Project Description

The 43,530 acre (17,616 hectare) site is in the Terrebonne Basin on the border of Terrebonne and Lafourche Parishes, Louisiana. Due to the size of the project, its location is best described by the following geographic entities. The area is west of Galliano, Louisiana and south of Larose, Louisiana. The northern border includes a segment of Bayou L'Eau Bleu and the Gulf Intracoastal Waterway (GIWW). To the west, the border is Bayou Pointe au Chien and includes the eastern portion of the Pointe au Chien Wildlife Management Area. The southern border is a line running east from the Bayou Pointe au Chien ridge to the eastern boundary, north of Catfish Lake (Figure 1). During periods of moderate stage on the Atchafalaya River, water flows from the Lower Atchafalaya River through the GIWW, to Houma where the U.S. Fish and Wildlife Service (USFWS) and U.S. Army Corps of Engineers (USACOE) have measured that 70 and 80 percent of the flow, respectively, proceeds to the Gulf of Mexico through the Houma Navigational Canal (HNC) (personal communication, Ronnie Paille, USFWS, 2000). A residual flow of 2,000 to 4,000 cubic feet per second (cfs) continues flowing eastward in the GIWW past Larose (unpublished, Paille 1999) and the Bayou L'Eau Bleu Canal.

Bayou L'Eau Bleu, along the northern portion of the project, currently supplies the project area with freshwater from the Gulf Intracoastal Waterway (GIWW) at an approximate rate of 500 cfs during periods of moderate to high Atchafalaya River stages (personal communication, Ronnie Paille, USFWS, 2000). To increase the flow of freshwater into bayous adjacent to Grand Bayou, Bayou L'Eau Blue Canal will be enlarged; resulting in a freshwater diversion of up to 600 cfs during periods of high flow (a 20% increase over typical high stage levels). The increase in flow during normal to high stage is anticipated to reduce canal-induced saltwater intrusion. By reducing saltwater intrusion in the canals, one of our goals is to maintain the freshwater/intermediate vegetative communities present (as of 1996) in the northern area of the project. Additionally, it is anticipated that the species composition of the brackish communities in the southern portion will shift toward the intermediate communities classified by Visser and Sasser (1996) for this region. Visser and Sasser (1996) classified the dominant understory vegetation as grading from freshwater maidencane, freshwater bulltongue, and freshwater spikerush in the northern areas to polyhaline oystergrass in the southern, brackish portion of the project.

Wetland Loss

Gosselink and Baumann (1980) estimated a coastal wetlands loss rate of 20,000 ac yr^{-1} (8,100 ha yr^{-1}) between 1922 and 1954 and 47,000 ac yr^{-1} (19,000 ha yr^{-1}) between 1954 and the 1970's. Reporting slightly lower values, Tiner (1984) estimated that 18,000 ac yr^{-1} (7,300 ha yr^{-1}) of

estuarine wetlands were lost from the 1950's to the 1970's, and Dahl and Johnson (1991) measured an annual loss of 7,100 ac (2,900 ha) from the mid-1970's to the mid 1980's. Though all loss estimates are just that - estimates, the disturbing trend of large-scaled coastal wetland loss is apparent.

While the above considers the entire coastal wetland resource, the largest amount of loss is known to occur throughout southern Louisiana. Freshwater and saltwater wetlands are decreasing at a rapid rate in coastal Louisiana, amounting to a total wetland loss of 25 mi^2 (66 km^2) per year attributed to both natural and artificial causes (Dunbar 1990, Dunbar *et al.* 1992). Within this project, the combination of incidental impoundment by oil-field access canals, increased saltwater inflow from Cutoff Canal and Grand Bayou Canal, and subsidence has resulted in dramatic land-loss in the Grand Bayou/GIWW area. For the Lake Felicity quadrangle, of which this project is a part, marsh loss totaled 28,028 ac (11,342.5 ha) from 1932 to 1982 (May and Britsch 1987). Within the project, land loss was greater in the southern portion as compared to the northern (Table 1).

Period	TE-10 North Grand Bayou/GIWW	TE-10 South Grand Bayou/GIWW
1932 - 1956	9.33	34.42
1956 - 1974	88.83	155.17
1974 - 1983	72.77	196.89
1983 - 1990	73.57	128.86

Table 1 - Land loss by period and region within the Grand Bayou/GIWW (TE-10) project boundaries (acres yr^{-1}), Lafourche and Terrebonne Parishes, LA.

