Attachment 3
PPBEP COMMUNITY GRANT FINAL REPORT FORM

Agreement No.:	FY2022-08		
Grantee Name:	University of South Alabama		
Grantee Address:	University of South Alabama, Mobile Alabama		
Grantee's Representative:	Ronald Baker	**Telephone No.:**	251-861-2141
Project Title:	Fish communities on remnant and restored oyster reefs of East and Escambia Bays: a baseline for assessing restoration success		
Please submit any high-resolution photos related to the project, if available (include photo credit for possible use by PPBEP for use in our e-newsletter, annual report, social media, or website) with your report as image files to lmcdonald@ppbep.org.			

RESULTS: Describe the progress made toward the goals and objectives as stated in the funded grant application.

The stakeholder meeting in early October identified preferred target sampling sites in East Bay. Evaluating the success of existing restoration projects at enhancing fish habitat is a critical component of guiding future restoration efforts that wish to maximize fish habitat benefits, and returns on restoration investment. Such information could potentially add to the oyster restoration prioritization tool as well as providing a baseline from which to monitor fish communities under further oyster restoration in the bays.

Fall 2021 field sampling occurred in October (5 days) and resulted in 83 successful replicate point-census samples from 9 reefs in East Bay (Fig. 1). An additional 50 visibility drops were made to assess visibility at each site, along with a further 23 point census samples that proved to have poor visibility and were excluded from the analysis. The total number of samples (visibility and census) was 156. Spring 2022 field sampling occurred in May (5 days) and resulted in 30 successful replicate point-census samples from 3 reefs in East Bay (Fig. 1). An additional 39 visibility drops were made to assess visibility at each site, along with a further 37 point census samples that proved to have poor visibility and were excluded from the analysis. The total number of samples (visibility and census) was 76.

