 1—CRITERIA TO CONSIDER FOR PRIORITIZING STRATEGIES

EFFECTIVE STRATEGIES ARE URGENT TO IMPLEMENT, HAVE SUPPORT, AND ARE SMART		
CRITERIA	EXPLANATION	
U	URGENT	Is it essential to address the issue to achieve the goals and objectives? Will things move in the wrong direction if the issue is not addressed?
	S	SUPPORT
		There is commitment and support from key stakeholders and regulators for implementation of the <i>Strategy</i> .
S	S	SPECIFIC
		It is detailed enough so that anyone reviewing the <i>Strategy</i> will know what is intended to be accomplished.
M	M	MEASURABLE
		The end result can be identified in terms of quantity, quality, acceptable standards, etc. You know you have a measurable <i>Strategy</i> when it states in objective terms the end result or product.
A	A	ATTAINABLE
		The <i>Strategy</i> is likely to be implemented, and there are resources available, or likely to become available for implementing the <i>Strategy</i> .
R	R	RELEVANT
		The <i>Strategy</i> is relevant, and if implemented it is likely to be successful in achieving the relevant goals and objectives of the ABSI.
T	T	TIME-FRAMED
		There are milestones with a specific date attached for completion.

TABLE 2—PRIORITIZATION RANKING SCALE FOR STRATEGIES

SCALE RANGE 10 – 1 (10 HIGHEST RATING TO 1 LOWEST RATING)			
10	Highest Level of Priority—Urgent/Critical	5	Medium Level of Priority
9	Very High Level of Priority	4	Medium Low Level of Priority
8	High Level of Priority	3	Low Level of Priority
7	Medium High Level of Priority	2	Very Low Level of Priority
6	Moderately High Level of Priority	1	Lowest Possible Priority—Don't Pursue
DETERMINATION OF PRIORITY 1, 2, AND 3 STRATEGIES FROM PRIORITIZATION RANKING RESULTS			

10 – 8 Ranking	Strategies that achieve an average ranking of from 10 - 8 will be classified as: Priority 1 Strategies = Important To Do Now
7 – 5 Ranking	Strategies that achieve an average ranking of from 7 - 5 will be classified as: Priority 2 Strategies = Important But Less Time Sensitive
4 – 1 Ranking	Strategies that achieve an average ranking of from 4 - 1 will be classified as: Priority 3 Strategies = As Time and Resources Allow

PRIORITY OF STRATEGIES BY GOAL AREA			
ALL STRATEGIES WITHIN EACH PRIORITY LEVEL (1 – 3) ARE OF EQUAL PRIORITY AND WILL BE IMPLEMENTED BASED ON A LOGICAL SEQUENCING			
Priority 1 Strategies = Important To Do Now			
GOAL A	GOAL B	GOAL C	GOAL D
Priority 2 Strategies = Important But Less Time Sensitive			
GOAL A	GOAL B	GOAL C	GOAL D
Priority 3 Strategies = As Time and Resources Allow			
GOAL A	GOAL B	GOAL C	GOAL D

PRIORITY OF STRATEGIES BY GOAL AREA	
STRATEGIES OUTSIDE OF ABSI SCOPE	
Priority 1 Strategies = Important To Do Now	
GOAL E STRATEGIES TO BE REFERRED	ADDITIONAL STRATEGIES TO BE REFERRED
Priority 2 Strategies = Important But Less Time Sensitive	
GOAL E STRATEGIES TO BE REFERRED	ADDITIONAL STRATEGIES TO BE REFERRED
Priority 3 Strategies = As Time and Resources Allow	
GOAL E STRATEGIES TO BE REFERRED	ADDITIONAL STRATEGIES TO BE REFERRED

SECTION V
PERFORMANCE MEASURES
METRICS ASSOCIATED WITH OBJECTIVES (TO MEASURED ANNUALLY)
AND ESTUARINE METRICS

PERFORMANCE MEASURES: The regular measurement of outcomes and results, which generates reliable data on the effectiveness, efficiency, and sustainability of programs and plans.

The decision-support tools will be used when available to forecast results that will use to help weigh the potential outcomes of different strategies.

The Team proposes that the following Table replace the bulleted list of Performance Measures as a more useful format for evaluating the effectiveness of proposed strategies and actions.

