OMB Number: 4040-0004
Expiration Date: 12/31/2022

Application for Federal Assistance SF-424

* 1. Type of Submission:
- [ ] Preapplication
- [x] Application
- [ ] Changed/Corrected Application

* 2. Type of Application:
- [x] New
- [ ] Continuation
- [ ] Revision

* If Revision, select appropriate letter(s):

* Other (Specify):

* 3. Date Received: 02/18/2022

4. Applicant Identifier:

5a. Federal Entity Identifier:

5b. Federal Award Identifier:

State Use Only:

6. Date Received by State:

7. State Application Identifier: FL

8. APPLICANT INFORMATION:

* a. Legal Name: Escambia County Board of County Commissioners

* b. Employer/Taxpayer Identification Number (EIN/TIN): 59-6000598

* c. Organizational DUNS: 0750796730000

d. Address:

* Street1: 221 S. Palafox Place
Street2:
* City: Pensacola
County/Parish: FL
* State: FL: Florida
Province:
* Country: USA: UNITED STATES
* Zip / Postal Code: 325025846

e. Organizational Unit:

Department Name:

Division Name:

f. Name and contact information of person to be contacted on matters involving this application:

Prefix:
* First Name: Logan
Middle Name:
* Last Name: McDonald
Suffix:

Title: Community Outreach Coordinator

Organizational Affiliation:
Pensacola and Perdido Bays Estuary Program

* Telephone Number: 8508951479
Fax Number:

* Email: lmcdonald@ppbep.org

Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

B: County Government

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

*** 10. Name of Federal Agency:**

Department of Commerce

11. Catalog of Federal Domestic Assistance Number:

11.008

CFDA Title:

NOAA Mission-Related Education Awards

*** 12. Funding Opportunity Number:**

NOAA-NMFS-SE-2022-2007159

* Title:

Fiscal Year 2022 NOAA Gulf of Mexico Bay Watershed Education and Training (B-WET) Program

13. Competition Identification Number:

3024169

Title:

NOAA Gulf of Mexico B-WET Program: Priorities 1 – 3

14. Areas Affected by Project (Cities, Counties, States, etc.):

Add Attachment | Delete Attachment | View Attachment

*** 15. Descriptive Title of Applicant's Project:**

Pensacola Bay System Oyster REEF (Restoration Education and Engagement Framework)

Attach supporting documents as specified in agency instructions.

Add Attachments | Delete Attachments | View Attachments

Application for Federal Assistance SF-424

16. Congressional Districts Of:

* a. Applicant FL-01 * b. Program/Project FL-01

Attach an additional list of Program/Project Congressional Districts if needed.

Add Attachment | Delete Attachment | View Attachment

17. Proposed Project:

* a. Start Date: 08/01/2022 * b. End Date: 07/31/2024

18. Estimated Funding ($):

* a. Federal	100,000.00
* b. Applicant	0.00
* c. State	0.00
* d. Local	0.00
* e. Other	0.00
* f. Program Income	0.00
* g. TOTAL	100,000.00

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

☐ a. This application was made available to the State under the Executive Order 12372 Process for review on .

☐ b. Program is subject to E.O. 12372 but has not been selected by the State for review.

☒ c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)**

☐ Yes ☒ No

If "Yes", provide explanation and attach

Add Attachment | Delete Attachment | View Attachment

21. *By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)**

☒ ** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix: * First Name: Matt

Middle Name:

* Last Name: Posner

Suffix:

* Title: Executive Director

* Telephone Number: 8505950820 Fax Number:

* Email: mjposner@myescambia.com

* Signature of Authorized Representative: Jeffrey T Kirschenfeld * Date Signed: 02/18/2022

View Burden Statement

BUDGET INFORMATION - Non-Construction Programs

OMB Number: 4040-0006
Expiration Date: 01/31/2019

SECTION A - BUDGET SUMMARY

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. NOAA-NMFS-SE-2022-2007159		$	$	$ 100,000.00	$ 0.00	$ 100,000.00
2.						
3.						
4.						
5. Totals		$	$	$ 100,000.00	$ 0.00	$ 100,000.00

SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY (1) NOAA-NMFS-SE-2022-2007159	(2)	(3)	(4)	Total (5)
a. Personnel	$ 22,080.00	$	$	$	$ 22,080.00
b. Fringe Benefits	7,728.00				7,728.00
c. Travel	12,469.00				12,469.00
d. Equipment	0.00				0.00
e. Supplies	16,338.00				16,338.00
f. Contractual	30,494.00				30,494.00
g. Construction	0.00				0.00
h. Other	1,800.00				1,800.00
i. Total Direct Charges (sum of 6a-6h)	90,909.00				$ 90,909.00
j. Indirect Charges	9,091.00				$ 9,091.00
k. TOTALS (sum of 6i and 6j)	$ 100,000.00	$	$	$	$ 100,000.00
7. Program Income	$ 0.00	$	$	$	$ 0.00

SECTION C - NON-FEDERAL RESOURCES

	(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e)TOTALS
8.	NOAA-NMFS-SE-2022-2007159	$ 0.00	$ 0.00	$ 0.00	$ 0.00
9.					
10.					
11.					
12. TOTAL (sum of lines 8-11)		$ 0.00	$ 0.00	$ 0.00	$ 0.00

SECTION D - FORECASTED CASH NEEDS

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	$ 50,000.00	$ 12,500.00	$ 12,500.00	$ 12,500.00	$ 12,500.00
14. Non-Federal	$ 0.00	0.00	0.00	0.00	0.00
15. TOTAL (sum of lines 13 and 14)	$ 50,000.00	$ 12,500.00	$ 12,500.00	$ 12,500.00	$ 12,500.00

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT

	(a) Grant Program	FUTURE FUNDING PERIODS (YEARS)			
		(b)First	(c) Second	(d) Third	(e) Fourth
16.	NOAA-NMFS-SE-2022-2007159	$ 50,000.00	$	$	$
17.					
18.					
19.					
20. TOTAL (sum of lines 16 - 19)		$ 50,000.00	$	$	$

SECTION F - OTHER BUDGET INFORMATION

21. Direct Charges:

22. Indirect Charges: 10% de minimus

23. Remarks:

OMB Number: 4040-0007
Expiration Date: 02/28/2022

ASSURANCES - NON-CONSTRUCTION PROGRAMS

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0040), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.

2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.

3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.

4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.

5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).

6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C.§§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee- 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.

7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.

8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.

10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is $10,000 or more.

11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).

12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.

13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593(identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).

14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.

15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.

16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.

17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."

18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.

19. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL	TITLE
Jeffrey T Kirschenfeld	Executive Director
APPLICANT ORGANIZATION	DATE SUBMITTED
Escambia County Board of County Commissioners	02/18/2022

Standard Form 424B (Rev. 7-97) Back

FORM **CD-511**
(REV 1-05)

U.S. DEPARTMENT OF COMMERCE

CERTIFICATION REGARDING LOBBYING

Applicants should also review the instructions for certification included in the regulations before completing this form. Signature on this form provides for compliance with certification requirements under 15 CFR Part 28, 'New Restrictions on Lobbying.' The certifications shall be treated as a material representation of fact upon which reliance will be placed when the Department of Commerce determines to award the covered transaction, grant, or cooperative agreement.

LOBBYING

As required by Section 1352, Title 31 of the U.S. Code, and implemented at 15 CFR Part 28, for persons entering into a grant, cooperative agreement or contract over $100,000 or a loan or loan guarantee over $150,000 as defined at 15 CFR Part 28, Sections 28.105 and 28.110, the applicant certifies that to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, 'Disclosure Form to Report Lobbying.' in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure occurring on or before October 23, 1996, and of not less than $11,000 and not more than $110,000 for each such failure occurring after October 23, 1996.

Statement for Loan Guarantees and Loan Insurance

The undersigned states, to the best of his or her knowledge and belief, that:

In any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form-LLL, 'Disclosure Form to Report Lobbying,' in accordance with its instructions.

Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure occurring on or before October 23, 1996, and of not less than $11,000 and not more than $110,000 for each such failure occurring after October 23, 1996.

As the duly authorized representative of the applicant, I hereby certify that the applicant will comply with the above applicable certification.

* NAME OF APPLICANT
Escambia County Board of County Commissioners

* AWARD NUMBER
NOAA-NMFS-SE-2022-2007159

* PROJECT NAME
Pensacola Bay System Oyster REEF

Prefix:

* First Name: Matt

Middle Name:

* Last Name: Posner

Suffix:

* Title: Executive Director

* SIGNATURE: Jeffrey T Kirschenfeld

* DATE: 02/18/2022

PROJECT SUMMARY

Organization Title: Pensacola and Perdido Bays Estuary Program (through fiscal agent Escambia County BOCC)
Principal Investigators:
Logan McDonald, Community Outreach Coordinator (850) 595-1479, lmcdonald@ppbep.org
Madi Ross, Community Outreach Assistant (850) 454-7624, mtross@ppbep.org
Dr. Amanda Croteau, Post Doc, University of West Florida (850)474-215, acroteau@uwf.edu
Address: 226 S. Palafox Place, Pensacola, FL 32502

B-WET Priority Area I.B.b: 2. Exemplary MWEE Programs combining teacher professional development and meaningful watershed educational experiences for their students
Gulf of Mexico Issue I.B.a.: Habitat Resources, Wildlife and Fisheries, Education and Engagement, Data and Monitoring, Coastal Community Resilience, Human Benefits of Nature, Integrated Planning
Special Interest Area I.B.c: Climate Education; Gulf of Mexico Fisheries
Project Title: Pensacola Bay System Oyster REEF (Restoration, Education, and Engagement Framework)
Project Duration: 24 months; August 1, 2022 to July 31, 2024
Project Objectives: 1. Conduct a week-long professional development workshop for approximately 12 educators; 2. Coordinate and support field trips, guest speakers, case studies, and spat monitoring efforts for educators as they lead MWEEs; 3. Facilitate student presentations to the PPBEP Management Conference; 4. Facilitate student construction of oyster gardening cages to be deployed at priority locations identified by students.
Total Federal Funding Requested: $100,000
Cost Sharing (non-federal sources): In-kind support from PPBEP is estimated at $4,368 for outreach supplies and travel costs.
Organization & Partnerships: The Pensacola and Perdido Bays Estuary Program works to restore and protect the Pensacola and Perdido Bay Watersheds through restoration, education, and unbiased monitoring of the health of our estuaries. Key project partners include University of West Florida, Navarre Beach Marine Science Station, UF IFAS Extension, Scientists in Every Florida School, PPBEP Oyster Sub-Committee, Bream Fishermen Association, Florida Fish and Wildlife Conservation Commission, Pensacola Oyster Cluster, Avalon Aquaculture, Pensacola Bay Oyster Company, Escambia County Marine Resource Division, Florida Department of Environmental Protection, and The Nature Conservancy.

Project Description: High School students and teachers in Santa Rosa and Escambia Counties (Florida) and Baldwin County (Alabama) will participate in MWEEs that investigate restoration and resilience through the lens of Pensacola Bay System (PBS) oysters. Students will explore climate change, resilience, and restoration through inquiry-based field trips and analysis of local data sets, case studies, and historical records. Teachers will be equipped to guide these MWEES through participation in a week-long summer workshop that covers the MWEE framework; oyster spat field monitoring protocols and analysis; oyster hatchery, farm, and restoration field trips; guest presentations; and examination of locally relevant data sets and models. At the end of their inquiry-based explorations, students will present their recommendations for locations to deploy student-built oyster gardening cages.
Audience Description: We will engage approximately 300 High School students and 12 educators in Santa Rosa, Escambia, and Baldwin Counties.
Delivery Methods: 1. Week-long summer teacher workshop (guest speakers, hatchery and oyster farm tours, restoration site tours, field spat monitoring); 2. Student MWEEs (oyster spat field monitoring and classroom analysis, interactive modeling case study exercises, PBS oyster documentary, guest speakers, tours and field trips, student presentations of findings, oyster gardening cage construction); 3. Peer to peer student and teacher calls.

PROJECT DESCRIPTION

Goals, Objectives, and Need:
The northern Gulf of Mexico is experiencing impacts from climate change including sea-level rise (e.g, flooding, storm surge) and increased frequency of extreme weather events causing strain on local communities and the natural systems. In the Pensacola and Perdido Bay area, recent storms (e.g., Hurricane Sally) have resulted in widespread damages to coastal property and critical infrastructure. As storms continue to increase in frequency and intensity, it is necessary to protect communities by enhancing resilience, reducing or mitigating risk, and restoring natural buffers and habitats along our coasts. Oyster reefs have the ability to buffer intense wave energy and protect our shorelines while also creating habitat for fish and wildlife and improving water quality.

Oyster reefs have declined by approximately 85% worldwide, making them one of the most imperiled habitats (Beck 2011). Once a booming industry along the Gulf Coast, oyster fisheries across many estuaries have experienced extensive losses causing cascading negative impacts on the economies, ecosystems, and communities. Oysters in the Pensacola Bay System (PBS) have experienced substantial decline since the 1950s due to poor water quality, sedimentation, and lack of suitable substrate for spat settlement leading to the collapse of the fishery with very few live reefs remaining (FWC 2019). Land use changes in the form of increased development and impervious surfaces throughout the watershed has resulted in an increase in stormwater runoff carrying with it excess nutrients, sediments, and pollutants from the landscape into our waterways which may affect remaining oyster populations.

The Nature Conservancy (TNC) convened a stakeholder working group (SWG) in 2019 that was comprised of scientists, restoration specialists, government and business representatives, community groups, and fishermen to develop a plan for the recovery of Pensacola Bay's oyster populations. This plan is the first of its kind in integrating the community's environmental, economic, and social well-being goals with the goals for natural marine resources (Birch et al., 2021). The Oyster Fisheries and Habitat Management Plan was completed in May 2021 after the culmination of a two-year planning effort and includes goals and strategies under four major theme areas or pillars: Ecology, Wild Harvest and Aquaculture, Economy, and Public Education and Communication (www.ppbep.org/the-plan/oyster-plan). The plan identified specific needs to support oyster citizen science monitoring programs, data collection, restoration efforts, oyster gardening, and educational programming to achieve increased environmental literacy and stewardship of the PBS watershed.

Recent research and restoration investments into the recovery of PBS oysters include: mapping of PBS oysters (2021); creation of an Oyster Habitat Suitability Model (2021); an oyster filtration model (2021); a living shoreline suitability model (due to be completed by summer 2022); evaluation of sediment loading throughout the watershed (beginning 2022); spat monitoring (beginning spring 2022); production of an Oyster Documentary addressing the past, present, and future status of the PBS oysters; and drone footage and construction of Project GreenShores Site 2 and the East Bay Oyster and Habitat Restoration Project (both to be completed in 2022). In addition, the watershed has seen growing investments in oyster aquaculture and a dedicated PPBEP Oyster Sub-Committee comprised of scientists, government and business representatives, oystermen, engineers, fisheries experts, and community advocates is building momentum to recover and restore Pensacola's oyster resource to ensure a sustainable future.

The culturally, economically, and environmentally significant PBS oyster fishery and habitat, combined with recent investments into research, restoration, and aquaculture, serves as an ideal, locally relevant case study for students to explore complex and evolving watershed issues. Pensacola Bay System Oyster REEF aims to 1. Increase stewardship of the PBS watershed and oyster fishery and understanding of its cultural, natural, financial, and human resources; 2. Increase teacher and student knowledge of local watershed issues and their relation to climate change; and 3. Increase student achievements in STEM.

The project team will 1. Conduct an oyster-focused week-long professional development workshop for approximately 12 educators; 2. Coordinate and support field trips, guest speakers, case studies, and spat monitoring efforts for educators as they lead MWEEs; 3. Facilitate student presentations to the PPBEP Management Conference; 4. Facilitate student construction of oyster gardening cages to be deployed at priority locations identified by students.

Target Audience: Proposed work will occur within the Pensacola Bay and Perdido Bay watershed in Santa Rosa and Escambia Counties (Florida) and Baldwin County (Alabama). An estimated 30 hours will be spent with students and an estimated 45 hours will be spent with teachers (in addition to the 30 hours spent with students and teachers simultaneously).

Escambia County is a large, urbanized county in Florida. Per the 2021 U.S. Census estimate, Escambia's population is 321,905, an increase of 8% since 2010. Escambia County residents are 68.9% White, 23.3% Black or African American, 0.9% American Indian, 3.3% Asian, 0.2% Native Hawaiian and Other Pacific Islander, 3.4% Two or More Races, and 5.9% Hispanic or Latino. An estimated 13.5% of residents are below the poverty line and four of the seven Escambia County public high schools are Title I Schools. In the 2018-2019 school year Escambia County Schools has a 53% science achievement rate. The project team will prioritize working with Black or African American students and teachers and Title I Schools in Escambia County.

Santa Rosa County is a medium, suburban/rural county in Florida. Per the 2021 U.S. Census estimate, Santa Rosa's population is 151,372, an increase of 24% from 2010. Santa Rosa County residents are 86.9% White, 6.5% Black or African American, 0.9% American Indian, 2.2% Asian, 0.2% Native Hawaiian and Other Pacific Islander, 3.4% Two or More Races, and 5.9% Hispanic or Latino. The district's rural population is 28.8% compared to Florida's 11.2%. In the 2018-2019 school year Santa Rosa County has a 69% science achievement rate. Santa Rosa County is only home to one Title 1 high school. We do aim to work with this school, but since the number of Title 1 schools are limited within Santa Rosa County we will prioritize working with rural teachers and students in the upper portions of our watersheds.

Baldwin County was Alabama's fastest growing county from 2010 to 2020. Per the 2021 U.S. Census estimate, Baldwin County's population is 239,294. Baldwin County residents are 87.4% White, 8.8% Black or African American, 0.8% American Indian, 1.1% Asian, 0.1% Native Hawaiian and Other Pacific Islander, 1.9% Tow or More Races, and 4.7% Hispanic or Latino. Approximately half of Baldwin County falls within the Perdido Bay Watershed boundaries. Only one of the Baldwin County public high schools located in the Perdido Bay Watershed is a Title I School. The project team will prioritize working with transient and newly arrived subgroups in the rapidly developing coastal areas of Baldwin County.

A sustained investment in hands-on educational experiences is necessary to build a sense of place and stewardship in the growing number of students that may be newcomers to our local ecosystems. The project team will also target rural students and teachers in the upper portions of our watershed that may have fewer coastal experiences and sense of stewardship toward our estuarine resources.

The project team will work with the respective county school district's administration to facilitate the adoption of MWEEs. We will utilize existing relationships of the project team, as well as the long-term relationships that have been developed with schools through the Bay Area Resources Committee (BARC), which was the predecessor of our current organization. BARC members serve on our education and outreach committee and will be able to leverage their connections to help recruit teachers. We will

promote the opportunity through school administration, district science coordinators, directly via e-mail and flyers in their mailboxes, and through the Scientist in Every Florida School's distribution list. PPBEP has had success reaching teachers through word of mouth from other teachers, and we believe that positive endorsements from teachers we are currently working with will help us reach new teachers.

Community-Based Partnerships that Lead with Equity

After the completion of the PBS Oyster Habitat and Fisheries Management Plan, the SWG (comprised of scientists, restoration specialists, government and business representatives, community groups, oyster harvesters, and oyster farmers) transitioned to the PPBEP Oyster Sub-Committee, an arm of the PPBEP Technical Committee. This dedicated group of community stakeholders represents diverse cultural, financial, and environmental perspectives and interests, all working collaboratively toward the recovery of PBS oysters. Oyster Sub-Committee members are invested in the implementation of the plan and supportive of this educational opportunity to enhance local context, cultural relevance, and cultural competence in professional development in teachers. Local expertise on existing environmental issues impacting PBS oysters will be provided by local oyster farmers and harvesters, restoration specialists, community planners, and government and business representatives through guest presentations, interviews, and hands-on field trips and tours. Teachers and students will hear from the diverse voices of the SWG and will be charged with designing an innovative map of oyster restoration priority areas, considering community values, the latest data and models, and climate change. The PPBEP Oyster Sub-Committee has members from different community sectors and organizations, including organizations that work with rural communities, such as the UF-IFAS Extension Office and Florida Sea Grant, that have strong connections with Escambia and Santa Rosa County schools.

