# LABRANCHE WETLANDS MARSH CREATION (PO-17)

## I. INTRODUCTION

### I.1. Project Description

The LaBranche Wetlands Marsh Creation project is located in St. Charles Parish, near the southwestern shoreline of Lake Pontchartrain, just east of the Bonnet Carre' Spillway (figure 1). The project was authorized for construction under the 1st Priority Project List (PPL).

The boundary of the project is unchanged since its inception. The project area encompasses about 502 acres. The WVA analysis used a project area size of 487 acres, which is the result of subtracting 15 acres of scrub/shrub occurring within the 502-acre area. The project area contained intermediate marsh and shallow open water (USACE Project Information Sheet, 9/27/91).

The main project feature is the hydraulic deposition of sediments dredged from the bottom of Lake Pontchartrain into the project area. Secondary features needed to accommodate the dredged material include a perimeter dike and several pipes, culverts and spillboxes to regulate the discharge of excess water during project construction. Another feature that was added after project construction was the aerial seeding of the newly deposited dredged material.

This project was proposed as a candidate project in October 1991 for inclusion in PPL1. A WVA was done for this project in September 1991. In June 1992 Glen Montz and Mike Saucier of the USACE conducted a field trip to determine the upper and lower elevations of marsh in the area, field elevations were shot and survey sites and plant species growing at that elevation were marked on a map. A FONSI was done for the project in January 1993, with the required EA completed in November 1992. The retention dikes were built between January-March 1994. Dredging operations began March 7, 1994 and ended April 2, 1994. In July 1994 the area was aerially seeded with *Echinochloa crusgalli* (Japanese millet) to enhance volunteer plant growth and reduce aeolian transport of sediment. The seeding was not part of the project as designed.

No significant changes to the project area size or construction features were made during project development and implementation.

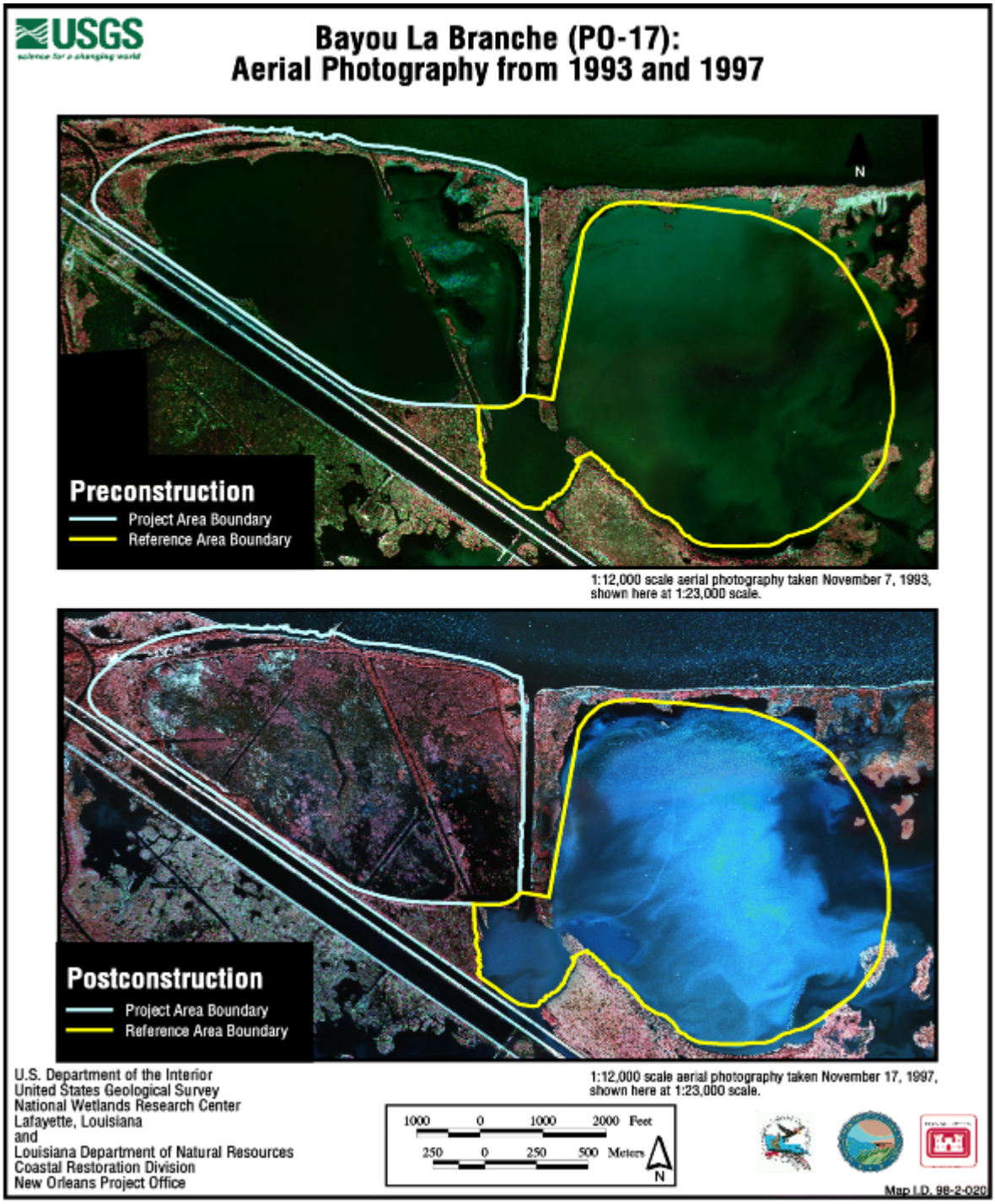



**Figure 1.** LeBranche Wetland Creation (PO-17) project and reference area boundaries and constructed features.

### I.2. Project Personnel

| Project Phase | Name | Position | Agency |
|---|---|---|---|
| Planning | Chris Alfonso | Engineering Design | USACE |
| | Richard Boe | WVA Analysis | USACE |
| | Michael Saucier | Env. Compliance | USACE |
| Implementation | Beth Cottone | Project Management | USACE |
| | Dom Elguezabal | Project Management | USACE |
| | Steve Gammil | Planning Manager | LDNR |
| | Tony Lauto | Construction Eng. | USACE |
| | John Radford | Project Engineer | LDNR |
| | Leroy Smith | Constr. Inspector | LDNR |
| Monitoring | Bill Boshart | Monitoring | LDNR |
| | John Troutman | Monitoring Manager | LDNR |
| | Diane Steller | Monitoring | LDNR |

## II. PLANNING

### II.1. Causes of Loss

*What was assumed to be the major cause of land loss in the projected area?*
The majority of the shallow open water in the project area, prior to project construction, was the result of marsh loss attributed to soil compaction and subsidence during a period in the early 1900's when the area was reclaimed for agricultural production [USACE Environmental Assessment (EA), 10/92]. However, the U.S. Army Corps of Engineers (USACE) land loss data shows the open water area developing between 1956 and the late 1970's. Only very minor land loss has occurred since the 1970's.