GOAL A—A HEALTHY AND PRODUCTIVE BAY ECOSYSTEM	
OBJECTIVES	RECOMMENDED METRICS
<p>A1) To use observations, monitoring, experiments and modeling conducted through ABSI and related efforts to create decision support tools that can inform how a range of natural and human influenced factors will affect the ABS ecosystem.</p> <p>Goal for Objective A1: User-friendly informative decision support tools available to ABS resource managers.</p>	<ul style="list-style-type: none"> • Models of oyster population dynamics (recruitment, growth, mortality) • River flows under climate and management scenarios • Hydrodynamics of the ABS • Forecasting model for temperature, salinity, oxygen, pH, nutrients and organic carbon dynamics under different climate and management scenarios • Reef area and height (total area of patches of living and nonliving oyster shell or substrate with and without live oysters) • Predictive habitat models for current and future conditions
<p>A2) To help establish a comprehensive monitoring plan to evaluate the health of the ABS oyster resource and its measurable ecosystem services with clearly defined performance measures and strong coordination among the various entities conducting research in the region.</p> <p>Goal for Objective A2: A monitoring plan approved by stakeholders and resource management.</p>	<ul style="list-style-type: none"> • Regularly updated maps of intertidal and subtidal reefs • Oyster recruitment rates • Density (#/m²) of live and dead oyster juveniles (<25mm), sub-adults (26-75 mm) and market size (> 76 mm) adults. • Oyster size-frequency distribution (using shell height) (mm) • Reproductive status • Condition index • Pest and predator prevalence

	<ul style="list-style-type: none"> • Disease prevalence • Environmental variables (temperature, salinity, oxygen, turbidity, pH, nutrients)
<p>A3) To use existing and new research, and decision support tools to identify viable strategies for restoration and management of the ABS oyster resources and the function of the ABS ecosystem.</p> <p>Goal for Objective A3: Management and restoration plan that increases ecological function of oyster reefs in the ABS.</p>	<ul style="list-style-type: none"> • Understanding of optimal restored reef, placement, dimensions and materials • Identification of optimal locations for broodstock reefs (areas closed to harvest) • Enhanced brood stock, larval supply, and oyster populations on both restored and non-restored reefs (#/m²). • Enhanced diversity and abundance of ecologically- and economically-important species (resident and transient) • Maintenance of sufficient live oysters and dead shell to sustain a healthy ecosystem.
<p>A4) To define measurable ecosystem services that can be used to determine the level of change in ecological health (e.g. oyster fishery harvest, habitat for other fishery species, abundance and condition indices for oyster reef and population health) and societal benefit derived from Apalachicola Bay System management and restoration efforts, with target and threshold levels identified.</p> <p>Goal for Objective A4: Improved oyster reef ecosystem services for the ABS.</p>	<ul style="list-style-type: none"> • Protection of shoreline habitat (improvement in shoreline extent, elevation, marsh cover). • Sustainable wild oyster harvest is supported by restored oyster populations • Improved recreational and commercial fisheries of oyster-reef related species (stone crab, sheepshead, drum) • Improved water clarity in the vicinity of restored oyster reefs.
<p>GOAL B—SUSTAINABLE MANAGEMENT OF OYSTER RESOURCES</p>	
<p>B1) To develop through a transparent and inclusive process a science-based ABS oyster recovery and adaptive management plan for both commercial and recreational industries that includes: broad stakeholder and community support; a long-term, comprehensive monitoring plan that will be carried out by state agencies and their contractors; a regulatory framework that allows for rapid modifications when needed to address changing environmental conditions; and enforceable regulations that contain penalties sufficient to deter violations and harm to the resource. It is imperative that this Plan be constructed with the direct involvement of entities within the State of Florida (e.g., FWC, FDACS, State</p>	<ul style="list-style-type: none"> • Establish sustainable allowable catch in total biomass (kg), including harvest rate and shell budgets. • Incorporate commercial and recreational harvest in oyster stock assessment model for ABS. • Model different adaptive management approaches, to promote sustainability of the fishery, and long-term planning and investment by harvesters and dealers. • Assign some existing reefs as broodstock reefs that are closed to harvest

