



**Coastal Protection and Restoration
Authority of Louisiana
Office of Coastal Protection and
Restoration**

**2008 Operations,
Maintenance, and Monitoring
Report**

for

**FRESHWATER
INTRODUCTION SOUTH OF
HIGHWAY 82**

State Project Number ME-16
Priority Project List 4

April 2009
Calcasieu Parish

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Suggested Citation:

Mouledous, M. and D. Billodeau 2008. *2008 Operations, Maintenance, and Monitoring Report for Freshwater Introduction South of Highway 82 (ME-16), Coastal Protection and Restoration Authority of Louisiana, Office of Coastal Protection and Restoration, Lafayette, Louisiana.* 57 pp.

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For
Freshwater Introduction South of Highway 82 (ME-16)

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I. Introduction

The Freshwater Introduction South of LA Hwy 82 project was proposed on the 9th priority list of the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA). The project area is located in the central and eastern portions of Rockefeller State Wildlife Refuge, on the eastern end of the Grand Chenier ridge, approximately 10 miles (16.09 km) east of the community of Grand Chenier in Cameron and Vermilion Parishes, La (Figure 1). It is bounded to the west by a canal west of Little Constance Bayou south of Deep Lake, to the south by the Gulf shoreline of the unmanaged marsh south of Unit 6, to the east by Rollover Bayou to a line from Flat Lake to the western boundary of Unit 15 and to the north by Louisiana LA Hwy 82. The project will benefit some 19,988 acres (8,088.87 ha) of which 15,835 acres (6,408.21 ha) are marsh and the remaining 4,153 acres (1,680.66 ha) are open water (USGS 1999).

The “Lakes” subbasin of the Mermentau Basin is experiencing high water levels (>2 ft MLG) due to the existence of locks and gates that control water levels and prevent saltwater intrusion into Grand and White Lakes. The Chenier subbasin of the Mermentau Basin is experiencing saltwater intrusion due to lack of freshwater flow caused by the presence of the hydrologic barriers consisting of LA Hwy 82 and the Lakes subbasin gates and locks. Marsh loss is occurring in the Chenier subbasin due to saltwater intrusion and in the Lakes subbasin due to high freshwater water levels which stress *Spartina patens* (marshhay cordgrass) and certain fresh marsh species and cause increased shoreline erosion along White Lake and Grand Lake (Clark 1999).

Most of the soils in the project area are classified as either Clovelly muck, Scatlake mucky clay or Bancker muck, which are level, poorly drained fluid soils (U.S. Department of Agriculture [USDA] 1995). Clovelly muck and Bancker muck are organic and mineral soils respectively, found in brackish marsh, whereas Scatlake mucky clay, prevalent at the southern end of the project area, is a mineral soil found in saline marshes.

The habitats of primary importance in the project and adjacent areas are brackish and intermediate emergent marsh with saline marsh along the edge of the Gulf of Mexico (Chabreck et al., 1968, Chabreck and Linscombe, 1978, 1988). Dominant emergent vegetation species present in and adjacent to the project include *Spartina patens* (marshhay cordgrass), *Schoenoplectus americanus* (chairmaker’s bullrush), *Distichlis spicata* (inland saltgrass), *Phragmites australis* (Roseau cane) and *Schoenoplectus robustus* (leafy three-square) (USDA-NRCS 2002).

The project is co-sponsored by the United States Fish and Wildlife Service (USFWS) and the Louisiana Department of Natural Resources (LDNR) and is designed to gravitationally move water from Grand and White Lakes (when adequate head differential exists) to marsh areas south of LA Hwy 82, in order to moderate elevated

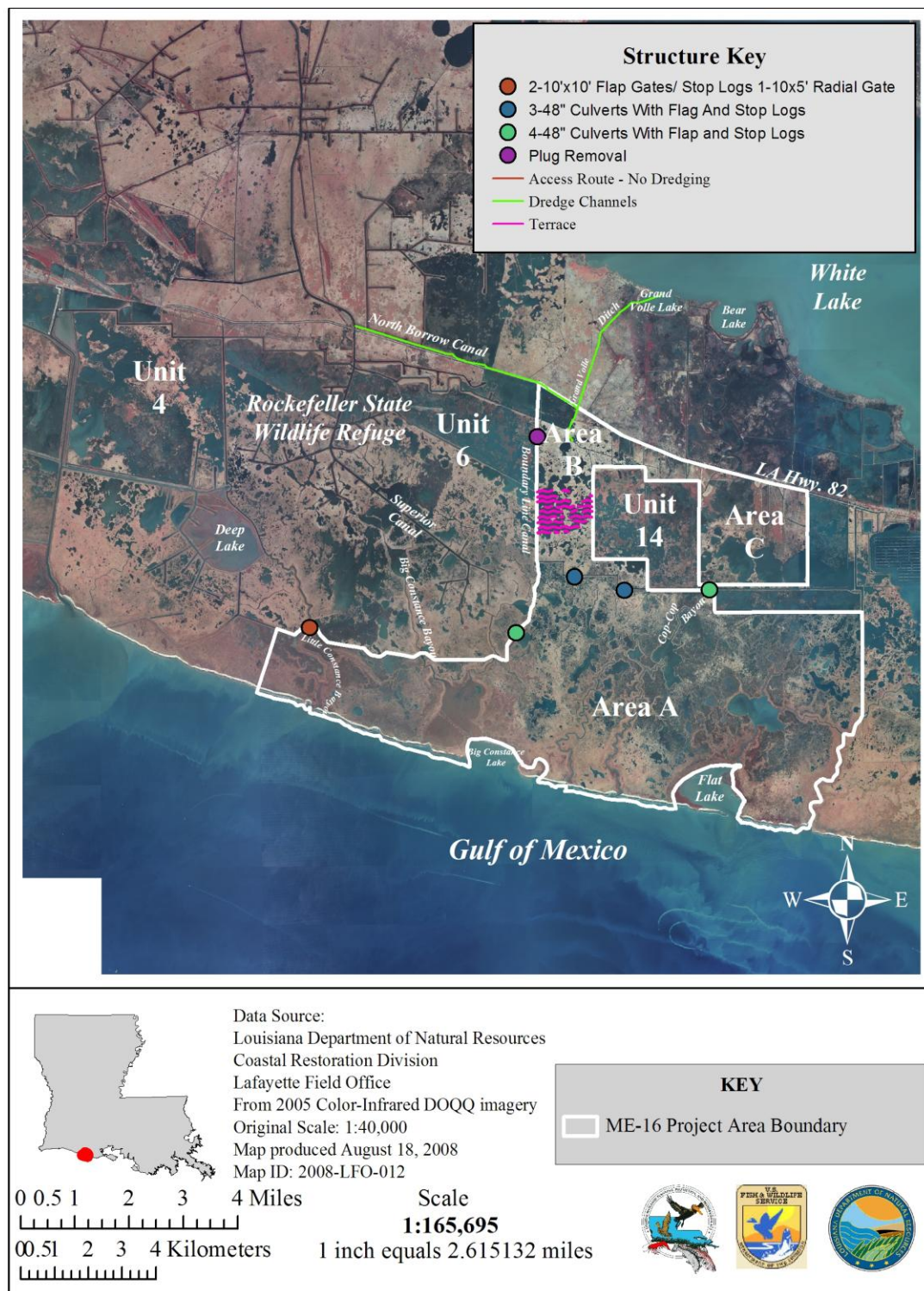


Figure 1. Freshwater Introduction South of Hwy 82 (ME-16) project area and construction features.

salinities in Areas A, B and C. In addition 14 acres (5.67 ha) of marsh will be created through the construction of terraces in Area B.

A model was prepared by Fenstermaker and Associates and a report was submitted to evaluate the effects of the project (C.H. Fenstermaker and Associates [CHFA] 2003). The modeling software used was MIKE 11, a one-dimensional model used for simulating flows, sediment transport, and water quality in estuaries, rivers, irrigation systems, and similar water bodies. The model showed that, overall, the project would reduce salinities in Area A. The magnitude of salinity reduction varied from each location with variances from 1-2 ppt to 3-4 ppt. The flap gates of the proposed structures at Little Constance Bayou, Dyson Bayou, Cop Cop Bayou, and structures No. 10 and 12 in the Boundary Line Levee should protect Unit 4 from salinity spikes.

The construction phase of the project consisted of the following components:

1. The borrow canal along Hwy 82 and the trenasse connecting Superior Canal to the borrow canal was widened and deepened.
2. The Grand Volle Ditch was widened and deepened on both sides of Hwy 82 and a conveyance channel was constructed into Grand Volle Lake from Grand Volle Ditch. A barricade was also placed at the intersection of Grand Volle Ditch and Grand Volle Lake
3. Approximately 26,000 linear ft of vegetated “duck-wing” terraces were constructed in the shallow open water between Units 6 and 14.
4. The plug in the Superior Canal branch that forms the eastern boundary of Rockefeller Refuge Unit 13 at the NE portion of Unit 13/Unit 6 Boundary line canal was removed.
5. The existing Little Constance Bayou water control structure was replaced with 4 – 4’-8” X 6’-8” flap gates on the south side and stop logs on the north side.
6. A new structure with four 48 in diameter culverts with flapgates and stoplogs was installed north of the existing Dyson Bayou structure near the NW portion of a small lake in the Unit 6 Boundary Line levee.
7. A new structure with four 48 in diameter culverts with flapgates and stoplogs was installed near the plugged Cop Cop Bayou adjacent to the existing Cop Cop Bayou structure.
8. Two new structures (10 and 12) with three 48 in diameter culverts with flapgates and stoplogs were installed in the Boundary Line Levee south of Unit 14.
9. The existing boundary line channel near the Cameron-Vermilion Parish line was widened and deepened.

Construction of the project features was completed in October 2006.

II. Maintenance Activity

a. Project Feature Inspection Procedures

The purpose of the annual inspection of the Freshwater Introduction South of Highway 82 Project (ME-16) is to evaluate the constructed project features to identify any deficiencies and prepare a report detailing the condition of project features and recommended corrective actions needed. Should it be determined that corrective actions are needed, OCPR shall provide, in the report, a detailed cost estimate for engineering, design, supervision, inspection, and construction contingencies, and an assessment of the urgency of such repairs. The annual inspection report also contains a summary of maintenance projects which were completed since completion of constructed project features and an estimated projected budget for the upcoming three (3) years for operation, maintenance and rehabilitation. The three (3) year projected operation and maintenance budget is shown in Appendix B.

An inspection of the Freshwater Introduction South of Highway 82 Project (ME-16) was held on March 6, 2008 under clear skies and mild temperatures. In attendance were Dewey Billodeau, Darrell Pontiff and Mark Mouledous of OCPR, Darryl Clark of USFWS, Chad Courville of Miami Corporation, and Tom Hess with LDWF. All parties met at the boat launch on the southern end of Unit 14. The annual inspection began at approximately 10:30 a.m. at the New Cop-Cop Structure and ended at the Grand Volle North Channel Enlargement Marine Barrier at 2:00 p.m.

The field inspection included a complete visual inspection of most of the project features. Staff gage readings and existing temporary benchmarks where available were used to determine approximate elevations of water, embankments and weir features. Photographs were taken at each project feature (see Appendix A) and Field Inspection notes were completed in the field to record measurements and deficiencies (see Appendix C).

b. Inspection Results

New Cop-Cop Structure

This structure is in good condition since completion of construction. Stop logs were set at approximately elevation +1.0 NAVD88. No water was flowing through the structure at the time of the inspection. The rock that was placed around the ends of the wingwalls has apparently been moved around by high water events and there is minor erosion occurring on the southwest quadrant of the outlet side of the structure. No maintenance is needed at this time however this area will be monitored for further erosion problems. (Photos: Appendix A, Photos 1, 2 & 3)

Structure No. 12

This structure is also in good condition and stop logs were set as noted above. The rock that was placed along each of the wingwalls is still in the same condition as post construction. Water was flowing through the most easterly culvert. No maintenance is required for this structure. (Photos: Appendix A, Photos 4 & 5)

Structure No. 10

This structure is in good condition and stop logs are set as described above. No water was flowing through the structure at the time of the inspection. Rock along the wingwalls is in same condition as post construction. There appears to be more vegetation atop the backfilled portion of the structure at this location as compared to New Cop-Cop and Structure No. 12. No maintenance is required for this structure. (Photos: Appendix A, Photos 6 & 7)

Earthen Terraces

The earthen terraces are in excellent condition. Very little settlement of the earthen material has occurred since construction was completed. The vegetated plantings that were put along the edge of each terrace are fully matured and the crown of the terrace which was not planted has begun to vegetate to almost 100% cover. No maintenance is required for the terrace field. (Photos: Appendix A, Photo 7)

Grand Volle South Channel Enlargement

The adjacent marsh along this section of the Grand Volle South Channel which had spoil material placed on it by spray dredge equipment is in excellent condition. The channel appears to be flowing water as intended. The pipeline crossing signs are also in good condition and there was approximately 3 foot of water depth on top of the pipeline near the center of the channel. No maintenance is required at this time. (Photos: Appendix A, Photo 9)

New Dyson Structure

The New Dyson Structure is also in good condition since completion of construction. The rock along each of the wingwalls is stable. There are three minor areas of settlement atop the backfilled portion of the structure that has occurred. The stop logs were set at elevation +1.0 NAVD88 and no water was flowing through the structure. No maintenance is required at this time however the areas of settlement will be monitored for further problems. (Photos: Appendix A, Photos 10 & 11)

Little Constance Structure

The refurbishment of the Little Constance Structure is in excellent condition. The stop logs were set at “just below marsh level” and no water was flowing through the structure at the time of the inspection. No maintenance is required at this time. (Photos: Appendix A, Photos 13 & 14)

Louisiana Highway 82 Channel Enlargement

The adjacent marsh along this section of the Louisiana Highway 82 borrow canal which had spoil material placed on it by spray dredge equipment is in excellent condition. The borrow canal appears to be flowing water as intended. No maintenance is needed at this time. (Photos: Appendix A, Photo 15)

Grand Volle North Channel Enlargement and Marine Barrier

The adjacent marsh along this section of the Grand Volle North Channel which had spoil material placed on it by spray dredge equipment is in excellent condition. The channel appears to be flowing water as intended. The marine barrier at the entrance of Grand Volle Channel along the southern rim of White Lake is also in good condition. No maintenance is required at this time however there is some concern about possible erosion along the entrance into Grand Volle Channel just inside the marine barrier which will be monitored during future inspections. (Photos: Appendix A, Photos 16 & 17)

Boundary Line Channel Enlargement and Earthen Plug Removal

The spoil bank created by the bucket dredging of the Boundary Line Channel is stable and is mostly covered with vegetation. The channel appears to be flowing water as intended. No maintenance is required at this time.

c. Maintenance Recommendations

i. Immediate/ Emergency Repairs

ii. Programmatic/ Routine Repairs

No maintenance work required at this time.

d. Maintenance History

General Maintenance: Below is a summary of completed maintenance projects and operation tasks performed since December 2006, the construction completion date of the Freshwater Introduction South of Highway 82 Project (ME-16).