The southern portion of the project, close to Grand Bayou and Cutoff Canal, primarily consists of brackish open water with little or no remaining fresh marsh.   The northern portion is classified by Visser and Sasser (1996) as both a thick mat marsh of undetermined bouyancy and thick mat herbaceous floating marsh. Additionally, there is a relatively small, open, stand of bald cypress (*Taxodium distichum*) with a marsh understory in the northern project area.. Land loss rates of 1.28% in brackish marsh and 0.70% in intermediate marsh areas (Dunbar *et al.* 1992) are expected to decrease by 30% and 70% respectively, over the 20-year life of the project.

Grand Bayou Freshwater Diversion Project (XTE-49/TE-10)

Delta Farms

LAFOURCHE

Bayou Terrebonne

Bayou Pointe au Chien

Grand Bayou Canal

Cut-Off Canal

Bayou Lafourche

TERREBONNE

Catfish Lake

	CWPPRA Project Boundary
	Parish Boundary
	Pipeline
■	Water Control Stucture
▲	Plug
	Dredging Area

Louisiana

Project Site

N

Data Source:

United States Geological Survey
National Wetlands Research Center
Coastal Restoration Field Station

Louisiana Dept. of Natural Resources
Coastal Restoration Division and
GIS Lab

1994 Satellite Imagery

Date: May 11, 2000
Map ID: 2000-4-330

2   0   2 Miles
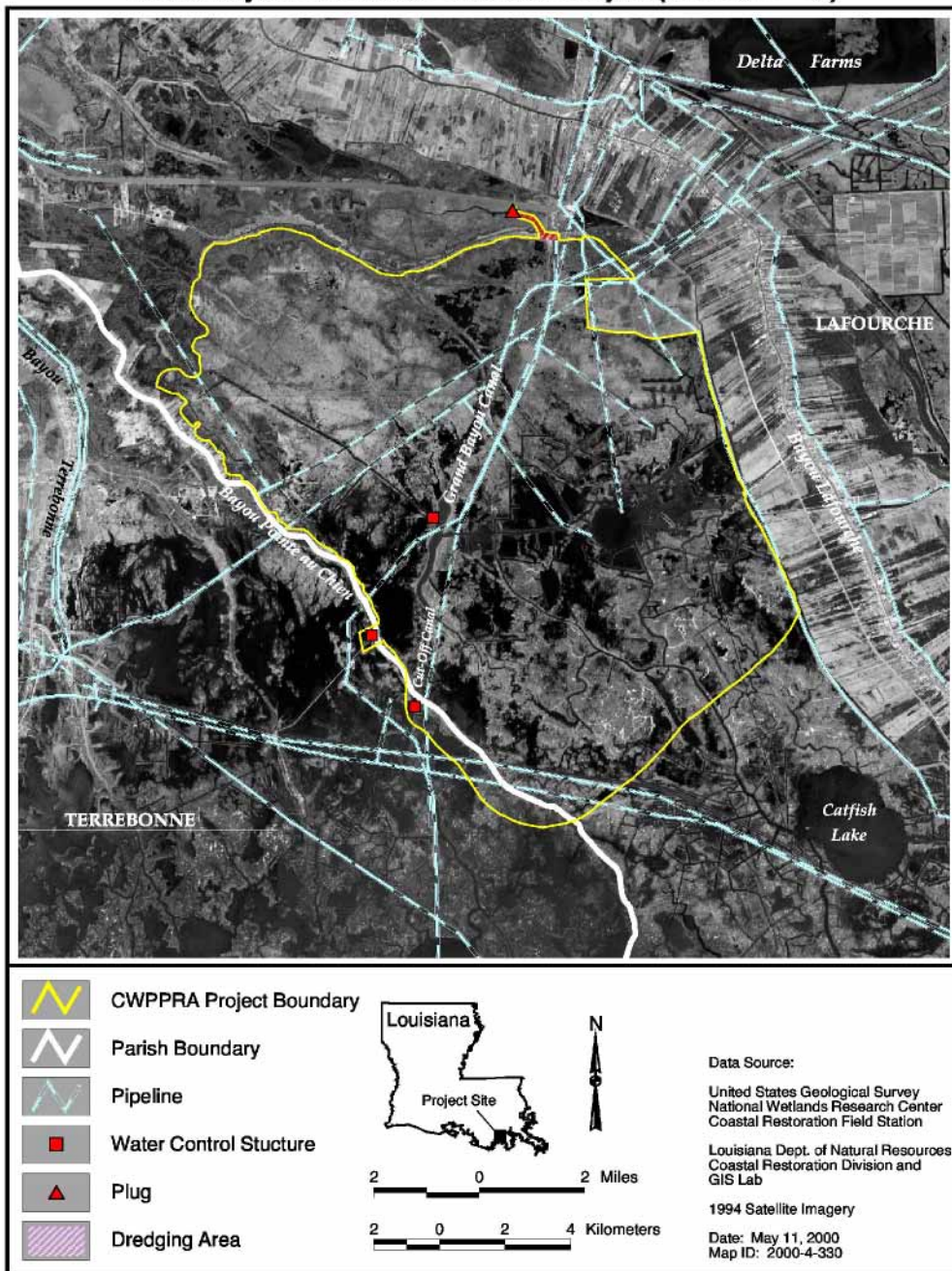
2   0   2   4 Kilometers

