VEGETATIVE DELINEATION REPORT

LABRANCH WETLAND PROJECT (PO-3a)

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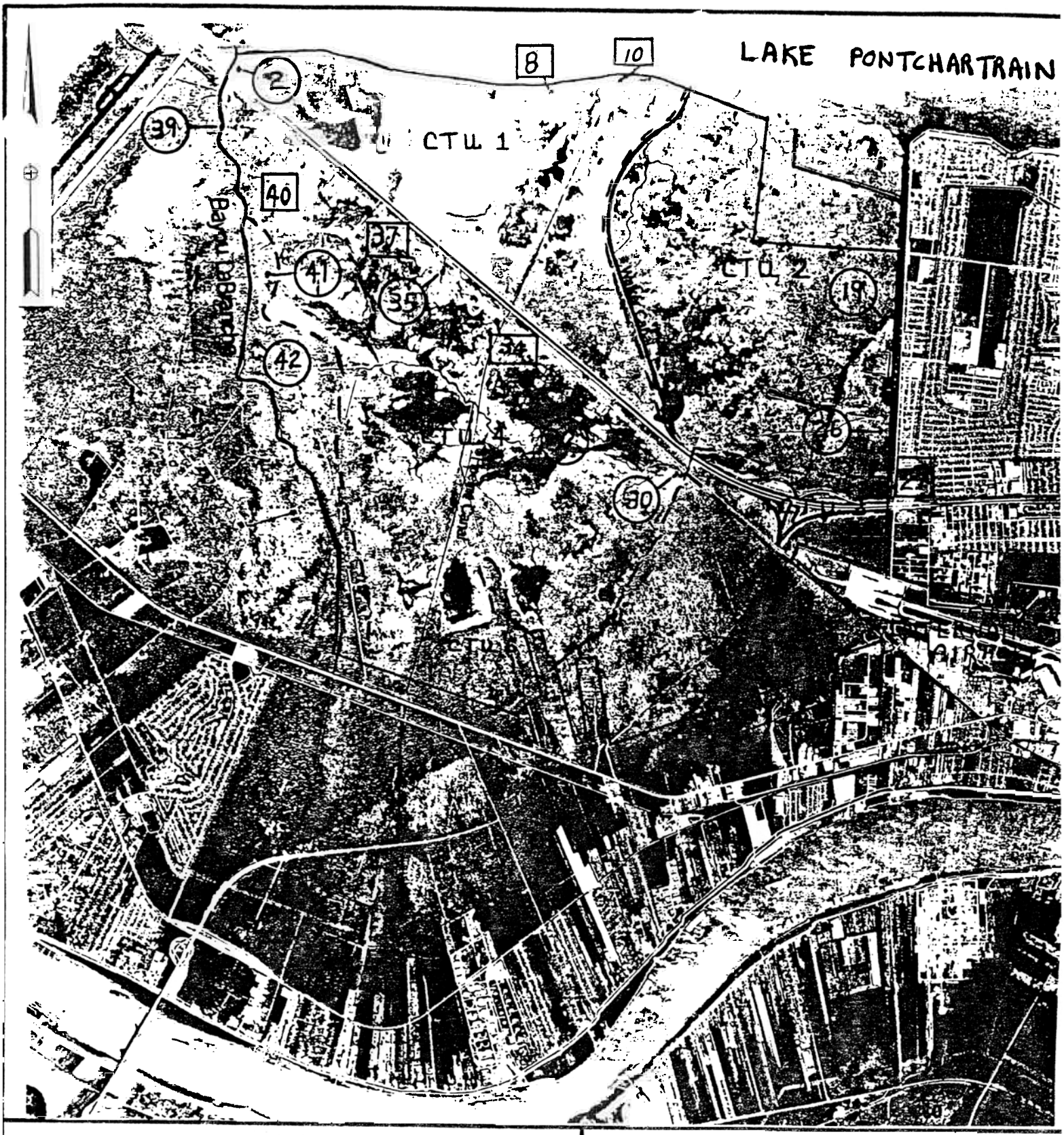
PURPOSE OF REPORT

The purpose of this report is to document the location and extent of each marsh vegetative zone (i.e. saline, brackish, fresh/intermediate, cypress/tupelo swamp) within the management area from 1992 near-vertical, color-infrared aerial photography. These data will be used to evaluate the effectiveness of structures and structure management on vegetative communities. This report also depicts the location of selected vegetative data stations used to determine vegetative zone locations. These findings will provide baseline information on the project area's present conditions. After baseline information is collected, vegetative surveys will be conducted every June and August at the same stations to provide spatial and temporal data between flight dates. Five years after completion, the project will be flown again and all data will be used to evaluate the effectiveness of the structures and structure management on vegetative communities. The data collected every flight year will be used to measure changes over time and assess the success or failure of the project.

STUDY AREA

This project is in St. Charles Parish on the east bank of the Mississippi River between Kenner and the Bonnet Carre Spillway (figure 1). The LaBranche Wetlands is the largest freshwater marsh and swamp remaining along the south shoreline of Lake Pontchartrain. Interstate 10 construction allowed saltwater encroachment into the wetlands because access canals were reconstructed and not maintained. Increased salinity levels in the southwest end of Lake Pontchartrain during storm events and excessive high tides are from the Mississippi River Gulf Outlet's (MRGO) connection with the lake through the Inter Harbor Canal.

