

## **American Oystercatcher Habitat Restoration in Florida**

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Duration 2011-2013

The American oystercatcher (*Haematopus palliatus*, AMOY) is a species of high conservation concern due to its small population, its declining trend and widespread degradation of its coastal habitat. The species is listed in Florida, and restoration of its wintering habitat is a key conservation strategy (FWC 2011). American oystercatchers migrate from Atlantic and Gulf coast breeding sites to coastal wintering sites on both the south Atlantic and Gulf of Mexico (Nol and Humphrey 1994). Two major aggregations exist in the range of this species: Cape Romain, South Carolina, and the area of the Florida Gulf Coast from Crystal River to Horseshoe Beach (Big Bend). The Big Bend has the largest undeveloped section of coastline in the continental United States, and is likely to remain undeveloped because of public ownership of much of the coast and lack of beaches. This area is also part of the Gulf coastal region that contains over 90% of the remaining healthy oyster reef habitat in the world (Beck et al. 2009). Banding data indicates the Big Bend supports wintering AMOY from nearly all Atlantic coast states, and the geographic and ecological separation of this area from Cape Romain makes it an independent and critical conservation unit. While considerable effort has been focused on breeding habitat conditions for this declining species, little has been devoted to understanding or improving wintering habitat, and none has been directed at the Gulf coast (Schulte et al. 2007). There is little information about this area's wintering aggregation other than the approximate annual size of the group (~900-1300 birds), some spring high tide roost locations, and limited mark-resight data. It is unclear what characteristics of the Big Bend oyster complexes are of nutritional and habitat value to AMOY, and this information is critical to modeling effects of sea level rise (SLR) and other processes on habitat dynamics.

Although the location of wintering AMOY concentrations in a highly conserved and undeveloped part of the coast is encouraging, there has been a well-documented decline in the extent of oyster reefs in the Big Bend area since the 1970s (Baker et al. 2003, Bergquist et al. 2006). Research suggests that the causes are likely a mix of coastal erosion and related sedimentation exacerbated by SLR, and poor recruitment and survival of oysters due to disease, substrate, and freshwater discharge (Baker et al. 2003). Much of the loss of oyster reefs has been on the most productive offshore areas, which may be particularly important for feeding and roosting by AMOY (Nol and Humphrey 1994). The documented decline in habitat quantity leaves the possibility that foraging habitat for AMOY in the Big Bend was formerly higher than at present, and consequently, that restoration efforts could markedly affect both the size of the wintering population and overwinter survival.

Concerns about the declines in oyster habitat have spawned new and ongoing studies of oyster habitat dynamics in the Big Bend (University of Florida, US Fish and Wildlife Service), with an immediate goal (6 – 12 months) of identifying the relative importance of different causes of decline and an eventual goal (1 – 2 years) of developing management strategies for buffering

or reversing decline. This UF oyster project (hereafter oyster project) has established monitoring sites at 36 stations over a 40-km section of coast, designed to measure responses to gradients of salinity, wave energy, harvest pressure, tide level and flow rates in a way that tests various hypotheses about mechanisms of oyster decline. Response variables include oyster density, size distribution, recruitment rates, and live/dead ratios. At a larger scale, the oyster project is analyzing aerial and satellite information from over 40 years to determine trends and geographic patterns in losses and growth of oyster reef habitat. From this project, collaborators plan to develop hypothesis-driven models of oyster dynamics, with specific restoration efforts in mind.

Restoration and mitigation efforts are likely to involve building or rebuilding oyster reefs using a combination of techniques, including terraforming by heavy equipment and depositing oyster “building blocks.” Clam aquaculture is an important industry in the area, with clams grown in bags on sandy subtidal areas. Over 15,000 “derelict” or abandoned bags have become heavily encrusted with oysters and other bivalves and are considered nuisances on the leases. They constitute 2 – 300 pound building blocks of live oysters that can be used to create solid reef structure. Fisheries and conservation communities have a strong interest in restoration of oyster habitat in the Big Bend, with one pilot project using derelict clam bags completed, permits for restoration activities in place, and a proposal submitted for more scaled-up restoration activities. However, the location and focus of reef-building activities is subject to uncertainties about the relative roles of SLR, freshwater inputs, and other factors. While many of these uncertainties are being addressed by the oyster project directly, the restoration timing is such that this effort can be directed specifically to include AMOY habitat improvement.

In order to improve AMOY habitat, it is critical to define the characteristics of both roosting and feeding habitat. While roosting and feeding habitat have been generally described for the species, they have not been described for the Gulf coast of the US, and there are important differences in tidal range, reef morphology, growth rates and recruitment processes between Atlantic and Gulf coasts (Hand 2008, Thibault 2008). Further, habitat restoration will likely be expensive and must be targeted in a way that makes the effort resilient to future effects of SLR and altered freshwater flows. For these reasons, it seems particularly efficient to couple the objectives of the oyster project with specific habitat needs of AMOY in the Big Bend in this project (Phase 1). Phase 2 of the AMOY project will be to monitor the effects of specific and geographically targeted AMOY roost and foraging habitat restoration.

During Phase 1, we plan to 1) determine characteristics of AMOY foraging and roosting habitat in the Big Bend, 2) determine the most resilient places to perform habitat restoration and enhancement, and 3) develop a habitat restoration plan in concert with interested management agencies and stakeholder groups. In Phase 2, which will follow the completion of Phase 1 in 2012, we plan to 4) perform the restoration, and 5) monitor responses of AMOY and restored habitat. The use of a phased approach allows for the uncertainties in location and type of restoration activities, which will be addressed through Phase 1 activities and activities associated with an ongoing oyster research project. The study design of phase 2 depends too much on the results of Phase 1 and the concurrent project on oyster reef dynamics to be accurately developed at the moment. Here, we describe proposed activities and products for Phase 1 and, in less detail, project the likely goals and activities for Phase 2.

### **Objectives of Phase 1:**

1. Identify coarse and fine-scale features of roosting and feeding habitat within the oyster reef complexes of the Big Bend that are biologically important to wintering AMOY.
2. In collaboration with concurrent oyster research efforts, determine the likely future effects of SLR on AMOY habitat requirements and determine the most resilient places to restore AMOY habitat.
3. Use the information from objectives 1. and 2. to develop a plan for restoration and expansion of oyster habitat that may increase overwinter survival of AMOY.

### **Objectives of Phase 2 (to be submitted in 2012):**

1. Collaborate with management and funding agencies, local oyster harvest groups and the UF oyster project to implement the habitat restoration plan.
2. Measure characteristics of restored AMOY habitat.
3. Monitor responses of AMOY to restored habitat and near-term quality of restored habitat.

#### **American Oystercatcher Monitoring**

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Participants: Pat and Doris Leary, Florida Shorebird Alliance Partners

Duration – ongoing as resources are available

### **OBJECTIVES**

1. Within the Florida mark-resight study, estimate wintering and breeding AMOY apparent survival rates, population size, realized population growth rate and habitat use.
2. Determine site fidelity of nesting birds.
3. Monitor marked birds to determine distribution and movement patterns of Florida reared birds.
4. Band young and adults at the nest and determine areas suitable for conservation and management activities.