SCR 154 STUDY GROUP REPORT

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2017 Regular Session **ENROLLED**

SENATE RESOLUTION NO. 154

BY SENATOR MILLS

A RESOLUTION

To urge and request the Department of Natural Resources to study potential solutions that may mitigate spoil banks.

WHEREAS, Louisiana's lower Atchafalaya Basin has been adversely impacted by spoil banks that block natural water flows; and

WHEREAS, historically, when constructing pipelines, operators have been allowed to discard their spoil as permitted or required by landowners, or required by the state of Louisiana, thus creating spoil banks; and

WHEREAS, spoil banks shut off the natural flow of water that restricts the carrying capacity of the flood way and damages water quality; and

WHEREAS, the Department of Natural Resources, office of conservation, division of pipeline safety regulates the maintenance of intrastate pipelines.

THEREFORE, BE IT RESOLVED that the Senate of the Legislature of Louisiana does hereby urge and request the Department of Natural Resources to study potential solutions that may mitigate spoil banks created on the lower Atchafalaya Basin affecting the natural water flows and fishing activities, including but not limited to the following:

(1) Whether any spoil banks are adversely affecting fishing activities.

(2) Whether the spoil should be placed into the water bottom or removed off site to an approved location such that there be no remaining spoil bank.

(3) Whether the pipeline should be removed at the end of its useful life.

(4) Whether any construction, maintenance, or any other work should be permitted between the East Atchafalaya Basin Protection Levee and West Atchafalaya Basin Protection Levee.

(5) Whether permits for new pipelines should be granted to companies that are out-of-compliance with prior issued permits, until such time as those previously-issued permits are brought back into compliance.

BE IT FURTHER RESOLVED that the Senate of the Legislature of Louisiana does hereby urge and request the Department of Natural Resources to request the following entities to participate in this study:

(1) The United States Army Corps of Engineers.

(2) The Coastal Protection and Restoration Authority.

(3) The Atchafalaya Basin Research and Promotion Board.

(4) The Sierra Club Delta Chapter.

(5) The Louisiana Crawfish Producers Association West.

(6) The Atchafalaya Basinkeeper.

(7) The Louisiana Landowners Association.

(8) The Louisiana Mid-Continent Oil and Gas Association.

(9) The Department of Wildlife and Fisheries.

(10) The Louisiana Association of Business and Industry.

(11) The Department of Natural Resources, office of conservation, division of pipeline safety.

(12) The office of state lands.

(13) The Department of Justice, natural resources division.

(14) The Louisiana Oil and Gas Association.

(15) A crawfish wholesale buyer located on the east side of the Atchafalaya Basin.

BE IT FURTHER RESOLVED that the department shall make recommendations to the Senate Committee on Natural Resources no later than February 1, 2018.

BE IT FURTHER RESOLVED that the department shall provide a report to the Senate Committee on Natural Resources no later than February 1, 2018, that includes the number and location of spoil banks between the East Atchafalaya Basin Protection Levee and West Atchafalaya Basin Protection Levee, the name of the pipeline company associated with the spoil bank, and the approximate date the pipeline was constructed.

BE IT FURTHER RESOLVED that a copy of this Resolution be transmitted to the secretary of the Department of Natural Resources.

PRESIDENT OF THE SENATE

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STUDY ON BURIAL OF SUBMERGED PIPELINES IN THE COASTAL ZONE

Prepared For:

The 2015 Louisiana Legislature

Pursuant to HCR 143 of the 2014 Regular Session

March 1, 2015

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INTRODUCTION

House Concurrent Resolution No. 143 (HCR 143) (see Appendix A) was adopted during the 2014 Regular Session of the Louisiana Legislature. HCR 143 urged and requested the Commissioner of Conservation and the Secretary of the Department of Natural Resources (DNR) to conduct a comprehensive assessment and evaluation of pipelines inadequately covered and no longer buried as originally designed or permitted, and to make recommendations for any necessary statutory, rule, regulation, or policy change.

HCR143 further specified that the assessment pertains to pipelines regulated under 49 CFR Parts 192 & 195 located in the Louisiana Coastal Zone and submerged under water or water bottoms.

Furthermore, HCR 143 requested that a comprehensive assessment and evaluation report and recommendations for any necessary statutory rule, regulation, or policy changes be submitted to the House Committee on Natural Resources and Environment and the Senate Committee on Natural Resources no later than March 1, 2015.

The Louisiana coast is a "working coast," supporting critical infrastructure such as highways, ports, pipelines and navigational waterways of national economic significance. Since the 1930s, Louisiana has lost nearly 1,900 square miles of land. Coastal land loss issues in Louisiana are well documented and attributable to many factors.

Because of the loss of wetlands and land areas in coastal Louisiana, some pipelines that were originally constructed on land have become submerged. As areas once land become open water, unintended interactions with pipelines previously buried may take place.

1. OVERVIEW OF REGULATIONS AND AUTHORITIES

The pipeline networks in Louisiana are regulated by different entities and in different ways depending on location, function, and jurisdiction. The federal Office of Pipeline Safety (OPS), under the United States Department of Transportation (DOT), the Office of Conservation – Pipeline Division (OOC – PD), the Office of Coastal Management (OCM), the United States Army Corps of Engineers (USACE) and the United States Coast Guard (USCG) all play various roles in the regulation of pipelines in Louisiana. Some entities roles are limited in scope while others are more comprehensive.

A. FEDERAL JURISDICTION

Regulatory processes and jurisdictional authority concerning pipelines in coastal areas are shared by several Federal agencies, including the Department of the Interior (DOI), DOT, USACE, the Federal Energy Regulatory Commission (FERC), and USCG. These agencies also have responsibility for overseeing and regulating the placement of structures and pipelines in areas that affect navigation, and the certification of proposed projects involving the transportation or sale of interstate natural gas. In addition, DOT is responsible for regulating the safety of interstate commerce of natural gas, liquefied natural gas (LNG), and hazardous liquids by pipeline. This responsibility includes all offshore pipelines on state lands beneath navigable waters, which originate in federal waters.

A.1 PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION

The primary federal regulatory agency responsible for pipeline safety is the Pipeline and Hazardous Materials Safety Administration (PHMSA) within DOT. Through PHMSA, the natural gas and hazardous liquid pipelines are regulated to ensure public safety under Title 49, Code of Federal Regulations, Parts 192 (natural gas) and 195 (hazardous liquids) (See Appendix N for these and other federal regulations). The safety of intrastate pipelines is the responsibility of state regulators as the intrastate pipeline safety program was delegated from PHMSA to Louisiana's Office of Conservation (now specifically administered by OOC-PD) in 1974 (natural gas) and 1987 (hazardous liquids).

These federal regulations include standards for burial depths in navigable waterways and the Gulf of Mexico and its inlets. For the purposes of enforcing these standards, the Gulf of Mexico and its inlets means the waters from the mean high water mark of the coast of the Gulf of Mexico and its inlets open to the sea (excluding rivers, tidal marshes, lakes, and canals) seaward to include the territorial sea and Outer Continental Shelf to a depth of 15 feet (4.6 meters), as measured from the mean low water mark (49 CFR 195.2). DOT also maintains a specific list of navigable waters (Appendix I). PHMSA uses this list for implementation, inspection and enforcement of the regulatory requirements for pipeline crossings of navigable waters.

A.2 FEDERAL ENERGY REGULATORY COMMISSION

Activities by other federal agencies also contribute to the safety of our state and nation's pipeline systems. For example, the Federal Energy Regulatory Commission (FERC) is responsible for pipeline siting, including depth of burial in connection with new interstate natural gas pipelines.

FERC regulates many aspects of interstate gas transmission pipeline operations, including approval, permitting and siting for new pipeline facilities (largely an assessment of the public need for a project versus its landowner and environmental impacts), as well as transmission rates.

The Natural Gas Act of 1938 empowers the FERC with plenary authority to conduct the review of a proposed interstate natural gas pipeline, coordinate environmental and land use permitting with other federal and state agencies, and determine if a proposed pipeline meets the "public convenience and necessity" standard. As part of approving a pipeline application, FERC can specify the conditions under which the pipeline can be constructed, including the route used and depth of burial.

A.3 US COAST GUARD

The US Coast Guard (USCG) is responsible for the regulation of hazards to navigation including notification and marking of hazards under 33 CFR 64.11. The definition of navigable used by USCG is based upon a number of factors that include the substantial use of waters in interstate commerce, tidal influence and other factors, which are ultimately determined by the Commandant of the USCG or the District Commander.

Under 33 CFR Part 64, the USCG requires owners of marine pipelines that are determined by the USCG District Commander to be a hazard to navigation to report and mark the pipeline in accordance with DOT regulations (49 CFR 192 and 195 as applicable). For flowlines and non-regulated gathering lines, the USCG would require marking. If a responsible party cannot be located, the USCG may mark the pipeline.

In determining whether an obstruction is a hazard to navigation for the purposes of marking, the District Commander considers, but is not limited to, the following factors:

(a) Location of the obstruction in relation to the navigable channel and other navigational traffic patterns;
(b) Navigational difficulty in the vicinity of the obstruction;
(c) Depth of water over the obstruction, fluctuation of the water level, and other hydrologic characteristics in the area;
(d) Draft, type, and density of vessel traffic or other marine activity in the vicinity of the obstruction;
(e) Physical characteristics of the obstruction;
(f) Possible movement of the obstruction;
(g) Location of the obstruction in relation to other obstructions or aids to navigation;
(h) Prevailing and historical weather conditions;
(i) Length of time that the obstruction has been in existence;
(j) History of vessel incidents involving the obstruction; and
(k) Whether the obstruction is defined as a hazard to navigation under other statutes or regulations (33 CFR 64.31)

A.4 US ARMY CORPS OF ENGINEERS

The U.S. Army Corps of Engineers (USACE) is responsible for the administration of laws for the protection and preservation of waters of the United States, including wetlands, pursuant to section 10 of the Rivers and Harbors Act and section 404 of the Clean Water Act (CWA). All work and or structures in or affecting the course, condition, location, or capacity of navigable waters of the United States, and artificial islands, installations, or other devices on the Outer Continental Shelf, require Corps authorization under the RHA. The Corps authorizes, under the CWA, the discharge of dredged or fill material into the waters of the United States, including wetlands. Both interstate and intrastate pipelines normally require one or more permits.

The USACE and the Environmental Protection Agency (EPA) assert that navigable waters include "[a]ll waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide." 33 C.F.R. § 328.3(a)(1); 40 C.F.R. § 30.3(s)(1). The guidance also states that, for purposes of the guidance, these "(a)(1) waters" are the "traditional navigable waters." These (a)(1) waters include all of the "navigable waters of the United States," defined in 33 C.F.R. Part 329 and by numerous decisions of the federal courts, plus all other waters that are navigable-in-fact.

USACE has pipeline burial requirements in the Gulf of Mexico, Mississippi River, Federal Channels and Non-Federally Maintained Waterways and Open Water Areas:

a) In the Mississippi River up to Baton Rouge, pipelines are required to be buried at least 25 feet below the mud line or 25 feet below the authorized channel depth, whichever is greater.
b) Burial depths on federally maintained navigation channels with a depth of less than 30 feet are to be at least 15 feet below the authorized project depth or 4 feet below the mud line, whichever gives the greater clearance.
c) Burial depths on federally maintained navigation channels with a depth greater than 30 feet are to be at least 15 feet below the authorized project depth or 10 feet below the mud line, whichever gives greater clearance.
d) Except for flowlines and activities in the Gulf of Mexico, pipelines are to be buried at least 4 feet below the mud line. This policy would be applicable to most rivers, bayous, canals, lakes, bays that are classified as navigable by the USACE.
e) Flowlines are to be buried at least 3 feet below the mud line in open waters. They may be placed on the marsh surface and/or on support structures in lieu of burial.
f) In areas where line cover has been reduced or lost due to erosion, the USACE general policy is to have the line reburied to conform to the minimum burial depth criteria as outlined above.

B. STATE JURISDICTION

B.1 OFFICE OF COASTAL MANAGEMENT

The Office of Coastal Management (OCM) of the Louisiana Department of Natural Resources is charged with implementing the Louisiana Coastal Resources Program (LCRP) under authority of the Louisiana State and Local Coastal Resources Management Act of 1978, as amended (Act 361, La. R.S. 49:214.21 et seq). This law seeks to protect, develop, and, where feasible, restore or enhance the resources of the state's coastal zone. Its broad intent is to encourage multiple uses of resources and adequate economic growth while minimizing adverse effects of one resource use upon another without imposing undue restrictions on any user. Besides striving to balance conservation and resources, the policies of the LCRP also help to resolve user conflicts, encourage coastal zone recreational values, and determine the future course of coastal development and conservation.

The OCM regulates development activities and manages the resources of the Coastal Zone. In October 1980, a Coastal Use Permit (CUP) Program was established by the LCRP to help ensure the management and reasonable use of the state's coastal resources and is administered by OCM under the Permits, Mitigation and Support Division. The Coastal Use Permit is the basic regulatory tool of the office and is required for most construction projects in the Coastal Zone, including energy infrastructure. The CUP Program requires persons planning public, private, or commercial projects within the coastal zone to apply for authorization prior to construction of any project that is not exempt from regulation. A prime concern of the CUP Program is to regulate activities that may increase the loss of wetlands and aquatic resources, as well as to reduce conflicts between coastal resource user groups. The regulations governing Coastal Use Permits are found in the Louisiana Administrative code under Title 43, Part 1, Chapter 7 §723. The focus of these permits with respect to pipeline installation, maintenance and removal is to minimize impacts of ingress and egress of laying a pipeline within the coastal zone.

From the OCM perspective, there is no distinction between a pipeline, gathering line, or flow line, or any other sort of utility or structure the installation which involves impacts to coastal resources. OCM relies upon the expertise of other agencies with respect to the regulation of the safe operation of these lines, irrespective of their size or the product they convey. Things such as recommended wall thickness, cathodic protection, and periodic maintenance, suitability of the pipeline material, size, and the thickness for any given product are all subjects that are outside of the regulatory scope of OCM. Outside of visible inspection via aerial survey, or actually walking, driving or boating on the site of the use, OCM relies upon the regulated community for this data, and its accuracy.

If the applicant has a clearly identifiable need to leave a pipeline in place (i.e. possible future use, conflicting activities, etc.), OCM may authorize the permittee to allow the pipeline to remain in place for a period of one year. During this period, the authorization shall not be transferred without specific acceptance of the responsibility to remove the pipeline as agreed. In order for OCM to consider authorizing a delay in removing an abandoned pipeline, the applicant must provide detailed justification for the delay in removing the pipeline. References: Louisiana Coastal Resources Program and Louisiana R.S. 49, Sections 214.21 to 214.41 and State and Local Coastal Resources Management Act of 1978 and Coastal Use Permit – General Permit 6 (GP-6).

OCM enforces the removal of permitted structures once their use has terminated, except in rare cases with extenuating circumstances. Pipeline activities permitted through individual Coastal Use Permits will likewise contain a prohibition against "abandoning" structures once their use is complete. Requiring removal is a standard condition in individual Coastal Use Permits unless it is determined that leaving the pipeline in place would be in the public interest, provided that letters of "no objection" to leaving the pipelines in place are received from:

1. Louisiana Department of Wildlife and Fisheries for pipelines located 1) within one-quarter of a mile or within the boundaries of an oyster lease, oyster seed ground, oyster seed reservation, or other public oyster harvesting area or other shell reef area; or 2) within the boundaries of an LDWF owned or managed wildlife refuge or wildlife management area; or 3) within an area designated as a natural or scenic river in accordance with the provisions of R.S. 56:1840.

2. Louisiana Department of Culture, Recreation, and Tourism for pipelines located 1) within a State Park, State Recreation Area, or State Commemorative Area; or 2) within any known historic or archaeological site or within the boundaries of an historical district.

For projects not within the express conditions to which a GP-6 applies, a Coastal Use Permit will be issued with similar conditions. OCM requires burial of the pipelines in those instances where the pipeline would present a hazard or conflict with fishing gear and/or navigation. Hazards to navigation would conflict with other user groups. Additionally, because OCM has an agreement with the (USACE) for joint permit processing; OCM uses the *General Criteria for Pipeline and Utility Line Burial in Waterways within the New Orleans District, Corps of Engineers,* guidance document that outlines burial requirements of the New Orleans District Regulatory Branch (see Appendix J).

OCM field biologists perform assessments of the pipeline project site after the pipelines are installed to determine if the projects were performed in accordance with the conditions of the coastal use permit. All CUPs, to include but not limited to the GP-6, for pipeline installation, maintenance and removal activities include a permit condition for a "full growing season" that requires an OCM field biologist to perform a field assessment (inspection) of each pipeline project after construction has been completed. The OCM field biologist's assessment with regard to pipeline projects is focused on impacts to coastal resources, and compliance with permit terms. During these field assessments, the OCM field biologist evaluates and quantifies the biological impact of the project on coastal resources. CUP's also require permittees to submit as-built drawings of pipeline projects, post-construction.

Coastal Use Permits are not required for individual specific uses legally commenced or established prior to the effective date of the program, as provided in La. R.S. 49:214.34(C)(2). Lines that were installed prior to the establishment of the LCRP in 1980 and have not subsequently had activities performed on them that require a Coastal Use Permit, are not regulated by the Office of Coastal Management.

B.2 OFFICE OF CONSERVATION

The Office of Conservation (OOC) is charged with conserving and regulating oil, gas, and lignite resources of the state. This statutory responsibility is to regulate the exploration, production and transportation of oil, gas and other hydrocarbons and lignite; to control and allocate energy supplies and distribution; and to protect public safety and the environment from oilfield waste, including regulation of underground injection and disposal practices.

In 1972, the Federal Department of Transportation prescribed a "Model State Gas Pipeline Safety Act" to allow the authorization of States to adopt safety standards for the transportation of natural and other gas by pipeline. The original program in Louisiana was to be implemented by the Public Service Commission; however, the job of establishing a Pipeline Safety program in Louisiana fell upon the Office of Conservation within the Department of Natural Resources in 1974.

When the initial safety program started, the State only had jurisdiction over a small number of intrastate natural gas transmission and distribution companies. The regulatory requirements are the same as provided under the federal 49 CFR Parts 191 and 192. The State program received jurisdiction of the municipal owned systems from the Federal government in the mid-1980s. The State legislature passed laws in the mid to late 1980s to give the state authority over master meter systems and authority to develop a hazardous liquids pipeline program. Both the natural gas and hazardous liquids programs are certified under the Federal grant and certification agreements.

Today, the Louisiana Pipeline Safety program employs 17 full-time employees with 13 of those being field inspectors. The program has jurisdiction over more than 300 pipeline and master meter operators in the state, reviewing and assuring safety compliance for over 50,000 miles of intrastate natural gas and hazardous liquids pipelines.

B.3 LOUISIANA ONE CALL

The "Louisiana Underground Utilities and Facilities Damage Prevention Law" was originally passed in 1988 and amended in 1992, 1995, 1997, 1999, 2001 and 2010. The Louisiana Underground Utility and Facility Damage Prevention Law provides for the protection of citizens and the safety of workers near underground utility lines. This law requires excavators and demolishers to call before digging and requires utility operators to mark or provide information as to where their underground utilities are located relative to where the digging will take place.

2. ASSESSMENT OF PIPELINES IN THE COASTAL ZONE PURSUANT TO HCR 143

Pursuant to HCR 143, a memorandum was sent to all pipeline operators with regulated pipelines in the state coastal zone, both intrastate and interstate, requesting cooperation with this study of pipeline burial depths under water bottoms in the Louisiana Coastal Zone (see Appendix C). The correspondence specifically requested information concerning depth of burial from the most recent depth of burial surveys, including location of pipe, depth of burial, consistency of the cover material and water depths along each segment. Additionally, for any areas which the operator believes the most recent survey does not represent current conditions or areas that have not been previously surveyed, we requested that such areas have a depth of burial survey performed (bank to bank) and similar results be submitted.

For this study, 51 operators (Appendix H) were contacted to participate and we found the vast majority to be cooperative (Appendix D). To date, only one company, which is beyond the Agency's jurisdictional authority, has declined to participate in this study. Two companies who have agreed to participate have not yet submitted their data. OOC-PD continues to follow up with these companies seeking the requested data. Due to one company's recent acquisition of pipelines targeted by this study, that company was contacted late in the process and is currently reviewing the request. Additionally, some companies are performing surveys in 2015 to submit up-to-date information for the study. Because of the length of time associated with conducting these surveys their results have not yet been received.

Some surveys submitted did identify potential issues. These potential issues include burial depths of less than 3', including in a few cases exposed pipe. Additionally, some of the surveys submitted were conducted more than 5 years ago. These potential issues were found on both intrastate and interstate pipe, both hazardous liquid and natural gas and both with and without Coastal Use Permits (installed prior to the Coastal Management Program). Most of the potential issues identified were on interstate pipelines.

Due to the voluminous amount of data collected for this report it was not practical to include the entire dataset as an attachment to this document, however all of the data collected is available in our files for review. A summary of this data is provided in Appendix D.

All potential issues identified on intrastate lines have previously been or are currently being addressed by the appropriate agency in accordance with the applicable laws and regulations. Potential issues that cannot be addressed by OOC/OCM due to a lack of jurisdictional authority will be forwarded to the Southwest Region of the US DOT, Pipeline & Hazardous Materials Safety Administration, Office of Pipeline Safety. Additionally, segments of pipelines which are exposed or present a hazard to navigation in the Gulf of Mexico and its inlets are required to be reported to the USCG by the operator per 49 CFR 192.612 and 49 CFR 195.413. In the course of reviewing the submitted information and in accordance with Agency policy, OOC/OCM will transmit any information on potential navigation hazards it finds to the USCG for them to determine the appropriate action to be taken.

3. ASSESSMENT OF PIPELINE BURIAL REQUIREMENTS

For interstate pipelines, PHMSA requires that natural gas pipelines located under navigable waterways are buried (at the time of installation) a minimum of 48 inches below the natural water bottom (49 CFR 192.327). PHMSA requires hazardous liquid pipelines crossing an inland body of water with a width of at least 100 feet to be buried a minimum of 48 inches below the natural water bottom (49 CFR 195.248).

For natural gas and hazardous liquid pipelines in the Gulf of Mexico and its inlets, pipelines located in less than 15 feet of water must be buried a minimum of 36 inches (49 CFR 192.612 & 49 CFR 195.413). For natural gas pipelines in the other water locations (not including the Gulf of Mexico and its inlets), pipelines in 12 feet or less of water are to be buried a minimum of 36 inches and in waters 12 feet or greater, the top of the pipeline must be below the natural bottom (49 CFR 192.327).

Hazardous liquid pipelines in water locations (not including crossings of inland bodies of water with a width of at least 100 feet and the Gulf of Mexico and its inlets) are to be buried a minimum of 30 inches (49 CFR 195.248). The Office of Conservation has adopted these federal standards verbatim and enforces them on intrastate pipelines through its Pipeline Safety Program (LAC 43:XIII & LAC 33:V). These regulations are consistent with those of neighboring coastal states.

The problem of burial is complicated in some parts of the Gulf of Mexico by the area's coastal dynamics, which feature large movements of sediments and a general pattern of shoreline erosion and retreat, modulated by storms. Large parts of the Louisiana coastline are suffering from erosion and land loss. A few areas, most notably, the Atchafalaya River and Wax Lake deltas are building land through sedimentation and accretion. Pipelines near the shore, or crossing the shore, may become exposed because of this sediment movement. Storms can cause wave- and current-induced movements of nearshore bottom sediments, barrier islands, and shorelines that can affect the depth of burial and integrity of pipelines laid in shallow waters. Pipelines and other structures that were constructed in the marsh may become exposed to wave forces.

Current regulatory pipeline burial requirements have been proven adequate under stable environments. In areas where the forces of nature, result in a dynamic, ever changing coastal area, the current inspection and maintenance requirements for pipelines initially buried on land, but now submerged may need to be strengthened in some areas which may require legislative and congressional action.

4. ASSESSMENT OF PIPELINE REGULATORY REQUIREMENTS

A. PERMITTING

Existing statutes and rules require permit approval prior to pipeline construction. Coastal Use Permits issued since 1980 require pipeline burial to a minimum of three feet below the mudline. Pipelines placed prior to 1980 had no such requirement from OCM to be buried to this depth as the CUP program did not then exist.

Promulgated in 1985, LAC 43:XI.307.A required all facilities (except field transmission, flow or gathering lines located on a state lease or right of way) constructed on state waterbottoms to obtain a permit from the Commissioner of Conservation. LAC 43:XI.307.B allows for a Coastal Use Permit (CUP) issued by OCM to satisfy the permitting requirements of LAC 43:XI.307.A. Since all structures in the Coastal Zone require a CUP, no permits are issued by the Commissioner of Conservation in order to avoid duplication of work by both the operator and the State.

During the CUP review process, OCM permit staff works with the applicant to ensure that impacts to coastal habitats are avoided and/or minimized. However, activities performed in the coastal zone often cause unavoidable impacts, such as wetland alteration. In such cases, the LCRP's goal of no net loss of wetlands due to permitted activities cannot be accomplished without habitat compensation. The Mitigation Section is responsible for analyzing project impacts, reviewing, and approving appropriate compensation. This means that the ecological value of wetlands that are unavoidably lost due to a permitted activity, must be replaced by the creation of an equal amount of ecological value. Compensatory mitigation can be accomplished by wetland creation, enhancement, restoration, protection, or the purchase of credits from an approved mitigation bank or area.

It is within this framework of geographical limits and programmatic focus, the OCM has conducted limited review of the methods by which pipelines, and gathering and flow lines are installed, maintained and removed in the coastal zone, since the establishment of the LCRP in 1980. How the sites are accessed, the construction methods, the disturbance of vegetation, suspension of sediments, the disturbance of surface flow regimes, and the re-vegetation after a disturbance are of primary concern to OCM. The OCM focus on these activities is on the impacts to coastal habitat caused by the construction or installation of the structures, and the maintenance and operation of the structures, once in place.

Most pipeline installation, maintenance and removal activities in the coastal zone are authorized by the Coastal Use Permit – General Permit 6 (GP-6). The GP-6 governs the installation, replacement, maintenance, and removal of up to 10,000 linear feet of pipeline in vegetated wetlands, spoil banks, and open water areas of the coastal zone. In wetlands and spoiled bank areas, the general practice is to lay these pipelines on the surface of the ground to avoid impacts to coastal resources. When pipelines cross open water or canals, OCM requires that the pipelines be buried to a depth of no less than 3 feet below the existing water bottom or placed on pipe bents. The GP-6 requires that all pipelines installed under this general permit be removed within 120 days of abandonment.

In some cases where a pipeline becomes exposed, OCM will approve the use of concrete matting to cover and protect the pipeline while minimizing impact to the fragile coastal environment. Installation, maintenance and/or removal of up to 1,000 linear feet of concrete mats and other hard-structure or engineered alternatives for pipeline protection can be handled under a Coastal Use Permit – General Permit 24 (GP-24).

To assist the public and the regulated community, a Joint Permit Application was developed to facilitate the state and federal permit application process administered by the Louisiana Department of Natural Resources/Office of Coastal Management (OCM) and the U.S. Army Corps of Engineers (USACE) for work within the Louisiana Coastal Zone. To simplify the permit application process, the Joint Permit Application is a multi-purpose application. It may be used to apply for a Coastal Use Permit (CUP) and/or a Department of the Army Permit under Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act.

B. INSPECTIONS

Interstate and intrastate hazardous liquid pipeline operators are required to inspect their crossings of navigable waterways (Appendix I) at least once every five years (49 CFR 195.412 & LAC 33:V.30412 as applicable). Operators are then to follow their procedures to remediate if issues are discovered (49 CFR 195.402 & LAC 33:V.30402). Interstate and intrastate natural gas and hazardous liquid pipeline operators are to inspect their pipelines in the Gulf of Mexico and its inlets (less than 15 feet of water) periodically. Should the pipeline be determined to be exposed or a hazard to navigation (less than 12 inches of cover), the operator shall: 1) notify the National Response Center (NRC) within 24 hours; 2) mark the location within 7 days in accordance with 33 CFR

Part 64; 3) within 6 months rebury the pipeline 36 inches below the natural bottom or employ an alternative to meet or exceed the level of protection provided by burial (49 CFR 192.612, LAC 43:XIII.2712 & 49 CFR 195.413, LAC 33:V.30413). Records of these activities (surveys and remedial efforts) should be maintained by the operator for inspection by PHMSA/Office of Conservation agents. Pipelines in areas not considered a navigable waterway (based on the 2011 Commercially Navigable Waterway database per US DOT) or the Gulf of Mexico and its inlets are not subject to these requirements.

C. NOTIFICATION OF EXPOSED PIPELINES

The USCG regulates the reporting of Hazards to Navigation. Specifically, owners of pipelines that are determined to be hazards to navigation shall report and mark the hazardous portion of those pipelines in accordance with 49 CFR parts 192 or 195, as applicable. In addition, OCM or OOC are sometimes notified of pipeline safety issues.

<u>OCM NOTIFICATION PROCEDURES</u>

OCM receives notification of pipeline safety issues in three ways:

1) the issue is self-reported by the pipeline or facility owner;

2) the U.S. Coastal Guard or Louisiana State Police (through LOSCO) notifies OCM of an incident involving a pipeline under OCM's jurisdiction (inside the coastal zone); or

3) a potential pipeline safety issue is found by an OCM field biologist during a scheduled site visit or while performing routine surveillance via boat or air.

Otherwise, if any OCM employee receives any data and/or information pertaining to possible hindrances to navigation or possible navigation hazards and all other possible issues of safety in the coastal zone, the data and/or information is immediately transmitted to OCM Oil Spill response staff (OCM's single point of contact with USCG and LOSCO). Immediately thereafter, OCM Oil Spill staff will transmit that data and/or information to the USCG, and LOSCO when appropriate, for

USCG or LOSCO to determine if any action is required, such as a notice to mariners, immediate response actions, hazard marking, etc.

OOC Notification Procedures

When OOC receives a call from the public concerning an issue with a pipeline, information must be collected to determine the next course of action. The operator of pipeline, the location and if known, the product the line is carrying is used to determine jurisdictional status. The National Pipeline Mapping System, SONRIS and the Dewitt Maps in the Pipeline Division are used in trying to make this determination. If the complaint concerns improper burial, the following action is taken dependent on the jurisdiction of the line:

1) If the pipeline is a regulated (intrastate) line, the operator is contacted by the Pipeline Division to determine the situation on the ground and instructed to take proper action according to their procedures; many complaints result in a site visit by CPM/CES with the operator in presence of the caller. If the incident/accident is reportable, a 30 day report is filed by the operator and the Pipeline Division conducts a failure investigation. Status updates and results of the investigation are reported to PHMSA and included on the Pipeline Division annual certification report to PHMSA.
2) If the pipeline is an interstate line, the caller is referred to the Southwest Region of PHMSA. A contact name and number with PHMSA is given to the caller. If the issue is deemed to be an emergency, Pipeline Division staff would contact the operator immediately and notify PHMSA staff.

D. MARKING/SIGNAGE

The US Coast Guard (USCG) is responsible for the regulation of hazards to navigation including notification and marking of hazards under 33 CFR 64.11.

Under 33 CFR Part 64, the USCG requires owners of marine pipelines that are determined by the USCG District Commander to be a hazard to navigation to report and mark the pipeline in accordance with 49 CFR

192 and 195 as applicable. If a responsible party cannot be located, the USCG may mark the pipeline. Any changes to existing marking requirements would be contingent on approval by the USCG.

Most navigation channels within federally recognized navigable waterways are clearly marked. Many other commonly used areas have sufficient water depth for navigation but do not have the safety benefit of channel marking to provide safe passage for vessels.

Pipeline safety regulations enforced by both PHMSA and the Office of Conservation require the marking of lines in the Gulf of Mexico and its inlets that are exposed or deemed to be a hazard to navigation within seven days of discovery (49 CFR 192.612, LAC 43:XII.2712 & 49 CFR 195.413, LAC 33:V.30413). The Office of Conservation requires the marking of pipelines at waterway crossings pursuant to LAC 43:XIII.2907.A.2 & LAC 33:V.30410.A.1.

5. ASSESSMENT AND EVALUATION OF ADEQUACY OF STATUTORY AND REGULATORY AUTHORITIES

Office of Conservation

The transportation and distribution of natural gas, crude oil and petroleum products have the potential to affect public safety and the environment. The Pipeline Safety program's mission is to provide regulation surveillance and enforcement activities to ensure the safety of the public and the integrity of the environment and to ensure sound operation and maintenance of the pipelines and facilities in the State's transportation system. The statutory authority granted to the Commissioner of Conservation by Title 43, Part XI, Subpart 3 allows for the subpoenaing of records, inspection of facilities and records and issuance of letters of non-compliance which may include civil penalties. The regulations applying to the intrastate natural gas pipeline systems fall under LAC 43:XIII and the hazardous liquid pipeline systems fall under LAC 33:V. This authority granted to the Commissioner is adequate.

Office of Coastal Management

OCM is charged with implementing the Louisiana Coastal Resources Program (LCRP) under authority of the Louisiana State and Local Coastal Resources

Management Act of 1978, as amended (La. R.S. 49:214.21 et seq. known as the SLCRMA). The LCRP helps to resolve user conflicts, encourage coastal zone recreational values, and determine the future course of coastal development and conservation. The OCM regulates development activities, including the installation, access to facilities for maintenance, and removal of pipelines and/or flowlines, and manages the resources of the Coastal Zone. A Coastal Use Permit (CUP) Program has been established by the Act to help ensure the management and reasonable use of the state's coastal wetlands. Also, the enforcement provisions of SLCRMA, found in La. R.S. 49:214.36 combined with the general authority of the Secretary provide adequate, authority for the Secretary to conduct inspections, obtain records, and take appropriate enforcement action to compel compliance for conditions determined by the Secretary to be not in conformance with the LCRP.

6. ADEQUACY OF FUNDING OF PROGRAMS RELATED TO PIPELINE SAFETY

OCM and the Office of Conservation are sufficiently funded to carry out the statutory authorities and responsibilities assigned to them by the Louisiana legislature for pipeline activities as currently performed. Any new programs or additional levels of regulatory oversight would require additional funding.

NOAA provides partial funding to OCM for the Coastal Use Permitting Program. OCM currently receives a federal 306 grant for $1,992,000 in fiscal year 2015, requiring an equal state match and $520,000 in 309 grant funding which does not require a state match. State general fund dollars are utilized to supplement federal funding and fees to run the program

The OC Gas Pipeline Safety Program and the Hazardous Liquid Program are both funded up to 75% (variable) from a federal grant from PHMSA ($1,229,870 in FY 14) with the balance of funds for the program coming from the Oil and Gas Regulatory Fund.

7. FLOWLINES AND GATHERING LINES

The Office of Conservation regulates the oil and gas drilling and production facilities in Louisiana. Additionally, all flowlines and pipelines in the coastal zone (except those that are connected to a production facility and located within 500 feet of said facility) must obtain a Coastal Use Permit (CUP) before installation. The CUP also satisfies the permitting requirements of LAC 43:IX.307.

Upon abandonment of well sites/production/flow line/gathering lines facilities located on state water bottoms, an operator must file a site clearance application with the Office of Conservation. Once receiving approval, the operator or Oilfield Site Restoration (OSR) Program contractor must clear the radius around the facility of any related obstructions and verify that the area is clear with a diver or trawler. This ensures that state water bottoms are cleared of any obstructions above the mudline within the specified radius depending on site conditions. This distance is 300' for dry holes or up to an existing bank, 400' or up to an existing bank for producing wells. Platforms require clearance for 1320' or up to an existing bank, unless they are located in a restricted waterway then this distance is measured linearly upstream & downstream. Submittal of paperwork verifying that the location has been cleared must be submitted to both the Office of Conservation and the Office of Coastal Management for approval.

If it is determined to be in the best interest of the state, the owner or operator of a pipeline, well, or associated structure shall not be required to remove the abandoned pipeline. Instead, they are required to mark it for the duration of the obstruction according to regulations of the Coast Guard and of the Office of Conservation.

LAC 43:XI.301 defines a pipeline as all segments of pipe other than any field transmission, flow or gathering line with the exception of site clearance. For the purpose of site clearance, a pipeline shall be considered any size or type of pipeline (including flowlines). The definition of pipeline does not include "field transmission, flow, or gathering" except where site clearance activities occur.

LAC 43:XI.307.E states that pipelines are required to be buried and maintained to a minimum depth of 3 feet in waters less than 20 feet deep, except for lines connected to an active production facility within 500 feet of that facility.

Under LAC 43:XI.311.C, the responsible person is required to notify the Office of Conservation of any exposed portion of the abandoned facility exposed above the mudline and remove or mark that portion of the facility within 90 days or as soon thereafter as practicable. Field transmission, flow, and gathering lines do not require removal, but the Office of Conservation can require their marking.

When the Office of Conservation receives information from the public concerning an exposed flowline/gathering line, the location data is utilized to attempt to locate a responsible party. If a responsible party can be located, they are notified of the issue and directed to address it in accordance with the applicable regulations. The issuance of a compliance order may be necessary to achieve this end. If no responsible party can be found, the flowline/gathering line can be placed on the Oilfield Site Restoration (OSR) list and/or the Underwater Obstruction list making it eligible for removal by the OSR program. Additionally, a report will be made to the National Response Center, which will in turn notify the USCG so that it may be marked. Additional funding would expedite removal of abandoned or non-jurisdictional lines that have been identified. Furthermore, additional funding could be used to improve the identification of those lines. To further enhance the process outlined above and accelerate implementation in the future would require additional staffing and resources. These additional resources would be utilized to develop and implement procedures to identify, assess and provide for expedited removal of flow lines and gathering lines that are determined to be of concern. Development of regulations and standard operating procedures would also be necessary to ensure consistency should the legislature authorize additional enhancement of this program.

8. RECOMMENDATIONS

The Office of Coastal Management permit process and Office of Conservation's Pipeline Safety program are effective; however, in areas subject to heavy erosion where pipelines previously on land become submerged, additional statutory requirements could potentially increase the level of public safety. The primary gap in regulatory oversight of pipelines that potentially pose a hazard to navigation lies in the multiple definitions of navigable waters and commensurate regulatory requirements. Pipelines placed in navigable waters crossings, as well as in the Gulf of Mexico and its inlets, are required to be buried, inspected and maintained at depths that pose no hazard to navigation. Pipelines outside of navigable waterways, as defined by DOT, do not have these inspection and maintenance requirements. It is important to note that these same issues apply to interstate pipelines, which are primarily regulated by federal agencies and comprise the majority of pipeline mileage located in the coastal zone of Louisiana.

DOT maintains a specific list of navigable waters. PHMSA and the Office of Conservation use this list for implementation, inspection and enforcement of the regulatory requirements for pipeline crossings of navigable waters.

The USCG definition of navigable is much more broad and based upon a number of factors that include the substantial use of waters in interstate commerce, tidal influence and other factors, which are ultimately determined by the Commandant of the USCG or the District commander.

The USACE and the Environmental Protection Agency (EPA) assert that navigable waters include "[a]ll waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide." 33 C.F.R. § 328.3(a)(1); 40 C.F.R. § 30.3(s)(1). The guidance also states that, for purposes of the guidance, these "(a)(1) waters" are the "traditional navigable waters." These (a)(1) waters include all of the "navigable waters of the United States," defined in 33 C.F.R. Part 329 and by numerous decisions of the federal courts, plus all other waters that are navigable-in-fact.

There is ongoing debate at both the state and federal level regarding the definition of navigable waterways. These differences in the definition of navigable waterways may lead to uncertainty among various stakeholders over the applicable regulatory requirements as they apply to various water bodies. In areas subject to erosional forces, consideration should be given to this issue, as well as to inspection and maintenance requirements for pipelines in any legislative package developed pursuant to HCR 143.

The legislature may want to consider either additional requirements for the marking of navigational channels outside of the established commercially navigable waterways or better ways to identify where hazards may exist so that they may be avoided. Systems that coordinate maritime traffic and pipeline locations should also be considered.

Pipelines that predate existing regulatory programs were constructed without specific burial depth requirements other than best management practices and industry standards. The legislature should consider if additional regulatory authorities are required to ensure pipeline safety within the State for those pipelines that predate State regulatory programs or which otherwise do not fall under State authority, but lie within State boundaries. The multitude of federal and state agencies having varied jurisdictional and regulatory roles regarding pipelines may lead to overlap and gaps in regulatory oversight. Streamlining and clarification of regulatory roles would enhance the performance of the program. To accomplish this may require both legislative and congressional action.

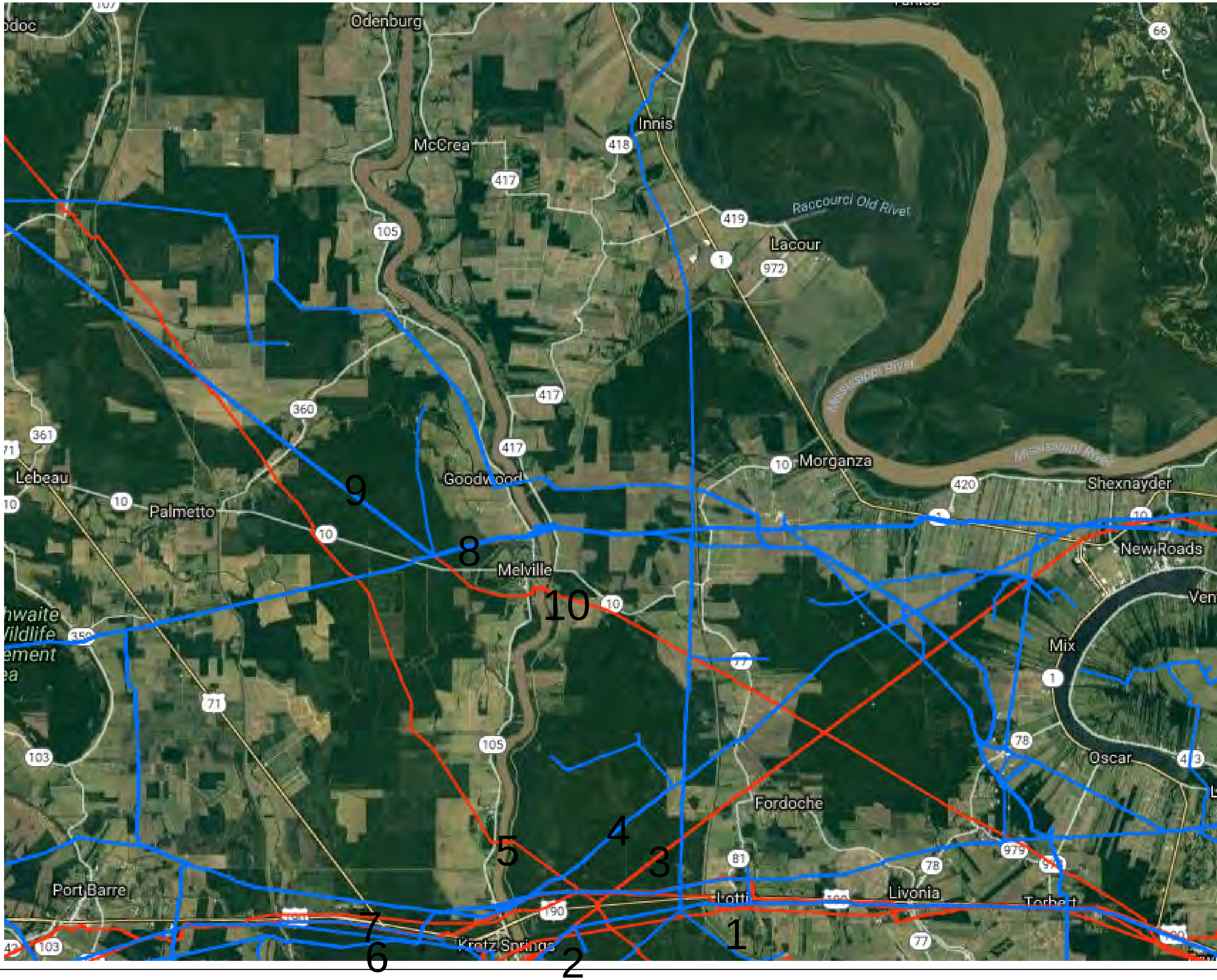
Coastal dynamics should be considered by the legislature when evaluating pipeline burial requirements and ensuring that those requirements are maintained when coastal conditions change. Due to differences in coastal dynamics and widely variable environments across the Louisiana Coastal Zone, these requirements should not be a one-size-fits-all approach; rather they should be focused on the areas where rapid and significant changes are taking place.

Appendix C - North & South Pipeline Maps and Keys
Page 31

Pipeline and Hazardous Materials Safety Administration

NATIONAL PIPELINE MAPPING SYSTEM

FOR OFFICIAL USE ONLY



Legend

- Gas Transmission Pipelines
- Hazardous Liquid Pipelines

5 km
2 mi

Pipelines depicted on this map represent gas transmission and hazardous liquid lines only. Gas gathering and gas distribution systems are not represented.

This map should never be used as a substitute for contacting a one-call center prior to excavation activities. Please call 811 before any digging occurs.

Questions regarding this map or its contents can be directed to npms@dot.gov.

Projection: Geographic

Datum: NAD83

Map produced by the PIMMA application at www.npms.phmsa.dot.gov

Date Printed: Dec 04, 2017

811 Know what's below. Call before you dig.

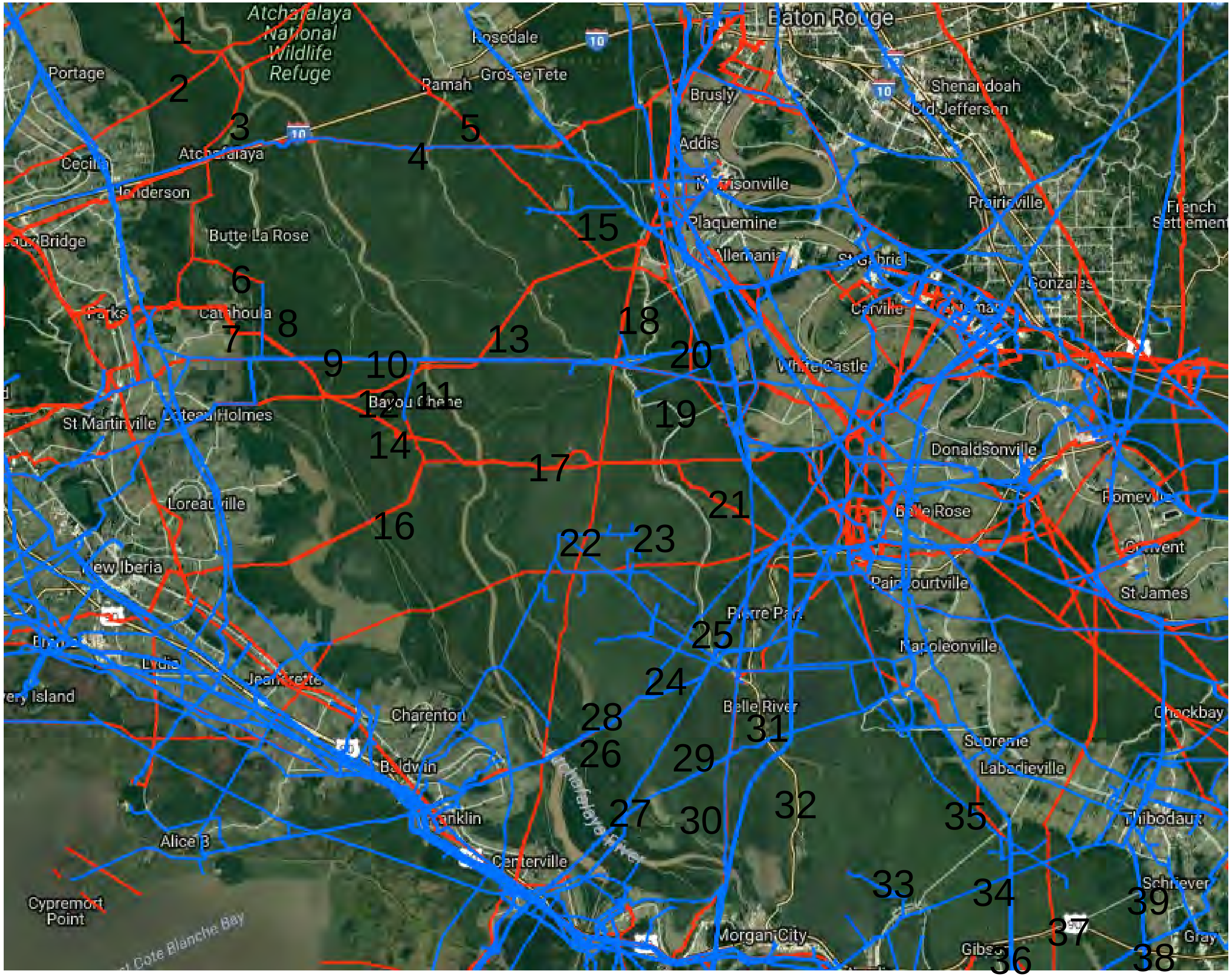
Map Legend – North

	Operator	Diameter	Product	Intra/Inter
1)	Crimson Gulf	16”	crude	Inter
2)	Cypress Gas	16”	NG	Intra
3)	Colonial	n/a	Ref Prod	Inter
4)	Texas Eastern	30”	NG	Inter
5)	NuStar	10”	AA	Inter
6)	FL Gas	24”	NG	Inter
7)	Boardwalk Petrochem	n/a	HVL	Inter
8)	Transcontinental	n/a	NG	Inter
9)	Acadian Gas PL	36”	NG	Intra
10)	ExxonMobil	22”	Crude	Inter

Pipeline and Hazardous Materials Safety Administration

NATIONAL PIPELINE MAPPING SYSTEM

FOR OFFICIAL USE ONLY



Legend

Gas Transmission Pipelines

Hazardous Liquid Pipelines

10 km

5 mi

Pipelines depicted on this map represent gas transmission and hazardous liquid lines only. Gas gathering and gas distribution systems are not represented.

This map should never be used as a substitute for contacting a one-call center prior to excavation activities. Please call 811 before any digging occurs.

Questions regarding this map or its contents can be directed to npms@dot.gov.

Projection: Geographic

Datum: NAD83

Map produced by the PIMMA application at www.npms.phmsa.dot.gov

Date Printed: Nov 28, 2017

811 Know what's below. Call before you dig.

Map Legend – South

	Operator	Diameter	Product	Intra/Inter
1)	Alon USA	6”	LPG	Intra
2)	Dixie PL	12”	LPG	Inter
3)	Enterprise	8”	NGL	Intra
4)	Air Products	18”	Hydr	Inter
5)	NuStar	10”	AA	Inter
6)	Enterprise	4”	NGL	Intra
7)	Enterprise	20”	Ethane	Inter
8)	ETC	12”	NG	Intra
9)	SNG	20”	NG	Inter
10)	Bridgeline	26”	NG	Intra
11)	SNG	6”	NG	Inter
12)	EnLink NGL	16”	NGL	Inter
13)	Enterprise	14”	LPG	Intra
14)	Florida Gas	2”	NG	Inter
15)	EnLink Processing	10”	Butane	Intra
16)	Enterprise Prod	10”	LPG	Intra
17)	ExxonMobil	10”	LPG	Intra
18)	Florida Gas	14”	NG	Inter
19)	Cypress Gas	8”	NG	Intra
20)	Enterprise Prod	14”	LPG	Intra
21)	SNG	16”	NG	Inter
22)	Texas Gas	n/a	NG	Inter
23)	Enterprise Prod	8”	LPG	Intra
24)	Florida Gas	8”	NG	Inter
25)	Cypress Gas	10”	NG	Intra
26)	Acadian Gas	8”	NG	Intra
27)	EnLink LIG	36”	NG	Intra
28)	UCAR	8”	Ethylene Gas	Inter
29)	SNG	30”	NG	Inter
30)	Gulf South	n/a	NG	Inter
31)	Cypress Gas	16”	NG	Intra
32)	Bridgeline	30”	NG	Intra
33)	Abandoned			
34)	Texas Gas	n/a	NG	Inter
35)	Florida Gas	14”	NG	Inter
36)	Gulf South	36”	NG	Inter
37)	Shell Pipeline	20”	Crude	Inter
38)	Bridgeline	16”	NG	Intra
39)	Transcontinental	n/a	NG	Inter

Appendix D - Study Group Roster
Page 36

Name	Organization
Jonathan Robillard	Office of State Lands
Stuart Brown	CPRA
Kent Bollfrass	CPRA
Jody Meche	LCPA-West, Atchafalaya Basinkeeper, Commercial Fisherman
Steven Giambrone	OOC
Vic Blanchard	LA Landowners Association
Rudy Sparks	LA Landowners Association
Ryan Mabile	Crawfish Producer - West
Dean Wilson	Atchafalaya Baskinkeeper
Tyler Gray	LMOGA
Don Briggs	LOGA
Keith Lovell	DNR
Harold Schoeffler	Sierra Club
Haywood Martin	Sierra Club
Gifford Briggs	LOGA
Harry Vorhoff	LDOJ
Ryan Seidemann	LDOJ
Raynie Harlan	LDWF
Brac Salyers	LDWF
Brad Inman	USACE
Lauren Chauvin	LABI

Appendix E - Study Group Survey Results
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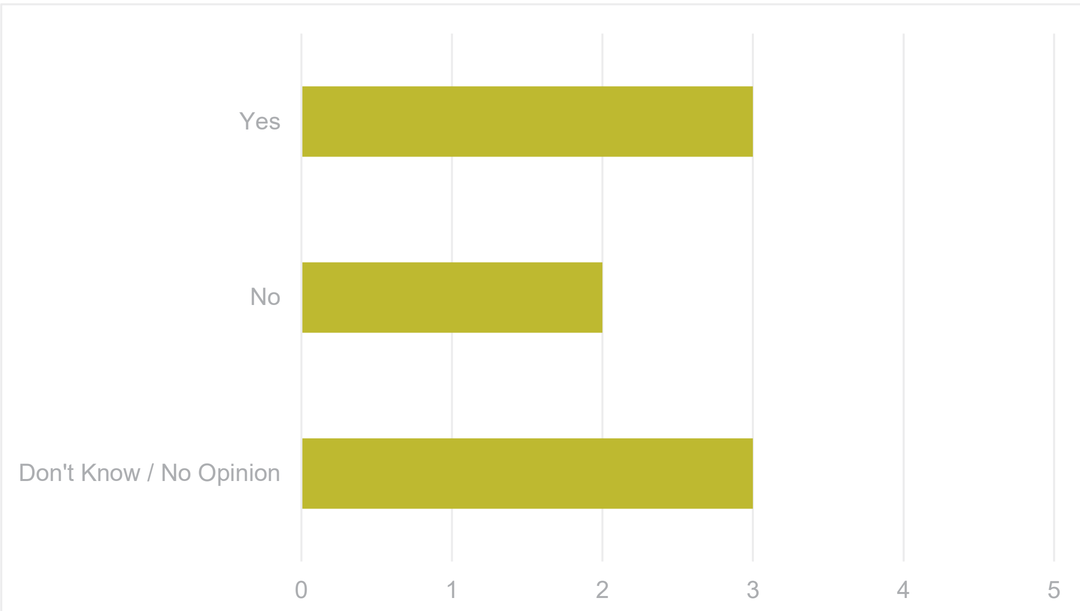
SCR 154

SURVEY SUMMARY

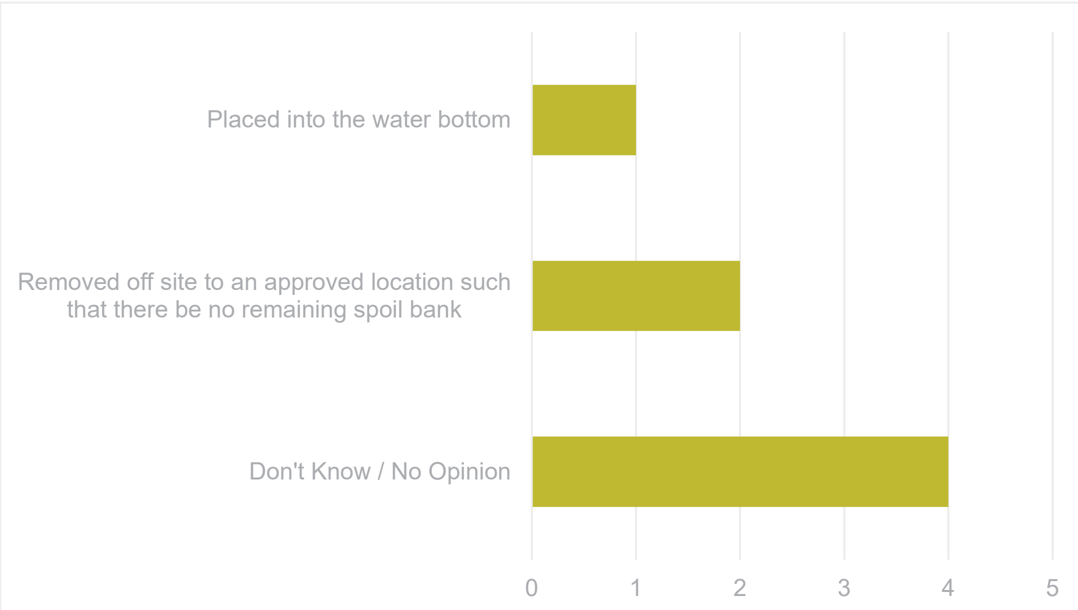
October 31, 2017

1. ARE SPOIL BANKS ADVERSELY AFFECTING FISHING ACTIVITIES?



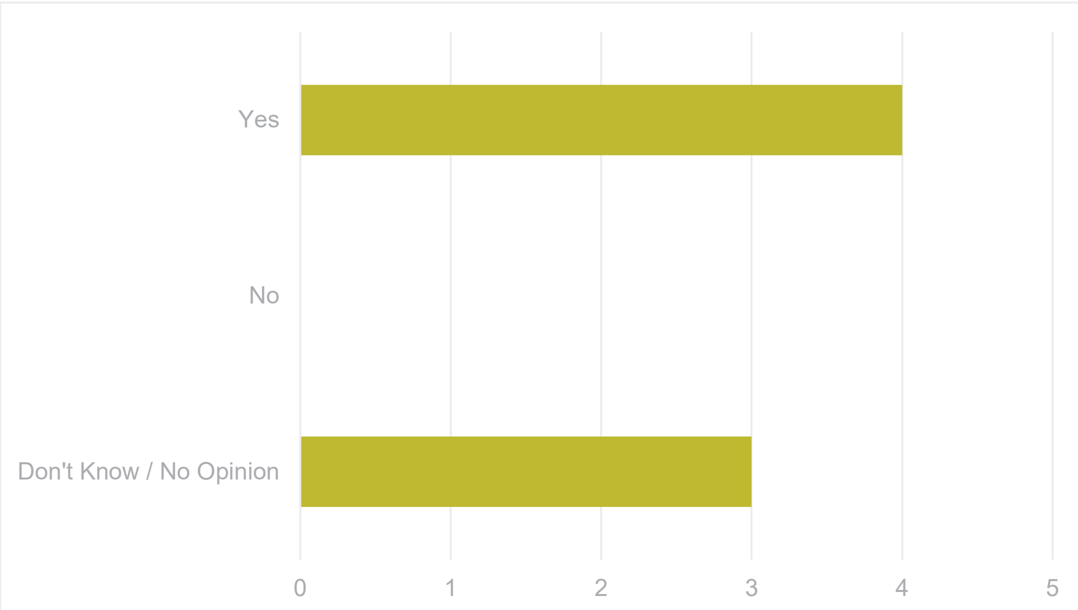
- I am not aware of any data that supports the proposition that spoil banks adversely affect fishing activities.
- The spoil bank stops water flow causing water to backup in areas causing bad water
- Perhaps locally but not overall
- Pipelines affect the Atchafalaya Basin in many different ways depending on their design and/or location. In some places spoil banks block water flows deeply impacting water quality. In other places north to south pipelines capture water flows away from wetlands. Some pipelines bring river water full of sediments deep into wetlands and waterways, creating deltas and filling those wetlands and waterways with sediments.
- Situational
- This is a case by case basis, and I look forward to working with the group to find a solution to any issues that come up.
- Spoil banks block natural sheet flow of water through the swamp creating dead zones of low oxygen. Crawfish trapped by fishermen in these areas are all dead when harvested.

2. THE SPOIL SHOULD BE...



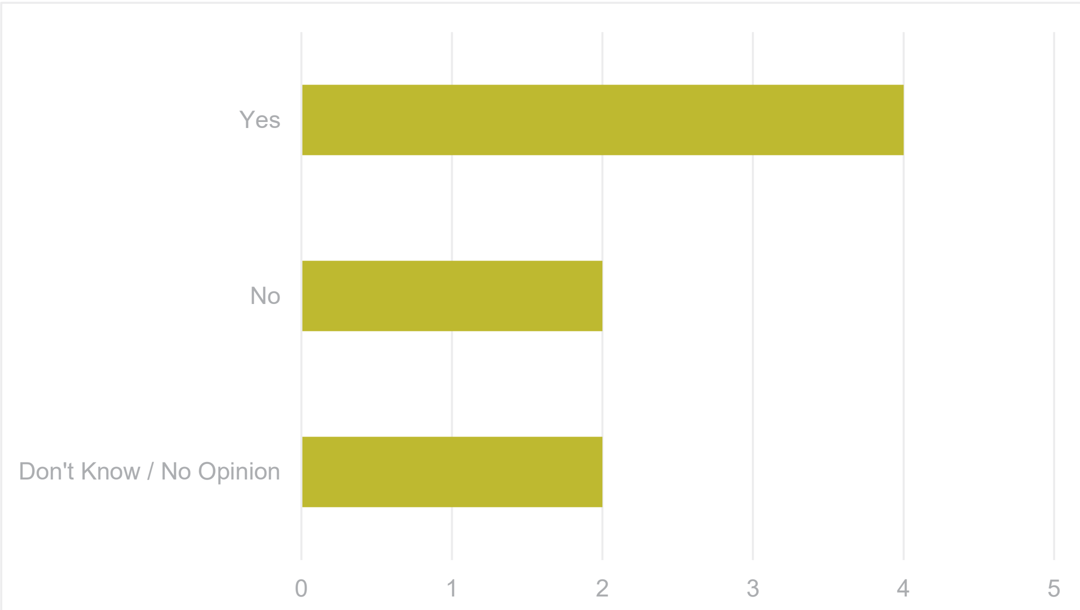
- Your question is inaccurate. You have made the assumption that the spoil banks are having a negative impact and should be removed. These spoil banks provide critical habitat diversity in an otherwise homogenous flooded swamp for many forms of wildlife including songbirds, rabbits, deer, alligators, furbearers, etc.
- Placed on water bottom or moved to an offsite location as some sort of beneficial use would be good. An additional option would be to include gaps in new spoil banks or retroactively gap existing spoil banks to allow for better hydrology and fisheries access.
- In some instances, some of the spoil should be used to create berms across the canal to stop the pipeline from capturing water flows. Some spoil could be placed back into the pipeline canal and some should be removed from the Basin or placed on high hills that won't interfere with natural water flows.
- All options should be considered based on the specific situation.
- This jurisisction spans across multiple agencies, including but not limited to, PHMSA, DNR, USACOE, Conservation, DEQ, EPA, etc., thus I look to the subject matter expert, including the operator, or former operator, in making any decision referenced in the question above. I look forward to working with the task force to find solutions to any issues proposed by affected stakeholders.
- Spoils should be replaced back in the canal created by pipeline construction so that the pipeline canal does not capture flow from the swamp. Extra spoil can be removed to an approved location such as a marsh rebuilding project.

3. SHOULD THE PIPELINE BE REMOVED AT THE END OF ITS USEFUL LIFE?



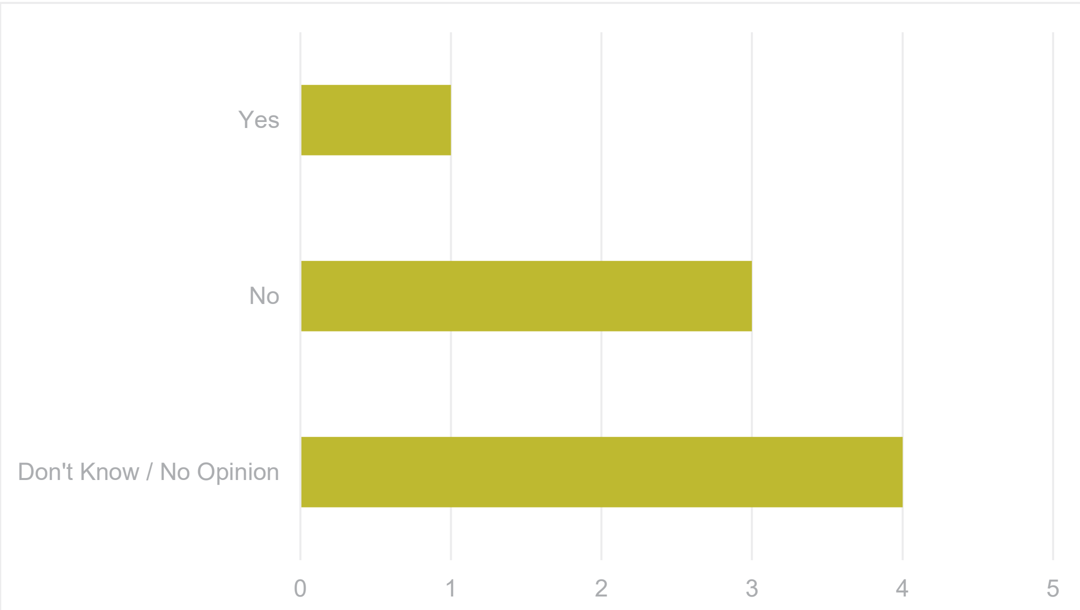
- If located on private property, that is a decision between the landowner and the owner of the pipeline.
- Capping and abandoning in place is acceptable as well.
- Pipelines will hold whatever chemicals or oil it was transporting that eventually will be released as the pipeline decays over time. Pipelines should be removed, and the right-of-way should be restored
- Depends on wetland impacts, safety, etc.
- This jurisdiction spans across multiple agencies, including, but not limited to, PHMSA, DNR, USACOE, Conservation, DEQ, EPA, etc., thus I look to the subject matter expert, including the operator, or former operator, in making any decision referenced in the question above. I look forward to working with the task force to find solutions to any issues proposed by affected stakeholders.
- I would say yes so long as the efforts to remove the pipeline are not more damaging to the area than leaving it in place.
- Old pipelines contain fluids that were being transported and can leak into the natural water. Old pipelines can emerge to become dangerous obstructions to navigation.

4. SHOULD ANY CONSTRUCTION, MAINTENANCE, OR ANY OTHER WORK BE PERMITTED BETWEEN THE EAST ATCHAFALAYA BASIN PROTECTION LEVEE AND THE WEST ATCHAFALAYA BASIN PROTECTION LEVEE?



- The majority of this property is in private ownership and in commerce for timber, mineral exploration and production, navigation, transmission of hydrocarbons, etc. all of which is critical the State of Louisiana's economy
- No until the regulatory department of the Corps is provided with the resources necessary for proper enforcement, including one or more boats and personal to review permits for compliance. Only projects to remove spoils or restore site should be allowed until enforcement can be provided.
- To ensure compliance with existing infrastructure needs, rules, laws, etc. and to review potential impacts of the project.
- This jurisdiction spans across multiple agencies, including, but not limited to, PHMSA, DNR, USACOE, Conservation, DEQ, EPA, etc., thus I look to the subject matter expert, including the operator, or former operator, in making any decision referenced in the question above. I look forward to working with the task force to find solutions to any issues proposed by affected stakeholders.
- New construction can be permitted only when existing pipeline causing obstructions to natural water flows are corrected.

5. SHOULD PERMITS FOR NEW PIPELINES BE GRANTED TO COMPANIES THAT ARE OUT-OF-COMPLIANCE WITH PRIOR ISSUED PERMITS, UNTIL SUCH TIME AS THOSE PREVIOUSLY-ISSUED PERMITS ARE BROUGHT BACK INTO COMPLIANCE?



- This situation should be assessed on a case-by-case basis and, if warranted, any owner of a pipeline should be made to operate its pipeline in compliance with all rules and regulations.
- Case by case basis. Holding any permittee accountable is inherently positive. However, there are likely challenges to doing so with entities that hold numerous permits where they are compliant within most permits but are not within a few.
- Pipeline companies with out of compliance pipelines should be responsible for restoration of the pipeline corridors prior to any consideration for additional permits. Furthermore, there should be affirmative efforts to enforce permits and mandate restoration and compliance even without consideration of additional permitting to these companies that have out of compliance projects in the Basin
- Depends on the situation and the nature of the compliance infraction.
- This jurisdiction spans across multiple agencies, including, but not limited to, PHMSA, DNR, USACOE, Conservation, DEQ, EPA, etc., thus I look to the subject matter expert, including the operator, or former operator, in making any decision referenced in the question above. I look forward to working with the task force to find solutions to any issues proposed by affected stakeholders.
- Companies should be required to show a good compliance record before being allowed to perform new construction.

Appendix F - Study Group Meeting 1 Agenda
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DEPARTMENT OF NATURAL RESOURCES

SCR 154 STUDY GROUP

November 2, 2017

AGENDA

Welcome and Introductions	**9:00 am**

- DNR Staff
- Study Group
- Emergent Method

Overview – Spoil Banks	**9:15 am**

- History
- SCR 154

Overview – Study Group	**9:30 am**

- Responsibilities
- Process and schedule

Survey Summary	**9:40 am**

- Purpose and background
- Summary of results

Deep Dive – 5 Key Questions	**10:00 am**

- Discuss each question – opinions, potential solutions, etc.

Public Comment	**11:30 am**

- Oral
- Written

Wrap Up	**11:45 am**

- Questions
- Next Steps

Appendix G - Study Group Meeting 1 Sign-In Sheet
Page 46

EMERGENT METHOD

DEPARTMENT OF NATURAL RESOURCES

SCR 154 STUDY GROUP

November 2, 2017

SIGN-IN SHEET

Name	Organization	Email Address
Charles Reulet	LDNR	charles.reulet@la.gov
Sara Krupa	LDNR	Sara.Krupa@la.gov
April Newman	ABP/DNR	april.newman@la.gov
Steven Giambrone	OOC	Steven.giambrone@la.gov
Ryan Seidemann	DOJ	seidemannr@ag.louisiana.gov
Harry Vorhoff	DOJ	vorhoffh@ag.louisiana.gov
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Brad Salyers	LDWF	bsalyers@wlf.la.gov
Ryan Malila		Malila30@yahoo.com
Jody Meche	LCPA west/ABK	jmeche[illegible]@hotmail.com
Jonathan Robillard	SLO	jonathan.robillard@la.gov

Name	Organization	Email Address
Vic Blanchard	LA Landowners Assoc	vblanchard@awilbertsons.com
Harold J [illegible]	Sierra club	[illegible] @ AOL.com
Tom Harris	LDNR	thomas.harris@la.gov
Don Briggs	LOGA	don@loga.la.
Haywood Martin	Sierra Club	hwmartin2sc@gmail.com
Dean A. Wilson	Atchafalaya Basinkeeper	on file
Tyler Gray	LMOGA	tyler.gray@LMOGA.com
Stuart Brown	CPRA	Stuart.brown@la.gov
Kent Bollfrass	CPRA	kent.bollfrass@la.gov
Joe Baustian	TNC	jbaustian@tnc.org

Appendix H - Study Group Meeting 1 Recap
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SR 154
MEETING #1 RECAP

Updated November 29, 2017

MEETING DETAILS

Date: November 2nd, 2017
Time: 9:00 – 11:30 a.m.
Location: LaSalle Building, Griffon Room

STUDY GROUP ATTENDEES

Name	Organization
Jonathan Robillard	SLO
Jody Meche	LCPA-WEST
Vic Blanchard	LA Landowners Association
Harold Schoeffler	Sierra Club
Dean A. Wilson	Atchafalaya Baskinkeeper
Steven Giambrone	OOC
Tom Harris	LDNR
Don Briggs	LOGA
Haywood Martin	Sierra Club
Tyler Gray	LMOGA
Stuart Brown	CPRA
Kent Bollfras	CPRA
Ryan Seidemann	DOJ
Ryan Mabile	Crawfish Producer - West
Brac Salyers	LDWF
Keith Lovell	DNR

ADDITIONAL ATTENDEES

Name	Organization
Charles Reulet	LDNR
Sara Krupa	LDNR
Blake Canfield	DNR
April Newman	ABP/DNR
Harry Vorhoff	DOJ
Joe Baustian	TNC
Seth Irby	Emergent Method
John Snow	Emergent Method

MEETING RECAP

OVERVIEW

The meeting began with DNR Secretary Thomas Harris welcoming participants and thanking them for their commitment to this process. Secretary Harris provided a brief history of the Atchafalaya Basin and an overview of SCR 154, and introduced Emergent Method, the third-party responsible for leading this effort.

Seth Irby, Emergent Method Senior Consultant, outlined the task at hand and defined the role and responsibilities of the study group. After this introduction, Irby walked through the pre-meeting survey results.

The rest of the meeting focused on the study group's opinions on each of the questions outlined in SR 154. A summary of the discussion and items for future discussion are outlined below and organized by the questions provided in the resolution.

1. ARE SPOIL BANKS ADVERSELY AFFECTING FISHING ACTIVITIES?

DISCUSSION SUMMARY

- There was robust discussion amongst participants around how fisheries have been negatively impacted in the Atchafalaya Basin and the suspected root causes of this impact. While some believe the spoil banks are to blame for a decline in fisheries, others believe it is more complicated than one factor and can be traced back to some combination of levee construction, sediment delivery, and changing water levels. While there was disagreement on the cause, all agreed the main issue that is negatively impacting fisheries is the water quality in the basin and specifically the lack of oxygen caused by stagnation ("dead zones"). Some participants pointed out the crawfishermen are the only fishermen left in the basin and other forms of commercial fishing have declined over time due in part to the poor water quality.
- There was some discussion on how pipelines and the resulting spoil banks have changed the elevation of the basin creating greater flood risk. Some suggested this could be fixed with dredging.
- Participants that frequently fish in the basin pointed out that spoil banks create barriers that restrict water flow. Even when gaps are cut in the banks, the flow of water is limited and the further one gets from the gaps "dead zones" still exist.
- Several participants requested data on basin depth and water quality over time to shed light on the root causes of the decline in fisheries. Others pointed out that data can't give the full picture and should be paired with first-hand accounts from fishermen that are on the water frequently and have seen the basin change over time.
- Some participants highlighted that not all spoil banks are bad, citing that many have provided habitat and refuge for wildlife.
- Most participants acknowledged that the pipeline industry plays a critical role in fueling Louisiana's economy and all parties should search for solutions that allow industry and fishermen to co-exist in a mutually beneficial manner.
- Most participants agreed that the best solution to the water quality issue is taking steps to restore "dead zones" to their natural state by improving circulation. All agreed this should be approached on a case-by-case basis by identifying solutions tailored to each area, particularly given the downstream impacts that can result from directly modifying water circulation in one area, and that heavily impacted areas should be addressed first.

ITEMS FOR FUTURE DISCUSSION

- USACE – Data on depth of basin over time
- Cause/effect – Have spoil banks negatively impacted fisheries or are there other factors causing this? Does data exist to back up these opinions?
- DWF – Data on "dead zones" in basin that previously were productive fisheries
- U.S. Coast Guard – previous report on water oxygen levels

2. SPOIL PLACEMENT

DISCUSSION SUMMARY

- Some participants did not like the two options provided in the legislation regarding spoil removal – placing spoil on water bottom or removing spoil to an offsite location – and offered other potential solutions. These alternative solutions included: creating berms across the canal to stop the pipeline from capturing water flows, cutting gaps in existing spoil banks, placing spoil into the pipeline canal, and placing spoil on high land that won't impact natural water flow.
- Several participants highlighted that the quality of pipeline installation has been inconsistent over the years – some companies have buried them deep below the surface with no negative impact to the basin while others have left elevated spoil banks impeding water flow.
- The issue of permit enforcement was brought up several times in this discussion. Several fishermen believe that the USACE doesn't have the resources and manpower to enforce permit guidelines. DNR staff pointed out that most of the troublesome areas were constructed in the 1950s and 1960s prior to proper guidelines being in place and current permits don't allow the construction of new spoil banks. Furthermore, DNR staff asked the fishermen in attendance to document pipelines out of compliance so they can review and, if appropriate, address directly with the USACE.
- Some participants highlighted the need for landowner involvement in discussions regarding spoil removal. They pointed out that landowners have agreements with pipeline companies and should be allowed to give input on the placement of spoil as a function of their private landowner rights.
- Most participants agreed that spoil removal should be addressed on a case-by-case basis and areas where spoil is interrupting the natural flow of water should take priority. Additionally, most participants agreed that hauling spoil outside of the basin is extremely expensive, making it an unrealistic solution to apply across the board.
- Several participants cautioned that unintended consequences can come from gapping – while one area might benefit it could have an adverse impact on another area. They stressed that these impacts should be taken into consideration when implementing solutions. Additionally, they suggested that it could be beneficial to consult a hydrologist in reviewing the potential of utilizing this process as a solution.
- One participant suggested exploring the use of horizontal drilling to avoid negative impacts all together.

ITEMS FOR FUTURE DISCUSSION

- Using LIDAR data, identify priority areas that need to be addressed
- Explore alternative solutions for spoil removal

3. SHOULD THE PIPELINE BE REMOVED AT THE END OF ITS USEFUL LIFE?

DISCUSSION SUMMARY

- DNR staff clarified that while both interstate and intrastate pipelines are required to be capped and purged at the end of its useful life, flow lines fall under more general regulations. DNR and LMOGA staff stated that anyone can report compliance issues and they will work with the owners to address. Both parties reiterated that neither the State nor the oil companies want to see negative impacts from these pipelines.
- While several participants stated that pipelines should be removed at the end of its useful life, others pointed out the location of the pipeline should dictate the removal. If the pipeline is on private property, the landowner should be consulted on the decision as long as there is not hazardous material that is negatively impacting the basin.
- Some participants pointed out that as long as pipeline is properly maintained, removal shouldn't be necessary.

ITEMS FOR FUTURE DISCUSSION

- Identify locations of out-of-compliance pipelines

4. SHOULD ANY CONSTRUCTION, MAINTENANCE, OR ANY OTHER WORK BE PERMITTED BETWEEN THE EAST ATCHAFALAYA BASIN PROTECTION LEVEE AND THE WEST ATCHAFALAYA BASIN PROTECTION LEVEE?

DISCUSSION SUMMARY

- Most participants acknowledged the need to grant permits for construction and maintenance in the basin but wanted to focus the discussion on compliance and enforcement. DNR staff clarified that the State does not have the authority to enforce these specific permits, only the USACE does. Several participants reiterated that the USACE does not have the resources and manpower to carry out enforcement and suggested this should be addressed before new construction is allowed to allow for proper accountability moving forward.
- Some participants believed the companies with a history of non-compliance should not be granted new permits until they fix non-compliant pipelines and restore the negatively impacted areas.
- Several participants pointed out pipeline ownership is an obstacle to compliance. Because pipelines often change hands to new operators, it can be difficult to hold new owners accountable for non-compliance issues the previous owner was responsible for addressing or maintaining prior to the change in ownership. DNR staff noted that the Office of Conservation regulations state that regardless of the ownership transfer, the new operator is held responsible for proper compliance.
- One participant commented that technology and in-depth knowledge of the basin should be leveraged to address many of these issues. This participant suggested exploring a program that would set aside production revenues to be used to restore the basin, highlighting the desire for all parties to work together to develop creative solutions to address these issues.

ITEMS FOR FUTURE DISCUSSION

- USACE involvement in future discussions regarding permit enforcement
- Follow-up discussions with LOGA regarding a potential revenue stream to fund basin restoration

5. SHOULD PERMITS FOR NEW PIPELINES BE GRANTED TO COMPANIES THAT ARE OUT-OF-COMPLIANCE WITH PRIOR ISSUED PERMITS, UNTIL SUCH TIME AS THOSE PREVIOUSLY-ISSUED PERMITS ARE BROUGHT BACK INTO COMPLIANCE?

DISCUSSION SUMMARY

- Several participants reiterated the opinion that the companies with a history of non-compliance should not be allowed to do new work until they fix non-compliant pipelines and restore the negatively impacted areas. Others believed this should be a case-by-case basis, taking into account the company’s history and past performance, previous ownership of the pipeline, and regulatory standards that were in place when the pipeline was installed.
- DNR staff noted that their department only issues permits when it impacts jurisdictional areas in the coastal zone and a company’s history of compliance is taken into consideration during this decision-making process. They highlighted that this information is received from the USACE and DNR operates under the assumption that these records are accurate.
- Several fishermen stated they have seen numerous instances of non-compliance from companies that continue to receive permits. DNR staff reiterated that they want to know about these examples so they can address non-compliance with the appropriate regulatory agencies, a stance that was supported by industry to ensure it fulfills its own self-regulation functions.

ITEMS FOR FUTURE DISCUSSION

- Specific examples of permit and/or pipeline non-compliance

Appendix I - Study Group Meeting 2 Agenda
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DEPARTMENT OF NATURAL RESOURCES

SR 154 STUDY GROUP

December 5, 2017

AGENDA

Welcome and Introductions **1:00 pm**
- Emergent Method
- Study Group

November Meeting Recap **1:15 pm**
- Discuss Each Question
  - Review "Discussion Summary"

External Research Presentations **1:30 pm**
- Pipeline Map
- LWDF Crawfish Data
- Bayou Sorrel Pipeline Restoration Proposal
- Discussion and Questions?

Deep Dive – 5 Key Questions **1:50 pm**
- Revisit Meeting #1 Recap
- Discuss Each Question
  - Review "Items for Future Discussion"
  - Solicit additional opinions, potential solutions, etc.

Public Comment **2:30 pm**
- Oral
- Written

Wrap Up **2:45 pm**
- Questions
- Final Report
- Next Steps

Appendix J - Study Group Meeting 2 Sign-In Sheet
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EMERGENT METHOD

DEPARTMENT OF NATURAL RESOURCES

SCR 154 STUDY GROUP

December 5, 2017

SIGN-IN SHEET

Name	Organization	Email Address
DEAN A. WILSON	ATCHAFALAYA BASINKEEPER	ON FILE
Kent Bollfrass	CPRA	kent.bollfrass@la.gov
Raynie Harlan	LDWF	on file
Lauren Chauvin	LABI	laurenc@LABI.org
Jonathan Robillard	SLO	on file
Rudy Sparks	La. Landowners Assoc	
Steven Giambrone	OOC	Steven.giambrone@la.gov
Tom HARRIS	LDNR	thomas.harris@la.gov
Harry Vorhoff	LDOJ	vorhoffh@ag.louisiana.gov
BRAC SALYERS	LDWF	ON FILE
Keith Lovell	DNR	Keith.Lovell@la.gov

Appendix K - Study Group Meeting 2 Recap
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SR 154

MEETING #2 RECAP

Updated December 20, 2017

MEETING DETAILS

Date: December 5, 2017
Time: 1:00 – 3:00 p.m.
Location: LaSalle Building, Griffon Room

STUDY GROUP ATTENDEES

Name	Organization
Dean A. Wilson	Atchafalaya Basinkeeper
Kent Bollfrass	CPRA
Raynie Harlan	LDWF
Lauren Chauvin	LABI
Jonathan Robillard	SLO
Rudy Sparks	LA Landowners Association
Steven Giambrone	OOC
Tom Harris	DNR
Harry Vorhoff	LDOJ
Brac Salyers	LDWF
Keith Lovell	DNR
Harold Shoeffler	Sierra Club
Woody Martin	Sierra Club
Jody Meche	LCPA-West, Atchafalaya Basinkeeper, Commercial Fisherman
Brad Inman	USACE
Tyler Gray	LMOGA

ADDITIONAL ATTENDEES

Name	Organization
Blake Canfield	DNR
Seth Irby	Emergent Method
John Snow	Emergent Method

***Note: Several attendees did not sign in*

MEETING RECAP

OVERVIEW

The meeting began with introductions from study group members and additional attendees. Seth Irby, Emergent Method Senior Consultant, outlined the task at hand and defined the role and responsibilities of the study group.

Irby then explained the outcomes for the meeting and introduced the key topics of discussion:

- November Study Group Meeting Recap
- External Research Presentations
- Revisiting the 5 Key Questions from SR 154
- Next Steps

The rest of the meeting focused on these topics. A recap of each discussion is included below.

NOVEMBER STUDY GROUP MEETING RECAP

Irby presented the meeting recap that was sent to participants five days prior to this meeting. Irby asked study group members to provide any edits or questions.

Several participants asked for further clarification regarding access to pipelines on private land. DNR staff explained that they do not permit activities on private property or access private property when the landowner objects.

One participant asked for clarification on DNR's permit enforcement process outlined in question four in SR 154. DNR staff explained that the department can only enforce permits issued by DNR, and the USACE enforces permits issued by USACE.

The discussion concluded with agreement from study group members that the meeting recap accurately reflected the discussion and takeaways from the November meeting.

EXTERNAL RESEARCH PRESENTATIONS

At the conclusion of the last meeting, study group members were invited to submit relevant external research and resources to be considered by the group. Three members submitted data for consideration and presented this information to the group for discussion:

- **Steven Giambrone,** DNR: North and South Pipeline Maps
- **Brac Salyers, LDWF:** LWDF Crawfish Data
- **Dean Wilson, Atchafalaya Basinkeepers**: Bayou Sorrel Pipeline Restoration Proposal

A recap of each presentation and subsequent discussion is included below:

NORTH AND SOUTH PIPELINE MAPS

PRESENTATION

- Giambrone presented a map for both the north and south areas of the basin with supporting pipeline lists. He provided hard copies of each and explained how to access this information online.
- He explained that the location of the pipelines and layers that exist on the map show both gas transmission pipelines and hazardous liquid pipelines. He also emphasized that these resources can be used to identify and track where pipelines are located throughout the basin and highlighted that they are regularly updated by DNR and other stakeholders.

DISCUSSION

- Several participants asked if DNR can identify which pipelines are no longer functioning. Giambrone explained that the online platform allows you to view the pipeline operator. If no operator is listed, it indicates this pipeline is abandoned. It was requested that instructions on how to access a sample pipeline record on the online platform be included in the final report.
- One participant asked where permitting information is located. Giambrone clarified that this data is logged with the USACE or PHMSA. Furthermore, he explained the public can access maps on a parish-by-parish basis through the PHMSA public map viewer.

- One participant asked if this data includes when the pipeline came online. Giambrone explained that the age of the pipeline is not included with this data.

LDWF CRAWFISH PRODUCTION DATA

PRESENTATION

- Salyers presented a table taken from the Atchafalaya Basin Management Plan – B. This data includes the annual landings and the value of landings of blue crab and wild crawfish in the Atchafalaya Basin for the years 2000 to 2016.
- Salyers explained that this data is taken from LDWF's trip ticket program, which includes anyone with a commercial fishing license or processing plant who sells fish or crawfish to the public or a processing plant. He highlighted that these are non-confidential reports, which means reports are omitted in which there were only one or two buyers involved in order to protect the financial information of private companies. Additionally, he noted that this data is organized by parish but not specific to the Atchafalaya Basin and does not include production outside of the ticket program.
- Salyers provided a high-level analysis highlighting that production was highly variable from year to year, and that there isn't a clear trend, upward or downward, over this time period. Furthermore, he stated that a decline in production can't be traced specifically to spoil banks and highlighted other factors such as changing markets and the number of fishermen needed to be considered when drawing conclusions about production trends.

DISCUSSION

- Some participants pointed out that this data only captures the last 17 years, while spoil banks have been around long before this time. This makes it difficult to fully understand the potential impacts of spoil banks on production. Salyers agreed but pointed out that LDWF does not have any such data that originates prior to 2000 due to when the current system was put in place.
- One participant requested more information on the ticket program and specifically asked Salyers to provide participation numbers to better understand how many fishermen are accounted for in this data. Additionally, participants requested more information on fishing zones to better understand where in the basin this production is coming from.
- Several participants asked if the USACE could provide water levels and soil gauge data from this 17-year period and years prior to better understand how the basin has changed over time.
- One participant asked if LDWF has a crawfish management plan in place as they do for the blue crab industry. Salyers explained that there are regulations in place that must be followed to obtain a license and committed to following up with specific details on these regulations.

BAYOU SORREL PIPELINE RESTORATION PROPOSAL

PRESENTATION

- Wilson presented a graphic which outlined a potential project focused on removing spoil banks in Bayou Sorrel. He suggested this is an area that has been negatively impacted by these banks and hurt crawfish production.
- He pointed out restoration is a complicated issue because the pipeline provides sediment traps in some places, but in others he believes the pipelines have negatively impacted the basin by filling in the wetlands and reducing water flow. He acknowledged that solutions have to be tailored to the area based on the impacts.

DISCUSSION

- DNR Secretary Harris commended Wilson for bringing a specific solution to the table and suggested he work with DNR to put together a formal proposal for this project.
- Tyler Gray, LMOGA Representative, suggested that CPRA's Coastal Master Plan is a great avenue to advance this project and similar ones. He highlighted that specific proposals like Wilson's make it easier for LMOGA and other agencies to implement necessary projects. Gray committed to working with the necessary stakeholders if/when a formal proposal is created.

ADDITIONAL DISCUSSION

Before concluding the external research presentations, study group members provided some additional analysis on the topics explored during this section of the meeting:

- Several participants stressed the importance of the USACE enforcement of permits to help address the water quality issue that has resulted from the construction of spoil banks.
- LDWF representatives pointed out that LSU has hydrology data that could be used to better understand water quality and flow and address dead zones.
- Gray suggested that it would be beneficial to include pipeline safety information with the study group's report to highlight how the oil and gas industry is addressing this important issue. He committed to providing this information before the final report is submitted.

REVISITING THE 5 QUESTIONS FROM SR 154

After concluding the external research presentations and discussion, Irby asked the study group to revisit the five key questions outlined in SR 154 and asked participants to include additional relevant commentary that should be included on the record and in the final report. Summaries of these discussions are provided below and organized by each of the five SR 154 questions.

1. ARE SPOIL BANKS ADVERSELY AFFECTING FISHING ACTIVITIES?

DISCUSSION SUMMARY

- Several participants stressed that they believe spoil banks are negatively impacting the fisheries and wildlife habitats. They pointed out that spoil banks are restricting the natural sediment deposition process and impeding water flow.
- One participant asked if the USACE could provide more information on basin depth by looking at rain lines to see how much the basin floor has risen over the years. Brad Inman, USACE Representative, said he would work to locate any relevant USACE data but believed the level of detail being requested isn't possible due to the resources that would be required to ascertain this information to the depth and degree it was requested.
- One participant asked Inman to clarify the USACE's responsibility to the basin. Inman explained the USACE's primary focus is flood protection and navigation channel protection.
- One participant highlighted the importance of not focusing entirely on spoil banks when it comes to identifying the source of negative impacts in the basin. Specifically, this participant explained that the amount of water flowing into the basin has changed over the years, changing the natural topography of the basin.
- Several participants pointed out that spoil banks also have positive benefits, such as providing habitats to wildlife during high water periods.

2. SPOIL PLACEMENT

DISCUSSION SUMMARY

- Several participants acknowledged that the removal of spoil is extremely costly, and other solutions – such as cutting gaps or creating islands – should be considered.
- One participant noted that, in some areas, large habitats have been created by spoil banks and removing them would be a large and unreasonable resource commitment.
- All participants agreed that creative solutions to spoil placement should be explored, and tailored solutions should be proposed to the areas where water flow is restricted the most.

3. SHOULD THE PIPELINE BE REMOVED AT THE END OF ITS USEFUL LIFE?

DISCUSSION SUMMARY

- One participant pointed out the importance of understanding the difference in interstate and intrastate pipelines when evaluating this issue.

- Several participants highlighted a specific pipeline between Rayna and Old Grant River that has caused damage to boats because it wasn't fully buried. DNR staff reminded participants that out of compliance pipelines can be reported through DNR or the USACE's website and will be addressed by the appropriate party.

4. SHOULD ANY CONSTRUCTION, MAINTENANCE, OR ANY OTHER WORK BE PERMITTED BETWEEN THE EAST ATCHAFALAYA BASIN PROTECTION LEVEE AND THE WEST ATCHAFALAYA BASIN PROTECTION LEVEE?

DISCUSSION SUMMARY

- Several participants stressed that the USACE does not have the proper manpower or resources to properly enforce permits which makes it easier for companies to "cheat the system" and "cut corners" when it comes to pipeline installation and maintenance. Furthermore, they explained that companies that "do the right thing" are placed at a competitive and financial disadvantage given the lack of enforcement that exists for those who are noncompliant.

5. SHOULD PERMITS FOR NEW PIPELINES BE GRANTED TO COMPANIES THAT ARE OUT-OF-COMPLIANCE WITH PRIOR ISSUED PERMITS, UNTIL SUCH TIME AS THOSE PREVIOUSLY-ISSUED PERMITS ARE BROUGHT BACK INTO COMPLIANCE?

DISCUSSION SUMMARY

- One participant suggested the State and USACE explore the implications and benefits of requiring horizontal drilling across the basin and cited Mobile Bay and parts of Florida as success stories for this method.

NEXT STEPS

Irby concluded the meeting by outlining the timeline and process for assembling a final report and asked study group members to provide written comments that they wish to be included in the report before the January 2018 meeting.

Appendix L - Study Group Meeting 3 Agenda
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DEPARTMENT OF NATURAL RESOURCES

SR 154 STUDY GROUP

January 9, 2018

AGENDA

Welcome and Introductions **1:00 pm**

- Emergent Method
- Study Group

December Meeting Recap **1:15 pm**

- Discuss Each Section
  - Suggested edits?

External Research Presentations **1:30 pm**

- LDWF – Raynie Harlan
- LSU – Dr. Michael Kaller
- USACE – Brad Inman
- Discussion and Questions?

Deep Dive – Final Report Draft **1:50 pm**

- Overview
- Solicit Feedback

Public Comment **2:30 pm**

- Oral
- Written

Wrap Up **2:45 pm**

- Questions
- Next Steps

Appendix M - Study Group Meeting 3 Sign-In Sheet
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EMERGENT METHOD

DEPARTMENT OF NATURAL RESOURCES

SCR 154 STUDY GROUP

January 9, 2017

SIGN-IN SHEET

Name	Organization	Email Address
Tiffany Pasco	LSU	tpasco1@lsu.edu
Michael Kaller	LSU	mkaller1@lsu.edu
Kent Bollfrass	CPRA	kent.bollfrass@la.gov
Nathan McBride	LMOGA	Nathan.McBride@lmoga.com
Jody Meche	LCPA-west	JAmeche@cox.net
Keith Lovell	DNR	Keith.Lovell@la.gov
Brac Salyers	LDWF	bsalyers@wlf.la.gov
Dean A. Wilson	Atchafalaya Basinkeeper	On File
Blake Canfield	LDNR	blake.canfield@la.gov
Michael Heier	LDOJ	heierm@ag.louisiana.gov
Sara Krupa	LDNR	Sara.Krupa@la.gov

Name	Organization	Email Address
Charles Reulet	LDNR	Charles.reulet@la.gov
Randy Sparks	LLA	rsparks@cox-internet.com
Lauren Chauvin	LABI	LaurenC@LABI.ORG
Joe Baustian	TNC	jbaustian@tnc.org
April Newman	LDNR	april.newman@la.gov
Harold Schoeffler	Sierra Club accompanied by	
Woody Martin	Sierra Club	hrmartin2sc@gmail.com
Ryan Mobile	Crawfish [illegible] est	Mobil50@yahoo.com
Raynie Harlan	LDWF	on file

Appendix N - Study Group Meeting 3 Recap

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EMERGENT METHOD

SR 154
MEETING #3 RECAP

Updated January 21, 2018

MEETING DETAILS

Date: January 9, 2018
Time: 1:00 – 3:00 p.m.
Location: LaSalle Building, Griffon Room

ATTENDEES

Name	Organization
Tiffany Pasco	LSU
Kent Bollfrass	CPRA
Raynie Harlan	LDWF
Lauren Chauvin	LABI
Dean Wilson	Atchafalaya Basinkeeper
Rudy Sparks	LA Landowners Association
Nathan McBrios	LMOGA
Sara Krupa	LDNR
Charles Reulet	LDNR
Brac Salyers	LDWF
Keith Lovell	DNR
Harold Shoeffler	Sierra Club
Woody Martin	Sierra Club
Jody Meche	LCPA-West, Atchafalaya Basinkeeper, Commercial Fisherman
Blake Canfield	LDNR
April Newman	LDNR
Ryan Moblie	Crawfish buyer
Michael Heser	LDOJ
Michael Kallger	LSU
Joe Baustian	TNL

MEETING RECAP

OVERVIEW

The meeting began with introductions from study group members and additional attendees. Seth Irby, Emergent Method Senior Consultant, outlined the task at hand and defined the role and responsibilities of the study group.

Irby then explained the outcomes for the meeting and introduced the key topics of discussion:

- December Study Group Meeting Recap
- External Research Presentations
- Revisiting the 5 Key Questions from SR 154

- Final Report Overview

The rest of the meeting focused on these topics. A recap of each discussion is included below.

DECEMBER STUDY GROUP MEETING RECAP

Irby presented the meeting recap that was sent to participants five days prior to this meeting. Irby asked study group members to provide any edits or questions.

No participants voiced edits for the December recap. The discussion concluded with agreement from study group members that the meeting recap accurately reflected the discussion and takeaways from the December meeting.

EXTERNAL RESEARCH PRESENTATIONS

At the conclusion of the last meeting, study group members were invited to submit relevant external research and resources to be considered by the group. Three members submitted data for consideration and presented this information to the group for discussion:

- **Raynie Harlan, LDWF**: Crawfish Regulations, Management, and Research
- **Dr. William E. Kelso, LSU:** Atchafalaya Basin History and Current Data

A recap of each presentation and subsequent discussion is included below:

CRAWFISH REGULATIONS, MANAGEMENT, AND RESEARCH

PRESENTATION

- Harlan presented LDWF's commercial and recreational crawfish regulations including traps, licenses, Trip Ticket program, and season length. She explained the differences between recreational regulations versus commercial regulations. She also emphasized the Trip Ticket program and all valuable data recovered from Trip Ticket entries.
- She also presented a 2016 survey reflecting crawfishermen sentiments on a range of topics from crawfish season to trip ticket regulations. Most crawfishermen preferred the year-round crawfish season and single area designation for Trip Ticket entries.
- Harlan also emphasized LDWF believes that spoil banks do pose a risk to aquatic habitats, but there is a lack in availability of LDWF data to facilitate the analysis of risks posed to those resources and habitats.

DISCUSSION

- One participant referred to his question from last meeting when he asked for data from 1999 to present comparing the number of licenses sold to the number of participants in the Trip Ticket program. Harlan explained that due to confidentiality, LDWF will not release that data for this study group.
- One participant asked for clarification on situations when oral histories from crawfishermen can be considered valuable and legitimate. Harlan mentioned the Sci-Teck program where crawfishermen can submit oral history accounts as valid evidence for cases.

ATCHAFALAYA BASIN HISTORY AND CURRENT DATA

PRESENTATION

- Dr. Kelso presented three different reasons for low water quality in the Atchafalaya Basin area as well as suggestions for improving conditions in the area.
- First, flood pulse timing is unpredictable and early flood years have the best crawfishing conditions, but managing ORCS to promote early floods is only partially achievable.

- Second, spoil banks limit flood bank circulation and allow non-moving water to sit and heat up. Kelso also presented a graph showing Grand Lake's depth in the 1930's compared to its depth now. He emphasized the problem with moving water and increased sediment accumulation. The state must find a balance between moving and sitting water. There needs to be sediment traps put in place to stop large accumulation from occurring.
- Finally, Kelso also reiterated the effect invasive plant species have on aquatic habitats. Macrophytes create a hypoxic environment that can limit the oxygen supply for aquatic habitats. These invasive species are a difficult problem to fix and won't be fixed overnight.
- His suggestions include gapping or shaving, but the water must have somewhere to go. Pre- and post studies take several years to accomplish, and the flood pulse every year proves unpredictable and difficult to manage. Also, reports should include all current data points as well as any missing data point entries that should be considered. Kelso also stressed that studies should be done in close proximity between the experiment and control sites.

DISCUSSION

- Some participants pointed out that bringing more water will just fill in the swamp. Kelso agreed and pointed out the difficulty with moving water and the quickness in which sediment fills traps. He also pointed out that coastal plains need sediment and the basin has too much of it, so finding a solution of value to both will be beneficial.
- Another participant asked what causes the lack of water movement. Kelso pointed out that the combination of leveeing the basin along with restricted water flow, lack of oxygen, spoil banks, and canals have all hindered water movement.

REVISITING THE 5 QUESTIONS FROM SR 154

After concluding the external research presentations and discussion, Irby asked the study group to revisit the five key questions outlined in SR 154 and asked participants to include additional relevant commentary that should be included on the record and in the final report. Summaries of these discussions are provided below and organized by each of the five SR 154 questions.

1. ARE SPOIL BANKS ADVERSELY AFFECTING FISHING ACTIVITIES?

DISCUSSION SUMMARY

- Several participants stressed that they believe spoil banks are negatively impacting the fisheries and wildlife habitats. They pointed out that spoil banks are restricting the natural sediment deposition process and impeding water flow.
- One participant noted that not all spoil banks are hindering water flow and damaging aquatic habitats. Some provide critical diversity and habitats for many other species besides crawfish in Atchafalaya basin.
- One participant highlighted the importance of not focusing solely on spoil banks when identifying problems in the basin. Specifically, this participant explained that the amount of water flowing into the basin has changed over the years this changing the natural topography of the basin.
- Another participant suggested part of the problem lies within the 30-70 water flow legislation written by out-of-state congressmen. He suggested the solution is as simple as asking legislators to rewrite the law.

2. SHOULD THE SPOIL BE PLACED INTO THE WATER BOTTOM OR REMOVED OFF SITE TO AN APPROVED LOCATION SUCH THAT THERE BE NO REMAINING SPOIL BANK?

DISCUSSION SUMMARY

- Several participants acknowledged that the removal of spoil banks is extremely costly, and other solutions should be considered.
- One participant noted that anything done in the basin has to be approved by landowners. He also noted legislators will have to force landowners to give consent to any such work. Another participant noted that over last 6 decades, most spoil banks were under contract and other legal documents between companies and landowners. There was no government involvement in previous contracts.

3. SHOULD THE PIPELINE BE REMOVED AT THE END OF ITS USEFUL LIFE?

DISCUSSION SUMMARY

- No additional comments

4. SHOULD ANY CONSTRUCTION, MAINTENANCE, OR ANY OTHER WORK BE PERMITTED BETWEEN THE EAST ATCHAFALAYA BASIN PROTECTION LEVEE AND THE WEST ATCHAFALAYA BASIN PROTECTION LEVEE?

DISCUSSION SUMMARY

- One participant recalled that seven or eight years ago, people were pulled together by the USACE, and the group came up with multiple different plans to fix the problem. The group came up with three options: to dredge, to raise the levees 10 feet, and to take no action. No action was taken. Temporary sheet piling from 1973 is still in place. This participant noted the current basin conditions and claimed that USACE has neglected the water quality problem as well as flood protection. He questioned whether USACE would even take action now given its absence from two of the three meetings.
- Another participant noted that the problem with removing pipelines is that the companies owning them are no longer in existence.

5. SHOULD PERMITS FOR NEW PIPELINES BE GRANTED TO COMPANIES THAT ARE OUT-OF-COMPLIANCE WITH PRIOR ISSUED PERMITS, UNTIL SUCH TIME AS THOSE PREVIOUSLY-ISSUED PERMITS ARE BROUGHT BACK INTO COMPLIANCE?

DISCUSSION SUMMARY

- No additional comments

NEXT STEPS

Secretary Harris emphasized that the basin continues to be an extremely important treasure, and it must be preserved for future generations. The problem is complex and lacks obvious answers. The different viewpoints allow multiple ideas to come to fruition. The legislature can use this report to identify what we know, what we don't know, and how to collect the unknown facts with more data, funds, and resources. He stressed that this document will be important to a lot of decision-makers, and time spent on it is very important for the future of the Atchafalaya Basin and livelihoods of those living and working in the area.

***Note: All additions for the Final Report and edits for Meeting 2 Recap must be sent in on or before January 12, 2018.*

Appendix O: LDWF Crawfish Production Data
Page 74

LDWF Research

The table below is taken from the Atchafalaya Basin Management Plan - B, updated yearly, showing the last 17 years of crawfish data.

Both the Management Plans A & B are public documents, and are available at this link…
http://www.wlf.louisiana.gov/fishing/waterbody-management-plans-inland

Non-confidential reports of landings from LDWF commercial trip ticket data are available to show the approximate pounds of the commercial harvest from the ARB (Tables 10 – 15). These data are not completely specific to waters only inside the levees but are representative of the area. It is assumed that the ARB, due to the expanse of the area, is a major contributor to these numbers.

LDWF Trip Ticket Data for Commercial Landings Species, total pounds reported and value by year

Table 15. The annual landings and the value of landings of blue crab and wild crawfish in the Atchafalaya Basin for the years 2000 to 2016.

Species	Blue crab		Wild crawfish	
Year	Lbs.	Value	Lbs.	Value
2000	256,186	$139,685	365,391	$639,649
2001	189,177	$121,369	8,899,014	$7,277,948
2002	157,275	$74,844	11,883,865	$6,244,166
2003	74,392	$57,982	6,412,974	$3,777,043
2004	42,704	$179,001	6,793,955	$3,869,911
2005	143,702	$72,688	13,418,851	$7,380,863
2006	86,496	$56,392	1,326,275	$1,173,635
2007	42,431	$35,707	12,792,134	$7,248,526
2008	90,615	$82,955	11,677,381	$7,023,178
2009	84,174	$66,141	14,256,965	$11,638,450
2010	37,706	$33,007	11,100,487	$10,426,904
2011	10,297	$11,641	5,147,817	$5,682,147
2012	65,097	$80,912	5,252,706	$6,413,278
2013	112,021	$151,793	14,160,997	$11,969,975
2014	14,369	$35,446	9,865,327	$12,297,512
2015	13,327	$29,968	3,105,150	$3,935,241
2016	24,057	$50,970	7,924,956	$7,054,830
"-" = Confidential non-reportable, "0" = No landings				

Appendix P: LDWF Report - Spoil Bank Mitigation Feedback and Suggestions

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SR 154 – Spoil Bank Mitigation

Louisiana Department of Wildlife and Fisheries Feedback and Suggestions

Objective: To provide the Louisiana Department of Natural Resources (LDNR) data and professional opinion needed to study potential solutions that may mitigate spoil banks created on the lower Atchafalaya River Basin (ARB) affecting the natural water flows and fishing activities.

Louisiana Department of Wildlife and Fisheries (LDWF) Responsibilities: Within the LDWF Inland Fisheries mission of managing living aquatic resources and their habitat, supporting the fishing industry, and providing access, opportunity and understanding of our resources, LDWF can provide input on the following issues pertinent to the SR 154 charge to the Department of Natural Resources (LDNR):

- risks spoil banks pose to Louisiana's living aquatic resources and habitat in the ARB
- availability of data that would facilitate analysis of the risks to resources and habitat
- availability of data that would facilitate reducing the risks once identified

Risks that Spoil Banks Pose to Aquatic Resources and Habitat:

1. Are spoil banks adversely affecting fishing activities?

LDWF collects Trip Ticket data from licensed commercial crawfish fishermen across the state. Below we present annual (figure 1) and quarterly landing results from 1999 – current, along with number of unique licensed commercial fisherman that submitted a trip ticket with crawfish from ARB during that same quarter (active resident commercial crawfish harvester; figure 4). Due to the fact that Trip Ticket data does not have a specific location noted (only fishing area, the 4-digit sub-basin), we do not have the ability to statistically analyze if spoil banks within the ARB have directly impacted crawfish landings. If spoil bank creation dates were known, there may be the possibility of looking at correlation with crawfish landings, but evaluating statistical causation is not possible with Trip Ticket data. Trip Ticket data cannot be provided at a resolution where fewer than 3 harvesters or 3 commercial dealers are reported for a cell (e.g. sub-basin/year), so landings have been reviewed and are reported at a level where this confidential information is not available.

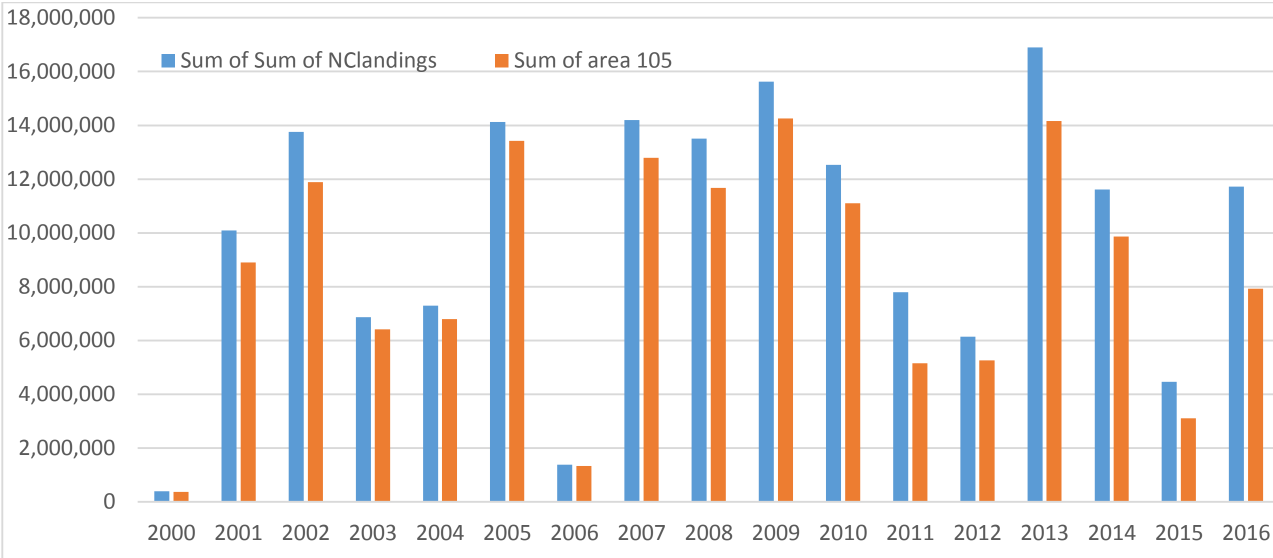

Fig. 1. Trip ticket non-confidential (NC) crawfish landings (millions of pounds) yearly for fishing area 105 (orange) and areas 101-109 (blue).

Fig. 2: Trip Ticket fishing area 105; spatial extent of orange bar data above.

Fig. 3: Trip Ticket fishing area 101 – 109: spatial extent of blue bar data.

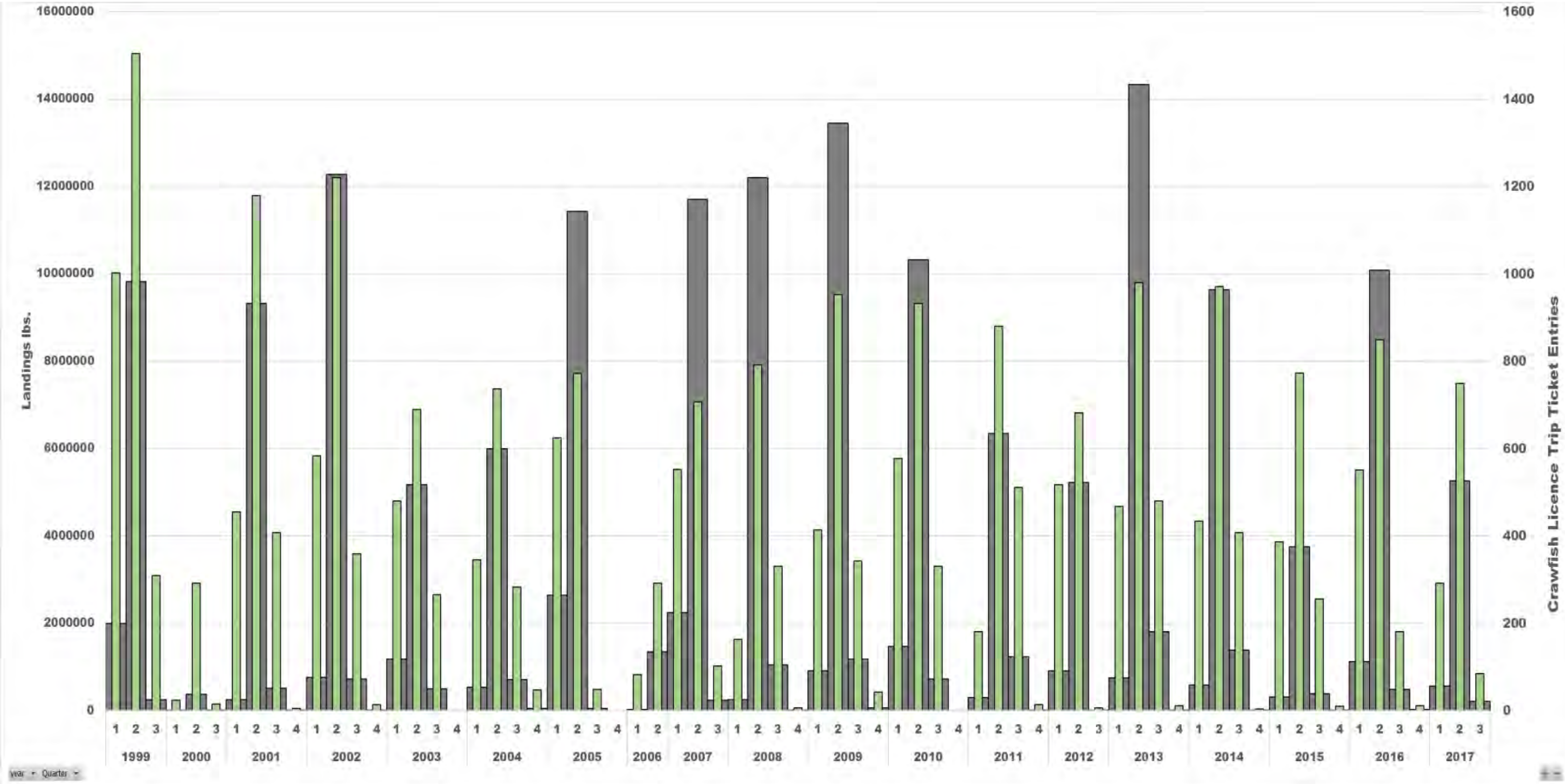

Figure 4: Trip ticket fishing areas 101-109 ARB landings per quarter (millions of pounds; grey bar; left vertical axis) and number of licensed crawfish fishermen submitting trip ticket data (green bar; right vertical axis). Time step is quarterly from 1999 – current.

2. <u>Does LDWF manage crawfish resource in any way?</u>

LDWF has the following recreational crawfish regulations:

- Recreational license and crawfish trap fee required
- Gear restrictions (trap ¾ inch X 11/16-inch hexagonal mesh; <2" opening) * this was changed from ¾" x 1" mesh in 2007 (SB 732)
- Gear must be marked
- 35 traps per licensed fisher
- 150 pounds per day per person
- WMA regulations differ slightly
- No restrictions on sex of crawfish harvested or size limit
- No season

LDWF has the following commercial crawfish regulations:

- Commercial license and crawfish trap fee required
- Gear restrictions (trap ¾ inch X 11/16-inch hexagonal mesh; <2" opening) * this was changed from ¾" x 1" mesh in 2007 (SB 732)
- No trap number limit
- No marking requirements
- No poundage limit
- No restrictions on sex of crawfish harvested or size limit
- No season
- Dealers required to collect trip ticket data from seller/fisherman
    - If fisherman wishes to transport and sell outside the state, or sell directly to retail or consumers he/she is required to have the following
        - seafood dealers license or
        - fresh products license
        - Trip ticket still required monthly if 0 sales
- Trip Ticket program details (as it pertains to crawfish)
    - Wild caught crawfish only
    - Licensed fisherman and dealers tracked
    - Exact location of trap not noted; fishing areas only
    - 1999 – present
    - Confidentiality restrictions with data sharing

Because the ability to catch crawfish, or more accurately, the ability to access preferred crawfish habitat of the shallow interior floodplain, is so directly related to the spring flood pulse of the Mississippi and Atchafalaya Rivers, there has not been a season set for wild-caught crawfish based on the calendar year. The river levels have dictated the start of the crawfish season historically. As the spring floods inundate the interior floodplain, vast additional amounts of fishable habitat become accessible, and catch rates typically begin to increase. As river levels fall in the late spring or summer, these floodplains drain. Waters recede back into the bayous and main channels, and access becomes restricted in areas considered to be preferred habitat for crawfish. As seen in figure 5 below, crawfish landings are directly impacted by river stage.

An exception to this trend would be an early rise in river stage during the coldest months. The water coming into the Atchafalaya via the Mississippi and Red Rivers can often be from snow melt or other very cold waters from the northern portions of the Basins, with water temperatures observed in the mid-40 degrees (F) during January. This can be seen in the figure below during winter months where river stages spike, but no corresponding crawfish catch is observed. Months that are displayed, but have no crawfish catch data, are months in which less than 3 harvesters or 3 commercial dealers are reported, and therefore that data is confidential and not available.

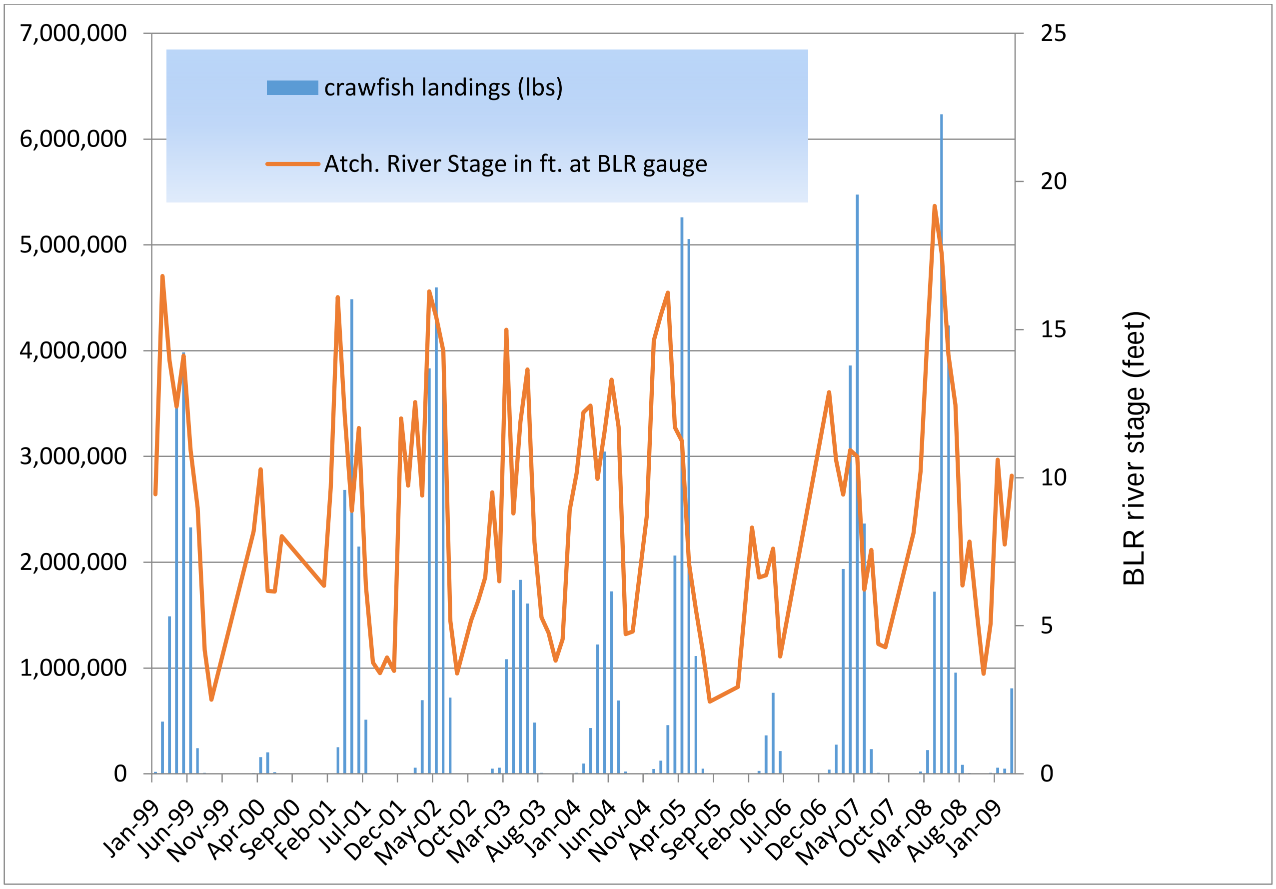

Figure 5: Monthly crawfish landings from the Atchafalaya Basin (Trip Ticket area 101-109) in relation to corresponding Atchafalaya River stages (ft.) at the Butte LaRose (BLR) gauge from January 1999-March 2009.

Availability of Data to Facilitate Analysis of the Risks to Resources and Habitat

1. Does LDWF have data that would allow statistical analysis of the effects of spoil banks in the ARB on crawfish fishery?

Fishery data can be distinguished as either fishery-dependent (coming from recreational or commercial fishery participants) and fishery-independent (collected by scientifically designed sampling and monitoring programs). The primary fishery-dependent data available in this area is the commercial Trip Ticket information. As stated previously, LDWF crawfish landings data collected via the Trip Ticket program is not collected at the spatial scale required to evaluate the impacts from spoil banks in the lower Atchafalaya Basin.

Figure 2 shows the finest spatial scale that LDWF could evaluate trends in crawfish landing information and data is only available from 1999 to present day. If spoil bank creation date was known, there may be the possibility of looking at correlation with crawfish landings, but determining causation statistically is not possible with Trip Ticket data. We are submitting the LDWF 2010 survey report entitled "Louisiana Commercial Crawfish Harvesters Survey Report" that was conducted by the Socioeconomic Research and Development Section of LDWF (Jack Isaacs and David Lavergne) that provides an overview of trip ticket details and opinions from the active crawfish fisherman across the entire state on topics such as seasons, fishing areas and many other topics.

The historic LDWF fishery-independent sampling program in the ARB is composed of sampling for vertebrate finfishes, not for invertebrates such as crawfish, crabs, and freshwater mussels. Thus, no fishery-independent biological data exists from LDWF that is directly applicable to the evaluation of crawfish utilization of habitats within the ARB. The water quality information collected in conjunction with the existing sampling data is usually not in prime crawfish habitats, but in more permanent waters within the system. Thus, historic information is probably of marginal use in attempting to characterize change within those prime crawfish habitats.

2. <u>LDWF recommends shifting study focus from direct impacts on fisheries to impacts on hydrologic flow patterns, sedimentation patterns and impacts on water quality (habitat metrics).</u>

Many peer-reviewed research papers, federal reports, state reports and private reports have been published identifying spoil banks and associated activities from the construction of flood protection works, navigation features and access for the oil and gas industry as main culprits in altering the historic hydrology of the Atchafalaya Basin and coastal Louisiana.

- Gagliano and van Beek 1975 - An Approach to Multiuse Management in the Mississippi Delta System
- USACE 1982 – Atchafalaya Basin Floodway System Louisiana Feasibility Study
- LDNR 2012 – Atchafalaya Basin Floodway System Project Louisiana Master Plan
- USACE 2003 – Buffalo Cove Pilot Water Management Unit EA #366
- Chadwick 2009 – Overview and Planning Process of the East Grand Lake Water Quality Improvement and Sediment Management Plan
- Hupp et. al 2009 – Geomorphic Processes and Environmental Impacts of Human Alteration along Coastal Plain Rivers.
- Pasco et. al 2015 - Predicting Floodplain Hypoxia in the Atchafalaya River, Louisiana, USA, a Large, Regulated Southern Floodplain River System
- Kozak 2015 – Restoration and Water Management in the ARB (Dissertation)
- CPRA 2017 – Louisiana's Comprehensive Mater Plan for a Sustainable Coast
- Others listed in literature cited below

There seems to be consensus in scientific and resource management community that dredged canals and associated spoil banks have negatively impacted water flow patterns and floodplain connectivity within the ARB. Many publications have correlated poor floodplain connectivity and altered internal flow patterns to poor water quality in areas of the ARB, which has led to several federal (USACE, United States Fish and Wildlife Service (USFWS), United States Geological Survey (USGS)), state (LDNR) and non-profit (The Nature Conservancy (TNC)) funded restoration projects specifically designed to mitigate the impacts from spoil banks and canals.

- USACE Water Management Units – Pilot research in Buffalo Cove and Henderson (west of the river)
- LDNR East Grand Lake Project – Upper, Western and Lower regions (east of the river)

- TNC Atchafalaya Basin Initiative – Upper Region (east of the river)

An ongoing restoration effort, authorized by the Water Resources and Development Act (WRDA), is being conducted that is relevant to this topic (Buffalo Cove Water Management Unit Pilot Project). Under the supervision of the USACE, construction of the pilot management unit was designed to improve interior circulation within the swamp; remove barriers and spoil banks to facilitate north to south flow; provide input of oxygenated, low temperature river water; and prevent or manage sediment input into the interior swamps. This design consists of 10 elements, which include a series of closures and sediment traps (to prevent sediment influx), constructed inputs for river water, and gaps placed in existing embankments.

Data from the USACE Buffalo Cove Water Management Unit (BCWMU) pilot project is tentatively set to be available on-line Spring 2018 (personal communication; Steve Roberts USACE). These project results will provide an opportunity to evaluate and model spoil bank mitigation actions and the impacts those actions have had on water flow patterns, floodplain inundation, water quality, and possibly fish community changes and vegetation responses. We urge the study group to obtain these resources as they become available and LDWF staff will facilitate data sharing in any way possible. Detailed computer modeling of hydrologic shifts through time as restoration actions were implemented would be the preferred next step to begin to evaluate water quality and flow responses. For further background, we are submitting EA # 366 Buffalo Cove Water Management Unit (2003) and other documents pertaining to the BCWMU pilot project to this study group.

This data will provide the opportunity to quantify the level of habitat alteration within the area, determine whether the alteration is from spoil bank creation due to construction of flood protection works, navigation features, access for the oil and gas industry or restoration activities, and quantify the changes in floodplain/river hydrologic responses based on the level of alteration. Further, the data will provide the opportunity to compare the hydrologic responses to responses observed in water quality data and eventually aquatic biota. Following a clear framework that links habitat alteration to floodplain hydrologic changes, and then links those hydrologic changes to water quality patterns, will provide the opportunity for much more robust results and management recommendations (ELOHA framework; Poff et. al. 2010).

Factors that do negatively impact fishing are the deposition of silt and sediment over spawning habitat, which can be exacerbated by altering the natural (generally north to south) flow of water through the basin. If positioning of spoil banks changes the north to south flow pattern of an area, the water most often times slows down, allowing more suspended materials (sand, sediment, silt, etc.) to fall out of the water column, potentially covering spawning beds and submerged aquatic vegetation. During high water events, large inter-connected spoil banks can create isolated areas that water enters, but cannot drain out of, or poorly drain as the river levels drop. This isolated, 'ponded water' often becomes stagnant as air temperatures warm up, with oxygen levels dropping to lethal levels for fish and crawfish.

Availability of Data that would Facilitate Reducing the Risks Once Identified

LDWF Inland Fisheries biologists will continue to follow Department sampling schedules for state waterbodies, which includes the Atchafalaya Basin. Results of fish population monitoring and water quality monitoring are included in LDWF Inland Fisheries Waterbody Management Plans. Sampling results can be requested from the Department, but approval must be obtained from our data management team. We are submitting the most current version of the Atchafalaya Basin Waterbody Management Plan and the Henderson Lake Waterbody Management Plan to the SR 154 study group.

As DNR East Grand Lake (Chadwick 2009) and USACE Buffalo Cove restoration projects (USACE 2003) come online and are finalized, real-time monitoring of water flow and direction, water quality and biotic responses are recommended to provide pre- and post-restoration observations so that measures of success can be tracked. Results from implementing restoration projects whose goals are to restore and/or conserve flow patterns, critical habitat, and historic biota should be evaluated and shared. The results of engineering techniques such as spoil bank notching, sediment trap installation, canal dredging and water input closures, can be evaluated and revise and adaptive management will be possible as a response. Partnerships and collaboration between all agencies working within the ARB should allow for data sharing and evaluation of abiotic and biotic responses to hydrologic alterations as they occur.

Any further questions for LDWF staff on SR 154 should be directed to District 9 Inland Fisheries Biologist Manager Brac Salyers (bsalyers@wlf.la.gov) or Inland Fisheries Program Managers Raynie Harlan (rharlan@wlf.la.gov) or Alex Perret (aperret@wlf.la.gov).

Documents and Data Provided to SR 154 study group:

1. Trip Ticket data (non-confidential) 1999 – present day that includes landings and Trip Ticket entries.

2. Trip Ticket Program document

3. LDWF Socioeconomic Report

4. Buffalo Cove EA #366

5. LDWF Water Body Management Plans (Buffalo Cove and Henderson Units)

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Appendix Q: Buffalo Cove Environmental Assessment
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ENVIRONMENTAL ASSESSMENT

ATCHAFALAYA BASIN FLOODWAY SYSTEM
BUFFALO COVE MANAGEMENT UNIT

WATER CIRCULATION IMPROVEMENTS AND
SEDIMENT MANAGEMENT INITIATIVES

IBERIA AND ST. MARTIN PARISHES, LOUISIANA

EA # 366

INTRODUCTION

The U.S. Army Corps of Engineers (USACE), New Orleans District (MVN), has prepared this Environmental Assessment #366 (EA #366) to evaluate the potential impacts associated with the construction and maintenance of the proposed circulation and sediment management improvements in the Buffalo Cove Management Unit (BCMU) elements of the Management Unit feature of the Atchafalaya Basin Floodway System, Louisiana project. The Buffalo Cove Management Unit is located in South Central Louisiana (See Figure 1) in the southwestern portion of the lower Atchafalaya Basin Floodway in several parishes including St. Martin, St. Mary and Iberia. The Buffalo Cove Management Unit is located south of Interstate 10 and adjacent to the West Atchafalaya Basin Protection Levee. The project area for the proposed action is located in St. Martin, St.Mary, and Iberia Parishes approximately 10 to 12 miles northeast of the town of Charenton, Louisiana. EA #366 has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality's Regulations (40 CFR 1500-1508), as reflected in the USACE Engineering Regulation, ER 200-2-2. The following sections include a discussion of the purpose and need for the proposed action, the authority for the proposed action, alternatives to the proposed action, significant resources affected by the proposed action, and the impacts of the proposed action.

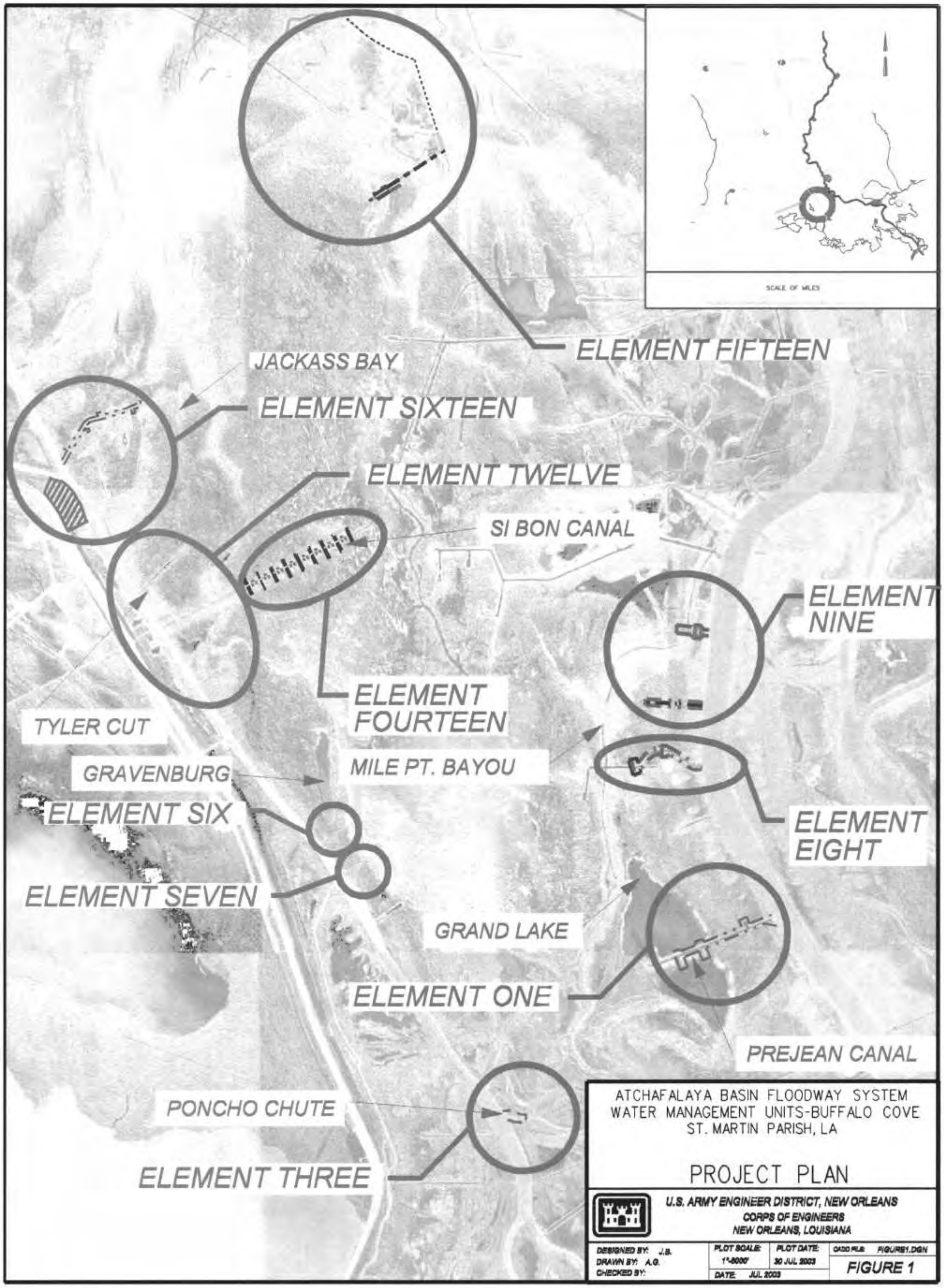
ELEMENT FIFTEEN
JACKASS BAY
ELEMENT SIXTEEN
ELEMENT TWELVE
SI BON CANAL
ELEMENT NINE
ELEMENT FOURTEEN
TYLER CUT
GRAVENBURG
MILE PT. BAYOU
ELEMENT SIX
ELEMENT EIGHT
ELEMENT SEVEN
GRAND LAKE
ELEMENT ONE
PREJEAN CANAL
PONCHO CHUTE
ELEMENT THREE
SCALE OF MILES
ATCHAFALAYA BASIN FLOODWAY SYSTEM
WATER MANAGEMENT UNITS-BUFFALO COVE
ST. MARTIN PARISH, LA
PROJECT PLAN
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA
DESIGNED BY: J.B.
DRAWN BY: A.G.
CHECKED BY:
PLOT SCALE: 1"=5000'
PLOT DATE: 30 JUL 2003
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FIGURE 1

PURPOSE AND NEED FOR THE PROPOSED ACTION

The Atchafalaya Basin Floodway System (ABFS) incorporates a multipurpose comprehensive plan that provides flood protection to south-central Louisiana, and preserves one of the largest alluvial bottomland hardwood swamps remaining in the continental United States. The floodway system ensures passage of up to one half of the predicted design flood of the combined flows of the Red and Mississippi Rivers, southward from the latitude of the Old River Control Complex to the Gulf of Mexico. The purpose of the ABFS is to protect life and property from major Mississippi River floods by diverting excess flows to the Gulf of Mexico. The ABFS, 1982 feasibility study/final environmental impact statement (FEIS) considered 13 management units in the Lower Atchafalaya Basin Floodway, ultimately recommending authorization of the initial construction of 5 management units with the initial construction of 2 pilot management units at Buffalo Cove and Henderson Lake as authorized features of the Recommended Plan for the floodway system, and construction of Cocodrie, Beau Bayou, and Flat Lake authorized management units to be held in abeyance pending the implementation decision of the Chief of Engineers after evaluating the operational success of the initial 2 pilot management units.

The purpose of the management units feature of the ABFS is to restore historical overflow patterns to the extent practicable, encourage over bank water movement through the management units, and reduce sediment deposition within the ABFS with the ultimate goal of restoring and enhancing the aquatic environment.

Rapid sediment deposition rates, altered hydrological relationships, and reduced water quality are now inducing environmental changes within the Atchafalaya Basin Floodway. The proposed action would produce "stand alone" benefits for specific water management objectives and would make additive contributions to the overall basin. Additional water quality improvements would be expected as successive management units are initiated. Supplemental environmental impact statements will be prepared to address both the direct and cumulative impacts of constructing and operating these future elements within the BCMU and the remaining authorized management units, as funds are obligated. The proposed action would provide for the implementation of an improved water distribution modification based on the previous pilot management studies in the Bayou Eugene area through the construction of the Buffalo Cove Pilot Management Unit, Bayou Eugene, Engineering Design Prototype Model Test. The proposed action evaluated in this EA would initiate both preservation of the area and a more targeted and precise development of an overall design concept for implementing a more integrated construction approach for the Buffalo Cove pilot management unit feature of the ABFS.

The purpose of the current proposed work is to prolong the life expectancy of the productive habitat that would become scarce over time (primarily aquatic and cypress tupelo habitats) by restricting or redirecting sediments, while simultaneously achieving a healthy water circulation pattern that would maintain or restore water quality and reestablish north to south water movement. Sediments would be managed so they would be directed to areas already undergoing accretion, thus prolonging the existence of swamp and aquatic habitat. These improved modifications would be evaluated for inclusion in an overall water management strategy for the BCMU.

AUTHORITY FOR THE PROPOSED ACTION

The proposed action was authorized by the Flood Control Act of May 15, 1928 (Public Law 391, 70th Congress), as amended and supplemented. Construction of two pilot management units (Buffalo Cove and Henderson Lake) is authorized by the Supplemental Appropriations Act of 1985 (PL 99-88) and the Water Resources Development Act (WRDA) of 1986 (PL 99-662), with construction of three additional authorized management units(Flat Lake, Beau Bayou, and Cocodrie Swamp) to take place upon approval of the Chief of Engineers after evaluation of the operational success of the initial two pilot management units. WRDA 1986 authorized the USACE to carry out the recommended plan for management units as described in the ABFS feasibility report of 1982 and the subsequent Chief of Engineers Report dated February 28, 1983.

PRIOR REPORTS

The 1982 feasibility study/FEIS for the ABFS evaluated the construction of two pilot management units, at Buffalo Cove and Henderson Lake, as an authorized feature of the floodway system feature of the Mississippi River and Tributaries, Atchafalaya Basin project. Engineering and design prototype model testing was not addressed. An EA prepared September 14, 1993, evaluated the impacts of an initial prototype model test in the BCMU along Bayou Eugene. By memorandum dated March 25, 1993, the President of the Mississippi River Commission approved the document entitled, "Flood Control, Mississippi River and Tributaries, Atchafalaya Basin Floodway System, Louisiana, Buffalo Cove Pilot Management Unit, Bayou Eugene, Engineering Design Prototype Model Test" for the construction of the Buffalo Cove Pilot Management Unit, Bayou Eugene Prototype Model Test Project, construction of which project was completed in 1965. This prototype model test was evaluated and monitored to aid in the design of water delivery features that would be used in the overall BCMU. A post construction monitoring report ("Effects of Variation in River Stage on the Water Quality and Biota in the BCMU of the Atchafalaya Basin, Louisiana"), evaluating the effects of the initial hydrologic improvements, was prepared in 1999 under contract to the MVN by the U.S. Fish and Wildlife Service in cooperation with the Louisiana State University Fisheries Department. Modifications to the original Bayou Eugene prototype model test were evaluated in EA #194A prepared in November 2001 entitled "Atchafalaya Floodway System, Buffalo Cove Pilot Management Unit; Bayou Eugene Prototype Model Test Modifications".

Additional actions were taken with the State of Louisiana to actively pursue the water management issue. The Louisiana Department of Natural Resources (LDNR) and the USACE entered into a Memorandum of Understanding (MOU) that was executed October 26, 1998 to initiate water management. Working with the state under this MOU, the USACE completed the Federal Master Plan for Atchafalaya Basin Floodway System, Louisiana project. The USACE Master Plan was completed in 2000 and serves as a guide in implementing the authorized features of the 1982 feasibility study. In terms of management units, the USACE Master Plan is important because it redefines the methods of implementation of the two pilot management units.

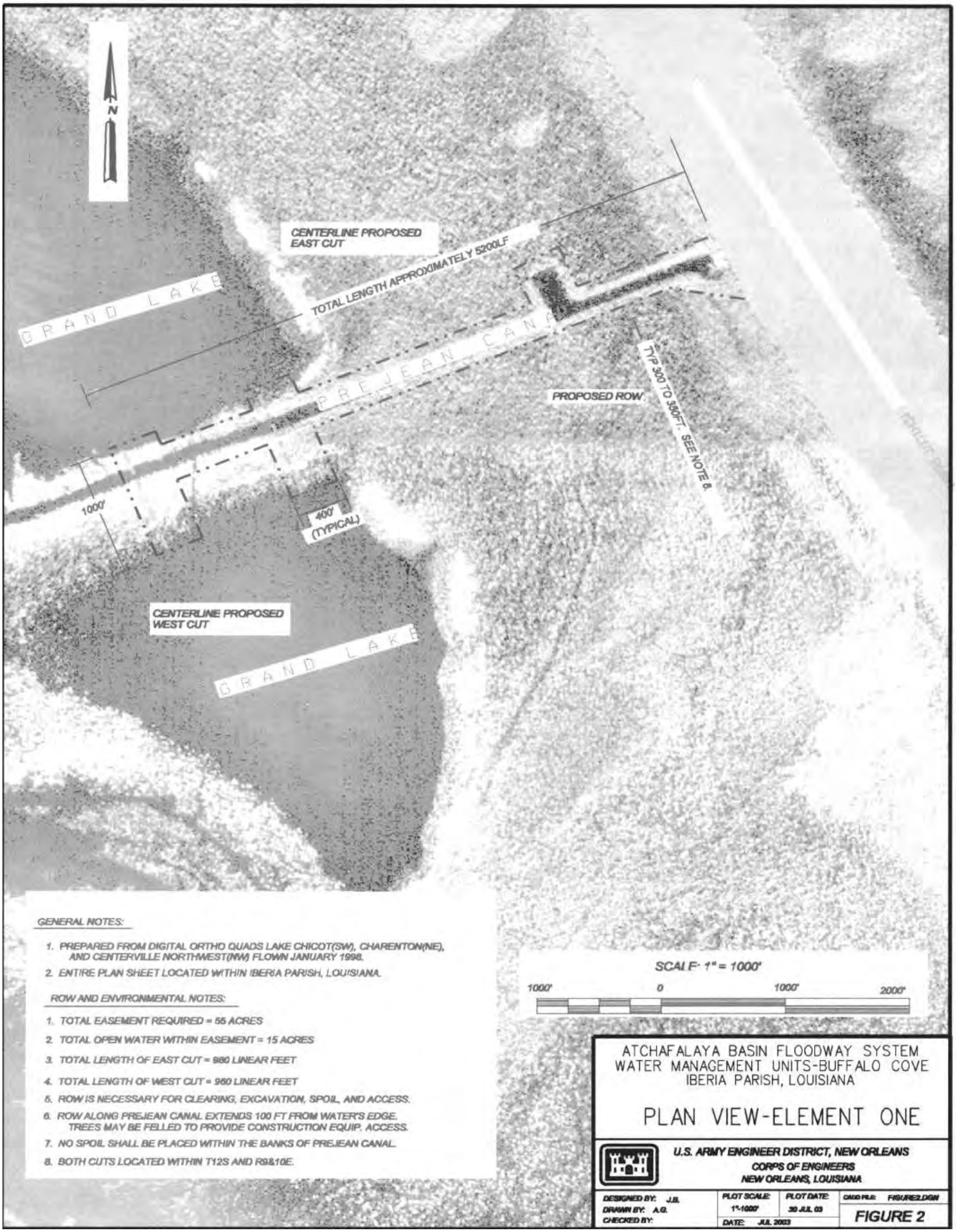
PUBLIC CONCERNS

Residents of the Atchafalaya Basin (the basin) are concerned about the floodway's ability to pass project floods and prevent inundation of property adjacent to the floodway system. Widespread support at state, local, and Federal levels exists for protecting environmental resources within the basin with special emphasis on averting further loss or degradation of wetland and woodland habitats. This support comes from a wide spectrum of the public representing residents as well as recreational and commercial users of the basin's resources. Concerns center on the probability of increased sedimentation and insufficient circulation, which may lead to hypoxic conditions and further reduce or eliminate viable habitat that exists under current conditions. Additionally there is concern for the overall health of the commercial and recreational fishery, the forestry resources, and wildlife habitat in the project area, as well as the passive uses of the basin.

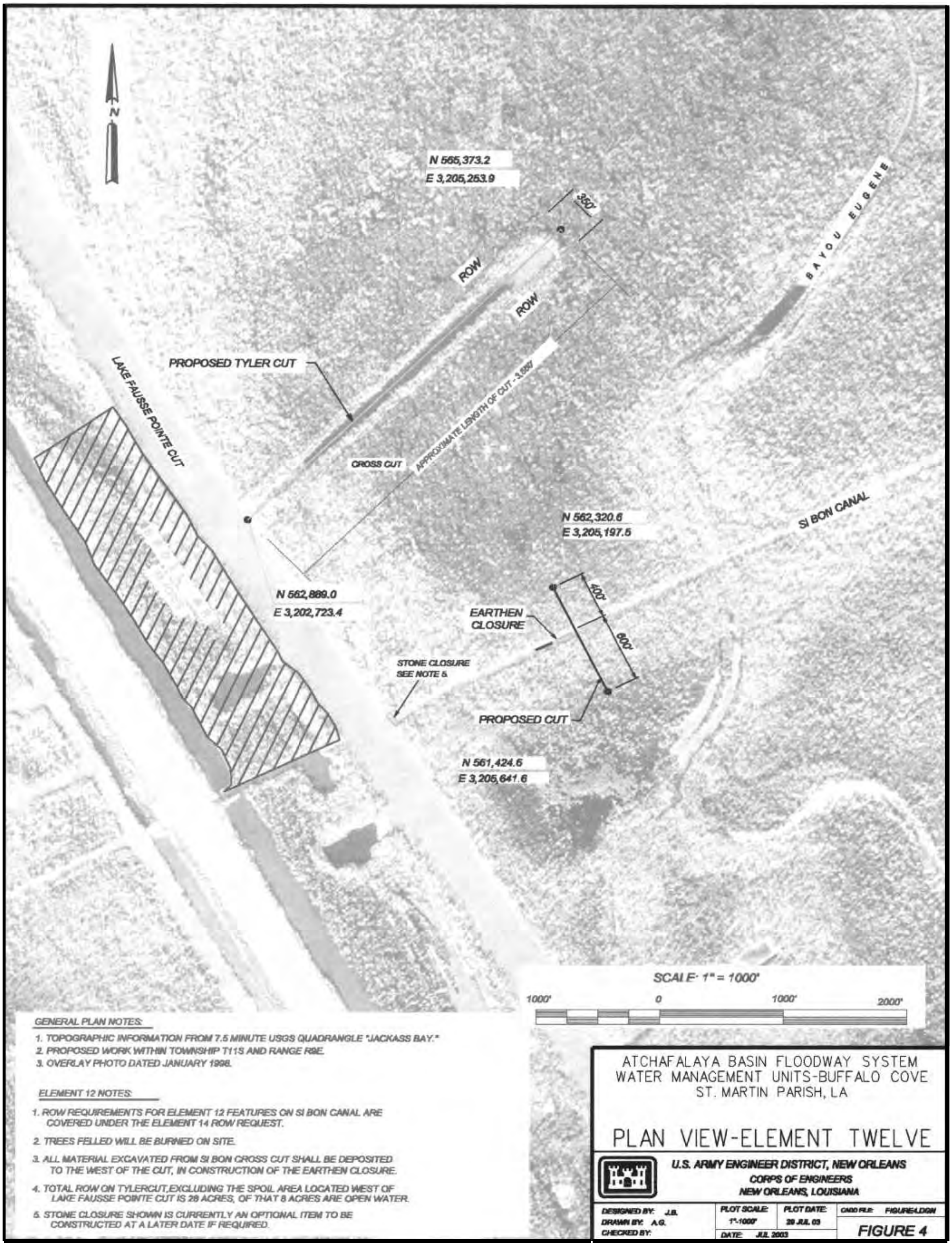
DESCRIPTION OF THE PROPOSED ACTION

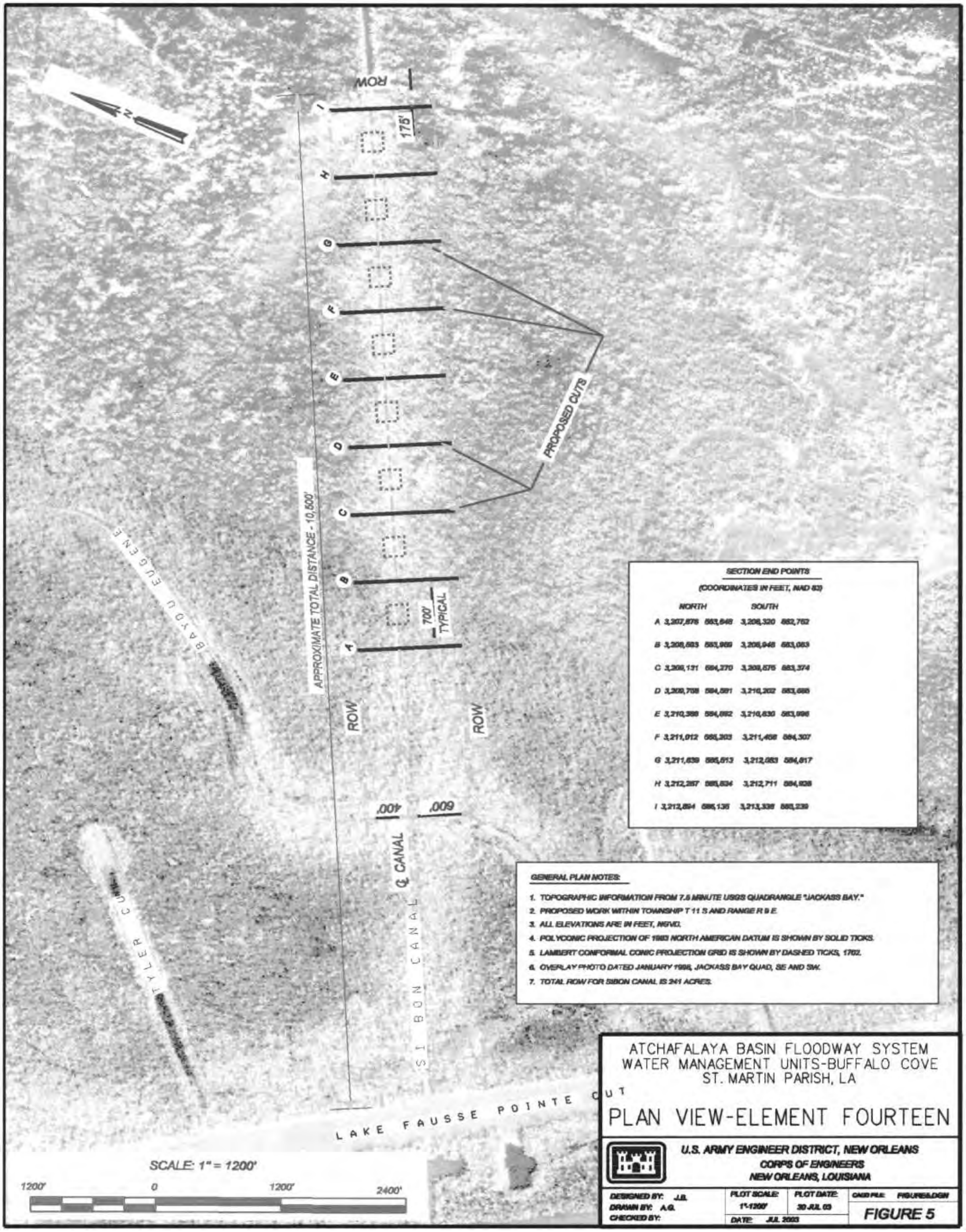
PLAN DESCRIPTION

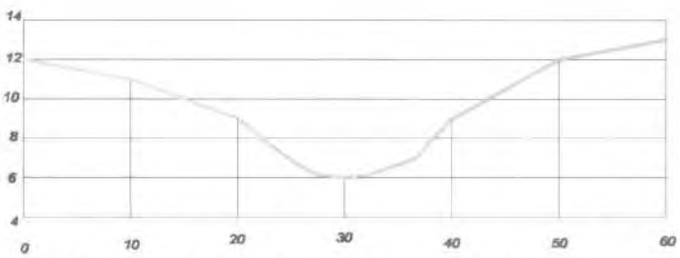
The proposed water management project is designed to improve interior circulation within the swamp; remove barriers to facilitate north to south flow; provide input of oxygenated, low temperature river water; and prevent or manage sediment input into the interior swamps. This would be accomplished by the construction of 10 elements (figures 2-13), which consist of a series of closures and sediment traps (to prevent sediment influx), constructed inputs for river water, and gaps placed in existing embankments (figure 1). Elements 1, 8, 12, and 14 (figures 2, 3, 4, and 5 respectively) are primarily intended to improve drainage and reestablish flow through the interior swamp basin. Cuts would be made through existing dredged material embankments to improve circulation and drainage in the interior swamp or create a connection between two water bodies (element 1). The excavated material would be placed non-continuously, with 50-foot gaps between placements, oriented in a north to south direction to prevent interference with sheet flow across the swamp. Elements 6 and 7 (figures 6 and 7) would function primarily as a means of restricting sediment input. The primary function of elements 9, 15, and 16 (figures 8, 9, and 10) would be to provide an additional source of river water into the management unit. These elements would include sediment traps to allow river water input while limiting sediment transport into the unit. Element 12 also supplements the freshwater input into the swamp through Tyler Cut (figure 4). It reduces sediment input through the closure of the Sibon Canal and improves internal circulation by removing barriers to flow. The remaining element 3 (figure 11), blocks a waterway, which presently acts as a hydraulic dam, preventing drainage of the management unit.