The study area is approximately 12,400 acres and is located in T11S-R8E, T11S-R9E, T12S-R8E, and T12S-R9E. The northern boundary is Lake Pontchartrain's south shoreline between the mouth of Bayou LaBranche on the west and the Jefferson Parish boundary line on the east. The eastern boundary is the Jefferson/St. Charles Parish line along the Duncan Canal which leads from Lake Pontchartrain to the north edge of the New Orleans International Airport. A small section of wetlands south of the airports's east-west runway extension and south of the Illinois Central Gulf Railroad (ICGR) adjoins developed property at the James Industrial Park. The southern boundary is along the north edge of the Highway 61 barrow canal. This boundary shifts around developed areas and final construction of the St. Charles Parish portion of the Lake Pontchartrain Hurricane Protection Levee will eventually limit this southern boundary to the north edge of the levee system. The western boundary is along the east bank of Bayou LaBranche from Lake Pontchartrain to the Cross Canal and along this canal's east bank to its junction with the Highway 61 barrow canal. Property within this large general boundary is primarily owned by St. Charles Land Syndicate; however, there is an "on paper only"



PROJECT BOUNDARY

CONSERVATION TREATMENT UNIT BOUNDARY

PROPOSED STRUCTURES

EXISTING STRUCTURES

PROJECT NO. PO – 3A
LABRANCHE WETLAND

PLAN V EW MAP

LA. DEPT. OF NATURAL RESOURCES
COASTAL RESTORATION DIVISION
CROWLEY PLANNING STAFF

Figure

subdivision known as Lakeland Gardens in the northeastern portion of the area adjacent to the Duncan Canal and Lake Pontchartrain.

A Marsh Management Plan for the area was developed in 1985 for the St. Charles Land Syndicate by the U.S. Department of Agriculture (USDA), Soil Conservation Service (SCS), and the Crescent Soil and Water Conservation District. The plan was permitted by the Louisiana Department of Natural Resources (DNR) and the New Orleans District, Corps of Engineers.

Bayou LaBranche is a Scenic Stream listed in the Scenic Rivers System and administered by the Louisiana Department of Wildlife and Fisheries (LDWF). Activity within and along this waterway is covered by a Scenic Stream, Class B Permit issued to the St. Charles Land Syndicate.

Bayou Traverse is the major natural waterway in the study area and empties into Bayou LaBranche approximately half way between Highway 61 and Lake Pontchartrain. Bayou Traverse is the major drainage system for the large watershed between the ICGR and Highway 61. A water control structure is scheduled for construction in the mouth of this waterway at the junction with Bayou LaBranche. The watershed is also influenced by five openings through the railroad system. Water control structures have been placed in two of these openings. shift rock weirs are in place at the three other openings. ICGR piled rocks in an attempt to reduce erosion to their railroad, which inadvertently restricted water movement through the openings. Also, waterfowl hunters have sunk boats and other debris in the openings to reduce tidal drainage of the marsh south of the railroad. Permits have been issued to upgrade three structures by adding more rip rap. A water control structure has been installed at the mouth of the Fall Canal at its junction with Bayou LaBranche. Several low sections of the

natural bank of Bayou LaBranche and some small openings are also scheduled to be closed as part of the permitted Marsh Management Plan.

Two large natural gas pipelines cross the study area in a north-south direction. One of the lines was installed in the 1940s using a flotation canal. The other line was installed later by the push ditch system and is approximately 50 ft east of the existing open canal. A small water control structure is on the north bank of the Highway 61 barrow canal at the south end of the pipeline canal. One of the large water control structures along the ICGR is at the point where the pipeline goes under the railroad facility.

Between the ICGR and Lake Pontchartrain, several man-made openings and facilities have been installed. The oldest of these is the railroad itself which was constructed from New Orleans to Bayou LaBranche in the late 1840s and mid 1850s, according to the railroad company files. During the late 1880s and early 1900s, a farming venture was attempted in the northwest section of the property adjacent to Bayou LaBranche. Sections of the old drainage canal system and its spoil bank are still evident. The Fall Canal is a portion of this system and a water control structure has been installed where the canal crosses the railroad.

Until Highways 61 and 51 were built, communities north of Lake Pontchartrain had to reach the New Orleans area by traveling along the lake's shoreline. Short segments of the old Hammond Highway are evident in isolated sites on the property. Sections of the roadbed have served as shoreline protection and stabilization features; however, only very small segments have survived. Approximately ¾ mi of the roadbed is intact east of Bayou LaBranche.

The I-10 Highway system in St. Charles Parish from the Jefferson Parish boundary to the east guide levee of the Bonnet Carre Spillway was contructed using flotation equipment

during the mid 1960s. Precast concrete pile casings and bridge sections were transported to the site aboard large barges that used a deep canal excavated between the twin spans.

The Duncan Canal was enlarged and deepened to accommodate construction access on the eastern end of the roadway. In addition to this waterway, a short existing oil and gas access canal out of Lake Pontchartrain approximately 1½ mi west of the Duncan Canal was expanded and extended into Bayou Piquant and Walker Canal. A new canal was built approximately half way between Bayou LaBranche and the United Gas Pipeline Canal for access to the construction sites west of the pipeline system. Both of the large access canals were closed with timber bulkheads when construction was complete; however, both of these facilities washed out within a very short time. The construction contractor repaired both, but eventually was no longer held responsible for maintenance and total failure occurred.