Figure 1.   Location of Grand Bayou/GIWW Freshwater Diversion
(TE-10) project boundary and structure locations.

<u>Project Features</u>

- Enlargement of the Bayou L'Eau Bleu canal, beginning at the GIWW and extending downstream to facilitate freshwater introduction.
- Utilization of a Relief Structure located along Grand Bayou incorporating double flapgated, variable-crested gates and one operable boat bay to improve drainage and facilitate freshwater introduction into bayous west of Grand Bayou. Alternative construction due to the hurricane protection levee alignment: the boat-bay will be removed.
- Construction of the Cutoff Canal Structure and tie-in levees to passively restore project area hydrology, retaining freshwater and reducing saltwater intrusion into the project area.
- Installation of the Island Road Borrow Canal structure; a series of double flapgated, variable-crested gates operated to reduce saltwater intrusion and to facilitate the discharge of excess water. Alternative construction due to the hurricane protection levee alignment: six concrete culverts, each 236' long, with sluice gates.
- Installation of an earthen plug with two (2) flap-gated 48 inch diameter culverts on the dead-end section of Bayou L'Eau Bleu near the GIWW.
- Six (6) trenasses and three (3) depressions along the western bank of Bayou Pointe au Chien south of its junction with Cutoff Canal will be plugged and filled, respectively.

<u>Project Objectives</u>

1. Reduce the rate of loss of emergent wetlands in the project area.
2. Increase freshwater movement into the project area from the GIWW.
3. Reduce canal-induced saltwater intrusion.

<u>Specific Goals</u>

The following measurable goals were established to either evaluate project effectiveness if reference areas are considered suitable or characterize the project area if reference areas are not suitable:

1. Reduce the conversion of marsh to open-water within the project area.
2. Decrease the mean salinity in the project area.
3. Maintain or increase the abundance of fresh/intermediate marsh plant species.
4. Maintain or increase the abundance of submerged aquatic vegetation (SAV).

The following measurable goals were established to evaluate the effectiveness of structures:

1. Increase the discharge of freshwater introduced from the GIWW into the project area.
2. Reduce water-level variability inside Cutoff Canal and Island Road Borrow Canal

structures relative to outside.

3.   Reduce mean salinity and salinity variability inside Cutoff Canal and Island Road Borrow Canal structures relative to outside.

4.   Increase amount of water flowing from Grand Bayou Canal into adjacent bayous.

<u>Reference Area</u>

The importance of using appropriate reference areas cannot be overemphasized. Monitoring on both project and reference areas provides a means to achieve statistically valid comparisons, and is therefore the most effective means of assessing project effectiveness. Various locations were evaluated for their potential use as a reference area that best mimic the preconstruction conditions of the project area. Evaluation of sites was based on the criteria that both project and reference areas have similar vegetational community, soil, hydrology, and salinity characteristics. Because the project area encompasses most of the Timbalier sub-basin, an appropriate reference area was difficult to find due to dissimilar vegetational community, soils, hydrology, and salinity. Two areas to the west of the project were thought to contain similar vegetation, hydrology, soil, and salinity characteristics. However, data on hydrology and salinity do not exist to confirm these assumptions. Consequently, we will collect water-level and salinity data from the 2 areas pre-construction to determine their suitability as reference sites. If they are found inappropriate, these areas will be used as reference areas for Habitat Mapping only, and the monitoring equipment established within will be relocated to the project area for increased monitoring. The lack of reference sites will then be a significant monitoring limitation, and our monitoring efforts will focus on the function of individual project features.