N
CENTERLINE PROPOSED EAST CUT
TOTAL LENGTH APPROXIMATELY 5200LF
GRAND LAKE
PREJEAN CANAL
PROPOSED ROW
TYP 300 TO 350FT. SEE NOTE 6.
1000'
400' (TYPICAL)
CENTERLINE PROPOSED WEST CUT
GRAND LAKE
GENERAL NOTES:
1. PREPARED FROM DIGITAL ORTHO QUADS LAKE CHICOT(SW), CHARENTON(NE), AND CENTERVILLE NORTHWEST(NW) FLOWN JANUARY 1998.
2. ENTIRE PLAN SHEET LOCATED WITHIN IBERIA PARISH, LOUISIANA.
ROW AND ENVIRONMENTAL NOTES:
1. TOTAL EASEMENT REQUIRED = 55 ACRES
2. TOTAL OPEN WATER WITHIN EASEMENT = 15 ACRES
3. TOTAL LENGTH OF EAST CUT = 980 LINEAR FEET
4. TOTAL LENGTH OF WEST CUT = 960 LINEAR FEET
5. ROW IS NECESSARY FOR CLEARING, EXCAVATION, SPOIL, AND ACCESS.
6. ROW ALONG PREJEAN CANAL EXTENDS 100 FT FROM WATER'S EDGE. TREES MAY BE FELLED TO PROVIDE CONSTRUCTION EQUIP. ACCESS.
7. NO SPOIL SHALL BE PLACED WITHIN THE BANKS OF PREJEAN CANAL.
8. BOTH CUTS LOCATED WITHIN T12S AND R9&10E.
SCALE: 1" = 1000'
1000'
0
1000'
2000'
ATCHAFALAYA BASIN FLOODWAY SYSTEM
WATER MANAGEMENT UNITS-BUFFALO COVE
IBERIA PARISH, LOUISIANA
PLAN VIEW-ELEMENT ONE
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA
DESIGNED BY: J.B.
DRAWN BY: A.G.
CHECKED BY:
PLOT SCALE: 1"-1000'
PLOT DATE: 30 JUL 03
DATE: JUL 2003
CADD FILE: FIGURE2.DGN
FIGURE 2

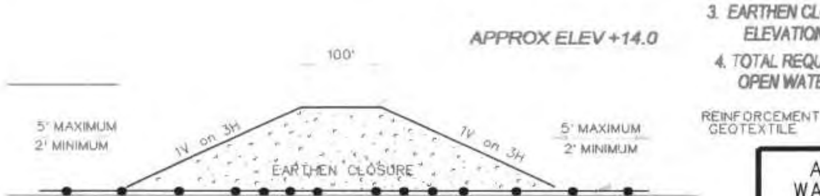

N
ATCHAFALAYA BASIN MAIN CHANNEL
SANDPILE
PROPOSED ROW
EAST CUT
WEST CUT
SAND HILL CANAL
IMPROVEMENTS
EXISTING SHEETPILE
CUT CA
MILE POINT BAYOU
T12S, R9E
T12S, R10E
SCALE 1" = 1000'
1000'
0
1000'
2000'
1. TOTAL EASEMENT REQUIRED = 47 ACRES
2. TOTAL OPEN WATER WITHIN EASEMENT = 12 ACRES.
3. TOTAL LENGTH OF WEST CUT = 1296 LINEAR FEET.
4. TOTAL LENGTH OF EAST CUT = 982 LINEAR FEET.
5. CLOSURE SHALL BE CONSTRUCTED TO ELEV (+)15.0 WITH A 100FT CROWN. EXACT LOCATION SHALL BE DETERMINED UPON COMPLETION OF ENGR ANALYSIS WITH COMPLETE DATA.
6. ROW IS NECESSARY FOR CLEARING, EXCAVATION, SPOIL, AND ACCESS.
7. ROW ALONG SAN HILL CANAL EXTENDS 100FT FROM WES.
8. NO SPOIL SHALL BE PLACED WITHIN THE BANKS OF SAND HILL CANAL.
GENERAL NOTES:
1. PREPARED FROM DIGITAL ORTHO QUADS JACKASS BAY(SE) AND LAKE CHICOT (SW) FLOWN IN JANUARY 1998.
ATCHAFALAYA BASIN FLOODWAY SYSTEM
WATER MANAGEMENT UNITS-BUFFALO COVE
IBERIA PARISH, LOUISIANA
PLAN VIEW-ELEMENT EIGHT
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA
DESIGNED BY: J.B.
DRAWN BY: A.G.
CHECKED BY:
PLOT SCALE: 1"=1000'
PLOT DATE: 30 JUL 03
DATE: JUL 2002
CADD FILE: FIGURE3.DGN
FIGURE 3


N
N 565,373.2
E 3,205,253.9
350'
BAYOU EUGENE
ROW
ROW
PROPOSED TYLER CUT
LAKE FAUSSE POINTE CUT
APPROXIMATE LENGTH OF CUT - 3,550'
CROSS CUT
N 562,320.6
E 3,205,197.5
SI BON CANAL
N 562,889.0
E 3,202,723.4
400'
EARTHEN CLOSURE
600'
STONE CLOSURE SEE NOTE 5
PROPOSED CUT
N 561,424.6
E 3,205,641.6
SCALE: 1" = 1000'
1000'
0
1000'
2000'
GENERAL PLAN NOTES:
1. TOPOGRAPHIC INFORMATION FROM 7.5 MINUTE USGS QUADRANGLE "JACKASS BAY."
2. PROPOSED WORK WITHIN TOWNSHIP T11S AND RANGE R9E.
3. OVERLAY PHOTO DATED JANUARY 1998.
ELEMENT 12 NOTES:
1. ROW REQUIREMENTS FOR ELEMENT 12 FEATURES ON SI BON CANAL ARE COVERED UNDER THE ELEMENT 14 ROW REQUEST.
2. TREES FELLED WILL BE BURNED ON SITE.
3. ALL MATERIAL EXCAVATED FROM SI BON CROSS CUT SHALL BE DEPOSITED TO THE WEST OF THE CUT, IN CONSTRUCTION OF THE EARTHEN CLOSURE.
4. TOTAL ROW ON TYLERCUT,EXCLUDING THE SPOIL AREA LOCATED WEST OF LAKE FAUSSE POINTE CUT IS 28 ACRES, OF THAT 8 ACRES ARE OPEN WATER.
5. STONE CLOSURE SHOWN IS CURRENTLY AN OPTIONAL ITEM TO BE CONSTRUCTED AT A LATER DATE IF REQUIRED.
ATCHAFALAYA BASIN FLOODWAY SYSTEM
WATER MANAGEMENT UNITS-BUFFALO COVE
ST. MARTIN PARISH, LA
PLAN VIEW-ELEMENT TWELVE
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA
DESIGNED BY: J.B.
DRAWN BY: A.G.
CHECKED BY:
PLOT SCALE: 1"=1000'
PLOT DATE: 29 JUL 03
DATE: JUL 2003
CADD FILE: FIGURE4.DGN
FIGURE 4


N
ROW
175'
I
H
G
F
E
D
C
B
A
PROPOSED CUTS
APPROXIMATE TOTAL DISTANCE - 10,500'
700' TYPICAL
ROW
ROW
400'
600'
℄ CANAL
BAYOU EUGENE
TYLER CUT
SIBON CANAL
LAKE FAUSSE POINTE CUT
SECTION END POINTS
(COORDINATES IN FEET, NAD 83)
NORTH SOUTH
A 3,207,876 583,646 3,208,320 582,752
B 3,208,503 583,959 3,208,948 583,063
C 3,209,131 584,270 3,209,575 583,374
D 3,209,758 584,581 3,210,202 583,685
E 3,210,385 584,892 3,210,830 583,996
F 3,211,012 585,203 3,211,458 584,307
G 3,211,639 585,513 3,212,083 584,617
H 3,212,267 585,824 3,212,711 584,928
I 3,212,894 586,135 3,213,338 585,239
GENERAL PLAN NOTES:
1. TOPOGRAPHIC INFORMATION FROM 7.5 MINUTE USGS QUADRANGLE "JACKASS BAY."
2. PROPOSED WORK WITHIN TOWNSHIP T 11 S AND RANGE R 9 E.
3. ALL ELEVATIONS ARE IN FEET, NGVD.
4. POLYCONIC PROJECTION OF 1983 NORTH AMERICAN DATUM IS SHOWN BY SOLID TICKS.
5. LAMBERT CONFORMAL CONIC PROJECTION GRID IS SHOWN BY DASHED TICKS, 1702.
6. OVERLAY PHOTO DATED JANUARY 1998, JACKASS BAY QUAD, SE AND SW.
7. TOTAL ROW FOR SIBON CANAL IS 241 ACRES.
ATCHAFALAYA BASIN FLOODWAY SYSTEM
WATER MANAGEMENT UNITS-BUFFALO COVE
ST. MARTIN PARISH, LA
PLAN VIEW-ELEMENT FOURTEEN
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA
DESIGNED BY: J.B.
DRAWN BY: A.G.
CHECKED BY:
PLOT SCALE: 1"=1200'
PLOT DATE: 30 JUL 03
DATE: JUL 2003
CADD FILE: FIGURE5.DGN
FIGURE 5
SCALE: 1" = 1200'
1200' 0 1200' 2400'



CROSS SECTION @ EARTHEN CLOSURE



TYPICAL EARTHEN CHANNEL CLOSURE DESIGN SECTION

NOT TO SCALE

DETAILED PLAN NOTES:

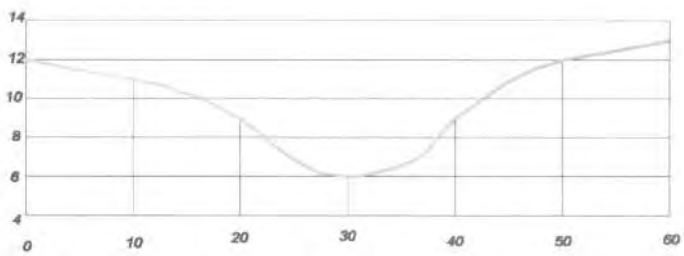
1. TREES FELLED WITHIN THE FOOTPRINT OF CONSTRUCTION SHALL BE PLACED DOWNSTREAM OF THE EARTHEN CLOSURES.
2. BORROW MATERIAL FOR EARTHEN CLOSURES SHALL BE OBTAINED FROM THE EXISTING BANKS LOCATED DOWNSTREAM OF THE PROPOSED EARTHEN CLOSURE.
3. EARTHEN CLOSURES SHALL BE CONSTRUCTED WITH A CREST ELEVATION 1-FT HIGHER THAN ADJACENT UPSTREAM BANKS.
4. TOTAL REQUIRED ROW IS 10 ACRES, OF WHICH 1 ACRE IS OPEN WATER.

ATCHAFALAYA BASIN FLOODWAY SYSTEM
WATER MANAGEMENT UNITS-BUFFALO COVE
IBERIA PARISH, LA

ELEMENT SIX
PLAN VIEW AND DESIGN SECTION

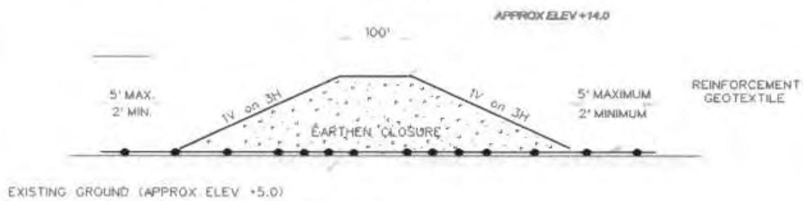
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: J.B. DRAWN BY: A.G. CHECKED BY:	PLOT SCALE: N.T.S.	PLOT DATE: 30 JUL 03	CADD FILE: FIGURES.DGN
	DATE: JUL 2003		FIGURE 6



CROSS SECTION @ EARTHEN CLOSURE

NOT TO SCALE



TYPICAL EARTHEN CLOSURE DESIGN SECTION

NOT TO SCALE

GENERAL NOTES:

1. PREPARED FROM AERIAL PHOTOS FLOWN IN JANUARY 1998.

DETAILED PLAN NOTES:

1. TREES WITHIN THE FOOTPRINT OF CONSTRUCTION SHALL BE PLACED DOWNSTREAM OF THE CLOSURE.
2. BORROW MATERIAL FOR EARTHEN CORE SHALL BE OBTAINED FROM WITHIN THE AVAILABLE ROW DOWNSTREAM OF THE PROPOSED CLOSURE.
3. CLOSURE SHALL BE CONSTRUCTED WITH A CREST ELEVATION 1-FT HIGHER THAN ADJACENT BANKS.
4. ACCESS CORRIDOR = 350 LINEAR FEET, EXTENDING 50' BEYOND TOP OF EITHER BANK.
5. TOTAL REQUIRED ROW IS 1.3 ACRES, OF WHICH 0.3 IS OPEN WATER.

QUANTITY ESTIMATES KEYHOLE CANAL

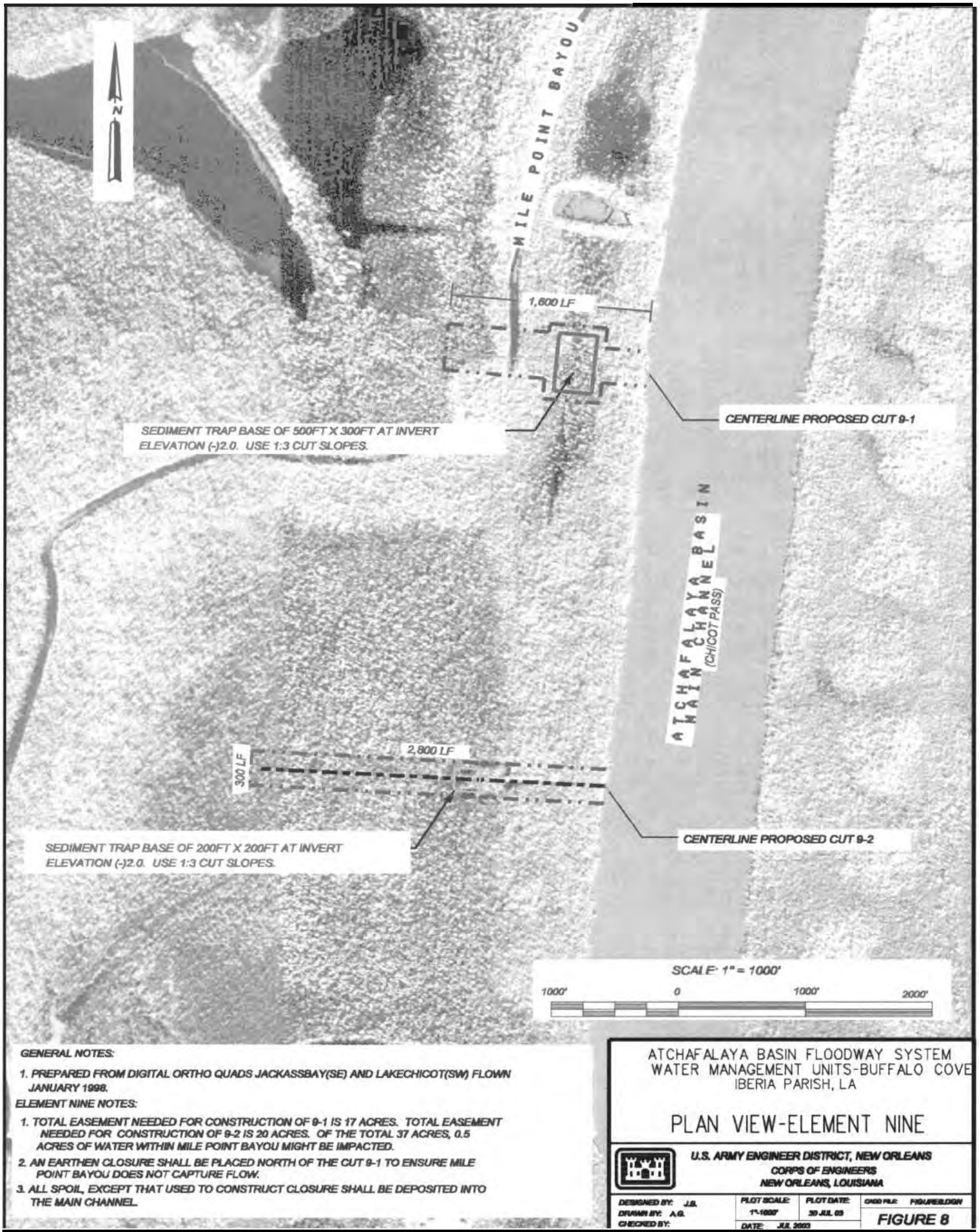
EARTHEN FILL	1,950 CUBIC YARDS
REINFORCEMENT FABRIC	1,250 SQUARE YARDS

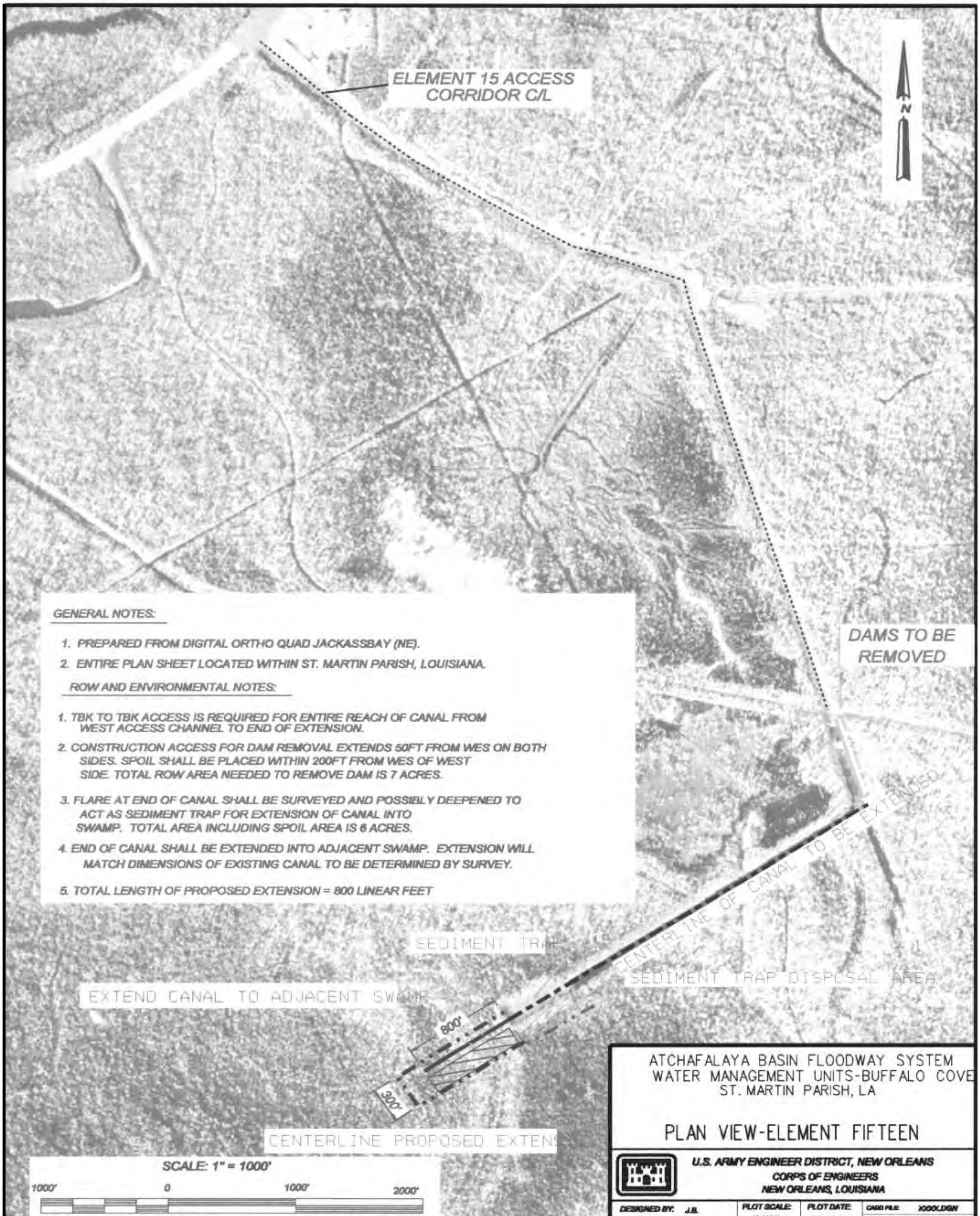
ATCHAFALAYA BASIN FLOODWAY SYSTEM
WATER MANAGEMENT UNITS-BUFFALO COVE
IBERIA PARISH, LA

ELEMENT SEVEN
PLAN VIEW AND DESIGN SECTION

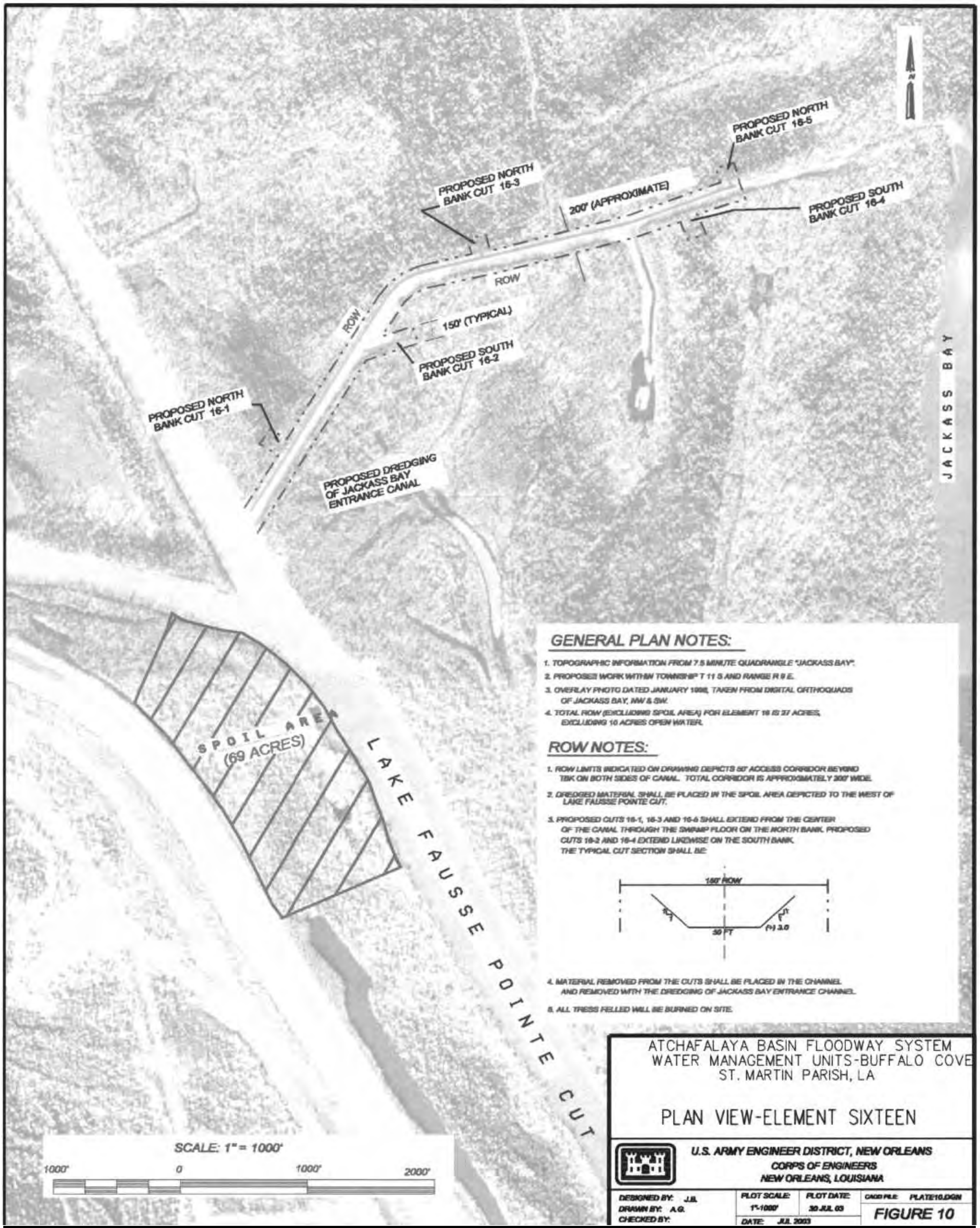
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: J.B. DRAWN BY: A.G. CHECKED BY:	PLOT SCALE: 1"=1000'	PLOT DATE: 30 JUL 03	CADD FILE: FIGURE7.DGN
	DATE: JUL 2003		FIGURE 7

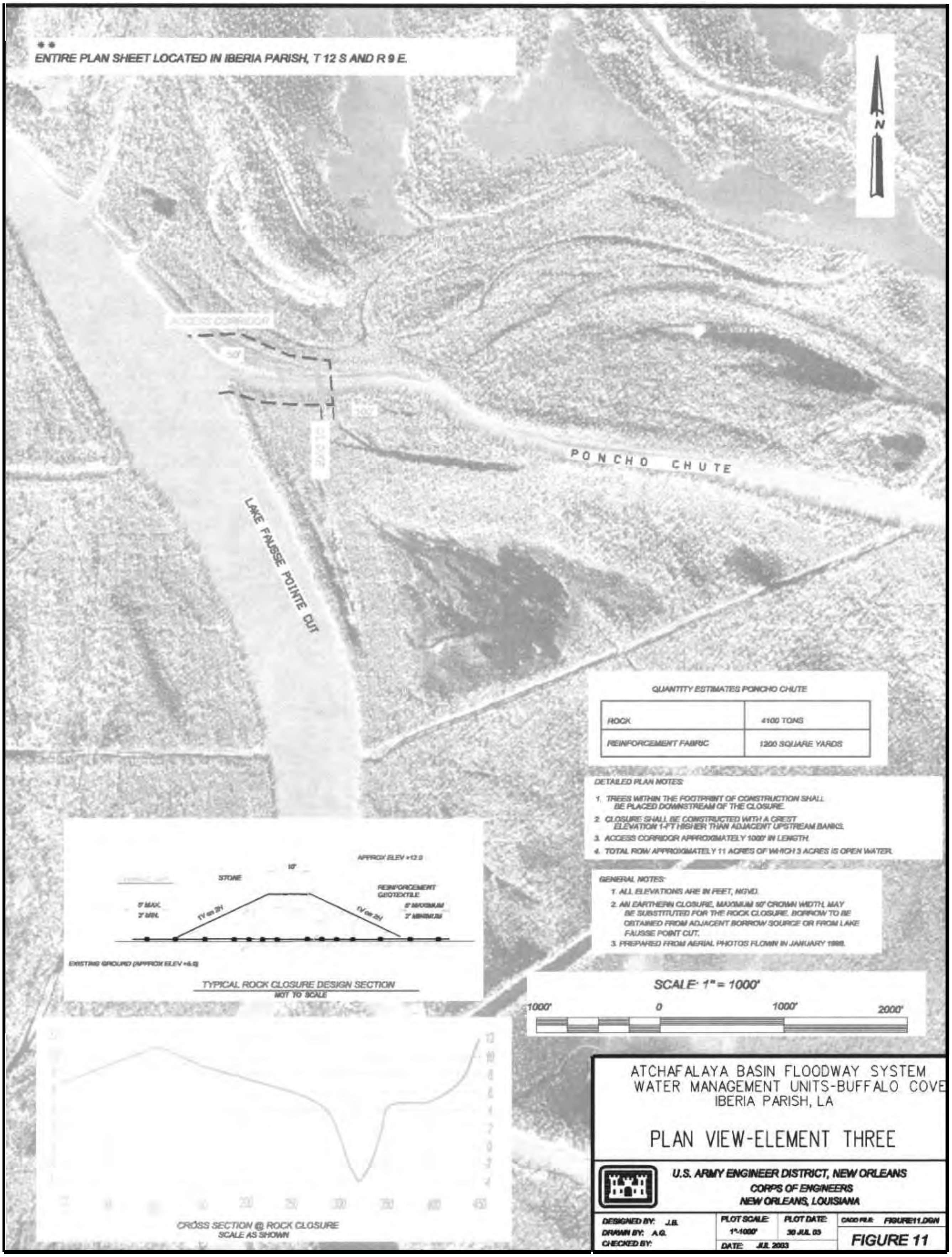

N
MILE POINT BAYOU
1,600 LF
CENTERLINE PROPOSED CUT 9-1
SEDIMENT TRAP BASE OF 500FT X 300FT AT INVERT ELEVATION (-)2.0. USE 1:3 CUT SLOPES.
ATCHAFALAYA BASIN MAIN CHANNEL (CHICOT PASS)
2,800 LF
300 LF
CENTERLINE PROPOSED CUT 9-2
SEDIMENT TRAP BASE OF 200FT X 200FT AT INVERT ELEVATION (-)2.0. USE 1:3 CUT SLOPES.
SCALE: 1" = 1000'
1000'
0
1000'
2000'
GENERAL NOTES:
1. PREPARED FROM DIGITAL ORTHO QUADS JACKASSBAY(SE) AND LAKECHICOT(SW) FLOWN JANUARY 1998.
ELEMENT NINE NOTES:
1. TOTAL EASEMENT NEEDED FOR CONSTRUCTION OF 9-1 IS 17 ACRES. TOTAL EASEMENT NEEDED FOR CONSTRUCTION OF 9-2 IS 20 ACRES. OF THE TOTAL 37 ACRES, 0.5 ACRES OF WATER WITHIN MILE POINT BAYOU MIGHT BE IMPACTED.
2. AN EARTHEN CLOSURE SHALL BE PLACED NORTH OF THE CUT 9-1 TO ENSURE MILE POINT BAYOU DOES NOT CAPTURE FLOW.
3. ALL SPOIL, EXCEPT THAT USED TO CONSTRUCT CLOSURE SHALL BE DEPOSITED INTO THE MAIN CHANNEL.
ATCHAFALAYA BASIN FLOODWAY SYSTEM
WATER MANAGEMENT UNITS-BUFFALO COVE
IBERIA PARISH, LA
PLAN VIEW-ELEMENT NINE
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA
DESIGNED BY: J.B.
DRAWN BY: A.G.
CHECKED BY:
PLOT SCALE: 1"=1000'
PLOT DATE: 30 JUL 03
DATE: JUL 2003
FIGURE 8



ELEMENT 15 ACCESS CORRIDOR C/L
N
DAMS TO BE REMOVED
GENERAL NOTES:
1. PREPARED FROM DIGITAL ORTHO QUAD JACKASSBAY (NE).
2. ENTIRE PLAN SHEET LOCATED WITHIN ST. MARTIN PARISH, LOUISIANA.
ROW AND ENVIRONMENTAL NOTES:
1. TBK TO TBK ACCESS IS REQUIRED FOR ENTIRE REACH OF CANAL FROM WEST ACCESS CHANNEL TO END OF EXTENSION.
2. CONSTRUCTION ACCESS FOR DAM REMOVAL EXTENDS 50FT FROM WES ON BOTH SIDES. SPOIL SHALL BE PLACED WITHIN 200FT FROM WES OF WEST SIDE. TOTAL ROW AREA NEEDED TO REMOVE DAM IS 7 ACRES.
3. FLARE AT END OF CANAL SHALL BE SURVEYED AND POSSIBLY DEEPENED TO ACT AS SEDIMENT TRAP FOR EXTENSION OF CANAL INTO SWAMP. TOTAL AREA INCLUDING SPOIL AREA IS 6 ACRES.
4. END OF CANAL SHALL BE EXTENDED INTO ADJACENT SWAMP. EXTENSION WILL MATCH DIMENSIONS OF EXISTING CANAL TO BE DETERMINED BY SURVEY.
5. TOTAL LENGTH OF PROPOSED EXTENSION = 800 LINEAR FEET
CENTERLINE OF CANAL TO BE EXTENDED
SEDIMENT TRAP DISPOSAL AREA
EXTEND CANAL TO ADJACENT SWAMP
800'
300'
CENTERLINE PROPOSED EXTENS
SCALE: 1" = 1000'
1000'
0
1000'
2000'
ATCHAFALAYA BASIN FLOODWAY SYSTEM
WATER MANAGEMENT UNITS-BUFFALO COVE
ST. MARTIN PARISH, LA
PLAN VIEW-ELEMENT FIFTEEN
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA
DESIGNED BY: J.B.
DRAWN BY: A.G.
CHECKED BY:
PLOT SCALE: 1"-1000'
PLOT DATE: 30 DEC 02
DATE: JUL 2003
CADD FILE: XXXX.DGN
FIGURE 9



PROPOSED NORTH BANK CUT 16-5
PROPOSED NORTH BANK CUT 16-3
200' (APPROXIMATE)
PROPOSED SOUTH BANK CUT 16-4
ROW
ROW
150' (TYPICAL)
PROPOSED SOUTH BANK CUT 16-2
PROPOSED NORTH BANK CUT 16-1
PROPOSED DREDGING OF JACKASS BAY ENTRANCE CANAL
JACKASS BAY
SPOIL AREA
(69 ACRES)
LAKE FAUSSE POINTE CUT
GENERAL PLAN NOTES:
1. TOPOGRAPHIC INFORMATION FROM 7.5 MINUTE QUADRANGLE "JACKASS BAY".
2. PROPOSED WORK WITHIN TOWNSHIP T 11 S AND RANGE R 9 E.
3. OVERLAY PHOTO DATED JANUARY 1998, TAKEN FROM DIGITAL ORTHOQUADS OF JACKASS BAY, NW & SW.
4. TOTAL ROW (EXCLUDING SPOIL AREA) FOR ELEMENT 16 IS 37 ACRES, EXCLUDING 10 ACRES OPEN WATER.
ROW NOTES:
1. ROW LIMITS INDICATED ON DRAWING DEPICTS 50' ACCESS CORRIDOR BEYOND TBK ON BOTH SIDES OF CANAL. TOTAL CORRIDOR IS APPROXIMATELY 200' WIDE.
2. DREDGED MATERIAL SHALL BE PLACED IN THE SPOIL AREA DEPICTED TO THE WEST OF LAKE FAUSSE POINTE CUT.
3. PROPOSED CUTS 16-1, 16-3 AND 16-5 SHALL EXTEND FROM THE CENTER OF THE CANAL THROUGH THE SWAMP FLOOR ON THE NORTH BANK. PROPOSED CUTS 16-2 AND 16-4 EXTEND LIKEWISE ON THE SOUTH BANK. THE TYPICAL CUT SECTION SHALL BE:
150' ROW
50 FT
(-) 3.0
4. MATERIAL REMOVED FROM THE CUTS SHALL BE PLACED IN THE CHANNEL AND REMOVED WITH THE DREDGING OF JACKASS BAY ENTRANCE CHANNEL.
5. ALL TRESS FELLED WILL BE BURNED ON SITE.
ATCHAFALAYA BASIN FLOODWAY SYSTEM
WATER MANAGEMENT UNITS-BUFFALO COVE
ST. MARTIN PARISH, LA
PLAN VIEW-ELEMENT SIXTEEN
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA
DESIGNED BY: J.B.
DRAWN BY: A.G.
CHECKED BY:
PLOT SCALE: 1"=1000'
PLOT DATE: 30 JUL 03
DATE: JUL 2003
PLATE10.DGN
FIGURE 10
SCALE: 1" = 1000'
1000'
0
1000'
2000'



**
ENTIRE PLAN SHEET LOCATED IN IBERIA PARISH, T 12 S AND R 9 E.
N
PONCHO CHUTE
LAKE FAUSSE POINTE CUT
QUANTITY ESTIMATES PONCHO CHUTE
ROCK
4100 TONS
REINFORCEMENT FABRIC
1200 SQUARE YARDS
DETAILED PLAN NOTES:
1. TREES WITHIN THE FOOTPRINT OF CONSTRUCTION SHALL BE PLACED DOWNSTREAM OF THE CLOSURE.
2. CLOSURE SHALL BE CONSTRUCTED WITH A CREST ELEVATION 1-FT HIGHER THAN ADJACENT UPSTREAM BANKS.
3. ACCESS CORRIDOR APPROXIMATELY 1000' IN LENGTH.
4. TOTAL ROW APPROXIMATELY 11 ACRES OF WHICH 3 ACRES IS OPEN WATER.
GENERAL NOTES:
1. ALL ELEVATIONS ARE IN FEET, NGVD.
2. AN EARTHERN CLOSURE, MAXIMUM 50' CROWN WIDTH, MAY BE SUBSTITUTED FOR THE ROCK CLOSURE. BORROW TO BE OBTAINED FROM ADJACENT BORROW SOURCE OR FROM LAKE FAUSSE POINT CUT.
3. PREPARED FROM AERIAL PHOTOS FLOWN IN JANUARY 1998.
APPROX ELEV +12.0
10'
STONE
REINFORCEMENT GEOTEXTILE
5' MAX.
2' MIN.
1V on 2H
1V on 2H
5' MAXIMUM
2' MINIMUM
EXISTING GROUND (APPROX ELEV +6.0)
TYPICAL ROCK CLOSURE DESIGN SECTION
NOT TO SCALE
SCALE: 1" = 1000'
1000'
0
1000'
2000'
CROSS SECTION @ ROCK CLOSURE
SCALE AS SHOWN
ATCHAFALAYA BASIN FLOODWAY SYSTEM
WATER MANAGEMENT UNITS-BUFFALO COVE
IBERIA PARISH, LA
PLAN VIEW-ELEMENT THREE
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA
DESIGNED BY: J.B.
DRAWN BY: A.G.
CHECKED BY:
PLOT SCALE: 1"=1000'
PLOT DATE: 30 JUL 03
DATE: JUL 2003
CADD FILE: FIGURE11.DGN
FIGURE 11

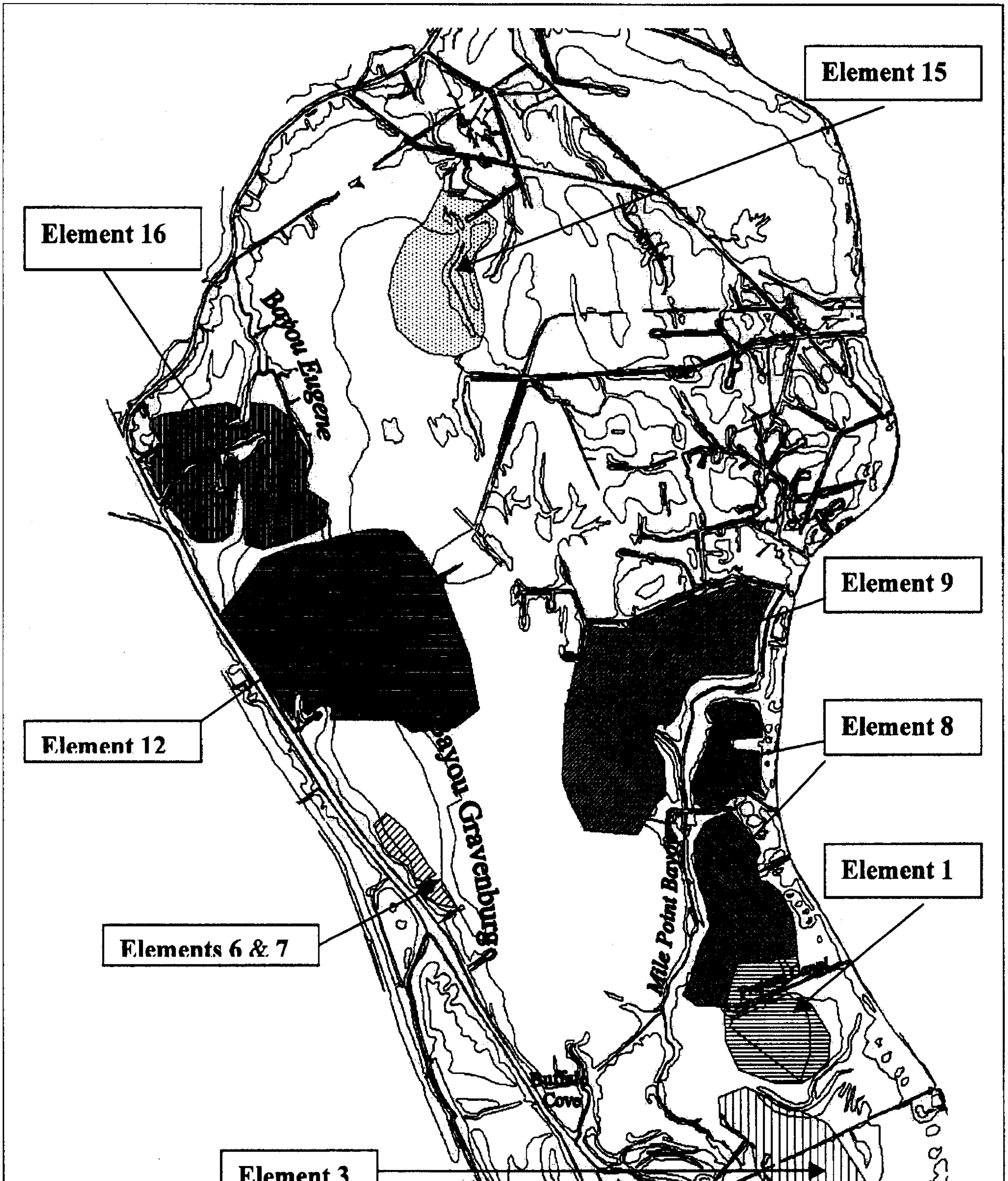
MAINTENANCE

The "monitored pilot project" will employ certain regularly scheduled maintenance, like traditional projects due to the uncertainty of maintenance needs. Maintenance frequency and need will be dictated by the results of the post construction monitoring. The monitored results will determine the amount and intensity of the work needed to maintain the function of the water management feature or changes needed to modify the feature to achieve an intended water management function.

However, the types of maintenance expected and addressed in this EA would entail annual inspections, periodic maintenance of sediment traps; light clearing of debris from cuts, maintaining design cross-section of elements, debris removal and maintain design elevations of closures. If rebuilding, enlarging, or reconfiguring of the elements beyond the original design footprint is needed, based on the post construction monitoring, approval for implementation of project modifications shall be requested for approval at higher United States Corps of Engineers (USACE) authority. All of the dredged material or sediment associated with these maintenance activities will be deposited in previously disturbed or designated disposal sites. The material will be used beneficially to the greatest extent possible in the reconstruction or enlargement of closures or placed where local agencies can access the material for other beneficial uses. This EA addresses the areas of impact associated with disposal placement. Areas recommended for disposal are within in the disturbed rights of way or previously designated rights of way associated with borrow locations including the deep-water disposal in the Atchafalaya River or Lake Fausse Point Cut.

MEASURABLE GOALS

In order to determine the success of the water management project, a number of measurable goals have been established and would be monitored to determine success. The measurable goals are as follows: 1) reduce the levels of the average annual water column hypoxia established at previously monitored sites by 50 percent, 2) increase water movement (velocity) in a north to south direction to a velocity greater than 0 feet per second, 3) limit sediment accretion to less than 1 inch per year in the areas of influence (figure 12) 200 yards or more from water inlets or bank shavings, as well as the open water areas of Jackass Bay, Bayou Gravenburg, the remnants of Grand Lake near Prejean Canal, and the area to the east of Poncho Chute; 4) introduce water into the unit at lower river stages in those areas influenced by water inlet projects. Monitoring would be completed or samples would be taken both in the target area for each element, and outside of the target areas within the BCMU. The data would be used to assess the effect of individual elements as well as the overall success of the entire project.


Element 15
Element 16
Bayou Eugene
Element 9
Element 12
Element 8
Bayou Gravenburg
Element 1
Mile Point Bayou
Elements 6 & 7
Cove
Element 3

If the monitored results indicate that an element or elements does not produce the desired result, MVN will recommend modifications to the appropriate element or additional elements, to be designed and sited as needed to accomplish the water management objective. A separate monitoring plan would be prepared that would provide a detailed description of monitoring and a detailed explanation of measurable goals, including long range monitoring of the forest condition.

Water-based equipment, small track, or low impact marsh vehicles would accomplish the proposed work where feasible in order to reduce access corridor impacts. The work would be done during both low water and higher water stages depending on the type of equipment and method of access used. The least damaging method of access may be accomplished utilizing water-based equipment, thus the potential need for high water during construction. The project would be maintained as deemed necessary, based on the monitored results of the elements. All closures include the possibility of using stone, earth, sheet pile, or combinations. Final determination would be made upon completion of borings and surveys. The best engineering option with concerns for both economics and the environment would be chosen. The construction of earthen closures would utilize the dredged material (spoil) excavated during embankment removal and gap construction in order to minimize the impacts of both dredged material placement and borrow acquisition. A total of approximately 547 acres of forested wetland would be impacted by the project. Of the total acreage impacted, approximately 48 acres of a willow, scrub /shrub, cypress swamp, and immature bottomland hardwoods mixture, would be impacted as a result of cuts made in existing dredged material embankments, closures that block existing waterways, and the construction of sediment traps. Approximately 182 acres of scrub/shrub and low-value bottomland hardwood forest would be impacted by the placement of dredged material that could not be beneficially used for closures. At least 134 of the 182 acres have already been impacted by excavation. Dredge material produced from drainage cuts will be used to fill existing waterside borrow ponds or placed in adjacent areas within the waterside site. These areas are located within the Atchafalaya levee system right of way and designated for borrow. Portions of the area have been utilized for borrow in the past, leaving either borrow canals or borrow ponds. The planned placement of dredged material would result in accessible borrow being available for use in future levee work in the area. By providing accessible dredged material storage, the material can be used for future projects in the Atchafalaya, thus reducing the need for additional borrow sites in the basin, resulting in a net savings of bottomland hardwood habitat. The remaining 317 acres is a worst-case estimate of the area needed for access, to get construction equipment into the area of work. Only a small portion of these 317 acres is likely to be cleared of trees for access. In addition, approximately 15 acres of water bottoms would be permanently impacted by construction of cuts, placement of closures, or dredged material. Of this acreage, approximately 5 acres of water bottoms would be impacted through either deepening or widening or both, but would still function as water bottoms.

An estimated total of 236,200 cubic yards of dredged or excavated material would be produced from construction of the cuts or removal of closures or spoil banks. Earthen closures would require the placement of 15,850 cubic yards of material. The earthen closures would utilize the excavated material from the construction described above. In addition, 7,600 tons of quarry stone would be used for closures and armor where needed. The stone would be obtained from a commercial quarry source. The dredge/fill material is considered to be free of contaminants. This determination is based on the isolated nature of the area, the land use history studies done for this area, lack of Coast Guard spill accounts, and information from the intermittent dredging activities in the vicinity. A Phase I Hazardous Toxic and Radioactive Waste (HTRW) Land Use Analysis and initial site assessment indicates that the risk of encountering HTRW in the work areas is low. A Storm Water Pollution Prevention Plan would be prepared and a storm-water discharge permit would be obtained from the Louisiana Department of Environmental Quality as necessary.

DESCRIPTION OF PLAN ELEMENTS

Each of the proposed elements is described below in as much detail as advanced engineering allows. It is noted that the elements are not numbered consecutively. This lack of consecutive numbering results from choosing these particular plans, based on completeness of design and application, from an array of previously formulated plans that that will be further evaluated and implemented at a later time.

Element 1 - Prejean Canal (figure 2)

This element consists of cuts in both the north and south banks of Prejean Canal at 2 locations, with 50-foot bottom widths at elevation 0 ft NGVD, and 1:3 side slopes. The total length of the cuts would be 980 ft for the east cut and 960 ft for the west cut. Disposal would be done on the east side of the cut, a minimum distance of 20 ft from the top of the cut, with the disposal height not to exceed 9 ft NGVD in the back swamp area. This elevation assumes a natural ground elevation of 0 ft NGVD, which will be verified by surveys. No disposal will be place in the Prejean Canal. The elevation of the bottom of the cut would be the same as the elevation of the remnants of Grand Lake, which is believe to be elevation 0 ft NGVD, but will be verified by surveys. Maintenance material would be placed in disposal areas adjacent to the cuts.

Element 3 - Poncho Chute (figure 11)

This element consists of a rock closure in Poncho Chute near Lake Fausse Point Cut. The closure would be constructed with a crest elevation of 12 ft NGVD, a 10 ft crown width, and 1:2 side slopes. Geotextile material would be added as necessary. The final dimensions of the closure and geotextile would be determined from boring and survey information taken prior to preparation of plans and specifications.

Element 6 - Gravenburg Cut (figure 6)

This element consists of 1 to 4 rock or earthen closures in Bayou Gravenburg Cut with a crest elevation of 14 ft NGVD, a maximum crown width of 100 ft, and 1:3 side slopes. The crest elevation would be 1 ft higher than existing bank elevations which will be verified by surveys. Geotextile material would be added as necessary. The final number and dimensions of the closures and geotextile would be determined from boring and survey information taken prior to preparation of plans and specifications. Borrow material would be obtained from the existing banks of the Bayou Gravenburg Cut on the east side of each closure to facilitate water movement through the banks of the Bayou Gravenburg Cut.

Element 7 - Keyhole Canal (figure 7)

This element consists of a rock or earthen closure in Keyhole Canal leading to Bayou Gravenburg with a crest elevation of 14 ft NGVD, a maximum crown width of 100 ft, and 1:3 side slopes. The crest elevation would be 1 ft higher than existing bank elevations which will be verified by surveys. Geotextile material would be added as necessary and extend from 2 to 5 ft beyond the toe of the east and west sides of the closure. The final dimensions of the closure and geotextile would be determined from boring and survey information taken prior to preparation of plans and specifications. Borrow material would be obtained from the existing banks of the Keyhole Canal on the east side of the closure to facilitate water movement through the banks of Keyhole Canal.

Element 8 - Sand Hill Canal (figure 3)

This element consists of cuts in both the north and south banks of Sand Hill Canal at 2 locations, with 50 ft bottom widths at elevation 3 ft NGVD, and 1:3 slide slopes. The length of the cut would be 630 ft for the west cut and 470 ft for the east cut. Disposal would be on the east side of the cut a minimum distance of 20 ft from the top of the cut, with the disposal height not to exceed 11 ft NGVD in the back swamp area. This assumes a natural ground elevation of 5 ft NGVD, to be verified by surveys. No disposal would be placed in Sand Hill Canal. The elevation of the bottom of the cut would be 1 ft below the swamp floor, which is believed to be at an elevation of 4 ft NGVD, but will be verified by surveys. Maintenance material would be placed in disposal areas adjacent to the cuts.

This element also consists of a rock or earthen closure to elevation 15 ft NGVD in Sand Hill Canal adjacent to the Atchafalaya Basin Main Channel. The precise location of the closure would be based on surveys and borings. The closure would have maximum crown width of 100 ft crown and 1:4 minimum side slopes. Geotextile material would be added as necessary. The final dimensions of the closure and geotextile would be determined from boring and survey information. The borrow source would be within the right of way area to the west of the closure.

Element 9-1 - Chicot North (figure 8)

This element consists of a new channel at a 90-degree angle to the Atchafalaya Basin Main Channel, with bottom width of 100 ft at elevation 3 ft NGVD and 1:3 side slopes for a distance of approximately 1,500 ft. The channel would extend a minimum distance of 100 ft from the Atchafalaya Basin Main Channel, then expand into a sediment trap with dimensions of 300 ft minimum length, 500 ft bottom width, and bottom elevation -2 ft NGVD. The expansion slopes would be 1:4, and the bottom slope would be 1:10. The channel bottom would rise to elevation 5.0 ft NGVD, with a minimum bottom slope of 1:10. The bottom width would then change from 500 ft to 100 ft, with minimum contraction slopes of 1:4. The channel would continue with dimensions of 100 ft bottom width, a bottom elevation 5.0 ft NGVD, and side slopes of 1:3 to the swamp west of Mile Point Bayou. The bottom elevation would be 1 ft below swamp floor, which is believed to be 6 ft NGVD, but will be verified by surveys.

This element also consists of a closure in Mile Point Bayou on the north side of the new channel, with a top width of 25 ft, and 1:3 side slopes. The closure would be a minimum distance of 20 ft from the top of the new channel. The elevation of the closure would be 1 ft above the top of bank elevation of Mile Point Bayou, which has an estimated elevation of 14 ft NGVD. The elevation would be verified by surveys. The closure would prevent diverted flow from entering the Amerada Canal area to the north and ensure that the flow reaches the target area. Geotextile material would be added as necessary. The final dimensions of the closure and geotextile would be determined from boring and survey information. The borrow source would be within the right of way area.

Dredged material generated during construction and maintenance would be placed in the Atchafalaya Basin Main Channel. Stone armor may be added to the new channel, as necessary, if significant scour occurs upon completion of the excavation. The stone armor may extend from the Atchafalaya Basin Main Channel to the eastern edge of the sediment trap.

Element 9-2 - Chicot South (figure 8)

This element consists of a new channel at a 90-degree angle to the Atchafalaya Basin Main Channel, with a bottom elevation of 5 ft NGVD, a bottom width of 50 ft and 1:3 side slopes for a distance of approximately 2,700 ft, which would extend to the 6 ft NGVD contour, the assumed elevation of the back swamp. A sediment trap would be constructed in the new channel approximately 1,000 ft from the Atchafalaya Basin Main Channel. The bottom elevation of the sediment trap would be -2 ft NGVD. The trap would have a bottom width of 200 ft and bottom length of 200 ft. Expansion and contraction side slopes should be 1:4 at a minimum. The channel bottom transitions would be 1:10 from elevation -2 ft NGVD to elevation 5 ft NGVD.

Material during construction and maintenance would be placed in the Atchafalaya Basin Main Channel. Stone armor may be added to the new channel, as necessary, if significant scour occurs upon completion of the excavation. The stone armor may extend from the Atchafalaya Basin Main Channel to the eastern edge of the sediment trap.

Element 12 - Tyler Cut (figure 4)

This element consists of closing the Sibon Canal approximately 1,500 ft east of its intersection with Lake Fausse Point Cut. The closure structure would have an elevation of 14 ft NGVD. The earthen closure would have a maximum top width of 100 ft and side slopes of 1:3. Any depressions along the north and south bank of Sibon Canal between Lake Fausse Point and the closure would be filled in to ensure elevation of the north and south banks in this location are greater than or equal to 14 ft NGVD. The material for the closures would come from degrading the canal banks where gaps would be placed. A stone closure may be constructed at a later date, if required.

This element would also consist of cuts in the north and south bank of Sibon Canal, on the east side of the closure, a minimum of 20 ft from the toe of the closure. The cuts would have 50 ft bottom widths at elevation 3 ft NGVD and 1:3 side slopes. The length of the cuts would be 400 ft on north side of Sibon Canal and 600 ft on south side of Sibon Canal. Material excavated from the cuts would be used to construct the closure. The cut may be enlarged as necessary to ensure adequate material for closure. Elevation for the bottom of the cuts would be 1 ft below the swamp floor, which is assumed to have an elevation of 4 ft NGVD, but will be verified by surveys.

This element also includes dredging Tyler Cut north of Sibon Canal. The new channel would be 100 ft wide at the bottom with an elevation of 2 ft NGVD and side slopes at 1:1 for a minimum distance of 100 ft. The slope of the canal bottom would be a minimum of 1:10 from elevation 2 ft NGVD to elevation -5 ft NGVD over a minimum distance of 70 ft. also adjusting the bottom width from 100 ft to 80 ft. The channel would continue with a bottom width of 80 ft at elevation -5 ft NGVD and side slopes of 1:1 until the keyhole at its end is reached, where the elevation rises to -3 ft NGVD. This would occur over a distance of approximately 2,900 ft. A cross cut would be constructed in the north and south banks of the canal with 10 ft bottom width at elevation 6 ft NGVD and 1:3 side slopes. Disposal of all material would be in a designated disposal area on the west side of Lake Fausse Point Cut. The cross cut on the north and south banks of the canal would be maintained if necessary to reduce velocities in the channel in order to increase effectiveness of the sediment trap. The final location and dimensions of the cross cuts would be based on the elevation of the back swamp at the end of the cross cut. To be effective, the back end of the cross cut would be opened to the back swamp. All maintenance material would be placed in the designated disposal area to the west of Lake Fausse Point Cut.

<u>Element 14 - Sibon Canal (figure 5)</u>

This element would consist of lateral cuts in both the north and south banks of Sibon Canal at 9 locations. The cuts would have 50 ft bottom widths at elevation 3 ft NGVD and 1:3 slide slopes. The lateral cuts on would be on 700 ft centers. The lateral cut on the north side of Sibon Canal would be 400 feet long. The cut on the south side would be 600 feet long. Disposal of the excavated material would be on the west side of the lateral cuts at a minimum distance of 20 ft from top of any cut, within the right of way, with disposal height not to exceed 8 ft NGVD in back swamp area and not to exceed 6 ft NGVD in Sibon Canal. The highest invert elevation in Sibon Canal would be determined by surveys. The elevation of the bottom of the lateral cut would be 1 ft below the swamp floor, which is estimated to be at an elevation of 4 ft NGVD and will be verified by surveys. Maintenance material would be placed in disposal areas adjacent to the cuts.

This element also consists of interior cuts on the north and south banks of Sibon Canal at 8 locations. Each interior cut would be centered between two of the lateral cuts described above. For each interior cut, a 200 ft section of the bank would be cut to a depth of two ft below the existing bank elevation. Disposal would be within the right of way at any location as long as disposal is a minimum distance of 20 ft from top of any cut. The disposal height would not exceed 8 ft NGVD in the back swamp area and 6 ft NGVD in Sibon Canal. The highest invert elevation in Sibon Canal would be determined by surveys. The elevation of the bottom of the interior cut would also be verified by surveys.

Element 15 (figure 9)

This element consists of removing two dams in an access canal to match existing canal dimensions. The material from the dam would be disposed of on the west side of the access canal, with the disposal height not to exceed 15 ft NGVD. This assumes a natural ground elevation of 8 ft NGVD, which would be verified by surveys. At the end of the access canal, a sediment trap would be constructed, with disposal on the south side of the canal. The disposal height would not exceed 13 ft NGVD. This is assuming a natural ground elevation of 6 ft NGVD, which will be verified by surveys. The canal would be extended to the swamp floor with a 50 ft bottom width, and 1:3 side slopes. The bottom of the extension would be 5 ft NGVD over a distance of 800 ft. Disposal would be on the south side of canal a minimum distance of 20 from the top of extension, with disposal height not to exceed 15 ft NGVD. This is assuming a natural ground elevation of 8 ft NGVD, which will be verified by surveys. The elevation of the bottom of the extension would be 1 ft below the swamp floor, which is estimated to be at an elevation of 6 ft NGVD but will be verified by surveys. Maintenance material would be placed in the two aforementioned disposal areas.

Element 16 - Jackass Bay (figure 10)

This element consists of dredging out the location canal leading to Jackass Bay and deepening it to form a sediment trap. The new channel dimensions would have a 60 ft bottom width at elevation 2 ft NGVD at its confluence with Lake Fausse Point Cut, with minimum side slopes at 1:1 for a minimum distance of 200 ft from top of bank of Lake Fausse Point Cut. The bottom width may be adjusted so that canal banks would not be removed. The bottom of the canal would be sloped 1:10 from elevation 2 ft NGVD to elevation -5 ft NGVD over a minimum distance of 70 ft. The bottom width would also be adjusted, if necessary, to ensure that canal banks are not removed. The bottom width may be 36 to 50 ft. The channel would continue with this bottom width at elevation -5 ft NGVD and minimum side slopes 1:1 for a minimum distance of 3,500 ft. forming the sediment trap. The bottom of the canal would then rise at a minimum slope of 1:10 to elevation 0 ft NGVD with a 20 ft bottom width to just past the cross canal, leaving the connection to Jackass Bay as shallow as it is presently. The connection has an estimated elevation somewhere above 0 NGVD. Disposal would be across Lake Fausse Point Cut in the designated area.

This element also consists of 3 cross-cuts in the north bank and 2 cross cuts in the south bank of the location canal. All cross cuts have 10 ft bottom widths at elevation 7 ft NGVD and 1:3 side slopes. The elevation of the bottom of the cuts would be 1 ft below swamp floor, which is believed to be at an elevation of 8 ft NGVD but will be verified by surveys. The cross cuts on the north and south banks of the canal will be maintained if necessary to reduce velocities in the channel in order to increase the effectiveness of the sediment trap. The final dimensions of the cross cuts would be based on the elevation of the back swamp at the end of the cross cut. To be effective, the back end of the cross cut must be open to the back swamp. All maintenance material would be placed in the designated disposal areas to the west of Lake Fausse Point Cut.

CONSTRUCTION SEQUENCE

It must be noted that the proper construction sequence is essential to achieving the desired outcome noted in the measurable goals, as stated previously. Some elements may not be constructed without their companion element(s) since the overall beneficial effect is premised on multiple elements being linked hydrologically and functioning simultaneously. The impacts assessed in this EA are based on all of the elements being constructed within a two-year period after the project is funded. If two or more of the elements can not be constructed during this time period then the USACE project delivery team would consult with the resource agencies to evaluate the sequence of construction for remaining elements and reevaluate the impacts. Currently, it is assumed that the elements on state owned lands (figure I; elements 1, 8, and 9) would be constructed first and the resolution of the real-estate issues with private landowners would determine, to some extent, the order of construction for the remaining elements. At a later time, a recommendation may also be made to higher USACE authority, based on monitoring data and field observations, to take corrective action if needed on constructed elements. This corrective action, if approved by higher USACE authority, may result in modifying existing elements or designing a new element in a new location. In the event that modifications are necessary, the appropriate NEPA documents would be prepared at the appropriate time.

HYDRO-BIOLOGICAL EVALUATION MONITORING PROGRAM

As noted above, the monitored pilot approach must include an effects monitoring program to evaluate the goals and objectives of the plan and adjust the features or elements as necessary based on the monitoring outcome. Each of the elements noted in the proposed plan has an estimated area of influence (figure 12). Each element has a stated measurable objective by which it would be evaluated through the monitoring process. A monitoring program would be conducted within both the area of influence as well as areas outside of the area of influence to assess changes in sedimentation rates, water quality, water movement in the interior swamp (circulation patterns), and the effect of various river stages at specified locations. The purpose of this monitoring program would be to assess the effects of the various plan elements on the specific problems they are trying to correct. Water quality monitoring would be located within the areas of proposed influence throughout the affected portion of the unit during high water. Water quality monitoring and sediment analysis related to sport and commercial fishery would be focused on the interior swamp. These stations would be placed in a manner to build on the existing historical stations for stage and velocity that have already been established by the USACE. The water quality monitoring stations would be located both to reflect the quality of "source" water entering the management unit as well as to assess the seasonal changes in the water quality of the interior swamp which contributes to the viability of commercial and sport fishery. Spot monitoring of the commercial crawfish production in the interior swamp would be accomplished by sub-sampling known crawfish producing areas. Water quality along with spot sampling of viable sport fishing areas would be monitored. Existing stage recorders and velocity meters would be monitored as necessary to detect fluctuations in water levels and circulation patterns. Parameters observed would include dissolved oxygen, pH, temperature, oxidation-reduction potential, conductivity, suspended sediments, depth, and turbidity.

Sediment monitoring would be designed to determine the operational affects of the elements on both the spatial distribution and accretion rates of any incoming sediment. In addition, sediment monitoring would measure the efficiency of the sediment traps to determine if they are functioning properly.

The Louisiana Department of Agriculture and Forestry (LDAF) would consider the results of sediment monitoring along with other factors that they would monitor in cooperation with the LDNR. The LDAF would initiate their monitoring program to record any changes in forest health and type as it relates to changes in hydrology and sedimentation. Based on landscape changes over time it is thought to be possible to determine if the forest is being affected positively or negatively and if management for a particular species or even landform is needed. If the landowner desires a forest management plan, the LDAF will assess the viability for forest management based on their monitoring plan and develop the appropriate action with the landowner. Forest management plans developed by the LDAF and the landowner must be developed in a manner that is consistent with the real estate interests acquired by the USACE for the other features of the ABFS project, including, but not limited to, the environmental protection and management unit features.

A minimum of three years of post-construction monitoring would record any localized effects of the proposed modifications and design changes as they relate to targeted water quality improvements in the interior swamps and areas adjacent to the cuts. In addition, a combination of biological and water quality sampling (available creel survey information and photo interpretative analysis of habitat changes) would be used to estimate fishery productivity in various representative habitats before and after implementation. Data would be used to derive estimates of reproductive success, relative abundance, and year-class strength of harvestable commercial and sport species within the study area.

ALTERNATIVE APPROACHES TO THE PROPOSED ACTION

INTRODUCTORY BACKGROUND

The overall approach to the water management in the Buffalo Cove area consists of developing features that would allow water to enter the BCMU from the north and flow through the area, exiting from the southern portion of the unit. This, together with limiting the amount of sediment carried into the unit, would be expected to improve water quality and reduce sedimentation problems. The management of the BCMU would be governed by functional components, each comprised of groups of individual features or elements that would produce the desired outcome for that functional component, i.e. outlet improvement, interior circulation improvement, or water infusion.

A supplemental EIS is currently being scheduled that will address the implementation of additional features in the in the BCMU to achieve the goals of the overall water management strategy within the BCMU. A comprehensive plan will be developed to combine functional components in a systematic way. A monitored pilot approach is expected to be a part of this plan because it provides the flexibility needed to account for the dynamic nature of this hydrologic system.

While the elements described in this EA provide "stand alone" benefits to both water quality and circulation within their targeted areas of the BCMU, the implementation of the planned additional elements within the BCMU management units would supplement and possibly broaden the beneficial affect of the elements addressed in this EA. The proposed actions is a combination of elements that would remove barriers to flow, improve outlets, and minimize or manage sediment input in the management unit.

DESCRIPTION OF ALTERNATIVE PLAN APPROACHES CONSIDERED

The Atchafalaya Basin is made up of many distinct hydrologic units such as Buffalo Cove. These management units are living, dynamically changing systems. These changes are process driven by variations in circulation, sedimentation, and flows, or event driven by hurricanes, flood events, and human induced activities associated with oil and timber production. To clarify the reasoning that drives the alternative selection process for this type of project, water management must be defined. Water management is defined here as controlling the quantity, quality, and flow of water to achieve a specific goal that results in overall positive environmental affects. There are two approaches that may be used to achieve this water management goal. Normally management approaches are not considered or discussed as part of the alternative selection process. However, in the case of water management it is logical to assume that the type of management approach taken would be a determinant as to the outcome and success of reaching water management goals in a living dynamic system. Therefore, there will be discussion of the management approaches along with the alternatives descriptions in this EA.

EIS Plan Alternative: Traditional Active, Structural Approach

This is the water management plan originally considered in the 1982 Atchafalaya Basin Floodway system feasibility EIS. The water management concept presented in the EIS is similar to an artificial impoundment. Under this original plan, perimeter levees would be constructed around the unit to a height equal to the river's average annual peak flow. Water control structures (flap gates, weirs, etc.) and channel and bayou closures would control water in and out of the unit. Excavation of channels, degrading of banks, and channel closures would control water movement within the unit. Boat rollovers or similar navigable structures would provide access into the area. This was to be accomplished by a traditional active, structural approach. This type of water management assumes that the biological and hydrological processes influencing the swamps and watercourses in the management unit are basically predictable and somewhat static. This approach lacks flexibility and cannot easily accommodate timely and responsive changes needed when working in a dynamic environment, and can cause increased first costs and unnecessary increases in construction and maintenance costs. The structural approach makes no allowances for changes in goals, objectives, or response to significant events that may occur during the course of the project. The traditional approach calls for designing and building the complete project, all at one time. Thus, using this traditional approach it is difficult to design a project that can respond well to an area that is continually evolving and changing. This approach may also result in increased initial costs, since future construction is based on projected data, rather than on monitored and measured results from phased, future construction. Projected, estimated construction applied to dynamic environments tends to lead to overbuilding and over-designing, in an effort to assure that all the variations in environmental conditions are addressed by the proposed features.

Proposed Action: Circulation Improvement and Sediment Management Plan (CSMP); "A Monitored Pilot Approach"

The BCMU was authorized for construction as a pilot unit by the Supplemental Appropriations Act of 1985 (PL99-88) and the WRDA 1986 (PL99-662). This pilot status was designated due to the uncertainty inherent in the use of traditional engineering design to achieve a specific hydro-biological effect in a dynamic swamp ecosystem. This approach allows for a preliminary design or pilot to be established for individual elements whose combined purpose is to produce an overall effect that meets the measurable goals desired for the management unit. While each element would have a monitored area of influence there would also be sites monitored outside the area of immediate influence to determine if the measurable goal for the BCMU as a whole has been met. If the elements are not performing as expected they could be modified or actually relocated and redesigned based on the monitoring information.

As has been noted in previous sections, these management units are dynamic living, evolving systems. It is because of these ongoing changes that the traditional water management approach would not be effective. Under the monitored pilot approach, allowances are made for modifications or additions in project elements based on the continual monitoring of conditions prior to, during, and following project construction. The monitored pilot approach is a continuing process of planning, implementation, monitoring, and evaluation to adjust management strategies and project components to meet a set of measurable goals. The uniqueness of this plan is that the integral project facets would be designed, constructed, and operated simultaneously, along with effects monitoring of a particular facet to determine its compatibility with the overall plan. Each subsequent facet would be phased-in and funded, based on its ability to meet the goals of the overall plan.

No Action Alternative

The existing and the expected future without project conditions define the no action alternative. No engineering and design for various features to reduce sediment inputs, improve the interior circulation, or assist in improving north/south flow in the BCMU would be constructed. Under this alternative, conditions would remain conducive for sedimentation and stagnation, and ponding of poor quality water would continue to exist and may potentially worsen. It would be expected that sedimentation would eventually not only fill in viable fishery habitat, but would also add to the internal circulation problems that contribute to the ponding and stagnant conditions of the water in the back swamp. No-flow to low flow conditions lead to poor water quality and therefore extend areas of hypoxic conditions into once viable aquatic habitat. If this is allowed to happen, the natural succession of the Atchafalaya Basin to bottomland hardwoods or invasive species would occur at the expense of the viable open water habitats that are prime producers of fish and crawfish.

PLAN APPROACHES ELIMINATED

Aside from the USACE-MVN analysis of plans, the planning process was coordinated with state and Federal resource agencies such as Louisiana Department of Wildlife and Fisheries (LDWF), Louisiana Department of Natural Resources (LDNR), Louisiana Department of Environmental Quality (LDEQ) as well as Federal agencies including U.S. Fish and Wildlife Service (USFWS), U.S. Geological Survey (USGS), and the United States Environmental Protection Agency (USEPA). The USFWS along with others agreed with the USACE analysis that the EIS plan was too restrictive, inflexible, and generally unsuited for assessing the dynamic nature of the system in which the water management activities are proposed. In addition, USFWS opposed the EIS plan on the basis that artificially-maintained water levels, using actively managed water control structures, could jeopardize timber production and could degrade wildlife habitat. In addition, by retaining water on the unit longer than would naturally occur could potentially cause increases in poor water quality especially if low river stages reduces or eliminate the amount of water flowing through the management unit. It could also reduce the support of potentially cooperative landowners. Again, another factor in the elimination of this plan is that this type of structural plan cannot easily accommodate the timely and responsive changes needed when working in a dynamic environment, and can cause increased first costs and unnecessary increases in construction and maintenance costs. In addition, in this type of plan there is no allowance for changes in goals, objectives, or responses to significant events that may occur during the course of the project. In this traditional structural approach to water management it is difficult to design a project that can respond well to an area that is continually evolving and changing. Thus, cost, flexibility, and ability to meet possibly changing goals eliminates this plan from further consideration. Therefore, the CSMP along with the elements that comprise this plan will be carried forward as the proposed plan with the no action plan as the alternative.

FORMULATION OF PLAN ELEMENTS

INTRODUCTION TO FORMULATION OF PLAN ELEMENTS

In 2001 and 2002, a series of meetings were held with representatives of state and Federal resource agencies with interest in the BCMU area as well as university personnel, community groups and organizations, and individual citizens. In addition, USACE personnel participated in scheduled public meetings with LDNR Atchafalaya Basin Water Management committees. A considerable amount of time and coordination was spent with the following agencies to formulate and recommend a plan for the BCMU. Federal resource agencies involved include USACE; USFWS; Natural Resources Conservation Service; National Park Service; and the USEPA. State agencies consulted include LDNR, LDWF, and Louisiana Department of Environmental Quality, Louisiana Department of Agriculture and Forestry as well as Department of State Lands. In addition coordination was accomplished with statewide public interest groups such as Acadiana Area Waterways Committee; Audubon Society; Common Claws; Louisiana BASS Federation; Louisiana Forestry Association; Louisiana Landowners' Association; Louisiana Travel Promotion Association; Louisiana Wildlife Federation; Mid-Continent Oil and Gas; The Nature Conservancy; The Sierra Club; Commercial Fishers and Crawfishers, and others.

Four objectives for the BCMU were identified to increase the value of the project area for fish and wildlife resources.

1. Introduce river water from the north,
2. Improve internal circulation,
3. Remove barriers to southerly flow, and
4. Reduce and/or redirect sediment deposition

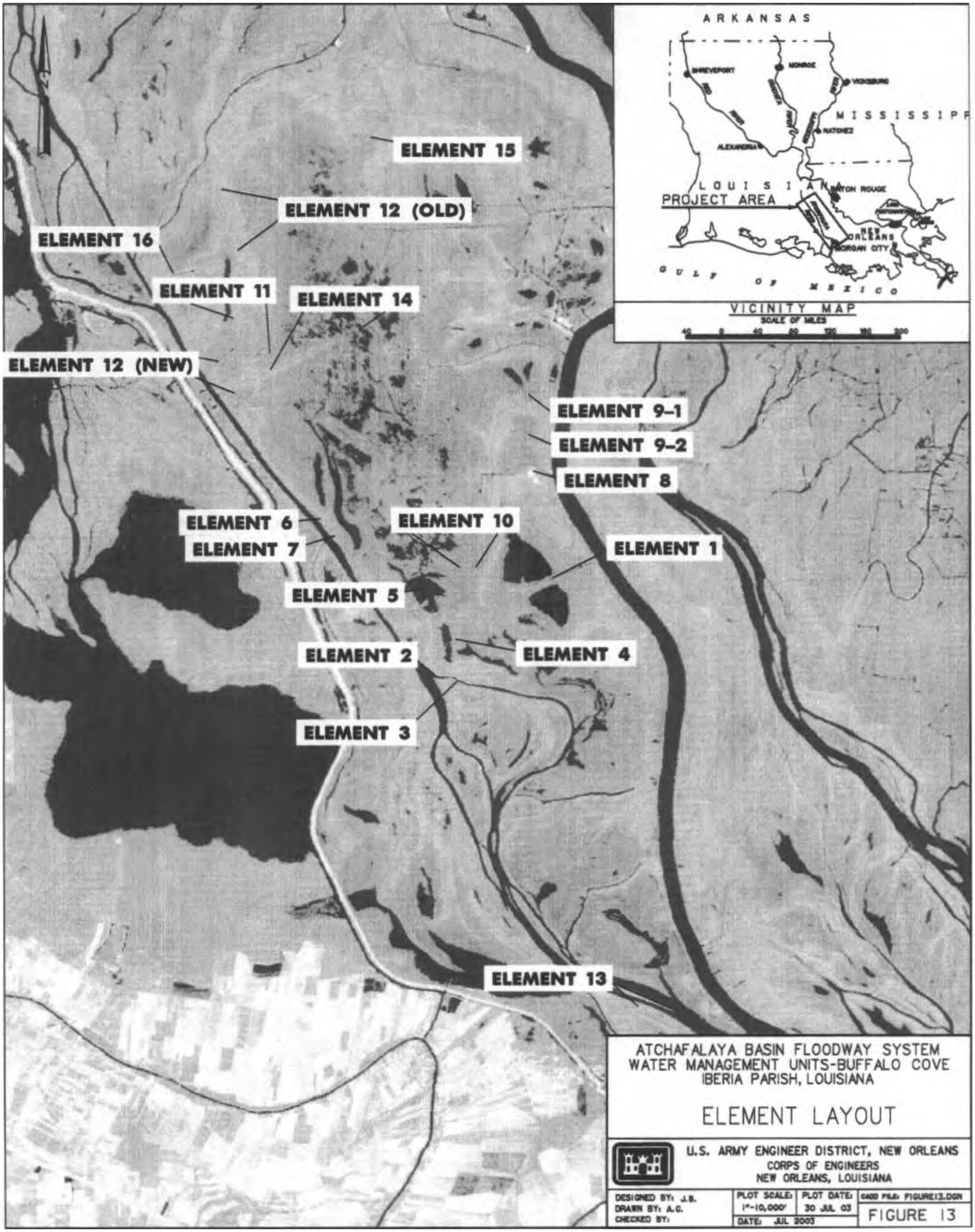
Given the fact that almost 18 years have past since receipt of congressional authorization for implementing the BCMU features, the resource agencies agreed that the short-term strategy for implementing the BCMU should be to start construction as soon as possible before additional critical habitat is lost. Therefore, elements to be considered, formulated, and designed were identified based on several parameters:

1. Elements can meet one or more of the four objectives.
2. Elements are located in areas where real estate acquisition appears readily available.
3. Elements are located in areas that would be easily accessible from the river or other existing access areas. This would minimize mobilization costs, reduce impacts and negate lengthy permits, and thereby simplify environmental compliance.
4. Elements are located in areas that would complement the work being done in adjacent areas.

5. Elements can be designed based on existing information.

PRELIMINARY ARRAY OF ELEMENTS

Initially, 8 elements were formulated to meet the above objectives and were all located on lands within the BCMU where real estate acquisition appeared readily obtainable (see figure 13 depicting considered alternatives). A problem, goal and objective statement was developed for each element as shown in table 1.



ELEMENT 15
ELEMENT 12 (OLD)
ELEMENT 16
ELEMENT 11
ELEMENT 14
ELEMENT 12 (NEW)
ELEMENT 9-1
ELEMENT 9-2
ELEMENT 8
ELEMENT 6
ELEMENT 7
ELEMENT 10
ELEMENT 1
ELEMENT 5
ELEMENT 2
ELEMENT 4
ELEMENT 3
ELEMENT 13
ARKANSAS
MISSISSIPPI
SHREVEPORT
MONROE
VICKSBURG
NATCHEZ
ALEXANDRIA
LOUISIANA
BATON ROUGE
PROJECT AREA
NEW ORLEANS
MORGAN CITY
GULF OF MEXICO
VICINITY MAP
SCALE OF MILES
40 0 40 80 120 160 200
ATCHAFALAYA BASIN FLOODWAY SYSTEM
WATER MANAGEMENT UNITS-BUFFALO COVE
IBERIA PARISH, LOUISIANA
ELEMENT LAYOUT
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA
DESIGNED BY: J.B.
DRAWN BY: A.G.
CHECKED BY:
PLOT SCALE: 1"=10,000'
PLOT DATE: 30 JUL 03
DATE: JUL 2003
CADD FILE: FIGURE13.DGN
FIGURE 13

Table 1
Problem Statements, Goals, and Objectives
Preliminary Array of Elements

Element 1	
Problem Statement	Spoil material from prior canal dredging associated with oil and gas exploration placed continuously on the northern and southern banks (of Prejean Canal) bisected remnants of Grand Lake, creating high spoil banks that impede southerly flow and pond water east of Mile Point Bayou, and north to Sand Hill Canal, and is degrading aquatic habitat.
Primary Goal	To remove hydraulic barriers to southerly flow.
Objective	To reintroduce hydraulic connections between upper and lower remnants of Grand Lake
Element 2	
Problem Statement	River water, during the rising and falling limbs of the hydrograph enters Buffalo Cove Lake, flows north through the opening at the southern end of the lake, creates a hydraulic barrier to southerly flow in Buffalo Cove swamp, then ponds overland and flows north to the West Access Channel. The resultant sediment deposit accompanying these flows degrades deep-water aquatic and cypress-tupelo habitats. River sediment also enters Buffalo Cove Lake flowing north through the opening at the southern end depositing into open water. This decreases lake and swamp depths in the receiving area, and reduces existing aquatic and cypress-tupelo habitats.
Primary Goal	To redirect sediment input into Buffalo Cove **Lake** and swamp from the Lake Fausse Point Cut.
Objective	Reduce the sediment concentration in the water entering the channel leading to Buffalo Cove Lake.
Element 3	
Problem Statement	During a falling hydrograph, river water enters Mud Cove through Poncho Chute and creates a hydraulic barrier **to** southerly flow in Buffalo Cove Lake. This barrier results in the ponding of water in the Buffalo Cove swamp north of Buffalo Cove Lake and to the West Access Channel. This ponding results in sediment deposition, which degrades the back swamp habitat. River sediment on the falling limb of the hydrograph enters Mud Cove through Poncho Chute depositing in open water, decreasing channel depth in the receiving area, and reducing existing aquatic habitat
Primary Goal	To reduce river water and sediment input into Mud Cove from Poncho Chute.

Objective	To close hydraulic connection between Lake Fausse Pointe Cut and Mud Cove.
Element 4	
Problem Statement	River water, during the rising and falling limbs of the hydrograph enters Buffalo Cove Lake from the south, flows north through the opening at the southern end of Buffalo Cove Lake, and creates a hydraulic barrier to flows south out of the Buffalo Cove swamp. As a result, the water ponds overland in the back swamps north of Buffalo Cove Lake and to the West Access Channel degrading aquatic and cypress-tupelo habitats. River sediment enters Buffalo Cove Lake with the river water, flowing north through the opening at the southern end depositing in open water, decreasing lake and swamp depths in the receiving area, and reducing existing aquatic and cypress-tupelo habitats.
Primary Goal	To redirect river water and sediment input into Buffalo Cove Lake and swamp from Lake Fausse Pointe Cut.
Objective	Reconnect the bayou entering the Buffalo Cove area to the old distributary/bifurcation at the first bend facing north of Mile Point Bayou. This reconnection would be directed south into the area known as the Ice Box.
Element 5	
Problem Statement	River water, during the rising and falling limbs of the hydrograph enters Buffalo Cove Lake **from** the south and flows north through the opening at the southern end creating a hydraulic barrier to southerly flow in Buffalo Cove swamp, ponding overland flow north to the West Access Channel, and degrading aquatic and cypress-tupelo habitats. River sediment during rising and falling hydrographs enters Buffalo Cove Lake flowing north through the opening at the southern end depositing in open water, decreasing lake and swamp depths in the receiving area, and reducing existing aquatic and cypress-tupelo habitats.
Primary Goal	Increase lake, swamp depths, and provide for future sediment deposition.
Objective	Remove sediment deposition in Buffalo Cove Lake and swamp from Lake Fausse Pointe Cut and provide depositional area for future sediment deposition.
Element 6	
Problem Statement	River flow during the high water season transports sediment through an enlargement connection with Lake Fausse Pointe cut into Bayou Gravenburg reducing deep-water habitat.
Primary Goal	To reduce sediment input into Bayou Gravenburg from Lake Fausse Pointe Cut.

Objective	To close low water hydraulic connection between Lake Fausse Pointe cut and Bayou Gravenburg.
Element 7	
Problem Statement	Existing conditions allows water access to Bayou Gravenburg from Lake Fausse Pointe Cut, increasing the probability of bank degradation and channel enlargement due to boat and wave actions. The probable result would be river sediment transporting through the enlarged connection, reducing deep-water habitat.
Primary Goal	To eliminate water access into Bayou Gravenburg from Lake Fausse Pointe Cut.
Objective	To construct a closure.
Element 8	
Problem Statement	Spoil material from past canal dredging associated with oil and gas exploration, placed continuously on the northern and southern banks of Sand Hill Canal, created high spoil banks that impede southerly flow and pond water east and south of Mile Point Bayou which is degrading terrestrial habitats. River sediment from historical over bank flow in Mile Point Bayou associated with high water events deposited continuously on the northern and southern banks of the east-west reach of Mile Point Bayou creating high spoil banks that impede southerly flow and force water to flow southwesterly into the Buffalo Cove swamp which is degrading cypress/tupelo and aquatic habitats.
Primary Goal	To remove hydraulic barrier to southerly flow.
Objective	To introduce a hydraulic connection above Mile Point Bayou to below Sand Hill Canal

SECOND ARRAY OF ELEMENTS

As previously noted, it is of primary importance to initiate the proposed project immediately in order to minimize further deterioration of the BCMU. While the importance of constructing elements 4 and 5 (as presented in Table 1) is understood, the time constraints noted above resulted in the elimination of these elements from further consideration at this time because information for the engineering design was unavailable within the time frame required to initiate the current project. Thus, construction for elements 4 and 5 would slip the schedule for constructing the remaining 6 elements.

There was concern from the resource agencies regarding the impact to the BCMU if Element 2 did not work as designed. Specifically there was concern due to the ownership (existing camps) in the area of element 2 and its potential for negative impacts. Due to a lack of information required to adequately design elements 2, 4, and 5, they were removed from current consideration with the understanding that these elements would be considered under a future decision document (supplemental environmental impact statement) and project cooperation agreement.

The remaining 5 elements (elements 1, 3, 6, 7, 8) were presented to the LDNR, state and Federal resource agencies, representatives from Louisiana State University (LSU), representatives of community groups, and interested citizens in May 2003. Comments received on these 5 elements indicated the plan presented lacked the necessary components that delivered oxygenated river water into the BCMU from the north. As a result of the feedback, additional elements were identified and presented to the resource agencies at a subsequent meeting in August 2002. The problem statements, goals, and objectives for these elements are shown on table 2 and the general locations shown on figure 13.

TABLE 2
Problem Statements, Goals, and Objectives
Second Array of Elements

Element 9	
Problem Statement	Spoil material (from past canal dredging associated with oil and gas exploration) placed continuously on the northern and southern banks of Amerada Hess Canal created high spoil banks that impedes southerly flow and ponds water east and south of Mile Point Bayou, degrading terrestrial habitats. River sediment from historical over bank flow in Mile Point Bayou associated with high water events deposited continuously on the northern and southern banks of the east-west reach of Mile Point Bayou creating high spoil banks that impede southerly flow and force water to flow southwesterly into the Buffalo Cove swamp which is degrading cypress/tupelo and aquatic habitats.
Primary Goal	To increase the volume of water available for southerly flow and to remove hydraulic barrier to southerly flow.
Objective	To be determined. This may include a volume of water computation, such as introduction of a minimum of volume of water when the Buffalo Cove stage is above a certain level.
Element 10	
Problem Statement	Log rafts and high banks at the south end of Buffalo Cove provide a barrier for part or all of the year. The magnitude of the problem is not known.
Primary Goal	To remove the hydraulic barriers to southerly flow.
Objective	To be determined. One objective may be to increase the exchange of water between the Buffalo Cove Lake swamp and the Icebox.
Element 11	
Problem Statement	River sediment has filled Bayou Eugene from a bottom elevation of-10 ft to a bottom elevation of 4 to 5 ft. The sediment has

	decreased the ability of Bayou Eugene to convey water from the north. The spoil banks from the construction of the Sibon Canal block the movement of water south toward Bayou Gravenburg.
Primary Goal	To increase the volume of water available for southerly flow and to remove the hydraulic barrier to southerly flow.
Objective	Restore the Bayou Eugene channel to historic dimensions and utilize the bayou to convey water in a southerly direction.
Element 12	
Problem Statement	Sediment deposition and spoil banks from the construction of the Sibon Canal created barriers that impede southerly flow south of Sibon Canal resulting in degrading terrestrial habitats. Bayou Eugene no longer conveys water from the north into Bayou Gravenburg area because the banks of Sibon Canal prevent this movement. Seasonally, hypoxic water is present in the Red Eye swamp area and in the Bayou Gravenburg area north of Buffalo Cove.
Primary Goal	To remove the hydraulic barrier to southerly flow. To introduce oxygenated river water into the north that can move north to south.
Objective	To introduce another hydraulic connection into the BCMU with a design to reduce the introduction of sediments accompanying the oxygenated water.
Element 13	
Problem Statement	River sediment has filled the lower end of Lake Fausse Pointe Cut/Myette Point channel near the Atchafalaya Basin Main Channel. The sediment has contributed to the decrease in conveyance of the lower portion of this channel, and is increasing the deposition.
Primary Goal	To remove hydraulic barrier to southerly flow.
Objective	Restore the channel to historic dimensions and improve its conveyance capacity.
Element 14	
Problem Statement	Spoil material (from past canal dredging associated with oil and gas exploration) placed continuously on the northern and southern banks of Sibon Canal, impedes southerly flow and ponds water north of Sibon Canal, degrading aquatic habitat. Banks along Sibon Canal are at an elevation of 13 ft NGVD in some areas.
Primary Goal	To remove hydraulic barrier to southerly flow.
Objective	To reintroduce hydraulic connection between the areas north and south of Sibon Canal

Element 15	
Problem Statement	The volume of river water from the West Access Channel into the BCMU area has diminished over time. The bank of the channel has been raised by maintenance dredging in the 1970s. Channels connected to the West Access Channel, such as Bayou Eugene, have filled over time, reducing the volume of water entering from West Access Channel. The eastern portion of Red Eye Swamp receives minimal direct river water input.
Primary Goal	To increase the volume of water available for southerly flow through the Red Eye Swamp.
Objective	To introduce another hydraulic connection into the BCMU with a design to reduce the introduction of sediments accompanying the oxygenated water.

ADDITIONAL ELEMENTS

After further discussions concerning how the above elements (9, 10, 11, 12, 13, 14, and 15) would function in conjunction with elements 1, 3, 6, 7, and 8, it was determined that elements 10, 11, and 13 would be removed from current consideration due to the inability to get accurate engineering field data needed for design. An additional element 16 was formulated. The final objectives and guidance from the resource agencies for elements 9, 12, 14, 15, and 16 are listed in table 3 and the general locations are shown in figure 13.

TABLE 3
Primary Purposes of Additional Elements

Element 9	Primary Purpose: Input water from east that will flow to the south. 9-1 - Introduce water into the western portion of Mile Point Bayou, minimize sedimentation, and the depth of cut is inconsequential. 9-2 - Introduce water south of Mile Point Bayou, modify Element 8 to keep the boundary between features 1 and 2. If the design of features 1 and 2 is implemented, then it is recommended to eliminate the northern cut of Element 8.
Element 12	Primary Purpose: To provide a source of sediment-free or low sediment water into the Gravenburg area and the interior swamp below Sibon Canal. Completely block Sibon Canal and gap adjacent canal banks, open Tyler Cut and gap adjacent banks on the southern side and gaps east of cut to Bayou Eugene. A - Closure away from Sibon. B - Gapping north and south banks between Lake Fausse Pointe Cut and Bayou Eugene. C - Enlarge Tyler Cut opening and construct sediment trap, construct gaps on south side of the Tyler Cut location canal.
Element 14	Primary Purpose: Remove barriers to north-south water movement that would allow water from the north to enter the interior swamp. Gap on both sides to the end of the canal to unknown area. Cut to or below swamp floor, 50 foot gap every 300 feet
Element 15	Primary Purpose: Add water from the northern part of the unit to refresh the upper interior swamp north of Sibon Canal with oxygen rich water. Remove two closures. Design sediment trap.
Element 16	Primary Purpose: Introduce low water to the south on the west side of the unit. Clean out Jackass Bay Canal (possible clear and snag) and install sediment trap offset from the river entrance.

Elements 1, 3, 6, 7, 8, 9, 12, 14, 15, and 16 were forwarded by the Federal and state interagency group to the USACE Planning Delivery Team (PDT) for consideration as part of the final recommended plan. In addition to formulating various elements to meet the objectives, goals and purposes of the BCMU, various alternatives were developed to meet the intended purpose of each element. Various alternative construction methods were considered in developing each of the elements in order to ensure an optimal and cost effective design for each element. Modifications to existing features within the BCMU were designed to introduce new and additional source water, improve water circulation, and extend the penetration of higher quality water into the back-swamp of the BCMU. Additionally, it is intended that these actions would also result in reducing sedimentation in deep-water aquatic habitat.

ENVIRONMENTAL SETTING

GENERAL

The Atchafalaya Basin is a large, shallow depression lying within the deltaic plain of the Mississippi River in south-central Louisiana. The Atchafalaya River is the largest distributary of the Mississippi River. A series of connected lakes; Lake Fausse Point, Grand Lake, Six Mile Lake, and Flat Lake historically transported water through the Atchafalaya Basin. Diversion of Mississippi and Red River waters to the Atchafalaya river since the mid-nineteenth century has forced these lakes to act as settling basins or sediment traps, leaving only small remnants of the original lakes. Likewise, construction of the ABFS has accelerated natural and artificial trends that are currently altering the character of the basin's fish and wildlife habitats. These trends include high sedimentation rates, hydrological changes, and changes in vegetation composition and development.

Sedimentation in swamps and lowlands has raised ground elevations, effectively reducing the extent and duration of over bank flooding throughout the basin. Bottomland hardwood forests have replaced swamps in many areas, with a corresponding loss of aquatic habitats. The basin's natural hydrology has also been altered by flood protection works such as navigational features, dredging operations, protection levees, and borrow pits. The East and West Atchafalaya River Guide Levees, for example, and certain channel closures, confine flows to the main river channel during low stages, which reduces the extent of backwater aquatic habitat previously available during the low-water season. The resulting impediments to water circulation during low river stages reduce water quality in various areas of the basin. Access canals for the oil and gas industry have further disrupted north to south flows through the interior swamps ("back-swamps").

Sediment accretion in the southwestern portion of the basin increased in 1933 when Fausse Point Cut was dredged to provide fill material for the West Atchafalaya Basin Protection Levee (Wicker, 1975). The BCMU was formed between 1935 and 1969 as sediment deposited by Fausse Point Cut and the Atchafalaya River filled the southwest portion of Grand Lake. Natural deposition of sediment along Fausse Point Cut restricted water flow into and out of the adjacent floodplain to the east, while oil exploration and logging canals with their associated spoil banks restricted water flow within the floodplain. Grand Lake was virtually filled with sediment by 1969, and subsequently created a barrier to water flowing south out of the BCMU when Fausse Point Cut merged with the Atchafalaya River. Crook Chene Bayou joins the two waterways to surround the large area of backwater swamp and lakes in the southwest region of the basin. Because of these changes in hydrology within the bounds of these channels, the MVN designated this area as a hydrologically separate area now recognized as the BCMU. This area is important to many species of terrestrial wildlife such as deer, squirrel, rabbit, raccoon, and potentially Louisiana black bear. Portions of the study area are used by several avian species such as wading birds, over-wintering waterfowl, various water birds, passerines, and songbirds. The back-swamp is one of the better commercial crawfishing areas in the state. In the deeper distributaries and shallow lakes within the BCWMA, largemouth bass, sunfishes, and crappie are recreationally fished. There is also a commercial deepwater fishery for shad, buffalo, some freshwater drum, and catfish in the adjacent river channel and deep water access channels (i.e. Fausse Point Cut).

Sediment deposition from dredging and high Atchafalaya flows have built up the natural levees of the main channel, West Access Channel, Lake Fausse Point Cut, and oilfield and pipeline canals, thus reducing over-bank flows. The oilfield and pipeline canals disrupt the north to south direction of flow. Access canals, such as Sibon Canal, convey water and sediment from the main channel into the center of the area. Many of the interconnecting channels are filled with sediment and snags. Water levels in the Atchafalaya Basin main channel and the Grand Lake area to the south of the BCMU area have risen over time. The local users of the area affirm that the Atchafalaya flows enter the management unit from the lower end of Grand Lake, impeding the north-south movement of water through the swamp. Increased sediment deposition occurs as flows entering from the north of the management area are held in the area until water levels in Grand Lake decrease.

In the BCMU, as in most of the Atchafalaya Basin, the manner in which flooding and dewatering of the swamp occurs has greatly changed over time. Historically, river water would enter the swamp primarily through over bank flooding, initially from the many small streams connecting the swamp and the surrounding major channels. Eventually it would enter through overflow, across the natural levees of channels such as the Atchafalaya Basin Main Channel and channels incorporated in the West Access Channel. Water was dispersed and circulation was maintained throughout the swamp by means of an intricate network of small interconnecting channels that comprised the interior drainage system. Presently, barriers to flow across the back swamp consist of a combination of ridges, berms, and dredged material placements associated with man-made disturbances. These barriers are a result of wellhead placement, construction and maintenance of pipeline canals, and sedimentation occurring along corridors of intermittent water influx during periods of over bank flow. Due to all of the man made and naturally induced sedimentation and isolation from natural over bank flow, many interior areas are experiencing increased sedimentation and poor water circulation. Specific to this study is the increasing amount of sediment presently entering Gravenburg Lake from Lake Fausse Point Cut, as well as backing up through the entrance channel to Buffalo Cove Lake. These problems in combination with the poor drainage, lack of sediment-free water inputs, and lack of outlets in the southern end of the management unit are continuing to contribute to poor water circulation and the resulting seasonal degradation of the water quality. The primary water quality concerns stem from the lack of interior circulation, introduction of unwanted sediment and nutrients, and an insufficient introduction of oxygenated water into the back swamp at lower river stages.

Various types of habitat are affected by variable flooding and dewatering regimes and may be used as spawning, feeding, or refuges for various species of fish and crawfish. Various deepwater habitats found in the few lakes, canals, and bayous within the management unit are used as refugia from the shallow water hypoxic areas at certain times of the year as the shallow water habitats in the back swamps heat up and become hypoxic. Terrestrial habitat is comprised of mid- to late-successional bottomland hardwoods and cypress tupelo swamp. Future forest regeneration of both these hardwood and cypress species is also dependent on highly oxygenated water purposed by the project. The proposed project elements are designed to improve water quality, as well as preserve terrestrial and aquatic habitats within the management unit. These improvements will be accomplished by excluding or managing the sediment-laden water; removing barriers to improve interior circulation; and providing sufficient outlets for drainage in order to promote southerly flow.

CLIMATE

The climate of the BCMU area is humid, subtropical, and subject to significant polar influences during winter as cold air masses periodically moves southward over the area displacing warm moist air. The annual normal temperature is 67.7 degrees Fahrenheit (°F), based on the 30-year normals (1971-2000) at Franklin, Louisiana (located approximately 10 to 14 miles south of the management unit). Monthly temperature normals vary from 81.4°F in July to 51.9°F in January. The area has a total annual normal precipitation of 65.13 inches based on records taken at Franklin. August is the wettest month with a monthly normal of 7.76 inches. The driest normal month is October, which averages only 3.72 inches. Prevailing winds are mostly southerly and create a strong maritime character. Winds average 7.5 miles per hour based on records at the New Orleans and Baton Rouge Airports. Maximum winds are caused by hurricanes and tropical storms that pass through the area. The monthly and annual normal temperature and precipitation for Franklin are shown in tables 4 and 5.

TABLE 4

Monthly and Annual Average Temperature (°F), Franklin, Louisiana
30-Year Normals (1971-2000)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
	51.9	55.1	61.3	67.2	74.6	79.7	81.4	81.1	77.4	68.6	60.3	54.1	67.7

Source: National Climatic Data Center

TABLE 5

Monthly And Annual Total Precipitation (inches), Franklin, Louisana
30-Year Normals (1971-2000)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	
	5.43	3.92	4.73	5.09	4.92	7.06	7.37	7.76	5.85	3.72	4.46	4.82	65.13	

Source: National Climatic Data Center

GEOLOGY

The study area is located in the Atchafalaya Basin Floodway between the West Atchafalaya Basin Protection Levee and the Atchafalaya River near Atchafalaya River mile 90 in Iberia, St. Martin, and St. Mary Parishes, Louisiana. This is an area of low relief ranging from +5 to +10 feet (NGVD) in elevation. Most of the study area was part of a shallow lake system, which has gradually filled with lacustrine delta and back swamp deposits. There are no existing borings at the specific study site; however, there are borings on the West Atchafalaya Basin Protection Levee. The information from these borings was used to estimate the geologic environments in the study area. The surface deposits consist of back swamp, lacustrine delta, abandoned distributary, and natural levee. Back swamp deposits consist of soft to stiff, organic, fat clay interbedded with occasional lenses of soft to medium lean clay, silt, and wood and average 115 feet thick. Lacustrine delta deposits are interbedded with back swamp deposits and consist of interbedded medium to stiff, fat and lean clays, silt, and sands with occasional shell fragments. Lacustrine delta deposits vary widely in thickness, but average 20 feet thick. Abandoned distributary deposits consist of interbedded clays, silt, and sands and vary in thickness, ranging from approximately 10 to 40 feet thick. Natural levee deposits are intermittent and occur adjacent to the larger distributaries. These deposits consist of interbedded soft to stiff fat and lean clays and silt with occasional lenses of sand and range from approximately 2 to 8 feet thick. Thin point bar deposits underlie a significant portion of the back swamp deposits and consist of sands and silt with occasional clays. The point bar deposits range from approximately 8 to 20 feet thick and are found between -100 to -130 feet in elevation. Substratum sands underlie the back swamp, point bar, and abandoned distributary deposits and consist of massive silty sand and sand with occasional gravel. These sands average 140 feet thick. Pleistocene deposits underlie the substratum sands and consist of interbedded, stiff to very stiff, highly oxidized, fat and lean clays, silt, and sands. The surface of the Pleistocene deposits in the study area ranges from approximately -200 to -375 feet in elevation and these deposits extend to an unknown depth.

Ground water in this area is at or near the surface and the silt and sands of the natural levee and lacustrine deposits may be hydraulically connected to the Atchafalaya River. Long-term relative subsidence rates average approximately 0.5 ft/century in the study area. Future eustatic sea level rise is currently estimated to contribute an additional 1.0 ft/century to the relative subsidence rates (USEPA, 1995). Combined, the relative subsidence rate is estimated to be 1.5 ft/century over the next 100 years.

SIGNIFICANT RESOURCES

This section contains a description of significant resources and the impacts of the proposed action on these resources. The significant resources described in this section are those recognized by: laws; executive orders; regulations; and other standards of national, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the general public.

AQUATIC RESOURCES

These resources are institutionally significant because of the Fish and Wildlife Coordination Act of 1958, as amended. Fisheries and aquatic resources are technically significant because: they are a critical element of many valuable freshwater and marine habitats; they are an indicator of the health of various freshwater and marine habitats; and many species are important commercial resources. Fisheries resources are publicly significant because of the high priority that the public places on their esthetic, recreational, and commercial value.

This aquatic resources section will discuss the various aquatic habitats as well as the fishery and the other aquatic components that contribute to or utilize the various aquatic habitats found within the management unit. "While it is recognized and acknowledged that questions and opinions exist as to public access of waters within the project area, this subject is a matter of Louisiana real property law and, further, is not an authorized feature of the project."

Existing Conditions

Almost all aquatic habitats within the BCMU, whether permanent or ephemeral, provide some component of the necessary requirements for food, shelter, and/or reproduction for resident fish species. Although the environment consists of a mosaic of habitat types, the aquatic habitat that supports fisheries can be generalized into three categories; riverine (larger distributaries of the Atchafalaya River), lakes (permanently inundated lakes, canals, and bayous), and *swamps* (seasonally inundated floodplain forest, mainly cypress/tupelo or willow). While recent environmental monitoring in the BCMU indicates that very few fish species are exclusive to a particular habitat, the frequency of occurrence for each species within the three habitat types indicates species-specific habitat discrimination for species like largemouth bass, bluegill, crappie, paddlefish, sturgeon, and others. Other species in the BCMU are generalists and are equally likely to be found in any aquatic habitat. Gar and mullet are examples of generalist species, possibly because they can utilize atmospheric oxygen when necessary and are the least threatened by hypoxic conditions that occur during the summer months of each flood cycle. Buffalo and shad also show little preference for either habitat and are often found in association with gar and mullet when hypoxia is present in swamp or lake habitats, but are less likely to be present in extreme hypoxic conditions. The presence or absence of each species in a particular habitat of the BCMU is influenced by the preference or need for that species to use that type of habitat, the presence of other species, and the quality or suitability of that habitat to provide essential needs. Recently observed changes in fish assemblages in the BCMU indicate undesirable or insufficient conditions for one or more of those factors.

Since specific habitat preferences are likely to remain unchanged for most species, temporal variation in species composition for a particular habitat is likely a response to changes in habitat suitability or the presence of other species. Whether it is associated with the avoidance of predator species or physical habitat alteration, most shifts in fish assemblages can be tied to some aspect of the Atchafalaya River hydrograph and the associated water quality changes in the BCMU. Changes in water level and water quality alter habitat characteristics and override species-specific habitat preferences by diminishing one or more essential habitat requirements. Lake species are forced to occupy riverine habitats when lake habitats become too shallow or hypoxic, and riverine species are distributed throughout swamp during high water. Previous studies in the Atchafalaya Basin indicate that the species composition changes seasonally in all habitats as the environment changes with fluctuation of river stage, and that the changes impact each species differently. The ultimate condition of each fishery is dependent on the amount of each habitat that is negatively impacted by poor water quality during each flood cycle, the reaction of that species to the altered environmental conditions, and the availability of alternate acceptable habitats.

Riverine habitat is the most seasonally stable in terms of species composition because of the environmental stability. Waterways like Fausse Point Cut, Alligator Bayou, and the Atchafalaya River are continuously flowing water bodies that support species like sturgeon, flathead catfish, blue catfish, carp, paddlefish, shad, mullet, striped bass, white bass, and other species that are adapted for life in deep, turbid, fast-flowing habitat where habitat complexity is minimal relative to the floodplain. The volume of water flowing into the Atchafalaya River from the Mississippi River is great enough, and the channel deep enough, to resist local changes in ambient temperature. The combination of temperature stability and turbulent flow that continually replenishes dissolved oxygen by rotating the water column provides a stable environment for riverine species. Although water temperature may be higher and oxygen concentration lower in summer months relative to spring, fall, or winter months, there is normally sufficient oxygen and low enough temperatures to accommodate fish during all seasons. Riverine habitats are rarely excluded as a refuge because of poor water quality. If accessible, most species would utilize riverine habitat during low water or when water quality is poor in lakes and swamp habitats.

Conversely, swamp habitat is the most environmentally variable habitat in the BCMU. Its environment fluctuates between terrestrial and deep water as water-surface elevation varies in the Atchafalaya River, and is by far the most abundant habitat comprising over 80 percent of the BCMU. Areas within the swamp that remain aquatic during low water are typically very shallow and can support dense stands of aquatic vegetation, have very low concentrations of dissolved oxygen. While crawfish can take refuge in underground burrows throughout the drained swamp until the subsequent flood cycle these areas provide little suitable habitat most fish species. New terrestrial vegetation grows on the nutrient-rich swamp floor during low water periods and new trees sprout as old plant material decomposes through oxidation. The new growth, along with remnant organic material yet to decompose, represents organic material that must be assimilated by the aquatic environment during subsequent high water. The cost of assimilation is observed in the consumption of aquatic oxygen by the decomposition of the vegetation, and varies in severity with the annual variation in the flood cycle. Ultimately, the timing and magnitude of the flood cycle would determine the amount of, vegetation growth, decomposition, oxygen supply, oxygen requirements of the system, and how fisheries would be impacted by environmental conditions in the swamp.

The typical spring rise in river stage occurs when water temperature is low, biological respiration is minimal, and oxygen solubility is high. Crawfish can emerge from burrows providing new food sources for fish, mammals, birds, reptiles, and amphibians. If suitable reproductive habitat is made available at the appropriate time, fish can spawn in shelter from predation in shallow swamp habitat. Nearly all species of fish, whether riverine or lake species, are found in swamp habitat during high water, so the assemblage of fishes found in inundated swamp is diverse and represents a combination of riverine and lake guilds. Since a large portion of swamp habitat in the BCMU is not aquatic for some portion of most years, the fish assemblage is seasonally and annually variable.

Once the swamp in the BCMU is inundated, the factors that determine habitat suitability for aquatic organisms have a cumulative impact on the water quality and determine the makeup of the aquatic community. Currently, the environmental factor that most limits the suitability and availability of fisheries habitat is dissolved oxygen. Some swamp areas experience hypoxic conditions more frequently and for a greater duration than others and are less likely to provide adequate habitat for either spawning or foraging. The least useful habitat for fisheries is swamp that is remote to river water input. These areas are the first to experience oxygen depletion, and the decrease in oxygen is most rapid when water movement is minimal. As a result, the most stationary swamp habitats are areas immediately downstream of barriers to water flow such as oilfield canals and pipelines. Swamp habitat, like the area west of Mile Point Bayou, south of the Amerada Hess Oilfield canal, and others are the first to become hypoxic and remain hypoxic the longest. Similar circumstances exist in other areas of the BCMU when internal circulation is thwarted by hydrologic barriers, but hydrologic barriers fluctuate with river stage and water quality problems associated with physical barriers are more severe and long-lasting. Hypoxia is intensified if aquatic vegetation density id high enough to block sunlight and reduce photosynthesis. The vegetation also adds to the oxygen debt by contributing additional organic material as portions of the vegetation die and add to the already oxygen-deficient system. Fish are usually absent or in low abundance in these areas except at the highest river stages when flow-barriers are breached.

Hypoxia has a direct physiological impact on fish in swamp habitat as well as the few deep-water areas that have previously maintained a resident sport fish population. Recent studies have shown that sustained hypoxia can have chronic effects on fish populations by reducing fecundity of spawning adults, decreasing fitness of young, and increasing mortality of relatively immobile larvae. Less obvious is the indirect impact to fish populations as stagnant areas drain into previously well-oxygenated lake habitats. While the direct impact of hypoxia is observed in reproductive success and recruitment, the abundance and composition of the fish community is also altered when certain species avoid unfavorable conditions by seeking alternate suitable habitat. As water levels in the river fall, much of the hypoxic swamp water can drain into lake habitats on its way back to riverine habitat. Some flood cycles yield an insignificant volume of hypoxic water and the impact on fisheries maybe minimal if spawning is successful and refuge areas can overcome the impact of draining mildly hypoxic swamp. Other flood cycles would yield a much larger volume of hypoxic water in the swamp, which may represent an insurmountable oxygen debt for those areas that ultimately drain such swamps. Suitable refuge areas decrease in availability as the volume of hypoxic water increases. There is little lake habitat in the BCMU and the increasing frequency of swamp hypoxia continues to reduce the available refuge, particularly during falling river stages.

Lakes are typically less environmentally variable than swamp habitat, but more variable than riverine habitat. While riverine habitat can be used by most species as refuge in order to avoid hypoxic conditions, the typical resident fish assemblages found in lake habitats are unlikely to remain stable if they are forced to depend on riverine refuge. Sport fish like largemouth bass, black crappie, and bluegill can survive in riverine habitat, but require the specific environmental conditions provided by lake habitats in order to maintain stable populations. In addition, sedimentation is reducing the accessibility of riverine as even temporary refuge, emphasizing the importance of lake habitat. Deep lakes, like Bayou Gravenburg and the borrow pond north of Sandy Cove boat launch can function as lentic systems by replenishing oxygen through photosynthesis. Much of the water's surface is free of obstruction to sunlight by either canopy cover or aquatic vegetation and the average water depth is usually greater than 2 m in depth during the low water period. They are more likely to attract sport fish species like largemouth bass, crappie, bluegill (and other sunfish), channel catfish, and other species that are typically found in less turbid, more structurally complex habitats. Water movement is either minimal or stationary and fits the habitat requirements of those species. Other lakes like Buffalo Cove Lake, Jackass Bay, and the two lakes north and south of Prejean Canal, are very shallow during most of the year, especially during the low water period, and intermittently provide suitable habitat for fish. Shallow lakes are typically densely vegetated and experience poor water quality every year, especially when ambient temperatures are highest.

Bayou Gravenburg is the largest and deepest lake in the BCMU and has the greatest potential for habitat improvement. It is surrounded by swamp habitat, some of which is stagnant and routinely contributes to poor water quality. Its location is in the drainage path of the isolated swamp and the lake must accommodate the drainage or hypoxic water that routinely depletes oxygen supplies in the lake. The problem is particularly evident when the Atchafalaya River is either stationary or falling. In spring of 2001 young-of-the-year largemouth bass were plentiful immediately following the spring spawn, but immediately declined in abundance as water levels fell and much of the lake became hypoxic. The fish assemblage after the river fell showed that the majority of fish in the lake were predatory garfish that outnumbered sport fish by 100 to 1. The refuge capacity of lakes like Bayou Gravenburg are diminished or eliminated if lake species are forced to migrate to riverine habitat to avoid hypoxia. Reproduction and recruitment decline as young bass and sunfish are more vulnerable to predation in the lake, in transition to riverine habitat, and while inhabiting riverine habitat.

Location in the floodplain is also an important factor in determining the extent to which environmental conditions would be suitable for fish in a particular lake. Interior lakes that are surrounded by swamp habitat that sustain acceptable water quality would be less likely to experience comprehensive changes in the fish community. Fish samples from the borrow pond north of the Sandy Cove boat launch indicate a more consistent fish assemblages than Bayou Gravenburg. The Sandy Cove pond is subject to no hypoxic swamp drainage and is sufficiently deep to serve as refuge habitat during low water. Although it is directly connected to the Fausse Point Cut and has riverine species in its assemblage, the proportion of sport fish is much more consistent and never absent. The comparison of fish assemblages from the two lakes suggest that lakes like Gravenburg would continue to experience unstable fish populations as long as water quality in the lake is subject to a significant volume hypoxic drainage.

Future Conditions with No Action

Without implementation of the proposed action, continued sedimentation would eventually fill the southern portion of Bayou Gravenburg, resulting in a potential loss of up to 255 acres of deep-water habitat. Water quality problems would get progressively worse as organic material accumulates and internal circulation is reduced. Deteriorating water quality would likely lead to unsuccessful reproduction due to either unsuitable spawning conditions or increased mortality of young fish. Fish assemblages would likely continue to become more transient as the frequency of hypoxia increases habitat variability. Recreational fishermen in Bayou Gravenburg, Prejean Canal, and other internal canals have experienced reduced success in recent years as hypoxia has become more common, and the trend would likely continue. The stagnant water conditions and low dissolved oxygen concentrations in swamp habitat caused crawfish mortality during harvest during the latest flood cycle, resulting in financial losses for commercial fishermen in the BCMU. The commercial crawfishing industry would continue to experience increases in the frequency of mortality during harvest under the existing environmental conditions.

Future Conditions with Proposed Action

In order to consider the benefits of the proposed plan to the BCMU, it must be described as preliminary habitat manipulation that would alter the future hydrology of swamp habitat. The currently proposed set of BCMU elements was not designed to completely eliminate water quality problems in the BCMU. It is assumed that future elements would be implemented in the BCMU after the impact of the current plan is assessed. Future modifications to the BCMU are presently being considered for implementation during a period of post construction monitoring, evaluation and approval by higher USACE authority and would also be designed to take advantage of the current alterations. The proposed addition of river water into the BCMU would increase the distribution and circulation of water and it is anticipated that the projects would directly improve the water quality in over 7,500 acres of swamp habitat. The direct improvement, as well as indirect improvements, in water quality would reduce swamp hypoxia and subsequently decrease larval mortality, increase reproductive success, and stabilize the refuge characteristics of existing deep-water habitat.

Specifically, fisheries in the BCMU would benefit from a more stable lake environment in Bayou Gravenburg, particularly sport fish. The closure of the Gravenburg inlet (element 6, figure 6) and the Keyhole Canal (element 7, figure 7)) are designed to reduce sedimentation in Bayou Gravenburg that is filling in deep-water habitat. Between three and five acres of deep-water habitat has been lost in the last decade due to sediment entering the lake through the Gravenburg inlet. Deep-water lakes, especially Bayou Gravenburg, are important because they are necessary for suitable fish refugia during low water and the BCMU has a limited area of potential refuge. However, the closure of the inlet also results in a net decrease in river water to the BCMU, and Bayou Gravenburg directly. Water from the inlet provides oxygenated river water to the lake and to the adjacent swamp east of the lake. The inlet allows water into the BCMU when the river stage at Butte LaRose is about 10 feet and is the only source of water between the Sibon Canal and the Buffalo Cove Channel. The inlet is also an important component of the hydrology because it generates eastward water movement and directs circulation toward that part of the BCWMA that most frequently experiences hypoxia.

However, additional river water would be introduced into the lake via the swamp north of Gravenburg (elements 12 and 14; figures 4 and 5 respectively), which would not only offset the reduction, but would likely improve internal circulation in the area surrounding the lake. Along with the closure of the inlet, element 6 would also lower the elevations of levees along the inlet that currently restrict north to south water exchange across the inlet. It is anticipated that water quality conditions in the region north and south of the lake would be improved in roughly 1,200 acres. The annual drainage of hypoxic water from this area would be reduced and benefit to aquatic life in the lake. Although difficult to quantify, additional improvements to water quality in the lake are likely through similar improvements in other areas of the BCMU (elements 9, 15, and 16; figures 8, 9,and 10 respectively).

Access to refuge would be limited if hypoxic conditions develop because the inlet is the most direct route to Fausse Point Cut. Water quality in the inlet is typically suitable and provides a short, well-oxygenated route from the lake to Fausse Point Cut. Closing the inlet would exclude the most direct route for migration between the lake and Fausse Point Cut. The only remaining access to refuge would be restricted to passage through the swamp and out of the Buffalo Cove channel. However, anticipated improvements to water quality in the area would likely reduce the necessity for fish to traverse hypoxic swamp habitat in order to seek refuge.

Another closure (element 3; figure 11) is proposed on Poncho Chute, a distributary of Fausse Point Cut. The channel closure would reduce sedimentation in an area below Mudd Cove, which is an efficient outlet for drainage of BCMU swamp at high river stages. Although the Mudd Cove area is very shallow and provides little permanent fish habitat, the closure would also preserve the potential to restore additional deep-water habitat in the BCMU. The conversion of the Poncho Chute channel from lotic to lentic habitat would improve habitat conditions for sport fish species in its existing form. Habitat conditions in the channel may also be improved in the future by dredging the canal to provide additional deep-water habitat. Sediment deposition in the channel would be retarded in the channel, improving the prospect of adding sustainable deep-water habitat in the BCMU.

There are at least three other open-water areas that have potential to sustain resident sport fish populations. The first two are roughly 533 acres of open-water habitat in the lakes on Prejean Canal. They are shallow, densely vegetated, and develop poor water quality much of the year. The closure on Poncho Chute would allow water to move into and out of the Prejean lakes more efficiently and compliment the construction planned for elements 8 and 9-2. These two construction elements would improve circulation by adding water into the area north of Prejean lakes, and in turn improve water quality in the lakes. These areas would likely provide more stable environmental conditions that favor successful spawning and recruitment in the future, but the greatest benefit may be the potential to add additional deep-water habitat in these areas. The lakes are currently too shallow to provide low-water refuge, but the currently proposed water management plans would prevent further habitat degradation and preserve the option to manage the habitat in the future.

The third open-water area is a 150-acre lake west of element 9. The current habitat conditions of this area are not well documented, but the isolated nature of the lake and the lack of access to refuge from hypoxia suggest that it is similar in nature to the Prejean lakes. It would likely benefit from improvements in circulation and additional river water in the same manner as the Prejean lakes, but may be better suited for providing stable fish habitat. Its proximity to the river and a continuous connection to the Whisky Bay Pilot channel would provide a continuous source of well-oxygenated water and fish to areas that are currently isolated from both. Similar to the Prejean lakes, it provides the potential for adding much needed deep-water habitat to the BCMU. Unfortunately, the lake is located in very close proximity to the discharge of element 9-1. Accordingly, emphasis must be placed on the sediment filtering function of the sediment trap on element 9-1 in order to prevent sedimentation in the lake.

WATER QUALITY

Existing Conditions

The BCMU is approximately 57,000 to 58,000 acres in area. Most of this area is state owned land with the remainder owned by private landowners and the Federal government, which owns approximately 300-400 acres on the southwest side of the BCMU. Oil and gas operations are present in areas such as the Amerada Oil Field in the northeast portion of the BCMU as well as in numerous canals that cross the BCMU. There are also numerous privately owned camps and river houses scattered throughout the BCMU.

Generally, the Atchafalaya River does not contribute considerably to the interior floodplain of the BCMU during low water stages. According to a 1999 report funded by the USACE-MVN, as the river's stage at Butte LaRose (BLR) reaches 9 feet there is limited flow of water into the swamp. At 13 feet BLR, water begins to flow into the floodplain while at 17 feet BLR most waterways are over bank causing most swamp and interior areas to be inundated with river water (USACE-MVN, 1999). During the low water stages, the isolated, interior areas tend to have stagnant water resulting in poor water quality conditions.

Section 303(d) of the Clean Water Act requires that States prioritize all impaired waters within the State. Once the impaired waters are prioritized, restoration activities can be implemented using tools such as total maximum daily loads (TMDLs). A TMDL is the calculation of the amount of a pollutant that a water body can receive and still meet water quality standards. The Atchafalaya River is listed on Louisiana's 1999 Section 303(d) list. The target completion date for Louisiana to develop the river's TMDL is March 31, 2009. The BCMU is affected by the quality of the water in the Atchafalaya River since it is the major source of inflow.

The following paragraphs discuss the recent and existing conditions in the Atchafalaya River and the BCMU for certain water quality parameters. The data used for this assessment were collected in 1997 through 1998 (USACE, 1999), and in 2001 through 2002 except for the nutrient data. The 1997 and 1998 data were collected primarily during the months of February through June and July, respectively. The 2001 data were collected in February through May and September through December. The 2002 data were collected during January through June except for March.

Nutrients

The USEPA recently published the "Integrated Assessment of Hypoxia in the Northern Gulf of Mexico"(USEPA, undated), which attributes the hypoxia issue in the northern Gulf of Mexico to the excessive nutrients in the Mississippi-Atchafalaya River Basin. According to the report (referring to the hypoxic area), "...the largest zone of oxygen - depleted coastal waters in the U.S., and the entire western Atlantic Ocean, is found in the northern Gulf of Mexico on the Louisiana/Texas continental shelf. The area affected is about the size of the State of New Jersey" (USEPA). The "1999 Non -Point Source Pollution Plan," states that "...the high levels of eutrophication in some Louisiana lakes and streams can be attributed to the nutrients derived from agricultural lands, primarily nitrogen and phosphorus" (LDEQ, 1999). The LDEQ plan also states that nutrient over - enrichment leads to "...an imbalance in natural nutrient cycles, changes in water quality and a decline in the number of desirable fish species" (LDEQ, 1999).

The Louisiana Water Resources Division of the USGS maintains current and historical nutrient data for the Atchafalaya River. The data were collected from November 1997 through March 2002 and show averages for the river of approximately 0.6 mg/L as N of Total Kj eldahl Nitrogen, 1.2 mg/L as N of NO_2 (nitrite) + NO_3 (nitrate), and 0.06 mg/L as P of orthophosphate. The USGS has also collected nutrient data in the floodplain area just north of the BCMU in and around Bayou Darby. Readings for NO_3 - N (nitrate-nitrogen) in March and July of 2000 averaged approximately 0.08 mg/L in the floodplain area. For reference, the NO_3 - N readings in Lake Fausse Pointe Cut, which is representative of the river, averaged approximately 1.7 mg/L in March and July of 2000.

LDEQ does not have numerical standards set for nutrient levels, but the state is working through the Non - Point Source Pollution Program to implement watershed management strategies over the next 5 - 10 years. The USEPA report mentioned above states that some researchers have suggested an approximate boundary of 1.5 mg/L for total nitrogen and 0.075 mg/L for total phosphorus.

Dissolved Oxygen

The LDEQ standard for dissolved oxygen (DO) is 5 mg/L. This criterion was designed to "protect indigenous wildlife and aquatic life species associated with the aquatic environment" (LDEQ, 2000). In addition, this standard ensures a diversified population of fresh, warm water biota including sport fish. Levels below this standard begin to stress certain aquatic species. According to the USEPA, DO levels below 5 mg/L slightly affect the rate of growth of fish and other aquatic life; however, levels at 3 mg/L and below are acutely lethal to some fish (USEPA, 1986).

The report, "Effects of Variation in River Stage on Water Quality and Biota in the Buffalo Cove Management Unit of the Atchafalaya Basin, Louisiana", published in 1999 and submitted to the USACE-MVN by Glenn Constant; William Kelso, Ph.D.; and D. Allen Rutherford, Ph.D. of Louisiana State University analyzed water quality data collected in the years 1997 and 1998. A summary of the results for DO data (surface and bottom of water column) is presented below.

1. The 1997 monitoring program covered a small area in the northern portion of the BCMU while the 1998 monitoring program was adjusted to cover a larger area in the northern and southern portions of the BCMU. The results for DO readings in 1997 revealed spatial variations for the surface DO readings during primary (BLR 6.5 ft to 13.8 ft) and secondary (BLR 13.8 ft to 17 ft) inundation. Less spatial variation occurred during the period of over bank inundation (BLR > 17 ft). However, in 1998 no significant spatial variations were detected for surface readings during primary and secondary inundation. According to Constant and others, the spatial variation of 1997 "...suggested a relationship between water quality within the floodplain and the distance from the source of river-water input." During primary and secondary inundation, surface DO readings were typically lower in the interior area of the BCMU than on the perimeter of the. BCMU. During over bank inundation, the surface DO readings were similar in the interior area to the perimeter area. Relative to the LDEQ standard of 5 mg/L, approximately 15 percent of the total surface readings for 1997 were below the standard. Approximately 20 percent of the total surface readings for 1998 were below the standard.

2. In both 1997 and 1998, bottom DO readings were low at all locations and only increased slightly with the higher water stages. Moreover, bottom DO readings at interior sites were much lower than bottom DO readings at perimeter sites. Relative to the LDEQ standard of 5 mg/L, approximately 30 percent of the total bottom DO readings in 1997 were lower than the standard while approximately 60 percent of the total bottom readings in 1998 were below the standard.

3. The data collected in 2001 through June 2002 contain DO readings at the surface, middle, and bottom of the water column. The number of sampling sites has expanded since the monitoring programs in 1997 and 1998. See table 6 for the percentages of DO readings below the LDEQ standard for the years 1997, 1998, 2001, and January through

June 2002.

TABLE 6
1997, 1998, 2001 and 2002 Percentages of
Yearly Dissolved Oxygen Readings less than 5 mg/L

YEAR	SURFACE	MIDDLE	BOTTOM
1997*	15%	NA	30
1998	20%	NA	60
2001	50%	70%	75
2002	65%	70%	75

*Note: 1997 was an above-average, high-water year.

During the 1997 monitoring program, Constant and others assessed that surface DO readings appeared to be affected by the amount of water hyacinth covering the water's surface; especially when the stage at BLR was less than 17 feet. Interior sampling sites that experienced water hyacinth cover at or near 100 percent also experienced surface DO saturations less than 20 percent. The perimeter sampling sites did not experience the same level of water hyacinth cover or DO saturations. The monitoring program results also showed that water hyacinth cover had a greater influence on DO near the surface of the water column than near the bottom.

Temperature

The BCMU is comprised of natural bayous, swamps, manmade canals, and open water lake systems. The water temperature varies depending on the local environment, i.e. extent of tree canopy, depth of water, and hydrologic setting.

The 2001 and 2002 monitoring programs collected temperature data at the surface, middle, and bottom of the water column for each sampling site. Three of the sampling sites, BC 8, BC 12, and BC 30, are located at the perimeter, southern interior, and the northern interior of the BCMU, respectively (see figures 14 and 15). BC 30 is located in an area with more tree canopy than BC 12; therefore, the water temperatures tend to be higher at BC 12. See table 7 for the summaries of the temperature data for these three sites from 2001 and 2002. During the monitoring programs of 1997 and 1998, Constant and others assessed that the surface and bottom temperatures were "statistically similar among sites in both years" (USACE, 1999).

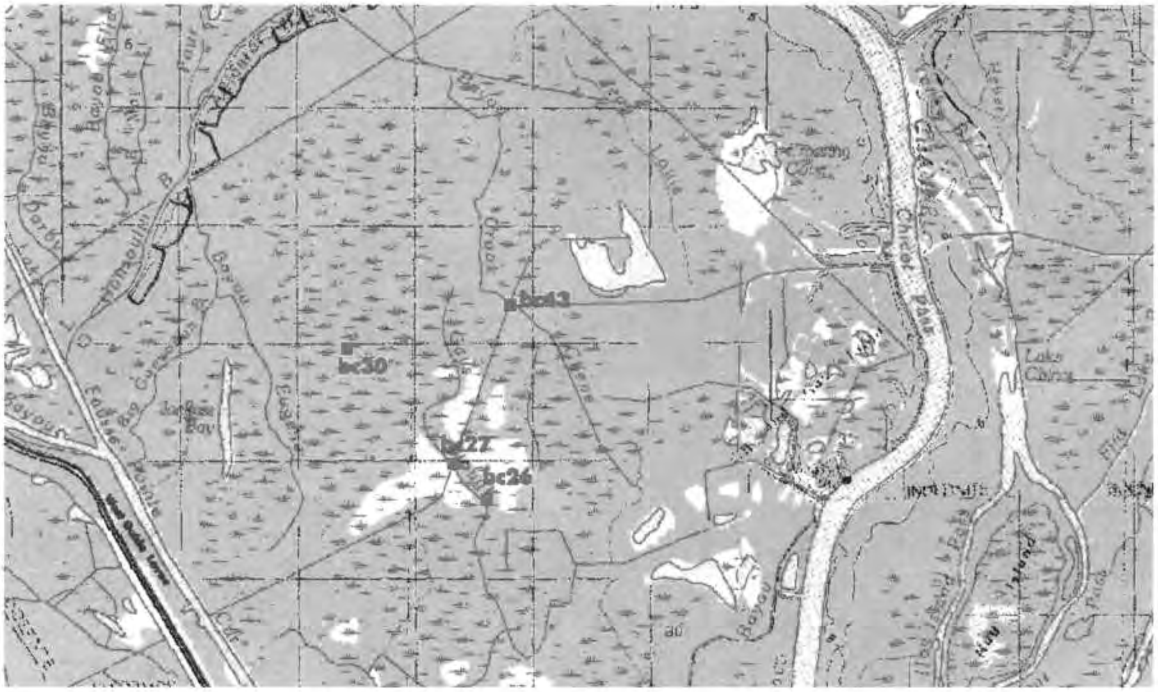


FIGURE 14
Monitoring Sites BC 26, 27, 30 and 43

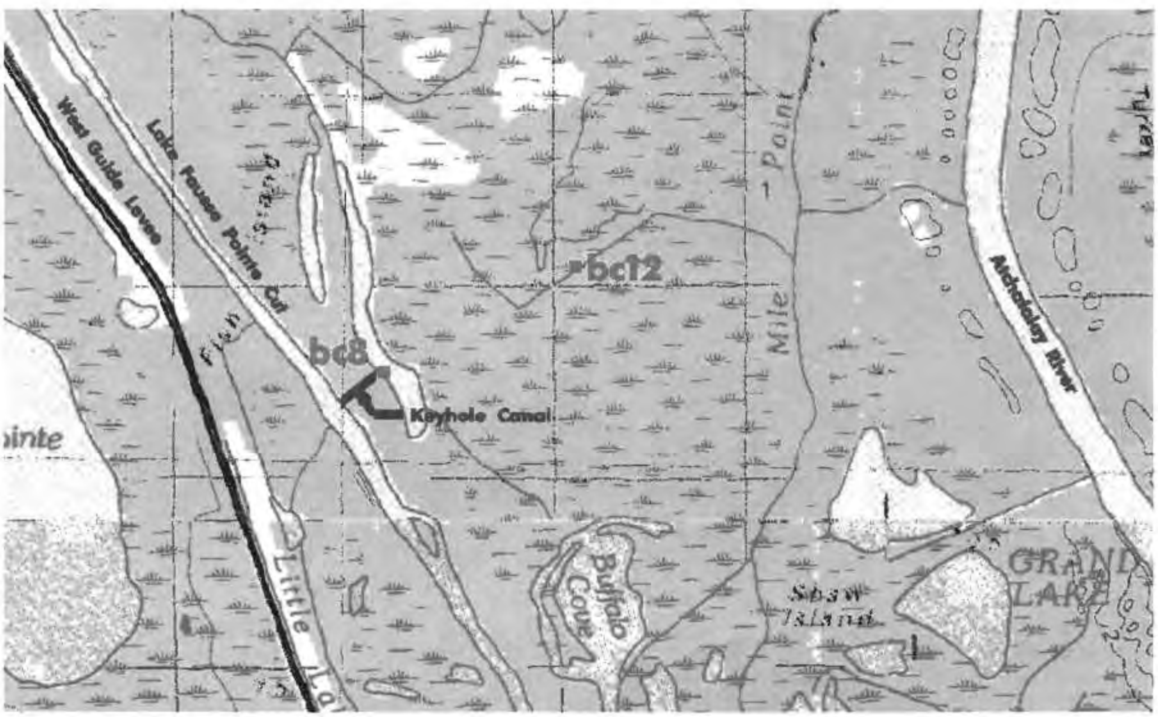


FIGURE 15
Monitoring Sites BC 8 and 12

TABLE 7
Average Temperature Readings for Surface, Bottom,
and Middle of Sites BC 8, BC 12, and BC 30

Site/Water Column		Temperature (Degrees C)		
		Maximum	**Minimum**	**Average**
BC 8	Surface	26.55	10.39	20.39
	Middle	26.47	10.38	20.05
	Bottom	25.68	10.31	19.44
BC 12	Surface	26.50	10.47	20.82
	Middle	25.93	10.39	19.04
	Bottom	26.22	10.38	20.14
BC 30	Surface	24.74	10.60	18.54
	Middle	24.31	10.52	18.06
	Bottom	24.11	10.47	17.65

Note: Readings from February-May and September-December 2001 and January-June 2002.

pH and Turbidity

The LDEQ criteria for pH allow an acceptable range from 6.0 to 9.0. During the monitoring programs of 1997 and 1998, Constant and others recorded a pH range of 6.5 to 8.0 for both years, which meets the LDEQ standard and is within the tolerance limits of fish and invertebrate species that inhabit the BCMU.

The LDEQ has established criteria for turbidity in the state's many different water bodies and major aquatic habitat types. The standard for the Atchafalaya River is 150 NTU (nephelometric turbidity units). The standard for bayous and canals is 50 NTU while the standard for freshwater lakes is 25 NTU. The BCMU contains bayous, canals, and freshwater lakes. Turbidity readings for the BCMU in 2001 and 2002 vary depending on the level of influence by the Atchafalaya River during high water stages. Sampling site BC 26, which is located in Gays Slough in the northern portion of the BCMU (figure 14), had average turbidity readings of 34 NTU, 32 NTU, and 32 NTU for the surface, middle, and bottom of the water column. Sampling site BC 27, which is located at the intersection of Sibon Canal and Gays Slough in the northern portion of the BCMU (figure 14), had average turbidity readings of 16 NTU, 15 NTU, and 15 NTU for the surface, middle, and bottom of the water column. Sampling site BC 43, which is located at the intersection of Sibon Canal and Phillips Canal in the northern portion of the BCMU (figure 14), had average turbidity readings of 38 NTU, 41 NTU, and 41 NTU for the surface, middle, and bottom of the water column. BC 26 and BC 43 had maximum turbidity readings of 55 NTU and 73 NTU, respectively, on April 19, 2002. The stage at Butte LaRose was 17.3 feet on April 19, 2002, which is a high water stage.

As stated previously, the LDEQ and USEPA have identified the Atchafalaya River as one of Louisiana's impaired water bodies. The Atchafalaya River Main stem -

Simmesport to Whiskey Bay Pilot Channel at mile 54 is designated as drinking water supply, primary contact recreation, secondary contact recreation, and fish and wildlife propagation. The suspected causes of impairment for this section of the river include flow alteration, non-priority organics, oil and grease, other habitat alterations, and siltation. The Lower Atchafalaya Basin Floodway - Whiskey Bay Pilot Channel at mile 54 to U.S. Highway 90 Bridge in Morgan City (including Grand Lake and Six Mile Lake) has designated uses of drinking water supply, primary contact recreation, secondary contact recreation and fish and wildlife propagation. The suspected cause of impairment for this section of the river is metals (mercury). LDEQ has reported mercury levels in fish in Buffalo Cove at averages of 0.292 parts per million (ppm) and a maximum of 0.662 ppm. The types of fish sampled include bigmouth buffalo, blue catfish, bowfin, freshwater drum, largemouth bass, and white crappie. LDEQ and the Louisiana Department of Health and Hospitals will consider issuing a health advisory limiting fish consumption for pregnant or breast feeding women and children under seven for locations and species where the average concentration of mercury exceeds 0.5 ppm in fish and shellfish.

Future Conditions with No Action

Without the proposed actions, the BCMU would likely continue to experience poor water quality conditions for extended periods between the yearly flood cycles. This would be more stressful than existing aquatic species can tolerate, therefore, continuing their decline.

The backswamp and interior areas of the BCMU would continue to be disconnected from the Atchafalaya River due to the lack of input sources. This would continue to cause poor water quality conditions in some disconnected areas until stages reached at or above 17 feet BLR. As natural deposition continues to occur on the banks of waterways causing higher bank elevations, the durations of disconnect from the river water would increase in the backwamps and interior areas. The natural periodic flooding of the alluvial river swamp would be reduced and water quality in these areas would degrade further.

The water movement in the interior of the BCMU would continue to be disrupted. High banks on manmade canals that run east to west and natural levees along waterways would continue to isolate the interior areas from river water and hinder the natural north to south flow within the BCMU. Hydraulic barriers would continue to hinder the natural draining of the interior areas during the falling stages of the hydrograph. These hindrances would continue to degrade water quality conditions within the interior of the BCMU.

Sediment deposition would continue to occur in sensitive aquatic areas that are targeted for preservation. The reduced depths and area in places such as the Buffalo Cove Lake and Bayou Gravenburg would cause higher water temperatures and water quality conditions not suitable for desired aquatic species.

Future Conditions with Proposed Action

The proposed actions for the BCMU include Elementsl, 3, 6, 7, 8, 9, 12, 14, 15, and 16 as previously described. These elements are the first in a series of efforts for the BCMU feature. The proposed actions would benefit the water quality in the BCMU, which is important in achieving the goal to sustain the aquatic and wildlife habitats.

Ashby (2002) lists the water quality wetland functions as follows:

1. Retention or removal of imported material, which reduces the transport of nutrients downstream.

2. Accumulation of peat, which results in the retention of nutrients, metals, and other substances.

3. Accumulation of inorganic material and sediments, which results in the retention of sediments and some nutrients.

Ashby explains that scientists (M.R. Walbridge) have concluded that, "sediment and nutrient removal and transformations in southern forested wetlands may provide the greatest value to society of these types of systems, particularly when they are located along low-order streams."

The elements of the proposed actions would collectively benefit the water quality within the BCMU by introducing more river water for a longer period during the seasonal high water stages of the Atchafalaya River and its tributaries; improve the movement of this river water into, within, and out of the BCMU; and reduce the amount of sediment entering the BCMU during the seasonal high water stages.

The BCMU is part of the alluvial river swamp of the Atchafalaya River. According to Gosselink (2000), "An alluvial river swamp often has water quality very different from that of the adjacent river." For example, during low water stages when the backswamps are isolated from the river, they may experience low DO concentrations. For long periods of time, this may be stressful to certain aquatic species. Typically, backswamps naturally experience periodic inundation with river water, which is important in sustaining the aquatic and wildlife habitats. Over time, the area delineated as the BCMU has become increasingly isolated from the Atchafalaya River due to natural and man influenced obstructions. The proposed actions would alleviate some of the stresses on the ecosystem due to these obstructions by reintroducing longer periods of inundation of the backswamps with river water. According to Mitsch and Gosselink, "water chemistry in Louisiana backswamps in the Atchafalaya Basin is distinct from that of the adjacent rivers and streams except during the flooding season, when the waters of the entire region are well mixed" (Gosselink, 2000). This "mixing" promotes the natural chemical transport processes and chemical transformations associated with wetlands biogeochemistry such as denitrification, phosphate sorption, nutrient uptake, decomposition of organic material, sorption of heavy metals, and retention of toxics (Ashby, 2002).

Along with the increased duration of river water inundation in the interior areas of the BCMU, the proposed actions would improve the movement of water into, within and out of the BCMU. Proposed modifications to pipeline canal spoil banks and naturally occurring, high stream banks would improve the movement of water within the BCMU. This would allow for areas of stagnant water due to flow hindrances to flood with riverine water and drain during falling river stages. The proposed actions would also remove hydraulic barriers in the BCMU so that interior areas may drain out of the area WMU during the falling river stages. This would allow for natural exchange of the stagnant, back swamp waters with river water during the flooding cycle further promoting the biogeochemical processes in the forested wetlands/back swamps.

The proposed actions would also improve water quality by reducing the amount of sediment entering the sensitive habitat areas. The historical sedimentation in the BCMU has resulted in reduced depths in lakes and open waters. This reduced depth has resulted in higher water temperatures in areas with little to no tree canopy, which may be stressful for certain aquatic species.

Application for the Louisiana State Water Quality Certification has been prepared along with the 404(b)1 evaluation and the appropriate public notices. A Storm Water Pollution Prevention Plan is being prepared and a discharge permit would be applied for from LDEQ if necessary. Construction would not proceed until all of the proper water quality documentation has been approved.

FORRESTED WETLANDS

Existing Conditions

Like the aquatic habitats, there are diverse forested landscapes and terrestrial habitats within the basin. The primary forest type found within the BCMU is cypress-tupelo, with the early and mid successional hardwoods dominating the higher dryer edges of the units. Frequency and duration of flood events, topography, and soil type are probably the most important factors regulating ecological succession and species composition within the basin. Landform changes in the basin occur with maturation of the river system (floodplain), or as a result of deposition materials from the Atchafalaya River, often dramatically altering the landscape. As these landform changes occur, species associations within the landscape shift, such that those sites found on the older, more stable soils have the most advanced forest succession (Putnam et al. 1960 in: USFWS 1981).

Establishment of early successional hardwoods is dependent upon the presence of bare mineral soil seedbed and the absence of overhead shade and competition from nearby vegetation (Putnam et al. 1960, Fowells 1965, Johnson 1973 in: USFWS 1981). Consequently, species composition in early successional bottomland hardwood forests is determined by the pioneer species already present on soils exposed by man's activities or by sediment carrying pioneer seed into an area at the time of deposition. The primary tree species of the early successional bottomland hardwood forest are moderately to highly tolerant of siltation and flooding (Teskey and Hinkley 1977 in: USFWS 1981). These species include black willow, sandbar willow, eastern cottonwood, and American sycamore (Hoffnan 1973 in: USFWS 1981). Soils supporting mid/late successional bottomland hardwoods are generally more mature, better drained (although seasonally flooded), extremely nutrient rich, and receive less sedimentation than those associated with the early successional bottomland hardwoods (Putnam et al. 1960, Johnson 1973 in: USFWS 1981). Cypress-tupelo forests types in the basin occur most often, but are not successful on very low, poorly drained flats, in deep sloughs, and in natural sumps that are flooded for approximately 9 months during the year (USDI 1974). Soils associated with this vegetative type are characterized as heavy clays and muck[s] that are dewatered only during the lowest river stages (Fowells 1965 in: USFWS 1981).

Future Conditions with No Action

Long term, the area would potentially undergo a series of successional changes triggered by a combination of increased sedimentation and drying cycles. Without proper purposeful introduction of more desirable species, willow and tallow are the pioneer species moving into bare ground (sediment) under the cypress-tupelo (Allen 1997). With all of the man made alterations in the surrounding basin (i.e., construction of oilfield canals and the placement of dredged material in the back swamp) the chance of getting a quality bottomland hardwood forest within the higher elevations of the back swamp is marginal at best, without proper forest management. However, it is understood that any forest management completed on these private lands would result from willing landowners working with their state forestry agency in a manner that is consistent with the silvicultural practices that are required by the easements to be acquired by the USACE in support of the ABFS environmental protection feature.

As previously discussed, frequency and duration of flood events are probably the most important factors regulating ecological succession and species composition within the BCMU. Under current conditions, cypress-tupelo forests appear to be merely surviving in continuously flooded areas, now common throughout the basin. Though most woody plants are poorly adapted for growth and survival in continuously flooded soils (Kozlowski et al. 1991), certain species such as baldcypress have adapted to growing in water-logged soils, more specifically, soils that are flooded for no longer than 4 to 5 months of the year (Hosner 1958, Broadfoot and Williston 1973, Baker 1997, Conner and Day 1986, USDA Report 1980). Other species, such as swamp tupelo and water tupelo, are highly resistant to flooding in clear water, but are easily damaged by muddy, sediment-laden water (Broadfoot and Williston 1973).

There are some species that cannot tolerate even short periods of water logging during critical stages of growth. This group is typified by yellow-poplar seedlings, which can withstand only 2 to 4 days of flooding during the growing season (Hook 1984). If nothing is done to improve environmental conditions in the BCMU, the future of sustainable forestry, as well as sport fishing and crawfishing would be threatened.

Regardless of species, trees survival is inherently related to the individual's ability to maintain a functional balance, internally, in direct response to a proportional allocation of resources available on site (Kozlowski et al. 1991). This simply means that there must be adequate resources (fresh, oxygenated water, and mineral soils) on site for proper growth and survival of any vegetation.

Future Conditions with Proposed Action

Implementation of this action would aid in producing annual flooding and dewatering cycles that would greatly benefit forest communities that are now either drying out or that exist in stagnant, waterlogged conditions. Over bank flooding prepares bare mineral soil seedbeds for species such as willow, cottonwood, and cypress by washing away heavy deposits of organic material. Floodwater dispersal selectively establishes some species on bare ground, while immersion improves the germination rates of others. However, with more frequent spring flooding, successful regeneration of some bottomland hardwood species could be adversely affected. Because complete submergence checks seedling growth and prolonged submergence often kills seedlings, regeneration would be prevented if new seedlings were drowned in successive years.

It is not expected that the proposed elements would have any affect on the overall frequency, magnitude or duration of flooding in the BCMU. The controlling factor for these parameters are dependent on the Mississippi River, Red River their tributaries, and the climate. With inundation or saturation persisting longer than 5 months of the growing season and a 100 percent probability of annual flooding, cypress regeneration would be virtually impossible. It is possible with the proposed project that the back swamp will actually be better able to completely drain, resulting in better conditions for forest regeneration and a reduction in the existing hypoxic conditions. This reduction of hypoxic conditions could improve the vigor of trees that are experiencing stress from such conditions.

The removal or reduction in hypoxic conditions in the back swamp where standing water may still exist would improve. In addition; mast-producing species on lower ridges could be replaced by willow, tallow, and box elder, thereby reducing habitat value for wildlife. Regeneration of low-quality hardwood species (buttonbush) that break seed dormancy to germinate late, after floodwaters have receded, could also occur. However, it must be noted that these low quality hardwoods such as buttonbush still provide valuable wildlife habitat, especially for songbirds. Flooding longer than 5 months during the growing season would restrict the growth of ground vegetation that contributes to detritus production and provides forage for terrestrial wildlife. Conversely, aquatic organisms and their terrestrial predators would benefit from the periodic expansion of the floodplain habitat and the prolonged existence of the aquatic swamp habitat.

In general, the proposed action would enhance maintenance of existing cypress-tupelo swamps north and east of Buffalo Cove Lake. Persistence of cypress-tupelo wetlands requires flooded conditions for four to five months during the growing season, for an average of three out of five years. As noted previously, frequency, the Mississippi River and its tributaries along with climate govern magnitude and duration of flooding to a great extent.

Approximately 230 acres of forested wetlands (cypress tupelo/mixed hardwoods) would be directly impacted by project construction. One hundred and eighty two acres of this 230 acres impacted would be used for dredged material disposal and would affect primarily early successional hardwoods mixed with willow. Tree survival in this area would be dependent on species, age and depth of disposal. It is more likely that existing tree species would be displaced by less desirable scrub/shrub and early successional hardwood species.

The remaining 48 acres of impact would result from the construction of the cuts, closures, and sediment traps. At these locations trees would actually be either removed or encounter extremely disturbed landscape conditions and therefore would be permanently lost. The majority of the impacts would be modifying previously disturbed spoil banks along manmade canals or natural levees formed along bayous from overflow. Due to the higher ground elevations and the periodically disturbed nature of these areas, a large portion of the forested areas affected would be young willow and scrub shrub habitat.

Three hundred and seventeen acres of mixed hardwoods would be removed or disturbed by providing an access corridor for the land-based equipment. These acreages are representing the worst-case scenario and may be revised downward if water access is feasible. As noted before, the elements are designed to mostly self maintain but would be monitored to assure maintenance if needed. If the determination is made that no or infrequent maintenance is necessary the access corridor could be selectively replanted to at least partially restore the habitat found to the extent practicable in the forested wetlands.

As with other floodplain systems, the Atchafalaya Basin is not static, and for this reason, specific requirements for optimal hardwood regeneration, growth, and survival have been difficult to determine. Because of this uncertainty, measures have been taken to minimize the impacts to woody vegetation in the BCMU. The first step toward maximizing success in the BCMU is to define the different forest types as they relate to variations in site, define the individual function of each forest type with regard to the overall ecology of the management unit within the Atchafalaya Basin, and require a management plan for each forest type that is assumed to change. The second step is to initiate a monitoring system for recording baseline information on the forest and subsequent changes regarding forest health and forest type as they relate to alterations in hydrology and sedimentation.

With or without human intervention, biotic and abiotic processes and components of the Atchafalaya Basin floodplain would change, over time. However, with the monitoring in place proposed by the LDAF, and the USFWS, the USACE would be better able to document how the forest is affected (negatively or positively), and document the degree to which it is affected. If bottomland hardwood management techniques are in place before an area transitions from one forest type to another, management would have a better chance of directing reforestation, rather than leaving regeneration of the once forested wetlands to chance succession. It must be noted that while the project would result in improved conditions for both forestry and wildlife it is the ultimate responsibility of the landowner, with assistance from the LDAF, to develop a long-term forest management plan for the property.

WILDLIFE

Existing Conditions

The viability of the wildlife resources in the Atchafalaya Basin are directly linked to the health of the bottomland hardwood forests, wooded swamps, and the margins of permanent water bodies provided within these management units. The wildlife resources of the Atchafalaya Basin have historically been diverse and abundant due to the variety and magnitude of available habitat. Wildlife species include game animals, fur animals, endangered species, and numerous other non-game species (USFWS, 1981). The basin provides prime habitat for a variety of diving and wading birds including anhinga, great blue heron, green-backed heron, little blue heron, cattle egret, great egret, snowy egret, tricolored heron, yellow-crowned night heron, and white ibis (Kennedy, 1977 in: USFWS, 1981). All of these species are known to nest in the Atchafalaya Basin (Martin and Lester, 1990). During breeding season, eight wading bird-nesting colonies contained more than 50,000 breeding birds (Kennedy, 1977; Portnoy, 1977 in: USFWS, 1981). Since that time, an additional nine colonies have been identified (Martin and Lester, 1990). Other avifauna found in the basin includes waterfowl, shorebirds, raptors, woodpeckers, and passerines. Over 170 bird species have been observed in, and immediately adjacent to, the basin (USFWS, 1981). The Atchafalaya Basin is an important wintering area for waterfowl in the Mississippi flyway (USFWS, 1981). The forested wetlands and shallow margins of permanent water bodies provide prime feeding and resting areas for significant numbers of American coot and dabbling ducks, such as the mallard and the northern pintail. Diving ducks are most common in the larger lakes and streams in the basin. Other game birds found in the basin include American woodcock, common snipe and wild turkey. The principal big game species in the Basin is the white-tailed deer. Overall, the relative abundance of deer is greatest in mid/late-successional bottomland hardwood and least in baldcypress-tupelogum swamps. However, seasonal variation in habitat preference has been noted (Evans, 1976, in: USFWS, 1981).

Future Conditions with No Action

Under current conditions in the BCMU, sedimentation and lack of circulation are filling in the shallow water habitat used by waterfowl and wading birds. In addition, the circulation problems within the swamp are not allowing the proper dewatering cycles to occur that are conducive to either waterfowl, bottomland hardwoods, or the young aquatic vegetation on which certain wildlife species depend. Without the continuation of the supporting habitats for the lower levels of the food chain, the upper levels of the chain cannot be supported.

Future Condition with Proposed Action

The with project conditions would initiate the restoration of the annual flooding and dewatering cycle, which would greatly benefit forest communities and that are now either drying out or subjected to stagnant conditions, such as cypress tupelo swamp. While the cypress tupelo swamp is not a prime wildlife habitat for producing wildlife it is an extremely important habitat for sustaining wildlife. Many of the food sources for waterfowl, wading birds, amphibians, and furbearers are produced in these shallow swamps in the form of crawfish, salamanders, small fish, snakes, and many aquatic insects. These areas are also beneficial as waterfowl nesting areas.

The reduced sedimentation the improved circulation within the interior swamp would tend to work against the establishment of young bottomland hardwoods in the interior swamp. However the new water circulation patterns expected would favor conditions for bottomland hardwoods along the low and high sedimentary ridges that parallel the various watercourses within the swamp where cypress is currently established. These young bottomland hardwoods along with an under story of scrub shrub habitat would provide nesting, cover, and forage areas for various species of small mammals. In addition, wildlife corridors into the interior swamp would be established as a result of providing construction access. The higher elevations created by the non-continuous deposition of excavated material created as a result of construction of water conveyance channels and construction access would provide habitat for small game animals as well as cover, nesting and resting areas for songbirds and other passerines. In addition, these access corridors would likely provide additional forest edge and water edge interface that could be used by small game species and their food base.

The reduction of ponding, along with the circulation improvements proposed here, would eventually improve conditions for bottomland hardwoods and the associated wildlife dependent on them. The immediate study area in this portion of the management unit is comprised of approximately 32,000 acres of cypress-tupelo gum with willow and mixed hardwood forest on the small amount of the elevated ridges. Historical over bank flooding regimes would have impacted most of the interior of the study area approximated at 16,000 acres.

ESSENTIAL FISH HABITAT

Essential Fish Habitat (EFH), as outlined in the Magnuson-Stevens Fishery Conservation and Management Act of 1996 (Public Law 104-297), has been considered, but based on lack of appropriate substrates, vegetation, and of Federally managed estuarine species, it has been determined that EFH is not found in the project area. Coordination with the National Marine Fisheries Service, Baton Rouge field office on July 9, 2002, affirmed that EFH does not occur in the project area.

ENDANGERED OR THREATENED SPECIES

This resource is institutionally significant because of: the Endangered Species Act of 1973, as amended; the Marine Mammal Protection Act of 1972; and the Bald Eagle

Protection Act of 1940. Endangered (E) or threatened (T) species are technically significant because the status of such species provides an indication of the overall health of an ecosystem. These species are publicly significant because of the desire of the public to protect them and their habitats.

Existing Conditions

Eight Federally-listed endangered or threatened species may occur or once occupied the proposed work area. The pallid sturgeon (E) inhabits large, turbid, free-flowing rivers, including the Atchafalaya, but does not appear to use forested wetland overflow areas. The American Alligator is listed as threatened under the "Similarity of Appearance" clause to the Endangered Species Act, but population levels in the area are sufficient to legally allow a state-regulated trapping season. The ivory-billed woodpecker (E) and Bachman's warbler (E) were formerly associated with bottomland habitats within the study area, but lack of recent sightings casts doubt on their current presence. The Eskimo curlew (E) historically migrated through the southern parts of Louisiana during its northward spring migration. The bald eagle (T) is known to nest in cypress-tupelo swamps bordering the nearby Lake Fausse Point, eastern Grand Lake, Duck Lake, and Upper Grand River Flats, and probably forages in the study area. The Florida panther (E) historically inhabited bottomland forests in the Basin, and a small population of the Louisiana black bear (T), a subspecies of the American black bear, is currently known to exist in southern St. Mary and Iberia Parishes.

Future Conditions With No Action

Without implementing the proposed plan the interior swamp would continue to receive sediment and the interior shallow water lakes and open water swamps would eventually be less likely to provide for bald eagles food base which is needed to attract them to the area. Other species such as the Bachman's warbler could possibly use the area if man made alterations do not prevent the now cypress tupelo swamp to complete its succession to bottomland hardwood forest.

Future Conditions With Proposed Action

The MVN has prepared a biological assessment (BA) of implementation impacts on the Louisiana black bear (appendix, available upon request). Based on information from the USFWS, animals are occasionally reported from the Bayou Eugene study area. The proposed construction of circulation and drainage improvements combined with managed sedimentation should help preserve and provide long-term stability of cypress-tupelo swamps, and bottomland hardwoods and would neither significantly improve nor degrade habitats important to the Louisiana black bear. Recent coordination with USFWS (July 25, 2002) concurred with MVN's findings that the proposed activities are not likely to adversely impact listed or proposed threatened or endangered species, not their critical habitats.

CULTURAL RESOURCES

This resource is institutionally significant because of: the National Historic Preservation Act of 1966, as amended; the Native American Graves Protection and Repatriation Act of 1990; and the Archeological Resources Protection Act of 1979; as well as other statutes. Cultural resources are technically significant because of: their association or linkage to past events, to historically important persons, and to design and/or construction values; and for their ability to yield important information about prehistory and history. Cultural resources are publicly significant because preservation groups and private individuals support their protection, restoration, enhancement, or recovery.

