Implications of Beach Restoration on Piping Plover *(Charadrius melodus)* in Louisiana at the Caminada Headland Beach and Dune Restoration Projects (BA-45/BA-143)

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Introduction

Currently in construction, the Caminada Headland Beach and Dune Restoration Projects (BA-45/BA-143) in Lafourche Parish, Louisiana are designed to protect and preserve the structural integrity of the barrier shoreline and provide for restoration of geologic and ecosystem processes such as longshore transport and overwash. Benefits of restoring the headlands Gulf shoreline would protect and sustain significant and unique coastal habitats important to the threatened and endangered populations of Piping Plover *(Charadrius melodus)*.

Figure 1: Caminada Headland Beach before start of construction (left) and as of March 13, 2014 (right).

Methods

Following the Louisiana Piping Plover Non-Breeding Season Survey Guidelines, the study site is divided up into 4 - 5 sections and is surveyed on foot. Surveyors walk the length of each section, using binoculars and spotting scopes to identify target species and document band combinations.

Data collected includes: number of individuals, coordinates, location on the beach, activity, color band combinations and photographs.

Figure 2: Surveyor using spotting scope to identify target species.

On April 1 & 2, 2013, 28 pre-construction benthic samples were collected at 4 sites and analyzed for population, density, diversity and total biomass of infaunal organisms known to be prey items for shorebirds. The following year, these 4 sites were re-visited to assess changes in the macro-invertebrate population structure. Nine additional sites, including 3 bay stations, were surveyed to provide a baseline for additional restoration. Only 14 of the 70 samples collected in 2014 consisted of newly constructed beach. Additional post construction benthic analysis will also be performed.

Preliminary Results

Twice monthly surveys were initiated on January 11, 2013 with construction activities commencing in May 2013 on the Caminada Headland. Forty-six surveys have been executed as of May 6, 2015. An average of 94 Piping Plover were detected per survey, with a range from a low of 0 to a high of 147. A total of 84 re-sighted color banded birds have been recorded. On average, 25 marked individuals are observed per survey.

Census numbers thus far have not indicated major changes in the number of birds encountered between pre-construction and active construction areas. Preliminary data of resighted banded Piping Plover show many of the birds exhibit site fidelity (n=33), with individual site usage ranging from 19.47 km to 0.35 km.

Figure 3: Clockwise from top left: Banded Piping Plover foraging, Surveyor collecting intertidal core sample, Polychaete, Amphipods.

Benthic sampling indicated that *Scolelepis squamata* and *Lepidactylus triarticulatus*, which are common inhabitants of intertidal and near-shore benthic habitats from the barrier island and mainland beaches from the Florida panhandle area to Texas, likewise dominated the intertidal benthic community at Caminada Headland Beach. Overall, macro-benthic density values were higher in 2013. The 2014 benthic analysis of the 2 sites surveyed both pre and post construction, only represents a post fill time frame of 4 months and 8 months. Additional benthic samplings are scheduled post construction.

Thus far, surveys indicate active restoration has caused no Piping Plover "incidental takes". Additionally of note, on the September 11, 2013 survey, Piping Plover on the construction site were located foraging directly along the Gulf shoreline with Wilson's Plover, Snowy Plover, Black-bellied Plover and Sanderlings where water was slowly seeping from the dredge outfall area ~91 meters from major construction activities.

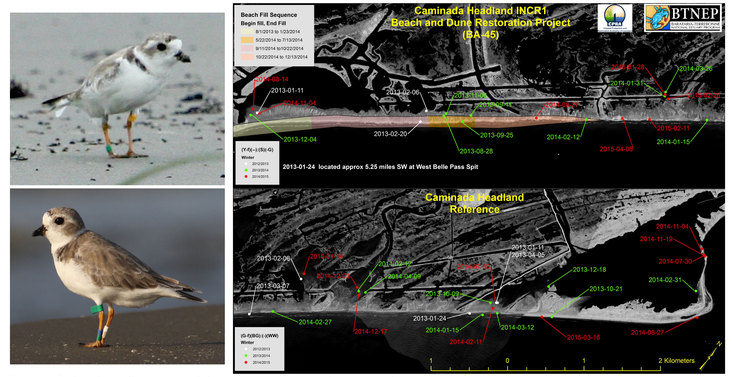

Figure 4: Distribution of two representative individuals in project area and reference.

Conclusion

Preliminary results indicate that survey intensity is capturing consistent Piping Plover numbers and that the regular surveys have determined not only numbers of birds but patterns of usage as well. Indications are also that the construction activities along the initial area of the Caminada Headland have had little impact to wintering Piping Plovers. Further analysis of the surveys should provide valuable indications of changes in Piping Plover as well as benthic community distributions and potential for future use of the restored shoreline.

Determining short-term impacts of active barrier island restoration projects on the threatened and endangered Piping Plover could have consequences for future barrier island restoration as most beaches along the state are considered critical habitat for this particular species and are included in Louisiana's Comprehensive Master Plan for a Sustainable Coast. Shoreline restoration projects have become larger, leading to increased construction durations. These increased durations could mean increased disturbances throughout multiple wintering seasons. Results of this project will help in development of best management practices (BMP's) available to the State for construction activities, as well as help regulators better access actual shorebird use and possible impacts of construction activities.

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