Supplementary Materials for the Apalachicola Bay System Initiative Application Submitted by the Florida State University Coastal & Marine Laboratory

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Table of Contents

I. Long-term prospects for restoring oyster reefs and bay health

The Apalachicola Bay is approaching a tipping point or threshold that, once reached, could result in dramatic shifts in its current structure, function, and dynamics with irreversible and certainly undesirable consequences. There is no question that the Apalachicola Bay oyster fishery is in trouble; fishing data from the past 10 years have shown an increase in effort and reduction in harvest, and monitoring has revealed a sharp decline in the number of sub-legal oysters. This decline has been blamed on the lack of freshwater input into the Bay. While freshwater has a significant influence, it is only one of a number of forces influencing the success or failure of oysters in Apalachicola Bay. Harvesting, climate, habitat quality and availability, disease, predation, recruitment, growth and survival all influence the success of oyster populations, but the relative importance of each of these factors is not clear.

The oyster is a critical keystone species in the Bay, providing food, habitat and other services that are important to ecosystem health and of direct benefit to humans. Their ability to filter particles from the water column, for instance, leads to greater water clarity that contributes to healthy sea grass

meadows; and the structure they create provides refuge and nursery habitat for a suite of economically and ecologically important species as well as shoreline protection from storm surge. Given the relatively recent oyster population crash, we feel that rapid, focused and comprehensive intervention can restore the Apalachicola Bay ecosystem's productivity and keep it from reaching a point of no return.

Since the Apalachicola Bay oyster fishery collapse, several government and private entities have invested heavily in oyster restoration projects. While these projects have generated valuable data and identified important gaps in our knowledge, they have been limited by funding and personnel capacity. The ABSI will address several critical information gaps that are outside the scope of existing efforts. We will create, in collaboration with other entities, a suite of tools which will allow an informed science-based, adaptive approach to management and restoration that will optimize the probability of ecosystem recovery. If the ABSI is not funded, other efforts will no doubt continue and will make some progress. However, with the ABSI funding, personnel capacity, broad scope, and collaborative structure, we envision increasing the rate of recovery, not only for oyster populations, but for the overall health of the Apalachicola Bay System (= the System).

The ABSI is a large, complex project with multiple scientific, management and outreach objectives that may initially appear daunting. The ABSI, however, is designed around well-defined objectives, each of which can be addressed independently and then integrated into one or more final products. The timeline of the ABSI is such that the first few objectives can be started immediately using existing facilities and personnel, with subsequent objectives ensuing as new personnel are brought on board and the pilot-scale hatchery brought on-line. As the ABSI progresses, we will draw on scientific, management and stakeholder expertise and feedback for guidance to maximize buy-in and therefore our chances of success. At a minimum, the ABSI will provide the best available science on the status of the System and an understanding of the primary and synergistic drivers of the oyster collapse. The best (expected), outcome is that the ABSI will result in a comprehensive management plan that is supported by the resource stakeholders, a suite of management/education tools with a user friendly interface, a clear science-based pathway for comprehensive restoration, and guidance for developing alternative industries that include aquaculture, oyster shell recycling, and ecotourism.

Why Do This?

- The Apalachicola Bay system is on a trajectory will that could result in a new steady state characterized by greatly reduced ecosystem services, economic potential and aesthetic appeal.
- Efforts to address the decline in oyster production have been incremental and not fully integrated.
- The ABSI will be the nucleating agent and **"honest broker"** for development of a COMPREHENSIVE UNDERSTANDING of the forces driving overall decline of the health of Apalachicola Bay as well as HOW to reverse and mitigate the process.
- The ABSI WILL DEVELOP A RESTORATION PLAN with a group of local, state and national stakeholders capable of securing resources to implement this effort and leveraging the resources effectively.

- We are convinced that in the long run the ABSI will prevent further deterioration and allow portions of the Bay to recover to economically viable levels of productivity and health, both of which have enormous implications for Franklin County and adjacent regions.