Existing Conditions

An extensive study of the Atchafalaya Basin was published by Jon Gibson in 1982, and much of the discussion below borrows from that study. The prehistory of the Atchafalaya Basin is indistinct at its earliest phases, with no evidence of Paleo-Indian Period occupations in the basin proper. However, characteristic Paleo-Indian artifacts have been discovered at locations on the western edge of the basin, suggesting that traces of human occupation within the basin proper have been obliterated by river activity in the intervening millennia. This is also true of Archaic Period occupations, which again appear on the older and higher landforms at the margins of the Atchafalaya Basin around 6000 to 4000 B.P., and on the elevated lands of the Teche Ridge in the northern portion of the basin. Also, during the Late Archaic, Poverty Point-affiliated communities are known from the Basin. In the Tchula Period, Tchefuncte sites become more numerous, again placed prominently on stable, elevated, older landforms. Note that this patterning of sites in early prehistory is reasonable both from the standpoint of long-term site preservation from geologic / hydrologic disturbances, but also from the point of view of the ancient inhabitants, who would have preferred elevated, dry lands with good visibility of the overall landscape, as would be found at basin and river margins.

Early in the first millennium A.D., socio-politically complex Marksville populations occupied other areas of the lower Mississippi River valley. However, the Atchafalaya Basin seems to have been scarcely populated during this period. Shortly thereafter, Issaquena and Troyville populations settled into the swamps, lakeshores, and bayous of the Basin proper, but also continued living on the natural levees and higher lands of the basin margin. A similar pattern was seen in late Prehistory, during the Coles Creek and Plaquemine periods, with an increase in population size and number of villages throughout the region.

Within and nearby the larger BCMU project area, the Chitimacha Tribe of Louisiana has a long and continuous history. Jon Gibson cites an account from 1784, at which time numerous Chitimacha settlements were in existence in the lower Bayou Teche region and adjoining areas. The Chitimacha Tribe of Louisiana today still claims and maintains portions of these lands as their aboriginal homelands. In addition to the many ancient Chitimacha village locations recorded on State Records, the Chitimacha Indians remember, respect, and maintain numerous traditional cultural properties within Iberia, St. Mary, and St. Martin Parishes and in close proximity to the current project area.

When Europeans arrived in the area, the earliest settlers were Acadian, French, and Spanish soldiers, trappers, and missionaries. The 1803 Louisiana Purchase transferred the territory to U.S. hands, which brought an influx of English-speaking settlers. Forests were cleared, lands were drained, and levees were constructed to protect the fertile agricultural lands. However, the Atchafalaya River corridor itself remained sparsely inhabited. The earliest settlers planted subsistence crops and made a brief foray into indigo production, which was wiped out by a caterpillar infestation between 1793 and 1796. By the early 1800s, however, cotton was the main commercial crop in the immediate area. Despite its poor navigability, the Atchafalaya River provided a means of transporting cash crops to market. This situation was slightly improved with the introduction of the first steamboat to the Atchafalaya Basin in 1819. These early boats had an average draft of only 28 inches when loaded, and were able to manage the low-water Atchafalaya River. Other than the economic disturbance associated with war and Reconstruction, the Civil War had little impact on the Atchafalaya Basin, since the swampy lands were unsuitable for troop movements.

According to the records held by the Louisiana State Office of Historic Preservation, there has been no cultural resources survey of construction areas within the Buffalo Cove area, and no prehistoric or historic archaeological sites or cultural resources are known within the construction areas of the project. Cultural Resources have been recorded within the BCMU area, but these are some distance from areas of planned construction or modification. The cultural resource sites nearest to any current or future construction area are Sites 161B42, 161B43, and 161B44 near Buffalo Cove and Grand Lake/Prejean Canal. These sites were first recorded in 1953 as shell middens, but could not be relocated either by Gibson's Atchafalaya survey team in the 1970's, or by MVN archeologists in 2002. These sites are presumed to be deeply buried by recent flood deposits. One proposed construction area is located near the former Bayou Chene community and the historic resources identified there, but the nature of work at this area and the distance from the historic settlements do not endanger any cultural resources.

Natural levees form the most prominent geologic features, averaging 4-5 meters above the surrounding swamp, generally less than 0.5 km in width. The principal force in the formation and subsequent alteration of these levees is intermittent flooding of the Atchafalaya and Mississippi Rivers, combined with lateral erosion and deposition of soils associated with migratory meanders. There has been recent, rapid, over bank deposition of fine-grained sediments due to increased flows in the Atchafalaya River since the early 1950s. Over the past 50 years, the project area has experienced significant sedimentation. Recent archeological survey for the former Bayou Chene community demonstrated over 6 feet of recent sediments over historic land surfaces. This flood deposition can be expected to have buried any historic or prehistoric cultural remains.

Site visits have been made to all proposed construction areas of the project area by a MVN archeologist, in both low water and high water. Random shovel tests were made, and surface examination of the areas was conducted. No evidence of significant cultural resources was found in any of the project areas.

Future Conditions with No Action

Without implementation of the proposed action, any undiscovered or unreported cultural resources would remain intact and in their current state of preservation. The burial of historic land surfaces would continue in the current pattern. There is no reason to believe that no action would have any positive or negative impact to cultural resources.

Future Conditions with Proposed Action

With implementation of the proposed action, any undiscovered cultural resources may be damaged during construction operations. However, the limited nature of the proposed work should not impact any historic land surfaces in the project construction areas. In addition, sedimentation during the past century should have buried any undiscovered cultural resources below the depth of potential construction impacts. Therefore, no direct impacts to cultural resources are expected. Throughout the larger area, it is possible that cultural resources may be indirectly impacted by increased water velocity caused by a return of natural drainage patterns. However, no known cultural resources exist in close proximity to the areas most likely affected in this way and no unknown cultural resources are expected to exist in areas most affected. Therefore, there is no reason to believe that the proposed action would have any positive or negative impact to cultural resources. Future monitoring of known cultural resources in the project vicinity would determine what impacts are taking place, and appropriate actions would be taken.

RECREATIONAL RESOURCES

This resource is institutionally significant because of the Federal Water Project Recreation Act of 1965, as amended, and the Land and Water Conservation Fund Act of 1965, as amended. Recreational resources are technically significant because of the high economic value of recreational activities and their contribution to local, state, and national economies. Recreation resources are publicly significant because of the high value that the public places on fishing, hunting, and boating, as measured by the large number of fishing and hunting licenses sold in Louisiana; and the large per-capita number of recreation boat registrations in Louisiana. "While it is recognized and acknowledged that questions and opinions exist as to public access of waters within the project area, this subject is a matter of Louisiana real property law and, further, is not an authorized feature of the project."

The Atchafalaya Basin Floodway is bountiful in recreational opportunities. Within the 45-mile radius of the proposed project is a population exceeding 280,000. Many of that number engage in multiple recreational uses. On any given day during the year, families can be seen fishing, boating, bicycling, hiking, bird watching, crawfishing, canoeing, and hunting near the project. Included within the proposed project's market area are: 21,652 registered boats, 21,329 resident fishing licenses, and 17,080 resident hunting licenses.

Existing Conditions

Due to the fluctuating levels of the river, heavy sediment-laden water pours into the lower portion of the Atchafalaya Basin. This heavy sediment load affects the water quality, which in turn impacts the quality and quantity of the sport fishing and crawfishing available to the recreating public.

It should be noted that the Buffalo Cove area is a favorite canoeing spot for local paddling clubs and the Louisiana Chapter of the Sierra Club. It is considered to be a very aesthetically pleasing paddle for the beginner as well as the experienced paddler. While recreating in this part of the basin, individuals can observe abundant numbers of migratory waterfowl and songbirds.

Future Conditions With No Action

Without implementation of the proposed action, the BCMU would continue to be impacted by increasing amounts of sediment and nutrients being introduced into it. Poor water circulation would lend itself to vegetation/habitat changes that would be generally negative to the recreating public. While natural population growth would bring more visitors to the site over time, their experience would be diminished by the negative impacts of no action.

Future Conditions With Proposed Action

Future forest regeneration of hardwood and cypress species is dependent on highly oxygenated water. This would be important to the ever-increasing numbers of people who observe and enjoy bird watching and nature photography. The proposed project elements are designed to improve water quality, preserve terrestrial and aquatic habitats within the management units, and provide sufficient outlets for drainage in order to promote a southerly flow. These improvements would provide the basis for quality recreation experiences in this portion of the Atchafalaya Basin. Fishing, hunting, and canoeing are the most obvious recipients of the benefits, but the overall improved aesthetics would provide a positive natural outdoor experience for all users.

AIR QUALITY

This resource is considered institutionally significant because of the Louisiana Environmental Quality Act of 1983, as amended, and the Clean Air Act of 1963, as amended. Air Quality is technically significant because of the status of regional ambient air quality in relation to the National Ambient Air Quality Standards (NAAQS). It is publicly significant because of the desire for clean air expressed by virtually all citizens.

Existing Conditions

St. Martin, St. Mary, and Iberia Parishes are currently classified as "in attainment" of all NAAQS. This classification is the result of area-wide air quality modeling studies.

Future Conditions With No Action

Without the implementation of the proposed action any erosion or wind driven sediment would be minimal due to the both remote and rural location of the project area. In addition, due to the vegetated cover and moisture content of the adjacent soils, little wind blown particulate would be expected. Within the area adjacent to the project an occasional pipeline canal maintenance operation may leave excavated material that may become wind blown as it dries.

Future Conditions With Proposed Action

With the implementation of the proposed action, localized air quality may be minimally elevated above ambient due to emissions from excavating equipment. However, due to the minimal amount of equipment involved (backhoe) and the short length of construction applicability determinations noted that emissions were determined to be "de minimus"according to terminology of the Louisiana Department of Environmental Quality and no further action would be required. Indirect affects would be related to the spread of the emissions beyond the area of impact to the area of no action.

HAZARDOUS, TOXIC, AND RADIOACTIVE WASTES

The MVN is obligated under Engineer Regulation 1165-2-132 to assume responsibility for the reasonable identification and evaluation of all Hazardous, Toxic, and Radioactive Waste (HTRW) contamination within the vicinity of the proposed action. A HTRW Land Use History and a Phase I HTRW Initial Site Assessment (ISA #198) have been completed for the proposed action and are on file at the MVN. Based on information gathered during the preparation of this preliminary assessment, it is reasonable to assume that no hazardous, toxic, or radioactive wastes would be encountered during the course of construction activities. Land use in the project area encompasses undeveloped cypress-tupelo swamp and bottomland hardwood forest. The project should proceed as scheduled with construction. However, before initiation of construction activities, additional site visits should be conducted for those elements not visited due to access problems. Should the construction methods change or the area of construction be more than evaluated, the HTRW risk would require re-evaluation.

CUMULATIVE IMPACTS

The Council on Environmental Quality (CEQ) defines "cumulative impact" as the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

Past actions within the project area involved, natural disasters, and construction of flood control measures (channel training, levee construction, dredged material placement), floodway construction, various real estate features (developmental control and environmental easements), construction of recreation feature (Myette Point boat launch), oil exploration and production, occasional maintenance dredging, wildlife management activities and USACE (U.S. Army Corps of Engineers) water management activities (Bayou Eugene Prototype model studies and modifications). The Old River Control Structure (ORCS) and its associated components (the low sill and over bank structures) do not directly impact the proposed water management strategy or the proposed project. The presence of the ORCS along with the Mississippi River and Tributaries Project does affect the base hydrological conditions (stage and duration) used as a reference for project planning. Past actions, with the exception of the Corps water management activities, have resulted in isolating the interior swamps from the water inputs of the Atchafalaya River, made barriers to north south flow within the interior swamps, caused changes in interior circulation and drainage patterns, which contributed to the factors causing poor water quality. Natural disasters such as floods and hurricanes have also added their share of blockages to internal circulation through the influx of sediment or forming impediments to flow causing localized sedimentation. The increase influx of detritus (plant material) brought in through the hurricane surge has also added to the poor water quality and further deterioration of the area. The resulting man made and natural intervention in this area of the Atchafalaya Basin has caused premature conversion of one forest type to another and is discussed in the forested wetland section of this EA. Willow/tallow forests are quickly becoming more common on the west side of the Atchafalaya Basin from Butte La Rose, east to Beau Bayou, and south to the BCMU (pers. corn., Debossier, LDWF, 2003). As a result of these activities the woodland habitats have changed as well as the aquatic habitats. The commercial and recreational fishery in the area has been diminished by the past actions as the sediment fills in deep water habitat and internal circulation problems continually cause poor water quality. The variations in seasonal flooding caused by the past activities have in some cases affected the viability and access to timber and timber harvest. All of the mentioned actions collectively have had effects on the water quality of the ABFS and the BCMU. The possibility of affects of these past activities on cultural resources are actually for the most part unknown since only Federally-funded projects were tasked with the preservation and protection of cultural resources.

Presently at the State level, the LDNR is currently planning and designing State projects to complement the efforts of the ABFS Project's BCMU feature. The projects include Bayou Sorrel Cuts, Upper Grand River and Pigeon Bay Cuts, Bayou Postillion Opening, Henderson Lake Access Channel, and Schwing Chute Opening. LDNR's projects are not located in areas in which the USACE-MVN is authorized to construct BCMU elements under the ABFS authority and the State will not be entitled to seek in-kind credit under the ABFS MU authority for the LDNR projects. These projects along with the projects proposed in this EA would have a combined positive affect on improving water quality, water movement and better habitat for high quality forest species. Environmental, developmental control and public access easements acquired by the USACE in the ABFS would have an additive positive cumulative affect to the ABFS as a whole. Any additional oil and gas exploration and associated pipelines would continue within the ABFS, in areas where the USACE has not purchased easements. However, it is reasonable to believe that mitigation required for these permitted oil and gas activities would ensure that these actions do not have a cumulative negative effect in the ABFS. Private landowner activities continue in accordance with State and Federal laws and regulations. These activities, while reduced and mitigated, may result in camp or housing development with attendant habitation and construction impacts on the environment.

In the recent past and foreseeable fixture, improvements within the management unit from both the environmental and cultural resources stance should be greatly improved. While oil exploration would continue the activities are now regulated and permitted by both a Federal and state process. If proper funding is forthcoming for enforcement and inspection of new pipeline and production facility installations the problems with water flow and circulation would be addressed. The state, Federal and private entities all have a better understanding of environmental friendly construction and are seen to willingly mitigate for damages. Regulatory policies within the state of Louisiana presently don't allow the construction of open pipeline canals with continuous elevated dredged material disposal. This practice has been replaced with non-continuous alternating bank disposal leaving gaps in the material banks for water passage. Additionally regulatory authorities require tunneling the pipe subsurface without canal construction if soil conditions allow. The proposed action will independently benefit target areas of impact and is expected not only to complement, but expand the area of water quality improvement, as additional features of the various management units are implemented as part of the basin wide strategy for improving water quality, circulation and sediment management.

In addition excavation and fill placement would be done in such a way as to not impede flow. In the near future there would be an additional pipeline placement in the existing Wanda Canal bordering the northern side of the BCMU. The USACE has coordinated with the US Fish and Wildlife Service, the pipeline company and regulatory agencies to assure that their pipeline installation is compatible with the USACE's overall Buffalo Cove Water Management Plan. This compatibility between plans assures the chances for blockages of internal circulation or north to south flow of water is eliminated. The USACE would continue internal coordination on all projects within the USACE dealing with the Atchafalaya Basin or affected by it. The affects of coastal projects or changes in Old River Structure operations would be assessed and coordinated. If changes in flows or circulation patterns are sufficiently aggressive to produce flows that may unearth artifacts, cultural resource monitoring or surveying would be initiated as advised by the MVN's staff archaeologist.

The benefits provided by the proposed water management elements evaluated in this EA will complement and enhance the water quality improvements that are expected to result from implementing the remaining management unit features for the Atchafalaya Basin. The Federal plans along with water management activities planned by the state would result in long term improvements in the water quality, allocation and circulation in ABFS. At the state level, the LDNR is currently planning and designing State projects to complement the efforts of the ABFS Project's WMU feature. The projects include Bayou Sorrel Cuts, Upper Grand River and Pigeon Bay Cuts, Bayou Postillion Opening, Henderson Lake Access Channel, and Schwing Chute Opening. LDNR's projects are not in areas that the USACE-MVN is authorized to construct WMU elements under the ABFS authority and the State will not be entitled to seek an in-kind credit under the ABFS MU authority for the LDNR projects. These projects would be built in a manner as to not increase sedimentation or add additional impediments to flow within the basin. The plans being considered are for the most part removing existing barriers to flow, clearing, maintaining or improving existing entrances to flow rather than just constructing additional inputs.

In conclusion, in the foreseeable future water quality improvements along with decreased sedimentation and reduction in hypoxic conditions should continue to progress resulting in an overall more conducive environment for fish and wildlife. The expected results of these improvements, while beneficially effective alone, will continue to contribute to the entire comprehensive BCMU improvements in water quality and habitat that will be expanded as additional planned elements are added in the future. Future elements, beyond those designed would be included, in a future decision document and accompany the Supplemental EIS. On a national level, the Mississippi River Basin would see the implementation of practices to "reduce, mitigate, and control hypoxia in the Gulf of Mexico" (USEPA). These practices include reducing inputs of nitrogen to streams and rivers in the Basin and restoring and enhancing natural denitrification processes in the Basin. At the State level, the LDEQ's Non-Point Source Pollution Program would continue to establish TMDLs for the Atchafalaya River as mandated by a 1999 court order and implement watershed management strategies. With these efforts, water quality within the Atchafalaya River would improve which would translate into improved water quality in the floodplain of the river. At the ABFS and BCMU level, oil and gas exploration and the laying of pipelines would likely continue within the ABFS in accordance with the state and Federal laws and regulations. The LDNR would continue planning, designing, and constructing state projects to complement the efforts of the ABFS Project's WMU feature. With respect to landowner activities, the USACE, MVN has authorization to purchase approximately 338,000 acres of developmental control and environmental protection easements through the ABFS project flood control and environmental protection features. These real estate acquisitions are on - going in the ABFS and would limit timber harvesting, future development of camps, and other activities that may be detrimental to the environment. Activities on private lands within the BCMU upon which Federal environmental protection and developmental control easements have not been purchased would remain regulated through the USACE regulatory authority over wetlands until such easements are acquired by USACE.

COORDINATION

Preparation of this EA and a draft Finding of No Significant Impact (FONSI) has been coordinated with appropriate Congressional, Federal, state, and local interests, as well as environmental groups and other interested parties. The following agencies, as well as other interested parties, are receiving copies of this EA and draft FONSI:

U.S. Department of the Interior, Fish and Wildlife Service
U.S. Environmental Protection Agency, Region VI
U.S. Department of Commerce, National Marine Fisheries Service
U.S. Natural Resources Conservation Service, State Conservationist
Advisory Council on Historic Preservation

Governor's Executive Assistant for Coastal Activities
Louisiana Department of Wildlife and Fisheries
Louisiana Department of Natural Resources, Coastal Management Division
Louisiana Department of Natural Resources, Coastal Restoration Division
Louisiana Department of Environmental Quality, PER-REGC
Louisiana Department of Environmental Quality, EP-SIP
Louisiana State Historic Preservation Officer

MITIGATION

The proposed project is a feature of the ABFS project. The proposed project along with other features of the project, including the purchase of lands and environmental control easements, public access improvements, developmental and timber easements, and water management in other management units within the basin, are designed to offset the adverse impacts of other project features, such as borrow pits associated with levee upgrading and navigation channel improvements. The proposed project would improve fish and wildlife habitat by reducing the amounts of low quality, ponded water, managing the influx of sediment, and creating an environment conducive for regeneration of forest resources. Even though there are direct construction impacts, these are expected to be fully offset with benefits to over 58,000 acres of forested wetlands, and improvements in water quality and deep water and terrestrial habitat within the BCMU.

COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

Environmental compliance for the proposed action would be achieved upon: coordination of this EA and draft FONSI with appropriate agencies, organizations, and individuals for their review and comments; USFWS and NMFS confirmation that the proposed action would not be likely to adversely affect any endangered or threatened species; LDNR concurrence that the project action is outside the coastal zone and is consistent, to the maximum extent practicable, with the Louisiana Coastal Resources Program; receipt of a Water Quality Certificate from the State of Louisiana; completion of the Section 404(b)(1) Evaluation; receipt of the Louisiana State Historic Preservation Officer Determination of No Affect on cultural resources; receipt and acceptance or resolution of all USFWS Fish and Wildlife Coordination Act recommendations; receipt and acceptance or resolution of all LDEQ comments on the air quality impact analysis documented in the EA. The draft FONSI would not be signed until the proposed action achieves environmental compliance with applicable laws and regulations, as described above.

CONCLUSION

The proposed work would to reestablish north to south flows, provide water inputs, improve interior circulation and improve drainage outlets through a series of closures, gaps, and connecting water inlets that would be monitored and through adaptive management would be modified as necessary to achieve the project goals. The proposed work would be accomplished by water based equipment or low impact marsh vehicles where feasible in order to reduce access corridor impacts. The work would be done during low water stages and should be complete within 3 to 6 months. This office has assessed the environmental impacts of the proposed action and has determined that the proposed action would have no impact upon cultural resources and no significant impact on aquatic resources, forested wetlands, fisheries, wildlife, essential fish habitat, endangered or threatened species, recreation, hydrology, water quality, and air quality. Other elements considered but were either not impacted or applicable to the area; prime and unique farmlands, coastal zone consistency issues, geology, and climate.

PREPARED BY

EA # 366 and the associated draft FONSI were prepared by Larry Hartzog, biologist, with relevant sections prepared by: Casey Rowe--HTRW; Paul Hughbanks--Cultural Resources; Jay Gamble--Recreational Resources; DannyWiegand--Water Quality; and Nancy Powell--Hydrology. The address of the preparers is: U.S. Army Corps of Engineers, New Orleans District; Planning, Programs, and Project Management Division, CEMVN-PM; P.O. Box 60267; New Orleans, Louisiana 70160-0267.

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Appendix R: LDWF Atchafalaya Basin Lake History and Management Issues
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LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

PART VI -A

WATERBODY MANAGEMENT PLAN SERIES

ATCHAFALAYA BASIN

LAKE HISTORY & MANAGEMENT ISSUES

CHRONOLOGY

October, 2009 – Prepared by
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July, 2011 – Modified by
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February, 2014 – Updated by
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September, 2014 – Updated by
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September, 2016 – Updated by
Brac Salyers, Biologist Manager, District 9

September, 2017 – Updated by
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LAKE HISTORY

GENERAL INFORMATION

History

The Atchafalaya River Basin is located in south-central Louisiana. **(See Maps 1 and 2, Appendix I)**

A full map of features and ownership of land in the basin is available for download from the Office of State Lands online at the following link:
http://www.doa.la.gov/osl/FPP/Publications/Atchafalaya_Basin_Webmap.jpg ;

or for purchase at the following link:
http://www.doa.la.gov/Pages/osl/Forms.aspx .

The history of the Atchafalaya River and its basin is not complete without mention of the geological history of the Mississippi River. The Atchafalaya Basin was formed thousands of years ago as part of the periodic meandering of the Mississippi. Much of the land contained in the basin was formed by the Cypremort/Sale and the Teche lobes of previous Mississippi River delta complexes.

Geologists would not technically classify the Atchafalaya River as a river since it actually has functioned as a distributary of the Mississippi River since the 1500's (van Heerden, I. L., and H. H. Roberts 1980. The Atchafalaya Delta-Louisiana's New Prograding Coast. Gulf Coast Association of Geological Societies Transactions (30):497–506).

The Mississippi River has changed course about every 1000 years. In the 15th century A.D., the meandering Mississippi, in a loop called Turnbull's Bend, broke into the basin of the Red River and captured the Red River. At the same time, it also intersected a small southerly flowing distributary of the Red River later known as the Atchafalaya River. When European settlers came to this area, they discovered the Red River emptying into the Mississippi at Turnbull's bend, and found the Atchafalaya River to be a well-defined distributary flowing out a few miles south in the same bend.

In 1831, Captain Henry M. Shreve dredged a cut across Turnbull's Bend. The Mississippi flow was captured by this cut and the old channel was abandoned. The old channel was filled in at the northernmost reaches and the southern end remained open to eventually become known as Old River.

The Red River no longer flowed into the Mississippi but was now diverted into the Atchafalaya River. Water also flowed west from the Mississippi to the Atchafalaya River by way of the Lower Old River. For years, capture of the Mississippi by the Atchafalaya was blocked by a huge 30-mile-long log raft. In 1839, the state of Louisiana began efforts to remove the raft and open up the Atchafalaya for navigation.

With the removal of the log jam, the Atchafalaya began to grow in width and depth, capturing more and more of the Mississippi River flow. The Atchafalaya was a shorter route to the sea at 142 miles, compared to 315 miles for the Mississippi channel.

Until 1928, the entire Atchafalaya flood plain consisted of the basin that occurred between the old natural Mississippi River ridges. On these old ridges, cities were located from Plaquemine to Donaldsonville on the east and from Opelousas to New Iberia and Franklin on the west. Following the great Mississippi flood in 1927, the United States Congress authorized the construction of a floodway through the basin. Until this time the Mississippi River Commission had planned to rely only on levees to control flooding. The 1927 flood was, at that time, the worst peacetime disaster in the history of the United States. Damage estimates were reported between 250 and 500 people killed, 16 million acres flooded, and 41,000 buildings destroyed. The Red Cross reportedly cared for over 600,000 people housed in temporary camps. The magnitude of this event changed plans espoused by the United States Army Corps of Engineers (USACE) over the previous 50 years.

By 1951, it became apparent that without modification, the Mississippi would abandon its channel by Baton Rouge and New Orleans and permanently take the Atchafalaya River to the Gulf of Mexico.

Predictions estimated that the abandoned portion of the Mississippi south of Old River would become a saltwater estuary, leading to devastating impacts to everything dependent on freshwater in this region, as well as the potential to severely reduce shipping availability for an already well-established port system. Extensive flooding would also occur in the Atchafalaya Basin, requiring much adaptation by the social and economic patterns along the new course.

The 1953 Mississippi River Commission report recommended that the flow from the Mississippi into the Atchafalaya River should be controlled by a set of structures built on Old River. The proposal was to dam Old River with two control structures. One was to remain open at all times and one would be open only during flood conditions. A lock was included to accommodate navigation between the Mississippi and the Red-Atchafalaya Rivers.

The control structures were to sustain the 1950 natural proportion of flow and sediment between the lower Mississippi and the Atchafalaya River. The distribution was about 30 percent of the total combined flow in both the Red River and the Mississippi River above the control structures. This percentage of flow was to be maintained on an annual average (Flood Control Act of 1954, P.L. 780, 83rd Congress). Congress authorized the plan in 1954, and construction was begun in 1955. The structures and accompanying complex were completed in 1962 at a total cost of $67 million dollars.

In 1973, the Old River Low Sill Structure was almost lost to flood waters. A subsequent eight-year improvement project was completed in 1981. Although improvements and repairs were made to the Low Sill, it was not capable of handling the hydraulic changes on the Mississippi that had been occurring since 1951. The Auxiliary Control Structure was completed in 1986 at a total cost of $206 million dollars. The USACE states that the total Old River complex can now provide flood protection and meet the requirements for which it was originally designed in 1951.

In 1985, a prefabricated power plant, the largest vessel ever towed up the Mississippi, was brought 205 miles from the Avondale shipyards in New Orleans to its position above the Low

Sill Structure. The flow through the power plant is adjusted daily to maintain the 70/30 proportions of water distribution required by law.

In addition to the original intent of harnessing the Mississippi and providing flood control, the Old River structures provide water to the Atchafalaya Basin. In the last 100 years the Mississippi has tended to divert more and more of its flow through the Atchafalaya.

In spring 2011, rainfall totals were approximately 300% that of normal precipitation amounts in portions of the Ohio Valley. Rainfall, combined with a nearly double the average size snowpack melt, caused historical flooding along the Mississippi River and its tributaries. On May 14, 2011, one of the floodgates of the Morganza Spillway was opened for the first time since the flood of 1973. This diversion, located along the western bank of the Mississippi River at river mile 280, near the town of Morganza in Pointe Coupee Parish, was constructed to protect levees and prevent major flooding in Baton Rouge and New Orleans. However, once the diversion is open, there is a possibility of severe flooding in the Atchafalaya Basin. During the 2011 opening, the plan first called for diverting 125,000 cubic feet per second (cfs) of water from the Mississippi River to the Atchafalaya Basin during this event (21% capacity). A total of 17 of the 125 steel gates of the Morganza Spillway structure were eventually opened, with the USGS estimating the flow rate at 172,000 cfs. The USACE had estimated that a forecast crest of 45 feet was anticipated to reach Baton Rouge on Tuesday, May 17, 2011. This crest height is the trigger for opening the Morganza Spillway, because the Mississippi River must remain below that height to ensure the integrity of the Baton Rouge levee system.

Based on the diversion of this additional MS River water, the flooding predictions for the Atchafalaya Basin were originally quite severe, as seen in the following link, http://en.wikipedia.org/wiki/File:NODInundationMay2011Scenario1a.jpg

Flooding in the Atchafalaya Basin was considerably lower than had been anticipated during initial estimates because the Morganza Spillway did not operate at as great a capacity as believed necessary. The MS River crested at 17 feet in New Orleans on May 14, 2011, at 63.09 feet at Red River Landing on May 21, 2011, and the Atchafalaya River crested at 10.35 feet in Morgan City on May 30, 2011. The operation of the Old River Control Structure, along with the Morganza Spillway and other lower Mississippi diversions, proved to be adequate in providing flood protection for the state of Louisiana. The Army Corps estimated that the Mississippi River and Tributaries System (MRTS) used in the flood of 2011 prevented approximately $100 billion dollars in damages.

The following are links to USACE documents concerning flood control, navigation and recreational projects in the basin.

http://www.iwr.usace.army.mil/Missions/FloodRiskManagement/FloodRiskManagementProgram.aspx

http://www.usace.army.mil/Missions/CivilWorks/Navigation.aspx

The following link is an explanation of the evolution of the Old River Control Structure.

http://www.americaswetlandresources.com/background_facts/detailedstory/LouisianaRiverControl.html

Size
833,000 acres of land, swamp, and water. The actual size of water varies with flood stage.

Watershed
River overflow basin that receives 30% of the water draining from 41 % of the continental United States. **(SEE MAP – APPENDIX I)**

Pool stage
Historical crest of 27.28 ft. on May 23, 1973 at the Butte la Rose gauge. Low water record of 0.33 ft. on October 17, 1976 at the Butte la Rose gauge.

Parish/s located
Iberia, Iberville, St. Martin, St. Mary, St. Landry, Pointe Coupee

Border waters
Red River, Mississippi River, Gulf of Mexico, Vermilion Bay

LAKE AUTHORITY

Association
Atchafalaya Basin Program
Louisiana Department of Wildlife and Fisheries
Louisiana Department of Natural Resources

Authorization
Legislature of Louisiana, Act 3 of 1998 and Act 920 of 1999

ACCESS

(SEE MAP - APPENDIX I)

Boat docks

Bayou Benoit	Adam's	Millet (Myette) Point
Catahoula	Belle River	New Verdunville
Butte La Rose	Bayou Pigeon	Old Verdunville
Whiskey Bay	Bayou Sorrel	Russo's
Ramah	Upper Grand Bayou	Doiron's
Sandy Cove	Charenton	Ruiz
Wilson's		

State/Federal facilities
Sherburne WMA is located north of I-10 in the upper basin east of the Atchafalaya River. There is a designated campground at the headquarters just south of Highway 190 east of Krotz Springs. The Atchafalaya National Wildlife Refuge is located in Sherburne and is managed by

LDWF for hunting. Link to Sherburne WMA and Atchafalaya National Wildlife Refuge information: http://www.wlf.louisiana.gov/wma/2763

Indian Bayou is a Corps of Engineers recreational area managed by the Corps of Engineers and is located north of I-10 on the west side of the Atchafalaya River, within the Henderson Lake area. Link to Indian Bayou site:
http://www.mvn.usace.army.mil/Missions/Recreation/AtchafalayaBasin.aspx

Attakapas WMA is located in the lower basin. There are two designated campgrounds on the area. These are accessible by boat only. Link to Attakapas WMA site:
http://www.wlf.louisiana.gov/wma/32640

Atchafalaya Delta WMA is located at the mouths of the Atchafalaya River and the Wax Lake Outlet in St. Mary Parish. The area is located some 25 miles south of the towns of Morgan City and Calumet and is accessible only by boat. Link to Atchafalaya Delta WMA: http://www.wlf.louisiana.gov/wma/32639

SHORELINE DEVELOPMENT

State/National Parks

The recently established (2006) Atchafalaya National Heritage Area stretches across 14 Parishes in south-central Louisiana, emphasizing the cultural and ecological diversity of the area. Link to site: http://www.atchafalaya.org/index.php

Shoreline development by landowners

Camps and houseboats

PHYSICAL DESCRIPTION OF LAKE

Timber type

Bottomland hardwoods, cypress/tupelo

Average depth

Not calculated

Maximum depth

River depth up to 95 feet at high river stages

Natural seasonal water fluctuation

The water in the Atchafalaya River comes from a huge watershed. This water is thirty percent of a combination of the Red River plus the Mississippi River drainage. The Red and Mississippi Rivers drain 41 percent of the continental United States from North Dakota to West Virginia and even a very small portion of Canada. The area of this catchment, 1,245,000 square miles, is the 3rd largest watershed in the world.

Figure 1 is a map showing the size of the MS River watershed.

Figure 1. Map of the Mississippi River watershed, and sub-basins within. (Image courtesy of www.mvd.usace.army.mil)

The primary river gauge used by District 9 Inland Fisheries personnel for sampling activities within the Atchafalaya Basin is the gauge located at Butte La Rose, LA. This gauge is located just downstream of the split between the main channel of the Atchafalaya River and the Whiskey Bay Pilot Channel. Information for this gauge is listed below:

USGS 07381515 Atchafalaya River at Butte La Rose, LA
St. Martin Parish, Louisiana
Hydrologic Unit Code 08080101
Latitude 30°16'53", Longitude 91°41'12" NAD27

The following are links to real-time river gauges showing current water levels as well as historical water levels.

http://waterdata.usgs.gov/la/nwis/uv?site_no=07381515

http://water.weather.gov/ahps2/hydrograph.php?wfo=lix&gage=blrl1

http://www.mvn.usace.army.mil/Missions/Engineering/StageandHydrologicData.aspx

EVENTS/ PROBLEMS

Management priority for the Atchafalaya Basin is flood control and navigation. Efforts to maintain deep water fisheries habitat can be considered only if they do not conflict with flood control or navigation. The dredging of the main channel through historical Grand Lake placed tons of spoil on the sides of the channel and greatly decreased the overflow of river water into the back swamp.

Channel training has cut off sheet flow overbank flooding from the interior swamp and replaced this with channelized overflow that is delivering thousands of tons of sand and sediment into previously productive fisheries habitat. An example is the bank stabilization levee built from Thibodaux Chute to American Pass. This levee was installed to work in conjunction with the rock weir in Grand Lake that distributed the water between the main channel and the Wax Lake Outlet. It was designed so that the water held up by the weir would overtop the weir at higher stages to keep the energy in the main channel and, thus, decrease dredging costs in the river at Morgan City. Without the weir, the water must reach an even higher stage for the river to overtop this levee and sheet flow over the back swamp. In order to get river water to the back swamp, either channels have been cut through the high spoil banks or existing channels were left to convey this water.

Deep water fisheries habitat is disappearing at an alarming rate. Blue Point Chute has filled in Willow Cove, Blue Point Cove, and Fisher Bayou. It is in the process of filling in Little Bayou Long from the junction of the Current Canal and Duck Lake, and from the Current Canal towards Bayou Long. With the decline in deep water areas, fishing pressure on the remaining habitat has increased.

The decline in publicly accessible water will be greatly exacerbated with enforcement of the statewide trespassing law on flooded private property. Also, the 2006 ruling on Gassoway Lake off the Mississippi River that prohibits the public from pursuing fish into flood waters over private property will severely limit the options to anglers in the Atchafalaya Basin. Many of the fisheries habitats in the basin are actually private canals dredged on private property. Private landowners may eventually begin to ask for enforcement of the trespassing law on their property or begin placing gates at the entrance to private canals. This is already being done in the coastal freshwater marsh and in a couple of places in the basin. When access to these canals is denied, anglers will be limited to natural bayous and lakes presently claimed by the state.

MANAGEMENT ISSUES

AQUATIC VEGETATION

<u>Biomass</u>

Annual weed estimates show that approximately 50,000 acres of aquatic plant coverage occur in the Lower Atchafalaya Basin. Approximately 60% are floating plants, consisting of water hyacinth (*Eichhornia crassipes)*, common salvinia (*Salvinia minima)*, giant salvinia *(Salvinia molesta)* and occasionally duckweed *(Lemna minor)*. Approximately 30% are submersed plants which consist primarily of hydrilla *(Hydrilla verticillata)*, coontail *(Ceratophyllum* *demersum)*, and fanwort *(Cabomba caroliniana)*. Approximately 10% are emergent plants which consist primarily of alligator weed *(Alternanthera philoxeroides)*, water primrose (*Ludwigia* spp.*)*, and sedge *(Carex* spp.*)*. The floating exotic species (water hyacinth and salvinia) present the biggest problems by completely covering navigable bayous and canals which limits or prevents boater access to these waterways. Water hyacinth has long been an extremely problematic plant in most Louisiana waters, restricting access ever since it's importation at the 1884 World's Fair in New Orleans. In the early 1900's it became especially problematic in the New Iberia area and over into the Atchafalaya Basin.

Treatment history by year available

Aquatic plant control is conducted by LDWF and private contractor spray crews who apply herbicides that are EPA approved for use in aquatic areas. Spray crews in the lower Atchafalaya Basin spray approximately 4,000 acres of aquatic weeds annually. The infestations targeted for spraying consist of approximately 90% water hyacinth and 10% emergent species. Table 1-A below contains LDWF spray records and herbicides used from 2012-2015. Table 1-B contains spray records from 2016, thus far in 2017, and future usage. All LDWF spray crews apply EPA approved herbicides for nuisance aquatic weeds in accordance with the approved LDWF Aquatic Herbicide Procedures.

Water hyacinth is controlled with 2,4-D (0.5 gal/acre) and a non-ionic surfactant (1 pint/acre). Common and giant salvinia are controlled with a mixture of glyphosate (0.75 gal/acre) and diquat (0.25 gal/acre) with Turbulence (0.25 gal/acre) surfactant from April 1 to October 31. Outside of that time frame, diquat (0.75 gal/acre) and a non-ionic surfactant (0.25 gal/acre) are used. Sedge is controlled with the aforementioned salvinia treatments if it is associated with those plants. If it is targeted specifically, 2,4-D (0.5 gal/acre) is used in conjunction with a non-ionic surfactant (1 pint/acre).

The Department has been introducing giant salvinia weevils (*Cyrtobagous salviniae)* through plant material containing the weevils to serve as an aid in controlling giant salvinia infestations. Since the summer of 2007, approximately 78,000 weevils have been released on giant salvinia infestations in the Bayou Postillion and Bayou Long areas. Weevil damage to salvinia plants has been observed in and around the release sites. Recent surveys have shown that the weevils have survived the winters and are spreading into new areas where salvinia infestations are present. The most recent release was conducted in April of 2015, where an estimated 21,000 giant salvinia weevils were released in the south-eastern portion of the Basin, west of Adam's landing, known as the Checkerboard. Another approximately 7,000 weevils were released along the western protection levee near the Bayou Benoit area, as well as an estimated 4,200 weevils released in the portion of Bayou Teche that runs between the east and west Atchafalaya Basin protection levees and is located in District 9.

During the fall of 2013, LDWF contracted applicators to spray additional vegetation in the Wax Lake Outlet area. Private applicators treated 300 acres of water hyacinth using 150 gallons of Weedestroy AM-40 (2,4-D). All herbicide applications included a non-ionic surfactant at a rate of 0.125 gallons per acre.

During 2014, 3,891 acres of water hyacinth were treated with 2,4-D, 176 acres of a water hyacinth/alligator weed mix with 2,4-D, 65 acres of common salvinia and 94 acres of giant salvinia with either a glyphosate/diquat mixture, or diquat depending on the time of year. During November 1st-March 31st, only diquat is used to spray salvinia species, while a glyphosate/diquat mixture is used from April 1st-October 31st based on the differences in plant metabolism and air temperatures. Also treated in 2014, 20 acres of willow trees, 16 acres of buttonbush, and 12 acres of Cuban bulrush were treated with 2,4-D. Other vegetation treated includes 86 acres of frog's bit with diquat, 66 acres of duckweed using diquat, 3 acres of cut grass with glyphosate, 6.5 acres of southern Naiad with penoxsulam, and a 28-acre mixture of 8 different species of plants treated with penoxsulam (Galleon).

In May 2014, LDWF contracted applicators to spray additional areas around the Wax Lake Outlet. Private applicators treated a total of 650 acres of vegetation including: 165 acres of water hyacinth, 170 acres of pennywort, 165 acres of alligator weed, and 150 acres of primrose. A total of 330 gallons of Arsenal (Imazapyr) sprayed at 0.5 gallons per acre (gpa), and 165 gallons of Turbulence (surfactant) sprayed at 0.25 gpa were used during this treatment. No other contract applications were conducted during the year.

During 2015, LDWF spray crews treated a total of 3,650 acres of aquatic vegetation including 14 different species of plants, with 6 different EPA-approved herbicides. Included in that total were 3,043 acres of water hyacinth, 163 acres of a water hyacinth/alligator weed mix, 252 acres of sedge, and 7.5 acres of willow trees treated with 2,4-D. For a complete list of the plants treated with each specific herbicide, see Table 1-A below. Also treated in 2015 in the portion of Bayou Teche mentioned above, were 408 acres of water hyacinth, and 15 acres of alligator weed mixed with hyacinth, both treated with 2,4-D. No contractor applications were conducted in 2015.

During 2016, LDWF spray crews made foliar herbicide applications on nuisance plants such as alligator weed, duckweed, cut grass, frog's bit, primrose, giant salvinia, sedge, water hyacinth, and willow trees. A total of 2,042 gallons were applied to 4,027 acres. Foliar applications of 2,4-D (0.5 gal/acre) were used to control water hyacinth and willow trees. Giant salvinia was controlled with a glyphosate/diquat mixture of glyphosate (0.75gal/acre) / diquat (0.25gal/acre). Diquat was applied at 1.0 gallons per acre to control duckweed. The alligator weed, cut grass, frog's bit, primrose, and sedge were not the targeted species of plants during those applications, but rather were incidentally treated with those plants that were being targeted. For a complete list of the plants treated in 2016 with each specific herbicide, see Table 1-B below.

In August 2016, LDWF contracted private applicators to spray additional areas within Bayou Teche. Private applicators treated a total of 224 acres of an American lotus/water hyacinth mix with 112 gallons of 2,4-D sprayed at 0.5 gal/acre, and 28 gallons of Activate Plus sprayed at 0.125 gal/acre. No other contract applications were conducted that year.

As of September 2017, LDWF spray crews had made foliar herbicide applications on nuisance plants such as alligator weed, American lotus, duckweed, frog's bit, pennywort, primrose, common salvinia, giant salvinia, sedge, water hyacinth, and water paspalum. A total of 1,938 gallons were applied to 3,092 acres. Foliar applications of 2,4-D (0.5 gal/acre) were used to control American lotus and water hyacinth. Common and giant salvinia were controlled with either a glyphosate/diquat mixture (0.75gal/acre) / (0.25gal/acre), or diquat (0.75gal/acre), depending on the time of year as mentioned above. Diquat was applied at 1.0 gallons per acre to control duckweed. The alligator weed, frog's bit, pennywort, primrose, sedge, and water paspalum were not the targeted species of plants during those applications, but rather were incidentally combined with those plants that were being targeted. For a complete list of the plants treated in 2017 with each specific herbicide, see Table 1-B below.

Multiple contracts with private applicators have been needed thus far in 2017 to treat additional problematic areas. As of September, six contracts had been established, with two others in the process of being approved and implemented.

The areas, acreage, and associated plant species for each contract are as follows:

- May, upper Grand River flats – 407 acres of water hyacinth treated with 2,4-D.
- July, Ramah & upper flats – 308 acres of water hyacinth treated with 2,4-D.
- August, Schwing Chute – 112 acres of water hyacinth treated with 2,4-D.
- September, Bayou Pigeon – 493 acres of water hyacinth and Cuban bulrush treated with 2,4-D.
- September, Bayou Pigeon/ Bayou Mallet – 115 acres of giant salvinia and alligator weed treated with glyphosate and diquat. September, Old River area – 480 acres of water hyacinth and Cuban bulrush treated with2,4-D.
- **Proposed for September**, Bayou Long & Big Fork Bayou – 960 acres of a common and giant salvinia mix, hyacinth, Cuban bulrush, and alligator weed mix to be treated with glyphosate and diquat.
- **Proposed for September**, upper Grand River flats – 640 acres of water hyacinth to be treated with 2,4-D.

The total acreage for those six established contracts is 1,915 acres at a cost of $105,000.

The two proposed contracts still to be approved total 1,600 acres at a cost of $107,096.

Table 1-A. Acres of aquatic vegetation treated by LDWF spray crews and contracted private applicators in the Atchafalaya Basin listed by vegetation type and applied herbicide, for the years 2012 – 2015.

			Year				Total
			2012	2013	2014	2015	
			Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed
			Sum	Sum	Sum	Sum	Sum
Body of Water	**Vegetation**	**Herbicide**					
10501 – Lower Atchafalaya Floodway	**Alligator weed**	**2,4-D**	55	135	171	163	524
		Imazapyr	.	.	165	.	165
		Penoxsulam	.	.	2.5	0.3	2.8
		Glyphosate	.	127	5	.	132
	Buttonbush	**2,4-D**	.	.	16	.	16
	Coontail	**Penoxsulam**	3	.	1	0.3	4.3
	Cut grass	**Imazapyr**	.	.	3.5	.	3.5
	Duckweed	**Glyphosate**	.	1	.	.	1
		Penoxsulam	2	.	0.5	0.6	3.1
		Diquat	.	.	66	16.5	82.5
	Frog's Bit	**Glyphosate**	.	8	.	.	8
		2,4-D	.	.	86	.	86
	Mosquitofern	**Penoxsulam**	.	.	.	0.3	0.3
	Pennywort	**Glyphosate**	.	21	.	13.	34
		Imazapyr	.	.	170	.	170
		Penoxsulam	.	.	0.5	.	0.5
	Primrose	**Imazapyr**	.	.	150	.	150
		Penoxsulam	.	.	2	.	2
		Glyphosate	.	.	.	18.93	18.93
	Salvinia, Common	**2,4-D**	.	.	5	.	5
		Glyphosate	80	36	35.	.	151
		Penoxsulam	.	.	0.5	0.3	0.8
		Diquat	.	.	43	1.5	44.5
	Salvinia, Giant	**2,4-D**	.	7.	24.	.	31
		Glyphosate	1140	250	57.	29.	1476
		Diquat	.	.	12	.	12
	Sedge sp.	**2,4-D**	.	.	12.	252.	264.
		Glyphosate	892	163	.	35	1090
	Southern Naiad	**Fluridone**	.	.	5	.	5
		Diquat	.	.	2	.	2

			Year				Total
			2012	2013	2014	2015	
			Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed
			Sum	Sum	Sum	Sum	Sum
	Torpedo grass	Glyphosate	.	.	.	0.7	0.7
	Water Hyacinth	2,4-D	1002	3816	4423	3043	12,284
		Glyphosate	.	521	114	41	676
		Imazapyr	.	.	168	.	168
		Penoxsulam	.	.	0.5	0.3	0.8
		Diquat	.	.	56	1	57
	Water lettuce	Penoxsulam	.	.	1	0.9	1.9
		Glyphosate	.	.	.	0.65	0.65
		Diquat	.	.	.	1	1
	Water Paspalum	Glyphosate	.	.	.	23.4	23.4
	Willow tree	2, 4-D	.	.	20	7.5	27.5
Total			3174	5085	5167	3649.5	17,075.5

Table 1-B. Acres of aquatic vegetation treated by LDWF spray crews and spray contracts in the Atchafalaya Basin listed by vegetation type and applied herbicide, for the years 2016, 2017 and future use.

			Year				Total
			2016	2017	2018	2019	
			Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed
			Sum	Sum	Sum	Sum	Sum
Body of Water	Vegetation	Herbicide					
10501 – Lower Atchafalaya Floodway	Alligator weed	2,4-D	114	.	.	.	11470
		Glyphosate	.	.	.	.	.
		Imazapyr	6.3	11.85	.	.	18.15
	American Lotus	2,4-D	112	1.3			113.3
	Cut grass	Imazapyr	10.3	.	.	.	10.3
	Duckweed	2,4-D	2	.	.	.	2
		Diquat	29.4	55	.	.	84.4
		Glyphosate	2.6	.	.	.	2.6
	Frog's bit	Glyphosate	6.6	39.15	.	.	45.75
	Pennywort	Imazapyr	.	.	.	.	.
		Glyphosate	.	2.25	.	.	2.25
	Primrose	Imazapyr	.	11.16	.	.	11.16

			Year				Total
			2016	2017	2018	2019	
			Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed
			Sum	Sum	Sum	Sum	Sum
		Glyphosate	6	.	.	.	6
	Salvinia, Common	Diquat	.	41.6	.	.	41.6
		Glyphosate	.	.	.	.	.
	Salvinia, Giant	2,4-D	2	.	.	.	2
		Glyphosate	.	.	.	.	.
		Diquat	17.	89.62	.	.	106.62
	Sedge sp.	2,4-D	39	6.36	.	.	45.36
	Water Hyacinth	2,4-D	3645.5	2824.51	.	.	6470
		Glyphosate	16	.	.	.	16
		Diquat	4.45	.	.	.	4.45
	Water paspalum	Glyphosate	.	9.10	.	.	9.10
	Willow tree	2,4-D	14	.	.	.	14
Total			4027	3092.	.	.	7,119

HISTORY OF REGULATIONS

Recreational

Statewide regulations are in effect for all fish species. The recreational fishing regulations may be viewed at the link below:
http://www.wlf.louisiana.gov/fishing/regulations

The 14-inch minimum length limit (MLL) for black bass was implemented as an emergency measure following the fish kill caused by Hurricane Andrew in 1992. The regulation was implemented to protect bass that had survived the storm, as well as bass stocked immediately following the storm, and allow them to spawn at least once before becoming available to harvest. In 1993, the regulation was renewed with a sunset date of 1995. In 1995, the regulation was renewed again for a 2-year period. During this time, biologists were asked to determine if the regulation increased the number of large bass in angler creels. In 1997, the regulation was renewed without a sunset clause with popular support. Most anglers viewed the minimum length limit as a method to control harvest of black bass in the system. In 2012, the Inland Fisheries Section released a report entitled "Evaluation of the 14 Inch Minimum Length Limit for Largemouth Bass in the Atchafalaya Basin and Adjacent Waters, Louisiana." The report described characteristics of the largemouth bass population and the history of the recreational fishery. This study found that slow growth, short life span, and the frequent catastrophic events are inherent factors that preclude benefits from any recreational harvest regulation, including the 14inch minimum length limit. As such, the 14 inch MLL was determined to be an ineffective regulation. Link to the full report:
http://www.wlf.louisiana.gov/sites/default/files/pdf/document/35987-atchafalaya-basin-lmb-technical-report-10-01-2012/atchafalaya_basin_lmb_technical_report_1o-01-2012.pdf

The Louisiana Wildlife and Fisheries Commission promulgated a rule to repeal the 14 inch MLL on black bass in the Atchafalaya Basin and adjacent waters. Effective June 20, 2013, regulations included a 7 fish daily creel limit with no MLL. The revised regulation was in effect for two years. After the two-year period, the modified creel limit expired (June 20, 2015) and statewide regulations of a 10 fish daily creel limit now apply.

Commercial

Statewide commercial regulations and seasons can be found at the following link:
http://www.wlf.louisiana.gov/fishing/commercial-fishing

FISH KILLS / DISEASE HISTORY, LMBV

- Largemouth Bass Virus (LMBV) was identified in 1999.
- Low dissolved oxygen events related to Hurricane Andrew in 1992 killed about 800,000,000 fish.
- Low dissolved oxygen events related to Hurricane Lili in 2002 killed a large, but undetermined number of fish.
- Low dissolved oxygen events related to Hurricane Rita in 2005 killed a large, but undetermined number of fish.
- Low dissolved oxygen events related to Hurricanes Gustav and Ike in 2008 killed a large, but undetermined number of fish.
- Low dissolved oxygen events related to Hurricane Isaac in 2012 killed small numbers of fish.
- High river levels lasting into Mid-August of 2015, then a quickly falling river hydrograph resulted in a fish kill of over 3,000 fish in the Whiskey Bay area.
- High river levels lasting into July and August, then quick periods of descending river levels caused two fish kills in 2017. The first was in the Mud Cove area in late July resulting in an estimated 3,600 fish killed, and the second was around two weeks later when the Basin river levels dropped sharply again, this time killing an estimated 1,500 fish in the Buffalo Cove area.

Oil field activity such as moving barges and rigs with tugboats when the water is low and the temperatures are high can kill fish. High river stages that last until the summer will kill fish when the river stage falls too quickly. Water pushed into back swamps and held at high air temperatures has little oxygen remaining when it drains back into canals and bayous. Localized fish kills occur in isolated areas.

CONTAMINANTS / POLLUTION

Water quality

The following link to the Louisiana Dept. of Environmental Quality's (LADEQ) website gives water quality assessments across Louisiana.

http://deq.louisiana.gov/resources/category/water-quality-management

Mercury Level
The following link to LADEQ's website gives information on their mercury initiative:
http://deq.louisiana.gov/page/mercury-initiative

Mercury levels in individual fish by date, location, species and size can normally be found at the following link to LDWF's website on mercury data:
http://www.wlf.louisiana.gov/fishing/fish-consumption-advisory

Specific alerts pertaining to a particular waterway can be found at the Louisiana Department of Health's (LDH) link:
www.ldh.la.gov/EatSafeFish

BIOLOGICAL

Fish samples taken by LDWF

History - 1965 to present

YEAR	WATER	GEAR
1984	Atchafalaya	Electrofishing
1990	Atchafalaya	Electrofishing, Seine
1991	Atchafalaya	Electrofishing, Seine
1992	Atchafalaya	Electrofishing, Seine, Hoop nets, Gill nets
1993	Atchafalaya	Electrofishing, Forage, Seine, Gill nets
1994	Atchafalaya	Electrofishing, Forage, Gill nets
1995	Atchafalaya	Electrofishing, Forage, Hoop nets, Gill nets, Frame nets
1996	Atchafalaya	Electrofishing, Forage
1997	Atchafalaya	Electrofishing, Forage, Hoop nets, Gill nets
1998	Atchafalaya	Electrofishing, Forage, Gill nets, Rotenone
1999	Atchafalaya	Electrofishing, Forage, Gill nets
2000	Atchafalaya	Gill nets
2001	Atchafalaya	Electrofishing, Forage, Gill nets
2002	Atchafalaya	Electrofishing, Seine, Hoop nets, Gill nets
2003	Atchafalaya	Electrofishing, Seine, Hoop nets, Gill nets
2004	Atchafalaya	Electrofishing, Forage, Seine, Hoop nets, Gill nets, Otter trawl
2005	Atchafalaya	Electrofishing, Forage, Seine, Hoop nets, Gill nets, Otter trawl
2006	Atchafalaya	Electrofishing, Forage, Seine, Hoop nets, Gill nets
2007	Atchafalaya	Electrofishing, Forage, Seine, Hoop nets, Gill nets
2008	Atchafalaya	Electrofishing, Forage, Hoop nets, Gill nets
2009	Atchafalaya	Largemouth bass population assessment, Electrofishing, Forage, Seine, Hoop nets, Gill nets

YEAR	WATER	GEAR
2010	Atchafalaya	Largemouth bass population assessment, Electrofishing, Seine, Hoop nets, Gill nets, mortality study
2011	Atchafalaya	Largemouth bass population assessment, Electrofishing, Gill nets; mortality study
2012	Atchafalaya	Electrofishing, Gill nets; mortality study
2013	Atchafalaya	Electrofishing, Gill nets, Larval fish tows; mortality study
2014	Atchafalaya	Electrofishing, Gill nets, Larval fish tows, Coastal Marsh Sampling at Wax Outlet; mortality study
2015	Atchafalaya	Electrofishing, Gill nets, Coastal Marsh Sampling at Wax Outlet; mortality study, mussel abundance and diversity sampling
2016	Atchafalaya	Electrofishing, Coastal Marsh Sampling at Wax Outlet; mussel abundance and diversity sampling
2017	Atchafalaya	Largemouth bass population assessment, Electrofishing, Coastal Marsh Sampling at Wax Outlet; mussel abundance and diversity sampling
2018	Atchafalaya	Largemouth bass population assessment, Electrofishing, Coastal Marsh Sampling at Wax Outlet; mussel abundance and diversity sampling
2019	Atchafalaya	Largemouth bass population assessment, Electrofishing, Coastal Marsh Sampling at Wax Outlet; mussel abundance and diversity sampling, creel survey

Lake records

No records specific to Atchafalaya Basin maintained.

Stocking History

From historical data and Inland Fisheries Stocking Data on Inland Server

YEAR	Florida Largemouth Bass	Northern Largemouth Bass	Bream	Channel Catfish	Blue Catfish
1992	394,000 fingerlings	1,271 adults 5,000 fingerlings	590,000 Bluegill/Redear	92,980 fingerlings	9,020 fingerlings
1993		1,412 adults 185,022 fingerlings	2,065,300 Bluegill/Redear 352,000 Bluegill	1,495,111 fingerlings	306,353 fingerlings
1994			1,075,000 Bluegill	657,928 fingerlings	65,224 fingerlings
1999	330,811 fingerlings				
2000	647,518 fingerlings				

YEAR	Florida Largemouth Bass	Northern Largemouth Bass	Bream	Channel Catfish	Blue Catfish
	451,700 fry				
2001	974,775 fingerlings 295,200 fry				
2002	732,224 fingerlings 25,457 Phase II				
2003	395,347 fingerlings 19,401 Phase II				
2004	200,251 fingerlings				
2005	27,600 fingerlings 12,834 Phase II				
2006	213,733 fingerlings		66,859 Bluegill		
2007	314,081 fingerlings				
2008	206,069 fingerlings				
2009	401,182 fingerlings				

Species profile

FRESHWATER FISHES OF THE ATCHAFALAYA BASIN

Sturgeon Family, ACIPENSERIDAE
Shovelnose sturgeon, *Scaphirhynchus platorynchus* (Rafinesque)
Pallid sturgeon, *Scaphirhynchus album* (Forbes and Richardson)

Paddlefish Family, POLYODONTIDAE
Paddlefish, *Polyodon spathula* (Walbaum)

Gar Family, LEPISOSTEIDAE
Spotted gar, *Lepisosteus oculatus* (Winchell)
Longnose gar, *Lepisosteus osseus* (Linnaeus)
Shortnose gar, *Lepisosteus platostomus* (Rafinesque)

Alligator gar, *Lepisosteus spatula* (Lacépède)

Bowfin Family, AMIIDAE
Bowfin, *Amia calva* (Linnaeus)

Freshwater Eel Family, ANGUILLIDAE
American eel, *Anguilla rostrata* (Lesueur)

Herring Family, CLUPEIDAE
Skipjack herring, *Alosa chrysochloris* (Rafinesque)
Gizzard shad, *Dorosoma cepedianum* (Lesueur)
Threadfin shad, *Dorosoma petenense* (Günther)

Mooneye Family, HIODONTIDAE
Goldeye, *Hiodon alosoides* (Rafinesque)

Pike Family, ESOCIDAE
Redfin pickerel, *Esox Americanus* (Gmelin)
Chain pickerel, *Esox niger* (Cook)

Minnow Family, CYPRINIDAE
Grass carp, *Ctenopharyngodon idella* (Valenciennes)
Silver carp, *Hypophthalmichthys molitrix* (Valenciennes)
Bighead carp, *Hypophthalmichthys nobilis* (Richardson)
Common Carp, *Cyprinus carpio* (Linnaeus)
Mississippi silvery minnow, *Hybognathus nuchalis* (Agassiz)
Silver chub, *Hybopsis storeriana* (Kirtland)
Golden shiner, *Notemigonus crysoleucas* (Mitchill)
Pallid shiner, *Notropis amnis* (Hubbs and Greene)
Emerald shiner, *Notropis atherinoides* (Rafinesque)
Pugnose minnow, *Notropis emiliae* (Hay)
Ribbon shiner, *Notropis fumeus* (Evermann)
Taillight shiner, *Notropis maculatus* (Hay)
Silverband shiner, *Notropis shumardi* (Girard)
Weed shiner, *Notropis texanus* (Girard)
Redfin shiner, *Notropis umbratilis* (Girard)
Blacktail shiner, *Notropis venusta* (Girard)
Mimic shiner, *Notropis volucellus* (Cope)
Bullhead minnow, *Pimephales vigilax* (Baird and Girard)

Sucker Family, CATOSTOMIDAE
River carpsucker, *Carpiodes carpio* (Rafinesque)
Smallmouth buffalo, *Ictiobus bubalus* (Rafinesque)
Bigmouth buffalo, *Ictiobus cyprinellus* (Valenciennes)
Black buffalo, *Ictiobus niger* (Rafinesque)
Spotted sucker, *Minytrema melanops* (Rafinesque)
Creek chubsucker, *Erimyzon oblongus* (Mitchill)

Freshwater Catfish Family, ICTALURIDAE
Black bullhead, *Ameiurus melas* (Rafinesque)
Yellow bullhead, *Ameiurus natalis* (Lesueur)
Blue catfish, *Ictalurus furcatus* (Lesueur)
Channel catfish, *Ictalurus punctatus* (Rafinesque)
Flathead catfish, *Pylodictis olivaris* (Rafinesque)

Pirate Perch Family, APHREDODERIDAE
Pirate perch, *Aphredoderus sayanus* (Gilliams)

Killifish Family, CYPRINODONTIDAE
Golden topminnow, *Fundulus chrysotus* (Gunther)
Blackstripe topminnow, *Fundulus notatus* (Rafinesque)
Blackspotted topminnow, *Fundulus olivaceus* (Storer)

Livebearer Family, POECILIIDAE
Mosquitofish, *Gambusia affinis* (Baird and Girard)
Sailfin molly, *Poecilia latipinna* (Lesueur)
Least killifish, *Heterandria formosa* (Girard)

Silverside Family, ATHERINIDAE
Inland silverside, *Menidia beryllina* (Cope)
Brook silverside, *Labidesthes sicculus* (Cope)

Temperate Bass Family, PERCICHTHYIDAE
White bass, *Morone chrysops* (Rafinesque)
Yellow bass, *Morone mississippiensis* (Jordan and Eigenmann)
Striped bass, *Morone saxatilis* (Walbaum)
Palmetto bass, *Morone saxatilis* & X *Morone chrysops*

Sunfish Family, CENTRARCHIDAE
Flier, *Centrarchus macropterus* (Lacépède)
Green sunfish, *Lepomis cyanellus* (Rafinesque)
Warmouth, *Lepomis gulosus* (Cuvier)
Orangespotted sunfish, *Lepomis humilis* (Girard)
Bluegill, *Lepomis macrochirus* (Rafinesque)
Longear sunfish, *Lepomis megalotis* (Rafinesque)
Redear sunfish, *Lepomis microlophus* (Günther)
Redspotted sunfish, *Lepomis miniatus* (Jordan)
Bantam sunfish, *Lepomis symmetricus* (Forbes)
Spotted bass, *Micropterus punctulatus* (Rafinesque)
Largemouth bass, *Micropterus salmoides* (Lacépède)
White crappie, *Pomoxis annularis* (Rafinesque)
Black crappie, *Pomoxis nigromaculatus* (Lesueur)

Perch Family, PERCIDAE
Sauger, *Sander canadense* (Smith)
Bluntnose darter, *Etheostoma chlorosomum* (Hay)

Slough darter, *Etheostoma gracile* (Gracile)
Logperch, *Percina caprodes* (Rafinesque)

Drum Family, SCIAENIDAE
Freshwater drum, *Aplodinotus grunniens* (Rafinesque)

ESTUARINE FISHES OF THE ATCHAFALAYA BASIN

Requiem Shark Family, CARCHARHINIDAE
Bull shark, *Carcharhinus leucas* (Valenciennes)

Stingray Family, DASYATIDAE
Atlantic stingray, *Dasyatis sabina* (Lesueur)
Southern stingray, *Dasyatis americana* (Hildebrand and Schroeder)

Tarpon Family, ELOPIDAE
Ladyfish, *Elops saurus* (Linnaeus)

Snake Eel Family, OPHICHTHIDAE
Speckled worm eel, *Myrophis punctatus* (Lütken)

Herring Family, CLUPEIDAE
Gulf menhaden, *Brevoortia patronus* (Goode)

Anchovy Family ENGRAULIDAE
Bay anchovy, *Anchoa mitchilli* (Valenciennes)

Needlefish Family, BELONIDAE
Atlantic needlefish, *Strongylura marina* (Walbaum)

Silverside Family, ATHERINIDAE
Tidewater silverside, *Menidia beryllina* (Cope)

Pipefish and Seahorse Family, SYNGNATHIDAE
Gulf pipefish, *Syngnathus scovelli* (Evermann and Kendall)

Porgy Family, SPARIDAE
Sheepshead, *Archosargus probatocephalus* (Walbaum)

Drum Family, SCIAENIDAE
Atlantic croaker, *Micropogon undulatus* (Linnaeus)
Red drum, *Sciaenops ocellata* (Linnaeus)

Mullet Family, MUGILIDAE
Striped mullet, *Mugil cephalus* (Linnaeus)

Sleeper Family, ELEOTRIDAE
Fat sleeper, *Dormitator maculatus* (Bloch)

Goby Family, GOBIIDAE
Violet goby, *Gobioides broussonetii* (Lacépède)
Clown goby, *Microgobius gulosus* (Girard)
Darter goby, *Gobionellus boleosoma* (Jordan and Gilbert)
Freshwater goby, *Gobionellus shufeldti* (Jordan and Eigenmann)

Left-eye Flounder Family, BOTHIDAE
Bay whiff, *Citharichthys spilopterus* (Gunther)
Southern flounder, *Paralichthys lethostigma* (Jordan and Gilbert)

Sole Family, SOLEIDAE
Lined sole, *Achirus lineatus* (Linnaeus)
Hogchoker, *Trinectes maculatus* (Bloch and Schneider)

Sea Catfish Family, ARIIDAE
Gafftopsail catfish, *Bagre marinus* (Mitchill)

Largemouth bass Genetics
Liver samples were collected and analyzed in 1994, 1995, 1997, 2001, 2003, 2004, and 2006-2013 to determine the percent composition of northern, Florida, and hybrid largemouth bass.

Age and Growth
Age and growth data were collected in 1990, 1994-1999, 2001, 2003, 2004, and 2006-2015.

Threatened/endangered/ and exotic species
Sturgeon Family, ACIPENSERIDAE
Pallid sturgeon, *Scaphirhynchus albus* (Forbes and Richardson), federally and state endangered.
Shovelnose sturgeon, *Scaphirhynchus platyrhynchus,* (Rafinesque), federally threatened and state protected.

Pallid and shovelnose sturgeons have been recorded at the Old River Control Structure and other points downstream as far as Morgan City (**Appendix II - research**).

Exotics
Minnow Family, CYPRINIDAE
Grass carp, *Ctenopharyngodon idella* (Valenciennes)
-Gill net sampling has generated records of these fish in the Basin.
Silver carp, *Hypophthalmichthys molitrix* (Valenciennes)
-The catch of silver carp in the Basin is increasing in gill net sampling.
Bighead carp, *Hypophthalmichthys nobilis* (Richardson)
-Although these fish have not been represented in gill net sampling, their presence has been noted in fish kills that have occurred in the Basin.
Black carp, *Mylopharyngodon piceus* (Richardson)

- Almost annual reports from the Atchafalaya River by commercial fishers since 2000.

Common Carp, *Cyprinus carpio* (Linnaeus)

- Found commonly throughout Louisiana.

Long-whiskered Catfish Family, PIMELODIDAE

Spotted tiger shovelnose catfish, *Pseudoplatystoma punctifer* (Castelnau)

-Caught on rod and reel, July 2017, in main stem Atchafalaya River near Melville, LA.

CREEL

The historical creel surveys conducted were access point surveys conducted on random days and times at randomly selected boat ramps that had been weighted by use. All anglers returning to the boat ramp were interviewed and all other users were counted. Anglers interviewed were asked what they were fishing for and their catch was measured and weighed.

Historic information

Table 2 below lists historical data for angler creel surveys conducted in the Atchafalaya Basin. Surveys from 1993 to 1996 included total counts of boat trailers at all boat ramps. Total estimates of all user types and creel data, including commercial anglers and crawfishermen as well as recreational anglers are available.

Table 2. Historical data of creel surveys conducted in Atchafalaya Basin. CPUE = catch per unit effort; LMB = largemouth bass.

YEAR	DURATION	DATA COLLECTED	TARGET GROUP
1989	12 months	CPUE only	Rec. anglers only
1990	5 months	CPUE only	Rec. anglers only
1991	4 months	CPUE only	Rec. anglers only
1993	6 months	Total estimates	All users counted
1994	12 months	Total estimates	All users counted
1995	12 months	Total estimates	All users counted
1996	12 months	Total estimates	All users counted
2003	12 months	CPUE only	All users counted
2004	12 months	CPUE only	All users counted
2008	12 months	CPUE only	All users counted
2009	12 months	CPUE only	All users counted
2013	6 months	Total estimates	LMB anglers only
2014	12 months	CPUE only	LMB anglers only

Opinion surveys were conducted at the boat ramps during creel census interviews in 1995, 1996 and 2003. The data was combined for 1995 and 1996. The opinions collected were from all recreational anglers concerning bass regulations for all three years. The 2003 opinions collected included those of crappie regulations.

Recent methods

An angler creel survey was conducted from July 1, 2013 through Dec. 31, 2014. The survey method used was a fixed access point survey of completed fishing trips. For the first 6 months of this 18-month creel, access point surveys of the entire Atchafalaya Basin were conducted on six randomly selected days per month. Sampling was conducted on two weekdays and four weekend days. The latter 12 months were conducted on three randomly selected days per month, with one weekday, and two weekend days. Start times were also randomly chosen for AM or PM creels. Morning sampling was started two hours after sunrise. Evening surveys were started five hours before sunset. For the first 6 months of the 18-month creel, all trailers at every launch in the Basin were counted. For the latter 12 months, trailers only at the selected ramp were counted. All recreational anglers returning to the ramp were interviewed and only the black bass of their harvest were counted, measured, and weighed. All other user types were identified and counted.

The next creel survey for the Atchafalaya Basin is scheduled to begin in 2019.

HYDROLOGICAL CHANGES

Atchafalaya Basin Levees

All levees in the Atchafalaya Basin, except the guide levees for the Morganza Floodway, are included under this heading. The levee system is designed to protect agricultural areas and towns from the normal high waters of the Mississippi-Red River backwater area, floods on the Atchafalaya River, and when necessary to contain excess floodwaters of the Mississippi and Red Rivers on their way south to the Gulf of Mexico. The levees also protect valuable agricultural lands from backwaters created by the flooding. The system includes about 449 miles of levees and currently will contain a flood of about 1.4 million cubic feet per second (cfs). Work is under way to raise the floodway levees to an elevation that will confine a design flow of 1.5 million cfs. Individual levee features within the existing Atchafalaya system include the following:

East Atchafalaya Basin Protection Levee (EABPL).

The levee begins at the lower end of the east guide levee of the Morganza Floodway, extends southward to and through Morgan City to the Avoca Island Cutoff, and includes the Bayou Boeuf and Bayou Sorrel locks. The length of this system is 106.7 miles, including 1.3 miles of floodwall along the Morgan City front and about 0.4 mile of floodwall below Morgan City. The Atchafalaya Basin Levee District and the city of Morgan City are responsible for operation and maintenance of this feature.

West Atchafalaya Basin Protection Levee (WABPL).

The levee begins near the town of Hamburg, where it joins the Bayou des Glaises fuse-plug levee. It extends in a south and southeasterly direction to the Wax Lake Outlet at the latitude of the East and West Calumet Floodgates and thence eastward through Berwick to the Gulf Intracoastal Waterway. This levee extends 128.7 miles and connects with 3 miles of floodwall along the front of the town of Berwick. Structures along the levee include Bayou Darbonne and Courtableau drainage structures, the Charenton Floodgate, and the Berwick Lock, described subsequently. The Red River, Atchafalaya, and Bayou Boeuf Levee District, the Atchafalaya Basin Levee District, the town of Berwick, and the St. Mary Parish Government (formerly Police Jury) are responsible for operation and maintenance.

East Atchafalaya River Levee.

The levee extends from the junction of the Atchafalaya, Old, and Red Rivers along the east bank of the Atchafalaya River to approximately 10 miles below Alabama Bayou, a distance of 52.5 miles. The Atchafalaya Basin Levee District is responsible for maintenance.

West Atchafalaya River Levee.

The levee extends southward from Bayou des Glaises levee at Simmesport along the west bank of the Atchafalaya River and Bayou La Rose, to approximately 2 miles below Butte La Rose, a distance of 60.1 miles. Additional levees include the Simmesport ring levee, 1.6 miles in length, and its drainage outlet, Brushy Bayou Drainage Structure, Melville ring levee, 4.1 miles in length and its drainage structures, and the Krotz Springs ring levee, 1.7 miles in length. The total length of levee in this system is 67.5 miles. The Red River, Atchafalaya, and Bayou Boeuf Levee District are responsible for maintenance of the portion of this levee from Simmesport to Bayou Courtableau. The remaining portion is maintained by the Atchafalaya Basin Levee District.

Bayou des Glaises Fuseplug Levee.

The levee extends from the town of Simmesport west and along the south bank of Bayou des Glaises, to the WABPL near Hamburg, a distance of approximately 8 miles. This levee protects the lands in the West Atchafalaya Floodway from floodwaters in the Mississippi-Red River backwater area until stages requiring the use of the West Atchafalaya Floodway are reached. Floodwaters will then enter the floodway by overtopping the levee. The Red River, Atchafalaya, and Bayou Boeuf Levee District are responsible for maintenance.

Mansura Hills to Hamburg Levee.

The levee extends from the Mansura Hills along the north bank of Bayou des Glaises across the structure and southward to the junction of the WABPL and the Bayou des Glaises fuseplug levee, near the town of Hamburg. This 20.5-mile levee protects the area west of the floodways and west of Marksville from Mississippi-Red River backwater flooding. The Red River, Atchafalaya, and Bayou Boeuf Levee District is responsible for maintenance.

Levees West of Berwick.

A total of 56.5 miles of levees tying into high ground are located west of Berwick. They have been designed to protect the agricultural lands along the Teche and Sale ridges from the back waters created by the introduction of floodwaters from the Mississippi and Red Rivers through the floodways, the Wax Lake Outlet, and Lower Atchafalaya River. The levee system begins at the lower end of the WABPL below Berwick and extends westward generally along the north bank of the Intracoastal Waterway and Wax Lake Outlet, to the Charenton Drainage Canal near Baldwin. It also encloses the Bayou Sale Ridge. Drainage for the enclosed area is through about 38 miles of canals, 3 drainage structures, 20 gated culverts, an inverted siphon, and 11 pumping stations, all of which were completed by 1965.

The Atchafalaya Delta development and coincident rising Gulf-side water levels would progressively reduce pumping capacities of these pumping stations. Formal notification was given to the local operating agencies in 1983 that the Federal government assumed responsibility for modifications needed to regain pumping capacities and was studying means that could be employed. Accordingly, refurbishment of pumps, replacement of aged drive-engines and equipment as necessary, and modifications and repairs were commenced in 1990 and completed in 1993 at the Bayou Yokely, Maryland, Franklin, Centerville, and Wax Lake East and Wax Lake West pumping stations to regain lost capacities.

Removals of some of the 20 gated culverts that are no longer useful or functional for effective gravity-control, collection and transmission of surface drainage waters through flood protection levees are scheduled to be completed by 2002.

Atchafalaya River Improvement Dredging

Improvement dredging of the leveed channel of the Atchafalaya River and its outlets is provided under this feature. Work includes the enlargement of the openings of existing railroad and highway bridges across the Atchafalaya River and such alterations of existing crossings of this river as are deemed necessary to the execution of the plan. Other restricted sections of the channel are to be enlarged to increase the flood flow capacity of the Atchafalaya River. The improvement extends the confluence of the Red, Old, and Atchafalaya Rivers to Alabama Bayou, at mile 57. All work has been completed, unless at a later date it is found that additional improvements are required. The cost of construction to date is $4,578,000. Work was completed in 1953.

Atchafalaya Basin Main Channel Improvement Dredging

The flood-carrying capacity of the Atchafalaya was developed by dredging a continuous main channel through the swamps of the central portion of the basin. The capacity of the floodway was being reduced by sedimentation in the floodway. The main channel preserves floodway capacity and reduces wetland loss by reducing overbank sedimentation in the Lower Atchafalaya Floodway. The dredging extended from the Atchafalaya River at Alabama Bayou to the main body of Six Mile Lake near Morgan City. No work has been performed on this feature since December 1968. The need and feasibility of continued channel dredging were addressed in the Phase I General Design Memorandum approved February, 1983.

This document concluded that the river was enlarging naturally and that flows could be confined to the main channel by slightly raising its natural banks. This channel training work would also significantly reduce sedimentation into the back wetlands. The initial channel training work above Morgan City was completed in 1989 when rock weirs were installed at Blue Point Chute and American Pass. Additional channel training and channel realignment work above Morgan City was completed in 1993. Material for enhancing the natural banks to confine the river came from within the construction right-of-way instead of the main channel which reduced environmental impacts by one third.

Wax Lake Outlet

The Corps constructed this outlet to convey floodwaters from the Atchafalaya Basin. The outlet, with an initial design capacity of 300,000 cubic feet per second, provides an additional means of safely passing flood waters to the Gulf of Mexico. The dredged channel is about 10 miles west of Berwick and extends from Six Mile Lake through the Teche Ridge and Wax Lake into Atchafalaya Bay, a distance of about 15.7 miles.

The channel was initially constructed to a bottom width of 300 feet from Six Mile Lake to a point one-half mile below Bayou Teche, 400 feet below that point, and a uniform depth of -45 feet NGVD. The excavated material from the channel dredging was used to construct guide levees extending from the WABPL to the Intracoastal Waterway on each side of the outlet.

The Wax Lake Outlet Control Structure was constructed in 1987 to stabilize the distribution of low to normal floodway outlet flows to approximately 70 percent/30 percent between the

Lower Atchafalaya River and the Wax Lake Outlet and to increase the channel development of the Lower Atchafalaya River, thereby increasing the combined capacity of the Lower Atchafalaya River and the Wax Lake Outlet to convey flood flows. Flooding of riverfront businesses along the Lower Atchafalaya River in Morgan City/Berwick, Louisiana occurred more frequently after the completion of the Wax Lake Outlet Control Structure. Local interests claimed that the control structure was primarily responsible for the more frequent flooding and requested a complete removal of the weir and dredging of the channel above the weir. The President of the Mississippi River Commission directed the removal of the weir, as requested. The weir removal was completed in March, 1995 and the dredging of Six Mile Lake was completed in June, 1995.

The East and West Calumet floodgates, described below were constructed where the guide levees cross Bayou Teche to allow continued navigation. New bridges were constructed to carry U.S. Highway 90 and the Southern Pacific Lines over the dredged channel. This improvement was completed in 1942 at a cost of $7,122,000, and is maintained by the U.S. Army Corps of Engineers, except for the bridges, which are maintained by their owners.

East and West Calumet Floodgates

These floodgates are located in the East and West Wax Lake Outlet guide levees where the levees cross Bayou Teche. Each floodgate is a reinforced-concrete structure 161 feet long, with a 45-foot clear width, a sill depth of -9.8 feet NGVD, and steel sector gates.

The floodgates allow navigation in Bayou Teche and regulate flows to some extent. They were completed in 1950 at a cost of $1,320,000. Operation and maintenance are the responsibility of the U.S. Army Corps of Engineers. Detailed engineering to modify the existing structures to the project flood flow line had been suspended because of the removal of the Wax Lake Outlet weir and pending the results of the lower Atchafalaya Basin Reevaluation Study.

Charenton Floodgate

This floodgate is located in the WABPL, about 1-mile north of Charenton. It is a reinforced, concrete structure 175 feet long, with a clear width of 45 feet, a depth of -10.8 feet NGVD, and steel sector gates. The floodgate regulates flows between Bayou Teche and the Atchafalaya Basin Floodway and affords a navigation connection between Grand Lake and the WABPL borrow pit and Charenton Drainage Canal. In 1951, a removable bridge with a low steel elevation of 20.7 feet NGVD was constructed across the structure. The floodgate was completed in 1948 at a cost of $298,000. Charenton Floodgate is operated by the U.S. Army Corps of Engineers. A study is underway to provide modifications to the existing floodgate through consultation and a public meeting with local interests. A navigable structure was determined to be no longer required. A non-navigable closure is planned. In 1994, a scour hole was repaired with rock removed from the Wax Lake Outlet weir.

Berwick Lock

Located in the WABPL near its crossing of the Lower Atchafalaya River, about 2 miles north of the town of Berwick, this lock is a reinforced-concrete structure 45 feet wide, with sills at an elevation of -9.8 NGVD and a usable length of 300 feet between steel sector gates. It affords a navigation passage through the levee and permits navigation up the Lower Atchafalaya River to Patterson and Bayou Teche. The lock was completed in 1951 at a cost of $2.1 million and is maintained by the U.S. Army Corps of Engineers.

Bayou Sorrel Lock
This lock, located in the EABPL at its intersection with the Morgan City-Port Allen Route to the Gulf Intracoastal Waterway, about 15 miles below Plaquemine, provides a navigation connection through the levee. The structure consists of reinforced-concrete gate bays equipped with steel sector gates and connected with an earth chamber having a timber guide wall on both sides. The usable length is 790 feet, the clear width is 56 feet, and the depth over the sill is 14 feet below NGVD. The navigation route between Port Allen and Morgan City through the lock is about 22 miles shorter than the landside waterway. The lock was completed in 1952 at a cost of $4,700,948, and is operated and maintained by the U.S. Army Corps of Engineers.

Bayou Boeuf Lock
This lock is located in the EABPL below Morgan City at a point where it crosses Bayou Boeuf and the Intracoastal Waterway. It consists of two reinforced-concrete gate bays, equipped with steel sector gates connected by an earth chamber which has a timber guide wall on both sides. The lock has a length of 1,136 feet, a clear width of 75 feet, and a depth over sills of 13 feet at NGVD. The Bayou Boeuf Lock provides for navigation through the levee, which protects the areas and communities east of Morgan City from the floodwaters from the Atchafalaya Basin. It was completed in 1955. The lock, excluding approach channels, was completed at a cost of about $2,754,000. It is operated and maintained by the U.S. Army Corps of Engineers.

Atchafalaya River
Channel work on the Atchafalaya River, completed in February, 1956 at a cost of $303,500, is a navigation feature of the MR&T project. The channel, 12 feet deep over a bottom width of 125 feet, extends from the Gulf Intracoastal Waterway at Morgan City to the Mississippi River via the Atchafalaya and Old Rivers. As a shortcut from the Gulf to the upper Mississippi, this project affords travel savings of 172 miles and eases port congestion at New Orleans. Average annual traffic, 1986-1995, was 10,458,000 tons.

Atchafalaya Basin Floodway System
The Atchafalaya Basin Floodway system resulted from a combination of a general investigation (GI) study with a Phase I General Design Memorandum (GDM). The GI study, Atchafalaya Basin (Water and Land Resources), Louisiana, was authorized, by resolutions of the Senate and House Committees on Public Works in 1972. The Phase I GDM was authorized in June, 1976 under the discretionary authority of the Secretary of the Army acting through the Chief of Engineers to address alternative plans for accomplishing the previously authorized purposes of the Atchafalaya Basin project. Because of the interrelationships of the separately authorized studies, they were combined into a single study.

The primary goal of the study was to develop an implementable multipurpose plan that will protect southeast Louisiana from Mississippi River floods by ensuring safe passage of one-half the MR&T project design flood through the Atchafalaya Basin Floodway system, while retaining and restoring the unique environmental values of the floodway and maintaining or enhancing the long-term productivity of the wetlands and woodlands.
The new plan was recommended in the Atchafalaya Basin Floodway system final report/EIS, which was submitted to the Mississippi River Commission in January, 1982, and was approved by the Office of the Chief of Engineers in February, 1983. The recommended plan provides for the following features under existing MR&T project authority:

- continued operation of the Old River Control Structure to maintain the authorized 70/30 flow division;
- continued construction of bank stabilization works above mile 55.0 on the main channel;
- modification of existing features, such as floodway guide levees, floodgates, pumping plants, etc.;
- further channel dredging only to the extent required for providing dredged/excavated material to construct training works along the main channel that will achieve the desirable degree of flow confinement and natural channel enlargement from mile 90.0 to 116.0;
- construction of the Wax Lake Outlet Control Structure to stabilize the distribution of low to normal floodway outlet flows to approximately 70 percent/30 percent between the Lower Atchafalaya River and the Wax Lake Outlet, with possible future restriction of Wax Lake Outlet flows to about 20 percent depending upon ecosystem response (as noted on page 49 the Wax Lake Outlet Control Structure rock weir has been removed and the connecting levee was removed in 1995);
- enlargement of the Wax Lake Outlet overbank area to allow passage of up to 50 percent of flood flows;
- realignment of the four principal distributaries of the main channel for sediment control;
- enlargement of the outlet channels for construction of training works along both channels below the latitude of Morgan City;
- construction of further extensions of the Avoca Island levee and/or other measures for backwater protection east of the floodway after completing additional detailed studies of the Atchafalaya Bay-wetlands-backwater complex;
- and construction of fresh water diversion structures for the Henderson Lake and Sherburne areas.

The recommended plan also included the following features that required additional authorization: acquisition of additional real estate in the Lower Atchafalaya Basin Floodway in the interest of flood control and environmental improvements, construction of recreation facilities, construction of two pilot management units and miscellaneous canal closures and water circulation improvements. These latter features were authorized by the Supplemental Appropriations Act of 1985 and the Water Resources Development Act of 1986.

The following features were authorized under the discretionary authority of the Chief of Engineers. The Wax Lake Outlet Control Structure in Six Mile Lake, which stabilized the distribution of low to normal floodway outlet flows, was completed in 1988 at a cost of $11,610,000. Removal of this structure was completed in March, 1995. This was necessary to reduce stages and stage durations in the vicinity of Morgan City. The Wax Lake Outlet Control Structure rock weir removal was completed in March, 1995, and the connecting levee was removed in February, 1996. All channel training work above the latitude of Morgan City was completed in February, 1992. The channel realignment work, which consists of two distributary realignments, was completed in 1992. Enlargement of the Wax Lake Outlet overbank has been indefinitely postponed pending recommendations of the Lower Atchafalaya Basin Reevaluation Study. In order to solve the problem of backwater flooding northeast of Morgan City, a 5.5-mile extension of the existing Avoca Island levee was considered. However, a recommendation against the action was made and approved by the Mississippi River Commission in December, 1991 citing:

- limited support
- high cost
- local and state opposition
- the high probability that the area would continue to flood from sources other than the Atchafalaya River backwater (even if the Avoca Island Levee were constructed)

At the present time, the study is being reevaluated. The issue of providing backwater protection for Morgan City is being studied as part of the Lower Atchafalaya Basin Reevaluation Study.

Excessive Atchafalaya River flows over the past several years have necessitated a project reevaluation to assess the project function. The Lower Atchafalaya Basin Reevaluation Study is addressing this concern and investigating conditions at Wax Lake Outlet, Bayou Black, and other locations and will recommend modifications desirable for flood protection, navigation, and environmental management. The study is investigating several alternatives aimed at reducing the volume of flood waters passing Morgan City for flows less than project flood. In conjunction with this study, the Corps of Engineers has initiated an intensive public involvement program intended to provide an avenue for local interest groups to express their concerns and to allow technical exchange of information. The expected completion date is July, 2000.

Improvements for Access, Fish and Wildlife, and Recreation
A program has been initiated to develop a plan to minimize disruption to basin access and damage to the fish and wildlife resource occasioned by the construction of the flood control improvements. Features for fish, wildlife, and recreation are provided for by the Atchafalaya Basin Floodway system project.

East and West Access Channels
This feature consists of channels, 7 feet deep by 80 feet wide, which provide navigable connections between the East and West Atchafalaya guide levees. The East Access Channel consists of a canal connecting the Atchafalaya River Main Channel with Bayou Sorrel. The West Access Channel connects the Main Channel to Lake Fausse Pointe Cut via Bayou Crook Chene and Little Gonsolin Bayou. They are used by both commercial and recreational craft and permit basin-wide access to and from the main channel. Another function of these channels is to distribute fresh water to the overbank areas which they traverse. The West Access Channel was realigned in 1991, and the old entrance (Little Bayou Chene) was closed.

East and West Freshwater Distribution Channels
These channels are being maintained to distribute fresh water on the east and west sides of the Atchafalaya Basin during seasons of low water on the Atchafalaya River system. The East Freshwater Distribution Channel consists of Little Tensas Bayou and Upper Grand River. The West Freshwater Distribution Channel connects the Main Channel with Lake Fausse Point Cut via Bayou LaRompe, Lake Long, and Bayou L'Embarras. The intermittent overflow from these channels is beneficial to fishing and hunting activities in the area. In 1992, a new entrance to the East Freshwater distribution channel was excavated, and the old entrance at Little Tensas Bayou was closed.

Sherburne Structure
This structure will be constructed in the Atchafalaya River levee at Sherburne to supply fresh water from the Atchafalaya River to the wetlands on the east side of the river. The structure at Sherburne would distribute water by gravity flow through Little Alabama Bayou, Bayou des Glaises, and connecting channels into the Ramah area of the Atchafalaya Basin Floodway, east of the Atchafalaya River.

Retention Dikes
Prior to dredging in the Atchafalaya Basin, a system of dikes, ditches and weirs was constructed to prevent damage to the high-value habitat. The purpose of the dikes is to confine dredged material to carefully chosen areas, while the ditches and weirs return spill waters from the dredging process to the main channel. This system precludes the incursion of sediments into existing off-channel open water areas and minimizes alteration of the basin's unique environment.

WATER USE

Activities related to the oil and natural gas industry and to commercial navigation are widespread throughout the Atchafalaya Basin.

Non-consumptive
Bird watching, related eco-tours, sight-seeing, canoeing, kayaking, camps and houseboats.

Hunting
Duck hunting, small game hunting, deer hunting, turkey hunting, alligator harvesting, fur trapping.

Fishing

Accessible to all anglers via boat from 19 boat ramps from inside the protection levees. Recreational angler surveys conducted in 1991 and 1998 list the Atchafalaya Basin as the most popular freshwater fishing destination in Louisiana.

Recreational and commercial fishing, recreational and commercial crawfishing, recreational and commercial frogging, plus recreational and commercial crabbing are all part of the many activities occurring in the basin at one time or another.

APPENDIX I – MAPS

Map 1.
Atchafalaya Basin below Hwy 190.

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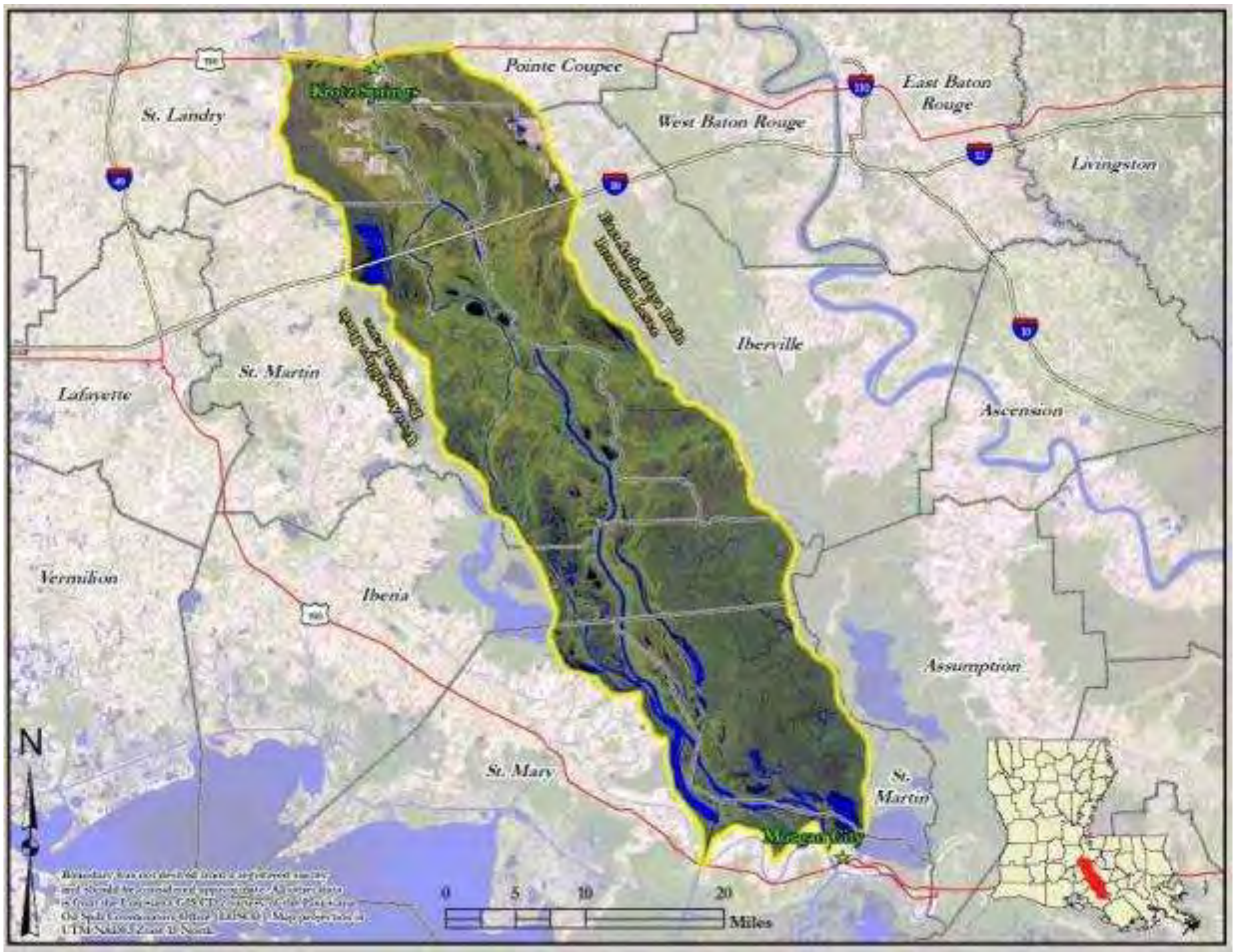

Map 2.
Geographical relationship of the Atchafalaya Basin to the Red and Mississippi Rivers.

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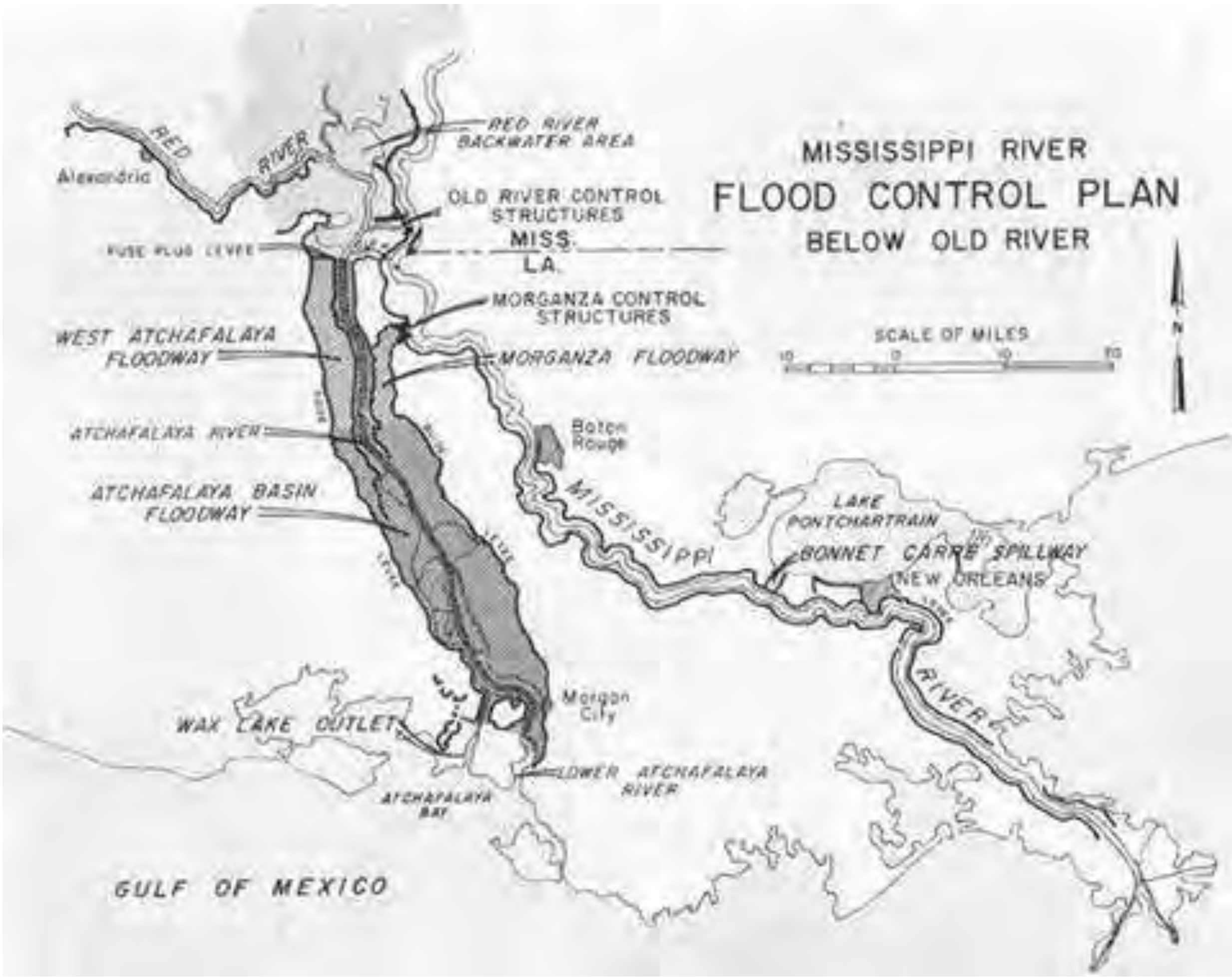

Map 3.
A schematic view of the watershed of the Atchafalaya River and how the cubic feet per second of project flood is calculated.

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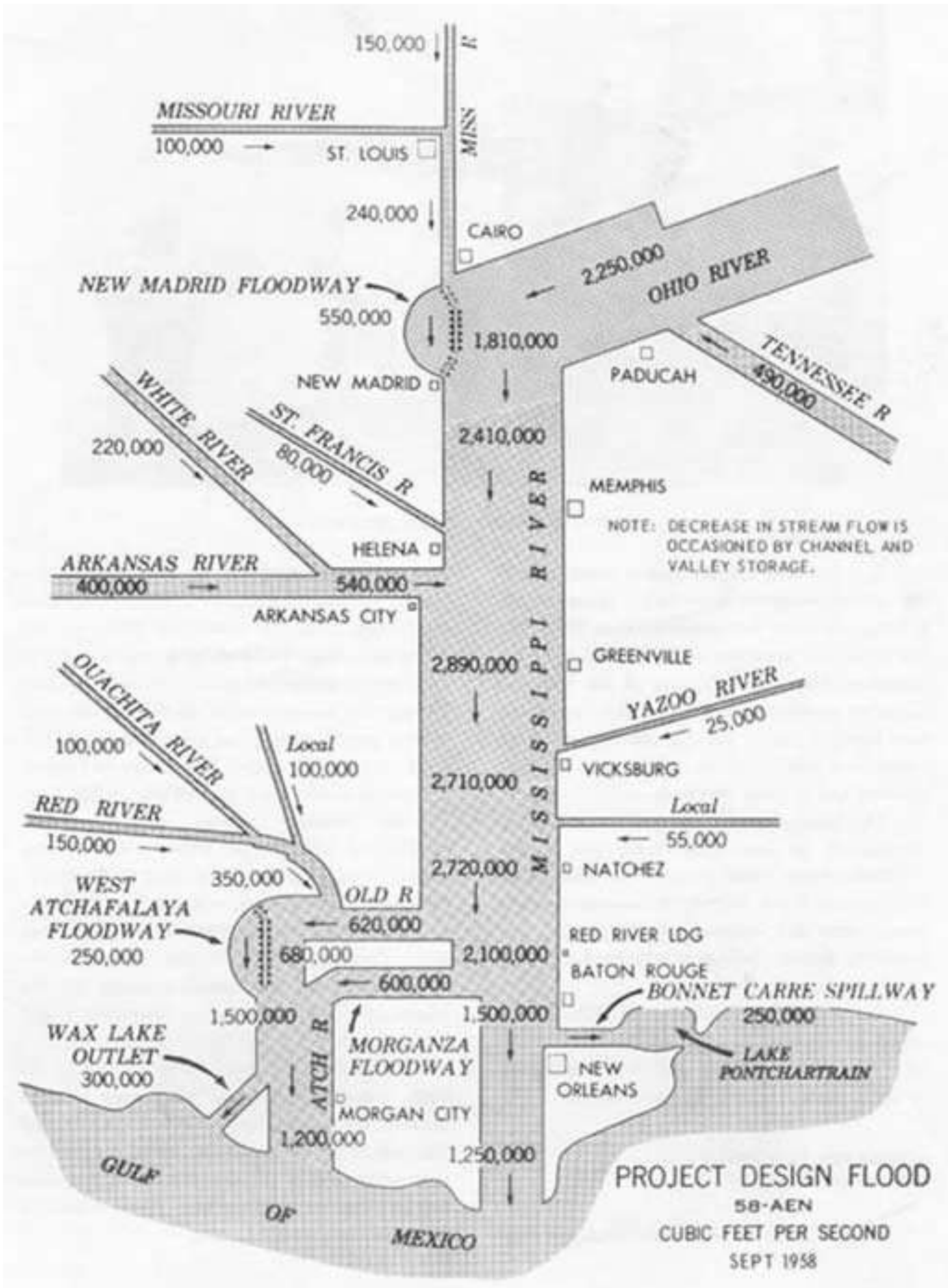

Map 4.
Boat Landings on the Atchafalaya from I-10 to Morgan City. (2 maps)

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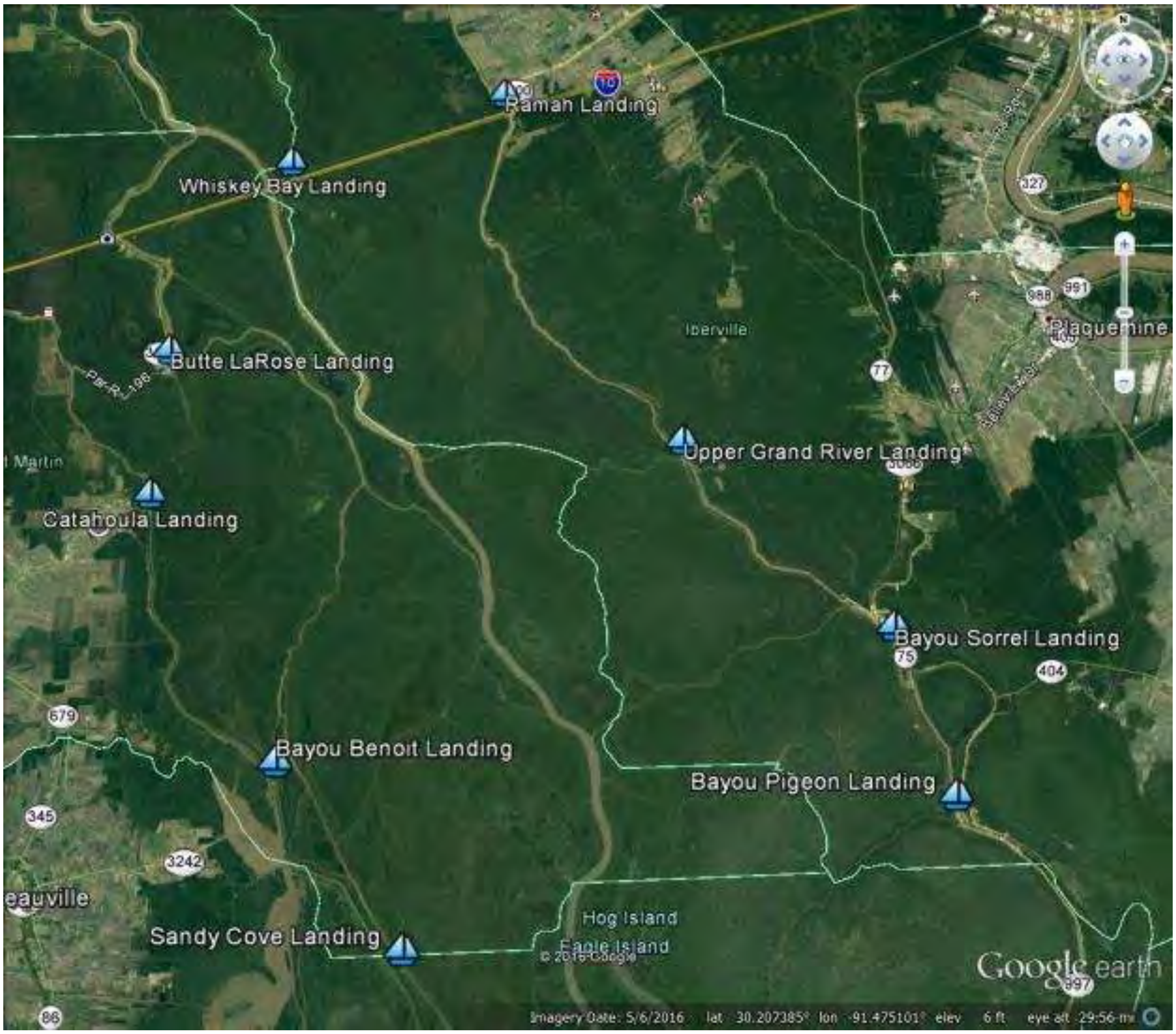
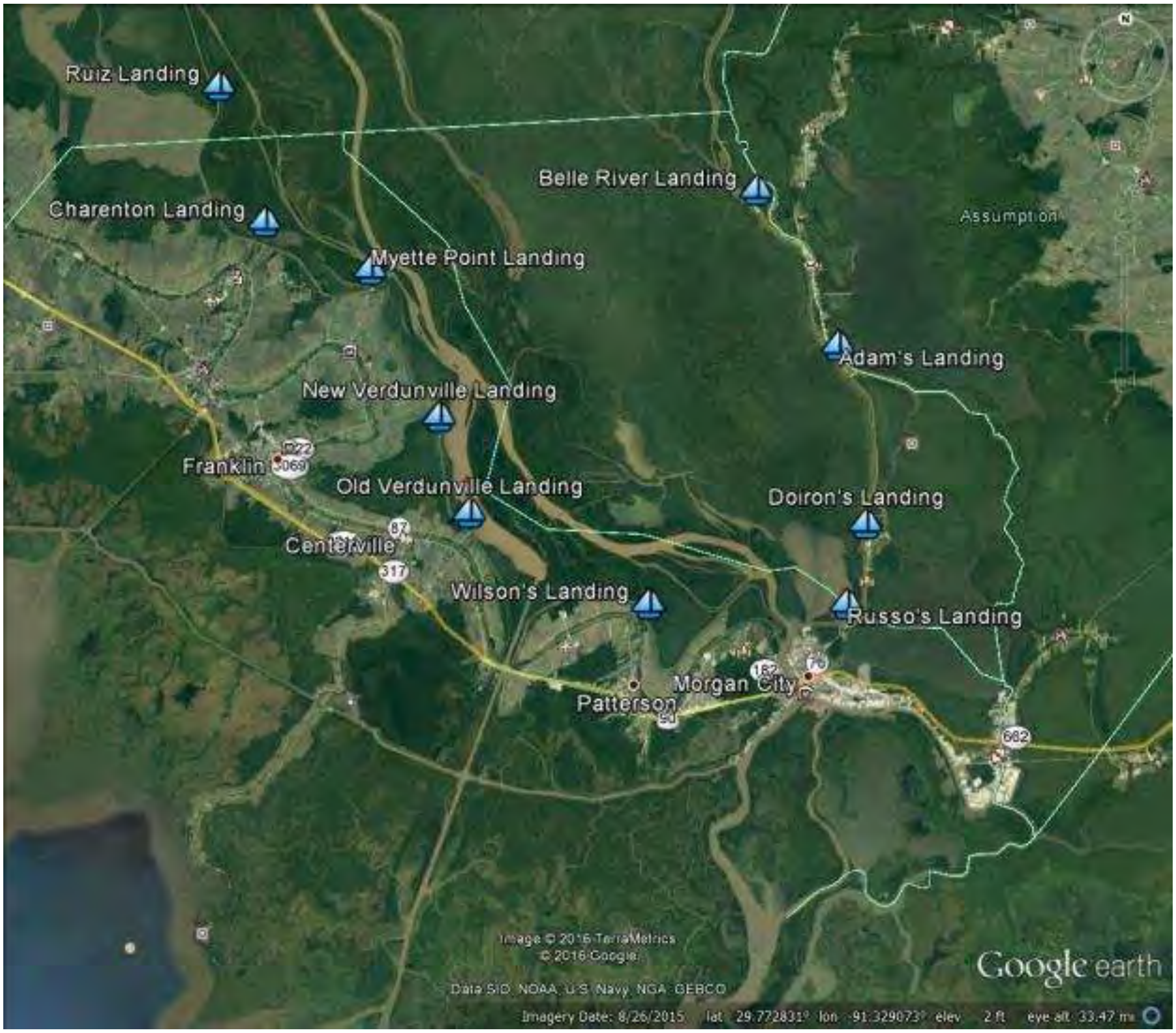
Upper Half Atchafalaya Basin Boat Launches



Lower Half Atchafalaya Basin Boat Launches



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Appendix S: LDWF Atchafalaya Basin Waterbody Evaluation and Recommendations

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LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

ATCHAFALAYA BASIN

WATERBODY EVALUATION &
RECOMMENDATIONS

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED ANNUALLY

June 2009 - Prepared by
Mike Walker, Biologist Manager, District 9

August 2011 – Aquatic vegetation recommendations updated by
Mike Walker, Biologist Manager, District 9

April, 2014 – Updated by
Brac Salyers, Biologist Manager, District 9

September, 2014 – Updated by
Brac Salyers, Biologist Manager, District 9

September, 2015 – Updated by
Brac Salyers, Biologist Manager, Distrcit 9

September, 2016 – Updated by
Brac Salyers, Biologist Manager, District 9

September, 2017 – Updated by
Brac Salyers, Biologist Manager, District 9

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational

Black bass, crappie, and catfish are managed to provide anglers the greatest opportunity to catch and harvest a limit of fish. Sunfish are managed to provide a sustainable population while providing anglers the opportunity to catch and harvest numbers of fish.

Commercial

Commercial species are managed with statewide regulations to provide a maximum sustainable yield that does not contribute to declines in future population strength.

Species of Special Concern

The harvest of pallid sturgeon, *Scaphirhynchus albus,* and shovelnose sturgeon, *Scaphirhynchus platorynchus* is prohibited.

The recreational harvest of paddlefish, *Polyodon spathula,* provides that two fish, not exceeding 30 inches lower jaw–fork length, may be harvested daily. Paddlefish greater than 30 inches must be returned immediately to the water. Taking or possessing paddlefish in all saltwater areas of the state is prohibited. The possession and transportation of live paddlefish is prohibited. All harvested paddlefish shall be maintained intact while on the water. No person shall have paddlefish eggs that are not fully attached to the fish in their possession while on the water. The commercial harvest of paddlefish is prohibited.

EXISTING HARVEST REGULATIONS

Recreational

The Louisiana Wildlife and Fisheries Commission amended a rule to repeal the 14 inch minimum length limit (MLL) on black bass in the Atchafalaya Basin and adjacent waters. Effective June 20, 2013, harvest regulations for bass included a 7 fish daily creel limit with no length restrictions. This regulation was in effect for two years, and upon its expiration, the daily creel reverted to 10 fish per day (statewide regulations) with no length restrictions.

The recreational regulations may be viewed at the link below:
http://www.wlf.louisiana.gov/fishing/regulations

Commercial

The commercial fishing regulations may be viewed at the link below:
http://www.wlf.louisiana.gov/fishing/commercial-fishing

SPECIES EVALUATION

There have been five hurricane-related fish kills in the Basin since population monitoring was established in 1990 (Andrew-1992, Lili-2002, Rita-2005, Gustav-2008, and Isaac-2012). Prior to 1990, limited information on the bass population in the Atchafalaya River Basin (ARB) was collected. However, it is certain that fish kills from hurricane-related events have occurred in the ARB throughout the geological history of the Atchafalaya River.

Recreational

Electrofishing is the most commonly used sampling technique to assess largemouth bass (LMB) relative abundance (catch per unit effort = CPUE), size distribution, and relative weight (physical body condition). Data collected during fall electrofishing is used to describe population trends, age composition, growth rate, and mortality rate. Water level conditions in the ARB are directly influenced by the Mississippi River. In the springtime, high, turbid waters negatively affect sampling efficiency. For that reason, electrofishing sampling is conducted in the fall only.

Electrofishing sample sites in the ARB have changed over the years. There were six original sites. Some sites became inaccessible due to accretion of sediment. These sites were replaced with alternate locations. Following Hurricane Andrew, the total number of sample sites was nine. In 2011, following the closure of the Ferriday, LA field office, LDWF's Office of Fisheries realigned their Inland Fisheries Districts, as well as Marine Fisheries Coastal Study Areas (CSA). District 9 was realigned to become the single office managing the Atchafalaya River and Basin, beginning at the Old River Control Structure and extending to the Atchafalaya Delta. After this realignment, nine more sites were added, bringing the total number of sites sampled to eighteen. In 2016, five more sites were added including two within Sherburne WMA, and three sites to better represent the eastern portion of the Basin, raising the total currently sampled to 23. Maps of the realigned districts, as well as a map of electrofishing sites in the Atchafalaya Basin, are located in **Appendix I**.

Largemouth Bass

Relative abundance, size structure indices, and length distribution

Electrofishing catch per unit effort (CPUE) results depicted in Figure 1 show LMB catch rates to be highly variable. The total catch rates for 2003-2005 were fairly stable, with over 80 bass per hour. The numbers dropped over the next four years, but then had a sharp increase in 2010 and 2011. In relation to total CPUE, catch rates of individual size classes provide a more detailed description of the annual variations.

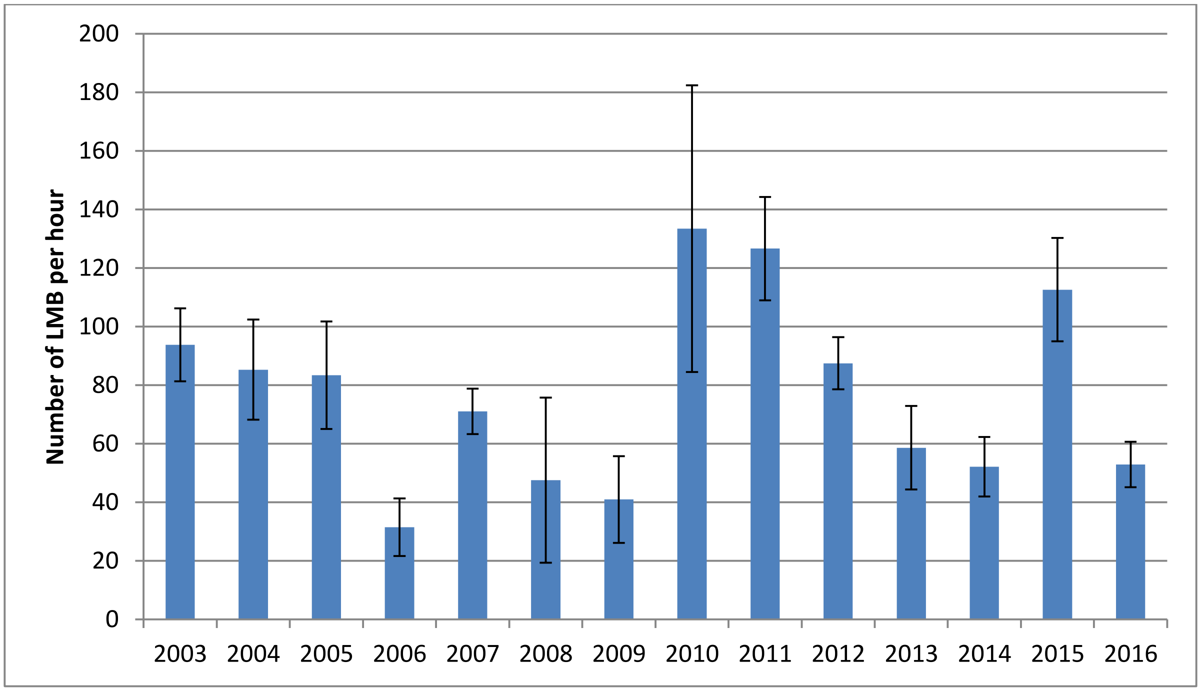

Figure 1. The mean total CPUE (± SE) for largemouth bass from the Atchafalaya River Basin, LA from fall electrofishing results (2003-2016).

Prior work indicates that water levels of sufficient height and duration during the spawning period lead to increased recruitment of nest building sport fish species (Aggus and Elliot 1975; Martin et al. 1981; Miranda et al; 1984; Noble 1986; Reinert et al. 1997; Sammons et al. 1999).

Catch indices displayed in Figure 2 show a good sub-stock and stock-size class in 2003 subsequent to Hurricane Lili related fish kills. Lower catch rates for 2006 and 2009 are likely related to the series of fish kills resulting from Hurricanes Rita (2005), Gustav, and Ike (2008). The increased abundance observed in the 2010 and 2011 samples reflects natural recovery from storm related fish kills.

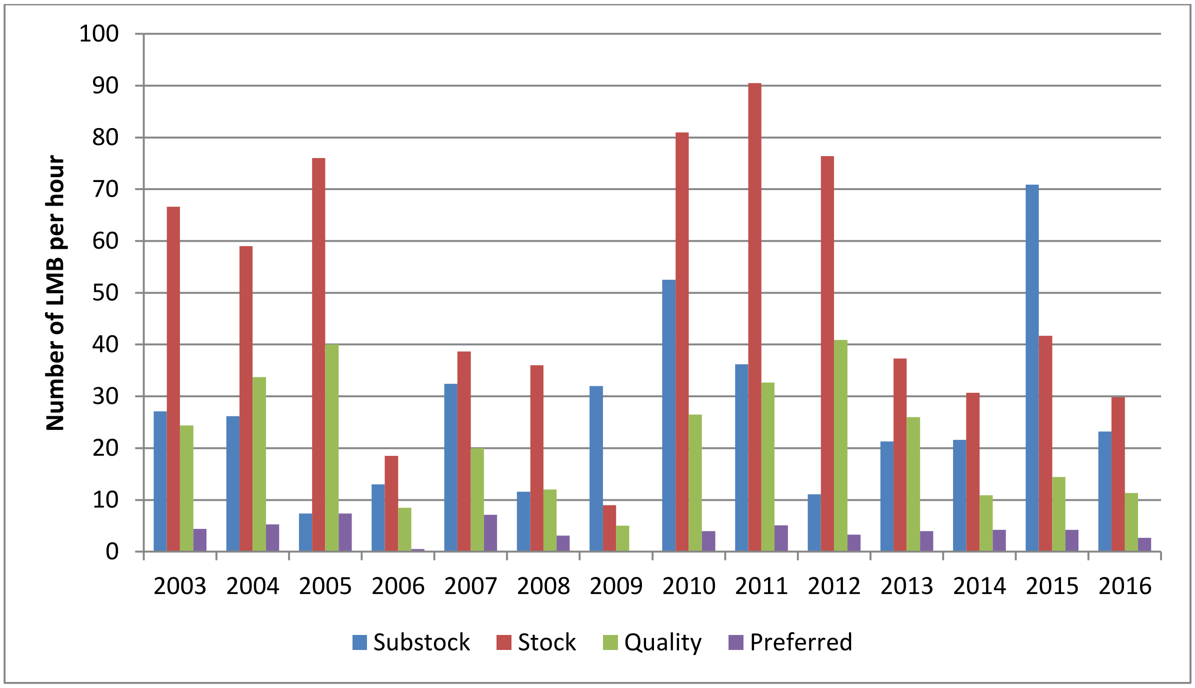

Figure 2. The CPUE for sub-stock, stock-, quality-, and preferred-size largemouth bass from the Atchafalaya Basin, LA from fall electrofishing results for 2003-2016.

Figure 2 also indicates that bass between 8 and 14 inches (stock- and quality-size) are a consistently strong component of the ARB bass population. The number of bass measuring over 14 inches shows sharp declines and then steady increases as a product of hurricane related fish kills and subsequent recovery. According to LDWF standardized electrofishing results, abundance of bass 14 inches and larger does not routinely follow years with high abundance of bass under 14 inches, even in periods of minimal weather or water related influence.

The size distribution of LMB collected during 2016 sampling efforts is depicted in Figure 3. Young-of-the-year (YOY) bass (2 to 6 inches) represent 35.2% of the sample. Stock and quality-size bass (8 to 14 inches) represent 51% of the sample, while bass greater than 14 inches TL represent only 5% of the sample.

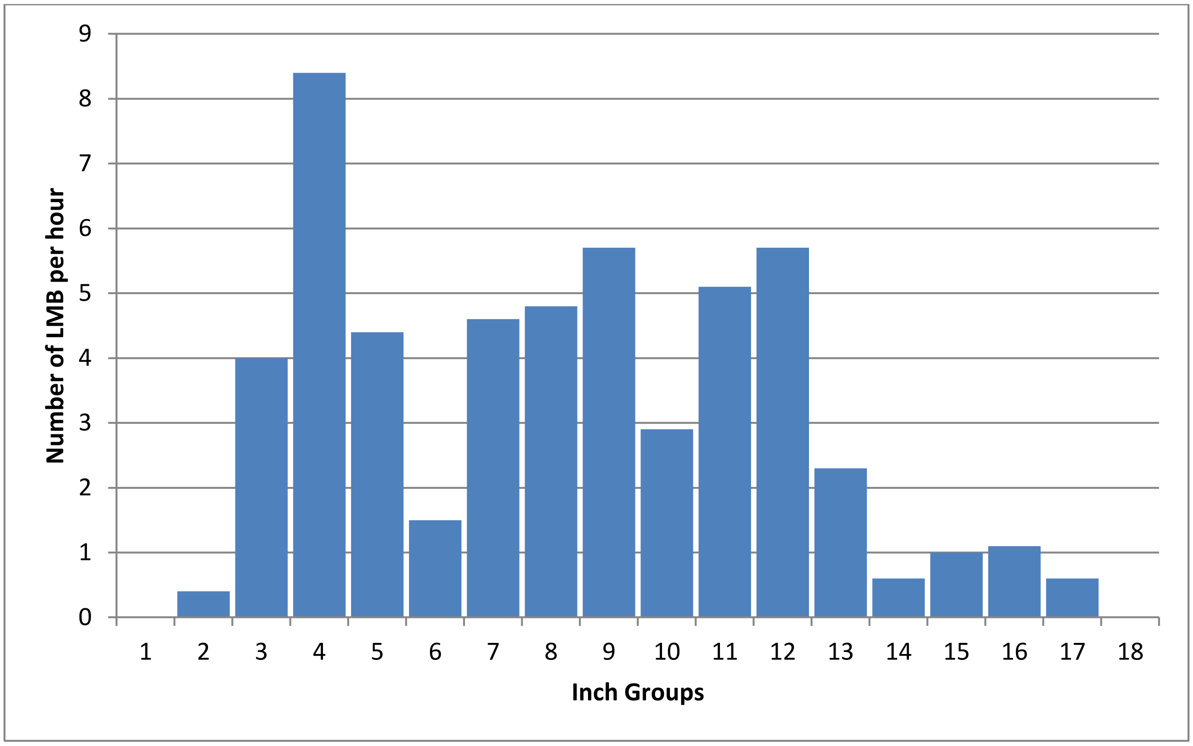

Figure 3. The size distribution (inch groups) of largemouth bass per hour of electrofishing effort for Atchafalaya Basin, LA from fall 2016 results (n=278).

Proportional stock density (PSD) and relative stock density (RSD) are indices used to numerically describe length-frequency data (Anderson and Neumann 1996). Proportional stock density compares the number of fish of quality size (> 12 inches for largemouth bass) to the number of bass of stock size (> 8 inches in length), and is calculated by the formula:

$$\text{PSD} = \frac{\text{Number of bass} \geq 12 \text{ inches}}{\text{Number of bass} \geq 8 \text{ inches}} \times 100$$

PSD is expressed as a percentage. A fish population with a high PSD consists mainly of larger individuals, whereas a population with a low PSD consists mainly of smaller fish. A value between 40 and 70 generally indicates a balanced bass population.

Relative stock density (preferred, RSD_{15}) is the percentage of largemouth bass in a stock (fish over 8 inches) that are also 15 inches TL or longer, and is calculated by the formula:

$$RSD_{15} = \frac{\text{Number of bass} \geq 15 \text{ inches}}{\text{Number of bass} \geq 8 \text{ inches}} \times 100$$

An RSD_{15} value between 10 and 40 indicates a balanced bass population, while values between 30 and 60 indicate a higher abundance of larger fish.

As seen in Figure 4, 14 years of continuous data show seven years having favorable PSD values (40 – 70) indicating a balanced population, but only five (2005, 2007, 2013, 2014, and 2015) of those years have favorable RSD_{15} values. This general absence of fish over 15 inches TL corresponds to recent size distribution data (Figure 3). The effect of environmental influences is undoubtedly a significant contributing factor to the lack of larger bass in the population. Events occurring within this time frame include three major hurricanes, two floods, and a year of very low water levels.

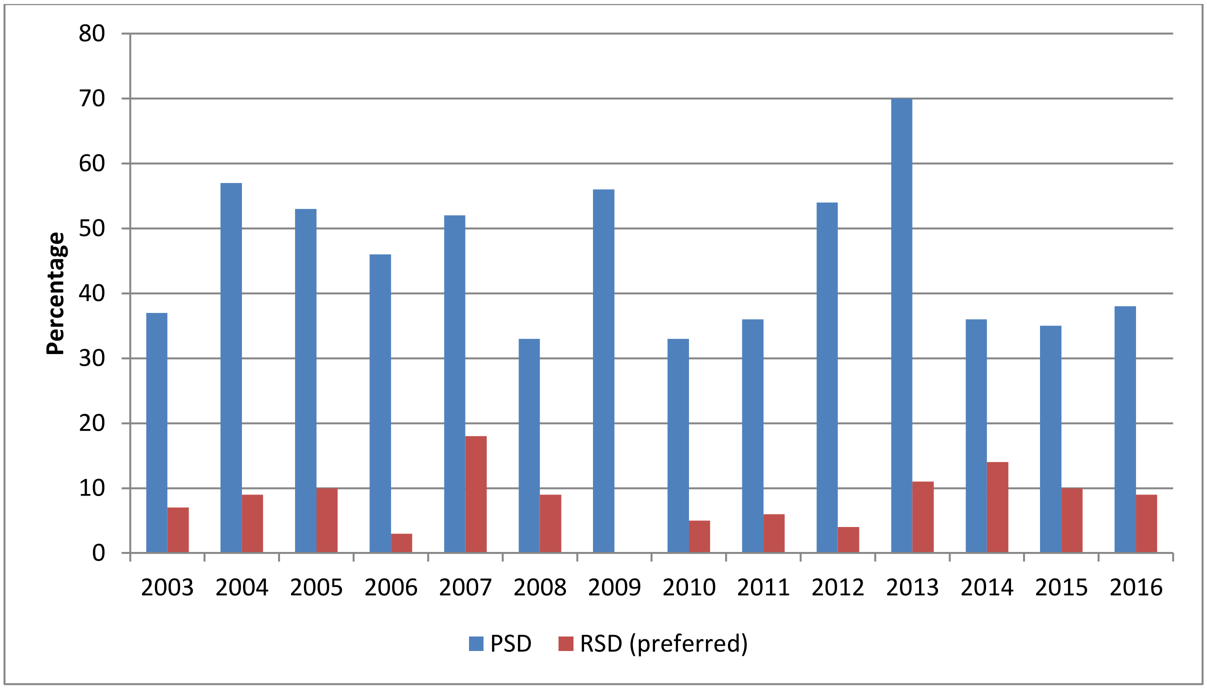

Figure 4. Proportional stock density (PSD) and relative stock density (RSD_{15}) for largemouth bass in the Atchafalaya River Basin, LA from fall electrofishing results, 2003 – 2016.

Relative weight

Mean relative weight (Wr) for each inch group is shown in Figure 5. This measurement is defined as the ratio of fish weight to the weight of a ''standard'' fish of the same length. The Wr index is calculated by dividing the weight of a fish by the standard weight for its length, and multiplying the quotient by 100. Largemouth bass relative weights below 80 may indicate a problem of insufficient or unavailable forage; whereas relative weights closer to 100 indicate that sufficient forage is available. Mean relative weights for almost all size classes of largemouth bass from the ARB are at or above the 95 value. Relative weights for 2008, and 2013-2016 were all above the 100 value. The robust body condition of ARB bass is an indication that bass forage is abundant and available.

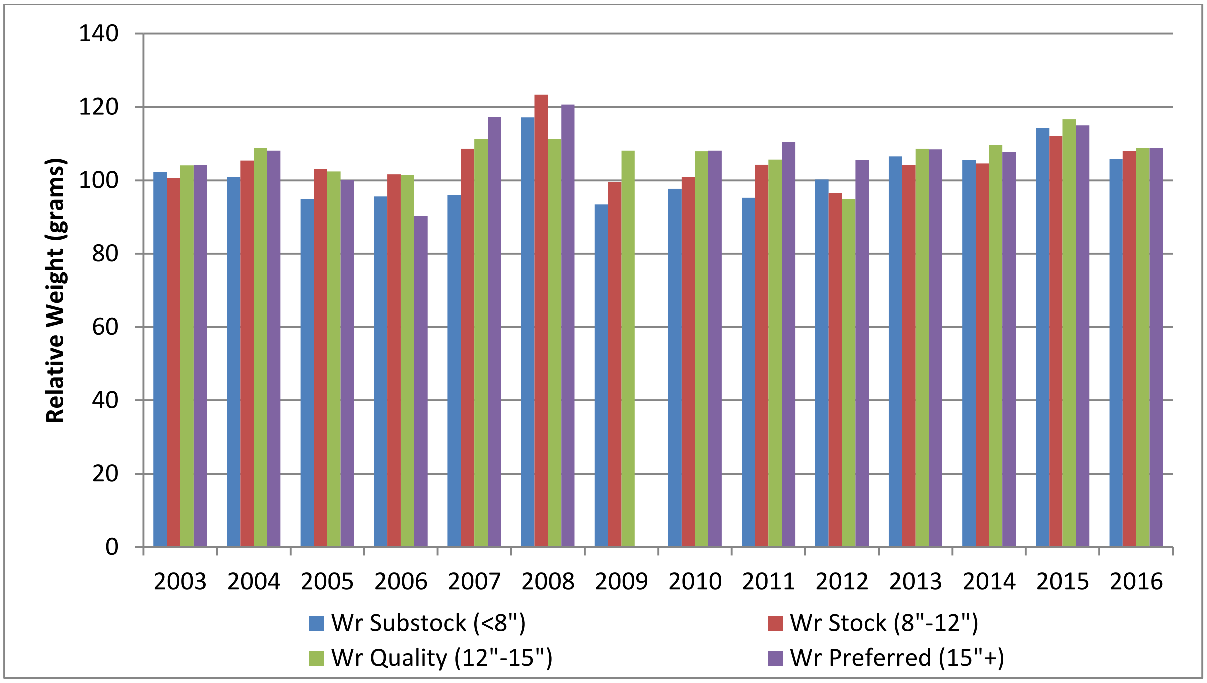

Figure 5. The mean relative weights for largemouth bass by length category from the Atchafalaya Basin, LA for fall electrofishing samples, from 2003-2016 (n=3,413).

<u>Age, growth and mortality</u>

1991 – 2008 analysis

Samples for largemouth bass age and growth analysis have been collected in conjunction with LDWF standardized sampling since 1991. Data in Figure 6 suggests a high level of variability in the average length at capture for each age class of bass in the ARB for the years 1991-2008. The average length at capture did not reach the statewide average for all waterbodies in the state. The average length of age two fish was below the former 14 inch minimum length limit and the average length of age three fish was right above the former minimum length limit. The evaluation results suggested that the minimum length limit did not alter the size structure of the ARB LMB population and increase the number of larger fish.

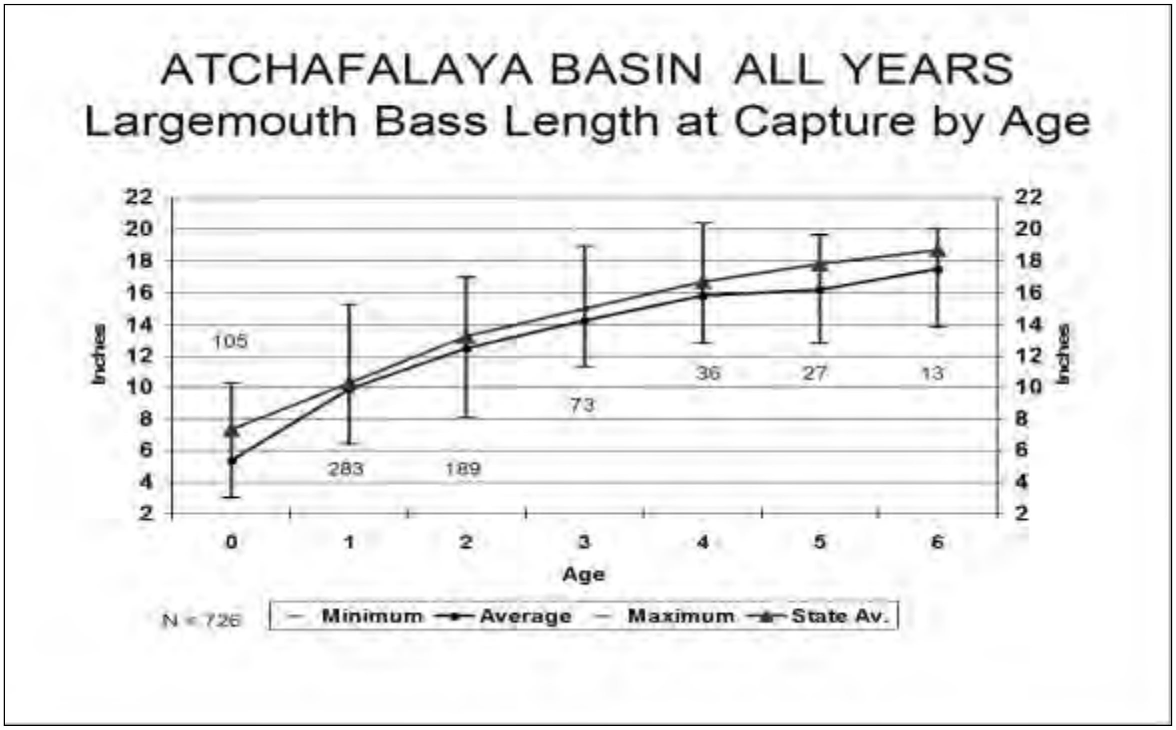

Figure 6. The minimum, maximum, and average length at capture for age of largemouth bass in the Atchafalaya Basin for 1991-2008 combined and the statewide average length at capture for age for all other waters in Louisiana.

2009 – 2011 analysis
From 2009-2011, a total of 446 LMB were sampled for age, growth, and mortality analyses. Sagittal otoliths were removed from ten bass per inch group per year for age analysis. Otolith sections were read by independent readers. Annuli counts were assigned. Biological ages were then estimated by assigning an April 1st birth date. Ages were assigned to fish collected during the 2009-2011 sampling period with age-length-keys (Ricker 1975). Ages were assigned to fish collected from earlier years (1990-2008) strictly as an inverse of the von Bertalanffy growth model. Growth was estimated by fitting the von Bertalanffy model (1938) to the 2009-2011 data. Total instantaneous mortality (Z) was calculated using the descending slope of catch curves (Ricker 1975). Only those age classes with $\geq$ 5 individuals were used in estimation of Z. Assumptions critical to accurate estimation of Z using catch curves includes constant recruitment and mortality in the population. Given the impact of Hurricane Gustav in 2008, and to reduce the impact of the constant mortality assumption, catch curves were only used to estimate Z with the 2011 sample.

Results from the 2009-2011 evaluation indicate an average of 3.4 years is required for ARB LMB to reach 14 inches TL as seen in Figure 7. The age structure of the 2011 electrofishing sample is shown in Figure 8. While bass up to 8 years old were found, only a small percentage of ARB LMB sampled were 3 years old and older. The annual mortality rate and survival rate calculated for the 2011 LMB age data is 73% (Z = -1.29) and 27%, respectively.

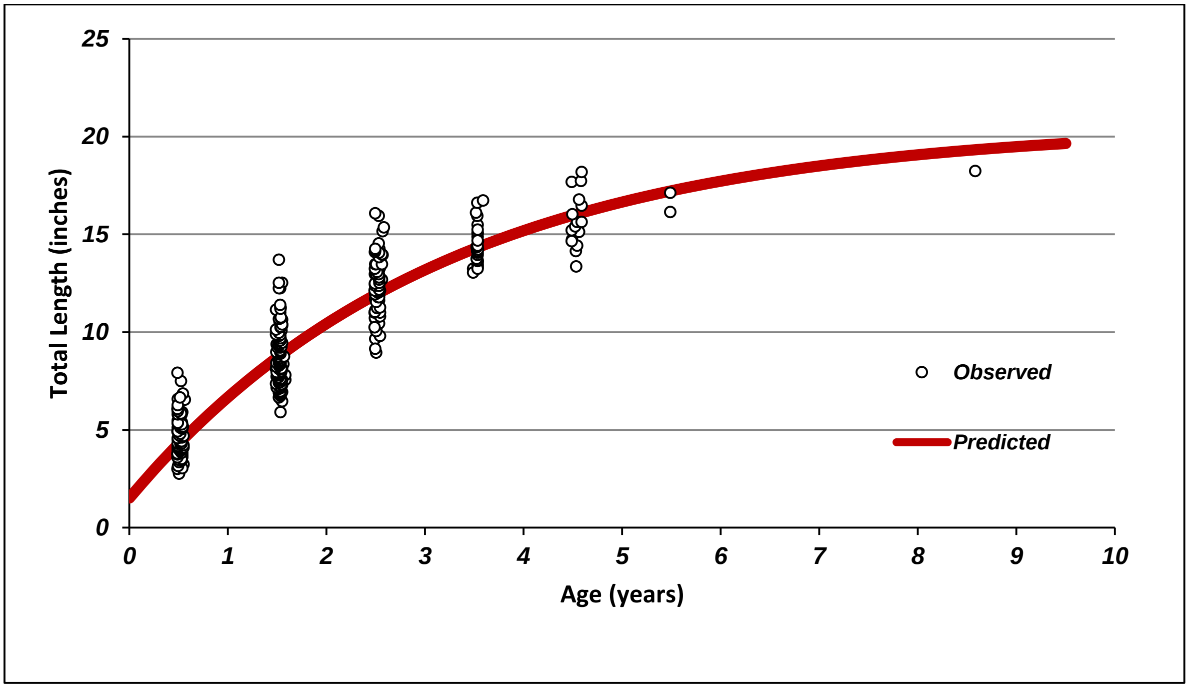

Figure 7. Observed and predicted length-at-age at capture (growth rate) of LMB from the Atchafalaya Basin, LA from 2009-2011 fall electrofishing samples (N=446).

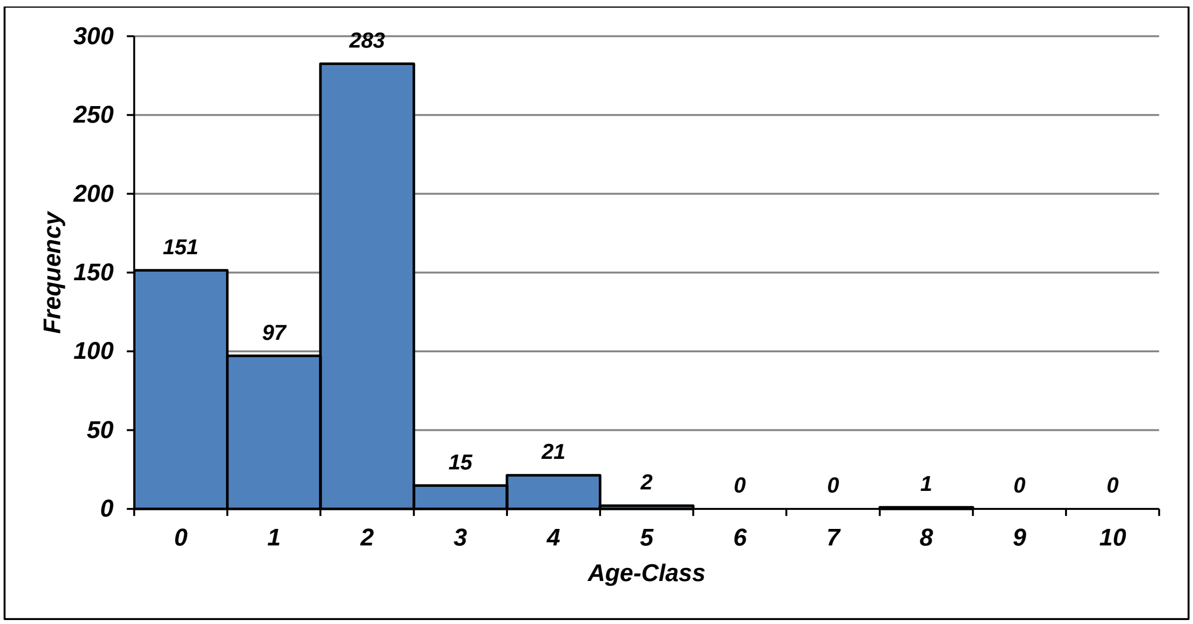

Figure 8. Age class structure of LMB collected from the Atchafalaya Basin, Louisiana for 2011 (n = 570). Few bass older than four years of age were observed in the sample.

Stocking and genetic sampling

Florida largemouth bass (*Micropterus salmoides floridanus*) were first stocked into ARB waters in 1992, following the Hurricane Andrew fish kill. These stockings were not designed to supplant the native northern largemouth bass population with Florida genetic stock. These stockings were intended as a response to facilitate the recovery of a population devastated by a massive fish kill. Subsequent to the recovery of the ARB fish population, additional stockings were conducted with the intention of increasing the opportunity for anglers to catch larger than average bass.

Over 5.6 million Florida bass (FLMB) have been stocked into the Atchafalaya River Basin since 1992 (Table 1). Almost 400,000 FLMB and 193,000 native largemouth bass were stocked post Hurricane Andrew in response to public concern over the massive fish kills that occurred following this storm. In the post storm absence of predation and competition, the FLMB should have become dominant. However, despite such an advantage, this species did not become established. Genetic testing conducted in 2011 indicated that only 9% of the Florida genome was present in the sample (n = 219; Table 2). Additionally, higher CPUE's in 2011 (Figures 1 and 2), along with the genetic results, indicate that the remaining fish population, including native largemouth bass, recovered robustly and that stocking efforts were unnecessary. The stocking of Florida largemouth bass in the adjacent Lake(s) Verret, Grassy, and Palourde system as well as Lake Fausse Point responded similarly; the ineffectiveness to establish this genotype during post hurricane recovery. This tenacity for recovery of native largemouth bass populations has also been noted in other coastal systems including the Calcasieu, Mermentau and Sabine Rivers in southwest Louisiana following Hurricanes Rita (2005) and Ike (2008). These systems received little to no stocking of largemouth bass before and after the hurricane related fish kills, yet yielded record CPUE's after two years of recovery. These observations suggest that native coastal populations of largemouth bass (and other indigenous fish species) have adapted to these periodic storm events and rapid recovery is part of the natural selection process.

Table 1.The known history of stocking events in the Atchafalaya Basin, from 1992 - 2009.

YEAR	Florida Largemouth Bass	Northern Largemouth Bass
1992	394,000 fingerlings	5,000 fingerlings
		1,271 adults
1993		185,022 fingerlings
		1,412 adults
1999	330,811 fingerlings	
2000	647,518 fingerlings	
	451,700 fry	
2001	974,775 fingerlings	
	295,200 fry	
2002	732,224 fingerlings	
	25,457 Phase II fingerlings	
2003	395,347 fingerlings	
	19,401 Phase II fingerlings	

YEAR	Florida Largemouth Bass	Northern Largemouth Bass
2004	200,251 fingerlings	
2005	27,600 fingerlings	
	12,834 Phase II fingerlings	
2006	213,733 fingerlings	
2007	314,081 fingerlings	
2008	206,069 fingerlings	
2009	401,182 fingerlings	

Electrophoretic analysis of largemouth bass liver tissues is conducted in conjunction with standardized fish sampling. These results, as seen in Table 2, show a range of 0 to 3% pure FLMB genome from the years 1994 to 2013. After the recovery stocking attempts following Hurricane Andrew, Florida largemouth bass were stocked annually from 1999 to 2009. Despite the combined stockings of millions of FLMB, genetic sampling conducted over 14 years indicates that only 12% of the Atchafalaya Basin bass population carried genetic material characteristic of Florida bass. Little, if any increase in Florida bass genetic material was detected despite continued stockings. Because of this, it was determined that stocking Florida bass for the purpose of increasing the FLMB genome was neither effective nor feasible in an area as dynamic as the Atchafalaya Basin. Such results may be disappointing in terms of providing genetic potential for larger bass size, but they are not entirely negative. As mentioned above, the failure of Florida bass establishment provides additional confirmation that the native bass population is particularly resilient, and that recruitment is strong.

Table 2. The results of genetic analysis of largemouth bass from standardized electrofishing samples in the Atchafalaya Basin, 1994 - 2013.

LARGEMOUTH BASS GENETICS					
Year	Number	Northern	Florida	Hybrid	FLMB Influence
1994	186	97%	1%	2%	3%
1995	116	98%	1%	1%	2%
1997	72	97%	0%	3%	3%
2001	154	93%	1%	6%	7%
2003	254	96%	1%	3%	4%
2004	190	91%	3%	6%	9%
2006	64	89%	2%	9%	11%
2007	163	94%	1%	5%	6%
2008	91	90%	0%	10%	10%

LARGEMOUTH BASS GENETICS					
Year	Number	Northern	Florida	Hybrid	FLMB Influence
2009	295	89%	1%	10%	11%
2010	1084	87.8%	0.2%	12%	12.2%
2011	219	91%	1%	8%	9%
2012	516	95%	0%	5%	5%
2013	450	95%	0%	5%	5%

Creel

Randomized access point surveys of anglers have been conducted by LDWF for thirteen separate creel years beginning in 1989. Much information has been collected about anglers and the results of their fishing trips into the Basin.

Another angler creel survey was recently conducted. This survey began July 1, 2013 and extended through Dec. 31, 2014. The survey method used was a random access point survey of completed fishing trips. The size distribution of angler harvested largemouth bass for the eightteen months (July 1, 2013- Dec. 31, 2014) is presented in Figure 9. The majority of fish harvested were in the 13, 14, and 12 inch groups, respectively. During this time period, it is estimated that 254,874 largemouth bass were caught. Of those, 107,869 were harvested and 147,005 were released. This estimate equates to a 58% release rate. Anglers caught an average of 3.0 bass per fishing trip for a catch rate of 0.65 largemouth bass per hour. The average weight of all bass harvested during the creel survey was 1.5 pounds per fish.

The next creel survey for the Basin is scheduled to begin in 2019.

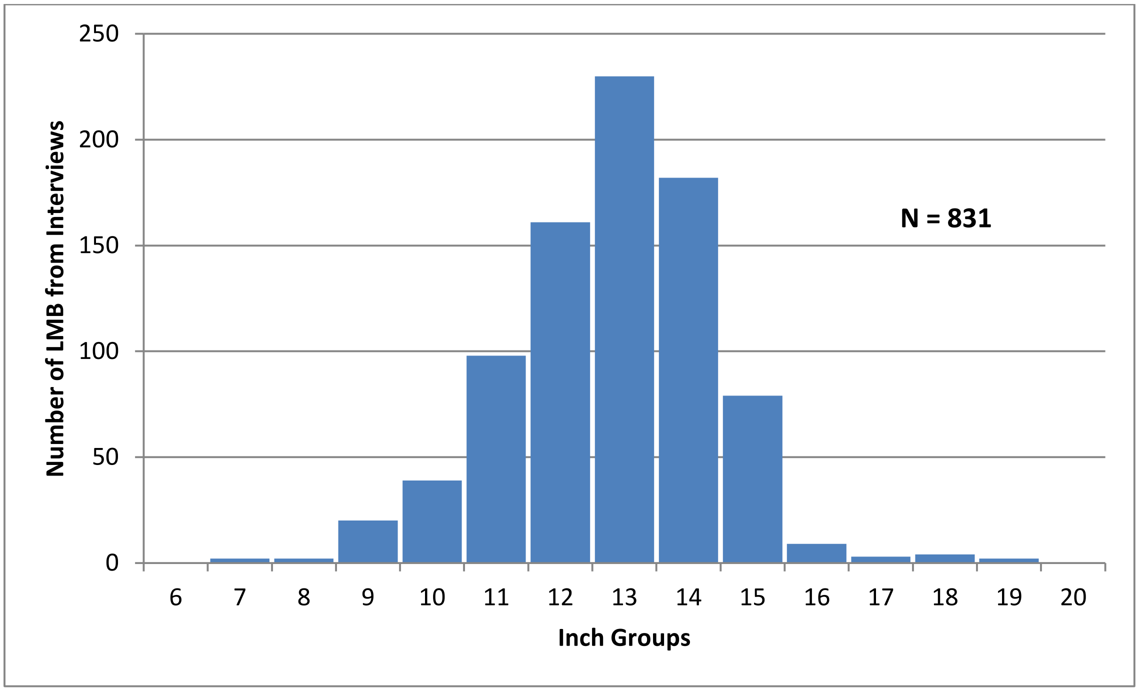

Figure 9. The size distribution (length groups) of angler harvested largemouth bass from the Atchafalaya Basin, LA for July 1, 2013 – December 31, 2014. Data collected from actual angler interviews.

Table 3. Annual averages of the number of bass anglers per fishing party, the length of each fishing trip and the number of one-way miles traveled to boat ramps for all years of creel surveys of the Atchafalaya Basin. (*- data represents 6 months)(^- data represents 18 months)

BASS ANGLERS (1989-91 - no length limit) (14 inch minimum 1993-June, 2013) (July 2013-present - length limit removed)			
Year	Mean no. of anglers in party	Mean trip length (hours)	Mean one-way distance traveled to ramp
1989	1.77	4.28	30.64
1990	1.79	5.75	52.82
1991	1.78	5.80	36.95
1993*	1.82	4.19	18.60
1994	2.00	4.66	27.09
1995	1.85	4.76	35.04
1996*	1.82	5.17	36.02
2003	1.70	5.33	36.92
2004	1.71	5.48	40.92
2008	1.62	4.66	37.24
2009	1.64	4.89	38.10
2013-2014^	1.76	4.69	40.00

Atchafalaya Basin bass anglers average 1.77 anglers per party and 4.97 hours per trip. The average one-way drive to launch their boat is approximately 35.86 miles.

Table 4. Annual data for average weight of largemouth bass harvested and largemouth bass caught, released and harvested per fishing trip by bass anglers for all years of creel surveys in the Atchafalaya Basin. (* - data represents 6 months)(^ - data represents 18 months)

BASS ANGLERS (1989-91 - no length limit) (14 inch minimum 1993-June, 2013) (July 2013-present – length limit removed)				
Year	LMB caught per trip/per hr.	LMB released per trip/per hr.	LMB harvested per trip/per hr.	LMB Av. weight
1989	1.78/0.32	0.98/0.18	0.80/0.14	1.72
1990	4.83/0.86	3.49/0.59	1.35/0.27	1.13
1991	4.93/0.88	3.54/0.65	1.39/0.23	1.15
1993*	2.35/0.48	2.15/0.44	0.20/0.04	2.09
1994	8.95/1.73	8.68/1.68	0.28/0.05	2.14
1995	6.84/1.36	6.32/1.25	0.52/0.11	1.95
1996*	5.38/0.96	4.51/0.81	0.86/0.15	1.96
2003	5.82/0.92	5.39/0.86	0.43/0.06	2.12
2004	4.95/0.86	4.57/0.79	0.38/0.07	2.18
2008	8.18/1.56	7.40/1.41	0.78/0.16	2.11
2009	3.53/0.84	2.92/0.72	0.61/0.11	2.46
2013-2014^	2.46/0.49	1.4/0.28	1.06/0.21	1.48

With the exception of hurricane affected years, bass catch rates and bass release rates were consistently higher under the 14 inch minimum length limit as seen above in Table 4. Harvested bass were also larger, by legal requirement. After extensive review, LDWF Inland Fisheries staff determined that the inherent characteristics of Atchafalaya Basin LMB (slow growth, short life span) and the frequency of environmental events are factors that cannot be mitigated by the 14" minimum length limit. The resulting conclusion was that 14" minimum length limit was not effective to produce increased abundance of larger sized bass.

Link to the report by LDWF:
http://www.wlf.louisiana.gov/sites/default/files/pdf/document/35987-atchafalaya-basin-lmb-technical-report-10-01-2012/atchafalaya_basin_lmb_technical_report_1o-01-2012.pdf

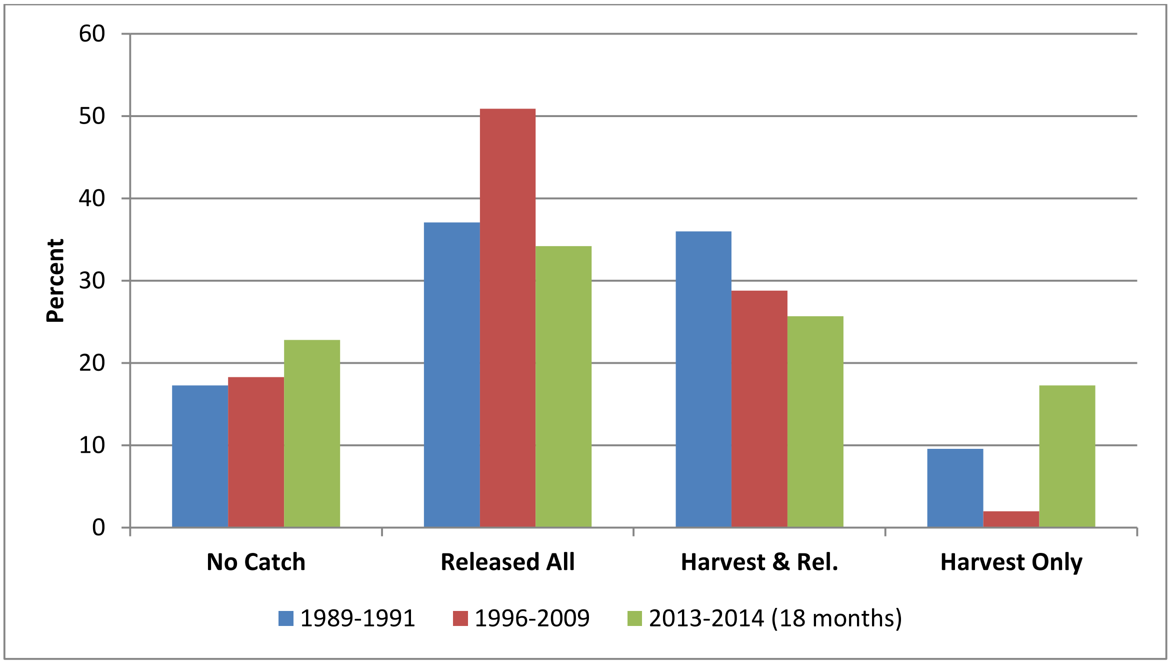

Figure 10. The comparison of bass anglers that caught nothing, released all bass, both harvested and released bass, or only harvested bass for pre-regulation and post 14 inch minimum length regulation creel survey years in the Atchafalaya Basin.