An oil and gas venture used the eastern-most of these two new access canals to transport equipment near the north side of the I-10 roadway to drill a directional hole south of the railroad. When complete, the company closed the opening near the lakeshore and installed a concrete armor protection feature to reduce erosion. This facility has functioned well and a small deposit of marsh material and vegetation has formed in Lake Pontchartrain at this site.

The western access canal constructed for the highway project was open until 1987 when St. Charles Parish closed it as part of their shoreline protection project. Also at that time, approximately 3000 ft of shoreline west of the canal was armored with clam shell and large rip rap stones. Approximately 9700 ft of additional shoreline protection is planned by St. Charles Parish and DNR/Coastal Restoration Division (CRD).

An earthen plug was installed under the east end of the I-10 project where the Duncan Canal spoil bank had been removed. Earthen plugs were also installed on both banks of Bayou LaBranche near the western end of the project. The plugs failed and were not repaired, which allowed excessive water interchange between the marsh area north of the railroad embankment and the Lake Pontchartrain shoreline. As part of the original construction technique for the I-10 system, an attempt was made to backfill the construction canal using suction dredge equipment. Two large holes were excavated in the marsh to obtain this fill material. The eastern hole is north of I-10 at the Walker Canal and the western hole is north of I-10 at the Fall Canal. While the backfill effort was successful in the short section west of Bayou LaBranche, it was not successful at any other site in the entire system. Water depth between the spans presently varies from 1 ft to 5 ft. An extensive amount of daily water interchange takes place at the opening into Bayou LaBranche because of its proximity to Lake Pontchartrain.

As permit conditions for the Louisiana Department of Transportation and Development (LDOTD) and the Federal Highway Commission to construct and maintain I-310 from the Luling Bridge to I-10, three variable-crest weirs with flap-gated openings were installed—two on the railroad and one at the Fall Canal mouth at Bayou LaBranche. In addition to these mitigation projects, a large fixed-crest structure was installed across the entire opening area west of the Duncan Canal where I-10 enters St. Charles Parish. This structure is made of clam shell covered with Armorflex concrete mats. The crest is set at 12 in. below average marsh elevation for approximately 150 ft in the center of the opening and 6 in. below average marsh elevation for the remainder of the area. The total structure opening is approximately 465 ft. Both structure wings are tied into earthen levees along the west side of Duncan Canal. Upon final

completion and acceptance by the LDOTD, the structures will be turned over to St. Charles Parish for operation and maintenance. This will assure that the goals and schedule of water level management within the area will be met on a long term basis. LDOTD has assured St. Charles Parish the opening under the I-10 south bound lane on the east bank of Bayou LaBranche will be closed. This closure is critical to long-term preservation of Bayou LaBranche's quality as a Scenic Stream because saltwater intrusion into the wetlands is primarily through this opening.

As part of the existing Marsh Management Plan for the LaBranche wetlands, St. Charles Land Syndicate has obtained a low level, fixed-crest weir in the Walker Canal mouth near where the United Gas Pipeline enters Lake Pontchartrain. St. Charles Parish also installed a fixed-crest steel weir in an opening known as the Blowhole at the same time the shoreline protection work was being done. These two lakeshore facilities provide some protection from saltwater intrusion and excessive tidal exchange. Plans are underway to fill a portion of the open water area north of I-10 and east of Bayou LaBranche as part of the Coastal Wetland Planning, Protection, and Restoration Act. Fill material will be pumped from a submerged delta in the Bonnet Carre Spillway mouth.

According to the 1988 vegetative type map prepared by Dr. Robert Chabreck and Greg Linscombe, the study area has three vegetative designations: non-marsh for the freshwater swamp area, intermediate between the railroad and the swamp fringe, and brackish between the railroad and Lake Pontchartrain. While their type maps are very useful for wide area application, the scale used makes it difficult to delineate small communities of fresh marsh areas

such as those that exist within the intermediate designation. The same holds true for a small freshwater swamp north of the railroad near the Duncan Canal.

Between 1958 and 1978, over 4000 acres of this area was converted from emergent marsh into open water. Much of this conversion is from saltwater intrusion through the above described, man-made openings. During that time, Hurricane Betsy in 1965 and Hurricane Camile in 1969 caused extensive damage to this wetland area. Large quantities of high salinity waters were forced into Lake Pontchartrain from the Mississippi Sound (Montz and Cherubini 1973). The swamp and marsh retained the water for a long time because of poor drainage features. These storms were followed infrequently by high tides that deposited brackish water into the marsh and swamp and increased soil salinity through accumulation. This process has contributed to the elimination of some freshwater plant species that grew in this area and has stressed the bald cypress trees.

Black and white aerial photographs of the LaBranche wetland area taken in 1953 are available for review at the Crescent Soil and Water Conservation District office in Boutte, Louisiana. Based upon information obtained from the Montz and Cherubini publication, from the old aerial photographs, and from personal interviews with hunters and landowners who have used this area for more than 40 years, it is possible to reconstruct a series of events that has led to the present ecosystem. Construction of the United Gas Pipeline Canal during the early 1940s led to some water interchange between Lake Pontchartrain and interior marsh areas. High salinity water infrequently entered through the canal system by overtopping the lakeshore bulkhead.

