

SECOND MONITORING REPORT NARRATIVE. MARCH, 15 2015

1. Project Overview

a. Corps Permit Number: SJA-2008-00123 (IP-CGR). Compensatory Wetland Mitigation Plan. Río de La Plata Flood Control Project, Dorado, Puerto Rico.

b. Fernando Payan, Subcontractor from Habitat, is the responsible party for conducting the monitoring. Dates the inspection was conducted: To be determined upon completion of planting.

c. The long-term goal of the mitigation plan is to provide self-sustaining, high quality mangrove, herbaceous and estuarine open water wetland habitats to increase the overall health of the ecosystem including the estuary and adjacent reefs. The mitigation project proposes a significant increase in estuarine habitat. This has the potential to improve the diversity, biomass, and production of the inshore reef immediately adjacent to the river mouth and has the potential to improve the general ecological wellbeing of this area. The mitigation plan proposes approximately 21.30 acres of mangrove habitat creation west of the river mouth. The creation areas west of the river mouth would tie into existing. The mitigation plan proposes approximately 53.70 acres of herbaceous habitat creation/enhancement located east of the river mouth and a small portion at parcel number 1 along the west bank of the river. The areas designated for the establishment of herbaceous

d. The proposed 10-acre estuarine lagoon would be located North of the Mameyal ditch and within the mangrove creation site West of the river mouth. The lagoon would tie directly to the existing linear depression and the Rio de la Plata via a 100-ft wide channel extending off the East side of the lagoon basin. For detailed information please refer to the Plans for Construction of Flood Damage Reduction Project Contract 1A, drawings C3-10 to C3-12 and C3-40 to C3-42.

e. The compensatory mitigation project commenced on October 24, 2011 and was completed on October 15, 2014

f. The mitigation project conducted at Rio La Plata Flood Control Project met the performance standards of a minimum of 80% survival of mangroves and herbaceous vegetation required for two years after initial planting.

g. During 2014, Habitat has been making corrective actions and maintenance activity 3 to 4 times a week, even though this is the second report submission.

h. At Wetland Mitigation #4, unwanted-nuisance species, *Typha domingensis* specie, was found at wetland mitigation parcel #4. As per USACE directions, this parcel was maintained and monitored aggressively to control the development this unwanted specie. This will be the last maintenance, completed on March 12, 2015. At the same time, Habitat, was also improved

the others parcels given maintenance as needed. Early maintenance and monitoring contributed to the growth and development of different species planted that was required maintenance.

2. Requirements

a. Vegetation monitoring should be performed to document the establishment and cover of the planted species, and to document the presence and cover of unwanted, nuisance species. The vegetation monitoring should occur in at least, eight locations (plots) within the mitigation, including the planted edge of the estuarine lagoon. These locations shall represent site conditions and should be representative areas of the mitigation planting sites. The dimensions of each plot should be at least 5 meters by 5 meters. The Contractor shall perform the following actions during monitoring:

1) Monitoring data such as; estimated cover by species, estimate of survival of planting, average height of planted species, casual observations, survival rates and identification of nuisance species, shall be recorded on a standardized form during monitoring events. In addition, monitoring will also detail observations regarding the hydrologic connectivity to the river, sedimentation and flushing of the estuarine lagoon.

2) Permanent monitoring and photographic stations will be established at the mitigation site. The stations' location coordinates shall be provided. At least, four photographs of the mitigation sites from each control points facing north, east, south and west must be provided.

3) Monitoring and photographic stations' identification markers should be maintained for location reference during successive monitoring.

4) Monitoring reports shall include photographic documentation of the site.

b. The mitigation project conducted at Rio La Plata Flood Control Project must meet the performance standards of a minimum of 80% survival of mangroves and herbaceous vegetation required for two years after initial planting.

c. The Contractor shall submit monitoring reports for the USACE Technical POCs review. The monitoring reports shall be prepared in accordance with the USACE Regulatory Guidance Letter 08-03 and shall be submitted as follows:

1) The Contractor shall submit a time-zero monitoring report within 30 days of planting completion.

2) Monitoring and reports should be performed every three months after planting completion, during two (2) years.

3) The monitoring reports shall be submitted no later than 30 days from completion of the monitoring event.

- 4) A closeout monitoring report shall be performed two years after planting completion.