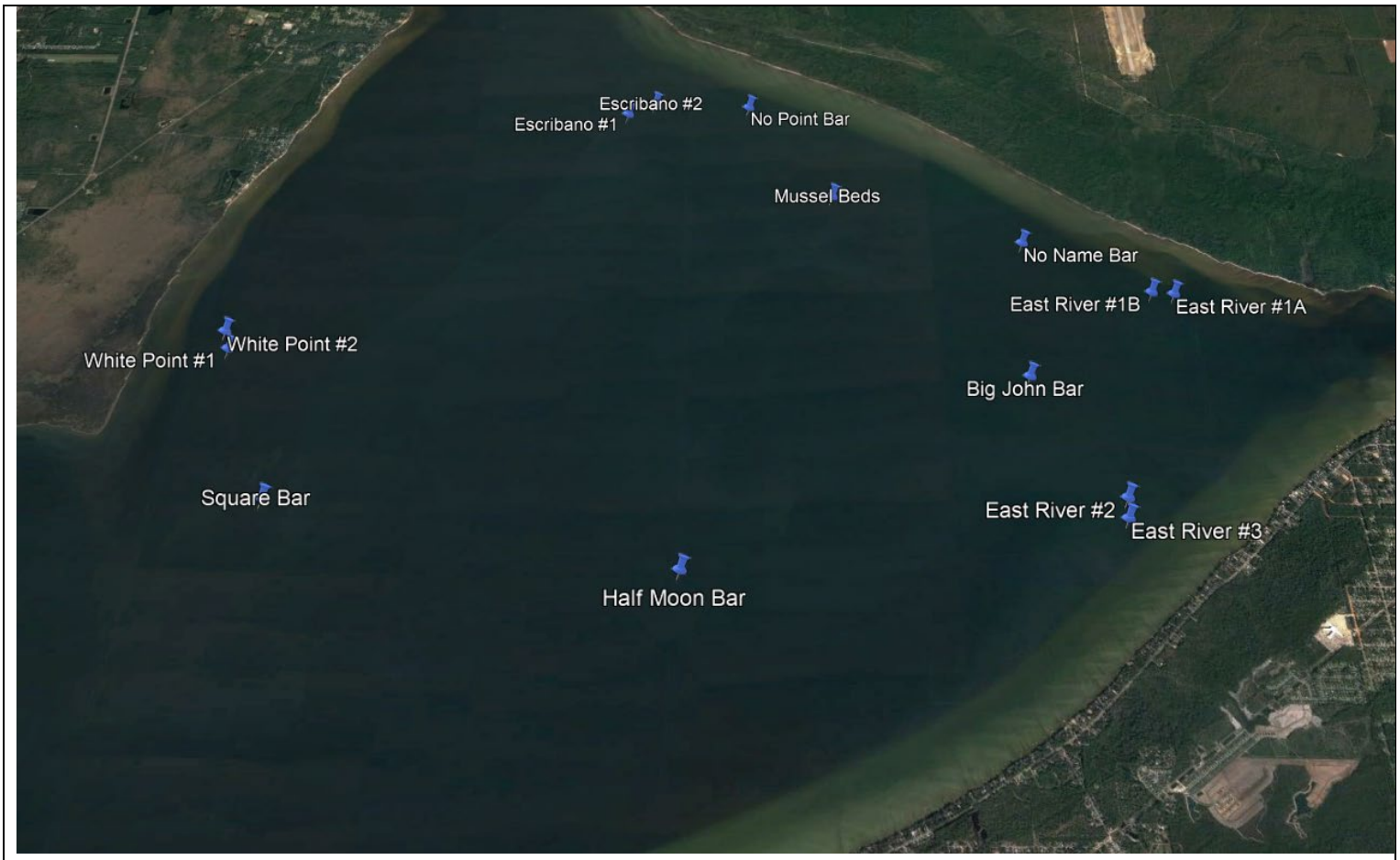

Figure 1: Oyster reefs in East Bay, Florida, sampled by underwater video to census fish and invertebrate communities during Fall 2021 and Spring 2022. Details of successful sample sizes collected form each reef are provided in Table 1.

In Fall 2021, at least 17 species of fish including 2 gar (*Lepisosteus* spp.), 1 species of stingray (7 individual sightings), 3-4 taxa of crabs, and 1 bull shark were observed in the videos (Table 1). The most frequently observed taxa was Gobiidae/Bleniidae (not possible to distinguish between these families in videos), followed by the hardhead catfish *Ariopsis felis*. Other species of interest to fisheries included the sheepshead *Archosargus probatocephalus*, the Atlantic spadefish *Chaetodipterus faber*, and the grey snapper *Lutjanus griseus*. Animals were recorded from 89% of successful videos, while 11% were empty. In Spring 2022, at least 3 species of fish, 1 stingray, 2 taxa of crabs, and Ctenophores were observed in the videos. The most frequently observed species was the hardhead catfish *Ariopsis felis*. Other species of interest to fisheries included Carangids (Jacks, Pomanos, etc.). Animals were recorded from 63% of successful videos, while 34% were empty.

Table 1: The occurrence of animals in underwater video surveys of oyster reefs in East Bay, Pensacola, Florida, during Fall 2021 and Spring 2022. Values represent the % of total videos by site in which each taxon was observed. Sample size (number of replicate video samples) is provided below site names, as well as the number of videos in which no animals were recorded (empty samples).

	Season Year	Fall 2021	Fall 2021	Fall 2021	Fall 2021	Fall 2021	Fall 2021	Fall 2021	Fall 2021	Fall 2021	Spr 2022	Spr 2022	Spr 2022
	Reef name	Big John Bar	Mussel Beds	No Name Bar	No Point Bar	White Point #1	White Point #2	East River #2	Half Moon Bar	Square Bar	East River #2	Half Moon Bar	Square Bar
	Samples per reef	6	10	11	4	6	8	15	12	11	11	12	7
	Empty samples per reef	*3*	*5*	*4*	*2*	*2*	*3*	*7*	*1*	*4*	*3*	*6*	*2*
Species (Scientific name)	Species (Common name)												
Osteichthyes													
Ariopsis felis	Hardhead catfish	16.7	-	30.8	-	16.7	40.0	6.7	58.3	-	9.1	8.3	64.7
Goby/blenny	Goby/blenny	-	10.0	-	-	-	-	87.3	73.1	41.7	-	-	-
Archosargus probatocephalus	Sheepshead	-	-	36.4	25.0	-	22.2	-	-	-	-	-	-
Orthopristis chrysoptera	Pigfish	-	-	16.7	-	16.7	-	6.7	41.7	-	-	-	-
Chaetodipterus faber	Atlantic spadefish	-	-	23.1	-	-	-	17.6	-	-	-	-	-
Lutjanus griseus	Grey snapper	-	-	-	-	37.5	-	-	-	-	-	-	-
Cynoscion nebulosus	Spotted sea trout	-	-	-	-	16.7	-	-	-	9.1	-	-	-
Lagodon rhomboides	Pinfish	-	-	9.1	-	-	-	-	-	16.7	-	-	-
Lepisosteus spp.	Gar	16.7	-	9.1	-	-	-	-	-	-	-	-	-
Leiostomus xanthurus	Spot	-	-	18.2	-	-	-	6.7	-	-	-	-	-
Gerreidae	Mojarras	-	-	-	-	-	-	-	21.4	-	-	-	-
Remora remora	Remora	-	-	-	-	16.7	-	-	-	-	-	-	-
Clupeidae	Herrings, shads, etc.	-	10.0	-	-	-	-	-	-	-	-	-	-
Engraulidae	Anchovies	-	10.0	-	-	-	-	-	-	-	-	-	-
Opsanus sp.	Toadfish	-	-	-	-	-	-	-	-	-	9.1	-	-
Carangidae	Jacks, pompanos, etc.	-	-	-	-	-	-	-	-	-	-	8.3	-
Lepisosteus osseus	Longnose gar	-	-	-	-	-	-	-	8.3	-	-	-	-
Pogonias cromis	Black drum	-	-	-	-	-	-	-	8.3	-	-	-	-
Scomberomorus maculatus	Spanish mackerel	-	-	-	-	-	-	-	8.3	-	-	-	-
Mugil sp.	Mullet	-	-	-	-	-	-	6.7	-	-	-	-	-
Unidentified fish		16.7	10.0	33.3	-	16.7	-	6.7	23.1	-	-	-	14.3
Elasmobranch													
Hypanus sabinus	Atlantic stingray	-	10.0	-	25.0	-	-	6.7	-	-	-	8.3	-
Hypanus spp.	Stingray	-	25.0	-	-	-	-	-	-	9.1	-	-	-
Carcharhinus leucas	Bull shark	-	-	-	-	-	12.5	-	-	-	-	-	-
Crustaceans													
Xanthidae or Menippidae	Stone/mud crabs	-	-	-	-	-	-	6.7	46.7	16.7	18.2	-	40.0
Paguroidea	Hermit crab	-	20.0	-	-	-	25.0	6.7	64.3	-	-	8.3	-
Callinectes sp.	Blue crabs	-	-	-	-	-	-	6.7	-	-	-	-	-
Unidentified crabs	unknown	-	-	-	-	-	-	20.0	38.5	36.4	-	8.3	-
Other													
Ctenophora	Comb jelly	-	-	-	-	-	-	-	-	-	62.5	33.3	28.6