A large segment of the interior marsh between the railroad and Highway 61 was vegetated with freshwater plants of which alligatorweed (*Althernanthera philoxeroides*) was prominent. Other common plants were maidencane (*Panicum hemitomon*), bullwhip (*Scirpus californicus*), roseau cane (*Phragmites communis*), giant cutgrass (*Zizaniopsis miliacea*), and water hyacinth (*Eichhornia crassipes*). All of these plants were impacted by gradual salinity increases. The most noticeable marsh damage followed hurricanes Betsy and Camile. Cypress trees near the I-10 and Duncan Canal junction showed stress following access canal construction during the mid 1960s.

The alligatorweed flea beetle (*Agasicles hygrophila*) was introduced to this section of Louisiana despite LDWF's objections. According to an article from USDA Technical Bulletin 1547, "Biological Control of Alligatorweed, 1959-72," the U.S. Corps of Engineers first introduced the flea beetle on February 19, 1971 at the Cross Canal on Highway 61 Other releases were recorded on May 7 and May 21 of the same year. In the discussion section of this article, it is noted that as alligatorweed was reduced, water hyacinth increased. Some areas are now subject to wind-driven wave erosion such as the large open water area on the LaBranche property. Inside the cypress swamp, a pest plant, fourchette (*Bidens laevis*), has become dominant. This plant damages nutria by causing sores on the skin and, when the pelts are harvested, they have large holes which make the product worthless.

The major plant communities in the brackish marsh section of the study area are marshhay cordgrass (*Spartina patens*) and bulltongue (*Sagittaria lancifolia*). SCS introduced smooth cordgrass (*Spartina alterniflora*) in May 1984 to establish an emergent plant species that could tolerate the increased tidal exchange and salinity range brought about by the MRGO. This

species of *Spartina* was not present in the LaBranche wetlands and the nearest naturally occurring stand was approximately 40 mi away (Talbot and Ensminger 1988). Original plantings have naturally expanded and landowners, hunting club members, St. Charles Parish, and DNR have made efforts to use this species to revegetate suitable property sites. While smooth cordgrass is not a preferred food plant for nutria, it is utilized and, in many planting sites, nutria have destroyed all plants introduced. Due to their inquisitive nature, some nutria may be attracted to the disturbed soil at the planting site. Small wire cages have been used to discourage nutria; however, these devices are expensive and have shown limited success. After introduction, some of the study's vegetative stations contained smooth cordgrass and this species should appear at other stations in the future.

Between the ICGR and Highway 61, the plant communities are intermediate to fresh. Saltwater influences have established large stands of marshhay cordgrass along the watershed of each of the trestle openings through the railroad. At the Walker Canal area south of the railroad, marshhay cordgrass is established within a bald cypress (*Taxodium distichum*)/tupelo (*Nyssa aquatica*) stand. The marshhay cordgrass is expanding while the freshwater swamp species are dying or showing extensive signs of stress.

Bulltongue is the dominant species for much of the emergent marsh south of the ICGR. This plant may be growing in areas once occupied primarily by maidencane. Several stands of bullwhip and small clumps of giant cutgrass are also present. These two species appear to withstand extensive nutria feeding and to survive and reproduce seed even though they may have limited a ability to expand the size of the stand.

Large stands of water hyacinth develop annually in all of the deeper and sheltered water areas south of the railroad such as the pipeline canal, Bayou Traverse, and the hunting access ditches. During high water stages following extensive rainfall or during wind-driven tides out of the lake, large floating mats of water hyacinth break loose and move across the ponds. This is very destructive to the established stands of aquatic vegetation such as southern naiad (*Najas quadalupensis*), duckweed (*Lemna minor*), coontail (*Ceratophyllum demersum*), and Eurasian water-milfoil (*Myriophyllum spicatum*). In extreme cases like storm tides, water hyacinth mats float out of the ponds onto emergent marsh causing die-back of valuable waterfowl food plant species such as wild millet (*Echinochloa walteri*) and smartweed (*Polygonum spp.*).

Without adequate water level control over the interior marsh area, production of annual seed producing plants such as wild millet, smartweed, bagscale (*Sacciolepis striata*), sprangletop (*Leptochloa fascicularis*), and fall panicum (*Panicum dichotomiflorum*) is sometimes reduced. Young plants become established on exposed mudflats from existing seed banks in the soil; however, these young seedlings cannot cope with prolonged periods of inundation. Also, high water temperatures in the shallow ponds from sunlight absorption scalds the young plants. Repeated germination takes place each time the area is subject to drying for more than a few days. Therefore, some plants on the more elevated sites survive until they are several inches tall and can withstand frequent flooding and drying cycles. During the spring growing season, tide levels in the lake are usually above optimum levels in the open water areas. Therefore, annual seed producing plants are primarily established within the bulltongue stands. Competition reduces production in these sites, but smartweed and wild millet are prolific seed producers and contribute the bulk of the seed food for migrating winter waterfowl in this area.

METHODS

Vegetative zones were delineated using color-infrared photographs of the project area. The vegetative zones were ground-truthed by identifying species composition, water levels, salinities, landmarks, etc. in the field at different stations in each vegetative zone. Field investigations were conducted on July 27, 1992 and the area was flown by helicopter on August 21, 1992 to verify station locations and plant communities. The project area was then mapped with vegetative zones, stations, and landmarks in place. The percent area of each habitat type and open water areas was then calculated by the dot grid method. Details of the methodology can be found in Appendix A.