*What were assumed to be the additional causes of land loss in the projected area?*
The construction of the Illinois Central Gulf Railroad in the 1830's appears to be the first major activity that impacted this area by interrupting sheet flow. In the 1960's, canals were created for barge access to build Interstate Highway 10, which increased the flux of salt water from Lake Pontchartrain (EA, 10/92). These canals were not properly closed at the Lake after construction was completed. The project area has also been impacted by pipelines. The extent to which these additional impacts are perceived to have caused land loss is not mentioned in the files.

### II.2. Background

The placement of dredged material into the project area was selected because of the suitability of the area for this type of restoration project. The features making this area suitable are the close proximity to a borrow source (Lake Pontchartrain);

the semi-confined nature of the project area; the shallow water in the project area; and the size of the project area. Another factor that made the project area attractive for marsh creation was the high visibility of the area from Interstate 10.

## II.3. Project Goals and Objectives

*How were the goals and objectives for the project determined?*
The revised fact sheet (USACE-10/1/91) developed for this project listed as the objective "to create new vegetated wetlands and restore and nourish deteriorated marshes in the Bayou LaBranche area".

The WVA performed for this project (USACE-9/27/91) delineated "marsh restoration of a 502 acre site based on existing physical features, with low-level dikes to contain the material. The dikes were to be breached to allow aquatic organism access once the material became consolidated".

The EA completed for this project (USACE-11/9/92) listed as the purpose of the project "to create an area of approximately 70% (30% open water) wetlands in which wetlands are interspersed with water to allow for access to nursery habitat by estuarine-dependent species. The created vegetated wetlands would also provide cover and food for migratory waterfowl and wading birds".

The Monitoring Plan (LDNR-5/16/94, revised 7/23/98) developed for this project indicates that the specific measurable goals were "to create approximately 305 acres (123ha) of shallow-water habitat conducive to the natural succession of emergent vegetation, and to increase the marsh:open-water ratio in the project area to a minimum of 70% emergent marsh to 30% open water after 5 years following project completion. There were no specific goals and objectives prior to the development of the monitoring plan in May 1994. The 70/30 land to water ratio was based on the optimal ratio determined in the original WVA done in 1991.

*Are the goals and objectives clearly stated and unambiguous?*
The goals and objectives of the project are clearly stated and attainable.

*Are the goals and objectives attainable?*
The goals and objectives of the project are attainable.

*Do the goals and objectives reflect the causes of land loss in the project area?*
The goals and objectives reflect the causes of land loss in the project area. The use of dredged material to increase surface elevations was designed to offset the marsh loss due to soil compaction and subsidence.

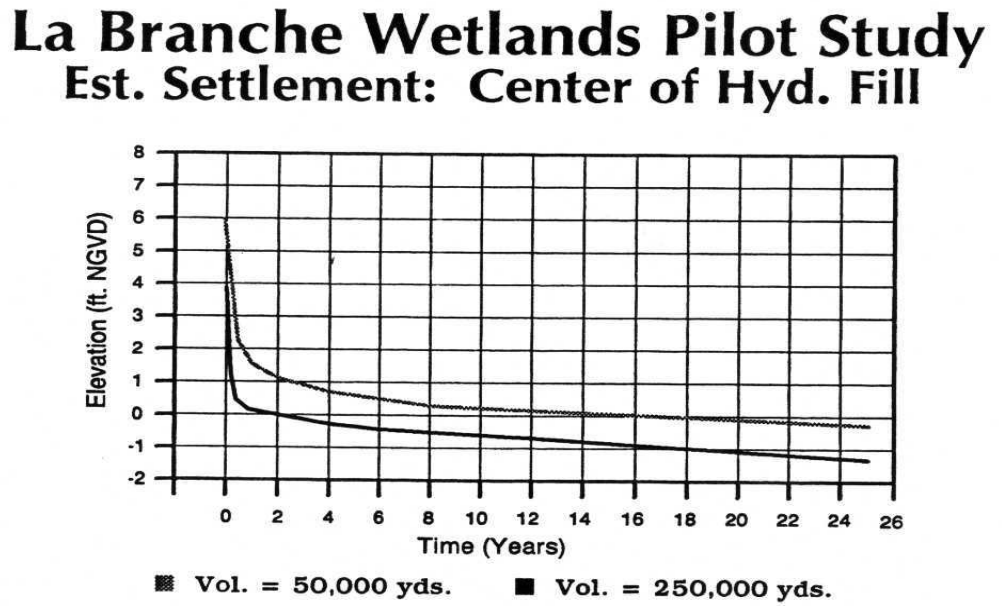
## III. ENGINEERING

### III.1. Design Feature(s)

*What construction features were used to address the major cause of land loss in the project area?*
The main construction feature was the deposition of hydraulically-dredge material into the project area. It was designed to elevate the soil surface back to the point that it would support wetland vegetation (USACE-6/18/92).

*What construction features were used to address the additional causes of land loss in the project area?*
The other causes of land loss mentioned in the project files include embankments that interrupt sheet flow (canal banks and railroad grade)(USACE-9/27/91); saltwater flux from Lake Pontchartrain; and canals (USACE-11/9/92). The project does not address embankments or sheetflow. Canals within the project area were filled by project construction. Saltwater flux from Lake Pontchartrain was stopped by other projects that blocked off the large canal along the east side of the project area (Gretchen Binet - personal communication).

*What kind of data was gathered to engineer the features?*
Surveys and borings were taken in both the borrow area and the deposition area prior to project design (Glen Montz- 6/18/92). A settlement curve was developed to help determine how high to pump the material during construction. The settlement curve could not be located in an electronic format. The person who prepared the graph reports that it was based on certain drying and compaction assumptions that were compromised by the vegetative plantings and water control structures. The graph has been scanned and pasted below.