The project team will engage with community partners from the UF-IFAS Extension Office and 4-H Program in Santa Rosa County as well as the USDA-NRCS Blackwater Soil and Water Conservation District to further reach address the needs of the upper watershed audience in Santa Rosa County. These organizations have deep interpersonal connections with farmers and rural communities that will allow us to identify shared goals and effectively reach this audience. The project team will work to establish communication plans with representatives from these respective organizations. Within Escambia County, the project team will engage with community leaders, such as Dr. Calvin Avant of Unity in the Family Ministry, that are community representatives of Black and African American communities in Pensacola that have experienced a history of environmental injustices. These community leaders have a deep understanding of the history of these communities, the current challenges they face, and their needs. Within Baldwin County the project team will work closely with the City or Orange Beach and Baldwin County. These government agencies understand the needs of this growing community and will help us to reach newly arrived teachers and students.

Methods

Timeline of Expected Deliverables, Outcomes and Milestones (MWEE Components)

1.1 Issue Definition

Student inquiry will focus on the status and restoration of PBS and Perdido oysters. Students will be provided with rich, locally relevant resources to guide their investigations and background research. A PBS Oyster Documentary that addresses the past, present, and future status of the PBS oysters (to be produced by Fall 2022) will highlight cultural, financial, and environmental perspectives that should be considered in restoration planning. Recent findings (maps, oral histories, etc.) on the history of oysters in Perdido Bay will inform student investigations in Perdido Bay. NOAA resources will be used (Introduction to Ocean Farming Series, Ocean Acidification's impact on oysters and other shellfish video, Surviving in an Estuary

lesson plan, Balance in the Bay lesson plan) will be utilized to build a solid foundation to support student investigations.

Extensive local datasets and models include: oyster maps (2021); Oyster Habitat Suitability Model (2021); Oyster Filtration Model (2021); Living Shoreline Suitability Model (due to be completed by summer 2022); evaluation of sediment loading throughout the watershed (beginning 2021); a report on the Cultural and Historic Ecology of Pensacola and Perdido Bays that documents a historical presence of oysters in Perdido Bay (May 2022), and spat monitoring (beginning spring 2022). Local restoration projects, Project GreenShores Site 2 and the East Bay Oyster and Habitat Restoration Project (both to be completed in 2022), will provide additional context and background for students. Construction of both restoration projects has been documented through drone footage (courtesy of the Northwest Florida Water Management District) that PPBEP will develop into educational resources for teachers. Students will also learn about local resilience plans, aquaculture and restoration policies, and root causes of PBS oyster declines from local experts.

Teachers will delve into these rich resources during a week-long summer professional development workshop in Year 1 to prepare them to support their students' investigations. The proposed project will align with several State of Florida high school learning objectives, including: SC.912.L.14 Organization and Development of Living Organisms, SC.912.L.17 Interdependence, and SC.912.N.1 The Practice of Science. A full list of benchmarks that this proposal will address can be found in Appendix C.

1.2 Outdoor Field Experiences

During the first year of teacher professional development, teachers will help to co-develop field experiences including seining near oyster reef restoration sites, oyster spat monitoring, and oyster hatchery tours. Teachers will also participate in oyster farm tours that are led by local oyster farmers, to gain a deeper understanding of the aquaculture industry and associated challenges. Students will not be able to visit the farms due to school boat restrictions, but teacher experiences, combined with farmer interviews and video footage, will help to supplement student understanding.

A guided visit by Escambia County Natural Resources at Navy Point in Escambia County and potentially a Santa Rosa guided tour at Florida Town Park (or other local site if construction is delayed) will provide students an opportunity to see firsthand how restoration plans should consider and integrate community values. Seining near the breakwater reefs will also demonstrate the role that oyster reefs play as critical fisheries habitat. Pensacola Bay Oyster Company and The Pensacola Oyster Cluster will provide guided fieldtrips of their facilities at the Port of Pensacola and Milton Marina. These tours will allow students to see the inner workings of a hatchery operation and build a greater understanding of oyster biology and aquaculture.

Each participating class will be assigned a spat monitoring site with spat monitoring arrays (oyster stringers hung from T-shaped PVC spat trees). Students will conduct field visits to collect oyster stingers, deploy new oyster stringers, and make field observations from August to October (the end of peak oyster spawning season). The oyster stringers will be examined under dissecting microscopes to determine oyster spat settlement by counting the number of spat on each shell. Students will also collect water quality parameters during their field visits. Student data will be supplemented with a 2022 data set FWC spat monitoring efforts that will provide additional data from the summer spawning season when school is not in session. Oyster spat stringers can be frozen upon collection until they are processed in the lab (FWC 2021). PPBEP

will coordinate volunteers to collect oyster stringers from spat arrays from spring through summer of 2023 to complete the 2023 student data set.

1.3 Synthesis and Conclusions

After background research is conducted, students will hypothesize which spat monitoring locations will have the greatest spat settlement. Aggregate spat monitoring data collected by multiple classes and schools will be provided for students to analyze. Students will compare data, evaluate their hypotheses, and form conclusions as to why certain sites had higher spat settlement. Environmental data, maps, and models will be used to support student conclusions. Student investigations will culminate in developing proposals that prioritize locations for oyster gardening based on what they learned throughout their investigations. These proposals will be presented to the PPBEP Management Conference, district school boards, and peers (via classroom-to-classroom presentations).

1.4 Environmental Action Projects

Oyster gardening is a growing practice that benefits restoration efforts and provides a rich, hands-on stewardship opportunity. Cages housing oysters (stocked with spat) can be attached to docks and allowed to grow out until oysters are ready to be transplanted to an oyster reef. Oyster gardening programs train volunteers to tend their oysters that they raise off their docks. The Bream Fishermen Association's Project Oyster Pensacola (POP) has engaged participants in hanging cages off their docks and monitoring survival, growth, and recruitment of oysters across the Pensacola and Perdido Bays. Expansion of the project was halted by Covid, but there is great regional demand for an oyster gardening program. BFA identified approximately 150 families interested in participating in oyster gardening and there is a growing public interest in PBS oysters. Students will learn about several issues in the watershed and oyster biology and will have to narrow their inquiry to define the exact questions to be studied. Students will design an approach and select sites for oyster cage deployment, guided by their inquiry driven investigations of these watershed issues. Students may be able to assist in stocking oyster cages prior to deployment dependent on oyster seed availability at the end of the school year.
In addition to developing prioritized locations for oyster gardening, students will work with BFA to construct oyster gardening cages for future deployment in the Pensacola and Perdido Bays.

Priority Areas

This project will address several Gulf of Mexico Alliance Priority issues. Students will learn about nature-based solutions such as living shorelines (e.g. Project GreenShores) that can improve coastal community resilience and protect human infrastructure, while also providing habitat that benefits wildlife and fisheries. Students and educators will participate in spat recruitment monitoring and learn more about fisheries dynamics and data collection. Local data (Oyster Filtration Model, Habitat Suitability Model, maps of oyster extent, new aquaculture harvesting closure maps, etc.) will be evaluated to demonstrate the interconnection between habitat, water resources, wildlife and fisheries (including their economic value), and human benefits. Students will engage and educate the broader community through presentations and construction of oyster gardening cages.

Timeline of Expected Deliverables

Year 1 Teacher Professional Development

- October 2023 Teacher Needs Assessment approved and distributed
- January 2023 Teacher Recruitment and Advertising
- Summer 2023 Teacher Professional Workshop (Total 40 hours; 25 hours outdoors)

	Morning	Afternoon
Day 1	Program Introduction, teacher pre-survey, MWEE Overview, Pensacola Bay Oyster Documentary (overview of history, current status, and future of Pensacola oysters), History of Perdido Bay Oysters	Navy Point oyster reef seining and tour with Escambia County Natural Resources
Day 2	Pensacola Bay Oyster Company Hatchery Tour and oyster reproduction	Exploration of local models, maps, data (Project GreenShores case study) Watershed factors and climate change
Day 3	Boat trip to Avalon Aquaculture and Grayson Bay Oyster Farms and The Nature Conservancy's East Bay Restoration site	Tour of Pensacola Oyster Cluster micro-hatchery
Day 4	FWC led oyster spat monitoring field and lab protocol	Peer to peer teacher engagement and planning
Day 5	Bream Fishermen Association oyster gardening presentation and dock visit	Debrief, application and next steps, post workshop survey

Year 2 Student MWEEs

	Aug 2023	Sept. 2023	Oct. 2023	Nov. 2023	Dec. 2023	Jan. 2024	Feb. 2024	Mar. 2024	Apr 2024	May 2024	Field Hours
1.1 Student issue definition and guest presentations	X	X	X	X	X	X	X	X			
1.2 Monthly spat monitoring field trip and lab processing	X	X	X	X							8
1.2 Oyster reef seining field trips		X	X	X							4
Q1 Teacher Peer to Peer Touchpoint			X			X			X		
1.2 Hatchery Tours					X	X	X				4
1.3 Synthesis & Presentations								X	X	X	
1.4 Oyster Cage Construction									X	X	5
Teacher Debrief										X	

Total Student Contact Hours: 30
Total Student Outdoor Hours: 21
Total Teacher Contact Hours in addition to student engagements: 5

COVID Contingencies

Escambia County School District ended hybrid and remote instruction for the 2021-2022 school year and resumed normal activities such as field trips and is allowing visitors. Santa Rosa County School District also resumed normal field trip activity and is allowing school visitors for the 2021-2022 school year. Baldwin County School District lifted restrictions for the 2021-2022 school year. These policies remained in place throughout the Omicron surge, with the addition of stricter quarantine guidelines for exposed individuals. Based on the school district's policies, we anticipate that brick and mortar instruction and field trips will continue.

Should these policies change, the project team is prepared to adjust to meet student and teacher needs. The project team will consult with school district administration to determine how to best navigate any new restrictions and policies. Students and teachers can be engaged through virtual content and "live from the field" field trips that cover all the identified field components: seining, hatchery tours, spat stringer collection, and oyster farm tours. PPBEP staff and volunteers will collect spat stringers and deliver them to classrooms for students to evaluate. If classrooms returned to hybrid learning, we will engage in person

participants in the field and offer a virtual stream to remote participants. We will also develop self-lead field explorations for students that are unable to participate in group field trips so that they can still experience the critical outdoor field experience component of the MWEE. These self-guided field explorations will take into consideration student resources and transportation limitations and will be designed so that they can be completed in any environment close to where a student resides. Students' environmental action project can also be adapted in several ways: providing Do-It-Yourself kits to students with all necessary materials and guided video instruction to construct oyster cages, virtual presentations to the PPBEP Management Conference, and implementing everyday choices from their home or classroom.

Outreach and Sharing

The value of MWEEs and environmental education will be highlighted through a variety of outreach and education activities. Data sharing is an integral component of our outreach strategy that can inform and inspire others to adopt and implement MWEEs. The project team will provide a program overview and share evaluation data in presentations to the Santa Rosa County, Escambia County, and Baldwin County School Boards, and the PPBEP Management Conference, which will be reinforced by student presentations. Participating educators will be invited to give presentations at a peer-to-peer teacher in-service or lunch and learn (with at least once recorded virtually to be distributed to a broader audience) to share their experience with MWEEs and encourage a broader adoption and implementation. Local media will be invited to participate in field experiences to showcase the success of the MWEE model and the project team will issue regular press releases about grant related activities and engagements. Curriculum and lessons developed through the grant will be hosted on PPBEP's website at www.ppbep.org and shared through PPBEP and partner newsletters (School Boards, Scientists in Every Florida School, etc.). PPBEP will implement a campaign (social media, newsletters, website articles, press releases, etc.) that promotes the MWEE model by: illustrating the essential elements of a successful MWEE with project related examples, providing tips and sharing lessons learned for interested teachers, organizations, or groups interested in implementing a MWEE, and collecting student and teacher testimonials.

The project results will be shared at national, regional, and state conferences (B-WET Conference, Gulf of Mexico Alliance Conference, Restore America's Estuaries, Southern Association of Marine Educators Conference, Florida Marine Science Educators Association, etc.). The project team is dedicated to acknowledging NOAA B-WET as a funder during all engagement and outreach activities (NOAA logo included on project materials and B-WET cited as a funder).

Sustainability

PPBEP is dedicated to continuing the program beyond the grant period. The proposed project leverages a strong network of local partnerships that will continue to support the MWEE model's exploration of locally relevant watershed issues with students and teachers. Broad support from the community and Oyster Sub-Committee will ensure that the Pensacola Bay System Oyster REEF not only continues but stays relevant and grows with the integration of new data and restoration projects. PPBEP also plans to expand our offering of MWEEs by both geographic range and subject. Experiences in developing the MWEEs throughout the grant period will allow the project team to transfer the model to other locally relevant topic areas such as seagrass.

PPBEP looks forward to continuing to expand our local partnerships. The recently established Escambia County Children's Trust is charged with investing in the well-being of children within Escambia County by maximizing resources and investing in support to community provider programs. PPBEP intends to work with the Trust to promote and support the MWEE model.

Dedicated staff time will be supported through in-kind funding from PPBEP's program operations (supported by local government contributions). PPBEP is pursuing National Estuary Program designation that would bring additional programmatic resources to expand MWEEs across our watersheds. We have successfully received two years of State of Florida Legislative Appropriations (totaling $750,000) that has supported educational and outreach activities, including supplies for an additional set of oyster spat arrays. Additionally, PPBEP is launching a Business Partnership Committee and membership program that will fundraise to support the program's education and outreach efforts that could provide additional funding to cover staff time, supplies, and workshop costs.

Evaluation & IRB Approval

Our project evaluation will help inform the development of the program and allow the project team to improve and adapt the program throughout the grant period, and beyond. The program will be evaluated using surveys (needs assessment, process evaluation, and outcome evaluations) and observations.

The main questions of our teacher evaluation are:

- What are teachers' needs (priority learning standards to target, training needs, resource and technology needs, preferred support methods, field trip structure and schedule, etc.)?
- Which aspects of the program (workshops, field trips, content, etc.) worked well? Which didn't work? What improvements could be made?
- What impact does the workshop have on classroom practice? Did the teachers participate in Year 2 MWEEs with their students? How likely are educators to implement MWEEs in the future?
- Did educator knowledge and understanding of the PBS watershed and oyster fisheries improve? Did program activities and content change attitudes or inspire stewardship?

High school students that participate in the MWEEs will be evaluated using two methods:
1) demonstration of understanding through communication of their proposed oyster gardening locations and 2) student surveys.
The main questions of our student evaluation are:

- Did student knowledge and understanding of the PBS watershed and oyster fisheries improve?
- Did program activities and content change attitudes or inspire stewardship?
- Which aspects of the program (workshops, field trips, content, etc.) worked well? Which didn't work? What improvements could be made?

A teacher needs assessment will be conducted at the beginning of the grant period to further inform the development and content of the Year 1 teacher professional development workshop and Year 2 student MWEEs. Pre and post program surveys will be given to both students and teachers to evaluate the impact (change in knowledge, actions, and stewardship over time) of our program.

Process evaluations will occur at key points throughout the program (after the teacher workshop, field trips, etc.) to evaluate educator and student experience, satisfaction, and perceptions. These results will allow the project team to assess whether program activities are occurring as expected and identify any necessary areas for improvement throughout the grant period.

The project evaluation assessment instruments will be developed in partnership with Dr. Amanda Croteau (University of West Florida Center for Environmental Diagnostics and Bioremediation) and administered by the University of West Florida. Survey results will be analyzed by Dr. Croteau throughout the project period and regular reports will be delivered to the project team so that any necessary adjustments can be

made in a timely manner. A final report will also compare pre and post survey data to determine the program's impact on students and educators.

IRB review and approval will be provided by the UWF IRB, with an estimated approval timeline of 4-6 weeks after submission. The project team expects to have initial teacher needs assessment surveys approved and distributed by October 2023. This timeframe leaves ample time to receive and integrate teacher feedback before the Summer 2023 teacher professional development workshop.

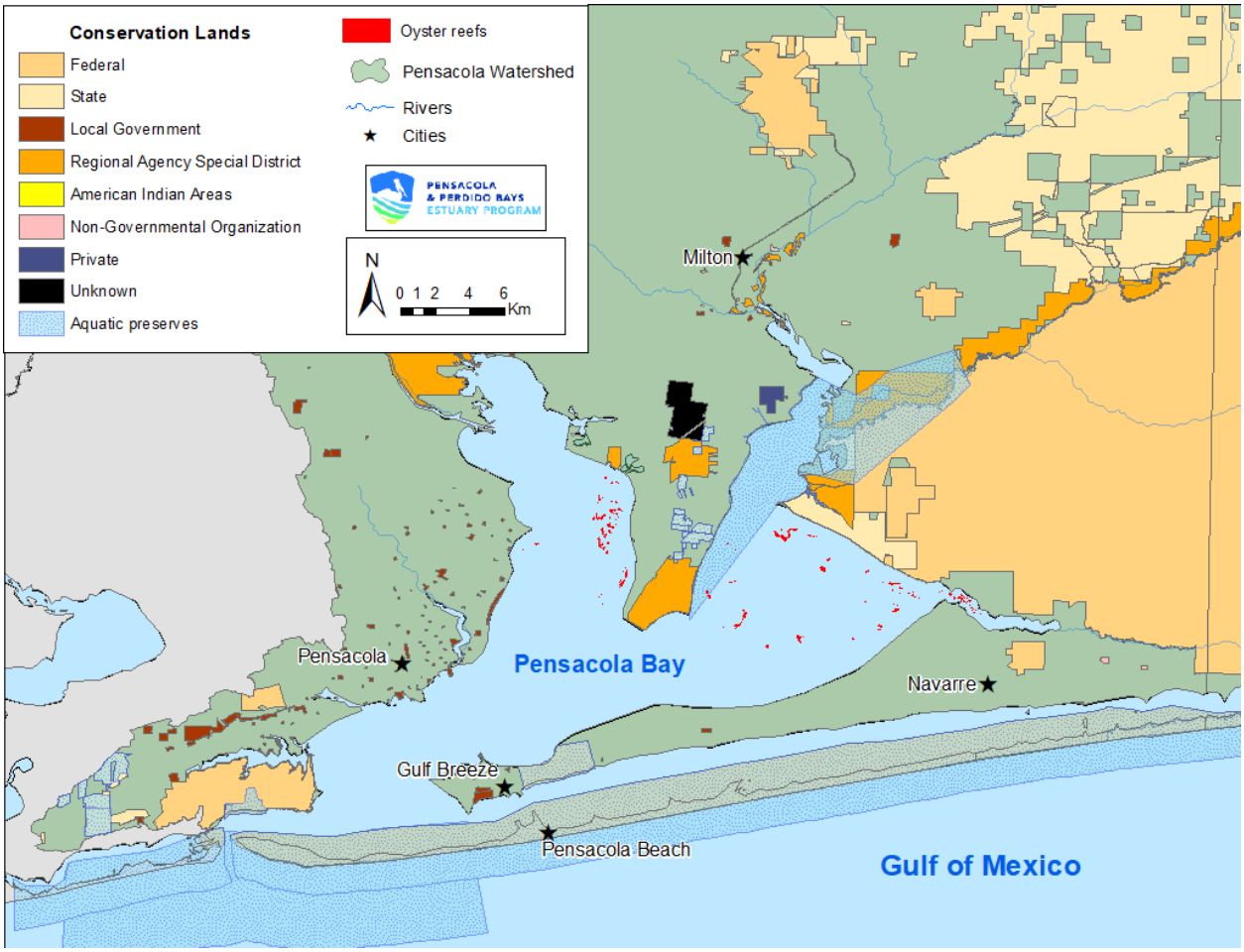

Figure 1. Map of the Pensacola Bay Watershed identifying locations of key conservation lands, existing oyster reef extent, and Aquatic Preserves.