<u>Monitoring Elements</u>

The following monitoring elements will provide the information necessary to evaluate the specific goals listed above:

1.   Habitat Mapping   To document the amount of subaerial land and vegetated and non-vegetated areas, near-vertical, color-infrared aerial photography (1:12,000 scale) will be obtained. The photography will be georectified, photo interpreted, and analyzed with GIS by National Wetlands Research Center (NWRC) following procedures outlined in Steyer et al. (1995). Photography will be obtained in the fall of 2000 (pre-construction), as an as-built in 2001, and in post-construction years 2004, 2007, 2011, and 2018. Additional photography may be obtained in response to major storm or flood events. Photo interpretation will be ground-truthed by USGS/NWRC personnel.

2.   Water Discharge   Water velocity from the GIWW will be measured regularly to monitor changes in flow over time. Discharge will be measured as a

combination of velocity and the channels cross-sectional area. In addition to Bayou L'Eau Bleu, discharge of the three main bayous east of Grand Bayou will be measured. Measurements will be taken at the mouth of each bayou and downstream of the mouth along Grand Bayou. A total of 11 cross-sectional areas will be measured during each sampling period. In order to shift the data to adjust for tidal influence, the flow/salinity gauge site on Bayou L'Eau Bleu will be re-established. The data will be used to rate the discharge at that site both before and after construction. Data will be collected monthly for one year pre-construction and the first 3 years post-construction (2002-2004). In 2004, the TAG will assist the LDNR/CRD monitoring manager with evaluation of data and determination of whether additional water discharge data is necessary during the remainder of the project life. Variations in water discharge will be compared to the operation of water control structures to determine the efficiency of their function.

3. Salinity

To monitor salinity variability, we will locate four continuous recorders within the project area, three immediately outside the southern portion of the project (two immediately south of the Cut Off and Island Road water control structures, and one immediately south of the project area in Grand Bayou Blue), and two in the potential reference areas. The three continuous recorders south of the project area will be placed in close proximity to the continuous recorders within the project. This arrangement will not only aid in the characterization of the project area over time, but will contribute toward the determination of structure function. Salinity will be measured monthly at a minimum of twenty-five discrete stations inside the project area and potential reference areas using techniques outlined by Steyer *et al.* (1995). Presently, the Louisiana Department of Wildlife and Fisheries measures salinity, bi-weekly, at twenty-four stations within the Pointe au Chien Wildlife Management Area. We will compare pre- and post-construction periods salinity variability within the project area, as well as inside and outside each southern water-control structure. Discrete data will be used to characterize the spatial and temporal variation in salinity throughout the project area and to compare with the reference area, if it is appropriate. The number of sampling stations may be adjusted by LDNR/CRD based on interpretations of preliminary data acquired from the area. Continuous salinity data will be collected every year from 1999 to 2004, then for each 2 year increment associated with vegetation sampling (2007-08, 2011-12, 2015-16, and 2018-19).