On June 17, 1992 a field trip was conducted to determine the upper and lower elevations of marsh in the area. Elevations were determined by the USACE Survey Section (USACE-6/18/92). Low and high marsh elevations (32 in all) were indicated for several plant species occurring on 3 sites. The mean for high and low marshes and the standard deviation for each were determined. Settled elevations for the dredged spoil to create wetlands were between 0.75' NGVD (+/- 0.41) to 1.34'NGVD (+/-0.28). The range of wetland elevations was listed as 0.34' to 1.62'NGVD.

*What engineering targets were the features trying to achieve?*
The Design Engineer for the project reviewed the surveys taken by the USACE to determine the elevation of the marsh adjacent to the fill area and based his construction height on that elevation plus the settlement curve. It is unclear whether or not the marsh elevation data collected by Glen Montz and Mike Saucier of the USACE in June 1992 were utilized.

### III.2. Implementation of Design Feature(s)

*Were construction features built as designed? If not, which features were altered and why?*
The construction features were built as designed. There is no mention in the Narrative Completion report (USACE-4/29/94) about modifications that had to be made during construction. There were some differences of opinion on what the initial (pumped-to) height of the dredged material should have been, but the settlement curve was not questioned. There was no monitoring plan developed until after the project was constructed.

It should be noted that the USACE did not specify, and never does specify, the type or size of dredge to be used on a construction contract. For this project, the source of the borrow material and the location and the elevation of the discharged material was specified. It was assumed that a relatively small to medium sized hydraulic cutterhead dredge would be used by the successful bidder to construct the project, based on the amount of material to be moved and the size of the fill area. However, the contractor sent the dredge Tom James for the job. According to USACE personnel familiar with dredging, the Tom James is a 30-inch cutterhead dredge, and is the "biggest cutterhead dredge in the Western Hemisphere". Although USACE contract nearly always contain language about the potential for the dredge operator to "throttle down" so as to avoid overtopping or blowing-out perimeter dikes, this statement is difficult to enforce and can easily lead to claims against the Government if the Government inspector requests the dredge operators to slow-down their pumping. The rapid filling of the project area by the Tom James blew out the perimeter dike along the eastern side of the project area and allowed a substantial amount of sediment to enter the large pond to the east. This later caused the duck hunters in that area to complain about the siltation. Other than that, there were no serious problems that developed from this spillage of sediment, although it likely increased the cost of the project since more material had to be pumped into the project area to fill it.

During the 1996-1997 period, two rudimentary structures were built and several other structures modified. These modifications were done by the LaBranche duck club and without the consent of the federal or state project manager (Allan Ensminger - personal communication, and LDNR Monitoring Report 4- 4/17/97). These were done to hold water for their duck leases. The largest structure, a weir, was built to close the breach in the southwest project levee. In Pond B plywood and 2x4's were used to block the drainage pipes located along the east containment levee. An additional weir was constructed to close the breach at the southern end of the east levee.

### III.3. Operation and Maintenance

*Were structures operated as planned? If not, why not?*
The structures built for this project include the perimeter dike and the water control structures built into the dike. One known problem that developed during construction was the excess water building-up within the project area.

Apparently, the water control structures in the perimeter dike were not sufficient to drain the excess water. A blow-out occurred in the eastern perimeter dike, which allowed for quicker drainage. This blow-out was later found to have allowed the release of a considerable amount of sediment into the shallow water area to the east of the project, an area used for waterfowl hunting. An important note is that the as-built drawings show a blow-out in the dike and the area where sediment flowed, but the narrative completion report is silent about the incident. The hunters leasing the area claimed damages in the form of reduced access. There are currently two known breaches in the dike as of 2002.

*Are the structures still functioning as designed? If not, why not?*
The unapproved modifications made by the LaBranche duck club effectively prevented the impounded areas from dewatering during low tides and reducing tidal exchange and thus caused differences in the sediment elevation and water levels. The structures have been washed-out since 1999 and no longer act to hold water in the project area.

There is a considerable amount of correspondence in the project files concerning the perimeter dike and associated water control structures. The pertinent points are summarized as follows.

- Prior to project construction, the landowner's representative, (Allan Ensminger) and at least one local resident (Patrick Lambert) recommended that water control structures be placed in the perimeter dike in order to control water levels after project construction. Documented in notes from a meeting on 2/25/1993 and mentioned in a letter of Allan Ensminger, 2/26/1999.
- The USACE did not want to install permanent water control structures because they would not be able to anticipate the elevation to which the

culvert should be set so that it would function properly after the fill material settled. Mentioned in a letter of Allan Ensminger, 2/26/1999.

- The project was constructed with spillboxes and culverts (USACE as-built drawings-June 1993).
- Within months of the project construction, the perimeter dike had breached in more than one location (Michael Saucier- personal communication).
- The USACE sent a letter (5/8/1995) to several agencies (NMFS, NRCS, LDWF, LDNR, TAG group, landowners rep., hunting club) requesting their input on whether or not the dike should be repaired. There was a suggestion to repair the dike in order to pond water and prevent the establishment of woody vegetation while the sediments consolidated and settled.
- The NMFS stated that they were opposed to the dike repair in a letter dated 5/16/1995.
- The LDNR wrote on 5/17/1995 that they did not support the repair of retention dikes.
- The USFWS stated that more information was needed in a letter of 5/17/1995.
- Allan Ensminger requested, on two occasions, that water control structures be implemented. Letters of Allan Ensminger, 5/26/1995 and 2/26/1999.
- Duck lease holders installed makeshift blockages on dike breaches to try and retain water for duck hunting (LDNR monitoring personnel- personal communication).
- No dike repairs were made by the USACE as of March 2002.

*Was maintenance performed?*
No maintenance has been performed on the project.

## IV. PHYSICAL RESPONSE

### IV.1. Project Goals

*Do monitoring goals and objectives match the project goals and objectives?*
The monitoring goals match the project goals and objectives.

### IV.2. Comparison to adjacent and/or healthy marshes

#### IV.2.1. Elevation

*What is the range of elevations that support healthy marshes in the different marsh types?*
The project was designed to obtain a sediment consolidation of +2 feet NGVD after 5 years. This elevation was originally deemed to be conducive to the natural succession of emergent vegetation, but subsequent monitoring reports indicate

that this elevation is not suitable to the establishment of wetland vegetation. Additional project features were being considered to facilitate the growth of such species.