II. FSUCML's pilot-scale oyster hatchery

Prior to developing the ABSI proposal, key FSU personnel traveled to the University of Maryland's Horn Point Oyster Hatchery, considered among the largest oyster hatcheries on the U. S. eastern seaboard. The intent was to determine the minimal size and capabilities needed to have a first-class pilot-scale hatchery to produce larvae, spat, and seed for research, restoration, and aquaculture. Dr. Coleman and Dr. Brooke will visit several other academic institutions that have shellfish hatcheries, including Virginia Institute of Marine Science http://www.vims.edu/research/units/centerspartners/abc/facilities/glo_pt_hatchery/index.php (e.g., Dr. Dick Snyder, Dr. Rom Lipcius), University of North Carolina at Wilmington https://uncw.edu/shellfish/, the Florida Atlantic University Center for Marine and Warm Water Aquaculture (http://www.fau.edu/hboi/aquaculture), and the University of Florida IFAS https://ncbs.ifas.ufl.edu/. We will also visit a number of privately owned hatcheries, including the Bay Shellfish Co. (http://www.bayshellfish.com) on Florida's Gulf Coast and possibly Southern Cross Sea Farms (http://www.clambiz.com/) located in Cedar Keys. These visits will help us define the size, structure, and equipment required for the pilot-scale hatchery to accomplish the ABSI research and restoration objectives. Travel funds will be provided by FSU as was the case with the trip to the Horn Point Oyster Hatchery

III. ABSI's outreach efforts

Public support for management measures and restoration efforts is critical to their success, particularly from citizens that rely on the Bay for their livelihoods. Equally important is public engagement in planning and implementation of management and recovery efforts (e.g., oystermen involvement in restoration to supplement incomes). To that end, the ABSI will carry out the following:

(1) Establish two ABSI Advisory Boards: a Local Advisory Board and a Scientific Advisory Board

The **Local Advisory Board** will consist of 10-12 members with a broad range of interests and perspectives, including representatives in local government, natural resource management and conservation, fishing and aquaculture, and other businesses. It will be established at the beginning of the project and will remain in place through year 5, or longer if appropriate. The Board members will advise key ABSI personnel on planning and executing project objectives, and will be a vital communication link (disseminating information and soliciting feedback) between the ABSI and a broader stakeholder community. Advisory Board meetings will be held at least twice a year (more frequently if necessary, particularly at the start of the project), and Board members will be invited to participate in the stakeholder workshops two to three times per year.

The **Scientific Advisory Board** will consist of 4-5 members with expertise in similar types of projects selected from academic institutions across the southeastern US (including one social scientist).

(2) Establish Interactive workshops with stakeholders throughout the project to provide input, update progress, and solicit feedback from the broader community on ABSI progress and outcomes.

While the Advisory Boards will be relatively small entities, the stakeholder workshops will provide opportunities for broader community engagement and wider scientific input. It is our intent to hire a professional consultant (e.g., through the FSU Conflict Resolution Center https://consensus.fsu.edu/) to act as a facilitator for all stakeholder meetings to ensure that the process is unambiguous and that Florida State University is viewed as an impartial entity, free of any particular political agenda or influenced by any interest group. By establishing a point of consensus among stakeholders as a starting point (e.g., all are likely in favor of enhancing the Bay's health), the facilitator can help build broader and deeper consensus over the five-year period of Triumph funding The importance of having FSU serve in the capacity of "honest broker" in this regard is critical. This is due to the heightened awareness of stakeholders to the myriad issues faced in the Apalachicola Bay system and the sometimes emotional discourse that this engenders. Our intent is to integrate stakeholder concerns and scientific knowledge to develop thoughtful management plans, in concert with state and federal agencies. FSU is uniquely qualified to fulfill this critical role. Both Coleman and Brooke have experience in this regard, having served on several federal fisheries management councils.

(3) Transfer expertise and technology among entities across the affected counties and beyond.

The ABSI effort will result in science-based adaptive management and restoration plans that can serve as models for oyster ecosystem recovery throughout the region. The bio-physical model produced through the ABSI can be used to predict recruitment which will assist management as well as research. We will be working with other groups conducting similar research and technology development across the Florida Gulf coast. For example, The Nature Conservancy is undertaking a large-scale restoration project in Pensacola Bay that includes mapping oyster habitat and restoring oyster reefs along a 6.5 mile tract. Also, the University of Florida Institute of Food and Agricultural Services (UF/IFAS) Nature Coast Biological Station (Cedar Key) is actively involved with living shoreline projects (including oyster reefs) to reduce coastal erosion. Exchanging information and ideas between the ABSI and the Nature Conservancy, and the UF/IFAS efforts, may enhance the success of all and facilitate consistency in scientific and management approaches. The ABSI will identify local strains of oysters that may be resilient to disease or prevailing environmental conditions. These strains can be used to improve restoration efforts and the aquaculture industry across the region.

(4) Provide paid hatchery internships.