RESULTS

The location of vegetative data collection stations and marsh zone delineations are shown in figures 1 & 2. Field investigation confirmed four plant zones. The area along the lakeshore is brackish and dominated by marshhay cordgrass, bulltongue, and smooth cordgrass. Along the pond edges and on small elevations within this area, deerpea (*Vigna luteola*), baccharis (*Baccharis halimifolia*), woolly rosemallow (*Hibiscus lasiocarpos*), morningglory (*Ipomoea sagittita*), and saltmarsh mallow (*Kosteletzkya verginica*) were common.

In the brackish marsh area between the railroad and lakeshore is a small, bald cypress swamp that is subject to excessive drainage and has been impacted by spoil deposits from I-10 and I-310 inchange construction. Cypress trees there are in advanced stages of stress and many are dead. Ground cover is bulltongue and marshhay cordgrass. Small water areas in the stand contain duckweed, common salvinia (*Salvinia rotundifolia*), and other aquatic vegetation. Chinese tallow tree (*Sapium sebiferum*) and black willow (*Salix nigra*) have invaded the spoil

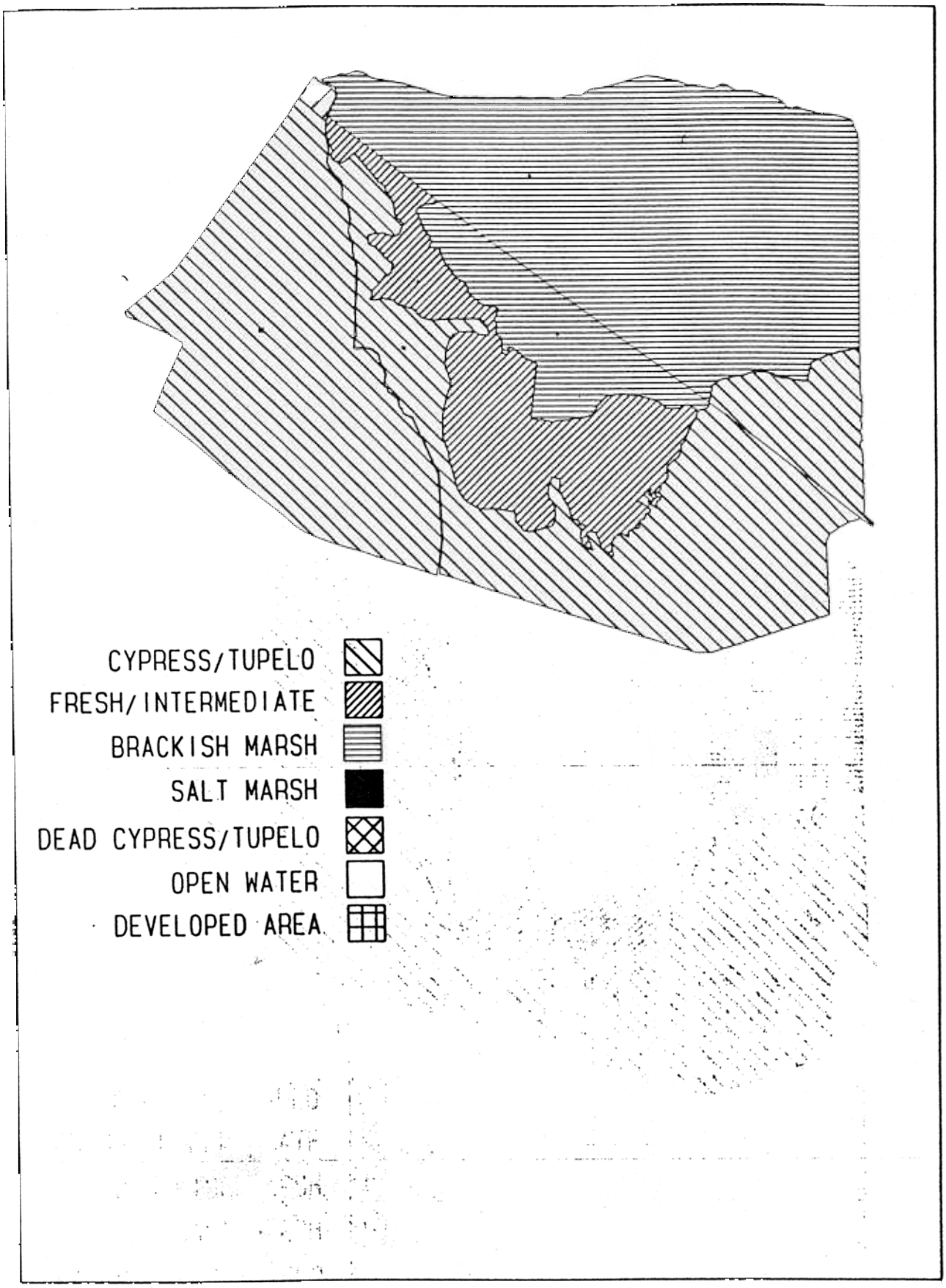


Figure 2. LaBranche Wetlands project area showing vegetative zone locations.

areas along with elderberry (*Sambucus canadensis*) and baccharis. Water level in a major portion of this small area is controlled by the large fixed-crest, armor-covered water control structure under I-10. This is the first site where saltwater intrusion from Lake Pontchartrain through the Duncan Canal will be noted. It is unlikely that any recovery of the bald cypress stand is possible.