The June1992 field trip conducted by noted USACE biologist Glen Montz surveyed existing marsh elevations at three sites, giving plant species growing at each elevation relative to NGVD (Glen Montz-6/18/92). The mean for low and high marshes and the standard deviation for each were determined. The following elevations for material to be placed were delineated: 0.75'NGVD (+/- 0.41) to 1.34'NGVD (+/- 0.28). Accordingly, the range of wetland elevations was determined to be 0.34 to 1.62'NGVD.

The latest monitoring report (due in June 2002) will indicate that elevations have nearly stabilized. Very little compaction of sediment is expected in the future. Current elevations will be included in the next monitoring report.

Does the project elevation fall within the range for its marsh type?

Habitats in the LaBranche project and reference areas represent three NWI habitat systems: estuarine, palustrine, and riverine (LDNR Monitoring Report, April 5, 1999). Additionally, three upland habitats were identified both in the project and reference areas: upland barren habitat, upland scrub-shrub, and upland forested habitats. The project does fall within the ranges for these habitat types.

Elevations in the southern section of the project are lower that in the northern section because of the way the project area was filled (north to south) and that no sediment was discharged within 1000 feet of I-10 to possibly undermine the foundation. Thus the southern section received less sediment during filling. Also, the project area is still semi-impounded and the tidal variation is different than in the reference area.

*Did the project meet its target elevation?*

As of the last monitoring report (LDNR Monitoring, April 1999), the project elevations at all 19 staff gauges were within the targeted range of 0.65' to 1.62'NAVD. However, some elevations were in the high end of this range, and it was apparent from the vegetation surveys and habitat analyses that the upper limit of the target range may not be suitable for the establishment of emergent wetland vegetation. Continued settlement of the dredged material and subsidence in the area was expected to result in lower sediment elevations and thus further benefit the establishment of wetland vegetation.

Monitoring personnel suggest that an elevation survey in the reference area should be performed at this time to give a good comparison to the project area. This would also serve as a check for the accuracy of the elevation gauges.

*What is the subsidence rate and how long will the project remain in the correct elevation range?*

The subsidence rate for this area (LDNR Coast 2050 Plan- December, 1998) is intermediate (1.1 to 2 feet per century). It will take additional time beyond the 5-

year completion date to get all 19 gauges within the project area to an elevation conducive to emergent vegetation growth, if it occurs at all. Sediment elevations have continued to decrease in the project area beyond the 5-year target, but the next monitoring report (June 2002) will show that elevations have nearly stabilized (personal communication- DNR monitoring manager).

### IV.2.2. Hydrology

*What is the hydrology that supports healthy marshes in the different marsh types?*
Water level variability in the project area was determined to be less variable than in the reference area. In 1996 the depth ranged from 0.6' to 3.2' in the project area and 0.8' to 4.4' in the reference area and in 1997 the range in the project area was 0.5' to 2.2', while in the reference area the ranges were 0.8'to 2.2' (LDNR Comprehensive Monitoring Report, April 1998). This variability was due to the semi-impoundment of the project area. Frequency of flooding in the project area in 1997 was 6 events lasting 45.6 days (31% time flooded), while the reference area had 26 events lasting 30.2 days (20.6% time flooded). In 1998 the reference area had 21 events totaling 171 days (46.9 % time flooded), while the reference area had 51 events for 149.5 days (40.3 % time flooded).

Data from natural intermediate and brackish marsh types indicate that these natural marshes, especially brackish marshes, experience a higher annual frequency of flooding than the created LaBranche marsh. Brackish marshes are reported to be inundated at a frequency of about 75 to 125 times per year (Byrne et al. 1976, Sasser 1977, Gosselink 1984), which is considerably greater than the range of 21-26 events at the created LaBranche marsh. Based on limited data, frequency of inundation decreases substantially in intermediate marshes to approximately 32 times per year (Sasser 1977, Gosselink 1984), which is still slightly greater than reported at the LaBranche marsh. Interestingly, when inundation is reported as the total amount of time inundated per year rather than frequency of inundation, brackish marshes are inundated approximately 40% - 42% of the time per year and intermediate marshes are inundated about 26% of the time per year (Byrne et al. 1976, Sasser 1977, Gosselink 1984), which is in the range reported at LaBranche in 1997 and 1998. Nonetheless, it is important to note that a more regular inundation pattern (higher frequency of relatively short-duration flooding events) are generally regarded as being less stressful to a plant community than fewer inundation events of longer duration, which can lead to the development of more reduced and anoxic soil conditions (Cronk and Fennessy 2001).

*Does the project have the correct hydrology for its marsh type?*
The project area hydrology is only partially correct for its habitat type. The habitat types occurring in the project area are not at the correct elevations yet to be conducive to the natural establishment of emergent vegetation, as was the project goal. In 1997 approximately 82% of the project area was land, but only 51% of the area was emergent marsh. The remaining 31% was a combination of shrub-scrub habitat. If the elevation continues to decrease the habitat is expected

to change from shrub-scrub to the desired emergent marsh habitat. Additional data from the next monitoring report will update this information.

*What were the hydrology targets for the project and were they met?*
The goal of creating a shallow water habitat conducive to the natural establishment of wetland vegetation has been partially met as of 1999. Targeted sediment elevations were met by 1997 at all 19 staff gauges, but the targeted maximum elevation (1.62'NAVD) is not suitable for the establishment of wetland elevation. The latest monitoring report from DNR (April, 1999) indicates that approximately 82% of the project area was land(thereby meeting the minimum 70%-30% land to water ratio) but only 51% of the area was emergent marsh. The next monitoring report (due June, 2002) will indicate that the subsidence rate has nearly stabilized (personal communication, John Troutman, DNR monitoring manager). It is doubtful, then, that the entire shrub-scrub habitat will ever change to the desired emergent marsh habitat.

It should be noted, however, that the project area is not a true tidal system (as was assumed in the original WVA). The low-level dikes used to confine the material were presumed to be breached once the material became consolidated. Over the project's life the containment levee has been breached three times, but these breaches were closed with weirs or sandbags. In addition, the culverts in the eastern levee were illegally blocked to hold water during duck season. Since 1999, none of the closures have been functional. They have washed-out and have not been repaired. But the perimeter levee is apparently still acting to partially limit tidal influence in the project area.