As shown in Figure 10, creel census data from 1989, 1990, and 1991, prior to the 14 inch minimum length limit regulation, shows that 17.3 % of bass anglers caught no bass. Those anglers neither harvested nor released any bass. After implementation of the regulation, for 1996, 1997, 2003, 2008 and 2009, 18.3 % of bass anglers caught no bass. Post-regulation change creel census in 2013-2014 shows 22.8% caught no bass. Prior to regulation, 37.1 % of bass anglers released all bass caught. With implementation of the regulation, an increase to 50.8 % was documented. The increase could be attributed to the regulation. After the length limit removal in 2013, angler release of all bass dropped significantly, as might be expected, to 34.2%. Prior to regulation, 36.0 % of bass anglers harvested bass and released other bass. After implementation of the regulation, 28.8 % of bass anglers harvested and released bass. These 2013-2014 numbers from post-regulation dropped to 25.7%. The regulation appears to have also been responsible for the reduction in number of anglers practicing total harvest with no release from 9.6% to 2%, and then a very sharp rise to 17.3% post-regulation.

Forage

Forage is available in the Basin in many forms. Small fish are one form. The other and most abundant is invertebrates, including crawfish and shrimp. Production of red swamp crawfish (*Procambarus clarkii)* and white river crawfish (*Procambarus zonangulus)* is directly related to river flood pulse and is to such an extent that millions of pounds may be harvested (Figure 18). Shrimp are also abundant, including river shrimp (*Machrobrachium ohione)* and grass shrimp (*Palaemonetes* spp.).

Table 5 shows that abundance of forage fish of all species, 5 inches or less, has remained consistently high in electrofishing forage samples. Rotenone samples in 1998 had results of

5,046.25 fingerlings per acre. With all of this forage observed on an annual basis, there should be no lack of food available for predacious fish.

Table 5. The catch-per–unit-of-effort (number per hour) of forage samples for all species less than or equal to 5 inches total length for the Atchafalaya Basin from 1993 - 2008.

ELECTROFISHING FORAGE SAMPLE ALL SPECIES ≤ 5 INCHES CATCH PER HOUR													
Year	1993	1994	1995	1996	1997	1998	1999	2001	2004	2005	2006	2007	2008
CPUE	424.0	80.0	144.0	448.0	884.5	808.9	568.0	1348.8	633.6	540.0	3353.6	935.3	589.3

Crappie

Creel Census

Crappie anglers in the ARB tend to fish in pairs for an average period of 5 hours after having driven approximately 35 miles to launch their boat (Table 6.).

Table 6. Annual averages of the number of crappie anglers per fishing party, the length of each fishing trip and the number of one-way miles traveled to boat ramps for all years of creel surveys of the Atchafalaya Basin.

CRAPPIE ANGLERS			
Year	Mean no. of anglers in party	Mean trip length (hours)	Mean one-way distance traveled to ramp
1989	1.96	4.40	36.49
1990	2.06	5.93	35.42
1991	1.81	6.56	37.89
1993	1.80	4.97	25.38
1994	1.95	4.50	30.19
1995	1.99	4.64	35.24
1996	1.89	5.09	34.76
2003	1.82	4.99	35.03
2004	1.90	4.67	45.12
2008	1.59	4.46	38.63
2009	1.61	4.48	32.00

Crappie harvested from the ARB have consistently averaged approximately one half pound per fish over the years. The best year for crappie fishing was in 1991, when the average harvest was 15 per trip. Some of the lowest averages for harvest of fish per trip occurred in the wake of hurricanes in 1992, 2005, and 2008 (Table 7). Harvest numbers for 2009 came back up significantly at 7 fish caught per trip. This number was the 3rd highest catch rate during all years of creel.

Table 7. Annual average weight of crappie harvested and crappie caught per fishing trip by crappie anglers for all years of creel surveys in the Atchafalaya Basin.

CRAPPIE ANGLERS		
Year	**Crappie caught per trip/per hour**	**Av. Weight (lbs.)**
1989	5.17/1.04	0.52
1990	4.24/0.72	0.36

CRAPPIE ANGLERS		
Year	**Crappie caught per trip/per hour**	**Av. Weight (lbs.)**
1991	15.24/2.29	0.44
1993	2.97/0.59	0.54
1994	2.10/0.42	0.65
1995	4.02/0.77	0.46
1996	5.11/0.86	0.51
2003	7.41/1.37	0.54
2004	4.51/0.84	0.45
2008	1.48/0.26	0.69
2009	7.00/1.41	0.61

In all creel surveys conducted, crappie anglers in the ARB on average harvested more 8 inch crappie than all other size classes as shown in Table 8.

Table 8. The length frequency of crappie harvested by crappie anglers for all years of creel surveys in the Atchafalaya Basin.

Percent of Crappie Harvest by Inch Group by Crappie Anglers									
Year	**6”**	**7”**	**8”**	**9”**	**10”**	**11”**	**12”**	**13”**	**14”**
1993	0.8	13.9	27.8	18.7	19.5	12.7	5.8	0.5	0.3
1994	5.5	13.7	19.9	19.1	15.4	15.5	7.8	2.5	0.4
1995	1.3	17.1	37.4	25.6	9.4	4.2	3.8	0.8	0.2
1996	1.5	16.5	30.0	27.4	14.6	6.2	2.7	0.6	0.2
2003	1.9	20.0	23.8	19.1	12.7	12.5	7.0	2.3	0.5
2004	0.4	15.9	43.5	22.2	10.6	3.8	2.4	0.9	0.2
2008	3.3	14.4	23.7	24.9	14.1	10.1	7.1	2.3	0.3
2009	0.0	3.42	26.65	35.99	19.59	8.43	5.47	0.46	0.0
Average	1.8	14.4	29.1	24.1	14.5	9.2	5.3	1.3	0.3

Relative abundance and size distribution

Black crappie is the prominent species of crappie collected by electrofishing in the ARB. The results of electrofishing are extremely variable for all years, but the effects of hurricane-related fish kills are clearly evident. Figure 11 shows the total CPUE of black crappie over the last 14 years sampled in the ARB. Electrofishing results show that 2011 was an exceptional year for black crappie in the ARB. The mean catch rate of 104 crappies per hour is the highest rate ever recorded since electrofishing efforts began.

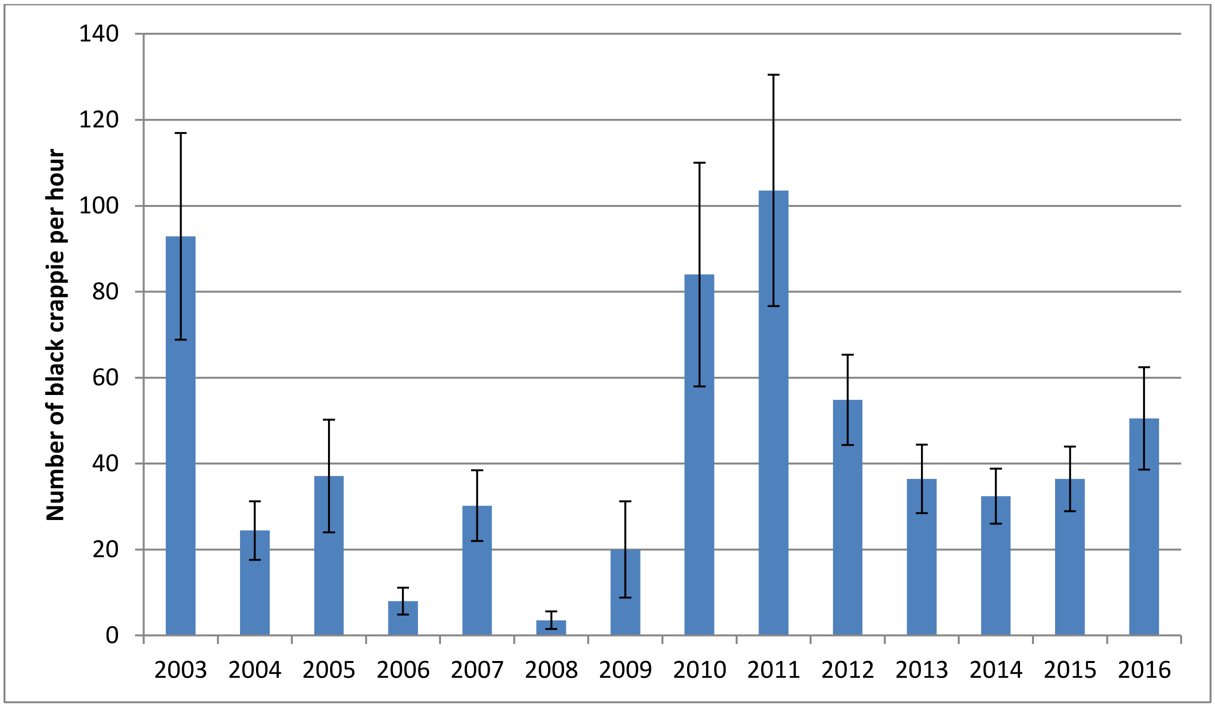

Figure 11. The mean total CPUE (+ SE) for black crappie from the Atchafalaya Basin, LA from fall electrofishing results for 2003-2016.

Black crappie catch indices show consistently lower catch rates from 2004-2009 with an increased number of stock-size crappie (5-8 inch) collected in 2010 (Figure 12). The population appeared slow to recover after the 2008 hurricane season, but a strong year class from 2010 can be followed into 2011 for one of the highest quality (8-10 inch) year classes collected.

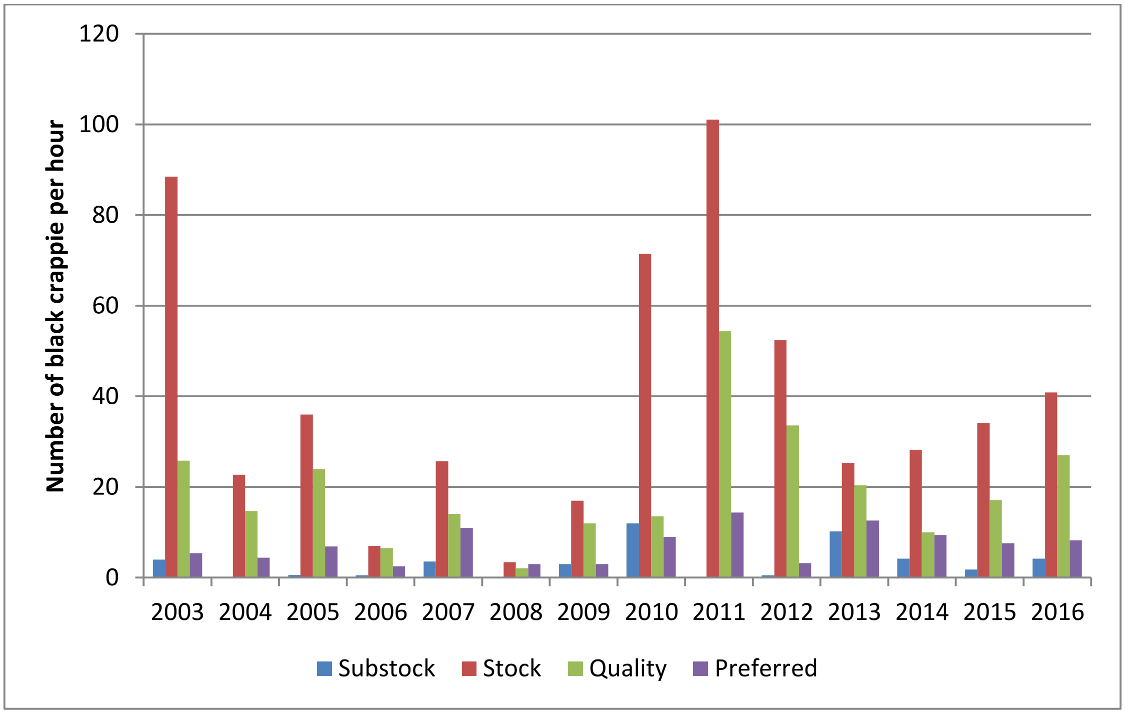

Figure 12. The CPUE for sub-stock-, stock-, quality- and preferred-size black crappie from the Atchafalaya Basin, LA for fall electrofishing results 2003-2016.

Size distribution for black crappie in 2016 is shown in Figure 13. The majority of fish collected were from the quality (8-9 inches) range, at 19.8 fish per hour, or 43% of all crappie sampled. The stock (5-7 inch) and the preferred-size (10-12 inch) range were collected at 15.9 (35%) and 6.3 (14%) fish per hour, respectively.

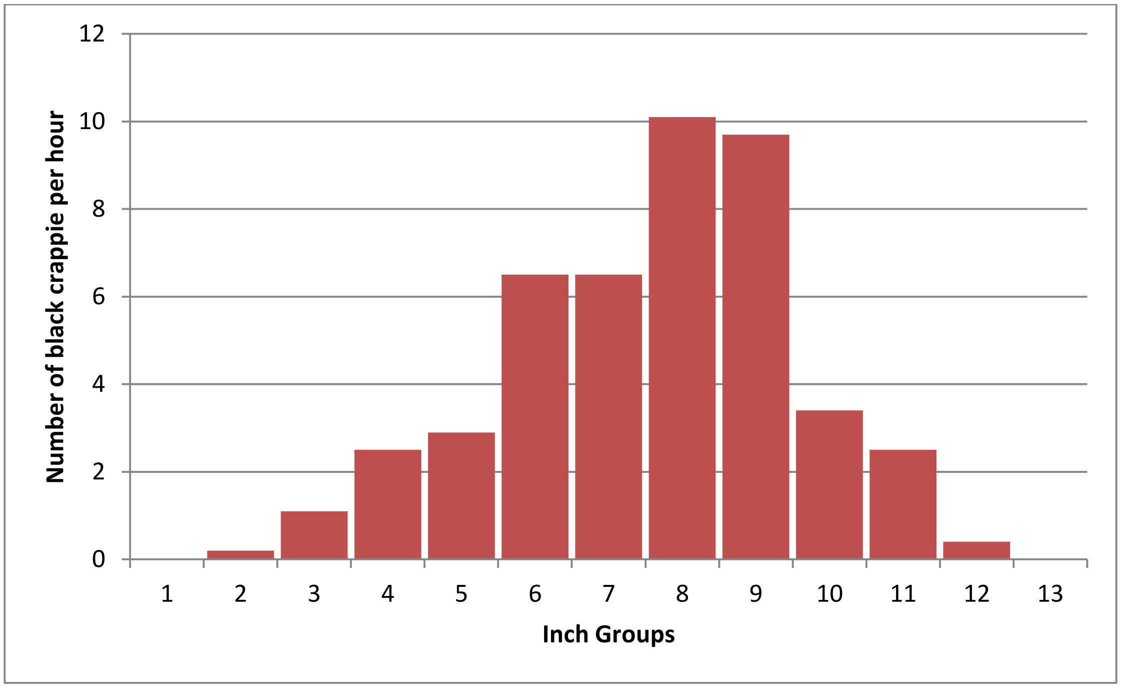

Figure 13. Size distribution for black crappie in the Atchafalaya Basin, LA for fall 2016 (n=240).

<u>Age and growth for Crappie</u>

Figure 14 shows age and growth data for crappie that were collected during fall standardized electrofishing efforts in the ARB for the years 1990-2008. Since black crappie is the predominant species of crappie sampled in the ARB, age and growth is presented for this species alone. These data illustrate why 8 to 9 inch crappie are the most commonly harvested size from the ARB (Table 8). Most 8 and 9 inch crappie are between 2 and 3 years of age, with a portion of age 1 fish also reaching those lengths.

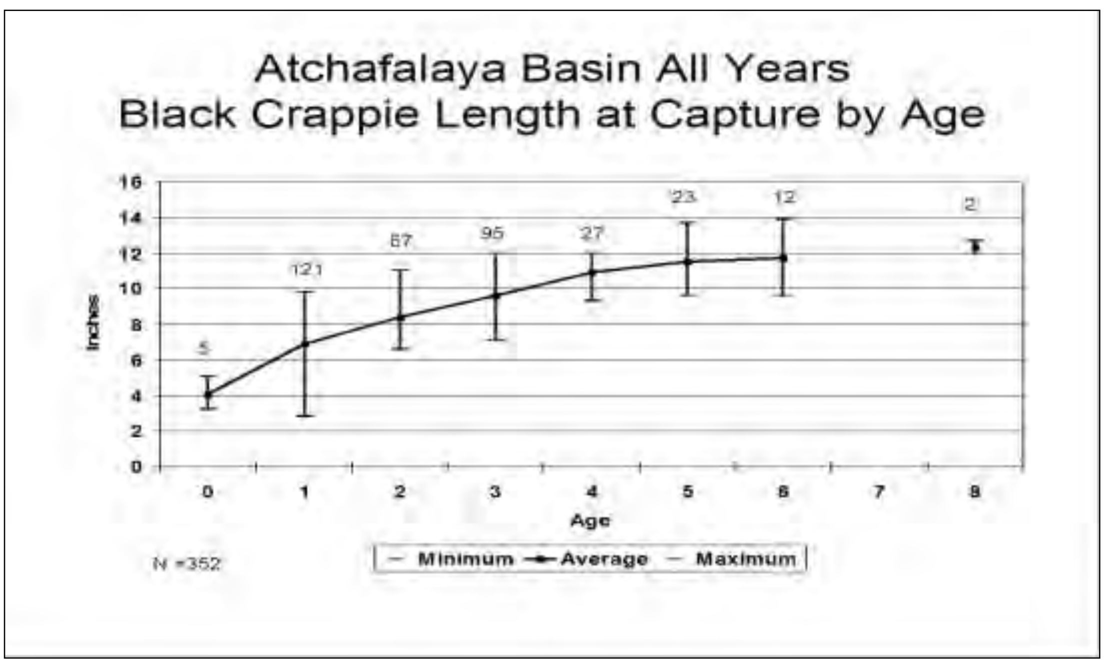

Figure 14. The average, minimum and maximum total length at capture for age of crappie combined for all years (1990-2008) of standardized fall electrofishing samples in the Atchafalaya Basin.

Based on the historical data, it is apparent that ARB anglers prefer quantity over quality with regard to crappie harvest. Management efforts, including current harvest regulations (no minimum length limit - 50 fish daily limit) routinely provide for that angler preference. Though legal, few anglers manage to harvest the daily 50 fish limit. The flood-drought cycle of the ARB is likely the largest factor of influence for crappie production.

Commercial

Commercial anglers are consistently encountered during creel surveys in the ARB as can be seen in Table 9. Hoop net anglers, gill net anglers, and trotline anglers are the predominant angler types. Commercial crab fishers are encountered in late spring to early winter as they utilize a fishery that exists only during low-water periods. Commercial bowfin anglers harvest for the egg/caviar industry in December, January, and February during the peak bowfin spawn.

Table 9. The estimated number of trips by type of activity from creel surveys conducted in the Atchafalaya Basin from July, 1993 to December, 1996.

User trip estimates from creel surveys.	**1993 6 Months (Jul – Dec)**	**1994 12 Months**	**1995 12 Months**	**1996 6 Months (Jan – Jun)**
Commercial Fishermen	16,873	33,119	40,251	15,653
Commercial Crawfishermen	46,259	137,538	99,700	59,438
Commercial Crabbers		4,642	10,864	1,190
Estimate of All User Groups	189,882	517,457	550,628	203,987
NOTE – VALUES ABOVE ARE DAILY TRIPS				

One fishery that is not as well known is that of river shrimp (*Machrobrachium ohione*) harvested from traps fished in the main river channel. Catfish anglers also use bush lines to capture this popular trotline bait. Hanging a wax-myrtle bush at the water's edge on the main channel provides a place of refuge for river shrimp. The anglers return in the morning and "shake" the bush into a dip net to capture the resting river shrimp.

There are commercial catfish processors in operation around the ARB. They have been in business since at least 1988. Though it is difficult to isolate reported landings for the ARB, it is possible to look at reports by parishes surrounding the ARB to make an estimation of commercial catfish production.

LDWF standardized gill net sampling in the ARB produces consistent catch rates of catfish (Figure 15) and smallmouth buffalo (Figure 16). Smallmouth buffalo catch rates during the 2013-2014 season sharply increased to more than double the pounds per night than any other year over the past decade. Catch rates stayed higher than average the following year as well.

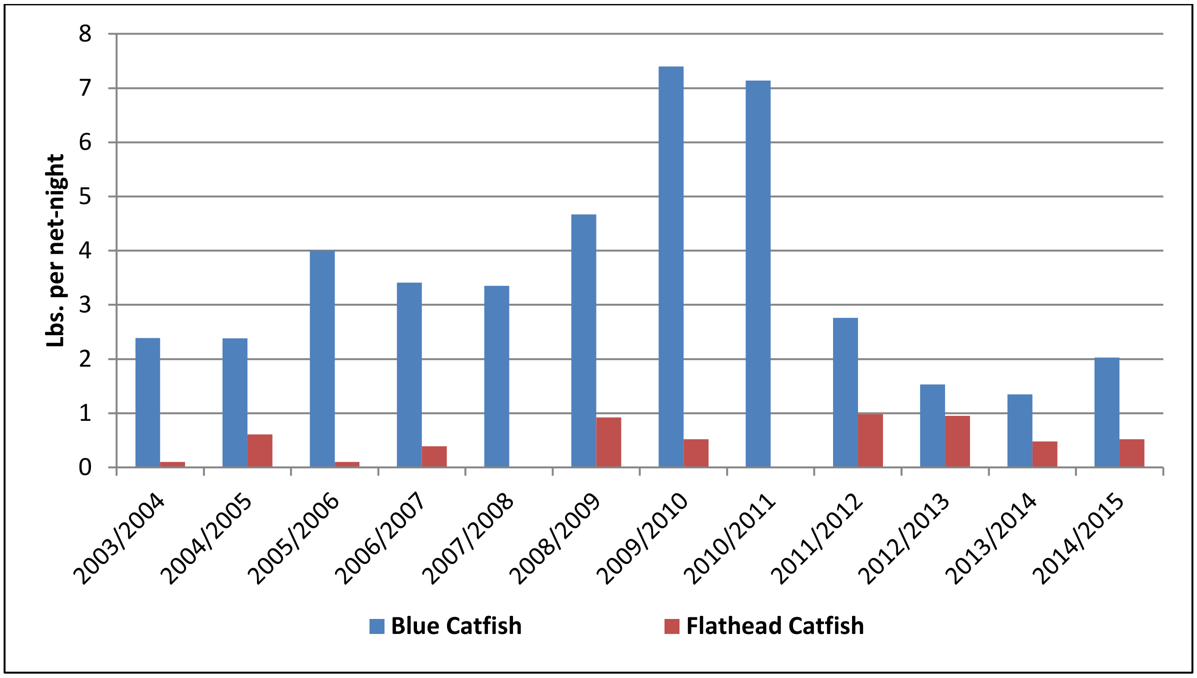

Figure 15. The catch-per-unit-effort (pounds per 100 feet of webbing per net night) of flathead catfish and blue catfish for all gillnet mesh sizes (2.5, 3.0, 3.5, and 4.0 inch bar) combined for each year (2003-2015) of standardized sampling.

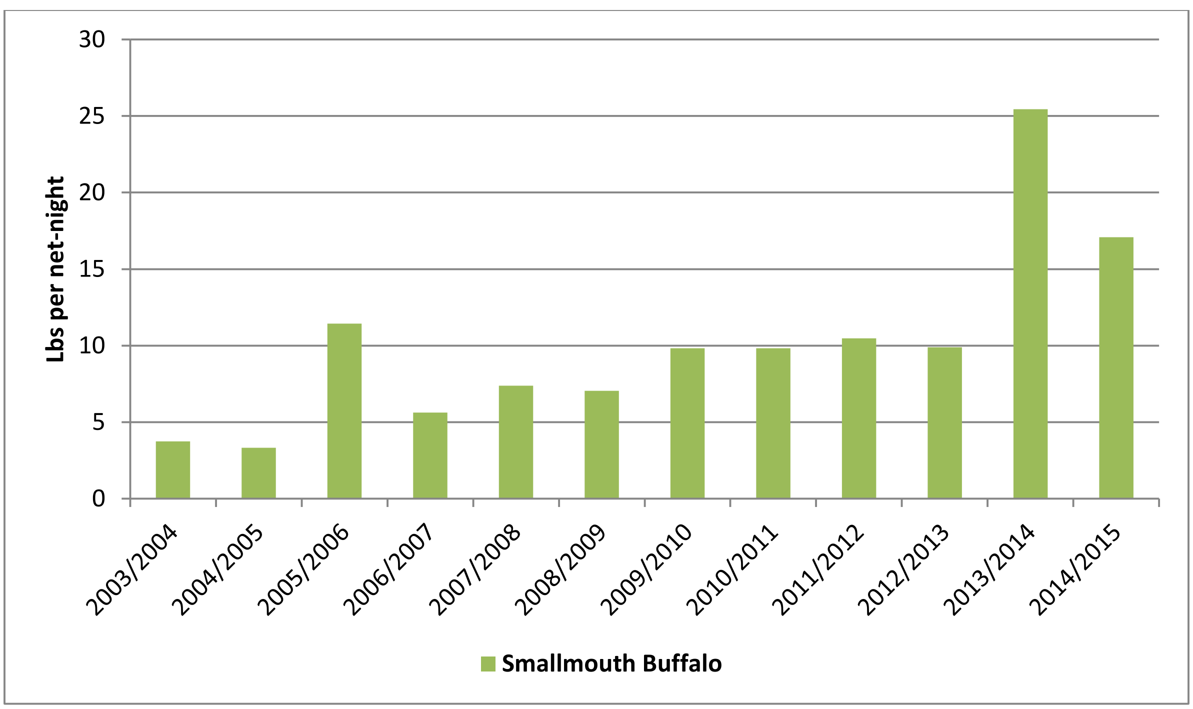

Figure 16. The CPUE (pounds per 100 feet of webbing per net night) of smallmouth buffalo for all gillnet mesh sizes (2.5, 3.0, 3.5, and 4.0 inch bar) combined for each year (2003-2015) of standardized sampling.

Non-confidential reports of landings from LDWF commercial trip ticket data are available to show the approximate pounds of the commercial harvest from the ARB (Tables 10 – 15). These data are not completely specific to waters only inside the levees but are representative of the area. It is assumed that the ARB, due to the expanse of the area, is a major contributor to these numbers.

LDWF Trip Ticket Data for Commercial Landings
Species total pounds reported and value by year

Table 10. The annual landings and the value of landings of bowfin, buffalo, bullhead catfish, and common carp in the Atchafalaya Basin for the years 2000 to 2016.

Species	Bowfin		Buffalo		Bullheads		Common carp	
Year	Lbs.	Value	Lbs.	Value	Lbs.	Value	Lbs.	Value
2000	34,978	$21,244	72,392	$9,830	-	-	2,367	$209
2001	12,580	$10,898	449,680	$47,874	0	0	18,281	$1,531
2002	53,976	$43,086	107,655	$12,092	-	-	3,802	$362
2003	81,746	$52,769	280,594	$33,968	-	-	22,111	$2,190
2004	54,047	$37,788	345,560	$43,313	1,394	$218	23,321	$2,638
2005	141,548	$136,031	513,361	$61,927	27,681	$2,804	23,355	$2,878
2006	85,698	$92,803	466,489	$59,727	-	-	5,924	$574
2007	45,312	$51,825	621,541	$977,260	-	-	-	-
2008	219,899	$247,480	382,032	$49,761	-	-	1,262	$1,175
2009	63,265	$37,285	374,182	$48,154	0	0	0	0
2010	146,937	$77,596	418,647	$58,057	0	0	-	-
2011	262,474	$144,607	422,462	$58,447	-	-	-	-
2012	102,237	$72,754	302,330	$41,305	-	-	-	-
2013	413,837	$280,561	315,731	$44,510	-	-	36,369	$5,751
2014	412,588	$307,462	310,876	$95,470	-	-	-	-
2015	294,751	$235,333	752,922	$120,758	-	-	-	-
2016	194,075	$255,273	558,937	$83,571	23,593	$3,400	11,579	$1,886
"-" = Confidential non-reportable, "0" = No landings								

Table 11. The annual landings and the value of landings of blue catfish, channel catfish, and flathead catfish in the Atchafalaya Basin for the years 2000 to 2016.

Species	Blue catfish		Channel catfish		Flathead catfish	
Year	Lbs.	Value	Lbs.	Value	Lbs.	Value
2000	311,793	$148,035	213,803	$97,790	35,957	$16,620
2001	205,250	$87,408	137,998	$57,721	37,795	$16,137
2002	316,656	$142,165	242,388	$105,507	34,296	$13,931
2003	205,947	$92,890	91,735	$41,260	26,626	$13,102
2004	195,867	$88,582	482,255	$196,604	41,925	$19,979
2005	150,232	$68,980	256,206	$104,041	41,016	$20,090
2006	152,101	$70,833	213,581	$95,417	42,198	$20,295
2007	235,912	$101,347	91,095	$38,054	59,546	$27,663
2008	120,494	$57,282	42,975	$20,232	31,312	$16,991
2009	95,213	$49,024	63,241	$31,479	29,015	$15,451

2010	163,379	$73,177	43,113	$18,859	30,520	$14,807
2011	245,552	$114,954	115,776	$58,104	29,001	$14,271
2012	192,163	$89,763	153,178	$76,874	15,726	$8,085
2013	192,028	$81,262	140,877	$69,006	22,074	$15,361
2014	252,941	$122,000	74,899	$34,465	27,387	$15,448
2015	236,712	$116,937	112,128	$56,305	31,625	$16,648
2016	137,347	$68,109	114,146	$55, 514	21,708	$11,091
"-" = Confidential non-reportable, "0" = No landings						

Table 12. Annual landings and the value of landings of garfish in the Atchafalaya Basin for the years 2000 to 2016.

	Unclassified gar		Longnose gar		Shortnose gar		Alligator gar	
Year	Lbs.	Value	Lbs.	Value	Lbs.	Value	Lbs.	Value
2000	439	$476	5,326	$5,173	-	-	310	$301
2001	0	0	2,152	$2,087	0	0	-	-
2002	-	-	-	-	0	0	3,287	$1,936
2003	0	0	-	-	0	0	3,194	$2,585
2004	-	-	1,548	$696	0	0	9,904	$8,297
2005	-	-	945	$809	0	0	9,483	$7,671
2006	-	-	-	-	0	0	35,730	$40,540
2007	0	0	947	$704	0	0	7,201	$5,524
2008	-	-	176	$64	0	0	-	-
2009	0	0	0	0	0	0	5,181	$2,219
2010	-	-	-	-	-	-	-	-
2011	-	-	-	-	0	0	13,381	$7,160
2012	0	0	0	0	0	0	-	-
2013	-	-	0	0	0	0	2,757	$1,677
2014	0	0	-	-	0	0	12,732	$8,968
2015	0	0	-	-	0	0	17,740	$9,081
2016	0	0	0	0	0	0	5,028	$3,022
"-" = Confidential non-reportable, "0" = No landings								

Table 13. The annual landings and the value of landings of shad and freshwater drum in the Atchafalaya Basin for the years 2000 to 2016.

Species	Gizzard shad		Unclassified shad		Freshwater drum	
Year	Lbs.	Value	Lbs.	Value	Lbs.	Value
2000	-	-	125,041	$14,385	13,555	$2,185
2001	27,470	$3,220	726,882	$74,083	21,244	$3,172
2002	14,255	$1,712	174,193	$23,610	7,961	$1,210
2003	205,464	$28,991	142,606	$20,762	8,908	$1,331
2004	160,018	$22,212	130,824	$18,157	26,404	$5,640
2005	200,703	$31,443	220,365	$34,870	17,383	$4,221
2006	27,939	$3,338	156,276	$24,716	23,563	$5,010

2007	125,227	$20,779	224,989	$36,303	19,923	$5,020
2008	185,723	$34,946	345,123	$63,555	19,060	$4,359
2009	-	-	52,874	$19,041	15,748	$3,643
2010	-	-	15,947	$3,141	13,487	$3,265
2011	45,378	$9,038	213,888	$58,227	8,267	$1,981
2012	37,409	$7,457	101,269	$28,387	5,654	$1,510
2013	59,886	$12,463	233,692	$68,234	8,084	$2,109
2014	102,177	$24,680	434,383	$95,795	14,172	$3,778
2015	-	-	240,624	$55,188	12,075	$4,700
2016	133,440	$39,741	177,002	$62,378	11,701	$3,781
"-" = Confidential non-reportable, "0" = No landings						

Table 14. The annual landings and the value of landings of grass, silver, and bighead carp in the Atchafalaya Basin for the years 2000 to 2016.

Species	Grass carp		Silver carp		Bighead carp	
Year	Lbs.	Value	Lbs.	Value	Lbs.	Value
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
2002	-	-	0	0	0	0
2003	-	-	0	0	0	0
2004	-	-	-	-	0	0
2005	-	-	0	0	0	0
2006	-	-	0	0	-	-
2007	0	0	0	0	0	0
2008	-	-	0	0	-	-
2009	0	0	0	0	0	0
2010	-	-	-	-	-	-
2011	-	-	-	-	-	-
2012	-	-	-	-	0	0
2013	-	-	-	-	-	-
2014	-	-	-	-	-	-
2015	-	-	-	-	-	-
2016	-	-	27,399	$4,424	-	-
"-" = Confidential non-reportable, "0" = No landings						

Table 15. The annual landings and the value of landings of blue crab and wild crawfish in the Atchafalaya Basin for the years 2000 to 2016.

Species	Blue crab		Wild crawfish	
Year	Lbs.	Value	Lbs.	Value
2000	256,186	$139,685	365,391	$639,649
2001	189,177	$121,369	8,899,014	$7,277,948
2002	157,275	$74,844	11,883,865	$6,244,166
2003	74,392	$57,982	6,412,974	$3,777,043
2004	42,704	$179,001	6,793,955	$3,869,911
2005	143,702	$72,688	13,418,851	$7,380,863
2006	86,496	$56,392	1,326,275	$1,173,635
2007	42,431	$35,707	12,792,134	$7,248,526
2008	90,615	$82,955	11,677,381	$7,023,178
2009	84,174	$66,141	14,256,965	$11,638,450
2010	37,706	$33,007	11,100,487	$10,426,904
2011	10,297	$11,641	5,147,817	$5,682,147
2012	65,097	$80,912	5,252,706	$6,413,278
2013	112,021	$151,793	14,160,997	$11,969,975
2014	14,369	$35,446	9,865,327	$12,297,512
2015	13,327	$29,968	3,105,150	$3,935,241
2016	24,057	$50,970	7,924,956	$7,054,830
"-" = Confidential non-reportable, "0" = No landings				

Table 15 shows the reported harvest of crawfish from the ARB. Crawfishermen fish with baited wire traps in the overflow swamp in response to the flood cycle of the river. Figures 17 and 18 below show the relationship between crawfishermen contacts at creel surveys and the monthly average river stage at the Butte la Rose gauge. For creel years 1993 to 1996, interviews were conducted at 3 different ramps per creel day. The number of crawfishermen was adjusted to the number of contacts per ramp per day to compare numbers with later creel years, 2003, 2004, 2008, and 2009, where only one ramp was surveyed per day.

The flood stage has a two-fold effect on the crawfishing industry. The flooded burrows of the previous year's population of crawfish trigger the release of the offspring that were carried into the burrows as eggs. The amount of inundated area related to the intensity and duration of the flood stage increases the amount and longevity of access to the new crop by the fishermen.

Some crawfishermen are reported to fish as many as 400 traps. Typically, about 100 are checked per day on a rotating basis. Historically, crawfishermen had unrestricted access to flooded lands in the ARB. Many fishermen were, and still are fishing over flooded private property. This issue is becoming increasingly controversial. Some landowners have begun leasing fishing rights to specific fishermen. The United States 5th Circuit Court of Appeals ruled that there are no states or federal rights to fish on private property when it is flooded by a navigable waterway (Appendix II (Parm vs. Shumate)). The ruling may have an effect on the ARB crawfishing industry in the future. Others argue that State vs. Placid Oil Company, 1973, implied that state waters extended to the high water mark and that fishing is allowed in all waters below the high water mark. Time will tell how the issue of access to waters covering private property will be resolved.

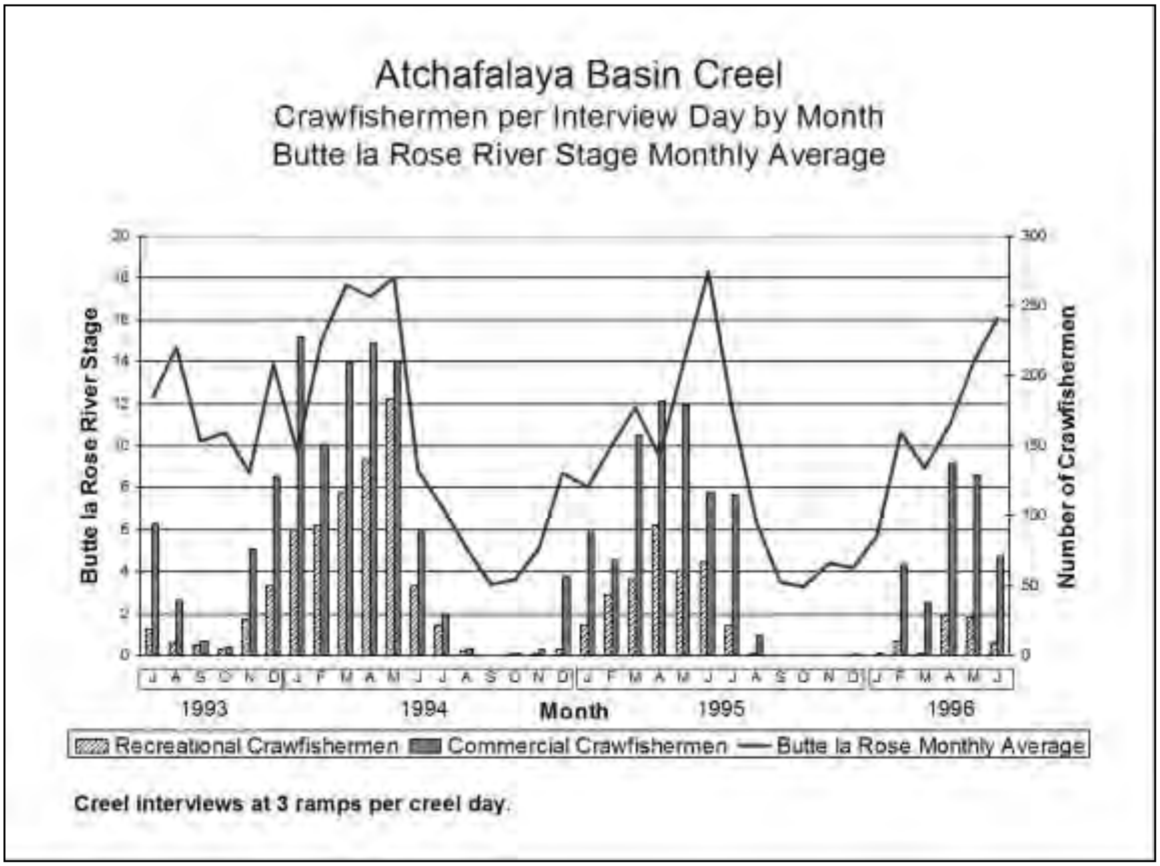

Figure 17. A comparison of the number of crawfishermen interviewed per day by month compared to the monthly average river stage at the Butte la Rose gauge on the Atchafalaya River from July, 1993 to December, 1996.

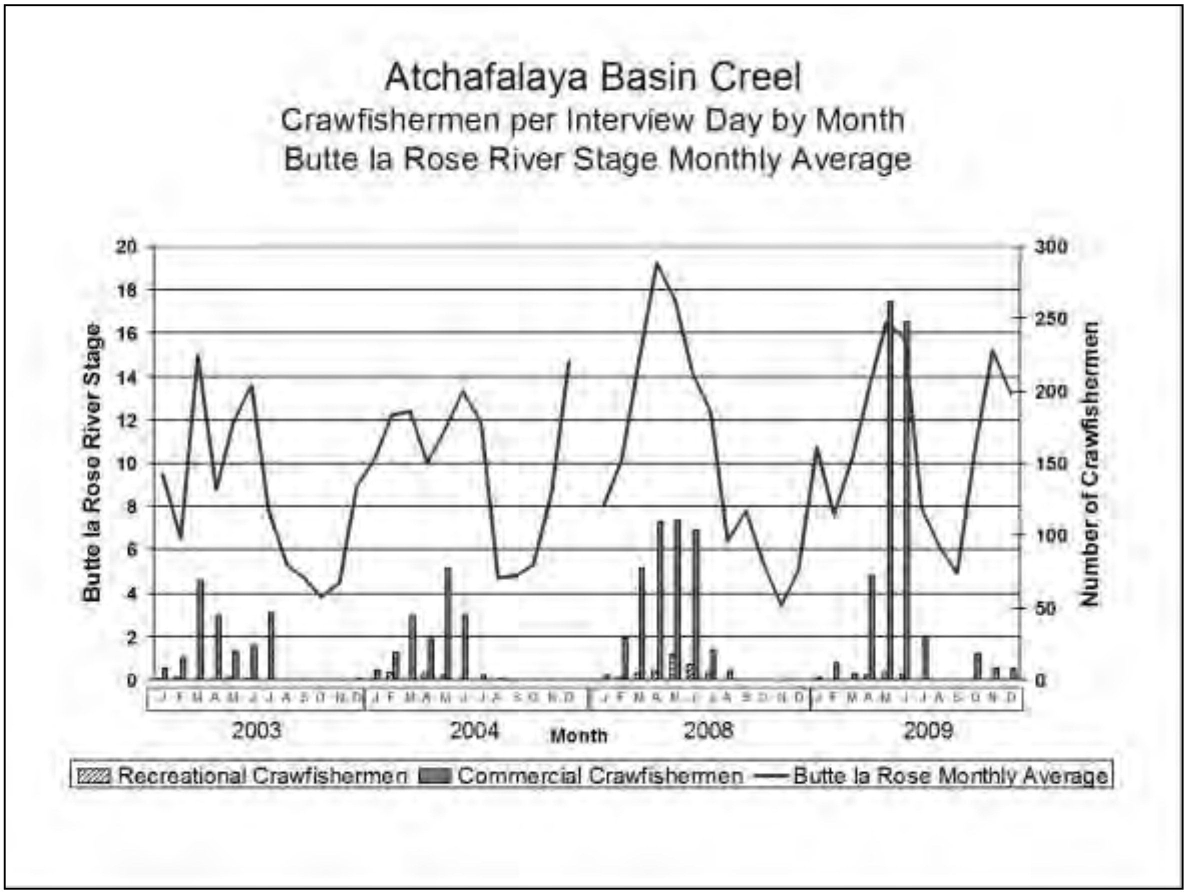

Figure 18. A comparison of the number of crawfishermen interviewed per day by month compared to the monthly average river stage at the Butte la Rose gauge on the Atchafalaya River from January, 2003 to December, 2009.

Figure 19 shows the number of crawfish sacks harvested per trip by month compared to the Butte la Rose daily river stage. It is apparent that a river rise increases the harvest of crawfish in the Basin.

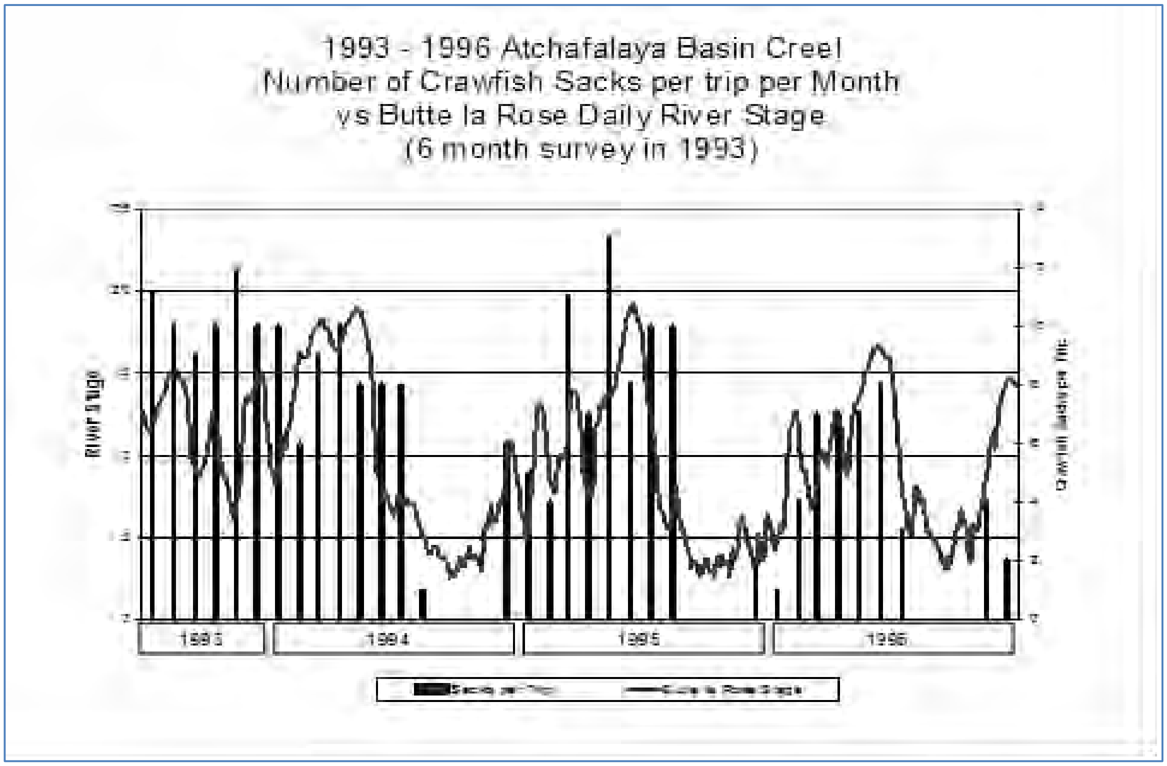

Figure 19. A comparison of the number of sacks of crawfish harvested by month compared to the monthly average river stage at the Butte la Rose gauge on the Atchafalaya River from July, 1993 to December, 1996.

<u>Species of Special Concern</u>

The pallid sturgeon (*Scaphirhynchus albus*) is a species that has been captured at the Old River Control structure near Simmesport, LA. Although none have been captured in LDWF standardized sampling in the lower Basin, they have been documented to be caught on rod and reel in the lower Atchafalaya River as well. The determination of endangered status for the pallid sturgeon was enacted in 1990. More information about this listed species can be found on the USFWS website at the following link.
https://ecos.fws.gov/ecp0/profile/speciesProfile?sId=7162

Effective October 1, 2010 the shovelnose sturgeon (*Scaphirhynchus platorynchus*) became listed as a threatened species due to similarity in appearance to the pallid sturgeon. Information from the Federal Register announcing the proposal and eventual listing can be found at the following USFWS link.

https://ecos.fws.gov/ecp0/profile/speciesProfile?sId=9035

Paddlefish (*Polyodon spathula*) are routinely captured in standardized gill net sampling in the Atchafalaya Basin. They are listed as Louisiana state status S3, or rare and local throughout the state or found locally (even abundantly at some of its locations) in a restricted region of the state, or because of other factors making it vulnerable to extirpation (21 to 100 known extant populations). More information can be found on this status at the following link.

http://www.wlf.louisiana.gov/sites/default/files/pdf/fact_sheet_animal/32190-Polyodon

HABITAT EVALUATION

Habitat is the principal factor of influence to all fish populations. Projects designed for flood control and navigation have altered the natural hydrology of the ARB and are responsible for cumulative negative impacts. The effects of natural events including flood pulse and hurricanes are more acute and are just as significant as they are unpredictable.

Hydrology

The Louisiana Department of Natural Resources (LDNR) directs the development of the state master plan for the Atchafalaya River Basin. The program operates under the authority of Act 3 of 1998 and Act 920 of 1999. LDNR, the federal U.S. Army Corps of Engineers, and the ARB parishes create projects to protect and enhance the ARB. The Department of Wildlife and Fisheries also works as part of the program.

Former Louisiana Governor Mike Foster directed LDNR to be the lead agency in the development of the ARB in 1996. In 1999, the Louisiana Legislature unanimously approved the State Master Plan for the Atchafalaya River Basin Program and $85 million, subject to future appropriations, over 15 years for access, easements, water management, and recreation projects.

The Louisiana Legislature adopted Act 606 in 2008, authorizing the Secretary of the LDNR, through the Atchafalaya Basin Program, to submit to the legislature each year an Annual Plan for the Basin that will include water management and access projects, such as boat launches, and other projects consistent with the mission statement of the Atchafalaya Basin Master Plan. Act 606 also creates the Atchafalaya Basin Conservation Fund. Presently, the program in place coordinates multi-agency efforts to change the hydrology in the Basin. Housed in the LDNR, the Atchafalaya Basin Program brings a broad spectrum of stakeholders together to receive, evaluate, design, and request funding for various projects between the guide levees that will have an effect on the total hydrology of the ARB.

The Technical Advisory Group (TAG) receives and also initiates proposed projects in the ARB. Only upon approval by the TAG committee are proposed projects forwarded to the Atchafalaya Basin Research and Promotion Board for consideration. Projects approved by the Board are reviewed and approved by Coastal Wetlands Protection and Restoration Authority. After passing this review, projects are sent to the Louisiana Legislature for consideration. An important tool for evaluation of proposed projects is the Atchafalaya Basin Natural Resource Inventory and Assessment Tool. The tool is programmed to consider that projects in the Basin have potential to affect the entire Basin and provides a means for scientists to evaluate and prioritize project proposals.

The Louisiana Department of Natural Resources has authority over all surface water withdrawals for commercial purposes as per the Surface Water Management Act – La. RS 30:961-963 (Act 955 of the 2010 legislative session).
The link below provides more information on the DNR Surface Water Management Program
http://dnr.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=92

Aquatic Vegetation

Annual vegetation estimates show that approximately 50,000 acres of the Lower Atchafalaya Basin has aquatic plant coverage. A large portion of the coverage is composed of invasive species. Approximately 60% are floating plants consisting primarily of water hyacinth (*Eichhornia crassipes)*, common salvinia (*Salvinia minima)*, giant salvinia *(Salvinia molesta)* and duckweed *(Lemna minor)*. Approximately 30% are submersed plants which consist primarily of hydrilla *(Hydrilla verticillata)*, coontail *(Ceratophyllum demersum)*, and fanwort *(Cabomba caroliniana)*. Approximately 10% are emergent plants such as alligator weed *(Alternanthera philoxeroides)*, water primrose (*Ludwigia* spp*.)*, and sedge *(Carex* spp*.)*. The floating invasive species (water hyacinth and salvinia) are the biggest problem species. It is not uncommon for either to completely cover navigable bayous and canals, limiting or even denying boating access.

Aquatic plant control is conducted by LDWF and private contractor spray crews who apply herbicides that are EPA approved for use in aquatic areas. Spray crews in the Lower Atchafalaya Basin spray approximately 4,000 acres of aquatic weeds annually. The infestations targeted for spraying consist of approximately 90% water hyacinth and 10% emergent species. Water hyacinth is controlled with 2,4-D (0.5 gal/acre) and a non-ionic surfactant (1 pint/acre). Common and giant salvinia are controlled with a mixture of glyphosate (0.75 gal/acre) and diquat (0.25 gal/acre) with Turbulence (0.25 gal/acre) surfactant from April 1 to October 31. Outside of that time frame, diquat (0.75 gal/acre) and a non-ionic surfactant (0.25 gal/acre) are used. Sedge is controlled with the aforementioned salvinia treatments if it is associated with those plants. If it is targeted specifically, 2,4-D (0.5 gal/acre) is used in conjunction with a non-ionic surfactant (1 pint/acre). All LDWF spray crews apply EPA-approved herbicides for nuisance aquatic vegetation in accordance with the approved LDWF Aquatic Herbicide Procedures.

The Department has been stocking giant salvinia weevils (*Cyrtobagous salviniae)* through introductions of plant material containing the weevilsl to aid in controlling giant salvinia infestations. Since the summer of 2007, approximately 78,000 weevils have been released on giant salvinia infestations in the Atchafalaya Basin. These areas include, Bayou Postillion, Bayou Pigeon, Bayou Cowan, Old River, Shell Fields, and Bayou Long areas. Weevil damage to salvinia plants has been observed in and around the release sites. Recent surveys have shown that the weevils have survived the winters and are spreading into new areas where salvinia infestations are present. The most recent release was conducted in April of 2015, where an estimated 21,000 giant salvinia weevils were released in the south-eastern portion of the Basin, west of Adam's landing, known as the Checkerboard. Another 7,000 estimated weevils were released along the western protection levee near the Bayou Benoit area. The portion of Bayou Teche that runs between the east and western Atchafalaya Basin protection levees also falls within the District 9 boundary. This area had an estimated 4,200 weevils released at that time as well.

During the fall of 2013, LDWF contracted applicators to spray additional vegetation in the Wax Lake Outlet area. Private applicators treated 300 acres of water hyacinth using 150 gallons of Weedestroy AM-40 (2,4-D). All herbicide applications included a non-ionic surfactant at a rate of 0.125 gallons per acre.

During 2014, 3,891 acres of water hyacinth were treated with 2,4-D, 176 acres of a water hyacinth/alligator weed mix with 2,4-D, 65 acres of common salvinia and 94 acres of giant salvinia with either a glyphosate/diquat mixture, or diquat depending on the time of year. From November 1st-March 31st, only diquat is used to spray salvinia species, while a glyphosate/diquat mixture is used from April 1st-October 31st based on the differences in plant metabolism and air temperatures. Also treated in 2014, 20 acres of willow trees, 16 acres of buttonbush, and 12 acres of sedge were treated with 2,4-D. Other vegetation treated includes 86 acres of frog's bit with diquat, 66 acres of duckweed using diquat, 3 acres of cut grass with glyphosate, 6.5 acres of southern Naiad with penoxsulam, and a 28 acre mixture of 8 different species of plants treated with penoxsulam (Galleon).

In May 2014, LDWF contracted applicators to spray additional areas around the Wax Lake Outlet. Private applicators treated a total of 650 acres of vegetation including: 165 acres of water hyacinth, 170 acres of pennywort, 165 acres of alligatorweed, and 150 acres of primrose. A total of 330 gallons of Arsenal (imazapyr) sprayed at 0.5 gal/acre, and 165 gallons of Turbulence (surfactant) sprayed at 0.25 gal/acre were used during this treatment. No other contract spray efforts were conducted during 2014.

During 2015, LDWF spray crews treated a total of 3,649.5 acres of aquatic vegetation including 14 different species of plants, with 6 different EPA-approved herbicides. Included in that total were 3,043 acres of water hyacinth, 163 acres of a water hyacinth/alligator weed mix, 252 acres of sedge, and 7.5 acres of willow trees treated with 2,4-D. Also treated was a 20 acre mixture of duckweed, common salnivia, water hyacinth, and water lettuce using 20 gallons of diquat. A total of 161 acres of a mixture of 8 plants made up primarily of water primrose, water paspalum, sedge, pennywort, and giant salvinia were treated with 119 gallons of glyphosate.
Also treated in 2015 within District 9's portion of Bayou Teche mentioned above, were 408 acres of water hyacinth and 15 acres of alligator weed mixed with hyacinth. Both were treated with 2,4-D. No contract applications were conducted in 2015.

During 2016, LDWF spray crews made foliar herbicide applications on nuisance plants such as alligator weed, duckweed, cut grass, frog's bit, primrose, giant salvinia, sedge, water hyacinth, and willow trees. A total of 2,042 gallons were applied to 4,027 acres. Foliar applications of 2,4-D (0.5 gal/acre) were used to control water hyacinth and willow trees. Giant salvinia was controlled with a glyphosate/diquat mixture of glyphosate (0.75gal/acre) / diquat (0.25gal/acre). Diquat was applied at 1.0 gallons per acre to control duckweed. The alligator weed, cut grass, frog's bit, primrose, and sedge were not the targeted species of plants during those applications, but rather were incidentally treated with those plants that were being targeted.

In August 2016, LDWF contracted private applicators to spray additional areas within Bayou Teche. Private applicators treated a total of 224 acres of an American lotus/water hyacinth mix with 112 gallons of 2,4-D sprayed at 0.5 gal/acre, and 28 gallons of Activate Plus sprayed at 0.125 gal/acre. No other contract applications were conducted that year.

As of September 2017, LDWF spray crews had made foliar herbicide applications on nuisance plants such as alligator weed, American lotus, duckweed, frog's bit, pennywort, primrose, common salvinia, giant salvinia, sedge, water hyacinth, and water paspalum. A total of 1,938 gallons were applied to 3,092 acres. Foliar applications of 2,4-D (0.5 gal/acre) were used to control American lotus and water hyacinth. Common and giant salvinia were controlled with either a glyphosate/diquat mixture (0.75gal/acre) / (0.25gal/acre), or diquat (0.75gal/acre), depending on the time of year as mentioned above. Diquat was applied at 1.0 gallons per acre to control duckweed. The alligator weed, frog's bit, pennywort, primrose, sedge, and water paspalum were not the targeted species of plants during those applications, but rather were incidentally treated with those plants that were being targeted.

Multiple contracts with private applicators have been needed thus far in 2017 to treat additional problematic areas. As of September, six contracts had been established, with two others in the process of being approved and implemented.
The areas, acreage, and associated plant species for each contract are as follows:

- May, upper Grand River flats – 407 acres of water hyacinth treated with 2,4-D.
- July, Ramah & upper flats – 308 acres of water hyacinth treated with 2,4-D.
- August, Schwing Chute – 112 acres of water hyacinth treated with 2,4-D.
- September, Bayou Pigeon – 493 acres of water hyacinth and Cuban bulrush treated with 2,4-D.
- September, Bayou Pigeon/ Bayou Mallet – 115 acres of giant salvinia and alligator weed treated with glyphosate and diquat.
- September, Old River area – 480 acres of water hyacinth and Cuban bulrush treated with 2,4-D.
- **Proposed for September**, Bayou Long & Big Fork Bayou – 960 acres of a common and giant salvinia, hyacinth, Cuban bulrush, and alligator weed mix to be treated with glyphosate and diquat.
- **Proposed for September**, upper Grand River flats – 640 acres of water hyacinth to be treated with 2,4-D.

The total acreage for those six established contracts is 1,915 acres at a cost of $105,000.

The two proposed contracts, which still need to be approved, total 1,600 acres at a cost of $107,096.

CONDITION IMBALANCE / PROBLEM

Optimum production of finfish and shellfish in the Atchafalaya Basin is dependent on, and directly related to, the extent of water level fluctuation of the Atchafalaya River. Strict adherence to the 30% share of the combined Mississippi and Red River flow is a limiting factor to this cycle. To the extent possible, water levels in the Basin should be managed to emulate the natural hydrologic cycle of the Basin. Unfortunately, such is not the case. In some years, high water levels are artificially held in the Basin for too long. When swamps are inundated past the month of April, elevated water temperature causes depletion of dissolved oxygen through decomposition of organic material. When the resulting poor quality water drains late in the year, it creates localized conditions for finfish ranging from stressful to lethal. The potential for harm is especially high if flood water levels are maintained into May, June, or July and subsequently drained with a rapidly descending river hydrograph.

The original ARB consisted of a small river with braided bayous and channels running through multiple lakes in cypress and tupelo swamps. With the dredging of the main river channel, the original system was critically altered. The great Grand Lake has all but disappeared and is now little more than a few scattered small lakes that are filling with sediment. The spoil from dredging on the sides of the main channel created habitat for whitetail deer and other upland species, but it also cut off the sheet flow of floodwaters to the back swamps. Channel training with the placement of bank stabilization levees along the river shoreline further cut off sheet flow of water.

The channel training project was designed to utilize water flow energy to scour the main channel. As the river scours a deeper channel, less water is available from normal hydrographs to flood the back swamps. The amount of water as lateral flow below the Old River Control structure doesn't overbank as it historically did. It now takes more water volume to fill the larger channel and provide beneficial flooding of the back swamps.

Because of the reduced over bank sheet flow into the back swamps, the method most commonly used to distribute oxygenated river water into the interior swamp is through the dredging of channels and the opening of bayous through the high river banks. This method successfully delivers water to the swamps, but it also transports and deposits tremendous amounts of sediment. Results of these actions can include permanent loss of deep water fisheries habitats in the backwater areas of the ARB.

CORRECTIVE ACTION NEEDED

Water flow through the ARB should be restored to emulate the historic flood drought hydrograph and allow flooding of an appropriate frequency, magnitude, and duration in the interior swamps. An ideal hydrograph would begin to flood the swamp gradually around December, continue inundation of the interior through March, and begin a slow decline through May. The drought portion of the cycle would begin in June and remain through October. The river bank should be restored to historical grade over lengthy portions of the river to allow sheet flow flooding of the interior swamps. Channels such as Coon Trap, Blue Point Chute, 21 Inch Canal, and American Pass that are delivering tons of sand and sediment into the interior swamp should be shut off or greatly constricted.

RECOMMENDATIONS

Continued participation in the Louisiana Department of Natural Resources Atchafalaya Basin Program is necessary. Participation in the Technical Advisory Group (TAG) is an opportunity to provide input on proposed projects and improve fisheries habitat.

LDWF will continue to monitor fish populations through standardized sampling as well as monitor recreational angler usage and harvest of largemouth bass through creel surveys. Standardized sampling will be conducted as per LDWF protocol.

Changes in commercial fishing regulations for the ARB are not necessary at this time. LDWF sampling efforts produce similar results on a consistent basis. Trip ticket information shows that the landings are affected by events beyond the control of regulations. Natural influences impact the ARB commercial fishery to such an extent that regulations more restrictive than those already in place statewide are not applicable.

EPA approved herbicides will be applied to nuisance aquatic weeds in accordance with the approved LDWF Aquatic Herbicide Recommendations. Water hyacinth will be controlled with 2,4-D (0.5 gal/acre) and a non-ionic surfactant (1 pint/acre). Both common salvinia and giant salvinia will be controlled with a mixture of glyphosate (0.75 gal/acre) and diquat (0.25 gal/acre) with Turbulence (0.25 gal/acre) surfactant from April 1 to October 31. Outside of that time frame, diquat (0.75 gal/acre) and a non-ionic surfactant (0.25 gal/acre) will be used. Sedge will be controlled with the aforementioned salvinia treatments if it is associated with those plants. If it is targeted specifically, 2,4-D (0.5 gal/acre) will be used in conjunction with a non-ionic surfactant (1 pint/acre). Alligator weed treatment depends upon the area of infestation. Imazapyr is more effective at controlling alligator weed and is less expensive than imazamox. However, imazapyr should only be used in areas where there is minimal threat to non-target species. Imazamox should be used to control alligator weed near homes, developed shorelines, and irrigation intakes because it is safer on non-target species and has less use restrictions.
In undeveloped areas, treatment rates are: Imazapyr (0.5 gal/acre)/ Turbulence (0.25 gal/acre). In developed areas, recommended rates are: Imazamox (Clearcast) (0.5 gal/acre)/ Turbulence (0.25 gal/acre).

LDWF will continue to closely monitor and treat giant salvinia infestations as necessary. Giant salvinia weevil releases will continue as long as salvinia accumulations are present.

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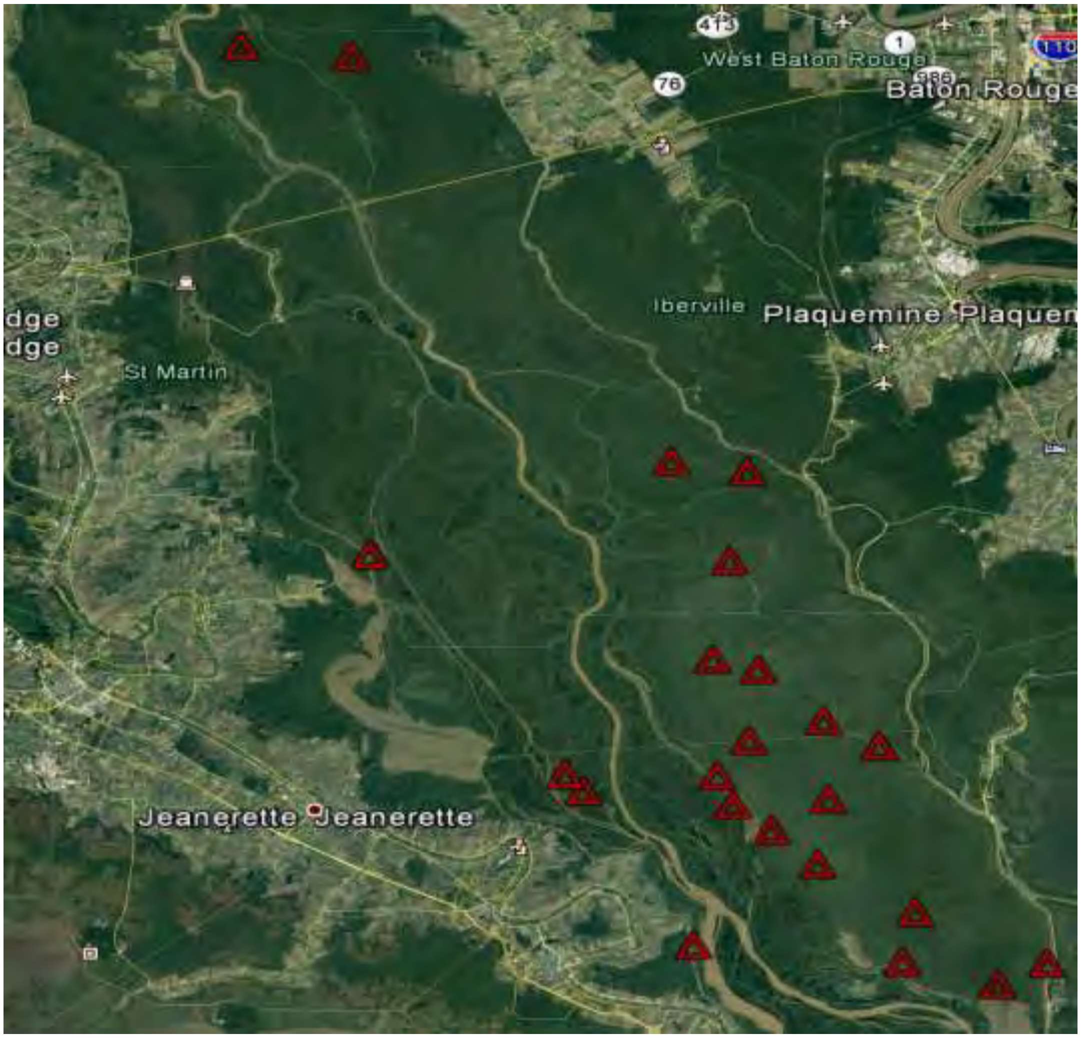
Appendix I - Maps

Realignment of Inland Fisheries Divisions and Marine Fisheries CSA’s

Appendix I – Maps

(**return to recreational**)
Electrofishing sites in the Atchafalaya Basin.



(CLICK HERE TO RETURN)

REVISED JANUARY 18, 2008
IN THE UNITED STATES COURT OF APPEALS
FOR THE FIFTH CIRCUIT

No. 06-31045

NORMAL PARM, JR; HAROLD EUGENE WATTS; ROY MICHAEL GAMMILL; WILLIAM T ROGERS; ROBERT ALLEN BALCH
Plaintiffs - Appellants

v.

MARK SHUMATE, in his official capacity as Sheriff of East Carroll Parish
Defendant – Appellee

Appeal from the United States District Court
for the Western District of Louisiana

Before KING, GARZA, and BENAVIDES, Circuit Judges.
KING, Circuit Judge:

Plaintiffs-appellants Normal Parm, Jr., Harold Eugene Watts, Roy Michael Gammill, William T. Rogers, and Robert Allen Balch ("Plaintiffs"), recreational fishermen, appeal the district court's denial of their summary judgment motion and the grant of the cross-motion for summary judgment by defendant-appellee East Carroll Parish Sheriff Mark Shumate ("Sheriff Shumate"). Plaintiffs brought their claims against Sheriff Shumate under 42 U.S.C. § 1983, alleging that they were falsely arrested for trespass when they refused to cease fishing on waters covering ordinarily dry, private property (the Property") owned by Walker Cottonwood Farms, L.L.C., successor-in-title to Walker Lands, Inc. (collectively "Walker"). Plaintiffs argue that Sheriff Shumate lacked probable cause to arrest them for fishing on the Property because the public has a federal and state right to fish on the Property when it is submerged under the Mississippi River. Because we disagree, we AFFIRM the district court's judgment.

I. FACTUAL AND PROCEDURAL BACKGROUND

The underlying dispute in this case began over a decade ago, and the facts have been considered in various forms by multiple courts, including this one. Plaintiffs are lifelong boaters, hunters, and fisherman who fish on the Mississippi River in East Carroll Parish and other river parishes in northeast Louisiana. The water levels of the Mississippi River fluctuate seasonally. In East Carroll Parish, the normal low water mark is seventy-seven feet above mean sea level. Yet during the spring season the river floods well beyond its normal channel—as a result of increased rainfall and snow melt in the North—and the river regularly rises to as high as one hundred and twelve feet above mean sea level. It is normal for the river to remain at this level for at least two months.

The Property is located in East Carroll Parish. On its eastern side, the Property is bound by the Mississippi River, and on its western side, it is bound by the Mississippi River's levees. Buildings, crop lands and forests, with trees as tall as one hundred and forty feet, are located on the Property. In addition, waterways known as Gassoway Lake, Little Gassoway Lake, and other bodies of water are contained within its boundaries. Gassoway Lake, which Plaintiffs consider the most ideal venue for fishing on the Property, is located on the Property's western side, nearly three-and-a-half miles from the ordinary low water mark of the Mississippi River and its channel. Gassoway Lake is connected by a man-made drainage ditch to Bunch's Cutoff, which, in turn, flows into the Mississippi River. When the river floods in the spring, Gassoway Lake, along with the rest of the Property, is submerged under its waters.

Plaintiffs have fished the waters of Gassoway Lake when it was flooded by the Mississippi River, even though they knew that Walker objected to their presence. In 1996, Walker began filing complaints with Sheriff Shumate against boaters fishing on Gassoway Lake. Sheriff Shumate responded by arresting Plaintiffs, and others found on the Property, for trespass.1 While admitting that they did not have Walker's permission, Plaintiffs claimed that they were entitled to fish on the Property when it was flooded because Gassoway Lake was either: (1) owned by the State of Louisiana on behalf of the public; or (2) subject to state and federal servitudes.

The Attorney General for the State of Louisiana agreed with Plaintiffs' position and issued Louisiana Attorney General Opinion No. 96-206, concluding that channels of the Mississippi River traversed the Property and were "river bed" owned by the State. His opinion stated that "Lake Gassoway is a naturally navigable body of water under both State and Federal law and actually supports navigation for such purposes as hunting, fishing, [and] trapping . . . ." He also determined that the Property was subject to a public servitude.

Notwithstanding this opinion, Sheriff Shumate continued to arrest fishermen found on the Property. However, the East Carroll Parish District Attorney, James "Buddy" Caldwell, informed Sheriff Shumate that he did not intend to prosecute any of the Plaintiffs for trespass until the ownership and public servitude issues were resolved. To this day, Plaintiffs have not been prosecuted.

1 Specifically, they were arrested for violating LA. REV. STAT. ANN. § 14:63(B), which states: "No person shall enter upon immovable property owned by another without express, legal, or implied authorization."

On June 10, 1996, Walker filed suit in Louisiana state court against the East Carroll Police Jury, seeking a declaration that it owned the Property and an injunction prohibiting members of the public from entering without permission. *Walker Lands, Inc. v. Louisiana*, No. 17,746, slip op. at 1-2 (La. 6th Dist. Ct., May 1, 2003). The state trial court issued a temporary restraining order prohibiting the Police Jury, and all other persons or government agencies, from entering Gassoway Lake without permission for any purpose, including boating, fishing, or hunting. *Id.* at 2. The Police Jury filed a third-party demand against the State of Louisiana. The State was added as an indispensable party, and the Police Jury was eventually dismissed. *Id.* On March 16, 1998, the court granted Walker's motion for summary judgment and issued a permanent injunction. *Id.* The State appealed to the Second Circuit Court of Appeal of Louisiana, which reversed, holding that the issues could not be resolved on summary judgment. *Id.*; *Walker Lands, Inc. v. East Carroll Parish Police Jury*, No. 31,490, slip op. at 5 (La. Ct. App., March 5, 1999).

On December 17, 2001, with the state trial court yet to issue a final decision, Plaintiffs filed this case in federal district court. Plaintiffs alleged that Sheriff Shumate lacked probable cause to arrest them in light of the opinion of the State Attorney General and the decision of the Second Circuit Court of Appeal. They claimed that:

> Until there is rendered a final judgment in the litigation pending in the Sixth District Court between [Walker] and the State of Louisiana, there is not sufficient legal evidence to prove, beyond a reasonable doubt, that the use of the naturally and regularly navigable waters of the Mississippi River, including those navigable waters that include Gassoway Lake, Little Gassoway, the old channel and Bunch's Cut-Off, results in a criminal trespass of the land of [Walker,] so long as the Plaintiffs utilize naturally occurring, navigable waters of the Mississippi River.

Plaintiffs sought damages for false arrest under 42 U.S.C. § 1983 and an injunction prohibiting further arrests for fishing on the Property until a "final judgment is rendered by a court of competent jurisdiction, specifying the ownership and navigational rights of the State of Louisiana and [Walker] relative to the [Property] . . . during normal water heights . . . ."

On June 4, 2002, Plaintiffs filed a motion for summary judgment, and on July 8, 2002, Sheriff Shumate filed a cross-motion for summary judgment or, in the alternative, a motion to stay the case pending resolution of the state court proceedings. Both motions were referred to a magistrate judge for a report and recommendation. Because there was a "reasonable probability that the state courts [might] find the waters at issue to be navigable and thus public," the magistrate judge held that a federal decision in this case could be obviated by the state proceeding. The district court adopted the report and recommendation, stayed the federal case, and Plaintiffs appealed. In an unpublished decision, we agreed that the questions of Louisiana law, then pending in a Louisiana court, might "render it unnecessary for federal courts to decide the constitutional issues presented in this case[,]" and affirmed the district court's stay. *Parm v.Shumate*, No. 02-31183, slip op. at 6 (5th Cir. June 16, 2003).

On May 1, 2003, the state trial court ruled that Walker owned the Property and had the right to exclude the public from it. *Walker Lands*, No. 17,746, slip op. at 1; *see also Walker Lands, Inc. v. East Carroll Parish Police Jury*, 871 So.2d 1258, 1261 (La. Ct. App. 2004). The court first noted that it was undisputed that the Property was either woodland or farmland in 1812, the year that Louisiana was admitted to the Union as a State.[2] *Walker Lands*, No. 17,746, slip op. at 1;

Walker Lands, 871 So.2d at 1261. It found that during the 1860s and 1870s, the Mississippi River slowly but gradually shifted westward and submerged the Property. *Walker Lands*, No. 17,746, slip op. at 1; *Walker Lands*, 871 So.2d at 1261. When the river subsequently shifted back eastward, it left behind a swale—a shallow depression in the land—which became Gassoway Lake through alluvion or accretion.[3] *Walker Lands*, No. 17,746, slip op. at 11-12; *Walker Lands*, 871 So.2d at 1261. Gassoway Lake and the other natural bodies of water on the Property were formed before 1910, when private landowners purchased it. *Walker Lands*, No. 17,746, slip op. at 11; *Walker Lands*, 871 So.2d at 1261. Moreover, the court determined that none of the waters on the Property were navigable. But for the man-made drainage ditch connected to Bunch's Cutoff and other structures, the court held, Gassoway Lake itself would be non-existent during the summer months. *Walker Lands*, No. 17,746, slip op. at 12-13. Since the waters lying on the Property were not navigable in fact, the trial court entered a permanent injunction prohibiting the public-at-large from going on Gassoway Lake, or on the land between Gassoway Lake and the Mississippi River. *Walker Lands*, No. 17,746, slip op. at 12-14; *Walker Lands*, 871 So.2d at 1262-63.

The State appealed the trial court's decision to the Second Circuit Court of Appeal, which affirmed in part and reversed in part. *Walker Lands*, 871 So.2d at 1268-69. The appellate court accepted the trial court's findings of fact and held that the Property was privately owned. The court rejected the State's argument that the Property was the bed of the Mississippi River—and therefore owned by the State—because a river's bed consists only of the land lying below the river's ordinary low water mark. *Id.* at 1262 n.7. It did not matter that the Mississippi River sometimes flooded the Property. *Id.* at 1264.

2 Bodies of water formed before 1812 are owned by the State. *See Dardar v. LaFourche Realty Co., Inc.*, 985 F.2d 824, 826-27 (5th Cir. 1993).

3 Alluvion and accretion are used synonymously to describe the addition of soil by gradual deposit. *Walker Lands*, 871 So.2d at 1264 n.13. Under Louisiana law, "[a]ny alluvion . . . which forms along the banks of a river belongs to the riparian landowners who own the land adjacent to the river, when the river shifts course." *Id.* at 1264 (citations omitted).

Privately owned land does not become part of a navigable body of water when a nearby navigable body of water overflows its normal bed and temporarily covers the property. Gassoway Lake is landlocked and does not now lie in the bed of the Mississippi river, which is some three and one-half miles to the east; likewise, it is not a channel of the river, since it is cut off from it.

Id. (citations omitted). In addition, the court held that Gassoway Lake was not a navigable body of water owned by the State because it was not a navigable body of water in fact. *Id.* at 1265-66.

Nevertheless, the Second Circuit Court of Appeal lifted the state trial court's injunction because Walker lacked standing to seek relief against a hypothetical public-at-large. *Id.* at 1267. The court stated that while "[o]wners of private property may forbid entry to anyone for purposes of hunting or fishing and the like[,]" Walker could only ask for relief against a specific individual after that person had invaded the Property. *Id.* The court declined to resolve whether there was a public servitude on the Property during the Mississippi River's peak stage. It observed that under Louisiana law, the bank of the Mississippi River consists of all the land lying between its ordinary low and high water marks, which includes all of the Property, and noted that a public servitude preserves a river's bank for the public's navigational use. *Id.* at 1268 & n.16. And while it stated that "[f]ishing and hunting on flooded lands do not meet the definition of using the bank of a river at its high water mark for a navigational purpose[,]" *id.* at 1268 n.6 (citations omitted), it "pretermit[ted] discussion" of the issue because the State had not properly raised it, *id.* at 1268.

On June 3, 2005, the Second Circuit Court of Appeal's decision became final when the Louisiana Supreme Court denied the State's application for a writ of certiorari. In light of the conclusion of the state court proceedings, on August 16, 2005, the district court lifted the stay in this case. The court ordered the parties to file supplemental briefs in support of their cross-motions for summary judgment and referred the matter to a magistrate judge for a report and recommendation. Sheriff Shumate filed briefs arguing that: (1) the case was moot because Plaintiffs merely sought relief "until the Second Circuit rules"; (2) there is no federal or state right to fish on private property above the Mississippi River's ordinary low mark; and (3) even if there was such a right, he was entitled to qualified immunity because it was not a clearly established constitutional right. Plaintiffs, on the other hand, argued that they were entitled to summary judgment because there is both a state and federal right to fish on the Property when it is submerged under the Mississippi River. They asserted that the case was not moot because their complaint sought damages for false arrest and an injunction, not just until the state proceeding was complete, but until the public's "navigational rights" were determined. Finally, they contended that Sheriff Shumate was not entitled to qualified immunity because he was not being sued in his personal capacity.

On April 21, 2005, the magistrate judge issued his report and recommendation. He rejected Sheriff Shumate's alternative arguments, stating that: (1) the case was not moot because the state appellate court expressly pretermitted ruling on the issue of navigational rights; and (2) Sheriff Shumate was not entitled to qualified immunity because the case was not brought against him in his personal capacity. Turning to the fundamental question in the case, the magistrate judge held that no federal statute authorized Plaintiffs to fish on the Property, nor did the "federal navigational servitude," which is derived from the Commerce Clause of the United States Constitution, grant persons the right to fish on navigable waters. However, the magistrate judge determined that federal common law *did* create a right to fish on navigable waters, and that this public right burdens the Property when it is submerged under the waters of the Mississippi River. Similarly, the magistrate judge held that Louisiana law grants to the public the right to use—including for purposes of fishing—the "running waters" found in the State, regardless of the river's stage.

On August 29, 2006, the district court adopted the report and recommendation in part. It agreed that neither federal statutes nor the federal navigational servitude provides Plaintiffs with the right to fish on the Property. The district court disagreed, however, with the magistrate judge's determination that federal common law and state law granted such a right. The district court stated that while this court has recognized a public right to reasonably use navigable waters, we have not found a right to fish on private lands. Moreover, although the district court found that the Property is a bank of the Mississippi River under Louisiana law and subject to a state servitude, the servitude "is limited to activities that are incidental to the navigable character of the Mississippi River and its enjoyment as an avenue of commerce. . . . [F]ishing and hunting are not included in these rights." Accordingly, the district court found that Sheriff Shumate had probable cause to arrest Plaintiffs for trespass and entered summary judgment on Sheriff Shumate's behalf.

This timely appeal followed.

II. DISCUSSION

Were view a grant of summary judgment de novo, viewing all the evidence in the light most favorable to the nonmoving party and drawing all reasonable inferences in that party's favor. *See Crawford v. Formosa Plastics Corp.*, 234 F.3d 899, 902 (5th Cir. 2000). "Summary judgment is proper when the evidence reflects no genuine issues of material fact and the non-movant is entitled to judgment as a matter of law." *Id.* (citing FED. R.CIV. P. 56(c)). "A genuine issue of material fact exists 'if the evidence is such that a reasonable jury could return a verdict for the non-moving party.'" *Id.* (quoting *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986)).

In order to prevail in a § 1983 claim for false arrest, a plaintiff must show that he was arrested without probable cause in violation of the Fourth Amendment. *Brown v. Lyford*, 243 F.3d 185, 189 (5th Cir. 2001) (citations omitted). In a suit brought against a municipal official in his official capacity, the plaintiff must show that the municipality has a policy or custom that caused his injury. *Kentucky v. Graham*, 473 U.S. 159, 165-66 (1985); *Monell v. N.Y. City Dept. of Soc. Servs.*, 436 U.S. 658, 689 (1979). If a municipal officer who has authority to establish final municipal policy makes a decision or orders a course of action, the municipality may be held liable for the officer's decision or order. *Pembaur v. City of Cincinnati*, 475 U.S. 469, 480-82 (1986); *see also Turner v. Upton County, Texas*, 915 F.2d 133, 136 (5th Cir. 1990) (holding that the municipality may be held liable for the illegal or unconstitutional actions of its final policy-makers as they engage in the setting of goals and the determination of how those goals will be achieved).

In this case, Sheriff Shumate does not argue that he lacked final policymaking authority. Nor does he continue to argue that he is entitled to qualified immunity, accepting Plaintiffs' assertion that they do not seek to hold him liable in his individual capacity. The key issue, therefore, is whether Plaintiffs have either a federal or state right to fish on the Property in the spring during the Mississippi River's normal flood stage. If they do not, Sheriff Shumate had probable cause to arrest them for trespass and was entitled to prevail on summary judgment.

A. Federal Rights

Plaintiffs argue that they have a federal right to fish on the Property when it is covered by the Mississippi River's waters because the Mississippi River is a navigable waterway of the United States. They contend that a federal navigational servitude burdens the Property, creating a public right to fish there. Plaintiffs also assert that there is a corresponding federal common law right to fish on the navigable waters of the United States. In response, Sheriff Shumate argues that: (1) the Property is not burdened by any federal easements because the Property is not a navigable waterway in fact; (2) the federal navigational servitude does not create a right to fish; and (3) there is no federal common law affecting riparian land owners' property interests.

It is well established that the Commerce Clause of the United States Constitution gives the federal government a "dominant servitude" over the navigable waters of the United States. *United States v. Cherokee Nat. of Okla.*, 480 U.S. 700, 704 (1987) (citation omitted). The so-called navigational servitude extends "laterally to the entire water surface and bed of a navigable waterway, which includes all the land and waters below the ordinary high water mark." 33 C.F.R. § 329.11(a); *see also United States v. Rands*, 389 U.S. 121, 123 (1967).

A river's ordinary high water mark is set at "the line of the shore established by the fluctuations of water . . . ." 33 C.F.R. § 329.11(a)(1). It is ascertained by "physical characteristics such as a clear, natural line impressed on the bank; . . . changes in the character of the soil; destruction of terrestrial vegetation; . . . or other appropriate means that consider the characteristics of the surrounding areas." *Id.* The navigational servitude does not burden land that is only submerged when the river floods. *Oklahoma v. Texas*, 260 U.S. 606, 632 (1923); *United States v. Harrell*, 926 F.2d 1036, 1041-43 (11th Cir. 1991); *United States v. Claridge*, 416 F.2d 933, 934 (9th Cir. 1970).[4]

As implied by its very name and the constitutional provision from which it arises, the federal navigational servitude is concerned with *navigational* rights and *commerce*. *See United States v. Montana*, 450 U.S. 544, 551 (1981) ("The State's power over the beds of navigable waters remains subject to only one limitation: the paramount power of the United States to ensure that such waters remain free to interstate and foreign commerce."); *Kaiser Aetna v. United States*, 444 U.S. 164, 177 (1979) ("The navigational servitude . . . gives rise to an authority in the Government to assure that such streams retain their capacity to serve as continuous highways for the purpose of navigation in interstate commerce."); *United States v. Chi. M., St. P.&P.R. Co.*, 312 U.S. 592, 596 (1941) ("[T]he rights of the title holder are subordinate to the dominant power of the federal Government in respect of navigation.") (citing *Gibson v. United States*, 166 U.S. 269, 272 (1897)). Neither navigation nor commerce encompass recreational fishing. *See Phillips Petroleum Co. v. Mississippi*, 484 U.S. 469, 482-84 (1988) (noting that fishing is not related to navigability); *George v. Beavark, Inc.*, 402 F.2d 977, 981 (8th Cir. 1968) ("Although the rule on navigability has been at times liberalized, to our knowledge none of the authoritative cases has liberalized the rule so as to indicate that mere pleasure fishing on a stream of water is such usage as would constitute navigability."). Accordingly, the navigational servitude does not create a right to fish on private riparian land.

Moreover, Plaintiffs' claim to a federal right ignores "the 'general proposition [that] the law of real property is, under our Constitution, left to the individual States to develop and administer.'" *Phillips Petroleum*, 484 U.S. at 484 (citation omitted). Louisiana took title to all lands below navigable waters in its boundaries when it was admitted to the Union. *Dardar*, 985 F.2d 824, 826- 27 (citation omitted); *see also Texas v. Louisiana*, 410 U.S. 702, 714 (1973); *Utah v. United States*, 403 U.S. 9, 10 (1971); *Pollard's Lessee v. Hagan*, 44 U.S. 212, 230 (1845). It has broad authority to regulate public trust lands, including the Property, as it sees fit. *See Phillips Petroleum*, 484 U.S. at 482-84. Louisiana may regulate or prohibit the use of land held in public trust. *See McCready v. Virginia*, 94 U.S. 391, 395 (1876) (upholding a state statute that prohibited non-state citizens from planting oysters in tidal lands); *Smith v. Maryland*, 59 U.S. 71, 74-75 (1855) (upholding a state statute that prohibited a federally licensed ship from dredging for oysters in the Chesapeake Bay). It may "retain for the general public the right to fish, hunt, or bathe on these lands." *Phillips Petroleum*, 484 U.S. at 482-84. Or, as it did here, it may relinquish title to a private landowner. *Id.* at 483; *see also Dardar*, 985 F.2d at 830 (stating that Louisiana may relinquish lands that are periodically overflown by the waters of the Mississippi). In any event, as things now stand, the right to fish on public trust lands is governed by Louisiana law, and there is no reason for us to displace that law by adopting a federal rule of decision in this context.[5] *See Wallis v. Pan Am. Petroleum Corp.*, 384 U.S. 63, 68 (1966) (stating that it is for Congress to decide whether latent federal power should be exercised to displace state law).

4 Plaintiffs argue that the Property is below the high water mark based on the Second Circuit Court of Appeal's finding that the high water mark is one hundred and twelve feet above mean sea level (the high water mark during the spring flooding season). The explanation for the Louisiana court's conclusion is that Louisiana has rejected the federal definition of high water mark and relies, instead, on the ordinary seasonal flood levels. *DeSambourg v. Bd. of Comm'rs for the Grand Prairie Levee Dist.*, 621 So.2d 602, 612 (La. 1993). Unfortunately, neither party submitted sufficient summary judgment evidence to determine where the federal high water mark lies, although it is unlikely that it includes much of the Property. *See Harrell*, 926 F.2d at 1043 ("To argue that the government's jurisdiction should extend laterally as much as three miles on either side of the Tombigbee River is ludicrous.").

B. State Navigational Servitude

Plaintiffs argue that a state servitude burdens the Property and grants them the right to fish upon it when it is flooded. Plaintiffs assert that this right exists in the Louisiana Constitution, which provides that the freedom to hunt, fish, and trap wildlife is a valued natural heritage that will be forever preserved. *See* LA. CONST. art. I, § 27. They also find support in the Louisiana Civil Code, which provides that everyone has the right to fish in the State's rivers. *See* LA. CIV.CODEANN. art. 452. Finally, they contend that the Property is burdened by the State for the public's use because Louisiana owns all of the running waters in the State. *See id.* art. 456. In response, Sheriff Shumate argues that the right to fish in Louisiana is explicitly limited to public lands and does not extend to private riparian property. Moreover, he argues that the Second Circuit Court of Appeal, while failing to hold that the Property is free of a state servitude because the issue was not properly raised, left a "guide post" for this court by noting in passing that the public does not have a right to fish on private lands. We agree with Sheriff Shumate.

First, the Louisiana Constitution, far from creating a private right to fish on the Property, explicitly reserves to private property owners the right to refuse consent to fishermen's entry on their land. The article Plaintiffs rely on reads:

> The freedom to hunt, fish, and trap wildlife, including all aquatic life, traditionally taken by hunters, trappers and anglers, is a valued natural heritage that shall be forever preserved for the people. . . . Nothing contained herein shall be construed to authorize the use of private property to hunt, fish, or trap without the consent of the owner of the property.

See LA. CONST. art. I, § 27.[6] When the article is read in full, it is plain that the right to fish is circumscribed and does not extend to waters on private property.

Second, the Louisiana Civil Code does not create a right to fish upon the Property, even if we assume that the Property in its entirety is a bank of the Mississippi River. Under Louisiana law, the "banks of navigable rivers are private things that are subject to public use." LA. CIV. CODE ANN. art. 452; *see also Buckskin Hunting Club v. Bayard*, 868 So.2d 266, 275-76 (La. Ct. App. 2004). The public use, however, is limited to use for navigational purposes. *Walker Lands*, 871 So.2d at 1268 n.6 (citations omitted); *Buckskin Hunting Club*, 868 So.2d at 276 (citation omitted). As stated in the comments to article 456, "[a]ccording to well-settled Louisiana jurisprudence, which continues to be relevant, the servitude of public use under this provision is not 'for the use of the public at large for all purposes' but merely for purposes that are 'incidental' to the navigable character of the stream and its enjoyment as an avenue of commerce."

LA. CIV. CODE ANN. art. 452 cmt. b (citations omitted). The Second Circuit Court of Appeal noted, in the parallel state proceeding, that fishing on the banks of the Mississippi River does not meet the definition of a navigational use. *Walker Lands*, 871 So.2d at 1268 n.6 (citations omitted). We agree. *See, e.g.*, *State v. Barras*, 602 So.2d 301, 305 (La. Ct. App. 1992) (holding that fishing was not incidental to navigation); *Edmiston v. Wood*, 566 So.2d 673, 675-76 (La. Ct. App. 1990) (same).

Finally, we reject Plaintiffs' argument that they have the right to fish on the Property when it is submerged under the Mississippi River because "running waters" are public things owned by the State. Under Louisiana law, "public things" belong to the State, and "public things" include "running waters." LA. CIV. CODE ANN. art. 456. Plaintiffs argue that the public has a right to fish on the running waters of the State based on *Chaney v. State Mineral Bd.*, 444 So.2d 105 (La. 1983). In that case, the Louisiana Supreme Court stated that the running waters over non-navigable streams are preserved for the general public. *Id.* at 109. This court has since determined that claims to the use of waterways based on *Chaney* have "failed to carry the day in Louisiana courts." *Dardar*, 985 F.2d at 834 (citation omitted). We have no reason to deviate from that holding. To the contrary, the Third Circuit Court of Appeal of Louisiana recently stated that although an owner must permit running waters to pass through his estate, Louisiana law "does not mandate that the landowner allow public access to the waterway." *Buckskin Hunting Club*, 868 So.2d at 274.

III. CONCLUSION

For the reasons stated above, we AFFIRM the district court's judgment.

6 This section of the Louisiana Constitution did not become effective until December 7, 2004. We, therefore, do not cite it for the proposition that Sheriff Shumate had probable cause to arrest Plaintiffs, but to show that the hortatory passage Plaintiffs rely on is limited in nature.

United States Court of Appeals
Fifth Circuit

F I L E D

December 28, 2007
Charles R. Fulbruge III
Clerk

Appendix T: LDWF Henderson Lake Lake History and Management Issues
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LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

PART VI -A

WATERBODY MANAGEMENT PLAN SERIES

HENDERSON LAKE

LAKE HISTORY & MANAGEMENT ISSUES

CHRONOLOGY

July 2007 - Prepared by
Jody T. David, Biologist Manager, District 6

February 2012 – Updated by
Mike Walker, Biologist Manager, District 9

November 2013 – Updated by
Brac Salyers, Biologist Manager, District 9

August 2014 – Updated by
Brac Salyers, Biologist Manager, District 9

August 2015 – Updated by
Brac Salyers, Biologist Manager, District 9

September 2016 – Updated by
Brac Salyers, Biologist Manager, District 9

September 2017 – Updated by
Brac Salyers, Biologist Manager, District 9

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LAKE HISTORY

GENERAL INFORMATION

Date formed

Henderson Lake is a man-made lake formed in the 1930's by the Atchafalaya Levee construction for flood control by the U.S. Army Corps of Engineers (USACE). The damming of Bayou Berard and other streams stopped the natural drainage of this area and caused flooding during normal low water stages. Most of the flooded areas were owned by St. Martin Land Company. In 1963 and 1964, earthen dams were constructed on the outlet channel. A permanent control structure was put in place in 1968 and set at an elevation of 7.5 ft. MSL. Due to a written agreement with the St. Martin Land Company, in the 1970's the elevation of the lake was increased to 9.0 ft. MSL but would never exceed this height. The structure remained operative but siltation issues made operation of the structure difficult. Improvements and repairs to the structure were conducted in 1985-1986 and 2006. Minor work on the control structure was done in July 2013 to address mechanical issues. The damaged chain-link fencing around the structure was replaced in July 2014 in order to keep trespassers out. Since 2003, over $500,000 has been spent by St. Martin Parish Government on repair costs for the structure (Guy Cormier, personal comm.).

Impoundment (Backwater area)

Henderson Lake is a backwater swamp consisting mainly of cypress, willow, and cottonwood trees. Numerous trees, stumps, logs, and submerged vegetation make up the majority of the lake's habitat.

Owners – U.S. Army Corp of Engineers, St. Martin Land Co., State of Louisiana, and private land owners.

Purposes for creation – Recreational activities and oil & gas exploration. In the document 'Atchafalaya Basin Floodway System Project, Louisiana, Master Plan Feasibility Study/Final Environmental Impact Statement' (USACE 1982), 13 water management units (WMUs) were considered in the Atchafalaya Basin Floodway System. The Henderson WMU was one of 5 recommended for initial construction. The 5 WMUs were selected for improved water quality, enhanced fish and wildlife, and controlled sediment flow (USACE 1982).

Size (Surface Acres)

5,000 surface acres at pool stage.

Watershed

170,000 acres.

Pool stage

9.0 ft. MSL at the Lake Pelba @ I-10 gauge.

Link to gauge: http://waterdata.usgs.gov/usa/nwis/uv?site_no=302020091435700

Parish/s located

Located in St. Martin Parish, 20 miles east of Lafayette, Louisiana (Latitude – 30° 20’ - Longitude – 91° 45’)

Border waters
Bayou Courtableau on the north end and the Atchafalaya River on the south end.

Drawdown description
The southern control structure is located in St. Martin Parish, south of Henderson Lake in the borrow canal adjacent to the West Atchafalaya Basin Protection Levee (WABPL). The drawdown structure is a gated system that can be opened to allow ingress and egress of boat traffic and can be used to dewater the lake (See map of structure locations, Figure 1).

The drawdown capability of Henderson Lake is directly related to the Atchafalaya River stage. Once the river has dropped below 9 ft. MSL at the Butte La Rose gauge, the closed structure will keep Henderson Lake at 9.0 ft. If opened, the structure will allow the lake to be lowered as far down as the river level potentially drops. If the river stage exceeds 9.0 ft. MSL, the water will back flow over the control structure, raising the level of the lake.

It is recommended that the water level in Henderson Lake be lowered at a rate of no more than 2-4 inches/day. At this rate the lake would roughly be drawn down 2 feet in 14 days. It is also recommended that during a drawdown, the structure only be partially opened, to slow drainage. If the gate were fully opened, the increase in current would result in the disturbance of decaying organic material within the lake as it flows towards the structure. This suspended material will reduce the dissolved oxygen content in the water which stresses fish and other aquatic life, potentially resulting in a fish kill.

The desired water level to achieve during a drawdown is 6.0 ft. MSL. At this stage, the flats directly north and south of the I-10 Bridge are exposed to air and sunlight. This area is one of the most problematic areas with invasive aquatic vegetation issues. This level also exposes most shallow areas in the northern half of the lake, stranding invasive vegetation that accumulates in that area during the summer months. The further lowering of the water level beyond 6.0 ft. MSL is not recommended due to the minimal benefits received versus the potential additional stress put on fish populations by continuing to reduce available habitat. Perhaps just as important as the biological rationale though, reducing the water level below 6.0 ft. MSL also further risks the exposure of a Chitimachan Indian burial mound located in Coquille Bay. The preservation of the integrity of this burial mound is very important to the Cultural Section of the USACE when they review applications for permits within the

Henderson Lake area.

Spillway – 100 ft. wide
Gate size – Gate system (open/close)
Condition – Fair to good (most recent repairs done July, 2013)

At the northern end of Henderson Lake, the Bayou Courtableau structure is owned and operated by the USACE. It is located approximately one-mile south of U. S. Highway 190 between Port Barre and Krotz Springs. The structure is made up of two features. A diversion control structure completed in 1942 consisting of two weirs with crests set at 18 feet National Geodetic Vertical Datum (NGVD) that puts water in the borrow canal located on the landside of the WABPL. This diversion is also used to maintain low flows in Bayou Teche and the Vermilion River for rice irrigation and water quality control. During periods of drought, Atchafalaya River water can be pumped in through the Vermilion-Teche pumping station which is owned and operated by the USACE. That water is channeled to the Bayou Courtableau control structure via the Darbonne Bay conveyance channel. In addition, there is a drainage structure, the Bayou Courtableau Drainage Structure, in the WABPL that diverts landside flood waters into the northern end of Henderson Lake. This structure, consisting of five reinforced concrete box culverts measuring 10 ft. wide by 15 ft. high, and 234 ft. in length, was built by the USACE in 1956. This is one of only two structures that provide entry points for water into the Henderson Lake area other than precipitation. When the Atchafalaya River rises, its backwaters flow northward through the southern control structure, which is the other point of entry into the lake. Water entering through the southern structure also has to exit through that same structure. Water flowing into Henderson Lake from the Bayou Courtableau Drainage Structure is often of poor quality due to the high loading of organic materials from agricultural runoff in heavy rainfall and flood conditions.

The Bayou Courtableau Structure is operated by the USACE as follows:
• Water elevation 17.63 ft. from March through November
• Water elevation 15.63 ft. during December
• Water elevation 16.63 ft. during January and February

The structure is operated under this schedule because farmers northwest of Henderson Lake depend on lower water elevations to gravity drain their rice fields during the winter; and higher elevations during the growing season to be able to easily pump into and flood their fields (Saucier 2010).

<u>Who controls</u>
The southern control structure was built on the private land of the St. Martin Land Co. and the St. Martin Parish Government operates the control structure receiving management guidance from Louisiana Department of Wildlife & Fisheries (LDWF). The northern control structure on Bayou Courtableau is owned and operated by the USACE.

Figure 1. Location of water control structures within Henderson Lake, LA.

LAKE AUTHORITY

Association

There is no official lake association or lake commission. However, the following groups work together to manage the lake.

U.S. Army Corps of Engineers- Port Barre Office, LA (337) 585-0853
St. Martin Parish – Parish President, Guy Cormier, (337) 394-2200
St. Martin Land Company - (337) 228-7501
LDWF- Inland Fisheries, New Iberia office (337) 373-0032
City of Henderson, Mayor Sherbin Collette (337) 319-5267

Historically, there was never an official protocol for opening the spillway. The St. Martin Parish Government had operated the control structure as needed or by request from interested parties. During a meeting in June 2014 to discuss a potential drawdown for Henderson Lake, St. Martin Parish President Guy Cormier agreed to use the LDWF Henderson Lake Management Plan as the operational plan to be used during future drawdowns. This agreement remains in place after another drawdown discussion meeting in July, 2016.

Authorization

UNKNOWN

ACCESS

Maps with locations of boat ramps attached
(**SEE MAP – APPENDIX I**)

Boat docks

3 public boat ramps and 8 private boat ramps.
The public boat ramp located under Interstate 10 (I-10) at the Butte La Rose exit is a very popular launch for fisherman, kayakers, swamp tour operations, and other recreational users. Data collected from a USACE car-counting device showed 50,630 vehicles entering the launch area between October 2012-September 2013 (USACE, personal comm.).

Piers

Bank fishing is limited. There is an opportunity for bank fishing near the public boat ramp under Interstate 10 at the Butte La Rose exit. There is also area for bank fishing up the WABPL, north of the town of Henderson, in Indian Bayou Wildlife Management Area, including the Dixie Pipeline public boat launch. Beyond that area, the levees become private property, and are marked as such to restrict access.

State/Federal facilities

Indian Bayou Wildlife Management Area, owned by the U.S. Army Corps of Engineers, is located in south-central Louisiana. The Indian Bayou area is approximately 28,500 acres located in St. Landry and St. Martin parishes. The area is located between Baton Rouge and Lafayette, north of I-10 and south of U.S. Hwy 190 west of the Atchafalaya River. User groups

consist of hunters, fishermen, hikers, canoeists and kayakers, birders, and site seers.
Link to Indian Bayou WMA:
http://www.mvn.usace.army.mil/Missions/Recreation/AtchafalayaBasin.aspx

Indian Bayou Office in Port Barre, LA
Park Manager, Barton Rodgers – (337) 585-0853
Indian Bayou Ranger station – (337) 228-1313

Reefs
No artificial reefs have been placed by LDWF, though some have been purchased and placed privately by fishermen to attract species such as crappie and sunfish.

SHORELINE DEVELOPMENT

State/National Parks
The recently established (2006) Atchafalaya National Heritage Area stretches across 14 Parishes in south-central Louisiana, emphasizing the cultural and ecological diversity of the area. Link to site: http://www.atchafalaya.org/index.php

Shoreline development by landowners
Limited development, consisting of commercial boat launches, restaurants and bait stands on private property.

One commercial boat launch, McGee's Landing, was recently purchased by the Boy Scouts of America (BSA). The launch, as well as the restaurant, adjacent campground, and property were acquired with the intent to build a large Scout facility/camp to support their 'Atchafalaya Swamp Base' initiative. The future construction of these educational facilities will undoubtedly help promote Henderson Lake and the Atchafalaya Basin, increase the recreational usage within both, as well as serve as a boost to the local economy.
Link to site: http://www.bsaswampbase.org/

PHYSICAL DESCRIPTION

Henderson is a backwater swamp consisting mainly of cypress, willow, and cottonwood trees. Areas such as the bays range from 20 – 30 feet deep. In the flats, water depths average 3 feet when the lake is at pool stage. Numerous trees, stumps, logs and submerged vegetation make up the majority of the aquatic habitat.

Shoreline length
90 miles

Timber type
Bald cypress (*Taxodium distichum)*, black willow (*Salix nigra*), water oak (*Quercus nigra*), bitter pecan (*Carya aquatica*), and buttonbush (*Cephalanthus occidentalis)* are the

predominant bottomland hardwood trees occurring in and around Henderson Lake.

<u>Average depth</u>
7.0 ft.

<u>Maximum depth</u>
30 ft.

<u>Natural seasonal water fluctuation</u>
Water levels can change dramatically from rainfall or changes in the Atchafalaya River stage height. During high water, Henderson receives backwater from the Atchafalaya River. During low water, Bayou Courtableau is the main source of water. Typically, water fluctuates 4 – 5 feet annually, which may increase the acreage of Henderson Lake from 5,000 to 7,500 acres. However, in some years, fluctuations can vary as much as 10 feet or more, as seen in 2016.

EVENTS / PROBLEMS

<u>Aquatic Vegetation</u>
There is an ongoing concern with the infestation of the aquatic plants, hydrilla (*Hydrilla verticillata*) and water hyacinth (*Eichhornia crassipes).* Annual requests are received from fishermen, hunters, camp owners, and boat launch operators to clear floating plants (mainly water hyacinth) for boating access. Many requests come from owners of private pay-to-launch boat ramps and tourism businesses. Unfortunately, immediate relief is expected when vegetation is treated. However, the chemical used to control water hyacinth is a systemic herbicide and can take more than a few days to several weeks to completely kill the plants depending on the air temperature. Private boat landings, as well as the public launch at the I-10 Butte La Rose Welcome Center, are often cleared of water hyacinth only to have rafts of new plants block the ramps after changes in wind direction or water levels. During the summer and fall of 2013 and 2014, there was approximately 50% coverage of hydrilla in Henderson Lake (Figure 1). Presently, the coverage is unknown, but it appears to be significantly less than in previous years. By late summer in previous years, the north and south flats would 'top out' with hydrilla at the water surface, expanding growth through the entire water column. In 2015, 2016, and thus far in 2017, none of the excessive growth was observed, though small patches of hydrilla were seen in several places in early 2017. Giant salvinia (*Salvinia molesta*) has also recently become another problematic aquatic invasive species in the lake. During the fall and winter of 2015/2016, plant growth expanded from a moderate amount in December to a massive infestation by April (estimate of coverage unknown). Surveys found that the entire flooded northern woods were filled with the plants. This huge increase in giant salvinia was believed to have occurred as the result of high waters earlier than normal in the winter months providing an abundance of inaccessible backwater habitat, along with very mild winter temperatures. Moderate salvinia growth was observed during the fall and winter of 2016/2017.

Figure 1. Henderson Lake hydrilla coverage as of June, 2013.

The capability exists to lower the water level in the lake to manage hydrilla infestations. Recent dredging efforts (2012-2013) allow continued access to private boat launches and tourism businesses during low water conditions. In the past, inconsistent access was a concern among business owners and one of the reasons drawdowns did not occur. A damaged hydraulic line has prevented the opening of the structure during the normal high water period of winter/spring 2017, lasting into the summer months. At the time of this update, St. Martin Parish Government was waiting for the lake to return to pool stage, 9.0 ft. MSL, in order to safely replace the damaged line (Sherbin Collette, personal comm.). Heavy summer rains this year have prevented the repairs by keeping lake levels high.

The various landowners within Henderson Lake do not always agree on management objectives. The landowners include the U.S. Army Corp of Engineers (**See Appendix II**), St. Martin Land Co., some State owned land and water bottoms (**See Appendix III**) and other minor in-holdings. It is assumed that the majority of the property not marked as state water bottoms or Corps property is private property.

State owned	
Opelousas Bay	288 acres
Lake Bigeaux	34 acres
Lake Pelba	216 acres
School Board	640 acres
Total	1,178 acres

USACE aquatic plant spraying operations on Henderson Lake were discontinued on October 2, 2011. As a result, the responsibility has been accepted by LDWF.

MANAGEMENT ISSUES

AQUATIC VEGETATION

Herbicide applications are used as needed to control water hyacinth and giant salvinia infestations. Historically, an average of 3,400 acres of floating vegetation, predominantly water hyacinth, was treated annually in Henderson Lake by LDWF. Only herbicides approved for aquatic use by the EPA are used. Water hyacinth is treated with applications of 2,4-D at a rate of 0.5 gal/acre.

Henderson Lake is relatively clear and subject to excessive growth of submerged aquatic vegetation. Native species include coontail (*Ceratophyllum demersum)*, fanwort (*Cabomba caroliniana)*, and American lotus (*Nelumbo lutea*). Non-native species include hydrilla (*H. verticillata)*, common salvinia (*Salvinia minima)*, giant salvinia (*Salvinia molesta*), and water hyacinth (*Eichhornia crassipes)*.

The amount of vegetation sprayed and herbicide used annually from 2008 to 2011 is found in Table 1-A. The amount of vegetation sprayed and herbicide used annually from 2012 to 2015 are found in Table 1-B. The amount of vegetation sprayed and herbicide used annually for 2016, and thus far in 20176 can be found in Table 1-C. An additional 1,000 acres sprayed in 2011 by the USACE is not included in the table. Additionally, LDWF secured a private contractor to spray additional areas using aerial and boat application during the winter of 2011/2012. The spraying of the north flats helped to control a major nursery area of water hyacinth that continually supplied vegetation to the rest of the lake. The action helped to alleviate a large portion of the hyacinth problem.

Private boat launches were cleared of water hyacinth in November and early December 2011 as a result of using private contract sprayers. With the rise of the Atchafalaya River stage, additional hyacinth was introduced and complaints resumed.

Additional areas sprayed in 2012 include 65 acres of alligator weed and water hyacinth treated with 50 gallons of imazapyr. An aerial application was conducted in early winter of 2012, treating 360 acres of water hyacinth with 180 gallons of 2,4-D. Another treatment to 820 acres of water hyacinth was applied by boat in late spring/early summer. A total of 410 gallons of 2,4-D were applied during that effort.

Giant salvinia was first detected in Henderson Lake in the fall of 2012. Though control efforts were made, plants were observed again in 2013. Biological controls were introduced in September 2013 with the release of plant material containing giant salvinia weevils (*Cyrtobagous salviniae*). An estimated 19,360 adult weevils were released at that time. Another release, conducted in July 2015, included an estimated 14,580 adult weevils. An A release made in April 2016 contained an estimated 13,986 adult weevils and were placed into heavy infestations of giant salvinia. And finally, this past June, another release was done with an estimated 31,500 weevils placed in the lake. Totals stockings include approximately 79,500 weevils released over the five-year period. It appears that the weevil releases are working well in Henderson Lake, as damaged salvinia plants have been noted throughout the lake, and weevil densities remain high. Depending on the severity of winters, it appears that some of the weevils are surviving through the winter and continue to feed on the plants the following spring.

In 2013, LDWF contracted private applicators to spray additional areas. They treated 4,080 acres of water hyacinth using 2,040 gallons of 2,4-D. All herbicide applications included a non-ionic surfactant at a rate of 0.125 gallons per acre.

During 2014, 2,215 acres of water hyacinth and 63 acres of alligator weed were treated with 2,4-D. Additionally, 34 acres of common salvinia and 56 acres of giant salvinia were treated with either a glyphosate/diquat mixture, or diquat depending on the time of year. During November 1st-March 31st, only diquat is used to spray salvinia species, while a glyphosate/diquat mixture is used from April 1st-October 31st based on the differences in plant metabolism and air temperatures. Also, 8 acres of pennywort were treated with 2,4-D. No contract spraying was necessary in 2014.

At the end of 2014, LDWF's Inland Fisheries Division began an attempt to downsize the aquatic plant program by ending temporary sprayer positions and focus more on private applicator contracts to treat problematic areas. This cost-savings effort removed 2 sprayers from the District 9 office that assisted in spraying efforts on Henderson Lake. Because of this, there is no longer a dedicated LDWF spray crew on the lake. Vegetation management will instead be achieved through privately contracted herbicide treatments.

During 2015, LDWF crews treated 123.5 acres of water hyacinth as well as 6 acres of alligator weed with 2,4-D. Also treated were 31 acres of duckweed using diquat, 12 acres of common salvinia, and 17 acres of giant salvinia treated using either a glyphosate/diquat mixture, or diquat depending on the time of year as mentioned above. Two contracts through private applicators were also needed in 2015 to spray additional areas. The first contract was in February and treated 99 acres of water hyacinth with 49.5 gallons of 2,4-D. This herbicide application included a non-ionic surfactant at a rate of 0.125 gallons per acre. A second contract in December treated 80 acres of giant salvinia with 60 gallons of diquat. This herbicide application included a non-ionic surfactant at a rate of 0.25 gallons per acre.

During 2016, LDWF spray crews made foliar herbicide applications on nuisance plants such as alligator weed, duckweed, pennywort, primrose, common and giant salvinia, and water hyacinth. A total of 59 gallons were applied to 81 acres. Foliar applications of 2,4-D (0.5 gal/acre) were used to control water hyacinth. Common and giant salvinia were controlled with a glyphosate/diquat mixture of glyphosate (0.75 gal/acre) / diquat (0.25gal/acre). Diquat was applied at 1.0 gallons per acre to control duckweed. The alligator weed, pennywort, and primrose treated were not the targeted species of plants during those applications, but rather were incidentally mixed in with those plants that were being targeted. Also in 2016, two contracts through private applicators were initiated to spray additional concentrations of giant salvinia. The first contract was in May which treated 480 acres, and the second contract was in June, which also treated 480 acres. The two contracts combined treated a total of 960 acres of giant salvinia using 720 gallons of glyphosate, 240 gallons of diquat, and 240 gallons of the surfactant Turbulence.

As of August 2017, LDWF spray crews had treated 20 acres of a mixture of duckweed, giant salvinia, common salvinia, and water hyacinth with 20 gallons of diquat along with 5 gallons of the surfactant Activate Plus. No contract spraying has been needed thus far in 2017.

DRAWDOWNS

Drawdowns expose the lake bottom and in doing so will retard aquatic weed infestations. They also improve fish spawning habitat and facilitate access for recreational and commercial activities. All management decisions related to Henderson Lake are accompanied by concerns that include access to private landings, an Indian burial ground, and boater access.

Type map

Vegetative type map sampling was conducted in the fall of 2003, 2004, 2005, and 2006. The most recent type map is included in **Appendix IV**.

Biomass

Vegetation biomass sampling has not been conducted in Henderson Lake.

Treatment history by year

Biological

Biological treatment was first conducted in 2013 with the release of plant material containing giant salvinia weevils. An estimated 19,360 adult weevils were released at that time. Another stocking effort in late July 2015 was conducted with an estimated 14,580 adult weevils being released. April of 2016, saw an estimated 13,986 adult weevils released, and June, 2017 had an estimated 31,500 weevils added.

An additional biological control was used in an attempt to control hydrilla in spring 2014, with the release of 25,000 triploid (sterile) grass carp (*Ctenopharyngodon idella).* Larger grass carp (12+ inches) were purchased for stocking to try and reduce the amount of predation upon the newly released fish, as well as put a larger fish that can readily consume more hydrilla than smaller ones. While the results of this effort are still to be determined, it appears the carp have likely played a part in the significant reduction of hydrilla in the lake. Triploid grass carp often take several years before the effects of their predation on submerged vegetation is noticeable.

Chemical

Herbicide applications are routinely used to control water hyacinth. LDWF began controlling the invasive species in the 1960's. An average of 3,400 acres of surface vegetation, predominantly water hyacinth, was historically treated annually. Details are listed in Tables 1-A, B, & C.

In 2002, approximately 4,000 acres of hydrilla were treated by the Louisiana Department of Natural Resources (LDNR) in an effort to contain the spread. In 2006, 525 acres of hydrilla were treated by LDWF with Cutrine Plus® at a rate of 2 gallons per acre with Sonar PR® at 4 pounds per acre. Also, 500 acres were treated by LDNR. In 2009, a treatment including 3,240 lbs. of SONAR PR, 2,880 lbs. of SONAR Q was applied to 1,018 acres in the south flats of Henderson Lake. Two weeks later, the Atchafalaya River rose above flood stage, inundating Henderson Lake. The flood diluted the Sonar treatment, rendering it ineffective.
The Corps of Engineers treated approximately 1,000 acres of water hyacinth on Corps property in July, 2011.

Table 1-A. Acres of aquatic vegetation treated in Henderson Lake - listed by vegetation type and applied herbicide, for the years 2008 to 2011.

			Year				Total
			2008	2009	2010	2011	
			Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed
			Sum	Sum	Sum	Sum	Sum
Body of Water	**Vegetation**	**Herbicide**					
10302 - Henderson Lake	Algae, Filamentous	Knockout	.	.	.	1	1
		Reward	.	.	.	1	1
	Alligator weed	2,4-D	.	.	5	.	5
		Aqua Master	.	.	10	.	10
		Platoon	.	28	2	.	30
	Duckweed	Knockout	.	.	23	1	23
		Reward	.	.	.	1	1
	Frog's Bit	Knockout	.	1	1	.	2
	Hydrilla	Sonar AS	.	2,000	.	.	2,000
		Sonar PR	.	571	.	.	571
		Sonar Q	.	447	.	.	447
	Pennywort	2,4-D	6	.	.	.	6
		Diquat E Pro 2L	.	3	.	.	3
		Knockout	.	1	4	.	5
	Primrose	Platoon	.	14	2	.	16
	Salvinia, Common	Aqua Master	.	23	42	26	91
		Aquastar	15	.	.	.	15
		Diquat E Pro 2L	.	40	.	.	40
		Knockout	.	90	148	.	239
	Sedge sp.	2,4-D	.	.	.	5	5
	Water Hyacinth	2,4-D	144	60	310	3,595	4,109
		Aqua Master	.	7	65	.	72
		Aquastar	15	.	.	.	15
		Diquat E Pro 2L	.	14	.	.	14
		Knockout	.	45	34	.	79
		Platoon	.	93	731	1,080	1,904
Total			179	3,437	1,377	4,710	9,703

Table 1-B. Acres of aquatic vegetation treated in Henderson Lake - listed by vegetation type and applied herbicide, for the years 2012-2015.

			Year				Total
			2012	2013	2014	2015	
			Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed	Area Sprayed
			Sum	Sum	Sum	Sum	Sum
Body of Water	Vegetation	Herbicide	.	.	.	.	.
	Alligator weed	2,4-D	74	114	.	.	188
		Aqua Master	.	31	.	.	31
		Round-Up Custom	.	.	21	6	27
		Weedestroy AM-40	.	.	42	.	42
	Duckweed	Tribune	.	.	.	31	31
		Aqua Master	.	13	.	.	13
	Pennywort	Tribune	.	.	8	.	8
	Salvinia, Giant	Round-Up Custom	.	.	.	86	86
		Aqua Master	8	34	.	.	42
		Tribune	.	.	56	11	67
	Sedge sp.	2,4-D	.	7	.	.	7
		Aqua Master	8	.	.	.	8
		Tribune	.	14	.	.	14
	Salvinia, Common	2,4-D	.	50	.	.	50
		Aqua Master	353	217	.	.	570
		Platoon	.	10	.	.	10
		Round-Up Custom	.	75	.	6	81
		Tribune	.	.	34	6	40
	Water Hyacinth	2,4-D	6,834	1,730	.	99	8,663
		Aqua Master	.	182	.	.	182
		Platoon	.	3,990	160	.	4,150
		Round-Up Custom	.	75	21	6	102
		Tribune	.	.	156	58	214
		Weedestroy AM-40	.	300	1878	60	2238
	Water Paspalum	Aqua Master	.	47	.	.	47
Total			7,276	6,889	2,376	369	16,910

Table 1-C. Acres of aquatic vegetation treated in Henderson Lake - listed by vegetation type and applied herbicide, for the years 2016-2017, and beyond.

			Year 2016 Area Sprayed Sum	Year 2017 Area Sprayed Sum	Year 2018 Area Sprayed Sum	Year 2019 Area Sprayed Sum	Total Area Sprayed Sum
Body of Water	Vegetation	Herbicide	.	.	.	.	.
	Alligator weed	2,4-D	2	.	.	.	.
		Tribune	.	.	.	.	.
		Round-Up Custom	1	.	.	.	.
	Duckweed	Tribune	15	12	.	.	.
	Pennywort	Round-Up Custom	3	.	.	.	.
	Primrose	Round-Up Custom	1				
	Salvinia, Giant	Round-Up Custom	963	.	.	.	.
		Tribune	.	6.	.	.	.
	Sedge sp.	2,4-D	.	.	.	.	.
		Tribune	.	.	.	.	.
	Salvinia, Common	2,4-D	2	.	.	.	.
		Round-Up Custom	.	.	.	.	.
		Tribune	10	1	.	.	.
	Water Hyacinth	2,4-D	16	.	.	.	.
		Round-Up Custom	23	.	.	.	.
		Tribune	5	1	.	.	.
	Water Paspalum	Round-Up Custom	.	.	.	.	.
Total			1041	20.	.	.	1061

HISTORY OF REGULATIONS

Recreational
Statewide regulations are in effect for all fish species.
The recreational fishing regulations may be viewed at the link below:
http://www.wlf.louisiana.gov/fishing/regulations

The 14-inch minimum length limit (MLL) for black bass was implemented as an emergency measure following the fish kill caused by Hurricane Andrew in 1992. The regulation was implemented to protect bass that survived the storm, as well as bass stocked immediately following the storm, and allow them to spawn at least once before becoming available to harvest. In 1993, the regulation was renewed with a sunset date of 1995. In 1995, the regulation was renewed again for a 2-year period. During this time, biologists were asked to determine if the regulation increased the number of large bass in angler creels. In 1997, the regulation was renewed without a sunset clause with popular support. Most anglers viewed the minimum length limit as a method to control harvest of black bass in the system. In 2012, the Inland Fisheries Section released a report entitled "Evaluation of the 14 Inch Minimum Length Limit for Largemouth Bass in the Atchafalaya Basin and Adjacent Waters, Louisiana." The report described population characteristics of the largemouth bass population and the history of the recreational fishery. This study found that slow growth, short life span, and the frequent catastrophic events are inherent factors that preclude benefits from any recreational harvest regulation, including the 14-inch minimum length limit. As such, the 14 inch MLL was determined to be an ineffective regulation. Link to the full report: LDWF Atchafalaya Basin Bass Report

The Louisiana Wildlife and Fisheries Commission promulgated a rule to repeal the 14 inch MLL on black bass in the Atchafalaya Basin and adjacent waters. Effective June 20, 2013, regulations included a 7 fish daily creel limit with no MLL. The revised regulation was in effect for two years. Statewide regulations of a 10 fish daily creel limit went into effect on June 20, 2015.

Black Bass – no minimum length limit, 10 daily bag limit (7 fish bag limit *was* in effect for 2 years, starting June, 2013). The 2-year period ended in June 2015, with the creel limit reverting to statewide regulations.

Commercial

Statewide commercial regulations and seasons can be found at the following link:
http://www.wlf.louisiana.gov/fishing/commercial-fishing

DRAWDOWN HISTORY

Drawdown date

There have been several drawdowns conducted to attempt to control submerged vegetation. Hydrilla was discovered in 1994. In two years, the invasive plant covered 50% of Henderson Lake. A fall/winter drawdown in 1996/97 was unsuccessful due to heavy rains. Between 1997 and 2000, drawdowns were recommended by LDWF but were not conducted due to lack of local public support (Table 2). In 2000/2001 a successful fall/winter drawdown was conducted, but in 2001/2002 the fall/winter drawdown was hampered by rainfall and a rise of the Atchafalaya River. In 2006, a 2-foot drawdown in the late summer enabled LDWF and DNR to apply herbicide (SONAR) to control hydrilla infestations. Approximately 1,200 acres were treated south of I-10. Minimal control was achieved. In 2007, another 2-foot drawdown was conducted and LDWF applied Sonar. Approximately 400 acres of hydrilla were treated on the South Flats. In 2008, an attempt to draw the lake down failed due to high water levels. In 2009, another 2-foot drawdown allowed for an aerial application of Sonar that treated 1,018 acres of hydrilla coverage. Two weeks later the Atchafalaya River rose above flood stage, inundating Henderson Lake. The flood diluted the Sonar treatment, rendering it ineffective. Dense hydrilla growth in Henderson Lake remained through 2014.

Funds made available by the LDNR Atchafalaya Basin Program enabled the dredging of heavily used boat lanes near private landings. The dredging was completed in the winter/spring of 2012/2013. The work provides private boat launches and swamp tour companies continued access during a drawdown. Because this controversial issue was finally addressed, a drawdown was planned to begin in late summer 2013 through winter of 2014. However, the permit was not issued due to the length of the permitting process, aided by a government shutdown (USACE, personal communication). The USACE issued a drawdown permit, good for 5 years, in August 2014. A drawdown was then initiated in mid-August of 2014, and water levels were maintained at 6.0 ft. MSL until November 1st. During this time, the north and south flats on either side of the I-10 bridge were exposed, drying up all previously submerged hydrilla. Also, the low water levels stranded a large amount of water hyacinth across the lake, causing it to root down heavily where it was stranded. Due to a lack of rainfall, water levels remained below pool stage until heavy rains came around mid-December. These heavy storms quickly raised water levels with cold, highly turbid water to an elevation well over pool stage (up to and over 12 ft. MSL) blocking out sunlight to the hydrilla tubers or roots, and drowning the rooted-down water hyacinth. The water levels remained high for months, only slightly dropping back to 10 ft. MSL in March, and then a steadily rising Atchafalaya River heavily inundated the lake for the rest of the summer, with levels still above pool stage in August 2015. The triple combination of a successful drying out period between August and mid-November, the stocking of 25,000 triploid grass carp in the spring of 2014, and the prolonged high-water that never allowed sunlight to reach the hydrilla is believed to have reduced submergent vegetation to levels not seen on Henderson Lake in years. The perpetual water hyacinth problem was reduced to almost non-existence in 2015, though it has since rebounded. During a survey to evaluate the hydrilla coverage in July, 2015 none could be found. The hydrilla tubers are undoubtedly still there, and consecutive drawdowns will be needed to exhaust their root storages. Small patches of hydrilla were seen in early 2017. An annual fall/winter drawdown was recommended for 5 consecutive years for hydrilla control, starting in 2014. The high water levels of the Mississippi and Atchafalaya Rivers that lasted into the fall of 2015 eliminated any chance to conduct a drawdown during 2015. In July 2016, LDWF met with St. Martin Parish officials to discuss having another drawdown, and two weeks later held a public meeting in Henderson, LA to give a presentation on the drawdown proposal and to hear public concerns. By the conclusion of the meeting, it was agreed upon to go ahead with another fall/winter drawdown. The structure was opened on August 8th, and 5 days later south Louisiana was hit with unprecedented amounts of rain from an unnamed storm system resulting in 20+ inches of precipitation in many areas, and widespread flooding that would later come to be known as the "Flood of 2016'. At that point the lake level went from just under 8 ft. MSL, to almost 15 ft. MSL. Though nearly 2 months of drying time was lost due to the high water levels associated with the August floods, the lake reached pool stage again in late September and the drawdown was attempted again. Water levels were lowered and maintained during the month of October, and despite the drawdown ending on Nov. 1st, a lack of rainfall during November kept the lake under 8 ft. MSL until heavy rains came in early Dec. Though abbreviated, the drawdown was successful in stranding large amounts of giant salvinia and water hyacinth. The effect on the remaining hydrilla was likely minimal. Another drawdown was planned for the fall of 2017, but mechanical issues with the control structure have made it unable to be opened. Repairs are needed on the hydraulic cables, but at the time of this update, water levels were still too high to safely attempt repairs. The inability to open the structure further slows the drainage of water from the lake.

Table 2. Years in which drawdowns have been conducted on Henderson Lake, LA.

DRAWDOWN HISTORY				
Date Opened	Date Closed	Purpose	Results	Issues
Fall 1996	Winter 1997	Hydrilla control	Unsuccessful, 40% exposed	5 ft. drawdown, heavy fall rains
1997-2000	*	Hydrilla control	Recommended	No action taken
Fall 2000	Winter 2001	Hydrilla control	Successful, 60% exposed	6 ft. drawdown, fish kill
Fall 2001	Winter 2002	Hydrilla control	Unsuccessful	Heavy rains
Late summer 06	Fall 2006	Hydrilla control	Little success w/ 2 ft. drawdown	1,200 acres treated
Late summer 07	Fall 2007	Hydrilla control	Little success w/ 2 ft. drawdown	400 acres treated
Late summer 08	Fall 2008	Hydrilla control	Unsuccessful	High water
Fall 2009	N/A	Hydrilla control	No success w/ 2 ft. drawdown	1,018 treated acres flooded by high river waters
Fall 2013 (planned)	N/A	Hydrilla control	N/A	Permit not issued (USACE)
Late Summer 2014	November 1	Hydrilla control	Successful, flats and north woods exposed	Environmental factors all played in favor of the drawdown.
Fall 2015 (planned)	N/A	Hydrilla control	Never attempted	High water
Fall 2016	November 1	Giant salvinia & hydrilla control	Successful, north woods exposed, plants stranded	Delayed by August flood waters
Fall 2017 (planned)	N/A	Giant salvinia & hydrilla control	Unable to attempt	Repairs needed to control structure

* Between 1997 and 2000, drawdowns were recommended by LDWF but were not supported by the local public, and were not conducted.

Fish kills
Fish mortality was associated with the 2001 drawdown due to low dissolved oxygen levels. Approximately 22,000 fish perished. Largemouth bass, crappie and sunfish made up approximately 27 % of the loss.

FISH KILLS / DISEASE HISTORY

In 2000 Largemouth bass virus sample – 20 bass sampled (10 tested positive)
In 2002 Largemouth bass virus sample – 23 bass sampled (0 tested positive)

A minor fish kill occurred in 1992 due to Hurricane Andrew, but was limited to the very northeast end of the lake.
Another fish kill occurred in 2005 due to Hurricane Rita. Game species such as largemouth bass, crappie, sunfish and commercial species such as catfish made up 25 % of the kill, which totaled approximately 150,000 fish.

Fish kills occurred related to the 2011 flood, though no quantitative estimates of fish killed are available.

Small, isolated fish kills were reportedly seen during the late summer of 2015 as the Atchafalaya River quickly dropped and stagnant, anoxic waters drained from the flooded forests and swamps. These reports were mentioned after the fact, and were not able to be documented.

Isolated fish kills were reported in late June of 2016 due to quickly falling water levels in the Atchafalaya River. The river had risen sharply around the beginning of the year, and remained high during spring though mid-summer. The southern control structure remained open during this time to reduce hydraulic pressure. As the water levels began dropping quickly in mid-June, stagnant, anoxic waters drained from the flooded forests and swamps of the shallow northwestern section of the lake. Upon inspection of this area, the fish kill was likely over, and therefore undocumented. The structure was closed over the July 4th weekend stopping flow and averting further fish kill potential.

Poor water quality is often associated with high water levels in Henderson Lake. Fish kills often occur when the Atchafalaya River level rises higher than the southern Henderson Lake control structure. As the flood waters rise in the lake, dry areas become inundated, including the organic terrestrial material. Decomposition of these organic materials increases the biological oxygen demand to the extent that insufficient dissolved oxygen is available for fish. The solubility of water to oxygen also decreases in direct proportion to temperature. When the river level drops, poor quality water is concentrated in some areas as water drains. The resulting conditions can be lethal for shellfish and finfish. The potential for fish kills is especially high if flood water levels continue into summer months and are subsequently drained with a rapidly descending river hydrograph.

CONTAMINANTS / POLLUTION

Water quality

Mercury advisories – Issued by Department of Health & Hospitals in 1996, 1999 and updated in 2003. The following link gives a detailed description of the species named in the advisory and consumption rates associated with them.
Fish Consumption Advisory - Henderson Lake

Specific alerts pertaining to a particular waterway can be found at the Louisiana Department of Health and Hospital's (LDHH) link below.
www.ldh.la.gov/EatSafeFish

Fish tissues were again sampled for mercury in 2016, as funding recently became available. That update will be added when available.

Water level

The U.S. Geological Survey has real-time data available at the following websites
http://waterdata.usgs.gov/la/nwis/rt

1. Lake Pelba at I-10 near Henderson, LA (Gage height and Stream level, NAVD)
http://waterdata.usgs.gov/usa/nwis/uv?site_no=302020091435700
2. Pontoon Bridge Canal near Butte Larose, LA (Gage height and Stream level, NAVD)
http://waterdata.usgs.gov/la/nwis/uv?site_no=301655091440800

Water levels can change dramatically in Henderson Lake from rainfall or rises in the Atchafalaya River. During high water, Henderson receives backwater from the Atchafalaya River. During low water, Bayou Courtableau is the main source of water. Typically, water fluctuates 4 – 5 feet annually, which may increase the acreage of Henderson Lake from 5,000 to 7,500 acres. However, in some years, fluctuations can vary as much as 10 feet or more, as seen in 2016. During 2017, river levels remained high into the early summer, combined with heavy rainfall from several tropical systems, resulted in potential flood waters being diverted into Henderson at the Bayou Courtableau drainage structure. During the month of June, lake levels spiked to over 18 ft. MSL, nine feet over pool stage. At the time of this update, lake levels in 2017 have never dropped below 10 ft. MSL.

BIOLOGICAL

Fish samples

In the 1960's and 1970's, biomass sampling (rotenone with block-off net) was conducted in Henderson Lake. From the mid 1980's to present, electrofishing, creel surveys, nets, rotenone, seines and water quality samples have been used to help monitor and manage fisheries in this water-body. Table 3 below describes sampling methods/gear types and scheduled sampling activities through 2019.

Table 3. Historical, present and proposed independent fisheries sampling conducted in

Henderson Lake, LA, from 2005 to 2019.

2005	Electrofishing, creel survey, aquatic type map, aquatic weed treatment
2006	Electrofishing, gill nets, water quality, stocking, aquatic type map
2007	Electrofishing, water quality, crappie age & growth, stocking, aquatic weed treatment, lead nets, drawdown
2008	Creel survey, stocking, aquatic type map, aquatic weed treatment
2009	LMB population assessment, Electrofishing, rotenone, gill nets, seine, water quality, bass age/genetics, aquatic weed treatment
2010	LMB population assessment, Electrofishing, hoop nets, water quality, aquatic weed treatment
2011	LMB population assessment, Electrofishing, gill nets, water quality, aquatic weed treatment
2012	Electrofishing, gill nets, water quality, aquatic weed treatment
2013	Electrofishing, gill nets, water quality, aquatic weed treatment, and plankton net pulls to measure larval Asian carp abundance, creel survey
2014	Electrofishing, gill nets, water quality, aquatic weed treatment, and plankton net pulls to measure larval Asian carp abundance, creel survey
2015	Electrofishing, gill nets, water quality, aquatic weed treatment, other projects as necessary
2016	Electrofishing, water quality, aquatic weed treatment, other projects as necessary
2017	LMB population assessment, Electrofishing, water quality, aquatic weed treatment, other projects as necessary
2018	LMB population assessment, Electrofishing, water quality, aquatic weed treatment, other projects as necessary
2019	LMB population assessment, Electrofishing, water quality, aquatic weed treatment, other projects as necessary, creel survey

Lake records
9.8 lbs. for largemouth bass

Stocking History
Two species of sport fishes have been stocked into Henderson Lake in recent years, the Florida largemouth bass (FLMB) and hybrid striped bass. The stocking history (species and number) is shown in Table 4 below.

In a further attempt at controlling hydrilla, 25,000 triploid (sterile) grass carp, 12+ inches in length were stocked during the spring of 2014. Fish were certified as being triploid through a USFWS grass carp ploidy verification program.

Table 4. The stocking history of Henderson Lake, LA, from 2000 to 2006.

Year	FLMB	Hybrid Striped bass

2000	55,182	74,583
2001	49,980	-
2002	63,008	62,882
2003	67,127	29,784
2004	66,165	-
2005	65,624	-
2006	74,720	-
Totals	**441,806**	**167,249**
* All fish were fingerlings		

Species profile

Table 5. Fish species that have been collected in LDWF samples in Henderson Lake, LA.

List of Fishes Collected in Henderson Lake, Louisiana
Northern largemouth bass, *Micropterus salmoides*
Florida largemouth bass, *Micropterus floridanus*
Black Crappie, *Pomoxis nigromaculatus*
White Crappie, *Pomoxis annularis*
Bluegill, *Lepomis macrochirus*
Redear sunfish, *Lepomis microlophus*
Green sunfish, *Lepomis cyanellus*
Warmouth, *Lepomis gulosus*
Orangespotted sunfish, *Lepomis humilis*
Longear sunfish, *Lepomis megalotis*
Redspotted sunfish, *Lepomis miniatus*
Bantam sunfish, *Lepomis symmetricus*
Banded pygmy sunfish, *Elassoma zonatum*
Gizzard shad, *Dorosoma cepedianum*
Threadfin shad, *Dorosoma petenense*
Black bullhead catfish, *Ameiurus melas*
Yellow bullhead catfish, *Ameiurus natalis*
Blue catfish, *Ictalurus furcatus*
Channel catfish, *Ictalurus punctatus*
Flathead catfish, *Pylodictis olivaris*
Spotted gar, *Lepisosteus oculatus*
Longnose gar, *Lepisosteus osseus*
Alligator gar, *Atractosteus spatula*
Bowfin, *Amia calva*
River carpsucker, *Carpiodes carpio*
Bigmouth buffalo, *Ictiobus cyprinellus*

Smallmouth buffalo, *Ictiobus bubalus*
Brook silverside, *Labidesthes sicculus*
Golden topminnow, *Fundulus chrysotus*
*Unknown darter, *Etheostoma* spp.
Common carp, *Cyprinus carpio*
Paddlefish, *Polyodon spathula*
Bighead carp, *Hypophthalmichthys nobilis*
Silver carp, *Hypophthalmichthys molitrix*
Grass carp, *Ctenopharyngodon idella*

Asian carp were first found in the lake in January, 2001.
*Electrofishing in the fall of 2014 found a largemouth bass with two *Etheostoma* spp. in its mouth and throat. Due to decomposition, not able to identify to species.

Genetics

Henderson Lake has a dominant native northern largemouth bass population (91%) while 9% of those fish tested have contained the Florida genome (Table 5).

Table 5. The genetic analyses of largemouth bass stocks on Henderson Lake, LA. during 1999 and 2004. Tissues were collected from LDWF standardized electrofishing samples.

YEAR	NORTHERN	FLORIDA	HYBRID	FLORIDA INFLUENCE
1999	100 %	0 %	0 %	0 %
2004	91 %	1 %	8 %	9 %

Threatened/endangered/exotic species

No threatened or endangered species have been documented within Henderson Lake. Exotic species include Asian carp (silver, bighead, common, and grass carp).

CREEL

Historic information

Angler creel surveys were conducted in 2000, 2001 and 2005. The survey method used was a dockside (access point) survey of completed fishing trips. Percent of total harvest by species is presented in Table 6.

Another creel survey was recently conducted, specifically for black bass. This survey began July 1, 2013 and continued through Dec. 31, 2014. This creel survey was designed to focus on black bass since these were the only species affected by the 2013 regulation change. The next creel survey for Lake Henderson is scheduled to begin in 2019.

Table 6. The results of creel surveys conducted on Henderson Lake, LA, by year. Results are presented as the percent of total harvest of fish by species.

SPECIES	2000	2001	2005	AVERAGE
Bluegill	34.9%	55.0%	53.2%	45.5%
Black Crappie	25.9%	14.9%	25.2%	23.6%
White Crappie	23.0%	6.6%	5.7%	13.5%
Largemouth Bass	7.0%	3.7%	4.1%	5.3%
Warmouth	1.7%	2.2%	4.9%	3.0%
Redear Sunfish	1.7%	2.7%	2.9%	2.3%
Freshwater Drum	1.0%	8.1%	0.2%	2.0%
White Bass	0.5%	1.9%	0.7%	0.8%
Blue Catfish	0.1%	1.4%	1.1%	0.7%
Channel Catfish	0.4%	1.8%	0.2%	0.6%
Yellow Bullhead	0.2%	0.0%	1.3%	0.6%
Buffalo	1.3%	0.0%	0.0%	0.6%
Yellow Bass	0.4%	1.6%	0.0%	0.5%
Bowfin	0.6%	0.0%	0.4%	0.4%
Spotted Gar	0.8%	0.0%	0.0%	0.3%
Spotted Sunfish	0.1%	0.2%	0.2%	0.1%
Carp	0.2%	0.0%	0.0%	0.1%
Black Bullhead	0.1%	0.0%	0.0%	0.0%
Smallmouth Buffalo	0.0%	0.0%	0.0%	0.0%
Flathead Catfish	0.0%	0.0%	0.0%	0.0%

HYDROLOGICAL CHANGES

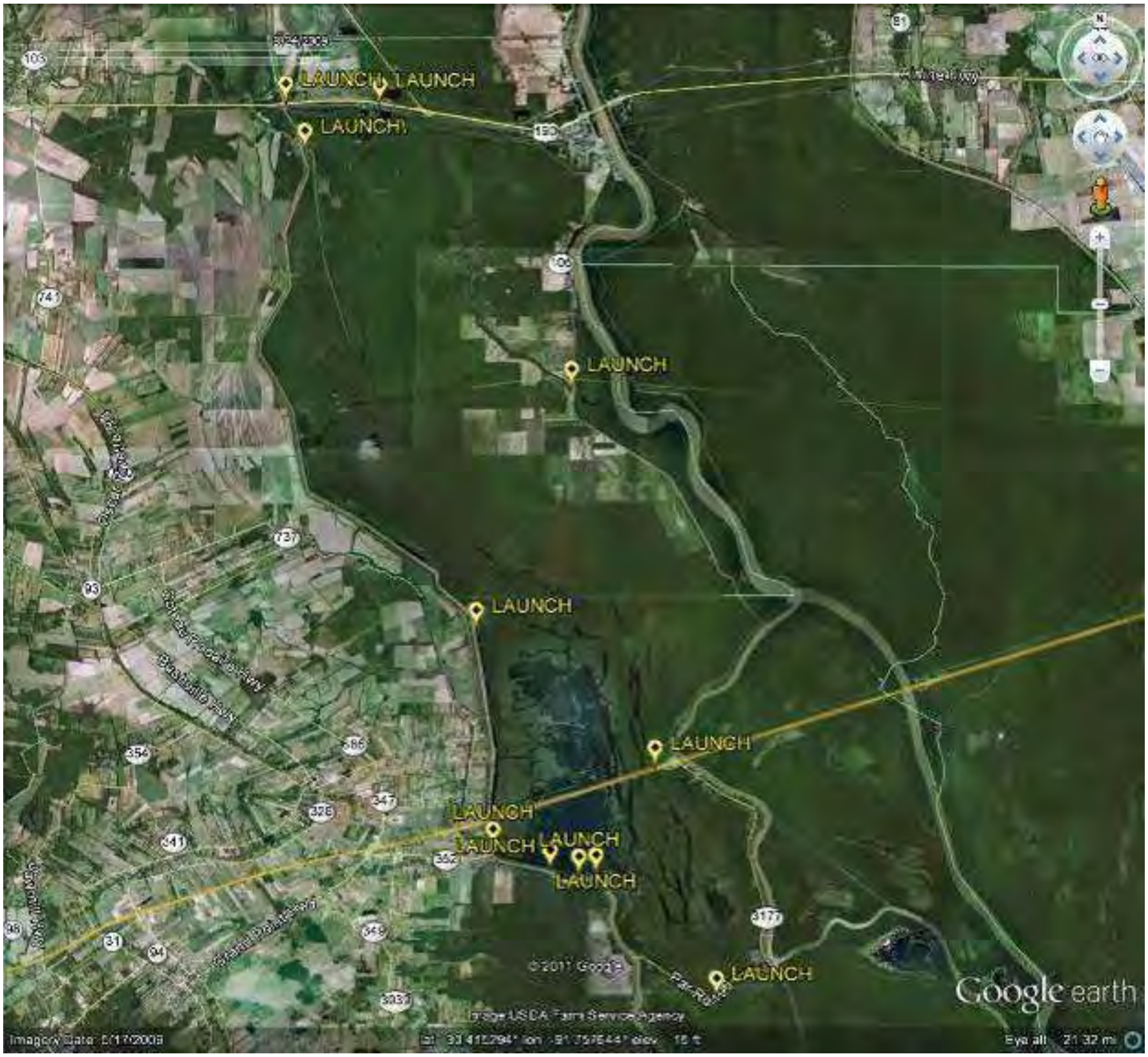
GRIMMET CANAL STRUCTURE- Owned and operated by the U. S. Army Corps of Engineers, this structure is located north of Interstate 10 (I-10) between Port Barre and Krotz Springs, Louisiana near Hwy 190. This structure is in place to allow for the removal of potential floodwaters from communities located along US 190, including Port Barre. When floodwaters reach 17.76 MSL this structure is opened and water flows through Henderson.

GATE ON HENDERSON – This control structure is located near Butte La Rose, south of I-10. St. Martin Parish operates this structure. This is a fixed structure set at 9.0 feet mean sea level (MSL).

DREDGING FOR I-10 – Water flow through Lake Henderson is typically from north to south, except when flood waters from the Atchafalaya River enter the system over the south control structure. Some of the canals were dredged to support specific uses, such as transport of materials to construct I-10 and for oil and gas exploration and production. At present these canals and bayous are utilized by the numerous marinas and tour operators located on the lake for fishing access and tourism. Some of these canals were re-dredged in the winter/spring of 2012/2013 in order to allow continual access during a drawdown.

Appendix I
(Click here to return)

Access Map



Appendix II
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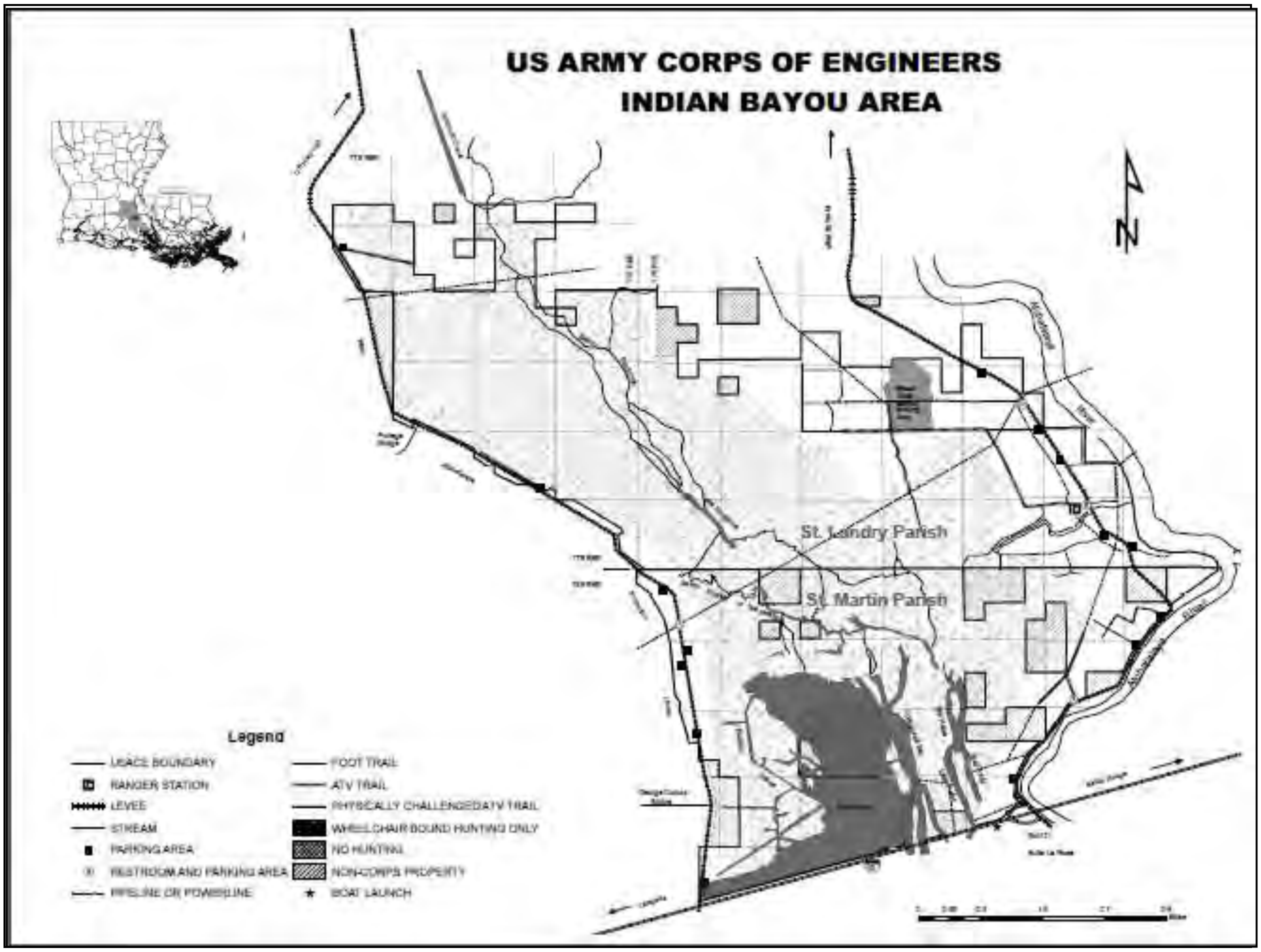
Map of USACE property in Henderson.



Appendix III
(Click here to return)

Map of State Water-bottoms in Henderson Lake.
State water-bottoms in blue and state lands in orange and pink outlined in black.

Appendix IV
([click to return]())

Henderson Lake
September 2006
Jody T. David

Henderson Lake, St. Martin parish, recently (8/28/06) was treated using SONAR to control the heavy infestation of Hydrilla south of interstate 10. Water levels in the lake were lowered two feet below pool stage to allow for adequate control; pool stage is 9.0 ft. (MSL).

Moderate amounts of common salvinia (*Salvinia minima*), coontail (*Ceratophyllum demersum*) and duckweed (*Lemna minor*) were found throughout the lake. Other plants that were observed in light to moderate amounts were primroses (*Ludwigia spp*.), sedge (*Carex spp*.), smartweed (*Polygonum hydropiperoides*), flatsedge (*Cyperus spp*.), and filamentous algae (*Pithophora spp*.) North of interstate 10 a heavy infestation of hydrilla and water hyacinth is present. This includes the north flats, Phillips canal, Coquille Bay and Fordoche Lake and bayou. These areas are Corps owned and were not treated.

Appendix U: LDWF Henderson Lake Waterbody Evaluation and Recommendations
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LOUISIANA DEPARTMENT
OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

HENDERSON LAKE

WATERBODY EVALUATION & RECOMMENDATIONS

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED ANNUALLY

May 2007 - Prepared by
Jody T. David, Biologist Manager, District 6

January 2012 – Vegetation recommendations updated by
Mike Walker, Biologist Manager, District 9

February 2014 - Updated by
Brac Salyers, Biologist Manager, District 9

August 2014 – Updated by
Brac Salyers, Biologist Manager, District 9

August 2015 – Updated by
Brac Salyers, Biologist Manager, District 9

September 2016 – Updated by
Brac Salyers, Biologist Manager, District 9

September 2017 – Updated by
Brac Salyers, Biologist Manager, District 9

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational

Black bass, crappie, and catfish in Henderson Lake are managed to provide anglers the greatest opportunity to catch and harvest a limit of fish. Sunfish are managed to provide a sustainable population while providing anglers the opportunity to catch and harvest numbers of fish.

Commercial

Commercial species of fish are managed to provide a sustainable population.

Species of Special Concern

No threatened or endangered fish species have been documented in this waterbody.

EXISTING HARVEST REGULATIONS

Recreational

The Louisiana Wildlife and Fisheries Commission amended a rule to repeal the 14-inch minimum length limit (MLL) on black bass in the Atchafalaya Basin and adjacent waters. Effective June 20, 2013, the new regulations were a 7 fish daily creel limit with no MLL. This regulation was in effect for two years. In June 2015, the regulation expired, and the area reverted to the statewide regulation of 10 black bass with no MLL.

Black Bass – no minimum length limit, 10 fish daily bag limit.

Statewide regulations for all fish species may be viewed at the link below:
http://www.wlf.louisiana.gov/fishing/regulations

Commercial

The commercial fishing regulations may be viewed at the link below:

http://www.wlf.louisiana.gov/regulations

SPECIES EVALUATION

Recreational

Electrofishing is the most commonly used sampling technique to assess largemouth bass (LMB) relative abundance (catch per unit effort = CPUE), size distribution, and relative weight (physical body condition). Data collected during fall electrofishing is used to describe population trends, age composition, growth rate and mortality rate. The water in Henderson Lake is typically under influence from the Atchafalaya River in the springtime. High, turbid waters are an inconsistent influence to sampling. For that reason, electrofishing sampling is conducted in the fall only.

Largemouth Bass

Relative abundance, size structure indices, and length distribution

Electrofishing catch per unit effort (CPUE) fluctuated significantly from 1988 through 1997 (Figure 1). The total catch rates for 1988 and 1989 were below 50 LMB per hour, while the average for 1992 and 1993 were over 150 an hour. The numbers declined again over the next two years and sharply increased the following two years. Results depicted in Figure 2 show LMB catch rates to be highly variable. In relation to total CPUE, catch rates of individual size classes provide a more detailed description of the variations.