The rapid expansion of the aquaculture industry across the Florida Gulf coast will increase the demand for hatchery-produced high quality seed. The ABSI will provide opportunities for residents in the county to obtain training and work experience associated with hatchery operation and management by providing ~8 hatchery internships annually. These internships will prepare students and/or other local residents to take advantage of this developing work opportunity.

(5) Developing entrepreneurial businesses related to restoration and aquaculture.

We envision a number of entrepreneurial small business opportunities developing as a result of the ABSI project. One of these would be an oyster shell recycling, given that oyster cultch is a precious commodity and can be hard to come by. Other regions have developed successful shell recycling programs that collect shell from area restaurants and shucking houses, clean it and sell for shelling and restoration activities. We will develop such a program in Franklin County using the Shuck and Share program (http://shuckandshare.org/) developed by the Marine Discovery Center (Volusia County, FL) as a model. Once established, this program could be further developed by the commercial sector into a profitable business, given the potential future extent of oyster reef restoration in the affected counties. Other businesses could raise disease resistant and environmentally tolerant strains of oyster spat and seed for local restoration efforts and aquaculture businesses.

(6) Community engagement through several public events at the FSUCML and partner institutions and through social media

This will include public events showcasing the research both at FSUCML and at the ANERR facility. The ABSI project updates, news and outreach events will be posted on the FSUCML's dedicated ABSI website, and will also be communicated through social media. Further, the FSUCML is well positioned geographically and scientifically to undertake public outreach and generate support for ecosystem-based oyster management and restoration in Apalachicola Bay and beyond.

ABSI Budget		
SOURCE	AMOUNT	
TRIUMPH	7,998,628	
FSU	1,500,000	
TOTAL	9,498,628	
RESEARCH and OUTREACH (R&O) TOTAL		1,480,000

R&O BREAKDOWN		
SOURCE	RESEARCH	OUTREACH
TRIUMPH	1,107,000	123,000
FSU	225,000	25,000
TOTAL	1,332,000	148,000
% R&O	90.0%	10.0%
% TRIUMPH REQUEST	16.7%	1.9%

IV. Benefit to Cost Ratio (BCR) Analysis

Here we calculate a BCR by integrating the benefit numbers derived for years 1-15 and dividing by the cost number, namely the $7,998,678 requested from Triumph Gulf Coast, Inc. The BCR formula follows: BCR = (A+B+C+D+E+F+G+H)/$7,998,678 where:

- A = **$1,500,000** direct cash cost share from FSU for staff, infrastructure and research/outreach operations in years 1 and 2.
- B = **$900,000** in external contract and grant awards in years 1-5. During the five year period FY13-17, FSUCML submitted 102 proposals and received 58 awards for a total of $6,689,336 award dollars (data are from https://www.research.fsu.edu/publications-reports/research-report-card/five-year-award-comparisons-data/). This amounts to >$1M per year. Thus, the projected additional contract and grant productivity is not unrealistic based on the track record of the unit and the growth of the faculty in the unit.
- C = **$6,136,858** from FSU in salaries and benefits from FSU for ABSI faculty and staff in years 6-15.
- D = **$4,000,000** in new contracts and grants for research in years 6-15. This is a conservative number based on parameter B above.
- E = **$40,041,600** in costs for implementation of plan to restore 485 hectares. The costs for restoration will depend on the plan as it emerges. Restorations that involve creation of sanctuary reefs with input of spat on cultch involve significant investment of resources. For instance, the Choptank River Complex effort in Maryland has restored 228.2 hectares at a cost of **$47.61M** or $206,398 per hectare[1]. On an intermediate scale, the state of North Carolina enhanced 125.1 hectares of oyster habitat, including creation of sanctuaries, at a cost of **$17.57M** or $140,448 per hectare[2]. We anticipate our restoration plan will involve a complement of approaches for identifying and monitoring closed "source" reefs, building oyster reef architecture in existing and new "sink" sites as well as creation of entirely new sanctuary sites involving construction of reefs and deployment of spat on cultch. For this BCR analysis, we have chosen $82,560 per hectare which is 40% of the extreme value above ($82,560/hectare x 485 hectares = **$40,041,600**). For every $1M spent on restoration, 15-33 jobs are created during the restoration effort[3]. This would amount to 600 to 1,320 for the proposed ABSI effort. Typically, these jobs last 18 months[3]. Furthermore, it has been reported that 80% of these jobs are above the national median wage[3]. Many of these are indirect jobs such as lawyers, professional services, boat services, lodging and a variety of other areas.[3] Kroeger (2012)[4] provides a good overview of the net economic benefits and economic impacts of restoration efforts.
- F = **$13,650,000** linked to start-ups and new businesses. Conathan et al., 2014[3] point out some examples of start-up companies derived from new technologies developed in restoration efforts. A case in point is development of an artificial substrate for reef restoration which is being utilized by a marine engineering firm in Louisiana[3]. The ABSI will invest considerable research in developing locally appropriate approaches for reef restoration and potentially developing unique strains of oysters as brood stock for restoration and aquaculture efforts. As a consequence, a variety of potential start-ups could develop from our efforts. If spat on cultch is required for the restoration effort, a large-scale, private-sector oyster hatchery would have to be developed in the bay region. This would be considerably larger than the pilot-scale facility built at FSUCML and cost upwards of $10,000,000 with an operating staff of 10 skilled personnel. In addition, this large-scale facility could produce oyster seed supporting the