### IV.2.3. Salinity

*What is the salinity regime that supports healthy marshes in the different marsh types?*
Historically, the project area was a brackish marsh. Mean salinities in the project area and the reference area were 4.02 ppt and 3.9 ppt respectively in April 1997 (LDNR Monitoring Report 4, 4/17/97), indicating that the salinity in the area is not influenced by outside factors such wind and tides. Soil salinity has continued to vary slightly from 4.2 ppt pre-construction to 4.5 ppt post-construction.

*Does the project have the correct salinity for its marsh type?*
Since the project area and reference area were historically brackish marshes the salinities measured pre- and post-construction (and their slight change in mean salinity average) are actually indicative of intermediate marsh types, assuming that intermediate marshes are found in the 3-5 ppt range. This would be expected in the project area, since it is impounded.

*What were the salinity targets for the project and were they met?*
As far as can be determined there were no salinity targets for this project.

### IV.2.4. Soils

*What is the soil type that supports healthy marshes in the different marsh types?*
The pre-construction sediment samples had a high water content (averaging 53.2%), mean bulk densities of 0.9 g/cc, mean organic matter was 5.6%, salinity of 3.62 ppt. Post-construction data showed that mean percent organic matter, bulk density, and percent moisture all differed significantly among years. Percent organic matter and bulk density decreased over time, whereas percent moisture varied by year. Typically, one would expect bulk density and percent organic matter to be inversely related (i.e., lower bulk density as percent organic matter increases). Therefore, it is possible that there may have been some inconsistencies in the collection of the bulk density data, such as compaction during the coring process. Only marginally significant differences were found among stations for bulk density and percent moisture. No significant differences were found among years and stations for either of the three soil properties. Overall, the soil bulk density and organic matter content at the created LaBranche marsh are not representative of typical intermediate or brackish marshes. Soil bulk densities for intermediate to brackish marshes are typically reported in the range of 0.1 - 0.3 g cm-3 with percent organic matter contents in the range of 13% - 30% (Gosselink 1984).

*Does the project have the correct soil for its marsh type?*
At LaBranche, the bulk densities remain much higher and percent organic carbon much lower than typical for intermediate and brackish marshes. The reported bulk densities and organic matter contents at LaBranche 4 years after construction (0.9 g cm-3, and 2.5%, respectively) are more representative of back barrier salt marshes (Mendelssohn and Hester 1988) than they are of typical intermediate and brackish marshes.

Monitoring personnel have proposed that soil samples also be taken in the reference area in a location adjacent to the project area where marsh type habitat already exists. A soil comparison can then be made between the project and the reference area.

### IV.2.5. Other

*Describe any other physical characteristics of the project that have bearing on the projects' success*
The unapproved construction modifications made by the LaBranche duck club (two new weirs and blockage of drainage culverts) undeniably prevented the impounded project area from dewatering during low tides and stabilized water levels by reducing tidal exchange, which in turn reduces environmental stress and increases species diversity.

### IV.3. Suggestions for physical response monitoring

*Are there other variables that could be monitored to substantially increase the ability to understand the results of the project?*
It was suggested that including natural marsh elevations in adjacent areas (reference areas) should be used to compare to the project area. Also, the monitoring program needed more frequent aerial photos, but this was not in the budget. It should be included in future projects of this type.

## V. BIOLOGICAL RESPONSE

### V.1. Project Goals

The specific measurable goals delineated in the monitoring plans were to create approximately 305 acres of shallow-water habitat conducive to the natural succession of emergent vegetation, establish a ratio of 70% emergent marsh and 30% open-water within 5 yrs. following project completion, and obtaining a sediment consolidation to design criteria of 2' NGVD.

### V.2. Comparison to adjacent and/or healthy marshes

#### V.2.1. Vegetation

*What is the range in species composition and cover for healthy marshes in each type?*
Pre-construction aquatic vegetation present in the project area was dominated by *Mryiophyllum spicatus* (water milfoil) and *Ceratophyllum demersum* (coontail), with abundant *Eleocharis parvula* (dwarf spikerush) around the shallower pond edges. The June 1992 field trip conducted by Glen Montz identified fourteen (14) low and high marsh vegetated species. In August 1994 Glen Montz reported that the diversity of plants on the disposal area was low and was dominated by 2 species - Japanese millet (90%) and dwarf spikerush (8%).

*Does the project have the correct species composition and cover for its type?*
The initial post-construction vegetation sampling in 1996 (monitoring report dated August 1995) indicated that the dominant vegetation in the project area was *Solidago sempervirens* (seaside goldenrod) and *Ranunculus sp.* (buttercup), with some dwarf spikerush and *Baccharis halimifolia* (groundsel bush). Since these vegetative types are considered "colonizing" species this was expected. It was surmised that as the sediment continues to consolidate the colonizing species would diminish and would be supplanted by more wetland-specific species.

The emergent vegetation to open-water ratio has not been fully addressed yet in the monitoring reports but is expected to be addressed in the 2002 report. Monitoring is currently in the process of analyzing the vegetation results for year 2001, which may add some additional characteristic wetland vegetation types and describe the changes in the plant community.

Considering that the sediments have not yet compacted to the levels projected to be attained, monitoring data would suggest that the project does have the correct species composition predicted. Again, more wetland-specific vegetation is predicted as long as the sediment continues to compact.

*Spartina patens* (marsh hay cordgrass) is typically common to dominant in intermediate to brackish marshes (Chabreck 1972), yet it is only minimally present at the created LaBranche marsh. Preliminary multivariate analyses of the most recent data at this site (2001) indicate that there is a strong positive association between water level species richness (i.e. the sites with higher water levels support a greater number of plant species). Initial analyses also indicate that certain plant species are negatively associated with soil salt concentrations. These plant species include *Amaranthus australi* (belle dame)*, Iva frutescens* (marsh elder)*, and Aster subulatus* (aster)*.*

*What were the vegetation targets for this project and were they met? If not, what is the most likely reason?*
Vegetation "targets" were not species-specific but were linked to the creation of 305 acres of shallow-water habitat conducive to the natural succession of emergent wetland vegetation and to the establishment of a minimum ratio of 70% emergent vegetation to 30% open water. This has not been met. The reason it has not been met is that the sediment levels have not sufficiently decreased to support such emergent vegetation. The April, 1999 monitoring report by DNR indicated that the area was 82% land; however, only 51% of the land area was emergent marsh. The next DNR monitoring report (due June, 2002), will indicate that subsidence has almost stabilized (personal communication, John Troutman, DNR monitoring manager), so it is doubtful that the entire land area will ever become emergent vegetation habitat. Even though the vegetation targets were not species-specific the target vegetation was assumed to be herbaceous, wetland emergent vegetation.