<p>Legislature) in cooperation with other relevant agencies to enhance the likelihood of its implementation.</p> <p>Goal for Objective B1: A stakeholder supported adaptive management plan for the ABS.</p>	<ul style="list-style-type: none"> • FWC law enforcement increases presence during oyster open season, and develops appropriate penalties for regulation violations • FWC establishes a long-term state-wide oyster monitoring program
<p>B2) To make recommendations to FDACS for oyster aquaculture best management practices that allow for the unimpeded recovery of oyster reefs, the oyster fishery, and the ecological and societal health of the ABS ecosystem while providing economic opportunities to the aquaculture industry.</p> <p>Goal for Objective B1: Identify positive and negative interactions between oyster aquaculture and wild oyster restoration and fisheries.</p>	<ul style="list-style-type: none"> • FDACS, FWC or other entity supports studies to identify aquaculture practices that affect oyster restoration and fisheries, and other habitats within the ecosystem.
<p>GOAL C—A FULLY FUNDED AND SUPPORTED MANAGEMENT & RESTORATION PLAN</p>	
<p>C1) To establish a fully funded permanent, representative stakeholder process to monitor the long-term implementation of the Plan.</p> <p>Goal for Objective C1: Establish a stakeholder group to ensure community support for the management and restoration plans.</p>	<ul style="list-style-type: none"> • Creation of an ABSI CAB successor group to continue stakeholder engagement in the management and restoration process
<p>C2) To support efforts to identify funding sources and define mechanisms for full implementation of the Plan.</p> <p>Goal for Objective C2: Obtain sufficient funding to implement restoration and management plans.</p>	<ul style="list-style-type: none"> • Form a small stakeholder group that will identify and obtain funding for large scale continued restoration of the ABS oyster reefs.
<p>GOAL D—AN ENGAGED STAKEHOLDER COMMUNITY AND INFORMED PUBLIC</p>	
<p>D1) To coordinate community engagement efforts to increase public awareness of and support for a healthy and well-managed ABS ecosystem; and to ensure that businesses, industries, non-profits, and local governments are supportive and included in these efforts.</p> <p>Goal for Objective D1: An engaged and informed community, including K-12 and adults in the local area and beyond.</p>	<ul style="list-style-type: none"> • Number of people with improved understanding of the ecosystem services provided by oysters • Number of businesses, schools, industries, non-profits, and local governments participating in outreach efforts. • Number of volunteers participating in oyster reef restoration efforts. • Number of internship program “graduates” that enter the oyster

	<p>aquaculture workforce in the ABS or other estuary in Florida.</p> <ul style="list-style-type: none"> • Number of K-12 students reached by ABSI.
<p>D2) To measure public and stakeholder understanding of the issues important to the health and restoration of the Bay and socio-economic indicators.</p> <p>Goal for Objective D2: Understand stakeholder commitment to a healthy ABS ecosystem.</p>	<ul style="list-style-type: none"> • Survey of stakeholders to assess level of understanding of the ecosystem services provided by oysters, and commitment to adopting measures that improve ABS health.
<p>GOAL E—A THRIVING ECONOMY CONNECTED TO A RESTORED ABS</p>	
<p>E1) To ensure that economic indicators of the commercial oyster fishery and associated industries in the ABS demonstrate increasing viability and growth.</p> <p>Goal for Objective E1: Increased viability and growth of oyster fishery and associated industries</p>	<ul style="list-style-type: none"> • Monitor economic indicators of a successful wild oyster industry, and assess causes of positive and negative trends.
<p>E2) To ensure that industries and businesses within the ABS are compatible with a healthy and well-managed ABS ecosystem.</p> <p>Goal for Objective E2: Create a decision support tool to assess the effect of ABS industries on ecosystem health.</p>	<ul style="list-style-type: none"> • Monitor metrics associated with Goal A and with objective E1 (above) to determine whether they have positive, neutral or negative interactions
<p>E3) To develop growth management policies, plans and regulations affecting the ABS that are compatible with a healthy and well-managed ABS ecosystem while maintaining a thriving economy and supporting cultural heritage.</p> <p>Goal for Objective E3: A healthy, well-managed ABS and thriving working waterfront industries.</p>	<ul style="list-style-type: none"> • Assess effect of growth management plans on ABS ecosystem health and economic growth
<p>E4) To develop an oyster aquaculture industry that provides economic opportunities and is complementary to the wild harvest fishery.</p> <p>Goal for Objective E4: Establish complementary oyster aquaculture and wild oyster harvest industries.</p>	<ul style="list-style-type: none"> • Assess economic indicators associated with aquaculture and wild oyster harvest • Assess social and economic compatibility between the two industries using stakeholder survey tools.

Estuarine Metrics. These are variables that can be measured and used to assess the benefits or impacts of the different upstream management and climate scenarios that influence freshwater flow into the ABS.