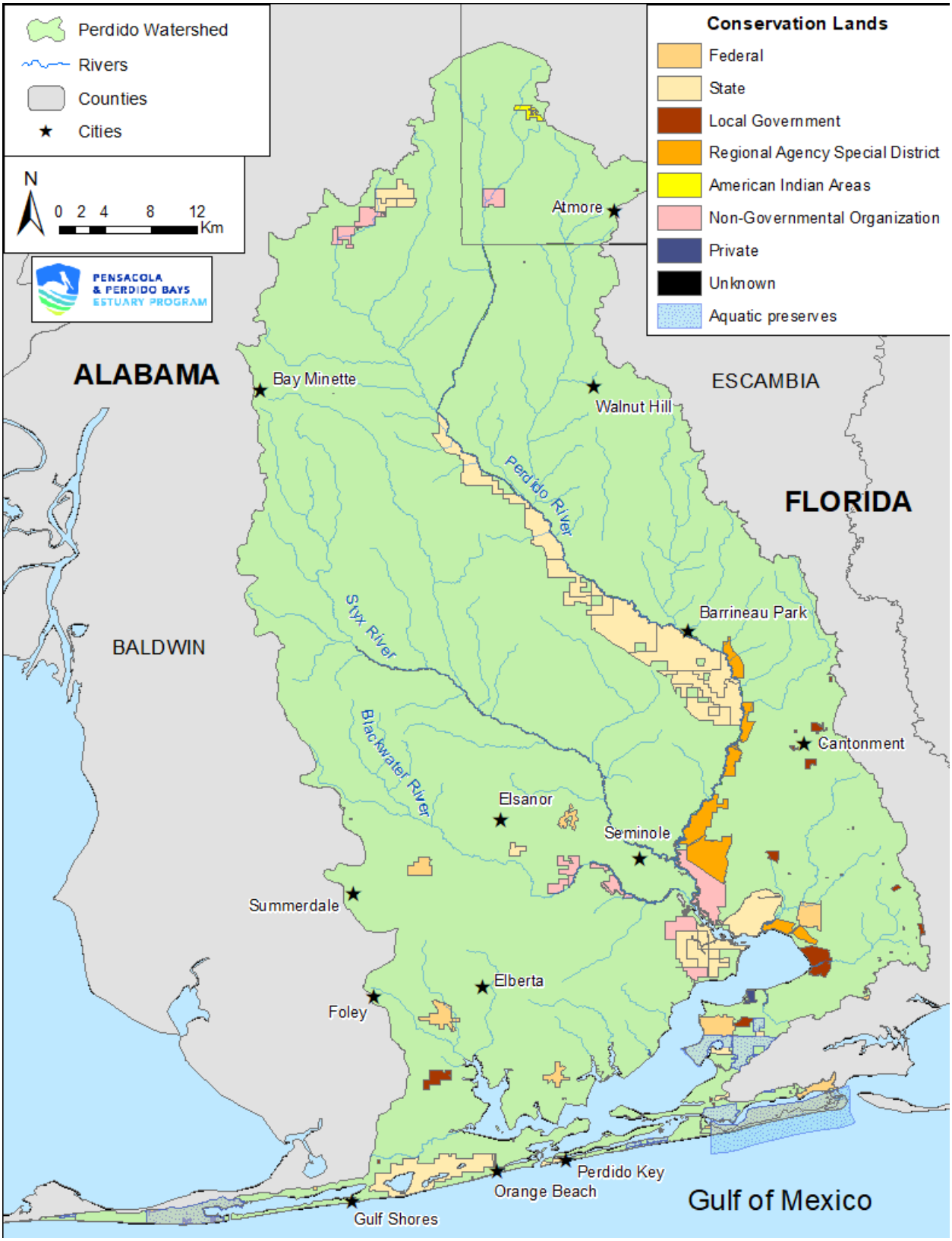

Figure 2. Map of Perdido Bay Watershed identifying locations of key conservation lands, National Parks, and Aquatic Preserves.

Budget Justification

Personnel – $22080.00 is budgeted for the two-year grant period to support key project personnel. $12,480.00 is budgeted for the Community Outreach Coordinator at $26.00 hour for 200 hours each year. $960.00 is budgeted for the Community Outreach Assistant at $20.00 for 200 hours each year. The Community Outreach Coordinator is the project lead and will provide program oversight, coordination between partners, and will help plan and execute teacher professional development workshops, fieldtrips, and curriculum development. The Community Outreach Assistant will help plan and support teacher professional development workshops, fieldtrips, and curriculum development.

Additional PPBEP personnel time (key project personnel and an outreach intern) and cost of living increases will be covered by PPBEP operational funds.

Fringe Benefits - $7,728.00 is budgeted for the two-year grant period. $4368.00 is budgeted for the Community Outreach Coordinator each year at 35% of base salary. $3360.00 is budgeted for the Community Outreach Assistant each year at 35% of base salary. Fringe benefits include health benefits, retirement, and paid leave.

Travel -$12,469.00 is budgeted for the two-year grant period. $3480.00 is budgeted in Year 1 for local educator travel ($.58 federal mileage reimbursement rate x 100miles maximum roundtrip/day x 5 days of the workshop x 12 educators) associated with the week-long teacher professional development workshop. The farthest expected distance for educator travel within the counties is 50 miles and lodging is not anticipated. $6720.00 is budgeted in Year 2 for field trip buses to support student field trips, tours, and spat collection (estimated at Santa Rosa County school bus driver rate of $25/hours + $15/hour bus attendant x 12 classes x 16 hours). $2,269.00 is budgeted in Year 2 for the Community Outreach Coordinator and Community Outreach Assistant to travel to the B-WET Conference ($400 flight x two project personnel, $200 car rental and gas, $150 lodging x 2 personnel x 3 nights, $60 per diem/food x 3 nights x 2 personnel).

Staff travel to project sites and additional conferences will be covered by PPBEP operational funds.

Supplies - $16,338 is budgeted for the two-year grant period. $10,890 is budgeted for lab processing of oyster spat stringers using dissecting microscopes (dissecting microscopes, large plastic trays). $2448 is budgeted for collecting water quality parameters (Secchi disks and multi-parameter water quality sondes). $3,000.00 is budgeted for oyster cage supplies for students' action project (approximately $10/cage x 300 cages).

Existing program resources will cover additional oyster spat monitoring supplies (wire cutters, galvanized wire, PVC pipe and joints, PVC glue, scrub brushes, oyster knives, sample freezer, buckets, and bleach).

Contractual - $30,494.00 is budgeted for the two-year grant period. $7,200.00 is budgeted to teacher stipends for participation in the week-long professional development workshop ($600/teacher x 12 teachers). $2,328 is budgeted in Year 1 for the contracted project evaluation with the University of West Florida that includes developing the evaluation tools (including IRB approval), analyzing and reporting evaluation results (Dr. Amanda Croteau's salary at 20.59 x 2.98 hours/week x 20 weeks; Dr. Croteau's fringe at 65% base salary; UWF indirect at 15%). $7,672.00 is budgeted in Year 2 for the contracted project evaluation with the University of West Florida that includes developing the evaluation tools (including IRB approval), analyzing, and reporting evaluation results (Dr. Amanda Croteau's salary at 20.59 x 3.78 hours/week x 52 weeks; Dr. Croteau's fringe at 65% base salary; UWF indirect at 15%.) $1000 is budgeted in Year 1 for aquaculture farm tour stipends ($500/farm tour x 2 farms) as part of the

teacher professional development workshop. $2000 is budgeted in Year 1 for boat rentals for teacher travel to the oyster farms ($1,000 rental x 2 boats/shifts to accommodate all 12 teachers). Farm tours are not included in the budget request for Year 2 due to school district restrictions regarding students on boats. $1000 is budgeted in Year 1 for oyster hatchery tour stipends ($500 stipend x 2 hatcheries) as part of the teacher professional development workshop. $1000 is budgeted in Year 2 for oyster hatchery tour stipends ($500 stipend x 2 hatcheries) for hatcheries that host student field trips. $224 is budgeted in Year 1 for the Bream Fishermen's Association (Barbara Albrecht's salary at $22.38/hour x10 hours) to support the teacher professional development workshop through a presentation and demonstration on oyster gardening. $1230 is budgeted in Year 2 for the Bream Fishermen's Association (Barbara Albrecht's salary at $22.38/hour x 55 hours) to support oyster cage construction and provide guidance on student action projects. $6,840.00 is budgeted in Year 2 for substitute teachers ($95/day x 6 field trips x 12 educators) to cover teachers' other classes while they participate in field trips.

Other - $1800.00 is budgeted for the two-year grant period. $1,800 is budgeted to provide lunches, coffee, and snacks during the weeklong professional development workshop ($30/day x 5 days x 12 educators).

Indirect - $ 9,091.00 is budgeted for the two-year project. Escambia County will serve as the host agency and fiscal agent. Escambia County/PPBEP elects to use the 10 percent de minimis indirect cost rate.

Total Project Costs & Justification	REQUEST YEAR 1	MATCH YEAR 1	TOTAL YEAR 1	REQUEST YEAR 2	MATCH YEAR 2	TOTAL YEAR 2	*REQUEST TOTAL*	*MATCH TOTAL*	*PROJECT COSTS TOTAL*
A. Personnel/Salaries:									
Key Staff (list by individual - include resume in Appendix)									
Logan McDonald Community Outreach Coordinator ($26/hour x 240 hours each year)	$6,240.00	$0.00	**$6,240.00**	$6,240.00	$0.00	**$6,240.00**	***$12,480.00***	***$0.00***	***$12,480.00***
Madi Ross Community Outreach Assistant ($20/hr x 240 hours) each year)	$4,800.00	$0.00	**$4,800.00**	$4,800.00	$0.00	**$4,800.00**	***$9,600.00***	***$0.00***	***$9,600.00***
	$11,040.00	**$0.00**	**$11,040.00**	**$11,040.00**	**$0.00**	**$11,040.00**	***$22,080.00***	***$0.00***	***$22,080.00***
B. Fringe Benefits:									
Logan McDonald Community Outreach Coordinator 35% of salary	$2,184.00	$0.00	**$2,184.00**	$2,184.00	$0.00	**$2,184.00**	***$4,368.00***	***$0.00***	***$4,368.00***
Madi Ross Community Outreach Assistant $20/hr x 240 hours each year)	$1,680.00	$0.00	**$1,680.00**	$1,680.00	$0.00	**$1,680.00**	***$3,360.00***	***$0.00***	***$3,360.00***
	$3,864.00	**$0.00**	**$3,864.00**	**$3,864.00**	**$0.00**	**$3,864.00**	***$7,728.00***	***$0.00***	***$7,728.00***
C. Travel:									
Travel Directly Related to Program Implementation									
Field Trips Buses (SRC rate of $35/hour x (12 classes X 16 hours)	$0.00	$0.00	**$0.00**	$6,720.00	$0.00	**$6,720.00**	***$6,720.00***	***$0.00***	***$6,720.00***
Educator Local Travel mileage (.58 mileage reimbursement rate x 100 max mileage roundtrip/day x 5 days X 12 educators)	$3,480.00	$0.00	**$3,480.00**	$0.00	$0.00	**$0.00**	***$3,480.00***	***$0.00***	***$3,480.00***
Travel Indirectly Related to Program Implementation									
B-WET Conference Travel ($400 flight x 2 team members; $200 car rental; $155 hotel x 3 nights x 2 team members; $60 food x 3 nights x 2 team members)	$0.00	$0.00	**$0.00**	$2,269.00	$0.00	**$2,269.00**	***$2,269.00***	***$0.00***	***$2,269.00***
	$3,480.00	**$0.00**	**$3,480.00**	**$8,989.00**	**$0.00**	**$8,989.00**	***$12,469.00***	***$0.00***	***$12,469.00***
D. Equipment:									
None									
	$0.00	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	***$0.00***	***$0.00***	***$0.00***
E. Supplies									
Dissecting Microscopes (30units x $331/unit).	$9,930.00	$0.00	**$9,930.00**	$0.00	$0.00	**$0.00**	***$9,930.00***	***$0.00***	***$9,930.00***
Multi-parameter water quality sonde (12 units at $139/units)	$1,668.00	$0.00	**$1,668.00**	$0.00	$0.00	**$0.00**	***$1,668.00***	***$0.00***	***$1,668.00***
Secchi Disks (12 units x $65.unit)	$780.00	$0.00	**$780.00**	$0.00	$0.00	**$0.00**	***$780.00***	***$0.00***	***$780.00***
Large plastic trays (48 units at $20/unit)	$960.00	$0.00	**$960.00**	$0.00	$0.00	**$0.00**	***$960.00***	***$0.00***	***$960.00***
Oyster Cage Supplies (300 units x $30/unit)	$0.00	$0.00	**$0.00**	$3,000.00	$0.00	**$3,000.00**	***$3,000.00***	***$0.00***	***$3,000.00***
	$13,338.00	**$0.00**	**$13,338.00**	**$3,000.00**	**$0.00**	**$3,000.00**	***$16,338.00***	***$0.00***	***$16,338.00***
F. Contractual									
Teacher Stipends ($600 stipend x 12 teachers)	$7,200.00	$0.00	**$7,200.00**	$0.00	$0.00	**$0.00**	***$7,200.00***	***$0.00***	***$7,200.00***
Evaluation Contract - University of West Florida Dr. Amanda Croteau	$2,328.00	$0.00	**$2,328.00**	$7,672.00	$0.00	**$7,672.00**	***$10,000.00***	***$0.00***	***$10,000.00***
Aquaculture Farmer Tour Stipends (2 farms x @ $500)	$1,000.00	$0.00	**$1,000.00**	$0.00	$0.00	**$0.00**	***$1,000.00***	***$0.00***	***$1,000.00***
Hatchery Tour Stipends (2 hatcherys x @ $500 stipend x 2 years)	$1,000.00	$0.00	**$1,000.00**	$1,000.00	$0.00	**$1,000.00**	***$2,000.00***	***$0.00***	***$2,000.00***
ducator Boat Tours ($1000 a tour x 2 trips to fit all teachers)	$2,000.00	$0.00	**$2,000.00**	$0.00	$0.00	**$0.00**	***$2,000.00***	***$0.00***	***$2,000.00***
Bream Fishermen Association - Oyster Cages - Barbara Albrecht (Y2 - $22.38/hr * 10 hours)(Y2 - $22.38/hr * 55 hours)	$224.00	$0.00	**$224.00**	$1,230.00	$0.00	**$1,230.00**	***$1,454.00***	***$0.00***	***$1,454.00***
Substitute Teachers $95/day (6 field trips x 12 educators)	$0.00	$0.00	**$0.00**	$6,840.00	$0.00	**$6,840.00**	***$6,840.00***	***$0.00***	***$6,840.00***
	$13,752.00	**$0.00**	**$13,752.00**	**$16,742.00**	**$0.00**	**$16,742.00**	***$30,494.00***	***$0.00***	***$30,494.00***

G. Construction:									
Construction is not allowed through the B-WET Program	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	*XXXXX*	*XXXXX*	*XXXXX*
H. Other:									
Educator Workshop Meals (12 educators x $30 coffee and lunch x 5 days)	$1,800.00	$0.00	**$1,800.00**	$0.00	$0.00	**$0.00**	***$1,800.00***	***$0.00***	***$1,800.00***
	$1,800.00	**$0.00**	**$1,800.00**	**$0.00**	**$0.00**	**$0.00**	***$1,800.00***	***$0.00***	***$1,800.00***
I. Total Direct Charges:	**$47,274.00**	**$0.00**	**$47,274.00**	**$43,635.00**	**$0.00**	**$43,635.00**	***$90,909.00***	***$0.00***	***$90,909.00***
J. Indirect Charges:	$4,727.00	$0.00	**$4,727.00**	$4,364.00		**$4,364.00**	***$9,091.00***	***$0.00***	***$9,091.00***
K: Totals:	**$52,001.00**	**$0.00**	**$52,001.00**	**$47,999.00**	**$0.00**	**$47,999.00**	***$100,000.00***	***$0.00***	***$100,000.00***

Technical Expertise & Qualifications

Pensacola and Perdido Bays Estuary Program Expertise and Qualifications

The Pensacola and Perdido Bays Estuary Program (PPBEP) serves as a trusted source for residents, businesses, industry, and the community on issues relating to preserving, restoring, improving and maintaining the natural habitat and ecosystem of the bays, estuaries and watersheds of Pensacola and Perdido Bays. The Estuary Program's mission is to restore and protect the Pensacola and Perdido Bay watersheds through restoration, education, and unbiased monitoring of the health of our estuaries.

PPBEP is a non-regulatory program that is governed by a Policy Board supported by three committees (Technical, Education & Outreach, and Business Partnership), and the Estuary Program staff. PPBEP's predecessor, the Bay Area Resource Council (BARC), has a long and successful history of engaging the community and area schools in watershed education and action. PPBEP's Education and Outreach Committee will continue this tradition by supporting the teacher workshop and student engagements. The Community Outreach Coordinator and Assistant will serve as the lead facilitators for programming, but they are supported by the Education and Outreach Committee's 30+ years of expertise and knowledge. The program's Oyster Sub-Committee (a branch of the Technical Committee) will provide oyster subject matter expertise from leading researchers, practitioners, and oyster farmers.

The Pensacola and Perdido Bays Estuary Program and fiscal conduit Escambia County were awarded a $2 million cooperative agreement from the USEPA Gulf of Mexico Program in 2018 to stand up the Estuary Program and to support the development of a Comprehensive Conservation and Management Plan (CCMP).
PPBEP is guided by our CCMP, which serves as a blueprint for the restoration and preservation of the bays and their watersheds. The draft CCMP is expected to be approved summer of 2022 and outlines an Education and Outreach Strategy that the Program and its partners are fully committed to implementing. This strategy includes the development of watershed curriculum, hands-on opportunities for students, and teacher support.

PPBEP was awarded a $297,220 Trash Free Waters grant from the USEPA Gulf of Mexico Program in 2020 to engage the community in trash removal and prevention, engage local businesses, and partner with area schools to reduce water-borne trash through the development and implementation of watershed curriculum. The program has successfully engaged the community through volunteer opportunities and began implementing high school curriculum in early 2022.

The Program successfully received two Florida Legislative Appropriations ($500,000 in 2020 and $250,000 in 2021) to support monitoring efforts, the Program's Community Grant Program, and education and outreach investments. PPBEP has successfully administered a Community Grant Program that provided $200,000 to ten projects from 2020-2021 and $250,000 to eight projects from 2021-2022.

Key Project Personnel

Logan McDonald
Logan McDonald is the Community Outreach Coordinator for the Pensacola and Perdido Bays Estuary Program (PPBEP). In this role she has been responsible for overseeing the development of the program's Education and Outreach Strategy for the program's Comprehensive Conservation and Management Plan (CCMP). Logan successfully supported the program's public engagement during COVID-19 restrictions

by implementing innovative technologies to facilitate meaningful virtual engagement. She also leads the program's K-12 education, stakeholder engagements, community outreach and programming, communications, and Community Grant Program. Previously, Logan served as the Program Supervisor for the City of Ocala Discovery Center where she developed and implemented scientific programming and field trips and led the center's public outreach and marketing efforts. As a Volunteer Coordinator for the Florida Fish and Wildlife Conservation Commission she was responsible for recruiting, training, and supervising volunteers across twelve counties. Logan has a M.S. and B.S in Biology and a B.A. in Environmental Studies. Logan's experience and expertise in education and outreach, project management, grant oversight and developing local partnerships will enable her to successfully oversee the implementation of the proposed project through curriculum development, partner coordination, and facilitation of field trips and tours.