No maintenance has been required on this project.

III. Operation Activity

a. Operation Plan

Operation Plan	Structure Type	Area Controlled	Salinity Target Level	Water Target Level	Operation
Little Constance Control Structure	Existing structure modified from 3 - 10 ft wide X 8 ft deep radial arm gates to flapgates on the south side and stoplogs on the north side.	Unit 6 and Area A Unmanned unit	5/10 ppt @ Superior Canal-Hwy 82 Bridge	3" below marsh level (0.75 feet NAVD88)	<u>Maintenance</u> – All flapgates open and stop logs removed when target levels not exceeded. <u>Salinity Target</u> – 2 bays closed (i.e., flapgates lowered) when 5 ppt salinity target level reached, stoplogs removed; all bays closed (all 3 flapgates lowered) when 10 ppt salinity reached, stoplogs removed. <u>Water Level Target</u> – Stoplogs set at marsh level to 0.5 feet below marsh level when water levels reach target levels (3 inches BML or 0.75 ft NAVD88) or less.
Existing Dyson Bayou and Bayou Josephine WCSs	4 – 48 inch diameter culverts with flapgates on south and stop logs on north (Unit 6) side.	Unit 6 and Area A	5/10 ppt @ Superior Canal-Hwy 82 Bridge	3" below marsh level (0.75 feet NAVD88)	<u>Maintenance</u> – All gates flapping, stop logs at 2 ft below marsh level <u>Water Level Target</u> – Stop logs set at marsh level to 0.5 ft below marsh level when water levels approach target levels (0.75 ft NAVD88) @ Superior Canal.
New Dyson Bayou WCS	4 – 48 inch diameter culverts with flapgates on south and stop logs on north (Unit 6) side.	Unit 6 and Area A	5/10 ppt @ Superior Canal-Hwy 82 Bridge	3" below marsh level (0.75 feet NAVD88)	<u>Maintenance</u> – All gates flapping, stop logs at 2 ft below marsh level <u>Water Level Target</u> – Stop logs set at marsh level to 0.5 ft below marsh level (1.0 ft to 0.5 ft) when water levels approach target levels (0.75 ft NAVD88) @ Superior Canal.
Existing Cop-Cop Bayou WCS	4 – 48 inch diameter culverts with flapgates on south and stop logs on north side.	Area A and Areas B and C	6 ppt @ Area A at Unit 14 station	3" below marsh level (0.75 feet NAVD88)	<u>Maintenance</u> – All gates flapping, stop logs at 2 ft below marsh level <u>Ingress Period</u> (May-June) – Flapgates raised; Stop logs at 2 ft below marsh level or lower <u>Water Level Target</u> – Stop logs set at marsh level to 0.5 ft below marsh level (1.0 ft to 0.5 ft) when water levels approach target levels (0.75 ft NAVD88) @ Superior Canal.
New Cop-Cop Bayou, New Structures 10 and No. 12 WCS	4 – 48 inch diameter culverts with flapgates on south and stop logs on north side.	Area A and Areas B and C	6 ppt @ Area A at Unit 14 station	3" below marsh level (0.75 feet NAVD88)	<u>Maintenance (Always)</u> – All gates flapping, stop logs at 2 ft or greater below marsh level <u>Water Level Target</u> – Stop logs set at marsh level to 0.5 ft below marsh level (1.0 ft to 0.5 ft) when water levels approach target levels (0.75 ft NAVD88) @ Superior Canal.

Note: The above operational plan submitted by Darryl Clark with USFWS.

b. Actual Operations

In accordance with the operation schedule outlined in the Operation and Maintenance Plan and as shown above, the structures were manipulated as required by Louisiana Department of Wildlife and Fisheries personnel.

IV. Monitoring Activity

CWPPRA projects authorized for construction after August 14, 2003 will be monitored only with Coastwide Reference Monitoring System-*Wetlands* (CRMS) stations and other existing data collection. At the request of the federal sponsor (USFWS) one additional continuous recorder was specifically added to the project and will be funded through project-specific monitoring funds. There are 4 CRMS-*Wetlands* sites in the project area (Figure 2).

a. Monitoring Goals

The objective of the Freshwater Introduction South of Hwy 82 project is to protect and restore intermediate and brackish marshes within the project area over the 20-year project life.

The following goals will contribute to the evaluation of the above objectives:

1. Reduce the rate of marsh loss in Area A saline marshes from 0.16%/yr to 0.11%/yr, in Area A brackish marshes from 0.16%/yr to 0.10%/yr, in Area B marshes from 0.24%/yr to 0%/yr and Area C marshes from 0.56%/yr to 0.39%/yr.
2. Reduce mean salinity levels in Area A saline marshes from 20 ppt to 17 ppt, in Area A brackish marshes from 15 ppt to 11 ppt, and in Areas B and C, from 5 to 4 ppt.
3. Increase the coverage of emergent wetland vegetation within Areas A, B and C.
4. Increase the coverage of submerged aquatic vegetation (SAV) in the shallow open water areas within Areas A, B and C.

b. Monitoring Elements

Spatial Data:

Aerial photography and satellite imagery will be collected for the entire coast through CRMS-*Wetlands*. The satellite imagery will be analyzed to determine land and water areas for the entire coast. This imagery will be subset and used to qualitatively evaluate changes in land and water areas within the ME-16 project area at a coarse (25m) resolution. Photography and satellite imagery for the Mermentau Basin was collected in 2005, and will be analyzed for years 2005, 2008 and every 3 years thereafter.

Salinity:

Salinity is monitored hourly utilizing 4 CRMS-*Wetlands* stations (599, 600, 609, 610) within the project area and selected reference sites (576, 589, 615, 626). A project-specific continuous recorder (ME16-06) was installed within Muskrat Bayou southeast of Cop-Cop Bayou to further measure project effects on marsh-water salinity levels (Figure 2). Marsh-water salinity is measured every hour with a salinity gauge that is attached to the water-level gauge. The gauges are serviced at the same time. Continuous data will be used to characterize average annual salinities throughout the project and reference areas.

At each servicing, a measurement of interstitial water salinity is collected adjacent to each gauge. Interstitial water salinity is also determined at 5 of the vegetation plots, when vegetation is surveyed. Salinity data will be used to characterize the spatial variation in salinity throughout the project area and to determine if project area salinity is being maintained within the target range. For this report, data were available pre-construction at stations ME16-01, ME16-02, ME16-03, ME16-04R, ME16-05R, pre- and post-construction at station ME16-06 and CRMS sites inside (599, 609) and outside (615) the project area.

Station	Data Collection Period
ME16-01	5/21/01 – 2/19/04
ME16-02	5/21/01 – 2/19/04
ME16-03	6/21/01 – 2/19/04
ME16-04R	1/9/02 – 2/19/04
ME16-05R	2/7/02 – 2/19/04
ME16-06	3/3/05 – 3/31/08
CRMS0599	11/14/06 – 3/31/08
CRMS0609	12/11/07 – 3/31/08
CRMS0615	6/20/06 – 3/31/08

Water Level:

Water level within the marsh is measured at every salinity station every hour with a water-level gauge installed within an area that is hydrologically connected to the surrounding water body. The gauge is surveyed relative to the top of the SET (NAVD 88). The water-level gauge is serviced on approximately a monthly basis. Duration and frequency of flooding was calculated based on the average elevation of the marsh surface and water level to look at vegetative health.

Vegetation:

Vegetation composition and cover was estimated from 10 permanent 2x2 m plots that are randomly distributed along a transect in the emergent marsh within each of the 1 km² CRMS-Wetlands sites. Data was collected in early fall of 2006 and 2007 using the Braun Blanquet method.

Floristic Quality Indices (FQIs) have been developed for several regions to determine the quality of a wetland based on its species composition (Cohen et al. 2004; Bourbaghs et al. 2006). A Floristic Quality Index (FQI) was developed by Jenneke Visser and an expert panel for Louisiana as part of CRMS. A list of plants occurring in Louisiana's coastal wetlands (~500 species) was provided to all known Louisiana coastal vegetation experts and their input on scoring was requested. The panel then provided an agreed upon group score (Coefficient of Conservatism or CC Score) for each species. CC scores are weighed based on cover in the FQI for Louisiana coastal wetlands. All species known to occur in the coastal zone were given a floristic quality score on a scale of 0 to 10. Species that scored lowest were considered by the panel to indicate disturbance or

unstable marsh environments. CRMS sites inside (599, 609, 610) and outside (615 and 589 to west, 626 to north, and 576 to east) the project area were used for this report. Project area CRMS0600 was excluded since it was surveyed only in 2007.

CRMS Supplemental

In addition to the project specific monitoring elements listed above, a variety of other data is collected at CRMS-*Wetlands* stations which can be used as supporting or contextual information. Data types collected at CRMS sites include hydrologic from continuous recorder (mentioned above), vegetative, physical soil characteristics, discrete porewater, surface elevation, and land:water analysis of 1 km² area encompassing the station. For this report, data from four sites within the project area is compared to data from four sites outside the project area in a traditional project versus reference manner. In the future, data collected from the CRMS network over a sufficient amount of time to develop valid trends will be used to develop integrated data indices at different spatial scales (local, basin, coastal) to which we can compare project performance.

Soil cores were collected one time (within a year of site establishment) to describe soil properties (bulk density and percent organic matter). Three, 4" (10.16-cm) diameter cores were collected to a depth of 24 cm and divided into 6, 4-cm sections at the site. The soil was processed by the Department of Agronomy and Environmental Management at Louisiana State University.

Soil surface elevation change utilizing a combination of sediment elevation tables (RSET) and vertical accretion from feldspar horizon markers are being measured twice per year at each site. This data will be used to describe general components of elevation change and establish accretion/subsidence rates. The RSET will be surveyed to a known elevation datum (ft, NAVD88) so it can be directly compared to other elevation variables such as water level. CRMS sites inside (599, 610) and outside (589, 615) were used for this report.

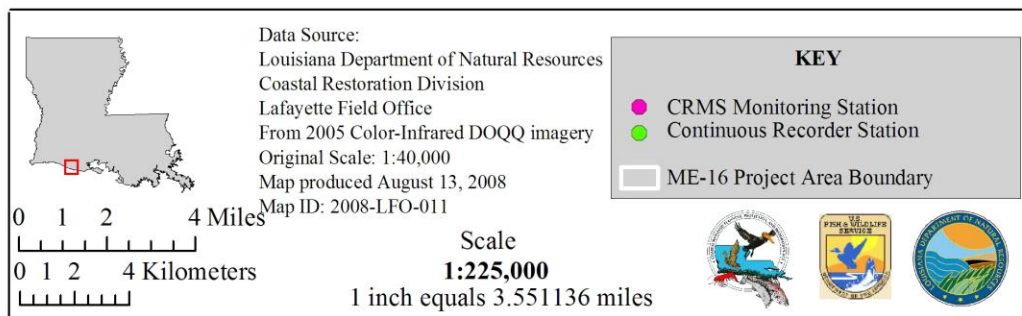


Figure 2. Location of project-specific monitoring stations and CRMS-Wetlands stations within Freshwater Introduction South of Hwy 82 (ME-16) project area and surrounding marsh.

c. Preliminary Monitoring Results and Discussion

Spatial Data:

For the four CRMS-*Wetlands* stations within the project area, the 2005 digital imagery was collected, but has only been analyzed for CRMS stations 599 and 610. The land:water analysis showed approximately 91% land and 9% water for station 599 and 95% land and 5% water for station 610 (Figures 3a and 3b).

Salinity:

Pre-construction-only data was collected for the model from May 2001 through February 2004 at project sites and reference sites (Table 1). ME16-01, located in the boundary line canal south of Unit 14 (Area C), was below the target range of 4 ppt for intermediate marshes 71% of the time. Project area brackish stations (ME16-02 and ME16-03), located in Area A, were below the target range of 11 ppt roughly 68 and 56% of the time, respectively. Station ME16-4R, located at the mouth of Rollover Bayou, near the Gulf of Mexico (considered saline), was under 17 ppt 81% of the time the station was active. Station ME16-05R, located in Grand Volle Lake, is considered a source of fresh water for the project area. Salinities were below the target range of 4 ppt for fresh marshes 100% of the time.

Table 1. Salinities during model development (May 2001 – February 2004)

Station	Area	Marsh Type	Salinity (ppt)		%Time within Target
			Target	Average	
ME16-01	C	intermediate	4	3.37	71
ME16-02	A	Brackish	11	7.96	68
ME16-03	A	brackish	11	10.59	56
ME16-4R	Ref	Saline	17	11.17	81
ME16-05R	Ref	Intermediate	4	0.32	100

Pre- and Post-construction data was collected at sites ME16-06 and CRMS0615. Brackish project area station ME16-06 was below the target range only 14% in the year prior to construction but since construction in October 2006, salinities have been below the target range 50% of the time (Figure 4a). CRMS station 615, chosen as a reference for the brackish stations, has been under the ME-16 target range (11 ppt) for 44% of the time since the project was constructed (Figure 4b). Prior to construction, this station was under the target range 33% of the time for July – September 2006.

Post-construction data was collected at sites CRMS0599 and CRMS0609. CRMS station 599, which is a saline project area station, had salinities below the 17 ppt saline target range 76% of the time (Figure 4c). CRMS station 609, a brackish station located just southeast of water control structure No. 10 (Area A), was below the target range 69% of the time for December 2007 – March 2008 (Figure 4d).