The intermediate marsh zone along the south side of the railroad has converted from a freshwater marsh into open water and emergent marsh which now supports plant communities composed of marshhay cordgrass and bulltongue. This same area still contains stands of bullwhip and cutgrass. Some live bald cypress trees are growing in stranded stands within the intermediate marsh. Wild millet, smartweed, spider lily (*Hymenocallis caroliniana*), and flat sedge (*Cyperus odoratus*) are common within the bulltongue stands. Along the pond edges, dwarf spikerush (*Eleocharis parvula*) and waterhyssop (*Bacopa monnieri*) are important wildlife food plants for nutria and waterfowl. Some small stands of alligatorweed survive annual insect infestations.

Along the bald cypress swamp fringe is a small band of freshwater marsh. It is mainly a floating marsh and is composed of fourchette, swamp loosestrife (*Decodon verticillatus*), sensitive jointvetch (*Aeschynomene idica*), belle dame (*Acnida cuspidata*), pennywort (*Hydrocotyle umbellata*), waterprimrose (*Ludwigia peploides*), false loosestrife (*Ludwigia leptocarpa*), bagscale, and pickerelweed (*Pontederia cordata*). Maidencane is conspicuously absent. This plant has been listed as the main species for building freshwater marsh organic soil.

The freshwater swamp area is composed of bald cypress, tupelo gum, and red maple (*Acer rubrum*). On elevated sites like spoil banks and the elevated portion of Bayou LaBranche, green ash (*Fraxinus pennsylvanica*) and hackberry (*Celtis laevigata*) are growing. Buttonbush (*Cephalanthus occidentalis*) is common in freshwater swamps throughout south Louisiana. This plant is not a nutria food source and is very sensitive to saltwater intrusion; therefore, it is a good indicator species to gauge saltwater impact. Buttonbush stumps and dead trees were observed and no live plants were noted.

Vegetative Station Data

Station 1 is along the edge of open water areas south of the Fall Canal on the east bank of Bayou LaBranche. This area is on the back side of the bayou's natural levee system and provides suitable sites for early seed germination of annual plants. Wild millet made up 95% of the stand and a combination of sprangletop, seashore paspalum (*Paspalum vaginatum*), and cutgrass made up the remaining 5%. Marsh salinity south of the railroad during the field investigation was 1 part per thousand (ppt) or less for the entire area (figures 3 and 4).

Station 2 is in a millet marsh east of Bayou LaBranche and north of Bayou Traverse. The area is 90% wild millet , 8% sprangletop, and a 2% combination of belle dame, sedge, and bulltongue (figure 5).

Station 3 is located where a zig-zag drift fence has been installed to trap marsh soil particles. Plants in this area are wild millet (70%), bulltongue (20%), and sprangletop (10%). Duckweed was common in the open water area at this site (figures 6 and 7).

Station 4 is south of Bayou Traverse in a stand of 90% bullwhip and 10% millet, waterhyssop, alligatorweed, deerpea, and camphorweed (*Pluchea camphorata*). Single cypress trees are common in this section (figure 8).

Station 5 is in the interior marsh east of Bayou LaBranche and south of Bayou Traverse. The marsh in this area is 90% bulltongue with many other plants such as sedge, millet, deerpea, belle dame, smartweed, alligatorweed, water hyacinth, and coffeeweed (*Sesbania exaltata*) making up the remaining 10% (figures 9 and 10).

Station 6 is in a ditch approximately 1000 ft west of the Monteleone ditch. This site is on the fringe of the cypress swamp and freshwater marsh and is approximately 1 mi north of Highway 61. The swamp is composed of cypress (95%) and red maple and tupelo (5%). understory is wild millet (95%) with smartweed, coffeeweed, marshmallow, rosemallow, alligatorweed, duckweed, coontail, and water hyacinth making up the remainder of the plant community. This is a very healthy freshwater marsh complex and is sheltered from saltwater except during extreme cases like hurricanes. This is a superb alligator and nutria producing area and provides excellent year-round habitat for wood ducks and winter habitat for migratory waterfowl (figures 11 and 12).

Station 7 is in a hunting access ditch about 1 mi east of Mr. Monteleone's camp. marsh is 80% bulltongue with a dense stand of wild millet, deerpea, smartweed, rosemallow, belle dame, sedge, and camphorweed making up the remaining 20%. The ditch and pond water is covered with a dense stand of duckweed. This is also an excellent wildlife producing marsh area. This section is subject to occasional high tides from the lake. Flow into and out of the area is through the Walker Canal and the 16 Mile Trestle on the railroad. Large, open water

areas are located east and north of here. With proper water level management, this section could be revegetated and improved as wildlife habitat (figures 13 and 14).

Station 8 is at the Walker Canal south of the trestle. The marsh in this area is bulltongue (60%), marshhay cordgrass (20%), and wild millet (20%) along with sprangletop, smartweed, sensitive jointvetch, swamp loosestrife, and fourchette. The portion of the Walker Canal not covered with water hyacinth is producing good stands of southern naias and coontail. This area is showing signs of extensive saltwater intrusion with stressed cypress trees and expanding stands of marshhay cordgrass. An active southern bald eagle nest is located approximately ¾ mi south of the Walker Canal trestle and has consistently produced young birds for the past several years (figures 15, 16, and 17).