Note that due to limited visibility and the nature of video sampling, it is not always possible to identify organisms to species level. For each observation, only the identifying features in the field of view are used for identification, and no assumptions are made based on closely related species observed in the same video.

MaxN data was also recorded from each video, being the maximum number of each taxon seen in a single frame in each video. This provides a conservative abundance estimate that eliminates the possibility of counting the same individual multiple times if it enters and leaves the field of view. Summary and analysis of the MaxN data will be completed after QAQC is finalized. In addition, we are exploring metrics of habitat quality based on the substrate visible in the field of view of each sample, and will indicate the nature of the substrate as e.g. mud, sand, cobble, oyster shell, live oyster. High resolution images and short video clips are being prepared to submit to PPBEP.

IMPACT: Summarize the organization's key evaluation results related to the funded grant (number of people reached, samples taken, etc.):

In Fall 2021, a total of 156 video samples were collected, including 83 successful census videos, 50 visibility videos, and 23 unsuccessful census videos (poor visibility). Census videos files are ~15 minutes long while visibility videos are 2-5 minutes and smaller. In Spring 2022, a total of 76 video samples were collected, including 30 successful census videos, 39 visibility videos, and 37 unsuccessful census videos (poor visibility). Census videos files are ~15 minutes long while visibility videos are 2-5 minutes and smaller. The total dataset amounts to almost 1.3 TB of video files, many of which are of limited visibility. All files can be transferred to PPBEP for reference and outreach, and we are currently working on editing short clips from high visibility videos showing interesting animals observed during the study

Funding from this project supported one University of South Alabama undergraduate student where he gained skills and experience in field surveys, the use of underwater video, and data processing and management.

The completed analysis of the data from this project together with data from the previous Community Grant will provide insights into the factors regulating fish communities on oyster reefs of East Bay, and help guide prioritization of future restoration in the bay. These data also help assess the success of restoration projects in enhancing fish habitat. The research could also be expanded to monitor fish communities in Pensacola and Perdido Bays more generally.

SUCCESSES AND CHALLENGES: Describe the significant successes and challenges the organization experienced related to the funded grant.

Rough weather, heavy rainfall and river flows, and the ongoing oyster reef restoration in East Bay combined to limit visibility and sampling opportunities during the fall and spring. In October 2021, barges were over Escribano Reef #1 & 2, making the site unsamplable. By May 2022, several barges were present along the eastern shoreline of East Bay. During this sampling period we experienced the worst visibility in the Bay we have seen to date. As is to be expected, visibility is the major limiting factor for video sampling. On May 17, 2022, visibility was found to be too poor for any successful sampling, while on many others, some sites had suitable visibility while others did not. As a result, much time was spent traveling between sites and testing visibility conditions. Efforts to maximize the sample size meant that a significant number of census videos were collected but subsequently excluded from analyses due to poor visibility (n = 60). Although the video sampling protocol allows for high levels of replication, the number of samples collected is significantly reduced during times of poor or marginal visibility when much time is spent searching for sites that can be sampled.

LESSONS LEARNED: Describe what the organization learned based upon the results, successes, and challenges reported. Address programmatic, evaluative, or organizational changes that will be made based upon these lessons learned.

Despite the challenges posed by marginal or poor visibility conditions experienced during the project period, we successfully collected a reasonable sample size using the underwater video sampling technique. Coupled with the data from a previous grant, findings will help guide future restoration in the bay, and provide a baseline for ongoing monitoring of fish communities on these restored reefs.

This report is submitted in accordance with the reporting requirements of Agreement No. FY2022-08 and accurately reflects the activities associated with the project.

6/15/2022

Signature of Grantee's Representative

Date

Ronald Baker, PI. Assistant Professor, USA

Print Name and Title