Madi Ross
Madi Ross is the Community Outreach Assistant for the Pensacola and Perdido Bays Estuary Program. In this role she has been responsible for developing and implementing curriculum for our EPA funded Trash Free Waters grant. Previously, Madi served as an AmeriCorps Environmental Steward for Okaloosa and Walton counties. As an AmeriCorps Steward, Madi taught Grasses in Classes lessons, developed virtual educational content, installed living shorelines, maintained a native plant nursery, and assisted with other education and restoration efforts. Madi has a B.S. in Marine Sciences. Madi's experience and expertise well prepares her to assist in developing curriculum, provide support to teacher workshops, and facilitate field trips and tours for students and teachers.

Dr. Amanda Croteau
Dr. Amanda Croteau is a coastal ecologist with an interdisciplinary background that includes both education and outreach and social science training. She has experience working with teachers and naturalists to design curriculum for traditional and non-traditional education settings. She has developed surveys to assess participants understanding of concepts, experience, perceptions, trust, and satisfaction. She has also developed and implemented stakeholder workshop evaluations for both public and technical workshops.

Partners

Navarre Beach Marine Science Station – Charlene Mauro
The Navarre Beach Marine Science Station (NBMSS) is a marine station located at the Navarre Beach Park in Santa Rosa County, Florida. The center is the focal point of marine, natural resource and watershed education for Northwest Florida K-12 students and the community. Since its official opening in August 2009, the Station has been host to well over 50,000 students and community members for programs focusing on local marine environments. The programs provide hands-on, feet-wet curriculum that educates and challenges participants from ages 3-33+ on how to be stewards of our marine environments. Award winning programs include two high schools of dual-enrolled students (through Pensacola State College and Santa Rosa County Schools), field experiences for K-8 school children, Saturday programs for K-8 students, over-night programs for 3-8th graders, public open houses for visitors to Navarre Beach, summer camps, and programs geared for both pre-K students and their family and for students with special needs. All the programs are designed to leave participants with a newfound understanding and respect for their nearby marine ecosystems, as well a desire to protect and conserve the delicate habitats of Florida. Charlene Mauro is the Director of NBMSS and a Teacher on Special Assignment for the Santa Rosa County School District. Past honors include National Marine Educator of the Year, Outstanding Florida High School Science Teacher of the Year, University of Florida

unique insights into the challenges and opportunities that come with the oyster aquaculture industry. The POC will share experiences from the aquaculture field and offer guided hatchery tours at the Milton micro-hatchery for students and teachers.

Avalon Aquaculture
Avalon Aquaculture is one of Pensacola's newest oyster farms that was established in 2021. Founder Shana Alford is a marine biologist training and education and an environmental educator by career. Shana will bring her education experience to provide hands-on learning for students and teachers and can support guided tours through her sister organization, Nurture by Nature Eco Tours. Additionally, Shana can speak to the process and challenges associated with obtaining an aquaculture lease and starting an oyster farm.

The Nature Conservancy
The Nature Conservancy (TNC) convened a stakeholder working group (SWG) in 2019 that was comprised of scientists, restoration specialists, government and business representatives, community groups, and fishermen to develop a plan for the recovery of Pensacola Bay's oyster populations. This plan is the first of its kind in integrating the community's environmental, economic, and social well-being goals with the goals for natural marine resources. TNC is a leader in oyster restoration and research and had made significant recent contributions in the Pensacola Bay Watershed including: the East Bay Habitat Restoration Project (33 reefs across 6.5 miles), an Oyster Filtration Model, and a Habitat Suitability Model for the Pensacola Bay System. TNC brings successful stakeholder engagement and research and restoration expertise that will inform the proposed work.

The Bream Fishermen Association
The Bream Fishermen Association led Project Oyster Pensacola (POP) which invited the public to participate in hanging cages off docks which contained 75 triploid oyster spat and monitored survival, growth, and recruitment in the Pensacola, Santa Rosa Sound, and Perdido Watersheds. Barbara Albrecht will share her oyster gardening knowledge and expertise to support the teacher workshop and the student action project. Barbara has 30 years of experience with local watershed and environmental issues. She is actively engaged with citizen science programs and has served as an advocate for many communities as they address local environmental concerns. She has a long history of working with faculty and students as also serves as a Coastal Communities Coordinator at the University of West Florida.

Escambia County Marine Resources Division
The Escambia County Marine Resources Division (MRD) has local knowledge and expertise in issues that affect the health and accessibility of Escambia County's marine, freshwater and coastal resources. Escambia County has experience in establishing successful living shorelines such as the Navy Point Park Living Shoreline Project and the County is a partner on the Naval Air Station Pensacola – Pensacola Bay Living Shoreline Project. Division Manager, Robert Turpin, brings his applied knowledge of oyster restoration projects and his background as an educator to support the teacher workshop and student seining field trips at Navy Point.

Distinguished Educator, EPA's Presidential Award, Gulf Guardian Award, Navarre area Citizen of the Year, University of West Florida Outstanding Young Alumnus, 2016 Johnette D. Bosarge Memorial Award, and a finalist for Florida Teacher of the Year. Charlene will share her expertise to assist with teacher engagement, workshop design, and support for reaching a broader audience.

FWC Fish and Wildlife Research Institute Shellfish Program – Apalachicola Field Laboratory
The Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute (FWRI) provides timely information and guidance to protect, conserve, and manage Florida's fish and wildlife resources through effective research and technical knowledge. FWRI's Shellfish Program is a lead agency working to understand the dynamics of the oyster resource and develop science-based restoration tools to recover declining oyster populations. The FWC Apalachicola Field Laboratory will be expanding monitoring and research efforts to the Pensacola Bay System beginning in March of 2023. The team will support the teacher workshop through a half-day training on field and lab spat monitoring protocols. Spat recruitment data collected by the team in 2022 (including summer months) will supplement student data to provide a seasonal perspective that students will not be able to collect during the academic year.

Scientists in Every Florida School
Scientists in Every Florida School (SEFS) is dedicated to engaging Florida K-12 students and teachers in cutting-edge research by providing science role models and experiences that inspire the future stewards of our planet. SEFS has demonstrated success in leading teacher professional development workshops and engaging a strong network of educators across the state. SEFS will assist PPBEP by including the opportunity in their newsletter to facilitate teacher recruitment and by providing their expertise in designing and teacher professional development workshops.

Florida Department of Environmental Protection
DEP's Northwest Florida Aquatic Preserves has led local oyster reef restoration projects that are essential to returning our estuaries to the thriving ecosystems they once were. Project GreenShores is multimillion-dollar, world renowned, habitat restoration and creation project in downtown Pensacola along the urban shoreline of Pensacola Bay that is a community effort to restore oyster reef, salt marsh, and seagrass habitat within the Pensacola Bay System. Site 2 of the project is currently receiving an update to add additional breakwaters and marshes, and DEP is preparing to analyze historical water quality data for Sites 1 and 2. As the Northwest Florida Aquatic Preserves Manager, Beth Fugate, brings extensive oyster restoration knowledge and experience with Project GreenShores that will support field trips curriculum development.

Pensacola Bay Oyster Company
Pensacola Bay Oyster Company operates a hatchery at the Port of Pensacola and a five-acre farm in Pensacola Bay as well as a 5-acre farm in East Bay. Owner and founder Donnie McMahon studied business and marine biology and established the hatchery in 2018. The hatchery collects brood stock from the bay so they can spawn and fertilize eggs within their tanks. Pensacola Bay Oyster Program key staff includes Hatchery Manager Mary Collier Eastburn. She completed her Master of Science degree at Auburn University where her research focused on triploid mortality of the Eastern Oyster in estuaries in the northern Gulf of Mexico throughout Alabama and Louisiana. The Pensacola Bay Oyster Company will bring their knowledge and experience of oyster hatchery operations to support the teacher workshop and student tours.

Pensacola Oyster Cluster
The Pensacola Oyster Cluster (POC) is the local aggregate of aquaculture business and watermen established to cooperatively grow the oyster aquaculture industry, restore wild stock populations, and grow the local blue economy. As a group comprised of local oyster aquaculture growers, they possess

Data Sharing Plan

Oyster spat settlement will be monitored across a network of spat monitoring arrays (three spat trees deployed at each monitoring location and retrieved approximately one month later. T-shaped spat trees with oyster stringers will be constructed and deployed following Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute Oyster Monitoring Procedures (FWC 2021). Spat stringers will be collected and counted in the classroom. The number of spat on each shell will be recorded by a student and independently confirmed by another student. After two students have independently counted and confirmed the number of spat on each shell, spat data analysis will be completed. Juvenile oyster recruitment is determined using the number of settled spat on the underside of the middle 4 shells on each stringer. Recruitment rates will be calculated by dividing the raw number of spat per shell by the number of days the shell had been deployed, and then standardize to a 28-day month. These standardized values will be used to calculate the mean number of spat per shell per month for each successfully retrieved spat monitoring array, resulting in a maximum of 3 data points per station each month. Water quality parameters (depth, temperature, salinity, pH, dissolved oxygen, and turbidity or Secchi depth) will be recorded during each monitoring activity. They will be measured using a calibrated water-quality sonde and data recorder near the oyster reef. Secchi depth is measured using a Secchi disk.

We expect to collect data across a maximum of 18 stations for approximately four months. While this data may be of interest to inform management, the primary purpose of collecting this data is to inform student investigations and has QA/QC limitations. We are requesting an exemption from data sharing.

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Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute. 2019. Oyster Integrated Mapping and Monitoring Program Report for the State of Florida Technical Report No. 22.

Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute. 2021. Oyster Integrated Mapping and Monitoring Program Report for the State of Florida No. 2.

U.S. Census Bureau 2021, https://www.census.gov

TABLE OF APPENDICES

Appendix A: Project Area Maps

1. Proposed Field Trip and Workshop Locations in Pensacola Bay System
2. Map of Perdido Bay
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6. Escambia County Oyster Reef Mapping
7. East Bay Restoration Project Schematic
8. East Bay Restoration Project Aerial Photo
9. Project GreenShores Site 1 Aerial Photo
10. Project GreenShores Site 2 Aerial Photo

Appendix B: Aligned Florida Learning Standards

APPENDIX A
Project Area Maps and Models

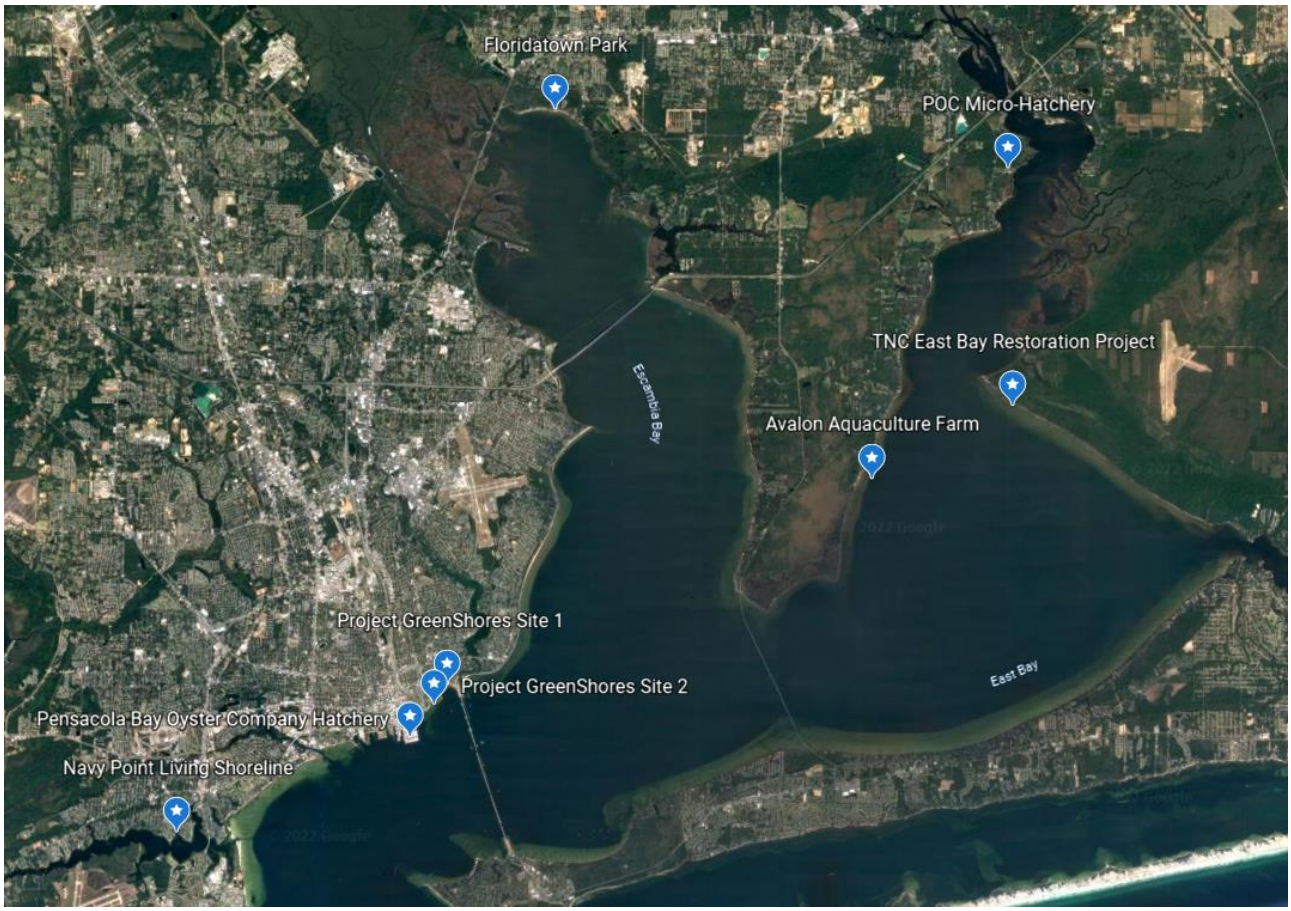

Figure 1. Proposed field trip and workshop locations in the Pensacola Bay System.

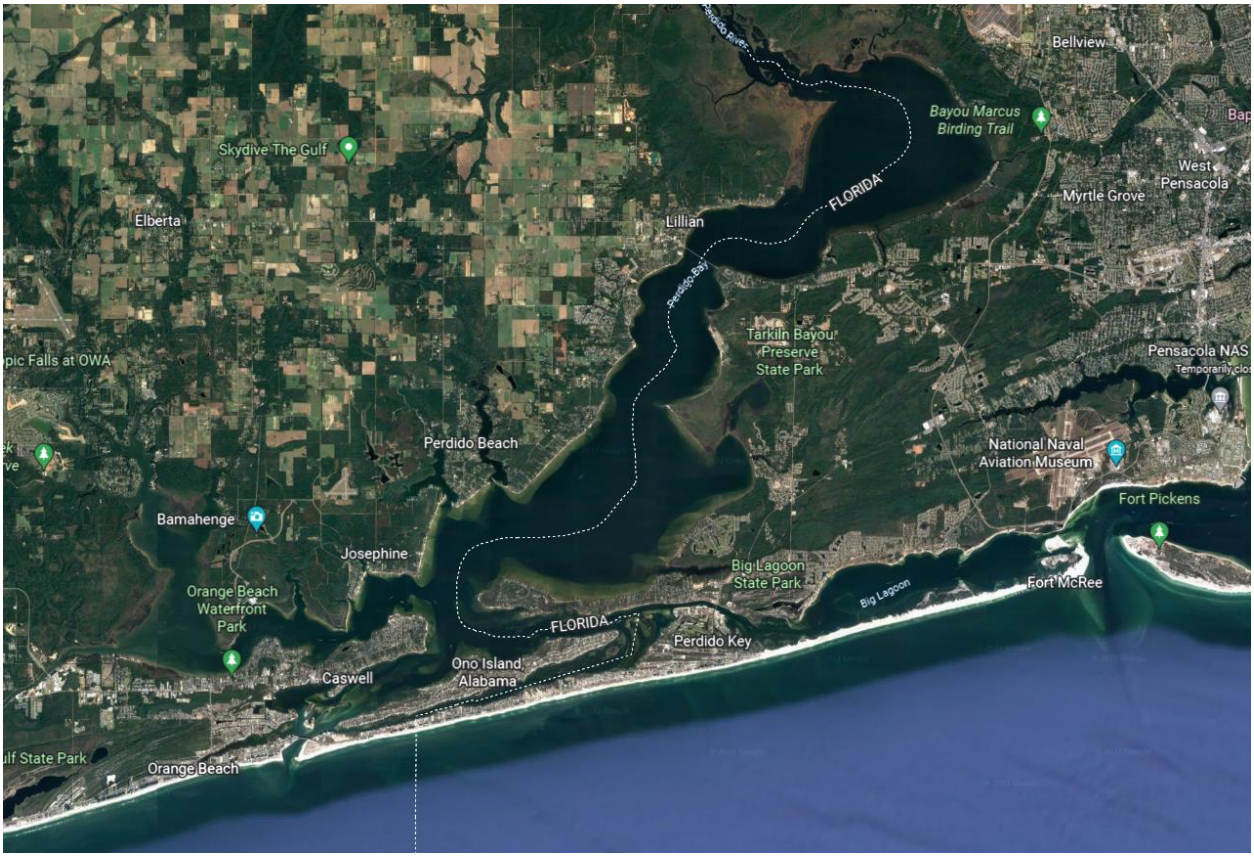

Figure 2. Map of the Perdido Bay System.

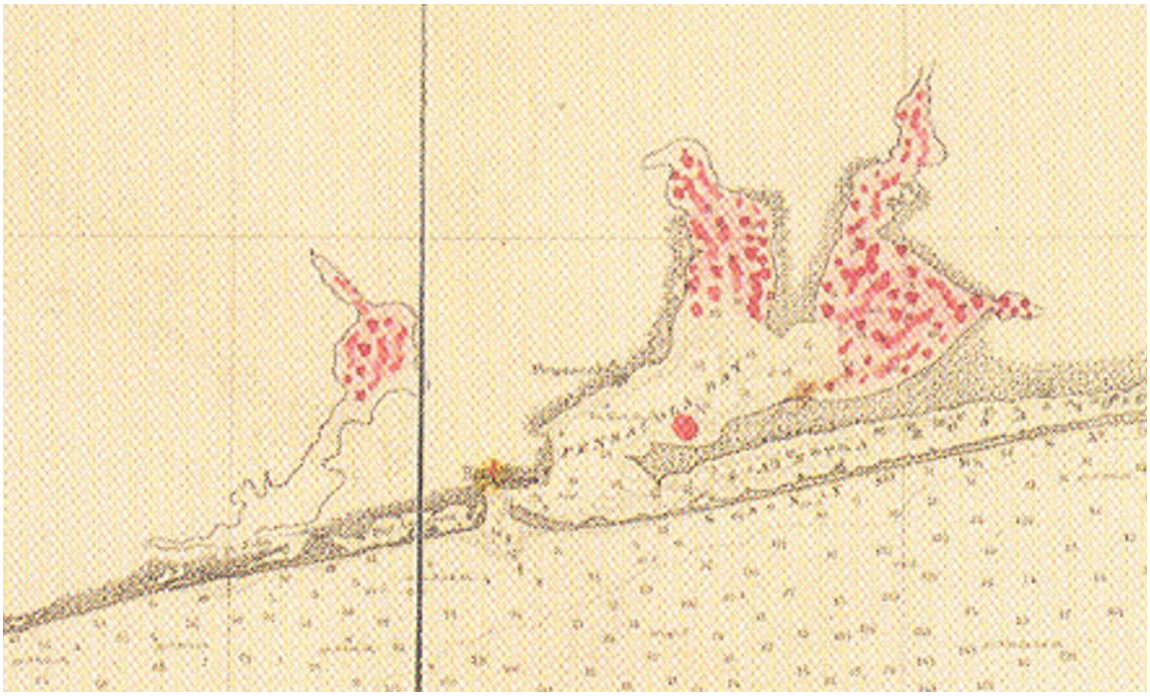

Figure 3. Map of 1883 Perdido Bay Oysters.