3. Summary Data:

The Compensatory Wetland Mitigation Plan for the Rio La Plata Flood control Project was divided in eight (8) Parcels (See attached table of parcels). The planting of the species for each parcel was conducted according to the availability of the parcels to do the mitigations and according to the USACE specifications. The planting order was as following:

- 1) Parcel #6: Species to be planted: *Laguncularia racemosa* (White mangroves) and *Avicennia germinas* (Black mangroves). They were planted according to the specifications of the mitigation projects. The planting began on the 24th of October of 2011 and ended in January of 2012. The mangroves are getting tall a spread on the parcels. **Some areas were destroyed by 4x4 vehicles (jeeps and four tracks). The development of the parcel can be seen in appendix No. 1.**
- 2) Parcel #7 (Estuarine Lagoon): Specie to be planted: *Rhizophora mangle* (Red mangrove). They were planted according to the specifications of the mitigation projects. The planting began on the 30th of November 2011 and ended in December of 2011. The environmental conditions, types of soils and grade of the site were optimal for the development of these red mangroves. See Appendix No. 2
- 3) Parcel #8: Species to be planted: *Laguncularia racemosa* (White mangroves) and *Avicennia germinas* (Black mangroves). They were planted according to the specifications of the mitigation projects. There were different planting period according to the availability of the areas. The planting began in December of 2011; The Second period in June of 2012; Another in November of 2012; and the last one in October 2014. **In general the development of the species are good (most of them have more than 7 feet tall) but in some areas are not big enough or well development because of the condition of soil, animal and/or people that damaged the areas. See Appendix No. 3.**
- 4) Parcel #5: Species to be planted: *Laguncularia racemosa* (White mangroves) and *Avicennia germinas* (Black mangroves). They were planted according to the specifications of the mitigation projects. The planting was completed between May 10 & 12 of 2012. The environmental conditions, the soil and grade of the site were very good. **This parcel is the best of all areas. See Appendix No. 4.**
- 5) Parcel #3: Species to be planted: *Paspalidum germinatum*, *Spartina*. They were planted according to the specifications of the mitigation projects. However, a change of species to be planted in Parcel #3 was required, due to the environmental conditions found. USACE approved the change, *Paspalidum* for *Eleocharis*. There were different planting period according to the availability of the areas. The planting began in June of 2012 and was basically completed by August 2013. **The north area of this parcel, was completely destroyed by people. They go in 4x4 jeeps and four tracks during the**

weekend. The species planted in this parcels are well developed to be in compliance with the standards. See Appendix No. 5.

- 6) Parcel #4: The species planted were *Paspalidum germinatun*, *Spartina* and *Eleocharis* and *Cyperus*). There were different planting period according to the availability of the areas. The planting began in August of 2012 and it was finished on October of 2014. **We focused the maintenance programs in this parcel to control unwanted species, especially *Thypha domingensis* during February and March 2015. The herbaceous vegetation, besides control erosion and filter the water, is providing habitat for aquatic organism (fish, crabs, insects and birds). We saw these in the monitoring visits of the parcels planting with herbaceous and mangroves. Appendix No. 6.**
- 7) Parcel #1: Like the Parcels 6, 8 and 5 the species to be planted were *Laguncularia racemosa* (White mangroves) and *Avicennia germinas* (Black mangroves) and *Spartina*. Planting following the specifications of the mitigation project. Planting of mangrove species began in November of 2013 and finished in December of 2013. The *Spartina* was planted in August and September of 2014. The development of the mangroves can be see in Appendix No. 7
- 8) Parcel #2: The species to be planted in this area was *Acrostichum* (a type of fern). The planting period began in August of 2012, but was not completed due to the harsh sunlight other environmental conditions. The plants did not do well at all. A request for a change was made and finally approved. *Paspalidum Germinatum* was planted and immediately completed. There is a good development of the *Acrostichum* planted near the mangroves and where they are not exposed to full sun. See Appendix No. 8

4. Maps and Plans

- 1) TABLE NO. 1 – COMPENSATORY WETLAND MITIGATION PARCELS (See Annex A). This annex shows the parcels, their principal coordinates, each area (in square meters) and in acres, together with the completion dates of each parcel.
- 2) WEST SIDE MAP & EAST SIDE MAPS (See Annex B). These maps of the Parcels show their location, their size and their Monitoring & Photographic Sites (all except for Parcel #2 & #5, due to their lack of accessibility to vehicular traffic).

5. Conclusions

1. The compensatory wetland mitigation plan has continued meeting the performance standards of 80% survival of the plants as illustrated in Table No. 2 of the first monitory report (December, 17 2014). Parcel No. 5 are the best of all it is almost 100% and the mangroves are the bigger of the project.
2. **Habitat recommended planting the mangroves and herbaceous vegetation 30 cm from the sea level in the entire project. But now we recommended that the mangroves, *Eleocharis* and *Spartina* can be planted below this high (30 cm). This**

species will develop very well in flood areas. The development of *Acrostichum* is better in shady areas. *Paspalum* and *Cyperus* like highest areas. These recommendations are based on the observations that we made on the results in the mitigation project at Rio La Plata.

3. *Thypha domingensis* is a herbaceous species that aggressively invades the areas, because it propagates very easily by seeds and its root system and is very difficult to control. We recommend for future mitigation programs that eliminate this plant in the areas to be planted and surrounding areas.