development of oyster aquaculture farms in areas situated to the east and west of the bay. Rough estimates for the impact of this can be found in Appendix 3 of the ABSI application (25 starts-ups; $650,000 materials; 50 new jobs). Increased oyster landings in out-years (see parameter G below) will require creation of additional post-harvest processing capabilities in the county which could require $3,000,000 in new facilities and up to 75 new employees over time (see Appendix 3 in the original ABSI application). We err very conservatively on parameter F and count only those numbers involving construction and purchase of goods.

- G = **$18,657,000** in cumulative value of increased oyster landings. Our goal for recovery of productive oyster reefs is 485 hectares. During the period 2000-2009 oyster landings averaged 2,196,868 lbs./year while during the 2014-2017 period the landings averaged 701,568 lbs./year creating an average deficit of 1,495,300 lbs./year, which we round up to an average of 1,500,000 lbs./year [please see Appendix 1 which contains a spreadsheet generated from the FWCC site (https://public.myfwc.com/FWRI/PFDM/ReportCreator.aspx)]. Appendix 1 also shows, not surprisingly, that the estimated price per pound has been an inverse function of landing pounds for the last eight years. For the purpose of our estimate, we have chosen a constant price of $6/lb. which is not escalated over time. To estimate the projected benefit of increased oyster landings due to restoration efforts, we have projected that 50% of the above deficit will be mitigated by the long-term restoration program. This amounts to an increase in landings of 750,000 lbs./year when the restoration goal is reached. The projected benefit of such restoration is shown below. These numbers can be viewed as being somewhat conservative as indicated by the following disclaimers: (1) the restored reefs may have a higher yield per hectare, (2) the slope for extent of achievement of the restoration may, in fact, be steeper which would impact oyster landings in each year, and (3) the projections do not take into account inflationary and other escalations of price.

Projected Increased Oyster Landings and Value			
Year	Percent of Restoration Goal	Oyster Landings (lb.)	Value (@ $6/lb.)
9	15	112,500	$675,000
10	30	225,000	$1,350,000
11	45	337,500	$2,025,000
12	60	450,000	$2,700,000
13	75	562,500	$3,375,000
14	90	675,000	$4,050,000
15	100	750,000	$4,500,000
			$18,675,000

Disclaimer #1 above can easily be defended. Grabowski et al. (2012)[5] indicate that the average harvest value of “pristine” oyster reefs in Virginia and North Carolina in 2011 dollars is $51,217 per hectare. If similar densities can be achieved in target restoration goal in ABSI, the oyster landings could be potentially higher. Disclaimer #3 relates to potential impact of demand increases and branding on price which, obviously, cannot be easily predicted.

- H = **$20,673,231** in cumulative, increased ecosystem services from the bay associated with achieving the target restoration goal. Ecosystem services from oyster reefs include water

quality improvement, seashore stabilization and erosion control, carbon sequestration, architectural complexity that creates refuge and nursery habitat for fish and invertebrates, increased biodiversity and landscape diversification. Grabowski et al. (2012)[5] document the published research on each of these services and discuss the bioeconomic model valuation method employed. They estimated that the economic value of ecosystem services provided by oyster reefs was between a $5,500 minimum and a $99,000 maximum per hectare per year not including the value of the oyster harvest. The most likely value between the two extremes was estimated to be $10,325. Our calculations for the value of ecosystem services have used this number and have been scaled to the projected timing of the extent of restoration relative to our goal. This is shown below.