ESTUARINE METRICS	
CATEGORY	ASSOCIATED METRICS
Environmental	<p>For eastern oysters, the optimal range of salinities is 15-25 ppt and temperatures are 20-30°C. Use hydrodynamic models to estimate:</p> <ul style="list-style-type: none"> • Spatial and temporal footprint of optimal salinity conditions under different flow regimes (and temperatures if possible). • Spatial and temporal footprint of unfavorable conditions (< 10 ppt, > 25 ppt) under different flow regimes. <p>Use <i>in situ</i> instruments to validate and parameterize models to increase accuracy.</p> <p>Use ANERR data (current and historical) to hindcast environmental conditions (temp, salinity, oxygen, turbidity, pH, nutrients) relative to historical water flows.</p>
Biological - Oysters	<p>Measurable biological responses may be <i>immediate</i> (e.g. mortality in response to extreme conditions), <i>delayed</i> (e.g. high mortality from predation/disease in response to extended high salinities) or <i>sub-lethal</i> (e.g. reduced growth in response to long-term suboptimal conditions). The following variables can be measured during monthly monitoring and results interpreted in the context of observed or modeled environmental conditions.</p> <p>Biological metrics include:</p> <ul style="list-style-type: none"> • Mortality (boxes) – juveniles, sub-adults, adults. • Recruitment - river outflow can change current regime and environmental conditions, which influence larval survival, and dispersal. • Condition index – decreases under sub-optimal conditions. • Disease (Dermo) prevalence – increases in high salinity warm conditions. Primarily affects adults. • Reproductive status – can be impacted under long-term suboptimal conditions.
Ecological - Oysters	<ul style="list-style-type: none"> • Oyster population dynamics – number of live, dead and boxes for juvenile, sub-adult and adult oysters can identify size-related mortality events.
Ecological - Other Species	<ul style="list-style-type: none"> • Predator abundance (high salinities facilitate predators such as oyster drills, crown conch, stone crabs). • Occurrence of pests (boring sponge, blister worms) and parasites (flatworms). • Use FWC Fisheries independent monitoring data to assess distribution of fishes (and managed invertebrate species) relative to river flow and modeled/observed environmental data.

The Team proposes to replace the following bulleted list of Performance Measures with the Table on pages 19 - 22.

~~A.) A HEALTHY AND PRODUCTIVE OYSTER REEF ECOSYSTEM~~ **~~Related Draft Performance Measures to Evaluate Strategies~~**

~~Basic Monitoring~~

~~Note that everything in this subsection applies to monitoring existing, restored, and newly-placed reefs:~~

~~Persistence of Reef Habitat Before and After Restoration Project~~

- ~~• Updated maps of intertidal and subtidal reefs~~
- ~~• Reef areal dimensions (m^2)~~
- ~~• Reef area (total actual area of patches of living and nonliving oyster shell or substrate with and without live oysters) (m^2)~~
- ~~• Reef height of existing reefs (m)~~
- ~~• Models that address oyster population and reef area required to meet ecological and fishery targets~~
- ~~• Project footprint (max. areal extent of the footprint of the reef (m^2))~~
- ~~• Project reef height determined to support sustainable reefs and oyster production (m)~~

~~Oyster Recruitment, Abundance, Survivorship~~

- ~~• Spat, and recruitment assessment throughout the system~~
- ~~• Density of live oysters (juveniles/spat (less than 25 mm) & mature adults ($\#/m^2$))~~
- ~~• Oyster size frequency distribution (using shell height) (mm)~~
- ~~• Reproductive status~~
- ~~• Conditions index~~
- ~~• Pest and predator prevalence~~
- ~~• Disease prevalence~~

~~Environmental Variables~~

- ~~• Water temperature ($^{\circ}C$)~~
- ~~• Salinity (ppt, psu)~~
- ~~• Dissolved oxygen (mg/L)~~
- ~~• Turbidity~~
- ~~• pH~~
- ~~• Nutrients~~

~~Ecosystem-Based Goals of Restoration~~

- ~~• Enhanced oyster populations & habitat:
 - ~~○ Enhanced brood stock, larval supply, and oyster populations on both restored and nearby non-restored reefs ($\#/m^2$).~~
 - ~~○ Enhanced diversity, abundance of ecologically and economically important resident & transient species on and off reef (e.g., soft sediments) and demonstrate positive species interactions that enhance recruitment, survival, and growth (e.g., refuge for fish that eat~~~~