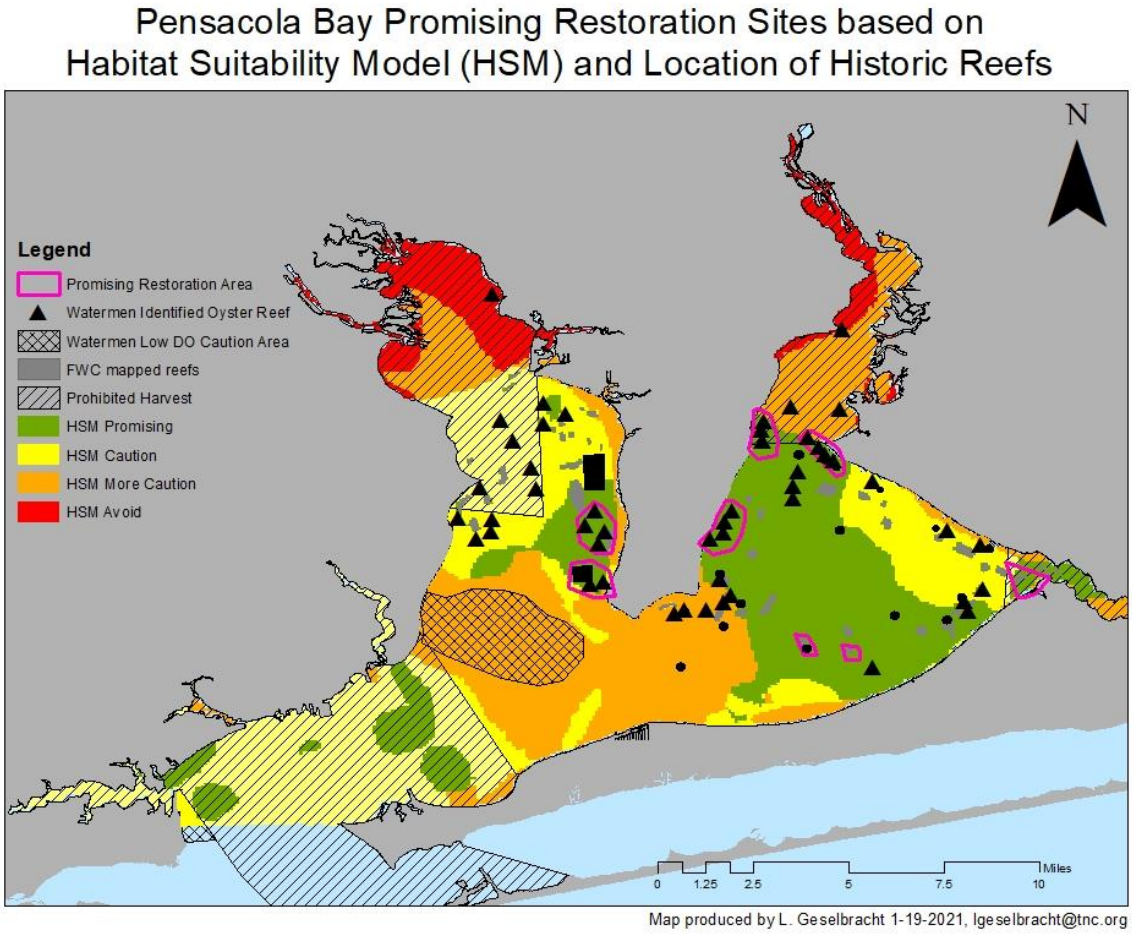

Figure 4. Pensacola Bay Habitat Suitability Model.

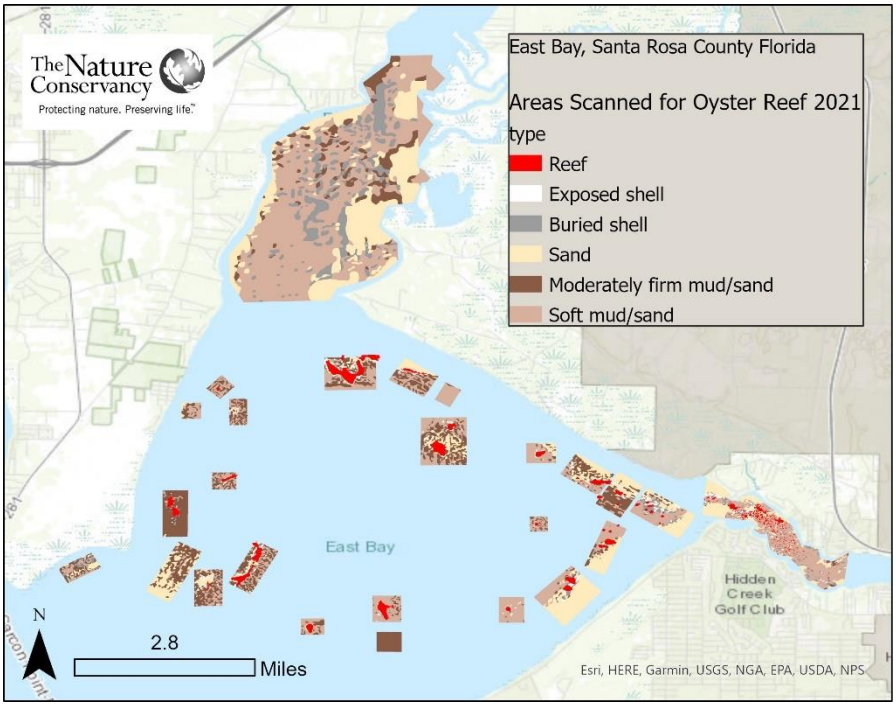

Figure 5. Example of one of the Santa Rosa County Oyster Reef Maps.

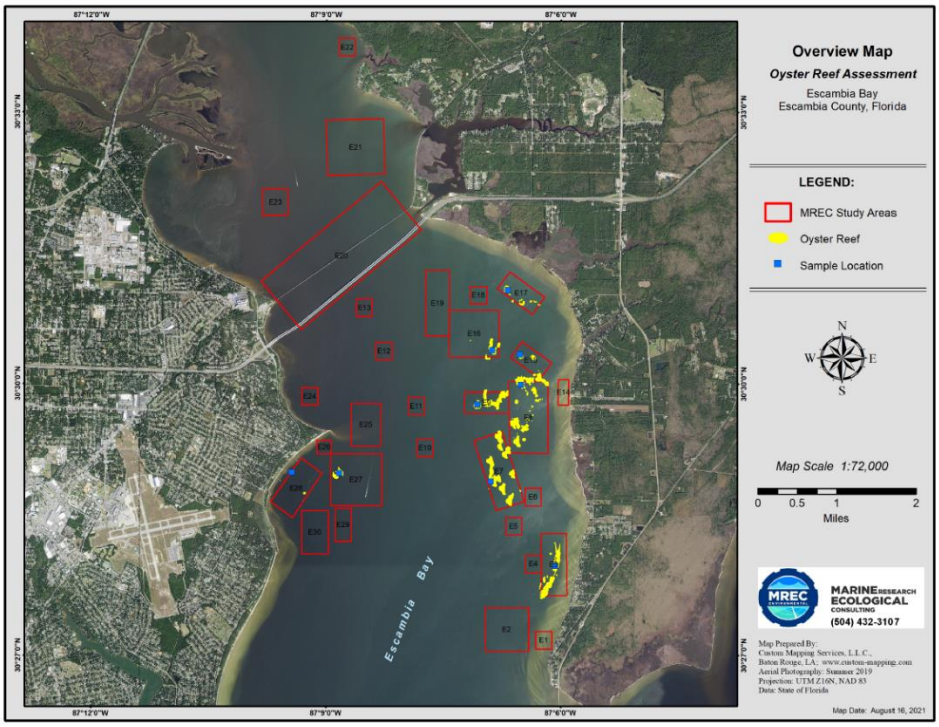

Figure 6. Example of one of the Escambia County Oyster Reef Maps.

Figure 7. Illustration showing locations of the three completed East Bay reefs to date. The map will be updated as reefs are 100% constructed. © Kathleen Freeman/TNC

Figure 8. Aerial photo of TNC East Bay reefs 12, 13 & 14 (in the foreground) are complete and Reefs 15, 16 & 17 (in the background) are under construction. © Darryl Boudreau/NWFWMD.

Figure 9. Photo of the well-established Project GreenShores Site 1. © Darryl Boudreau/NWFWMD.

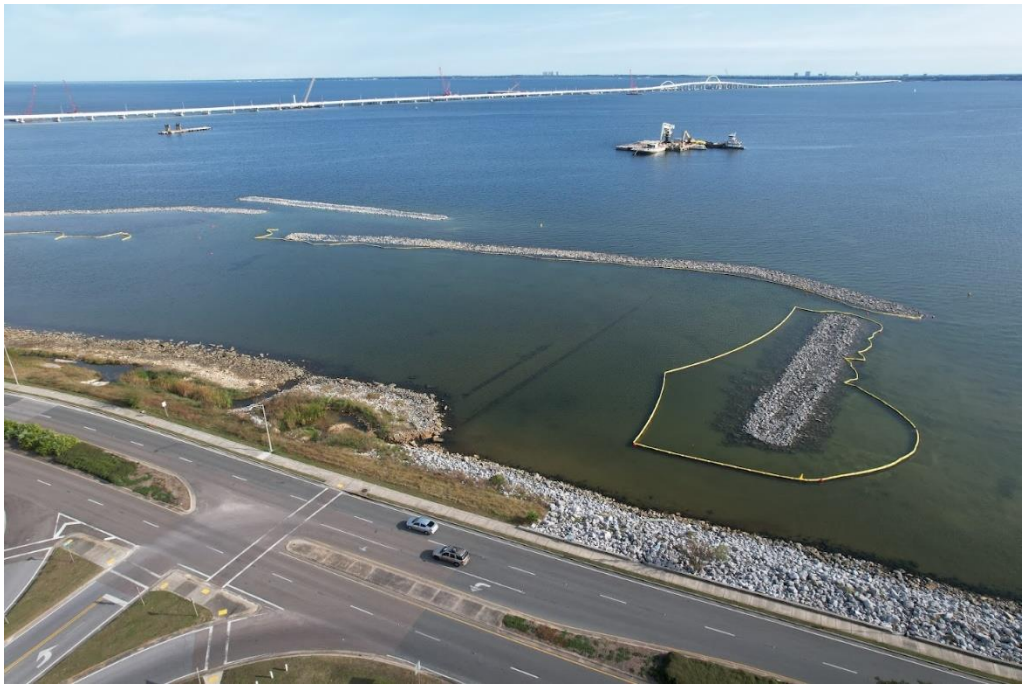

Figure 10. Photo of Project GreenShores Site 2 that is currently under construction.

APPENDIX B
Florida High School Learning Standards Alignment

SC.912.L Life Science

- **SC.912.L.14 Organization and Development of Living Organisms**
  - SC.912.L.14.4 Compare and contrast structure and function of various types of microscopes.

- **SC.912.L.17 Interdependence**
  - SC.912.L.17.1: Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.
  - SC.912.L.17.2 Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.
  - SC.912.L.17.3 Discuss how various oceanic and freshwater processes, such as currents, tides, and waves, affect the abundance of aquatic organisms.
  - SC.912.L.17.4 Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
  - SC.912.L.17.5 Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.
  - SC.912.L.17.6 Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
  - SC.912.L.17.7 Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems.
  - SC.912.L.17.8 Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
  - SC.912.L.17.11 Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
  - SC.912.L.17.12 Discuss the political, social, and environmental consequences of sustainable use of land.
  - SC.912.L.17.13 Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
  - SC.912.L.17.16 Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution
  - SC.912.L.17.17 Assess the effectiveness of innovative methods of protecting the environment.
  - SC.912.L.17.18 Describe how human population size and resource use relate to environmental quality.
  - SC.912.L.17.19 Describe how different natural resources are produced and how their rates of use and renewal limit availability.
  - SC.912.L.17.19 Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.

SC.912.N Nature of Science

- **SC.912.N.1 The Practice of Science**
  - SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: (1-11).

- **SC.912.N.4 Science and Society**

- SC.912.N.4.1Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
- SC.912.N.4.2 Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.

SC. 912.CS-CS Computer Science – Communication Systems and Computing

- **SC. 912.CS-CS1 Modeling and Simulations**
  - SC. 912.CS-CS1.3 Explain how data analysis is used to enhance the understanding of complex natural and human systems.
  - SC. 912.CS-CS1.5 Represent and understand natural phenomena using modeling and simulation.

Letters of Support

A. Navarre Beach Marine Science Station
B. West Florida High School
C. Booker T. Washington High School Marine Science Academy
D. Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute
E. Scientists in Every Florida School
F. Florida Department of Environmental Protection
G. Pensacola Bay Oyster Company
H. Pensacola Oyster Cluster
I. Avalon Aquaculture
J. The Nature Conservancy
K. Bream Fishermen Association
L. Escambia County Marine Resources Division
M. University of West Florida

Navarre Beach Marine Science Station
Santa Rosa County School District
8638 Blue Heron Court
Navarre Beach, FL 32566

February 15, 2022

NOAA Gulf of Mexico
Bay Watershed Education and Training (B-WET) Program Panel
c/o Logan McDonald
Pensacola and Perdido Bays Estuary Program
Delivered via email to lmcdonald@ppbep.org

As the Director of the Navarre Beach Marine Science Station, I would like to express my full support for the Pensacola and Perdido Bays Estuary Program's (PPBEP) proposal to the NOAA Gulf of Mexico B-WET Program for Pensacola Bay System Oyster REEF (Restoration Education and Engagement Framework).

The Navarre Beach Marine Science Station is a marine station located at the Navarre Beach Park in Santa Rosa County, Florida. The center is the focal point of marine, natural resource and watershed education for Northwest Florida K-12 students and the community. Since its official opening in August 2009, the Station has been hosted to well over 50,000 students and community members for programs focusing on local marine environments. The programs provide hands-on, feet-wet curriculum that educates and challenges participants from ages 3-33+ on how to be stewards of our marine environments. Award winning programs include two high schools of dual-enrolled students (through Pensacola State College and Santa Rosa County Schools), field experiences for K-8 school children, Saturday programs for K-8 students, over-night programs for 3-8th graders, public open houses for visitors to Navarre Beach, summer camps, and programs geared for both pre-K students and their family and for students with special needs. All the programs are designed to leave participants with a newfound understanding and respect for their nearby marine ecosystems, as well a desire to protect and conserve the delicate habitats of Florida.

PPBEP is building exciting partnerships and investments to support innovative research and restoration efforts to restore and protect our waters. The proposed project will connect students and educators with local researchers, aquaculture farmers, and restoration specialists as they share the latest, locally relevant oyster research and restoration efforts in the Pensacola Bay System. I am thrilled to connect my students to groundbreaking work happening in their own backyards and I look forward to many future partnerships with the PPBEP. Knowledge and experiences gained through this opportunity will have far reaching applications for current and future students pursuing STEM careers. In addition, the proposed project will enhance current programming and will be highlighted at community events and environmental festivals.

I fully support this project and look forward to participating as an educator as well as assisting PPBEP with teacher engagement, workshop design, and any assistance needed to reach a broader audience.

Sincerely,

Charlene Mauro

Charlene Mauro
Director
Navarre Beach Marine Science Station
(850) 261-2141

NOAA Gulf of Mexico
Bay Watershed Education and Training (B-WET) Program Panel
c/o Logan McDonald
Pensacola and Perdido Bays Estuary Program
Delivered via email to lmcdonald@ppbep.org

As an instructor at West Florida High School, I would like to express my full support for the Pensacola and Perdido Bays Estuary Program's (PPBEP) proposal to the NOAA Gulf of Mexico B-WET Program for Pensacola Bay System Oyster REEF (Restoration Education and Engagement Framework).

West Florida High School currently has 6 Marine Science classes encompassing both regular and honors curriculum. Our school is currently collaborating with PPBEP in the implementation of curriculum for the Trash Free Waters program. Our school and students are seeing a direct positive impact from the program. The proposal for the Pensacola Bay System REEF is correlated with the state standards for Marine Science and other courses within our school. This program will enhance our curriculum and allow students the opportunity to learn through real world experiences.

PPBEP is building exciting partnerships and investments to support innovative research and restoration efforts to restore and protect our waters. The proposed project will connect students and educators with local researchers, aquaculture farmers, and restoration specialists as they share the latest, locally relevant oyster research and restoration efforts in the Pensacola Bay System. I am thrilled to connect my students to groundbreaking work happening in their own backyards and I look forward to many future partnerships with the PPBEP.

I believe this program will foster stewardship of our local waterways look forward to participating in teacher engagement workshop and MWEEs with my students.

Best Regards,

Matthew MacGregor, Marine Sciences

West Florida High School

Booker T. Washington High School

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Principal
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Assistant Principal
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Assistant Principal
Sherita Williams-Forney

NOAA Gulf of Mexico
Bay Watershed Education and Training (B-WET) Program Panel
c/o Logan McDonald
Pensacola and Perdido Bays Estuary Program
Delivered via email to lmcdonald@ppbep.org

As an instructor at the Booker T. Washington High School Marine Science Academy, I would like to express my full support for the Pensacola and Perdido Bays Estuary Program's (PPBEP) proposal to the NOAA Gulf of Mexico B-WET Program for Pensacola Bay System Oyster REEF (Restoration Education and Engagement Framework).

The Marine Science Academy at B. T. Washington High School is an academy designed for students who have a strong interest in pursuing careers in the Marine Sciences, Coastal Ecology or related fields. Students in the Marine Science Academy will have an intensive curriculum which will include immersion in scientific processes including laboratory experimentation, research, field study, and community involvement. This oyster centric project aligns well as a research track for my students.

PPBEP is building exciting partnerships and investments to support innovative research and restoration efforts to restore and protect our waters. The proposed project will connect students and educators with local researchers, aquaculture farmers, and restoration specialists as they share the latest, locally relevant oyster research and restoration efforts in the Pensacola Bay System. I am thrilled to connect my students to groundbreaking work happening in their own backyards and I look forward to many future partnerships with the PPBEP.

I believe this program will foster stewardship of our local waterways look forward to participating in teacher engagement workshop and MWEEs with my students.

Sincerely,
Edward J. Bauer

Edward J. Bauer
MSA Director
BT Washington High School
6000 College Pkwy
Pensacola, Florida 32504
ebauer@escambia.k12.fl.us

Florida Fish and Wildlife Conservation Commission

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Assistant Executive Director

Jennifer Fitzwater
Chief of Staff

Fish and Wildlife Research Institute
Gil McRae
Director

727-896-8626
727-823-0166 FAX

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

Fish and Wildlife Research Institute
100 Eighth Avenue SE
St. Petersburg, Florida
33701-5020
Voice: (727) 896-8626
Fax: (727) 823-0166
Hearing/speech-impaired:
(800) 955-8771 (T)
(800) 955-8770 (V)
MyFWC.com/Research

2/3/2022

NOAA B-WET Gulf of Mexico Grant Review Panel
c/o Logan McDonald
Pensacola and Perdido Bays Estuary Program

Dear Selection Committee,

I am writing to you in support of the proposal submitted to the Bay Watershed Education and Training (B-WET) Program by the Pensacola and Perdido Bays Estuary Program. This proposal is a targeted outreach and education effort for educators and students in a region where ongoing restoration and monitoring by the Florida Fish and Wildlife Research Institute's Shellfish Program is working to understand the dynamics of the oyster resource and develop science-based restoration tools to recover declining oyster populations.

While good science is essential for successful oyster restoration, the outreach and engagement with local communities to build support and an understanding of the importance of local ecosystems is often overlooked. This proposal is a great step in community engagement that delivers the information and experience directly to the youth in the local communities and the educators that support them. This proposed work not only creates the opportunity for High School students to interact with the resource but brings them along a science-based path that facilitates a deeper understanding of the information that is used to evaluate the current condition of the resource, understand its future under climate change, and what the loss of this resource would mean for their community. Additionally, the program will demonstrate that they can make a difference in their local resource through better understanding of the science behind the actions. By including educators in this process, it will provide them with materials, tools, resources, and contacts that will allow the knowledge passed during the proposed funding period to continue to benefit the local community long after the grant has closed. For these reasons I fully support the proposed work and if funded our staff from the FWC Apalachicola Field Laboratory will devote time to assist the Pensacola and Perdido Bays Estuary Program in this work.