### V.2.2. Landscape

*What is the range in landscapes that supports healthy marshes in different marsh types?*
The project was designed to reach a minimum 70% emergent marsh to 30% open-water ratio 5 years after completion (1999). By 1997 the project area was approximately 82% land and 18% water, but only 51% of the land was emergent marsh with the rest being shrub-scrub and upland habitats (figure 2, LDNR Monitoring Report 5 - April 1999). Habitat composition in pre-construction consisted mainly of submerged aquatic vegetation (water milfoil and coontail) with some dwarf spikerush. Early post-construction vegetation was dominated by colonizing species such as seaside goldenrod and buttercup. By 1997 the species composition of vegetation changed, with the frequency of upland species decreasing and wetland-specific species increasing. The reference area habitat composition has remained relatively unchanged.

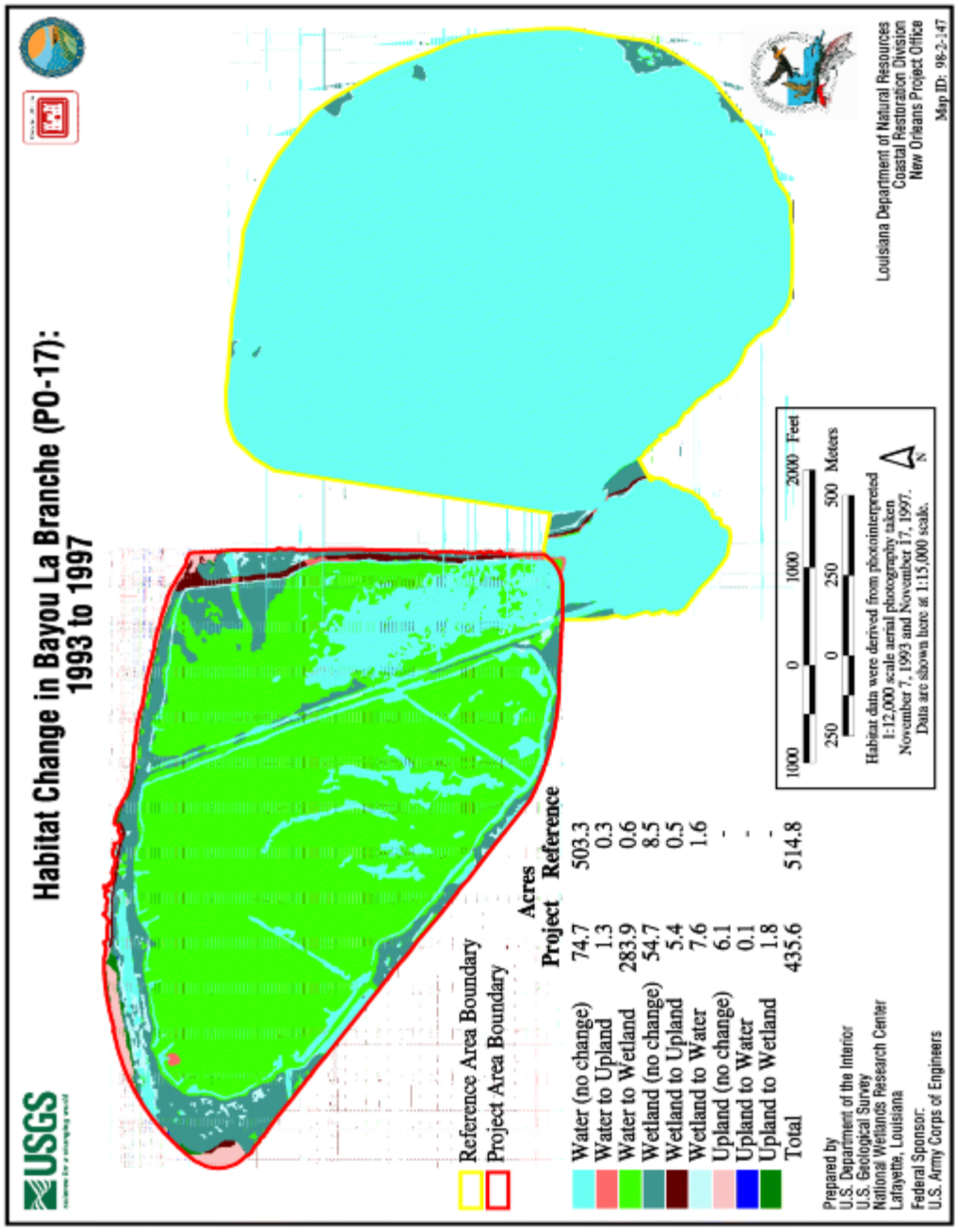



**Figure 2.** Habitat change in the Bayou La Branche project area between 1993 (preconstruction) and 1997 (postconstruction).

*Is the project changing in the direction of the optimal landscape? If not, what is the most likely reason?*
The project was slowly reaching the desired sediment elevation, but the newest monitoring data suggests that subsidence has almost stabilized. It is doubtful, then, that the project elevations may ever allow the natural succession of vegetative types (emergents) to be attained in the entire land area.

### V.2.3. Other

Partially to blame for the project's not meeting its stated goals and objectives after the 5-year period was the fact that the project area, previously operated only for waterfowl hunting, was compromised by lessees illegally modifying the structures designed to regulate water flows and tidal exchanges to hold more water during duck seasons. This prevented the area from properly de-watering and allowing the proposed tidal fluctuations.

## V.3. Suggestions for biological response monitoring

*Are there other variables that could be monitored to substantially increase the ability to understand the results of the project?*
One weakness of the current monitoring effort is the limited monitoring of the reference area (LDNR 1993). Therefore, we suggest that marsh vegetation, elevation, and soil properties (soil salinity, bulk density, percent moisture, and percent organic matter) be monitored in the reference area as well. In fact, with initiation of this adaptive management project review, an additional elevation survey was performed in the project and reference area to get a better measure of average elevation in and for comparison of the two areas. Vegetation and soil properties will be surveyed this coming summer. In addition to these variables, more frequent aerial photography would have aided the determination of habitat and the land-water ratio for this project.