~~shell-crushing crabs) or reduce physiological or biological stress (e.g., vertical shell orientation compared to horizontal creates microclimate) (#/m² for selected spp; biodiversity indices).~~

- ~~○ Enhancement/protection of adjacent shoreline habitat (Change in shoreline extent, elevation, marsh cover).~~
- ~~○ Maintain sufficient live oysters and dead shell to sustain a healthy ecosystem.~~

- ~~Ecosystem Modeling~~

- ~~○ Development of a forecasting model for salinity, temperature, nutrients (including nitrogen) and organic carbon dynamics under different climate and management scenarios (relates to water entering the Bay from the river and water exchange between the Bay and the Gulf) (Light penetration, seston/chlorophyll a concentration).~~

B.) SUSTAINABLE MANAGEMENT OF OYSTER RESOURCES

Measures to Reopen the Oyster Fishery

- ~~FWC rule currently stipulates that the fishery will reopen once '300 bags/acre can be found on a significant number of oyster reefs'. This metric will be used as a performance measure unless/until model data indicates otherwise.~~

Closed Areas

- ~~Map and apportion some percentage of existing reef areas as Management Areas based on types of closed areas and identify allowable gear by area:~~
 - ~~○ X% of the most important larval source areas are assigned as permanent closures to oyster harvest.~~
 - ~~○ X% all reefs closed seasonally during peak spawning seasons and during either local or large-scale environmental disturbances that negatively affect water quality and/or the oyster populations.~~
 - ~~○ X% Reefs put on rotational closure cycle based on scientific data on population dynamics~~
 - ~~○ Reefs are closed to harvest when oyster populations fall below critical sustainable levels (defined in 1) above).~~

Stock Assessment & Shell Budget Models

- ~~Sustainable allowable catch in total biomass (kg), including harvest rate (allowable daily catch) and shell budgets.~~
- ~~Account for commercial & recreational (data needed) harvest in stock assessment model.~~
- ~~Model different management regimes (e.g., adaptive management with IFQs, ITQs TURES, others), to promote stability and long-range planning and investment by harvesters and dealers, and minimize gear & area conflicts.~~

Aquaculture Effects on Restoration

- ~~FDACS, FWC or other entity supports studies to identify aquaculture practices that both positively and negatively affect oyster restoration and fisheries, and other habitats within the ecosystem.~~

Enforcement Measures

- ~~FWC increases enforcement presence on the water during open oyster harvest periods.~~

- ~~FWC develops appropriate penalties for regulation violations.~~

~~C.) THE ECOSYSTEM-BASED ADAPTIVE MANAGEMENT AND RESTORATION PLAN~~

~~Performance measured for Goal C are addressed in the Objectives for Goal C and the performance measures in Goals A and B that collectively make up the Apalachicola Bay System adaptive Management and Restoration Plan.~~

~~D.) AN ENGAGED STAKEHOLDER COMMUNITY AND INFORMED PUBLIC~~

~~Education & Public Awareness~~

- ~~Number of people with improved understanding of the ecosystem services provided by oysters important to health and restoration of the ABS.~~
- ~~Number of businesses, schools, industries, non profits, and local governments participating in outreach efforts.~~
- ~~Number of volunteers participating in oyster reef restoration efforts.~~
- ~~Number of internship program “graduates” that enter the oyster aquaculture workforce in the ABS or other estuary in Florida.~~
- ~~Number of K-12 students reached by ABSI.~~
- ~~Number of undergraduate and graduate student research projects conducted related to ABSI.~~

~~-~~

~~E.) A THRIVING ECONOMY CONNECTED TO A RESTORED APALACHICOLA BAY SYSTEM~~

~~Outreach~~

- ~~Number of times Plan is referenced in growth management plans.~~

~~Implementation~~

- ~~Number of Land Development Code policy changes implemented to enhance and protect the ABS.~~
- ~~The extent to which FWC & FDACS implement recommendations in the Plan.~~
- ~~Percent of funds secured in relation to funds needed to implement the Plan.~~
- ~~Amount of private, state, federal (and RESTORE) funds allocated for management and restoration actions in the ABS.~~

SECTION VI

TERMS AND DEFINITIONS AND PROJECT BOUNDARY

GUIDING PRINCIPLES: The Community Advisory Board’s Guiding Principles reflect the broad values and philosophy that guides the operation of the Community Advisory Board and the behavior of its members throughout its process and in all circumstances regardless of changes in its goals, strategies or membership.

