SURVEY OF SEAGRASS BEDS AT PLACEMENT AREA 62, WEST BAY CONTRACT FOR GIWW, TEXAS CAUSEWAY U. S. ARMY CORPS OF ENGINEERS CONTRACT NO. W912HY-10-C-0036

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TABLE OF CONTENTS

ABSTRACT:

This report presents methods and findings of an approximate 383-acre seagrass survey conducted at Corps of Engineers Placement Area (PA) 62 and an additional 500 foot beyond the bayward limits of PA 62. The seagrass survey included 417 quadrat samples along 13 transects within the survey area. Elevations of the 383-acre survey area were mapped on a 100-ft grid to establish 0.5 Ft contours. This topographic survey included seagrass beds and the submerged portion of PA 62. Four evenly spaced sediment samples taken from each of the 13 transects were collected and tested. A total of 52 sediment samples were examined. Seagrass was observed in 75% of the quadrats. Shoalgrass (*Halodule wrightii*) was found in 74% of the samples while clover grass (*Halophila englemannii*) was present in 13%. Elevations in existing seagrass areas ranged from -0.2 ft NAVD 88 to -3.2 ft NAVD 88. Soils in the survey area were predominantly fat and lean clays and sand. Prior to initiation of this survey, some dredged material was placed on an approximately 57 acre area at the western end of PA 62. In the area impacted by dredge material (Transects 10 & 11) 74% (165 of 222) of the samples contained seagrass roots and rhizomes. This report quantifies the extent of existing seagrass beds within the survey area and documents the density, abundance, and frequency of seagrasses by species as well as seabed elevations and composition prior to the placement of material from maintenance dredge operations of the GIWW. Readily available aerial photographs from 2005-2011 were examined to estimate the rate of seagrass development at PA 62 and PA 63. The results of this survey will be compared to results of a post-construction survey to estimate actual impacts to seagrass. Additional follow up survey may be performed and compared to the results of this report to document seagrass recovery.

1.0 INTRODUCTION:

This seagrass survey was authorized by the USACE to collect baseline data at Placement Area (PA) 62 prior to placement of dredge material from the GIWW. The vicinity, location and approximate boundary of the seagrass survey area are included in Appendix A, Figures 1, 2 and 3. The GIWW dredging project is part of regular authorized maintenance of the channel to ensure adequate depths are maintained. The hydraulically dredged material will be placed in various disposal sites including PA 62 as shown in Appendix A, Figures 1-3. The approximately 383-acre seagrass survey area Belaire Environmental, Inc. (BEI) surveyed includes the submerged portion of PA 62 plus 500 feet beyond the bayward limits of PA 62. The purpose of the seagrass survey was to map the full extent of the seagrass beds and to document the density, abundance and frequency of seagrasses by species, as well as to map the seabed elevation in 0.5 Ft contours. This survey data, combined with sediment testing will aid in determining the effect of dredge material on existing seagrass beds as well as the migration of placed dredged material. BEI personnel sampled along 13 transects within the approximately 383-acre survey area (Appendix A, Figure 3). BEI used the techniques developed by Fourqurean et al (Fourqurean, J. W., A. Willsie, C.D. Rose, and L.M. Rutten. 2001. "Spatial and Temporal Patterns in Seagrass Community Composition and Productivity in South Florida. Marine Biology Journal 138:341-354) to conduct the seagrass survey. BEI personnel, directly responsible for the data collection were Charles Belaire, Royce Williams, Bobby Forbes, Zac Giessel, Dean Adamson, Rich Coan, and Mike Walston. The data analysis and report were the responsibility of Charles Belaire, Andrea Binion, Royce Williams, Zac Giessel and Kara Thompson. The seagrass sampling, topographic survey, and sediment sample collection were conducted concurrently between January 9 and January 15, 2012. The following sections of this report provide a description of the

environmental setting, methodology, results and conclusions of BEI's field investigations.

2.0 ENVIRONMENTAL SETTING:

The survey area is situated between the Gulf Intracoastal Waterway (GIWW) to the west and West Bay to the east in Galveston County, Texas. To the west of PA 62 the mainland is undeveloped ranch land. West Bay is situated landward of Galveston Island, and receives runoff from Chocolate Bayou, Mustang Bayou and other local bayous (Lester, 2002). West Bay is bounded by San Luis Pass to its south and Galveston Causeway to the north, where it meets with Galveston Bay (Leatherwood, 2010). West Bay's main extension is Christmas Bay, which extends south into Brazoria National Wildlife Refuge. Other extensions include Chocolate Bay to the west, Jones Bay to the north, and Bastrop Bay to the south (Leatherwood, 2010). Overall, the bay covers roughly 39 square miles and ranges from four to six feet in depth (Lester, 2002). The water quality of the survey area is good as evidenced by the presence of submerged aquatic vegetation (TCEQ, 2002). Historical decline in existing seagrass beds has been well documented. Most of these seagrass meadows (primarily shoalgrass) grew along the barrier island edges of western West Bay. Until recently, the only remaining seagrass beds still in existence were found in Christmas Bay, a semi-isolated embayment adjoining West Bay (Pulich, 1991). Seagrass loss has been attributed primarily to direct and indirect effects of dredging canals for housing developments, increased turbidity and increased wave action after bulkheading (Sheridan, 1999). Within the survey area deeper seagrass beds provide beneficial fishery habitat while shallower portions of the seagrass bed provide habitat for wading birds and shorebirds.

3.0 METHODOLOGY:

Survey methods are described in the "Proposed Sampling Plan" approved by the Corps of Engineers (Appendix B). To conduct the seagrass survey, BEI used the Braun-Blanquet rapid visual assessment technique (Braun-Blanquet, 1972. Plant Sociology: The Study of Plant Communities. Hafner Publishing Company). Also refer to Pulich, et al (Pulich, Warren Jr., Hardegree, Beau, Kopecky, Andrea, Schwelling, Steve, Onuf, Christopher, Dunton, Kenneth. 2000. Texas Seagrass Monitoring Program: 2000 Strategic Plan. TPWD). The survey was taken perpendicular to the seagrass survey baseline as shown in Appendix A, Figure 3. BEI examined 13 survey transects ranging in length from 995 to 1,730 linear Ft. These transects are also shown in Appendix A, Figure 3. The total transect length was 17,327 Ft. Prior to initiating field work, BEI established GPS coordinates every 10 meters along each transect. Seagrass sampling was performed between January 9, 2012 and January 15, 2012. Once in the field, the ends of each transect were marked with PVC pipe. A total of 417 sample quadrats, each measuring 0.25 square meters, were located by GPS (sub-centimeter RTK and XRT GPS receiver with a TRSC 2 data logger) every 10-meters along each transect. Bayward sampling was continued along each transect until three consecutive sampling stations did not produce seagrass roots from post hole sampling and if the water was 4 ft deep and getting deeper. Within each quadrat, each seagrass species was visually identified, and a score based on the cover of the species in that quadrat was assigned according to the analytical techniques developed by Fourqurean et al (2001). A total of 1,629 post-hole digger samples were taken, three at each 10-meter interval sample point, to determine the presence or absence of seagrass roots. The table below summarizes the scoring methodology of Braun-Blanquet abundance scores (S). Each seagrass species was scored in each quadrat according to this scale (from Fourqurean et al., 2001).