# VI. ADAPTIVE MANAGEMENT

## VI.1. Existing improvements

*What has already been done to improve the project?*
No improvements have been made since the project was constructed. However, unauthorized modification of the perimeter dike by lessees of the property (duck hunters) has likely reduced the settlement of the dredged material.

## VI.2. Project effectiveness

*Are we able to determine if the project has performed as planned? If not, why?*
Monitoring and general observation of the project area is showing a conversion of the vegetation in the area from woody species to herbaceous species. Also, monitoring is showing that the land-to-water ratio is very close to the project goal

of 70 %land to 30 % water and that the elevation is almost entirely within the target range. The hydrology of the area is not the same as adjacent areas, but development of a certain hydrology was not a project goal. In addition, the adjacent areas are degraded marsh and may not serve as a reasonable target for hydrology.

*What should be the success criteria for this project?*
Whether or not the land/water ratio was attained and the dredged material created the estimated acreage originally designated.

### VI.3. Recommended improvements

*What can be done to improve the project?*
The review team reached consensus on the following recommendations:

1. Remove any remaining un-permitted barricades/structures to increase tidal exchange.
2. Re-survey staff gauges for more reliable elevation data (this has been conducted through the Adaptive Management review process).
3. Establish a reference area with target marsh elevation.
4. Add a maintenance component to address landowner/lessee issues.

The review team could not reach consensus on the following recommendations:

1. Gap containment dikes to increase tidal exchange, after consolidation of dredged material.
2. Level containment dikes to marsh elevation unless habitat diversity is desired and thought to be important in order to follow mandates of Executive Order 13186.
3. Re-grade high elevations in project area to target elevation.
4. Add a maintenance lift of dredged material to the project area to lessen open water conversion.
5. Dredge tidal creeks or add trenasses.

### VI.4. Lessons learned

The team reached consensus on the following lessons learned:

1. Data gathered during pre-construction (biological and engineering) should be utilized to a greater degree, and a greater degree of coordination between biologists and engineers should occur.
2. Staff gauges should be surveyed to NAVD for more reliable data.
3. Reference areas should be selected with the same elevations, marsh types, salinities, and soil characteristics as the project area.
4. There needs to be a clear understanding between the CWPPRA agencies and the landowners and lessees of the property that no modifications of project components is allowed without the written consent of the agency that acquired the real estate easement.

The team could not reach consensus on the following lessons learned:

1. Dredging or creating trenasses for tidal creeks and ponds should be part of the construction phase.
2. Containment dikes should be leveled to marsh elevation once dredge material has consolidated unless habitat diversity is desired and thought to be important in order to follow mandates of Executive Order 13186.
3. More frequent aerial photos for monitoring should be included in budgets.

## VII. SUPPORTING DOCUMENTATION

### VII.1. Published References


Byrne, P. M., M. Borengasser, G. Drew, R. Muller, B. L. Smith, Jr., and C. Wax. 1976. Barataria Basin: Hydrologic and Climatologic Processes. Sea Grant Publication LSU-T-76-012. 175 pp.

Chabreck, R. H. 1972. Vegetation, Water, and Soil Characteristics of the Louisiana Coastal Region. Louisiana Agricultural Experiment Station Bulletin no. 664.

Cronk , J. K., and M. S. Fennessy. 2001. Wetland Plants: Biology and Ecology. CRC Press, Boca Raton, Florida. 462 pp.

Gosselink, J. G. 1984. The Ecology of Delta Marshes of Coastal Louisiana: a Community Profile. U.S. Fish and Wildlife Service. FWS/OBS-84/09. 134 pp.

Mendelssohn, I. A., and M. W. Hester. 1988. Coastal Vegetation Project. Timbalier Island. Final Report. Texaco, USA. 244 pp.

Sasser, C. E. 1977. Distribution of vegetation in Louisiana coastal marshes as response to tidal flooding. M.S. Thesis. Louisiana State University, Baton Rouge, Louisiana. 40 pp.

U.S. Army Corps of Engineers. 1992. LaBranche Wetlands, St. Charles Parish. Environmental Assessment #180. New Orleans, LA. 15 pp.


### VII.2. Unpublished Sources

| Agency | Date | Agency Contact | Content | Short Description | Pages |
|---|---|---|---|---|---|
| USACE | 1991 (SEP) | Richard Boe | Wetland Value Assessment Worksheet | Handwritten worksheet | 2 |
| USACE | 1991 (SEP) | Richard Boe | Project Information Sheet | Detailed listing of project information | 4 |
| USACE | 1991 (SEP) | Unknown | WVA Narrative Explanation | A very detailed, typed explanation of assumptions used for the WVA | 3 |
| USACE | 1991 (OCT) | David Carney | Candidate Project Fact Sheet for 1st Priority Project List | Detailed description of the project including objectives and descriptions | 3 |
| USACE | 1992 (JUN) | Michael Saucier | Memo and Elevation Data | Memo transferring marsh elevation data collected by Montz and Saucier prior to project construction | 4 |
| USACE | 1992 (NOV) | Michael Saucier | Environmental Assessment (EA) | Compliance document | 16 |