Station 9 is south of the railroad near the 16 Mile Trestle. During field investigation, water was moving out and the salinity was 2.0 ppt. Vegetation is showing saltwater influence with marshhay cordgrass making up 90% of the stand and bulltongue 10% with some wild millet, sprangletop, and smartweed mixed in. The large pond areas adjacent to the marshhay cordgrass are supporting good stands of southern naias and coontail (figure 18).

Station 10 is west of the United Gas Pipeline near the railroad. This marsh is also showing saltwater influence with marshhay cordgrass making up 90% of the stand. Bulltongue is 10% with wild millet, sprangletop, and smartweed mixed in. There is a healthy stand of bullwhip (90%) near this station that glossy ibis use as a nesting site. The understory in the bullwhip stand is made up of deerpea, morningglory, and duckweed. This station is near the Tie Ditch Trestle and the water salinity was 1.0 ppt (figures 19 and 20).

Station 11 is along the Marsh Club hunting access ditch adjacent to the railroad and Bayou LaBranche. This marsh is made up of bulltongue (70%), wild millet (10%), cattail (*Typha spp.*) (10%), and marshhay cordgrass (10%). This is the only section of the study area with large stands of cattail, which is a good indicator that it is sheltered from large, frequent saltwater infusions (figures 21 and 22).

Station 12 is north of the railroad and west of the Fall Canal in an area where smooth cordgrass has been introduced by planting. This is also in an area where efforts have been made to utilize discarded Christmas trees for silt-trapping fences. This experiment is realizing limited success. Most of this area is open water with southern naias and coontail making up the major portion of the aquatic vegetation. The emergent marsh is made up of smooth cordgrass (65%), sedge (20%), camphorweed (10%), and wild millet (5%). Along the shallow pond rim and on exposed mud flats, dwarf spikerush is very extensive (figures 23, 24, and 25).

Station 13 is along a hunting access ditch west of the United Gas Pipeline and southeast from the Blowhole Weir on the lakeshore. The marsh vegetation was marshhay cordgrass (70%), camphorweed (20%), and wild millet (10%) in a mixture with deerpea, morningglory, and baccharis. Salinity was 1.0 ppt (figure 26).

Station 14 is on the east side of the United Gas Pipeline and approximately 2000 ft north of I-10. This is a brackish marsh and marshhay cordgrass made up 90% of the plant community with 5% camphorweed and a combination of deerpea, baccharis, rosemallow, and marshmallow for the remaining 5%. Very little aquatic vegetation was noted in the area ponds (figures 27, 28, and 29).

Station 15 is in the brackish marsh interior east of Bayou Piquant and approximately half way between I-10 and Lake Pontchartrain. Vegetation was 90% marshhay cordgrass with 5% camphorweed, and a 5% combination of deerpea and baccharis. This marsh appears not to have burned for several seasons and has a large amount of accumulated surface material (figures 30 and 31).

Station 16 is about 1000 ft east of Bayou Piquant and about 1000 ft south of the lakeshore along a small interior bayou. Salinity was 0.5 ppt and vegetation was marshhay cordgrass (90%), camphorweed (5%) and deerpea, morningglory, and baccharis (5%). Sedge and wild millet plants were growing along the pond edge which had a good stand of southern naias and coontail (figures 32, 33, and 34).

Station 17 is along a large pond area approximately 1 mi west of the Duncan Canal adjacent to the area's large power line. Vegetation was marshhay cordgrass (90%) with a 10% combination of camphorweed, deerpea, rosemallow, and marshmallow. One small clump of three-cornered grass (*Scirpus olneyi*) was noted at this station. Good stands of aquatic vegetation (southern naias and coontail) were observed in the ponds. Water salinity in the ponds was 1.5 ppt (figures 35, 36, and 37).

Station 18 is west of the end of a mineral access canal site. SCS used this area to establish average marsh elevation to determine the crest level of the fixed-crest concrete weir under I-10 at the Duncan Canal. Vegetation was 90% marshhay cordgrass with a 10% combination of camphorweed, deerpea, and belle dame. There was one clump of cutgrass and some small clumps of roseau cane in the marsh at this site. Ponds in the area had stands of

southern naias and coontail. This station is near the cypress stand north of the spoil bank created for I-10 construction (figures 38, 39, and 40).

Vegetative Area Calculations

This project area (20,728.60 acres) is basically made up of three different vegetative zones, fresh/intermediate marsh, brackish marsh, and live cypress/tupelo swamp. The cypress/tupelo swamp is located throughout the southern portion of the project and covers 10,121.99 acres (48.83%). The fresh/intermediate marsh is located between the cypress swamp and Interstate I-10 and covers 2,592.76 acres (12.51%). The brackish marsh zone is primarily located in the northern portion of the project, extending from Interstate I-10, north to Lake Pontchartrain covering 8,013.85 acres or 38.66%.

SUMMARY

This project is in the major marsh and swamp wetland area remaining on Lake Pontchartrain's south shore. Offsite influences such as the construction of the Mississippi River levee system over 100 years ago isolated the area from freshwater input and silt loads. The MRGO construction during the 1960s allowed for more frequent tidal exchange in the area and for occasional saltwater intrusion during hurricane or tropical storm events. Before the MRGO was built, daily tidal exchange in this area was nominal; however, the tidal exchange range has been increased under present conditions.