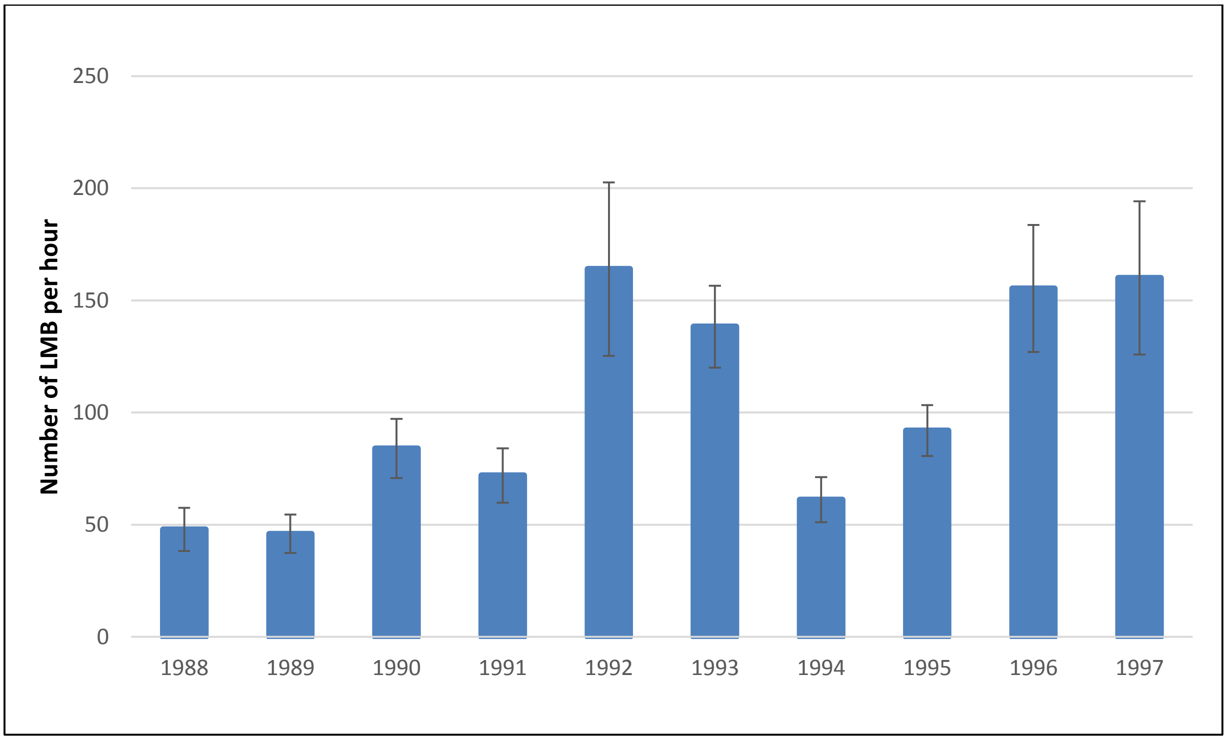

Figure 1. The mean total CPUE (± SE) for largemouth bass collected from Henderson Lake, LA during fall electrofishing (1988-1997).

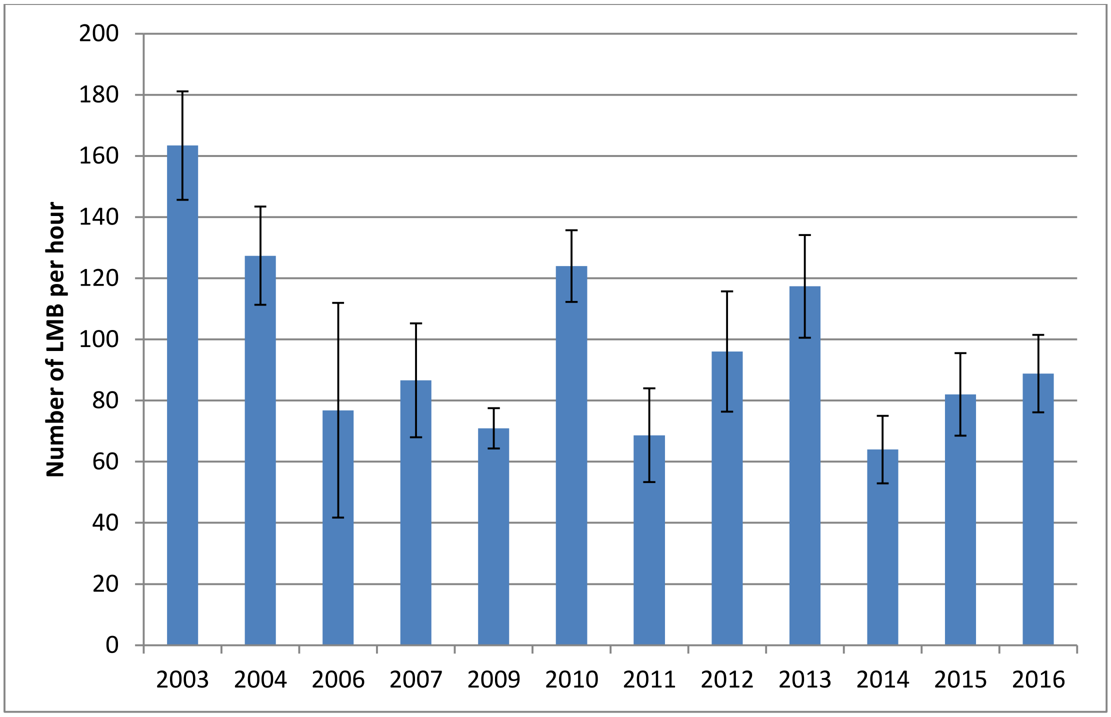

Figure 2. The mean total CPUE (+ SE) for largemouth bass collected from Henderson Lake, LA during fall electrofishing (2003-2016).

Sample catch indices in Figure 3 clearly show a sharp peak in reproduction (substock-size) in 1993 following Hurricane Andrew. Stock-size bass continued to increase with each successive year. The discovery of hydrilla in 1994 is associated with an upward trend of bass. In Figure 4, a strong sub-stock size class can be seen in 2003 subsequent to Hurricane Lili related fish kills. Lower catch rates for ’06, ’07, and ’09 are likely related to the series of fish kills resulting from Hurricanes Rita (2005) and Gustav and Ike (2008). The increased abundance observed in the 2010 sample reflects natural recovery from storm related fish kills.

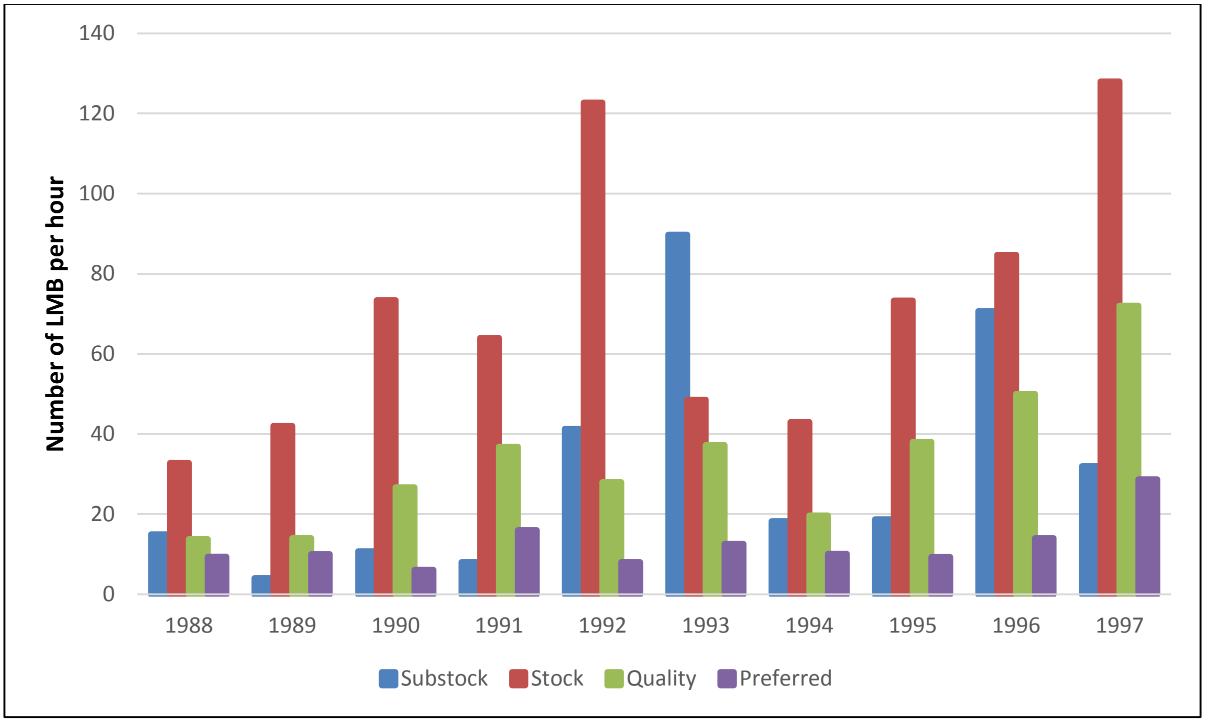

Figure 3. The CPUE for sub-stock, stock, quality and preferred size largemouth bass collected from Henderson Lake, LA during fall electrofishing (1988-1997).

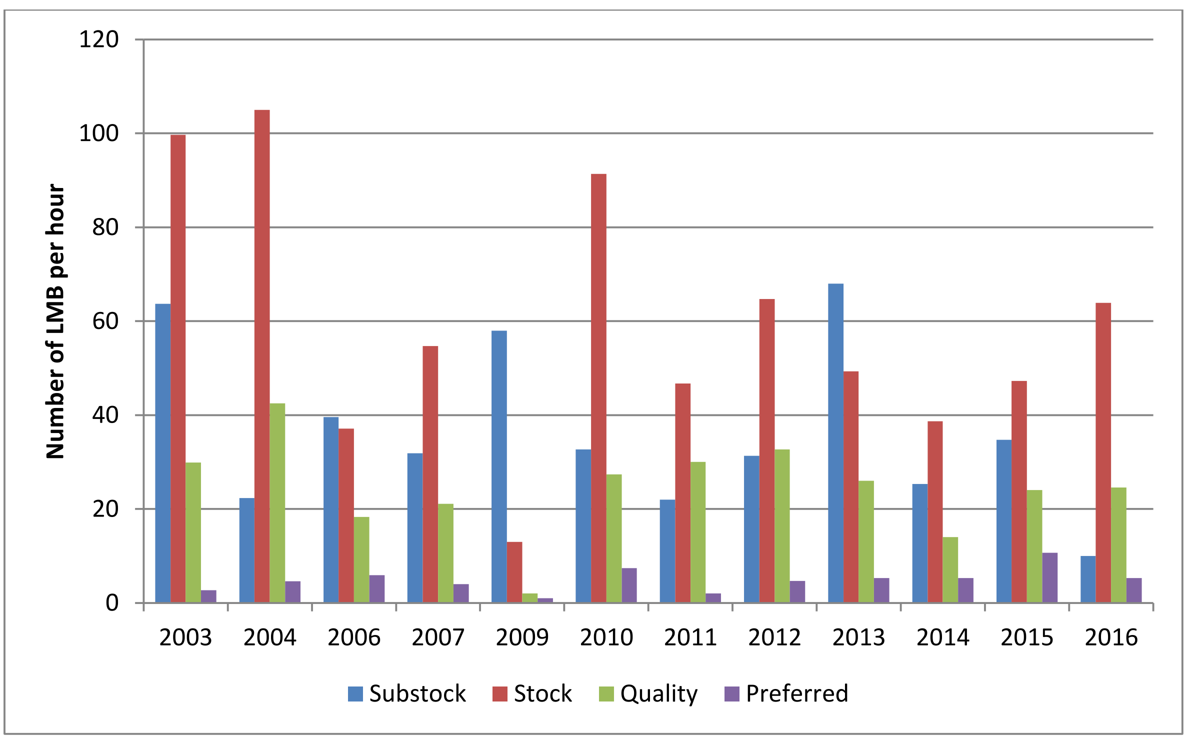

Figure 4. The CPUE for sub-stock, stock, quality and preferred size largemouth bass collected from Henderson Lake, LA during fall electrofishing (2003-2016).

Results from 2016 sampling represent current largemouth bass size distribution for Henderson Lake (Figure 5). Young-of-the-year (YOY) bass (3 to 6 inches) represent 7% of the sample. Stock and quality-size bass (8 to 14 inches) represent 87% of the sample. Bass greater than 14 inches represent 6% of the sample.

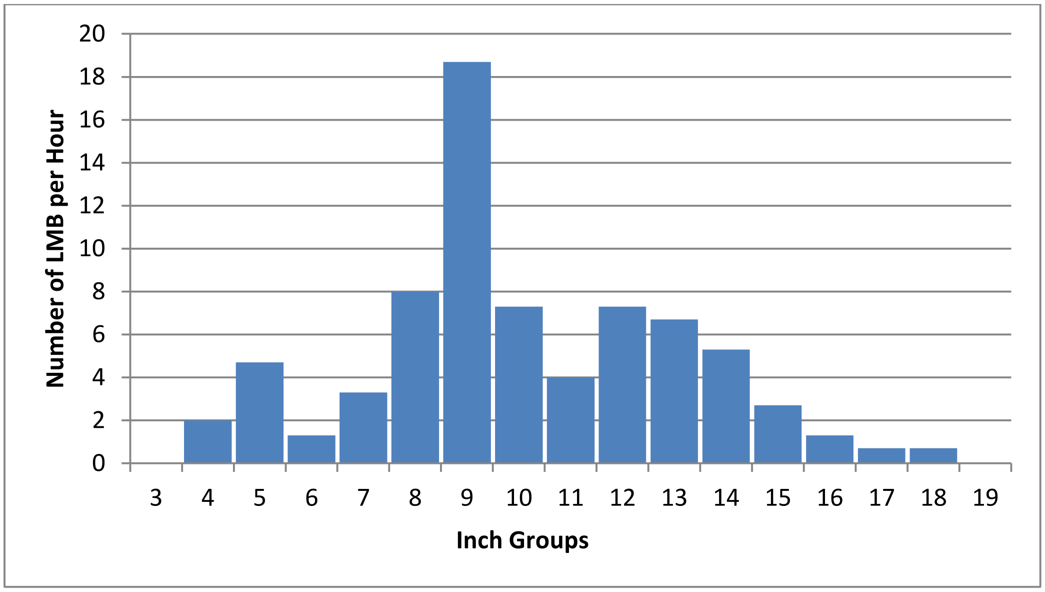

Figure 5. Size distribution (inch groups) of largemouth bass collected during one hour of electrofishing effort at Henderson Lake, LA in fall 2016 (n=111).

Proportional stock density (PSD) and relative stock density (RSD) are indices used to numerically describe length-frequency data (Anderson and Neumann 1996). Proportional stock density compares the number of fish of quality size (> 12 inches for largemouth bass) to the number of bass of stock size (> 8 inches in length), and is calculated by the formula:

$$PSD = \frac{\text{Number of bass} \geq 12 \text{ inches}}{\text{Number of bass} \geq 8 \text{ inches}} \times 100$$

PSD is expressed as a percentage. A fish population with a high PSD consists mainly of larger individuals, whereas a population with a low PSD consists mainly of smaller fish. A value between 40 and 70 generally indicates a balanced bass population.

Relative stock density (preferred, RSD_{15}) is the percentage of largemouth bass in a stock (fish over 8 inches) that are also 15 inches TL or longer, and is calculated by the formula:

$$RSD_{15} = \frac{\text{Number of bass} \geq 15 \text{ inches}}{\text{Number of bass} \geq 8 \text{ inches}} \times 100$$

An RSD_{15} value between 10 and 40 indicates a balanced bass population, while values between 30 and 60 indicate a higher abundance of larger fish.

As seen in Figure 6, these 10 years of data show a viable bass population, with 7 of 10 years having favorable PSD values, and 8 of 10 years having favorable RSD_{15} values. The poorest stock density values (1992) reflect sampling conducted in the wake of Hurricane Andrew.

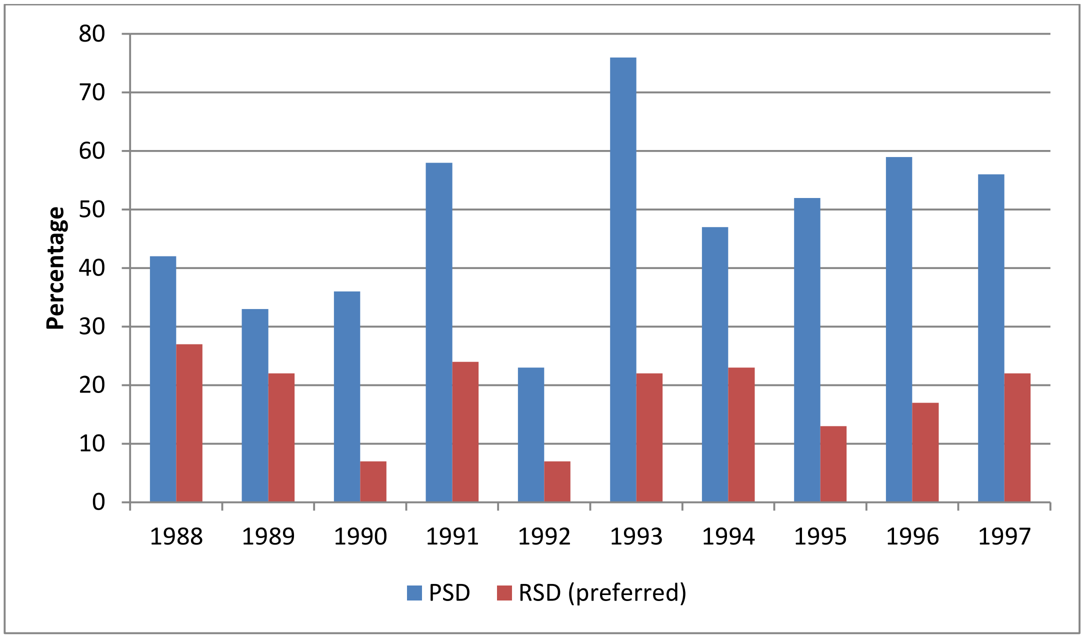

Figure 6. Proportional stock density (PSD) and relative stock density (RSD_{15}) for largemouth bass collected from Henderson Lake, LA during fall electrofishing (1988 – 1997).

The last 12 years of stock density data (Figure 7) indicate that the Henderson Lake bass population is lacking in abundance of bass larger than 15 inches. The influence of environmental conditions is undoubtedly a significant contributing factor. Events occurring within this time frame include 3 major hurricanes, 2 floods, and a year of very low water levels.

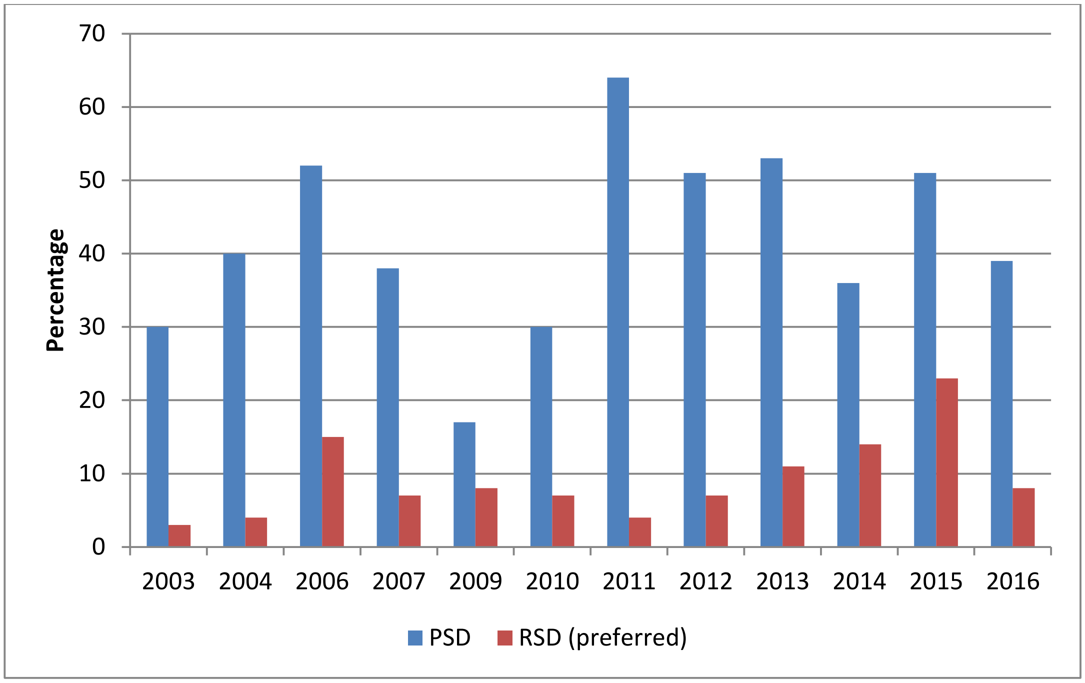

Figure 7. Proportional stock density (PSD) and relative stock density (RSD_{15}) for largemouth bass collected from Henderson Lake, LA during fall electrofishing (2003 – 2016).

<u>Relative weight</u>

Mean relative weight (Wr) for each inch group is shown below in Figure 8. This measurement is defined as the ratio of fish weight to the weight of a ''standard'' fish of the same length. The Wr index is calculated by dividing the weight of a fish by the standard weight for its length, and multiplying the quotient by 100. Largemouth bass relative weights below 80 may indicate a problem of insufficient or unavailable forage; whereas relative weights closer to 100 indicate that sufficient forage is available. A description of the forage species and relative abundance is described below. Mean relative weights for almost all size classes of largemouth bass from Henderson Lake are at or above the 95 value. Relative weights for 2012-2016 were all near or exceeded the 100 value. The robust body condition of Henderson Lake bass is an indication that bass forage is abundant and available.

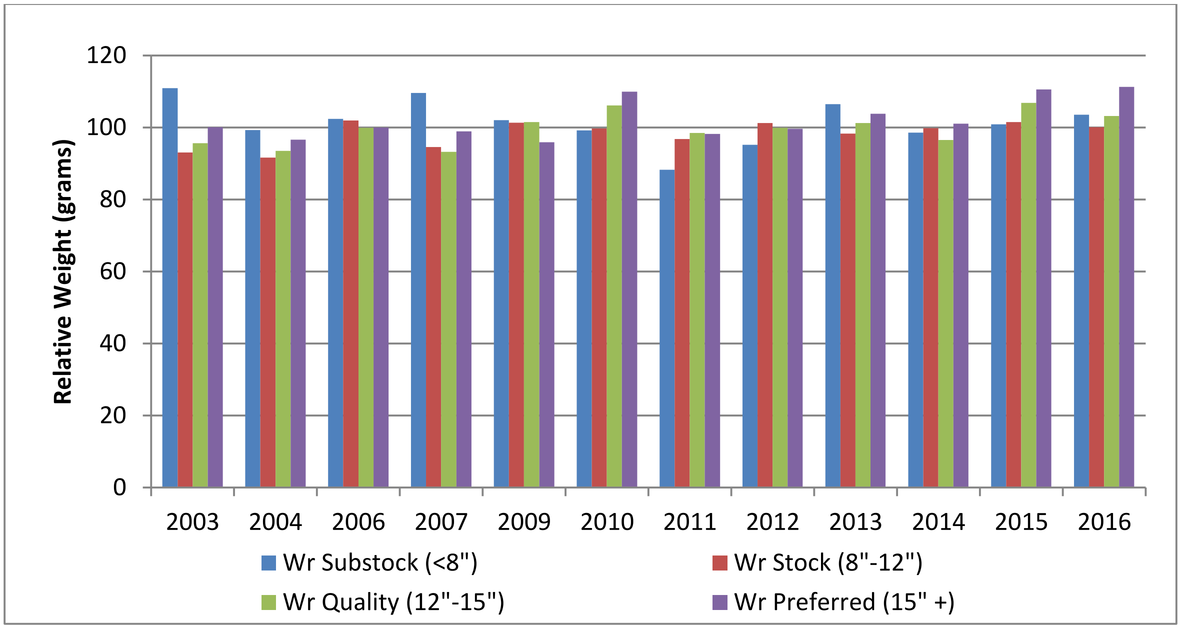

Figure 8. The mean relative weights by length category for largemouth bass collected from fall electrofishing (2003-2016; n=1,589).

Forage

Henderson Lake forage is primarily comprised of shad and sunfish. An average of three 1-acre rotenone samples/year is shown below. The results provide an indication that forage has not been a limiting factor in largemouth bass growth.

Table 1. Total weight (lbs.) of forage fishes collected from Henderson Lake, LA (1981-1998).

Year	Total lbs./acre — forage
1981	215.7
1985	1,835.2
1987	372.1
1990	131.5
1997	166.0
1998	224.4

Largemouth bass genetics

Genetic analyses of largemouth bass through electrophoresis of liver tissues show a range of 0 to 1% total Florida largemouth bass (FLMB) genome influence from the years 1999 and 2004 (Table 2). Florida largemouth bass were stocked annually from 2000 to 2006 at a rate of approximately 10 fish per acre. Despite the multiple stockings, genetic sampling conducted in 2004 indicates that only 9% of the Henderson Lake bass population carried genetic material characteristic of Florida bass. Such results may be disappointing in terms of providing genetic potential for large bass size but, they are not entirely negative. The failure of a larger Florida bass influence provides additional confirmation that the native bass population is particularly resilient, and that recruitment is strong. Because of the lack of establishment of the Florida gene in Henderson Lake, the decision was made to no longer stock FLMB but rather rely on the native bass population for recruitment.

Table 2. Genetic analysis of largemouth bass samples from Henderson Lake, LA (1999 and 2004).

Year	Northern	Florida	Hybrid	Florida Influence
1999	100%	0%	0%	0%
2004	91%	1%	8%	9%

Black Crappie

Relative abundance and size distribution-

As shown in Figure 9, fall electrofishing CPUE for black crappie on Henderson Lake showed consistently lower numbers from 1988 through 1992. Hurricane Andrew struck in August of 1992. Fish kills related to Hurricane Andrew were massive. Increased abundance of sub-stock size (YOY) crappie in 1993 is evidence of fish population recovery from those kills. Diminished predation allowed high survival of newly spawned fish. A similar increase is noted in 2003 following Hurricane Lili (Figure 10).

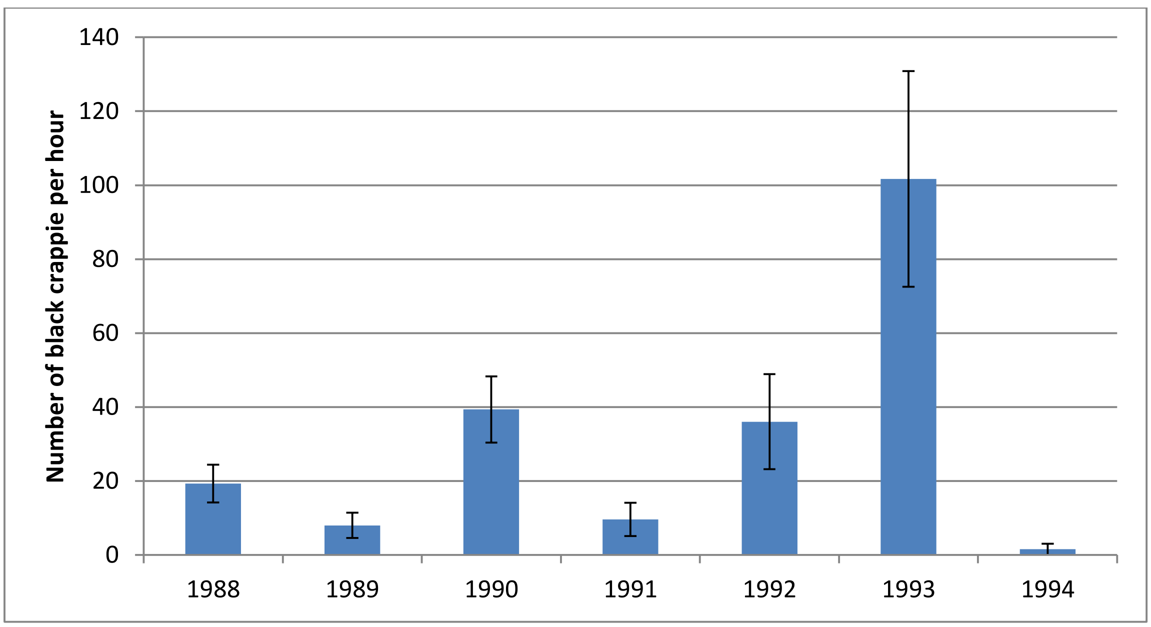

Figure 9. The mean total CPUE (± SE) for black crappie collected from Henderson Lake, LA during fall electrofishing (1988-1994).

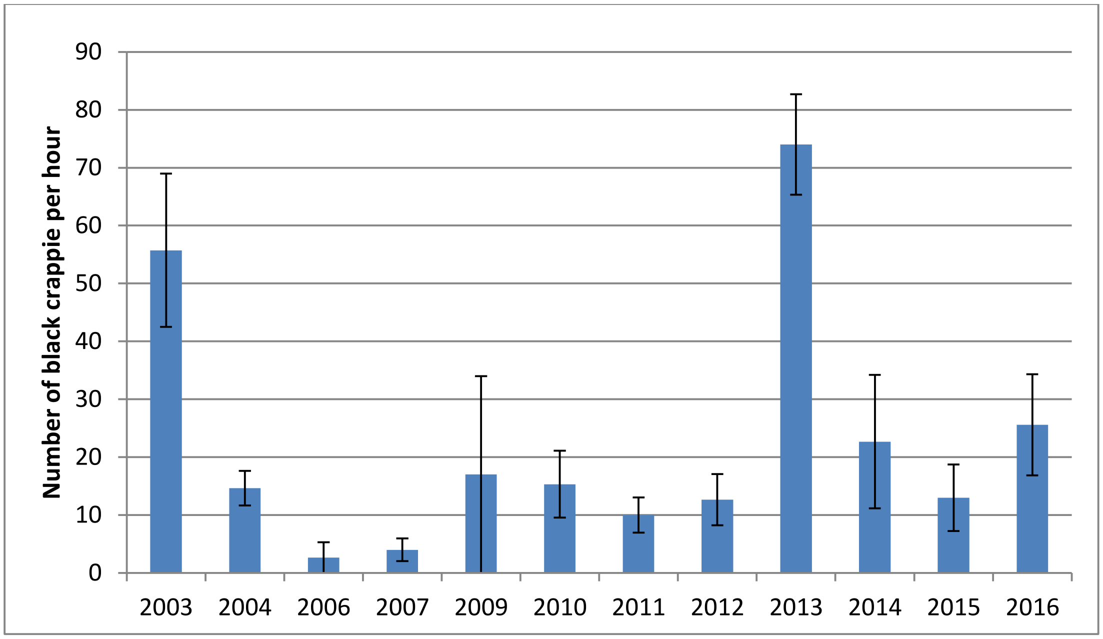

Figure 10. The mean total CPUE (± SE) for black crappie collected from Henderson Lake, LA during fall electrofishing (2003-2016).

Black crappie catch indices show consistently lower catch rates from 1988-1992 with an increased number of stock-size crappie (5-8 inch) collected in 1990 (Figure 11). The large increase in sub-stock and stock size crappie in 1993 indicates recovery from Hurricane Andrew related fish kills. The sharp increase in crappie collected in 2003 shows that stock size fish (5-8 inch) were in relatively high abundance (Figure 12). The rise in sub-stock size fish (4 inches or smaller) in 2009 indicates recovery after Hurricane Gustav. That cohort can be followed into the next year (2010) with an increase in stock-size fish (5-8 inch) abundance. The upward spike in total CPUE in 2013 (primarily sub-stock and stock-size fish) seen in Figures 10 and 12 are believed to be a very strong year class of crappies that were spawned following the drought conditions of 2010 – 2012.

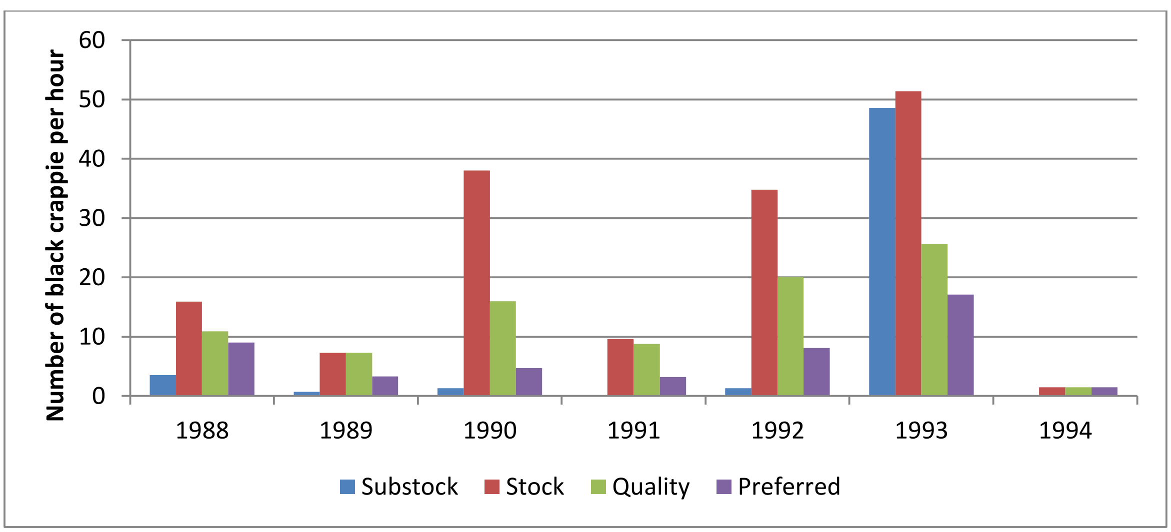

Figure 11. The CPUE for sub-stock, stock, quality, and preferred size black crappie collected from Henderson Lake, LA during fall electrofishing (1988-1994).

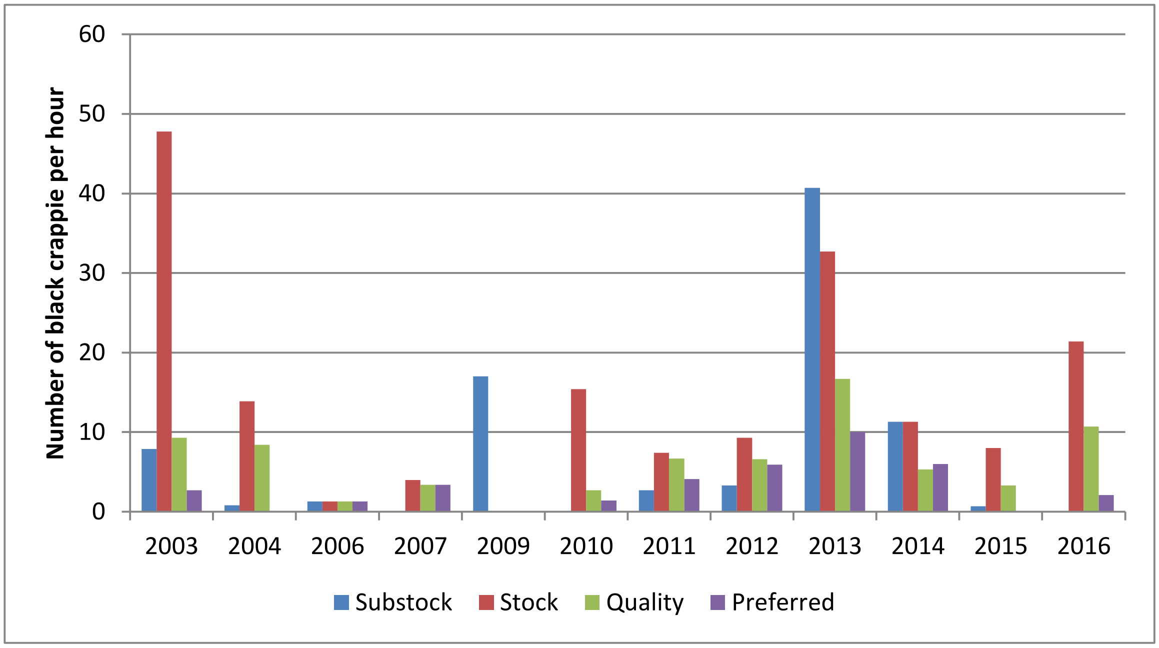

Figure 12. The CPUE for substock-, stock-, quality- and preferred-size black crappie collected from Henderson Lake, LA during fall electrofishing (2003-2016).

Size distribution for black crappie in 2016 is shown in Figure 13. The majority of fish collected were stock size fish (5-7 inches) followed by a moderate amount of fish in the quality size range (8-10 inch) and a few from the preferred size (10-12 inch) range.

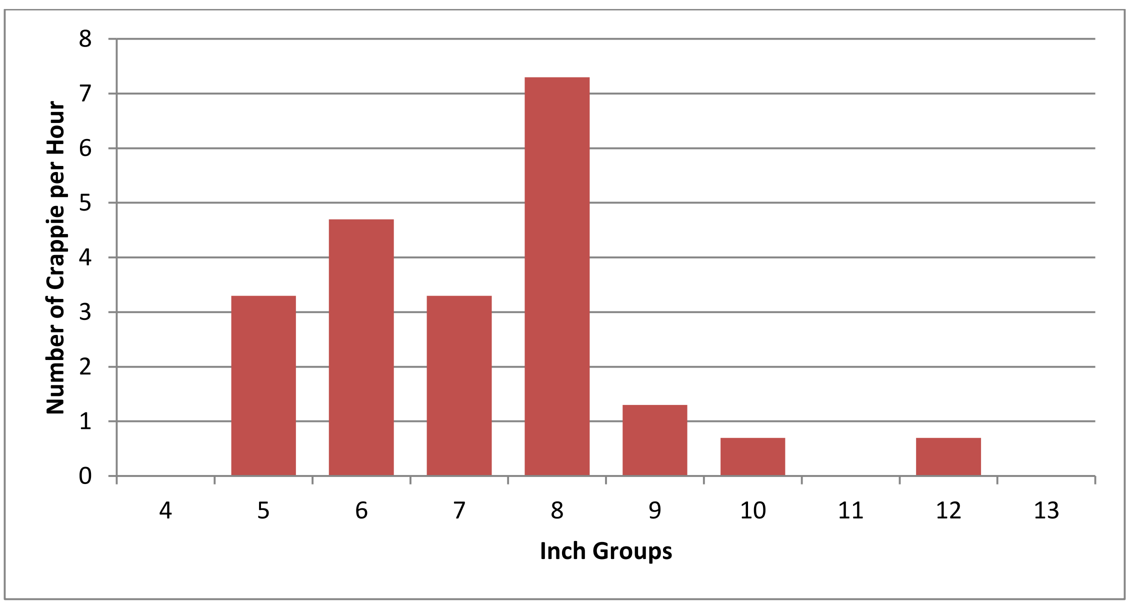

Figure 13. Size distribution for black crappie collected from one hour of electrofishing at Henderson Lake, LA in fall 2016 (n=32).

Sunfish

Shoreline seine sampling is conducted to collect information related to species composition, year class strength, and prey availability. Henderson Lake sampling was conducted in summertime periods of 2000, 2001, and 2005. All samples were conducted at night from one-half hour after sunset until one–half hour before sunrise. One quadrant haul, using a 25-foot x 6-foot seine, was conducted at each sampling station. A total of three samples were taken each year at three boat ramps, one per ramp. The quadrant haul was conducted by anchoring one end of the seine at the shoreline and the other stretched perpendicular to the shoreline. The distal end was then swept back around to the shoreline, keeping the lead line tight and on the bottom. After the seine haul is completed, all fish from the seine are placed in a plastic bag, properly marked, and placed on ice. Fish specimens were sorted to species, and by length. Total number of sunfish collected is provided in Table 3.

Table 3. Sunfish collected from Henderson Lake, LA by seine haul from 2000-2005.

YEAR	TOTAL NUMBER CAUGHT
2000	1,110
2001	738
2005	1,450

Commercial

Commercial landings statistics are reported by parish and not by waterbody. As a result, landings data specific to Henderson Lake is not available. However, Henderson Lake has a thriving commercial fishery. Harvest includes crawfish, catfish, buffalo, and freshwater drum.

Aquatic invasive species

Asian carp are present in Henderson Lake. They include the grass carp, common, bighead, and silver carp. Asian carp fish kills have been observed during periods of rapidly decreasing water levels.

Creel Surveys

Angler creel surveys were conducted in 2000, 2001, and 2005. The survey method used was an access point survey of completed fishing trips. Percent of total harvest by species is presented in Table 4.

Table 4. The results of creel surveys conducted on Henderson Lake, LA, by year. Results are presented as the percent of total harvest of fish by species.

SPECIES	**2000**	**2001**	**2005**	**AVERAGE**
Bluegill	34.9%	55.0%	53.2%	45.5%
Black Crappie	25.9%	14.9%	25.2%	23.6%
White Crappie	23.0%	6.6%	5.7%	13.5%
Largemouth Bass	7.0%	3.7%	4.1%	5.3%
Warmouth	1.7%	2.2%	4.9%	3.0%
Redear Sunfish	1.7%	2.7%	2.9%	2.3%
Freshwater Drum	1.0%	8.1%	0.2%	2.0%
White Bass	0.5%	1.9%	0.7%	0.8%

Blue Catfish	0.1%	1.4%	1.1%	0.7%
Channel Catfish	0.4%	1.8%	0.2%	0.6%
Yellow Bullhead	0.2%	0.0%	1.3%	0.6%
Buffalo	1.3%	0.0%	0.0%	0.6%
Yellow Bass	0.4%	1.6%	0.0%	0.5%
Bowfin	0.6%	0.0%	0.4%	0.4%
Spotted Gar	0.8%	0.0%	0.0%	0.3%
Spotted Sunfish	0.1%	0.2%	0.2%	0.1%
Carp	0.2%	0.0%	0.0%	0.1%
SPECIES	**2000**	**2001**	**2005**	**AVERAGE**
Black Bullhead	0.1%	0.0%	0.0%	0.0%
Smallmouth Buffalo	0.0%	0.0%	0.0%	0.0%
Flathead Catfish	0.0%	0.0%	0.0%	0.0%

Another angler creel survey was recently conducted from July 1, 2013 through Dec. 31, 2014. The survey method used was an access point survey of completed fishing trips. The size distribution of angler harvested largemouth bass for the 18-month duration of the creel is presented in Figure 14. The majority of fish harvested were in the 13 and 14 inch groups. During this time period, it is estimated that 55,934 largemouth bass were caught. Of those, 15,428 were harvested and 40,506 were released, for a release rate of 72%. The next creel survey scheduled for Henderson Lake is in 2019.

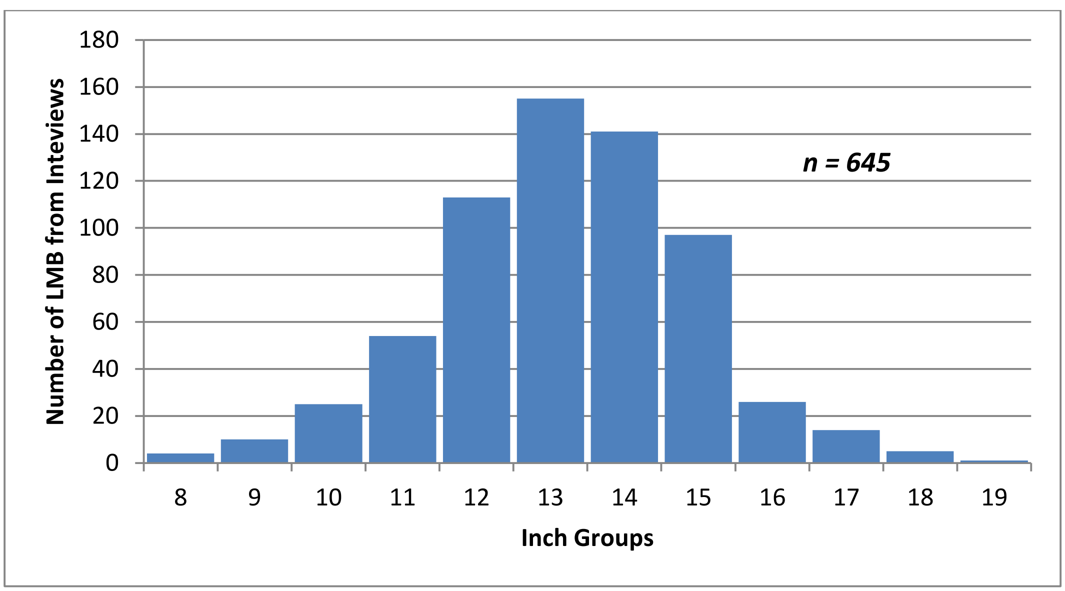

Figure 14. The size distribution (inch groups) of angler harvested largemouth bass from Henderson Lake, LA for July 1, 2013 – December 31, 2014.

HABITAT EVALUATION

Aquatic Vegetation

There is ongoing concern with overabundant aquatic vegetation in Henderson Lake. The primary species of concern are hydrilla (*Hydrilla verticillata*), water hyacinth (*Eichhornia crassipes),* and recently, giant salvinia (*Salvinia molesta*). Complaints related to boating access are common from fishermen, hunters, camp owners, and boat launch operators. Unfortunately, immediate relief is typically expected. However, the chemicals used to control these plants are systemic herbicides. Systemic herbicides are effective, but a few days to several weeks may be required for complete plant mortality. The effects of systemic herbicides are directly related to plant metabolism, which is related to air temperature. Private boat landings as well as the public launch at the I-10 Butte La Rose Welcome Center are often cleared of water hyacinth only to have rafts of new plants block the ramps following a change in water levels or wind direction. Hydrilla was first discovered in the lake in 1994. For many years following, and up until the summer and fall of 2013 and 2014, there was approximately 50% coverage, or 2,500 acres of hydrilla in Henderson Lake as seen in Map 1 below. Presently, the coverage is unknown, but it appears to be significantly less than in previous years. By late summer, the north and south flats would 'top out' with hydrilla at the water surface, expanding growth through the entire water column. In 2015 and 2016, none of the excess growth was seen. That level of growth has also not been seen as of September 2017, though small patches of hydrilla were seen during the winter of 2017.

Recently, giant salvinia has also become another seriously problematic aquatic invasive species in the lake. Surveys in the fall and winter of 2015/2016 showed the plant expand from a moderate amount of material in December, to a massive infestation by April (estimation of acreage unknown). Surveys found that the entire flooded northern woods were filled with the plant. This huge increase in giant salvinia was believed to have occurred as the result of high waters earlier than normal in the winter months providing an abundance of inaccessible and sheltered backwater habitat, along with very mild winter temperatures.

Giant salvinia was first detected in Henderson Lake in the fall of 2012. Though eradication efforts were attempted, plants were observed again in 2013. Biological controls were introduced in September 2013 with the release of plant material containing giant salvinia weevils (*Cyrtobagous salviniae*). An estimated 19,360 adult weevils were released at that time. Another release conducted in late July 2015, included an estimated 14,580 adult weevils. Weevils were also released in April 2016, with an estimated 13,986 adult weevils placed in heavy infestations of giant salvinia. In June 2017, another release was conducted with an estimated 31,500 weevils placed in the lake. A total of almost 79,500 weevils have been released within the last five years. It appears that plant control from weevil herbivory is working well in Henderson Lake, as damaged salvinia plants have been noted throughout the lake, and weevil densities remain high. Depending upon the severity of upcoming winters, it also appears that some of the weevils are surviving through the winter and continue to feed on the plants the following spring.

During 2014, LDWF spray crews treated 2,215 acres of water hyacinth and 63 acres of alligator weed with 2,4-D, 34 acres of common salvinia and 56 acres of giant salvinia with either a glyphosate/diquat mixture, or diquat depending on the time of year. During November 1st-March 31st, only diquat is used to spray salvinia species, while a glyphosate/diquat mixture is used from April 1st-October 31st based on the differences in plant metabolism and air temperatures. Also, 8 acres of pennywort were treated with 2,4-D. No contract spraying was necessary in 2014.

At the end of 2014, LDWF's Inland Fisheries Division began an attempt to downsize the aquatic plant program by ending temporary sprayer positions and focus more on private applicator contracts to treat problematic areas. This cost-savings effort removed 2 sprayers from the District 9 office that assisted in spraying efforts on Henderson Lake. Because of this, there is no longer a dedicated LDWF spray crew on the lake. Vegetation management will instead be achieved through privately contracted treatments.

During 2015, LDWF crews treated 123.5 acres of water hyacinth and 6 acres of alligator weed with 2,4-D. Also treated were 31 acres of duckweed using diquat, 12 acres of common salvinia and 17 acres of giant salvinia with either a glyphosate/diquat mixture, or diquat depending on the time of year as mentioned above. Two contracts utilizing by private applicators were also needed in 2015 to spray additional areas. The first contract was in February and treated 99 acres of water hyacinth with 49.5 gallons of 2,4-D. This herbicide application included a non-ionic surfactant at a rate of 0.125 gallons per acre. A second contract in December treated 80 acres of giant salvinia with 60 gallons of diquat. This herbicide application also included a non-ionic surfactant at a rate of 0.25 gallons per acre.

During 2016, LDWF spray crews made foliar herbicide applications on nuisance plants such as alligator weed, duckweed, pennywort, primrose, common and giant salvinia, and water hyacinth. A total of 59 gallons were applied to 81 acres. Foliar applications of 2,4-D (0.5 gal/acre) were used to control water hyacinth. Common and giant salvinia were controlled with a glyphosate/diquat mixture of glyphosate (0.75 gal/acre) / diquat (0.25gal/acre). Diquat was applied at 1.0 gallons per acre to control duckweed.
The alligator weed, pennywort, and primrose were not the targeted species of plants during those applications, but rather were incidentally treated with those plants that were being targeted. Additionally, two contracts utilizing private applicators were initiated to spray additional concentrations of giant salvinia. The first contract in May treated 480 acres, and the second was in June also treated 480 acres. These two contracts treated a combined 960 acres of giant salvinia using 720 gallons of glyphosate, 240 gallons of diquat, and 240 gallons of Turbulence.

As of August 2017, LDWF spray crews had treated 20 acres of a mixture of duckweed, giant salvinia, common salvinia, and water hyacinth with 20 gallons of diquat along with 5 gallons of the surfactant Activate Plus. No contract spraying has been needed thus far in 2017.

Triploid grass carp (TGC) were stocked in 2014 (25,000 fish, 12+ inches in length) to assist with the ongoing hydrilla problem within the lake. The fish were certified as being triploid (sterile) by the U.S. Fish and Wildlife Service.

Map 1. Henderson Lake hydrilla coverage as of June, 2013.

CONDITION IMBALANCE / PROBLEM

1. In the absence of natural controls, invasive aquatic vegetation, including water hyacinth, giant salvinia, and hydrilla become overabundant each growing season.

2. Atchafalaya River water inundates Henderson Lake during high river flows. During a river flood pulse, water enters the control structure on the south end of the impoundment and then drains out of the same structure when the water later recedes. This hydrologic condition often creates a low dissolved oxygen situation and associated fish kills.

CORRECTIVE ACTION NEEDED

1. Reduce overabundant vegetation through available means of control. In 2013, LDWF met with officials from St. Martin Parish and the town of Henderson, LA and proposed a fall 2013 drawdown. All parties were in favor of the proposed action. Mr. Guy Cormier, St. Martin Parish President, applied for a drawdown permit with the USACE in the summer of 2013. This permit is required because of the USACE's 28,500 acre, Indian Bayou Wildlife Management Area, but also due to a Chitimachan Indian burial site that could be exposed with a reduction in water level. The permit was not issued that year because of the length of the permit process and a federal government shutdown (USACE, personal communication). The LDWF recommended a drawdown for the fall of 2014, and the St. Martin Parish Government re-applied for a permit. The permit was issued in August 2014 and is valid for 5 years. A drawdown was initiated in mid-August of 2014, and water levels were maintained at 6.0 ft. MSL until November 1st. Another drawdown was scheduled for the fall of 2015, but due to persistent high river levels throughout the summer, the drawdown was not able to be conducted as planned. In July 2016, LDWF met with St. Martin Parish officials to discuss having another drawdown in the fall. Two weeks later they held a public meeting in Henderson, LA to give a presentation on the drawdown proposal and to hear public concerns. By the conclusion of the meeting, it was agreed upon to go ahead with another fall/winter drawdown. The structure was opened on August 8th, and 5 days later south Louisiana was hit with unprecedented amounts of rainfall from an unnamed storm system resulting in 20+ inches of rain in many areas, and widespread flooding that would later come to be known as the "Flood of 2016'. The lake level at the Pelba gauge jumped from almost 8 ft. during the beginning of the drawdown, to nearly 15 ft. in those two weeks afterwards. Although nearly two months of drying time was lost due to the high water levels associated with the August floods, the lake reached pool stage again in late September and the drawdown was attempted again. Water levels were lowered and maintained during the month of October, and despite the drawdown ending on Nov. 1st, a lack of rainfall during November kept the lake under 8 ft. MSL until heavy rains came in early December. Though abbreviated, the drawdown was successful in stranding large amounts of giant salvinia and water hyacinth. The effect on the remaining hydrilla was likely minimal. Another drawdown was planned for the fall of 2017, but mechanical issues with the control structure have made it unable to be opened. Repairs are needed on the hydraulic cables, but at the time of this update, water levels were still too high to safely attempt repairs. The inability to open the structure further slows the drainage of water from the lake. An annual fall/winter drawdown is recommended for 5 consecutive

years for hydrilla control. LDWF will continue to recommend drawdowns, monitor problematic vegetation during that time, evaluate their effectiveness, and make recommendations for future control efforts.

2. There are two solutions to the recurring fish kills in Henderson Lake.
    a. The first option would be for Henderson Lake to be completely separated from the Atchafalaya Basin and become a reservoir kept at pool stage with a structure that prohibits Atchafalaya flood waters from entering and draining from the southern end. The structure would need to be constructed with an overflow feature to allow rain water to drain from the lake and have the capability to conduct annual drawdowns for vegetation control.
    b. The second option would be to completely remove the control structure at the drain and have openings to the Atchafalaya River in the northern portion of the lake. This would allow Henderson Lake to fluctuate naturally with the river stage and have water flow from north to south through the system. The annual drying and flooding of Henderson Lake would then more closely mimic historical conditions.

RECOMMENDATIONS

1. Five consecutive years of summer/fall drawdowns beginning in 2014 are recommended for Henderson Lake. Previous efforts have proven that single year drawdowns have little effect on hydrilla in Henderson Lake. The southern control structure should be opened after the spring/summer flood cycle has fallen below 9 ft. MSL at the Butte La Rose gauge. The structure should remain open until the water level is 3 ft. below pool stage (6.0 ft. MSL). The dewatering rate should not exceed 4 inches per day. The 6.0 ft. MSL water level should be maintained as long as possible to achieve maximum potential. The heat from the summer months, as well as the possible freezing temps from the winter months, could provide a potential ‘double impact’ to vegetative propagules during a drawdown. After the first drawdown, as many as 80-90% of hydrilla tubers in the bottom sediment will sprout, giving the false impression of failure. Consecutive drawdowns will be necessary to deplete hydrilla propagules in Henderson Lake. Natural water level fluctuation in the Mississippi/Atchafalaya Rivers will re-flood the lake during the winter and early spring months.

2. EPA approved herbicides will be applied to nuisance aquatic weeds in accordance with the LDWF Aquatic Herbicide Procedure. Water hyacinth will be controlled with 2,4-D (0.5 gal/acre) and a non-ionic surfactant (1 pint/acre). Both common salvinia and giant salvinia will be controlled with a mixture of glyphosate (0.75 gal/acre) and diquat (0.25 gal/acre) with Turbulence (0.25 gal/acre) surfactant from April 1 to October 31. Outside of that time frame, diquat (0.75 gal/acre) and a non-ionic surfactant (0.25 gal/acre) will be used. Sedge will be controlled with the aforementioned salvinia treatments if it is associated with those plants. If it is targeted specifically, 2,4-D (0.5gal/acre) will be used in conjunction with a non-ionic surfactant (1 pt./acre).

3. Standardized sampling will be conducted as per LDWF protocol.

4. Continue to work toward development of a comprehensive Henderson Lake Management Plan. Cooperative partners should include the St. Martin Parish Government, U.S. Fish & Wildlife Service, U.S. Army Corp of Engineers, LA Department of Natural Resources, U.S. Geological Survey, and LDWF.

5. Triploid grass carp (TGC) retention will be monitored through LDWF standardized sampling. As a preliminary measure to reduce TGC escapement, an agreement with the St. Martin Parish government should be reached to limit control structure openings.

6. Continue to closely monitor and treat giant salvinia infestations as necessary. Giant salvinia weevil releases will continue on a routine basis.

REFERENCES

Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

Appendix V: LDWF Trip Ticket Procedures Manual
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TRIP TICKET PROCEDURES MANUAL

LOUISIANA
DEPARTMENT OF WILDLIFE AND FISHERIES

TRIP TICKET PROJECT
P.O. BOX 80337
BATON ROUGE, LA 70898-0337

April 2015

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TRIP TICKET PROGRAM

Please Note: You must use ORIGINAL trip tickets, monthly submission sheets and/or crab shedder sheets. Copies of these forms will not be accepted. You must also fill out your paperwork with only BLUE or BLACK ink. Please stick with only one color so that your data can be recorded properly.

TRIP TICKET Frequently Asked Questions

What is the trip ticket program?

The trip ticket program was established by the Louisiana Legislature in 1991 as a system to collect commercial landings and associated information by trip. Funding for the trip ticket program became available in 1998 and the program started January 1, 1999.

Why do we need trip tickets?

Trip tickets are quickly becoming the standard method of marine commercial landings collection throughout the nation. Individual trip information provides fishery scientists with gear and area specific catch information that will improve the accuracy of stock assessments. Individual trip information will also provide fishery managers information on the impact of environmental changes and catastrophic events (such as hurricanes) on the fishery.

Who has to report?

All Wholesale/Retail Dealers and Fresh Products Licensees must participate in the trip ticket program.

Is the information I provide on trip tickets confidential?

YES. The information provided on trip tickets is protected under state and federal confidentiality statutes.

When are reports due?

By the 10th of the month for the preceding month. For example, January's tickets are due by February 10.

Can I send in reports more often than once a month?

YES. You can send in reports as often as you would like as long as all the previous months reports are sent to the department by the 10th.

Where and how are reports sent?

The department will supply self-addressed envelopes. The dealer is responsible for the postage.

What type of report(s) do I need to fill out?

Wholesale/Retail Dealers that purchase fish from commercial fishermen and commercial fishermen with a Fresh Products license need to fill out the following reports:

- Trip Tickets
- Monthly Submission Sheet

Wholesale/Retail Dealers that do not purchase fish from commercial fishermen or handle only farm raised product need only fill out the following report:

- Monthly Submission Sheet

Wholesale/Retail Dealers that shed crabs or operate a shedding facility need to fill out the following reports:

- Trip Tickets
- Monthly Submission Sheet
- Monthly Crab Shedder Sheet

If my spouse will be selling my catch, what type of license will be needed?

A Spousal Fresh Product License can be purchased through the licensing department. This will allow your spouse to legally sell your catch. NO

Triptickets will be issued for a spousal license. Instead, all paperwork must be filled out with the primary Fresh Product License number.

When do I need to fill out a trip ticket?

A trip ticket must be filled out when the commercial fisherman transfers his catch to a wholesale/retail dealer or fresh products licensee.

When do I need to fill out a Monthly Submission Sheet?

A Monthly Submission Sheet must be filled out and sent to the department at least once a month. The monthly submission sheet documents the number of trip tickets filled out each time trip tickets are sent to the department. If no trips are taken for a given month, you are still required to send a monthly submission sheet indicating "0" trips were obtained for that month. Multiple months with “0” trips may be submitted on a single monthly submission sheet.

When do I need to fill out a Monthly Crab Shedder Sheet?

A Monthly Crab Shedder Sheet must be filled out and sent to the department at least once a month. The monthly crab shedder sheet documents the number of peelers put into the shedder and the number of soft shells produced. If no peelers are taken in for a given month and there are no soft shells produced, you are still required to send a monthly crab shedder sheet indicating “0” for number of peelers and “0” for number of soft shells produced.

How do I get report forms?

The Department will provide all forms. Obtaining report forms is the responsibility of the license holder. You must determine the <u>type</u> and <u>number</u> of forms you will need to last about 6 months. You must not wait until you run out of forms before requesting additional forms. Trip tickets are assigned to you and <u>cannot</u> be shared among other license holders.

Who do I call to get forms?

Call the department at (225)763-3588 during regular working hours (Monday-Friday, 8:00am - 4:30pm). Have your wholesale/retail dealers or fresh products license number ready when you call.

Who do I call if I need help filling out forms?

Call the department at (225)765-2393 or (225)765-2399 or (225)765-2449 during regular working hours (Monday-Friday, 8:00am - 4:30pm).

If I already have a computer and internet access, how can I save time and submit my trip ticket electronically?

Specialized software for data entry of trip ticket information can be installed at no cost. If you are interested in this program, please contact our contractor, Claude Peterson, Bluefin Data, LLC at (225)744-0807.

Electronic Trip Ticket Program

The electronic trip ticket program automates the process of collecting and reporting information on seafood species as required by Louisiana Wildlife and Fisheries.

Advantages of going Electronic:

- Almost completely replaces the paper ticket system
- Collects all information required by the state
- Sends information to the state electronically
- Tracks all monies owed and paid to fisherman
- Tracks deductions
- Generates various reports/receipts
- Prints checks and exports data

Monthly Submission Sheets (MSS) and Signature Logs – Electronic Submissions

Dealers who submit their files electronically must print an electronic submission with the data entry program and send that submission sheet and the fisherman signature log to the LDWF. Because these documents are generated by the dealer, they do not contain the scanner recognition marks.

<u>All Dealers with federal permits must report electronically</u>

Extra Advantage:

Trace Register

Traceability Information is information provided by Trip Ticket dealers for eventual use by consumers as a means to view details of seafood purchase. The Traceability Info fields in the Dealer screen are part of this mechanism and used only by Dealers participating in the Trace Register Program. To send a ticket to Trace Register from the ticket screen, select the ticket and click on the “Send To TR” menu item. If the Dealer is not a Trace Register participant than the “Cannot Find Dealer Import Key” message will appear after clicking the “Send to TR” menu item and the ticket will not be sent to Trace Register.

If interested in participating in the electronic trip ticket program please call Claude Peterson with Bluefin Data at 225-744-0807.

LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES
ELECTRONIC MONTHLY LOG

EV1

#	TICKET NUMBER	DATE	BOAT NAME (OPTIONAL)	FISHERMAN'S SIGNATURE	TRIP TIME	DEALER INITIALS
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

INSTRUCTIONS FOR FILLING OUT FORMS
TRIP TICKET FORMS

TYPE 677 (Document #1)

FORMS (OYSTER PURCHASES ONLY)

Type 677 forms can only be used for trips that harvest oysters. If a fisherman harvests and is selling only oysters on that trip, you can use type 677 forms. If a fisherman is selling anything in addition to oysters, you must use another type of form.

This form is designed to accommodate multiple trips on a single form, but can only be used for transactions within the same month.

Tickets cannot be used for transactions that cross multiple months. All open tickets must be closed on the last day of the month.

It is essential that you write legibly and stay within the outlined boxes. Use only blue or black ink. Please stick with only one color so that your data can be recorded properly.

TICKET NO. (PREPRINTED)

The "TICKET NO." is a sequential form number that is preprinted on each form. Each wholesale/retail dealer or fresh products licensee is issued a specific range of numbered forms and this information is tracked by LDWF. The forms cannot be shared with other dealers.

CONTINUATION TICKET NO. (REQUIRED IF MULTIPLE FORMS USED)

The "CONTINUATION TICKET NO." box is used only if multiple forms are needed to document a trip. If multiple forms are needed, enter the ticket number of the FIRST form used for that trip in this box.

VOID TICKET (REQUIRED IF TICKET VOIDED)

The “Void Ticket” box is used when a ticket is incorrectly filled in. Each ticket must be returned to the Department even if voided.

COMMERCIAL FISHERMAN'S NAME (REQUIRED)

The "COMMERCIAL FISHERMAN'S NAME" box is used by the dealer to record the name of the licensed commercial fisherman from whom the seafood is obtained.

COMMERCIAL FISHERMAN’S LICENSE NUMBER (REQUIRED)

The "COMMERCIAL FISHERMAN’S LICENSE NUMBER" box is the commercial fisherman's license number, and must be filled in to ensure the catch is properly assigned to the correct fisherman.

COMMERCIAL VESSEL LICENSE NUMBER (REQUIRED FOR SALTWATER LANDINGS, OPTIONAL FOR FRESHWATER LANDINGS)

The “COMMERCIAL VESSEL LICENSE NUMBER” box is the commercial vessel license number issued by LDWF assigned to the boat or vessel used to harvest the seafood being obtained by the wholesale/retail seafood dealer. This will allow LDWF to properly assign landings to a vessel owner. This field is optional for landings from freshwater areas, but is mandatory for landings from saltwater areas or for possession of catch in saltwater areas.

COAST GUARD DOCUMENTED VESSEL NUMBER OR
STATE VESSEL REGISTRATION NUMBER (REQUIRED)

The "COAST GUARD DOCUMENTED VESSEL NUMBER" or "STATE VESSEL REGISTRATION NUMBER", which ever applies, is the number assigned to the boat or vessel that was used to harvest the seafood being obtained by the wholesale/retail seafood dealer.

AREA FISHED (REQUIRED)

The "AREA FISHED" is the area where the <u>majority</u> of the seafood was harvested. The four digit basin code or two digit statistical grid code must be placed in the designated space. In addition, the hyphenated box following the area fished must be filled out if the commercial fisherman is harvesting oysters from a state designated public oyster seed ground or a commercial fisherman is harvesting in STATE outside waters off the Terrebonne (1208) or Barataria (0211) Basins. REFER TO THE MAPS PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX. A SEPARATE MAP IS PROVIDED TO HIGHLIGHT THE DESIGNATED PUBLIC OYSTER SEED GROUNDS AND OFFSHORE STATE WATERS THAT MUST BE REPORTED BY THE COMMERCIAL FISHERMAN.

GEAR USED (REQUIRED)

The "GEAR USED" box is the main gear used in the harvest of the seafood being obtained from the commercial fisherman. REFER TO THE LIST OF GEAR CODES PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

DEALER'S NAME (REQUIRED)

The "DEALER'S NAME" box is used by the dealer to record the name of the business or individual that holds the wholesale/retail seafood dealers or fresh products license.

DEALER’S LICENSE NUMBER (REQUIRED)

The "DEALER’S LICENSE NUMBER" box is the wholesale/retail seafood dealer's or fresh products license number, and must be filled in to ensure the report is properly assigned to the correct dealer.

YEAR and MONTH (REQUIRED)

The "YEAR" and the “MONTH” that the purchase or transaction took place. Year is the four digits of the year the transaction took place. For example if the year is 2014 you should record "2014" in the box. Month is a number from 1-12 referring to January-December.

DAY (REQUIRED)

The “DAY” is the day of the month that the purchase or transaction took place.

TRIP TIME (REQUIRED)

Trip time is the amount of time in HOURS from when the trip began to when the seafood harvested on that trip was unloaded and transferred to the dealer.

PUBLIC OR PRIVATE (REQUIRED)

Put an “X” in one of the boxes to designate whether the oysters were harvested from a PUBLIC or PRIVATE reef.

QUANTITY (REQUIRED)

The "QUANTITY" box is used to write in the amount of a species obtained from a fisherman.

SACK, BUSHEL OR BARREL (REQUIRED)

Put an “X” in one of the boxes to designate whether the oysters were landed by the sack, bushel or barrel. Convert any “half-sacks” or “little sacks” to standard sacks.

1 Barrel = 6451.26 cubic inches, which approximately represents
the cubic contents of 3 bushels or 2 sacks.

1 Sack represents 3225.63 cubic inches or one and one-half bushels, or one-half barrel.

PRICE/UNIT (REQUIRED)

The "PRICE/UNIT" box is used to document the price per unit of the species being obtained.

VALUE (RECOMMENDED)

The "VALUE" box is the dollar value of the species being obtained.

FISHERMAN’S INITIALS (REQUIRED)

The fisherman transferring his catch to the dealer must initial each transaction.

VOID (REQUIRED IF RECORD IS VOIDED)

Put an “X” in this box if you made an error in filling out that record, and correctly fill out the record on the next line. Do not attempt to write over any errors.

FISHERMAN’S SIGNATURE AND DEALER’S SIGNATURE (REQUIRED)

The "FISHERMAN'S SIGNATURE" and "DEALER'S SIGNATURE" must be provided when the trip ticket is completed or closed out. By signing the trip ticket both the fisherman and dealer certify that the information on the form is correct to the best of their knowledge.

DEALER DEDUCTIONS (NOT REQUIRED)

This space is provided for the dealer to use, if he/she so wishes, to document anything he needs to deduct from the amount paid to the fisherman.

TOTAL PURCHASES, TOTAL DEDUCTIONS AND TOTAL PAID (NOT REQUIRED)

These spaces are provided for the dealer to enter the amount paid to the fisherman.

Document #1: Example of Type 677 Tripticket Form

LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES DEALER RECEIPT FORM (OYSTER TRIPS ONLY)

Please print characters like this and stay within the boxes. Use only *blue* or *black* ink.

677 | 1 2 3 4 5 6 7 8 9 0 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z | DEPARTMENT COPY

TICKET NO. 2786507 | CONTINUATION TICKET NO. | VOID TICKET ☐

FISHERMAN PROVIDED INFORMATION

COMMERCIAL FISHERMAN'S NAME (Please Print)

Commercial Fisherman's License Number C

Vessel License Number C

VESSEL NAME

Coast Guard Documented Vessel Number
OR
State Vessel Registration Number

Area Fished -

Gear Used

WHOLESALE/RETAIL SEAFOOD DEALER PROVIDED INFORMATION

DEALER'S NAME (Please Print)

Dealer's License Number C

YEAR

MONTH

DAY	TRIP TIME	PUBLIC	PRIVATE	QUANTITY	SACK	SHELL STOCK BUSHEL	BARREL	PRICE/UNIT	VALUE	FISHERMAN'S INITIALS	VOID
		☐	☐		☐	☐	☐		$		☐
		☐	☐		☐	☐	☐		$		☐
		☐	☐		☐	☐	☐		$		☐
		☐	☐		☐	☐	☐		$		☐
		☐	☐		☐	☐	☐		$		☐
		☐	☐		☐	☐	☐		$		☐
		☐	☐		☐	☐	☐		$		☐
		☐	☐		☐	☐	☐		$		☐
		☐	☐		☐	☐	☐		$		☐
		☐	☐		☐	☐	☐		$		☐
		☐	☐		☐	☐	☐		$		☐
		☐	☐		☐	☐	☐		$		☐
		☐	☐		☐	☐	☐		$		☐
		☐	☐		☐	☐	☐		$		☐

ITEM	DEALER DEDUCTIONS	COST

TOTAL PURCHASES	
TOTAL DEDUCTIONS	
TOTAL PAID	

I CERTIFY THAT THIS INFORMATION IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

FISHERMAN'S SIGNATURE

DEALER'S SIGNATURE

NOTE: ALL INFORMATION REQUIRED BY LAW MUST BE COMPLETED FOR EACH TRIP. I UNDERSTAND THAT PROVIDING FALSE INFORMATION MAY RESULT IN CRIMINAL CONSEQUENCES.

NOTE: THIS FORM MAY BE USED FOR TRANSACTIONS FOR NO MORE THAN 7 CONSECUTIVE DAYS.

TYPE 776 (Document #2)

FORMS (ONE DAY SHELLFISH TRIPS ONLY)

Type 776 forms can only be used for trips that harvest shellfish. If a fisherman harvests and is selling only shellfish on that trip, you can use type 776 forms. If a fisherman is selling anything other than shellfish, you must use another type of form.
This form is designed to accommodate a single trip per form. If you need a form that can be used to document multiple trips for a fisherman, see form type 875.

It is essential that you write legibly and stay within the outlined boxes. Use only blue or black ink. Please stick with only one color so that your data can be recorded properly.

TICKET NO. (PREPRINTED)

The "TICKET NO." is a sequential form number that is preprinted on each form. Each wholesale/retail dealer or fresh product licensee is issued a specific range of numbered forms. The forms cannot be shared with other dealers.

CONTINUATION TICKET NO. (REQUIRED IF MULTIPLE FORMS USED)

The "CONTINUATION TICKET NO." box is used only if multiple forms are needed to document a trip. If multiple forms are needed, enter the ticket number of the FIRST form used for that trip in this box.

VOID TICKET (REQUIRED IF TICKET VOIDED)

The "VOID TICKET" box is used when a ticket is incorrectly filled in. Each ticket must be returned to the Department even if voided.

COMMERCIAL FISHERMAN'S NAME (REQUIRED)

The "COMMERCIAL FISHERMAN'S NAME" box is used by the dealer to record the name of the licensed commercial fisherman from whom the seafood is being obtained.

COMMERCIAL FISHERMAN’S LICENSE NUMBER (REQUIRED)

The "COMMERCIAL FISHERMAN’S LICENSE NUMBER" box is the commercial fisherman's license number, and must be filled in to ensure the catch is properly assigned to the correct fisherman.

TRIP TIME (REQUIRED)

Trip time is the amount of time in HOURS from when the trip began to when the seafood harvested on that trip was unloaded and transferred to the dealer.

COMMERCIAL VESSEL LICENSE NUMBER (REQUIRED FOR SALTWATER LANDINGS, OPTIONAL FOR FRESHWATER LANDINGS)

The “COMMERCIAL VESSEL LICENSE NUMBER” box is the commercial vessel license number issued by LDWF assigned to the boat or vessel used to harvest the seafood being obtained by the wholesale/retail seafood dealer. This will allow LDWF to properly assign landings to a vessel owner. This field is optional for landings from freshwater areas, but is mandatory for landings from saltwater areas or for possession of catch in saltwater areas.

COAST GUARD DOCUMENTED VESSEL NUMBER OR
STATE VESSEL REGISTRATION NUMBER (REQUIRED)

The "COAST GUARD DOCUMENTED VESSEL NUMBER" or "STATE VESSEL REGISTRATION NUMBER", which ever applies, is the number assigned to the boat or vessel that was used to harvest the seafood being obtained by the wholesale/retail seafood dealer.

AREA FISHED (REQUIRED)

The "AREA FISHED" is the area where the majority of the seafood was harvested. The four digit basin code or two digit statistical grid code must be placed in the designated space. In addition, the hyphenated box following the area fished must be filled out if the commercial fisherman is harvesting oysters from a state designated public oyster seed ground or a commercial fisherman is harvesting in STATE outside waters off the Terrebonne (1208) or Barataria (0211) Basins. REFER TO THE MAPS PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX. A SEPARATE MAP IS PROVIDED TO HIGHLIGHT THE DESIGNATED PUBLIC OYSTER SEED GROUNDS AND OFFSHORE STATE WATERS THAT MUST BE REPORTED BY THE COMMERCIAL FISHERMAN.

GEAR USED (REQUIRED)

The "GEAR USED" box is the main gear used in the harvest of the seafood being obtained from the commercial fisherman. REFER TO THE LIST OF GEAR CODES PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

DEALER'S NAME (REQUIRED)

The "DEALER'S NAME" box is used by the dealer to record the name of the business or individual that holds the wholesale/retail seafood dealers or fresh products license.

DEALER'S LICENSE NUMBER (REQUIRED)

The "DEALER'S LICENSE NUMBER" box is the wholesale/retail seafood dealer's or fresh products license number, and must be filled in to ensure the report is properly assigned to the correct dealer.

TRANSACTION DATE (REQUIRED)

The date the product was transferred to the dealer from the commercial fisherman. Month "MM" is a number from 1-12 referring to January-December. For example if the month is June you should record "06" in the box. Day "DD" is the day of the month the transaction took place. For example if the day is the 15th you should record "15" in the box. Year "YY" is the last two digits of the year the transaction took place. For example if the year is 2014 you should record "14" in the box.

SPECIES (REQUIRED)

The species of seafood being purchased. For example, if you purchase brown shrimp then "BROWN SHRIMP" should be entered on this line.

SHELLFISH CODE (REQUIRED)

The shellfish code refers to the shellfish species being purchased. REFER TO THE LIST OF SHELLFISH CODES PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

QUANTITY (REQUIRED)

The "QUANTITY" box is used to write in the amount of a species obtained from a fisherman.

UNIT (REQUIRED)

The unit of measure associated with the quantity purchased. REFER TO THE LIST OF UNIT CODES PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

COND (CONDITION) (REQUIRED)

The condition that the species was landed. REFER TO THE LIST OF COND (CONDITION) CODES PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

COUNT OR MARKET (REQUIRED)

The actual size range of the species landed if sorted, or the size category or market size you assign when purchasing that species. For example, if you purchase brown shrimp in the size range 21-25 then you should enter 21 in the first set of boxes and 25 after the dash in the second set of boxes. However, if you use a general market category such as number 1's in the case of crabs or other species then use the market codes provided by the department. REFER TO THE LIST OF MARKET CODES PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

PRICE/UNIT (REQUIRED)

The "PRICE/UNIT" box is used to document the price per unit of the species being obtained.

VALUE (RECOMMENDED)

The "VALUE" box is the dollar value of the species being obtained.

VOID (REQUIRED IF RECORD IS VOIDED)

Put an “X” in this box if you made an error in filling out that record, and correctly fill out the record on the next line. Do not attempt to write over any errors.

FISHERMAN’S SIGNATURE AND DEALER’S SIGNATURE (REQUIRED)

The "FISHERMAN'S SIGNATURE" and "DEALER'S SIGNATURE" must be provided when the trip ticket is completed or closed out. By signing the trip ticket both the fisherman and dealer certify that the information on the form is correct to the best of their knowledge.

DEALER DEDUCTIONS (NOT REQUIRED)

This space is provided for the dealer to use if he/she so wishes to document anything he needs to deduct from the amount paid to the fisherman.

TOTAL PURCHASES, TOTAL DEDUCTIONS AND TOTAL PAID (NOT REQUIRED)

These spaces are provided for the dealer to enter the amount paid to the fisherman.

Document #2 - Example of Type 776 Tripticket Form

LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES DEALER RECEIPT FORM (SHELLFISH TRIPS ONLY)

Please print characters like this and stay within the boxes. Use only *blue* or *black* ink.

776 | 1 2 3 4 5 6 7 8 9 0 | A B C D E F G H I J K L M N O P Q R S T U V W X Y Z | DEPARTMENT COPY

TICKET NO. 7090004 | CONTINUATION TICKET NO. | VOID TICKET ☐

FISHERMAN PROVIDED INFORMATION

COMMERCIAL FISHERMAN'S NAME (Please Print)

Commercial Fisherman's License Number C

Vessel License Number C

TRIP TIME

VESSEL NAME

Coast Guard Documented Vessel Number

OR

State Vessel Registration Number

Area Fished - Gear Used

WHOLESALE/RETAIL SEAFOOD DEALER PROVIDED INFORMATION

SEAFOOD DEALER'S NAME (Please Print)

Seafood Dealer's License Number C

Transaction Date MM DD YY

SPECIES	SHELLFISH CODE	QUANTITY	UNIT	COND	COUNT OR MARKET	PRICE/UNIT	VALUE	VOID
					-		$	☐
					-		$	☐
					-		$	☐
					-		$	☐
					-		$	☐
					-		$	☐
					-		$	☐
					-		$	☐
					-		$	☐
					-		$	☐
					-		$	☐
					-		$	☐
					-		$	☐
					-		$	☐

ITEM	DEALER DEDUCTIONS	COST

TOTAL PURCHASES	
TOTAL DEDUCTIONS	
TOTAL PAID	

I CERTIFY THAT THIS INFORMATION IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

FISHERMAN'S SIGNATURE

TYPE 875 (Document #3)

FORMS (MULTIPLE DAY/SHELLFISH TRIPS ONLY)

Type 875 forms can only be used for trips that harvest shellfish. If a fisherman harvests and is selling only shellfish on that trip, you can use type 875 forms. If a fisherman is selling anything other than shellfish, you must use another type of form.

This form is designed to accommodate multiple trips on a single form, but can only be used for transactions within the same month.

Tickets cannot be used for transactions that cross different months. All open tickets must be closed on the last day of the month.

It is essential that you write legibly and stay within the outlined boxes. Use only blue or black ink. Please stick with only one color so that your data can be recorded properly.

TICKET NO. (PREPRINTED)

The "TICKET NO." is a sequential form number that is preprinted on each form. Each wholesale/retail dealer or fresh product licensee is issued a specific range of numbered forms. The forms cannot be shared with other dealers.

CONTINUATION TICKET NO. (REQUIRED IF MULTIPLE FORMS USED)

The "CONTINUATION TICKET NO." box is used only if multiple forms are needed to document a trip. If multiple forms are needed, enter the ticket number of the FIRST form used for that trip in this box.

VOID TICKET (REQUIRED IF TICKET VOIDED)

The "VOID TICKET" box is used when a ticket is incorrectly filled in. Each ticket must be returned to the Department even if voided.

COMMERCIAL FISHERMAN'S NAME (REQUIRED)

The "COMMERCIAL FISHERMAN'S NAME" box is used by the dealer to record the name of the licensed commercial fisherman from whom the seafood is being obtained.

COMMERCIAL FISHERMAN’S LICENSE NUMBER (REQUIRED)

The "COMMERCIAL FISHERMAN’S LICENSE NUMBER" box is the commercial fisherman's license number, and must be filled in to ensure the catch is properly assigned to the correct fisherman.

COMMERCIAL VESSEL LICENSE NUMBER (REQUIRED FOR SALTWATER LANDINGS, OPTIONAL FOR FRESHWATER LANDINGS)

The “COMMERCIAL VESSEL LICENSE NUMBER” box is the commercial vessel license number issued by LDWF assigned to the boat or vessel used to harvest the seafood being obtained by the wholesale/retail seafood dealer. This will allow LDWF to properly assign landings to a vessel owner. This field is optional for landings from freshwater areas, but is mandatory for landings from saltwater areas or for possession of catch in saltwater areas.

COAST GUARD DOCUMENTED VESSEL NUMBER OR
STATE VESSEL REGISTRATION NUMBER (REQUIRED)

The "COAST GUARD DOCUMENTED VESSEL NUMBER" or "STATE VESSEL REGISTRATION NUMBER", which ever applies, is the number assigned to the boat or vessel that was used to harvest the seafood being obtained by the wholesale/retail seafood dealer.

AREA FISHED (REQUIRED)

The "AREA FISHED" is the area where the <u>majority</u> of the seafood was harvested. The four digit basin code or two digit statistical grid code must be placed in the designated space. In addition, the hyphenated box following the area fished must be filled out if the commercial fisherman is harvesting oysters from a state designated public oyster seed ground or a commercial fisherman is harvesting in STATE outside waters off the Terrebonne (1208) or Barataria (0211) Basins. REFER TO THE MAPS PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX. A SEPARATE MAP IS PROVIDED TO HIGHLIGHT THE DESIGNATED PUBLIC OYSTER SEED GROUNDS AND OFFSHORE STATE WATERS THAT MUST BE REPORTED BY THE COMMERCIAL FISHERMAN.

GEAR USED (REQUIRED)

The "GEAR USED" box is the <u>main</u> gear used in the harvest of the seafood being obtained from the commercial fisherman. REFER TO THE LIST OF GEAR CODES PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

DEALER'S NAME (REQUIRED)

The "DEALER'S NAME" box is used by the dealer to record the name of the business or individual that holds the wholesale/retail seafood dealers or fresh products license.

DEALER'S LICENSE NUMBER (REQUIRED)

The "DEALER'S LICENSE NUMBER" box is the wholesale/retail seafood dealer's or fresh products license number, and must be filled in to ensure the report is properly assigned to the correct dealer.

YEAR and MONTH (REQUIRED)

The "YEAR" and the "MONTH" that the purchase or transaction took place. Year is the four digits of the year the transaction took place. For example if the year is 2014 you should record "2014" in the box. Month is a number from 1-12 referring to January-December.

DAY (REQUIRED)

The "DAY" is the day of the month that the purchase or transaction took place.

TRIP TIME (REQUIRED)

Trip time is the amount of time in HOURS from when the trip began to when the seafood harvested on that trip was unloaded and transferred to the dealer.

SHELLFISH CODE (REQUIRED)

The shellfish code refers to the shellfish species being purchased. REFER TO THE LIST OF SHELLFISH CODES PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

QUANTITY (REQUIRED)

The "QUANTITY" box is used to write in the amount of a species obtained from a fisherman.

UNIT (REQUIRED)

The unit of measure associated with the quantity purchased. REFER TO THE LIST OF UNIT CODES PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

COND (CONDITION) (REQUIRED)

The condition that the species was landed. REFER TO THE LIST OF COND (CONDITION) CODES PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

COUNT OR MARKET (REQUIRED)

The actual size range of the species landed if sorted, or the size category or market size you assign when purchasing that species. For example, if you purchase brown shrimp in the size range 21-25 then you should enter 21 in the first set of boxes and 25 after the dash in the second set of boxes. However, if you use a general market category such as number 1's in the case of crabs or other species then use the market codes provided by the department. REFER TO THE LIST OF MARKET CODES PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

PRICE/UNIT (REQUIRED)

The "PRICE/UNIT" box is used to document the price per unit of the species being obtained.

VALUE (RECOMMENDED)

The "VALUE" box is the dollar value of the species being obtained.

FISHERMAN'S INITIALS (REQUIRED)

The fisherman transferring his catch to the dealer must initial each transaction.

VOID (REQUIRED IF RECORD IS VOIDED)

Put an "X" in this box if you made an error in filling out that record, and correctly fill out the record on the next line. Do not attempt to write over any errors.

FISHERMAN'S SIGNATURE AND DEALER'S SIGNATURE (REQUIRED)

The "FISHERMAN'S SIGNATURE" and "DEALER'S SIGNATURE" must be provided when the trip ticket is completed or closed out. By signing the trip ticket both the fisherman and dealer certify that the information on the form is correct to the best of their knowledge.

DEALER DEDUCTIONS (NOT REQUIRED)

This space is provided for the dealer to use if he/she so wishes to document anything he needs to deduct from the amount paid to the fisherman.

TOTAL PURCHASES, TOTAL DEDUCTIONS AND TOTAL PAID
(NOT REQUIRED)

These spaces are provided for the dealer to enter the amount paid to the fisherman.

Document #3 - Example of Type 875 Tripticket Form

LOUISIANA DEPARTME[...] LFISH TRIPS ONLY)

Please print characters like this and stay within the boxes. Use only *blue* or *black* ink.

875 1234567890 ABCDEFGHIJKLMNOPQRSTUVWXYZ DEPARTMENT COPY

TICKET NO. 8527004 CONTINUATION TICKET NO. VOID TICKET ☐

FISHERMAN PROVIDED INFORMATION

COMMERCIAL FISHERMAN'S NAME (Please Print)

Commercial Fisherman's License Number C

Vessel License Number C

VESSEL NAME

Coast Guard Documented Vessel Number
OR
State Vessel Registration Number

Area Fished - Gear Used

WHOLESALE/RETAIL SEAFOOD DEALER PROVIDED INFORMATION

SEAFOOD DEALER'S NAME (Please Print)

Dealer's License Number C

YEAR MONTH

DAY	TRIP TIME	SHELLFISH CODE	QUANTITY	UNIT	COND	COUNT OR MARKET	PRICE/UNIT	VALUE	FISHERMAN'S INITIALS	VOID
						-		$		☐
						-		$		☐
						-		$		☐
						-		$		☐
						-		$		☐
						-		$		☐
						-		$		☐
						-		$		☐
						-		$		☐
						-		$		☐
						-		$		☐
						-		$		☐
						-		$		☐
						-		$		☐

ITEM	DEALER DEDUCTIONS	COST

TOTAL PURCHASES	
TOTAL DEDUCTIONS	
TOTAL PAID	

I CERTIFY THAT THIS INFORMATION IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

FISHERMAN'S SIGNATURE

DEALER'S SIGNATURE

NOTE: ALL INFORMATION REQUIRED BY LAW MUST BE COMPLETED FOR EACH TRIP. I UNDERSTAND THAT PROVIDING FALSE INFORMATION MAY RESULT IN CRIMINAL CONSEQUENCES.

TYPE 974 (Document #4)

FORMS GENERIC TICKET—THE ONLY TICKET FOR FINFISH
ALL SPECIES CAN BE RECORDED ON THIS TICKET
SINGLE TRIP ONLY

Type 974 forms can be used for any type of trip. If a fisherman harvests and is selling any species of fish on that trip, you can use type 974 forms. This form is designed to accommodate a single trip per form.

It is essential that you write legibly and stay within the outlined boxes. Use only blue or black ink. Please stick with only one color so that your data can be recorded properly.

TICKET NO. (PREPRINTED)

The "TICKET NO." is a sequential form number that is preprinted on each form. Each wholesale/retail dealer or fresh products licensee is issued a specific range of numbered forms. The forms cannot be shared with other dealers.

CONTINUATION TICKET NO. (REQUIRED IF MULTIPLE FORMS USED)

The "CONTINUATION TICKET NO." box is used only if multiple forms are needed to document a trip. If multiple forms are needed, enter the ticket number of the FIRST form used for that trip in this box.

VOID TICKET (REQUIRED IF TICKET VOIDED)

The "VOID TICKET" box is used when a ticket is incorrectly filled in. Each ticket must be returned to the Department even if voided.

COMMERCIAL FISHERMAN'S NAME (REQUIRED)

The "COMMERCIAL FISHERMAN'S NAME" box is used by the dealer to record the name of the licensed commercial fisherman from whom the seafood is being obtained.

COMMERCIAL FISHERMAN’S LICENSE NUMBER (REQUIRED)

The "COMMERCIAL FISHERMAN’S LICENSE NUMBER" box is the commercial fisherman's license number, and must be filled in to ensure the catch is properly assigned to the correct fisherman.

TRIP TIME (REQUIRED)

Trip time is the amount of time in HOURS from when the trip began to when the seafood harvested on that trip was unloaded and transferred to the dealer.

COMMERCIAL VESSEL LICENSE NUMBER (REQUIRED FOR SALTWATER LANDINGS, OPTIONAL FOR FRESHWATER LANDINGS)

The "COMMERCIAL VESSEL LICENSE NUMBER" box is the commercial vessel license number issued by LDWF assigned to the boat or vessel used to harvest the seafood being obtained by the wholesale/retail seafood dealer. This will allow LDWF to properly assign landings to a vessel owner. This field is optional for landings from freshwater areas, but is mandatory for landings from saltwater areas or for possession of catch in saltwater areas.

COAST GUARD DOCUMENTED VESSEL NUMBER OR STATE VESSEL REGISTRATION NUMBER (REQUIRED)

The "COAST GUARD DOCUMENTED VESSEL NUMBER" or "STATE VESSEL REGISTRATION NUMBER", which ever applies, is the number assigned to the boat or vessel that was used to harvest the seafood being obtained by the wholesale/retail seafood dealer.

AREA FISHED (REQUIRED)

The "AREA FISHED" is the area where the majority of the seafood was harvested. The four digit basin code or two digit statistical grid code must be placed in the designated space. In addition, the hyphenated box following the area fished must be filled out if the commercial fisherman is harvesting oysters from a state designated public oyster seed ground or a commercial fisherman is harvesting in STATE outside waters off the Terrebonne (1208) or Barataria (0211) Basins. REFER TO THE MAPS PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX. A SEPARATE MAP IS PROVIDED TO HIGHLIGHT THE DESIGNATED PUBLIC OYSTER SEED GROUNDS AND OFFSHORE STATE WATERS THAT MUST BE REPORTED BY THE COMMERCIAL FISHERMAN.

GEAR USED (REQUIRED)

The "GEAR USED" box is the main gear used in the harvest of the seafood being obtained from the commercial fisherman. REFER TO THE LIST OF GEAR CODES PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

DEALER'S NAME (REQUIRED)

The "DEALER'S NAME" box is used by the dealer to record the name of the business or individual that holds the wholesale/retail seafood dealers or fresh products license.

DEALER’S LICENSE NUMBER (REQUIRED)

The "DEALER’S LICENSE NUMBER" box is the wholesale/retail seafood dealer's or fresh products license number, and must be filled in to ensure the report is properly assigned to the correct dealer.

TRANSACTION DATE (REQUIRED)

The date the product was transferred to the dealer from the commercial fisherman. Month “MM” is a number from 1-12 referring to January-December. For example if the month is June you should record "06" in the box. Day “DD” is the day on the month the transaction took place. For example if the day is the 15th you should record "15" in the box. Year “YY” is the last two digits of the year the transaction took place. For example if the year is 2014 you should record "14" in the box.

SPECIES (REQUIRED)

The species of seafood being purchased. For example, if you purchase red snapper then “RED SNAPPER” should be entered on this line.

SPECIES CODE (REQUIRED)

The species code refers to the species being purchased. REFER TO THE LIST OF SPECIES CODES PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

QUANTITY (REQUIRED)

The "QUANTITY" box is used to write in the amount of a species obtained from a fisherman.

UNIT (REQUIRED)

The unit of measure associated with the quantity purchased. REFER TO THE LIST OF UNIT CODES PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

COND (CONDITION) (REQUIRED)

The condition that the species was landed. REFER TO THE LIST OF COND (CONDITION) CODES PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

COUNT OR MARKET (REQUIRED)

The actual size range of the species landed if sorted, or the size category or market size you assign when purchasing that species. For example, if you purchase brown shrimp in the size range 21-25 then you should enter 21 in the first set of boxes and 25 after the dash in the second set of boxes. However, if you use a general market category such as number 1's in the case of crabs or other species then use the market codes provided by the department. REFER TO THE LIST OF MARKET CODES PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

PRICE/UNIT (REQUIRED)

The "PRICE/UNIT" box is used to document the price per unit of the species being obtained.

VALUE (RECOMMENDED)

The "VALUE" box is the dollar value of the species being obtained.

VOID (REQUIRED IF RECORD IS VOIDED)

Put an “X” in this box if you made an error in filling out that record, and correctly fill out the record on the next line. Do not attempt to write over any errors.

PERMITTED SPECIES (REQUIRED)

This set of boxes is used to document any permits used in the harvest of permitted species or groups of species. The "PERMITTED SPECIES" box is used to identify the species allowed to be harvested with the permit. REFER TO THE LIST OF PERMITS PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

TYPE (REQUIRED)

The "TYPE" box is used to designate whether the permit used is a state or federal permit. Place an "S" in the box if the permit is issued by the state of Louisiana, or an "F" if the permit is a federal permit issued by National Marine Fisheries Service. REFER TO THE LIST OF PERMITS PROVIDED BY THE DEPARTMENT TO FILL IN THIS BOX.

PERMIT NUMBER (REQUIRED)

If the permit used is a Louisiana permit, the "PERMIT NUMBER" box is to be filled in with the number on the commercial fisherman's permit. If the permit used is a federal permit, leave the "PERMIT NUMBER" box empty. Federal permits use the vessel registration numbers as the permit number and you have already provided that number in the vessel registration number box.

FISHERMAN'S SIGNATURE AND DEALER'S SIGNATURE (REQUIRED)

The "FISHERMAN'S SIGNATURE" and "DEALER'S SIGNATURE" must be provided when the trip ticket is completed or closed out. By signing the trip ticket both the fisherman and dealer certify that the information on the form is correct to the best of their knowledge.

DEALER DEDUCTIONS (NOT REQUIRED)

This space is provided for the dealer to use if he/she so wishes to document anything he needs to deduct from the amount paid to the fisherman.

TOTAL PURCHASES, TOTAL DEDUCTIONS AND TOTAL PAID (NOT REQUIRED)

These spaces are provided for the dealer to enter the amount paid to the fisherman.

Document #4 - Example of Type 974 Tripticket Form

LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES DEALER RECEIPT FORM (GENERIC TICKET)

Please print characters like this and stay within the boxes. Use only *blue* or *black* ink.

974 1234567890 ABCDEFGHIJKLMNOPQRSTUVWXYZ DEPARTMENT COPY

TICKET NO. 9111006 CONTINUATION TICKET NO. VOID TICKET

FISHERMAN PROVIDED INFORMATION

COMMERCIAL FISHERMAN'S NAME (Please Print)

Commercial Fisherman's License Number C

Vessel License Number C

TRIP TIME

VESSEL NAME

Coast Guard Documented Vessel Number

OR

State Vessel Registration Number

Area Fished - Gear Used

WHOLESALE/RETAIL SEAFOOD DEALER PROVIDED INFORMATION

SEAFOOD DEALER'S NAME (Please Print)

Seafood Dealer's License Number C

Transaction Date

SPECIES	SPECIES CODE	QUANTITY	UNIT	COND	COUNT OR MARKET	PRICE/UNIT	VALUE	VOID
							$	☐
							$	☐
							$	☐
							$	☐
							$	☐
							$	☐
							$	☐
							$	☐
							$	☐
							$	☐
							$	☐
							$	☐
							$	☐

PERMITTED SPECIES	TYPE	PERMIT NUMBER

TOTAL PURCHASES	
TOTAL DEDUCTIONS	
TOTAL PAID	

ITEM	DEALER DEDUCTIONS	COST

I CERTIFY THAT THIS INFORMATION IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

FISHERMAN'S SIGNATURE DEALER'S SIGNATURE

NOTE: ALL INFORMATION REQUIRED BY LAW MUST BE COMPLETED FOR EACH TRIP. NOTE: I UNDERSTAND THAT PROVIDING FALSE INFORMATION MAY RESULT IN CRIMINAL CONSEQUENCES.

SPECIAL INSTRUCTIONS FOR SHARK LANDINGS

In addition to completing all required trip ticket elements, Wholesale/Retail dealers, with a Federal permit, purchasing shark carcass and/or fins from a properly licensed and permitted (State and Federal) commercial fisherman must adhere to a special set of instructions when reporting on a trip ticket.

Shark Landings must be completed on a 900 series trip ticket or within the electronic trip ticket program.

Please Include All State and Federal permit numbers.

HOW TO REPORT THE PURCHASE OF SHARK FINS

Complete a trip ticket the following way for each shark species purchased with fins.

Line 1 – record species (Species Code), unit=1 (pounds), condition (whole, tubed, etc.), pounds of shark landed and unit price

Line 2 – record species (Species Code), unit=6 (individuals), condition (whole, tubed, etc.), number of individual carcasses which contributed to the pounds of shark reported on line 1

Line 3 – record species (Species Code), unit=1 (pounds), condition=7 (pieces), market=10 (fins), pounds of shark fins landed and unit price

Line 4 – record species (Species Code), unit=6 (individuals), condition=7 (pieces), market=10 (fins) [number of individual fins which contributed to the pounds of fins reported on line 3]

HOW TO REPORT THE PURCHASE OF SHARK CARCASS

The Wholesale/Retail dealer completes' a trip ticket for each species of shark carcass purchased.

Line 1 - record species (Species Code), unit=1 (pounds), condition (whole, tubed, etc.), pounds of shark landed and unit price

Line 2 – record species (Species Code), unit=6 (individuals), condition (whole, tubed, etc.), number of individual carcasses which contributed to the pounds of shark reported on line 1

HOW TO REPORT THE TRANSFER OF SHARK FROM A PERSON ACTING AS THE COMMERCIAL FISHERMAN AND THE WHOLESALE/RETAIL DEALER

The Commercial Fishermen who is required to hold a Wholesale/Retail dealers license fills out a trip ticket transferring the fins from himself as a fisher to himself as a wholesale/retail dealer.

Line 1 – record species (Species Code), unit=1 (pounds), condition=7 (pieces), market=10 (fins), pounds of fins landed and unit price

Line 2 – record species (Species Code), unit=6 (individual), condition=7 (pieces), market=10 (fins), number of individual fins which contributed to pounds landed in line 1

MONTHLY SUBMISSION SHEET INSTRUCTIONS (Document #5)

A Monthly Submission Sheet must be filled out and sent to the department by the 10th of the month for the preceding month. The Monthly Submission Sheet must accompany trip tickets when there are trip tickets to send to the department. Please be sure to use original forms, copies will not be accepted.

If you are a wholesale/retail seafood dealer and only buy, acquire or handle farm raised seafood products, you must still send in monthly submission sheets indicating "0" trip tickets. If you are a wholesale/retail seafood dealer and only buy, acquire or handle seafood products from other wholesale/retail dealers, you must still send in monthly submission sheets indicating "0" trip tickets. You may submit one monthly submission sheet for the year only if you do not plan to purchase from commercial fishermen during the year. This type of monthly submission sheet must show the reporting period as January 1 to December 31 and "0" trip tickets during this period. The due date for a form written this way would be February 10. Subsequent monthly submission sheets may be submitted should you resume purchasing seafood directly from a commercial fisherman.

If you are a wholesale/retail seafood dealer and do not buy, acquire or handle wild caught seafood from commercial fishermen during a given month, you still must send in a monthly submission sheet indicating "0" trip tickets for that month. If your business is closed (no purchases) during certain parts of the year, you may fill out one monthly submission sheet for this period by writing the "from" date as the first day of the first month you are closed and the "to" date as the last day of the last month you are closed. The due date for a form written this way would be the 10th of the month following the month written in the "to" field.

If you are a fresh products licensee and do not handle seafood for sales to the consumer for a given month, you still must send in a monthly submission sheet indicating "0" trip tickets for that month.

COMPLETING THE MONTHLY SUBMISSION SHEET

License number: Enter your wholesale/retail seafood dealer or fresh products license number in the boxes provided.

Last 4 digits of account number: Enter the last 4 digits of your Tax ID number for businesses or Social Security Number for individuals.

Reporting Period from: The beginning month, day and year you're reporting.
to: The ending month, day and year you're reporting.

Number of Tickets: The number of trip tickets filled out during the reporting period.

Current Date: The month, day and year that you are completing the report to send to the department.

Enter the dealer's name just as it appears on your license on the bottom of the form in the space provided. The dealer or authorized representative must sign the form.

If you have any questions concerning these instructions, contact the department at (225) 765-2393 or (225) 765-2399 or (225) 765-2449.

The dealer is responsible for obtaining additional forms by calling (225) 763-3588.

MONTHLY SUBMISSION SHEET

Louisiana Department of Wildlife & Fisheries
Trip Ticket Project
P.O. Box 80337
Baton Rouge, LA 70898-9000
(225) 765-2449

MS1

This report must be submitted monthly in order to comply with the requirements of LA R.S. 56:306.6 and rules and regulations adopted pursuant to those statutes. Completed trip tickets for the time period should accompany this form. **DO NOT STAPLE TRIP TICKETS.**

USE BLUE OR BLACK INK ONLY

License Number: C ☐☐☐☐☐☐ **Last 4 digits of account number** ☐☐☐☐

Reporting Period

from: M M / D D / Y Y Y Y

to: M M / D D / Y Y Y Y

Number of Tickets: ☐☐☐☐☐

Current Date: M M / D D / Y Y Y Y

By signing this document I hereby certify the following:

- the attached trip tickets represent all transactions of fish and shellfish obtained [illegible] a[illegible]on[illegible] other than a licensed dealer for the reporting period described above.
- all records (receipts) submitted in this report [illegible]utes a[illegible] a[illegible]ons [illegible]q[illegible] to be [illegible]ported by law.
- all the attached [illegible]rmation [illegible] ac[illegible] an[illegible] acc[illegible]nts for a[illegible] b[illegible] t[illegible]sactions required to b[illegible]mitt[illegible] is rep[illegible]
- I un[illegible]rs[illegible] at p[illegible]viding [illegible] n m[illegible] result in criminal consequences.

Dea[illegible]: ______________________________________

Signature: ______________________________________
(Licensed Dealer or Dealer's authorized representative)

MONTHLY CRAB SHEDDER SHEET INSTRUCTIONS (Document #6)

This report must be submitted monthly by wholesale/retail seafood dealers who shed soft shell crabs or operate soft shell crab shedding facilities in order to comply with the requirements of LA R.S. 56:306.6.

The Monthly Crab Shedder Sheet should accompany completed trip tickets and monthly submission sheets for the time period indicated. A Monthly Crab Shedder Sheet must be filled out and sent to the department on or before the tenth of the month for the preceding month.

If you are a wholesale/retail seafood dealer and do not shed soft shell crabs or operate soft shell crab shedding facilities you are not required to submit this form.

COMPLETING THE CRAB SHEDDER FORM

License Number: Enter your wholesale/retail seafood dealer number in the boxes provided.

Last 4 digits of account number: Enter the last 4 digits of your Tax ID number for businesses or Social Security number for individuals

Reporting Period Month: Enter the month you are reporting.

Reporting Period Year: Enter the year you are reporting.

Date Submitted: Enter the month, day and year that you are completing the report to send to the department.

Total Number of Peelers into system: This is the total number of crab put into the shedder.

Total Purchase Price of Crab: Enter the total purchase price of the crab put into the shedder.

Total Number of Soft Shells produced: Enter the total number of soft shells taken out of the shedder.

Total Selling price of Crab: Enter the total selling price of all soft shells taken out of the shedder.

Enter the dealer’s name just as it appears on your license on the bottom of the form in the space provided. The dealer or authorized representatives must sign the form.

If you have any questions concerning these instructions, contact the department at (225) 765-2393 or (225) 765-2399 or (225) 765-2449. The dealer is responsible for obtaining additional forms by calling (225) 763-3588. Please be sure to use original forms, copies will not be accepted.

CS2

Document #6 - MONTHLY CRAB SHEDDER SHEET

Louisiana Department of Wildlife & Fisheries
Trip Ticket Program
P.O. Box 80337
Baton Rouge, LA 70898-9000
(225)765-2399

This report must be submitted monthly by wholesale/retail seafood dealers who shed soft shell crabs or operate soft shell crab shedding facilities in order to comply with the requirements of LA R.S. 56:306.6. This form is to accompany completed trip tickets and monthly submission sheets for the time period indicated. If you do not shed soft shell crabs or operate soft shell crab shedding facilities you are not required to submit this form. **DO NOT STAPLE CRAB SHEDDER SHEETS, TRIP TICKETS OR MONTHLY SUBMISSION SHEETS.**

USE BLUE OR BLACK INK ONLY

License Number: C | | | | | | | Last 4 digits of account number: | | | | |

Reporting Period

Month | M | M |

Year | Y | Y | Y | Y |

Date Submitted | M | M | | D | D | | Y | Y | Y | Y |

SOFT SHELL CRAB PRODUCT REPORT

Enter number of individual crabs (no pounds or dozens)

TOTAL NUMBER OF PEELERS INTO SYSTEM	TOTAL PURCHASE PRICE OF CRAB	TOTAL NUMBER OF SOFT SHELLS PRODUCED	TOTAL SELLING PRICE OF CRAB

By signing this document I hereby certify the following:

- all the reported information is accurate and accounts for all actual shedding activities required to be submitted.
- I understand that providing false information may result in criminal consequences.

Dealer Name: ______________________________

Signature: ______________________________

(Licensed Dealer or Dealer's authorized representative)

CODES

AREA FISHED

SEE THE MAPS PROVIDED WITH THIS MANUAL FOR AREA FISHED CODES.

Louisiana State Codes are found on the Louisiana state map and the enhanced public oyster seed ground and near shore state waters map. This table lists those areas with an additional sub-basin code other than zero.

Public Oyster Reef and Near Shore State Water Sub-basin Coding	
Area Fished	Description
0304-1	Calcasieu Lake – Eastside/Growing Area 29
0304-2	Calcasieu Lake – West Cove/Growing Area 30
0420-1	Lake Borgne Public Oyster Seed Ground
0420-2	Mississippi Sound Public Oyster Seed Ground
0422-1	Public Oyster Seed Grounds North of MRGO
0422-2	Public Oyster Seed Grounds South of MRGO
0209-1	Hackberry Bay Public Oyster Seed Reservation
0209-2	Little Lake Public Oyster Seed Ground
0211-1	State waters (0-3 miles) off Barataria Basin
1208-1	State waters (0-3 miles) off Terrebonne Basin
1208-2	Lake Felicity Public Oyster Seed Ground
1208-3	Lake Chien Public Oyster Seed Ground
1207-1	Deep Lake Public Oyster Seed Ground
1207-2	Lake Tambour Public Oyster Seed Ground
1207-3	Sister Lake Public Oyster Seed Reservation
1207-4	Lake Mechant Public Oyster Seed Ground
1207-5	Bay Junop Public Oyster Seed Reservation

All other area codes are found on the map of the Gulf of Mexico and are used when fishing in waters other than Louisiana state waters.

GEAR CODES	
CODE	DESCRIPTION
20	HAUL SEINE
50	POUND NETS
71	WEIRS
125	PURSE SEINE, MENHADEN
145	PURSE SEINE, OTHER
189	BUTTERFLY NETS
192	SKIMMER NETS
210	OTTER TRAWL, FISH
215	OTTER TRAWL, SHRIMP
290	WIRE NETS
310	HOOP & FYKE NETS, FISH
315	HOOP & FYKE NETS, TURTLE
330	POTS & TRAPS, CRAB
335	POTS & TRAPS, CRAWFISH
340	POTS & TRAPS, EEL
345	POTS & TRAPS, FISH
375	POTS & TRAPS, TURTLE
390	SLAT TRAPS
401	LONG LINES, VERTICAL
404	LONG LINES, SURFACE, MIDWATER
425	GILLNETS, STAKE
475	GILLNETS, STRIKE
530	TRAMMEL NETS
610	HAND LINES
611	ROD & REEL
612	MANUAL REEL
613	ELECTRIC OR HYDRAULIC REEL
650	HARPOONS
657	GREEN-STICK GEAR
665	TROLL LINES

675	LONGLINE, SURFACE
676	LONGLINE, BOTTOM
680	TROT LINES/SETLINE
703	DIP NETS
735	CAST NETS
760	SPEARS & GIGS
770	BOW FISHING
803	AQUACULTURE
815	OYSTER DREDGE
840	OYSTER TONGS
900	OFF BOTTOM CULTURE
955	BY HAND (*JUGS*)
968	CANS, BUCKETS, PIPES, DRUMS, TIRES
969	BUSH LINES

SALTWATER FINFISH SPECIES		
GROUP	SPECIES CODE	SPECIES
JACK	0030	GREATER AMBERJACK
	1815	LESSER AMBERJACK
	1817	BANDED RUDDERFISH *(AMARINO, AMBERINE)*
	1800	HORSE-EYE JACK
	1805	BLACK JACK
	1810	ALMACO JACK
	1811	BAR JACK
	0870	JACK CRAVELLE
	0270	BLUE RUNNER
	1814	RAINBOW RUNNER
	2720	FLORIDA POMPANO
	1807	AFRICAN POMPANO
GROUPER	1409	SOAPFISH
	1411	SPECKLED HIND *(SPOTTED GROUPER, KITTY MITCHELL)*
	1412	ROCK HIND *(CALICO GROUPER)*
	1413	RED HIND *(STRAWBERRY GROUPER)*
	1414	SNOWY GROUPER *(SNOWY, BROWNIE)*
	1415	YELLOWEDGE GROUPER
	1416	RED GROUPER
	1417	MARBLED GROUPER *(SLOPEHEAD, JOHN PAW)*
	1420	MISTY GROUPER
	1422	BLACK GROUPER
	1423	GAG GROUPER *(BLACK GROUPER, COPPER BELLY)*
	1424	SCAMP
	1425	YELLOWMOUTH GROUPER *(CARBORITA)*
	1426	YELLOWFIN GROUPER *(RED GROUPER, TRUE YELLOWFIN, FIRE BACK)*
	1427	CREOLE FISH *(GRAY SNAPPER, ROSE SNAPPER)*
	1428	GRAYSBY

	1430	NASSAU GROUPER
	4740	WARSAW GROUPER *(BLACK JEWFISH)*
SNAPPER	3754	DOG SNAPPER
	3755	BLACK SNAPPER
	3756	WENCHMAN *(BIG-EYE SNAPPER)*
	3757	BLACKFIN SNAPPER *(BLACKFIN, HAMBONE SNAPPER)*
	3758	SILK SNAPPER *(SILKY, YELLOW EYE)*
	3759	CUBERA SNAPPER
	3760	GRAY SNAPPER *(MANGROVE, BLACK SNAPPER, MANGO)*
	3761	LANE SNAPPER *(CANDY SNAPPER)*
	3763	MUTTON SNAPPER
	3764	RED SNAPPER *(REDFISH, SNAPPER, CHICKEN SNAPPER)*
	3765	VERMILION SNAPPER *(BASTARD SNAPPER, BEE-LINER, MINGO)*
	3767	YELLOWTAIL SNAPPER *(YELLOWTAIL, SPOTTED SNAPPER)*
	3770	QUEEN SNAPPER *(SILK, BALL-BAT)*
	3772	MAHOGANY SNAPPER
GRUNT	1440	GRUNTS
	3302	RED PORGY *(PINK SNAPPER, PINKY)*
	3306	WHITEBONE PORGY *(WHITE SNAPPER)*
	3308	KNOBBED PORGY *(KEYWEST PORGY)*
	3312	JOLTHEAD PORGY
BIGEYE	0140	BIGEYE
	0145	SHORT BIGEYE
	0147	BULLEYE
	0149	BIGEYE UNCLASSIFIED
SCORPIONFISH	3263	SPINY CHEEK SCORPIONFISH
	3265	SPOTTED SCORPIONFISH
	3267	LONGSNOUT SCORPIONFISH
	3270	LIONFISH
TILEFISH	4472	GOLDFACE TILEFISH

	4470	TILEFISH (*GOLDEN TILEFISH*)
	4474	BLUELINE TILEFISH
	4476	BLACKLINE TILEFISH
	4478	SAND TILEFISH
TRIGGERFISH	4561	GRAY TRIGGERFISH
	4563	QUEEN TRIGGERFISH
	4562	OCEAN TRIGGERFISH
TUNA	4651	ALBACORE TUNA
	4652	BLUEFIN TUNA
	4653	LITTLE TUNNY *(BONITO, LITTLE TUNA, FALSE ALBACORE)*
	4654	SKIPJACK TUNA *(OCEAN BONITO, SKIPJACK, BONEHEAD)*
	4655	YELLOWFIN TUNA *(ALLISON TUNA)*
	4657	BIGEYE TUNA
	4658	BLACKFIN TUNA *(BERMUDA TUNA)*
	0330	ATLANTIC BONITO *(OCEAN BONITO, COMMON BONITO)*
COBIA DOLPHIN	570	COBIA *(LING, LEMON FISH)*
	1050	DOLPHIN (MAHI MAHI, DORADO)
	1940	KING MACKEREL
	3840	SPANISH MACKEREL
	4710	WAHOO
SHARKS, DOGFISH AND RAYS	3506	ATLANTIC SHARPNOSE SHARK
	3519	BONNETHEAD SHARK
	3481	FINETOOTH SHARK
	3485	BLACKNOSE SHARK
	3490	NURSE SHARK
	3493	SILKY SHARK
	3495	BLACKTIP SHARK
	3496	SPINNER SHARK
	3497	BULL SHARK
	3510	SCALLOPED HAMMERHEAD
	3511	GREAT HAMMERHEAD
	3513	SANDBAR SHARK

	3515	TIGER SHARK
	3517	LEMON SHARK
	3520	SMOOTH HAMMERHEAD
	3482	SAND TIGER SHARK
	3483	NARROWTOOTH SHARK
	3484	GALAPAGOS SHARK
	3486	OCEANIC WHITETIP SHARK
	3487	CARIBBEAN REEF SHARK
	3488	SMALLTAIL SHARK
	3489	BASKING SHARK
	3491	BIGNOSE SHARK
	3494	NIGHT SHARK
	3498	SMOOTH DOGFISH SHARK (AKA DUSKY SMOOTHOUND)
	3499	FLORIDA SMOOTH-HOUND SHARK
	3500	WHALE SHARK
	3501	PORBEAGLE SHARK
	3502	LONGFIN MAKO
	3504	BLUE SHARK
	3505	SHORTFIN MAKO (BONITO SHARK)
	3507	CARIBBEAN SHARPNOSE SHARK
	3509	THRESHER SHARK
	3512	WHITE SHARK
	3514	DUSKY SHARK
	3518	COMMON THRESHER SHARK
	3521	SPINY DOGFISH
	3522	BIGEYE SAND TIGER SHARK
	3523	BIGEYE THRESHER
	3524	ATLANTIC ANGEL SHARK
	3527	BIGEYE SIXGILL SHARK
	3528	SHARPNOSE SEVENGILL SHARK
	3529	SIXGILL SHARK
	3532	PELAGIC THRESHER SHARK
MULLET	2341	STRIPED MULLET *(BLACK MULLET, GREY MULLET)*

	2348	MULLET - RED ROE
	2349	MULLET - WHITE ROE
CATFISH	3381	GAFFTOPSAIL CATFISH
	3380	HARDHEAD CATFISH
EEL	1142	CONGER EEL
	1143	MORAY EEL
OTHER SALTWATER FISH	0925	CROAKER
	4060	SPOT
	1081	BLACK DRUM
	1235	FLOUNDER
	1970	WHITING *(CHANNEL MULLET, SOUTHERN KINGFISH)*
	3447	SPOTTED SEATROUT
	3455	WHITE TROUT *(SAND TROUT, SILVER TROUT)*
	3560	SHEEPSHEAD
	0230	BLUEFISH
	0521	BUTTERFISH
	0180	BARRACUDA
	0120	ANGELFISH
	0192	BLACK DRIFTFISH *(BARREL GROUPER)*
	0720	CHUBS
	1144	BEARDED BROTULA
	1550	HAKE
	1687	THREAD HERRING
	1790	HOGFISH
	2210	MENHADEN
	2230	MINNOWS
	2280	MOONEYE
	2310	MOONFISH
	2501	ESCOLAR
	2502	OILFISH
	2503	OPAH
	2520	PARROTFISH
	2525	CRIMSON ROVER

	2670	PINFISH
	2710	POMFRETS
	2760	PUFFERS
	2990	RUDDERFISH
	3260	SCULPINS
	3371	SPANISH FLAG
	3374	LONGTAIL BASS *(QUEEN SNAPPER, LONGTAIL)*
	3375	BANK SEABASS
	3360	BLACK SEABASS
	4120	SQUIRRELFISH
	4260	OCEAN SUNFISHES
	4320	SWORDFISH
	4410	LADYFISH *(TENPOUNDER)*
	4590	TRIPLETAIL
	3810	SPADEFISH
	8145	JELLYFISH
	9999	UNKNOWN SALTWATER FINFISH SPECIES

FRESHWATER FINFISH SPECIES		
GROUP	SPECIES CODE	SPECIES
CATFISH & BULLHEAD	662	BLUE CATFISH
	663	CHANNEL CATFISH *(EEL CAT, WILLOW CAT)*
	664	FLATHEAD CATFISH *(OPELOUSAS CAT, YELLOW CAT)*
	450	BULLHEADS *(MUD CAT)*
CARP	630	COMMON CARP *(GERMAN CARP)*
	4800	GRASS CARP
	4801	SILVER CARP
	4802	BIGHEAD CARP
SHAD	1340	GIZZARD SHAD
	1341	THREADFIN SHAD
	3474	SHAD UNCLASSIFIED
GAR	1331	SPOTTED GAR
	1333	LONGNOSE GAR *(SPIKE BILL)*
	1335	SHORTNOSE GAR
	1337	ALLIGATOR GAR
	1330	GARFISH UNCLASSIFIED
OTHER FRESHWATER FISH	1141	FRESHWATER EEL
	360	BOWFIN (GRINNEL)
	420	BUFFALOFISH
	3530	GASPERGOU *(FRESHWATER DRUM)*
	4460	TILAPIA
	2230	MINNOWS
	8888	UNKNOWN FRESHWATER FINFISH SPECIES

SHELLFISH		
GROUP	SPECIES CODE	SPECIES
SHRIMP	10	BROWN SHRIMP *(BRAZIL)*
	11	PINK SHRIMP *(HOPPERS)*
	12	WHITE SHRIMP
	13	SEABOB
	14	ROCK SHRIMP
	15	ROYAL RED
	16	RIVER SHRIMP
	17	BLOOD SHRIMP
	18	GRASS SHRIMP
	19	TIGER PRAWN
CRUSTACEANS	20	BLUE CRAB
	21	STONE CRAB
	22	WILD CRAWFISH
BIVALVES	30	OYSTERS PUBLIC REEF
	31	OYSTERS PRIVATE REEF
	32	WASHBOARD MUSSEL
	33	THREERIDGE MUSSEL
	34	MAPLE LEAF MUSSEL *(PIMPLEBACK)*
	35	BLEUFER MUSSEL
	36	MUSSELS AND MUSSEL SHELLS UNCLASSIFIED
	37	RANGIA
	38	MERCENARIA
OTHER	40	SQUID
	77	UNKNOWN SHELLFISH SPECIES

REPTILES AND AMPHIBIANS		
GROUP	SPECIES CODE	SPECIES
SALAMANDER	9301	LESSER SIREN
	9302	WATERDOG
	9303	AMPHIUMA
	9304	SPOTTED NEWT
	9305	SPOTTED SALAMANDER
	9306	MARBLED SALAMANDER
	9307	MOLE SALAMANDER
	9308	SMALL-MOUTHED SALAMANDER
	9309	DUSKY SALAMANDER
	9310	THREE-LINED SALAMANDER
	9311	DWARF SALAMANDER
	9312	SLIMY SALAMANDER
	9313	OTHER SALAMANDERS
FROG	8141	SPADEFOOT TOAD
	8142	GULF COAST TOAD
	8143	OTHER TOADS
	8144	CRICKET FROG
	8158	BIRD-VOICED TREE FROG
	8146	GREEN TREE FROG
	8147	GRAY TREE FROG
	8148	BARKING TREE FROG
	8149	SQUIRREL TREE FROG
	8150	SPRING PEEPER
	8151	CHORUS FROG
	8152	BULLFROG
	8153	BRONZE FROG
	8154	PIG FROG
	8155	LEOPARD FROG
	8156	NARROW-MOUTHED TOAD
	8157	OTHER FROGS
TURTLE	8121	COMMON SNAPPING TURTLE

	8122	ALLIGATOR SNAPPING TURTLE
	8123	MUD TURTLE
	8124	RAZOR-BACKED MUSK TURTLE
	8125	COMMON MUSK TURTLE
	8126	PAINTED TURTLE
	8127	CHICKEN TURTLE
	8128	ALABAMA MAP TURTLE
	8129	MISSISSIPPI MAP TURTLE
	8081	DIAMONDBACK TERRAPIN
	8130	RIVER COOTER
	8131	GULF COAST BOX TURTLE
	8132	THREE-TOED BOX TURTLE
	8133	RED-EARED TURTLE
	8134	SOFTSHELL TURTLE
	8135	OTHER TURTLES
LIZARD	9201	GREEN ANOLE
	9202	EASTERN FENCE LIZARD
	9203	FIVE-LINED SKINK
	9204	BROAD-HEADED SKINK
	9205	BROWN GROUND SKINK
	9206	GLASS LIZARD
	9207	OTHER LIZARDS
SNAKE	9401	SCARLET SNAKE
	9402	RACER
	9403	RING-NECKED SNAKE
	9404	CORN SNAKE
	9405	TEXAS RAT SNAKE
	9406	MUD SNAKE
	9407	HOG-NOSED SNAKE
	9408	PRAIRIE KING SNAKE
	9409	SPECKLED KING-SNAKE
	9410	MILK SNAKE
	9411	COACHWHIP

	9412	SALT MARSH SNAKE
	9413	GREEN WATER SNAKE
	9414	YELLOW-BELLIED WATER SNAKE
	9415	BANDED WATER SNAKE
	9416	DIAMOND-BACKED WATER SNAKE
	9417	ROUGH GREEN SNAKE
	9418	PINE SNAKE
	9419	GRAHAM'S CRAYFISH SNAKE
	9420	GLOSSY CRAYFISH SNAKE
	9421	DEKAY'S SNAKE
	9422	RIBBON SNAKE
	9423	GARTER SNAKE
	9424	CORAL SNAKE
	9425	COPPERHEAD
	9426	COTTONMOUTH
	9427	CANEBRAKE RATTLESNAKE
	9428	PYGMY RATTLESNAKE
	9429	OTHER SNAKES

UNIT	
CODE	DESCRIPTION
1	POUNDS
2	SACKS*
3	BARRELS
4	BUSHELS
5	DOZENS
6	INDIVIDUALS OR BY THE HEAD
7	TONS
8	THOUSANDS OF STANDARD FISH (Menhaden)

*convert any “half-sacks” or “mini sacks” to standard sacks

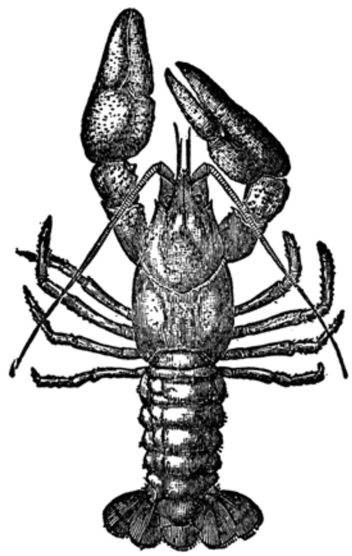
CONDITION (Cond)	
CODE	DESCRIPTION
1	WHOLE OR ROUND OR HEADS ON
2	GUTTED
3	HEADED OR HEADS OFF
4	GUTTED & HEADED
5	FILLETED OR PEELED OR MEAT
6	TUBED (GUTTED, HEADED, & TAILED)
7	PIECES OR CHUNKS
8	LIVE BAIT
9	DEAD BAIT

MARKET	
CODE	DESCRIPTION
1	Number 1 (LARGE CRABS)
2	Number 2 (MEDIUM CRABS)
3	Number 3 (SMALL CRABS)
4	Factory Grade Crab
5	No Grade (used for tuna)
6	Large
7	Medium
8	Small
10	Fins
11	Roe (Females or Female Crab)
12	Roe (Males or Male Crab)
13	Crab Claws
14	Buster or Peeler
15	Softshell
99	Farm raised, Aquaculture

PERMITS			
PERMIT		TYPE	SPECIES
STATE	Mullet Permit	S	MULLET
	Pompano Permit	S	POMPANO
	Spotted Seatrout Permit	S	TROUT
	Shark Permit	S	SHARK
	Mussel Harvester Permit	S	MUSSEL
	Out-Of-State Oyster Landing Permit	S	OYSTER
	Traversing Permit	S	TRAVERSE
	Special Bull Drum Permit	S	DRUM
	Menhaden Bait Permit	S	MENHADEN
	Shrimp Bait Permit	S	SHRIMP
	Experimental Gear Permit	S	GEAR
	Public Oyster Seed Ground Vessel Permit	S	OYSTER
FEDERAL	King Mackerel Permit	F	KING
	Spanish Mackerel Permit	F	SPANISH
	Reef Fish Permit	F	REEF
	Atlantic Bluefin Tuna Permit	F	BLUEFIN
	Other Tuna Permit	F	TUNA
	Swordfish Permit	F	SWORDFISH
	Shark Permit	F	SHARK

Appendix W: Louisiana Commercial Crawfish Harvesters Survey Report 2011

Louisiana Commercial Crawfish Harvesters Survey Report



By

Jack C. Isaacs and David Lavergne

Louisiana Department of Wildlife and Fisheries
Socioeconomic Research and Development Section

March, 2010

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Louisiana Commercial Wild Crawfish Harvester's Survey Report

By
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Louisiana Department of Wildlife and Fisheries
Socioeconomic Research and Development Section

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Louisiana Commercial Wild Crawfish Harvester's Survey Report

Introduction

Louisiana's aquatic and marine resources support the production of millions of pounds of commercial seafood every year. The production of crawfish, though relatively minor in terms of volume relative to shrimp, crabs, and oysters, nevertheless has a special place in Louisiana's culture and economy. Within the Louisiana crawfish industry, those fishermen who harvest and sell crawfish from the wild (wild crawfish harvesters) play a special part, serving a sector of consumers who prefer crawfish obtained from natural or wild origins.

As a regulator and manager of natural resources, the Louisiana Department of Wildlife and Fisheries (LDWF) has the potential to affect wild crawfish harvests and harvesters. In early 2010, the LDWF conducted a survey of resident wild crawfish harvesters to learn more about these individuals and their preferences and perspectives of selected actual and hypothetical regulations and management practices. The results of this survey will inform the LDWF as they assess the Department's rules, procedures, policies, and practices that are most relevant to wild crawfish management.

Louisiana Crawfish Production

Louisiana's commercial crawfish harvest is derived from two sources: commercial aquaculture operations (crawfish farms or ponds) and commercial harvests of crawfish from the wild. Farmed-raised crawfish has regularly accounted for the vast majority of the volume (Figure 1) and value (Figure 2) of the state's commercial crawfish production. Of the 127.3 million pounds of crawfish produced in Louisiana in calendar year 2008, 111.9 million pounds (87.9%) came from farms and 15.4 million pounds (12.1%) was harvested from the wild.

This report will focus on wild-caught crawfish because the policies, regulations, and research of the LDWF relate more directly to crawfish derived from the wild than from agricultural sources. Farm-raised crawfish, as an agricultural product, falls under the purview of the Louisiana Department of Agriculture and Forestry, the United States Department of Agriculture, and other agencies.

Figure 1. Volume of Louisiana Wild-Caught Crawfish and Farm-Raised Crawfish: 1997 - 2008

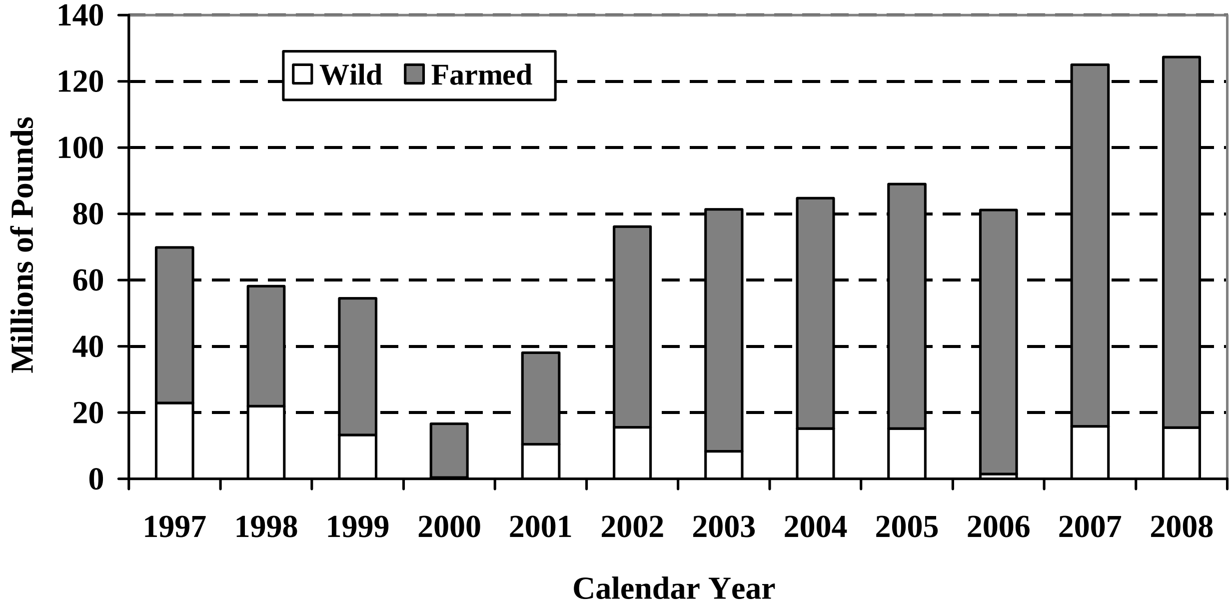
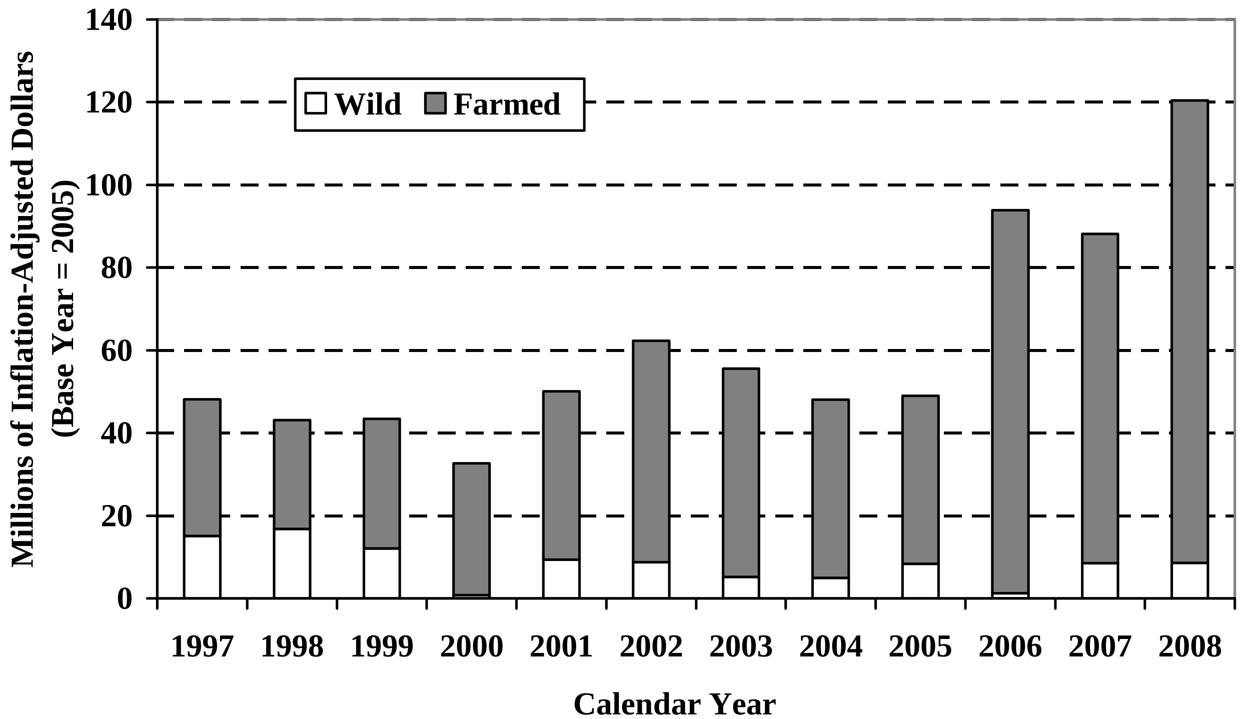
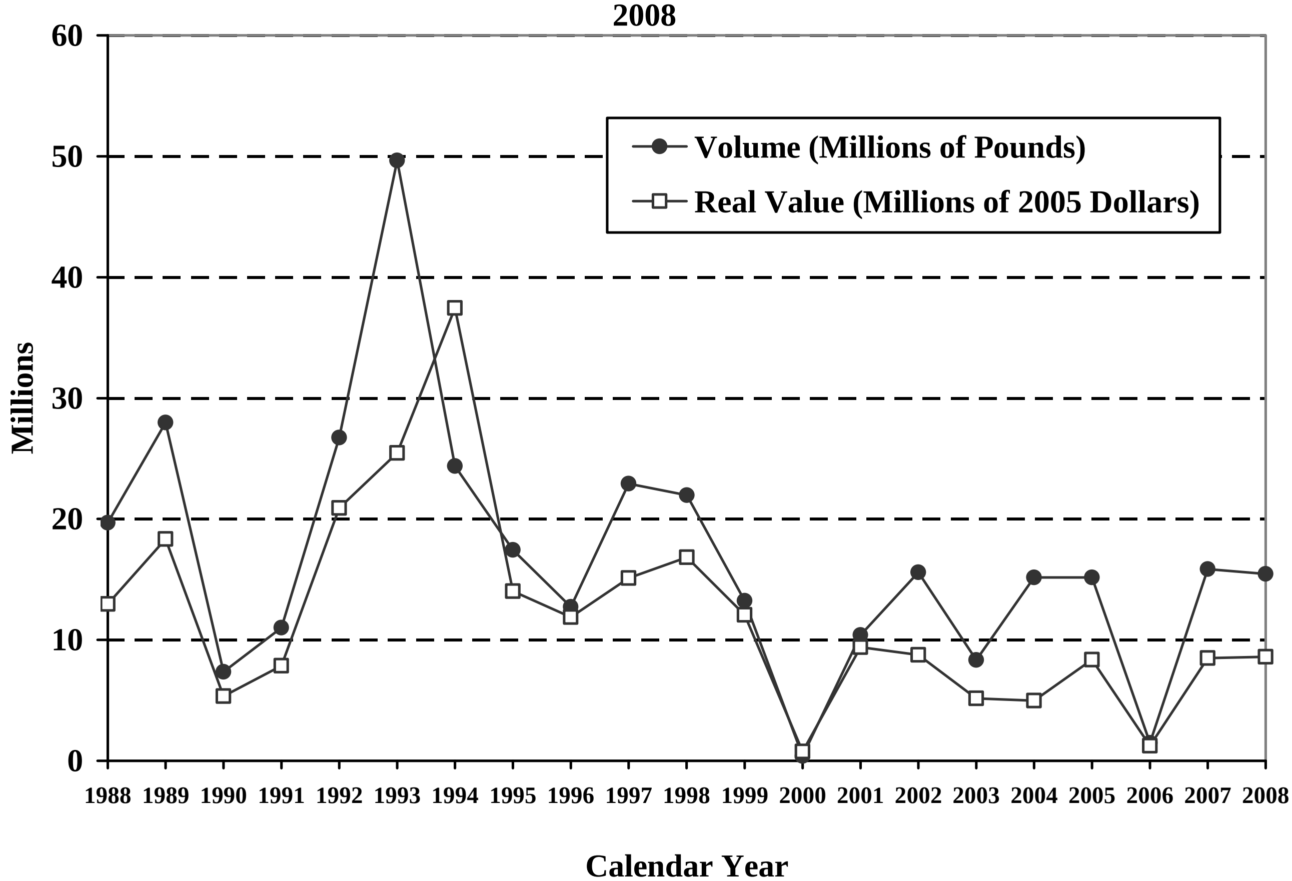


Figure 2. Value of Louisiana Wild-Caught Crawfish and Farm-Raised Crawfish: 1997 - 2008



Subject to a variety of biological, environmental, and economic factors, the volume and value of Louisiana's wild crawfish harvest are highly variable (Figure 3). Since 1988, commercial harvests have averaged 16.8 million pounds per year with a low of 392 thousand pounds in 2000 and a high of 49.7 million pounds in 1993. The dockside value of commercial wild crawfish landings (expressed in constant, inflation adjusted 2005 dollars) have averaged $12.10 million dollars during that period.

Figure 3. Volume and Value of Louisiana Wild Crawfish Harvest: 1988 - 2008



Louisiana Resident Commercial Wild Crawfish Harvesters

LDWF Commercial Licenses database and trip ticket files can be used to define and identity commercial wild crawfish harvesters and to discern some basic descriptive facts about crawfish landings and harvesters. In order to harvest wild crawfish legally for commercial purposes (that is, to land and sell crawfish obtained from wild or non-agricultural areas), one must hold two licenses: a commercial fisherman license (which permits the holder to land crawfish and other seafood species) and a commercial crawfish trap license (which permits the holder to deploy and harvest any number of legal crawfish traps). In license year 2008, the LDWF issued 10,490 resident commercial fisherman licenses[1] and 1,756 commercial crawfish trap licenses.

The LDWF Inland Fisheries Division consulted with staff from the LDWF Socioeconomic Research and Development Section and staff from the LDWF Research and Assessment Division to identify everybody who held a resident commercial fisherman license and reported landings of crawfish on trip tickets between July 1, 2008 and June 30, 2009.

The LDWF does not identify everybody who holds a crawfish trap license as an active commercial wild crawfish harvester. Many individuals may hold a commercial crawfish trap license but not actually deploy crawfish traps, sell crawfish, or otherwise participate in the commercial seafood sector in any given year.

The LDWF prefers to define "active resident wild crawfish harvesters" as those individuals who held a resident commercial fisherman license and completed and submitted trip tickets that indicated the landing and sale of crawfish in Louisiana within the previous license year. Based on trip ticket data from July 1, 2008 to June 30, 2009, one thousand one hundred forty two (1,142) qualified as active resident commercial wild crawfish harvesters under these criteria.

Parish of Residence among Active Resident Wild Crawfish Harvesters

The parish of residence for the wild crawfish harvesters was determined according to the city included in the Louisiana resident commercial fisherman's license files (Table 1). Commercial wild crawfish harvesters resided in thirty (30) parishes. Nearly four-fifths (78.2 percent) lived in four parishes within or near the Atchafalaya Basin: Assumption, Iberville, St. Martin, and St. Mary.

[1] Most of these resident commercial fisherman licenses were not held by individuals who harvested crawfish.

Table 1. Parish of Residence for Active Resident Wild Crawfish Harvesters, 2009

Parish	Number	Percent	Parish	Number	Percent
Acadia	3	0.26%	Rapides	3	0.26%
Ascension	13	1.14%	St. Charles	4	0.35%
Assumption	265	23.20%	St. James	3	0.26%
Avoyelles	58	5.08%	St. Landry	22	1.93%
Calcasieu	3	0.26%	St. Martin	240	21.02%
Cameron	3	0.26%	St. Mary	152	13.31%
East Baton Rouge	9	0.79%	Terrebonne	8	0.70%
Iberia	40	3.50%	West Baton Rouge	9	0.79%
Iberville	236	20.67%	Other North Louisiana[a]	3	0.26%
Lafayette	12	1.05%	Other SW Louisiana[b]	5	0.44%
Lafourche	6	0.53%	Other SE Louisiana[c]	4	0.26%
Livingston	20	1.75%			
Pointe Coupee	21	1.84%	State Total	1,142	

a-Other North Louisiana category includes De Soto, Catahoula, and Concordia Parishes
b-Other Southwest Louisiana category includes Evangeline, Vermilion, and Vernon Parishes
c-Other Southeast Louisiana category includes East Feliciana, Plaquemines, and Tangipahoa Parishes

Commercial Crawfish Harvest Categories: Catch Quartiles

In order to learn more about the distribution of the quantity of commercial crawfish landings among commercial harvesters, the population of active resident wild crawfish harvesters was sorted by the quantity of crawfish landings they reported on their trip tickets between July 1, 2008 and June 30, 2009. The population was then divided into four separate groups (or "catch quartiles") of roughly equal size. Three of the commercial crawfish catch categories (Quartiles 1 – 3) contained 284 crawfish harvesters each (Figure 4). Quartile 4 was slightly smaller (282 crawfish harvesters) because the survey population was not evenly divisible by four.

<u>Quartile 1</u> consisted of 284 commercial fishermen who landed less than 2,445 pounds of wild crawfish between July 1, 2008 and June 30, 2009. The average reported crawfish landings by harvesters in this quartile were 907.7 pounds. The collective harvest by crawfish harvesters in this quartile accounted for only 1.4 percent of all of the reported crawfish landings in Louisiana for that period (Figure 5).

Figure 4. Apportionment of the Population of Active Resident Crawfish Harvesters (July 1, 2008 to July 30, 2009) by Catch Quartiles

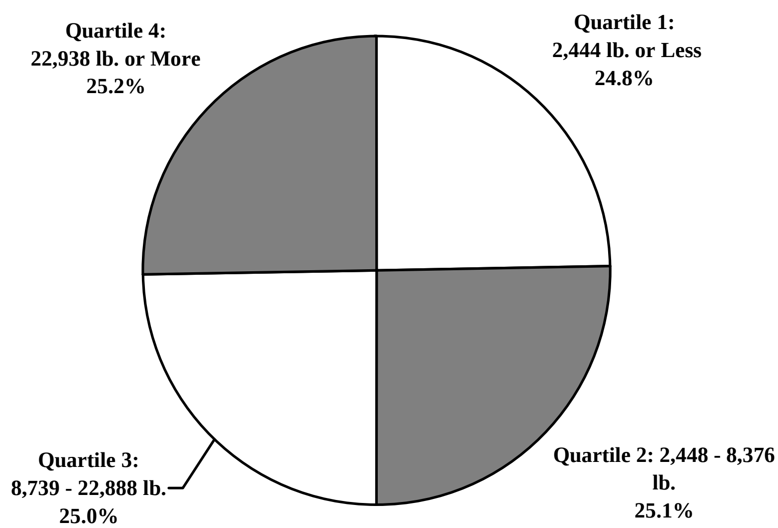
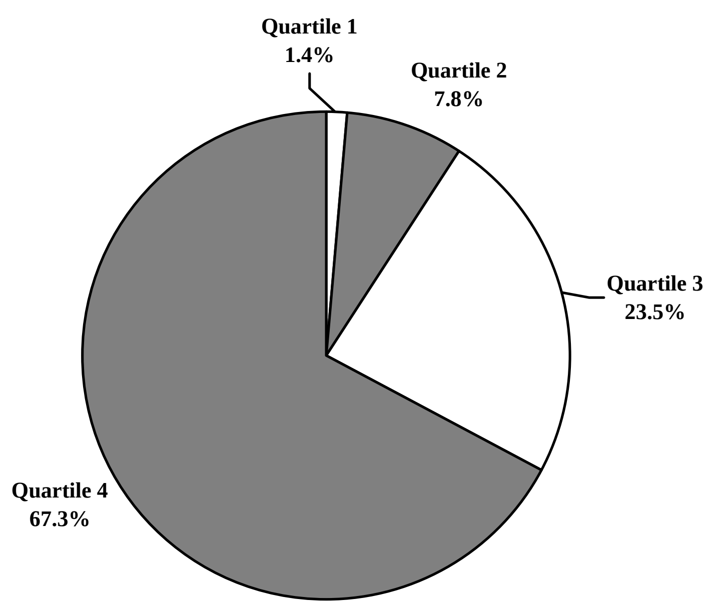


Figure 5. Percentage of All Commercial Crawfish Landings (July 1, 2008 to June 30, 2009) Reported by Active Resident Crawfish Harvesters in Each Catch Quartile



Quartile 2 consisted of 284 commercial fishermen who landed between 2,448 and 8,376 pounds of wild crawfish between July 1, 2008 and June 30, 2009. The average reported wild crawfish landings by fishermen in this quartile were 4,942.8 pounds. Their collective harvest accounted for only 7.8 percent of all of the reported wild crawfish landings in Louisiana for that period.

Quartile 3 consisted of 284 commercial fishermen who landed between 8,739 and 22,000 pounds of wild crawfish between July 1, 2008 and June 30, 2009. The average quantity of wild crawfish landed by fishermen in this quartile was 14,830.8 pounds. Their collective harvest totaled less than one-quarter (23.5 percent) of all of the reported wild crawfish landings in Louisiana for that period.

Quartile 4 consisted of 282 commercial fishermen who landed more than 22,000 pounds of wild crawfish between July 1, 2008 and June 30, 2009. The average reported wild crawfish landings by fishermen in this quartile were 42,800.9 pounds. The collective harvest by crawfish harvesters in this quartile exceeded two-thirds (67.3 percent) of all of the reported wild crawfish landings in Louisiana for that period.

The parish of residence for all commercial wild crawfish harvesters within each quartile (Table 2) could be determined by examining the city and town identified for each individual in the LDWF License Database. For each quartile, the majority of commercial wild crawfish harvesters resided in Iberville, Assumption, St. Martin, and St. Mary Parishes. The percentage living in these four parishes ranged from 68.53% for Quartile 1 to 73.78% for Quartile 2 to 81.47% for Quartile 3 to 89.09% for Quartile 4.

There are some interesting variations among quartiles for the percentage of wild crawfish harvesters living in individual parishes, most notably St. Martin and St. Mary Parishes. While 12.49% of the wild crawfish harvesters in Quartile 1 resided in St. Martin Parish, 35.21% of those in Quartile 4 lived in that parish. Nearly one-fifth (19.58%) of the wild crawfish harvesters in Quartile 1 lived in St. Mary Parish, while less than ten percent (7.74%) of the wild crawfish harvesters in Quartile 4 lived in St. Mary Parish.

Table 2. Distribution of Parish of Residence of Active Resident Crawfish Harvesters, By Catch Quartiles

	Quartile 1		Quartile 2		Quartile 3		Quartile 4		Total	
Parish	**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**
Assumption	54	18.88%	67	23.43%	75	26.22%	69	24.30%	265	23.20%
Avoyelles	20	6.99%	20	6.99%	12	4.20%	6	2.11%	58	5.08%
Cameron	3	1.05%							3	0.26%
Iberia	15	5.24%	8	2.80%	7	2.45%	10	3.52%	40	3.50%
Iberville	49	17.13%	59	20.63%	66	23.08%	62	21.83%	236	20.67%
Lafayette	6	2.10%	3	1.05%	3	1.05%			12	1.05%
Pointe Coupee	5	1.75%	9	3.15%	7	2.45%			21	1.84%
St. Martin	37	12.94%	47	16.43%	56	19.58%	100	35.21%	240	21.02%
St. Mary	56	19.58%	38	13.29%	36	12.59%	22	7.75%	152	13.31%
West Baton Rouge			6	2.10%			3	1.06%	9	0.79%
All Other[a]	41	14.35%	29	10.15%	24	0.84%	12	0.84%	106	9.31%
Total	286		286		286		284		1142	

a-"All Other" includes those parishes which did not have at least three (3) active resident crawfish harvesters in any individual catch quartile: Acadia, Ascension, Calcasieu, Catahoula, Concordia, De Soto, East Baton Rouge, East Feliciana, Evangeline, Lafourche, Livingston, Plaquemines, Rapides, St. Charles, St. James. St. Landry, Tangipahoa, Terrebonne, Vermilion, and Vernon.

The LDWF Louisiana Crawfish Harvesters Survey 2010

In early 2010, the Louisiana Department of Wildlife and Fisheries (LDWF) conducted a survey of Louisiana resident commercial fishermen who harvested wild crawfish to assess their views, opinions, and perspectives on issues of concern in the commercial wild crawfish industry. The results of this survey will be used by the LDWF Inland Fisheries Division in the development and implementation of resource management and regulatory policies. The survey will also be used to inform Louisiana state legislators, members of commercial fishing organizations, and other interested individuals of the range of opinions and viewpoints held by Louisiana's commercial wild crawfish harvesters.

Representatives from the LDWF Inland Fisheries Division consulted with staff from the LDWF Socioeconomic Research and Development Section to design and implement a survey of commercial wild crawfish harvesters in late 2009. They discussed methods of identifying the population of active commercial crawfish harvesters, framing the survey sample, designing the survey instrument (questionnaire), and conducting and implementing the survey.

Population and Survey Sample

An active resident commercial crawfish harvester is defined in this study as any individual who held a resident commercial fisherman license and reported crawfish landings on trip tickets between July 1, 2008 and June 30, 2009. As previously noted, this population included 1,142 individuals.

The LDWF Inland Fisheries Division and Socioeconomic Research and Development section chose to include all 1,142 active resident commercial crawfish harvesters in its survey because sending a survey to all (a) was not prohibitively expensive and (b) would give all active wild crawfish harvesters the opportunity to express their opinions on matters of interest.

Selected Survey Topics

Of the many issues relevant to commercial crawfish harvesting, the LDWF Inland Fisheries Division selected four with which it had the greatest concern and for which it had the capacity and authority to address. The four issues selected for inclusion in this survey were all hypothetical insofar as the LDWF does not necessarily have plans to alter these specific regulations or management policies at this time.

<u>Commercial Crawfish Harvest Seasons</u>

Currently the State of Louisiana does not have a defined crawfish season. Legally licensed commercial fishermen can harvest crawfish using legally acceptable means throughout the year. There are some who believe that a crawfish season may reduce harvest effort at times of the year when many crawfish are small or bearing eggs. If so, proponents of this view believe, a properly-timed commercial wild crawfish season could reduce the amount of harvest activities at these times of the year and result in more and larger crawfish.

Minimum Crawfish Trap Mesh Size

Currently legal commercial wild crawfish traps must have a minimum mesh size of ¾-inches by 11/16 inches. There are some who propose the establishment of a larger minimum mesh size of ¾-inches by ¾-inches. Proponents of this regulatory change believe that it would result in an increased proportion of landings of larger and potentially more valuable crawfish.

Area Designation for the Atchafalaya Basin on Trip Ticket Reporting

Louisiana commercial fishermen have been required to provide information for a “trip ticket” whenever they sell their wild commercial seafood harvests to dealers, processors, retailers, or other buyers. Trip tickets include details of the volume (in pounds), value (in dollars), and form of each species landed as well as the area in which most of the related harvest effort was expended. Seafood harvest areas are delineated on a map made available by the LDWF and assigned numbers or codes. Currently virtually all of the Atchafalaya Basin falls within one trip ticket reporting area (Area 0105). Most (74.11 percent) of the commercial landings of wild crawfish landings in the state of Louisiana originate from this single region. There are some who believe that redefining this single area into multiple reporting areas would improve the quality of harvest information and enhance the ability to form resource management decisions. Suggested alternative designations range from as few as two areas (one east of the Atchafalaya, one west of the Atchafalaya River) to as many as thirteen areas (following the boundaries of the U.S. Army Corps of Engineers Water Management Units) within the Atchafalaya Basin.

Commercial Wild Crawfish Trap Tag Requirements

Currently Louisiana wild crawfish harvesters are not required to affix tags identifying ownership on their crawfish traps. There are some who propose the mandatory placement of tags identifying the owner of all commercial crawfish traps, similar to the requirement placed on commercial crab traps in Louisiana. Proponents of this view believe that tags may assist law enforcement agents in identifying suspects who may be allegedly stealing traps or illegally harvesting wild crawfish from traps that they do not own. Tags may also assist in finding the owners of lost, stolen, or abandoned traps.

Each of these proposals, of course, may also be criticized or opposed for a variety of reasons, such as costs, inconvenience, regulatory burden, and perceived ineffectiveness or inefficiency. Thus, the LDWF Inland Fisheries Division implemented a survey to assess the degree of support for or opposition to these proposals among this important group of stakeholders.

Survey Questionnaire

Staff from the LDWF Inland Fisheries Division and Socioeconomic Research and Development Section developed a ten-question, three-page questionnaire, *The 2010 Louisiana Crawfisherman Survey*. Four questions that formed the central part of the survey pertained to the proposed alterations to commercial crawfish harvest seasons, trap mesh size, Atchafalaya Basin trip ticket designations, and trap tag requirements.

Another four questions pertained to geographic characteristics or harvesting or marketing practices of the survey respondents. One of these questions asked the respondent to identify where he or she harvested most of his or her crawfish in 2009: east of the river in the Atchafalaya Basin; west of the river in the Atchafalaya Basin; or elsewhere. The second question in this series asked the respondent to identify the parish where he or she sold most of his or her crawfish in 2009. A third question asked the respondent to provide his or her ZIP code and the fourth to estimate how long he or she has been a commercial wild crawfish harvester.

The last page of the questionnaire contained two open-ended questions. One question asked the respondents to identify the major problems they think are affecting the Louisiana wild crawfish industry. The other gave the respondents the opportunity to provide comments or suggestions.

The LDWF designed slightly different questionnaire covers for each quartile that allowed analysts to identify from which commercial harvest category each returned questionnaire came. This is a common practice among survey designers that allows them to incorporate available data more efficiently while still maintaining respondents' anonymity.

Survey Implementation

Staff from the LDWF Inland Fisheries Division and Socioeconomic Research and Development Section prepared survey packages, containing a questionnaire, explanatory letter, and a self-addressed, postage-paid envelope, on January 13, 2010. Survey packages were mailed on January 14, 2010 to 1,142 resident wild crawfish harvesters at the mailing addresses included in the LDWF Commercial License database. Thirteen survey packages were returned as undeliverable and removed from the sample to produce an adjusted sample of 1,129. As of February 23, 2010, 470 completed questions were returned, yielding a response rate of 41.63 percent.

Respondents' Parishes of Residence

The parishes of residence for wild crawfish harvesters were identified by the survey respondents' ZIP codes. The residential pattern among survey respondents (Table 3) was similar to that seen in the license file database. Approximately 80.21 percent resided in Assumption, Iberville, St. Mary, and St. Martin Parishes.

Staff in the Inland Fisheries Division examined every respondent's ZIP codes and parish to determine whether his or her place of residence was east or west of the Atchafalaya River (Figure 6). A majority of respondents (58.3 percent) lived in a city, town, or community on the east side of the Atchafalaya River and approximately one-third (35.5 percent) lived on the west side of the river. Less than five percent (4.3 percent) lived in an area north of the river.

Number of Years of Commercial Crawfish Harvesting Activity

The typical survey respondent has been harvesting crawfish commercially for approximately two decades. The average respondent has been a commercial wild crawfish harvester for 22.02 years (Table 4). The median value was 20 years.