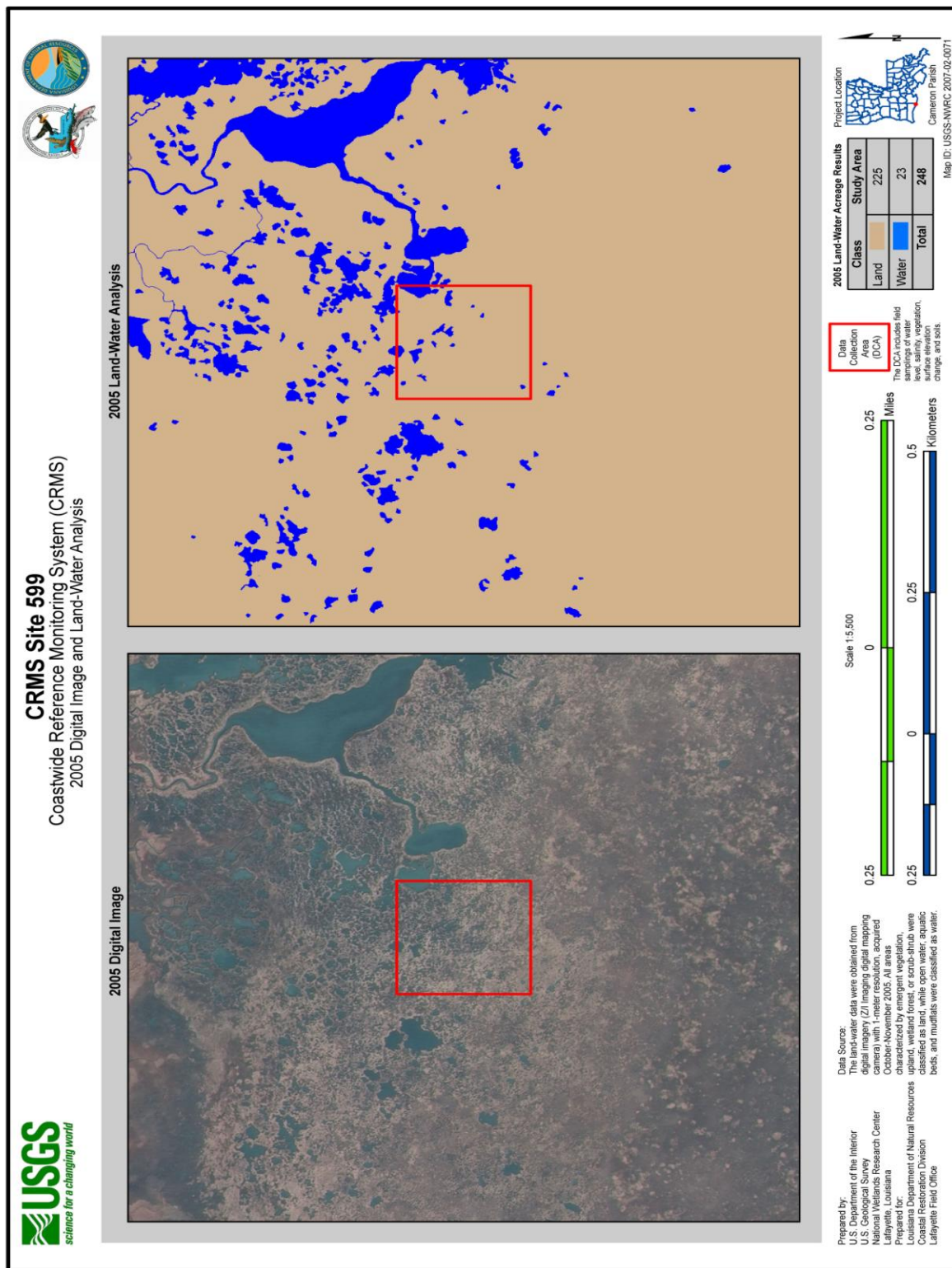


Figure 3a. CRMS station 599 2005 land/water analysis.

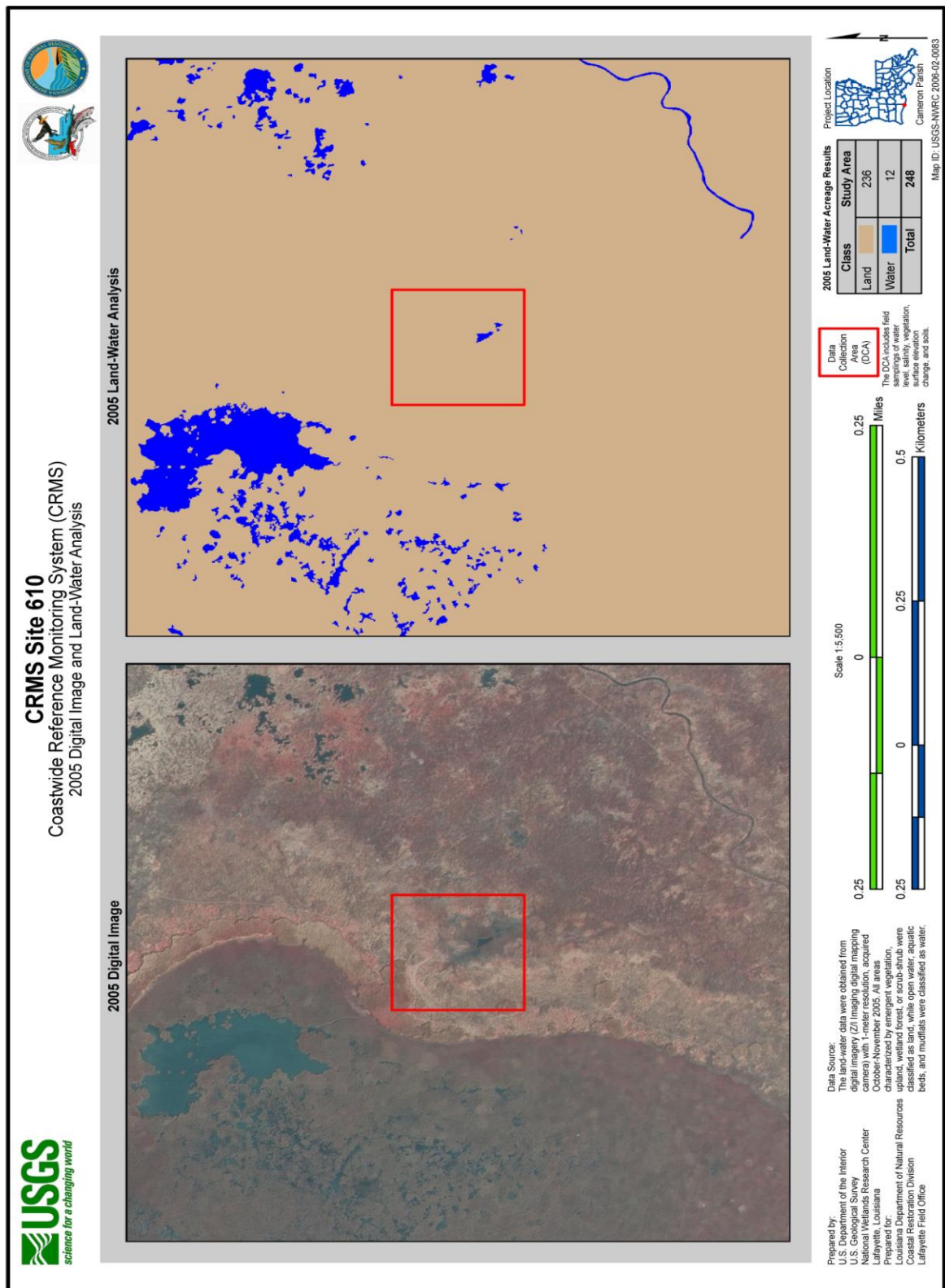


Figure 3b. CRMS station 610 2005 land/water analysis.

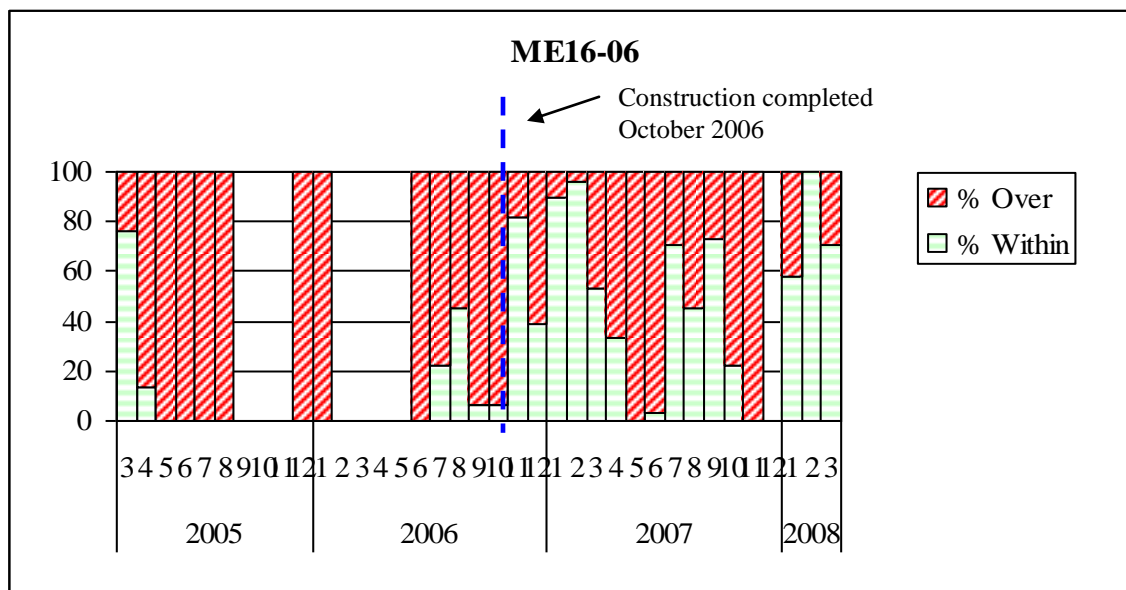


Figure 4a. Percentage of month salinities were inside and outside of target range for project station ME16-06 in Muskrat Bayou (Area A).

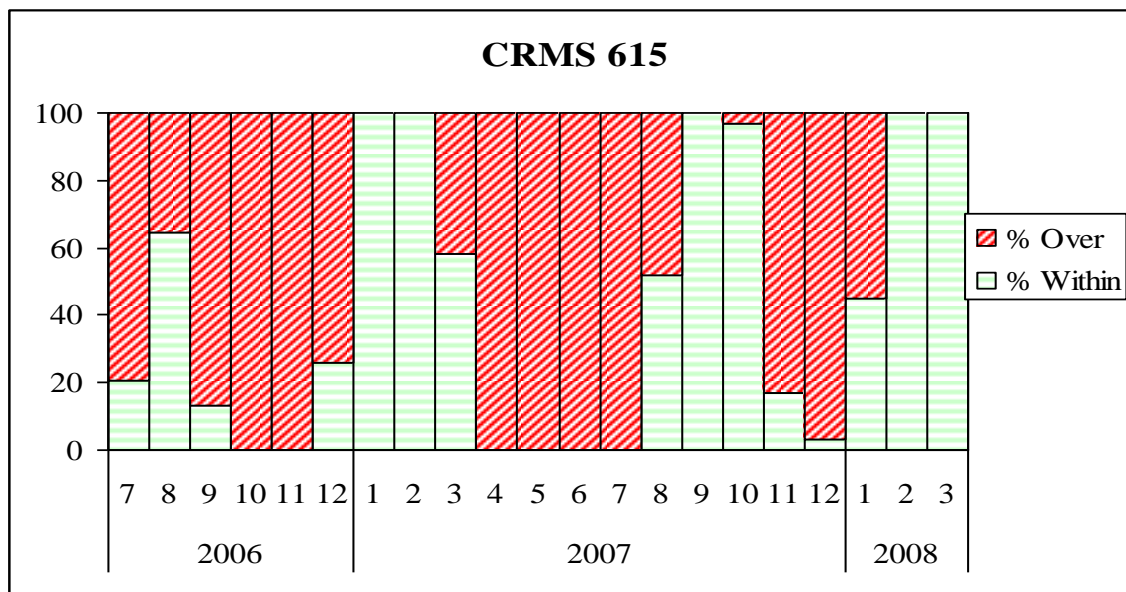


Figure 4b. Percentage of month salinities were inside and outside of target range for reference station CRMS0615, west of the project area.

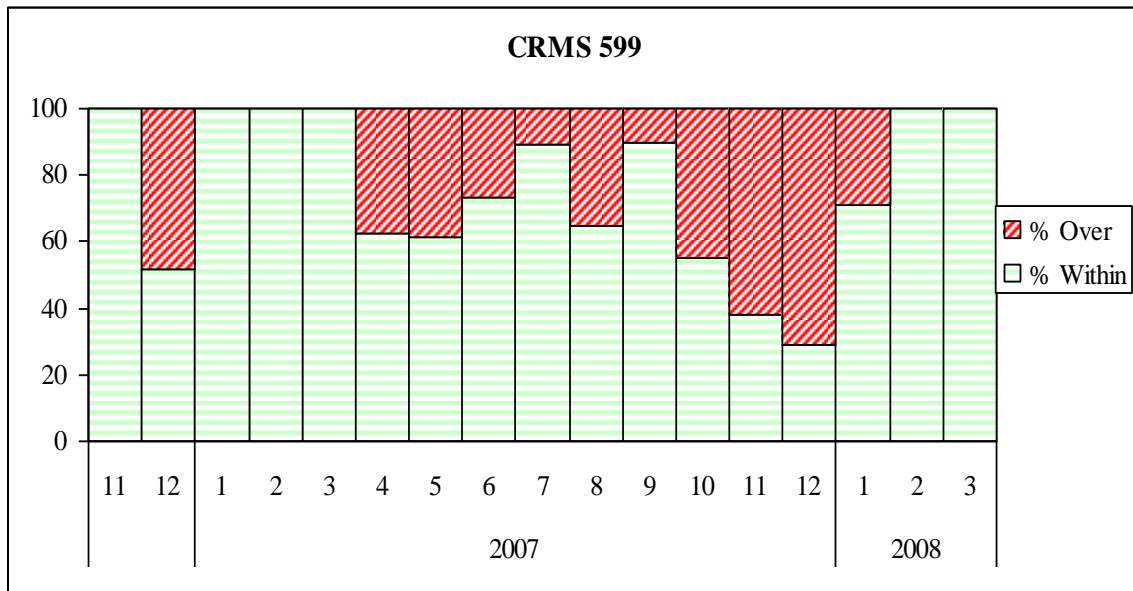


Figure 4c. Percentage of month salinities were inside and outside of target range for post-construction project station CRMS0599, southwest of Big Constance Bayou control structure.