Onsite modification of the natural hydrology was first influenced by the Mississippi River levee system and by the construction of the ICGR embankment more than 150 years ago. Construction of access and drainage canals to accommodate timber harvest and for removing excess water from farm and residential areas along the river terrace continues to influence the existing water level regimen to a minor degree.

Access canals built for I-10 through the LaBranche wetlands have introduced saline water from Lake Pontchartrain and daily tidal exchange into sections of the marsh that had previously been isolated. Increased salinity has created extensive open water areas through deaths of freshwater plant communities. The tidal exchange has also transported extensive amounts of organic material out of the interior marsh through uncontrolled openings into Lake Pontchartrain.

Nutria and alligatorweed flea beetles have caused extensive loss of area vegetative wetlands. Nutria naturally invaded the area following introduction to the Louisiana coastal wetlands during the late 1930s. Alligatorweed flea beetles were introduced into the barrow canal system along Highway 61 by the Corps of Engineers as a biological control for alligatorweed

in 1971. Because this species removed alligatorweed from large sections of the interior marsh and waterways, saltwater intrusion was encouraged and excessive drainage during low tide stages in Lake Pontchartrain was created.

Remedial measures to restore hydrologic stability are being taken by the St. Charles Land Syndicate, owners of the property, and by cooperative efforts of St. Charles Parish and DNR. Several large water control structures and shoreline stabilization efforts have been installed through mitigation processes. Additional structural management is planned. It is now possible to control water level enough to stimulate and aid revegetation of much of the interior land. Additional control will help reduce the amount of open water area between the railroad and Highway 61. Some additional soil vegetation should be planted when water level control is improved.

The study area was the first site in Louisiana where efforts were tested to install drift fences to trap soil particles and recreate marshland. Discarded Christmas trees have been used successfully as shown in figures 41, 42, 43, and 44. The accretion process is dependent upon an availability of suspended material in the water column and in the case the material is decomposed marsh soil particles and decaying plant material washed into the from the interior marsh sites. Though a limited amount of mineral soil particles is available in Lake Pontchartrain, the natural tidal flow process to move these particles into the interior marsh is more destructive than beneficial.

SCS introduced smooth cordgrass into the study area as an experiment. Suitable growing sites for this plant are available between the railroad and the lakeshore where the plant has naturally colonized. Attempts to establish large stands between the railroad and Highway 61

have met with limited success because of a restricted amount of mineral soil and nutria feeding impacts. The large open water areas between the railroad and the lake can be filled with dredged material from Lake Pontchartrain and vegetated with suitable wetland plants through natural processes and planting. This is planned by the Corps of Engineers as part of the Coastal Wetland Planning, Protection, and Restoration Act.

The brackish marsh between the railroad and Lake Pontchartrain needs periodic burning during the fall and winter periods to maintain healthy stands of brackish vegetation. Extensive amounts of plant material accumulate on the surface of brackish marsh ecosystems and, if left unburned for several years, will cause plant communities to die back. Large accumulations also cause excessive surface temperatures during fires set without water levels near the surface. Without controlled burns, summer fires are started by lightning and vandals. Uncontrolled burns during spring and summer growing seasons cause adverse impacts to plants. Because these wetlands are near I-10 and the New Orleans metropolitan area, it is difficult to institute a proper burning program that will not be a hazard to automobile traffic or the health of people with respiratory ailments.

Waterfoul, furbearing animal, and alligator habitat should be improved with the existing management program. Stabilized water levels and increased vegetative production will increase the attractiveness and productivity of the area to marine fisheries organisms.

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APPENDIX A

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

Figure 9

Figure 10

Figure 13

Figure 14

Figure 15

Figure 16

Figure 17

Figure 18

Figure 19

Figure 20

Figure 21

Figure 22

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Figure 24

Figure 25

Figure 26

Figure 27

Figure 28

Figure 29

Figure 30

Figure 31

Figure 32

Figure 33

Figure 34

Figure 35

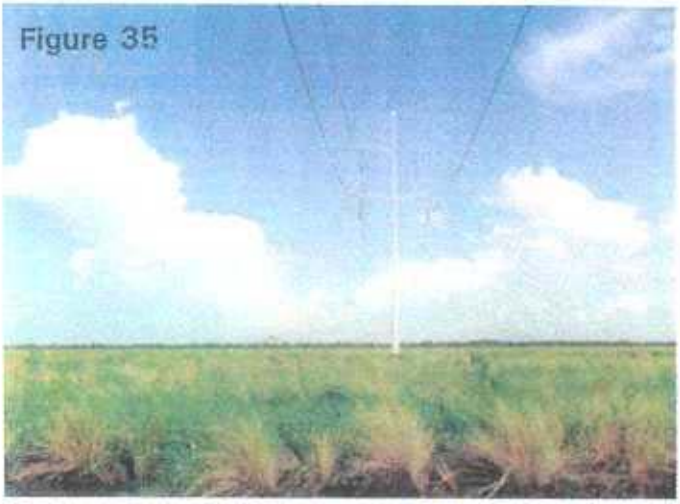

Figure 36

Figure 37

Figure 38

Figure 39

Figure 40

Figure 41

Figure 42

Figure 43

Figure 44