Value of ecosystem services scaled to extent of reef restoration

Year	Percent of Restoration Goal	Restored Oyster Reefs (hectares)	Ecosystem Services Realized (@ $10,325/hectare/year)
9	15	73	$751,144
10	30	135	$1,393,875
11	45	218	$2,253,431
12	60	291	$3,004,575
13	75	364	$3,755,719
14	90	437	$4,506,862
15	100	485	$5,007,625
			$20,673,231

The calculation of the BCR, based on the sum of the benefits (parameters A-H), then results in ($105,558,689)/($7,998,678) = ~13.2.

V. FSU's Match Computations

1. Cash cost-share: **$1,500,000**

2. New grants & contracts: **$4,900,000** (see rationale in discussions of parameters B and D above)

3. Salaries of permanent staff (years 6-15) hired using Triumph funds during years 1-5: **$6,136,858**

4. FSUCML faculty and other staff funded by FSU funds but contributed as a portion of their effort to the ABSI: Here we allocated the effort of the FSUCML faculty and staff funded by FSU sources to the ABSI project and multiplied this percent effort times the annual salary and fringe benefits of each. We have chosen to count only the salary match for these individuals for years 1-5.

Match Contribution of FSU-Funded FSUCML Personnel Based on Percent Allocation of their Effort to ABSI*							
SECTION	POSITION	Year 1	Year 2	Year 3	Year 4	Year 5	5 Year Total
Faculty	Triumph Sci. Director	$ 33,728	$ 36,426	$ 39,340	$ 42,487	$ 45,886	$ 197,868
Faculty	Director FSUCML	$ 80,414	$ 60,793	$ 65,656	$ 70,909	$ 76,581	$ 354,352
Faculty	Faculty	$ 6,654	$ 7,186	$ 7,761	$ 8,382	$ 9,053	$ 39,036
Faculty	Faculty	$ 5,530	$ 5,972	$ 6,450	$ 6,966	$ 7,524	$ 32,443
ADMIN	Facilities Director	$ 36,400	$ 37,492	$ 38,617	$ 27,843	$ 28,678	$ 169,030
Marine Ops	Mar. Tech	$ 16,198	$ 16,684	$ 17,184	$ 17,700	$ 18,231	$ 85,997
FACILITIES	SW Sys Tech	$ 13,794	$ 14,208	$ 14,634	$ 10,049	$ 10,350	$ 63,035
FACILITIES	Carpenter	$ 16,666	$ 17,166	$ 17,681	$ 12,141	$ 12,506	$ 76,161
FACILITIES	Mech. Trades	$ 18,749	$ 19,311	$ 19,891	$ 10,244	$ 10,551	$ 78,745
FACILITIES	Custodian	$ 5,720	$ 5,892	$ 6,068	$ 4,688	$ 4,828	$ 27,196
Marine Ops	Small Boats	$ 6,303	$ 6,492	$ 6,687	$ 4,592	$ 4,729	$ 28,803
	TOTAL	$ 240,156	$ 227,623	$ 239,970	$ 216,000	$ 228,917	**$ 1,152,667**
*Spreadsheet avaialble							

5. Unrecovered indirect costs: FSU is not recovering indirect costs for the ABSI project. We choose here to count as unrecovered indirect costs for administrative services which are capped at 26%. Here we exclude renovations ($750,000), pilot-scale oyster hatchery ($3,350,000), contingency ($250,000) and the FSU cash cost-share ($1,500,000) which leaves $3,873,678 as the basis for the unrecovered indirect cost calculation (0.26 x $3,873,678 = **$1,007,156**).

FSU Match Summary	
Component	Match Amount
Cash Cost-Share	$1,500,000
New Grants & Contracts	$4,900,000
Salaries of ABSI Staff (Years 6-15)	$6,136,858
FSUCML Staff Supporting ABSI Effort (Years 1-5)	$1,152,667
Unrecovered Indirect Costs	$1,007,156
TOTAL	**$14,696,681**

FSU match to Triumph cost ratio:

$14,696,858/$7,998,678 = 1.84

(for every $1 invested by Triumph Gulf Coast Inc., FSU will be contributing $1.84)

VI. Performance Targets

1. New businesses developed and start-ups

- 25 small oyster aquaculture operations with two employees each
- Full scale oyster hatchery with capacity to provide spat on cultch for restoration and seed for aquaculture
- Cultch (oyster shell) recycling, processing, storage and transport businesses to provision the pilot-scale and full-scale oyster hatcheries (for instance see the Chesapeake Bay effort https://oysterrecovery.org/sra/)
- New post-harvest processing facility
- Potential start-ups exploiting new technologies for restoration and aquaculture