Table 3. Parish of Residence for Respondents to *The 2010 Louisiana Crawfisherman Survey*

Parish of Residence	Number	Percent	Parish of Residence	Number	Percent
Acadia	1	0.21	Livingston	6	1.28
Ascension	9	1.91	Pointe Coupee	7	1.70
Assumption	104	22.13	Rapides	1	0.21
Avoyelles	19	4.04	St. Charles	2	0.43
Calcasieu	1	0.21	St. Landry	3	0.64
East Baton Rouge	3	0.64	St. Martin	122	25.96
East Feliciana	1	0.21	St. Mary	59	12.55
Evangeline	1	0.21	Tangipahoa	1	0.21
Iberia	19	4.04	Terrebonne	3	0.64
Iberville	92	19.57	West Baton Rouge	2	0.43
Lafayette	3	0.64	Unknown or Invalid	9	1.91
Lafourche	2	0.43	State Total	470	

Figure 6. Respondents' Place of Residence in Reference to the Atchafalaya River

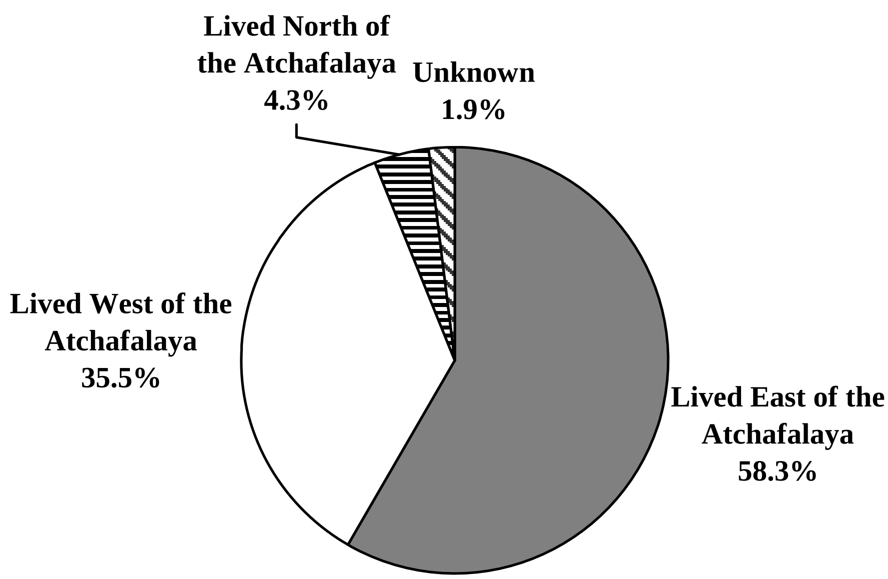


Table 4. Distribution of Years as a Crawfish Harvester among Respondents to *The 2010 Louisiana Commercial Crawfisherman Survey*

Observations	Minimum	Maximum	Mean	Median	Mode	Standard Deviation
462	1	74	22.02	20	20	17.78

There was no statistical difference in the number of years of commercial crawfish harvesting reported by respondents on the east side and the west side of the river (Table 5). (Respondents on the north of the river were not included in statistical comparisons because of the small subsample size.)

Parishes Where Respondents Sold Most of Their Crawfish Landings in 2009

Like the crawfish harvesters themselves, the majority of the seafood dealers to whom commercial wild crawfish harvesters sold most of their catch in 2009 were also situated near or within the Atchafalaya Basin (Table 6). Among those respondents who identified a single Louisiana parish for the location of their most frequented dealer, nearly nine-tenths (89.1 percent) sold most of their crawfish to dealers in St. Martin, Assumption, Iberville, and St. Mary Parishes.

Area Where Respondents Reported Landing Most of Their Crawfish in 2009

Over ninety-percent (91.6 percent) of respondents reported harvesting most of their wild crawfish (Figure 7) within in the Atchafalaya Basin (Basin) in 2009: 56.7 percent on the east side of the Atchafalaya River (river); 29.5 percent on the west side of the river; and 5.6 percent both east and west of the river[2]. Approximately 8.2 percent reported harvesting most of their 2009 crawfish in some location "other" than the Basin. Their responses are presented in Box 1 as the respondents wrote them. The repetition of a site or location in this list is an indication that more than one person identified that locale as the place where they harvested most of their crawfish.

Table 5. Distribution of Years as a Crawfish Harvester among Respondents , By Place of Residence in Reference to the Atchafalaya River

	Usable Observations	Minimum	Maximum	Mean	Median	Mode	Standard Deviation
East of the River	270	1	74	21.30	20	20	14.68
West of the River	166	1	65	23.65	23.5	20	15.19
North of the River	20	1	50	19.25	20	30	12.96

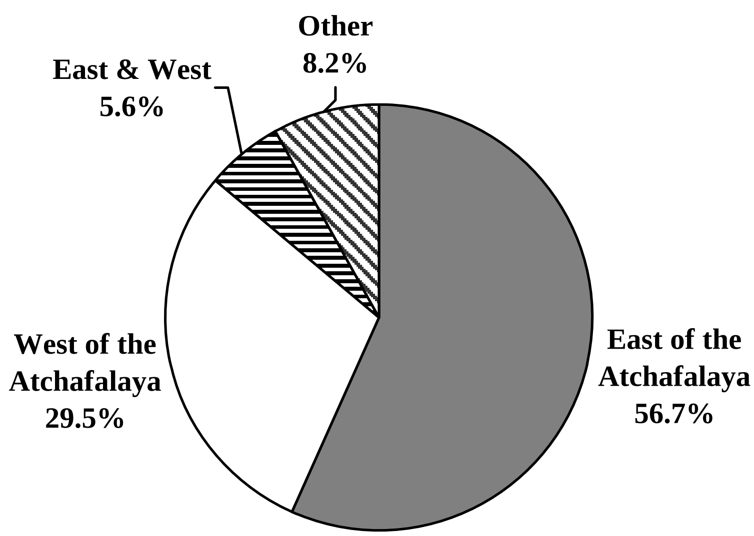
[2] Though the questionnaire did not include an "east and west" alternative, the researcher created a special code when entering the data for those respondents who indicated "east and west", "both sides" or similar responses.

Table 6. Location of Crawfish Dealers to Whom Respondents Sold Most of Their Crawfish in 2009, By Parish

Parish	Number	Percent	Parish	Number	Percent
Ascension	2	0.43%	Plaquemine	1	0.43%
Assumption	109	23.19%	Pointe Coupee	11	2.34%
Avoyelles	15	3.19%	St. Landry	1	0.43%
Caddo	1	0.21%	St. Martin	141	30.0%
East Baton Rouge	1	0.21%	St. Mary	41	8.72%
Iberia	12	2.55%	Terrebonne	1	0.21%
Iberville	110	23.4%	Vermilion	1	0.21%
Lafayette	1	0.21%	Multiple Parishes*	6	1.28%
Lafourche	1	0.21%	Out of State**	2	0.43%
Livingston	1	0.21%	None Identified	12	2.55%

*"Multiple Parishes" – Assumption & East Baton Rouge; Assumption & Iberville; Assumption & St. Mary; St. Martin & Iberia; St. Martin & St. Mary
** Out of State – Texas; Texas to Florida

Figure 7. Area Where Respondents Reported Landing Most of Their Crawfish Harvests in 2009



Box 1. Respondents' Specifications of "Other" Areas Where They Harvested Most of Their Crawfish in 2009

- North
- Area 0101 (North side)
- Avoyelles/Concordia
- Cat Island area
- Leased property Pierre Part area
- Stephensville: Flat Lake area and Bayou Soleil
- Swamp (Assumption Parish)
- Assumption Parish Swamp
- Grand Lake
- LWAF [Louisiana Wildlife and Fisheries?]
- Flooded woods off Mississippi
- Mississippi
- Mississippi River
- Mississippi River - Old River lease
- Mississippi River - Raccourci Island
- Mississippi River (Vidalia)
- Mississippi River backwater
- Mississippi River north of EBR
- West of Mississippi Wildlife & Fisheries
- Pointe Coupee
- Pointe Coupee
- Port Allen
- Private land
- Raccourci Island
- Raccourci Island
- Raccourci Island
- South of I-10
- Concordia Parish - Three Rivers game preserve
- Three Rivers
- Three Rivers
- Three Rivers LDWF (Rev)
- Wherever
- All over
- Everywhere
- [Nothing specified]
- Became disabled in 2009
- Cash
- Didn't fish in 2009

Respondents who reported landing most of their wild crawfish within the Atchafalaya Basin were similar to each other (and the sample overall) in terms of place of residence (Table 7) and the location of their most-frequented crawfish dealers (Table 9). Assumption, Iberville, St. Martin, St. Mary were the parishes of residence for 83.27 percent of the respondents who landed most of their crawfish in the east side of the river, 84.67 percent of those who landed most of their crawfish on the west side of the river, and 88.0 percent of those who reported landing most of their crawfish on both sides of the river[3]. Similarly, these same four parishes contained the crawfish dealers most frequented by 91.23 percent of the respondents who harvested most of their crawfish on the east side of the river, 88.33 percent of those who harvested most of their crawfish on the west side of the river, and 92.00 percent of those who landed most of their crawfish on both sides of the river.

Respondents who reported harvesting most of their crawfish in some “other” area outside the Atchafalaya Basin[4] appear to demonstrate some differences in the patterns of parish of residence and parish of their most frequented crawfish dealers. While over 80 percent of the respondents who landed most of their crawfish in the Atchafalaya Basin live or sell their crawfish within Assumption, Iberville, St. Martin, and St. Mary Parishes, of those who harvest most of their crawfish in some “other” area, only 41.02 percent live in and only 33.3 percent sell most of their crawfish within those four parishes. Avoyelles Parish stands out among this subsample of respondents as the parish of residence (35.90 percent) and the parish of their most frequented crawfish dealers (28.21 percent).

There is evidence of differences in the length of time that commercial crawfish harvesters have been harvesting crawfish commercially based on the areas where they harvested most of their crawfish (Table 8). The average number of years of commercial crawfishing reported by respondents who

[3] The interpretation of the results for respondents who reported landing most of their crawfish on both sides of the river must be interpreted with caution because the size of this subsample (25) is too small for statistical reliability.

[4] The interpretation of the results for respondents who reported landing most of their crawfish in some “other” area outside the Basin must be interpreted with caution because the size of this subsample (39) is probably too small for statistical reliability.

harvested most of their crawfish on the west side of the Atchafalaya River (25.07 years) is significantly larger than the average reported by those who harvested most of their crawfish on the east side of the river (21.08 years). The average number of years of commercial crawfishing by those who harvest most of their crawfish in some "other" area outside the Atchafalaya Basin (16.34 years) also appears to be significantly less than the averages reported by those who harvest most of their crawfish within the Basin on the east side, west side, or both sides of the river. (The relatively small size of the "other area" subsample may affect the reliability of these statistical tests, however.)

Table 7. Respondents' Parish of Residence, By Primary Crawfish Harvest Area

	Respondents Who Harvested Most of Their Crawfish …							
	East of the River		West of the River		East and West of the River*		Other Area**	
Parish of Residence	**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**
Acadia	1	0.38%						
Ascension	7	2.66%	1	0.74%	1	3.85%		
Assumption	62	23.57%	29	21.32%	5	19.23%	6	15.79%
Avoyelles	2	0.76%	3	2.21%			14	36.84%
Calcasieu	1	0.38%						
East Baton Rouge	1	0.38%	1	0.74%			1	2.63%
East Feliciana							1	2.63%
Evangeline			1	0.74%				
Iberia	8	3.04%	8	5.88%	3	11.54%		
Iberville	71	27.00%	17	12.50%	1	3.85%	2	5.26%
Lafayette	2	0.76%	1	0.74%				
Lafourche	2	0.76%						
Livingston	4	1.52%	2	1.47%				
Pointe Coupee	3	1.14%	1	0.74%			3	7.89%
Rapides							1	2.63%
St. Charles	2	0.76%						
St. Landry	3	1.14%						
St. Martin	47	17.87%	58	42.65%	11	42.31%	5	13.16%
St. Mary	39	14.83%	12	8.82%	5	19.23%	2	5.26%
Tangipahoa							1	2.63%
Terrebonne	1	0.38%	1	0.74%			1	2.63%
West Baton Rouge	2	0.76%						
Unknown or Invalid	5	1.90%	1	0.74%			1	2.63%
Total	263		136		26		38	

*The size of the subsample of respondents who harvest crawfish both east & west of the river is too small for reliable statistical analysis.
**The size of the subsample who harvest crawfish in other areas is probably too small for reliable statistics analysis.

Table 8. Distribution of Years as a Crawfish Harvester among Respondents , By Primary Crawfish Harvest Area

	Usable Observations	Minimum	Maximum	Mean	Median	Mode	Standard Deviation
East of the River	260	1	74	21.08	20	20	14.47
West of the River	135	1	65	25.07	25	30	15.34
East and West of the River	24	3	60	26.63	25	20	13.63
Other Area	38	1	50	16.34	15	20	13.34

Table 9. Parish of Crawfish Dealers to Whom Respondents Sold Most of Their Crawfish, By Primary Crawfish Harvest Area

	Primary Commercial Crawfish Harvest Area							
	East of the River		West of the River		East and West of the River*		Other Area**	
Dealers' Parish	**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**
Ascension	1	0.38%	1	0.73%				
Assumption	70	26.62%	27	19.71%	6	23.08%	5	13.16%
Avoyelles	2	0.76%	2	1.46%			11	28.95%
Caddo			1	0.73%				
East Baton Rouge							1	2.63%
Iberia	4	1.52%	7	5.11%	1	3.85%		
Iberville	86	32.70%	20	14.60%	1	3.85%	2	5.26%
Lafayette	1	0.38%						
Lafourche	1	0.38%						
Livingston			1	0.73%				
Plaquemine	1	0.38%						
Pointe Coupee	2	0.76%	1	0.73%			8	21.05%
St. Landry	1	0.38%						
St. Martin	60	22.81%	64	46.72%	12	46.15%	4	10.53%
St. Mary	24	9.13%	10	7.30%	5	19.23%	1	2.63%
Terrebonne	1	0.38%						
Vermilion	1	0.38%						
Multiple Parishes	4[a]	1.52%	1[b]	0.73%	1[c]	3.85%		
Out of State							1[d]	2.63%
None Identified	4	1.52%	2	1.46%			5	13.16%
Total	263		137		26		38	

a- Parishes: Assumption & East Baton Rouge; Assumption & Iberville; St. Martin & St. Mary
b- Parishes: Iberia & St. Martin
c- Parishes: Assumption & St. Mary
d- State: Texas to Florida

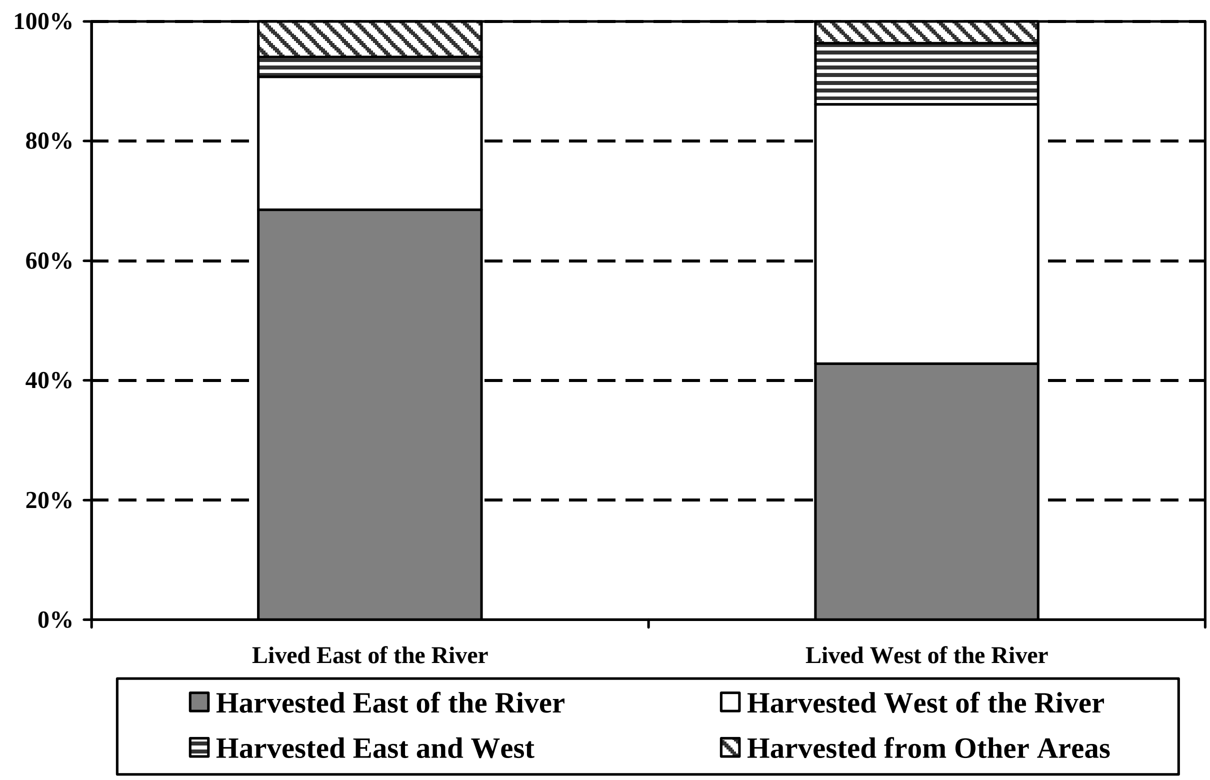
*The size of the subsample of respondents who harvest crawfish both east & west of the river is too small for reliable statistical analysis.
**The size of the subsample who harvest crawfish in other areas is probably too small for reliable statistics analysis.

Primary Crawfish Harvest Areas According to Place of Residence in Reference to the Atchafalaya River

Over two-thirds (68.5 percent) of the respondents who resided in a town, city, or community on the east side of the Atchafalaya River harvested the majority of their crawfish on the east side of the river in the Atchafalaya Basin (Figure 8). Approximately one-third (32.4 percent) harvested most of their crawfish on the west side of the river.

Respondents who resided on the west side of the Atchafalaya River were somewhat more likely to "cross over" to the other side of the river when harvesting crawfish. Of the respondents who lived on the west side of the river, 43.4 percent harvested most of their crawfish on the west side of the Basin and 42.8 percent harvested most of their crawfish in the Atchafalaya River on the east side of the Basin. One-tenth (10.2 percent) said they harvested more of their crawfish on both sides of the river.

Figure 8. Respondents' Primary Crawfish Harvest Areas, By Place of Residence in Reference to the Atchafalaya River



Crawfish Catch Quartiles

The original numbers of crawfish harvesters in the catch quartiles were 284 each for Quartiles 1, Quartile 2, and Quartile 3 and 282 for Quartile 4. Following standard procedure, surveys that were returned to the LDWF as undeliverable by the U.S. Postal Service were removed from the subsample population to calculate adjusted subsample sizes. Of the thirteen questionnaires returned to the LDWF as undeliverable, six were from Quartile 1, three from Quartile 2, and four from Quartile 3. Non-deliverable surveys were subtracted from the original category population to produce adjusted category population sizes of 280 for Quartile 1; 283 for Quartile 2; 282 for Quartile 3; and 283 from Quartile 4 (Table 10).

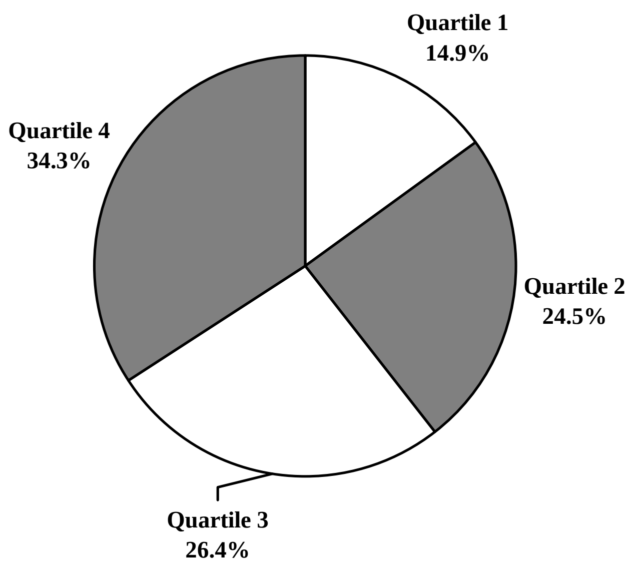
Of the 470 returned questionnaires, 70 were from Quartile 1; 115 from Quartile 2; 124 from Quartile 3; and 161 from Quartile 4. Response rates (the number of returned questionnaires divided by adjusted sample size) were 25.0 percent for Quartile 1; 40.64 percent for Quartile 2; 43.97 percent for Quartile 3; and, 56.69 percent for Quartile 4.

Because response rates varied among the commercial crawfish catch categories (quartiles), some quartiles may make a disproportionately small or large percentage of the survey sample relative to the population of active resident commercial wild crawfish harvesters. Though each quartile contained roughly 25% of all commercial wild crawfish harvesters, only 14.9 percent of the returned questionnaires were from Quartile 1 while 34.3 percent were from Quartile 4 (Figure 9). The percentage of the survey sample from Quartile 2 (24.5 percent) and Quartile 3 (26.4 percent) were roughly equal to the percentage of population within those quartiles.

Table 10. Survey Subsample Population Sizes, By Catch Quartiles

Catch Quartile	Population	Non-deliverable*	Adjusted Population
Quartile 1	286	6	280
Quartile 2	286	3	283
Quartile 3	286	4	282
Quartile 4	284	0	284
Total	1,142	13	1,129

Figure 9. Percentage of Survey Respondents, By Catch Quartiles



Approximately three-quarters of the respondents in Quartile 1 (72.86 percent), Quartile 2 (75.64 percent), and Quartile 3 (76.61 percent) reside in Assumption, Iberville, St. Martin, and St. Mary (Table 11). A larger percentage of the respondents in Quartile 4 (89.43 percent) live in those four parishes.

The average length of time for which respondents have been harvesting crawfish commercially (Table 12) ranges from a low of 17.37 years in Quartile 1 to a high of 24.53 years in Quartile 4. The average for Quartile 1 is significantly lower than the averages for Quartile 3 (23.43 years) and Quartile 4. The average for Quartile 2 (19.89 years) is also significantly lower than the average for Quartile 4.

There are also apparent differences in the patterns of where respondents within the different quartiles market their crawfish as determined by the location (parish) of the dealer to whom they sell most of their crawfish (Table 13). For instance, while 68.58 percent of the respondents in Quartile 1 sell most of their crawfish to dealers in Assumption, Iberville, St. Martin and St. Mary Parishes, 85.21 percent of those in Quartile 2, 84.68 percent of those in Quartile 3, and 92.42 percent of those in Quartile 4 sell most of their crawfish to dealers within those four parishes.

Table 11. Respondents' Parish of Residence, By Catch Quartile

	Quartile 1		Quartile 2		Quartile 3		Quartile 4	
Parish of Residence	**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**
Acadia			1	0.87%				
Ascension	1	1.43%	1	0.87%	4	3.23%	3	1.86%
Assumption	14	20.0%	22	19.13%	31	25.0%	37	22.98%
Avoyelles	2	2.86%	7	6.09%	8	6.45%	2	1.24%
Calcasieu			1	0.87%				
East Baton Rouge	2	2.86%					1	0.62%
East Feliciana	1	1.43%						
Evangeline							1	0.62%
Iberia	7	10.0%	5	4.35%	3	2.42%	4	2.48%
Iberville	9	12.86%	35	30.43%	19	15.32%	29	18.01%
Lafayette			1	0.87%	2	1.61%		
Lafourche					1	0.81%	1	0.62%
Livingston	1	1.43%	3	2.61%	1	0.81%	1	0.62%
Pointe Coupee	1	1.43%	4	3.48%	2	1.61%		
Rapides	1	1.43%						
St. Charles					2	1.61%		
St. Landry			1	0.87%			2	1.24%
St. Martin	11	15.71%	14	12.17%	30	24.19%	67	41.61%
St. Mary	17	24.29%	16	13.91%	15	12.10%	11	6.83%
Tangipahoa	1	1.43%						
Terrebonne	1	1.43%			2	1.61%		
West Baton Rouge			2	1.74%				
Unknown or Invalid	1	1.43%	2	1.74%	4	3.23%	2	1.24%
Total	70		115		124		161	

Table 12. Distribution of Years as a Crawfish Harvester among Respondents , By Catch Quartile

	Usable Observations	**Minimum**	**Maximum**	**Mean**	**Median**	**Mode**	**Standard Deviation**
Quartile 1	70	1	65	17.37	15	1	15.33
Quartile 2	114	1	60	19.89	20	20	14.70
Quartile 3	119	1	74	23.43	20	20	15.79
Quartile 4	159	1	57	24.53	25	30	13.18

Table 13. Parish of Crawfish Dealers to Whom Respondents Sold Most of Their Crawfish, By Catch Quartile

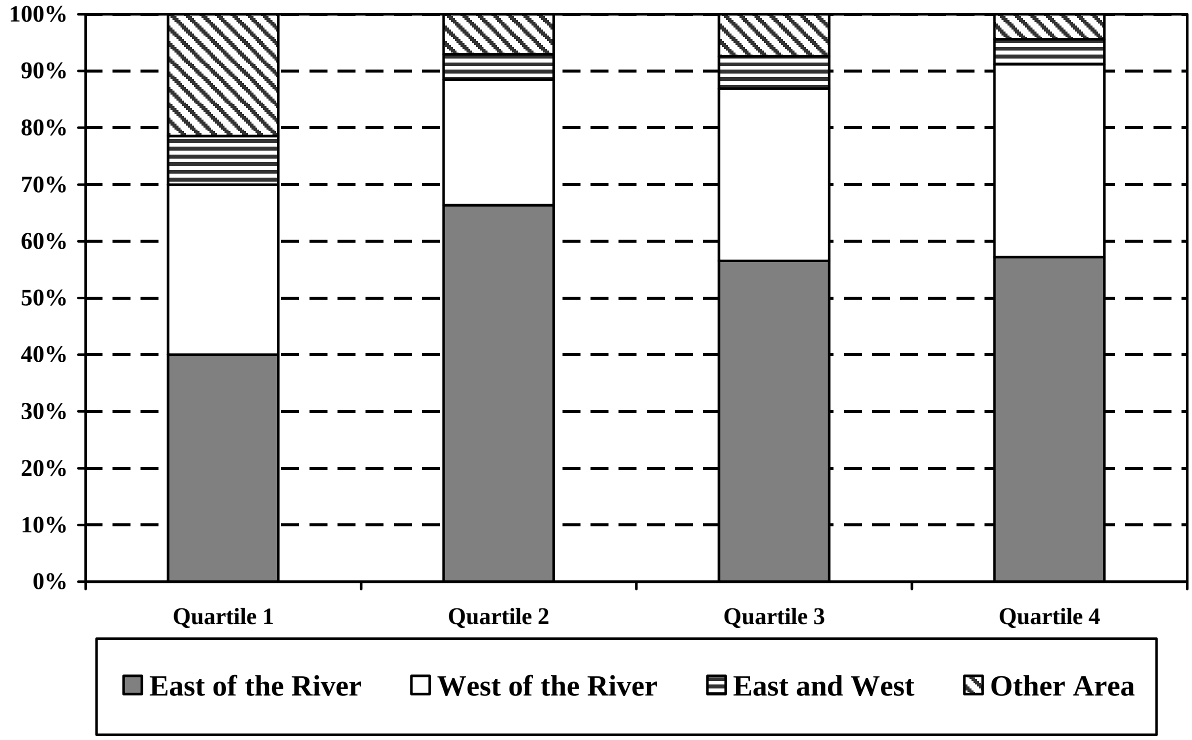
	Quartile 1		Quartile 2		Quartile 3		Quartile 4	
Dealers' Parish	**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**
Ascension	2	2.86%	1	0.87%				
Assumption	9	12.86%	21	18.26%	37	29.84%	42	26.09%
Avoyelles	3	4.29%	6	5.22%	4	3.23%	2	1.24%
Caddo					1	0.81%		
East Baton Rouge	1	1.43%						
Iberia	3	4.29%	3	2.61%	2	1.61%	4	2.48%
Iberville	10	14.29%	39	33.91%	23	18.55%	38	23.60%
Lafayette							1	0.62%
Lafourche					1	0.81%		
Livingston			1	0.87%				
Plaquemine							1	0.62%
Pointe Coupee	3	4.29%	3	2.61%	5	4.03%		
St. Landry			1	0.87%				
St. Martin	16	22.86%	24	20.87%	35	28.23%	66	40.99%
St. Mary	13	18.57%	14	12.17%	10	8.06%	4	2.48%
Terrebonne					1	0.81%		
Vermilion							1	0.62%
Multiple Parishes	2[a]	2.86%	1[b]	0.87%	3[c]	2.42%		
Out of State	1[d]	1.43%	1[e]	0.87%				
None Identified	7	10.0%	1	0.87%	2	1.61%	2	1.24%
Total	70		115		124		161	

a-Parishes: Assumption & East Baton Rouge
b-Parishes: St. Martin and St. Mary
c-Parishes: Assumption & Iberville; Assumption & St. Mary; St. Martin & St. Mary
d-State: Texas to Florida
e-Texas

Of some additional interest is the fact that while approximately three-quarters of the respondents in Quartile 2 (75.65 percent) and Quartile 3 (76.61 percent) live in Assumption, Iberville, St. Martin, and St. Mary Parishes, somewhat larger percentages sell most of their crawfish to a dealer within those parishes (85.21 percent for Quartile 2 and 84.68 percent for Quartile 3).

There also appear to be some differences in terms of where respondents within each quartile harvest their crawfish (Figure 10). Approximately one-fifth (21.43 percent) of the respondents in Quartile 1 harvest most of their crawfish in some "other area" outside the Atchafalaya Basin, far more than the percentages of respondents in Quartile 2 (7.08 percent), Quartile 3 (7.38 percent), and Quartile 4 (4.40 percent) who claim to get most of their crawfish from areas outside the Atchafalaya Basin. Furthermore,

Figure 10. Respondents' Primary Crawfish Harvest Areas, By Catch Quartiles

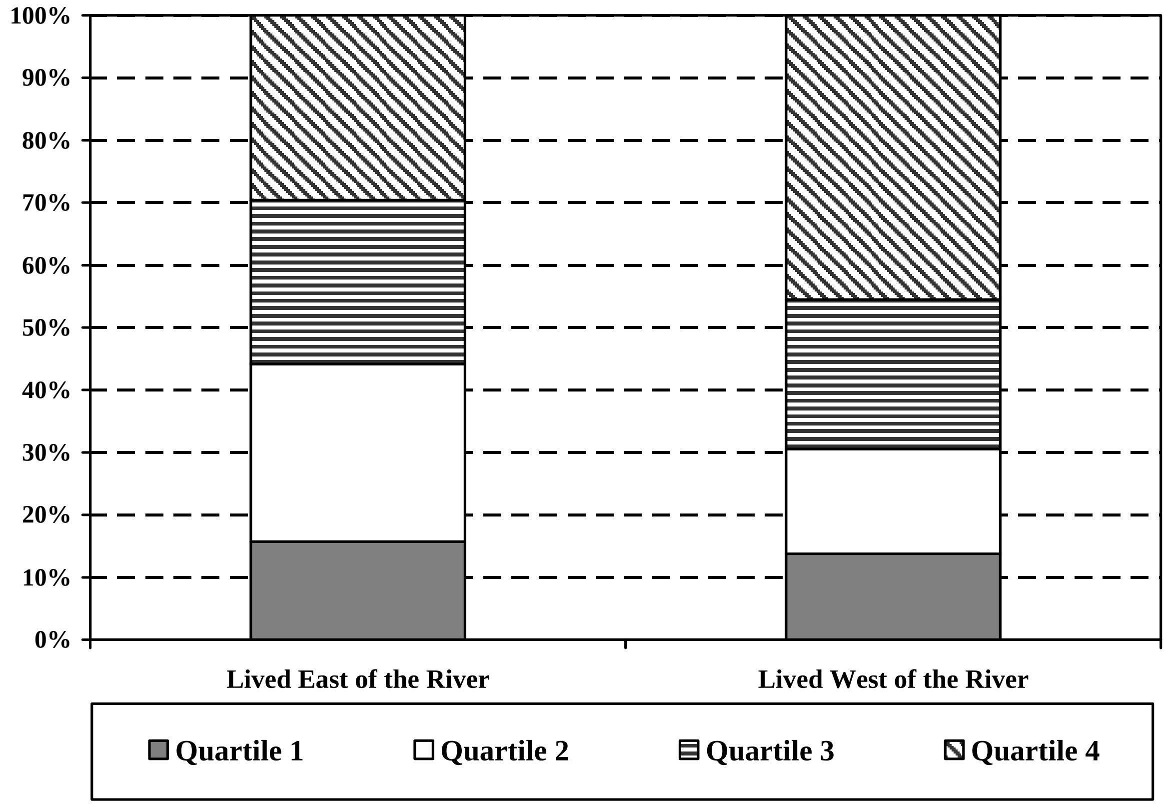


while 40.0 percent of the respondents in Quartile 1 reported harvesting most of their crawfish within the Basin east of the Atchafalaya River, the majority of those in Quartile 2 (66.37 percent), Quartile 3 (56.56 percent), and Quartile 4 (57.23 percent) claimed to have obtain most of their commercial crawfish from the east side of the river.

Catch Quartiles According to Place of Residence in Reference to the Atchafalaya River

As determined by the percentage of respondents within catch quartiles, the respondents who live on the west side of the Atchafalaya River are somewhat more likely to harvest larger quantities of crawfish than those residing on the east side of the river (Figure 11). While 55.8 percent of the respondents who lived on the east side of the river were in Quartile3 and Quartile 4, 69.5 percent of the respondents who resided on the west side of the river were in Quartiles 3 and Quartile 4. Over one-quarter (28.5 percent) of the respondents who lived on the east side of the river were in Quartile 2. Approximately one-sixth (16.8 percent) of those on the west side were in Quartile 2.

Figure 11. Catch Quartiles by Respondents' Place of Residence in Reference to the Atchafalaya River

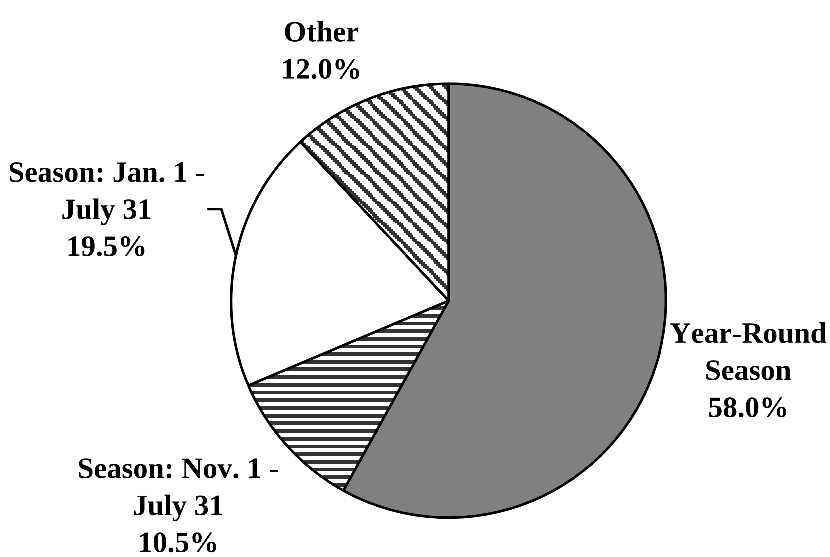


Respondents' Perspectives on Establishing a Commercial Crawfish Season

In a multiple-choice question, respondents were asked to indicate their preferences regarding the imposition of a commercial crawfish harvesting season in Louisiana. They were requested to mark their preferences for one of the following alternatives: (a) to maintain the current year-round harvest, (b) to set a season from November 1 to July 31, (c) to set a season from January 1 to July 31, or (d) to set a season beginning and ending on some "other" dates of the respondents' own specifications.

The majority of respondents (58.0 percent) preferred maintaining the current system of year-round commercial crawfish harvests (Figure 12). One-fifth preferred a season from January 1 to July 31 and one-tenth from November 1 to July 31. Approximately twelve percent preferred some "other" season designation. Their suggestions for season beginning and end dates are presented in Box 2.

Figure 12. Preferences Regarding Crawfish Seasons among *2010 Louisiana Crawfisherman Survey* Respondents



Box 2. "Other" Suggestions for Season Start Dates and End Dates

Suggested Season Start Date	Suggestion Season End Date
October	August
November 1	June 30
November 1	July 10
November 1	July 15
November 1	July 31
November 1	July 1
November	June 30
December 1	July 31
December 1	August 1
December	June
January 1	June
January 1	June 30
January 1	June 30
January 30	July 1
January 1	July 4
January 1	July 10
January 1	July 31
January 1	July 31
January 1	August 31
January	August
February 1	June 30
February 1	June 30
February 1	June 30
February 1	June 30
February 1	June 30
February 1	June 30
February 1	June 30
February 1	June 30
February 1	July 1
February 1	July 1
February 1	July 15
February 1	July 31
February 1	July 31
February 1	July 31
February 1	July 31
February 1	July 31
February 1	July 31
February 1	July 31
February 1	August 31
February 1	August 31
February 15	June 15
February 15	July 31
February 20	June 30
February 20	July 31
February	July 31
February	July

Box 2. "Other" Suggestions for Season Start Dates and End Dates (Continued)

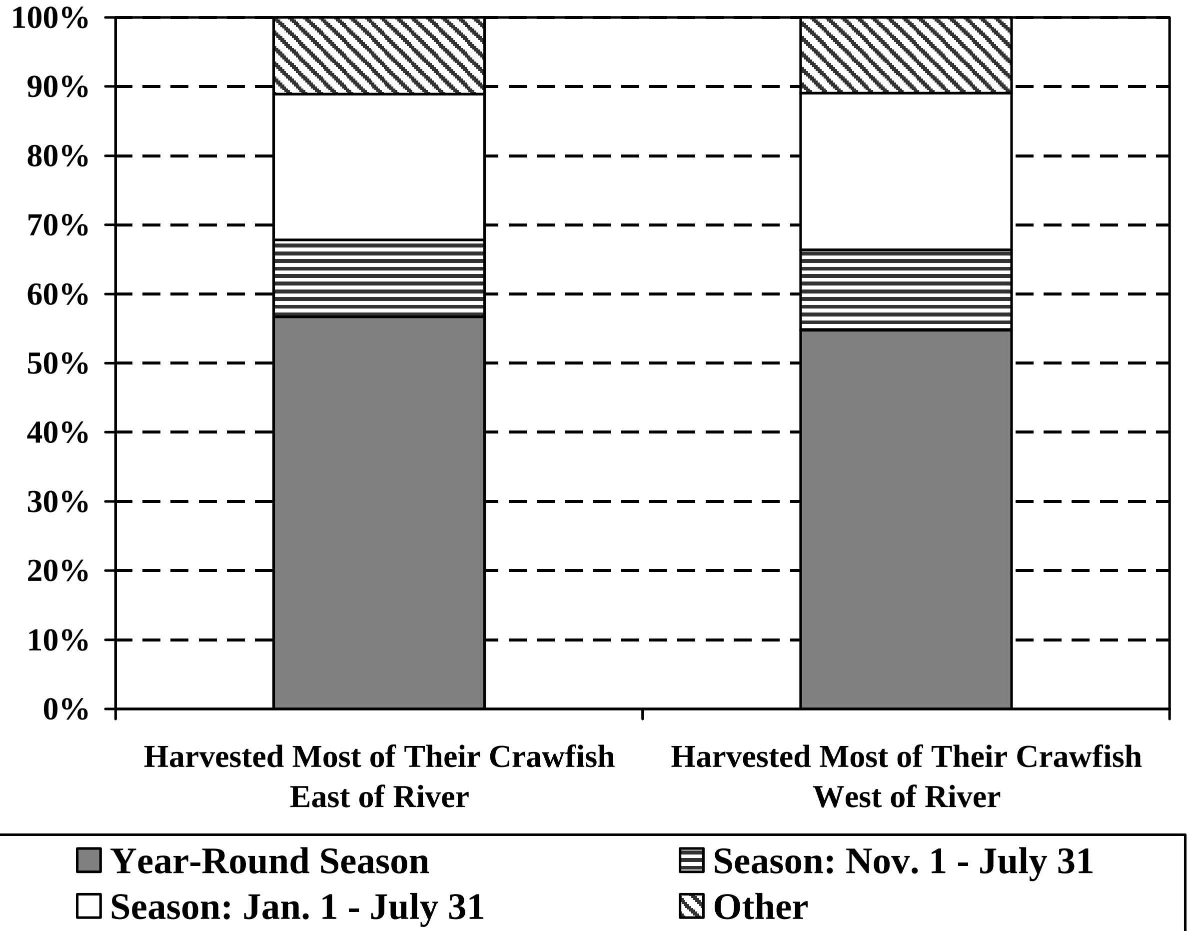
Suggested Season Start Date	Suggestion Season End Date
March 1	June 31
March 1	July 31
March 1	July 31
March 1	July 31
March 1	July 31
March 1	August 10
March 15	July 15
March or April	July 31
When water is above five feet	Crest at five feet

Preferences According to Primary Crawfish Harvest Areas

Figure 13 displays patterns of responses among respondents who harvested most of their crawfish in 2009 on the east side of the Atchafalaya River and the west side of the river. (Responses from those respondents who reported harvesting most of their crawfish on both sides of the river or some "other area" outside the Atchafalaya Basin but are not examined as a separate category for this question because the sizes of their respective subsamples were too small for this type of analysis. Their responses are, of course, part of the analysis all respondents displayed in Figure 12.)

The majority of respondents who harvest most of their crawfish on the east side of the Atchafalaya River (56.70 percent) or the west side of the river (54.74 percent) preferred to maintain the current system of allowing year-round commercial crawfish harvests. Approximately eleven percent of each subsample preferred a season from November 1st to July 31st and approximately 22 percent of each subsample preferred a season from the beginning of January to the end of July.

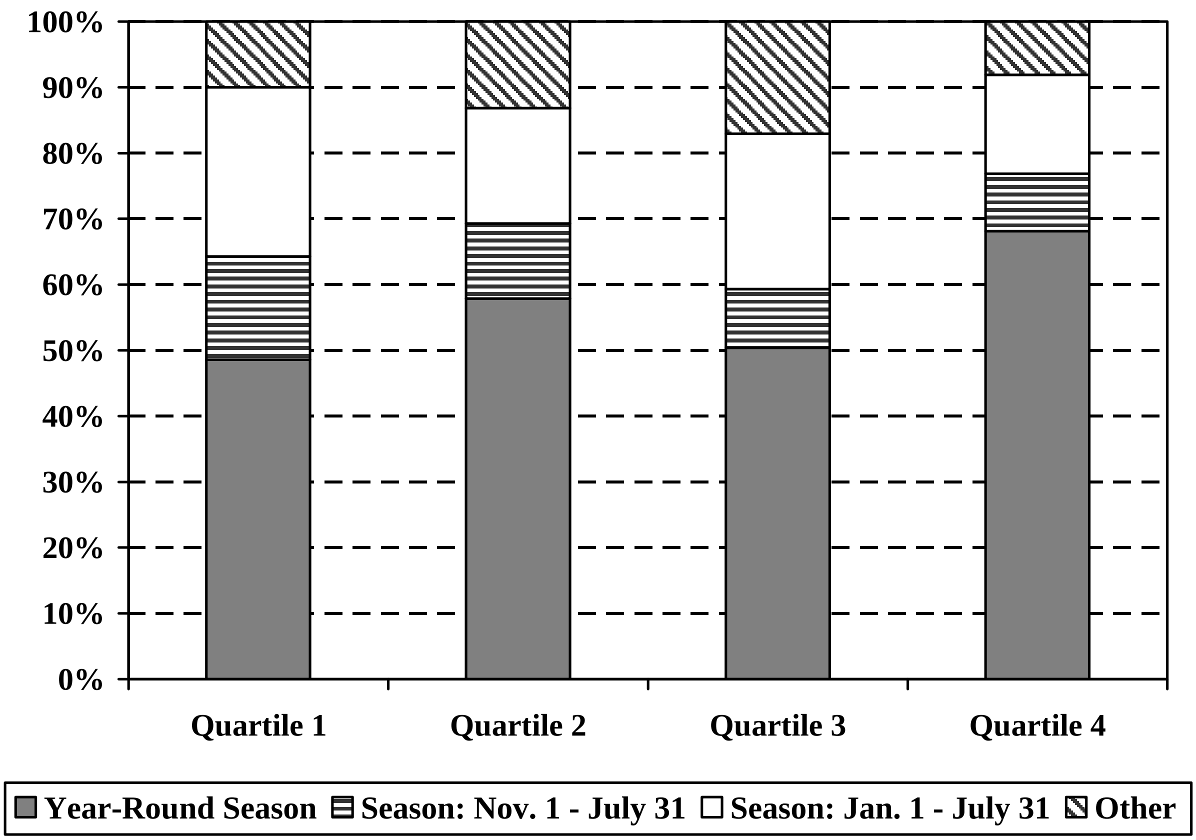
**Figure 13. Preferences Regarding Crawfish Seasons,
By Respondents' Primary Crawfish Harvest Area**



Preferences According to Catch Quartiles

There were some differences in the patterns of preferences regarding the imposition of a commercial crawfish season among those respondents in different quartiles (Figure 14). While majorities of less than sixty percent in Quartile 2 (57.89 percent) and Quartile 3 (50.41 percent) preferred maintaining the year-round commercial crawfish harvest, two-thirds (66.7 percent) of those in Quartile 4 wished to keep the current system. In contrast, a mere plurality 48.57 percent of the respondents in Quartile 1 preferred keeping the current year-round commercial crawfish harvest, implying that a majority of those in this group indicated a preference for some kind of a more limited commercial crawfish season.

Figure 14. Preferences Regarding Crawfish Seasons, By Catch Quartiles

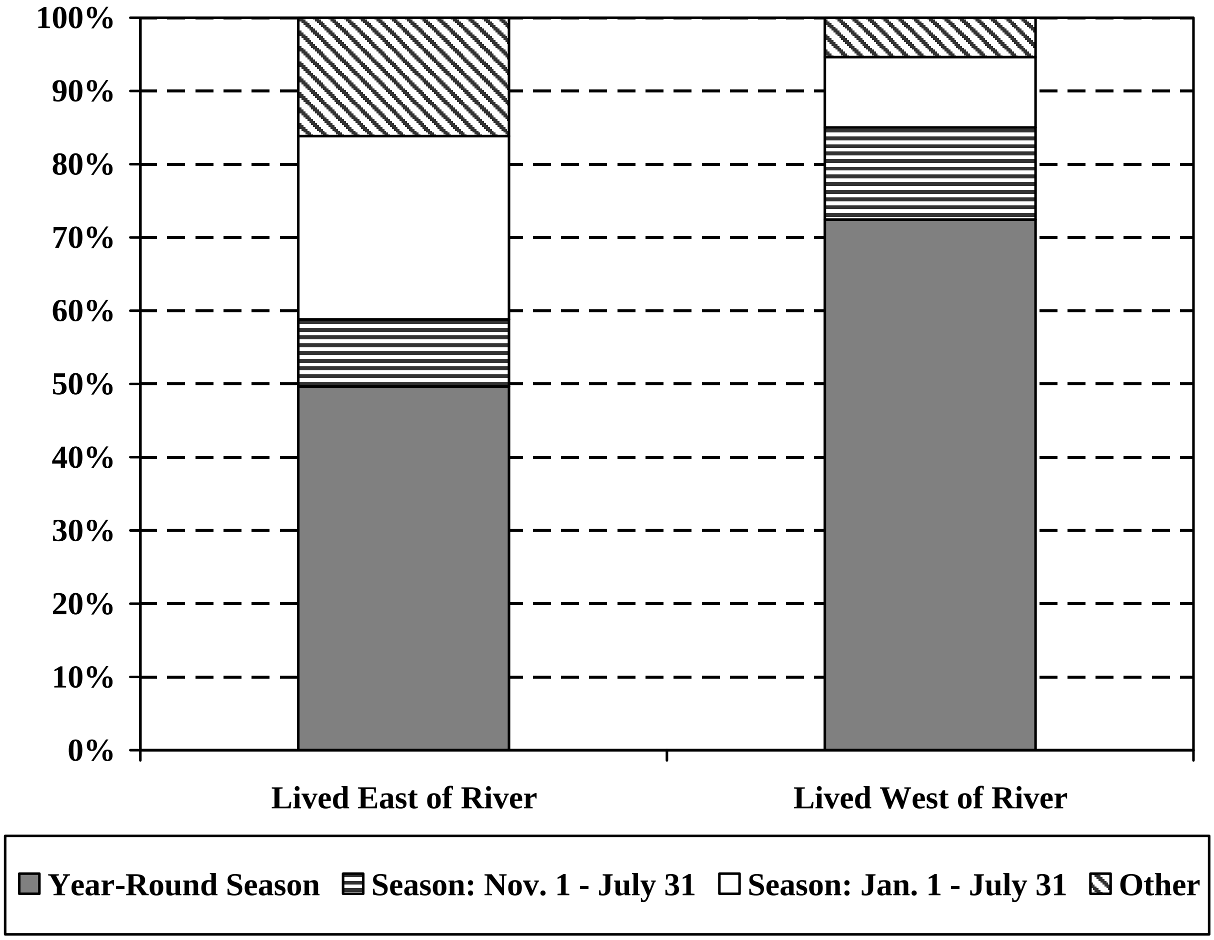


Preferences According to Respondents' Place of Residence in Reference to the Atchafalaya River[5]

Respondents who resided in an area to the west of the Atchafalaya River expressed a stronger preference for maintaining the current year-round commercial crawfish harvest season (Figure 15). While a large plurality (49.6 percent) of those on the east side of the river preferred the current regulation, nearly three-quarters (72.5 percent) of those on the west side of the river wished to keep the year-round season. On the other hand, one-quarter (25.0 percent) of those who reside on the east side of the river preferred a season from January 1 to July 31, a season preferred by only 9.6 percent of the residence on the west side.

[5] Responses from respondents who lived to the north of the Atchafalaya River were not included in this analysis because of the small size of the subsample

**Figure 15. Preferences Regarding Crawfish Seasons,
By Place of Residence in Reference to the Atchafalaya River**

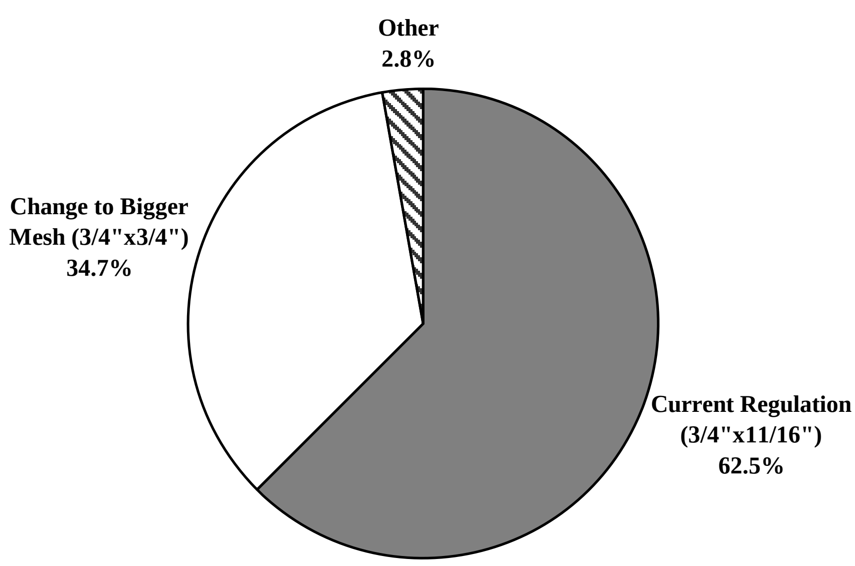


Respondents' Perspectives on Changing the Minimum Regulatory Mesh Size for Commercial Crawfish Traps

In a second multiple choice question, respondents were also asked their preferences regarding regulations concerning the minimum mesh size for commercial crawfish traps. They were asked to mark their preferences for one of the following three alternatives: (a) maintaining the current minimum mesh size (3/4-inch by11/16-inch), (b) changing to a larger minimum mesh size (3/4-inch by 3/4-inch), or (c) changing to some "other" minimum mesh size of the respondents' own specifications.

The majority of respondents (62.5 percent) indicated a preference to maintain the current minimum mesh size (Figure 16). Over one-third (34.7 percent) preferred a larger ¾-inch by ¾-inch minimum mesh size. Of the 2.8 percent who marked the "other" alternative, roughly half (seven respondents) preferred no minimum regulatory mesh size at all (Box 3).

Figure 16. Preferences Regarding Mesh Size Regulations among *2010 Louisiana Crawfisherman Survey* Respondents



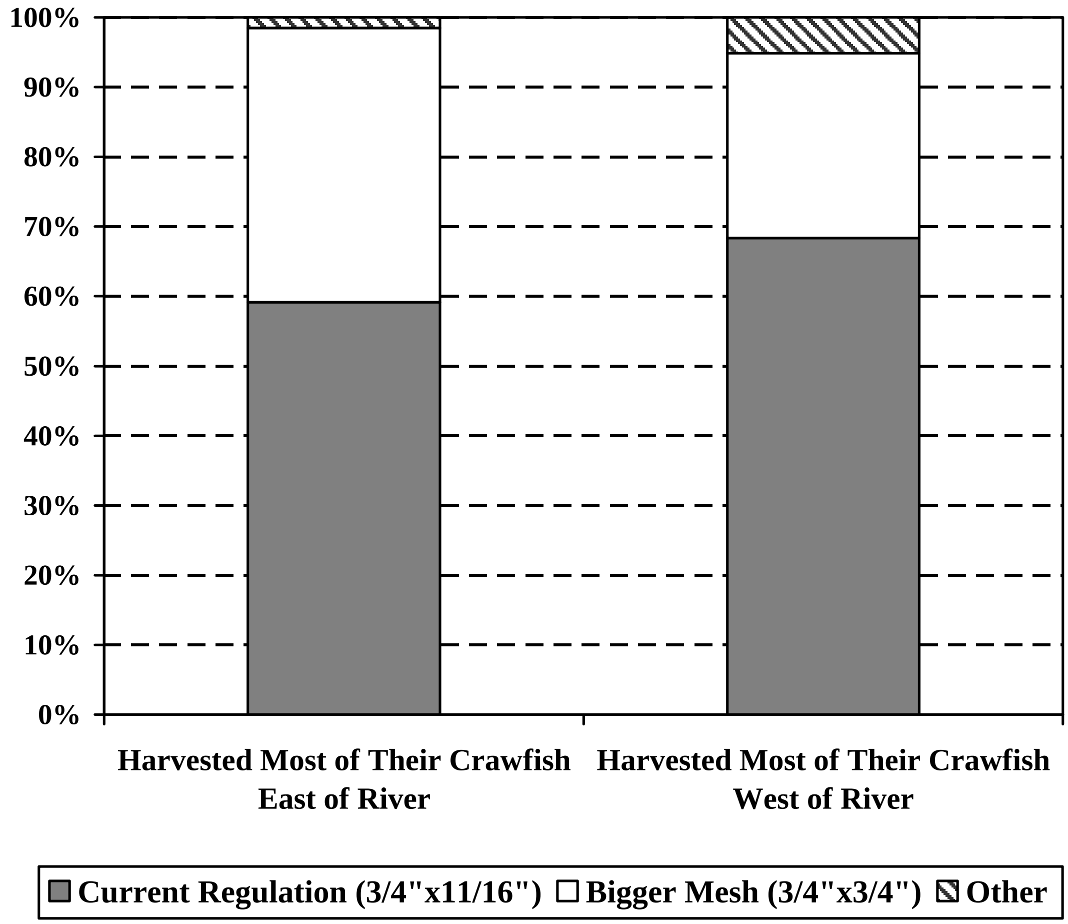
Box 3. “Other” Preferences for Minimum Regulatory Mesh Size

- ¾-inch by 15/16-inch that's your trap, 3/4 mesh wire
- 11/16-inch by 11/16-mesh
- ¾-inch by 15/16-mesh, that's your true ¾-inch mesh
- ¾-inch only
- ¾-inch or 9/16-inch
- ¾-inch by 1-inch
- There shouldn't be any regulations on size or shape.
- No regulation on mesh size
- No regulation
- No mesh size. If the crawfish is too small, people won't buy them.
- No regulations at all
- Any size
- No regulation

Preferences According to Primary Crawfish Harvest Areas

A preference for maintaining the current minimum required mesh size is seen among the majority of respondents, regardless of where they harvested most of their crawfish in 2009 (Figure 17). Almost sixty percent (59.16 percent) of those who harvested most of their crawfish on the east side and almost seventy percent (68.38 percent) of the respondents who harvested most of their crawfish on the west side of the Atchafalaya River preferred the current minimum mesh size of ¾-inch by 11/16 inch. (Again, the responses from those who reported harvesting most of their crawfish on both sides of the river or some “other area” outside the Atchafalaya Basin were excluded from this analysis because the sizes of their respective subsamples were too small for type of analysis. Their responses are, of course, part of the analysis all respondents displayed in Figure 16.)

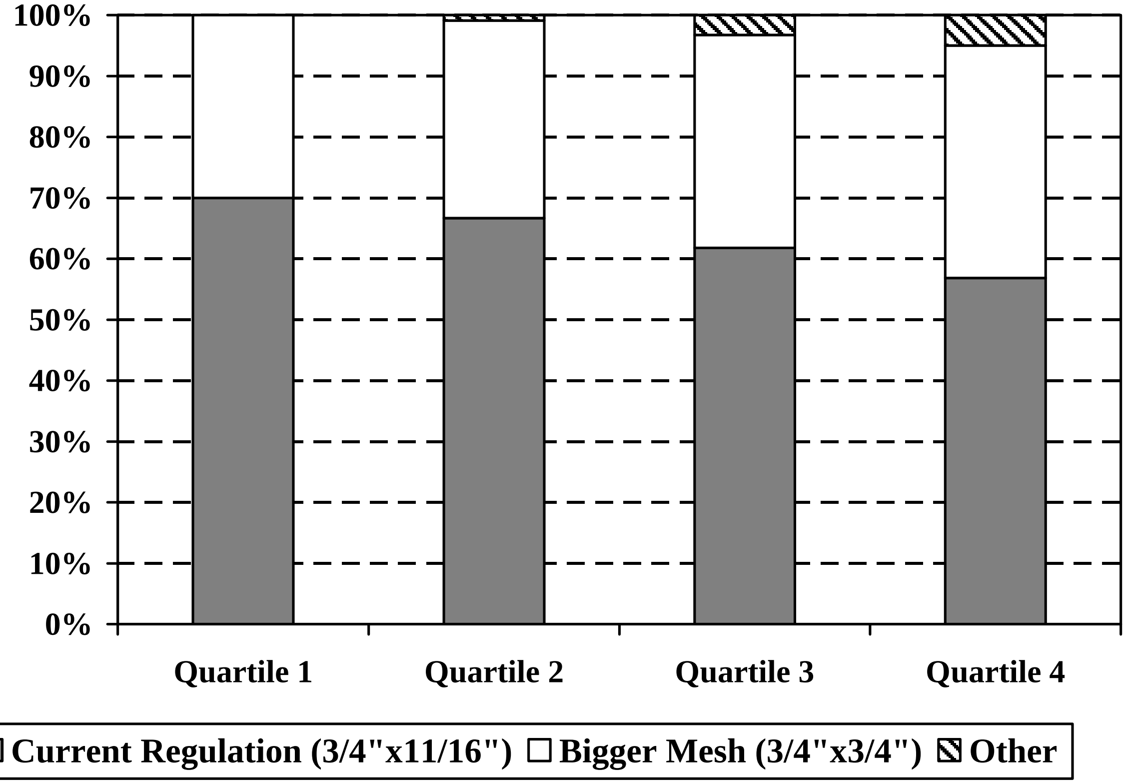
Figure 17. Preferences Regarding Mesh Size Regulations, By Primary Crawfish Harvest Area



Preferences According to Catch Quartiles

There were apparent differences in the patterns of responses from those in different quartiles (Figure 18). The percentage that preferred keeping the current mesh size was 70.0 percent for Quartile 1, 66.7 percent for Quartile 2, 61.79 percent for Quartile 3, and 56.88 percent for Quartile 4.

Figure 18. Preferences Regarding Mesh Size Regulations, By Quartile

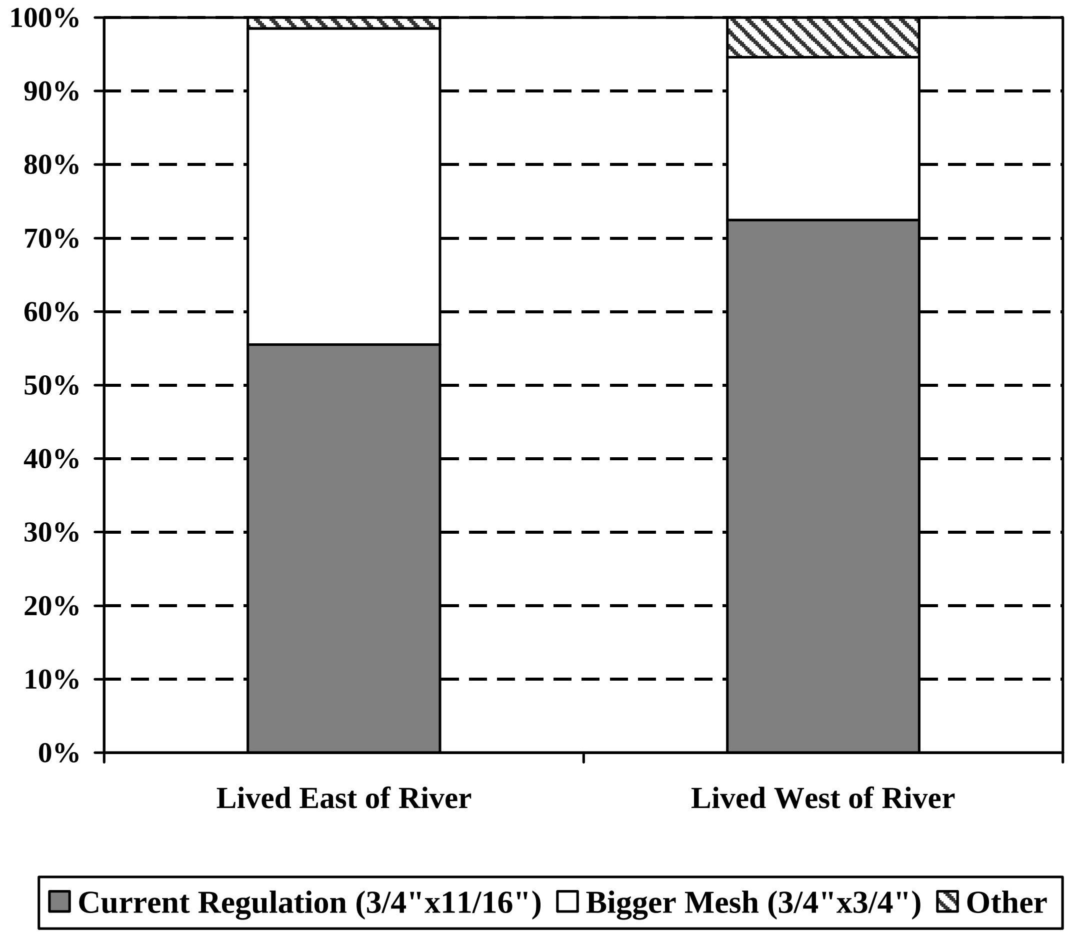


***Preferences According to Respondents' Place of Residence in Reference to the Atchafalaya River*[6]**

A majority of respondents on both the east side (55.5 percent) and the west side (72.5 percent) of the Atchafalaya River prefer to maintain the current minimum mesh size of ¾-inch by 11/16-inch (Figure 19). Though still a minority view, there is a larger preference for increasing the minimum mesh size to ¾-inch by ¾-inch among resident on the east side of the river (43.0 percent) than among those residing on the west side of the river (22.2 percent).

[6] Responses from respondents who lived to the north of the Atchafalaya River were not included in this analysis because of the small size of the subsample.

Figure 19. Preferences Regarding Mesh Size Regulations, By Place of Residence in Reference to the Atchafalaya River

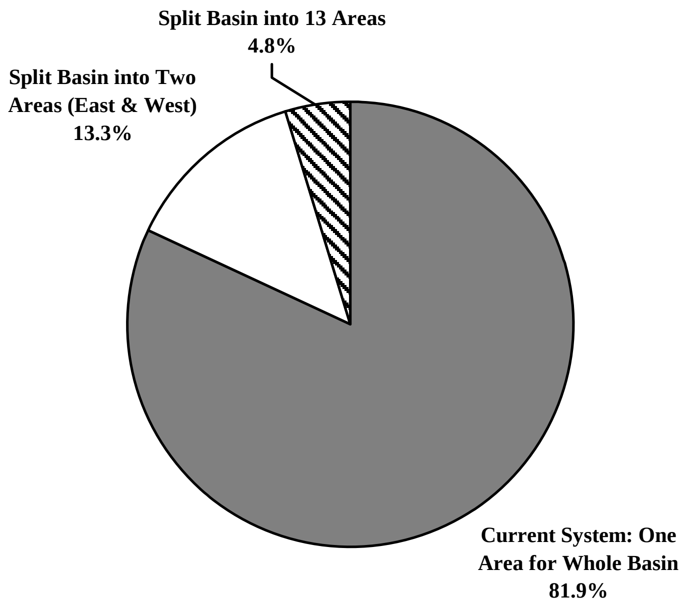


Respondents' Perspectives on Changing the Number of Trip Ticket Reporting Area Designations

Regarding trip ticket area reporting designations, respondents were asked whether they preferred (a) to maintain the current number of reporting areas for the Atchafalaya Basin or (b) to split the Basin into two reporting areas or (c) thirteen reporting areas. A large majority (81.9 percent) preferred keeping one area for the entire Atchafalaya Basin (Figure 20).

There is no apparent support for changing the number of reporting areas within the Atchafalaya Basin within any subgroup identifiable in this survey. Over seventy percent of all subsamples or categories - whether designated by primary wild crawfish harvest areas[7] (Figure 21) or crawfish catch quartile (Figure 22) or residence on the east side or the west side of the Atchafalaya River (Figure 23) – prefer to maintain the current standard of one reporting area that encompasses the entire basin.

Figure 20. Preferences Regarding Trip Ticket Area Designations among *2010 Louisiana Crawfisherman Survey* Respondents



[7] Responses from those respondents who reported harvesting most of their crawfish on both sides of the river or some "other area" outside the Atchafalaya Basin are not examined as a separate category for this question because the sizes of their respective subsamples were too small for this type of analysis. Their responses are, of course, part of the analysis of all respondents displayed in Figure 20.

Figure 21. Preferences Regarding Trip Ticket Area Designations, By Primary Crawfish Harvest Area

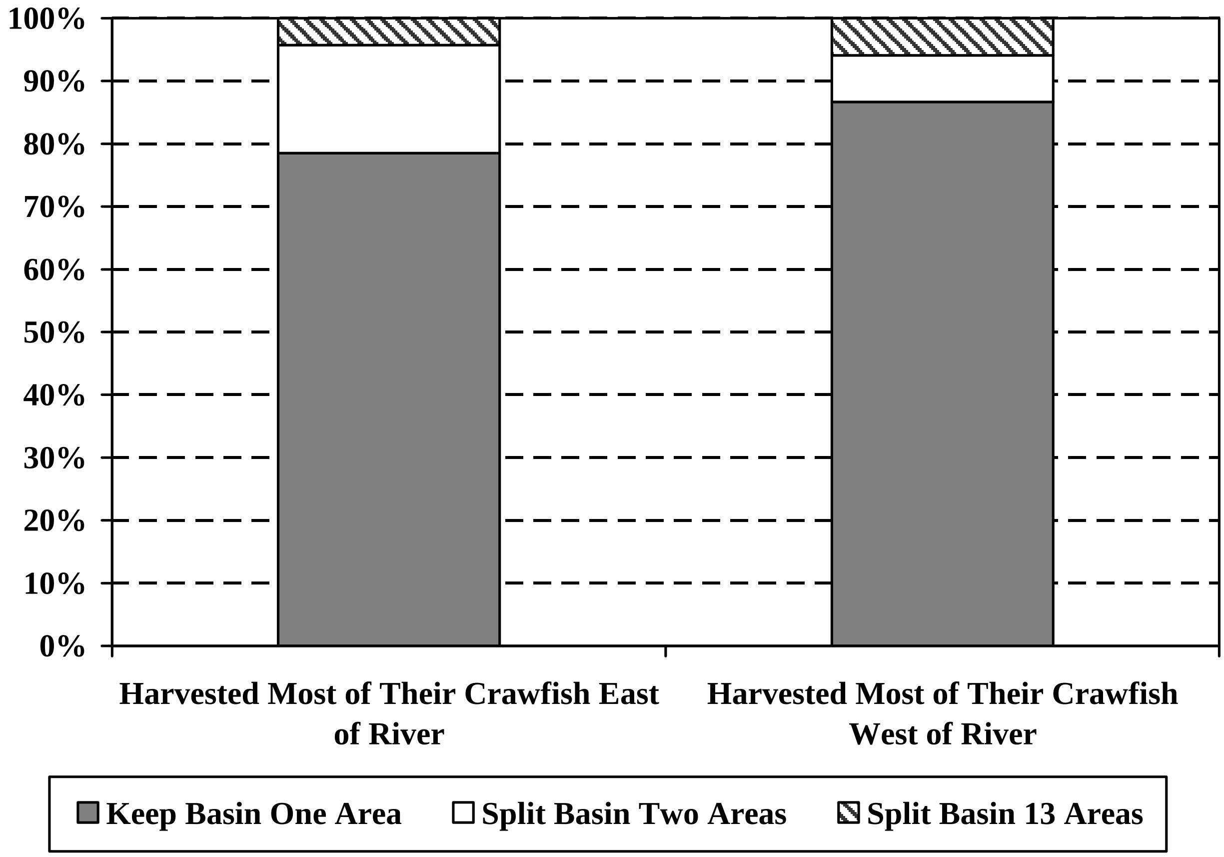


Figure 22. Preferences Regarding Trip Ticket Area Designation, By Catch Quartile

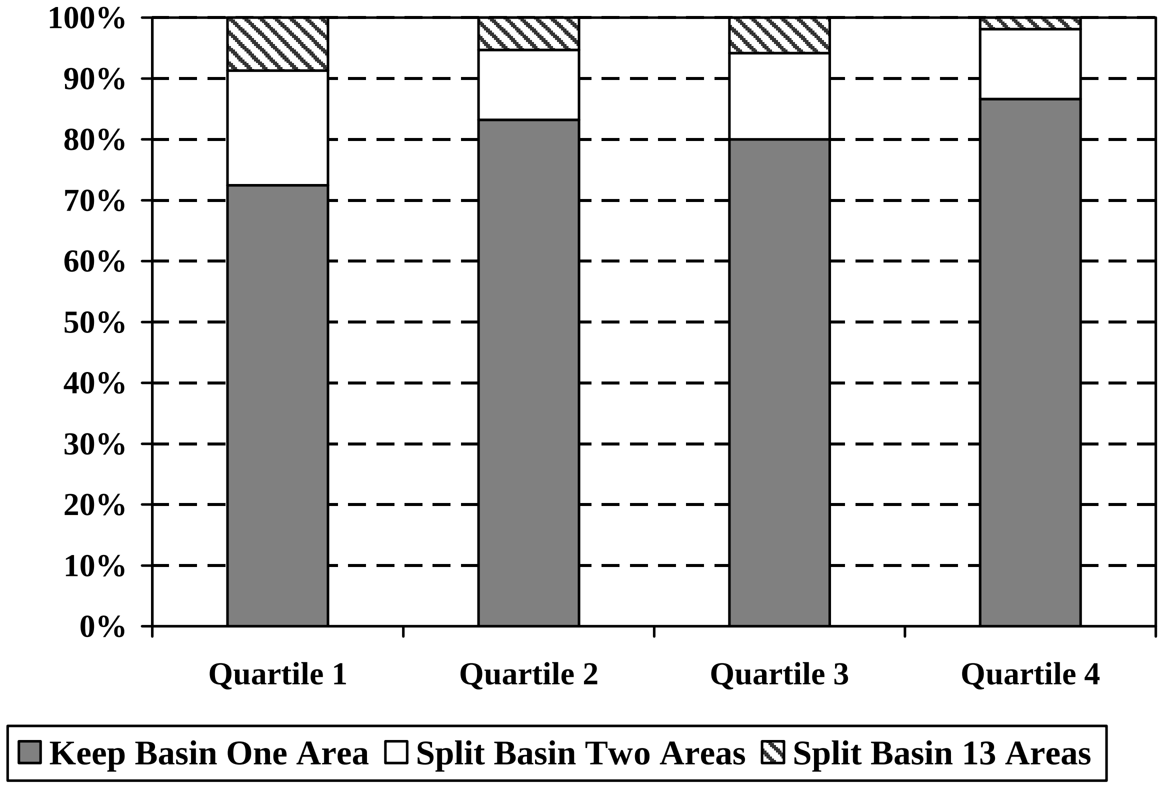
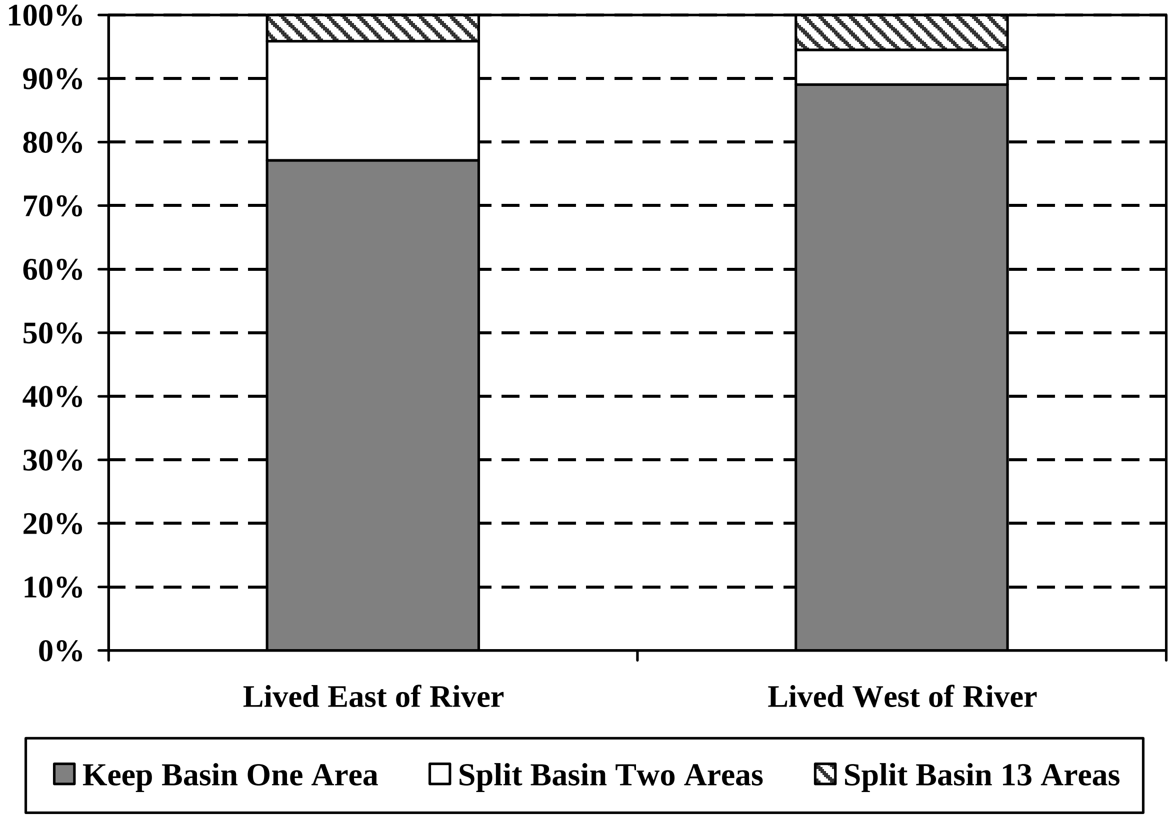


Figure 23. Preferences Regarding Trip Ticket Area Designations, By Place of Residence in Reference to the Atchafalaya River



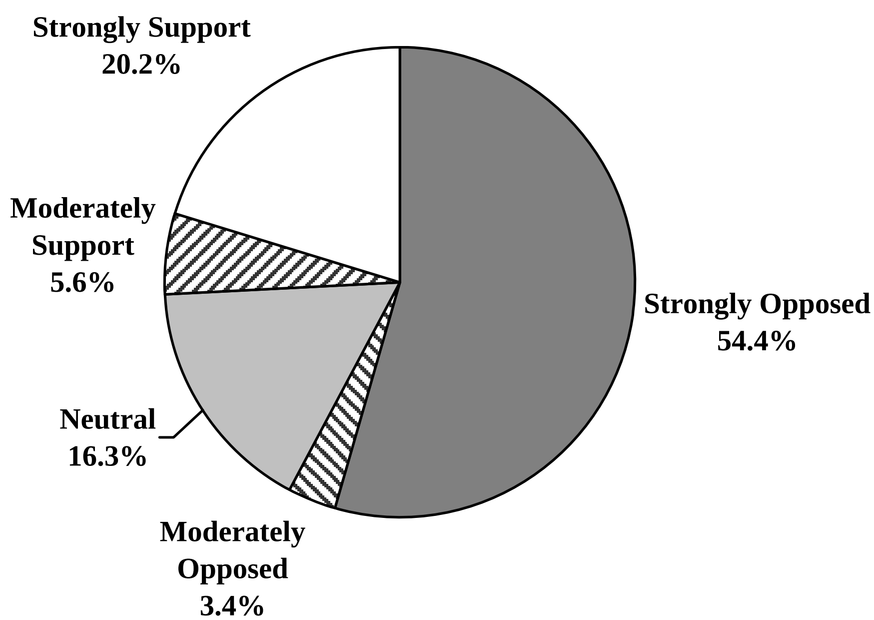
Respondents' Support for Required Crawfish Trap Tags

Respondents were asked to indicate their level of support for or opposition to a hypothetical regulation requiring the affixing of tags on commercial wild crawfish traps identifying their owners. The majority of respondents (57.8 percent) were strongly or moderately opposed to such a tag requirement (Figure 24). Approximately one-quarter (25.8 percent) were moderately or strongly supportive.

Preferences According to Primary Crawfish Harvest Areas

Some degree of opposition to a hypothetical required trap tag regulation was expressed by a majority of respondents in each major primary crawfish harvest area category[8] (Figure 25). The degree of

Figure 24. Degree of Support for Requiring Crawfish Trap Tags among *2010 Louisiana Crawfisherman Survey* Respondents

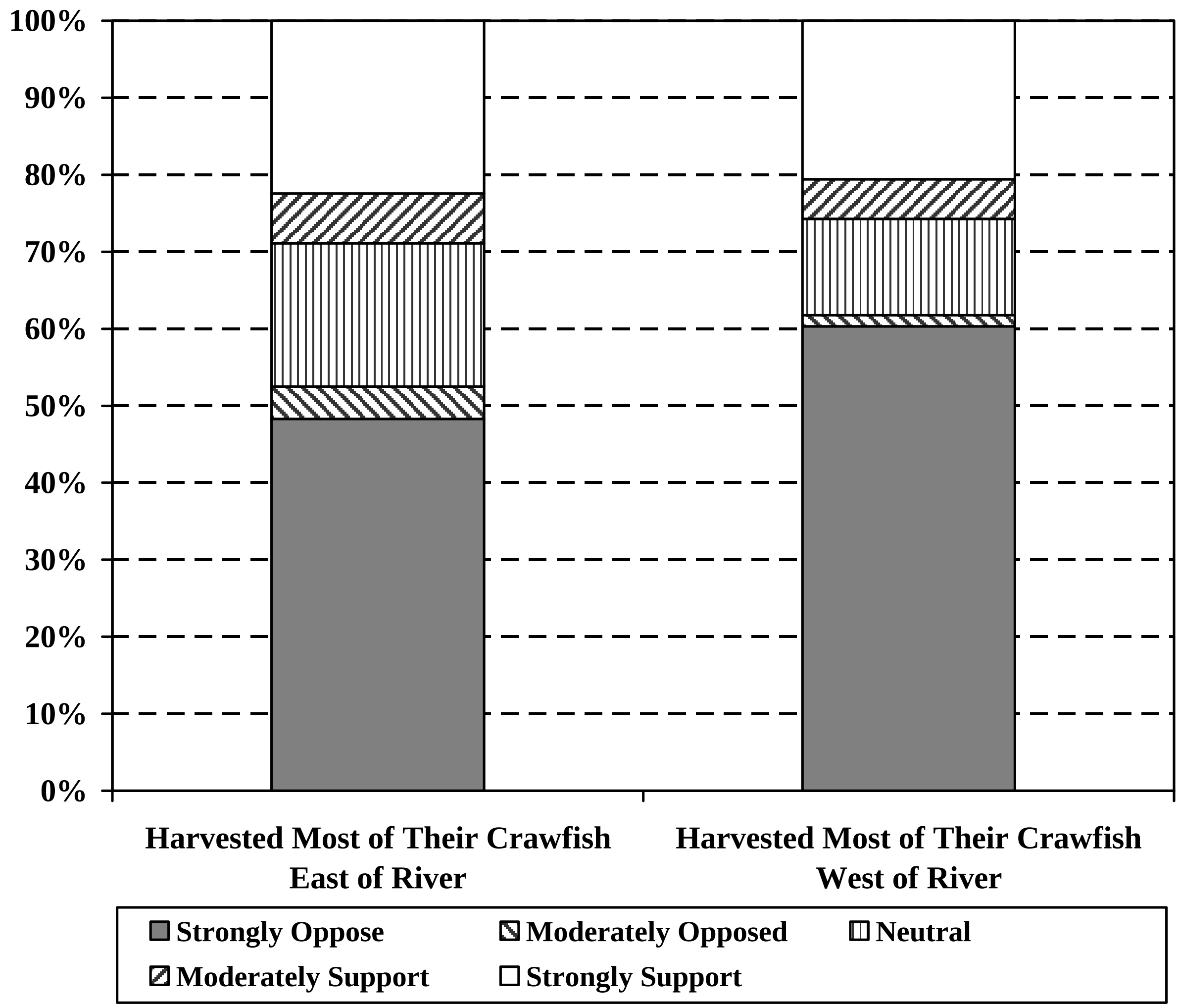


[8] Responses from those respondents who reported harvesting most of their crawfish on both sides of the river or some "other area" outside the Atchafalaya Basin are not examined as a separate category for this question because the sizes of their respective subsamples were too small for this type of analysis. Their responses are, of course, part of the analysis of all respondents displayed in Figure 24.

opposition is evidently stronger among those who harvest most of their crawfish on the west side of the Atchafalaya River (61.76 percent moderately or strongly opposed) than among those who harvested primarily on the east side of the river (52.47 percent moderately or strongly opposed).

There appears to be a larger degree of "neutral" responses among those who harvest most of their crawfish from the east side of the river (18.63 percent) than among those who harvest primarily from the west side of the river (12.50 percent).

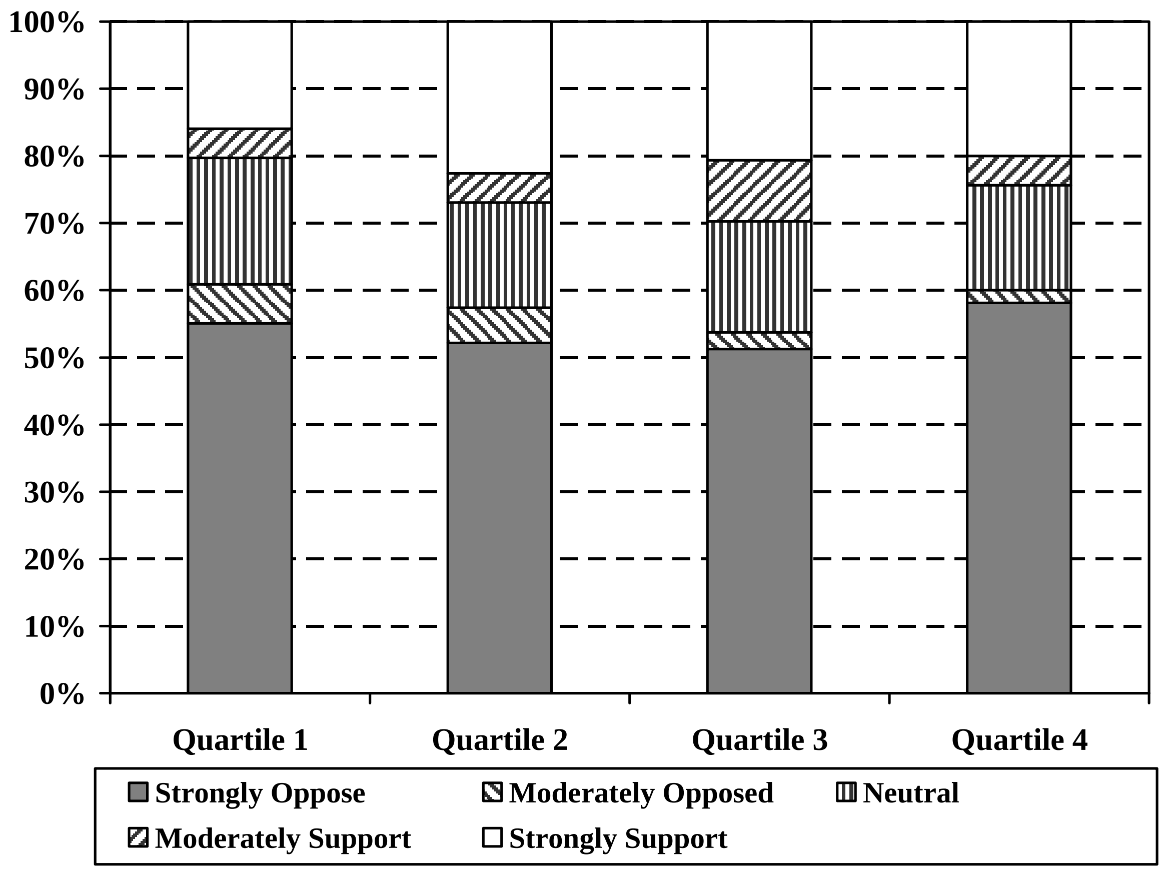
Figure 25. Degree of Support for Trap Tag Regulation, By Primary Crawfish Harvest Area



Preferences According to Catch Quartiles

The majority of respondents within each quartile expressed some degree of opposition to a hypothetical required crawfish trap tag regulation (Figure 26). The degree of opposition was somewhat stronger among those in Quartile 1 (60.87 percent moderately or strongly opposed) and Quartile 4 ((60.01 percent moderately or strongly opposed) than among those in Quartile 2 (57.37 percent strongly or moderately opposed) or Quartile 3 (53.72 percent strongly or moderately opposed). Quartile 1 reported the lowest level of support (20.29 percent moderately or strongly support) and Quartile 3 the highest level of support (29.75 percent moderately or strongly support).

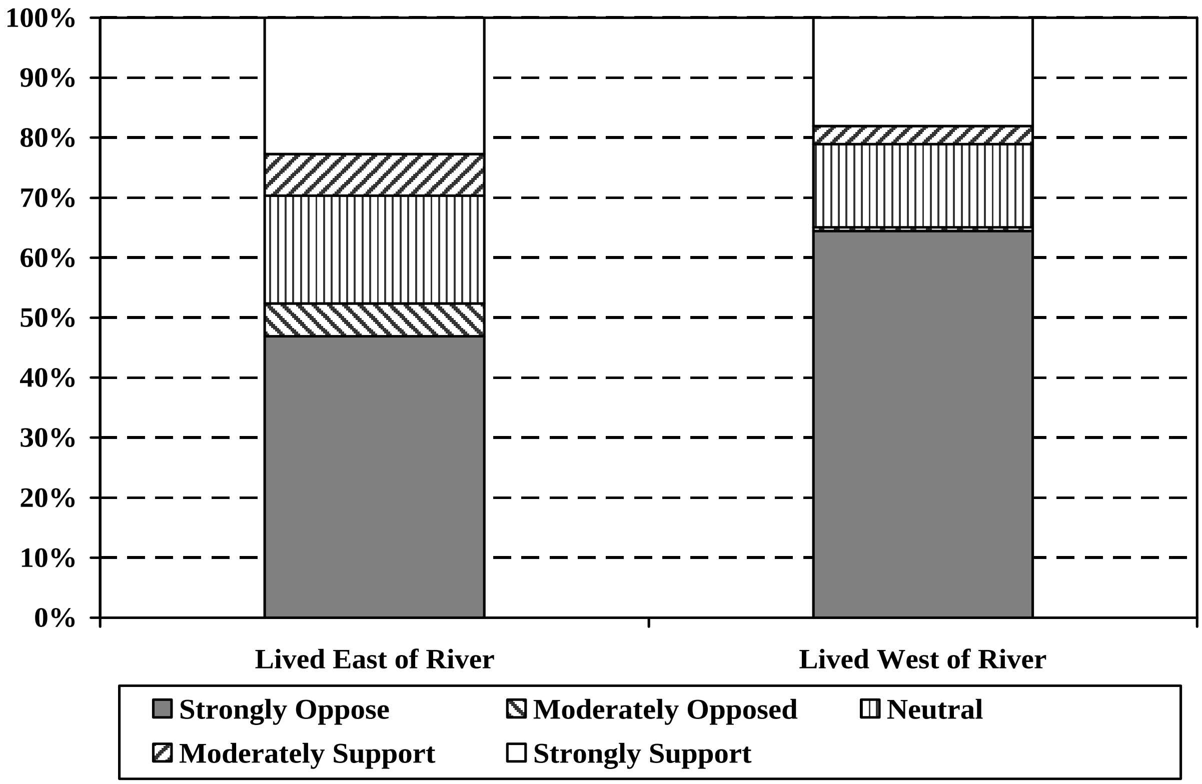
Figure 26. Degree of Support for Trap Tag Regulation, By Catch Quartiles



Preferences According to Respondents' Place of Residence in Reference to the Atchafalaya River[9]

There was an apparent difference in the degree of opposition to or support of a hypothetical trap tag requirement based on respondents' place of residence in reference to the Atchafalaya River (Figure 27). Though a majority of respondents on either side of the river oppose the hypothetical regulation, a larger portion of those living on the west side of the River (65.1 percent) than those on the east side (52.4 percent) moderately or strongly oppose the measure. A smaller portion of the respondents residing on the west side of the river (21.1 percent) than those on the east side (29.7 percent) expressed moderate or strong support for requiring tags on crawfish traps.

Figure 27. Degree of Support for Trap Tag Regulation, By Place of Residence in Refereence to the Atchafalaya River



[9] Responses from respondents who lived to the north of the Atchafalaya River were not included in this analysis because of the small size of the subsample.

Written Responses to Open-Ended Items

Survey respondents provided hundreds of written responses to the two open-ended questions included on the questionnaire. The first of these open-ended questions asked respondents to identify what they believe is the major problem facing the Louisiana wild crawfish industry today. The second open-ended question solicited general comments and suggestions. The written comments, too voluminous for this report, were transcribed and distributed to the head of the Louisiana Department of Wildlife and Fisheries Inland Fisheries Division.

Over ninety percent (93.40 percent) of all respondents provided some kind of written response to the question, “What do you believe is the major problem facing the Louisiana wild crawfish industry today?” The majority of comments related to water quantity, water quality, imported crawfish, and competition from farmed crawfish.

Sixty percent (60.43 percent) of the respondents provided some kind of general written comments or suggestions in addition to the responses to the question above. The majority of these general comments related to water issues, crawfish farm issues, commercial harvesting seasons, Louisiana Department of Wildlife and Fisheries policies and law enforcement efforts, and trap tags.

Conclusions

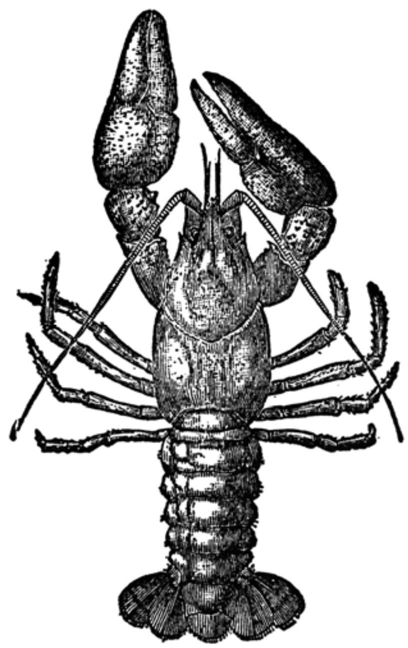
This research combined existing data from the LDWF Commercial License database and trip ticket files and results from the *2010 Louisiana Commercial Crawfisherman Survey* to reveal some salient details regarding active resident commercial crawfish harvesters and their harvesting activities. For example, an examination of the trip ticket data revealed the fact that over two-thirds of the commercial wild crawfish landed between July 1, 2008 and June 30, 2009 were harvested by 282 crawfish harvesters, approximately twenty-five percent of the population of active resident crawfish harvesters. Half of the commercial fishermen landed 8,376 pounds or less (and three-quarters 22,888 pounds or less). Using an average dockside price of 60.4¢ in 2008, according to National Marine Fisheries Service data, this means that half of the active resident commercial fishermen obtained $5,059 or less in revenue (and three-quarters of them $13,824 or less in revenue) from harvesting wild crawfish between July 1, 2008 and June 30, 2009.

This research also revealed that most of the activity associated with wild crawfish harvesting is centered in the Atchafalaya Basin or within the boundaries of four parishes in the Basin area. Nearly three-quarters (74.11 percent) of the commercial landings of wild crawfish in 2008 were harvested in a single trip-ticket reporting area (Area 0105) that encompasses most of the Atchafalaya Basin. Of the survey respondents, 91.6 percent reported harvesting most of their crawfish within the Basin; more than half (56.7 percent) on the east side of the Atchafalaya River. Most of the respondents live and sell most of their crawfish in or near the Basin in Assumption, Iberville, St. Martin, and St. Mary Parishes.

Respondents were presented proposals for altering existing three regulations or management practices: replacing the current year-round commercial crawfish harvest season with a more limited season, replacing the existing minimum regulatory mesh size, or changing the existing trip ticket area designation for the Atchafalaya Basin from one reporting area to multiple reporting areas. For each of these, the majority of respondents preferred the *status quo*. Similarly, a majority of respondents were strongly or moderately opposed to a hypothetical trap tag requirement regulation.

Appendix

Louisiana Crawfisherman Survey 2010
Questionnaire



All answers to this survey will be strictly anonymous and confidential.

Louisiana Commercial Crawfisherman Survey - 2010

Please answer the following questions. All answers will be anonymous and confidential.

1. Currently the commercial crawfish season lasts all year round. Which one of the following do you prefer? (Please circle only <u>one</u>.)

   A Keep the current year-round commercial crawfish season
   B A commercial crawfish season from November 1 to July 31
   C A commercial crawfish season from January 1 to July 31
   D A commercial crawfish season from _____________ to ______________

2. Currently regulations say commercial crawfish traps have to use a minimum mesh size of ¾-inch by 11/16-inch. Which of the following do you prefer? (Please circle only <u>one</u>.)

   A Keep the current regulation: ¾-inch by 11/16-inch mesh size
   B Change the regulation to ¾-inch by ¾-inch mesh size
   C Other (Please specify ____________________________________)

3. Currently, for the purposes of filling out trip tickets, there is only one large area (Area 105) that covers the majority of the Atchafalaya Basin. Which of the following do you prefer? (Please circle only <u>one</u>.)

   A Keeping the current system: One big area for the entire Basin
   B Splitting the Atchafalaya Basin into <u>two</u> areas (East & West of the Atchafalaya River) to improve the accuracy of trip ticket reporting
   C Splitting the Atchafalaya Basin into <u>13</u> areas (using the boundaries of the Corps' water management units) to improve the accuracy of trip ticket reporting

4. What do you think of requiring a tag on every crawfish trap that identifies who the owner is? (Please circle only <u>one</u>.)

   A Strongly opposed
   B Moderately opposed
   C Neutral
   D Moderately support
   E Strongly support

5. Where did you harvest most of your crawfish in calendar year 2009? (Please circle only one.)

   A Atchafalaya Basin – East of the River
   B Atchafalaya Basin – West of the River
   C Other (Please specify ____)

6. In what parish is the crawfish dealer to whom you sold most of your crawfish in 2009 located?

   ____

7. How many years have you been a Louisiana commercial crawfish harvester?

   Approximately ______________ years

8. What is your ZIP code?

   ____

9. What do you think is the major problem facing the Louisiana wild crawfish industry today?

10. If you have any comments or suggestions, please write them in the space below.

If you have any questions about this survey or the questionnaire, please call Jack Isaacs at (225) 765 - 2605

Appendix X: Bayou Sorrel Pipeline Restoration Proposal
Page 428


Bayou Sorrel pipeline restoration proposal
Write a description for your map.
Legend
RED: Spoil removal/islands
BLUE: Spoil removal islands/berms
GREEN: Stream restoration
404
75
997
70
Hog Island
Eagle Island
Google earth
© 2017 Google
6 mi
N

Appendix Y: 2016 AP-AOPL Annual Pipeline Safety Excellence Performance Report Strategic Plan Page 430

http://www.aopl.org/wp-content/uploads/2016/08/2016-API-AOPL-Annual-Pipeline-Safety-Excellence-Performance-Report-Strategic-Plan.pdf

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http://www.aopl.org/wp-content/uploads/2016/10/Pipelines-by-the-Numbers-2016.pdf

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index.php/about/

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http://www.pipeline101.org/Are-Pipelines-Safe

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http://pstrust.org/about-pipelines1/stats/

Appendix JJ: U.S. Liquids Pipeline Usage and Mileage Report_Oct 2014
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Appendix KK: State Master Plan - Atchafalaya Basin Floodway System
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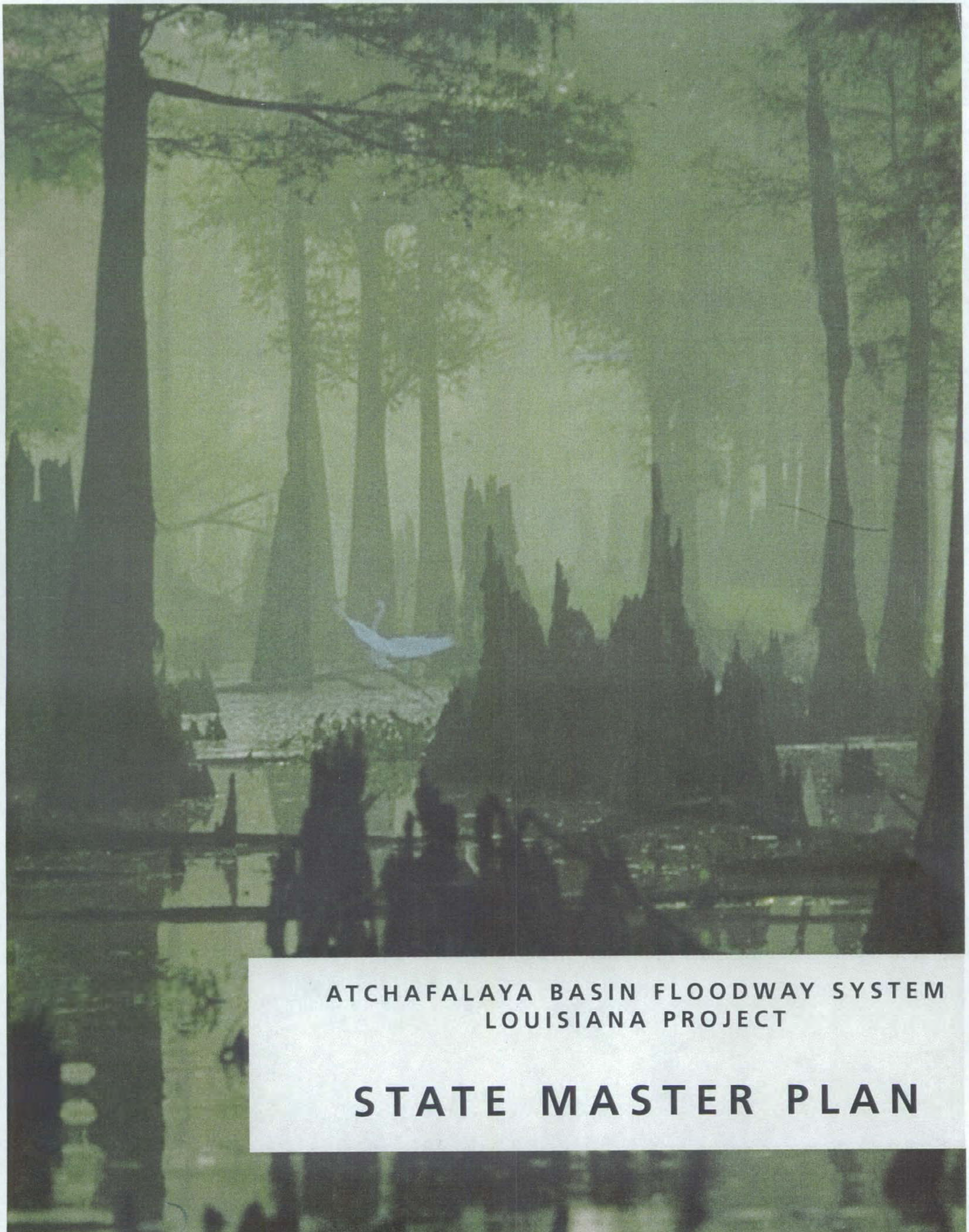

ATCHAFALAYA BASIN FLOODWAY SYSTEM
LOUISIANA PROJECT

STATE MASTER PLAN

ATCHAFALAYA BASIN FLOODWAY SYSTEM
LOUISIANA PROJECT

STATE MASTER PLAN

A REPORT TO:

TO: The People of Louisiana
Governor M.J. "Mike" Foster, Jr.
The Louisiana State Legislature

From: Atchafalaya Basin Advisory Committee
Policy & Planning Working Group
Public Access Working Group
Environmental Easement Working Group
Water Management Working Group
Recreation Working Group

April 1998
Revised: June 1998

Cover: Second-Growth Cypress with Great Egret at Buffalo Cove–Greg Guirard

PREFACE

VISION STATEMENT

Any proposal for the future of the Atchafalaya Basin must take a realistic view. This view will necessarily be based partly on projections of current conditions and recognized trends. As in the past, there may be different opinions over uses and management directions; they are routinely part of the democratic process, and when conducted in a constructive spirit are often a good avenue for making informed decisions. If it is actually possible to create, or even envision, a perfectly managed Atchafalaya Basin in which all parties and interest groups are fully satisfied, the following vision of the future can be attained.

As stakeholders and participants in the planning process, we must draw upon the best within ourselves to imagine an idealized future, one that does meet our highest expectations and fulfills our fondest dreams. If we do not, we have failed ourselves, our families, our friends and coworkers. Most importantly, we will have failed future generations. Without high expectations and lofty goals each of us can expect to accomplish little that is truly worthwhile, or perhaps noble, for our communities, society and ourselves. Without a destination in mind, a map, a compass, a direction and determined effort, we are not likely to get there.

If we care about the future of the Atchafalaya Basin, each of us must take responsibility for ourselves and then motivate and lead others. The achievement of goals and realization of a vision depends upon leadership - our leadership.

What follows then, is not unreasonably optimistic. It assumes that the Atchafalaya Basin can serve many people well at the same time that its fundamental values are adequately protected. This vision is based on reasonable expectations of what can be realized within a generation or two with a concerted effort and widespread public support.

Vision of the Future

Future visitors and residents of the Atchafalaya Basin will encounter a landscape:

where natural processes are operating on a grand scale with humans moderating their activities so that they have become less intrusive and a reasonable part of, rather than an encumbrance upon, these processes;

where the built and natural environments are visually attractive, the object of intense human enjoyment, and make manifest the qualities of scenic beauty and aesthetic harmony;

where the photogenic panoramas and vistas of the region will exhibit more than static post-card images, but a truly dynamic landscape, as in ages past, constantly changing and evolving; forests in various stages of succession, seasonal flooding and other natural disturbances; soil erosion and deposition; the minimum necessary control of waterways and unpolluted lakes;

where in these grand settings, ecological processes will be apparent at all scales, from the geological time frame of river course changes and land formation to the moment-to-moment pace of life in a bird rookery;

where the complex interrelationships of all the components, from the Atchafalaya River to the smallest life forms, will be not only evident but also carefully protected and interpreted;

where human institutions are re-oriented toward a stewardship approach to the region's diverse resource processes, patterns, qualities, uses and values;

where a diversity of livelihoods will continue; commercial fishing, timber harvesting, oil and gas extraction, all activities done in harmony with, and sensitive to, other resource values and land uses;

where people regard the Atchafalaya ecosystem as a single, complex organism, and are working together in concert with widespread public support to plan, manage and interpret the region's intrinsic (natural) and extrinsic (man-made) resources as a unified whole;

where the overriding mood of the Atchafalaya will be a harmonious balance between naturalness and unimpaired ecological processes, and the enlightened and unobtrusive use of the land for needed economic and social purposes;

where, complementing that mood, educational opportunities abound and where the Atchafalaya has become a world model - a showcase of visionary planning and progressive management of public and private resources, and of cooperation among many agencies, groups, and individuals to achieve goals.

State of Louisiana

M.J. "MIKE" FOSTER, JR.
GOVERNOR

JACK C. CALDWELL
SECRETARY

DEPARTMENT OF NATURAL RESOURCES

April 23, 1998

Hon. M. J. "Mike" Foster, Jr.
Governor of Louisiana
Post Office Box 94004
Baton Rouge, LA 70804-9004

Dear Governor Foster:

This endeavor to develop a State Master Plan for the Atchafalaya Basin is the culmination of many years of state, local and national efforts to preserve and protect the great Atchafalaya Basin. We are fortunate, at this time, to have your leadership, and your directive, to move ahead with the implementation of a project which was authorized by Congress in 1986 with a funding amount of $250 million. It is now up to the State to get this plan approved and to enter into cost/share agreements with the Corps of Engineers for implementation.

A committee of 75, representing all interest groups in the Basin and working for more than a year, prepared this document. It includes all of the major aspects of the Atchafalaya Basin Project - Public Access, Environmental Easements, Water Management and Recreation. The cost to the State is relatively low, with the Corps picking up 100% of the cost of construction of most of the features, and the State only required to provide 25% of the cost of operation and maintenance. The recreation features will be cost/shared on a 50/50 basis.

The state and federal agencies, led by the Department of Natural Resources and the Corps of Engineers, will coordinate and communicate to an extent not previously experienced. There is no place in the State at this time, or perhaps in the South, more fitting to pioneer this concept. No landscape and its people could benefit more fully than the Atchafalaya Basin. It has the public support, the agency enthusiasm, and the unique spectrum of natural and cultural resources to provide a world class model of what can be done to restore, protect and interpret a working landscape with unique attributes for the benefit of all. It is an opportunity that the Corps of Engineers, the State agencies and the Committee have wholeheartedly embraced.

On behalf of the Department of Natural Resources and the Atchafalaya Basin Advisory Committee, I am pleased to present this Plan to you and to the Louisiana Legislature for your consideration.

Sincerely,

Jack Caldwell

JACK CALDWELL
Secretary

OFFICE OF THE SECRETARY P.O. BOX 94396 BATON ROUGE, LOUISIANA 70804-9396

AN EQUAL OPPORTUNITY EMPLOYER

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT. CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS. LOUISIANA 70160-0267

REPLY TO ATTENTION OF:

April 17, 1998

Executive Office

Honorable Jack Caldwell
Secretary
Louisiana Department of Natural Resources
Post Office Box 94369
Baton Rouge, Louisiana 70804-9396

Dear Mr. Caldwell:

The State's draft master plan for the Atchafalaya Basin is a reflection of the extraordinary and successful effort of the State Advisory Committee, and the leadership of the Department of Natural Resources to facilitate a far-reaching, visionary proposal among diverse interests. It is a testimony to consensus-building and deserves commendation.

Should the Congress provide the legislative authorization and funding necessary to accomplish the ambitious proposal requested by DNR, the Corps has the expertise and the capability to participate in every feature of the State's plan. The thrust of the proposed State plan is to broaden the recreational and environmental benefits of the Atchafalaya Basin Floodway System project. The Corps is actively committed to the enhancement and preservation of the lower Atchafalaya Basin Floodway through the implementation of the currently authorized federal project. Therefore, I embrace and welcome the initiative and ideas that have the potential to complement the Congressionally authorized project as it now stands.

Sincerely,

William L. Conner

William L. Conner
Colonel, U.S. Army
District Engineer

April 23, 1998

ACKNOWLEDGMENTS

Sandra Thompson, Chairman
Atchafalaya Advisory Committee

There are a lot of people to thank when a document such as this one is produced. First and foremost, we thank Governor Foster for responding to the Corps' request for action, and for designating the Department of Natural Resources as the lead agency. We thank Secretary Jack Caldwell for championing the project and for providing the strong leadership essential to making it work. This Plan would not be possible without his enthusiastic advocacy and the help of so many DNR employees.

We thank the legislators, parish officials and mayors who have supported the effort from the beginning; the eight department secretaries who signed the Memorandum of Understanding which gave this project validity and momentum; Col. Conner for his support and the participation of representatives of the Corps of Engineers at every meeting and their enthusiastic encouragement of our efforts.

We especially thank **each and every member of the Atchafalaya Basin Advisory Committee** for taking time from work or other activities to devote a year to pulling this plan together. Although it is not possible to name all of you here, this is **your** plan and **you** deserve the credit. For assistance above and beyond, we recognize the following:

- Ernie Gammon, for chairing the Public Access Working Group, and for getting the pipeline companies together in an effort to open cuts and gaps in spoil banks;
- David Walther, for chairing the Environmental Easement Working Group and for providing the knowledge of the past years' work, and the documents and files to assist us in this effort;
- Ben Skerrett, for chairing the Water Management Working Group and for keeping the project alive for the past ten years when almost everyone else gave up;
- Les Kent, for chairing the Recreation Working Group and for bringing his knowledge and expertise on recreation to use for the benefit of the plan;
- Bobby Wilkinson, for the comprehensive report and pictures of all the boat ramps in the Basin;
- Charlie St. Romain and Clay Carter, for the map of all state-owned lands in the Basin;
- Gary Tilyou, and Wildlife and Fisheries, for the information, meeting rooms and coffee;
- Lu Cutrera, for his beautiful work on the Morgan City features;
- Greg Guirard for his magnificent photos, including the cover shot;
- Charles Fryling, for his suggestions for canoe trails and his beautiful pictures;
- Jay Edwards, GIS at DNR, and Fred Bryan and Lamar Hale, LSU, for the base line maps;
- Mary Courville and Kathleen Hebert, for escorting us to many unique areas around the Basin;
- The people of Catahoula, for opening up their homes and their hearts to us;
- Rod Cobi and Aaron Tuley for providing the Vision Statement and other inspirational materials;
- Mike Lyons for pulling the pipeline companies together;
- Rusty Jabour, for his astute advice on communications, and Roger Magendie for agreeing to advise us on financial matters.

And last, but certainly not least, we thank Ned Cole, for agreeing to come out of retirement to attend all the meetings and to prepare this Plan, using only his typewriter. Ned is 80 years old and while he has done some wonderful work for state government over the years, we think this is his best.

Sandra Thompson

Sandra Thompson, Ned Cole, Kathleen Hebert
Lake Fausse Pointe

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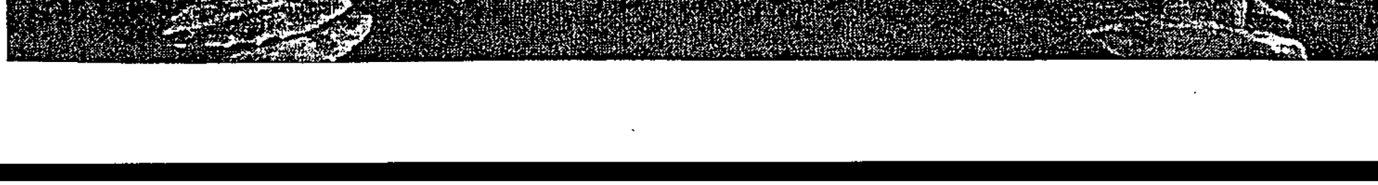
ACRONYMS

ABAC	–	Atchafalaya Basin Advisory Committee
ABFS	–	Atchafalaya Basin Floodway System
ACE	–	After Current Era (current era is beginning of Roman Empire)
ADAAG	–	Americans with Disability Accessibility Assistance Guidelines
AMAC	–	Atchafalaya Multi-Agency Cultural Center
ANWF	–	Atchafalaya National Wildlife Refuge
BCE	–	Before Current Era (current era is beginning of Roman Empire)
cfs	–	Cubic Feet Per Second (measure of water flow)
COE	–	Corps of Engineers (see also USACOE)
COLA	–	Cost-of-Living Adjustment
DAF	–	Department of Agriculture and Forestry
DCRT	–	Department of Culture, Recreation, and Tourism
DEQ	–	Department of Environmental Quality
DHH	–	Department of Health and Hospitals
DNR	–	Department of Natural Resources
DOTD	–	Department of Transportation and Development
DWF	–	Department of Wildlife and Fisheries
EPA	–	Environmental Protection Agency
FWS	–	Fish and Wildlife Service (see also USFWS)
GIS	–	Geographic Information System
LSU	–	Louisiana State University
MOA	–	Memorandum of Agreement
MOU	–	Memorandum of Understanding
NRCS	–	Natural Resource Conservation Service
NPS	–	National Park Service
SCORP	–	Statewide Comprehensive Outdoor Recreation Plan
SLO	–	State Land Office
SPA	–	State Preservation Area
USACOE	–	United States Army Corps of Engineers
USDA	–	United States Department of Agriculture
USFWS	–	United States Fish and Wildlife Service
USGS	–	United States Geological Survey
WMA	–	Wildlife Management Area

SECTION 1.00
EXECUTIVE SUMMARY



1.00 EXECUTIVE SUMMARY

Public interest in conserving and restoring, where possible, the unique environmental values of the Atchafalaya Basin, the largest river-swamp in the country, began in the 1960s, was given State sponsorship by Governor McKeithen in 1971, succeeded in developing a consensus of viewpoints in the Treen Agreement in 1981, and received federal support and funding in the Water Resources Development Act, and subsequent legislation, in 1985 and 1986.

The Congress had met its responsibilities and directed the Corps of Engineers to prepare a comprehensive plan and to begin the purchase of land. The sum of $250.0 million was authorized for purchase of land, certain flood-control projects, and water management, environmental, and recreational features.

The cost/sharing formula outlined in the legislation required the State of Louisiana to provide certain funding:

COST/SHARE FORMULA

	Federal	Non-Federal
Public Access: Fee purchase of land, less minerals, from willing sellers	100%	0%
Dedication of State lands + Dow donation	0%	100%
Purchase of environmental/development easements	100%	0%
Operation/maintenance of access and easement lands	75%	25%
Purchase of easements for water management projects	100%	0%
Dedication of State lands for water management projects	0%	100%
Construction of water management projects	100%	0%
Operation/maintenance of water management projects	75%	25%
Land purchase and construction of recreation projects*	50%	50%
Operation/maintenance of recreation projects	0%	100%

**The State must purchase the land, using its own funds. The cost is then credited against the State's share of the total (land + development) costs.*

For ten years the State took no coordinated action to meet its responsibilities. However, many individuals spent time and effort on the State's behalf to keep the the project alive.

Then, in 1996, Governor Foster directed the Department of Natural Resources to be Lead Agency in the development of a plan to meet the State responsibility. Jack Caldwell, Secretary of the Department of Natural Resources, asked Sandra Thompson, who had been Executive Director of the Atchafalaya Basin Commission in the 1970s, to appoint a citizens' committee and begin working to get the job done. The first meeting of the Atchafalaya Basin Advisory Committee was held January 23, 1997.

A Memorandum of Understanding among the eight State agencies involved in the Basin was signed in March 1997 and work was begun on a State Master Plan. See Appendix A.

The State Master Plan preparation required one year and more than forty separate meetings of Working Groups and four quarterly meetings of the Advisory Committee. The Plan was drafted by representatives of the following: eight State agencies, six-Federal agencies (the U.S. Army Corps of Engineers as an advisor), city and parish governments in, or adjacent to, the Basin, landowners, fishing clubs, environmental organizations, and interested citizens.

This Master Plan is the first step to meet the State's responsibilities to match federal funds to "...conserve, restore, and enhance (where possible) the natural habitat and give all people the opportunity to enjoy the Atchafalaya Experience."

Two additional steps are required:

1998 - Explain the plan through the written media, TV, direct mail, and speakers available for both formal and informal presentations and discussions. Formal regional meetings will be held throughout the state to present the plan, answer questions, and receive suggestions.

1999 Presentation to the Governor and Legislature for approval and funding.

The State Master Plan includes:

Public Access:

Managing the land bought by COE; improvements of access roads: La. Hwys. 105 and 975 to the Wildlife Management Areas; the levee road at the foot of the West Protection Levee from Henderson to Verdunville; 3-lanes for La. Hwy. 352 at Henderson; exit lanes for La. Hwy. 70 at Morgan City; La. Hwy. 75 from Bayou Sorrel to Pigeon; and investigate the feasibility of a new road from La. Hwy. 77 at Grosse Tete to the Upper Grand River Flats area.

Environmental:

Working with the Corps of Engineers, the Department of Agriculture and Forestry (timber monitoring) and the State Land Office (State lands), and the United States Fish and Wildlife Service to monitor compliance with the Corps' environmental and development easements.

Water Management:

To save the Basin, problems with water quality and sedimentation must be solved by working with the Corps of Engineers, Department of Wildlife and Fisheries, Louisiana State University, and others to monitor the results of water management features planned by the Corps with assistance from the State and implemented by the Corps. Additionally, the group will coordinate its efforts with the work of other Federal and Federal/State projects which impact, or are impacted by, the Atchafalaya Project - particularly the Coastal Restoration Program.

The Department of Wildlife and Fisheries (fisheries) with the LSU Agricultural Center (water quality) and the Department of Agriculture and Forestry (for tree and vegetation condition) will monitor the effects of the Corps' projects and the Department of Natural Resources will assist the Corps in the planning phase and provide equipment and personnel for maintenance of spoil bank cuts and gaps.

Ricky Verret

Without action, this stagnant water in Buffalo Cove will kill vegetation. A pilot water management project in Buffalo Cove is the action. Similar projects are proposed for East Grand Lake (Flat Lake and Upper Grand River) and studies are proposed for the Alabama Bayou (Sherburne) and Bayou Courtableu (Henderson Lake) projects.

Ricky Verret

Twenty years ago water was 20' deep, now with sediment there is not enough water to float this log off a sand bar.
Without action, Buffalo Cove will be dry land.

The "public" enjoying the Basin.
Brandon Green
Daniele Dent
Hailey Verret

Recreation:
Mission:

To purchase 1,500 acres of land, in fee, less minerals, for recreational features.

To assist the Corps of Engineers in planning "....to provide a cost-effective range of recreation facilities to optimize public accessibility and use of the floodway while minimizing adverse impacts to the environment."

To expand the Corps' plan as necessary to provide interpretive and educational facilities to enhance the public's knowledge and enjoyment of this unique area.

Attraction:

The irreplaceable assets in the Atchafalaya Basin establish it as a recreation area without peer in the nation. The attraction is rapidly gaining the attention of visitors from far and near. Boat tours of the Basin, without publicity or organization, booked over 200,000 visitors last year and bookings from tour groups, schools, and family groups for 1998 are "most encouraging and will require an increase in equipment and services."

The Master Plan recommends that gateway communities plan carefully for this expected growth in visitors so that the area's culture, principally "Cajun", rural architecture, and way of life is not compromised by commercialism.

The Master Plan identifies growth areas (principally the west side) for tourism and natural areas (principally the east side of the Basin) and separate entry points for tourists (Morgan City, Henderson, Catahoula) and for sports and nature lovers (Ramah, Bayou Sorrel, Bayou Pigeon, Belle River).

Facilities proposed:

Figure 1.00 A identifies the location and type facilities proposed for the recreational phase of this program.

PROJECTED STATE COSTS FOR THE TOTAL PROGRAM

	Total	Cost/Share		State Budget Increase
		COE	State	
PROJECTED CONSTRUCTION COSTS:			2)	
COE land and easement purchases and certain water projects	146,637,517	146,637,517	0	0
State Projects:				
Roads to Recreation areas	16,355,000	8,177,500	8,177,500	8,177,500
Recreation features 1)	40,007,630	20,739,749	19,267,881	20,267,881
Total Projected Construction Cost	203,000,147	175,554,766	27,445,381	28,445,381
PROJECTED OPERATING COSTS:				
Wildlife Management Areas-15yrs	25,758,378	19,318,784	6,439,594	7,612,945
Monitoring Easements - 15 yrs.	9,038,085	6,778,564	2,259,521	3) 1,234,761
Water Management Features-15yrs	48,286,237	36,214,678	12,071,559	6,044,058
Management of Project - 15 yrs.	5,555,053	2,777,527	2,777,526	3) 427,080
Recreation features 1)	49,904,668	9,355,681	40,548,987	40,548,987
Total Protected Operating Costs	138,542,421	74,445,234	64,097,187	55,867,831
Total Projected Construction and Operating Costs for 15 Years	341,542,568	250,000,000	91,542,568	84,313,212

FUNDING FROM OTHER FEDERAL PROGRAMS AND SOURCES WILL BE INVESTIGATED FOR THOSE PROJECTS WHICH MAY NOT QUALIFY FOR THE ABFS, LA. PROJECT

1) Recreation costs are 50% Federal and 50% State. The cost share varies since the Morgan City complex includes a cultural center that is partly used for environmental and water management monitoring by state and federal agencies.

State Budget Increase includes funds for Atchafalaya Basin Wildlife Refuge, sponsored by USFWS, thus cannot be used for additional federal funding.

2) State Budget Increase less Corps cost/share

3) Low because many costs are already funded

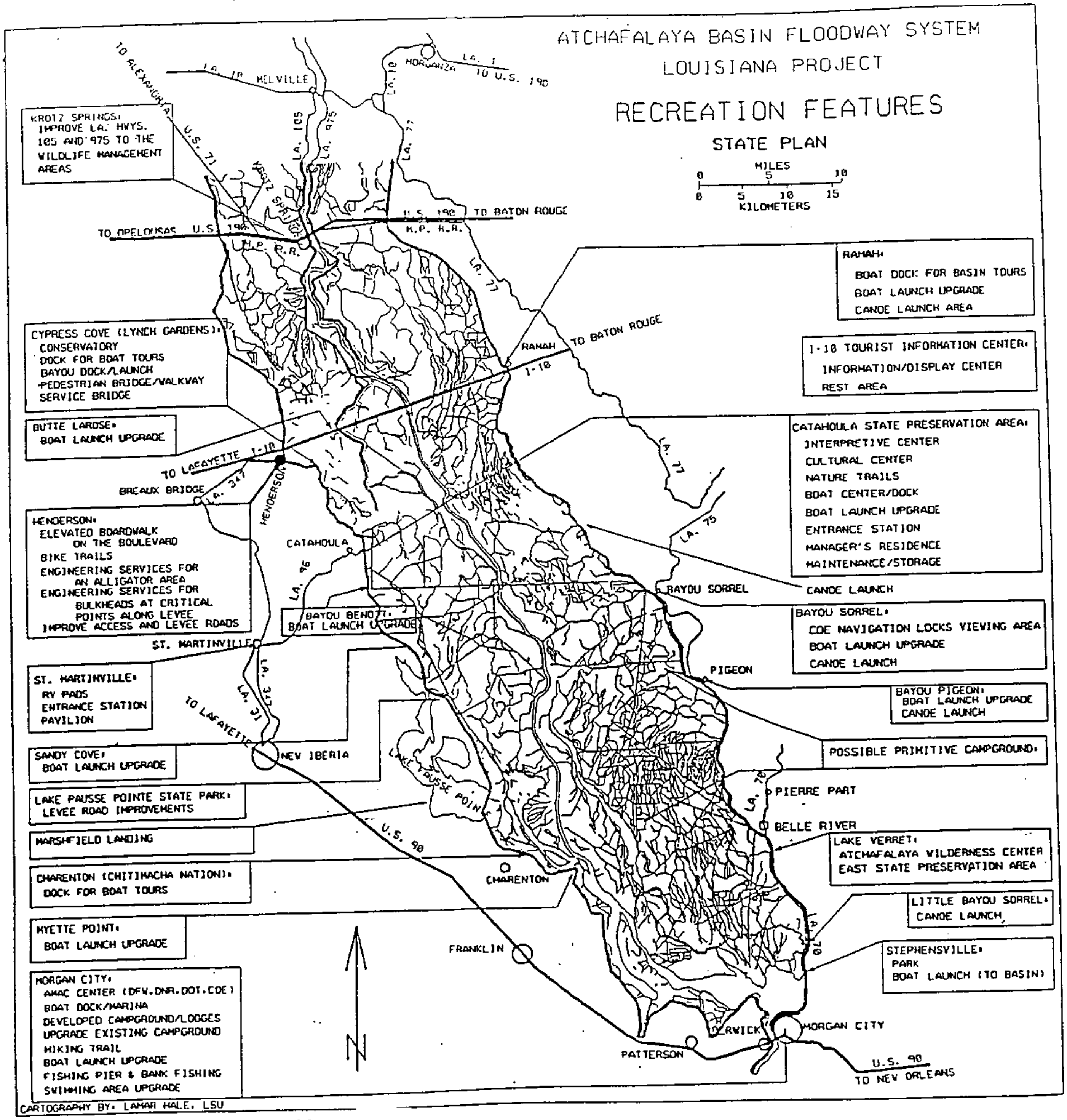


FIGURE 1:00 A: *Suggested Facilities and Locations*

SUGGESTED FUNDING PLAN

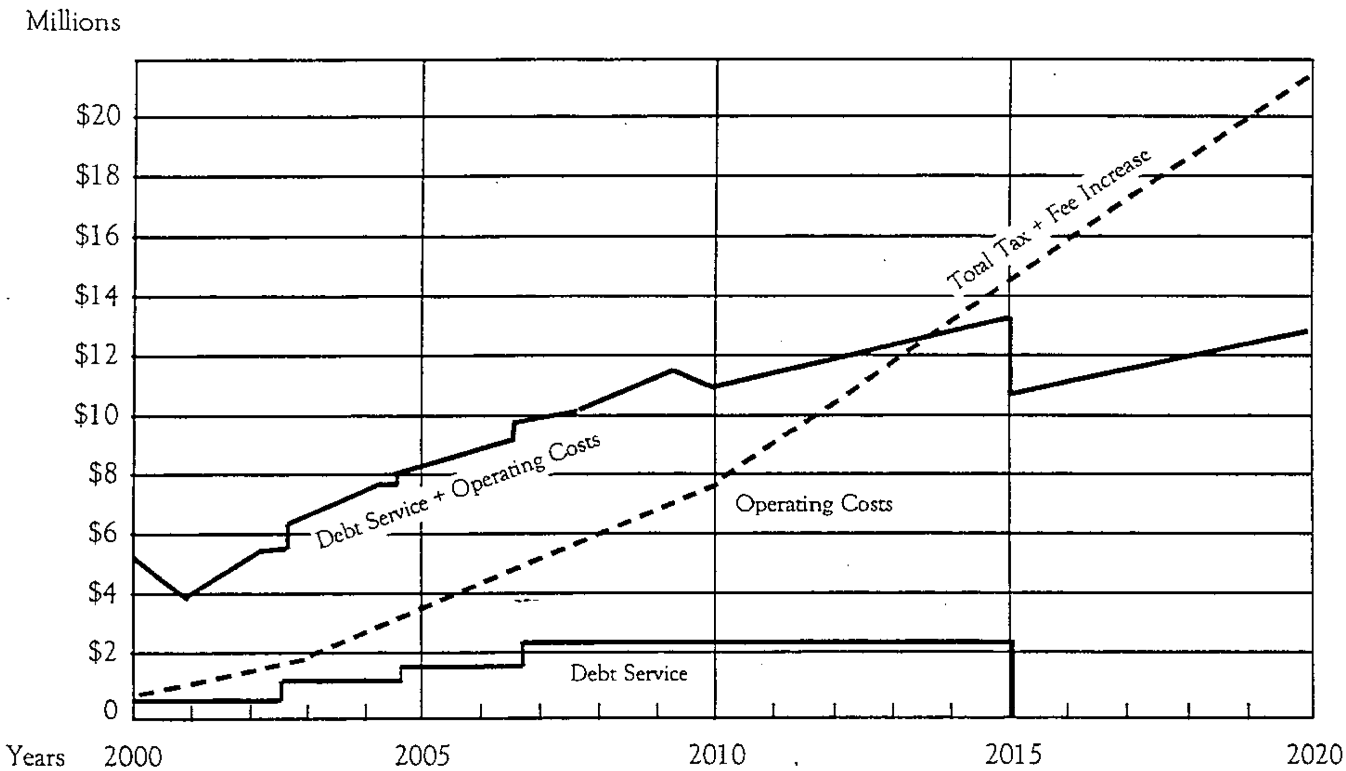
This State Master plan is a fifteen year plan. Every five years each major activity will be evaluated and the environmental protection sections (water management and easement monitoring) will be renewed if recommended by this evaluation.

The Plan suggests that construction costs (approx. $30 million State funds), which include road improvements and two state Preservation Areas (currently planned), be funded by a capital outlay bond issue (15 years with interest and principal payments throughout the 15 years). As required by capital outlay rules, a detailed plan will be filed for funding in five-year increments.

The projected operating costs range form $3.5 million/year initially to $4.8 million/year for the 15th year.

The projected increase in state tax revenues (sales tax, gasoline tax, and corporate income tax,) as a result of this project trails the debt service + operating costs for the first 13 years (many of the tourist attractions will not be built until the fourth or fifth year) and is projected to provide a surplus as shown on the following chart.

COMPARISON OF INCREASED TAX AND FEE INCOME TO TOTAL COSTS



Tax revenue based on out-of state- visitor expenditures only

An added benefit is that the water management and environmental easement projects offer a real hope that the Basin will be preserved, as much as possible, for the enjoyment of future generations.

SECTION 2.00
INTRODUCTION

2.0 INTRODUCTION

2.10 Overview

2.11 Need for a State Master Plan

Interest in preserving the unique environmental values of the Atchafalaya Basin began in the 1960s and was given State-sponsorship by Governor McKeithen in 1971. In 1981, the Treen Agreement united the various factions and in 1985 and 1986 the Congress, in the Water Resources Development Act and in subsequent legislation, authorized and directed the Corps of Engineers to begin land acquisitions, easements, and other actions.

The Corps of Engineers' Feasibility Study and Environmental Impact Statement was completed in 1982 and the Corps' Comprehensive Master Plan, now in the drafting state, as authorized by Congress has "....as its primary goal the protection of Southeast Louisiana from Mississippi River floods by ensuring safe passage of one-half the project flood (1,500,000 cubic feet per second) through the floodway system. In addition, the plan would retain and restore the unique environmental values of the floodway and maintain or enhance the long term productivity of wetlands and woodlands. It also provides for public access to maximize the public opportunity to observe and to utilize the fish and wildlife resources of the floodway."

Since many of the actions relating to protection of the environment and accessibility for public enjoyment require state matching funds, the Corps' work has been limited awaiting action by the State.

This State Master Plan outlining the public's needs and desires, to be followed by statewide public meetings in 1998, responds to that required action.

2.12 Perceived Benefits

All citizens should have the opportunity to enjoy the Atchafalaya Experience.

That opportunity depends upon several factors:

Maintaining the environmental, cultural, and historic integrity of the area;

Developing controlled public access to the Basin's wonders;

Encouraging all communities surrounding the Basin to follow the lead of other areas in maintaining the interest of their citizens in their heritage,and in the uniqueness of their culture by establishing incentives to refurbish the old, and to provide zoning to control the new, thus maintaining a uniform and appealing community. Examples of areas well-planned for these objectives include: Natchitoches, Sante Fe, Charleston, Williamsburg, and the French Quarter of New Orleans.

This State Master Plan recommends restricting governmental development within the Basin levees to water management and other environmental enhancement actions and establishing a framework for controlled developments of necessary services for the interested public.

The resulting benefit in environmental, cultural, and economic terms is presented.

Landowner rights are protected. Access is acquired by the Corps from willing sellers by fee purchase of certain lands; and purchase of environmental and development easements is acquired by the Corps on the remainder. Thus the landowners are paid market value for any perceived loss in economic terms.

2.13 Interests and Interest Groups

All individuals and groups with interests in the Basin have been involved as members of the Working Groups who have drafted this report and as members of the oversight committee - the Atchafalaya Basin Advisory Committee.

A Working Group on a field trip

Deliberations have been lengthy and in-depth on every point and at each stage of drafting. Most sections of the report have progressed through at least ten drafts as new factors and new viewpoints were presented.

The list of members of the Atchafalaya Basin Advisory Committee is shown in Appendix B.

2.20 Report Organization

The organization of this report was influenced by the Corps of Engineers decision to divide the work program into four tasks: Public Access, Environmental Easements, Water Management, and Recreation. Introductory sections prior to the four major sections and a funding program and other sections at the end complete the State Master Plan outline.

2.30 Mission Statement

The mission is to conserve, restore, and enhance (where possible) the natural habitat and to give all people the opportunity to enjoy the Atchafalaya Experience.

2.40 State Authorization

In late 1996 Governor Foster appointed the Department of Natural Resources as the lead state agency to work with the Corps of Engineers on the Atchafalaya Basin Floodway System, Louisiana Project, and directed Secretary Jack Caldwell to complete the State's responsibilities permitting this project to be fully implemented.

Lake Henderson

SECTION 3.00
DESCRIPTION AND PROJECT BACKGROUND

3.00 DESCRIPTION/BACKGROUND

3.10 Description

3.11 Geographic area

The Atchafalaya Basin encompasses 838,000 acres. The area is bounded by Simmesport on the north, Morgan City on the south, and on the east and west by protection levees.

The Atchafalaya Basin Floodway System, Louisiana Project encompasses 595,000 acres of the Basin south of the Missouri Pacific railway tracks (at U.S. 190).

The Simmesport project (which received separate funding), Morganza and Old River Locks and museum (proposed) are not part of the Project, but are included in the State Plan due to their importance as recreational and educational features.

The region beyond this area directly affected includes the communities of Ramah, Bayou Sorrel, Pigeon, Belle River, Pierre Part, Stephensville, Morgan City, Patterson, Charenton, New Iberia, St. Martinville, Catahoula, Breaux Bridge, Henderson, Krotz Springs, and Port Barre. Lafayette and Baton Rouge, also, are affected.

The Project, and affected region are illustrated on Fig. 3.00 A

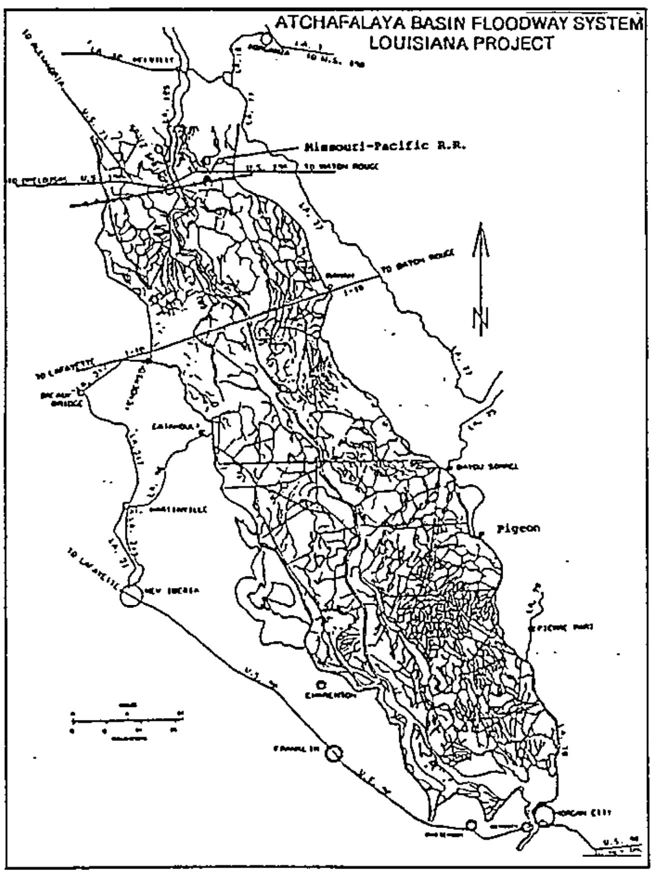


FIGURE 3.00-A: The Project Geographical Area

3.12 Natural history and resources

A. Geology

The first ice age of the Pleistocene Era formed what is now the Mississippi River. The level of the oceans was lowered, all flow to the north was blocked by the glaciers and drainage from the central land mass and from the melting glaciers dug a deep trench. As the ocean increased in level due to the melting ice, the trench was flooded and a layer of sediment deposited. Following ice ages repeated this process filling the trench to approximately its present elevation. The river which formed to drain this area meandered through this alluvial plain changing its course during flood stage and building natural levees.

The sediment mass in the deltaic plain is approximately 20,000 feet thick. In the Atchafalaya Basin the top layers of this mass include approximately one hundred feet of recent deposits of silt and clay and two to three hundred feet of sand and gravel.

The weight of the load of silt has caused a downwarping, a settling of the mass into the structural trough that extends through the alluvial plain.

The Atchafalaya Basin, as we know it today, was formed by the natural levees (alluvial ridges) built by the various Mississippi River routes. The west limit of the basin is known as the Teche ridge and the east limit the Bayou Lafourche ridge. In the lower basin the present east and west protection levees are well inside these limits thus reducing the basin to its present size.

B. Hydrology

The Atchafalaya River is a typical alluvial stream which became a distributary of the Mississippi River about 1500 ACE (AD in the old designation). It is deep (the bottom is well below sea level in many places), treacherous, and only 135 miles long.

The Atchafalaya Basin Floodway System is an integral part of the Corps of Engineers' flood control system for the Mississippi River and tributaries. The features of the floodway system include levees, structures, and channels. These features are designed to convey one-half of the project flood flow of the Mississippi River and tributaries or 1,500,000 cubic feet per second, safely to the Gulf.

One of the major problems facing the Corps is the rapid sedimentation - the Atchafalaya Basin Floodway System carries more than 57,000,000 cubic yards of sediment annually. Sediment deposits in the basin affect the carrying capacity of the floodway, fish and wildlife habitat, and regeneration of forests and other vegetation.

C. Ecology

Factors influencing the ecology of the Basin are: soil, climate, and water. Soil and climate have been relatively constant during the recorded history. Water, however, has been subject to constant and continuing change.

The Corps of Engineers decision to place major emphasis on a main channel for flood-carrying capacity and for reducing sedimentation in the Basin has affected water flow and water levels in the remainder of the Basin.

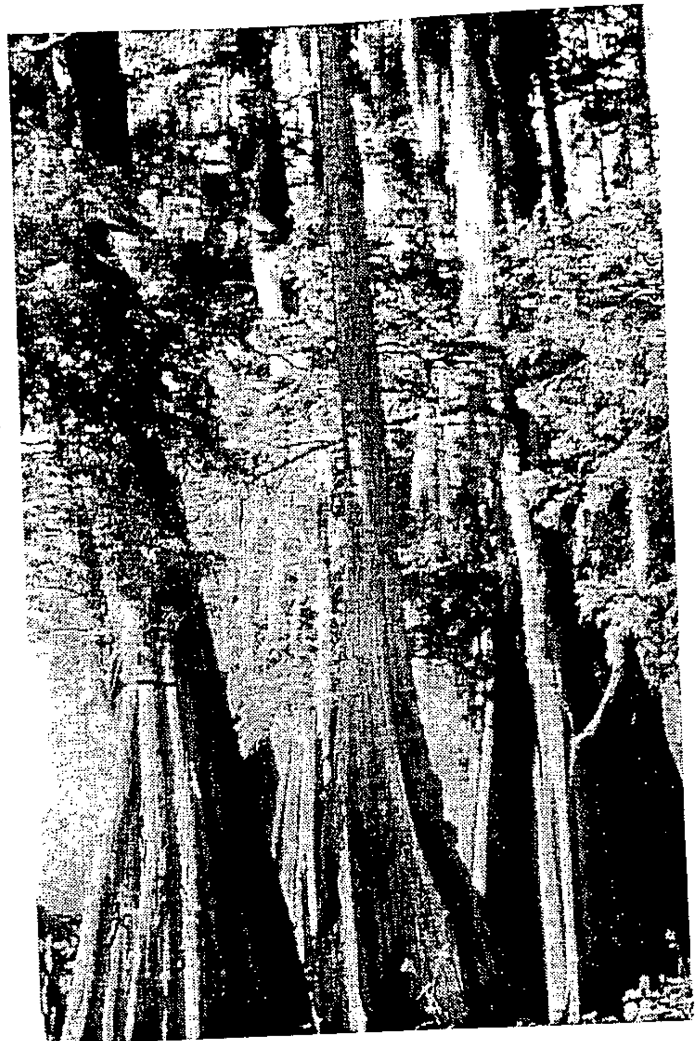
Canals and the spoil banks constructed by the timber and oil industries to support their operations, by highway engineers to construct I-10, by the Corps of Engineers for flood control, navigation, and fresh water distribution, and by pipeline construction have added to this disruption of waterflow.

The forests in the Basin dominated by cypress were harvested by the 1920s. Most of the existing cypress is second growth and while regeneration of vast cypress forests may not be possible, preservation of pockets of old growth is a goal of this Master Plan.

The ecosystem is adapting, supporting new species of trees and vegetation providing habitat for varied wildlife.

While many have blamed human action for the Basin's evolution, it must be noted that had the levees not been built, natural forces would have restricted human population in much of South Central Louisiana and would have resulted in a different wildlife habitat.

Thus, in a captured area we still have a river swampland and a link to our pre-historic past. Such areas have been compared to "wild islands in a sea of cultivated farmlands, furnishing habitat for fish, birds, and wildlife of all kinds, all parts of the live-community that offers joy and pleasure to man and to nature an ecosystem balance." (Robert Harrison, An Alluvial Empire).



Charles Fryling

3.13 Cultural history and resources

While many cultures including Spanish and English settled in the Basin, two cultures have dominated the cultural history of the Atchafalaya Basin. These are:

A. Native American

Investigations of the distant past have been limited compared with studies of the Inca, the Maya, and the Olmecs each of which left many monuments for study. Discovery of Poverty Point in West Carroll Parish has sparked interest, as have the studies of several scholars who have listed possible cultures present in the Atchafalaya Basin. These cultures are:

TIME	CULTURE	SIGNS OF EARLY INHABITANTS
10,000 BCE	Paleo-Indian	None discovered to date
6,000 - 550 BCE	Archaic	Poverty Point is believed to be of this culture (Newman and others) Bayou Sorrel Mound is believed to be of this culture (Swamton and others)
550 BCE - 250 ACE	Tchefuncte	Bayou Sorrel Mound is believed to be of this culture (Gibson and others)
250 - 700 ACE	Marksville	Middens near Bayou Pigeon (Swamton and others)
700 - 1100 ACE	Troyville Coles Creek	Middens north of Charenton (Swamton)
1,100 - 1700 ACE	Plaquemine Mississippipian	The Chitimacha Nation is of this culture (Gibson and others). It should be noted that the Chitimacha based on their research (hinted at by Swamton), claim ancestry back to the Bayou Sorrel Mound period.

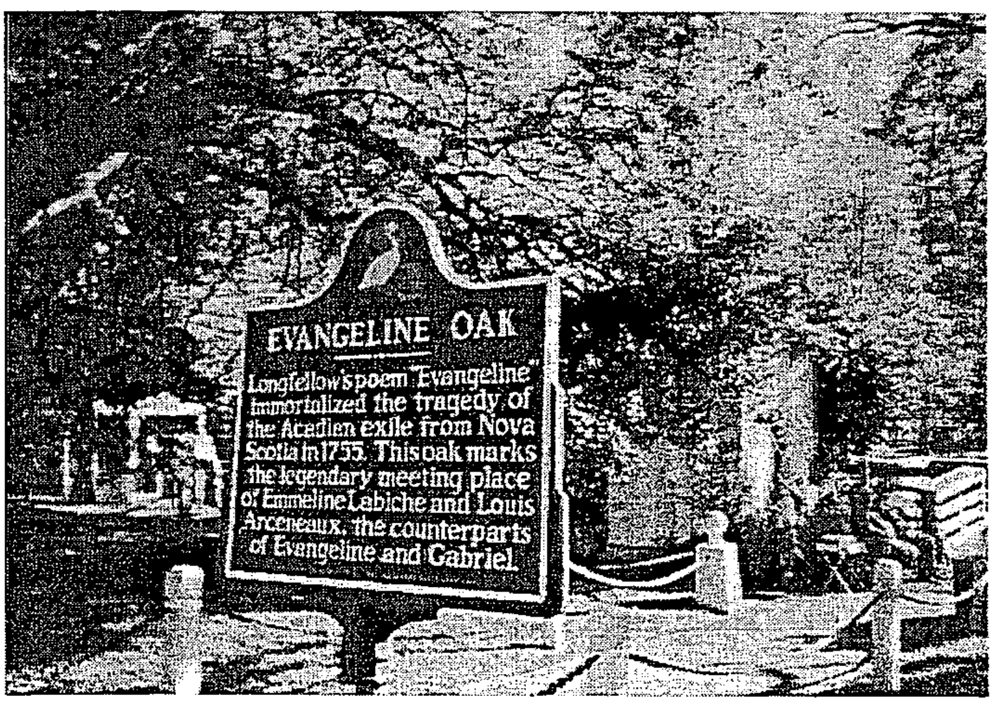
Source: Noted above

B. Acadian (Cajun)

The first Acadians, evicted from Nova Scotia by the English, arrived in Louisiana in 1764 and settled on high ground west of the Atchafalaya Basin.

Living off the land and the rich harvest from the bayous, the Cajuns retained the culture of the lost homeland and in this area of prairies, marshland, swamp, placid lakes and quiet bayous, developed as a community fiercely independent, deeply religious, industrious and with a hospitality that is seldom surpassed by any culture. "Laissez les bon temps roulez" (let the good times roll) is a leisure time byword.

Lafayette, New Iberia, and St. Martinville all have Cajun exhibits and/or replicas of early villages and real-life panoramas of early life in the Basin. An interpretive and cultural center is planned at the Atchafalaya Wilderness Center West State Preservation Area near Catahoula which will present basin visitors a view of the Cajun culture and guide them to the three cities for addi-



St. Martinville

tional interpretation of this culture, and an opportunity to experience the world-famous Cajun cuisine.

3.14 Scenic resources

A. Overview

The Atchafalaya scenic experience is enjoyed by relatively few: the hardy canoeists who join one of the organized trips, those with boats who explore the basin for fish and/or pleasure, and the visitors from outside the region who take one of the organized boat tours. Others share a hint of the experience while viewing the photographs of C. C. Lockwood or Greg Guirard, or a narrated slide show presented by a local group involved with the Basin. As interesting as these second-hand experiences are, they do not compare with the "real thing".

The Atchafalaya scenic experience is a feeling of awe, of contentment, of lofty feelings and aspirations, and of a serenity seldom encountered in our everyday experiences.

The "real thing" is personal contact with moss hanging from trees, the stately cypress, flocks of birds circling a lake, the abundant wildlife in the water and on the land.

3.15 Other Atchafalaya Basin resources

A. Flood control

The Atchafalaya River is the largest of all distributaries of the Mississippi River. Flood protection improvements in the Basin have been authorized and constructed primarily under the Mississippi River and Tributaries (MR&T) project and are an integral and extremely important part of the lower Mississippi River.

"At the latitude of Old River, the design project flood has been determined to be 3,000,000 cubic feet per second. The MR&T project allows one-half of this flow down the Mississippi River and half to be introduced into the Atchafalaya Basin Floodway. The Mississippi River below the Morganza Floodway is capable of carrying 1,500,000 cubic feet per second without threatening the integrity of the levees along its banks which protect densely populated areas, highly developed agricultural lands, industries, and the City of New Orleans, as well as a number of lesser populated communities. The diversion of the other 1,500,000 cubic feet per second is made through the Old River Control Structure, the Old River Auxiliary Structure, the Atchafalaya River, and through the Morganza and West Atchafalaya Floodways. In order to prevent diverted waters from spreading over the rich and highly developed agricultural lands outside the Atchafalaya Basin, the rivers and floodways have been leveed to confine the diverted flows. Since this construction program began, farms and industries have developed in the areas adjacent to the floodway with full confidence that they would receive protection. Therefore, overtopping or crevassing of the levees would cause far more damage than anticipated at the start of project construction.

"The Corps of Engineers' flood control project consists of a leveed floodway 15 miles wide and 110 miles long that extends generally from the latitude of Old River to the Gulf of Mexico. The upper basin is divided by the leveed Atchafalaya River. The Morganza Floodway is to the east of the Atchafalaya River and has a capacity of 600,000 cubic feet per second which is introduced into the floodway by a control structure. The West Atchafalaya Floodway, which is located to the west of the river, is placed into operation when the fuse plug sections are overtopped bringing flows from the river that will introduce 900,000 cubic feet per second into the lower basin. After passing through the floodways, the flood waters enter the Gulf of Mexico through the Lower Atchafalaya River and the Wax Lake Outlet. The flood protection works in the Atchafalaya Basin include levees, control structures, locks, pumping stations, floodgates, channel improvements, and floodwalls." (Corps of Engineers)

B. Navigation

Navigation activities in the Atchafalaya Basin have traditionally been of great importance to Louisiana and these activities will continue in the future. The Gulf Intracoastal Waterway (GIWW), a major east-west inland waterway route, passes through the lower end of the Basin. The GIWW, Alternate Route connects Morgan City to the Mississippi River near Baton Rouge providing an additional route for the shipment of commodities. The Atchafalaya River, from Morgan City to the Old River Lock, was responsible for 9,810,000 short tons of freight in 1996.

Ports located at Morgan City and Krotz Springs continue to grow and serve the maritime industry. And, with the opening of the J. Bennett Johnston Waterway (Red River), the ports located at Shreveport, Natchitoches, Alexandria, and soon Coushatta in Red River Parish, are linked to Morgan City and points beyond.

C. Oil and gas production

The production from many fields adds to the energy supply of the nation. This production tapered off during the 1980s, but with new oil-finding techniques (3-D seismic principally) new finds have materially increased production.

D. Timber

Timber harvesting, even under the restrictions of the Corps of Engineers' environmental easements now being purchased for the entire Basin, continues to provide an important source of employment as well as lumber for our growing economy.

E. Fish, crawfish, and fur production

Commercial and sport fishing, commercial crawfish harvests, and the fur industries provide enjoyment and/or livelihood to thousands of residents of this region. It should be noted that the value of nutria for food as well as for fur is being promoted by the Department of Wildlife and Fisheries.

Fishing - a family affair

F. Recreational and educational resources

These resources are examined in Section 7.00 of this report.

3.20 History of the Atchafalaya Basin and Project

3.21 Historic Actions

Date	Activity
1927	The 1927 flood prompted Congress to enact several subsequent flood control bills to develop the Atchafalaya Basin Floodway System and the construction of the Old River Structures. Dredging, channelization (e.g.Whiskey Bay Cutoff), and bank stabilization projects have been conducted as funds were available.
1968-69	The Louisiana Legislature passed legislation concerning real estate issues and purchase of land by the Wildlife and Fisheries Commission.
1972	Louisiana Legislature Act 365 of 1972 established the Atchafalaya Basin Division in the Department of Public Works. The Attakapas Island Wildlife Management Area was established, legislation creating the Atchafalaya Delta Wildlife Management Area was passed, as well as legislation outlawing billboards on I-10. Boat ramps were built, planning was begun on recreational facilities and the purchase of land for the Catahoula Interpretive Center was begun.
	The Corps of Engineers began work on a Comprehensive Plan for preservation and for management of water and land resources.
	The Atchafalaya Basin Management Group was formed to provide input into this plan.
1975-81	Meetings between the Corps of Engineers and landowners and other groups were held to discuss differences and to develop an acceptable plan.
1981	The Treen Agreement (see Appendix C) was negotiated between landowners and environmentalists and presented to the Congress.
	The Dow donation of 45,000 acres (30,000 in Basin) was announced.
1982	Governor Treen signed legislation which authorized funding to purchase 46,000 acres in cooperation with Federal Government.
	Completion of Corps' Feasibility Study and Environmental Impact Statement for Atchafalaya Basin Floodway System, Louisiana Project.
1983	10,232 acres were purchased by the State from willing sellers for creation of Sherburne Wildlife Management Area.
1985	Public Law 99-88 was enacted authorizing the Multipurpose Plan recommended by the Corps of Engineers. Details of the plan were based on the Treen Agreement.
1986	Public Law 99-662, Section 906, stated that the fish and wildlife enhancement features of the Multipurpose Plan shall be considered to provide "national" benefits.
	15,255 acres were purchased for the Atchafalaya National Wildlife Refuge by the U.S. Fish and Wildlife Service.
1988	The Corps of Engineers began purchase of real estate interests beginning in the north section of the Basin.
1988-94	Negotiations between State and Federal Agencies and interested groups to finalize timber easements.

3.22 Current actions:

Date	Activity
Nov. 1996	The District Engineer of the Corps of Engineers requested Governor Foster to designate a lead agency to coordinate state participation in the Atchafalaya Basin Floodway System, Louisiana Project, authorized by the Congress. The Governor designated the Department of Natural Resources as lead agency and Secretary Caldwell appointed Sandra Thompson, who had been Executive Director of the 1972 Atchafalaya Basin Division, as the Project Director.
Dec. 1996	The Atchafalaya Basin Advisory Committee was created and members of that committee were appointed.
Jan. 1997	The Advisory Committee held its first meeting to receive reports from representatives of the Corps of Engineers concerning Corps' activities and a list of tasks which must be completed by the State. Working groups were appointed, meetings held, and work begun on a Memorandum of Understanding to be agreed to and signed by the eight agencies involved. The membership of the working groups included representatives of state and federal agencies involved, industry, landowners, environmental groups, and concerned citizens.
Apr. 1997	The MOU was completed and signed.
Apr. 1997- Dec. 1997	The working groups completed the work program and schedules for developing a State Master Plan, in cooperation with the Corps of Engineers, to present to the public, the Governor, and the Legislature. Elements of the plan included: . Public access (purchase of land) Environmental concerns and purchase of easements Water management Recreation
Jan. 1998	A draft of the Master Plan was completed and circulated for review and comment to the Working group members, the Atchafalaya Basin Advisory Committee, and others for review and comment. The Corps offered advice.
Spring 1998	The report was printed and plans made for statewide public meetings to secure additional input and to solicit support.
Apr. 1999	The plan will be presented to the Legislature for approval and funding.

3.30 Constraints and Limitations

3.31 Limiting Factors

A. Water levels

The Basin is a floodway that experiences high and low water levels. Because the floodway system is used for flood control and must be capable of carrying 1,500,000 cubic feet per minute, developments, subject to Corps' permitting of real estate authority within the protection levees, must be limited to facilities which do not affect the carrying capacity or can be removed (e.g. primitive campgrounds, nature trails. etc.).

B. Navigation

The Atchafalaya Main Channel and the GIWW, Alternate Route are federally maintained waterways open to barge traffic. Such traffic always has the right-of-way.