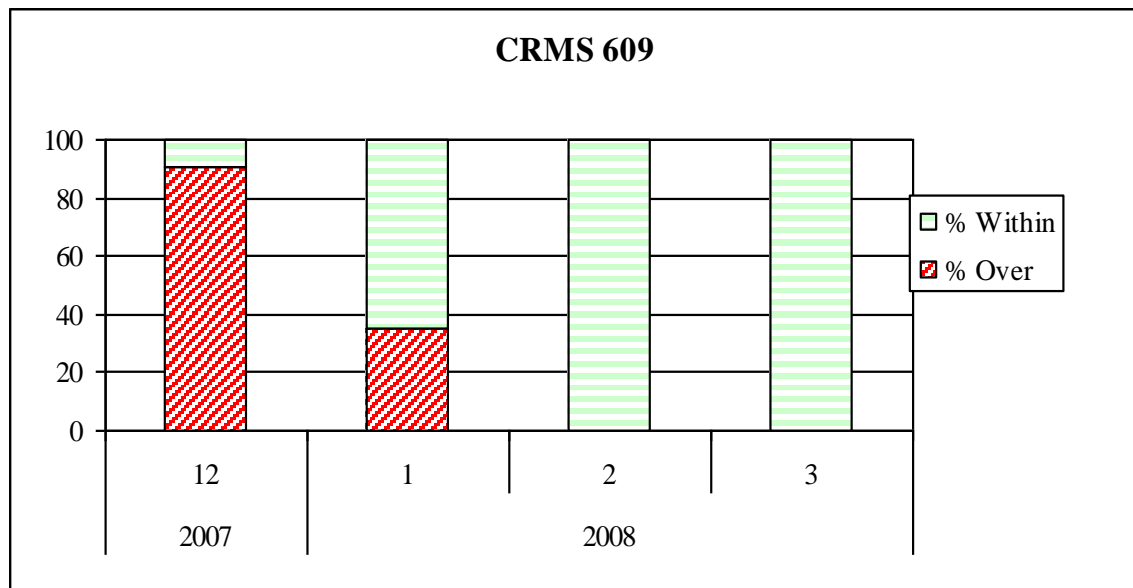


Figure 4d. Percentage of month salinities were inside and outside of target range for project station CRMS0609, located southeast of water control structure No. 10 (Area A).

Means by month of interstitial water salinity is presented in Figures 5a and 5b. The highest salinities occurred in the brackish reference sites (576, 589, 615) and saline project site (599) all averaging just over 20 ppt. At brackish project stations (600, 609, and 610), salinities averaged around 10 to 18 ppt. In the intermediate marsh north of Hwy 82 (CRMS 626), interstitial salinities were lower, around 5 ppt.

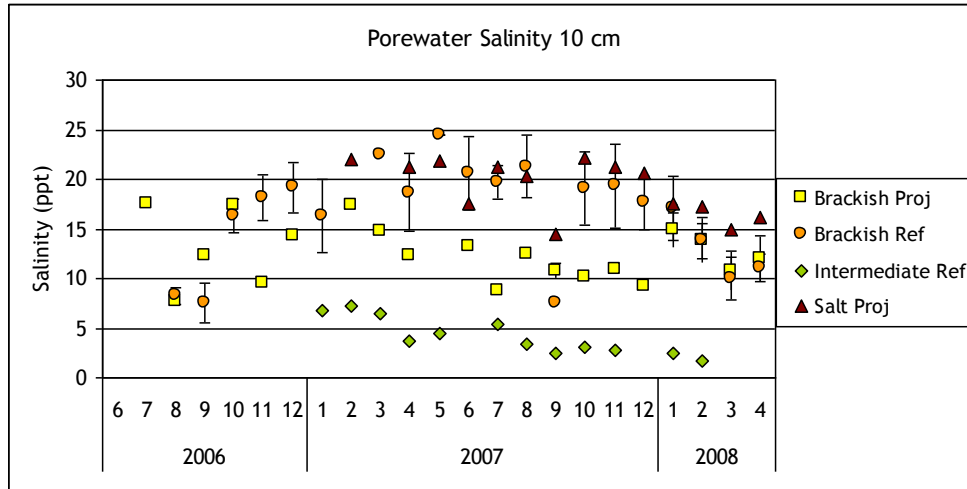


Figure 5a. Interstitial water salinity at 10 cm below the soil surface. Error bars, where present, represent the mean of stations in that class for that month ± 1 Std Err. Brackish Proj = CRMS 600, 609, 610; Brackish Ref = 576, 589, 615; Intermediate Ref = 626; Salt Proj = 599.

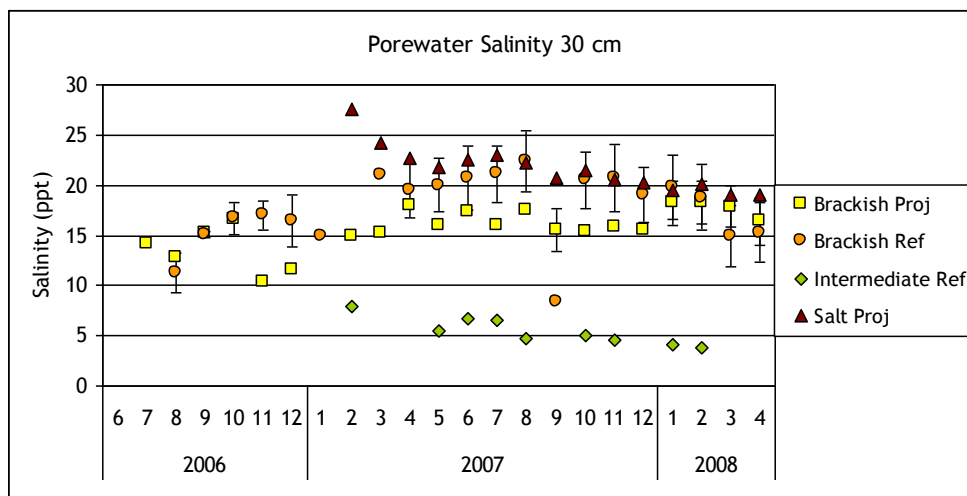


Figure 5b. Interstitial water salinity at 30 cm below the soil surface. Error bars, where present, represent the mean of stations in that class for that month ± 1 Std Err. Brackish Proj = CRMS 600, 609, 610; Brackish Ref = 576, 589, 615; Intermediate Ref = 599; Salt Proj = 626.

Water Level:

Pre-construction water levels (Figure 6a) at the 3 project and 2 reference sites typically followed the same pattern, though water levels were generally lower at ME16-05R. Elevated water levels in October 2002 indicate the effects of Hurricane Lili. Because the project was west of the hurricane, storm surge effects were minimal, although the area received 3.03 inches of rainfall (Perry 2008). Hurricane Rita made landfall west of the project in September 2005 (Figure 6b). Unfortunately, the recorder at ME16-06 was overtopped by the storm surge and malfunctioned and the water control structures damage was sustained. Estimated surge levels in the project area were approximately 9 ft NAVD88 (McGee et al. 2006). The water control structures in the project area became functional again in October of 2006. Stop logs were set at 1.0 ft NAVD88 (Hess 2008). Stop logs were removed to -1.0 ft NAVD88 due to a late tropical weather event which caused high tides and flooding from rainfall late October through December 2006 (Hess, 2008). The project saw less of an effect from this system than the reference area around CMRS0615. Water levels ranged from 0.6 to 1.5 ft NAVD 88 in 2007.

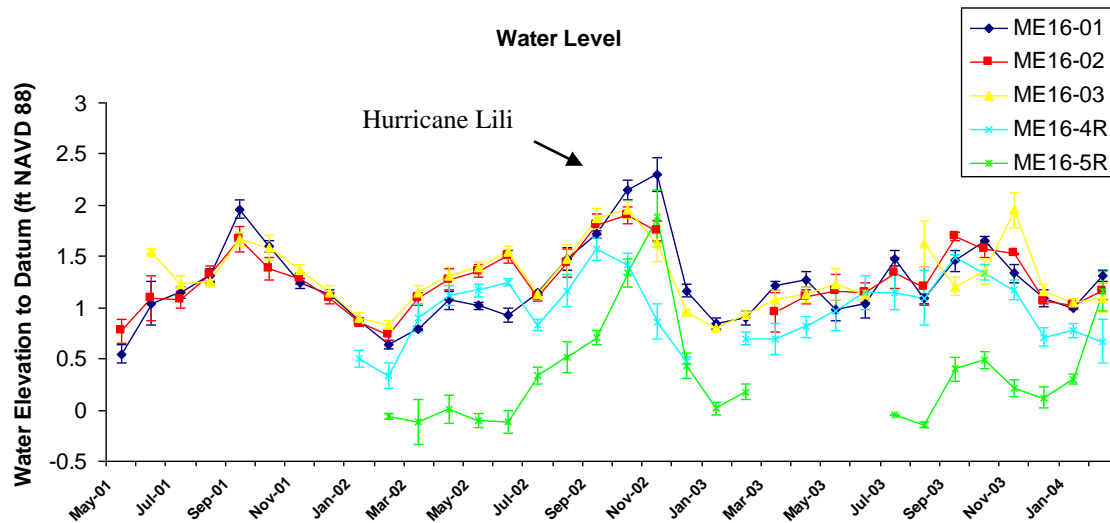


Figure 6a. Monthly means (± 1 SE) of water level data collected pre-construction within the ME-16 project and reference areas.

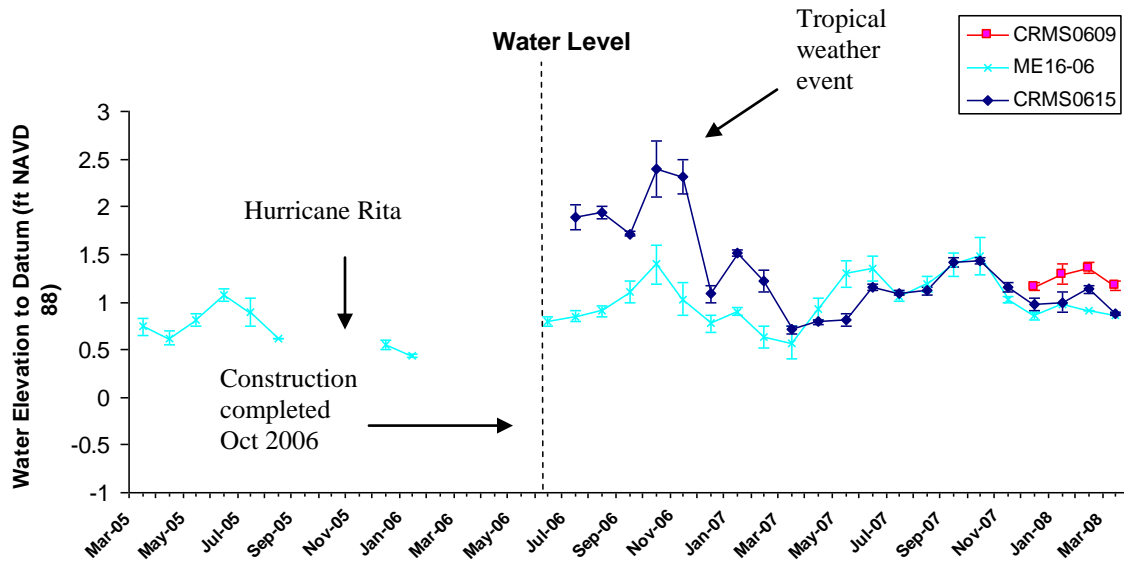


Figure 6b. Monthly means (± 1 SE) of water level data collected pre- and post-construction at ME16-06 and CRMS stations within (609) and outside (615) project area.

Vegetation:

Cover as well as FQI score increased for all stations from 2006 to 2007, possibly showing a recovery stage from the effects of Hurricane Rita (Figures 7a – 7e). Though the project intermediate sites showed a lower cover value than the reference sites in 2007, the quality of the vegetation was better (0.7 versus 0.4 FQI score). Brackish project sites saw a greater increase in cover and quality of vegetation than the reference brackish sites. The saline site within the project area (CRMS0599) showed a significant increase in cover between the two years (24% - 71%) as well as an increase in FQI score (0.2 – 0.8). There was not a suitable reference for saline site CRMS0599.

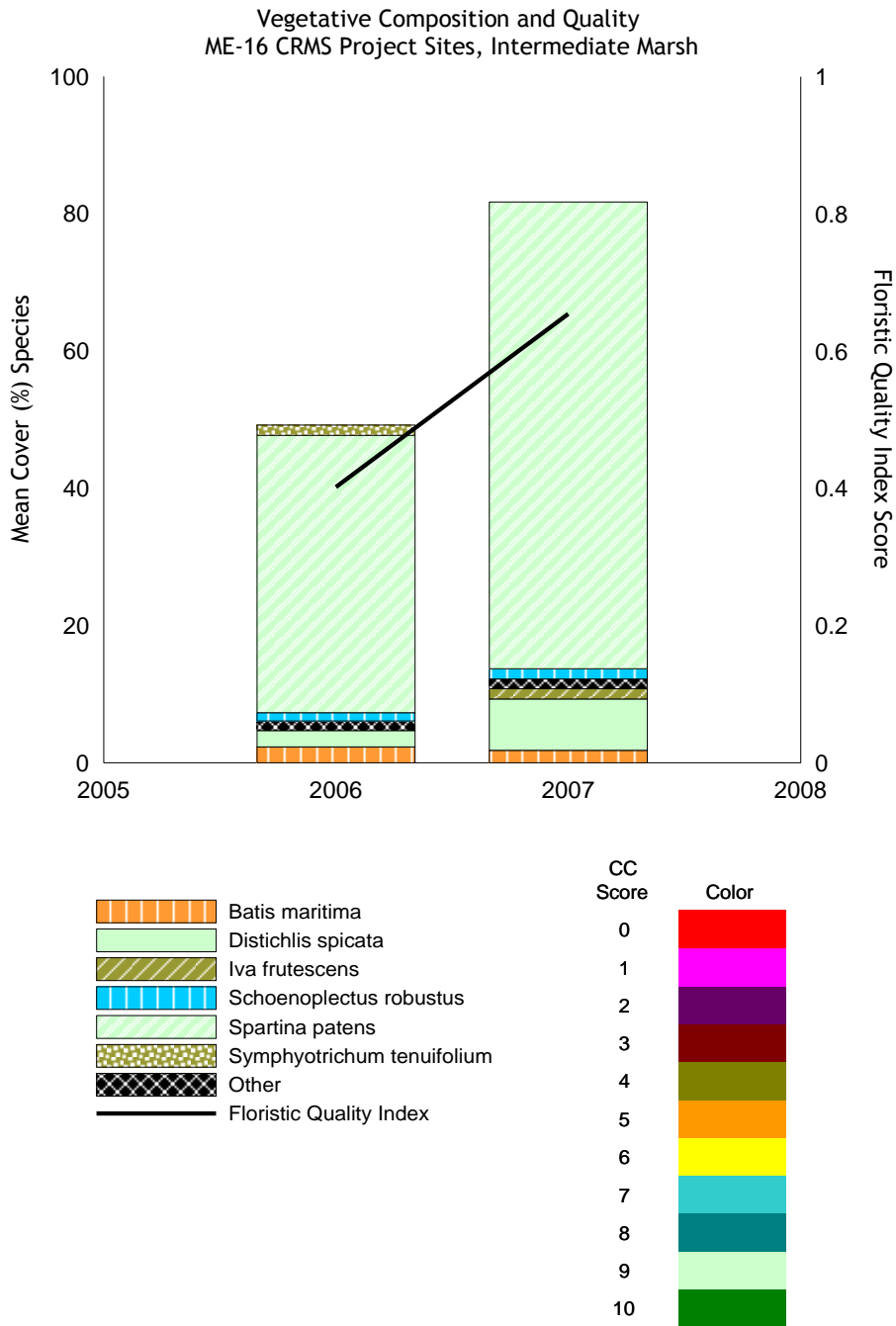


Figure 7a. Percent coverage and floristic quality index of species collected from intermediate CRMS site 609 within the project are in 2006 and 2007. Values are means of 10 stations within the site; therefore, the sum of % coverage of individual species can be greater than 100%.