Sincerely,

Ryan L. Gandy Ph.D.
Research Administrator II
Fish and Wildlife Research Institute
ryan.gandy@myfwc.com
(727) 502-4886

UF UNIVERSITY of FLORIDA

Thompson Earth Systems Institute
Scientist in Every Florida School

3215 Hull Road
Gainesville, Florida 32611

NOAA Gulf of Mexico
Bay Watershed Education and Training (B-WET) Program Panel
c/o Logan McDonald
Pensacola and Perdido Bays Estuary Program
Delivered via email to lmcdonald@ppbep.org

On behalf of Scientists in Every Florida School (SFS), I would like to express our full support for the Pensacola and Perdido Bays Estuary Program's (PPBEP) proposal to the NOAA Gulf of Mexico B-WET Program for Pensacola Bay System Oyster REEF (Restoration Education and Engagement Framework).

SEFS is dedicated to engaging Florida K-12 students and teachers in cutting-edge research by providing science role models and experiences that inspire the future stewards of our planet. The proposed project is aligned with SEFS's mission and will connect teachers and students with science role models and the latest, locally relevant oyster research and restoration efforts. The intensive week-long workshop will provide meaningful professional development for educators that will enable teachers to engage students in sustained inquiry over the academic year. The oyster-centric student inquiries will challenge students and educators to consider dynamic cultural, environmental, and financial factors that all play a role in natural resources management. The proposed student and teacher engagements will help to advance public understanding of environmental issues by building a deep understanding of the complex factors that must be considered in effective natural resources management.

SEFS has demonstrated success in leading teacher professional development workshops and engages a strong network of educators across the state. We look forward to expanding participation in Escambia and Santa Rosa counties by supporting this locally relevant program. SEFS fully supports this project and will assist PPBEP by including the opportunity in our newsletter to facilitate teacher recruitment and by providing our expertise in designing and teacher professional development workshops.

Sincerely,

Brian Abramowitz
K-12 Education & Outreach Coordinator
Scientist in Every Florida School Program

An Equal Opportunity Institution

FLORIDA DEPARTMENT OF Environmental Protection

Northwest Florida Aquatic Preserves
3000 Environmental Place
Pensacola, FL 32514

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Shawn Hamilton
Secretary

NOAA Gulf of Mexico
Bay Watershed Education and Training (B-WET) Program Panel

On behalf of The Florida Department of Environmental Protection (DEP), I would like to express our full support for the Pensacola and Perdido Bays Estuary Program's (PPBEP) proposal to the NOAA Gulf of Mexico B-WET Program for Pensacola Bay System Oyster REEF (Restoration Education and Engagement Framework).

DEP's Northwest Florida Aquatic Preserves recognizes that oyster reef restoration is essential to returning our estuaries to the thriving ecosystems they once were. Project GreenShores is multimillion-dollar, world renowned, habitat restoration and creation project in downtown Pensacola along the urban shoreline of Pensacola Bay that is a community effort to restore oyster reef, salt marsh and seagrass habitat within the Pensacola Bay System. Site 2 of the project is currently receiving an update to add additional breakwaters and marshes, and DEP is preparing to analyze historical water quality data for Sites 1 and 2.

This proposal will develop a restoration case study around Project GreenShores that utilizes long-term monitoring data, drone footage, and guided site tours. The proposed work recognizes the importance of communicating successful restoration projects to the community, which is critical for gaining community buy-in for future restoration efforts. The Pensacola and Perdido Bays Estuary Program will provide resources to translate restoration data into a digestible and usable format for teachers and students.

DEP fully supports this project and its contribution to the recovery of Pensacola's oysters and will serve as an expert site resource for the project team as they develop the curriculum and tours.

Sincerely,

Beth Fugate

Beth Fugate
Florida Department of Environmental Protection
Northwest Florida Aquatic Preserves
3000 Environmental Place
Pensacola, FL 32514

PENSACOLA BAY
- PBO -
OYSTER CO
PREMIUM FL. OYSTERS

NOAA Gulf of Mexico
Bay Watershed Education and Training (B-WET) Program Panel
c/o Logan McDonald
Pensacola and Perdido Bays Estuary Program
Delivered via email to lmcdonald@ppbep.org

On behalf of The Pensacola Bay Oyster Company, I would like to express our full support for the Pensacola and Perdido Bays Estuary Program's proposal to the NOAA Gulf of Mexico B-WET Program for Pensacola Bay System Oyster REEF (Restoration Education and Engagement Framework).

Pensacola Bay Oyster Company was a dedicated member of the stakeholder working group that helped to shape the Oyster Fisheries and Habitat Management Plan led by the Nature Conservancy. We continue to work to restore and recover Pensacola Bay System oysters through active involvement in the PPBEP's Oyster Sub-Committee, that is charged with implementation of the plan.

We welcome the opportunity to assist in increasing public awareness and support for a healthy and well-managed oyster habitat and fishery. Pensacola Bay Oyster Company's hatchery, located at the Port of Pensacola, can provide hands on learning, and demonstrate the real-world applications of classroom learning for students and teachers. From hurricanes to thefts, we have experienced firsthand both the challenges and opportunities that come with oyster aquaculture. Sharing our story and offering guided hatchery tours can help students understand the complex social, economic, and environmental role that oysters play in our communities.

Pensacola Bay Oyster Company fully supports this project and its contribution to the recovery of Pensacola's oysters.

Sincerely,

Donald McMahon, III, President

Pensacola Bay Oyster Company

DONALD MCMAHON •850 982 2623• DON@MCMAHONHADDER.COM

PENSACOLA
OYSTER CLUSTER

NOAA Gulf of Mexico
Bay Watershed Education and Training (B-WET) Program Panel
c/o Logan McDonald
Pensacola and Perdido Bays Estuary Program
Delivered via email to lmcdonald@ppbep.org

On behalf of The Pensacola Oyster Cluster, I would like to express our full support for the Pensacola and Perdido Bays Estuary Program's proposal to the NOAA Gulf of Mexico B-WET Program for Pensacola Bay System Oyster REEF (Restoration Education and Engagement Framework).

The Pensacola Oyster Cluster is the local industry aggregate of aquaculture businesses and watermen established to cooperatively grow the oyster aquaculture industry, restore wild stock populations, and grow the local blue economy. The Pensacola region is in a unique position regarding oyster aquaculture and restoration opportunities, poised to become a hub of blue innovation. And we are developing a strategic network that engages the Greater Pensacola Bay System community to support our efforts to fully realize the health of our estuary and the success of the businesses that depend upon it. Supporting such partners as the Pensacola and Perdido Bay Estuary Program is critical in effectively engaging and educating the stakeholders about not only the status of our bay, but also how to support future oyster-focused initiatives that benefit our community.

Several members of our organization were dedicated participants of the stakeholder working group that helped shape The Nature Conservancy-led Pensacola Bay System Oyster Fisheries and Habitat Management Plan. We welcome the opportunity to assist in increasing public awareness and support for a healthy and well-managed oyster habitat and fishery. The Pensacola and Perdido Bay Estuary Program has proven to be more than effective through previous outreach and education initiatives while our micro-hatchery can provide hands on learning that demonstrates the real-world applications of classroom education for students and teachers. Being that our group consists of local oyster aquaculture growers, we possess unique insight into the challenges and opportunities that come with the oyster aquaculture industry. We are excited to share experiences from the aquaculture field and offer guided hatchery tours to help students understand the complex social, economic, and environmental roles of oysters in our community.

The Pensacola Oyster Cluster fully supports this project and its contribution to educating the public about the recovery of Pensacola's oysters.

Sincerely,

Josh Neese

Josh Neese | Director

The Pensacola Oyster Cluster

NOAA Gulf of Mexico
Bay Watershed Education and Training (B-WET) Program Panel
c/o Logan McDonald
Pensacola and Perdido Bays Estuary Program
Delivered via email to lmcdonald@ppbep.org

On behalf of Avalon Aquaculture and Nurture by Nature Eco Tours, I would like to express our full support for the Pensacola and Perdido Bays Estuary Program's proposal to the NOAA Gulf of Mexico B-WET Program for Pensacola Bay System Oyster REEF (Restoration Education and Engagement Framework).

I established Avalon Aquaculture in 2021 to allow a future endeavor for my family which would be sustainable for the long term and have zero to little impact on the environment.

As a marine biologist by education and environmental educator by career, I am excited to be a part of the collaborative effort to restore and recover Pensacola Bay System oysters through active involvement in the PPBEP's Oyster Sub-Committee, which is charged with implementation of the plan. I welcome the opportunity to assist in increasing public awareness and support for a healthy and well-managed oyster habitat and fishery.

The Avalon Aquaculture farm can provide hands-on learning for students and teachers. As a new farmer, I have unique insight into the challenges and opportunities that come with the oyster aquaculture industry. I am thrilled to share my experiences from the aquaculture field and offer guided farm tours, through my sister organization, Nurture by Nature Eco Tours, to help students and teachers understand the complex social, economic, and environmental role that oysters play in our communities.

Avalon Aquaculture and Nurture by Nature Eco Tours fully supports this project and its contribution to the recovery of Pensacola's oysters.

Shana Alford

850-748-1043

info@avalonaquaculture.com

Avalon Aquaculture

The Nature Conservancy
Protecting nature. Preserving life.

January 31, 2022

NOAA Gulf of Mexico
Bay Watershed Education and Training (B-WET) Program Panel
c/o Logan McDonald
Pensacola and Perdido Bays Estuary Program
Delivered via email to lmcdonald@ppbep.org

On behalf of The Nature Conservancy, I am pleased to offer support for the Pensacola and Perdido Bays Estuary Program's proposal to the NOAA Gulf of Mexico B-WET Program for Pensacola Bay System Oyster REEF (Restoration Education and Engagement Framework).

The deep roots and traditions of the oyster fishery that shaped the waterfront communities in Pensacola are vanishing, and a collection of informed, invested, and motivated stakeholders are taking decisive action to restore and safeguard this unique bivalve and all it can contribute to the regional community, economy, and health of the environment. The community's scientists, governmental and business representatives, oystermen, engineers, fisheries experts, and advocates have been undeterred in their collective goal to and restore and manage Pensacola's oyster population. An improved and sustainable future for oysters is within reach through the Oyster Fisheries and Habitat Management Plan (OFHMP).

Convened by The Nature Conservancy, the strategy developed by the community represents the first ecosystem-based fisheries management plan for oysters in Florida, one that integrates environmental, economic, and social well-being goals with management of the marine resources. Public education and communication were identified as critical pillars of the OFHMP. This project will implement the OFHMP educational strategies of creating a new education program focused on restoration and monitoring of oyster habitat and fisheries; and generating and increasing public awareness and support for a healthy and well-managed oyster habitat and fishery.

The implementation of this project by the Pensacola and Perdido Bays Estuary Program is an important step in informing constituents about the importance of oysters to the health of the bay and the community.

Sincerely,

Anne P. Birch

Anne P. Birch, FL Oceans and Coasts Strategy Director

The Nature Conservancy, Florida

BREAM FISHERMEN ASSOCIATION

WATER QUALITY MONITORING · HABITAT CONSERVATION · CITIZEN ENGAGEMENT · ENVIRONMENTAL EDUCATION

Dear Ms. McDonald, 9 February 2022

Thank you for the opportunity to collaborate with Pensacola and Perdido Bays Estuary Program (PPBEP) for the project: Pensacola Bay System Oyster REEF (Restoration, Education, and Engagement Framework) through the NOAA-Gulf of Mexico B-WET Program.

The Pensacola Bay System Oyster REEF is very similar to the Bream Fishermen Association's (BFA) Project Oyster Pensacola (POP) which invited the public to participate in hanging cages off docks which contained 75 triploid oyster spat and monitored survival, growth, and recruitment in the Pensacola, Santa Rosa Sound, and Perdido Watersheds. The findings and report can be found on the BFA Website (www.BreamFishermen.org/project-oysters).

A second effort to expand the project was thwarted by Covid in 2020, so your invitation to participate is timely. The BFA POP Project originally included 25 participants spread throughout the geographic region (see report for map) and garnered so much interest that we anticipated roughly 150 families wanted to participate in the next event.

We look forward to supporting this effort, educating students in this field, and continuing to share information on how the public can be good stewards or the natural resources.

Sincerely,

Barbara Albrecht
President, Bream Fishermen Association

Board of County Commissioners
Escambia County, Florida

Jeff Bergosh
District One
Vice-Chair

Douglas B. Underhill
District Two

Lumon J. May
District Three

Robert D. Bender
District Four
Chairman

Steven Barry
District Five

2/7/2022

Robert Turpin
Escambia County Marine Resource Division
3363 West Park Place
Pensacola, FL 32505

Logan McDonald
Pensacola and Perdido Bays Estuary program
226 S Palafox Place
Pensacola, FL 32502

Dear Ms. McDonald,

Escambia County Marine Resources Division is happy to support the Pensacola and Perdido Bays Estuary Program's (PPBEP) project to deliver Meaningful Watershed Educational Experiences that investigate restoration and resilience through the lens of Pensacola Bay System oysters. This support our mission of providing access to safe, healthy, and productive waterways for all citizens and visitors of Escambia County.

The Marine Resources Division happy to provide their time and expertise in support of this project and commits to assisting in preparation and implementation of teacher workshops and student activities, and to work collaboratively with PPBEP to provide oyster resources to students and teachers.

Oysters are an integral part of Pensacola's economy, history and culture. They are the perfect way to illustrate the linkage between sustainable stewardship of our local resources and a resilient economic future. As we look ahead to the future of our coastal communities, we are happy to support a project that equips the next generation with the skills to make decisions and take actions that contribute to stronger, sustainable, and equitable communities.

Best Regards,

Robert Turpin

Cpt. Robert Turpin, Division Manager
Escambia County Marine Resources Division

University of West Florida

Center for Environmental Diagnostics and Bioremediation
11000 University Parkway
Pensacola, FL 32514-5750

February 11, 2022

Dear Logan McDonald

If the proposal submitted by the Pensacola and Perdido Bays Estuary Program entitled "*Pensacola Bay System Oyster REEF (Restoration Education and Engagement Framework)"* is selected for funding by the NOAA B-WET program, it is my intent to support, collaborate, and/or commit resources as detailed in the Project Description and the Statement of Work that was provided.

Sincerely,

Amanda Croteau
Postdoctoral Associate
Center for Environmental Diagnostics and Bioremediation
University of West Florida

Phone **850.474.2060** **850.474.3130**
Web **uwf.edu/cedb**
An Equal Opportunity/Equal Access Institution

Logan A. McDonald

226. S. Palafox Place, Pensacola, FL 32502 • lmcdonald@ppep.org • (850) 585-8682

Versatile community outreach specialist with 11+ years of education, outreach, and biological research experience.

EDUCATION

Virginia Commonwealth University (VCU) **May 2017**

- M.S. in Biology

Florida Gulf Coast University (FGCU) **May 2014**

- B.S in Biology (Ecological & Organismal Concentration) and B.A. in Environmental Studies

EXPERIENCE

Community Outreach Coordinator **July 2020-present**
Pensacola and Perdido Bays Estuary Program, Pensacola, FL

- Develop and coordinate outreach, public engagement, and education activities in Alabama and Florida
- Administer the program's Community Grant Program ($250,000 in funding from 2021-2022)
- Facilitate stakeholder engagements and development of the program's Education and Outreach Strategy
- Coordinate broad communication functions for the program (press releases, social media, newsletters, website management, marketing materials, etc.).

Discovery Center Program Supervisor **September 2019-present**
City of Ocala Recreation and Parks Department, Ocala, FL

- Planned, developed, organized, scheduled, promoted, implemented and evaluated programs (summer camp, toddler classes, junior zookeepers, lego robotics, math club, field trips, and seasonal and adult programs).
- Prepared and justified program and center budgets and monitored related expenditures and revenue
- Directed facility operations and ensured a clean and safe environment in the exhibit hall
- Managed social media and website content
- Interviewed, hired, trained, and supervised staff, volunteers, and interns
- Represent and promote the center at community events and off-site programs
- Assisted with care for 30 species of animals
- Increased student field trip bookings by 77% within three months

Northeast Region Volunteer Coordinator **March 2017 - September 2019**
Florida Fish and Wildlife Conservation Commission, Ocala, FL

- Designed, planned, and implemented volunteer driven conservation projects
- Identified species and explained scientific protocols to volunteers
- Directly supervised, trained, and managed 100+ volunteers locally and remotely
- Counseled FWC staff on volunteer best management practices, policies, and procedures
- Promoted the Volunteer Program internally, amongst partnering agencies, collaborators, and the public
- Developed the volunteer program through Salesforce CRM platform testing, creation of a communication plan and logo, and revision of internal policies and procedures
- Maintained accurate records, generated quarterly and annual reports, authored newsletters, and co-managed the FWC Volunteers Facebook page

Amphibian Research Crew Leader **March 2015 - March 2017**
VCU, Fort A.P. Hill, VA

- Planned and executed multiple amphibian research projects in a decentralized work environment with minimal supervision at an army installation
- Liaised with the Center for Environmental Management of Military Lands and problem solved difficult site access logistics
- Supervised and trained a technician and undergraduate researchers
- Cultivated positive team morale in shared housing and challenging field conditions

Volunteer Educator **September 2015 - March 2017**
Blue Sky Fund, Richmond, VA

- Provided hands on science and outdoors experiences for Richmond City Public School students

Graduate Teaching Assistant **August 2015 - March 2017**
VCU, Richmond, VA

- Independently led Biology I and II labs, prepared solutions and specimens, and evaluated students

Educator **August 2016**
VCU Discovery Program, Richmond, VA

- Designed curricula and taught week long class to middle school students on amphibian ecology

Wildlife Biology Intern **August 2014 - February 2015**
National Park Service, Santa Monica Mountains National Recreation Area, CA

- Independently monitored herpetofauna diversity, distribution, and abundance using pitfall arrays
- Surveyed streams for reintroduced California red-legged frog populations
- Deployed and maintained remote wildlife cameras and processed photos
- Assisted in bobcat trapping

Salamander Research Assistant **June 2014 - August 2014**
University of Maryland, Mountain Lake Biological Station, VA

- Performed nocturnal surveys for a capture-mark-recapture study of red-backed salamanders

Instructor
Aquatic Systems Mosquito Education, Fort Myers, FL **January 2014 - May 2014**

- Introduced kindergarten students to life sciences through lessons on mosquito life cycles
- FGCU Civic Engagement Day Overall Best Course Based Service Learning Project Award

Campus Naturalist **August 2012 - May 2013**
FGCU Colloquium Program, Fort Myers, FL

- Served as a peer interpreter on immersive outdoor tours, including cypress dome wet walks

Land Stewardship Intern **February 2011 - August 2012**
Lee County Parks & Recreation, Fort Myers, FL

- Chemically and mechanically treated invasive species
- Facilitated Beach Parks volunteer driven events and programs
- Planned an alternative spring break for the University of Georgia

MADISON ROSS

226. S. Palafox Place, Pensacola, Fl 32502| 850-454-7624 | mtross@ppbep.org

Community Outreach Assistant, PPBEP November 2021- Present

• Develop and implement age relevant curriculum for classes ranging from K-12, including the program's Trash Free Waters funded curriculum

•Engage stakeholders, including youth, interest groups, and individuals in environmental stewardship

•Represent the program and engage the public with hands on activities at outreach events such as festivals, community meetings, and school events

Environmental Steward, AmeriCorps Northwest Florida August 2020- July 2021

Choctawhatchee Basin Alliance; Partnering Non-Profit Organization

•Volunteered with the Choctawhatchee Basin Alliance to help promote swimmable and fishable waterways in Walton and Okaloosa counties, educate third and fifth grade students about the Choctawhatchee Bay Watershed and the local coastal environment, and help with restoration of wetlands with Virginia Tech, Jackson Guard, and U.S. Fish and Wildlife Service.