C Public accessible land

The public has access to the following lands:

Federal fee-purchase lands (Corps of Engineers)	50,000 acres:
U.S. Fish & Wildlife Service Refuge	15,000 acres
State lands (principally water-bottoms and Wildlife Management Areas) approximately	192,000 acres
To be purchased by State for recreational purposes	1,500 acres
Total with public access	258,500 acres

The remaining 338,000 acres (approximately) are privately owned over which the Corps is in the process of purchasing environmental and development easements. These easement rights do not require public access, however many landowners allow access.

The public has access to publicly-owned navigable waterways. Public access to privately owned canals and waterways is not required, however many landowners allow access for recreational purposes.

D. Sedimentation

Plans for long-term use or enjoyment in many areas may be limited by build-up of sediments which may eliminate water access and which changes the character of trees and vegetation.

3.32 Constraints

Conformity with federal and state laws and regulations is required. Particular attention is directed to the following areas of concern:

Environmental protection
Public health and safety
Funding requirements
Special laws and Corps' regulations governing this project

SECTION 4.00
PUBLIC ACCESS

4.00 PUBLIC ACCESS

4.10 Introduction

One of the primary goals of both State and Federal Legislation and plans concerning the Atchafalaya Basin is to provide for public access for fish and wildlife oriented recreation in a manner which protects the environment and does not unduly encroach on landowner rights.

To achieve this goal, the Congress directed the Corps of Engineers to purchase in fee title, less minerals, from willing sellers, 50,000 acres of land in the Basin.

4.20 Status of Public Land Acquisition

4.21 The Corps of Engineers

The Corps of Engineers, to date, has purchased fee title (ownership, less mineral rights) for approximately 33,000 acres of land in the Atchafalaya Basin from willing sellers. This area is illustrated on Fig. 4.00 A.

As shown, this land is located, primarily, north of I-10 and south of U.S. 190 and will be jointly managed wildlife management areas, already designated and/or under development in the area.

15,000 acres has been designated Indian Bayou Wildlife Management Area. Within Indian Bayou, 4,000 acres of land has been designated, through the Louisiana Natural Area Registry Program as the Bayou Fordoche Natural Area. This area is composed of a series of lowland bayous surrounded by second-growth hardwood and bald cypress forests. The area will be cooperatively managed by the Corps of Engineers, with advisory support from the Nature Conservancy which is the primary force behind this designation, and the Louisiana Department of Wildlife and Fisheries.

4.22 U.S. Fish and Wildlife Service

The Service owns 15,000 acres designated as the Atchafalaya National Wildlife Area Refuge and operated by the Louisiana Department of Wildlife and Fisheries. Though not officially a part of the Corps' Atchafalaya Basin Floodway System, Louisiana Project, it does provide public access and is important to include in the State Master Plan.

The Refuge was established for the following purposes:

> To provide for the conservation and management of fish and wildlife within the refuge;
>
> To fulfill the international treaty obligations of the United States with respect to fish and wildlife; and
>
> To provide opportunities for scientific research, environmental education, and fish and wildlife-oriented recreation, including hunting, fishing, and trapping, bird watching, nature photography, and others.

The U.S. Fish and Wildlife Service has been requested by Congressman Livingston to study the Atchafalaya Basin with the objective of locating lands for acquisition. The Service will study the entire area of the project, including the land above Hwy 190 for possible purchase as a national wildlife refuge. The Trust for Public Land will be assisting the Service in the effort.

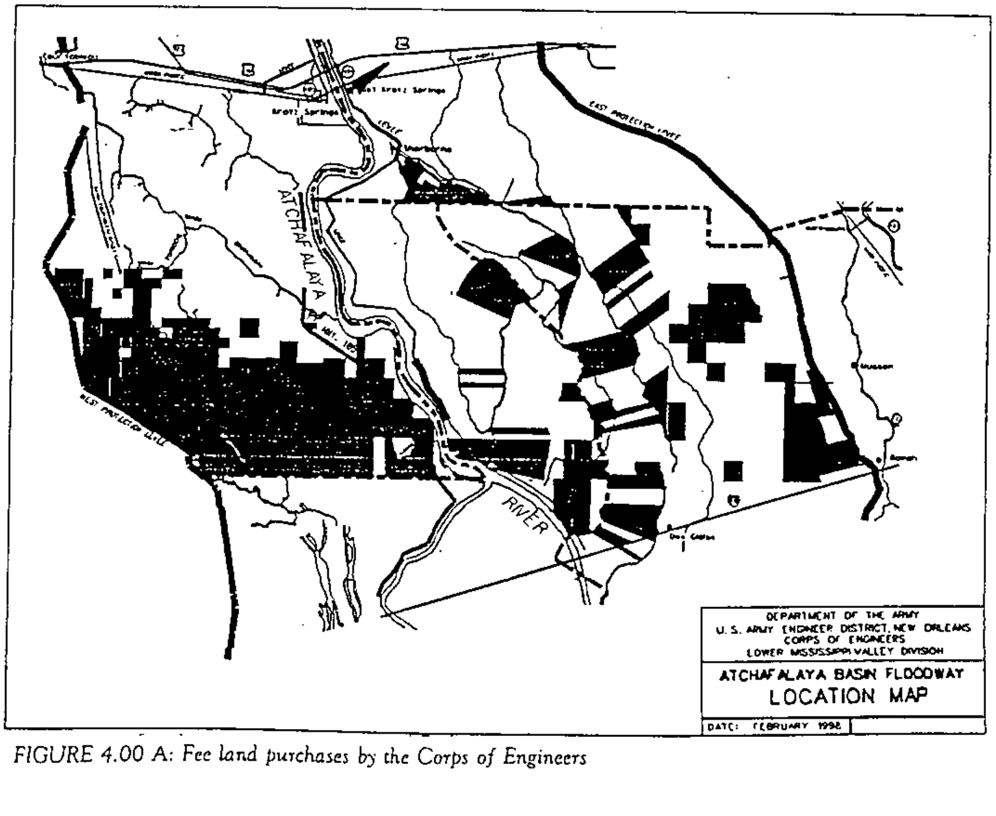


FIGURE 4.00 A: Fee land purchases by the Corps of Engineers

4.23 The State of Louisiana

The State established the 26,000 acre Attakapas Island Wildlife Management Area in 1975 and, in 1983, purchased 10,232 acres of land for the Sherburne Wildlife Management Area. Both areas are operated by the Department of Wildlife and Fisheries and both are dedicated to the Project.

4.24 Nature Conservancy

The Nature Conservancy (TNC) has shown a willingness to take part in both fee simple and easement acquisition projects that, when completed, would protect the biological diversity of the Atchafalaya Basin. Their involvement in the Basin to date has included negotiating natural area registry agreements with private landowners and the Corps of Engineers. These non-binding agreements have been established in the Lake Verret and Bayou Fordoche areas. The registry agreement with the Corps of Engineers includes a management plan designed to protect the natural communities that occur within the area. The Nature Conservancy has experience throughout Louisiana crafting and closing conservation real estate transactions. Many of TNC's projects in the state have been cooperative projects including private individuals and federal and state agencies. The expansion of the Attakapas WMA in the lower basin is such an example. TNC has initiated discussions with the Corps of Engineers to assist with the acquisition of old-growth cypress swamp. It is TNC's strict policy to work only with willing sellers of private property.

4.30 State Lands Dedicated to the Project

4.31 The Treen Agreement

Under the Treen Agreement of 1982 (see Appendix C), the State agreed to dedicate the following lands in the Atchafalaya Basin to the project for recreational purposes:

A. Non-severed lands (acquired from the Bureau of Land Management which title was never severed from the State) - 450 acres;
B. Lake beds and navigable waterways claimed by the State - approximately 150,000 acres;
C. The Dow donation lands - approximately 30,000 acres (in the Basin); See Fig. 4.00 B for State and Dow lands.
D. Attakapas Island Wildlife Management Area (part of "B" above).

4.32 Ownership of Dedication

This dedication by the State to the Project does not change the ownership of the lands. The State retains title to all the lands and will continue leasing for mineral production, selective harvesting of some timber, and campsite leasing on designated sites.

4.40 Remaining Acres to be Purchased

4.41 Corps of Engineers

A. Fee title purchases

The Corps of Engineers is authorized to purchase a total of 50,000 acres in fee title, less minerals, of land for public access in the Atchafalaya Basin. With 33,000 acres purchased, 17,000 acres remain to be purchased and this purchase is targeted to cypress/tupelo stands to retain vestiges of that original forest that dominated the lower Basin.

The Corps has made an offer to purchase the 17,000 acres in the Flat Lake area, less mineral rights, and negotiations are ongoing.

All working groups have shown an interest in the location of this cypress/tupelo area and have recommended additional areas if the landowners of the first choice do not sell. See Fig. 4.00 C for location of the first choice and additional areas which have been suggested.

B. Operation and maintenance of Corps fee title lands

Under the Congressional plan, the Corps is to enter into a management agreement with the State (with the Department of Wildlife and Fisheries as the responsible State agency) for operation and maintenance of the areas which will be designated as wildlife management areas, if acceptable arrangements and agreements regarding management philosophies can be reached.

Currently, the Corps and the Department of Wildlife and Fisheries are jointly managing the Sherburne and the Indian Bayou wildlife areas, with the Department doing the majority of work on Sherburne, with the Corps' major emphasis on the Indian Bayou area.

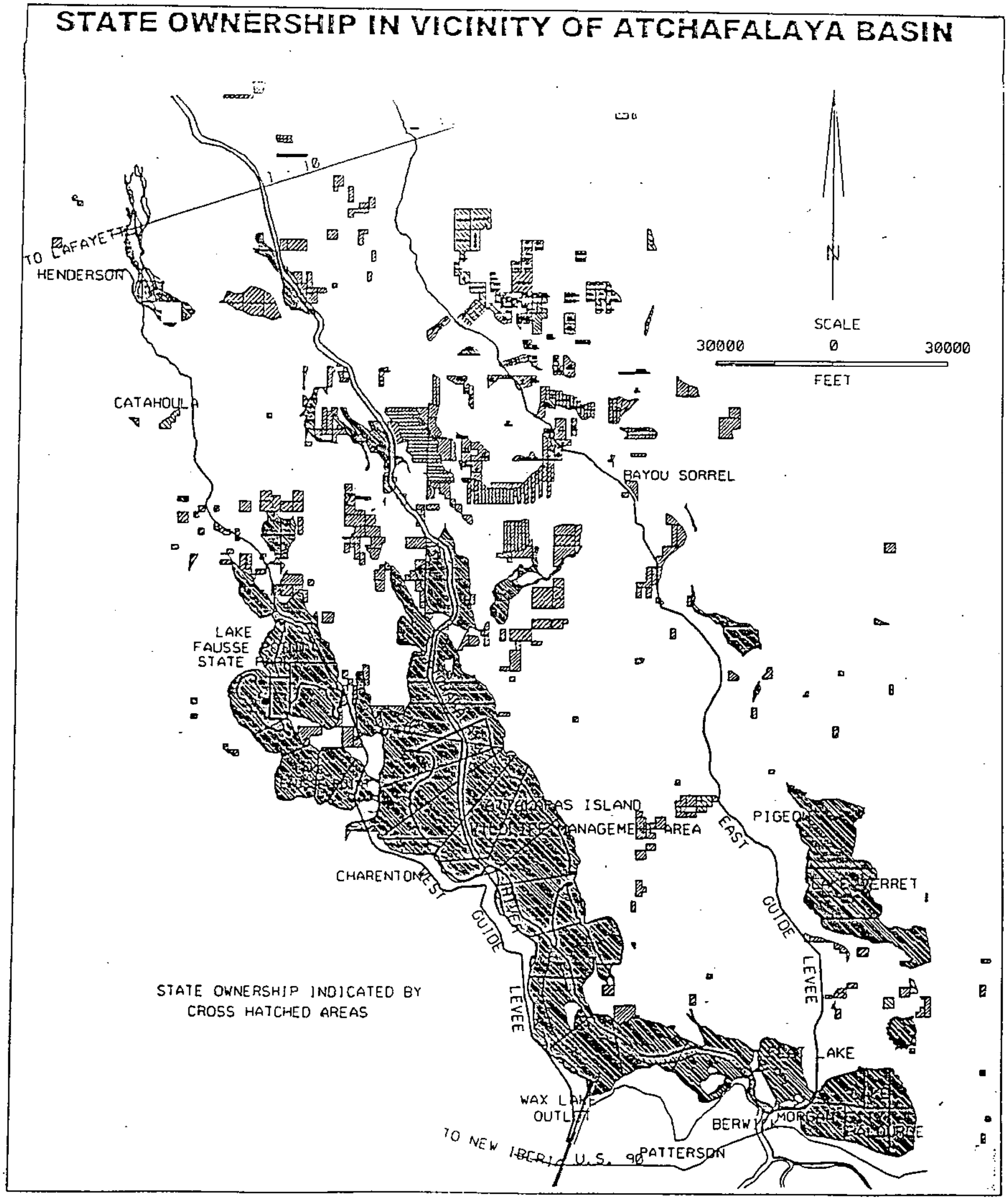


FIGURE 4.00 B: Location of State Lands Under Jurisdiction of the State Land Office

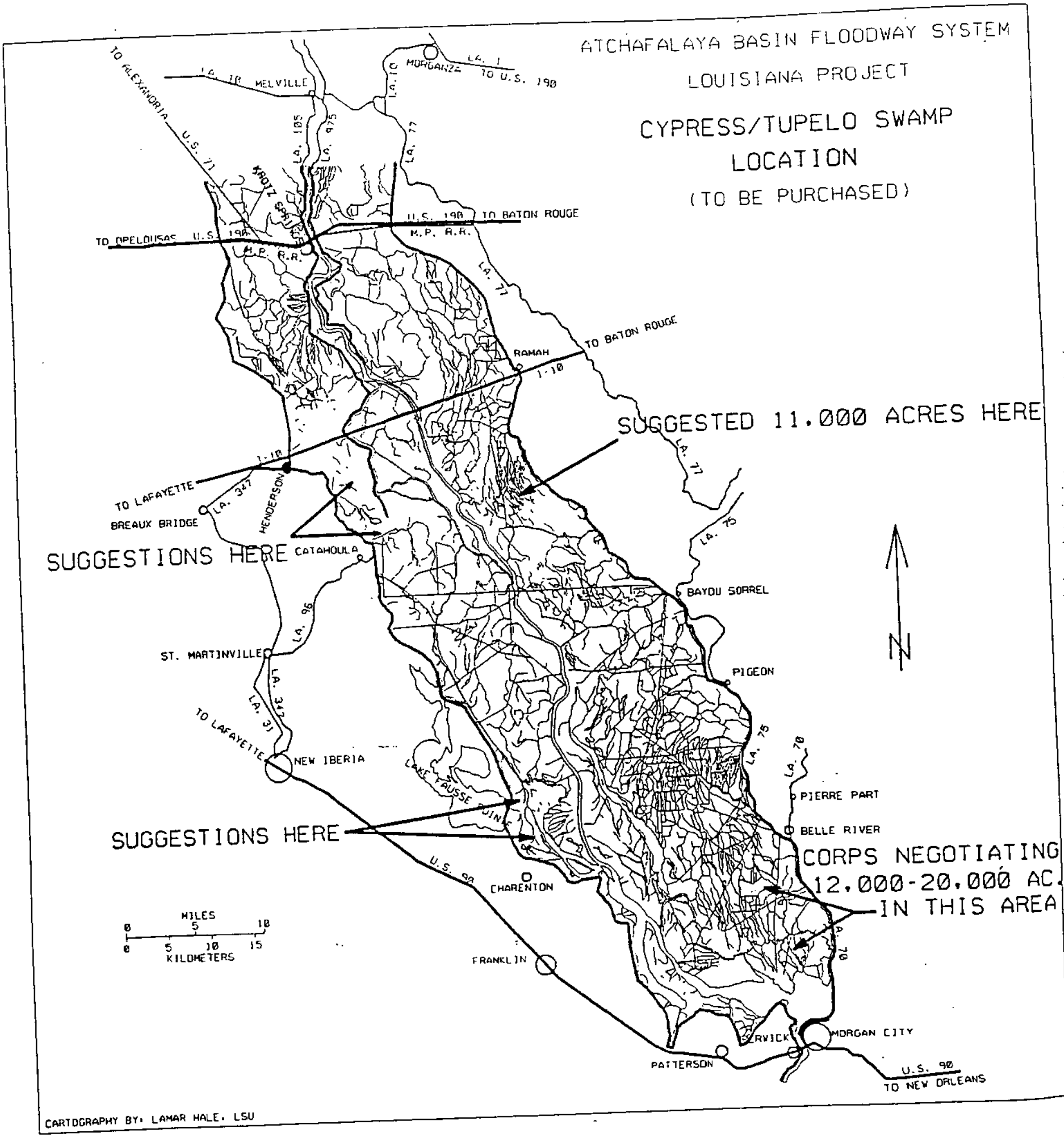


FIGURE 4.00 C: Cypress/Tupelo Swamp Location

When a Project Cooperative Agreement is in place, this joint management will continue with the Department of Wildlife and Fisheries conducting management as specified in the agreement. The Corps is ultimately responsible, since they cannot abrogate this responsibility. Detailed annual and five year estimated management plans will be submitted to the Corps' Operations Project Manager, along with the Corps' management plans to be approved and incorporated into the Operational Management Plan. See Appendix D.

Quarterly updates will be submitted, reviewed and discussed in quarterly management meetings. The management of these lands will be funded on a 75% Federal and 25% State ratio.

4.42 The State of Louisiana

A. Under the plan the State will select and purchase 1,500 acres of fee title land for recreational purposes. The cost of this purchase will count as part of the State's cost-share (towards the total recreational development costs - including acquisition and construction) provided the location and use conforms to guidelines set forth by the Corps of Engineers.

B. This land will provide space for the following recreational activities:

Developed campgrounds
Primitive campgrounds
Boat launch sites
Interpretive center
Nature trails
Unique and scenic areas

The suggested location of these sites is illustrated in Section 7.00 of this report.

4.50 Public Access to Waterways

4.51 Jurisdictional issues

A. General

Currently, public access is available to waterways on State-owned lands, on Corps fee purchase lands, on the U.S. Fish and Wildlife Service lands, and on all natural navigable waterways owned by the State.

B. Conditions

Excerpts from a communication from Attorney Newman Trowbridge, representing the Louisiana Landowners' Association:

1. Not all navigable waterways, however, are owned by the State, since pipeline canals and other man-made waterways which are navigable remain in private ownership.

2. That portion of State-owned waterways between the ordinary low water mark and the ordinary high water mark (the "bank") is owned by the riparian landowner. Banks, even when covered with navigable waters, are subject only to public use for very limited purposes.

EDITORIAL COMMENT: Land between ordinary low water and ordinary high water on lakes is owned by the State.

3. Issues relating to which waterways are available for public access, as well as the nature and extent of permissible access, are very fact sensitive and can be extremely complex.

The LSU Law Institute prepared a report, dated March 23, 1995, demonstrating the nature of the issues and limitations to public access to waterways.

4. Many of the State-owned scenic waterways are bordered by private lands, a fact which may limit public access to the adjacent lands and the banks of the waterway. While some private landowners have, either expressly or tacitly, allowed the public to access the banks of the stream and the adjacent lands, many others object to even temporary public use of privately owned lands and waterways. The objections are for a variety of reasons, which include: interference with the landowners' activities, littering of the area, damage to trees and other vegetation, and liability issues. It may be anticipated that, as public use of the waterways of the Atchafalaya Basin increases, tolerance of the public's use of privately owned lands and waterways may diminish unless the concerns of private landowners are addressed and potential adverse impacts of temporary public use of private lands are eliminated or drastically diminished.

4.52 Suggested Remedies

A. Assigning responsibility to Boat Tour Operators

Adverse impacts to the use of private waterways can be eliminated, in part, by utilizing organized boat tours. These tours can prevent passenger landing except at authorized areas and can prevent, or clean up, any littering which may occur. Tour operators, by posting a a bond and providing insurance, can encourage landowners to enter into agreements which allow access to certain areas on private lands.

Organized boat tours will handle most of the tourist demand, but will not accommodate the local and regional demand from those who bring their own boats or canoes or rent craft from local suppliers.

B. State actions

Possible actions by the State to address local and regional use of waterways include:

Informing the public, through this report and other means, that some waterways are private.

Encourage private landowners to allow limited public use of privately owned lands and waterways by enacting legislation which specifically limits its liability to persons accessing these areas. Some legislation has been passed recently, but it is recommended that legislation referring specifically to the Atchafalaya Basin be proposed.

4.60 Highway and Road Assessment

4.61 Roads within the Basin

A. Jurisdictional issue:

Private service roads on top of levees are construction roads for use by heavy levee maintenance equipment under the jurisdiction of the Atchafalaya Levee District, in cooperation with the Corps of Engineers and, in some cases, the Louisiana Department of Transportation and Development.

Minimum highway requirements are not met, since heavy equipment would destroy the roads. Thus, public use, while generally allowed, is not favored for safety and conflict-with-maintenance operations reasons.

B. Access Road Recommendations:

Two roads within the Basin are State Highways: La. Hwy. 105 from Butte LaRose intersection at I-10 to Krotz Springs, and La. Hwy. 975 from Krotz Springs to the Whiskey Bay Interchange on I-10.

Both roads give access to Wildlife Management Areas, thus are heavily used by sportsmen, hikers, birdwatchers, and nature lovers.

Both roads require upgrading in some sections and new overlay.

See Fig. 4.00 D.

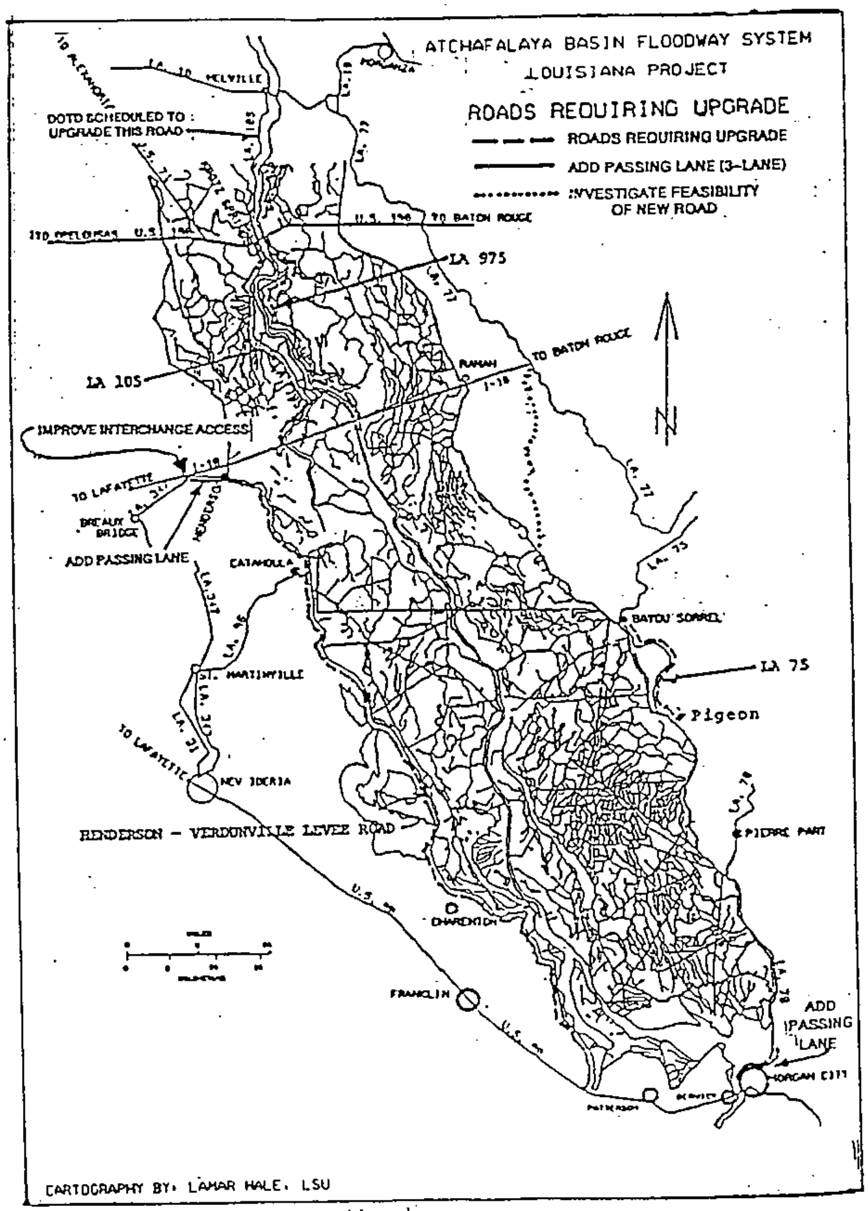


FIGURE 4:00 D: *Roads Requiring Upgrade*

4.62 Roads to the Basin

A. New roads recommended:

1. Investigate feasibility of new road from La. Hwy. 77 at Grosse Tete to the East Protection Levee at Upper Grand River for access to the Upper Flat River area using Federal Trace guidelines;
2. Access road to tracts of land purchased by the Corps north of I-10 which currently have no road access. Access and road construction are the responsibility of the Corps of Engineers.

B. Upgrading recommended:

1. Pave unpaved sections of Henderson Levee Road (at foot of levee on west side) from Henderson to Verdunville and resurface entire road;
2. Add turning lane (3rd lane) on La. Hwy. 352 at Henderson from La. Hwy. 347 (at I-10) to Henderson Levee Road and improve La. Hwy. 347 from Interchange to La. Hwy. 352. Rep. Sydnie Mae Durand has asked the Federal Highway Department to investigate building a new frontage road from the I-10 Interchange at Henderson to the Henderson Levee Road. This endeavor would not be part of the ABFS,LA Project.
3. Add turning lane (or exit lanes) on La. Hwy. 70 at Morgan City at Lake End Park and to the new parking areas from Lake End Park to the boat race viewing stand.
4. Overlay La. Hwy. 75 from Bayou Sorrel to Pigeon and improve roadside drainage.

4.63 Access to Basin from Entry Points

Required access is included in Recreation Section (7.00) as part of boat launch and other recreation feature requirements.

4.64 Acquire Rights-of-Way

1. Henderson boardwalk R.O.W. - The Boulevard from opposite point La. Hwy. 352 intersects the Henderson Levee Road to Cypermart Crevasse - approximately 20 feet in width by 2 miles long. (see Section 7.00)

4.65 Land for Recreation Features:

Location of the 1,500 acres having a potential for recreation development is shown in Section 7.00 of this report.

4.66 Standards for Basin Access Roads

It is recommended that local governing bodies adopt standards governing access roads at all entry points. Standards should include:

A. Design requirements

1. Pull-offs with adequate parking should be installed for views and photo-ops at all points of scenic, cultural, or special interest;
2. Bicycle trails located on the opposite side of the drainage ditch for safety should be included.

B. Aesthetic requirements

1. Signage should be consistent in size and design and should provide information concerning directions and explanation of cultural and historic points of interest. Maximum size of 2'x4' is recommended;
2. Trees and vegetation planted should be native species;
3. Permits should be required for all roadside developments to control type, location, and use thereby eliminating developments or use that would detract from the natural setting.

C. Maintenance requirements

1. To achieve and maintain aesthetically pleasing entries to the Basin, a high level of maintenance will be required, thus it is recommended that the local authority responsible for such maintenance enter into an agreement with the operating agency for each entry point transferring grass mowing, landscape enhancement, and litter clean-up operations for the entrance roads to the operating agency.
2. Road maintenance and drainage control should remain the responsibility of the State or local governments.

4.70 Capital Costs (land)

The land purchases by the State are limited to sites for recreational purposes. See Section 7.92 for lists.

4.80 Capital Costs (Roads to Recreation Projects)

Location	item	Miles	Cost/Mile	Total
Krotz Springs	La. Hwy. 105 - Butte LaRose	19	170,000	3,230,000
	La. Hwy. 975 - Whiskey Bay at I-10	18	170,000	3,060,000
Ramah	Feasibility of road to Upper Grand River area			50,000
Bayou Sorrel	La. Hwy. 75 to Pigeon	12	160,000	1,920,000
Morgan City	La. Hwy. 70 - 3-lane	1.5	250,000	375,000
Henderson to Verdunville	Henderson Levee Road 1)	45	160,000 (aver.)	7,200,000
Henderson	La. Hwy. 375 - 3-lane	3	140,000	420,000
	La. Hwy. 347 improve link from I-10 to La. 352			100,000
	Total roads			16,355,000

Note: Costs based on average current costs plus allowance for cost increases to date of construction.

1) Study is underway for all sources of Federal funds for this road, including the Hurricane Evacuation Route already under discussion.

Capital costs for roads are included in this section of the State Plan, since such roads, appropriately, are for public access. However, since the Atchafalaya Basin Floodway System, LA Project considers only land purchases as public access, the costs will be accumulated in the Recreation Section (7.00).

4.90 Operation and Maintenance of Corps' fee-title Public Access Lands

4.91 Cost/share ratio

O&M costs for the 50,000 acres of land to be purchased by the Corps and jointly managed with the State will be shared at a ratio of 75% Corps and 25% State. There is debate concerning whether State lands dedicated to the Atchafalaya Basin Floodway System, Louisiana Project will qualify for the 75%/25% funding. If these two WMAs are determined not be be a part of the ABFS, La. Project, the State is prepared to seek additional Federal authorization from the Congress to include them.

4.92 Projected operation and maintenance costs for all the WMAs (Sherburne, Attakapas, Indian Bayou, and the proposed cypress/tupelo area) and the Atchafalaya National Wildlife Refuge, owned by the U.S. Fish and Wildlife Service and jointly managed with the Louisiana Department of Wildlife and Fisheries, if current plans are executed, are shown on the following tables:

PROJECTED ANNUAL OPERATING COST SHERBURNE WMA

Item	No.	Subtotal	Total	State
Personnel:				
Area Manager	1	54,000		
Area Biologist	1	48,000		
Total		102,000		
Benefits @ 23%		23,460		
Total Personnel & Benefits		125,460		125,460
Indirect Costs (administrative. support, space, utilities, etc. @ 40%)		50,184		
Hired labor - 4820 hrs @ 25.16/hr		121,271		121,271
Total Personnel & Indirect			296,915	
Contractual:				
Building replacement		23,600		
Misc. land maintenance		26,600		
Equipment replacement		9,070		
Total Contractual			59,270	59,270
Expenses:				
Misc. supplies		10,000		
Travel & Per Diem (meetings)		4,000		
Total Expenses			14,000	14,000
Total Operating Cost FY 97/98			370,185	320,001

Annual Operating Cost Atchafalaya National Wildlife Refuge

	Total Cost/ Share	State Budget Increase
Assumed to be the same as Sherburne	370,185	320,001

Operated by DWF for USFWS, a federal agency which owns the land, thus not available for additional federal funding. However, since current operating budget is inadequate, the State's share is included in the State budget.

Projected Annual Operating Costs Attakapas WMA

Item	No.	Subtotal	Total	State
Personnel:				
Manager	1	54,000		
Biologist (1/2 time)	1	24,000		
Total State Service		78,000		78,000
Benefits @ 23%		17,940		17,940
Indirect Costs (administrative. support, space, utilities, etc. @ 40%		38,376		
Hired labor 2834 hrs @ 13.87		39,295		39,295
Total Personnel & Indirect			173,611	135,235
Contractual:				
Land/facility maintenance		33,500		
Equipment replacement		11,000		
Total Contractual			44,500	44,500
Expenses:				
Misc. supplies		5,000		
Travel & per diem (meetings)		3,000		
Total expenses			8 000	8,000
Total Operating Cost FY 97/98			226,111	187,735

Projected Annual Operating Costs Cypress/Tupelo Refuge

	Total Cost/ Share	State Budget Increase
Assumed to be the same as Attakapas WMA	226,111	187,735

Projected Annual Operating Costs Indian Bayou WMA

			Total Cost/ Share	State Budget Increase
Personnel:				
Manager	1	54,000		
Biologist (1/2 time)	1	24,000		
Total State Service		78,000		78,000
Benefits @ 23%		17,940		17,940
Indirect Costs (administrative support, space, utilities, etc.) @ 40%		38,376		
Hired labor 2834 hrs @ 13.87		56,000		56,000
Total personnel & Indirect			190,316	151,940
Contractual:				
Land/facility maintenance		35,000		
Normal road/trail/equipment maintenance 1)		20,000		
Total Contractual			55,000	55,000
Expenses:				
Misc. supplies		10,000		
Travel & per diem (meetings)		5,000		
Total expenses			15,000	15,000
Total Operating Costs FY 97/98			260,316	221,940

1) Initial road construction costs- add-$100, 000/year for 5 years
(Corps' cost - not cost/share)

PROJECTED ANNUAL OPERATING COSTS ALL WMAs

	Total Cost/ Share	State Budget Increase
Sherburne WMA	370,185	320,001
Atchafalaya National Wildlife Refuge		320,001
Attakapas WMA	226,111	187,735
Cypress/Tupelo Refuge/WMA	226,111	187,735
Indian Bayou WMA	260,316	221,940
Total FY 97/98	1,082,723	1,237,412
Add 5% cost increase to beginning date (2 years) Total FY 99/00	1,193,702	1,364,247

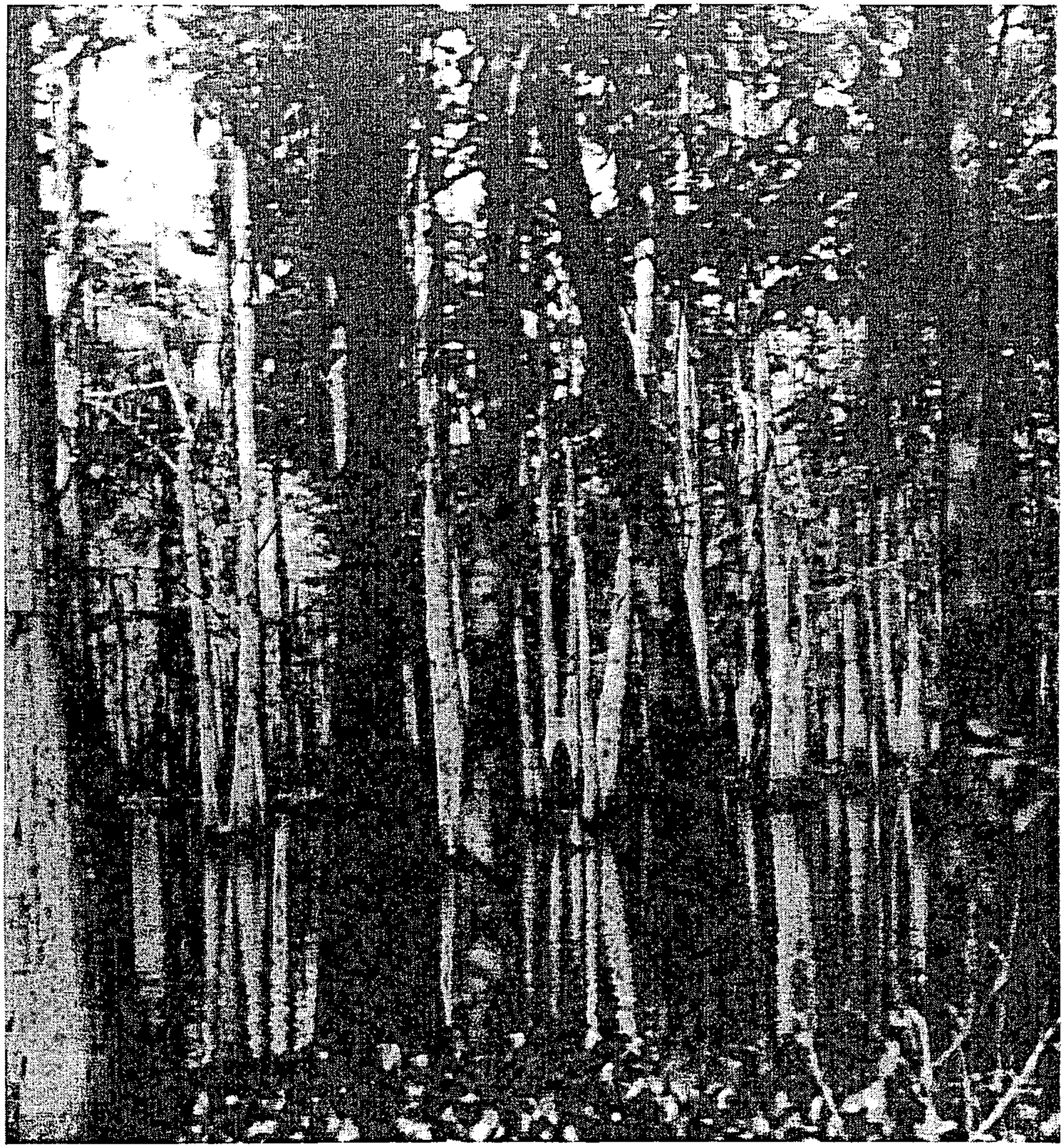
State Budget Increase includes funds for the Atchafalaya National Wildlife Refuge operation which are not available for additional federal funding cost/share.

PROJECTED 15 YEAR TOTAL OPERATING COSTS OF CURRENT AND PROPOSED WILDLIFE MANAGEMENT AREAS AND REFUGES

	Total Cost/ Share	State Budget Increase
DWF Operating Costs FY 99/00	1,193,702	1,364,247
DWF Operating Costs FY 00/01	1,253,387	1,432,459
DWF Operating Costs FY 01/02	1,316,056	1,504,082
DWF Operating Costs FY 02/03	1,381,859	1,579,286
DWF Operating Costs FY 03/04	1,450,952	1,658,250
DWF Operating Costs FY 04/05	1,523,500	1,741,163
DWF Operating Costs FY 05/06	1,599,675	1,828,221
DWF Operating Costs FY 06/07	1,679,659	1,919,632
DWF Operating Costs FY 07/08	1,763,642	2,015,614
DWF Operating Costs FY 08/09	1,851,824	2,116,395
DWF Operating Costs FY 09/10	1,944,415	2,222,215
DWF Operating Costs FY 10/11	2,041,636	2,333,326
DWF Operating Costs FY 11/12	2,143,718	2,449,992
DWF Operating Costs FY 12/13	2,250,904	2,572,492
DWF Operating Costs FY 13/14	2,363,449	2,701,117
Total DWF Operating Costs 15 yrs.	25,758,378	29,438,491

Cost increases calculated @ 5%/year

Note: DWF refers to joint management between the Corps of Engineers and the Louisiana Department of Wildlife and Fisheries.



SECTION 5.00
ENVIRONMENTAL EASEMENTS

5.00 ENVIRONMENTAL EASEMENTS

5.10 Congressional Plan

5.11 Background

U.S. Senate and House of Representatives resolutions (23 March 1972 and 14 June 1972, respectively) stated that the Corps should examine the Atchafalaya Basin project with other State and Federal agencies to develop "....a comprehensive plan for management and preservation of the water and related land resources of the Atchafalaya River Basin, Louisiana."

The results and key details of the recommended plan were facilitated by Governor David C. Treen in 1981 and the following goals were adopted.

5.12 Goals of the Developmental Control and Environmental Protection Easements:

The goal of the Developmental Control portion of the easement is to prevent development within the floodway that would interfere with the continued unrestricted use of the floodway for flood control purposes and help preserve the environmental values of the Basin by preventing destruction of fish and wildlife habitat (e.g. clearing of forests for industrial development and permanently habitable structures).

The goal of the Environmental Protection portion of the easement is preservation of fish and wildlife habitat and maintaining the "wet and wild" environmental appeal of the lower floodway by prohibiting the destruction of habitat through the conversion of land to other uses (e.g. clearing of forests for agricultural development) and providing control over the method of cutting timber by controlling clearcutting and promoting sustained yield forestry practices.

5.20 Environmental Protection and Developmental Control Easements Purchased by the Corps of Engineers

5.21 Purchases to date

The Corps of Engineers has purchased from landowners the right to enforce certain developmental control and environmental protection restrictions governing the use of land on approximately 31,500 acres. This land is located in the Basin between U.S. 190 and I-10 (see Fig. 5.00 A).

5.22 Additional easement purchases

Additional environmental protection and developmental control easement purchases will include all the remaining land in private ownership, except for certain natural ridges which have been developed, totalling approximately 338,000 acres.

In addition, approximately 190,000 acres of State-owned lands, including the Dow donation and Sherburne, are subject to similar restrictions which will be equal to, or stronger than the Corps' restrictions.

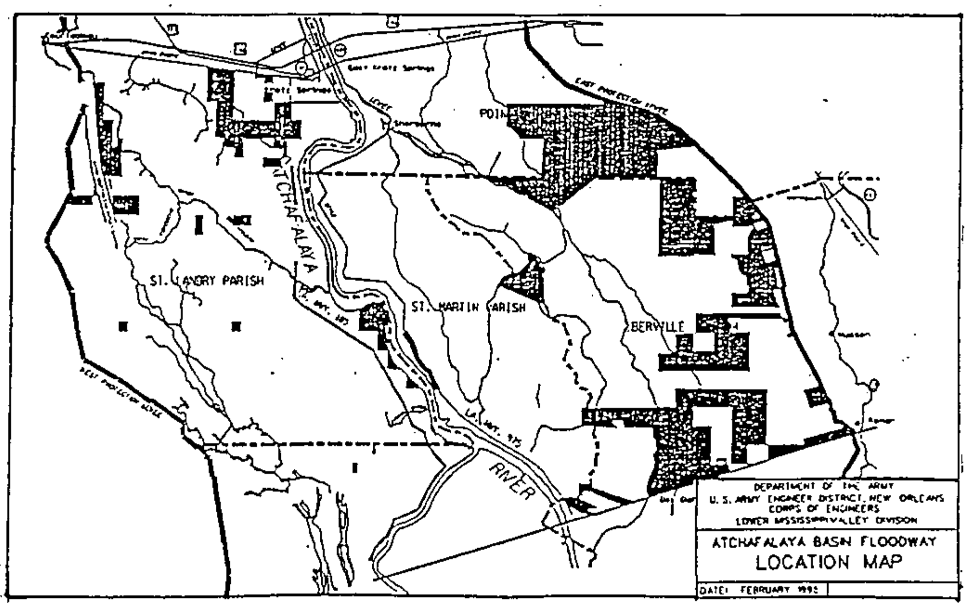


FIGURE 5.00 A: Easement Land Purchases by the Corps of Engineers

5.23 Flowage easements

Flowage easements have been purchased for 9,000 acres of land not subject to frequent overflow with an additional 59,000 acres of flowage easements to be purchased.

5.24 Activities allowed on Corps' Easement Lands

Private ownership without required public access;

Future sale and/or lease of private property subject to easement;

Timber harvesting, except for certain species at particular sizes;

Oil, gas and mineral production and leasing;

Existing camps and/or structures to remain and new ones, if consented by the Corps of Engineers;

Continued use of the property as it currently exists;

Hunting;

Fishing;

Camping;

Other recreational activities, and

Any activity which does not conflict with the terms of the easement/servitude agreement.

5.25 The easement restricts the following:

Construction or placement of new permanently habitable dwellings;

Construction or placement of all other new structures, including camps, unless a consent is granted by the Corps of Engineers; excluding structures used in the exploration, development, and/or production of oil, gas, and other minerals.

Conversion or development of the land from its existing use to another use (e.g. woods to cropland); and

Harvesting certain sizes and species of timber.

5.26 Timber restrictions concerning the harvesting of certain sizes and species of timber include:

Prohibition of removal of any bald cypress greater than 42 inches in diameter at 10 feet above the ground;

Prohibition of removal of oak, ash and sweet pecan less than 20 inches in diameter at 12 inches above the ground, and water tupelo and bald cypress less than 24" in diameter at 2 feet above the ground, unless an average of 40 square feet of basal area per acre in any combination of these species is maintained (see Fig. 5.00 B).

Prohibition of removal of trees less than 16 inches in diameter at 12 inches above the ground within 200 feet from tl woody vegetation along both banks of certain channels; however, at least one clear-cut of 350 feet in width every

The channels referred to above are as follows:

Bayou LaRompe/Tensas Bay/Spice Island Chute;

Lake Long/Bayou L'Embarrass/Lake Long/Grand I

Atchafalaya River Main Channel;

Lower 2/3 of West Access Channel (Little Bayou/Alligator Bayou);

Little Tensas Bayou/Upper Grand River;

Jakes Bayou/Bloody Bayou/Bayou Sorrel;

Little Bayou Pigeon (East of Bayou Pigeon C Bayou Pigeon).

These restrictions were negotiated and agr the early 1990s by landowners, State anc agencies, and major environmental groups.

5.27 Exceptions to timber harvesting restric

A. A procedure has been proposed for the r and granting of exceptions to the timbe ing restrictions. The exceptions as draft be limited to purposes that are in the pul est and also the best interest of forest h sustainability of the Atchafalaya Basin e and include the following:

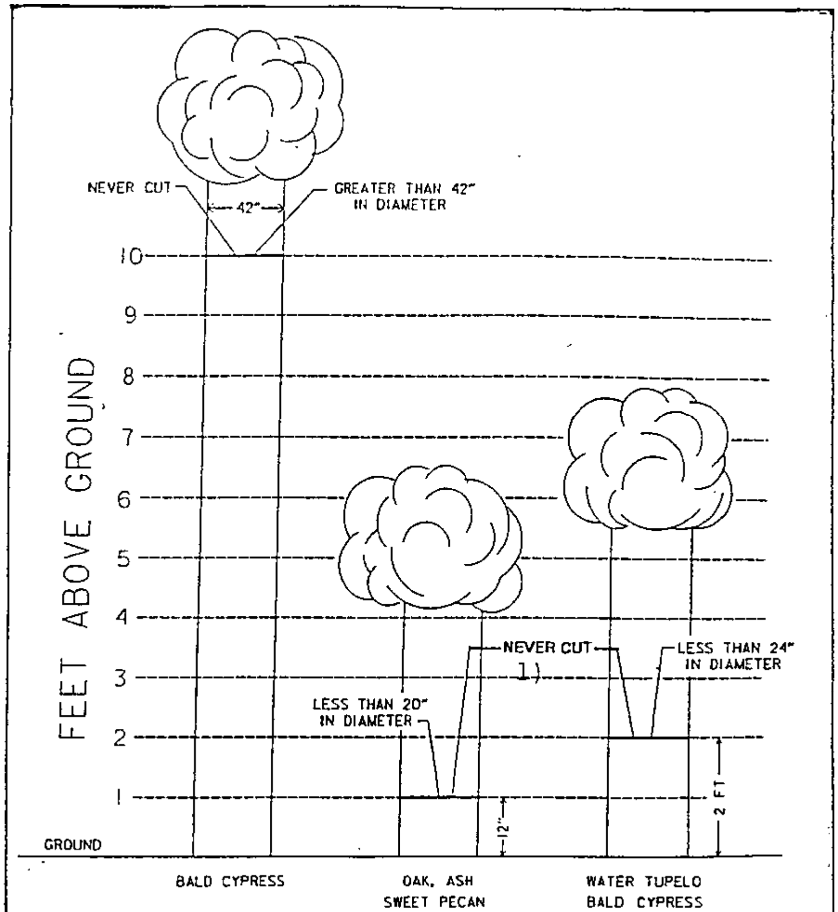
Removal of trees to control the spread of a disease infection upon recommendatio Department of Agriculture and Forestry, th Engineers and the U.S. Fish and Wildlife Se

Salvage removal of trees damaged or destrc ural disaster (fire, wind, hail, ice, animals, i eases, saltwater, extended flooding);

Wildlife habitat improvement requires a n 100 stems per acre in any combination o sweet pecan, bald cypress, or water tupelo, g 3 feet in height to be established on the area by the Department of Agriculture and Fc Corps of Engineers, and the U.S. Fish ar Service.

B. Because the Corps of Engineers, the Wildlife Service and the State all have pu est mandates, all three will have a role mining if specific exception requests s granted.

C. The Environmental Easement Workir will continue working to further defir tions and proposed penalties.



1) Unless 40 sq.ft. of identified species is maintained

FIGURE 5.00 B: Tree Removal Restrictions

The restrictions promote good forestry management practices...
PLUS
Protect the habitat for our feathered friends..

Egrets and Ibis Feeding near Bayou Benoit — Greg Guirard

5.28 Corps of Engineers' Camp Consent Policies and Guidelines for camps in the Atchafalaya Basin on Corps' easement lands:

Existing structures on lands that have no prior Corps' easements will be given a consent:

Movable structures, such as recreational vehicles, will require consents if they remain in one location for more than 14 days in a 30 day period;

Permanent campsite locations where RVs are placed on a regular basis, e.g. campgrounds, will require a consent;

Camps will be located adjacent to existing water bodies;

Camps will be spaced no closer than 5,000 feet apart;

Camp sites are limited to one-half acre in size;

Structures are limited to a combined total of 2,000 square feet. The structure must be movable or raised to a level above the elevation designated by local ordinances;

All structures must comply with other state and federal regulatory programs, such as Corps of Engineers Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act permits. These permits will be issued separately by the responsible agency;

All structures and activities associated with them must comply with the Endangered Species Act guidelines;

Floating structures will be consented in a similar manner to campsites; and

New docks with enclosed sides are prohibited.

5.29 Land Use Conversion Restrictions

Conversion of easement land from its current use to any other use is prohibited unless the conversion returns the land nearer to its natural state.

5.30 Monitoring and Enforce Requirements on Corps Easement

5.31 Monitoring

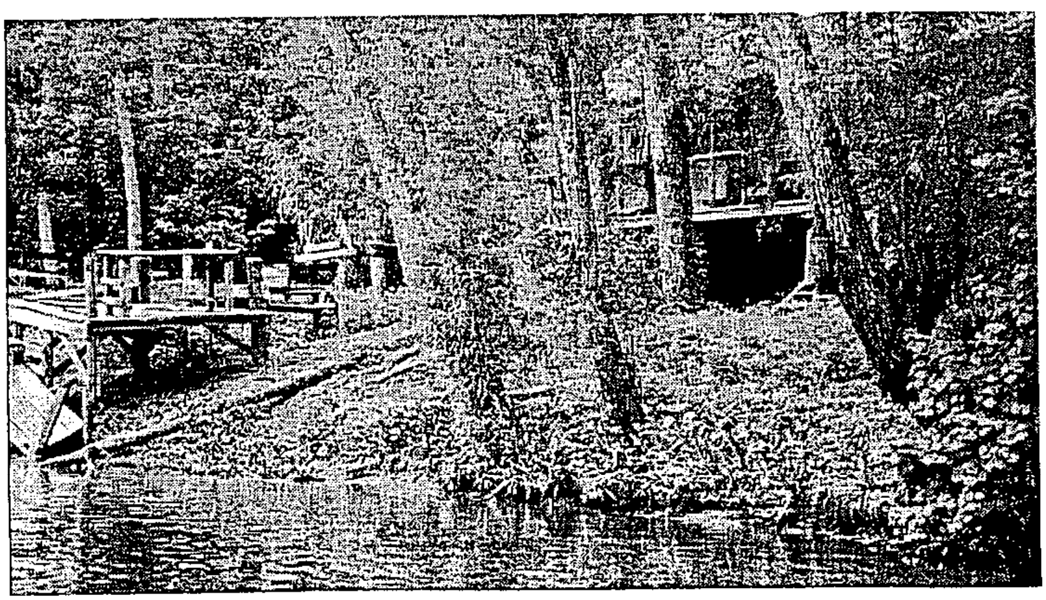
A. State responsibility

The State's responsibility concerning development a ronmental easements is to supply personnel and se monitor compliance with the easements. The State ; the Department of Agriculture and Forestry as the l agency for monitoring easements.

Federal legislation requires that the State provi the cost related to the project's environmental featu could include, but is not limited to, regular insp determine if the easements are in compliance. Cooperative Agreement will be developed to provi cost/share mechanism.

B. The State (DAF) proposes to assume the f tasks:

1. Aerial and/or ground inspection of all easement a Basin at least twice a year;
2. Required administrative and support services inspections;
3. Participation in monthly one-day meetings with C resentative(s) to discuss violations or requested e and to make field trips if necessary to resolve determine extent of violations, or justification tions;
4. Minimum quarterly reports of areas inspected tions noted. Violations will be immediately rep reports shall include:
   Camera shots of violations
   Location (GPS)
   Description of violation
   Date and time of observation



C. Federal responsibility

It is recommended that the following tasks be assumed by the Corps of Engineers:

1. Aerial and/or ground inspections at least twice a year;
2. Inspections to determine if the new structures regulations have been violated;
3. Furnish location and facilities required for monthly meetings;
4. Determine ownership of areas where violations occurred or exemption is requested;
5. Conduct all contacts with owners concerning violations or exemptions and maintain all records concerning all contacts and resolution of violations or exemptions.

5.32 Enforcement

A. Federal responsibility

Since federal easements are involved, all enforcement actions are the responsibility of the Corps of Engineers acting, if legal means are necessary, through the U.S. Justice Department.

B. State Responsibility

The State's responsibility is limited to:

1. Assisting in determining the extent of the violation;
2. Serving as a witness at hearings;
3. Participation in pre-trial conferences.

5.33 Suggested penalties

For timber easement violations, a reparation policy is recommended such as requiring the planting of site-suited native bottomland hardwood seedlings having a minimum 50% hard-mast producing species, and with the remaining percentage containing a diverse assemblage of native species, requiring any future timber harvests to be in compliance with the easement regulations unless an exemption is granted.

5.40 State Lands Dedicated to the Project

All state-owned properties in the Basin are dedicated to the Atchafalaya Basin Floodway System, Louisiana Project. This dedication does not involve transfer of ownership.

5.41 Lands involved

Non-severed – 450 acres (approx.)

Dried lakebeds, navigable waterways – 150,000 acres (approx.)

Dow Donation – 45,000 acres (not all in Basin)

See Fig. 5.00 C for location of these lands

5.42 Activities on State-owned lands

A. Timber harvesting

Timber harvesting guidelines on state-owned lands (Louisiana R.S. 41:1001-1009) include:

1. Any person who desires to purchase any timber located on property under the jurisdiction of the Division of State Lands, shall file an application to purchase, giving the exact location, section, township and range and the types of timber he desires to purchase. The applicant shall deposit the sum of one hundred dollars as evidence of good faith.
2. On receipt of an application to have timber offered for sale, the Assistant Secretary of the Office of Forestry shall evaluate the current market value and quantity that could be harvested based on sound forestry practices.
3. An advertisement shall be published in the official journal of the parish wherein the land is located setting forth the description of the land on which the timber to be sold is located, the type and quantity of timber, and the time and place, and terms of the sale.
4. The timber so advertised shall be sold to the highest bidder by the sheriff of the parish wherein the timber is located, at the time mentioned in the advertisement for the consideration of bids.
5. The adjudicatee of the timber sold shall have the right of ingress and egress at any time for the purpose of removing the timber from the land; provided that the time stipulated to cut and remove the timber shall be fixed in the advertisement and in the act of sale, as well as the type and size of trees to be cut.
6. Should the State advertise and sell timber on State lands, the title to which is in dispute, a provision may be made that the consideration to be paid the state by the adjudicatee of the timber sold shall be deposited in escrow to be held pending the final determination of the validity of the title to the land or until the State and the grantee otherwise agree the payment should be made or released as provided for in the agreement.
7. Notwithstanding any other provision of law, the cutting or sale, or both, of standing cypress timber located on any water bottom owned by the State of Louisiana is hereby prohibited except in the exercise of rights under a state lease, right-of-way or permit.

B. Camp lease current policies and guidelines on State owned lands in the Atchafalaya Basin:

1. Camps will be located adjacent to existing water bodies;
2. Camps will be located only in the 40 designated sub-divided areas managed by the State Land Office;
3. Camp sites are allowed up to a maximum of two acres;
4. Structures are limited to a combined total of 2,000 square feet. The structure must be movable or raised to a level above the elevation designated by local ordinances;

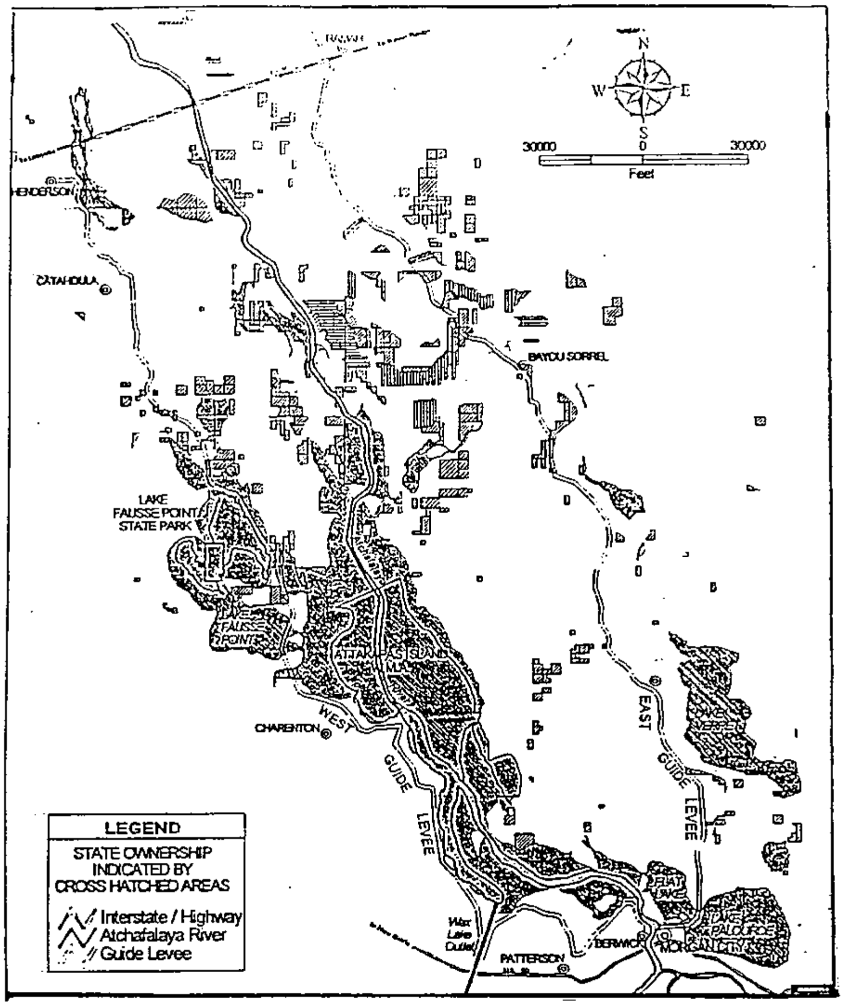


FIGURE 5.00 C:
State Land Office Monitoring Lands and
State Lands Dedicated to the Project

5. All structures and their associated utilities must comply with local, state and federal regulations;

6. All structures must comply with other state and federal regulatory programs such as Corps of Engineers Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act permits. These permits will be issued separately by the responsible agency;

7. All structures and activities associated with them must comply with the Endangered Species Act guidelines;

8. New docks with enclosed sides are prohibited.

5.43 Monitoring and Enforcement on State-owned Lands

It is recommended that the State Land Office and the Department of Wildlife and Fisheries (for State-owned Wildlife Management Areas) assume the following tasks:

A. Inspection of all State lands in the Basin at least twice a year;

B. Required administrative and support services for those inspections;

C. Violations immediately reported and reports include:
   Camera shots of violations
   Location (GPS)
   Description of violation
   Date and time of observation

D. Enforcement methods are recommended to include fines, increased lease costs and/or reparation if necessary. As a part of the legislative package to be prepared as a result of this master plan, rules and regulations including proposed penalties and fines will be developed and presented to the Louisiana Legislature for approval.

5.50 Capital Cost Estimates

The State has no responsibility for any of the capital costs incurred in securing the easements or otherwise setting up this program. The State does agree to establish rules and regulations on State lands that are equal to, or greater than, the Corps' easements.

5.60 Maintenance and Operating Costs

5.61 Maintenance costs

Maintenance is considered part of Operating Costs (O&M).

5.62 Operating costs (O&M)

Operating costs are divided 75% Federal and 25% State. Procedures for achieving these percentages will be outlined in a Project Cooperative Agreement.

A. Monitoring tree harvesting easement regulations by the Louisiana Department of Agriculture and Forestry

1. Projected Start-Up Costs (replacement every 5 years)

Item	No.	Unit	Amount
Geographic Positioning System units:			
Aircraft type	1		2,800
Hand held type	2	1,100	2,200
Computers, lap top	2	2,500	5,000
2-way radios			
Truck mount	2	500	1,000
Hand held	2	500	1,000
Boat, motor, trailer			15,000
Trucks, 4-wheel drive	2	20,00	40,000
Total equipment costs FY 97/98			67,000
Costs projected (@ 3%/yr) to start FY 99/00			71,080
Replacement costs FY 03/04			80,000
Replacement Costs FY 08/09			92,742
Total equipment costs 15 years			243,822

2. Projected annual operating costs (DAF)

	No.	Unit	Subtotal	Total	State Budget Increase
Personnel:					
Foresters	2	35,800	71,600		71,600
Technician(PT)	2	12,800	25,600		25,600
Secretary (PT	1		13,600		13,600
Total personnel			110,800		-
Benefits @ 23%			25,484		25,484
Total Personnel & Benefits				136,284	136,284
Indirect-costs (space, equipment, utilities, etc.) @ 40%			54,514	54,514	
Contractual:					
Aerial Detection 200 hrs @ 120				24,000	24,000
Supplies:					
Office expense			7,000		
Oil, gas, etc.			3,000		
Vehicle & Equipment repair and maintenance supplies			5,000		
Mensuration tools & supplies			1,000		
Total supplies				16,000	16,000
Total operating costs		FY 97/98		230,798	176,284
Total projected to start in*			FY 99/00	325,535	265,433
DAF Operating Costs			FY 00/01	267,178	204,071
DAF Operating Costs			FY 01/02	280,537	214,275
DAF Operating Costs			FY 02/03	294,564	224,989
DAF Operating Costs**			FY 03/04	389,292	316,238
DAF Operating Costs			FY 04/05	324,757	248,050
DAF Operating Costs			FY 05/06	340,995	260,453
DAF Operating Costs			FY 06/07	358,045	273,476
DAF Operating Costs			FY 07/08	375,947	287,150
DAF Operating Costs***			FY 08/09	487,486	394,250
DAF Operating Costs			FY 09/10	414,481	316,583
DAF Operating Costs			FY 10/11	435,205	332,412
DAF Operating Costs			FY 11/12	456,965	349,033
DAF Operating Costs			FY 12/13	479,813	366,485
DAF Operating Costs			FY 13/14	503,804	384,809
Total DAF costs 15 yrs.				5,734,604	4,437,707

* includes 67,000 start-up equipment costs
** includes 80,000 equipment replacement
***includes 92,742 equipment replacement

Cost increases calculated at 5%/year

B. Projected Costs of Monitoring Easement Regulations on State Land by the State Land Office:

1. Initial Start-Up Costs - Replacement Every 5 Years

Item	NO.	Unit	Amount
Air Boat	1		23,000
4-Wheeler	1		5,000
GPS Unit (portable)	1		11,000
4-Wheel Drive Vehicle	1		30,000
Total equipment costs FY 97/98			69,000
Costs projected (@ 3%/yr) to start FY 99/00			73,202
Replacement costs FY 03/04			82,390
Replacement Costs FY 08/09			95,513
Total equipment costs 15 years			251,105

Costs for State Land Office are based on current personnel and benefits costs, plus cost increases of 5%/yr. to starting date FY 99/00.

Equipment cost increases are calculated at 3%/yr.

2. Annual Operating Costs (State Land Office)

	No.	Unit	Subtotal	Total	State Budget Increase
Personnel:					
Field Officer (GS17)	1		41,000		41,000
Field Inspector (GS17)	1		25,000		25,000
Total personnel			66,000		
Benefits @ 23%			15,180		15,180
Total Personnel & Benefits				81,180	81,180
Indirect Costs (space, equipment, utilities, etc. @ 40%)				20,272	
Expenses:					
Maintenance/fuel - vehicle			8,600		
Maintenance/fuel - air boat			2,250		
Travel and per-diem			16,000		
Total expenses				26,850	26,850
SLO Operating Costs			FY 97/98	128,302	108,030
Total to start operation in *			FY 99/00	214,655	192,306
SLO Operating Costs			FY 00/01	148,526	125,059
SLO Operating Costs			FY 01/02	155,952	131,312
SLO Operating Costs			FY 02/03	163,750	137,878
SLO Operating Costs**			FY 03/04	254,328	227,162
SLO Operating Costs			FY 04/05	180,535	152,011
SLO Operating Costs			FY 05/06	189,562	159,612
SLO Operating Costs			FY 06/07	199,040	167,593
SLO Operating Costs			FY 07/08	208,992	175,973
SLO Operating Costs ***			FY 08/09	314,955	280,285
SLO Operating Costs			FY 09/10	230,414	194,011
SLO Operating Costs			FY 10/11	241,935	203,712
SLO operating Costs			FY 11/12	254,032	213,898
SLO Operating Costs			FY 12/13	266,734	224,593
SLO Operating Costs			FY 13/14	280,071	235,823
Total SLO Operating Costs for 15 yrs.				3,303,481	2,821,228

* includes 73,202 start-up equipment costs

** includes 82,390 equipment replacement costs

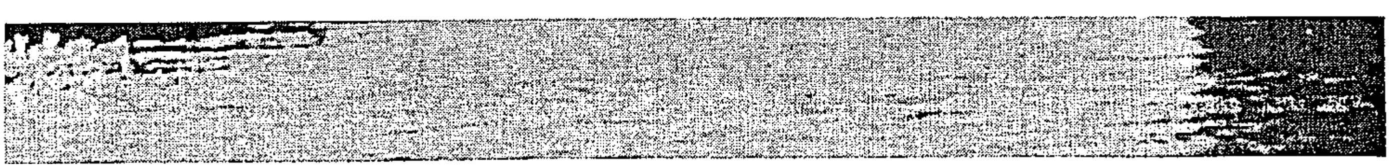
*** includes 95,513 equipment replacement costs

3. Projected Total Monitoring of Easement Regulations for 15 Years

Item	Cost/Share	State Budget Increase
Department of Agriculture and Forestry	5,734,604	4,437,707
State Land Office	3,303,481	2,821,228
Total	9,038,085	7,258,935

The State Land Office has excess self-generated funds which could be utilized for this project, if authority to spend these funds is granted.

SECTION 6.00
WATER MANAGEMENT



6.00 WATER MANAGEMENT PROJECTS

6.10 Introduction

6.11 Background

Water management of the Atchafalaya Basin began in the mid 1800s with the removal of a log jam at the head of the Atchafalaya River, and accelerated after the 1927 flood with numerous COE dredging and levee projects designed to improve flood control and navigation.

These projects served their purpose but produced a side-effect - an expedited change in the environmental character of the Basin.

This change in character was further hastened by numerous activities, including petroleum exploration and pipeline and other canals which altered the flow of water to areas in the Basin, thus interfering with the watering and dewatering cycle This alteration in water flow is illustrated in Fig. 6.00 A.

The U.S. Senate and House of Representatives resolutions (23 March 1972 and 14 June 1972, respectively) stated that the Corps should examine the Atchafalaya Basin project with other State and Federal agencies to develop: "....a comprehensive plan for management and preservation of the water and related land resources of the Atchafalaya Basin, Louisiana, which would include provisions for reductions of siltation, improvement of water quality, and possible improvements of the area for commercial and sport fishing".

6.12 Stated Goal

The State's principal interest is to restore, where possible, and to preserve, where feasible, the natural habitat that has made the Atchafalaya Basin a national treasure, a part of Louisiana's culture, and an educational, economic and recreational asset for the public.

Therefore, the goal of the management units is to prolong the expected life of some habitats that may become scarce through time (primarily aquatic and cypress/tupelo habitats) by managing sediments, while at the same time achieving a healthy water circulation pattern that will maintain or restore water quality. Sediment-laden water would be directed to areas that would naturally be undergoing accretion (e.g. natural levees, overbank areas) or to maintained areas designed to trap sediments, thus prolonging the existence of swamp and aquatic habitats.

Since other Federal and Federal/State programs impact, or are impacted by, the Atchafalaya Project, careful coordination with these programs will be required to achieve optimum results in the public interest.

6.20 Selection of Water Management Projects

6.21 Background

Many environmental and conservation groups were organized to call attention to siltation and water circulation issues. Ben Skerrett became one of the leading spokespersons advocating a re-evaluation of projects in the Basin that affected natural water flow.

The Water Resources Development Act of 1986 (P.L. 99-662) recognized the importance of environmental enhancement in the Basin and authorized the construction of two pilot water management units with implementation of future units to be at the discretion of the Chief of Engineers, after evaluation of the operational success of the pilot units. The Corps is advocating the use of adaptive management principles in the implementation of the management units meaning that certain actions will be taken and then evaluated. Future recommendations may be changed based on these evaluations

The Natural Habitat *Charles Fryling*

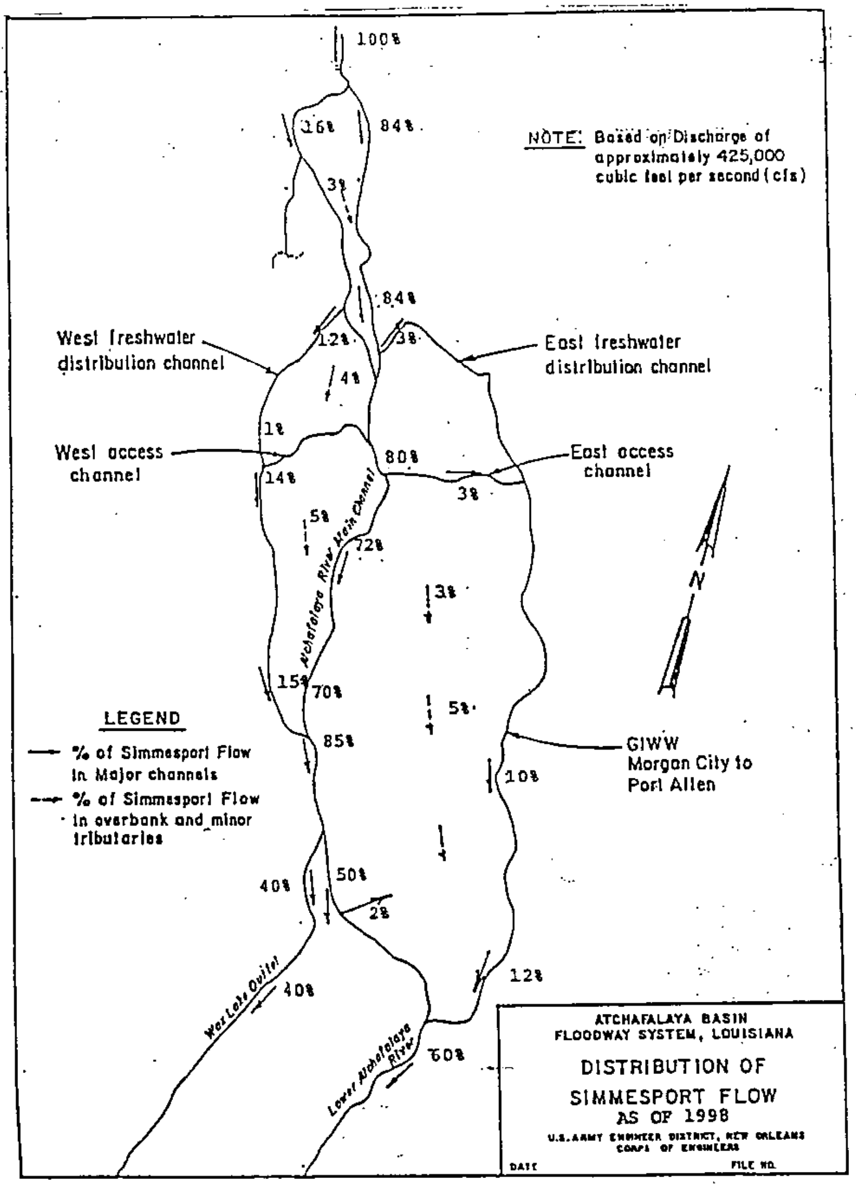


FIGURE 6.00-A: The Corps' Water Distribution Plan

and possibly some actions may be reversed or altered.

Future management units will be individually evaluated to determine their potential effectiveness for retaining or restoring desirable environmental values. Some improvements may be achieved by selective closing of canals that allow sediment-laden waters to reach backswamp areas, and by selective opening of dredged material banks or natural levees to improve water flow patterns.

6.22 Initial Selections

A. The Corps of Engineers, in part of the Environmental Impact Statement (1982) noted the necessity to restore some water flow into areas isolated from the river by levees, and recommended that structures should divert water from the river into both Henderson Lake and Alabama Bayou.

Currently design of those projects has not been completed. The Alabama Bayou (also known as Sherburne) structure work is being pursued.

B. The Impact Statement also delineated 13 proposed water management units (see Fig. 6.00 B). Later Corps studies indicated that 5 of those units "have the best potential for implementation". These units are:

- Buffalo Cove
- Henderson Lake
- East Grand Lake
- Beau Bayou
- Cocodrie Swamp

These 13 water management units were proposed in the first feasibility study of the Atchafalaya Basin completed in 1982.

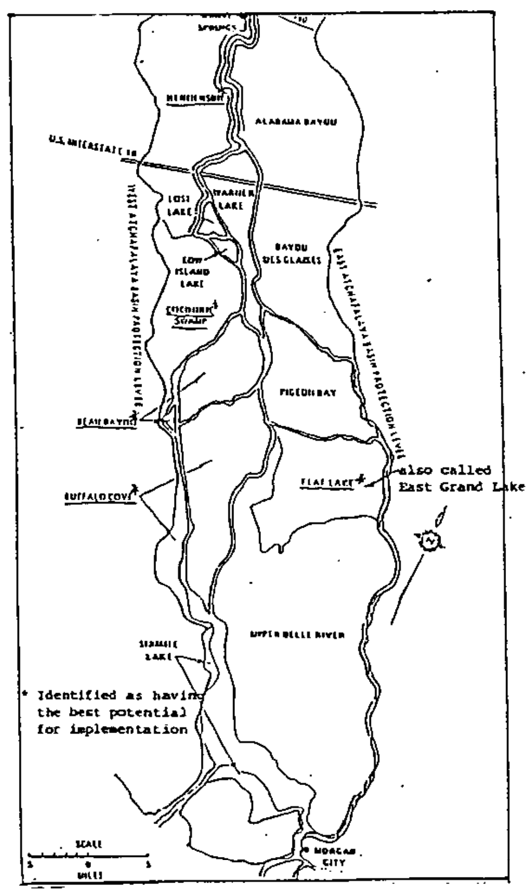


FIGURE 6.00 B: Proposed Water Management Units

Buffalo Cove is primarily located on State lands which were dedicated to this and other project purposes. Other State lands required for other water management projects are similarly dedicated; however, the Corps will purchase appropriate rights from landowners if the project is located, or affects, private lands.

C. In the funding bill, the Corps was authorized to work on two pilot water management projects:
Buffalo Cove
Henderson Lake

Subsequent input from local groups convinced the Corps to accelerate the Buffalo Cove unit as a pilot unit to be implemented and work is underway at this time to complete surveys and studies. Construction of this project, pending funding, can then proceed. See Fig. 6.00 C

6.23 Water Management Working Group Recommendations

A. The Group recommends that the proposed draft rating factors be utilized to determine if the five other units selected still have the best potential for implementation. See Appendix E.

B. The Group recommends that the second water management unit to be implemented (concurrent with Buffalo Cove) should be:

Flat Lake Management Unit (currently referred to as the East Grand Lake study area which is the Flat

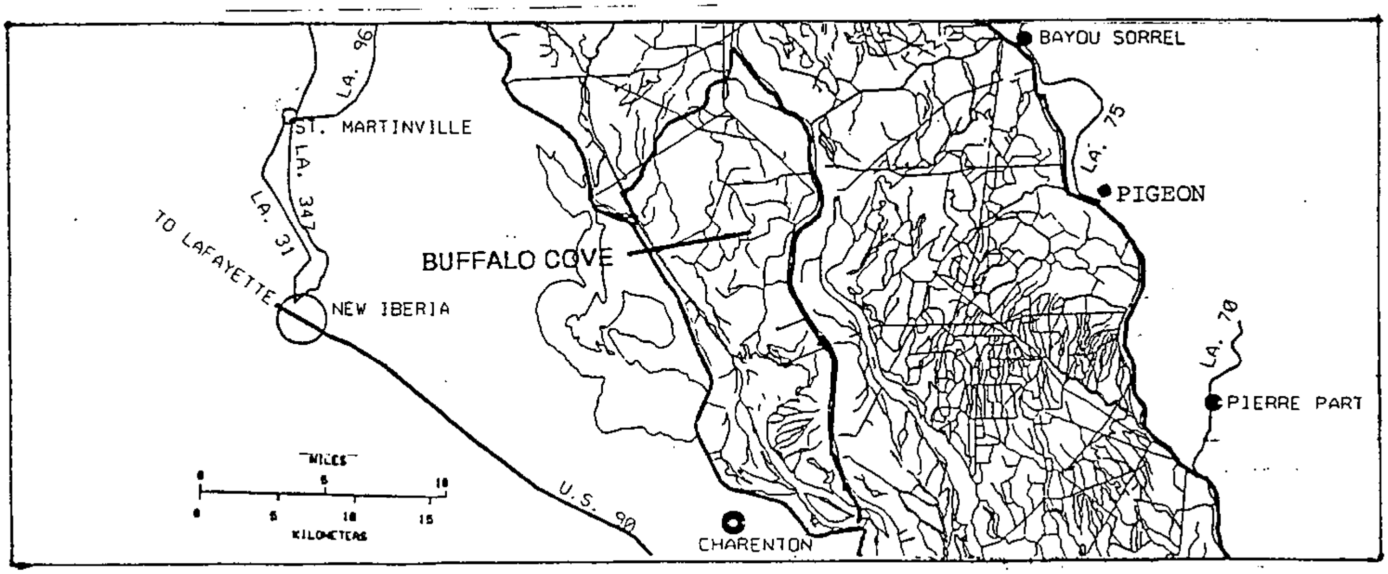


FIGURE 6.00 C: *Buffalo Cove*

Lake unit expanded to include the area within the Upper Belle River unit).

C. The Group also recommends that the completion of the Alabama Bayou (Sherburne) project be accelerated and that planning for the Bayou Courtableu (Henderson Lake) project commence under separate authorities.

D. The group recommends that Cow Island and Lake Warner Units receive a Corps review.

The Corps has emphasized that the success of future water management units, to a great extent, is dependent on the success of the pilot water management unit projects.

6.24 Recommendations for Buffalo Cove Water Management Unit

A. A study is underway within the Corps of Engineers regarding the Buffalo Cove water management unit.

In the interim, some steps can be taken to begin providing benefits before the project is completed. It is recommended that the following actions be taken as soon as possible and be coordinated with public input:

Actions should include gapping spoil banks in the northern and middle portion of the management unit, repairing weirs that are allowing sediments into interior swamps, and removing sediments and debris from waterways or gaps in spoil banks.

Examples:

a. Open one of the closures along the river to provide water flow into Mile Point Chute when river stage is approximately 13 feet elevation on the Butte LaRose gauge. See Fig. 6.00 D for location.

b. Excavate/maintain gaps in the banks of the Phillips Canal (west of the weir and east of Si Bon Canal) and in the oil field canals south of there. Repair Phillips Canal and Crook Chene Cove weirs.

c. Excavate gaps in the Florida Gas Canal on the eastern side of the Buffalo Cove unit.

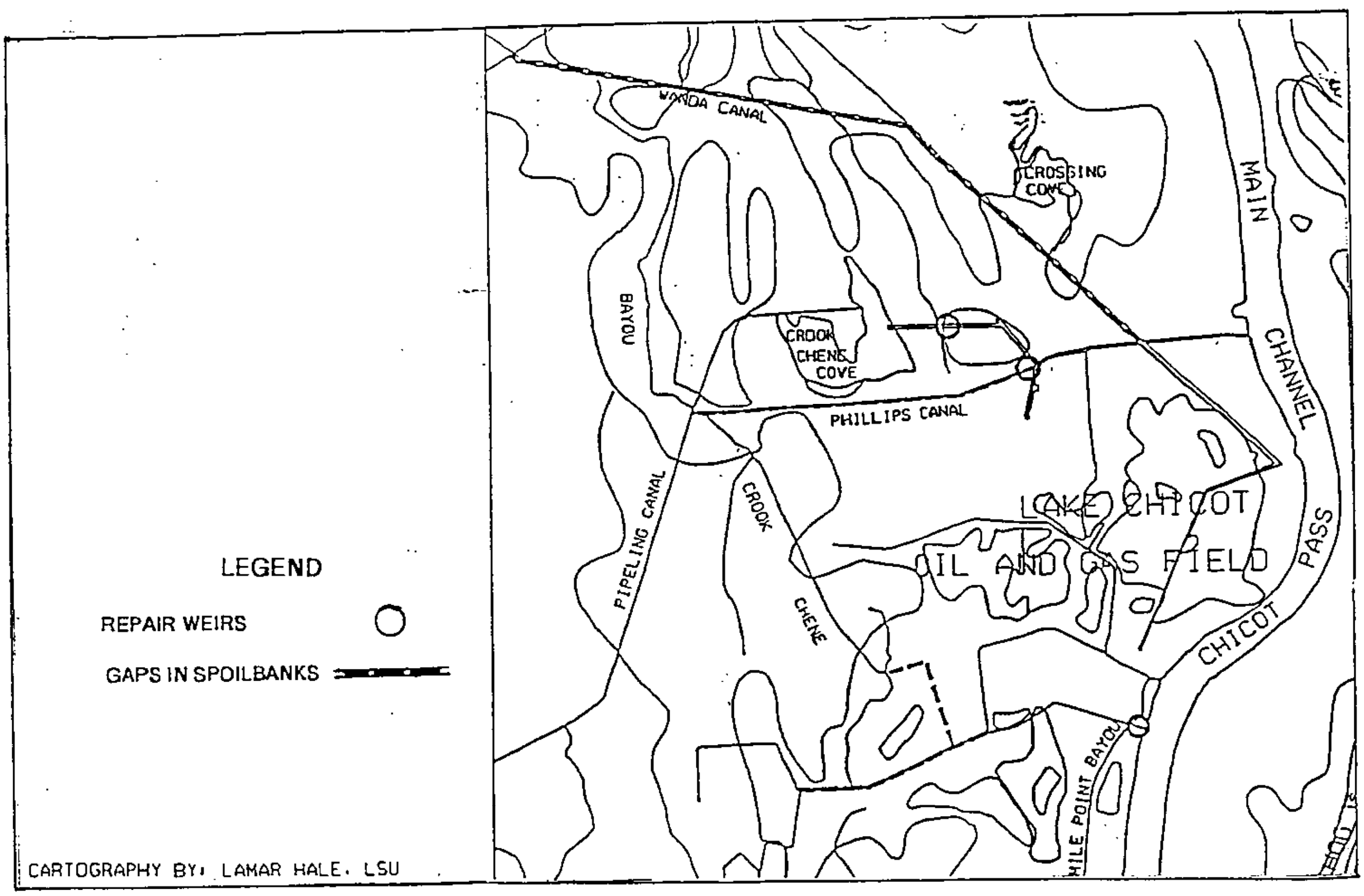


FIGURE 6.00 D: Weirs and Gaps for Buffalo Cove

6.25 Recommendations for East Side Water Flow Problems

Members of the Water Management Working Group investigated the Upper Belle River area and found similar water flow problems. An example of one solution is illustrated on Fig. 6.00 E. Productive meetings with pipeline owners are ongoing to secure support for spoil bank cuts and gaps. Landowner support will be sought also.

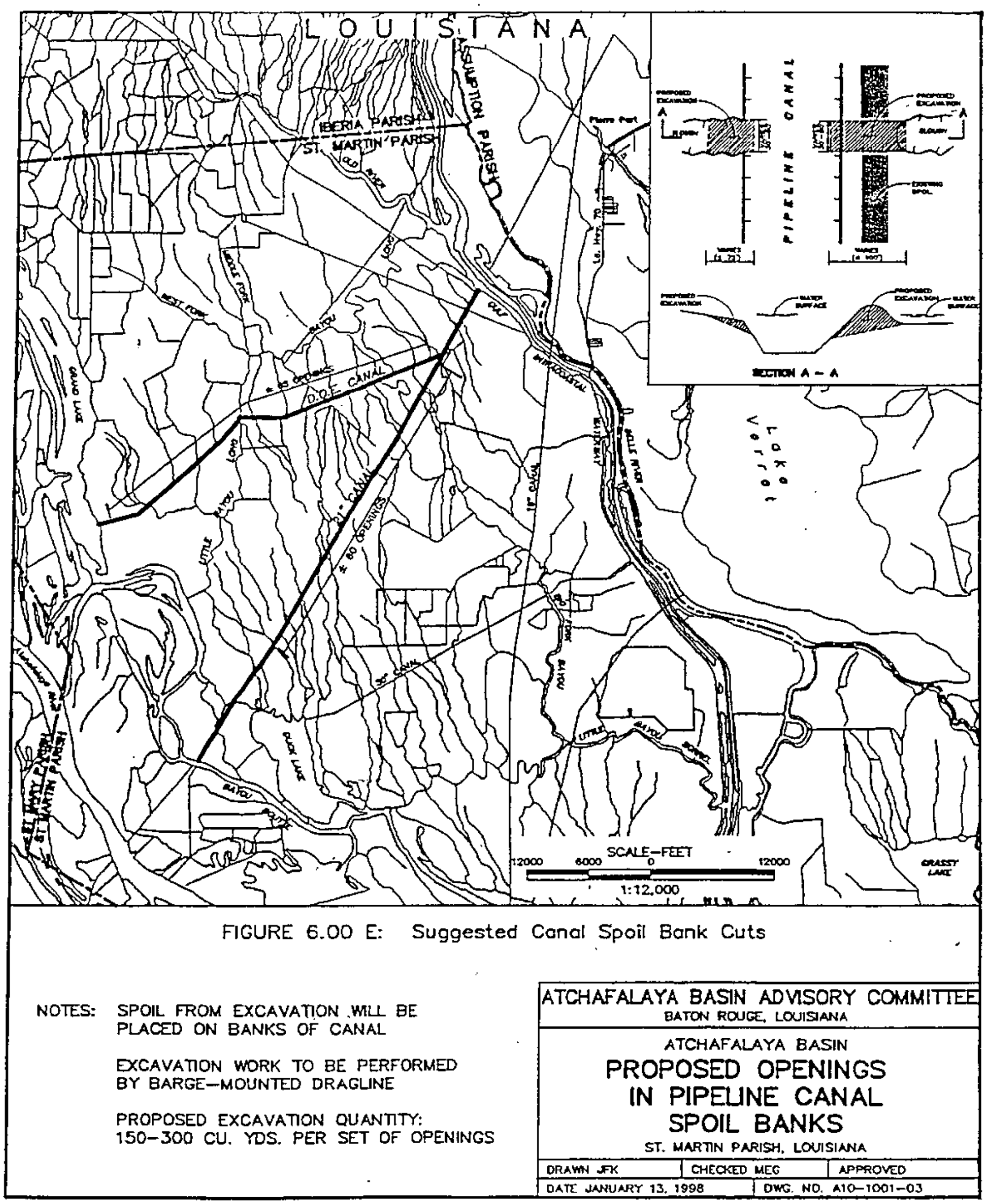


FIGURE 6.00 E: Suggested Canal Spoil Bank Cuts

6.30 State Responsibilities

The Water Resources Development Act of 1986 (P.L. 99-662) authorized the federal government to pay 100% of the first cost of environmental enhancement features, since the benefits were national in scope. The Act also authorized the federal government to pay 75% of the operation and maintenance cost of these features.

6.31 State Responsibility for Design of units:

The State will provide technical and engineering advice on the design and construction (if necessary) of water management units and will provide a letter of intent to the Corps indicating the State's commitment to a cost/share agreement. See Appendix F.

6.32 State Responsibility for Operation and Maintenance

The State will provide the following:

A. Monitoring of conditions by the Department of Wildlife and Fisheries to determine effectiveness of the project, including:

Sampling of water quality and food-web organisms; fish sampling

See Section 6.51 for complete program

B. Monitoring of conditions by the Department of Agriculture and Forestry to determine effectiveness of project, including:

Tree and vegetation condition

C. The Department of Natural Resources will work with the oil and gas industry to accomplish the following:

Encourage selective cutting of gaps in spoil banks of canals and restoration of the canals' cross sectional areas in instances where sediment has restricted the canals' ability to transport water to the interior of the Basin. It is recommended that the Department of Natural Resources set up a section, with equipment and staff, to provide this service and that an oversight committee, composed of Corps, USFWS, DWF, DAF, and oil and pipeline representatives, be formed to advise DNR in this operation.

Research the possibility of establishing a mitigation bank so that cooperating oil and gas companies may earn credit against some future projects.

D. The adjustment of responsibilities and funds transfer procedures will be worked out in a General Agreement to be negotiated with the Corps in mid-1998.

E. Some of the units could be pursued under different authorities, such as the Water Resources Development Act, Section 1135 or Section 206 authority, and if so, the ratio of costs may be different (up to 35% State).

6.40 Capital Cost Estimates

All capital costs are the responsibility of the Corps of Engineers.

6.50 Operation, Maintenance, and Rehabilitation Cost Estimates

6.51 Program Management

Three state agencies will be involved and will manage their own activities under the overall general oversight, coordination, and administration of the Project Manager.

Project Manager costs are listed in Section 8.00.

6.52 Department of Wildlife and Fisheries (DWF)

A. Sampling of Water Quality and Food-Web Organisms

This work will be conducted by Louisiana State University Agricultural Center (LSU) under contract with DWF.

LSU Ag. Center (Louisiana Cooperative Fish and Wildlife Research Unit and Louisiana State University) was selected because, during the last 25 years, more than 80 scientist-years of aquatic research effort have been invested in the Atchafalaya Basin. The most recent work, for the Federal Emergency Management Agency, has involved an investigation of possible ways to diminish fish kills that result from hurricanes. That work led to the development, by the LSU Ag. Center and the Department of Wildlife and Fisheries of a water quality and fisheries monitoring plan. That plan will be used in this Project.

Purpose:
Water quality monitoring to determine impact of water management projects on the water environment.

Number monitoring sites:
20-50 depending upon size of water management units.

Sampling frequency: (keyed to flood pulse)
2/month (spring through early fall)
1/month (winter)
daily (at locations during flooding to monitor impact of construction activities)

Analysis (for all sites):
temperature, specific conductance, pH, dissolved oxygen, oxidation-reduction potential, flow velocity, and light attenuation (all using in situ sampling equipment), and water levels (reading Corps' monitors), accretion and depth data;

Analysis for selected sites: (relative to flow patterns)
essential nutrients, minerals, determination of phytoplankton, zooplankton, vegetable dwelling invertebrate densities.

1. Equipment start-up costs

Item	No.	Unit	Amount
Equipment (laboratory & field upgrades, shockboats, computers, in situ water monitors)			
Buffalo Cove Project			25,000
Replacement FY 03/04			29,852
Replacement FY 08/09			34,607
East Grand Lake Project			125,000
Replacement FY 03/04			149,257
Replacement FY 08'09			173,030
Total for 2 projects 15 years			536,746

Operations estimated costs (two management units)
(water quality - LSU)

Buffalo Cove	311,760	234,400
East Grand Lake	380,416	283,440
Total FY 97/98	692,176	517,840
Total FY 99/00	763,124	570,919

Cost increases are calculated at 5%/year.

Equipment costs increases are calculated at 3% yr.

2. Annual Operating Costs (LSU under contract to DWF) for two management units simultaneously

	No.	Unit	Subtotal	Total Costs/ Share	State Budget Increase
Personnel:					
Buffalo Cove:					
Personnel					
Research Associate	2	40,000	80,000		
Benefits @ 23%			18,400		
Total			98,400		
Secretary (PT)			10,000		
Research Asst.	5	15,000	75,000		
Technicians (PT)	5	2,000	10,000		
Total Personnel				193,400	193,400
Indirect Costs @ 40%				77,360	77,360
LSU Ag Center waiver					-77,360
Expenses.					
Travel & per diem		6,000			
Supplies/Services	---	35,000			
Total Expenses				41,000	41,000
Total Buffalo Cove				311,760	234,400
East Grand Lake:					
Personnel:					
Research Associate	3	40,000	120,000		
Secretary (PT)			8,000		
Total			128,000		
Benefits @ 23%			29,440		
Research Assistant	5	15,000	75,000		
Technicians	5	2,000	10,000		
Total Personnel & Benefits				242,440	242,440
Indirect Costs @ 40%				96,976	96,976
LSU Ag. Center waiver					-96,976
Expenses:					
Travel & per diem			6,000		
Supplies/Services			35,000		
Total Expenses				41,000	41,000
Total East Grand Lake				380,416	283,440

LSU AG. CENTER PROJECTED 15 YEAR OPERATING COSTS OF WATER QUALITY MONITORING
(for Buffalo Cove and East Grand Lake - or their equivalent)

	Total Costs/ Share	State Budget Increase
LSU Operating Costs FY 99/00*	913,124	720,919
LSU Operating Costs FY 00/01	801,280	599,465
LSU Operating Costs FY 01/02	841,344	629,438
LSU Operating Costs FY 02/03	883,411	660,910
LSU Operating Costs FY 03/04**	1,106,691	873,065
LSU Operating Costs FY 04/05	973,961	728,654
LSU Operating Costs FY 05/06	1,022,659	765,087
LSU Operating Costs FY 06/07	1,073,792	803,341
LSU Operating Costs FY 07/08	1,127,482	843,508
LSU Operating Costs FY 08/09***	1,394,493	1,096,320
LSU Operating Costs FY 09/10	1,243,049	929,967
LSU Operating Costs FY 10/11	1,305,201	976,465
LSU Operating Costs FY 11/12	1,370,461	1,025,288
LSU Operating Costs FY 12/13	1,438,984	1,076,552
LSU Operating Costs FY 13/14	1,510,933	1,130,380
Total Operating Costs 15 Yrs.	17,006,865	12,859,359

*includes 150,000 equipment purchases
**includes 179,109 equipment replacement
***includes 210,637 eouipment replacement
Cost increases calculated @ 5%/year for operation.

B. Fish Sampling

This work will be conducted by the Department of Wildlife and Fisheries (DWF).

Purpose:

To determine the effects of the water management projects by monitoring changes in adult fish and crawfish distribution and abundance.

Number sampling sites:

8-15 depending upon size of water management project.

Sampling frequency:

Weekly or bi-weekly depending upon river stages, season, and changing water conditions

Monthly sampling of fish (experimental gill nets and electrofishing) and crawfish (traps).

Analysis:

Temperature, specific conductance, pH, and dissolved oxygen (using *in situ* water quality monitor).

Monitor biotic assemblages and abiotic habitat characteristics to determine whether hypoxic regions in the Management Units have been reduced in volume, either vertically and/or horizontally, due to construction and water management activities.

Increased diversity and abundance of resident fishes and invertebrates will indicate that the project has improved water quality.

Operations estimated costs (two management units)

1. Initial start-up costs (equipment replacement every five years)

Fish Sampling-DWF

Item	NO.	Unit	Amount
Equipment:			
Shockboat	2	30,000	60,000
Netting boat	2	15,000	30,000
Water Quality Units	2	6,000	12,000
Truck	2	16,000	32,000
Boat shed	1		40,000
Computer	2	3,000	6,000
Total Buffalo Cove and East Grand Lake or equivalent units (FY 97/98 costs)			180,000
FY 99/00 increase @3%/yr (purchase)			190,962
Replacement FY 03/04			214,930
Replacement FY 08/09			249,163
Total for two projects for 15 yrs.			655,055

Equipment cost increases are calculated at 3%/year.

2. Annual Operating Costs (Fish sampling)

	No.	Unit	Subtotal	Total	State Budget Increase
Buffalo Cove:					
Personnel					
Biologist	1		40,000		
Specialists	2	12,500	25,000		
Secretary (PT)	1		3,300		
Total			68,300		
Benefits @23%			15,700		
Total Personnel & Benefits				84,000	84,000
Indirect Costs @ 40%				33,600	
Expenses					
Travel & per diem			2,600		
Supplies/Services			13,400		
Total Expenses				16,000	16,000
Total Buffalo Cove				133,600	100,000
East Grand Lake:					
Personnel:					
Biologist	1		40,000		
Specialists	3	12,500	37,500		
Secretary (PT)	1		2,500		
Total Personnel			80,000		
Benefits @ 23%			18,400		
Total Personnel & Benefits				98,400	98,400
Indirect Costs @ 40%				39,360	
Expenses:					
Travel & per diem			2,600		
Supplies/Services			14,000		
Total Expenses				16,600	16,600
Total East Grand Lake				154,360	115,000

DWF Projected Costs for Monitoring Buffalo Cove and East Grand Lake (or Equivalent Water Management Units)

	Total Costs/ Share	State Budget Increase
Buffalo Cove	133,600	100,000
East Grand Lake	154,360	115,000
Total FY 97/98	287,960	215,000
Total FY 99/00	317,476	237,038

DWF Projected 15 Year Costs

	Total Costs/ Share	State Budget Increase
DWF Operating Costs FY 99/00*	508,438	428,000
DWF Operating Costs FY 00/01	333,350	248,890
DWF Operating Costs FY 01/02	350,018	261,335
DWF Operating Costs FY 02/03	367,519	274,402
DWF Operating Costs FY 03/04**	600,825	503,052
DWF Operating Costs FY 04/05	405,190	302,528
DWF Operating Costs FY 05/06	425,450	317,654
DWF Operating Costs FY 06/07	446,723	333,537
DWF Operating Costs FY 07/08	469,059	350,214
DWF Operating Costs FY 08/09***	741,675	616,888
DWF Operating Costs FY 09/10	517,138	386,111
DWF Operating Costs FY 10/11	542,995	405,417
DWF Operating Costs FY 11/12	570,145	425,688
DWF Operating Costs FY 12/13	598,652	446,972
DWF Operating Costs FY 13/14	628,585	469,321
Total Operating Costs for 15 yrs	7,505,762	5,770,009

*includes 190,962 equipment purchases
**includes 214,930 equipment replacement
***includes 249,163 equipment replacement
Cost increases are calculated at 5%/year.

C. Control of Nuisance Aquatic Vegetation

This work will be conducted by the Department of Wildlife and Fisheries, Nuisance Aquatic Plant Section, whose employees have been certified to apply the restricted use of pesticides necessary to control aquatic vegetation and have extensive experience in the Basin.

Left uncontrolled, water hyacinths and hydrilla will curtail many of the outdoor activities that are part of this plan and also have a deleterious impact on water quality.

ANNUAL OPERATING COSTS
FOR CONTROL OF AQUATIC PLANTS

	No.	Unit	Subtotal	Total	State Budget Increase
Personnel					
Biologist Supervisor (parttime)	1		30,000		
Workers, Aquatic Control	8	22,700	181,600		
Total State Service			211,600	-	211,600
Benefits % 23%			48,668		48,668
Indirect Costs (administrative support space, utilities, etc.@ 40%			104,107		
Total Personnel & Indirect				364,375	260,268
Expenses:					
Supplies & chemicals			100,410		
Travel			6,000		
Total expenses				106,410	106,410
Total Operating Costs FY 97/98				470,785	366,678
Total Operating Costs FY 99/00				519,040	404,263

EQUIPMENT COSTS

Boats. Trailer,trucks spray equipment, ect.			
FY 97/98 prices	206,500		
FY 99/00 prices	219,076	219,076	219,076
Replacement FY 03/04		246,572	246,572
Replacement FY 08/09		285,845	285,845
Total Equipment Costs 15 years		751,493	751,493

Cost increases for operating costs calculated at 5%/year.
Cost increases for equipment costs calculated at 3%/year

Note: This aspect is currently not a part of the ABFS, LA. Project.
Additional Federal authority may be sought

D. DWF PROJECTED 15 YEAR TOTAL WATER QUALITY MONITORING AND FISH SAMPLING FOR BUFFALO COVE AND EAST GRAND LAKE (or their equivalent) and AQUATIC PLANT CONTROL

	Total Costs/ Share	State Budget Increase
LSU Ag. Center Water Quality Monitoring	17,006,865	12,859,359
DWF Fish Sampling Monitoring	7,505,762	5,770,009
DWF Aquatic Plant Control	11,951,682	9,737,403
Total for 15 years	36,464,309	28,366,771

DWF PROJECTED 15 YEAR OPERATING COSTS FOR AQUATIC CONTROL FOR THE ATCHAFALAYA BASIN WATER AREAS

	Total Costs/ Share	State Budget Increase
DWF Operating Costs FY 99/00*	738,160	623,339
DWF Operating Costs FY 00/01	544,992	424,476
DWF Operating Costs FY 01/02	572,242	445,700
DWF Operating Costs FY 02/03	600,854	467,985
DWF Operating Costs FY 03/04**	877,469	737,956
DWF Operating Costs FY 04/05	662,442	515,953
DWF Operating Costs FY 05/06	695,564	541,751
DWF Operating Costs FY 06/07	730,342	568,839
DWF Operating Costs FY 07/08	766,859	597,281
DWF Operating Costs FY 08/09**	1,091,047	912,990
DWF Operating Costs FY 09/10	845,462	658,502
DWF Operating Costs FY 10/11	887,735	953,922
DWF Operating Costs FY 11/12	932,122	725,998
DWF Operating Costs FY 12/13	978,728	762,298
DWF Operating Costs FY 13/14	1,027,664	800,413
DWF Operating Costs for 15 years	11,951,682	9,737,403

*includes initial equipment costs (219,076)
**includes equipment replacement costs (246,572)
Cost increases are calculated at 5%/year. (285,845)

6.53 Department of Agriculture and Forestry (DAF)

A. Monitoring tree and vegetation stress resulting from construction and water management activities

1. Initial start-up costs

All equipment required is included in the DAF's environmental monitoring duties (Section 5.00).

2. Annual Operating Costs:

Purpose:
To determine what impact, if any, the construction and operation of water management projects has had on trees and vegetation.

Number inspections:
Aerial monitoring–1/year to detect stress
Water/land monitoring - as required to inspect stressed areas, but no less than annually

Analysis:
Growth rate, regeneration, and stress characteristics for scientific and photographic record.

OPERATING COSTS (DAF)

	No.	Unit	Subtotal	Total Costs Share	State Budget Increase
Personnel					
Forester (PT)	1		10,000		
Technician (PT)	1		3,500		
Secretary (PT)	1		1,000		
Total personnel			14,500		
Benefits @ 23%			3,335		
Total Personnel & Benefits				17,835	17,835
Indirect costs (administrative support, space, utilities, etc. @ 40%)				7,134	
Contractual:					
Aerial detection 4hrs @ 120				480	480
Supplies:					
Office			300		
Fuel			800		
Travel & Per Diem			1,000		
Total supplies				2,100	2,100
Total Operating Cost FY 97/98				27,549	20,415
Projected to probable starting date:					
Total Operating Cost FY 98/99				28,926	21,436
Total Operating Cost FY 99/00				30,372	22,508

Cost increases are calculated at 5%/year.

DAF PROJECTED 15 YEAR OPERATING COSTS FOR MONITORING WATER MANAGEMENT UNITS

	Total Cost/ Share	State Budget Increase
DAF Operating Costs FY 99/00	30,372	22,508
DAF Operating Costs FY 00/01	31,891	23,633
DAF Operating Costs FY 01/02	33,486	24,815
DAF Operating Costs FY 02/03	35,160	26,056
DAF Operating Costs FY 03/04	36,918	27,359
DAF Operating Costs FY 04/05	38,764	28,727
DAF Operating Costs FY 05/06	40,702	30,163
DAF Operating Costs FY 06/07	42,737	31,671
DAF Operating Costs FY 07/08	44,874	33,255
DAF Operating Costs FY 08/09	47,118	34,918
DAF Operating Costs FY 09/10	49,474	36,664
DAF Operating Costs FY 10/11	51,948	38,497
DAF Operating Costs FY 11/12	54,545	40,422
DAF Operating Costs FY 12/13	57,272	42,443
DAF Operating Costs FY 13/14	60,136	44,565
DAF Operating Costs for 15 years	655,397	485,696

Cost increases are calculated at 5%/year.

6.54 Department of Natural Resources (DNR)

A. The DNR role is fourfold:

1. Engineering consultation, when requested, concerning design of water management projects;
2. Oil and gas industry liaison concerning spoil banks and other industry-related activities which impact water flow;
3. Investigate possibility of establishing a Mitigation Bank for industry activities;
4. Provide and maintain cuts and gaps in spoil banks and canal cross-sections where sedimentation has blocked water flow.

B. Operation Costs (DNR)

1. Engineering consultation:

One engineer will be available to assist the Corps of Engineers, at their request, with costs billed on a time and material basis.

2. Oil and Gas Industry Liaison

The Project Manager will assume this responsibility. Cost is included in the Management Budget (see Section 8.00).

3. Mitigation Bank

The Project Manager will assume this responsibility. Cost is included in the Management Budget (see Section 8.00)

4. Cuts and Gaps

The Water Management Working Group has recommended the lease or purchase of a dredge and staffing an operation to maintain the integrity and quantity of water flow. The unit will be based in Morgan City (AMACCenter).

a. Initial Start-Up Costs (DNR)

Item	Quantity	Unit Cost	Total
Dredge, with all necessary accessories and barge mounted	1		330,000
20' Work Boat, 75HP	1		15,000
Boat trailer	1		4,000
Truck, 1/2 ton; crew-cab	1		16,000
Total Equipment FY 97/98 costs			365,000
Total Equipment FY 99/00 costs			387,229
Replacement (less dredge) FY 03/04			43,009
Replacement (less dredge) FY 08/09			49,859

Equipment cost increases are calculated at 3%/yr. Extensive annual maintenance should prolong the life of the dredge for 15 years.

b. Operating Costs (DNR)

	No.	Unit	Subtotal	Total	State Budget Increase
Personnel					
Manager/hydrologist	1		60,000		
Secretary/driver	1		15,000		
Dredge Operator	1		50,000		
Helper/mechanic	1		20,000		
Total personnel			145,000		
Benefits @ 23%			33,350		
Total personnel & benefits				178,350	178,350
Indirect costs (administrative support, space, utilities, etc. @ 40%)				71,340	
Contractual:					
Transp. costs dredge	30	1,100	33,000		
Retention dikes	6	12,500	75,000		
Major maintenance			20,000		
Landrights spec.			10,000		
Total contractual				138,000	138,000
Expenses:					
Travel & per diem			10,000		
Fuel, grease, etc.			40,000		
Pipe replacement			1,000		
Supplies, office			500		
Supplies, field			10,000		
Total Expenses				61,500	61,500
Annual Operating Cost FY 97/98				449,190	377,850
Annual Operating Cost FY 99/00				495,233	416,580

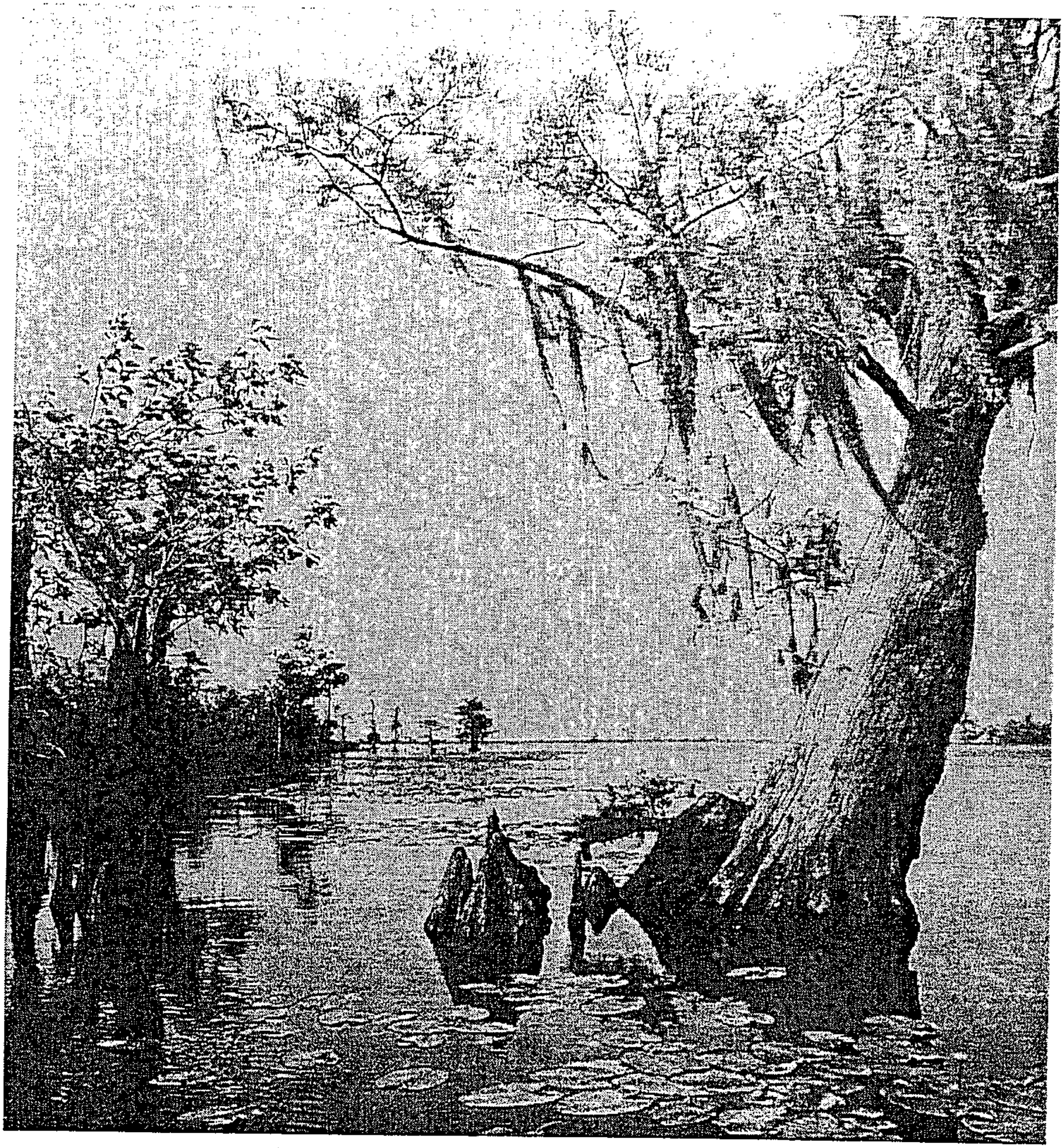
DNR PROJECTED 15 YEAR COSTS FOR WATER MANAGEMENT FEATURES

	Total Costs/ Share	State Budget Increase
Total DNR Costs for FY 99/00*	882,462	803,809
Total DNR Costs for FY 00/01	519,995	437,409
Total DNR Costs for FY 01/02	545,995	459,279
Total DNR Costs for FY 02/03	573,295	482,243
Total DNR Costs for FY 03/04**	644,969	549,364
Total DNR Costs for FY 04/05	632,058	531,673
Total DNR Costs for FY 05/06	663,661	558,257
Total DNR Costs for FY 06/07	696,844	586,170
Total DNR Costs for FY 07/08	731,686	615,479
Total DNR Costs for FY 08/09***	818,129	696,112
Total DNR Costs for FY 09/10	806,684	678,566
Total DNR Costs for FY 10/11	847,018	712,494
Total DNR Costs for FY 11/12	889,369	748,119
Total DNR Costs for FY 12/13	933,837	785,525
Total DNR Costs for FY 13/14	980,529	824,801
DAF Operating Costs for 15 years	11,166,531	9,469,300

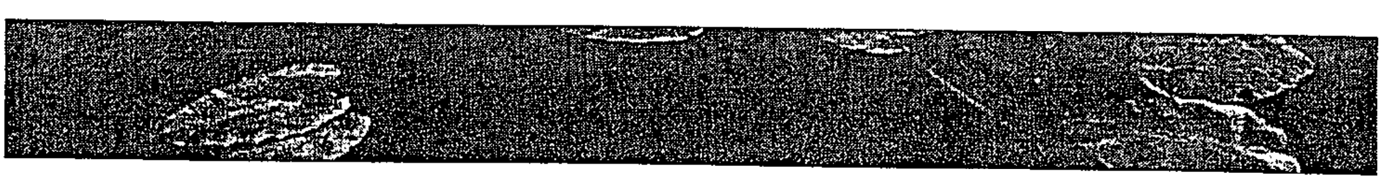
6.55 PROJECTED TOTAL 15 YEAR WATER MANAGEMENT COSTS

	Cost/Share	State Budget Increase
Department of Wildlife & Fisheries		
LSU Ag. Center	36,464,309	28,366,771
Dept. Agriculture & Forestry	655,397	485,696
Department Natural Resources	11,166,531	9,469,300
Total	48,286,237	38,321,767

*includes 387,229 equipment purchase (incl.dredge)
**includes 44,009 equipment replacement (less dredge)
***includes 49,859 equipment replacement (less dredge)
Cost increases calculated @ 5%/year



SECTION 7.00
RECREATION



7.00 RECREATION FEATURES

7.10 Mission

The mission of the Recreation Section is twofold:

> To assist the Corps of Engineers in planning "...to provide a cost effective range of recreation facilities to optimize public accessibility and use of the floodway while minimizing adverse impacts to the environment;
>
> To expand the Corps' plan as necessary to provide interpretive and educational facilities to enhance the public's knowledge and enjoyment of this unique area.

See Appendix G for the Chief of Engineers mandate to the Corps of Engineers to "provide increased emphasis on, and opportunities for recreation at water resources projects...operated by the Corps of Engineers."

To achieve the two tasks, the Recreation Working Group and technical advisors investigated needs of the public in this region and state for public recreation facilities, and the opportunities for recreation in the Basin and, recommended the development of specific facilities at several locations.

7.20 Needs Study for Recreation Activities

7.21 Corps of Engineers Preliminary Plan

A. The Corps of Engineers, in 1982, conducted a comprehensive analysis of recreation demand, supply, and resulting need for recreation activities which can be met in the Basin for the area of South Central Louisiana within 45 miles of the Basin. See Fig. 7.00-A.

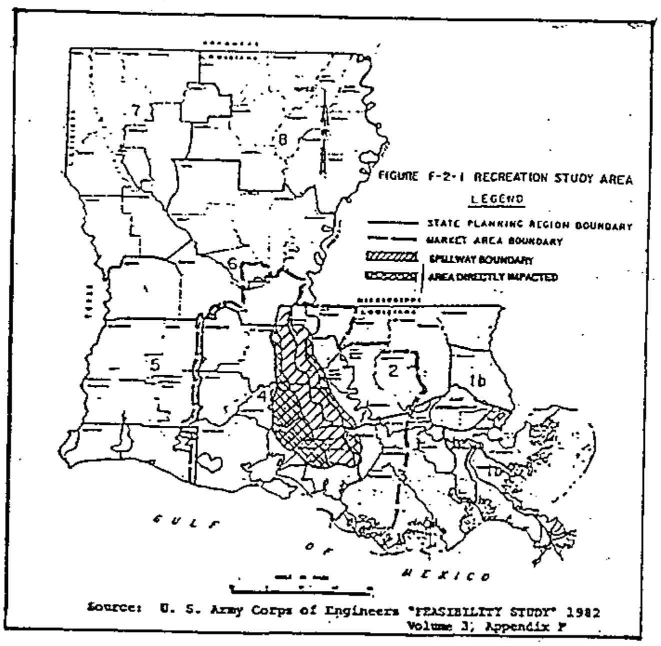


FIGURE 7.00 A: *Primary Market Area Boundary*

B. Needs which can be met in the Basin included:

Land-oriented		Water-oriented
Bicycling	Nature walks	Boating, power
Birdwatching	Picnicking	Boating, non-power
Camping, tent	Multi-use field	Boat fishing, fresh
Camping, trailer	Multi-use court	Boat fishing, salt
Hiking	Sightseeing	Bank fishing, fresh
Horseback riding	Playground	Crabbing
		Crawfishing
		Swimming, lake
		Waterskiing

C. The Corps' analysis was based on data from several sources, including:

> 1977 SCORP (Statewide Comprehensive Outdoor Recreation Plan)
>
> 1997 SCORP (for the update)
>
> Corps of Engineers/Louisiana Department of Wildlife and Fisheries - "*Atchafalaya Basin Usage Study*"
>
> Statistical Abstract of the United States "*Most Popular Sports Activities*"
>
> United States Fish and Wildlife Service- "Hunting and Fishing Survey for Louisiana"
>
> Corps of Engineers - "Heritage, Conservation and Recreation Service Outdoor Recreation Space Standards"
>
> SCORP for both Texas and Arkansas

Discussions with individuals in the area involved in the supply and/or the use of recreation facilities.

D. In 1997, Corps officials, mindful that the analysis conducted in the early 1980s which projected the needs to 2000 might require updating, reviewed the original data and the projections by comparison with 1997 populations and participation rates from the current Bureau of Economic Analysis and Economic Research Service and with the Louisiana 1997 SCORP.

The Corps reported that little upgrading was required, since the earlier projections were on-target. "The only potential over-supply is in available water area for fishing and boating, assuming public access is available in all basin water areas."

7.22 1997 Louisiana SCORP

A. The SCORP report included an analysis of recreation preferences by age group and investigated peak usage, since many activities are seasonal. The report was restricted to needs which can be supplied by State Parks. The activity list includes:

Swimming	Playgrounds	Trailer camping
Boating	Picnicking	Tent camping

B. The report also broadened the market area by adding zones (50 miles apart) and adjusting participation rates for the populations within those zones.

7.23 Louisiana Office of Tourism

A. Tourism is the fastest growing industry in Louisiana with 22.6 million U. S. resident visitors in 1996.

B. Over 32,000 vehicles on I-10 and 25,000 on U.S. 90 cross the Atchafalaya Basin each day, thus the "Atchafalaya Basin could generate visitors if the site development occurred to influence them to stop".

C. 2.2 million pleasure trips were made to Cajun Country (1992 - the Longwood Study). Of this number 286,000 took a "swamp tour". This number is growing as commercial boat tours, particularly in Henderson, become better known to the tourist industry.

7.24 Louisiana Travel Promotion Association

A. "The major growth in tourism nationwide is based on nature-based ecotourism."

B. "The Atchafalaya Basin is known nationally as the best example of a dynamic wetland ecosystem in the country and will attract major attention when access to interpretive centers and boat tours is increased."

7.25 The Basin as a Classroom

A. The Basin is an educational aid for study of an evolving ecosystem, a wildlife and botanical laboratory, and a real-life exhibition of waterflow processes. The oil, gas, and timber industries operate in the Basin providing students and scholars examples of efforts of these industries to operate in an environmentally sound manner.

B. Universities, principally LSU, USL, and Nicholls, have expressed interest in establishing research centers in the area and Lynch Botanical Gardens and Morgan City plan to offer facilities for this activity.

C. Educators have long recognized the value of trips to classrooms in a natural setting by all age groups.

7.26 Needs Projections

A. Corps of Engineers Study:
"The needs analysis of the market area shows an overall deficit in recreational needs for all land and water-based recreational activities considered..."

B. 1997 SCORP
The study projects a deficit in all categories of facilities even after planned State Park construction.

C. Travel Industry:
The opportunity for a tourist to enjoy the scenic wonders of the Basin and to acquire knowledge of the evolving ecological process and the history and culture of the people is minimal.

"Needed are visitors' centers to provide an overview and directions, interpretive centers to immerse the visitor in the natural spell cast by the basin, and nature trails, both land and water, that provide an incentive for the visitor to stay longer, to see more, and to experience the totality of the area."

"You must understand that the market area for the Atchafalaya Basin when made people-friendly is not limited to the area indicated by the Corps or to the State of Louisiana. The market area is nationwide and, for some, worldwide." (Office of Tourism)

7.30 Inventory of Recreation Facilities

Note: This inventory includes the basin and the area directly adjacent to the basin as shown on Fig. 7.00-A - area directly impacted by activities in the Basin.

7.31 Existing Public Facilities

A. State Parks and Preservation Areas
(Family outings, nature studies, nature trails, campgrounds, playgrounds)

Lake Fausse Pointe State Park
Catahoula State Preservation Area (land purchased)

B. Wildlife Management Areas (hunting, cycling, hiking, birdwatching, environmental pursuits)
State:
Attakapas Island Wildlife Management Area
Sherburne Wildlife Management Area
Federal:
Atchafalaya National Wildlife Refuge (USFWS)
Indian Bayou (Corps of Engineers)

Lake Fausse Pointe State Park *Greg Guirard*

7.32 Existing Private Facilities (adjacent to the Basin)

A. Boat tours:

Henderson
McGee's Landing
Kern's Swamp Tours
Angelle's Swamp Tours

Lafayette
Atchafalaya Experience

Catahoula
Errol Verret Swamp Tours
de la Houssaye's Swamp Tours

Loreauville
Airboat Tours, Inc.

Patterson
Cajun Jack's Swamp Tours

Morgan City
Scully's Swamp Tours
Original Swamp Tours

B. Major projects:

Cypress Cove
John J. Lynch American Natural Heritage Park (land acquired,project in planning stage)

Charenton
Chitimacha Reservation and trading center
Museum (National Park Service)

C. Campgrounds:

St. Landry
Northwest of Krotz Springs
Birthplace of Teche

Pointe Coupee - Alabama Bayou

St. Martin
Butte LaRose
Frenchman's Wilderness

D. Boat launch sites:

16 commercial plus 25 public (total of 41) boat launch sites – see fig. 7.00 B

C. Local Government Projects

Morgan City/St. Mary Parish:
Rig Museum (1st submersible offshore rig), Aviation Museum, Swamp Gardens, Brownell Park, Shrimp and Petroleum Festival

Henderson:
Atchafalaya Festival
Numerous tourist promotion activities to support local Cajun restaurants and boat tours

St. Landry Parish
Park for picnicking and fun (Veteran's Memorial)

St Martin Parish
3 parks for picnicking and fun (Henry Guidry Memorial, Brownell Memorial, and I-10 Rest Stop/picnic)

D. Campgrounds

Iberia - Sand Bar Park
St. Mary - Lake End Park
St. Martin - Uncle Dick Davis Park

E. Boat Launch Sites

46 public sites - see 7.00-B

F. Corps of Engineer Projects (of educational interest)

Flood control
Navigation

Charles Fryling

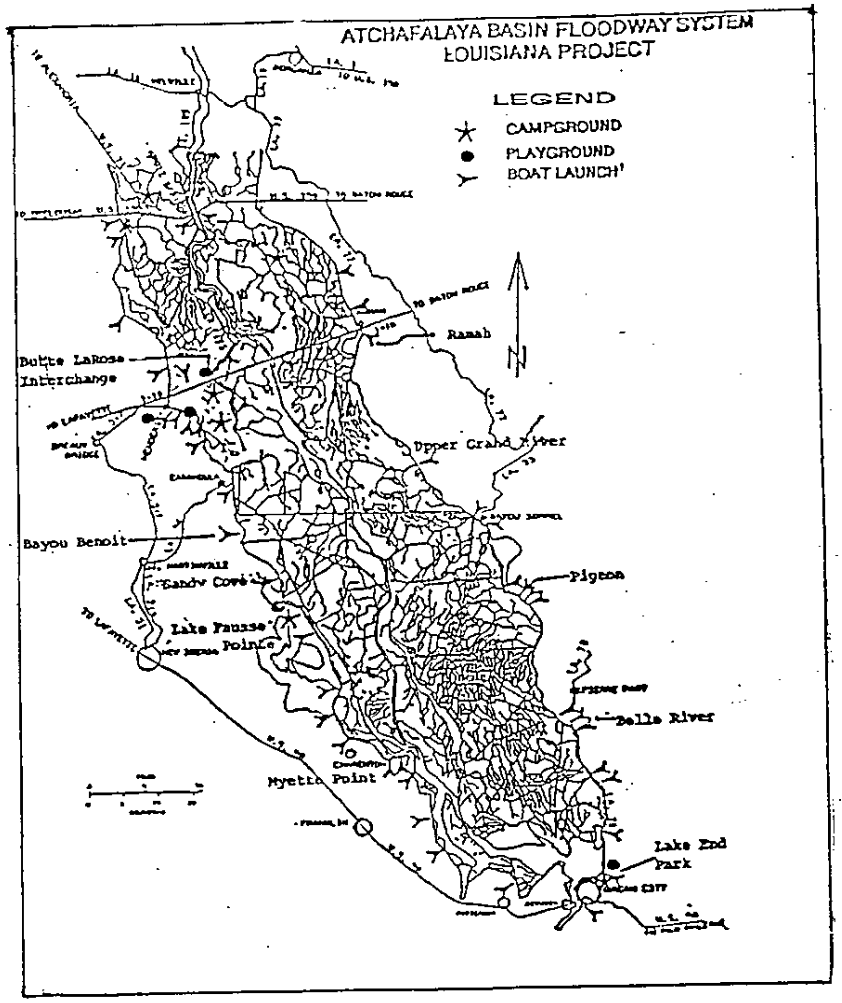


FIGURE 7.00 B: Existing Recreation Features

7.40 Inventory of Recreational Opportunities

7.41 Points of Interest

A. Cultural and Historic
- Bayou Sorrel Indian Mound - 500 BCE
- Several restored Cajun Villages - 1700 ACE
- Chitimacha Reservation - 400 ACE - present

B. Nature
- Rookeries - 5 in Lower Basin, principal ones are:
  - Bayou Sorrel
  - Upper Grand River
  - Big Tensas Bayou
  - Spice Island
- Bird Watching
  - Upper Grand River Flats
  - Lake Henderson
  - Buffalo Cove
  - Bayou Sorrel Eagle Nest
- Scenic
  - Buffalo Cove
  - Lake Warner
  - Upper Grand River Flats
  - Bayou Sorrel
  - Little Bayou Pigeon
  - Miles of tree-lined waterways

C. Corps of Engineers Flood Control and Navigation Projects
- Levee System
- Old River Locks
- Atchafalaya Main Channel
- Bayou Sorrel Locks
- Whiskey Bay Bypass
- Lower Atchafalaya River Locks

7.42 Areas of Interest

A. Nature
- Old Growth (mature) Cypress
  - Flat Lake
  - Buffalo Cove
  - Upper Grand River
  - Cypress Cove
- Bottomland Hardwood
  - Wildlife Management Areas between I-10 and U.S. 190
- Water trails throughout Basin

B. Educational
- Geology
  - Geological history of Basin - Ice Ages to Present
- Hydrology
  - Waterflow processes
  - Siltation - cause and effect
- Ecosystems
  - Evolution of a forest
  - Botanical studies
  - Impact of aquatic plants on the environment
  - Wildlife habitat
- Engineering
  - History of Corps of Engineers work in the Mississippi Valley

7.43 Activities of Interest

A. Hunting

Hunting, during season, is permitted in the Wildlife Management Areas and on private lands leased to clubs or individuals

B. Fishing

All waterways accessible to the public offer fishing opportunities

C. The Need to Escape and Get Away From It All

The principal asset for recreation in the Basin which will create its own demand is the never ending beauty of this wilderness area. A flat swamp ringed with mossdraped cypress is bordered by a ridgeline studded with hardwoods. The bayous twist and turn and at every turn there may be flocks of heron that rise gently from the water to wheel overhead. A startled alligator or moccasin adds to the never ending variety of the picturebook scene.

Ricky Verret

Ricky Verret

"The vegetation is rich and of great variety. A single plant community may dominate a certain area while nearby the community is richly mixed. The cypress, mostly young, but with an occasional Methuselah more than a thousand years old, sets the stage. This is a quiet place, a place apart from civilization, a place requiring a communication with nature."

"These irreplaceable assets establish the Atchafalaya Basin as a recreation area without peer in the nation." (from Atchafalaya Basin Study - 1971)

7.44 Planning Objective

A. Create primary and secondary entry points each presenting a basin panorama of the recreational opportunities, the scenic wonderland, and the cultural heritage that creates a desire by locals and visitors to study, admire, and enjoy the entire Basin.

The entry points will entice the motorist to get out of the car and see...and having seen, want to see more...and more....and more.

B. Tie all entry points together in a guide plan so that the interested visitor is led through the entire Basin and would feel incomplete if the visit is cut short.

C. Plan in such a manner that the Basin is preserved and made accessible for all generations to enjoy.

7.45 Selection of Entry Points

A. Criteria for selection
Selection is based on following criteria:
Ease of public access
Local interest and sponsorship
Scenic, cultural, and historic points of interest
Access to Basin waterways
Availability of land

B. Primary entry points:

1. The I-10 entry

There are three I-10 highway exits in or near the Basin: Ramah, Butte LaRose, and Henderson.

The Ramah Exit provides a direct access to the Basin. Lacking is year-round surface or water access to areas of interest which would require canal and road construction to upper Grand River Flats and other areas.

The Butte LaRose Exit provides a direct access with Basin waterway through Lake Henderson for those areas of interest, and through the Atchafalaya River for the remainder of the Basin.

The Henderson Exit answers all criteria although a new interchange at the levee or a frontage road from the exit to the Henderson Levee Road would provide better access. Paving unpaved sections and new hard surface in other sections of the levee road south of Henderson is recommended to provide access to points of interest and to the remainder of the Basin. Designation as a hurricane evacuation route would provide for additional funding for project.

With additional work, all three sites meet the criteria, thus all will be considered with land availability the principal issue.

2. The U.S. 90 entry

Morgan City provides direct highway and water access and has available public land for the required support facilities.

C. Other Entry Points of Significant Interest

1. Old River Locks (outside the project area)

Located in Avoyelles Parish at the northern end of the Basin, these navigation locks and flood control structure are accessible via La. Hwy. 15 north of Lettsworth.

2. Simmesport (outside the project area)

Simmesport is at the head of the Atchafalaya River near the junction of the Red River and Old River and is accessible via La. Hwy. 1.

3. Krotz Springs

Krotz Springs is the principal entry to the Wildlife Management Areas which are accessible via U.S. 190 and La. Hwy. 975. These areas of hardwood forests have nature trails for hikers and birdwatchers and a special trail for All-Terrain-Vehicles (ATV).

4. Bayou Sorrel

The navigation locks, the Indian mound, and the rookeries provide the visitor with an interesting and informative outing. From Bayou Sorrel there is road and water access to all the Basin.

5. Charenton

The "Sovereign Nation of Chitimacha" is accessible from U.S. 90 off the Baldwin Interchange on LA. Hwy. 87. The entire Basin can be reached by water or road from this area.

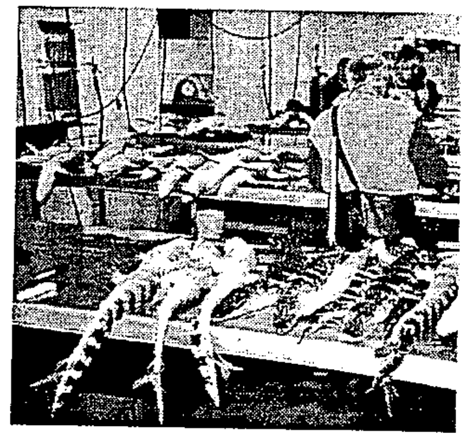
6. Other important west bank destinations include Lake Fausse Pointe State Park and Catahoula State Preservation Area which can be reached by road from Henderson and Morgan City.

D. Long Term Plan

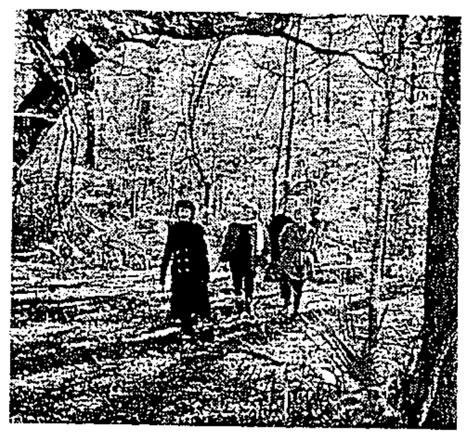
Upon completion of the Atchafalaya Basin Project, all important perimeter destinations plus the cities of St. Martinville, New Iberia, and Lafayette can be linked by offering a series of organized tours lasting one week for those interested in learning the complete story of the Basin and enjoying all its wonders. Additionally, all public water routes can be linked showcasing Basin natural and cultural wonders.

The tour envisioned in the Long-Term Plan would give the visitor the opportunity to:

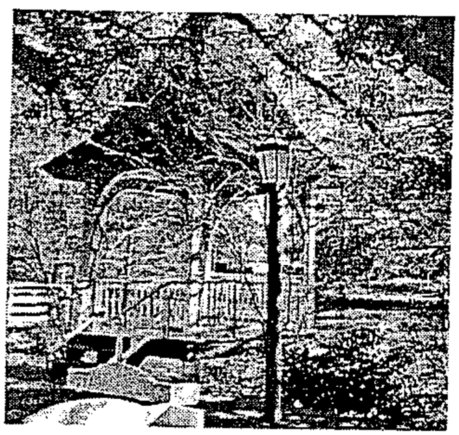
Enjoy the tranquillity at Buffalo Cove



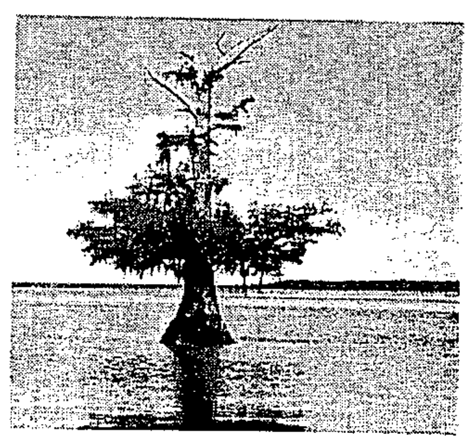
Help skin an alligator at Catahoula



Explore the nature trail at Catahoula State Preservation Area



Sit under the Evangeline Oak at St. Martinville



Visit the lonesome cypress at Lake Fausse Pointe State Park

Listen to the Brownell Carillon Tower's music at Morgan City

and scores of additional interesting, aesthetic, and educational sights and experiences.

7.50 Facilities Required to Utilize the Recreational Opportunities

7.51 The Corps of Engineers' Plan

A. Responding to resolutions of the Senate and House Public Works Committees in 1972, the Corps' 1982 Plan suggests:

Item	Number	Land Area
Developed Campgrounds	3	600 acres
Primitive Campgrounds	7	350 acres
Visitors' Center	1	100 acres
Boat Launch (2-lane)	8	80 acres
Boat Launch (5-lane)	7	70 acres
Nature Trail	1	100 acres
Special/Unique Area	1	200 acres
Total Land Area Required		1,500 acres

B. Corps officials stated that the plan is preliminary and that they solicit suggestions, subject to the following restrictions:

Any development receiving federal funds must be inside of, or reasonably adjacent to, the area bounded by the East and West Protection levees.

The development should follow the intent of the Congressional legislation and resolutions and Corps of Engineers directives in order to receive funding under this project.

Non-federal sponsors must provide the funding required in the cost-share agreement.

7.52 The State Plan

A. Provide space and facilities for the following activities:

1. Hunting - in addition to the projects already completed or under development, road-access is needed to several of the Wildlife Management Areas. Those requirements are included in Section 4.00 (Access) of this report.

2. Fishing and boating - construction or upgrade of boat launch facilities following guidelines included in the Corps' Plan. Size and location are shown in Section 7.60. Other needs are:
   Primitive campgrounds
   Access to privately-owned waterways

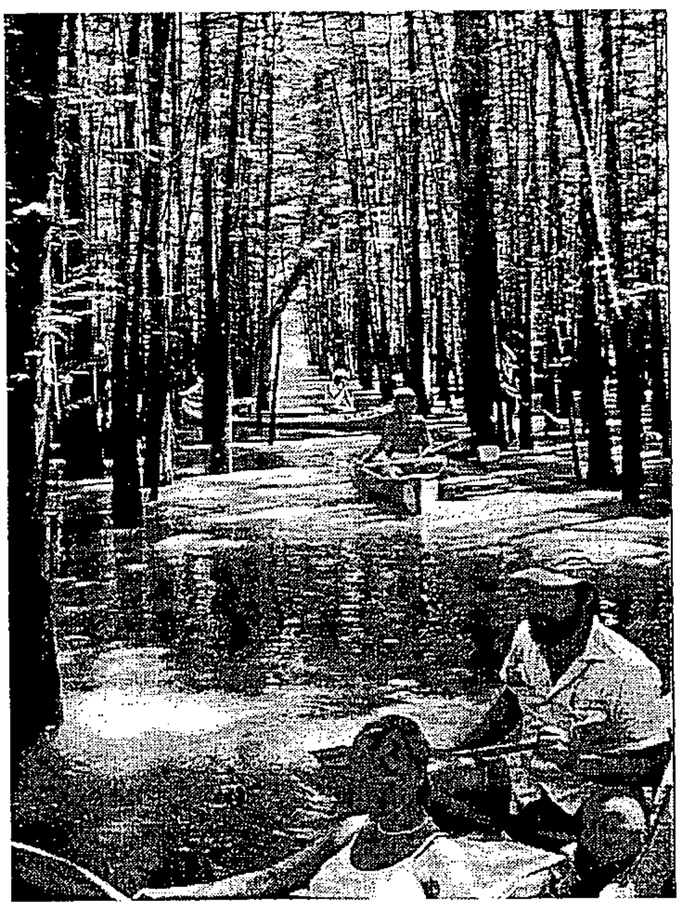
3. Swimming
   Water areas screened from boats and alligators with an area for sunbathing and a sloping entry into the water are needed (principally in Lake Henderson and Lake Palourde).

4. General Recreation including Environmental Pursuits
   Boat launch sites
   Space for boat rental operations
   Developed campground
   Nature trails to scenic and birding areas
   Access to privately-owned waterways
   Designated areas for sport boating and skiing (Lake Henderson and Lake Palourde)
   Picnicking and play areas

5. Tourism
   One Visitors' Information Center
   One Interpretive Center
   Three nature and cultural centers
   Organized boat and canoe tours
   Nature trails - land and water
   Developed campgrounds (outside the levees)

6. Education
   One Environmental Research Center
   One Botanical Research Center
   Access to nature's laboratory (the Basin)

7. Special/Unique Area
   Cypress/Tupelo swamp preserving one part of the Basin similar to the way it was years ago



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7.60 Location of Each Activity

7.61 Purpose, Existing and Proposed Features

A. Old River Locks (State not involved)

The Corps of Engineers plans to enlarge an existing building and install a display describing the Atchafalaya Floodway System and its part in the Mississippi Valley flood control and navigation system and a history of the Corps' work and future plans.

The facility will be designed, constructed and operated by the Corps of Engineers and it will be an integral part of the State Plan. It will be included in all programs, advertisements, and tours promoting the area. However, funds for the project will not be taken from the ABFS-LA Project funds.

Existing - locks and floodway control structure

Proposed - Interpretive Center, parking and support services
Nature trail and view and photo-op platform.

B. Simmesport (separate state funding - not project)

The first facility to be built under the project will be a boat launch and primitive campground in Simmesport. A Project Cooperative Agreement (PCA) is being developed by the Corps of Engineers and the Non-Federal Sponsors (Levee Board, Red River Waterway and Avoyelles Parish).

Proposed - Boat launch w/courtesy pier
Parking
Toilets
Bank fishing trail
Primitive camping area
Picnic area

C. Krotz Springs (Project)

Krotz Springs is the gateway to the Wildlife Management Areas between U.S. 190 and I-10. The primary purpose of these areas is to protect, conserve, and enhance wildlife. However, the area is open for public use for hunting (in season), fishing, hiking, ATV trail riding, birdwatching and enjoyment of the hardwood forests.

The areas are part of an existing LDWF/COE program and are an important part of the State Plan, since they provide needed recreational opportunities. Thus, improving the access by providing public roads to the areas is a justified part of this plan.

Existing - the three Wildlife Management Areas/Refuge

Proposed - all-weather public access roads

D. I-10 Entry (Project)

The purposes of the Visitors' Information Center, as developed in the Corps of Engineers Plan, are well stated. They are endorsed for the State's Plan and include activities to:

"Involve the visitor emotionally and physically with the site, and thus, in the floodway project;

Provide the visitor with the information necessary to explore the full range of recreational opportunities made available by the floodway;

Provide an interpretation of the natural resources intrinsic to the Atchafalaya River Basin and the floodway;

Provide an interpretation of the cultural resources related to the Atchafalaya Basin, focusing on the continuing interaction of man with the floodway;

Interpret the role of the U.S. Army Corps of Engineers in the development of the floodway;

Provide information that would enable the visitor to make a conceptual linkage between the Visitors' Center site and other significant sites associated with the project;

Be a visual symbol of the project's emphasis, quality and purpose."

The Corps of Engineers' conceptual plan locates the Visitors' Information Center at Bayou Sorrel. The State Plan suggests that a location on I-10 is a superior site, since it would attract interest from the passengers in the more than 32,000 cars which cross daily. The final site will be selected from several possibilities.

Existing (private) Boat tours (Henderson)
Cajun food (Henderson)
Boat launch sites (Henderson)
Campgrounds (Butte LaRose, Henderson)

Existing (public) Boat launch sites (all locations)
Rest, picnic area (Butte LaRose)

Proposed (project) Visitors' Information Center
Display area (views of the Basin)
Boat dock for tours
See Section 7.61 O (for Henderson)and Section 7.61 P (for Ramah) for additional features for each of those sites

Proposed (private) John J. Lynch American Natural Heritage Park at Cypress Cove - a botanical garden and wildlife sanctuary depicting the Basin's natural state.
Expansion of several Cajun restaurants (Henderson)

E. Bayou Sorrel

Mary Courville is the Director of the Heritage Center, daughter of John J. Lynch, and a naturalist in her own right. She loves the area and knows you will too.

Because of the importance of the navigation locks and the Indian Mounds, a natural area is proposed "....to interpret the role of the Corps of Engineers in the development of the project, as well as natural and cultural resources of the region".

Additionally, the State assigns this site the role of entry point for sport and commercial fishing, boating, and canoeing to the scenic areas of Murphy Lake, Lake Chicot, Flat Lake, and Little Bayou Pigeon.

Existing (Corps of Engineers):
  Navigation locks

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Existing
  Boat launch site (public)
  Indian Mounds (Private)

Proposed (project):
  Viewing stand at locks and explaining the Corps' role in the project
  Nature trail through scenic area along canal
  Nature trail to Indian Mound and to viewing stand and photo-op for rookeries
  Upgrade boat launch site and add dock and canoe launch facility and assembly area

F. Bayou Pigeon

Pigeon is at the end of La. Hwy. 75 and at the head of Big Bayou Pigeon. It is also the favorite entry point to the Basin for many of the region's fishermen and increasing numbers of the region's fisherwomen plus canoeists and birdwatchers.

Existing (public) - Boat launch
  Parking

Existing (private) - Shop - marine supplies and bait

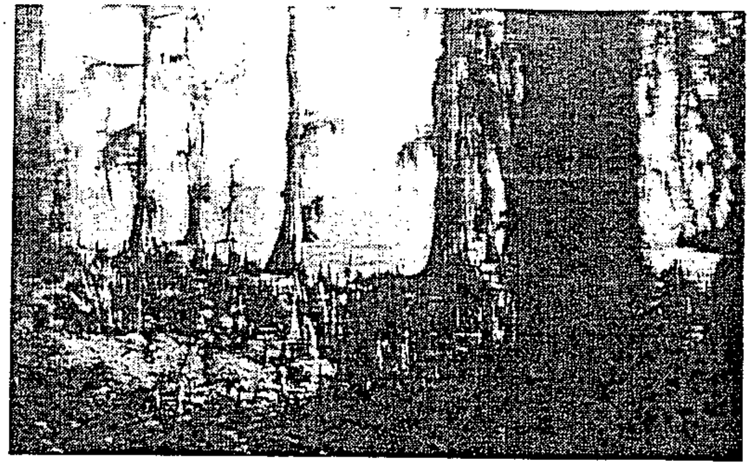
Proposed (project) - Upgrade ramp and parking area and canoe launch

G. Lake Verret - (Atchafalaya Wilderness Center East State Preservation Area)

This Center is planned to provide a representation of the river basin swamp habitat. If the Corps is successful in purchasing the cypress/tupelo lands north of Flat Lake, some acreage could be used for this purpose and additional acres could be purchased adjacent to the Basin extending to Lake Verret for the planned development.

H. Stephensville

The St. Martin Parish Police Jury requested the inclusion of Stephensville as an entry point to both the Basin and Lake Verret.



View from Brownell Park over cypress knees to Lake Palourde

I. U.S. 90 Entry (Morgan City)

Morgan City is the principal entry point to the Basin from U.S. 90 and is on the dividing ridge between the inland swamp and the coastal marsh.

The City/Parish Government (Morgan City/St. Mary Parish) has embarked on an extensive eco-tourism project to broaden the area economic base and is emphasizing "Impact Tourism" (man's impact on the area) as well as "Nature-based Tourism".

This project provides an addition to those plans so that a major complex can be developed which will serve the area's and the State's interests.

As a result of ABAC's request, the Corps has initiated a project to add land adjacent to Lake Palourde for hiking and bike trails, parking and other recreational uses.

Existing (public) - Lake End Park and Campground
- Boat launch site
- Brownell Park and Carillon Tower
- Wedell-Williams Aviation Museum
- Swamp Gardens and Wildlife Zoo
- International Petroleum Museum (including the Rig Museum)
- Shrimp & Petroleum Festival
- Historic District and the Great Wall

Existing (private) - Boat tours through lower basin
- Several homes and plantations listed on National Register of Historic Places
- Metropolitan infrastructure supporting the project

Proposed (project) - Atchafalaya Multi Agency Cultural Center (AMACCenter) - headquarters for federal and state agencies responsible for the basin's environmental control
- Wildlife and Fisheries research
- Natural processes research:
  - Sedimentology
  - Backwater flooding
  - Watering and dewatering cycle
  - Erosion control
  - Coastal environments
- Natural history
- Developed campground (addition to Lake End Park) with A-frame lodges
- Renovations in Lake End Park to update to Corps standards
- Boat dock and marina (base for Corps and DWF boats and supplies and docking and waiting area for tour boat passengers)
- Bank fishing (Lake Palourde)
- Fishing pier (Lake Palourde)
- Expand boat launch facilities adding parking and launching space (Russo site)
- Erosion control - protection for La. Hwy. 70 and East Protection Levee from Lake End Park to Brownell Park also providing for a bike and hiking trail and additional parking. The COE is proceeding with this project

Site of the A-frame lodges - adjacent to Lake End Park, Morgan City

using alternative sources of funding.
- Shore facilities for swimming, sport boating, and skiing in Lake Palourde

J. Charenton - Chitimacha Nation

The Chitimacha Nation, in cooperation with the National Park Service operates a museum with video and displays to tell the story of their people in the Atchafalaya Basin area.

Additionally, the Nation is home for a casino that is very popular with both regional and out-of-state visitors (the parking lot has a capacity of 1,000 cars).

A Basin Tour Office is proposed, to be built and operated by the Nation for those visitors interested in the Basin. A dock for tour boats is proposed to support this operation.

Existing (private) - Museum
- the Chitimacha Village of Charenton
Proposed (private) - Basin Tour office
Proposed (project) - Tour boat dock - boardwalk dock to road

K. Lake Fausse Pointe

Lake Fausse Pointe State Park is located in a part of the natural floodplain separated from the current floodway by the levee system, thus it is a pictorial history of the floodway as it existed in the era prior to 1927 and the subsequent construction of the levees.

The park is included in the State Plan to provide tourists, both local and national, the opportunity to investigate and enjoy this part of the Basin's history by hiking the nature trails and staying overnight, or a week, in the campgrounds or lodges. It is one of the most popular parks in the State's Park System.

Currently, the primary access is by a gravel road.

Existing (public) - State Park
Proposed (project) - Paved road from Henderson to Verdunville providing convenient access to the Park

Lake Fausse Pointe from the nature trail

L. Catahoula

Catahoula (Atchafalaya Wilderness Area West State Preservation Area) has been planned as part of the State Park System. The principal feature of the area is the forests (oak on the ridges and cypress in the swamp).

To maximize its role in the project, an Interpretive Center will be included for Cajun culture and the role of the Cajuns in the Basin. Ideas include areas set aside to highlight the Cajun culture, such as pirogue making, crawfish net-making, and other native crafts. Local people would be employed to demonstrate these crafts.

Proposed - State Preservation Area, crafts area, interpretive center
- Improve access from north and south by improving and resurfacing the gravel road from Henderson to Verdunville and, via U.S. 90, to Morgan City.

Proposed (Project) - Interpretive Center - History and culture of the Basin with emphasis on the Cajuns

Research activities
- Nature trails
- Primitive campground for researchers
- Dock
- Boardwalk from dock to Center

The town of Catahoula will work closely with the State in determining when this project will commence.

Exploring by land

or by water under the tree bridge

M. St. Martinville

While not in, or adjacent to, the Basin, St. Martinville is an important part of the Cajun Culture story and the gateway to Catahoula and Lake Fausse Point.

Proposed - RV Campground

N. Cypress Cove

The John J. Lynch American Natural Heritage Park will own, design, build, and operate this facility.

This site will be a major attraction for tourism, education, and public enjoyment purposes.

Proposed (Private) - Heritage Gardens
- Nature trails
- Support facilities

Proposed (Project) - Heritage and Research Center
- Dock for boat tours
- Boardwalk from dock-Center
- Footbridge & service bridge

O. Henderson

Henderson is an important public recreation and tourist center for boat tours (180,000 passengers in 1996), for Cajun food, and as a gateway to the Lynch Heritage Park and Catahoula State Preservation Area.

Discussions with City Officials and an inspection of the area pinpointed several infrastructure needs which are appropriate as project features. See 7.81 M for list.

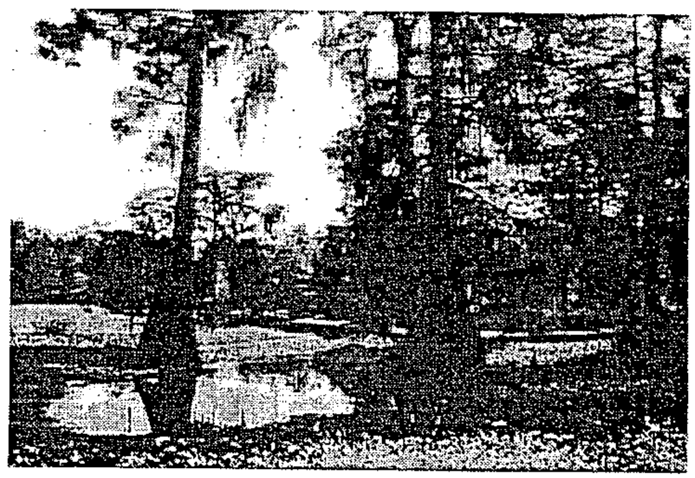
P. Ramah

Ramah, with an I-10 Interchange to the levee road, is the first potential stop for visitors from the east to see the Basin, particularly the Upper Grand River Area, one of the most natural and pristine swamp areas in the Basin.

Solutions to the low water access problems are shown in 7.81 O.

Q. Primitive Campgrounds

Primitive campgrounds are proposed to support hunting in the Wildlife Management Areas and fishing and boaters/canoeists in the Basin. Existing - Attakapas (2), Sherburne (1). Proposed - to be determined. See Fig. 7.00 D for possible locations.



Mary Courville

R. Developed Campgrounds - see Lake Verret, Morgan City, Lake Fausse Pointe - others under discussion

S. Boat launch (5-lane)

Large boat launches are recommended for locations with current use requiring this capacity. All are existing, but require upgrading.

Butte LaRose (to lake)@ I-10	Morgan City (Russo)
	Myette Point
Bayou Pigeon	Bayou Sorrel

Boat launch (2-lane)

Upgrading is required on the following existing launches:

Bayou Benoit	Catahoula	Belle River
Sandy Cove	Ramah	Marshfield Landing
	Butte LaRose (river)	

A new launch is planned for Simmesport and a new launch (to Basin) is proposed for Stephensville.

Canoe launch areas are proposed for Little Bayou Sorrel, Ramah, Upper Grand River Flats, Bayou Sorrel and Bayou Pigeon.