4.	Water Level	To monitor water level variability, we will establish four continuous recorders within the project area, three outside the project on the southern end (two immediately south of the Cut Off and Island Road water control structures, and one immediately south of the project area in Grand Bayou Blue), and two in potential reference areas (all are recorded using the equipment in place for hourly salinity measurements). The three continuous recorders south of the project area will be placed in close proximity to the continuous recorders within the project. This arrangement will not only aid in the characterization of the project area over time, but will contribute toward the determination of structure function. Water level variability between the project and reference area will be compared for both pre- and post-construction periods. Staff gauges adjacent to the continuous recorders will be surveyed to the North American Vertical Datum of 1988 (NAVD 88) in order to tie recorder water levels to a known datum. Marsh elevation will be surveyed and used in conjunction with continuous recorders to determine duration and frequency of flooding. The number of sampling stations may be adjusted by LDNR/CRD based on interpretation of preliminary data acquired from the area. Water level data will be collected every year from 1999 to 2004, then for 2 year increments associated with vegetation sampling (2007-08, 2011-12, 2015-16, and 2018-19).
5.	Vegetation	Species composition and percent cover will be evaluated inside the project area using a modification of the Braun-Blanquet method (Mueller-Dombois and Ellenberg 1974) described in Steyer et al. (1995). Twenty five plots will be located in the project area and ten in reference areas (if deemed suitable). Increasing the number to 25 vegetation plots in the northern and southern portion of the project, as well as 10 in the reference area, is being considered. Vegetation species composition and cover will be evaluated once prior to construction in 2000, and at years 2004, 2008, 2012, 2016, and 2019. The number of sampling stations may be adjusted by DNR/CRD based on interpretation of preliminary data acquired from the area.
6.	Submerged Aquatic Vegetation (SAV)	The frequency of occurrence of SAV will be characterized for the project area; reference areas will be included only if suitable reference ponds are found. Pond-like areas will be sampled once in the fall of 2000 (preconstruction) and once during the fall (August or September) growing seasons in 2004, 2008, 2012, 2016, and 2019. Methods described by Nyman and Chabreck (1996) will be used to determine the frequency of occurrence of SAV. Each pond-like area

will be sampled at random points along transects. The number of random points and transects will be adjusted to appropriately characterize each pond according to size and configuration. Within each pond sampled, the presence/absence of SAV, by species, will be determined at multiple points along each transect.

7.   Soil Salinity

A dominant factor in the vegetative productivity and species selection in a salt marsh is the salinity of the soil pore water (Mitsch and Gosselink 1993). The salinity in marsh soil water depends on several factors (*i.e.*, inundation, depth to water table, and freshwater inflow), each potentially being influenced by a freshwater diversion. The following was adapted from Mitsch and Gosselink (1993): 1) *Frequency of inundation* - marshes farther from the Gulf, and closer to sources of freshwater (GIWW in this projects northern area), will experience fluctuations in soil water salinity due to tidal fluctuation and proximity to a freshwater input. 2) *Depth to Water Table* - when groundwater is close to the surface, as is expected with increased flow, soil water salinity fluctuations are less (Mitsch and Gosselink 1993). 3) *Freshwater Inflow* - the introduction of a freshwater source, either naturally or artificially, will decrease the depth to the water table; which decreases soil salinity.

To monitor soil salinity, 15 passive wells and/or high flow ceramic tension lysimeters will be located within the project area, and 5 will located in the reference area. Each well will be constructed of 5 centimeter diameter PVC pipe with 1 mm screening on the lower 105 centimeters, and installed to a depth of 122 cm. The high flow ceramic lysimeters are constructed of 4 centimeter diameter hard plastic tubing with a ceramic cap of the same diameter epoxied to the bottom. Using a pump that attaches to tubing on a #10 stopper at the aboveground end, 50 millibars of suction will be applied to each lysimeter to draw groundwater through the belowground ceramic cap. The data will be used to characterize the spatial and temporal variation in soil salinity throughout the project area and to aid in the characterization of the vegetative communities, if it is appropriate. Soil pore water salinity data will be collected during monthly fieldtrips every year from 1999 to 2004 then for 2 year increments associated with vegetation sampling (2007-08, 2011-12, 2015-16, and 2018-19).

8.   Marsh Mat

To monitor marsh mat movement, two continuous recorders will be located in both the project and reference areas. Mean daily water level, the variability of daily water level, as well as the duration and frequency of flooding of floating marshes, will be determined by comparisons of the pre- and post-construction data collected in the

project and reference areas. Marsh mat movement will be monitored in 2000 (pre-construction), 2001, 2002, 2003, and 2004. If the data confirm the conclusion of Visser and Sasser (1996) that the marsh is floating, then marsh mat movement will also be monitored during the following two-year periods: 2007-08, 2011-12, 2015-16, and 2018-19. If we conclude by 2002 that the marsh is not floating, accretion and subsidence will be measured using the appropriate techniques as outlined by Steyer *et al*. (1995).