VISION: An idealized view of where or what the stakeholders would like the oyster resource and ecosystem to be in the future.

VISION THEMES: The related key topical issue area strategies that characterize the desirable future for the oyster resource and ecosystem. The Vision Themes establish a framework for goals and objectives. They are not ordered by priority.

GOAL: A goal is a statement of the project’s purpose to move towards the vision expressed in fairly broad language.

OUTCOME: Outcomes describe the expected result at the end of the project period – what is hoped to be achieved when the goal is accomplished. *(E.g., an ecologically, and economically viable, healthy and sustainable Apalachicola Bay System oyster fishery and ecosystem)*

Objective: Objectives describe in concrete terms how to accomplish the goal to achieve the vision within a specific timeframe and with available resources. *(E.g., by 2023, the State of Florida will have approved a stakeholder developed Ecosystem-Based Adaptive Management and Restoration Plan for the Apalachicola Bay System.)*

STRATEGY: A method, action, 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 Apalachicola Bay System.

RESTORATION: The process of establishing or re-establishing a habitat that in time can come to closely resemble a natural condition in terms of structure and function.

PERFORMANCE MEASURES: The regular measurement of outcomes and results, which generates reliable data on the effectiveness, efficiency, and sustainability of programs and plans.

STAKEHOLDERS: All interest groups whether public, private or non-governmental organizations who have an interest or concern in the success of a project, and can affect or be affected by the outcome of any decision or activity of the project. For purposes of the Apalachicola Bay System Initiative, stakeholders include but are not limited to: agriculture, silviculture, business, real estate, economic development, tourism, environmental, citizen groups, recreational fishing, commercial seafood industry, regional groups (i.e., ACF Stakeholders, and Riparian Counties), local government, state government, federal government, universities, and research interests.

ECOSYSTEM SERVICES: The direct and indirect contributions of ecosystems to human wellbeing. These services include **provisioning services** (food, raw materials, fresh water, medicinal resources), **regulating services** (climate, air quality, carbon sequestration & storage, moderation of extreme events, waste water treatment, erosion prevention & maintenance of soil fertility), **habitat or supporting services** (habitat for all species, maintenance of genetic diversity), and **cultural services** (recreation for mental & physical health; tourism; aesthetic appreciation and inspiration for culture, art & design; spiritual experience & sense of place).

APALACHICOLA BAY SYSTEM: Consists of six bays: Apalachicola Bay, East Bay, St Vincent Sound, East and West St George Sound, and Alligator Harbor comprising a total of 155,374 acres (62,879 Ha). Confined to Franklin County and ending to the north at river mile zero (0). Important considerations include riverine and offshore inputs to the ABS as well as the reciprocal influences of outputs from the ABS to the Gulf of Mexico.

HEALTHY APALACHICOLA BAY SYSTEM:

A healthy ecosystem is one in which material and energy flows are balanced through interacting biological, physical, and chemical processes (involving microorganisms, plants, animals, sunlight, air, water) that conserve diversity, support fully functional evolutionary and ecological processes, and sustain a range of ecological and ecosystem services.

OYSTER RESOURCES: Sources of oysters that provide natural and cultural benefits to humans. These sources can come from the wild or from aquaculture (see ecosystem services). The responsible management of oyster resources for present-day needs and future generations requires integrated approaches that are place-based, embrace systems thinking, and incorporate the social, economic, and environmental considerations of sustainability.

APALACHICOLA BAY SYSTEM INITIATIVE PROJECT BOUNDARY



SECTION VII
KEY TO COMMON ABBREVIATIONS

ABBREVIATION	DEFINITION
ABS	Apalachicola Bay System
ABSI	Apalachicola Bay System Initiative
CAB	Community Advisory Board
County	Franklin County
DACS or FDACS	Florida Department of Agriculture and Consumer Services
DEP or FDEP	Florida Department of Environmental Protection
DOH or FDOH	Florida Department of Health
EPA	U.S. Environmental Protection Agency
FDOT	Florida Department of Transportation
FSU	Florida State University
FSUCML	Florida State University Coastal and Marine Laboratory
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	FWC Fish and Wildlife Research Institute
NGO	Non-Governmental Organization
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resource Conservation Service
NWFWMD	Northwest Florida Water Management District
Plan	Apalachicola Bay System Ecosystem-Based Adaptive Management and Restoration Plan
RESTORE	Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast Act of 2012
RPC	Regional Planning Council
UF	University of Florida