- New ecotourism companies

2. Raising incomes above Franklin, Gulf and Wakulla average- Average earnings per job in these counties in 2015 ranged from approximately $33,000 to $37,000 (see Appendix 3 in the ABSI full proposal). The ABSI will raise incomes above the average in the following ways:

- **Seven full-time employees** at FSUCML will be hired at an average salary of $63,950 per year.
- Projected restoration efforts will involve investment of $40M in new funds to the region. Per parameter E above in the BCR calculation, for every $1M invested in restoration 15-33 jobs will be created. Of these, 80% will be above the national median wage which brackets the tri-county average wage (above). If we use the minimum job creation factor, this means that 600 x 0.8 = **480 jobs** will be created above the average wage.
- Projected number of small oyster aquaculture start-ups with two employees each = 25. This yields **50 jobs** at an average salary of $42,000.
- Large-scale oyster hatchery with **10 employees**. Average salary of FSUCML pilot-scale hatchery staff is $44,500.
- There will be $3M expended to construct the pilot scale oyster hatchery at FSUCML and the potential for $10M and $3M in the construction of large scale oyster hatchery and post-harvest processing facility, respectively. This amounts to $16M in construction. The industry multiplier is 24 jobs per $1M for a year. Therefore, **384 jobs** will be created, most likely above the average wage for the tri-county region.

VII. IMPLAN Models for Economic Impact of Restoration Efforts

The economic impact of coastal restoration has been modeled using IMPLAN (http://www.implan.com/). This effort included job creation associated with planning and design, implementation and construction and operations and monitoring. Edwards et al. (2013)[6] provide a good discussion of direct and indirect job creation in restoration efforts using IMPLAN impact analysis.

VIII. ABSI as a Self-Sustaining Effort

In year 6 of the ABSI effort, Florida State University will assume responsibility for the salaries of the two permanent faculty and five staff members hired initially using Triumph Gulf Coast Inc. funding. The total cost for year 6 will be $536,241; $6,136,858 total for years 6-15. Facilities and other infrastructure created in the ABSI effort will be maintained through resources from requested plant operations and maintenance (PO&M) funding from the University, leveraging existing FSU-funded supported staff on site. Operating funds in out-years for research, restoration and outreach will be derived from external contract and grants secured by FSUCML faculty, faculty from the main FSU campus and a broad range of external partners. The ABSI will serve as a nucleating agent for developing partnerships supporting the recovery of Apalachicola Bay. The research, restoration and outreach efforts supported by Triumph Gulf Coast and the FSU cost-share will be leveraged to develop a broad team of regional, state and national partners that will seek funding for the long-term efforts required to restore and maintain the Bay. The

scale of the funds as indicated in parameter E (see above BCR analyses) is substantial and realistic given restoration efforts that have taken place along the upper Atlantic Coast.

Citations

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5. Grabowski, J.H., R.D. Brumbaugh, R.F. Conrad, A.G. Keeler, J.J. Opaluch, M.F. Piehler, S.P. Powers and A.R. Smyth (2012) Economic valuation of ecosystem services provided by oyster reefs. Bioscience **62**: 900-909.
6. Edwards, P.E.T., A.E. Sutton-Grier and G.E. Coyle (2013) Investing in nature: Restoring coastal habitat blue infrastructure and green job creation. Marine Policy **38**: 65-71.

Appendix 1: Florida Fish And Wildlife Conservation Commission

Commercial Landings Summary

Years: 2000 - 2017

Species: OYSTERS

Subject to Revision

Years before 2017 are final

Report created: May 10, 2018

Year	Pounds	Average Price
2000	2475666	1.52
2001	2481654	1.5
2002	1871556	1.61
2003	1542726	1.66
2004	1561507	1.76
2005	1408108	2.02
2006	2358009	2.26
2007	2978964	2.24
2008	2475480	2.19
2009	2815015	2.43
2010	2107520	2.92
2011	3056716	2.77
2012	3230900	2.93
2013	1236109	4.49
2014	662705	5.5
2015	660453	5.58
2016	734651	6.09
2017	748464	6.3

2000-2009 average landings = 2,196,868 lbs./year

2014-2017 average landings 701,568 lbs./year

Deficit = 1,495,300 lbs./year