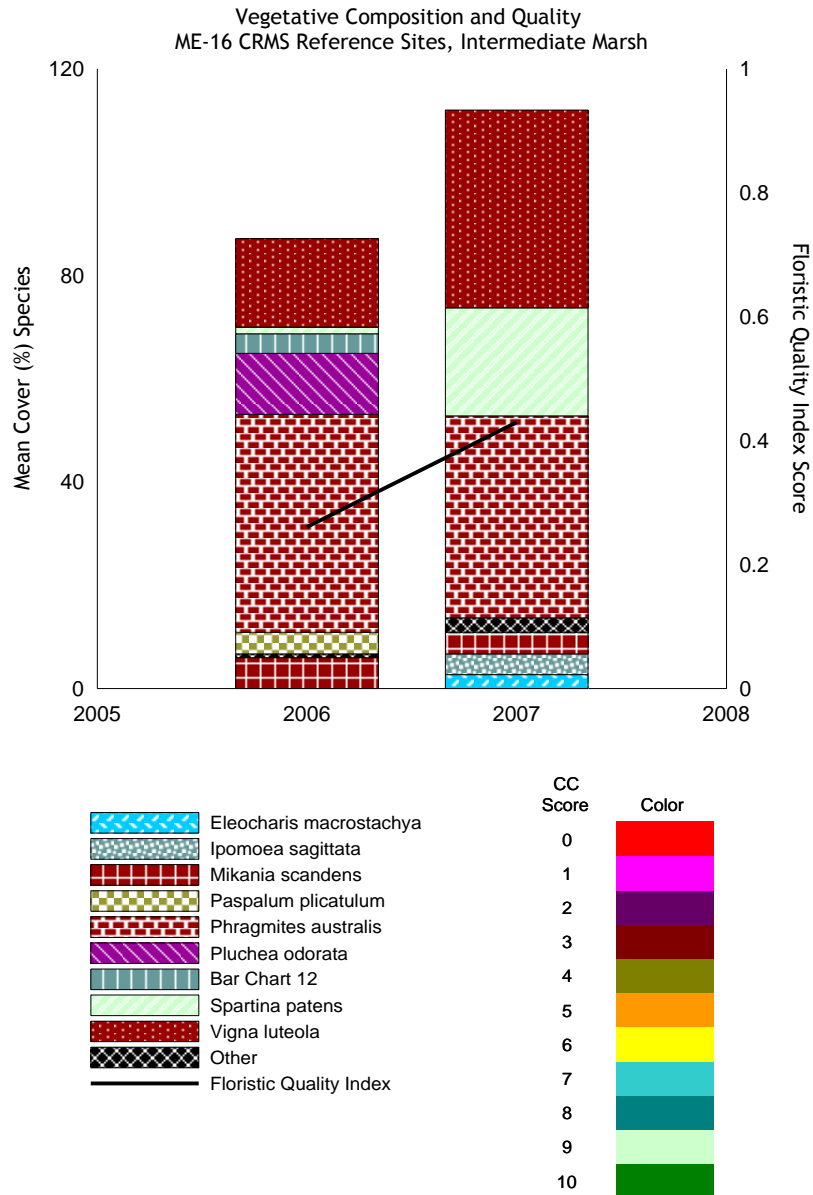


Figure 7b. Percent coverage and floristic quality index of species collected from intermediate CRMS reference site 626 in 2006 and 2007. Values are means of 10 stations within the site; therefore, the sum of % coverage of individual species can be greater than 100%.

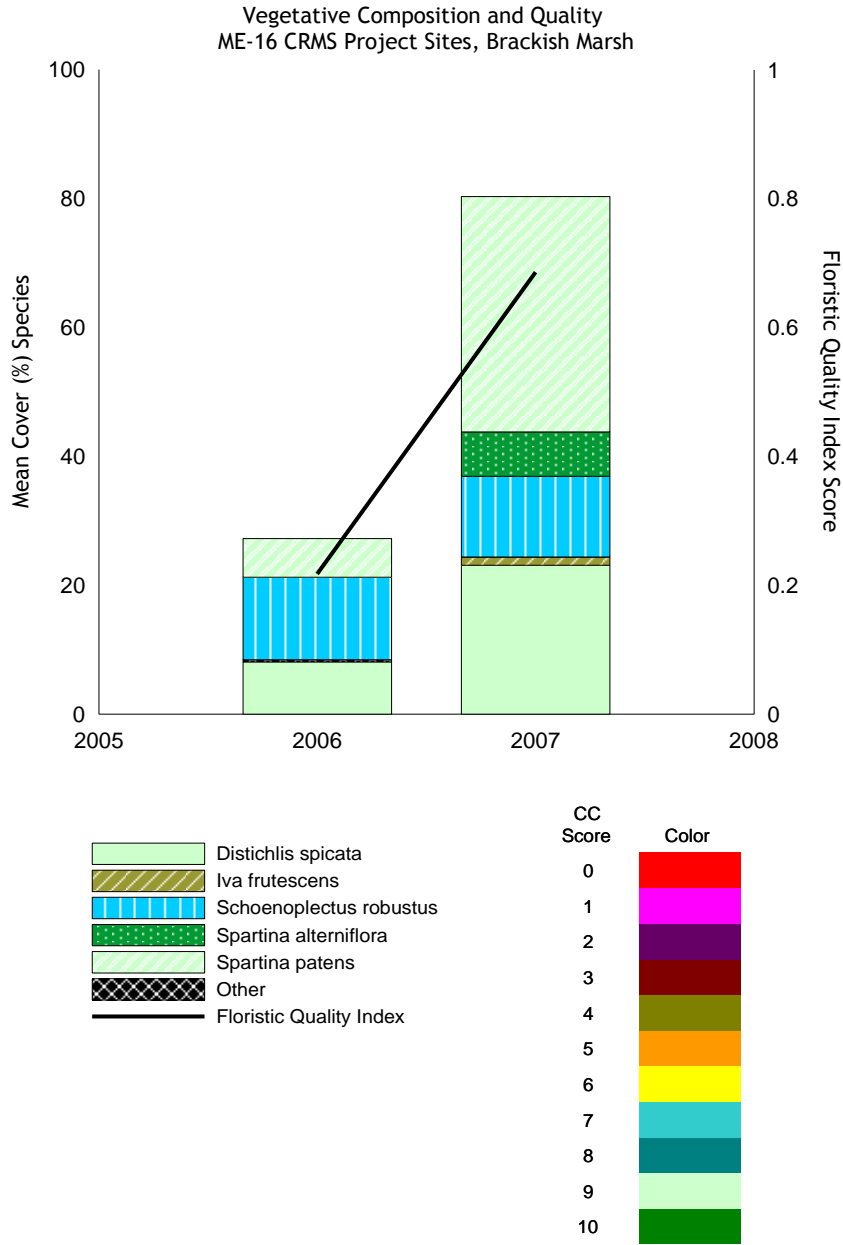


Figure 7c. Percent coverage and floristic quality index of species collected from brackish CRMS site 610 within the project area in 2006 and 2007. Values are means of 10 stations within the site; therefore, the sum of % coverage of individual species can be greater than 100%.

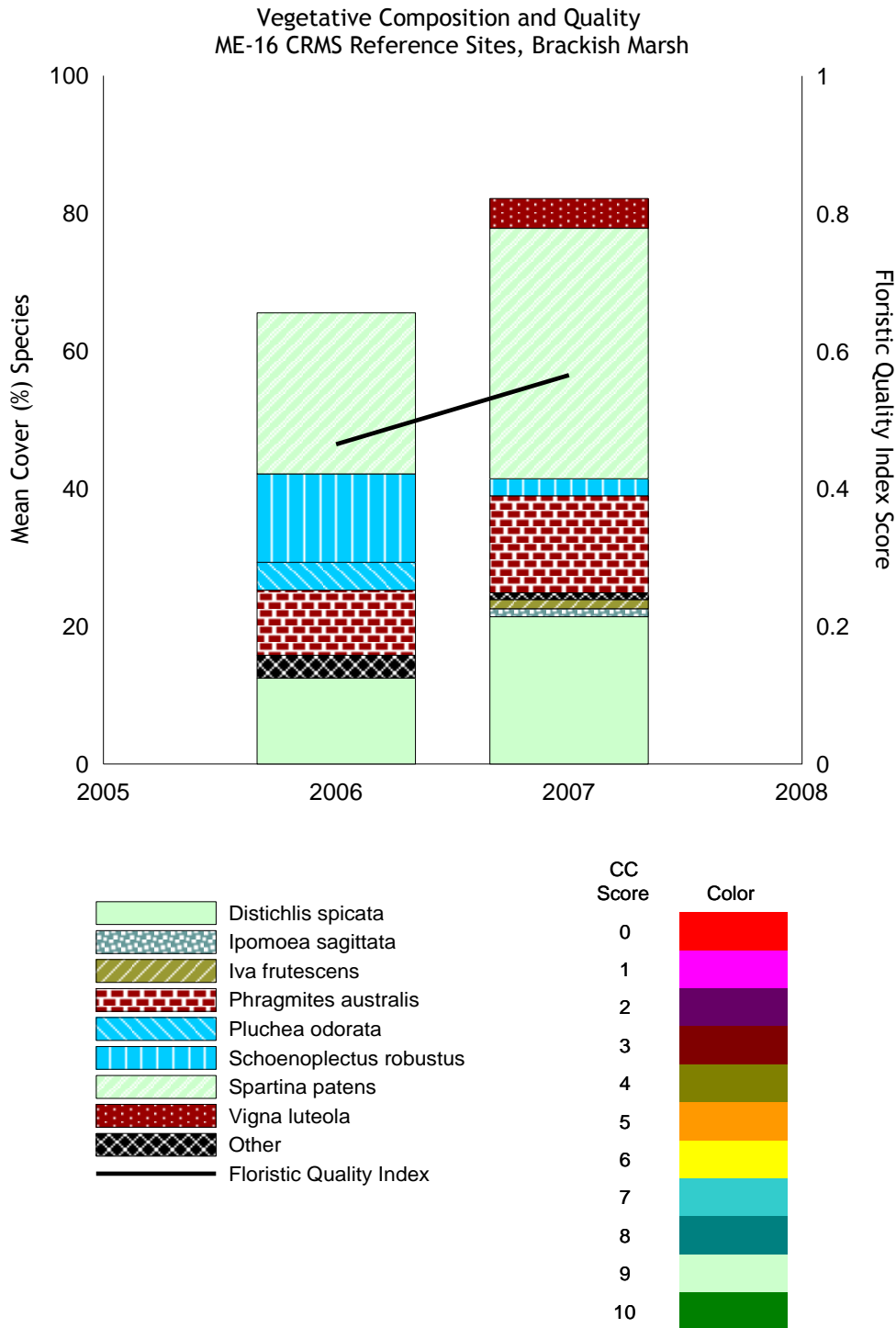


Figure 7d. Percent coverage and floristic quality index of species collected from brackish CRMS reference sites 576, 589 and 615 in 2006 and 2007. Values are means of 10 stations within the site; therefore, the sum of % coverage of individual species can be greater than 100%.