• Monitored water quality using a HYDROLAB in the Choctawhatchee Bay, Choctawhatchee River and Walton County's Coastal Dune Lakes.

• Analyzed propagation of native shoreline plants used in shoreline restoration and educational purposes.

• Facilitated oyster shell recycling program from local restaurants to be recycled for brand new reef breakwaters.

• Participated in the installation of living shorelines through construction of oyster reefs and planting of marsh grasses, *Spartina alterniflora.*

• Collaborated in the creation and delivery of Zoom delivered STEM curriculum for elementary school students to foster environmental stewardship.

• Adapted the Grasses in Classes student lessons to an online format through rapid creative lesson plan development including storyboarding, filming, scripting, and editing.

• Helped identify Macroinvertebrate species for creek surveys with USFWS.

• Collaborate with scientists from Virginia Tech & Jackson Guard to restore critical habitat for endangered species on Eglin AFB through clearing brush for prescribed burns, and collecting geospatial mapping data.

EDUCATION

Coastal Carolina University – Conway, SC – Bachelors of Marine Science

– Related coursework: Marine Biology, Marine Invasive Species, Marine Environmental Issues, Marine Environmental Chemistry, Organic Chemistry, Physical Oceanography, Marine Geology, Ecology

– Laboratory and field skills: Spectrophotometry, Chromatography, HYDROLAB water quality monitoring, Salinity data w/ refractometer, general research and biochemistry laboratory skills, data processing, statistical analysis, Florida native wildlife identification.

Amanda Croteau

POSTDOC
ECOLOGIST, SOCIAL SCIENTIST

Profile

I am an estuarine ecologist with a background in fisheries, coastal restoration, and social science. I have an interest in understanding and mediating anthropogenic impacts to restore and protect coastal ecosystems.

Fields of Interest

- Estuarine ecology; fisheries; zooplankton; water quality; coastal restoration
- Human dimensions of conservation, natural resource management and fisheries

Contact Details

Email:
acroteau@uwf.edu

Phone:
(904) 769-9770

Office Address:
University of West Florida
Center for Environmental Diagnostics and Bioremediation
11000 University Pkwy
Building 83, Room 116
Pensacola, FL 32514

Affiliations

- CERF - Coastal Estuarine Research Federation
- SEERS - Southeastern Estuarine Research Society
- AFS - American Fisheries Society
- FLAFS - Florida Chapter of the American Fisheries Society

Publications & Presentations

- Articles & Extended Abstracts:8
- Technical Reports & Theses: 18
- Oral Presentations: 18
- Poster Presentations: 7

Work Background

Postdoctoral Associate
University of West Florida | August 2020 - present

- Florida RESTORE Act Center of Excellence (FLRACEP) grant: Facilitate the development of three new estuary programs by providing research, data analysis, ArcGIS mapping; Develop and facilitate workshops for both the public and stakeholders; Develop and administer surveys.

Biologist
University of Florida | 2015 - August 2020

- Gulf of Mexico Research Initiative (GOMRI) grant: Fish processing, aging, and measuring otolith increments of commercially and recreationally important species in the Gulf of Mexico to assess impacts of the Deepwater Horizon oil spill on fish growth
- Bureau of Ocean Energy Management (BOEM) grant: Data entry, database management, plankton analysis, and fish processing to assess the ecological impacts of dredging nearshore sand shoals for beach re-nourishment

Graduate Assistant
University of Florida | 2011 - 2015

- Teaching Assistant/Co-instructor for 3 undergraduate/graduate courses including lectures, course development, grading, and management of online content
- Research Assistant: zooplankton analysis, visitor impacts on the Rainbow River, fouling communities in clam aquaculture
- Education and outreach

Education & Training

University of Florida
Ph.D. Fisheries and Aquatic Sciences

- Completed in 2019
- Dissertation: Restoring Essential Fish Habitat: Long-term Monitoring and Evaluation of Salt Marsh Restoration Efforts in Robinson Preserve

University of Florida
M.S. Natural Resource Recreation

- Completed in 2011
- Thesis: Understanding Visitor Knowledge and Managing Visitor Behavior in Protected Areas

New College of Florida
B.A. Marine Biology & Environmental Studies

- Completed in 2007
- Thesis: Fish, Finches, and Tour Boats: Conservation and Plunder in Latin America. A Case Study of the Galapagos Islands

Environmental Compliance Questionnaire for National Oceanic and Atmospheric Administration Notice of Federal Funding Opportunity Applicants

1. Describe the proposed activity, including:

- **Explain the purpose, objectives, and goals; and**
- **Explain if the proposed activity will occur in different locations and/or multiple phases.**

Project Purpose: To improve the condition of the Pensacola Bay System (PBS) and its oyster fishery and habitat through stewardship and awareness.

Project Objectives: Conduct a week-long professional development workshop for approximately 12 educators; 2. Coordinate and support field trips, guest speakers, case studies, and spat monitoring efforts for educators as they lead Meaningful Watershed Educational Experience (MWEEs); 3. Facilitate student presentations to the PPBEP Management Conference; 4. Facilitate student construction of oyster gardening cages to be deployed at priority locations identified by students based on the best available science.

Project Goals: The goals of the proposed activity are to 1. Increase stewardship of the PBS and oyster fishery and understanding of its cultural, natural, financial, and human resources; 2. Increase teacher and student knowledge of local watershed issues and their relation to climate change; and 3. Increase student achievements in STEM.

The proposed work will engage high school students and teachers in Santa Rosa County (Florida), Escambia County (Florida), and Baldwin County (Alabama) to participate in MWEEs that investigate restoration and resilience through the lens of the Pensacola Bay System (PBS) and Perdido Bay System oysters. Students will explore climate change, resilience, and restoration through inquiry-based field trips and analyses of local data sets, case studies, and historical records. Teachers will be equipped to guide these MWEES through participation in a week-long summer workshop that covers the MWEE framework; oyster spat field monitoring protocols and analysis; oyster hatchery, aquaculture farm, and restoration field trips; guest presentations; and examination of locally relevant data sets and models. At the end of their inquiry-based explorations, students will present their recommendations for locations to deploy student-built oyster gardening cages.

The proposed activity will involve the deployment of oyster spat collection devices and oyster gardening cages across the Pensacola and Perdido Bays from summer of 2023 to summer of 2024.

2. Is the proposed activity a continuation or part of an ongoing activity?
No

3. Describe the proposed activity location, including, if available and appropriate, geographic coordinates (latitude, longitude in DD MM.MMM), river mile markers, etc. for all distinct phases of the proposed activity.

The proposed activity will occur in the Pensacola and Perdido Bay Systems within Santa Rosa County (Florida), Escambia County (Florida), and Baldwin County (Alabama).

4. Provide maps and graphics of the proposed location, if available (at a scale that clearly shows site location(s) relative to the surrounding area and nearby features).

5. Is the location of the proposed activity in a previously undisturbed area? If yes, then explain if the proposed activity would degrade or disturb the previously undisturbed area.
No, the proposed activities will occur at accessible public access points (deployment of PVC spat collectors) and off private docks (deployment of oyster cages) and will not degrade existing habitats.

6. Are there pre-existing or ongoing uses at the location of the proposed activity? If yes, then describe and explain the pre-existing or ongoing uses at the location of the proposed activity or, if not known, describe how pre-existing/ongoing uses will be determined.
Specific sites in the bay system will be selected in collaboration with participating schools from a variety of public access points. Site conditions, including safety considerations for student access, other public uses, and existing site structures will be considered during the site selection process. The project team will work with the appropriate public site managers (e.g., Escambia County, Department of Environmental Protection) to further determine pre-existing and ongoing uses at the sites.

7. Describe the characteristics of the location of the proposed activity by:
• indicating whether it includes unique geographic areas of notable recreational, ecological, scientific, cultural, historical, scenic, economic, or aesthetic importance;
Historically, Pensacola Bay had a productive oyster fishery mainly in Escambia, East, and Blackwater Bays, but due water quality declines from sedimentation and nonpoint and point source pollution over the past few decades, the oyster fishery has collapsed. The shrimping and scallop industries used to be prevalent in the bays but are no longer harvested. Seagrass declines due to sedimentation and reduced water clarity are also problematic, but some areas have experienced recovery in recent years. Santa Rosa Sound is an important area for seagrass habitat. The southern areas of the bays system (e.g., Big Lagoon, Santa Rosa Sound, Gulf Islands National Seashore, etc.) have high boating activity in the summer and are valued for their recreational and aesthetic importance.

• describing any anticipated changes over time to the natural landscape and/or viewshed that would result from the proposed activity;
No changes are anticipated to the natural landscape through the deployment of oyster spat arrays and oyster cages.

• listing any ecologically significant or critical areas in the location of the proposed activity, including areas that are normally inundated by water or areas within the 100- year flood plain;
Ecologically significant oyster reef habitat can be found in limited areas in the Pensacola Bay System (Figure 1). Seagrass beds are found across both the Pensacola and Perdido Bay Systems, aerial mapping and ground truthing will be completed during late summer of 2022 to update existing data layers on seagrass extent and condition.

• essential fish habitat and habitat areas of particular concern designated under the 3 Magnusnon-Stevens Fishery Conservation and Management Act;
Gulf Islands National Seashore Marine Protected Area and Yellow River Marsh Aquatic Preserve are critical habitat for the Gulf Sturgeon.

• listing any critical habitat areas for Endangered Species Act-listed species;
The Pensacola Bay System is critical habitat for the Gulf Sturgeon.

• listing any marine protected areas or national marine sanctuaries in the location of the proposed activity;
Gulf Islands National Seashore is a marine protected area within the Pensacola Bay System and Yellow River Marsh Aquatic Preserve.

• listing any part of refuge lands, wild or scenic rivers, wetlands, or prime/unique farmland in the location of the proposed activity;
Yellow River Marsh Aquatic Preserve, Big Lagoon State Park, Tarkiln Bayou State Park, and Perdido Key State Park.

• listing any properties listed or eligible for listing on the National Register of Historic Places, National Historic Landmarks, or National Monuments; and
Proposed activity will not occur on any properties listed or currently eligible for listing.

• listing any religious or cultural sites of any Federally recognized Indian Tribes or Native Hawaiian organizations in the proposed activity area.
Proposed activity will not occur on any religious or cultural sites of any Federally recognized Indian Tribes in the proposed activity area.

Proposed Activity Timeframe

8. Specify the proposed start date and duration of the proposed activity for all distinct phases of the project.
The proposed start date for deployment of oyster spat arrays is March 2023 – June 2024.
The proposed start date for potential deployment of oyster cages along private docks is March 2024-August 2024.

9. Provide proposed activity schedules for all distinct phases of the proposed activity, including:
• implementation dates of major elements of the proposed activity; frequency of activities within the proposed activity schedule (e.g. once per week, 10 days per month, daily); and deployment and recovery schedules of equipment or structures that would be temporarily or permanently placed in the environment.
Oyster spat arrays will be deployed from March 2023 – June 2024. Oyster spat stringers will be collected monthly and replaced with fresh stringers throughout the deployment period, following FWC methodology.
Oyster gardening cages will potentially be deployed along private docks from March 2024-August 2024 and monitored monthly.

Project Partners, Permits, and Consultations

10. Is this proposed activity funded in any way by another Federal or state agency? If yes, then: • identify the Federal or state agency; and • include information on whether an environmental assessment or environmental impact statement was completed or is in the process of being completed for the proposed activity.
No.

11. List all other interested or affected Federal, state, and local agencies, Native American tribes or Native Hawaiian organizations, non-governmental organizations, and private individuals which may potentially be interested and/or affected by the action.
The National Park Service's Gulf Islands National Seashore, the Florida Department of Environmental Protection's (DEP) Northwest Florida Aquatic Preserves, and DEP's State Parks may be interested in the proposed activities. The project team will work with agencies to obtain any required permitting and coordinate deployment if ideal sites are selected at any properties managed by these agencies. Private property owners that agree to deploy oyster cages will be interested in the action; deployment would only occur with property owner's consent.

12. Are minority or low-income communities located in the area of the proposed activity? If yes, then describe how the minority or low-income communities may be impacted by the 4 proposed activity
Yes, there are minority and low-income communities within the bay systems, but we do not anticipate the proposed activity impacting these communities or interfering with their access to any waterbodies.

13. Are Federal, state, or local permits, authorizations, waivers, determinations, or consultations required for the proposed activity to comply with all applicable environmental laws and regulations? If yes, then: • list and provide the status of all required Federal, state, or local permits, authorizations, waivers, determinations, conditions, and consultations, as applicable; and • provide copies of all required Federal, state, or local permits, authorizations, waivers, or determinations that you have secured.
A Florida Fish and Wildlife Conservation Commission Special Activity License application and an Alabama Department of Conservation and Natural Resources Scientific Collecting Permit will be submitted following the execution of the grant agreement.
If ideal sites are identified on Florida State Park or National Park Service properties, the project team will work to obtain a research permit from the DEP and NPS.

Proposed Activity Details and Impacts Fishing Activities

14. Describe potential effects of the proposed activity on species and/or habitats protected under Federal, state, or local laws by
• listing potential environmental impacts on specimens, habitats, water quality, communities, etc.;
Oyster spat will be collected from spat monitoring arrays.

• listing any coral reefs, essential fish habitat and habitat areas of particular concern designated under the Magnusnon-Stevens Fishery Conservation and Management Act, or critical habitat designated under the Endangered Species Act;

Gulf Island National Seashore Marine Protected Area and Yellow River Marsh Aquatic Preserve are habitat for the Gulf Sturgeon.

• listing the species of plants and animals protected under Federal, state, or local laws that are subjects of the proposed activity and describe the numbers (by species, age, sex, stock, location, etc.) to be targeted; • listing species that would be transplanted, introduced, or cultured at the site or in its immediate vicinity; and
• listing any non-native and/or invasive species that would be introduced incidentally or removed from the proposed activity area and how introduced or removed.

Oyster spat and invertebrates that settle on oyster spat stringers from monitoring arrays across the Pensacola and Perdido Bay Systems will be collected over a 4-month period. Oyster spat stringers will be replaced monthly with cured oyster shells to prevent introduction of diseases or other species. Oyster stringers will be inspected for other species before removal from the field and will not be transplanted to a different environment.

15. If the proposed activity is a continuation of an on-going project involving fishing, provide information/reports for previous years addressing the following:
the number of fish and other species that were collected for the activity/monitoring needs; • any impacts to protected species, including takes (as defined by 50 C.F.R. 216.3, 50 C.F.R. 222.102, and 15 C.F.R. 922.3); • any impacts to sensitive or protected habitats, including critical habitat that has been identified under the Endangered Species Act or essential fish habitat that has been identified under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act); and 5 • the number of non-target fish/invertebrates/protected species (listed by species) that were incidentally captured.
N/A

16. What amount (total numbers and/or weight) of fish or invertebrates are proposed to be caught? What is the size (weight, length, and age class) of each species targeted for capture?
Oyster spat that settle onto oyster spat stringers from approximately 18 monitoring arrays across the Pensacola and Perdido Bay System will be collected over a 4-month period. The total amount collected will be dependent upon in situ spat settlement.

17. If any organisms would be released alive, how many of each species would be tagged, measured, or sampled? What is the probability of individuals surviving after being handled (e.g., tagged, measured) and released (e.g., percent survival post-release)?
Spat will be collected for post processing and analysis in both the lab and classroom and will not be released.

18. List non-target species that may occur in the proposed sampling area and specify how many of each non-targeted species are expected to be caught.
We do not anticipate capturing non-targeted species other than invertebrates that colonize on the monitoring arrays. Any other species found on the shells that can be removed will be released at the site.

19. If the proposed activity involves commercial fishing, would the proposed activity be for research purposes only? If fish would be retained for sale or personal consumption, quantify the amount of each species that would be sold or used for personal consumption.
N/A

20. What type and size of gear would be used? Describe any differences between proposed research gear and currently regulated gear.
N/A

21. If using fixed fishing gear, how many traps, pots, gillnets, or other fixed gear would be used during the course of the study? Would new gear be added to the water or would existing, permitted fishing gear be used? If new gear would be added to the water, how many extra vertical lines would be associated with any fixed gear such as traps, pots, or gillnets? What lengths of gillnet would be used

(e.g., number of nets per string, gillnet panel lengths, etc.)?
N/A

22. Would the fishing gear being used conform to that allowed for use under take reduction plan regulations (e.g., regulations for the Atlantic Large Whale Take Reduction Plan, Harbor Porpoise Take Reduction Plan, Bottlenose Dolphin Take Reduction Plan, etc.) and other appropriate fishing regulations (e.g. sea turtle gear requirements)? If not, explain why the gear does not conform and the reason for the nonconformance.
N/A

23. How long would the fishing gear be deployed? List average soak time for each gear type.
N/A

24. What is the proposed number of gear hauls for each gear type (e.g., trawl gear, fixed gear, etc.)?
N/A

25. What is the proposed duration and speed of each tow for mobile gear such as trawl gear?
N/A

26. If trawls are proposed to be used, would a turtle exclusion device (TED) or marine mammal exclusion device be used? Please describe the TED or marine mammal exclusion device that will be used.
N/A

27. If the applicant is applying for an exemption to any of the following, please explain what the exemptions would be and why the exemption is necessary for the proposed activity: • fishing gear restrictions; • other regulatory requirements such as Days At Sea (DAS), Total Allowable Catch (TAC), and/or possession limits; • use areas closed to proposed activities (e.g., fishery management closed area, habitat closed area, etc.); • any closed or otherwise restricted fishing seasons; and • minimum size limits.
N/A

28. If the proposed activity would increase fishing effort, describe the extent of the increase. For example, would catches contribute to an annual catch total? What proportion of the total catch limit would the proposal result in?
N/A

29. How many proposed fishing days are there within the year for each gear type?
N/A

Aquaculture and Mesocosums

30. Will the proposed activity be conducted in a closed system mesocosm/aquaculture facility or in open water (coastal or Federal waters)?
The proposed activity will occur in coastal waters.

31. Will the proposed activity introduce genetically modified organisms, species bred for specific traits (e.g. disease resistant stocks), or non-indigenous species into an area?
No

32. If using aquaculture gear, describe whether gear would be deployed short-term (1-2 years) or long-term (2+ years) and describe the number of cages/nets, lines, anchors, etc. that would be used during the course of the study. What type and size of cages/nets, lines, anchors, etc. would be used?
A maximum of 300 approximately 1.5 feet x 1 foot x 1 foot oyster cages would be attached to private docks for short-term deployment.

33. What amount (total numbers and/or whole weight in pounds) of fish or invertebrates are proposed to be captured for culture purposes (i.e., broodstock)? What is the target size (weight and length) and age class of each species to be captured for culture purposes?
N/A

34. What amount (total numbers and/or whole weight in pounds) of fish or invertebrates are proposed to be cultured? What is the estimated size (weight and length) and age class of each species targeted for harvest at the end of each culture period?
N/A

35. If the proposed activity involves the use of any specialized equipment that may introduce sound into the environment, then provide a description of the noise(s), including frequency (Hz), amplitude (dB), angle (or degrees) radius the noise may travel from the source, and other relevant technical specifications. Compare the noise(s) generated by the proposed activity with ambient noise conditions, if known. Also, discuss the length of time and frequency of occurrence that the noise is expected to be introduced into the environment.
N/A

Marine debris

36. Will the proposed activity identify, determine sources of, assess, prevent, reduce, remove, dispose, or recycle marine debris? If yes, then describe the targeted debris type, debris condition, and why the proposed action is needed in the project area.
No.

37. Describe how the proposed activities would complement or encourage other similar marine debris removal activities in the area.
N/A

38. Describe the disposal technique and the extent to which recycling, reuse, or other sustainable disposal alternatives were considered.
N/A

Equipment Installation, Construction and/or Maintenance

39. Does the proposed activity involve construction, restoration, dredging, excavation, and/or fill? If yes, then: • describe the extent of the construction, restoration, dredging, excavation, and/or fill; and · include a description and plan diagram of the proposed impact area.
N/A

40. If the proposed activity involves installing equipment or antennas on buildings or property, has the owner of the property granted written approval for the use of their property? If yes, provide copies of the approvals.
If oyster cages are deployed on private property, written approval will be provided from property owners prior to deployment.