Anticipated Statistical Tests and Hypotheses

The following hypotheses correspond with the monitoring elements and will be used to evaluate the specific goals established to assess project effectiveness:

1. Descriptive and summary statistics will be used on both historical aerial photography data collected during the pre- and post-construction period, and reference site, to evaluate marsh to open water ratios and marsh loss rates.

   Goal: Reduce the conversion of marsh to open water within the project area.

2. Using the General Linear Model module of SAS, we will use analysis of variance (General Linear Model, SAS Institute Inc. 1990) to compare the pre- and post-construction mean salinities between the project and reference areas (should it be deemed appropriate). The 2-way design will consider spatial variation (project vs reference), temporal variation (pre vs post construction), and interaction. All original data will be analyzed and transformed (if necessary) to meet the assumption of ANOVA (normality, equality of variances). When the H_o is not rejected, the possibility of negative effects will be examined.

   Goal: Decrease the mean salinity in the project area.

   Hypothesis 1:

   H_o: Mean salinity inside the project area post-construction will not be less than salinity inside the project area pre-construction.

   H_a: Mean salinity inside the project area post-construction will be less than salinity inside the project area pre-construction.

Hypothesis 2:

        H_o: Mean salinity inside project area will not be less than salinity in reference area.

        H_a: Mean salinity inside project area will be less than salinity in reference area

3.   To determine if relative abundance of fresh/intermediate marsh vegetation inside the project area was maintained or increased after project construction, we will use Analysis of Variance (ANOVA) techniques. Relative abundance of total fresh/intermediate marsh vegetation and the more abundant species will be compared among the pre-construction and 5 post-construction periods in both project and reference areas if they are deemed suitable. The 2-way design will consider spatial variation (project vs reference areas), temporal variation (6 time periods) and the interaction. Multiple comparisons will be used to separate periods if significant differences are found. All original data will be analyzed and transformed (if necessary) to meet the assumption of ANOVA (normality, equality of variances). When the H_o is not rejected, the possibility of negative effects will be examined.

Goal: Maintain the abundance of fresh/intermediate marsh plant species.

Hypothesis 1:

        H_o: Relative abundance of fresh/intermediate marsh vegetation inside the project area post-construction will not be greater than relative abundance of intermediate marsh vegetation inside the project area pre-construction.

        H_a: Relative abundance of fresh/intermediate marsh vegetation inside the project area post-construction will be greater than relative abundance of intermediate marsh vegetation inside the project area pre-construction.

Hypothesis 2:

        H_o: Relative abundance of fresh/intermediate marsh vegetation inside the project area will not be greater than relative abundance of fresh/intermediate marsh vegetation in the reference areas.

        H_a: Relative abundance of fresh/intermediate marsh vegetation inside the project area will be greater than relative abundance of intermediate marsh vegetation in the reference areas.

Using PC-ORD© version 3.2 (McCune and Mefford 1999), we will use Non-metric Multidimensional Scaling (NMS) (Kruskal 1964, Mather 1976, McCune and Mefford 1999) to search for differences in vegetative communities between the northern and southern portions of the project area, between pre- and post-construction periods within the project area by region, and between the project regions and reference area, if appropriate. Species will be analyzed using the average percent covers within each 2 x 2m plot.

4. To determine if abundance of SAV is maintained or increased in the project area after construction, we will use Analysis of Variance (ANOVA) to test the frequency of occurrence of SAV among the pre-construction and 5 post-construction periods and between the project and reference areas if they are deemed suitable. This 2-way design will consider spatial variation (project vs reference area), temporal variation (6 time periods), and the interaction. Multiple comparisons will be used to separate time periods if significant differences are found. All original data will be analyzed and transformed (if necessary) to meet the assumption of ANOVA (normality, equality of variances). When the H_o is not rejected, the possibility of negative effects will be examined.

    Goal: Increase or maintain the mean abundance of submerged aquatic vegetation (SAV).

    Hypothesis 1:

    H_o: Mean SAV % occurrence inside the project area post-construction will not be greater than mean SAV % occurrence inside the project area pre-construction.

    H_a: Mean SAV % occurrence inside the project area post-construction will be greater than mean SAV % occurrence inside the project area pre-construction.

    Hypothesis 2:

    H_o: Mean SAV % occurrence inside the project area will not be greater than mean SAV % occurrence in reference areas.