| Agency | Date | Agency Contact | Content | Short Description | Pages |
|---|---|---|---|---|---|
| USDOT | 1992 (NOV) | William Sussmann | Letter | Letter from U.S. Dept. of Transportation suggesting coordination with La. DOTD | 1 |
| LDAF | 1992 (DEC) | Paul Frey | Letter | Letter from La. Dept. Agriculture and Forestry advising about the need to exclude tallow trees | 1 |
| USACE | 1992 (DEC) | Dom Elguezabal | Memo and Elevation Data | Memo from project manager discussing fill rate for borrow area in Lake Pontchartrain | 2 |
| USACE | ca. 1992 | Unknown | Map | Map of geotechnical boring sites | 1 |
| USACE | 1993 (JAN) | Michael Saucier | Finding of No Significant Impact (FONSI) | Description of Action, Factors Considered, Public Involvement, Conclusion | 1 |
| USACE | 1993 (FEB) | | Project Scope Fact Sheet | General project information | 4 |
| USACE | 1993 (FEB) | Glen Montz | Meeting Notes | Handwritten notes from meeting to discuss local citizen concerns | 1 |
| USACE | 1993 (JUL) | Glen Montz | Memo to the File | Glen Montz's memo documenting a meeting with the LaBranche Duck Club | 1 |
| USACE | 1994 (FEB) to 1996 (SEP) | Dom Elguezabal | Project Fact Sheets | Six fact sheets prepared by the USACE over a period of 3 years | 6 |
| USACE | 1994 (APR) | Chester Ashley | Memo | Memo of final site inspection | 1 |
| USACE | 1994 (APR) | Tony Lauto | Narrative Completion Report | Detailed report of completed project | 4 |
| USACE | 1994 (APR) | Chris Alfonso | As-Built Drawings | Project drawings - post construction | 2 |
| USACE | 1994 (JUN) | Jim Addison | News Release | News release about aerial seeding of the project area | 1 |
| USACE | 1994 (AUG) | Glen Montz | Memo to the File | Glen Montz's memo about vegegation colonizing the project area after project construction | 3 |
| USACE | 1995 (APR) | Michael Saucier | Letter | Letter from USACE to agencies and others requesting comments on closing breaks in the retention dike | 1 |
| NMFS | 1995 (MAY) | Ric Ruebsamen | Letter | Letter from NMFS opposing the repair of the retention dikes | 2 |
| LDNR | 1995 (MAY) | Bill Good | Letter | Letter from LDNR to the USACE not supporting repair of retention dikes | 1 |
| USFWS | 1995 (MAY) | Dave Fruge' | Letter | Letter from USFWS concerning the need for more information before deciding on the need for repair of retention dikes | 1 |
| N/A | 1995 (MAY) | Allan Ensminger | Letter | Letter from Allan Ensminger about need to install water control structures | 1 |
| USACE | Unknown | Unknown | Additional Information | Very detailed, typed information about the project. Date and author unknown, but likely ca. 1998 | 9 |
| LDNR | 1998 (JAN) | Unknown | Seed Specifications | Specifications for seed used for aerial seeding of the project area | 2 |
| N/A | 1999 (FEB) | Allan Ensminger | Letter | Letter from Allan Ensminger about need to install water control structures | 1 |
| USACE | No Date | Rick Broussard | Presentation about Engineering the Project | Presentation by USACE at a workshop on Engineering for Wetlands Restoration | 8 |

## VIII. PROJECT REVIEW TEAM

| | |
|---|---|
| Troy Barrilleaux | LDNR |
| Jason Binet | USACE |
| Richard Boe (co-team leader) | USACE |
| George Boddie | LDNR |
| Bill Boshart | LDNR |
| David Burkholder | LDNR |
| Van Cook | LDNR |
| Marty Floyd | NRCS |
| Mark Hester | UNO |
| Dianne Lindstedt | LSU/NMFS |
| Wes McQuiddy | EPA |
| Mike Miller | LDNR |
| Mark Mouledous | LDNR |
| Jeannene Peckham | EPA |
| Phil Pittman (co-team leader) | LDNR |
| John Troutman | LDNR |

## APPENDIX A. PROJECT INFORMATION SHEET

**Project Name and Number: PO-17 Bayou LaBranche Wetlands**
**Date: July 9, 2002**

| INFORMATION TYPE | YES | NO | N/A | SOURCE |
|---|---|---|---|---|
| Fact Sheet - *Included in package* | X | | | Richard Boe (USACE), PPL RTC |
| Project Description – *In Fact Sheet and EA* | X | | | Richard Boe (USACE), Pre-selection plan |
| Project Information Sheet – *Included in package* | X | | | Richard Boe (USACE) |
| Wetland Value Assessment – *Included in package, with supplemental assumptions* | X | | | Richard Boe (USACE), John Troutman (DNR) |
| Environmental Assessment – *Included in package, with FONSI* | X | | | Richard Boe (USACE), John Troutman (DNR) |
| Project Boundary – *No early maps found. Maps included with EA and additional information package from 1998* | X | | | Richard Boe (USACE), (DNR) |
| Planning Data – *Multiple letters and memos included in package. Some items are memo about pioneer plant species; news release and info on seeding; (6) USACE Fact Sheets; (7) letters concerning perimeter dikes; cost sheet from 1999; and an additional info package from 1998* | X | | | Soil borings, (Glen Montz report) Richard Boe (USACE); Surveys & elev. , vegetation, John Troutman (DNR) |
| Permits – *WQC, CZM, 404 included in package* | X | | | Richard Boe (USACE) |
| Land Rights – *Need to find documentation of payments to landowners* | ? | | | Richard Boe (USACE); landright issues pd for landrights |
| Cultural Resources – *Need to document* | X | | | Richard Boe (USACE), John Troutman (DNR) |
| *Preliminary Engineering Design* – USACE Engineering | X | | | Chris Alfonso, Richard Boe (USACE) |
| *Geotechnical* – One boring map included in package | X | | | Chris Alfonso, Richard Boe (USACE) |
| Engineering Design – *USACE Engineering* | X | | | Richard Boe (USACE) |
| As-built Drawings – *Included in package* | X | | | Richard Boe (USACE) |
| Modeling Output – *N/A* | | X | X | |
| Construction Completion Report – *Narrative Completion Report and final site inspection memo included in package* | X | | | Richard Boe (USACE) |
| Engineering Data – *USACE Engineering* | ? | | | Chris Alfonso (USACE) |
| Monitoring Plan | X | | | (DNR), www.saveLAwetlands.org |
| Monitoring Reports | X | | | (DNR), www.saveLAwetlands.org |
| Supporting Literature | X | | | Wetland Management Plan (DNR); possible info from PO-03b (DNR), seismic survey of borrow area (Shea Penland) |
| Monitoring Data | X | | | 1999, 2001 soils & vegetation not in last available monitoring report (DNR); possible PO-28 data |
| Operations Plan | | | X | |
| Operations Data | | | X | |
| Maintenance Plan | | | | |
| Maintenance Data | | | | |
| O&M Reports | | | | No O&M funds, No maintenance |
| Other: | | | | |
| Cost Share Agreement | X | | | DNR |
| | | | | |
| Data Needs: | | | | |
| Tie in sediment staff gauges to network | | | | |
| Establish marsh elevation in reference area | | | | |