4. According to section 5.0 Maintenance and Monitoring of "Rio de la Plata Flood Control Project, Compensatory Wetland Mitigation Plan. It was implemented a two year maintenance and control program starting at the beginning of the planting in each parcel. This plan of maintenance and monitoring was helpful to be in compliance with the performance standard of the mitigation programs.

5. The biggest mangroves will produce more seeds during the next summer, that will permit the growth of additional mangroves and allow the spread of these species in the parcels, like the herbaceous vegetation.

TABLE NO. 2 – PERFORMANCE OF THE MITIGATION PROJECT (22 OCT 2014)

WETLAND MITIGATION PARCELS							
	SURVEY	PLANTED	DAMAGED	AREA	%		
PARCEL	AREA (SM)	AREA (SM)	AREAS (SM)	%	REMAINING	STATUS	NUISANCE SPECIES
1	30,286.39	27826.04	2,460.35	0.08	0.92	OK	
2	2,603.11	2603.11	0.00	0.00	100.00	OK	
3	46,919.37	40995.56	5,923.81	0.13	0.87	OK	
4	163,371.74	152873.16	10,498.58	0.06	0.94	OK	See Note c.
5	1,072.07	904.52	167.55	0.16	0.84	OK	
6	28,329.77	26235.01	2,094.76	0.07	0.93	OK	
7	11,513.50	11513.50	0.00	0.00	1.00	OK	
8	30,951.76	26260.20	4,691.55	0.15	0.85	OK	

Note: The data includes information for the planted area in each Parcel.

- a. Since the planting began (October 2011) to today (March 2015) the mitigation project continued in compliance with the performance standard of 80% survival of the plants, as can be seen on Table No. 2. The development also is evident at the complete mitigation parcels. Herbaceous species and mangroves continue their development. See photos.
- b. Vandalism to the parcels continued, motor vehicles were at the parcels, this caused damages to the plantations. Herbaceous species fight to survive. Two-legged vandals and animals (horses and cattle) contribute to the damage of the species. This is noted on Parcels No. 3. No. 6 & No. 8.
- c. The ongoing maintenance and monitoring during the project, was help full for the species development. The unwanted species were controlled cutting by hand and/or herbicide application. The unwanted specie, *Thypha domingensis*, was found growing aggressively in parcel no. 4. Immediately special care was taken, cutting and herbicide application to prevent further propagation.
- d. The development of the mangroves still good. All mitigation parcels

containing this species in general are strong. The herbaceous species are also flowering and reproducing in the planted areas.

- e. The mitigation project in Rio La Plata has created an additional and suitable habitat for animals, birds, insects and fish.

ANNEX A - TABLE NO. 1

COMPENSATORY WETLAND MITIGATION PARCELS

RIO DE LA PLATA FLOOD CONTROL PROJECT

DORADO, PUERTO RICO

NAD 83 PARCEL NO.	POINT	N COORD.	E COORD.	AREA (SM)	AREA(ACRE)	DATES COMPLETED
1	3001B	270,528.4345	218,215.0624			Dec-13 & Sep-14
	3001C	270,638.6179	218,226.9582			
	3006	270,595.6752	218,583.1853			
	3002A	270,496.5851	218,508.3590	30,286.39	7.48	
2	3030	270,594.4329	218,790.5306			Aug-13
	3034	270,664.3423	218,829.2983			
	3038	270,646.9351	218,855.4244			
	3043	270,583.4832	218,802.8913	2,603.11	0.64	
3	3105	270,559.9248	218,833.5937			Oct-14
	3068	270,799.9979	218,905.6792			
	3085	270,541.8776	219,112.5800			
	3087	270,410.4572	219,080.3039	46,919.37	11.59	
4	3129	269,984.0855	218,832.6548			May-12
	3110	270,574.8734	218,741.2965			
	3125	270,397.3813	219,077.6632			
	3128	269,952.5949	219,001.3597	163,371.74	40.37	
5	3151	270,652.1303	218,582.3959			Jan-12
	3149	270,668.5842	218,582.6380			
	3159	270,685.8975	218,646.7920			
	3157	270,666.7768	218,639.7291	1,072.07	0.26	
6	3184	270,804.3859	218,431.9790			Dec-11
	3167	270,896.2307	218,560.9554			
	3174	270,787.1599	218,682.6474			
	3178	270,698.9530	218,552.8305	28,329.77	7.00	
7	3197	270,716.0199	218,202.0893			Oct-14
	3198	270,897.4345	218,228.9671			
	3192	270,706.7001	218,657.5160	39,979.73	9.88	
8	3219	270,682.1014	218,183.4735			TOTALS
	3218	270,954.4717	218,223.5283			
	3211	270,981.1392	218,367.9318			
	3200	270,787.2467	218,420.5188	<u>30,951.76</u>	<u>7.65</u>	
				343,513.93	84.88	