41. If the proposed activity involves installing equipment, describe how the equipment would get to its final location (i.e. would gasoline or diesel engine vehicles be used to transport the equipment)?
Oyster spat monitoring arrays and oyster cages will be deployed from land access or in shallow waters with wading access.

42. If the proposed activity involves installing equipment or antennas that would require structural support, describe the nature and extent of such support.
N/A.

Data, Risk, and Mitigation

43. Describe sampling, collecting, or observation protocols and operational procedures.
Oyster spat settlement will be monitored across a network of spat monitoring arrays (three spat trees deployed at each monitoring location and retrieved monthly for 4 months). T-shaped spat trees with oyster stringers will be constructed and deployed following Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute Oyster Monitoring Procedures (FWC 2021). Spat stringers will be collected and counted in the classroom. The number of spat on each shell will be recorded by a student and independently confirmed by another student. After two students have independently counted and confirmed the number of spat on each shell, spat data collection will be completed. Juvenile oyster recruitment is determined using the number of settled spat on the underside of the middle 4 shells on each stringer. Recruitment rates will be calculated by dividing the raw number of spat per shell by the number of days the shell had been deployed, and then standardize to a 28-day month. These standardized values will be used to calculate the mean number of spat per shell per month for each successfully retrieved spat monitoring array, resulting in a maximum of 3 data points per station each month. Water quality parameters (depth, temperature, salinity, pH, dissolved oxygen, and turbidity or Secchi depth) will be recorded during each monitoring time point. They will be measured using a calibrated water-quality sonde and data recorder near the oyster reef. Secchi depth is measured using a Secchi disk. We expect to collect data across a maximum of 18 stations for approximately four months. Oyster cages will be deployed from private docks, but monitoring will not begin until after the funded research is completed.

44. Describe and provide specification of the equipment or structures (e.g. scientific monitoring equipment, deployment platforms, etc.) that would need to be temporarily or permanently placed in

the environment.
T-shaped spat trees with oyster stringers will be constructed and temporarily deployed following Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute Oyster Monitoring Procedures (FWC 2021). Oyster cages will be temporarily deployed from private docks.

45. Describe any proposed mitigation or monitoring measures and protocols.
N/A

46. Describe the processing methods to be used to conduct the research.
Spat stringers will be collected and analyzed in the classroom. The number of spat on each shell will be recorded by a student and independently confirmed by another student. After two students have independently counted and confirmed the number of spat on each shell, spat data collection will be completed. Juvenile oyster recruitment is determined using the number of settled spat on the underside of the middle 4 shells on each stringer. Recruitment rates will be calculated by dividing the raw number of spat per shell by the number of days the shell had been deployed, and then standardize to a 28-day month. These standardized values will be used to calculate the mean number of spat per shell per month for each successfully retrieved spat monitoring array, resulting in a maximum of 3 data points per station each month. Oyster cages will be checked monthly to measure the size of each oyster in the cage.

47. Does the proposed activity utilize a new or untested scientific technology or method? If yes, then describe briefly the technological process or methodology and potential environmental effects of the proposed activity.
No

48. Will the proposed activity require the cataloging and compiling of sources of socioeconomic data? If yes, then please explain.
N/A

49. Does the proposed activity consist solely of software research and manipulation? If yes, please explai

Safety

50. Describe potential unique or unknown risks to human health or the environment from the proposed activity.
There are no anticipated unknown human health or environmental risks from this activity. Appropriate field and lab standard operating procedures will be followed.

51. Describe the potential to generate, use, store, transport, or dispose of hazardous or toxic substances. Please include the following: • a list of any hazardous substances (as defined by 29 C.F.R. 1910.120(a)(3)) that will be involved in this project and any hazardous wastes (as defined by 40 C.F.R. 261.3) that may be generated during the proposed activity; • any hazardous contaminants that may be uncovered and/or disturbed by the proposed activity; and • a list of the procedures/protocols that will be followed to ensure safe handling of hazardous substances and proper disposal of all hazardous wastes.
N/A

52. If biological agents would be used, specify how the proposed activity would meet all conditions of the Biosafety Level 1 (BL1) standard from the most current version of the National Institutes of Health (NIH) and the Center for Disease Control and Prevention (CDC) Biosafety in Microbiological and Biomedical Laboratories (BMBL) guidelines.
N/A

53. If the proposed activity has electromagnetic properties or creates electromagnetic fields, specify how those aspects would comply with the Institute of Electrical and Electronics Engineers (IEEE) standard C95.1-1991 (recognized by the American National Standards Institute (ANSI)), or newer guidance.
N/A

54. If the proposed activity involves ionizing radiation, specify: • whether the appropriate radiation safety authority has been consulted or when consultation would occur; • the results of the radiation safety authority's review; and • how the proposed activity complies with NOAA's U.S. Nuclear Regulatory Commission (NRC) materials license #05-11997-01
N/A

55. If the proposed activity involves lasers, specify how the proposed activity would meet the American National Standards Institute (ANSI) safety standards Z136.1-2000 and Z136.6- 2000, or newer guidance.
N/A

56. If the proposed activity involves satellite sensors and experiments with radioactive materials, specify and include: • whether NASA has evaluated the payload or when the evaluation would occur; • the results of the evaluation (i.e. whether the proposed project is categorized as a Routine Payload On Expandable Launch Vehicles, as evaluated by the current version of NASA Routine Payload Environmental Checklist GSFC Form 23-78 and NASA Flight Projects Environmental Checklist GSFC Form 23-74); and • a copy of the evaluation, if available.
N/A

Energy and Atmosphere

57. Would the proposed activity require large amounts of water or electricity for an extended period of time? If yes, then explain.
No

58. Would any fuel be used for the proposed activity during development or long term operation, including any fuel used for powering small fuel cells? If yes, then explain.
No

59. Would the proposed activity, during development or long term operation, require large amounts of outdoor lighting, or create unusual odors? If so, describe the setting and effects of the proposed activity.
No

60. Would the proposed activity, during development or long term operation, change characteristics of the atmosphere or contribute to ozone-depletion? If yes, then explain.
No

Transportation

61. Would the proposed activity, during development or long term operation, change transportation infrastructure or increase local traffic? If yes, then explain.
No

62. If the proposed activity requires airplane or balloon/sonde flights (e.g. investigations over Arctic Sea ice using satellite and aircraft altimetry), would the proposed activity use a previously scheduled flight or sea voyage, or would a special trip be required? If yes, please explain.
N/A

Reviewer Comments and Questions – Escambia County Board of County Commissioners
FY22 Gulf of Mexico B-WET competition

Budget and Federal Form Corrections
NOAA does not operate in cents. Please round the Indirect Costs in the SF-424A and the B-WET budget table such that year 1 totals $4,727, year 2 totals $4,364, and the two-year total for Indirect is $9,091. This will bring the project grand total to $100,000 in both documents such that it is parallel with the SF-424 request of $100,000. Also, please adjust the last page of the Budget Narrative such that Indirect reflects $9091, along with any other applicable budget documents.

- The indirect rates have been adjusted in the SF-424, the B-WET budget table, and budget narrative.

Project Narrative Corrections/Comments

The Project Summary and various sections of the Project Narrative indicate 18 teachers will be reached; however, a later section of the Project Summary and the Budget Table indicate 12 teachers will be reached. Please adjust documents such that they are parallel in the numbers of teacher to be reached. Please know that if you stick with 12 per your budget, you will have flexibility to aim for reaching more teachers than planned throughout the life of your award.

- The number of teachers that will be reached was corrected in the Project Summary and Project Narrative to reflect the correct number of 12 teachers.

On the subject of reaching marginalized communities, reviewers would like more detail regarding ***which*** of these community(ies) will be prioritized (e.g. Title 1 schools, schools in the upper portions of our watershed, Black or African American teachers and students, rural teachers and students, transient or newly arrived subgroups, etc.)?

- Santa Rosa County is only home to one Title 1 high school. We do aim to work with this school, but since the number of Title 1 schools are limited within Santa Rosa County we will prioritize working with rural teachers and students in the upper portions of our watersheds.
- Within Escambia County we will prioritize working with Title 1 schools and Black or African American teachers and students.
- Only one of the Baldwin County public high schools located in the Perdido Bay Watershed is a Title I School. We do aim to work with this school, but since the number of Title 1 schools are limited in Baldwin County within the Perdido Bay Watershed boundaries. Baldwin County was Alabama's fastest growing county from 2010 to 2020; we will prioritize working with transient and newly arrived subgroups in the rapidly developing coastal areas of Baldwin County.

Reviewers would also like to more about ***how*** you will effectively reach the specific prioritized targeted audience(s) from the bullet above. Specifically, best practices (per the NOFO) for reaching such audiences typically involve including a representative from the targeted marginalized community(ies) on the project planning/implementation team. This trusted source will inform the project on the needs of the marginalized communities, the best ways to meaningfully reach them, and will gain participation from teachers and students from the targeted marginalized community(ies). Sometimes this representative or trusted source is one person from the marginalized community or with strong experience working with them. Sometimes it is an entire community-based organization (CBO) composed of people from the marginalized community or with strong experience working with them. Regardless, the PI should take as many of the following steps as possible to create a meaningful, effective, and mutually-beneficial partnership with the person or people in this "trusted source" role:

- Document shared goals between the project primary PI and the representatives/CBO from the targeted marginalized community(ies)
- Recognize the strengths of representatives/CBO from the targeted marginalized community(ies) and document how their strengths will be incorporated into project planning and implementation
- Establish communication plans and processes for working together effectively and for join decision-making
- Compensative representatives/CBO for the effort they are contributing to the project
- Other tips can be found in NAAEE's Community Engagement Guidelines for Excellence (https://naaee.org/eepro/publication/community-engagement-guidelines)

Please describe how you will address these practices to thoughtfully/meaningfully address and gain participation from each marginalized community you prioritize.

- Santa Rosa County rural students and teachers – The project team will engage with community partners from the UF-IFAS Extension Office and 4-H Program in Santa Rosa County as well as the USDA-NRCS Blackwater Soil and Water Conservation District to further reach this audience and address their needs. These organizations have deep interpersonal connections with farmers and rural communities that will allow us to identify shared goals and effectively reach this audience. The project team will work to establish communication plans with representatives from these respective organizations.
- Escambia County Title 1 Schools and Black or African American teachers and students – The project team will engage with community leaders, such as Dr. Calvin Avant of Unity in the Family Ministry, that are community representatives of Black and African American communities in Pensacola that have experienced a history of environmental injustices. These community leaders have a deep understanding of the history of these communities, the current challenges they face, and their needs.
- Baldwin County – The project team will engage with community partners from the City of Orange Beach and Baldwin County to further reach this audience. These organizations understand this growing communities' needs and can help us reach newly arrived teachers and students.

Reviewers noted that the PPBEP Oyster Sub-Committee is diverse in its membership. Perhaps this group is an appropriate trusted source in the community, as the application states, for reaching marginalized groups. If so, please address the two bullets above with regard to this committee's role.

- The PPBEP Oyster Sub-Committee has diverse membership from different community sectors and organizations, including organizations that work with rural communities, such as the UF-IFAS Extension Office and Florida Sea Grant, that have strong connections with Escambia and Santa Rosa County schools.

Reviewers noted that there are letters of support from two teachers who wish to participate in the professional development. However, with the goal of reaching 12 to 18 teachers, some from marginalized communities, there is a question on the recruitment strategy and teacher participation. Knowing how busy, overcommitted, and underfunded teachers are, how will you recruit to reach your target number? It is sometimes effective to work with the targeted schools' administration, science supervisors, or other district level leadership to get more holistic buy in, commitment, and long term participation from teachers. This type of effort can also move you towards strong relationships with schools and school districts that may lead to integration of the MWEE into the culture of the school and therefore sustain the use of the MWEE approach (even as a modified version) in schools after grant funding/outside support ends.

- The project team will work with the respective county school district's administration to facilitate the adoption of MWEEs. We will utilize existing relationships of the project team, as well as the long-term relationships that have been developed with schools through the Bay Area Resources Committee (BARC), which was the predecessor of our current organization. BARC members serve on our education and outreach committee and will be able to leverage their connections to help recruit teachers. We will promote the opportunity through school administration, district science coordinators, directly via e-mail and flyers in their mailboxes, and through the Scientist in Every Florida School's distribution list. We have also had success reaching teachers through word of mouth from other teachers, and we believe that positive endorsements from teachers we are currently working with will help us reach new teachers.

Can you say more about the student-led pieces of the proposed work? Ideally students are not just led through the activities, but help to drive it. Will the students use ***inquiry*** to define the questions to be studied (the local watershed issues). Will the students help to design the project's element? The stewardship element is especially ripe for student driven plans and designs. Will the student be able to assist with planting the spat in their selected area? And related to this, how will the teachers be trained on using student-led and inquiry-based teaching in their classrooms? (this requires some skill and a good deal of confidence building)

- Yes, students will use inquiry to shape the questions around local watershed issues. Students will learn about several issues in the watershed and oyster biology and will have to narrow their inquiry to define the exact questions to be studied. Students will design an approach and select sites for oyster cage deployment, guided by their inquiry driven investigations of these watershed issues. Students may be able to assist in stocking oyster cages prior to deployment dependent on oyster seed availability at the end of the school year.
- Teachers will gain an understanding of inquiry-based learning and approaches during the week-long professional development workshop. Participating teachers will be lead through the inquiry driven investigations that they will later lead with their students. The project team will highlight the elements of inquiry based and student-led learning and provide guidance on how educators can employ these practices in their own classroom.

Please indicate how the proposed work aligns to NOAA's Education Strategic Plan, and the Climate Literacy and Ocean Literacy standards.

- NOAA Education Strategic Plan: https://www.noaa.gov/education/explainers/noaaeducation-strategic-plan
  - The proposed work is aligned with Goals 1-3 of NOAA's Education Strategic Plan.
  - Goal 1: Science-Informed Society – Pensacola Bay System Oyster REEF will bring the best available science on PBS oysters to students and teachers. Inquiry driven investigations will lead to an informed community that has a deep understanding of current and future issues in the watershed.
  - Goal 2: Conservation and Stewardship – The proposed work will provide learners with an opportunity to connect to their local ecosystem and help them better understand how their individual behaviors impacts the PBS environment and oysters.
  - Goal 3: Students and educators will learn about environmental hazards associated with rising sea-levels and how these hazards can impact our environment and communities. Participants will learn how nature-based solutions such as living shorelines can help protect our communities.

- Ocean Literacy Principles: http://www.coexploration.org/oceanliteracy/documents/OceanLitChart.pdf
  The proposed project aligns with several Ocean Literacy Principles.
  - 1. D. E. and G. – Students will learn about sea level, factors that influence changes, and how sea level changes impact our communities and environment. Through the exploration of the PBS students will learn about estuary conditions, such as salinity and pH, and the role these properties play. Several complex watershed issue such as sedimentation, nutrient runoff, and increased freshwater flow from across the watershed will help students understand the connection between our watersheds, estuaries, and oceans.
  - 3.G. – Students will understand how changes in the ocean-atmosphere system impact climate and can have consequences on their local communities and environment.
  - 5.F. and I. - Students and teachers will learn about the role environmental factors such as salinity, oxygen, pH, light, substrate, etc. play in defining oyster ecosystems. The primary investigation will occur in an estuary and will highlight their importance as vital nursery habitat.
  - 6. B. C. D. E. F. and G. – PBS oysters provide a case study for how economy, culture, recreation, and heritage are tied to our marine resources. Participants will learn about how humans have impacted the PBS and oyster fishery through harvest, human development, etc. and how we all play a role in the recovery of the environment.
  - 7. E.– PBS water filtration and habitat suitability models will help students understand the importance of models to understand complex systems.
- Climate Literacy Principles: http://oceanservice.noaa.gov/education/literacy/climate_literacy.pdf
  - 3. Life on Earth depends on, is shaped by, and affects climate – The proposed project will highlight that oysters survive within specific ranges of temperature and precipitations and that climate conditions outside of their normal range mean the must adapt, migrate, or perish.
  - 7. Climate change will have consequences for the Earth system and human lives – The proposed project will provide local context to sea-level rise threats, extreme weather events, ocean acidification, and disturbances to local ecosystems.

Other notes

- Please identify any impact the proposed work will have on the quality of the environment by completing the NOAA NEPA Questionnaire at the following link: https://www.noaa.gov/sites/default/files/2021-11/NOAA-Grants-Questionnaire-final.pdf. Please place N/A under sections or questions that do not apply. Once complete, please email the questionnaire to Amy.Clark@noaa.gov.
- Please provide a copy of the applicant's approved Indirect Cost Rate Agreement reflecting the rate applied to the application budget.
- Your request for an exemption from data sharing is granted.

FORM **CD-450**
(REV 10/18)

U. S. DEPARTMENT OF COMMERCE

FINANCIAL ASSISTANCE AWARD

☒ GRANT ☐ COOPERATIVE AGREEMENT

RECIPIENT NAME ESCAMBIA, COUNTY OF	FEDERAL AWARD ID NUMBER **NA22NMF0080234**
	PERIOD OF PERFORMANCE 08/01/2022-07/31/2024
STREET ADDRESS 221 PALAFOX PL STE 200	FEDERAL SHARE OF COST $100,000.00
CITY, STATE, ZIP CODE PENSACOLA FL 32502-5835	RECIPIENT SHARE OF COST $0.00
AUTHORITY 33 USC 893a, as amended: The America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Re-authorization Act of	TOTAL ESTIMATED COST $100,000.00

CFDA NO. AND NAME

11.008 NOAA Mission-Related Education Awards

PROJECT TITLE

Pensacola Bay System Oyster REEF (Restoration Education and Engagement Framework)

This Award Document (Form CD-450) signed by the Grants Officer constitutes an obligation of Federal funding. By signing this Form CD-450, the Recipient agrees to comply with the Award provisions checked below and attached. Upon acceptance by the Recipient, the Form CD-450 must be signed by an authorized representative of the Recipient and returned to the Grants Officer. If not signed and returned without modification by the Recipient within 30 days of receipt, the Grants Officer may unilaterally withdraw this Award offer and de-obligate the funds.

☒ DEPARTMENT OF COMMERCE FINANCIAL ASSISTANCE STANDARD TERMS AND CONDITIONS

☐ R & D AWARD

☐ FEDERAL-WIDE RESEARCH TERMS AND CONDITIONS, AS ADOPTED BY THE DEPT. OF COMMERCE

☒ BUREAU SPECIFIC ADMINISTRATIVE STANDARD AWARD CONDITIONS

☒ SPECIFIC AWARD CONDITIONS

☒ LINE ITEM BUDGET

☒ 2 CFR PART 200, UNIFORM ADMINISTRATIVE REQUIREMENTS, COST PRINCIPLES, AND AUDIT REQUIREMENTS, AS ADOPTED PURSUANT TO 2 CFR § 1327.101

☐ 48 CFR PART 31, CONTRACT COST PRINCIPLES AND PROCEDURES

☒ DEPARTMENT OF COMMERCE PRE-AWARD NOTIFICATION REQUIREMENTS FOR GRANTS AND COOPERATIVE AGREEMENTS (REF: 79 FR78390)

☐ MULTI-YEAR AWARD. PLEASE SEE THE MULTI-YEAR SPECIFIC AWARD CONDITION.

☒ OTHER(S):

This award is being made under competitive Funding Opportunity Number NOAA-NMFS-SE-2022-2007159 posted at Grants.gov on 12/06/2021.

SIGNATURE OF DEPARTMENT OF COMMERCE GRANTS OFFICER Olga Dixon	DATE 07/14/2022
PRINTED NAME, PRINTED TITLE AND SIGNATURE OF AUTHORIZED RECIPIENT OFFICIAL Matt Posner	DATE 08/16/2022