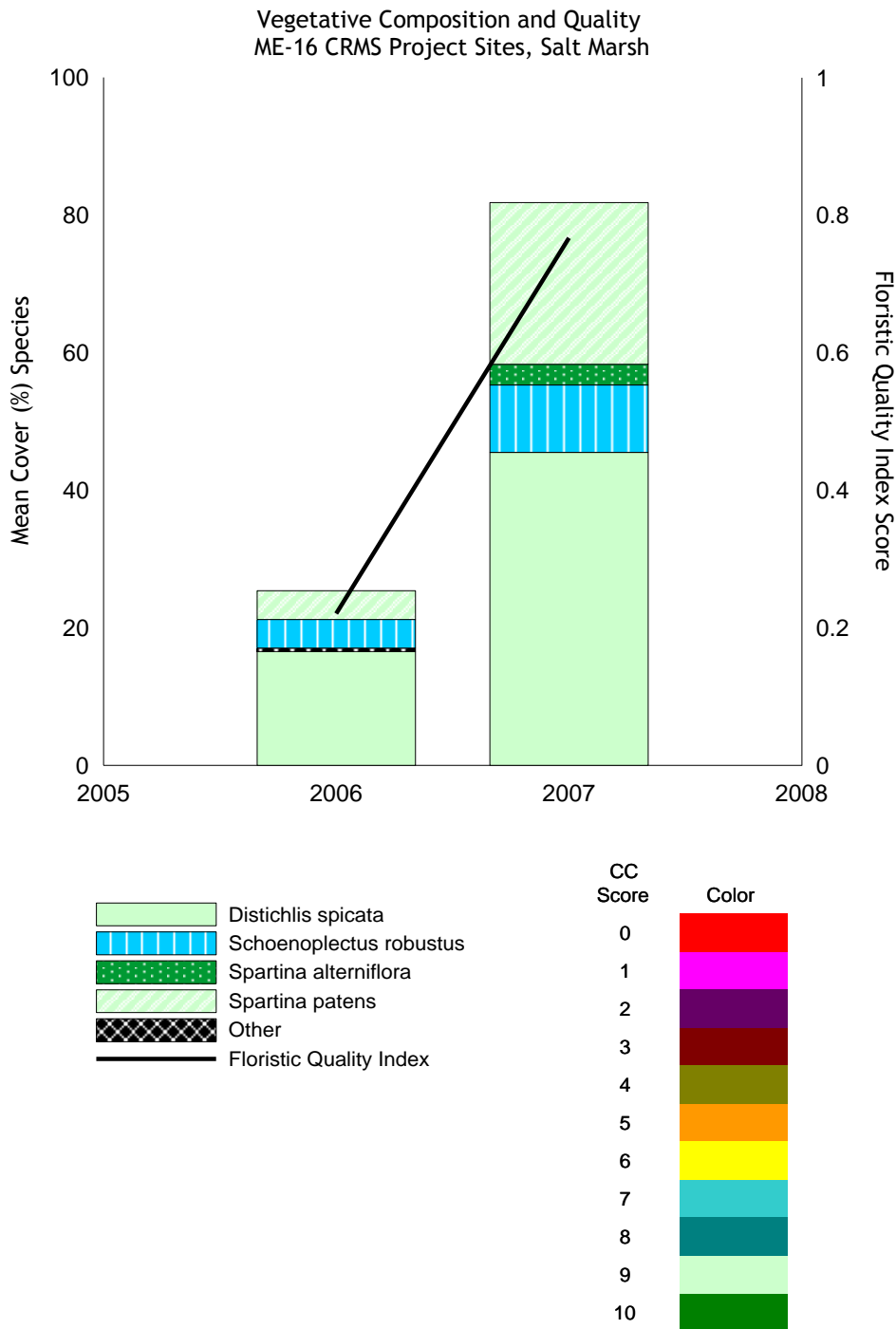


Figure 7e. Percent coverage and floristic quality index of species collected from saline CRMS site 599 within the project area in 2006 and 2007. Values are means of 10 stations within the site; therefore, the sum of % coverage of individual species can be greater than 100%.

CRMS Supplemental:

Soils:

Soil samples were collected at each of the CRMS-*Wetlands* sites in the project (599, 600, 609, 610) area and selected reference sites (576, 589, 615, 626). The soil properties data were sampled in 4 cm increments. All cores were sampled after Hurricane Rita. Figures for mean bulk density and organic matter by area by marsh type are presented in Figures 8a and 8b. Bulk density profiles are similar for all marsh types and areas except for the intermediate marsh north of Hwy 27 which has lower bulk density below 18 cm.

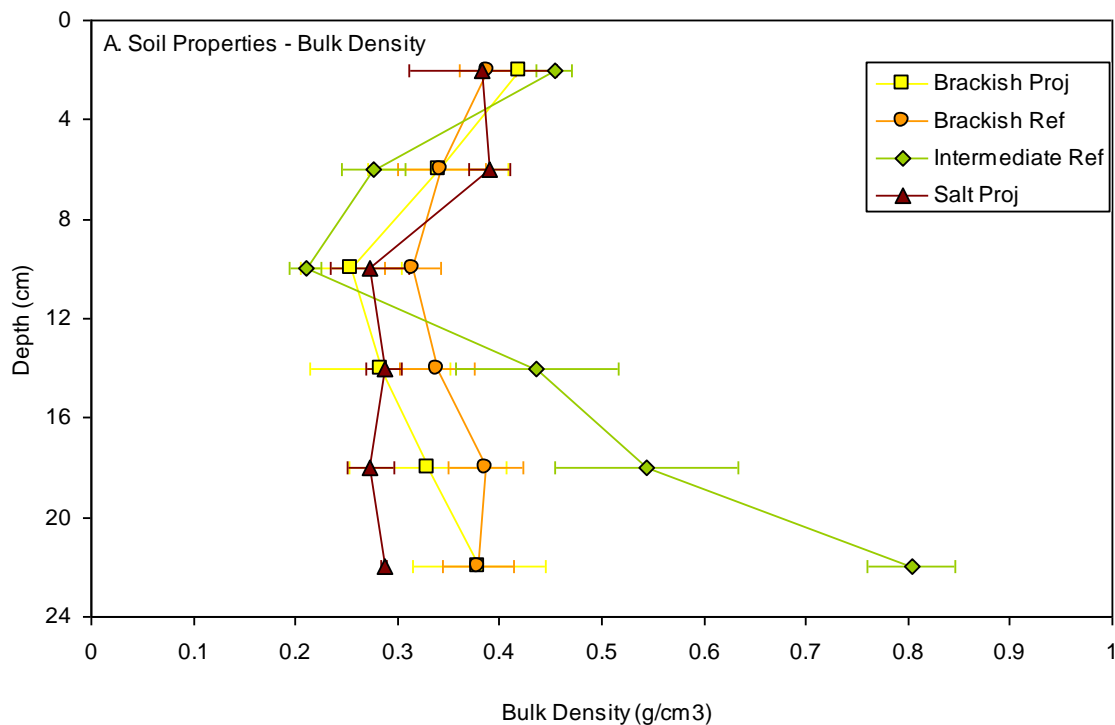


Figure 8a. Mean \pm 1 Standard error of soil variables collected at project and reference CRMS-*Wetlands* stations.

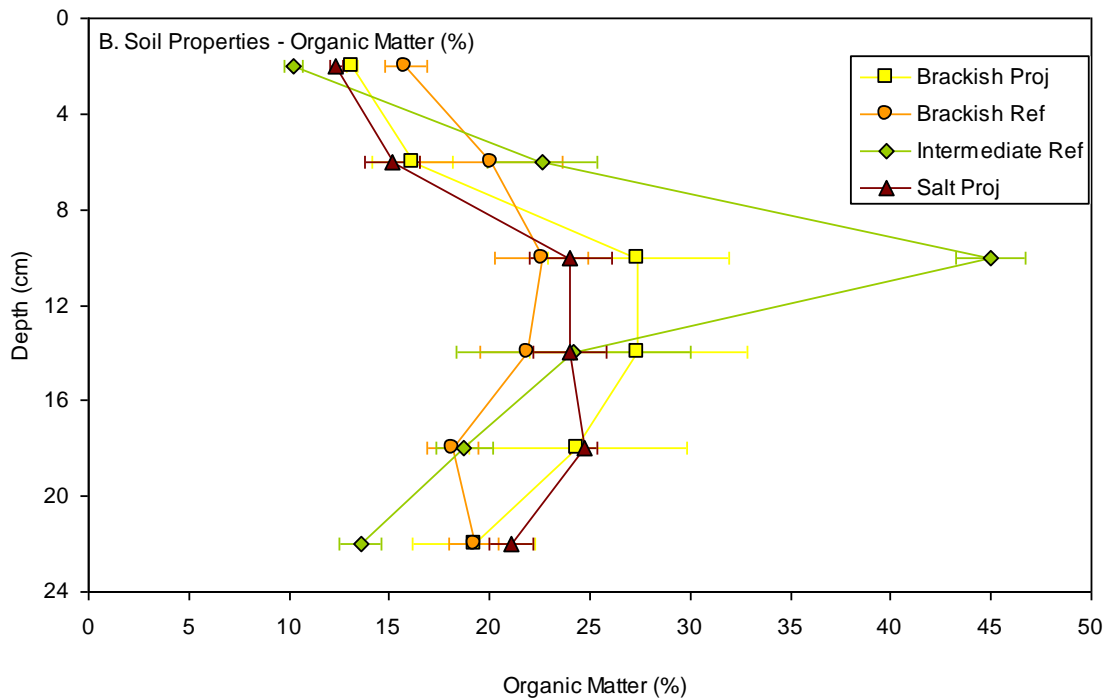


Figure 8b. Mean \pm 1 Standard error of soil variables collected at project and reference CRMS-Wetlands stations.

Soil Surface Elevation Change:

The rates presented are preliminary and should not be used for decision making until at least 3 years of data have been collected.

Reference CRMS stations 589 and 615 (Figures 9a & 9b) showed almost identical accretion and elevation change rates for the sampling period indicating the material being accreted is contributing to the elevation change. Both showed slight gains in elevation (0.003 and 0.31 cm/yr respectively). Site CRMS0610 (Figure 9c), within the southwestern part of the project area showed a net gain in elevation of 3.57 cm/yr. The deficit between elevation change and accretion within Figure 9c indicates some shallow subsidence is occurring at this site. CRMS0599 (Figure 9d), also in the southwestern part of the project area, showed a loss in elevation (-0.46 cm/yr).

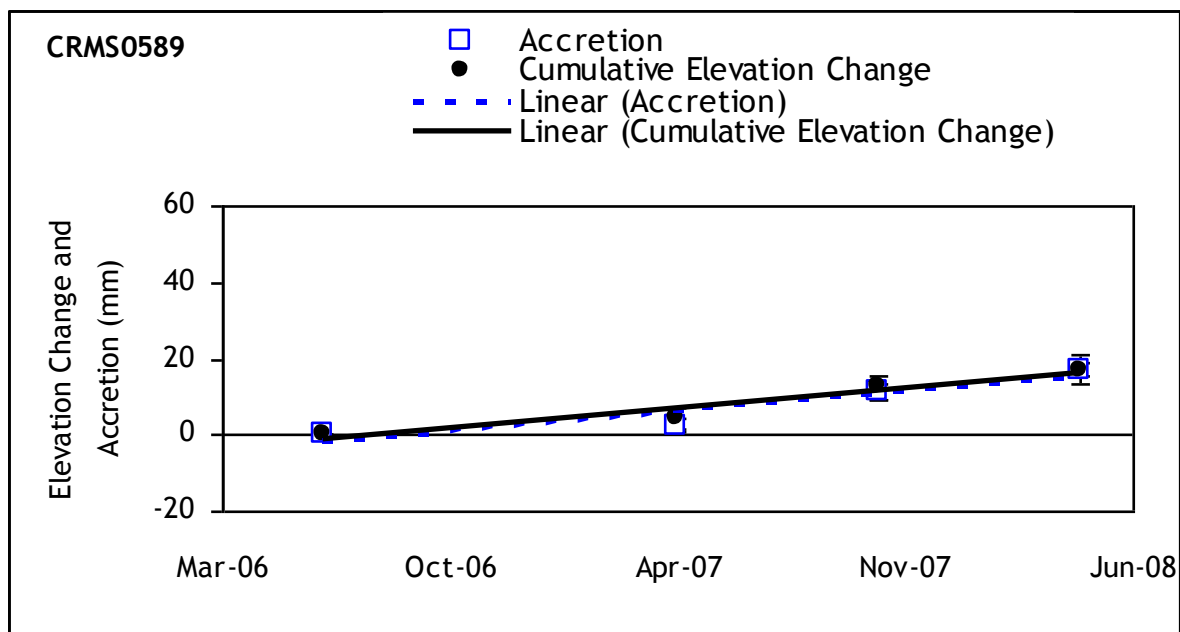


Figure 9a. Accretion and Elevation change for reference station CRMS0589 over 4 samplings for the period June 2006 to April 2008.

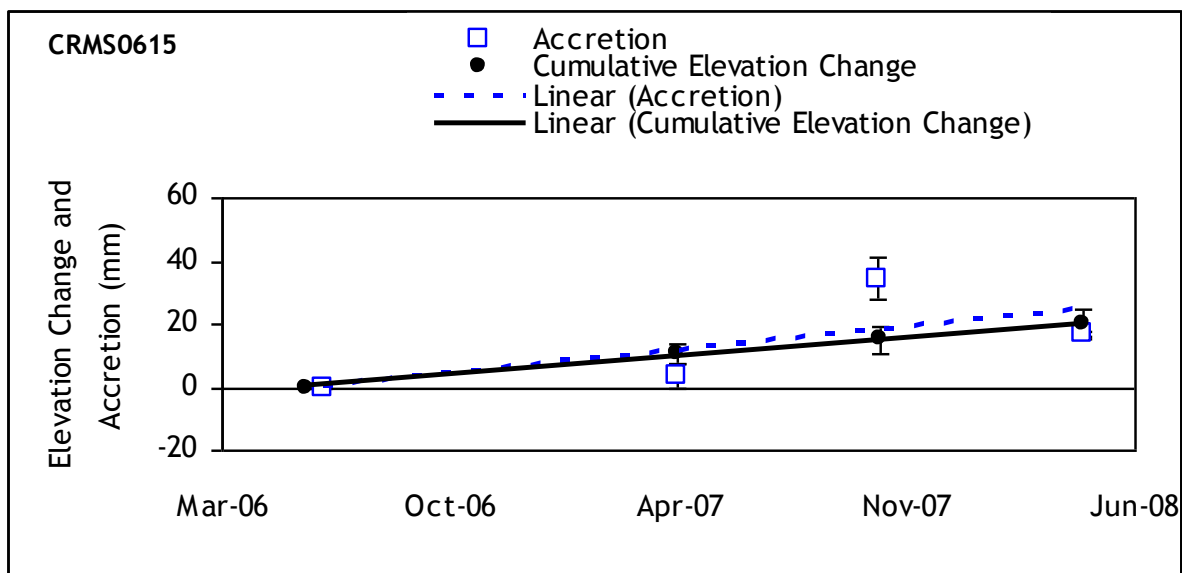


Figure 9b. Accretion and Elevation change for reference station CRMS0615 over 4 samplings for the period June 2006 to April 2008.