    H_a: Mean SAV % occurrence inside the project area will be greater than mean SAV % occurrence in reference areas.

The following hypotheses correspond with the monitoring elements and will be used to evaluate the specific goals established to assess effectiveness of the structures:

1.   To determine if more freshwater was introduced into the project area, we will use parametric t-tests to detect mean water discharge increases after project implementation. Mean discharge data will be transformed if necessary to meet the assumptions of this test (normality, equality of variances). When the H_o is not rejected, the possibility of negative effects will be examined.

> *Goal*: Increase introduction of freshwater from the GIWW.

> *Hypothesis 1:*

>> H_o: Mean discharge will be no greater after project construction than before.

>> H_a: Mean discharge will be greater after project construction than before.

2.   To determine if water level variability is lower inside the Cutoff Canal and Island Road Borrow Canal structures, continuous water level data will be summarized to get maximum, minimum, and range, then compared using parametric t-tests. Data will be transformed, if necessary, to meet the assumptions of this test (normality and equality of variances). If H_0 is not rejected, the possibility of negative effects will be investigated.

> *Goal*: Reduce water-level variability inside structures relative to outside

> *Hypothesis 1*:

>> H_o: Water-level variation will not be less inside the structures after construction.

>> H_a: Water level variation will be less inside the structures after construction.

3.   To determine if salinity is lower inside the Cutoff Canal and Island Road Borrow Canal structures, we will use parametric t-tests. Data will be transformed, if necessary, to meet the assumptions of this test (normality and equality of variances). If H_0 is not rejected, the possibility of negative effects will be investigated.

> *Goal*: Reduce mean salinity and salinity variability inside structures relative to outside.

> *Hypothesis 1*:

>> H_o: Mean salinity will not be less inside the structures after construction.

>> H_a: Mean salinity will be less inside the structures after construction.

Hypothesis 2:

  H_o: Salinity variability will not be less inside the structures after construction.

  H_a: Salinity variability will be less inside the structures after construction.

4. To determine if soil salinity is lower inside the northern and southern project area, we will use parametric t-tests. Data will be transformed, if necessary, to meet the assumptions of this test (normality and equality of variances). If H_0 is not rejected, the possibility of negative effects will be investigated.

  Goal: Reduce mean soil salinity and soil salinity variability inside structures relative to outside.

 Hypothesis 1:

  H_o: Mean soil salinity will not be less inside the structures after construction.

  Ha: Mean soil salinity will be less inside the structures after construction.

 Hypothesis 2:

  H_o: Soil salinity variability will not be less inside the structures after construction.

  H_a: Soil salinity variability will be less inside the structures after construction.

5. To determine if more water is flowing from Grand Bayou into the adjacent bayous, we will compare the discharge measurements for pre- and post construction periods for each bayou, as well as the entire project area, using parametric t-tests. If H_0 is not rejected, the possibility of negative effects will be investigated.

  Goal: Increase amount of water flowing from Grand Bayou to adjacent marsh.

 Hypothesis 1:

  H_o: Post-construction discharge in the three main bayous east of Grand Bayou is equal to or less than pre-construction measurements.

  H_a: Post-construction discharge in the three main bayous east of Grand Bayou is greater than pre-construction discharge measurements.

NOTE: Hydrological data will be analyzed in concert with structure operation in an attempt to link structure operation with hydrologic function and associated ecological characterizations. Specific goals and design of data collection may be altered based on analyses of data from first 3 years post-construction.

Available ecological data, both descriptive and quantitative, will be evaluated in concert with all of the above data and with statistical analyses to aid in determination of the overall project success.

Notes

1.   Implementation: Start Construction: December 1, 2000
                                         End Construction: January 31, 2001

2.   USFW Point of Contact: Ronny Paille   (318) 291-3117

3.   DNR Project Manager: Mitch Andrus   (225) 342-9419
      DNR Monitoring Manager: John Rapp   (504) 447-0993
      DNR DAS Assistant: Chuck Armbruster   (225) 342-0277

4.   The twenty year monitoring plan development and implementation budget for this project is $1,686,323. Progress reports will be available in 2002 and 2003. Comprehensive reports will be available in 2005, 2009, 2013, 2017, and 2021. These reports will describe the status and effectiveness of the project.

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