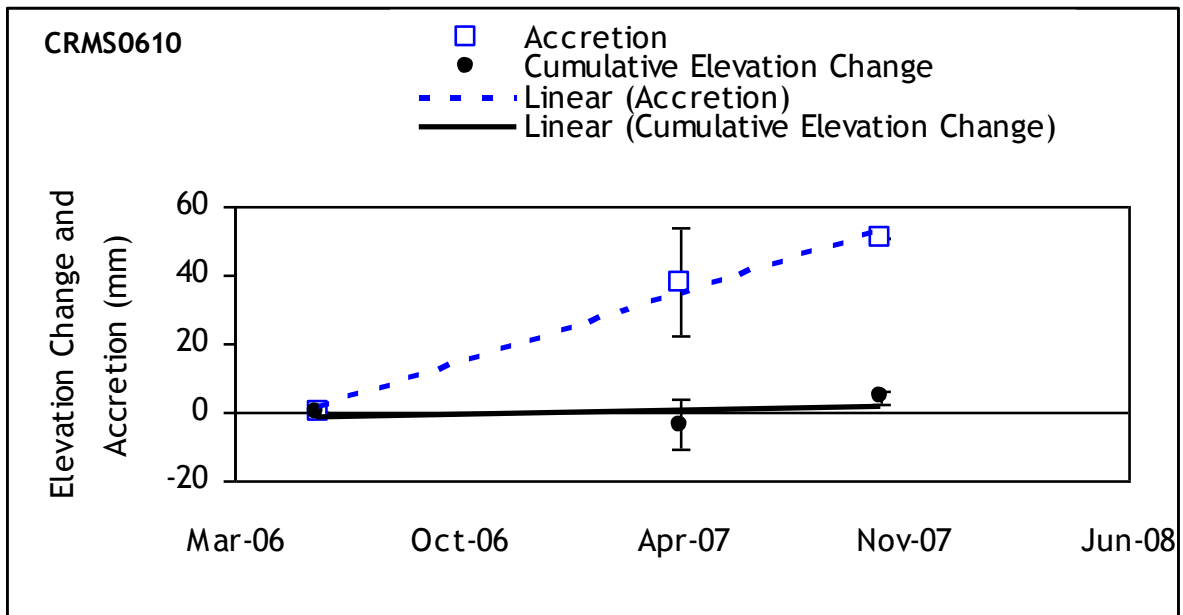


Figure 9c. Accretion and Elevation change for project station CRMS0610 over 3 samplings for the period June 2006 to October 2007.

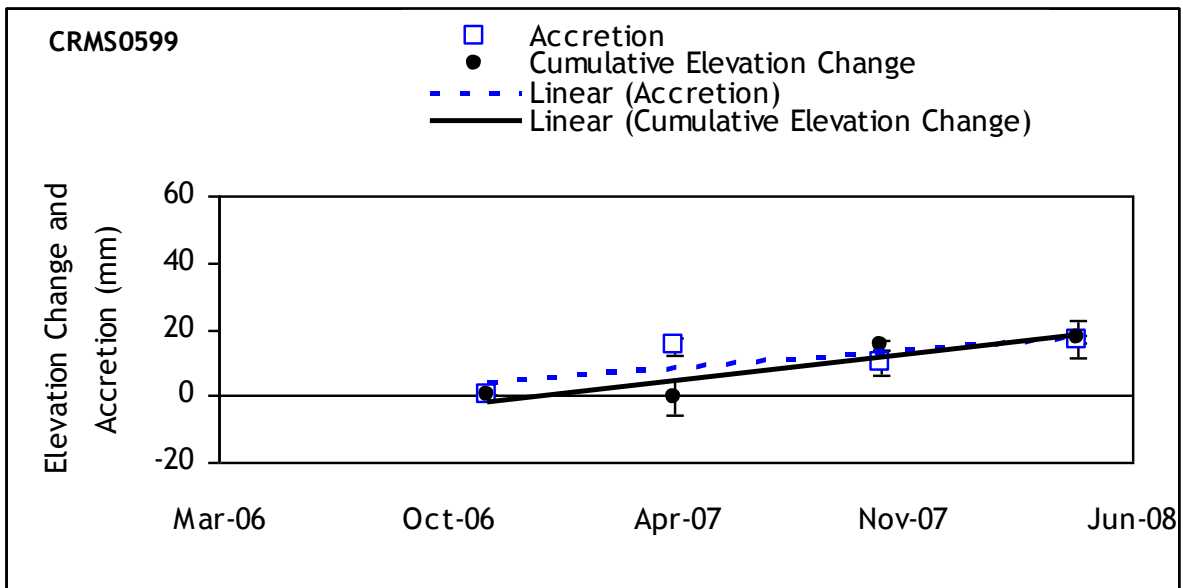


Figure 9d. Accretion and Elevation change for project station CRMS0599 over 4 samplings for the period November 2006 to April 2008.

V. Conclusions

a. Project Effectiveness

The goal to reduce salinities post-construction produced mixed results. Salinity levels were reduced in the brackish marshes in the central portion of Area A (ME16-06), which is influenced by the structures at Cop-Cop Bayou and structure Nos. 10 and 12 in the Boundary Line Levee. Results from a site to the west (CRMS0615) indicate no change in salinity pre- and post-construction. Future data collection should help to determine the project affect on salinity.

Interstitial water salinities were highest along the gulf shoreline averaging above 20 ppt. In the brackish marsh, average salinities were near the target range at the 10 cm depth, but near 15 ppt at 30 cm.

Operation of the structures to expedite drainage allowed the project area to recover quicker after a storm event in the fall of 2006. Under normal climatic conditions, the project has not had a significant effect on water levels within the project area since construction.

Between 2006 and 2007 the cover and quality of vegetation for the brackish marsh in the project area showed a greater recovery from Hurricane Rita than the reference sites. The quality of vegetation at the intermediate project sites was higher than the reference sites, though the cover was slightly lower. Vegetation cover and quality improved significantly at the project saline site as well.

Surface elevation at the reference sites showed minimal gains in elevation. Of the two project sites analyzed, the brackish site in Area A showed a gain in elevation, while the saline site showed a slight loss. Again, these rates are very preliminary and should not be used for decision making at this time.

Overall, the various features of the Freshwater Introduction South of Hwy 82 Project are in excellent condition and are functioning as designed. The LDWF Rockefeller Refuge staff is pleased with the amount of fresh water getting into the marshes south of Hwy 82 and has seen beneficial reduction of salinities in these areas. It should be noted that the Dyson Sheet Pile Dam is beginning to fail and creates a breach in the levee system at high water events, thus short circuiting the operation of the structures in that area. The LDWF Refuge Staff indicate this problem will be repaired using in house personnel.

b. Recommended Improvements

c. Lessons Learned

The use of spray dredge technology in performing the enlargement of Grand Volle Channels and Highway 82 Channel enlargement was very beneficial in that the spoil material from these areas was thinly spread out over the existing marsh and did not have any adverse effects as compared to conventional bucket dredging with built up spoil bank. Within a few months time, the spray dredge disposal areas were barely visible and the marsh was in pre-construction condition.

VI. Literature Cited

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APPENDIX A

(Inspection Photographs)



Photo No.1, View of inlet side of New Cop-Cop Structure.



Photo No. 2, View of outlet side of New Cop-Cop Structure.



Photo No. 3, View showing minor erosion on SW quadrant of outlet side of New Cop-Cop Structure.



Photo No. 4, View of inlet side of Structure No. 12.



Photo No. 5, View of outlet side of Structure No. 12.



Photo No. 6, View of inlet side of Structure No. 10.



Photo No. 7, View of outlet side of Structure No. 10.



Photo No. 8, Typical view of earthen terrace covered with vegetation.



Photo No. 9, View of Grand Volle South Channel Enlargement and Pipeline Crossing.



Photo No. 10, View of inlet side of New Dyson Structure.



Photo No. 11, View of outlet side of New Dyson Structure.



Photo No. 12, View showing three minor settlement areas atop the New Dyson Structure.



Photo No. 13, View of the inlet side of the Little Constance Structure.

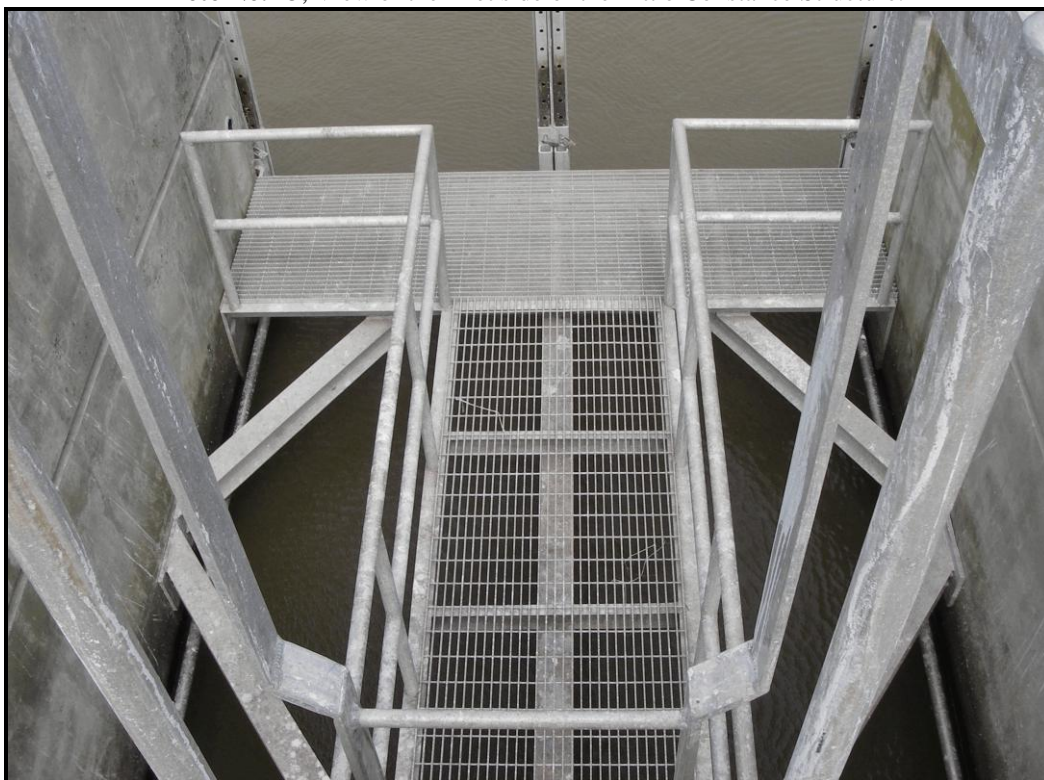


Photo No. 14, Typical view of a refurbished structure bay including inlet weir with flap gate on the Little Constance Structure.



Photo No. 15, View of adjacent marsh along Louisiana Hwy 82 Borrow Canal.



Photo No. 16, View of adjacent marsh along the Grand Volle North Channel Enlargement.



Photo No. 17, View of marine barrier at entrance of Grand Volle North Channel along the southern rim of White Lake.

APPENDIX B
(Three Year Budget Projection)

FRESHWATER INTRODUCTION S. OF HWY 82/ ME-16 / PPL 9
Three-Year Operations & Maintenance Budgets 07/01/2008 - 06/30/2011

<u>Project Manager</u>	<u>O & M Manager</u>	<u>Federal Sponsor</u>	<u>Prepared By</u>
Pat Landry	Dewey Billodeau	USFWS	Dewey Billodeau

	2008/2009	2009/2010	2010/2011
Maintenance Inspection	\$ 5,570.00	\$ 5,737.00	\$ 5,909.00
Structure Operation			
Administration	\$0.00	\$ -	\$ -
Maintenance/Rehabilitation			

08/09 Description:

E&D	\$0.00
Construction	\$0.00
Construction Oversight	\$0.00
Sub Total - Maint. And Rehab.	\$ -

09/10 Description:

E&D	\$ -
Construction	\$ -
Construction Oversight	\$ -
Sub Total - Maint. And Rehab.	\$ -

10/11 Description:

E&D	\$ -
Construction	\$ -
Construction Oversight	\$ -
Sub Total - Maint. And Rehab.	\$ -

	2008/2009	2009/2010	2010/2011
Total O&M Budgets	\$ 5,570.00	\$ 5,737.00	\$ 5,909.00

O & M Budget (3 yr Total)	\$ 17,216.00
Unexpended O & M Budget	\$ 53,597.75
Remaining O & M Budget (Projected)	\$ 36,381.75

OPERATION AND MAINTENANCE BUDGET 07/01/2008-06/30/2009
FRESHWATER INTRODUCTION SOUTH OF HIGHWAY 82/ME-16/PPL9

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	\$5,570.00	\$5,570.00
General Structure Maintenance	LUMP	1	\$0.00	\$0.00
Engineering and Design	LUMP	1	\$0.00	\$0.00
Operations Contract	LUMP	1	\$0.00	\$0.00
Construction Oversight	LUMP	1	\$0.00	\$0.00

ADMINISTRATION

LDNR / CRD Admin.	LUMP	0	\$0.00	\$0.00
FEDERAL SPONSER Admin.	LUMP	0	\$0.00	\$0.00
SURVEY Admin.	LUMP	0	\$0.00	\$0.00
OTHER				\$0.00
TOTAL ADMINISTRATION COSTS:				\$0.00

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:					
	Secondary Monument	EACH	0	\$0.00	\$0.00
	Staff Gauge / Recorders	EACH	0	\$0.00	\$0.00
	Marsh Elevation / Topography	LUMP	0	\$0.00	\$0.00
	TBM Installation	EACH	0	\$0.00	\$0.00
	OTHER				\$0.00
	TOTAL SURVEY COSTS:				\$0.00

GEOTECHNICAL

GEOTECH DESCRIPTION:					
	Borings	EACH	0	\$0.00	\$0.00
	OTHER				\$0.00
	TOTAL GEOTECHNICAL COSTS:				\$0.00

CONSTRUCTION

CONSTRUCTION DESCRIPTION:						
	Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
		0	0.0	0	\$0.00	\$0.00
		0	0.0	0	\$0.00	\$0.00
		0	0.0	0	\$0.00	\$0.00
	Filter Cloth / Geogrid Fabric	SQ YD	0	\$0.00	\$0.00	
	Navigation Aid	EACH	0	\$0.00	\$0.00	
	Signage	EACH	0	\$0.00	\$0.00	
	General Excavation / Fill	CU YD	0	\$0.00	\$0.00	
	Dredging	CU YD	0	\$0.00	\$0.00	
	Sheet Piles (Lin Ft or Sq Yds)		0	\$0.00	\$0.00	
	Timber Piles (each or lump sum)		0	\$0.00	\$0.00	
	Timber Members (each or lump sum)		0	\$0.00	\$0.00	
	Hardware	LUMP	1	\$0.00	\$0.00	
	Materials	LUMP	1	\$0.00	\$0.00	
	Mob / Demob	LUMP	1	\$0.00	\$0.00	
Contingency	LUMP	1	\$0.00	\$0.00		
General Structure Maintenance	LUMP	1	\$0.00	\$0.00		
OTHER			\$0.00	\$0.00		
OTHER			\$0.00	\$0.00		
OTHER			\$0.00	\$0.00		
TOTAL CONSTRUCTION COSTS:					\$0.00	

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **\$5,570.00**

OPERATION AND MAINTENANCE BUDGET 07/01/2009-06/30/2010
FRESHWATER INTRODUCTION SOUTH OF HIGHWAY 82/ME-16/PPL9

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	\$5,737.00	\$5,737.00
General Structure Maintenance	LUMP	1	\$0.00	\$0.00
Engineering and Design	LUMP	1	\$0.00	\$0.00
Operations Contract	LUMP	1	\$0.00	\$0.00
Construction Oversight	LUMP	1	\$0.00	\$0.00

ADMINISTRATION

LDNR / CRD Admin.	LUMP	0	\$0.00	\$0.00
FEDERAL SPONSER Admin.	LUMP	0	\$0.00	\$0.00
SURVEY Admin.	LUMP	0	\$0.00	\$0.00
OTHER				\$0.00
TOTAL ADMINISTRATION COSTS:				\$0.00

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:					
Secondary Monument	EACH	0	\$0.00	\$0.00	\$0.00
Staff Gauge / Recorders	EACH	0	\$0.00	\$0.00	\$0.00
Marsh Elevation / Topography	LUMP	0	\$0.00	\$0.00	\$0.00
TBM Installation	EACH	0	\$0.00	\$0.00	\$0.00
OTHER					\$0.00
TOTAL SURVEY COSTS:					\$0.00

GEOTECHNICAL

GEOTECH DESCRIPTION:					
Borings	EACH	0	\$0.00	\$0.00	\$0.00
OTHER					\$0.00
TOTAL GEOTECHNICAL COSTS:					\$0.00

CONSTRUCTION

CONSTRUCTION DESCRIPTION:					
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	0	0.0	0	\$0.00	\$0.00
	0	0.0	0	\$0.00	\$0.00
	0	0.0	0	\$0.00	\$0.00
Filter Cloth / Geogrid Fabric	SQ YD	0	\$0.00	\$0.00	\$0.00
Navigation Aid	EACH	0	\$0.00	\$0.00	\$0.00
Signage	EACH	0	\$0.00	\$0.00	\$0.00
General Excavation / Fill	CU YD	0	\$0.00	\$0.00	\$0.00
Dredging	CU YD	0	\$0.00	\$0.00	\$0.00
Sheet Piles (Lin Ft or Sq Yds)		0	\$0.00	\$0.00	\$0.00
Timber Piles (each or lump sum)		0	\$0.00	\$0.00	\$0.00
Timber Members (each or lump sum)		0	\$0.00	\$0.00	\$0.00
Hardware	LUMP	1	\$0.00	\$0.00	\$0.00
Materials	LUMP	1	\$0.00	\$0.00	\$0.00
Mob / Demob	LUMP	1	\$0.00	\$0.00	\$0.00
Contingency	LUMP	1	\$0.00	\$0.00	\$0.00
General Structure Maintenance	LUMP	1	\$0.00	\$0.00	\$0.00
OTHER			\$0.00	\$0.00	\$0.00
OTHER			\$0.00	\$0.00	\$0.00
OTHER			\$0.00	\$0.00	\$0.00
TOTAL CONSTRUCTION COSTS:					\$0.00

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **\$5,737.00**

OPERATION AND MAINTENANCE BUDGET 07/01/2010-06/30/2011
FRESHWATER INTRODUCTION SOUTH OF HIGHWAY 82/ME-16/PPL9

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	\$5,909.00	\$5,909.00
General Structure Maintenance	LUMP	1	\$0.00	\$0.00
Engineering and Design	LUMP	1	\$0.00	\$0.00
Operations Contract	LUMP	1	\$0.00	\$0.00
Construction Oversight	LUMP	1	\$0.00	\$0.00

ADMINISTRATION

LDNR / CRD Admin.	LUMP	0	\$0.00	\$0.00
FEDERAL SPONSER Admin.	LUMP	0	\$0.00	\$0.00
SURVEY Admin.	LUMP	0	\$0.00	\$0.00
OTHER				\$0.00
TOTAL ADMINISTRATION COSTS:				\$0.00

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:					
Secondary Monument	EACH	0	\$0.00	\$0.00	\$0.00
Staff Gauge / Recorders	EACH	0	\$0.00	\$0.00	\$0.00
Marsh Elevation / Topography	LUMP	0	\$0.00	\$0.00	\$0.00
TBM Installation	EACH	0	\$0.00	\$0.00	\$0.00
OTHER					\$0.00
TOTAL SURVEY COSTS:					\$0.00

GEOTECHNICAL

GEOTECH DESCRIPTION:					
Borings	EACH	0	\$0.00	\$0.00	\$0.00
OTHER					\$0.00
TOTAL GEOTECHNICAL COSTS:					\$0.00

CONSTRUCTION

CONSTRUCTION DESCRIPTION:					
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	0	0.0	0	\$0.00	\$0.00
	0	0.0	0	\$0.00	\$0.00
	0	0.0	0	\$0.00	\$0.00
Filter Cloth / Geogrid Fabric	SQ YD	0	\$0.00	\$0.00	\$0.00
Navigation Aid	EACH	0	\$0.00	\$0.00	\$0.00
Signage	EACH	0	\$0.00	\$0.00	\$0.00
General Excavation / Fill	CU YD	0	\$0.00	\$0.00	\$0.00
Dredging	CU YD	0	\$0.00	\$0.00	\$0.00
Sheet Piles (Lin Ft or Sq Yds)		0	\$0.00	\$0.00	\$0.00
Timber Piles (each or lump sum)		0	\$0.00	\$0.00	\$0.00
Timber Members (each or lump sum)		0	\$0.00	\$0.00	\$0.00
Hardware	LUMP	1	\$0.00	\$0.00	\$0.00
Materials	LUMP	1	\$0.00	\$0.00	\$0.00
Mob / Demob	LUMP	1	\$0.00	\$0.00	\$0.00
Contingency	LUMP	1	\$0.00	\$0.00	\$0.00
General Structure Maintenance	LUMP	1	\$0.00	\$0.00	\$0.00
OTHER			\$0.00	\$0.00	\$0.00
OTHER			\$0.00	\$0.00	\$0.00
OTHER			\$0.00	\$0.00	\$0.00
TOTAL CONSTRUCTION COSTS:					\$0.00

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **\$5,909.00**

APPENDIX C

(Field Inspection Notes)

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: ME-16 Freshwater Intro. S of Hwy 82

Date of Inspection: March 6, 2008 Time: 1:55 pm

Structure No. Grand Volle Barricade

Inspector(s): Dewey Billodeau, Mark Mouledous, Darrell Pontiff (OCPR)
Darryl Clark (USFWS), Chad Courville (Miami Corp.), Tom Hess (LDWF)

Structure Description: Timber barricade with boat access

Water Level Inside: +1.0 Outside:
Weather Conditions: Sunny and mild

Type of Inspection: Annual

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	N/A				
Stop Logs	N/A				
Hardware	Good				
Timber Piles Timber Walkway	Good			17	
Timber Wales	Good			17	
Galv. Pile Caps	Good			17	
Cables	N/A				
Signage /Supports Staff Gages	Good				
Rip Rap (fill)	N/A				
Earthen Embankment	N/A				

What are the conditions of the existing levees?
Are there any noticeable breaches?
Settlement of rock plugs and rock weirs?
Position of stoplogs at the time of the inspection?
Are there any signs of vandalism?

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: ME-16 Freshwater Intro. S of Hwy 82

Date of Inspection: March 6, 2008

Time: 11:10 am

Structure No. Earthen Terraces

Inspector(s): Dewey Billodeau, Mark Mouledous, Darrell Pontiff (OCPR)
Darryl Clark (USFWS), Chad Courville (Miami Corp.), Tom Hess (LDWF)

Structure Description: 26,000 LF "duck wing" earthen terraces

Water Level Inside: +1.0 Outside:
Weather Conditions: Sunny and mild

Type of Inspection: Annual

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	N/A				
Stop Logs	N/A				
Hardware	N/A				
Timber Piles	N/A				
Timber Walkway	N/A				
Timber Wales	N/A				
Galv. Pile Caps	N/A				
Cables	N/A				
Signage / Supports	N/A				
Staff Gages	N/A				
Rip Rap (fill)	N/A				
Earthen Terraces	Good			8	Fully vegetated.

What are the conditions of the existing levees?
Are there any noticeable breaches?
Settlement of rock plugs and rock weirs?
Position of stoplogs at the time of the inspection?
Are there any signs of vandalism?

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: ME-16 Freshwater Intro. S of Hwy 82

Date of Inspection: March 6, 2008

Time: 12:20 pm

Structure No. Little Constance

Inspector(s): Dewey Billodeau, Mark Mouledous, Darrell Pontiff (OCPR)
Darryl Clark (USFWS), Chad Courville (Miami Corp.), Tom Hess (LDWF)

Structure Description: Variable crest concrete control structure
Four 4'-8" X 6'-8" flapgates w/ stop logs

Water Level Inside: +1.0 Outside:
Weather Conditions: Sunny and mild

Type of Inspection: Annual

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Flap Gates	Good			13, 14	
Stop Logs	Good			13, 14	
Hardware	Good			13, 14	
Timber Piles	N/A				
Timber Walkway	N/A				
Timber Wales	N/A				
Galv. Pile Caps	N/A				
Cables	Good				
Signage / Supports	N/A				
Staff Gages	N/A				
Rip Rap (fill)	N/A				
Earthen Embankment	N/A				

What are the conditions of the existing levees?
Are there any noticeable breaches?
Settlement of rock plugs and rock weirs?
Position of stoplogs at the time of the inspection?
Are there any signs of vandalism?

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: ME-16 Freshwater Intro. S of Hwy 82

Date of Inspection: March 6, 2008

Time: 11:55 am

Structure No. New Dyson

Inspector(s): Dewey Billodeau, Mark Mouledous, Darrell Pontiff (OCPR)
Darryl Clark (USFWS), Chad Courville (Miami Corp.), Tom Hess (LDWF)

Structure Description: Variable crest aluminum culverts
Four 48" diameter culvs. w/ flapgates and stop logs

Water Level Inside: +1.0 Outside:
Weather Conditions: Sunny and mild

Type of Inspection: Annual

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	Good			10	
Stop Logs	Good			10	
Hardware	Good			10, 11	
Timber Piles	Good			11	
Timber Walkway					
Timber Wales	Good			11	
Galv. Pile Caps	Good			11	
Cables	N/A				
Signage / Supports	N/A				
Staff Gages					
Rip Rap (fill)	Good				
Earthen Embankment	Good			12	Some minor erosion atop the structure.

What are the conditions of the existing levees?
Are there any noticeable breaches?
Settlement of rock plugs and rock weirs?
Position of stoplogs at the time of the inspection?
Are there any signs of vandalism?

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: ME-16 Freshwater Intro. S of Hwy 82

Date of Inspection: March 6, 2008

Time: 10:30 am

Structure No. New Cop Cop

Inspector(s): Dewey Billodeau, Mark Mouledous, Darrell Pontiff (OCPR)
Darryl Clark (USFWS), Chad Courville (Miami Corp.), Tom Hess (LDWF)

Structure Description: Variable crest aluminum culverts
Four 48" diameter culvs. w/ flapgates and stop logs

Water Level Inside: +1.0 Outside:
Weather Conditions: Sunny and mild

Type of Inspection: Annual

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	Good			1	
Stop Logs	Good			1	
Hardware	Good			1, 2	
Timber Piles Timber Walkway	Good			1, 2	
Timber Wales	Good			2	
Galv. Pile Caps	Good			2	
Cables	N/A				
Signage /Supports Staff Gages	N/A				
Rip Rap (fill)					
Earthen Embankment	Good			3	Some minor erosion on SW quadrant of outlet side of structure.

What are the conditions of the existing levees?
Are there any noticeable breaches?
Settlement of rock plugs and rock weirs?
Position of stoplogs at the time of the inspection?
Are there any signs of vandalism?

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: ME-16 Freshwater Intro. S of Hwy 82

Date of Inspection: March 6, 2008

Time: 10:55 am

Structure No. 10

Inspector(s): Dewey Billodeau, Mark Mouledous, Darrell Pontiff (OCPR)
Darryl Clark (USFWS), Chad Courville (Miami Corp.), Tom Hess (LDWF)

Structure Description: Variable crest aluminum culverts
Three 48" diameter culvs. w/ flapgates and stop logs

Water Level Inside: +1.0 Outside:
Weather Conditions: Sunny and mild

Type of Inspection: Annual

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	Good			6, 7	
Stop Logs	Good			6, 7	
Hardware	Good			6, 7	
Timber Piles	Good			6, 7	
Timber Walkway					
Timber Wales	Good			7	
Galv. Pile Caps	Good			6, 7	
Cables	N/A				
Signage / Supports	N/A				
Staff Gages					
Rip Rap (fill)	Good			6, 7	
Earthen Embankment	Good			7	

What are the conditions of the existing levees?
Are there any noticeable breaches?
Settlement of rock plugs and rock weirs?
Position of stoplogs at the time of the inspection?
Are there any signs of vandalism?

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: ME-16 Freshwater Intro. S of Hwy 82

Date of Inspection: March 6, 2008

Time: 10:40 am

Structure No. 12

Inspector(s): Dewey Billodeau, Mark Mouledous, Darrell Pontiff (OCPR)
Darryl Clark (USFWS), Chad Courville (Miami Corp.), Tom Hess (LDWF)

Structure Description: Variable crest aluminum culverts
Three 48" diameter culvs. w/ flapgates and stop logs

Water Level Inside: +1.0 Outside:
Weather Conditions: Sunny and mild

Type of Inspection: Annual

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	Good			4, 5	
Stop Logs	Good			4	
Hardware	Good			4, 5	
Timber Piles	Good			4, 5	
Timber Walkway					
Timber Wales	Good			5	
Galv. Pile Caps	Good			4, 5	
Cables	N/A				
Signage / Supports	N/A				
Staff Gages					
Rip Rap (fill)	Good			5	
Earthen Embankment	Good			4, 5	

What are the conditions of the existing levees?
Are there any noticeable breaches?
Settlement of rock plugs and rock weirs?
Position of stoplogs at the time of the inspection?
Are there any signs of vandalism?