7.62 Comparison of Corps and State Facility Requirements

Facility	Corps	State/Local		
		Project	Other	Total
Developed Campgrounds	3	1	1	2
Primitive Campgrounds	7	4**	4	8
Visitor's Center	1	1		1
Boat Launch (2-lane)	8	8**		8
Boat Launch (5-lane)	7	6		6
Special Unique Area	1	1		1
Interpretive Center	2*	2*		2
Research Center	0	2		2
Canoe Launch Sites	0	5		5
Swimming Facilities	0	1	1	2
Nature trails	1	3	2	5

*Includes Old River Locks
**Includes Simmesport

Map showing location of these facilities

Corps Plan Fig. 7.00 C
State Plan Fig. 7.00 D

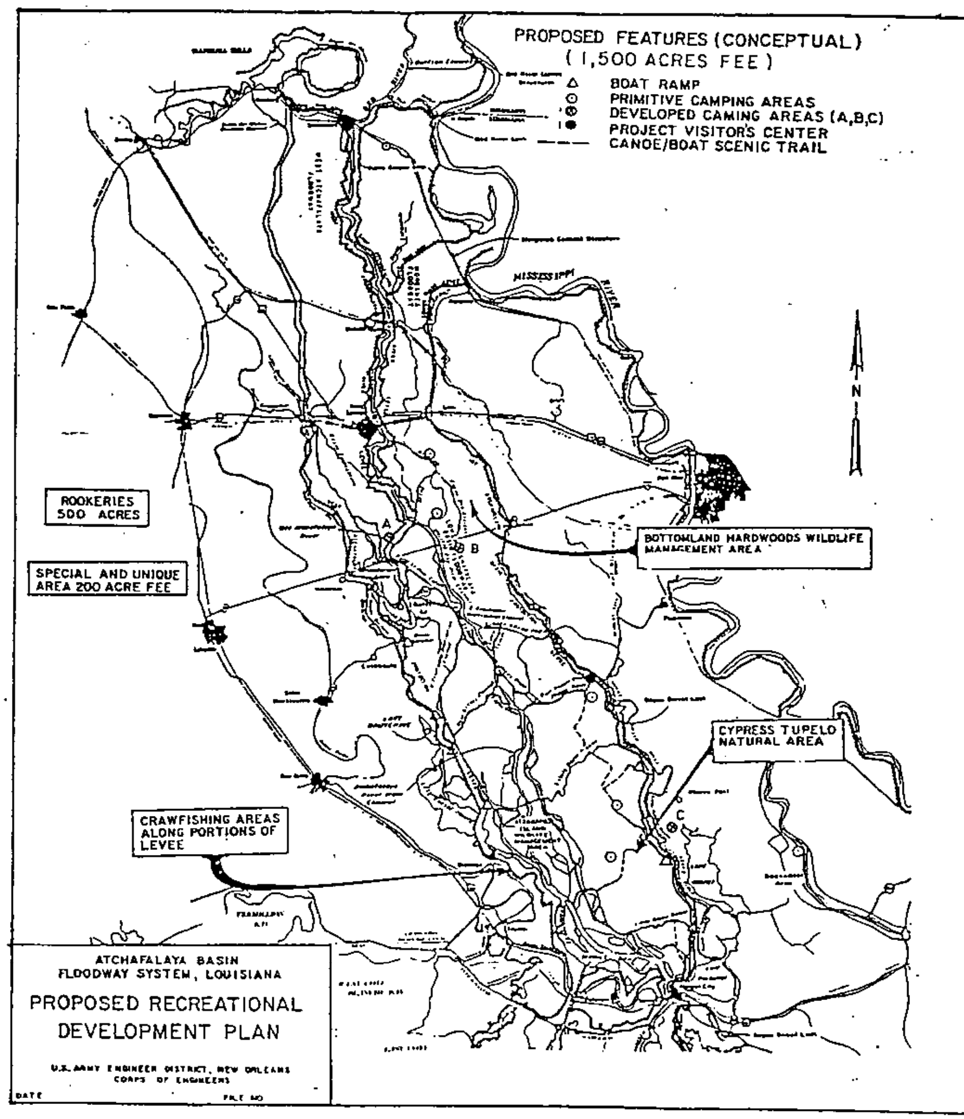


FIGURE 7.00 C:
Corps of Engineers 1982 Plan

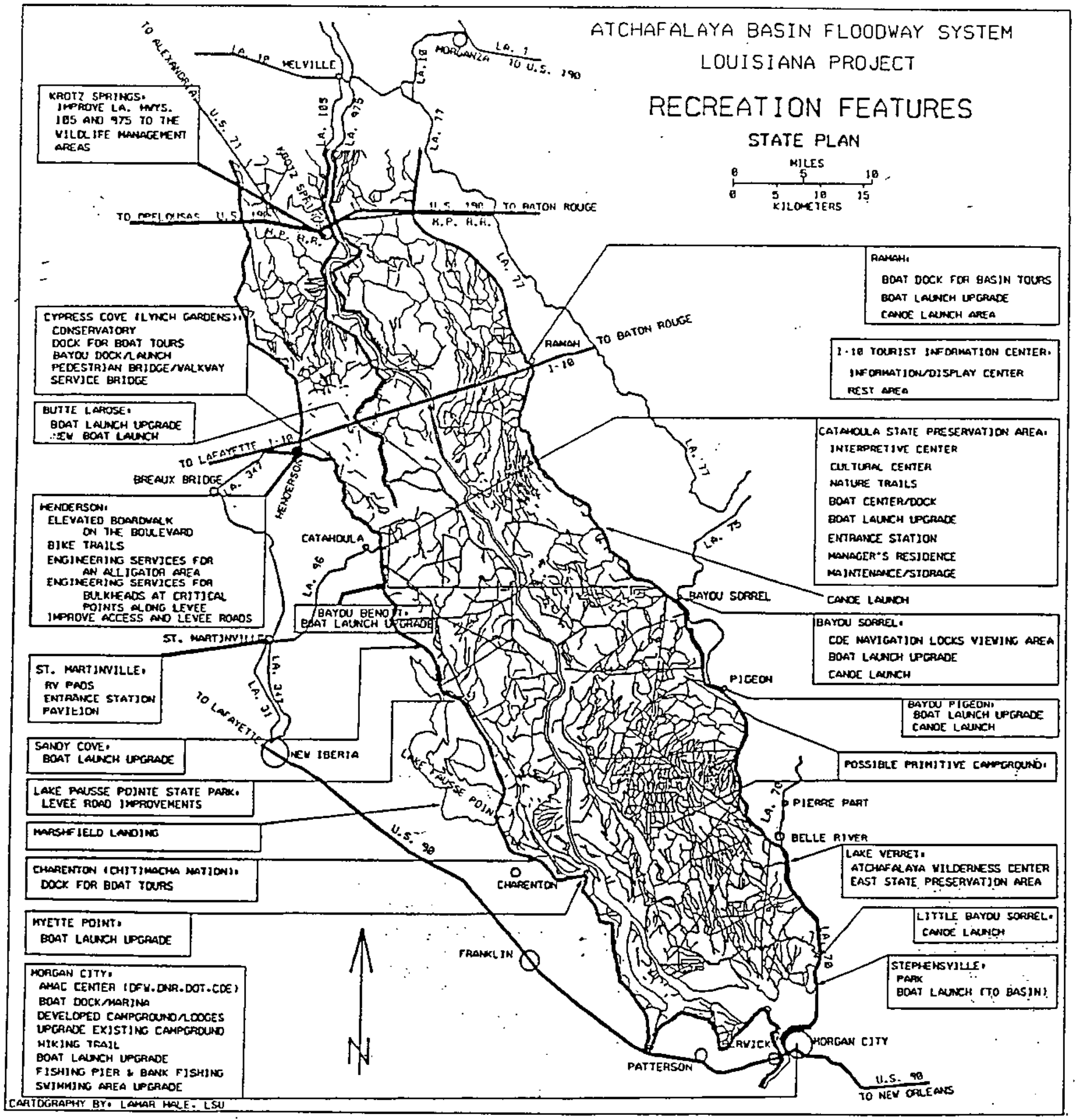


FIGURE 7.00 D: State Plan for Recreational Features

7.70 Anticipated Public Use

7.71 Methodology

A. Local and in-state anticipated use calculations are based on participation rates, developed by surveys, times the populations within the market area. These rates are reduced by distance from the attraction to calculate in-state totals.

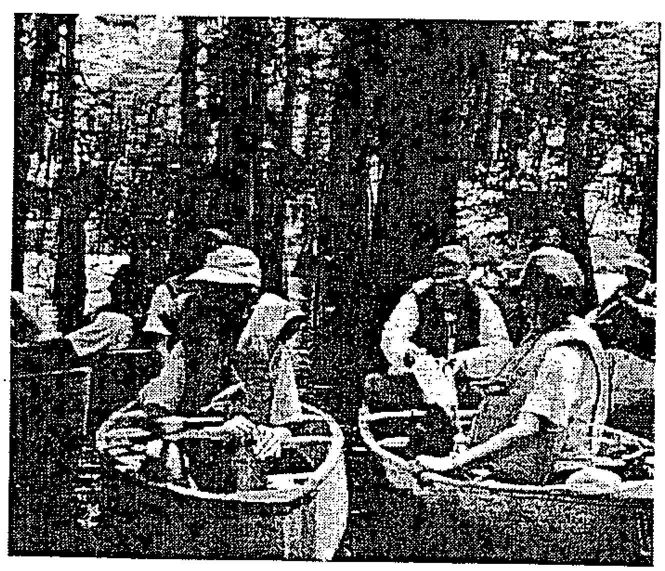
Both the Corps of Engineers projections of usage and those made by SCORP were calculated using this method.

The quality of the attraction plays a major role in usage. Since participation rates surveys do not include this factor, the above calculations will be adjusted due to the high quality of most of the attractions in the basin. This adjustment will be based on usage by comparable attractions in other states.

Publicity is a factor. Motorists in the over 32,000 cars daily on I-10 and over 25,000 daily on U.S. 90 may be interested in learning more about the Atchafalaya Basin as a result of reading about it in the media.

Out-of-state (tourists) visits to the basin will be estimated based on attendance at comparable attractions.

Estimating attendance at tourist attractions is not an exact science. No sampling nor any modeling formula would account for the need for two boat tours per day year-round from a rural park near Patterson.



Group Outing in the Basin

The following estimates of attendance are based on standard procedures utilized by the Corps and SCORP adjusted by the factors listed above. These estimates are further adjusted by the limitations (e.g. support facilities and ease of access) of the facilities planned.

7.72 User Days Projected

User days - one visit to a given site by one person

The total number of user days for all sites in and adjacent to the Basin are shown in the following table.

ESTIMATED PUBLIC USE
Atchafalaya Basin

	USER DAYS		
	2000	2010	2020
Consumptive Use:			
Hunting	200,000	225,000	240,000
Fishing	300,000	327,000	350,000
Trapping, Crawfish, etc.	1,400	1,700	2,000
Non-Consumptive Use:			
General Recreation	210,000	438,000	745,000
Tourism: Motorists	200,000	472,000	675,000
Organized Tours	260,000	425,000	700,000
Educational Utilization	5,000	18,000	37,000
Totals	1,176,400	1,906,700	2,749,000

The estimated number of user days for each of the sites is shown on the following tables:

ESTIMATED PUBLIC USE
Old River Locks

	USER DAYS		
	2000	2010	2020
Consumptive Use:			
Hunting			
Fishing			
Trapping, Crawfish, etc.			
Non-Consumptive Use:			
General Recreation			
Tourism: Motorists		15,000	25,000
Organized Tours		5,000	10,000
Educational Utilization		1,000	2,000
Totals		21,000	37,000

ESTIMATED PUBLIC USE
Simmesport

	USER DAYS		
	2000	2010	2020
Consumptive Use:			
Hunting			
Fishing	5,000	7,000	10,000
Trapping,			
Crawfish, etc.			
Non-Consumptive Use:			
General Recreation	5,000	13,000	15,000
Tourism: Motorists	5,000	7,000	10,000
Organized Tours			
Educational			
Utilization			
Totals	15,000	27,000	35,000

ESTIMATED PUBLIC USE
Krotz Springs (Game Management Areas)

	USER DAYS		
	2000	2010	2020
Consumptive Use:			
Hunting	85,000	96,000	100,000
Fishing	15,000	20,000	23,000
Trapping,			
Crawfish, etc.			
Non-Consumptive Use:			
General Recreation	5,000	10,000	10,000
Tourism: Motorists	3,000	4,000	5,000
Organized Tours			
Educational			
Utilization			---
Totals	108,000	130,000	138,000

ESTIMATED PUBLIC USE
Charenton and Vicinity

	USER DAYS		
	2000	2010	2020
Consumptive Use:			
Hunting	10,000	11,000	12,000
Fishing	30,000	32,000	35,000
Trapping,			
Crawfish, etc.	100	200	200
Non-Consumptive Use:			
General Recreation	5,000	10,000	20,000
Tourism: Motorists			
Organized Tours	55,000	75,000	85,000
Educational			
Utilization	20,000	50,000	75,000
Totals	120,100	178,200	227,200

Numbers influenced by the casino

ESTIMATED PUBLIC USE
I-10 Entry
Ramah, Butte LaRose, Henderson, Cypress Cove, Catahoula

	USER DAYS		
	2000	2010	2020
Consumptive Use:			
Hunting			
Fishing	80,000	86,000	92,000
Trapping,			
Crawfish, etc.	200	200	200
Non-Consumptive Use:			
General Recreation	75,000	190,000	350,000
Tourism: Motorists	75,000	166,000	270,000
Organized Tours	140,000	200,000	250,000
Educational			
Utilization	3,000	7,000	15,000
Totals	373,200	649,200	977,200

ESTIMATED PUBLIC USE
Bayou Sorrel

	USER DAYS		
	2000	2010	2020
Consumptive Use:			
Hunting	30,000	35,000	38,000
Fishing	50,000	53,000	55,000
Trapping,			
Crawfish, etc.	400	500	600
Non-Consumptive Use:			
General Recreation	15,000	20,000	30,000
Tourism: Motorists		40,000	60,000
Organized Tours		20,000	50,000
Educational			
Utilization		5,000	10,000
Totals	95,400	173,500	243,600

ESTIMATED PUBLIC USE
Bayou Pigeon

	USER DAYS		
	2000	2010	2020
Consumptive Use:			
Hunting	20,000	20,000	20,000
Fishing	40,000	40,000	40,000
Trapping,			
Crawfish, etc.	200	200	300
Non-Consumptive Use:			
General Recreation	5,000	5,000	10,000
Tourism: Motorists			
Organized Tours			
Educational			
Utilization			
Totals	62,200	65,200	70,300

ESTIMATED PUBLIC USE
U.S. 90 Entry
Lake Verret, Morgan City, Patterson, Garden City

	USER DAYS		
	2000	2010	2020
Consumptive Use:			
Hunting	40,000	46,000	50,000
Fishing	50,000	56,000	60,000
Trapping, Crawfish, etc.	400	500	600
Non-Consumptive Use:			
General Recreation	75,000	150,000	250,000
Tourism: Motorists	60,000	150,000	200,000
Organized Tours	100,000	150,000	315,000
Educational Utilization	2,000	5,000	10,000
Totals	327,400	557,500	885,600

ESTIMATED PUBLIC USE
Lake Fausse Pointe and Vicinity

	USER DAYS		
	2000	2010	2020
Consumptive Use:			
Hunting	15,000	17,000	20,000
Fishing	30,000	33,000	35,000
Trapping, Crawfish, etc.	100	100	100
Non-Consumptive Use:			
General Recreation	15,000	40,000	60,000
Tourism: Motorists Organized Tours	2,000	15,000	20,000
Educational Utilization			
Totals	62,100	105,100	135,100

All visitors ask to see an alligator...face-on like this one.

Greg Guirard

7.80 Facility Requirements for Each Site

7.81 List of Proposed Facilities

A. Old River Locks (not part of the ABFS-LA project) Corps of Engineers project; while the State is not involved in the building or operation of the Center, the State will include the Locks in its promotional campaign.

B. Simmesport (the State has previously appropriated its share for the construction of this project)

Boat launch (3-lane) ,
  Concrete ramp - 36'x350'
  Dock & marina
Parking
  40 spaces @ 10'x40'
  40 spaces @ 10'x20'
  Drive-through entry/exit lanes
Bank Fishing Trail - 300'
Toll Booth
Toilets
Picnic area - 14 permanent tables/benches
Primitive Campground - 2 acres,
Waste dump station
Access road to La. Hwy. 105

See Fig. 7.00 E for conceptual layout.

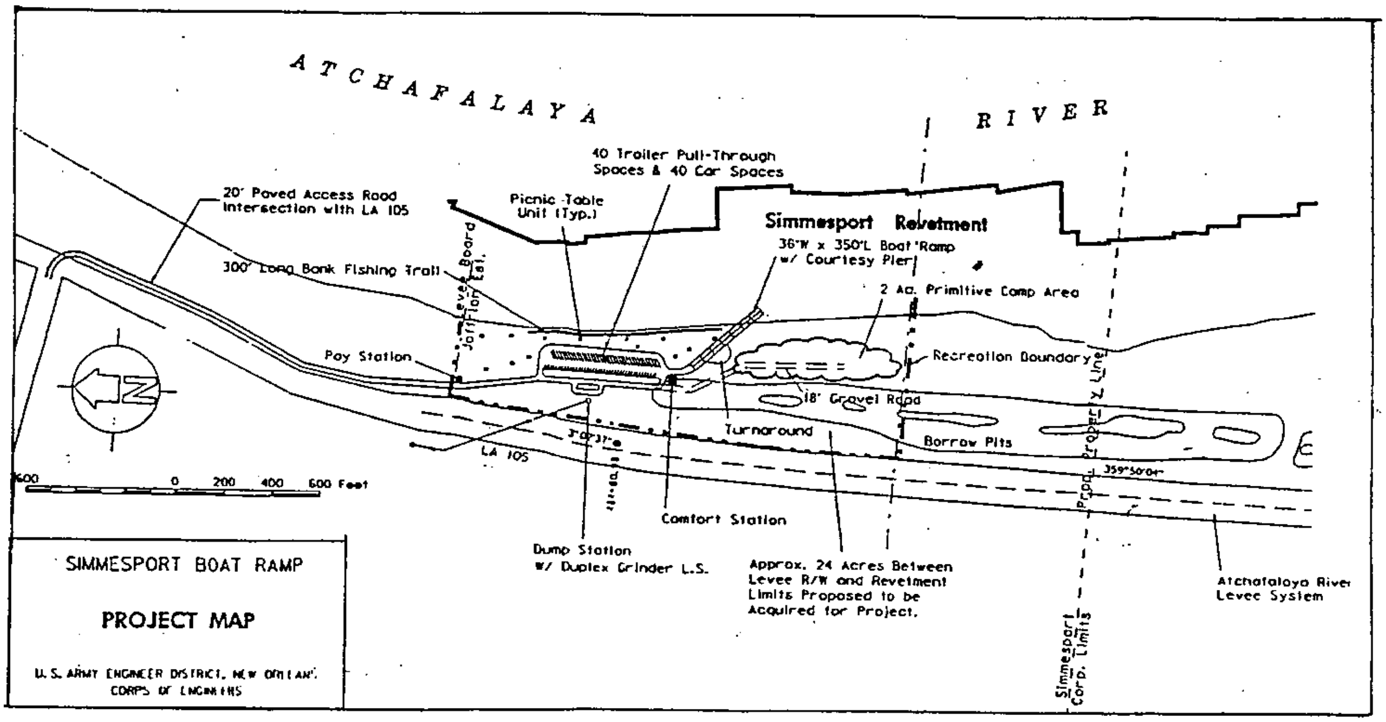


FIGURE 7.00 E: Simmesport Conceptual Layout

C. Krotz Springs - Entry to Wildlife Management Areas
Facilities for Wildlife Management Areas See Fig. 7.00 F
Facilities proposed: Upgrading La Hwys. 105 and 975

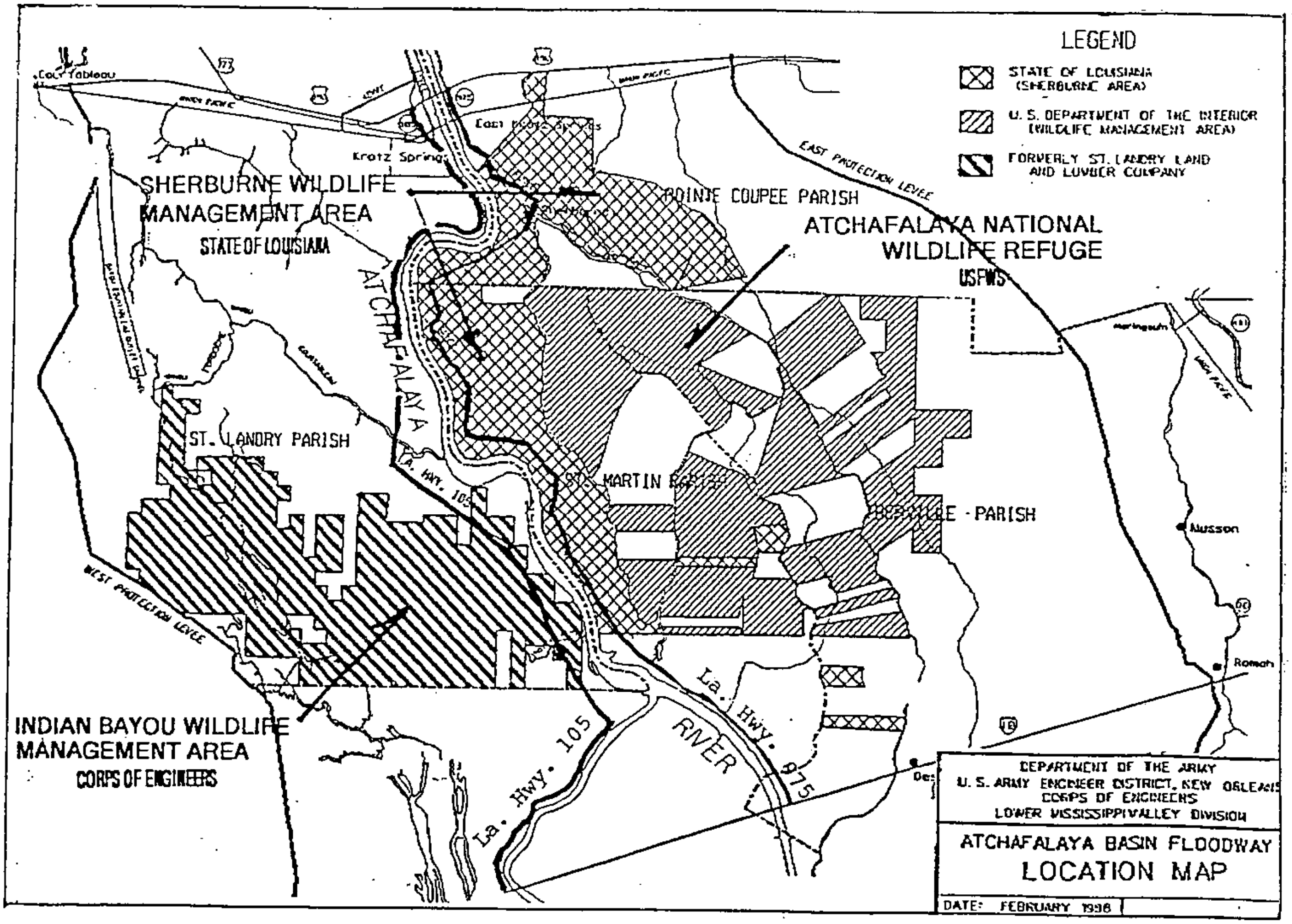


FIGURE 7.00 F: Wildlife Management Areas

D. I-10 Visitors' Information Center
Information/Display Building: 3,000 sqft
Reception area:
Enclosed - 350 sqft
Porch - 150 sqft
Fixtures: Information counter - 4 attendants
Shelving for pamphlets and other literature on rear wall
Coffee service nook
Staff quarters:
Office, lounge area, toilet, storage and equipment room

Display area: 1,000 sqft.
Open plan divided into two areas
Video area
Display area
Equipment: Monitors centrally controlled
Movable panels for panoramic views
Display cases
Pinpoint lighting
Sales area: 300 sqft
Display cases and shelves
Circulation pattern: traffic flow enters reception, then to video/display area, and exit through sales area

Rest area: (comply with ADAAG requirements) 700 sqft.

Women
- 8 stalls
- 4 lavatories
- 1 infant changing facility

Men
- 3 stalls
- 4 urinals
- 2 lavatories
- 1 infant changing facility

Parking:
- 50 cars
- 5 buses

Access and exit roads
- As required for the site

E. Bayou Sorrel

Navigation Locks Viewing Area
- (Area elevated for view of entire lock system)
- Viewing area - 800 sqft
- Display area - 400 sqft
- Staff quarters
  - Office, lounge, toilet, storage, equipment room

Rest area (comply with ADAAG requirements)

Women
- 5 stalls
- 3 lavatories
- Infant changing facility

Men
- 2 stalls
- 2 urinals
- 2 lavatories
- 1 infant changing facility

Parking
- 50 cars
- 5 buses

Boat launch - upgrade including fill to raise level of parking above high water level and ramp to new level

See Fig. 7.00 G for conceptual layout:

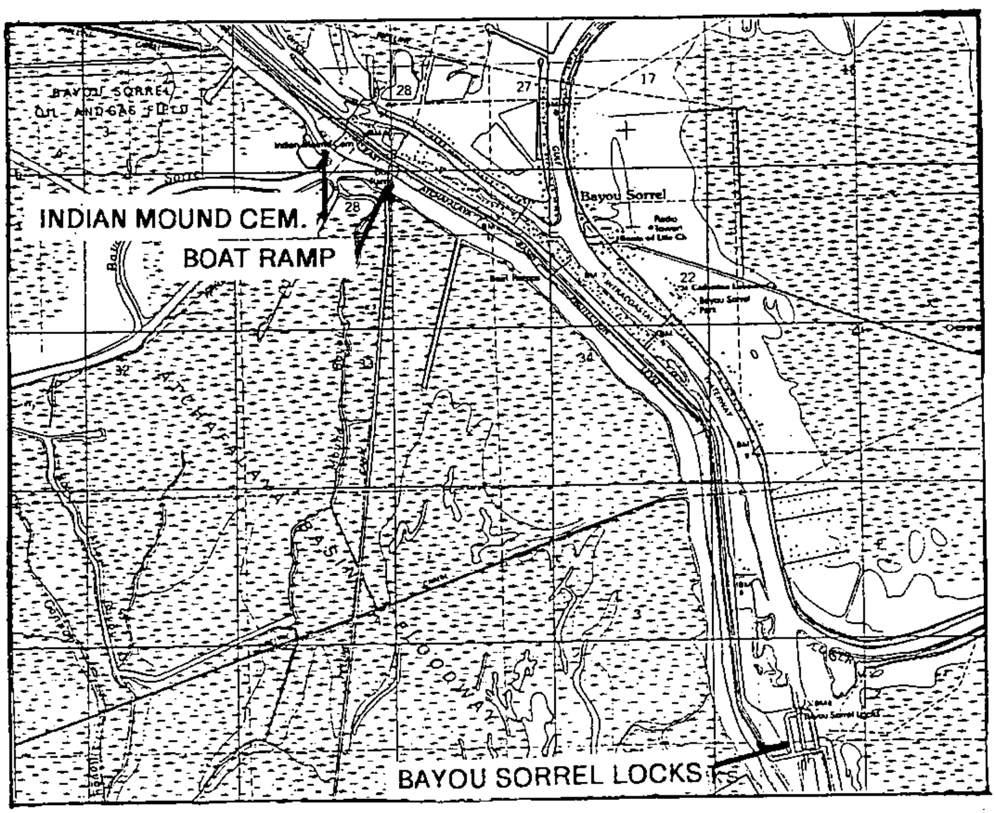


FIGURE 7.00 G: Bayou Sorrel Conceptual Layout

F. Bayou Pigeon
- Upgrade ramp and expand to 5 lanes and expand parking to capacity of 50 cars and trailers
- Clear area at end of parking space and maintain for canoe launch site

G. Lake Verret (Atchafalaya Wilderness Center East State Preservation Area)
- Facilities to be built (from State Parks Plan 1997)
- Interpretive Educational Center (level 3)
  - Entrance station, manager's residence, maintenance area
  - Day use area with picnic facilities
  - Cabins
  - Nature trails with wayside exhibits
  - Parking and drop-off

H. Stephensville
- Regional park and recreation area:
  - Add 24" fill to 10 acre site
  - Park building: 1,400 sqft
    - Manager office, toilet, storage 250 sqft
    - Concessions - 400 sqft
    - Restrooms: Comply with ADAAG standards - 750 sqft

Women	6 stalls
	4 lavatories
	infant changing facility
Men	2 stalls
	2 urinals
	3 lavatories
	1 infant changing facility

  - Equipment storage/workshop 600 sqft
  - Park pavilion (1) - 2,500 sqft
    (4) - 500 sqft each
  - Playgrounds
  - Hiking trail - 6' wide x 3,000' long
  - Overhead lighting
  - Utilities:
    - Connect to City water, power, gas, sewer
    - Water fountains at pavilions, playgrounds, concession stand
  - Parking - 50 cars - 20,000 sqft
  - Access and interior roads - 1/2 mile
- Boat launch (2-lane)
  - See 7.81 S for requirements for boat launch

I. U.S. 90 Entry - Morgan City
- Atchafalaya Multi-Agency Cultural Center (AMACCenter) - 25,000sqft.
  - Reception area - 1450 sqft
  - Staff quarters - 800 sqft
    - Office, lounge area, toilet, storage

Display area - 5,625 sqft
- Open plan divided into several areas:
  - History of area as influenced by floodway
  - History of oil industry
  - History of the timber industry
  - History of the fishing industry
  - Role of the Corps of Engineers since the 1927 flood
  - Water transportation
  - Manufacturing - drilling platforms
- Fish and Wildlife exhibit area

Meeting and conference rooms - 4,000 sqft

Regional headquarters - 4,500 sqft
- Louisiana Department of Wildlife & Fisheries
- U.S. Army Corps of Engineers
- Louisiana Department of Agriculture and Forestry
- Louisiana Department of Natural Resources
- Other Federal, State and Local Agencies

Center Administration - 1,000 sqft
- Reception
- 2 - offices
- Conference room
- Storage

Rest Rooms(ADAAG) 1st floor-750sqft
2d & 3rd Floors - 125 sqft each

Women	8 stalls	2 stalls (each)
	4 lavatories	2 lav. "
	Infant changing	
Men	3 stalls	1 stall (each)
	3 urinals	2 urinals "
	3 lavatories	2 lav. "
	1 infant changing	

- Storage, equipment room, circulation - 2,000 sqft

Observation deck

Research Center and Laboratories - 4,625 sqft

Parking
- 70 cars
- 8 buses

Boat dock for tours and marina (floating)
- Tour office 100 sqft
- Waiting room, toilet 200 sqft
- Marina - docking for 10 boats (DWF, COE, DAF, DNR) and DNR dredge

Boardwalk from Center to Dock

Fishing pier and bank fishing trail

Developed Campground (at Lake End Park)
- 20 - A-frame lodges - parking for 2 cars/lodge
  - Lower level - 800 sqft + 200 sqft deck
  - All purpose room

Kitchen
Bedroom
Bath
Upper level - 300 sqft + 50 sqft deck
Bunk area
Bath
RV Park - 20 spaces water, power, sewer connection
Picnic area 20 tables/benches
Hiking trail - Lake End Park to Brownell Park - 2 miles
Bike trail - Lake End Park to Brownell Park - 2 miles
Storm and erosion protection seawall (sheet piling) from Lake End Park to Brownell Park and at least 300' east of La. Hwy. 70 using as fill the sand banks in the Atchafalaya River just over the levee. The distance is approximately 2 miles. The Corps arranged separate funding, thus not in project, however the $3,000,000 cost requires matching funds of $1,000,000.

Renovations to Lake End Park Campground to bring it up to Corps of Engineers' standards
Upgrade existing Boat Launch Site to Corps' Standards and add parking to a total of 50 car/trailer spaces
Swimming area - located in Lake Palourde
Shore area - sand - 6,000 sqft
Water area - protection against encroachment by boats - 10,000 sqft
Observation tower
Rest rooms: (ADAAG)
Women - 2 stalls, 2 lavatories, 1 shower, 1 infant changing
Men- 1 stall, 1 urinal, 1 lavatory, 1 shower, 1 infant changing
Parking
25 cars
See Fig. 7.00 H for conceptual design

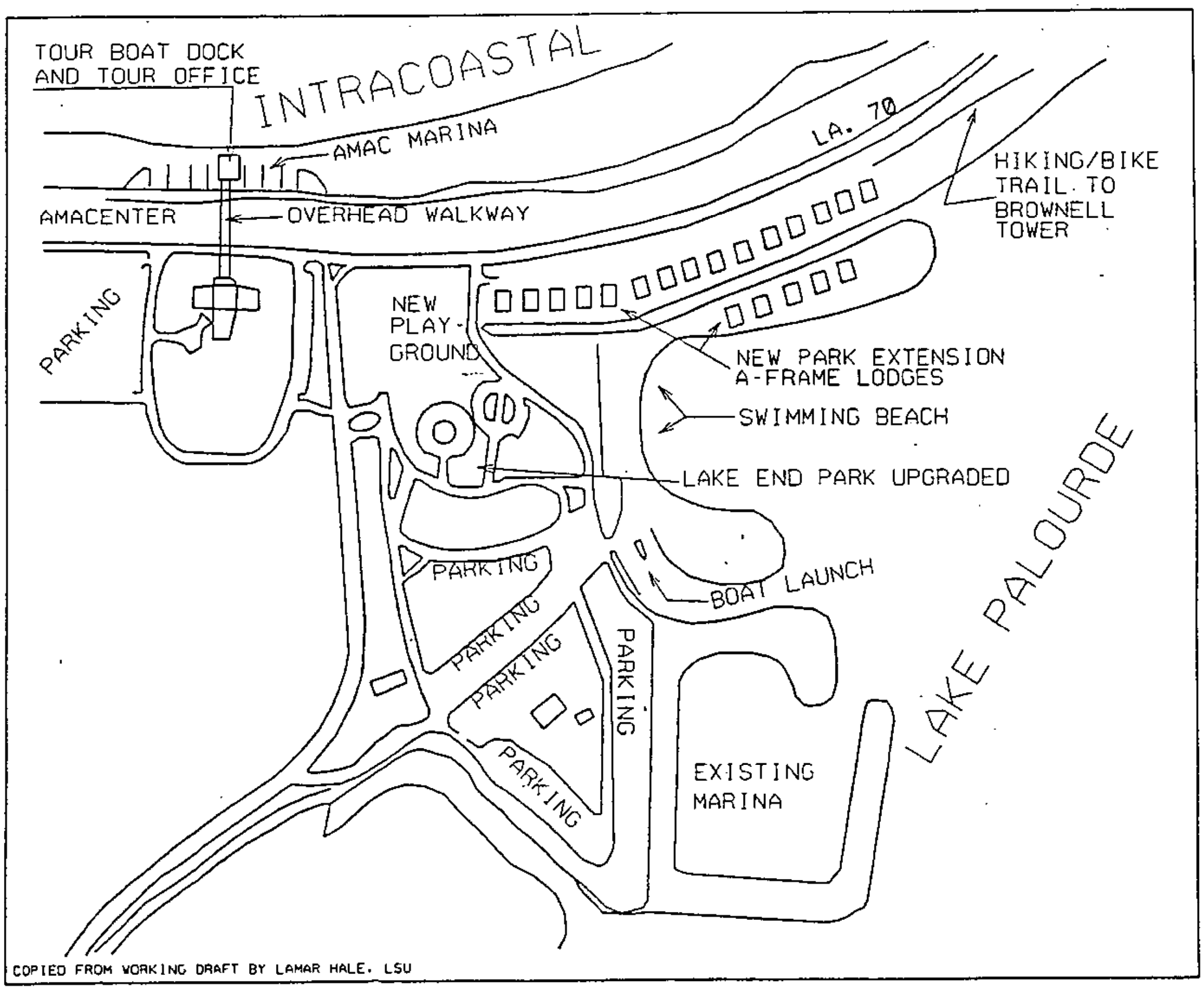


FIGURE 7.00 H:: Morgan City Conceptual Layout

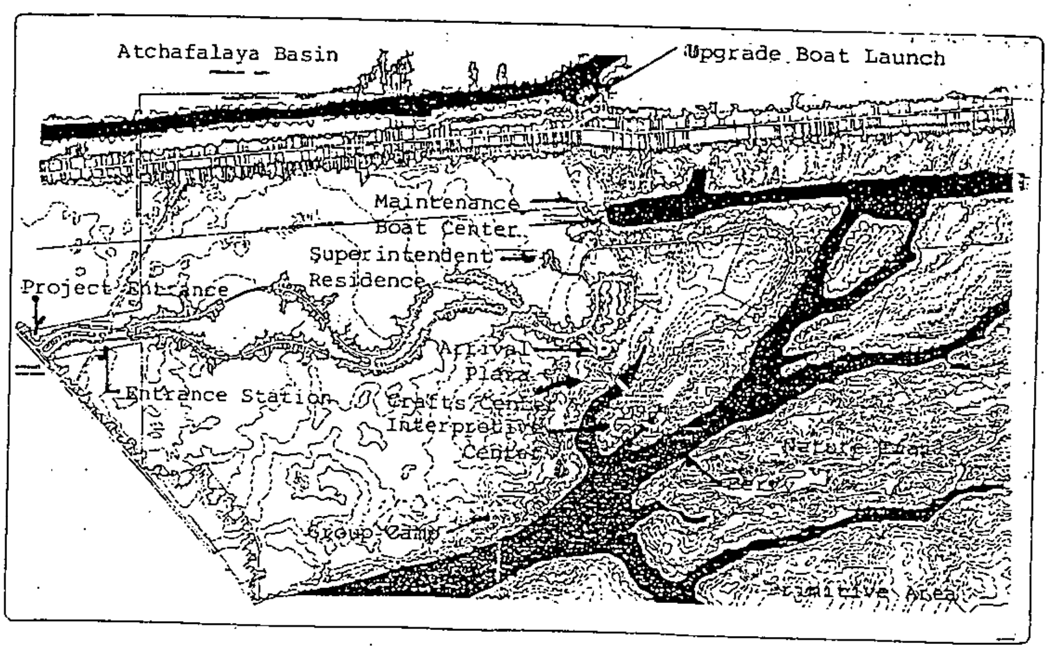
J. Charenton (Chitimacha Nation)
It is suggested that the Chitimacha Nation build and operate a tour office at the casino to arrange boat tours for those interested.

A dock for access by boat tours is the only project facility.

Dock for boat tours:
The Charenton Structure public boat launch is the potential location of this facility.
Dock - 8'x30' (floating) w/railing
Access to shore - hinged walkway - 4'x45'
Access from walkways to village is by public road.

K. Lake Fausse Pointe
See Section 4.80 for road improvements to this site.

L. Catahoula (Atchafalaya Wilderness Center West)
Boat launch at Lake Catahoula (2-lane)
See 7.81S for requirements
Entrance Station
Control office - 80 sqft
Manager's Residence - 1,800 sqft
LR, FR, K, 3 BR, 2B, 2 car garage
Maintenance and Storage - 1,000 sqft
Interpretive Center - 10,000 sqft
Reception area:
Enclosed - 550 sqft
Porch - 150 sqft
Toilets: 700 sqft (ADAAG)
Women - 4 stalls
- 3 lavatories
- Infant changing facility
Men - 2 stalls
- 2 urinals
- 2 lavatories
- Infant changing facility
Staff quarters: 500 sqft
Office, lounge area, storage and equipment room
Interpretive area – 8,000 sqft
Open plan divided into 2 areas
Video area
Display area
Equipment:
Monitors centrally controlled
Movable panels for panoramic views
Display cases
Pinpoint lighting
Sales area - 250 sqft
Circulation pattern: traffic enters reception, then to video/display, and exit through sales.
Crafts Center (3 Cajun-type buildings w/loft and porch)
Buildings each 30'x45' = 1350 sqft - 3 = 4,050 sqft
Porch 8'x35' - loft 1/3 floor area
Staff toilet and office - 120 sqft
Parking:
50 cars
8 buses
Group camp (day use only)
Nature trails with wayside exhibits and picnic areas
Access and interior roads
Utilities
See Fig. 8.00 I for Master Plan



Source: Office of State Parks - Charles M. Hubbs Associates Landscape Architects - Planners
FIGURE 7.00 I: Catahoula Conceptual Layout

M. St. Martinville
RV Pads:
Phase I: 45 pads in Magnolia Park
Phase II: 200 pads on adjacent land (subject to donation)
Entrance Station:
Control office at gate - 8'x10'
Ports:
Concrete - 24'x36' with 25' landscaped area between ports drive through layout
Utilities - water, sewer, power provided to each site
Pavilion:
25'x25' overlooking Bayou Teche
Utilities - lights, water hydrant
Access:
Entry road and interior road net

N. Cypress Cove
Heritage Center - 8,000 sqft
Reception Area - 300 sqft
Toilets: 700 sqft (ADAAG)

Women	- 4 stalls
	- 2 lavatories
	- Infant changing facility
Men	- 2 stalls
	- 2 urinals
	- 2 lavatories
	- infant changing facility

Staff quarters: 400 sqft
Office, lounge area, storage and equipment room

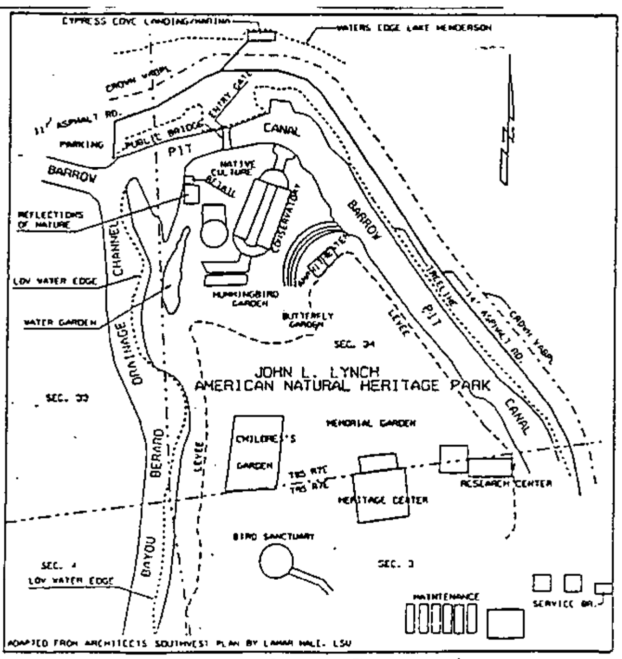


FIGURE 7.00 J Cypress Cove Conceptual Layout

Botanical Area - 6,300 sqft inside + outside displays
Sales area - 300 sqft
Parking - provided by Lynch Gardens
Dock for boat tours:
Floating dock - 8'x40'
Walkway to dock, hinged, 4'x35'
Walkway: Dock to Center - 6'x100' with foot-bridge over bayou
Service bridge: over bayou plus access road
See Fig. 7.00 J for conceptual layout

O. Henderson
Proposed (Project)
Construct elevated boardwalk on the Boulevard Henderson to Cypermart Crevasse) 2 miles x 6' wide with viewing and photo-op stands (10'x16') at scenic overlook points (a total of not less than 6).
Construct a bike trail at the foot of the levee inside the Basin from Henderson to Cypermart Crevasse (2 miles x 8' wide)
Provide planning and engineering services to a local authority for the construction of a natural-setting alligator area on the tour boat route in Henderson Lake (probably near Bay Patin). The local authority will maintain and operate the facility.
Provide engineering and permit services to a local authority for installation of sheet piling bulkheads at critical points along the Boulevard and levee.
Provide water access to boat launch sites during periods of draw-down of Lake Henderson for environmental and other purposes.
Road access improvement needs:
See Section 4.80 for necessary road improvements, including:
Improving La. Hwy. 347 from I-10 to La. Hwy. 352 which will be widened to include a passing lane and improve levee road from Henderson to Verdunville.
See Fig. 7.00 K for Conceptual Layout

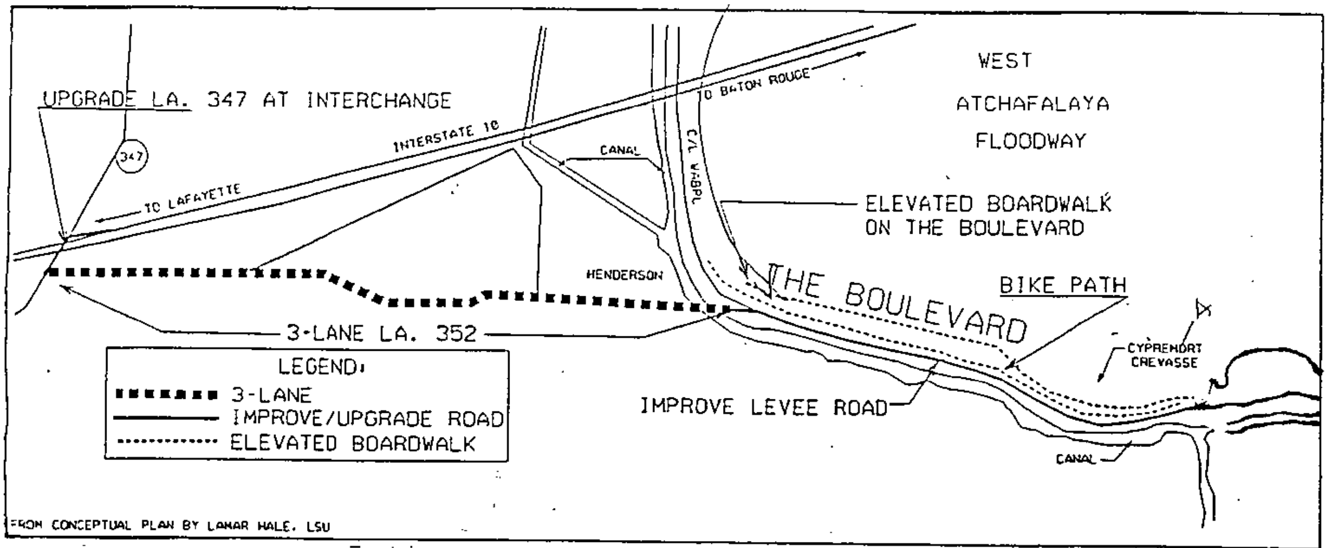


FIGURE 7.00 K: Henderson Conceptual Layout

P. Ramah
- Dock for boat tours:
  - Floating dock - 8 'x40 '
  - Walkway to dock - 4'x35', hinged
- Dredging to create all-season channel from Henderson to the Upper Grand River area
- Boat launch upgrade (see 7.81 S for details)

Q, Primitive Campgrounds
- Existing primitive campgrounds:
  - Attakapas Island Wildlife Management Area - 3
  - Sherburne Wildlife Management Area - 1
- Proposed primitive campgrounds
  - See Fig . 7.00 D for locations
- Requirements:
  - Tent platforms - raised wood platforms - 8'x10' 25 per site
  - Firepit:
    - Raised firepit/grille for each platform
  - Waste disposal:
    - Trash-in, trash-out policy enforced
  - Sanitary facilities:
    - None provided
  - Utilities:
    - None provided
  - Trails:
    - Aggregate trails from platform to entry road or landing
  - Boat landing (for water-access only sites)
    - Cleared sloping bank with handy trees or posts for tie-up

R. Developed Campgrounds
- Existing developed campgrounds:
  - Lake Fausse Pointe State Park
  - Butte LaRose - Frenchman's Wilderness (commercial)
  - Alabama Bayou - (commercial)
  - Morgan city - West End Park
  - St. Martinville
  - Others in the area are beyond reasonable driving range
- Proposed developed campgrounds:
  - Simmesport
  - Morgan City - expansion and upgrading of Lake End Park St. Martinville - 47 RV sites in Magnolia Park
  - Note: Additional sites will be added as local non-federal sponsors submit requests

Proposed campgrounds will be managed and maintained by the local non-federal sponsor or by lease to an operator. Fees will be charged for use of the campgrounds and such revenue retained by sponsor.

- Central Facilities:
  - 2-office suite with private toilet
  - First aid room
  - Ticket office
  - Storeroom - cleaning and maintenance supplies and equipment
- Tent camping pad - 100 units 8'x 10' (varies with site)
  - Parking for each unit - 10'x25' minimum
  - Electricity to each unit
  - Water hydrant for each 10 units
  - Shower and toilet: 1 per 50 units (ADAAG)
    - Women - 6 toilet stalls
      - 6 lavatories
      - 1 infant changing table

- 4 shower stalls
- dressing area

Men
- 3 toilet stalls
- 2 urinals
- 6 lavatories
- 4 showers
- dressing area
- infant changing facility

Washroom- (1 per 50 units)
- 6 coin-operated washers
- 7 coin-operated dryers

Raised firepit/grille for each unit
Street lights
Outside lights for rest areas and washroom
Anchored trash receptacles - 1 per 2 units

RV pads — 30 units (12'x28') (varies with site)
Electricity to each unit
Sanitary waste dump to each unit (preferable) or 1 central dump station
Water to each unit
Anchored trash receptacles - 1 per 2 units
Street lights

Central activity playground:
Cleared and sodded area for group games
Covered pavilion - 300 sqft

Toilets - women - 2 stalls (ADAAG)
- 2 lavatories ies

Men - 1 stall (ADAAG)
- 1 urinal
- 2 lavatories

Water fountain - 2
Water hydrant - 1

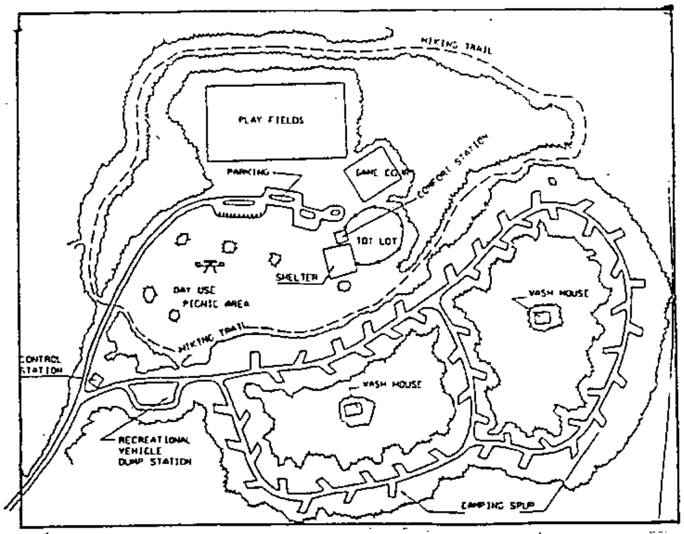
Nature trails - elevated over wetlands

Picnic area - for day-use groups
Concrete tables and benches - 12
Water fountain - 2
Trash receptacle - 1 per 4 tables
Parking - 12 cars
- 2 school buses

Utilities:
Unless available from municipal sources, local provision is required and must be planned and constructed in accordance with state regulations.

NOTE: Each site dictates the layout and size.

A conceptual plan by the Corps of Engineers is shown on Fig. 7.00 L



Source: U.S. Army Corps of Engineers
FIGURE 7.00 L: Conceptual Developed Campground

S. Boat launch
In addition to the boat launch sites at one of the entry points, the following sites are proposed to answer local demand:

5-lane Boat Launch	2-lane Boat Launch
Butte LaRose upgrade	Bayou Benoit upgrade
Myette Point upgrade	Belle River upgrade
Butte LaRose (River)	Sandy Cove upgrade
	Marshfield landing
	Stephensville (new)

Corps of Engineers standards include:

Launching lane widths - 12' - total ramp width would be a multiple of this width;
Upper limit of ramp - 3' above the 2 percent flowline
Lower limit of ramp - 4' below the annual average low water elevation
Turnaround - 75' diameter minimum
Ramps surfaced in scored reinforced concrete
Ramp gradients - 13% - 15%
Ramp shoulders stabilized to prevent erosion
Curbs - 6" both sides of ramp
Lighting provided when feasible

7 90 Costs and Sponsorship

7.91 Methodology

Costs are estimated based on current cost plus an allowance for inflation to construction date and a contingency for unexpected problems.

Estimates are for the size and number of facilities shown in Section 7.80. Change in this program as a result of more complete studies will affect the total costs.

Engineering and design costs are estimated at 12% and include the following: site planning, engineering and testing, and architectural design.

7.92 First costs of development (land acquisition)

Location	Item	No. Acres	Cost/A	Total
Old River Locks			Corps land	
Simmesport			Parish	
Krotz Springs	Access to sections of fee-purchase land by Corps		Corps project	
I-10 Entry	Visitor Center-site not selected	20	3,000	60,000
Bayou Sorrel	Trails R.O.W.	20	1,000	20,000
Little Bayou Sorrel	Canoe assembly and launch	10	500	5,000
Atchafalaya Wilderness Center East SPA	Included in State Parks construction budget			
Stephensville	Park	10	3,000	30,000
	Boat launch		Parish responsibility	
Morgan City	AMACCenter	5	10,000	50,000
	R.O.W. Dock to Center	2	2,500	5,000
	Campground		City land	
	Bike/hike trails		State land	
	Boat launch expansion	4	1,500	6,000
Charenton	Dock and R.O.W. to road	5	1,000	5,000
Lake Fausse Pointe	State Park		State land	
Marshfield Landing	Marshfield boat launch		Parish land	
Catahoula	State Preservation Area		State land	
Cypress Cove	Dock and R.O.W. to Center	4	1,000	4,000
	Heritage Center		Lynch Gardens	
Henderson	R.O.W. trail on Boulevard	50	1,500	75,000
Ramah	R. O.W. for water access to Upper Grand River Flats scenic area	370	500	185,000
Primitive Campgrounds	site selection under study			
Scenic/unique area	(preferably Upper Grand or similar area)	1,000	1,150	1,150,000
Total		1, 500		1, 595, 000

Note: The cost of land acquisition for recreational purposes can be used as a cost/share against the 50% development cost of those facilities. Note that the state must purchase the land and will receive the offsetting credit (for 50% of the total costs) after construction.

7.93 Costs for Individual Sites

Note: Most projects are conceptual and will require additional feasibility and design studies and approval and qualification by the Corps of Engineers, including development of a Project Cooperative Agreement (PCA) between the Corps and the non-federal sponsor for operation and maintenance of the facilities, and funding by the Louisiana Legislature.

A. Old River Locks

No state funds are involved at this site

B. Simmesport Boat Launch and Campground

State funds are involved under a previous appropriation. There is no state involvement under the ABFS-LA project.

C. Krotz Springs Wildlife Management Areas

Capital costs - completed under separate program.

Operating costs - see Section 4.90

No project facilities are planned for Krotz Springs at this time. Information and directions to interested visitors and necessary support services may be included at a future date.

D. I-10 Entry

VISITORS' INFORMATION CENTER
Estimated Capital Costs

Item	Area & Unit	Subtotal	E&D	Total
Site work	6 acres @ 5,000	30,000	3,600	33,600
Structure	3,000 sqft @ $120	360,000	43,420	403,420
Utilities	Local/state hookup			75,000
Furnishings				35,000
Electronic Eq.	Computer, video			50,000
Displays		50,000	6,000	56,000
Parking/drives	50,000 sqft @ $4	200,000	24,000	224,000
Landscape/walks	---	25,000	3,000	28,000
Total Estimated Capital Costs				905,020

Costs will vary due to site selected.

VISITORS' INFORMATION CENTER
Estimated Operating Costs

Item	No.	Subtotal	Amount	Total
Personnel:				
Director	1		36,000	
Assistant	1		24,000	
Host/hostess	4	18,000	72,000	
Clerk	1		15,000	
Groundkeeper/maintenance	1		15,000	
Total Personnel			162,000	
Benefits @ 23%			37,260	
Total Personnel & Benefits				199,260
Indirect costs not applicable since there is no cost/sharing				
Contractual:				
Display update (annual)		24,000		
Solid waste disposal (2/week)		20,000		
Total contractual				44,000
Expenses:				
Software & video update		10,000		
Utilities		2,400		
Communications		3,600		
Office/maintenance supplies		6,000		
Literature handouts/maps		12,000		
Coffee service/tourists		6,000		
Total expenses				40,000
Total Estimated Operating Costs (97/98 costs)				283,260
Total Estimated Operating Costs (99/00 costs)				312,294
Total Estimated Operating Costs 15 yrs.				6,738,855

Cost increases calculated @ 5%/year

E. Bayou Sorrel

BAYOU SORREL ESTIMATED CAPITAL COSTS

Item	Area & Unit	Subtotal	E&D	Total
Locks' Viewing Stand and Display:				
Site work	3 acres @ $5,000	15,000	1,800	16,800
Structure	2,200 sqft @ $120	264,000	31,600	295,600
Furnishings				30,000
Display		50,000	6,000	56,000
Parking/roads	35,000 sqft @ $3	105,000	12,600	117,600
Utilities				75,000
Total Viewing Stand and Display				591,000
Boat Launch Upgrade:				
Complete fill	1, 000 cuyd @ $40	40,000	4,800	44,800
Extend ramp	12,000 sqft @ $10	120,000	14,400	134,400
Parking	25, 000 sqft @ $2	50,000	6,000	56,000
Total boat launch upgrade				235,200
Total Bayou Sorrel Estimated Costs				826,200

BAYOU SORREL ESTIMATED OPERATING COSTS

No State funds are involved.

F. Bayou Pigeon

BAYOU PIGEON ESTIMATED CAPITAL COSTS

Item	Area & Unit	Subtotal	E&D	Total
Boat Launch Upgrade:				
Site work	3 acres @ $5,000	15,000	1,800	16,800
Ramp Exten.	6,000 sqft @ $10	60,000	7,200	67,200
Parking	25,000 sqft @ $2	50,000	6,000	56,000
Total boat launch upgrade				140,000
Total Bayou Pigeon Estimated Costs				140,000

BAYOU PIGEON ESTIMATED OPERATING COSTS

No State funds are involved.

G. Lake Verret (Atchafalaya Wilderness Center East)

LAKE VERRET ESTIMATED CAPITAL COSTS

Estimate for land and development from 1997 SCORP	7,000,000

LAKE VERRET ESTIMATED OPERATING COSTS

Assumed to be the same as Catahoula FY 97/98	508,860
FY 99/00	561,018
Total Operating Costs 15 years	12,105,951

Cost increases calculated @ 5%/year

H. Stephensville

STEPHENSVILLE ESTIMATED CAPITAL COSTS

Item	Area & Unit	Subtotal	E&D	Total
Boat launch (2-lane) new				
Site work	4 acres @ $5,000	20,000	2,400	22,400
Fill	3,000 cuyds @ $40	120,000	14,400	134,400
Ramp	8,000 sqft @ $10	80,000	9,600	89,600
Parking	30,000 sqft @ $2	60,000	7,200	67,200
Access road	½ mile @ 200,000/m	100,000	12,000	112,000
Total Estimated Cost Boat Launch				425,600
Regional Park and recreation area: Fill 10 acre area and build facilities as outlined in Section 7-31 H. Cost estimate from Al Landry, Architect for St. Martin Parish				970,000
(subject to land donation)				
Total estimated Cost Stephensville				1,395,600

STEPHENSVILLE ESTIMATED OPERATING COSTS

No State funds are involved.

I. U.S. 90 Entry - Morgan City

MORGAN CITY ESTIMATED CAPITAL COSTS

Item	Area & Unit	Subtotal	E&D	Total
AMACCenter				
Site work	6 acres @ $5,000	30,000	3,600	33,600
Structure	25,000 sqft @ 130	3,250,000	390,000	3,640,000
Info. Network				150,000
Displays		250,000	30,000	280,000
Furnishings				200,000
Parking/access rd	40,000 sqft. @2.50	100,000	12,000	112,000
Total Estimated Cost AMACCenter				4,415,600
Boat dock (floating):				
Structure	2,000 sqft @ $75	150,000	18,000	168,000
Anchors/bumpers				16,000
Berths	6 @ $10, 000	60,000	7,200	67,200
Decking	2,000 sqft @ $10	20,000	2,400	22,400
Tour Center (on dock):				
Structure	300 sqft @ $120	36,000	4,320	40,320
Furnishings				3,000
Walkway to Center				10,000
Lighting/Utilities				50,000
Landscaping and walkways:				50,000
Total Estimated Cost Center Area				426,920
Campgrounds:				
20 A-frame Lodges	20 @ $96,000	1,920,000	11,520	1,931,520
20 RV Ports	20 @ $15,000	300,000	36,000	336,000
Utilities				100,000
Landscaping				30,000
Renovate existing				500,000
Total Estimated Cost Campgrounds				2,897,520
Hiking/Bike Trails				
Hard surface	5,280 sqyd@ $35	184,800	22,176	206,976
Swimming Area:				
Rest Rooms	400 sqft @ $100	40,000	4,800	44,800
Swimming/sun bathing area				40,000
Access/parking	50,000 sqft @ $4	200,000	24,000	224,000
Total Swimming Area				308,800
Boat Launch Upgrade:				
Site work	100,000 sqft @ $1	100,000	12,000	112,000
Ramp extension	5,000 sqft @ $5	25,000	3,000	28,000
Parking	20,000sqft @ $3	60,000	7,200	67,200
Lights/water				20,000
Dock (floating)				
Structure	200 sqft @ $75	15,000	1,800	16,800
Anchors/bumpers				2,000
Decking	200 sqft @ $10	2,000	240	2,240
Boardwalk	1,200 sqft @ $25	30,000	3,600	33,600
Total Boat Launch/Dock				281,840
Total Morgan City (project total)				8,537,656
Bulkhead/fill - non-project funding arranged by Corps - required State matching funds				1,000,000

I. U.S. 90 Entry - Morgan City

MORGAN CITY ESTIMATED OPERATING COSTS

Item	No.	Subtotal	Amount	Total
Personnel:				
Facility Manager	1		35,000	
Secretary	1		17,000	
Wildlife Educator	3	25,000	75,000	
Wildlife Agent 1)	6	22,000	132,000	
Maintenance	1		18,000	
Groundskeeper	1		16,000	
Total Personnel			293,000	
Benefits @ 23%			67,390	
Total Personnel/Benefits				360,390
Contractual:				
Display Update (annual)			30,000	
Solid Waste Disposal			3,120	
Total Contractual				33,120
Operating Services: 2)				
Utilities			25,000	
Telephone			5,000	
Rentals (equipment)			12,000	
Printing			25,000	
Postage			20,000	
Insurance			100,000	
Repairs/Maintenance			30,000	
Miscellaneous			20,000	
Total Operating Services				237,000
Supplies:				
Office			16,000	
Computer			18,000	
Audio-Visual			72,000	
Building/grounds supplies			20,000	
Repair/maintenance supplies			10,000	
Other operating supplies			20,000	
Total Operating Supplies				156,000
Total Operating Costs AMACCenter FY 97/98				786,510
Total Operating Costs AMACCenter FY 99/00				867,128
Total Operating Costs for 15 years Cost increases calculated @ 5%/year				18,711,361

1) Wildlife Agents: 2 for DWF Research Center
2 for Lower Basin Security & Information (based in Morgan city)
2 for Upper Basin Security & Information (based in Henderson area)

2) Indirect cost omitted - Operating Services includes all costs normally listed as Indirect Costs.

Developed Campgrounds, Trails, Boat and Canoe Launch,
Swimming Area, and Associated Grounds:
No state funds involved.

J. Charenton (Chitimacha Nation)

ESTIMATED CAPITAL COSTS - CHARENTON

Item	Area & Unit	Subtotal	E&D	Total
Dock for Boat Tours:				
Structure	200 sqft @ $75	15,000	1,800	16,800
Anchors/bumper				2,000
Decking	200 sqft @ $10	2,000	240	2,240
Boardwalk	800 sqft @ $25	20,000	2,400	22,400
Total Charenton Dock				43,440

ESTIMATED OPERATING COSTS - CHARENTON

No State funds are involved.

K. Lake Fausse Pointe

See Access Section 4.80 for road improvements to this site.

L. Catahoula - ATCHAFALAYA WILDERNESS CENTER - WEST
ESTIMATED CAPITAL COSTS

Cost estimate by Office of State Parks	6,224,270
Crafts center requested by Parish and City	526,500
Upgrade Catahoula Boat Launch and parking area	400,000
Total Estimated Capital Costs - Catahoula	7,150,770

ESTIMATED OPERATING COSTS - CATAHOULA - AWC

Item	No.	Unit	Subtotal	Total
Personnel:				
SPA Director	1		40,000	
Secretary	1		17,000	
Facility Manager	1		25,000	
Naturalists	2	18, 000	36,000	
Maintenance Manager	1		20,000	
Mechanic	1		16,000	
Groundskeeper	2	15,000	30,000	
Interpretive Center:				
Curator	1		30,000	
Assistant	1		22,000	
Naturalists	2	18,000	36,000	
Total Personnel			272,000	
Benefits @ 23%			62,560	
Total Personnel & Benefits				334,560
Indirect Costs - not applicable, since there is no cost/sharing				
Contractual:				
Contract labor			18, 000	
Display (update)			30, 000	
Solid Waste Disposal			4,800	
Total Contractual				52,800
Expenses:				
Operating services			80,000	
Supplies			30,000	
Travel and per diem			1,500	
Misc. expenses			10,000	
Total expenses				121,500
Total Operating Costs FY 97/98 costs				508,860

ESTIMATED OPERATING COSTS - CATAHOULA - AWC West (Cont.)

	Total
Total Operating Costs at Beginning of Project - FY 99/00	561,018
Total Operating Costs for 15 years	12,105,951

Cost increases calculated at 5%/yr.
Note: If cultural center is included funds will be requested for additional guides and native or local people for crafts displays and periodic entertainment.

M. St. Martinville

ESTIMATED CAPITAL COSTS - ST. MARTINVILLE

Estimate furnished by Mayor's Office City of St. Martinville	1,500,000

ESTIMATED OPERATING COSTS - ST. MARTINVILLE

No State funds are involved.

N. Cypress Cove - Lynch Botanical Gardens

ESTIMATED CAPITAL COSTS - CYPRESS COVE

Item	Area & Unit	Subtotal	E&D	Total
Dock - Tour boats:				
(floating)				
Site work	20,000 sqft @ $1	20,000	2,400	22,400
Structure	300 sqft @ $75	22,500	2,700	25,200
Anchors/bumpers				3,000
Decking/railing	300 sqft @ $10	3,000	360	3,360
Boardwalk	600 sqft @ $25	15,000	1,800	16,800
Total Dock				70,760
Footbridge	150' (75' span)			
	900 sqft @ $100	90,000	10,800	100,800
Walkway	1,800 sqft @ $5	9,000	1,080	10,080
Total Footbridge/Walkway				110,880
Service Bridge &	5,000 sqft @ $40	200,000	30,000	280,000
Access road	1/4 mile @ $200,000	50,000		
Heritage Center:				
Site work	3 acres @ $5,000	15,000	1,800	16,800
Structure	8,000 sqft @ $120	720,000	86,400	960,000
Landscape				75,000
Furnishings				35,000
Total Estimated Costs - Heritage Center				1,086,800
Total Estimated Costs - Cypress Cove				1,548,440

ESTIMATED OPERATING COSTS - CYPRESS COVE

No State funds are involved.

O. Henderson

ESTIMATED CAPITAL COSTS - HENDERSON

Item	Area & Unit	Subtotal	E&D	Total
Elevated Board walk	63,360 sqft @ $50	3,168,000	380,160	3,548,160
6-viewing & Photo Ops	960 sqft @ $50	48,000	5,760	53,760
Bike Trail incl. Fill	7,040 sqyds @ $50	352,000	42,240	394,240
Alligator Area Planning				20,000
Bulkhead Planning				50,000
Water Access				150,000
Improve Roads	See Section 4-12			
Total Capital Costs - Henderson				4,216,160

ESTIMATED OPERATING COSTS - HENDERSON

No State funds are involved.

P. Ramah

ESTIMATED CAPITAL COSTS - RAMAH

Item	Area & Unit	Subtotal	E&D	Total
Dock - Tour boats: (floating)				
Site work	15,000 sqft @ $1	15,000	1,800	16,800
Structure	320 sqft @ $75	24,000	2,880	26,880
Anchors/bumper				3,000
Decking/rail	320 sqft @ $10	3,200	384	3,584
Boardwalk	600 sqft @ $25	15,000	1,800	26,800
Total dock				77,064
Boat launch upgrade:				
Site work	50,000 sqft @ $1	50,000	6,000	56,000
Ramp extension	10,000 sqft @ $5	50,000	6,000	56,000
Parking ext.	30,000 sqft @ $3	90,000	10,800	100,800
Total boat launch				212,800
Canoe Assembly & Launch; parking:				
Site work	30,000 sqft @ $1	30,000	3,600	33,600
Parking	12,000 sqft @ $2	24,000	2,880	26,880
Total Canoe				60,480
Dredging water access:				
Survey & permit			50,000	50,000
Dredging (est.)		500,000	60,000	560,000
Total dredging				610,000
Total Ramah				960,344

ESTIMATED OPERATING COSTS - RAMAH

No State funds are involved.

Q. Primitive Campgrounds

Since the state Land Office has agreed not to allow additional camps on state lands (see Section 5.42 B) except on the 40 designated sub-divided areas, which areas are not suitable for primitive campgrounds, alternative sites are being investigated on other lands.

Existing primitive campgrounds in the Attakapas and the Sherburne Wildlife Management Areas are available.

The following budget is included to provide funds for alternative sites, if found:

ESTIMATED OPERATING COSTS - PRIMITIVE CAMPGROUNDS

3 @ $143,000 each (COE estimate)	429,000

ESTIMATED OPERATING COSTS - PRIMITIVE CAMPGROUNDS

Supervisory:	
DWF Wildlife Agent (see Section 7.93 H)	
Contractual:	
Clean-Up and disposal - 2 visits/site/month	10,000
Total Estimated Operating Costs FY 97/98	10,000
Total Estimated Costs FY 99/00	11,025
Total Estimated Costs for 15 years	242,550

R. Developed Campgrounds

Included in Entry Point Budgets

S. Boat Launch

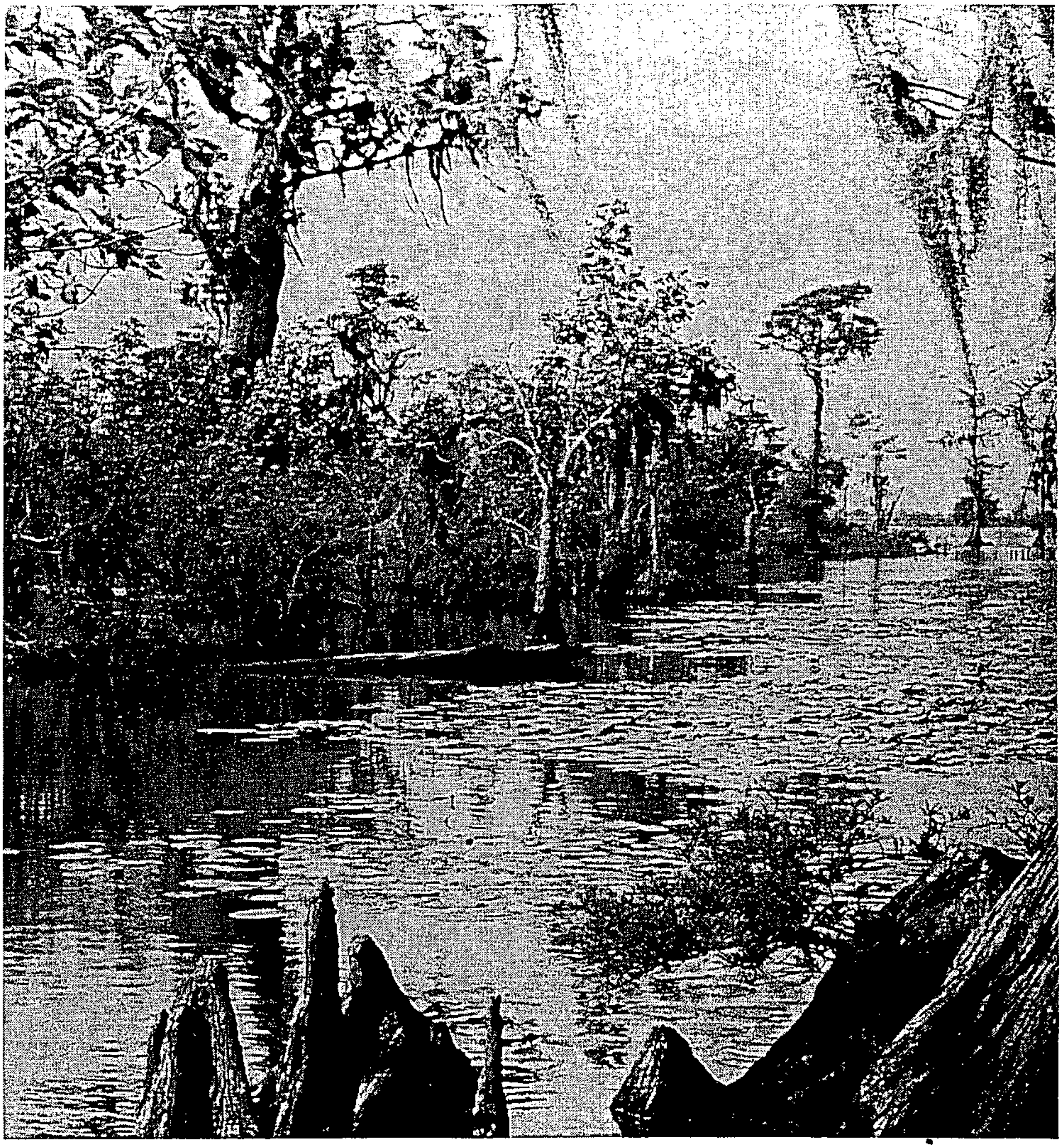
5-lane Boat Launch:	
Butte LaRose upgrade (I-10 Exit - existing launch with access to Lake Henderson)	225,000
Myette Point upgrade	381,840
Sandy Cove upgrade	381,840
2-lane Boat Launch:	
Butte LaRose with access to Atchafalaya River,	545,000
Belle River upgrade	605,320
Bayou Benoit upgrade	240,000
Marshfield landing upgrade	350,000
Canoe Assembly and Launch:	
Little Bayou Sorrel (new)	225,000
Total Boat Launch Facilities & Upgrades (not previously budgeted)	2,954,000

ESTIMATED OPERATING COSTS - BOAT LAUNCH

No State funds are involved.

7.94 Sponsors

A. LOCATION	FACILITY	SPONSOR
Old River Locks	all	Corps of Engineers
B. Simmesport	all	Red River Waterway Comm./Parish
C. Krotz Springs	Sherburne WMA	Dept. Wildlife & Fisheries
	Atchafalaya National Wildlife Refuge	USFWS & DWF
	Indian Bayou	Corps of Engineers &DWF
D. I-10 Entry	Visitor Information	CRT Office of Tourism
E. Bayou Sorrel	Lock Viewing Area	Corps of Engineers
	Boat launch	Parish, Levee Board
F. Bayou Pigeon	Boat launch	Parish, Levee Board
G. Lake Verret	Atchafalaya Wilderness Center-East	CRT Office of State Parks
H. Stephensville	Community Park	City/Parish
	Boat Launch	Parish
I. Morgan City	AMACCenter	Dept. Wildlife & Fisheries
	Campgrounds	City/Parish
	Trails/Swimming	City/Parish
	Boat Launch	Parish, Levee Board
	Lake End Park	City
J. Charenton	Boat Dock	Chitimacha Nation
K. Lake Fausse Pointe	State Park	CRT Office of State Parks
L. Catahoula	Atchafalaya Wilderness Center-West	CRT Office of State Parks
	Boat launch	Parish
M. St. Martinville	RV Pads/campground	City
N. Cypress Cove	Heritage Center	Lynch Gardens
	Boat dock	Lynch Gardens
O. Henderson	Elevated walkway	City/Parish
	Bike trail	City Parish
	Planning Assistance	Dept. of Natural Resources
P. Ramah	Boat launch	Dept. Transportation/Develop.
	Boat dock	Dept. Transportation/Develop
	Water access	Dept. of Natural Resources
Q. Primitive Campgrounds	under study	
R. Developed Campgrounds	see above	
S. Boat launch (not incl. above)	Butte LaRose (lake)	Dept. Transportation/Develop.
	Butte LaRose (river)	Parish
	Myette Point	Parish, Levee Board
	Bayou Benoit	Parish, Levee Board
	Belle River	Parish, Levee Board
	Marshfield Landing	Parish
	Sandy Cove	Parish, Levee Board
Canoe launch	Little Bayou Sorrel	Levee Board
	Bayou Pigeon	Parish, Levee Board
	Bayou Sorrel	Parish, Levee Board
	Ramah	Parish
	Upper Grand River	Dept. Wildlife & Fisheries



SECTION 8.00
PROJECT MANAGEMENT

8.00 MANAGEMENT

8.10 Focus

As mandated by Congress, the focus of the project shall be on three primary components:

Regional and ecosystem needs
Project resource capabilities and suitabilities
Expressed public interest and desires

The management team is responsible for maintaining this focus.

8.20 Management Team

8.21 The Corps of Engineers, in cooperation with the State of Louisiana, is responsible for the implementation of this project.

"The District Engineer is the sole jurisdictional authority to protect and oversee Federal interests in the Atchafalaya Basin Floodway system upon implementation of the recommended comprehensive multipurpose plan. Recreation and environmental features of the plan would be operated and maintained by the appropriate Louisiana state agencies under license, lease, or other agreements administered by the U.S. Army Corps of Engineers. The District Engineer will continue to coordinate with other Federal agencies on special studies and collateral interests as required by Federal law and U.S. Army Corps of Engineers regulations." (Corps of Engineers Feasibility Study)

8.22 Other Federal agencies with jurisdictional responsibilities

Environmental Protection Agency
National Marine Fisheries Service
National Park Service
U.S. Fish and Wildlife Service
U.S. Geological Survey
Natural Resource Conservation Service

8.23 State of Louisiana

At the request of the District Engineer, Governor Foster appointed the Department of Natural Resources as the lead state agency to represent the state in this project.

A. Other state agencies involved:

Department of Agriculture and Forestry
Department of Culture, Recreation and Tourism
Department of Environmental Quality
Department of Health and Hospitals
Department of Transportation and Development
Department of Wildlife and Fisheries
State Land Office

B. A Memorandum of Understanding (MOU) was executed by the state agencies which outlined the functions and responsibilities of each agency and established an operating procedure.

C. The Atchafalaya Basin Advisory Committee was formed including:

All state agencies involved in the Basin
All federal agencies involved in the project
Representatives of the Governor's Office and the Louisiana Legislature
Parish and local officals
Representatives of the Atchafalaya Basin Levee District
Police Jury representatives from Basin parishes
Louisiana Landowner Association
Representatives from major environmental groups
Industry representatives
Fishing and hunting clubs
Commercial fishing and crawfishing interests
Private citizens interested in the Basin

The role of the committee is to provide input into the state Master Plan drafting process and to provide advice as the Plan is implemented.

D. The organization developed to draft the state Master Plan is illustrated on Fig. 8.00 A.

The organization's role includes:

Collection of all pertinent information and the "interests and desires of the public;"

Development of a partnership with the Corps of Engineers and close cooperation with other federal agencies;

Achieving a consensus on issues and plans.

Organizational structure

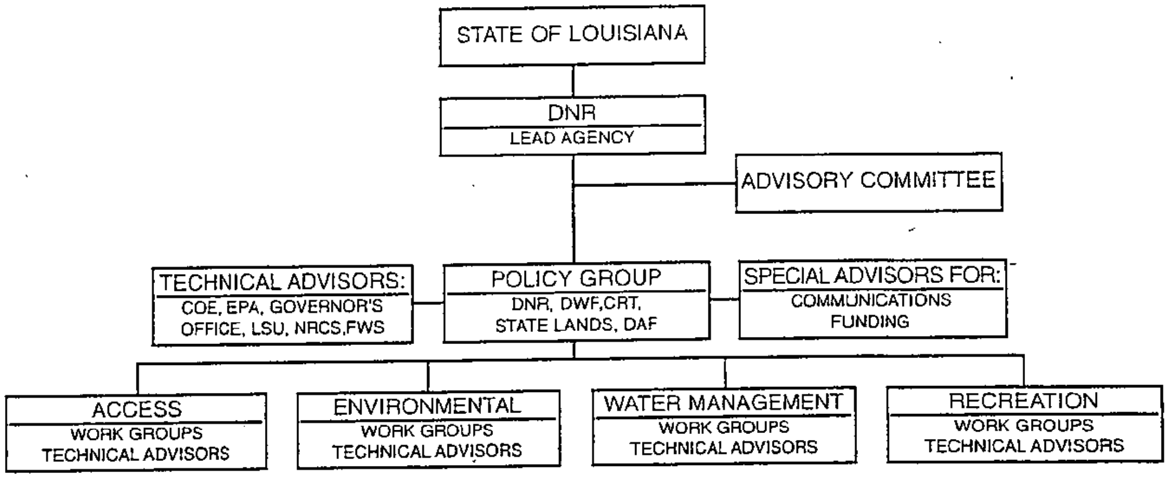


FIGURE 8.00-A: Organization to Develop Master Plan

The development of the state Master Plan was the task of the Working Groups, supervised by the Policy Group. Technical Advisors to the Working Groups included representatives of the Corps of Engineers and other federal agencies, state agencies, LSU, sportsmen's organizations, landowners, and environmental groups.

8.30 The State Management Plan

8.31 Implementation of the plan requires management of four phases:

A. Preliminary planning phase

This phase involved drafting the state Master Plan which was accomplished by the organizational structure described above. This report marks the completion of this phase.

B. Advanced planning phase

This phase will involve developing presentations and graphics for a series of statewide public meetings to explain the plan, secure additional input, and develop statewide public support for the project.

During this phase, this report will be revised to include suggestions from the public. Facility details will be developed during the advanced planning phases and an Executive Summary will be published. Working with the Corps of Engineers, a General Agreement between the Corps and State will be drafted and approval secured.

The final work under this phase will be the presentation of the project to the Governor and the Legislature for approval and funding .

Work included in this phase will be managed by the Lead Agency working through the Policy Group with assistance from the Working Groups as outlined in the previous section.

This phase of work will be accomplished during the time period from June 1998 to June 1999.

C. Implementation phase

Public Access tasks:

Development of an additional Wildlife Management Area on Corps of Engineer fee-title lands;

Development of a joint management agreement covering all public access lands in the Basin.

Environmental Easement tasks:

Inspections and monitoring of the environmental easement lands and reporting violations to the Corps of Engineers;

Assistance to the Corps of Engineers as outlined in the state Master Plan and in the General Agreement between the State and the Corps.

Water Management tasks:

Inspections and monitoring of the projects;

Representing the state in all water management initiatives conducted by the Corps of Engineers;

Operating those projects which require operation (e.g. weirs, gaps, and other waterflow controls);

Cutting and maintaining gaps in pipeline canals.

Recreation features program tasks:

Purchase of 1,500 acres as required in the state Master Plan;

Working with non-federal sponsors of the several sites in the following tasks:

Detailed planning of the facilities;

Contracting with and supervision of architects, engineers, and other professionals;

Letting contracts for construction and supervision of construction;

Involving the Corps of Engineers in all decision making and other actions.

Planning and developing the marketing program for local and national markets to increase public use and enjoyment of the recreational opportunities.

D. Operation Phase

Continue operating public access areas; continue environmental easement monitoring;

Continue monitoring and operation of water management projects;

Central management of all recreation facilities working through the local non-federal sponsor.

8.32 Management Plan

The Corps of Engineers has made two recommendations concerning management of these activities:

A. "Since several state agencies will be involved, the state should consider establishing a single management entity or authority, staffed to effectively coordinate all various departmental efforts; i.e., planning, budgeting, designing, construction, operating, and maintaining the various support elements of the comprehensive plan."

The single management entity suggested by the Corps of Engineers is created in the office of the lead state agency by this chapter.

B. "It is also recommended that the State establish a subordinate law enforcement entity with police powers and arrest authority to adequately control and protect all public and private use and natural resource features of the Basin."

Different state, federal, and local agencies have legislatively mandated enforcement authorities that are sufficient to protect all public/private use and natural resource features.

ORGANIZATIONAL STRUCTURE

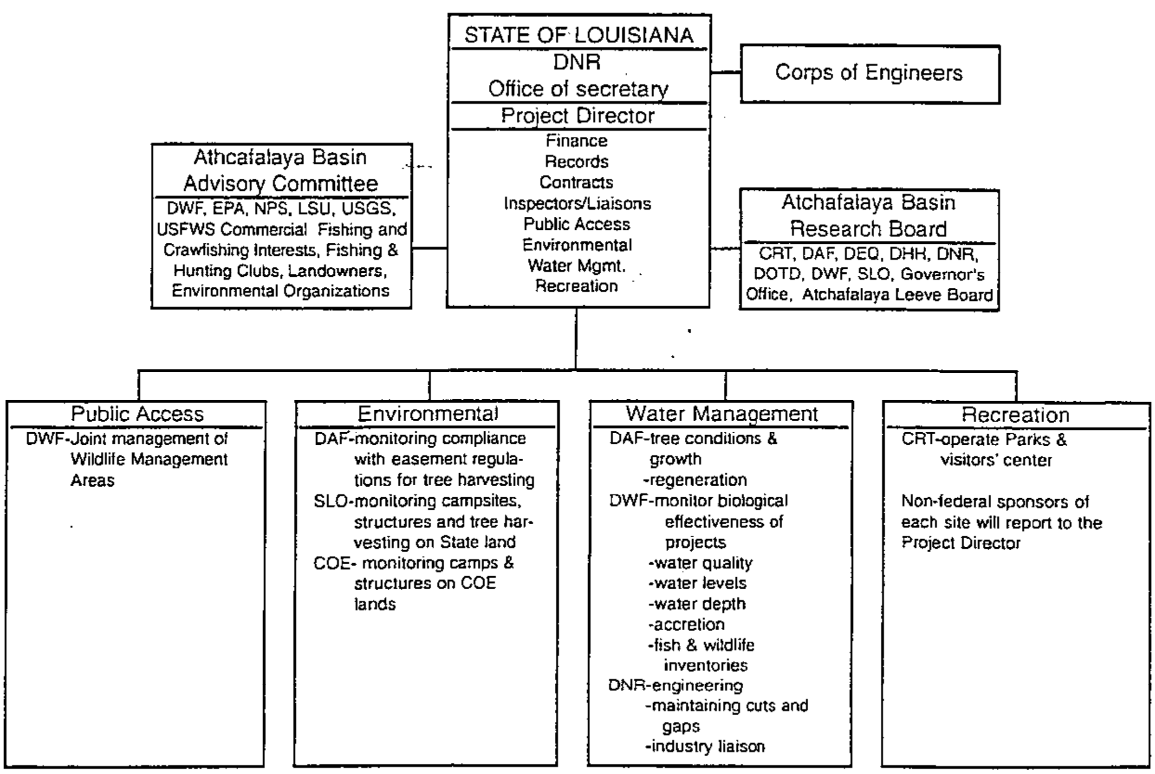


FIGURE 8.00 B Organization to Implement Master Plan

8.33 The organizational structure to provide effective management is illustrated in Fig. 8.00-B.

As noted, the Research Board and the Project Director, with assistance from the Advisory Committee, will furnish the following direction and services to all activities:

- Coordination with the Corps of Engineers in decision-making and funding
- Funding accounting and disbursement
- Recordkeeping and reporting
- Contract administration
- Inspections and coordinating
- Supervising contract housekeeping services at primitive campgrounds
- Publicity, citizen awareness and response

8.34 Annual Management Cost Estimates

A. First phase - Preliminary Planning (FY 97/98)

The time and expenses of agency personnel who worked on the project were absorbed by the agencies involved. Other than the Corps, federal agencies operated in the same fashion. Individuals representing organizations donated their time.

The following state costs have been accumulated for cost/share purposes:
Tasks completed during First Phase include:

Completion and acceptance by agencies of a Memorandum of Understanding among the state agencies involved in the Atchafalaya Basin;

Achieving consensus of governments, organizations, and interested citizens, and drafting of the state Master Plan for the Atchafalaya Basin.

ESTIMATED MANAGEMENT COSTS FOR FIRST PHASE

	No.	Unit	Cost/Share		State Budget Increase
			Subtotal	Total	
Personnel:					
Project Director	1		36,000		
Agency personnel:					
Meetings: 2,400hrs		20/hr	44,000		
Data 1,400hrs		20/hr	28,000		
GIS 30 hrs		25/hr	750		
LSU:					
Data 20 hrs		30/hr	600		
GIS 100 hrs		25/hr	2,500		
Total personnel			115,850		
Fringe benefits @ 23%			26,646		
Total Personnel & benefit,				142,496	
Indirect costs (space, equipment, utilities, administrative. etc) @ 40%				56,998	
Contractual: Drafting MOU and Master Plan				25,000	
Expenses:					
Travel, per-diem			600		
Office supplies			500		
Printing			7,500		
Total expense				8,600	
TOTAL STATE COST FIRST PHASE				233,094	0

B. Second Phase - Advanced Planning (FY 98/99)

The following estimated costs cover more detailed planning (particularly with the non-federal sponsors of the recreation features), administrative and supervisory services supporting the work in Buffalo Cove, planning and conducting statewide public meetings to explain the state Master Plan, developing a general agreement with the Corps of Engineers concerning the Cost/Share process, and working with the Governor and Legislature in the drafting of the enabling legislation.

ESTIMATED MANAGEMENT COSTS FOR SECOND PHASE
FY 98/99

	No.	Unit	Cost/Share Subtotal	Cost/Share Total	State Budget Increase
Personnel:					
Project Director	1		58,000		58,000
Secretary/Asst.	1		31,000		31,000
Financial Officer (part time) 1)	1		13,400		
Total personnel			102,400		89,000
Fringe Benefits @ 23%			23,552		20,470
Total Personnel & Benefits				125,952	109,470
Indirect costs (space, equipment, administrative support, utilities, @ 40%				50,366	
Contractual: Technical assistance 2)				20,000	20,000
Expenses:					
Travel, per-diem, meeting rooms			7,000		7,000
Office supplies			5,000		5,000
Reports, video/slides, printing, and miscellaneous expenses			10,550		10,550
Total expenses				22,550	22,550
TOTAL ESTIMATED COSTS SECOND PHASE				218,868	152,020

1) To assist Director in negotiating cost/share agreement with Corps of Engineers (borrowed from Agency Budget Office);

2) To prepare visual presentations for public meetings, to assist Director in advanced planning with non-federal sponsors, and for other technical purposes.

C. Third Phase - Implementation (FY 1999-2010)

The estimated costs for the Office of the Project Director during the construction phase estimated to end in 2010 are as follows:

ESTIMATED MANAGEMENT COSTS FOR THIRD PHASE
FY 99/00 - FY 2010

	No.	Unit	Cost/Share Subtotal	Cost/Share Total	State Budget Increase
Personnel:					
Project Director	1		68,000		68,000
Secretary	1		32,550		32,550
Accountant (PT)	1		10,000		-
Bookkeeper (PT)	1		15,000		
Contract Administrator (part time)	1		15,000		
Coordinator (P.T.)	1		14,450		14,450
Total Personnel			155,000		115,000
Benefits @ 23%			35,650		26,450
Total Personnel & Benefits				190,650	141,450
Indirect costs (space, equipment, utilities, administrative support, etc.) @ 40%				76,260	
Expenses:					
Travel and per-diem			4,500		
Office supplies,			3,000		
Printing & miscellaneous			10,000		
Total Expenses				17,500	17,500
TOTAL MANAGEMENT COSTS FY 99/00				284,410	158,950
TOTAL MANAGEMENT COSTS FY 00/01				298,631	166,896
TOTAL MANAGEMENT COSTS FY 01/02				313,563	175,243
TOTAL MANAGEMENT COSTS FY 02/03				329,241	184,005
TOTAL MANAGEMENT COSTS FY 03/04				345,703	193,205
TOTAL MANAGEMENT COSTS FY 04/05				362,988	202,865
TOTAL MANAGEMENT COSTS FY 05/06				381,137	213,008
TOTAL MANAGEMENT COSTS FY 06/07				400,194	223,658
TOTAL MANAGEMENT COSTS FY 07/08				420,204	234,841
TOTAL MANAGEMENT COSTS FY 08/09				441,214	246,583
ESTIMATED MGMT. COSTS THIRD PHASE				3,577,285	1,999,256

Cost increases are calculated at 5%/year for personnel and increase in cost of goods and services.

Work during this phase includes overseeing public access features; easement violation monitoring, the water management project planning, maintaining, monitoring, and managing the construction projects for recreational features.

D. Fourth Phase - Operations (FY 10/15)

After construction is completed, the operations management which began in FY 98/99 will continue to the end of the 15-year budget plan in 2015.

ESTIMATED STATE COSTS FOR FOURTH PHASE
FY 09/10 - FY 13/14

	No.	Unit	Cost/Share Subtotal	Cost/Share Total	State Budget Increase
The recreation construction will have been completed, thus management responsibilities are reduced to the supervision and financial officer roles with following resulting costs:					
Permanent staff			138,000		138,000
Part time staff			18,000		
Total personnel			156,000		138,000
Benefits @ 23%			35,880		31,740
Total Personnel & Benefits				191,880	169,740
Indirect costs (space, equipment utilities, administrative support @ 40%)				76,752	
Expenses:					
Travel and Per-Diem			4,500		
Office supplies			3,000		
Total expenses				7,500	7,500
Total State Cost for FY 09/10				276,132	177,240
Total State Cost for FY 10/11				289,939	186,102
Total State Cost for FY 11/12				304,436	195,407
Total State Cost for FY 12/13				319,658	205,177
Total State Cost for FY 13/14				335,641	215,436
ESTIMATED STATE COST FOR FOURTH PHASE				1,525,806	979,362

Cost increases are calculated at 5%/year for personnel and increase in cost of goods and services.

Work during this phase includes overseeing Public Access features, managing the inspection and monitoring programs for Environmental Easements and Water Management projects, and supervision and monitoring the Recreation program.

8.35 Cost Share

Federal/State or local cost share ratio is:

Public Access	- 75%/25%
Environmental	- 75%/25%
Water Management	- 75%/25%
Recreation:	
Construction	- 50%/50% *
Operation	- 0%/100%

* Land costs 100% state, however it is credited as part of state 50% for total cost/share (land + development), thus included in construction; therefore the total cost/share is 50% Federal and 50% state.

The division of tasks and of costs will be outlined in the General Agreement during 1998.

The estimated total State costs for center management are as follows:

Item	Cost/ Share Total	State Budget Increase
First Phase - FY 97/98	233,094	0
Second Phase FY 98/99	218,868	148,020
Third Phase - FY 99/10	3,577,285	1,999,254
Fourth Phase FY 10/15	1,525,806	979,362
Total	5,555,053	3,126,636

8.36 Responsibility for Safety and Law Enforcement

This section is in response to the Corps of Engineers recommendation that the State establish a "subordinate law enforcement entity with police powers..."

The Department of Wildlife and Fisheries has such authority to enforce laws governing fish and game and boating safety.

The Sheriff of each Parish has police powers to enforce criminal laws.

However, neither organization has the personnel to provide the type service found in national parks where park rangers enforce the laws and also serve as sources of information, give safety instruction, and give educational seminars to interested groups.

The State Master Plan, therefore, includes a proposal for additional DWF personnel to act as basin rangers, in addition to their present duties. Additional personnel and increase in department budgets are included in Section 7.00.

Management of this force and cooperation with the parish officials will be DWF's responsibility.

SECTION 9.00
FINANCIAL FACTORS

9.00 FINANCIAL FACTORS

9.10 Costs

9.11 Construction Costs

Item	Subtotal	Total Subject to Cost/Share
Improvement to state highways for access to recreation areas	16,355,000	
Total Access		16,355,000
Recreation: Land Acquisition	1,595,000	
Simmesport (separate funding)		
I-10 Visitor Information	905,020	
Bayou Sorrel	826,200	
Bayou Pigeon	140,000	
Lake Verret (SPA - East)	7,000,000	
Stephensville	1,395,600	
Morgan City (see 1) below)	8,537,656	
Charenton	43,440	
Catahoula (SPA West)	7,150,770	
St. Martinville	1,500,000	
Cypress Cove (Lynch Gardens)	1,548,440	
Henderson	4,216,160	
Ramah	960,344	
Primitive Campgrounds	429,000	
Boat Launch (not incl. above)	2,954,000	
Total Recreation Construction		39,201,630
Total		55,556,063

1) Bulkheads/fill not included: total cost $3,000,000; Corps arranged non-project funds ($2,000,000) State share $1,000,000

Construction costs are projected to FY 99/00 and must be adjusted for inflationary increases when construction dates are determined.

9.12 Operating Costs

Item	Start-Up	Annual FY 99/00	Total 15 Years	Total Subject to Cost/Share
Wildlife Management Areas (4) ABFS (5) State			29,438,491	25,758,378
Monitoring Easements				
DAF	71,080	254,455	5,734,604	
State Land Office	73,202	141,453	3,303,481	
Total	144,282	395,908		9,038,085
Monitoring Water Management Projects:				
DWF	560,038	1,599,640	36,464,309	
DAF		30,372	655,397	
DNR	365,000	495,233	11,166,531	
Total	925,038	2,125,245		48,286,237
Recreation:				
I-10 Visitor Ctr.		312,294	6,738,855	
Lake Verret SPA		561,081	12,105,951	
Morgan City AMACC		867,128	18,711,361	
Catahoula SPA		561,018	12,105,951	
Primitive Camps		11,025	242,550	
Total		2,312,546		49,904,668
Management		370,337 (aver.)	5,555,053	5,555,053
Totals		5,204,036		138,542,421

9.20 Cost/Share

9.21 Construction Costs

	Total	Cost/Share		State Budget Increase
		COE	State	
COE land and easement purchases & water projects	146,637,517	146,637,517	0	2) 0
State Project:				
Roads to Rec. sites	16,355,000	8,177,500	8,177,500	8,177,500
Recreation Projects:				
Morgan City: MACCenter				
1/3 Recreation	1,471,867	735,934	735,933	735,933
2/3 Environmental	2,943,733	2,207,800	735,933	735,933
Morgan City: Bulkhead				1,000,000
Other Rec. Projects	35,592,030	17,796,015	17,796,015	17,796,015
Total Construction	203,000,147	175,554,766	27,445,381	28,445,381

9.22 Operating Costs

	Total	Cost/Share		State Budget Increase 2)
		COE	State	
Wildlife Management Areas (4) Project, (5) State	25,758,378	19,318,784	6,439,594	3) 7,612,945
Monitoring Easements-15 yrs	9,038,085	6,778,564	2,259,521	1,234,761
Monitoring Water Management Projects - 15 years	48,286,237	36,214,678	12,071,559	6,044,058
Management - 15 years	5,555,053	2,777,527	2,777,526	3) 427,080
Recreation - 15 years				
Morgan City: 18,711,361				
1/3 Recreation 1)	6,237,120	0	6,237,120	6,237,120
2/3 Environmental	12,474,241	9,355,681	3,118,560	3,118,560
Other Recreation Projects	31,193,307	0	31,193,307	31,193,307
Total Operation	138,542,421	74,445,234	64,097,187	55,867,831
Costs Total Construction and 15 yr. Operating Costs	341,542,568	250,000,000	91,542,568	84,313,212

1) The Atchafalaya Multi-Agency Cultural Center (AMACCenter) is planned for three floors with the bottom floor used for interpretation of the Basin's cultural, industrial, and environmental resources and the two upper floors to be occupied by State and Federal agencies managing the water management features and environmental easements and the Basin's unique natural environment and for research of the Basin's unique areas.

2) State Budget Increase less Corps cost/share

3) Low because many costs are already funded

FUNDING FROM OTHER FEDERAL PROGRAMS AND SOURCES WILL BE INVESTIGATED FOR THOSE PROJECTS WHICH MAY NOT QUALIFY FOR THE ABFS, LA. PROJECT

Some projects are conceptual and will require additional feasibility and design studies, funding from the Louisiana Legislature, and approval and qualification by the Corps of Engineers, including the development of Project Cooperative Agreements (PCA) between the Corps and the non-federal sponsor for operation and maintenance of the facilities.

State Budget Increase is less than State Share, since Indirect Costs (administrative support, space, utilities, and other central services) are already furnished; thus, in most cases, Indirect Costs are not an additional cost.

9.30 Feasibility Analysis

9.31 Methodology

A. Data Sources:

1. Expenditures/person/day:
   - Hunting/Fishing/Trapping:
     - Dept. of Wildlife & Fisheries,"Southwick Report"
   - General Recreation/Tourism:
     - Dept. Culture, Recreation & Tourism
   - Educational - "Outdoor Classrooms" - UNO
2. Sales and Income Tax Rates:
   - Department of Revenue and Taxation

B. Total Economic Impact

The Total Economic Impact (ripple effect) is the multiplier that measures the number of rounds of spending by retailer, wholesaler, manufacturer, and service which occur from the initial expenditure. Each round generates additional economic benefit and each round is taxed.

This multiplier is supplied by the Bureau of Economic Analysis, U.S. Department of Commerce (RIMS II).

C. Inflationary increases are calculated at 3%/year.

9.32 Resulting Calculations:

A. Expenditures/person/day:

	2000	2010	2020
Hunting	70	93	125
Fishing	110	147	198
Trapping*	4000	4000	4000
General Recreation	35	45	60
Tourist: Motorist	150	203	272
Organized Tours	240	322	434
Educational	15	16	17

* Includes sale of catch

Decreasing catch offsets inflationary increases

B. Multiplier
2.5 (average)

C. Sales and Income Taxes
3.5% (average) - based on the low end of the Southwick Report averages to be on the safe side
- see calculations this page

TAX REVENUE CALCULATIONS

2 000

Activity	User Days	Retail Sales	Total Economic Impact	Sale and Income Tax Revenue
Consumptive Use:				
Hunting	200,000	14,000,000	35,000,000	1,225,000
Fishing	300,000	33,000,000	82,500,000	2,887,500
Trapping-Crawfish*	1,400	5,680,000	14,200,000	497,000
Non-Consumptive Use:				
General Recreation	210,000	7,350,000	18,375,000	643,125
Tourism: Motorists	200,000	30,000,000	75,000,000	2,625,000
Organized Tours	260,000	62,400,000	156,000,000	5,460,000
Educational	5,000	75,000	187,500	6,563
Totals				13,344,188
2010				
Consumptive Use:				
Hunting	225,000	20,925,000	52,312,500	1,830,938
Fishing	327,000	48,069,000	120,172,500	4,206,038
Trapping-Crawfish**	1,700	6,800,000	17,000,000	595,000
Non-Consumptive Use:				
General Recreation	438,000	19,710,000	49,275,000	1,724,625
Tourism: Motorists	472,000	95,816,000	239,540,000	8,383,900
Organized Tours	425,000	136,850,000	342,125,000	11,974,375
Educational	18,000	288,000	720,000	25,200
Total				28,740,076
2020				
Consumptive Use:				
Hunting	240,000	30,000,000	75,000,000	2,625,000
Fishing	350,000	43,750,000	109,375,000	3,828,125
Trapping-Crawfish**	2,000	8,000,000	20,000,000	700,000
Non-Consumptive Use:				
General Recreation	745,000	44,700,000	111,750,000	3,911,290
Tourism: Motorists	675,000	183,600,000	459,000,000	16,065,000
Organized Tours	700,000	303,800,000	759,500,000	26,582,500
Educational	37,000	629,000	1,572,500	55,038
Totals				53,766,953

* Includes sale of catch which will decrease if efforts to prolong expected life of some habitats not taken

** Decreasing catch offsets inflationary increases

9.33 Tax Revenue Resulting from Ouf-of-State Visitor Expenditures

Louisiana visitors' expenditures at the Basin do not result in an increase in State tax revenue, since the visitors' disposable income spent in the Basin may be spent elsewhere in the State.

However, out-of-state visitors' expenditures result in an increase in Louisiana's tax revenue. This increase results from the following:

	2000	2010	2020
Hunting - 15% of total	183,750	274,641	393,750
Fishing - 10% of total	288,750	420,604	382,813
Tourism:			
Motorists - 20%	525,000	1,676,780	3,213,000
Org. Tours- 75%	4,095,000	8,980,781	19,936,875
Totals	5,092,500	11,352,806	23,926,438
Subtract 1997 tax revenue	3,851,738	3,861,738	3,861,738
Total tax revenue increase to State resulting from Atchafalaya Project	1,240,762	7,491,068	20,064,700

Parish tax revenue would increase for all activities.

9.34 Fee Income from State Preservation Areas

The two proposed State Preservation Areas charge admission fees for entering the area and, in the proposed Atchafalaya Wilderness Area East; rentals for the lodges, RV docks, and camping areas.

This fee income is estimated as follows:

By 2010 – $300,000/year
By 2020 – $425,000/year

9.35 Total Tax Increase and Fee Income

	2000	2010	2020
Tax revenue increase	1,240,762	7,491,068	20,064,700
Fee income	0	300,000	425,000
Total	1,240,762	7,791,068	20,489,700

9.40 Suggested Funding Plan

9.41 Qualifications to the Plan

A. Qualifications due to Corps of Engineer regulations:

1. The cost/share calculated depends upon the Corps of Engineers acceptance of each of the features of the Plan and approval of the cost estimates shown or the successful granting of alternative sources of federal funding;

2. Many of the tasks outlined in the Plan will be performed by State Agencies individually or through joint management thus a method to transfer funds must be studied. A General Agreement will be signed with the Corps of Engineers in mid-1998 which will clarify this procedure. If additional federal authorization is required to authorize fund transfers, the State is prepared to seek that authority.

3. Several operations included in the Plan are ongoing operations and are included to take advantage of the Corps' cost/share. These include:

Operation, by the Department of Wildlife and Fisheries, of the Sherburne and Attakapas Island Wildlife Management Areas - additional federal authorization may be required for this purpose;

Improvement of existing state highways in, and bordering, the Basin to accommodate the expected increased use - alternative sources of funding may be required;

Fish and wildlife habitat monitoring by the Department of Wildlife and Fisheries and forestry monitoring by the Department of Agriculture and Forestry;

If the Plan is not implemented, these operations will continue at full cost rather than the reduced cost due to cost/share from the Corps and other funding sources;

B. Qualifications or changes due to scheduling:

1. The Plan is a 15-year program which will be reviewed and evaluated every five years to determine the feasibility of each of the programs. At the end of the 15-year period it is expected that the Plan will be evaluated and revised and a new 15-year plan adopted;

2. All costs are based on a beginning date immediately after the Plan is authorized and funded by the Legislature.

3. Some of the programs will be delayed due to planning time required by the non-federal sponsor and other factors. These programs include:

Road improvements
Land purchases for recreational purposes
Recreational features

An estimated starting date for these programs is noted on the next page.

9.42 Capital Outlay

A. Schedule

The Plan suggests that the capital costs be made available as follows

FY 99/00	$8,000,000
FY 02/03	$8,000,000
FY 04/05	$7,000,000
FY 06/07	$7,000,000
Total	$30,000,000

Total increased from $27,070,381 estimated to provide a contingency and for rounding.

B. Source of funds

A bond issue is the suggested source of funds.

C. Funds recovery

As shown in the next section the anticipated increase in sales tax revenues resulting from out-of-state visitor purchases plus some fee income is sufficient to liquidate the bonds, pay some of the operating expense until about 2013, and then produce a surplus sufficient to recover the preceding deficit and, in effect, place the total burden of debt payment and operating costs on the user, rather than on the general public.

Additionally, it should be noted that the Plan absorbs the capital costs of two State Preservation Areas already included in the State Parks Plan totalling $13,224,270 and the operating budget of approximately $24,000,000.

9.43 Operating Cost Funding

The following table shows the annual operating costs for fifteen years:

State Budget Increase

Fiscal Year	ACCESS	MONITORING EASEMENTS		WATER MANAGEMENT			RECREATION		MANAGEMENT	TOTAL
	DWF	DAF	SLO	DAF	DNR	DWF	CRT	DWF	DNR	
FY 97/98									1)	
FY 98/99	2)								1)	
FY 99/00	352,801	92,362*	86,216*	271	432,384*	679,444*	1,445,569	433,564	16,745	3,539,356*
FY 00/01	370,441	22,346	13,665	285	47,413	125,376	1,517,848	455,242	17,582	2,570,198
FY 01/02	388,963	23,463	14,348	299	49,784	131,645	1,593,739	478,004	18,461	2,698,706
FY 02/03	408,411	24,636	15,065	314	52,273	138,227	1,673,426	501,904	19,384	2,833,640
FY 03/04	428,832	25,868	15,818	330	54,887	145,138	1,757,099	526,999	20,353	2,975,324
FY 04/05	450,274	27,161	16,609	347	57,631	152,395	1,844,953	553,349	21,371	3,124,090
FY 05/06	472,788	108,519*	99,829*	364	164,522*	800,626*	1,937,202	581,016	22,440	4,187,306*
FY 06/07	496,427	29,945	18,311	382	63,539	168,016	2,034,062	610,068	23,562	3,444,312
FY 07/08	521,248	31,442	19,227	401	66,716	176,417	2,135,764	640,571	24,740	3,616,526
FY 08/09	547,310	33,014	20,188	421	70,052	185,238	2,242,552	672,599	25,977	3,797,351
FY 09/10	574,676	34,465	21,197	442	73,355	194,500	2,354,679	706,230	39,174	3,998,718
FY 10/11	603,410	129,140*	117,770*	464	127,092*	949,870*	2,472,414	741,542	41,133	5,182,835*
FY 11/12	633,581	38,218	23,370	487	81,095	214,436	2,596,034	778,618	43,190	4,409,029
FY 12/13	665,260	40,129	24,539	511	85,150	225,158	2,725,836	817,548	45,350	4,629,481
FY 13/14	698,523	42,135	25,766	537	89,408	236,416	2,862,130	858,426	47,618	4,860,959
TOTAL 1	7,612,945	702,843	531,918	5,855	1,515,301	4,522,902	31,193,307	9,355,680	427,080	55,867,831
TOTAL 2	7,612,945	702,843	531,918	5,855	1,515,301	4,522,902	25,717,758	7,988,870	427,080	
Agency:										
CRT							31,193, 307			
DAF		702, 843		5,855						
DNR					1,515,301				427,080	
DWF	7,612,945					4,522,902		9,355,680		
SLO			531,918							

*Includes start-up equipment and replacement
Total 1: maximum costs assuming all projects begin FY 99/00 (note that most Access, Monitoring, Water and management operations are already underway.
Total 2: Costs for the period ending FY 13/14 with staggered starting dates for some recreation projects with are yet to be planned.
These calculation assume that the Corps of Engineers will provide the Corps' cost/share in cash or reduce State responsibilities accordingly.
1) FY 97/98 ($233,094) and FY 98/99 ($218,868) funding was provided by separate sources, thus not included above.
2) These totals for DWF provide partial funding for management of the Atchafalaya National Wildlife Refuge

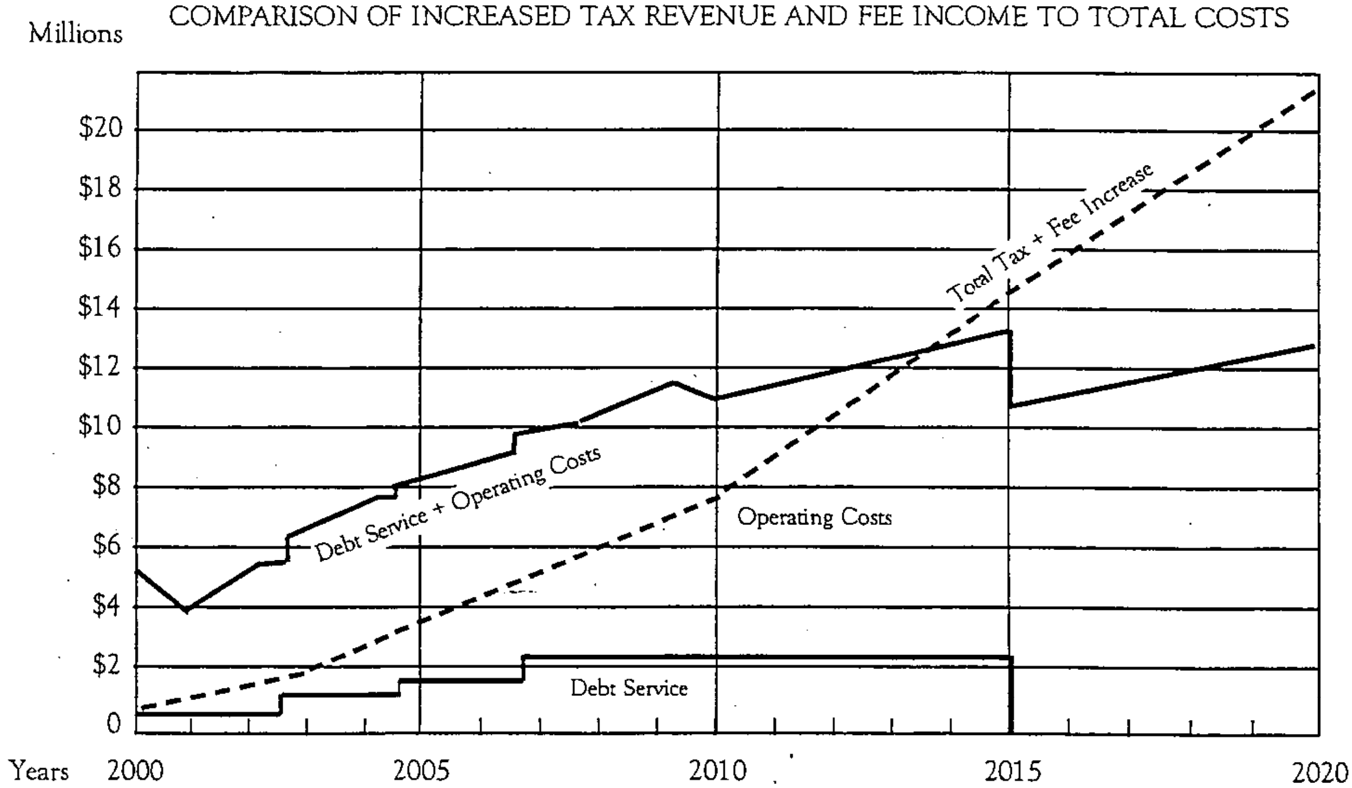
ANNUAL OPERATING COSTS

9.44 Comparison of Increased Tax Revenue to Total Costs

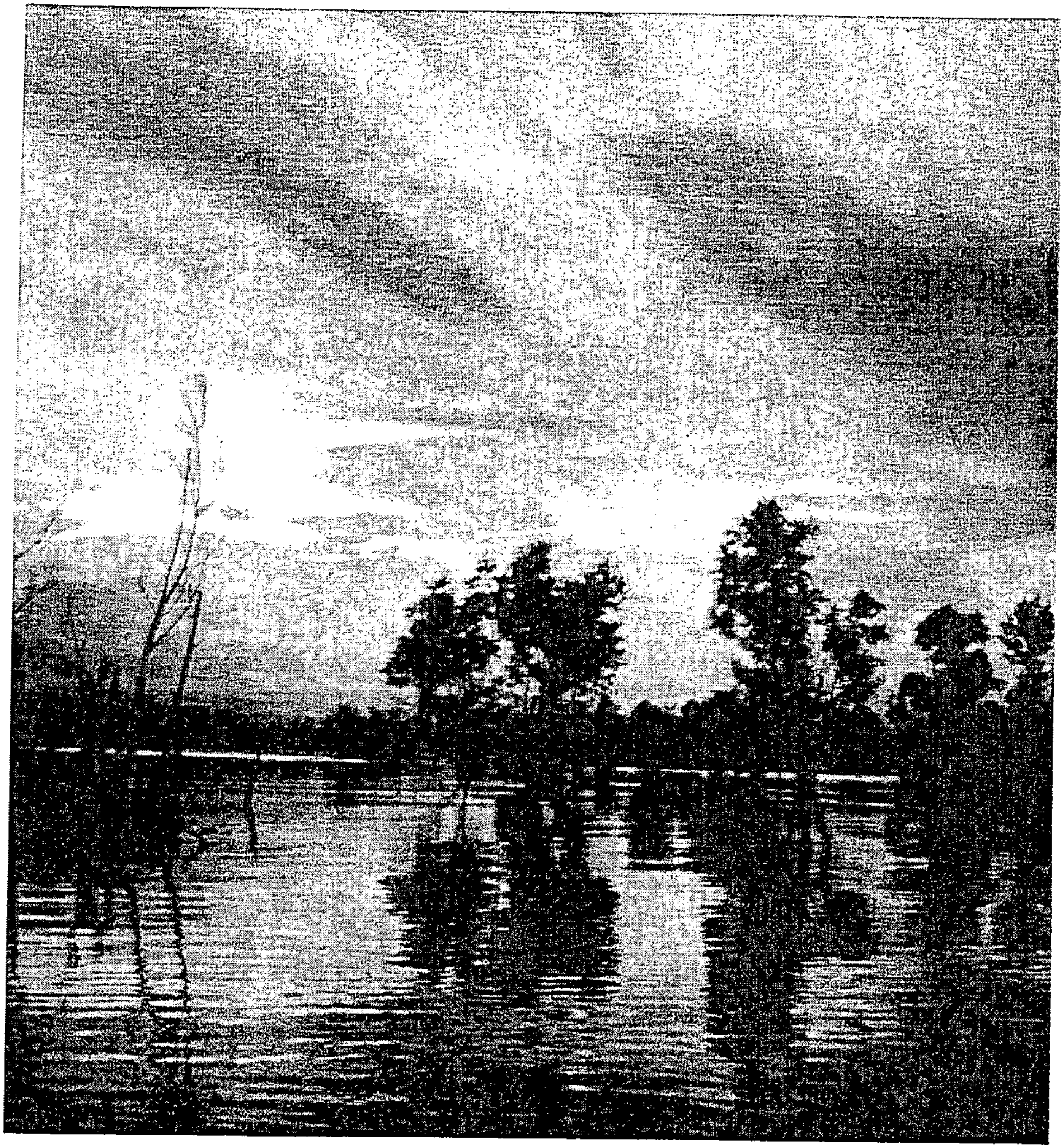
Debt service is calculated on a 15-year prorated principal plus interest @ 7% basis. The usual 30-year bond would increase the surplus, but substantially increase the total amount of interest paid.

In effect, this plan puts the total burden of debt payment and operating costs on the user, rather than the general public.

COMPARISON OF INCREASED TAX REVENUE AND FEE INCOME TO TOTAL COSTS



Note: Total tax increase calculated for out-of-state visitors expenditures only.



SECTION 10.00
COMPLEMENTARY PLANS/PROGRAMS

10.00 COMPLEMENTARY PLANS AND PROGRAMS

10.10 Need for Complementary Plans and Programs

Interest in the Atchafalaya Basin area, local, national, and international, is twofold:

The river/swamp ecosystem;

The people, principally the "Cajuns", and how they were shaped by this environment.

The State Master Plan for the Atchafalaya Basin is part of a the Atchafalaya Basin Floodway System, LA Project which encompasses an area bounded by the East and West Protection Levees plus those communities and areas adjacent to the levees.

Thus, most of the "Cajun" culture is nestled in communities adjacent to the levees.

A complementary project answers that need.

10.20 The Atchafalaya Trace Heritage Project

Organizers of this project have received the support of many organizations, including the Dept. of Culture, Recreation, and Tourism. A bill was approved, but not funded, by the 1997 Legislature which established the Atchafalaya Trace Commission.

The project is patterned after the National Heritage Area program defined in the Congressional Act as

"...a place designated by the Congress where natural, cultural, historic, and recreational resources combine to form a cohesive, nationally distinctive landscape arising from patterns of human activity shaped by geography."

The organizers identify the Greater Atchafalaya Area as follows:

"...a unique blend of peoples of Native, Acadian, Creole, African, and European origin reside in the many small communities which surround the Atchafalaya Basin — an extensive semi-tropical swamp rich in natural resources and pristine splendor, a mecca for outdoor recreation enthusiasts, a place steeped in the mystique and color of South Louisiana heritage."

Thus, this project will be a major addition to the Atchafalaya Basin Floodway System, LA Project, providing additional areas of interest to visitors and an economic boost to the regional economy.

Communities identified will be "Gateways" to the project and highways identified will provide aesthetic access routes to the project and extensions of the visitor's enjoyment of the Atchafalaya Experience.

10.30 The Wildflower Management Program for Atchafalaya Levees

The Bayou Teche Scenic Byway was funded by FHA in 1994. Part of the project is to develop a corridor management plan with a regional native wildflower program as one element of the plan.

The program organizers have suggested that the West Protection Levee be part of that program, since it offers extensive land suited for wildflower management and the opportunity for public enjoyment to those touring the levee road to visit the many Basin recreational facilities on this route.

The attraction of the Texas Bluebonnet program has been studied and used as a pattern for this program which would be planned as a year-round program rather than just seasonal, as the bluebonnet festival.

A section of the levee near Henderson has become a wildflower scenic route by natural means and illustrates the added attraction to this route of this blaze of mingled colors.

10.40 Lower Atchafalaya River Study

An appealing picture to all generations *Ricky Verret*

The Corps of Engineers is currently engaged in a study of the delta of the Atchafalaya River, the region south of Morgan city, including Avoca and Bateman Islands and the area to the east of the Atchafalaya Basin Floodway, including Lake Verret and Lake Palourde.

The results of this study will be made available to the interested public.

10.50 Special Resource Study of Basin by National Park Service

"The National Park Service (NPS) is conducting a Special Resource Study of the Atchafalaya Basin, at the request of Congress. The purpose of the Special Resource Study is to evaluate the resources of the Basin for national significance, examine levels of existing protection, and to evaluate the suitability and feasibility of including an area in the national park system. The study will also explore means whereby basin resources can be protected, interpreted, and used for public benefit. It will not be a detailed plan or action document. Substantial NPS involvement is not possible without congressional authorization or further planning.

"Preliminary findings of the study, which will be completed in 1998, include the following:

"The Basin as a whole is not feasible for inclusion within the National Park system because of the over-riding flood control mission of the U.S. Army Corps of Engineers, the requirements of which compromise the integrity of the natural system.

"The Basin does contain nationally significant natural and cultural resources in need of protection.

"The Basin is an outstanding example of a natural resource, possesses exceptional value in illustrating and interpreting many key natural and cultural themes of our nation's heritage, and offers exceptional opportunities for recreation, public use and enjoyment, and scientific study.

"A range of available management alternatives are explored as a means by which the Basin's resources could be protected, including implementation of the joint COE/State Master Plan and the creation of a National Heritage Area to encompass the Basin.

"The legislation creating Jean Lafitte National Historical Park and Preserve, which was established to preserve for the education, inspiration, and benefit of present and future generations, significant examples of natural and historical resources of the Mississippi Delta region, provides a means by which the NPS could become involved in the management of discrete areas containing significant natural resources within the Basin, for protection and interpretation. Such involvement could take place within the framework of the existing COE/State master planning process."

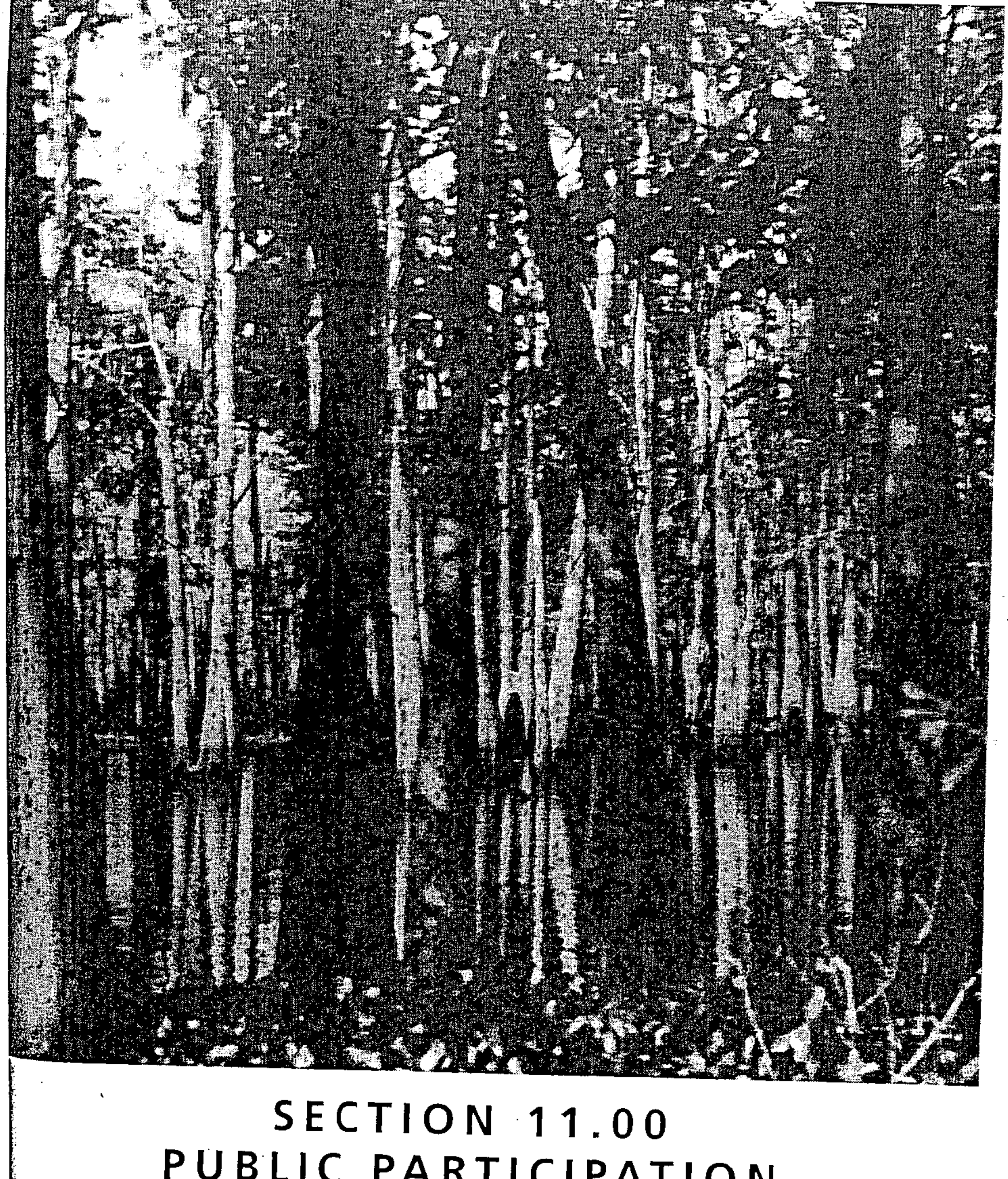
(Letter from David P. Muth of the National Park Service, dated February 17, 1998)

10.60 U.S. Fish & Wildlife Services

The U.S. Fish and Wildlife Service has been requested by Congressman Livingston to study the Atchafalaya Basin with the objective of locating lands for acquisition. The Service will study the entire area of the project, including the lands above Hwy 190 for possible purchase as a national wildlife refuge. The Trust for Public Land will assist the Service in the effort.

10.70 The Coastal Restoration Program

This Federal/State Project authorized by the Congress to protect and restore, where possible, the coastal marshes and to build additional land with the silt carried by the rivers, is impacted by the work of the Atchafalaya Project, thus careful coordination of efforts is required in the public interest.



SECTION 11.00
PUBLIC PARTICIPATION

11.00 PUBLIC PARTICIPATION

11.10 First Phase - January 1997 to April 1998

The public, at each step of the process, researched and drafted this "State Master Plan" for the Atchafalaya Basin Project.

The "public" included representatives of local, state, and federal agencies, of industries operating in the Basin, of landowners, of fishing and hunting clubs, commercial fishing and crawfishing interests, of environmental organizations, and of interested citizens.

The process included forty meetings during which each section of the plan was debated, additional information and views solicited, and consensus reached. The choice between the "ideal" and the "possible" was always present and diligent effort made to find ways to reach the ideal.

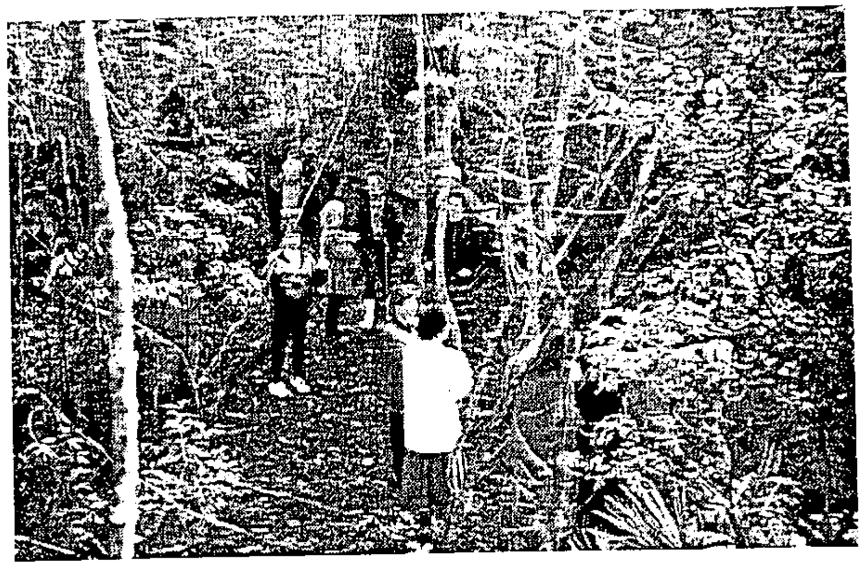
Since each meeting was limited to a single section of the Plan, participants included those most interested in that subject. To provide an opportunity for all to review and comment on all the sections, quarterly meetings of the Advisory Committee were held. Comments received were included in the next draft to be reviewed.

Most sections, including all the major sections, evolved through at least ten drafts and re-writes.

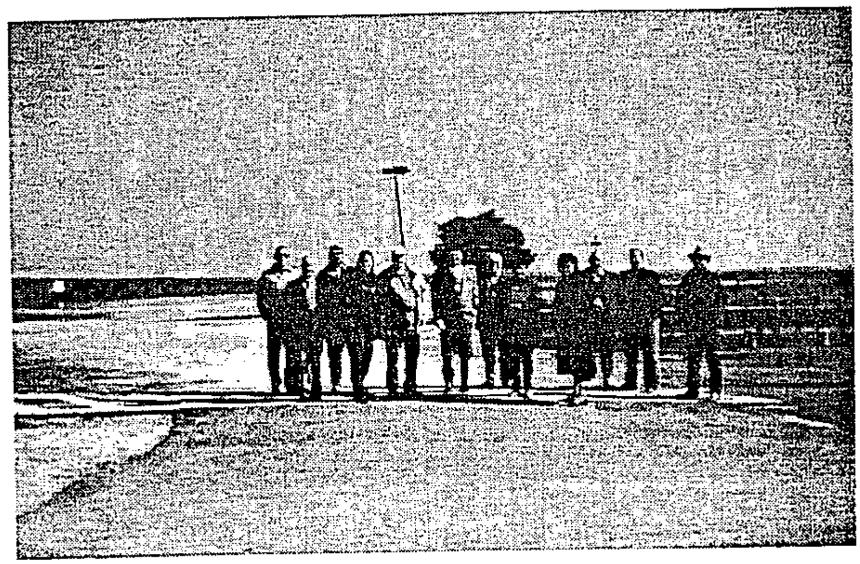
The "Final Working Draft" was presented to the Advisory Committee January 22, 1998 for review and comment. Comments received were included prior to printing.

Working Group meetings involved reports from members, displays of [illegible]s and charts, and discussions concerning a single section of the Master [illegible] being drafted.

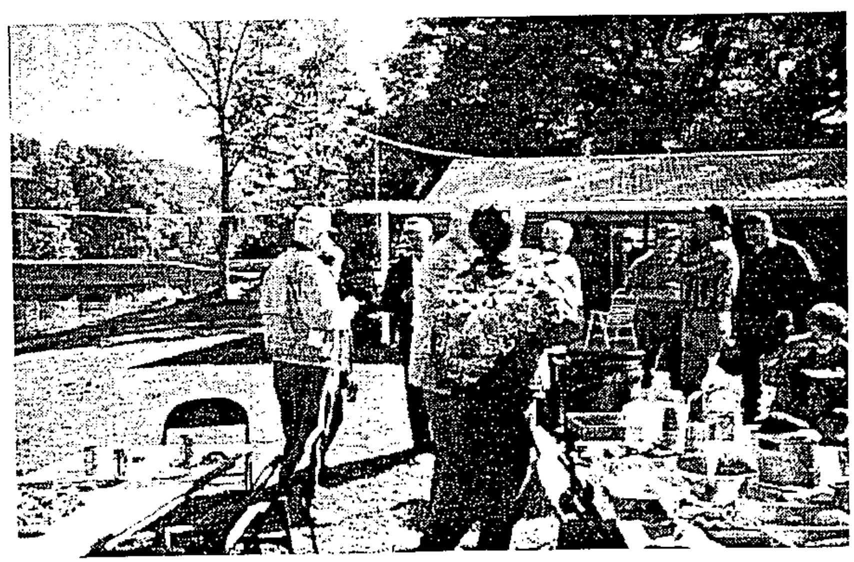
Occasionally, meetings involved field trips, this one to the site of the future Catahoula State Preservation Area;



this one to Morgan City with City, St. Mary Parish, and Corps of Engineers Officials



and once we were served freshly-caught catfish and all the trimmings.



Second Phase - May 1998 - March 1999

This phase involves several tasks:

Members of the Atchafalaya Basin Advisory Committee will serve as messengers to deliver talks to interested clubs and organizations and answer questions concerning the state Master Plan;

Development of presentations and graphics for a series of statewide public meetings and media program;

Conduct public meetings throughout the state to explain the plan, secure additional input, and develop statewide public support for the project;

Preparation of an Executive Summary incorporating the suggestions received for wide distribution including the members of the Legislature, parish and local officials, members of the Atchafalaya Basin Advisory Committee, and interested citizens;

Work with the Corps of Engineers to develop a General Agreement concerning the project which is acceptable to the Corps and the state;

Presentation of the project to the Governor and the Legislature for approval and funding.

The guidelines for an effective communications campaign were presented to the Publicity Committee and active participation of the members solicited to answer the questions presented and to plan solutions.

THE COMMUNICATIONS CAMPAIGN

Purpose:
What do we want to accomplish?

Message:
What are the main points we want to get across?

Messengers:
Who can best deliver our messages?
How will the messenger(s) be trained? We want third party affirmation!

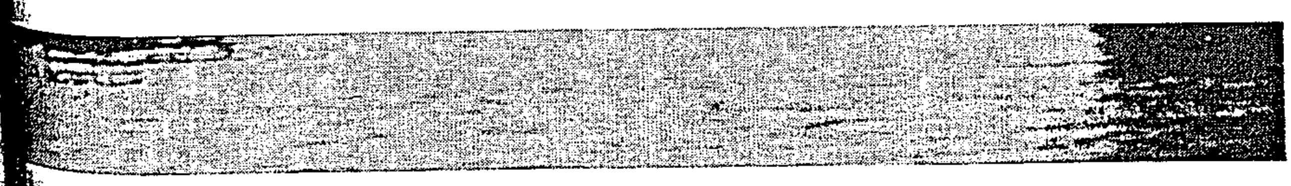
Audience(s):
Who are the main people we want to reach?
What will motivate them to take the actions we want?

Timing:
What are our natural pre-determined milestones?
What are others we can create?
What is our calendar of events?

Delivery System/Methods:
What are the best ways we can reach our audience(s) ?
How do they want to get their information?

Goals
What do we want the audience to do with this information?

APPENDICES



AF

Louisiana STATE LAND OFFICE

MEMORANDUM OF UNDERSTANDING

AMONG THE DEPARTMENTS OF AGRICULTURE AND FORESTRY,
LTURE, RECREATION AND TOURISM, ENVIRONMENTAL QUALITY,
HEALTH AND HOSPITALS, NATURAL RESOURCES,
TRANSPORTATION AND DEVELOPMENT,
WILDLIFE AND FISHERIES AND
THE STATE LAND OFFICE

CONCERNING THE ATCHAFALAYA BASIN FLOODWAY PROJECT PARTIALLY FUNDED BY CONGRESS ($250,000,000) IN P.L. 99-88 IN 1985 AND P.L. 99-662 IN 1986

NTRODUCTION

he Atchafalaya Basin, at 595,000 acres, is the nation's largest swamp ess, containing nationally significant expanses of bottomland hardwoods, lands, bayous and back-water lakes. Fish and wildlife values are ing and one-half of the migratory species in the North American flyway area each year. Efforts are underway to protect the natural resources and sustainable multiple use of the Basin.

July, 1996, the Colonel of the New Orleans District of the U.S. Army Engineers (COE) requested Louisiana's Governor to designate a lead to coordinate state participation in the Atchafalaya Basin Floodway Louisiana project. This project authorizes the Corps of Engineers to certain interests and to construct certain improvements for the ment and/or protection of the fish, wildlife and other resources of the area within the Lower Atchafalaya Basin Floodway, and to manage, and maintain these features in accordance with the project purposes; however, that the State of Louisiana shall agree in writing to provide the statutory obligations of the non-Federal Sponsor.

he Louisiana Department of Natural Resources was designated as the ncy and has since formed the Atchafalaya Basin Advisory Committee This committee is composed of government employees and private and will provide the forum for public discussion of state and federal and future plans concerning the Atchafalaya Basin.

URPOSE

e purpose of this Memorandum of Understanding (MOU) is to develop a idelines which will permit the State to fulfill its proper role and s as the non-Federal sponsor in the implementation of the Atchafalaya oodway System, Louisiana project, (Project) which project, as d by the Supplemental Appropriations Act of 1985, Public Law 99-88, e Water Resources Development Act of 1986, Public Law 99-662, the following features:

lic Access: Acquisition by the Corps of Engineers of the fee title rest, exclusive of oil, gas and minerals, in 50,000 acres of privately ed lands from willing sellers for purposes of public access, including a(s) of old growth cypress-tupelo, and other areas to be designated. As ded, purchase the appropriate easements, including road, channel, and er easements over privately-owned lands in order to afford a servitude passage from the nearest public right-of-way to the above referenced ect fee lands. As deemed necessary, in accordance with the gressional authorization, the State will dedicate, manage, operate and ntain portions of the approximately 150,000 acres of additional State-ed lands and waterbottoms and of the State's Dow donation lands ted within the project limits for the Project purpose.

Corps of Engineers and the State of Louisiana will manage, operate, maintain the fish and wildlife resources of the public use lands ired and held in fee by the U.S. Army Corps of Engineers in rdance with a Project Cooperation Agreement (PCA).

y attempt will be made for public access lands to be available for all ional recreational uses, including crawfishing, hunting and fishing; ses however, being subject to public health and safety concerns and peration of the Floodway.

Environmental Protection and Developmental Control Feature: The Corps of Engineers will acquire developmental control and environmental protection easements over approximately 338,000 acres of privately-owned lands, exclusive of developed areas located within the project area and will acquire flowage easements over approximately 59,000 acres of these same lands.

Water Management: In order to control water flow to maintain and enhance the existing habitats within the Project area, plan, acquire (by the Corps of Engineers), construct, operate and maintain two "pilot" Management Units with the implementation of future units to be at the discretion of the Chief of Engineers and Congress after evaluation of the operational success of the pilot units and plan, acquire, construct, operate and maintain miscellaneous canal closures and water circulation improvements in the Project area. The Corps of Engineers will retain title to the easement interests to lands acquired for this purpose. The Corps of Engineers and the State of Louisiana will manage, operate, and maintain the water management units in accordance with a Project Cooperation Agreement.

Recreation: Plan, acquire (by the State of Louisiana), construct, operate and maintain primitive and developed campgrounds, a visitor's center, boat ramps, nature trails and other facilities complementary to outdoor recreational activities with the Project area on 1500 acres of fee land acquired by the State of Louisiana for this purpose. The State of Louisiana will retain title to the fee recreational lands. The State will manage, operate and maintain the recreation feature in accordance with the master plan and the Project Cooperation Agreement.

The following goals are outlined by this MOU:

A. To reach a consensus of state agencies and the public concerning the Basin so that the State speaks with one voice in negotiating with federal agencies and elements of the public;

B. To develop, with the Corps of Engineers, a comprehensive Master Plan and Operation Management Plan which details the concepts, parameters, developmental and management criteria of the project features and to plan the acquisition, construction and operation of the authorized project features in concert with the approved Master Plan and Operation Management Plan.

C. To develop a plan to promote the project statewide and to secure public and governmental support;

D. To outline duties and responsibilities so that all interested state agencies and public groups can be involved, and

E. To estimate the total required state share of the cost and to document all state services rendered which count toward this share and, thus, determine the non-federal funding required to implement the plan.

III. BACKGROUND

The Governor's Atchafalaya Basin Committee, created in 1971, was chaired by Secretary of State Wade O. Martin, Jr. The committee sponsored legislation in 1972 which created a new commission and subsequent negotiations led to preliminary agreement on goals and objectives. One result of this action was the establishment, in 1978, of the Attakapas Island Wildlife Management Area on state-owned lands.

In 1981, Louisiana's Governor Dave Treen announced that a consensus had been reached among landowners, environmentalists and affected governmental agencies. He presented his recommended plan to Congress and the COE. The Governor also announced the donation by Dow Chemical Company of 30,000 acres toward the plan.

In January 1982, the Corps of Engineers recommended the implementation of Governor Treen's 1981 compromise plan in the Feasibility Study for the Atchafalaya Basin Floodway System, Louisiana project. The Feasibility Report was recommended by the Chief of Engineers for submission to Congress in February, 1983.

Complementing this project, in 1983, 10,232 acres of land were purchased by the State for the Sherburne Wildlife Management Area. The Department of Wildlife and Fisheries (DWF) began work in 1986 to build access roads and to enhance the habitat. That effort is continuing. To date, this area is managed by the DWF and is a fully operational wildlife management area.

In 1985 the Congress enacted the Supplemental Appropriations Act of 1985 which was reauthorized in the Water Resources Development Act of 1986 which, as amended by subsequent acts, authorized and funded the Corps of Engineers to begin land acquisition and other actions.

Also complementing the project, in 1986, the U.S. Fish and Wildlife Service (USFWS) began acquiring land (15,255 acres to date) for the Atchafalaya National Wildlife Refuge which DWF is operating and maintaining for USFWS under an agreement.

Under the access portion of The Plan, the COE has purchased acreage north of Interstate 10 on the west side of the Atchafalaya River and is operating it as Indian Bayou. DWF is assisting with enforcement services.

The COE also purchased acreage on the east side of the Atchafalaya River and DWF is assisting with the operation and maintenance of those lands. The COE plans to accelerate purchase of additional acreage in the lower Basin in the next year.

The COE has purchased easements on acreage for developmental control and environmental protection purposes. The COE plans to purchase easements on the remaining undeveloped acreage in the Basin, for a total of approximately 338,000 acres.

Under the water management portion of the plan, the COE has begun surveying in the Buffalo Cove area toward development of a pilot water management project. The COE is now monitoring the operation of a pilot water management project which was constructed by the COE in 1994 and 1995 at Bayou Eugene. The pilot project consisted of clearing and snagging Bayou Eugene and opening several cuts into the banks of Bayou Eugene and Florida Gas canal in order to restore the natural historic flowage patterns to the adjacent lands.

Under the recreation portion of the plan, the planning for the Atchafalaya River Landing Project at Simmsport and campground area is underway and should be opened to the public in 1998.

In order to move ahead with the remaining parts of the project features, a memorandum of understanding should be signed among state agencies, and a Project Cooperation Agreement (PCA) must be signed between the State of Louisiana and the Corps of Engineers for project features. Project responsibilities and cost sharing are set forth in the authorizing legislation and will be included in the Master Plan.

IV. ALLOCATION OF RESPONSIBILITY

A. The Department of Natural Resources (DNR) has been appointed to be the Lead Agency by the Governor and will assume the following responsibilities:

1. Represent the State by presenting the consensus view of the policy group, state agencies and public groups involved in each issue listed in this MOU;

2. Chair meetings of the policy and working groups which are called to reach decisions or to make recommendations;

3. Assist the Policy Group in the development, with the Corps of Engineers, a comprehensive long-range plan for the Basin;

4. Make presentations, with assistance as required, to the Governor, the Legislature, the COE and to civic and public groups;

5. Chair planning and design conferences concerning the various Basin project features;

6. Develop the public relations program, with the Corps of Engineers, to solicit statewide public support for the project;

7. Plan, call and chair meetings of the Atchafalaya Basin Advisory Committee;

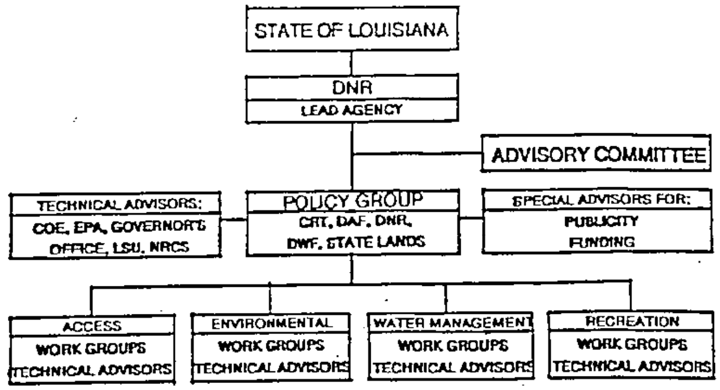
8. Prepare and distribute summaries of meetings to attendees and to all members of the Advisory Committee concerning committee meetings. Prepare and distribute status reports to the COE, and annual reports to the Legislature and the Governor;

9. Play a lead role in collecting documentation concerning in-kind services performed by all agencies which can be counted a part of the state match;

10. Chair meetings to estimate costs of the several project features requiring a non-federal match, and

11. Play a lead role in requesting funding.

As Lead Agency, the DNR will work through the following organizational structure:



The Policy Group includes representatives from the following agencies:

- Department of Natural Resources (Chair)
- Department of Culture, Recreation and Tourism
- Department of Wildlife and Fisheries
- Department of Agriculture & Forestry
- State Land Office
- Atchafalaya Levee Board

Currently, the group includes as technical advisors, representatives from the following:

- Corps of Engineers
- Environmental Protection Agency
- Governor's Office
- Louisiana State University
- National Resource Conservation Service (NRCS)
- U.S. Fish and Wildlife Service
- Additional advisors as needed

The Policy Group will assume the following duties and responsibilities:

1. Coordinate the activities of the working groups;

2. Develop a comprehensive long-range plan for role of non-Federal sponsor in meeting project authorization requirements as contained in the comprehensive project Master Plan and Operation Management Plan, both of which will be developed by the State of Louisiana and the Corps of Engineers in accordance with project authorization regulations;

3. Plan a public information program and through the Advisory Committee, plan and conduct statewide public meetings to discuss the program and secure public input. Provide information packets for media coverage and furnish speakers as requested for TV and civic and business meetings;

4. With input from working groups and the Corps of Engineers, detail estimated costs of current and future project features (as planned) and prepare a budget of non-federal matching funds required;

5. Identify services provided by state agencies for which cost-share credit will be sought. Assemble documentation of such services as provided by Corps of Engineers regulations governing such credit for services;

6. Identify local sponsors for each project feature, and

7. Prepare and implement a procedure to settle issues within and among the working groups.

TASKS OF WORKING GROUPS:

Access: Advise on site selection for acquisition
Assistance to COE in finding willing sellers
Develop PCAs, with DNR and the designated non-Federal sponsor, for the operation and maintenance of COE public access lands
Purchase servitude of passage over some privately-owned lands to provide access to some public lands

Environmental Features: Develop PCAs, with DNR and the designated non-Federal sponsor, for the acquisition, operation and maintenance of COE easement lands

APPENDIX A (Cont.)

Water Management: Advise on selection of new project features
Develop PCAs, with DNR and the designated non-Federal sponsor, for the planning, acquisition, construction, operation and maintenance of Buffalo Cove and other water management project features including:
Monitoring Construction
Monitoring Water Quality
Monitoring Water Flow

Recreation Features:
Work with COE on master plan for recreation
Advise on site selection for specific projects
Develop PCAs, with DNR and the designated non-Federal sponsor, for the planning, acquisition, construction, management, operation and maintenance of projects

B. The Department of Agriculture and Forestry (DAF) will assume the llowing responsibilities:

1. Serve on Access Working Group to provide input concerning e type and condition of forests and to advise on selection of areas containing d growth stands of cypress-tupelo;

2. Serve on the Environmental Working Group and to assist the OE in monitoring timber easements;

3. Serve on the Water Management Working Group to monitor the rest and timber related effects of water flow changes by the COE as this affects oject features such as Buffalo Cove;

4. Serve on the Recreation Features Working Group, to advise on selection of areas suited for particular recreation features;

5. Monitor plans and actions of all working groups and provide ut concerning all forest and soil management matters, and

6. Attend and participate in meetings of the ABAC.

C. The Department of Culture, Recreation and Tourism (CRT) will ume the following responsibilities:

1. Assist the Policy Group in the development of a mprehensive long-range plan for the Basin;

2. Serve on the Access Working Group providing input cerning recreation views;

3. Assist in locating willing sellers of land targeted for purchase;

4. Serve on the Recreation Features Working Group which will se on the selection of sites for proposed campgrounds, nature trails, boat ps, and other similar projects;

5. Serve on the Recreation Features Working Group to assist in ning new project features and to monitor the entire planning process for project features, particularly including tourism considerations;

6. Serve on the Recreation Features Working Group to plan the tion of recreation project features, operate project features relating to the of CRT, and develop budgets and document activities which may count as nd contributions to match requirements for construction projects;

7. Include the Atchafalaya Basin in the department's state and nal tourism promotional program, and

8. Attend and participate in meetings of the ABAC.

D. The Department of Environmental Quality (DEQ) will assume the ing responsibilities:

1. Serve on the Water Management Working Group charged with oring the water quality effects of projects under consideration;

2. Provide the Policy Group with information and documentation vices performed in the Basin which may be eligible for in-kind state match uired funding, and

3. Attend and participate in meetings of the ABAC.

E. The Department of Health and Hospitals (DHH) will assume the g responsibilities:

1. When requested, assist all working groups which are involved in planning facilities in the Basin, by providing state requirements for sewage disposal and other health protection regulations which must be included in the planning process;

2. Continue to provide permits for sewerage facilities for private camps, and regulate any public water systems, and

3. Attend and participate in meetings of the ABAC.

F. The State Land Office will assume the following responsibilities:

1. Assist the Access Working Group, and other working groups, in selecting lands for acquisition and in designating access routes to existing and planned Basin project features;

2. Provide access to state lands to accomplish goals of public purposes including fish and wildlife features;

3. Monitor and report any actions which restrict public access to navigable waterways, and

4. Attend and participate in meetings of the ABAC.

G. The Department of Transportation and Development (DOTD) will assume the following responsibilities:

1. Serve on the Water Management Working Group to monitor construction of water management projects to insure that the state's interests are protected;

2. Serve on the Recreation Features Working Group regarding planning recreation and other projects in the Basin which require the construction of roads, parking areas, flood control and drainage systems;

3. Serve as a clearinghouse for water quality information under the Louisiana Water Resources Information Center, and

4. Attend and participate in meetings of the ABAC.

H. The Department of Wildlife and Fisheries (DWF) will assume the following responsibilities:

1. Assist the Policy Group in the development of a long-range comprehensive plan for the Basin;

2. Continue to operate and maintain the Sherburne Wildlife Management Area and the Attakapas Island Wildlife Management Area;

3. Continue to manage lands purchased by the COE in the vicinity of Sherburne WMA provided that an acceptable agreement can be reached between DWF and COE;

4. Consider management of additional lands purchased by the COE provided that an acceptable agreement can be reached between COE and DWF;

5. Assist the Policy Group in planning future budgets to provide for state matching funds required, and in the documentation of current and planned expenditures which may qualify as state matching funds;

6. Serve on the Access Working Group charged with assisting the COE with:

A. Selecting sites for acquisition,

B. Enhancing and protecting aquatic and terrestrial habitat,

C. Finding willing sellers of selected lands.

7. Serve on the Water Management Working Group to help select water management projects and provide information concerning aquatic and terrestrial habitat;

8. Provide habitat considerations information to the Water Management Working Group as it pertains to monitoring water quality effects, water management maintenance and operation and water flow control;

9. Serve on the Recreation Features Working Group to provide habitat information to guide the planning of selected projects;

10. Serve on the Water Management Working Group to monitor the effect of flow changes by the COE on wildlife and fisheries resources and their habitats, and

11. Attend and participate in meetings of the ABAC.

IV. PUBLIC PARTICIPATION

The Atchafalaya Basin Advisory Committee will provide a forum for public discussion of state and federal actions and future plans concerning the Atchafalaya Basin Floodway System, Louisiana project. The ABAC membership includes:

- All state agencies involved in the Basin
- All federal agencies involved in the Basin
- Representatives of the Governor's Office and the Louisiana Legislature
- Representatives of all major environmental groups
- Louisiana Landowners' Association
- Industry representatives
- Police Jury representatives from Basin parishes
- Fishing and hunting clubs
- Private citizens

The ABAC will meet quarterly to receive reports and to discuss the progress of activities.

A report of each meeting will be distributed to all members and made available to the public, including a summary of all presentations and a list and discussion of all decisions reached. Suggestions from the public will be listed and actions to be taken concerning those suggestions will be outlined.

The ABAC will have input into the annual Report to the Governor and Legislature.

V. COST SHARING

The Federal and non-Federal cost-sharing obligations for the planning, acquisition, and/or construction (First Cost) and for the operation and maintenance (O&M) of the features of the Atchafalaya Basin Floodway System, Louisiana project, as established by the Supplemental Appropriations Act of 1985, Public Law 99-88, and by the Water Resources Development Act of 1986, as amended, are as follows:

State Lands, as needed, will be dedicated to the project purpose.

A. PUBLIC ACCESS FEATURE:

First Cost: Private Lands - 100% Federal

O & M: Federal: 75%; State: 25%

B. DEVELOPMENTAL CONTROL AND ENVIRONMENTAL PROTECTION FEATURE:

First Cost: Private Lands - 100% Federal

O & M: Federal: 75%; State: 25%

C. FLOWAGE EASEMENT FEATURE:

First Cost: Private Lands - 100% Federal

O & M: Federal: 100%

D. WATER MANAGEMENT UNIT, CANAL CLOSURE AND CIRCULATION IMPROVEMENTS FEATURE**:

First Cost: Private Lands - 100%

O & M: Federal: 75%; State: 25%

E. RECREATION FEATURE:

First Cost: Federal: 50%; State: 50%

The State of Louisiana will acquire the fee interest, exclusive of minerals, in 1,500 acres of privately-owned lands, and will perform all relocations and alterations of utilities, facilities and improvements necessary for the construction, operation and maintenance of the project, and will be entitled to receive a credit for the value of these contributions against its 50% share of the cost of construction.

**In cases which are not deemed to be environmental in nature, the cost-sharing may be reduced to 75% federal, 25% non-federal.

Existing and future services provided by the state in the Basin will count as part of the non-federal share provided that satisfactory negotiations with the COE properly define such services, provided such services comply with project authorization and COE regulations.

VI. FUNDING OF NON-FEDERAL SHARE

The agencies participating in this MOU will develop a proposed budget with estimated costs for funding the non-federal share of the Atchafalaya Floodway Plan project with the goal of presenting the plan to the 1999 Legislative session.

Once approval has been obtained, annual appropriations will be requested in an amount sufficient to fulfill the State of Louisiana's project obligations, as non-Federal sponsor, for the project features, or the separable elements thereof, for which Federal funds have been appropriated and scheduled for expenditure.

VII. GENERAL

A. Nothing in the MOU is intended to diminish, modify or otherwise affect statutory or regulatory authorities of any of the signatory agencies. All formal guidance interpreting this MOU and background materials upon which this MOU is based will be issued jointly by the agencies.

B. Nothing in this MOU will be construed as indicating a financial commitment by the signatory agencies for the expenditure of funds except as authorized in specific appropriations.

C. This MOU will take effect on the date of the last signature below and will continue in effect until modified or revoked by agreement of all signatory agencies, or revoked by any of the signatory agencies alone upon 90 days written notice. Modifications to this MOU may be made by mutual agreement and approval by all the signatory agencies. Such modifications will take effect upon signature of the modified document by all the signatory agencies.

D. The signatory agencies will refer delineation requests to the appropriate agency pursuant to this MOU.

VIII. SIGNATURES OF PARTICIPATING DEPARTMENT SECRETARIES

Bob Odom
Commissioner
AGRICULTURE AND FORESTRY

Secretary,
CULTURE, RECREATION & TOURISM

Secretary,
ENVIRONMENTAL QUALITY

Secretary,
HEALTH AND HOSPITALS

Secretary,
NATURAL RESOURCES

Secretary,
TRANSPORTATION AND DEVELOPMENT

Secretary,
WILDLIFE AND FISHERIES

Director,
STATE LAND OFFICE

April 24, 1997

Vol. No. March 9, 1998

ATCHAFALAYA BASIN

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Police Jury Members:

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Hon. Scott Angelle
St. Martin Parish Police Jury
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APPENDIX C

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STATE OF LOUISIANA LAND USE PROPOSAL FOR THE FINAL ATCHAFALAYA BASIN MANAGEMENT PLAN

Any land use plan adopted for the Atchafalaya Basin must recognize ...t the basin is first and foremost a floodway. Uses that are ...nsistent with the continued use of the basin as a floodway must be ...hibited; and actions which are necessary to maintain the basin as a ...odway must be given first priority.

...the recommended plan involves the obtaining of certain easements ...r private property in the basin. If in the future it is determined ...t these easements are no longer necessary, the owner of the property ...ject to the easements should be given the first option to repurchase ...m. Where an easement gives the government the right to provide ...lic access to private property, provision must be made to exonerate ...e private property owner from non-intentional tort liability for ...idents arising out of the exercise of that easement.

...ERAL-

...Except as specifically provided below, an A-7 Easement should be ...ained over all property except developed ridges and State owned ...perty in the basin.

The A-7 Easement would generally provide the following rights in ...e property:

1) The landowner retains ownership and the right to exploit minerals;
2) The landowner retains the right to control public access;
3) The landowner retains ownership of timber and the right to practice silviculture (as conditioned below);
4) The government would obtain the right to flood the property;
5) The government would control all excavations, landfilling, and uses which change the natural condition of the property (e.g. to clearcutting to convert land to a different use);
6) The government could prohibit permanent habitable structures (other than camps); and
7) Additional uses and structures would be subject to governmental regulation or prohibition.

...ERAL PRODUCTION (OIL AND GAS)-

The A-7 Easement would leave the ownership and right to exploit ...erals with the property owner. In accordance with LSA R.S. 31:149, ...scription will not run against the property owners. Those rights ...ld have to be exercised in accordance with accepted mineral ...elopment practices. It is envisioned that the conditions will be ...ilar to those contained in the Corps of Engineers "Dredge and Fill ...mitting Process" (Section 404). Concern has been expressed by ...tain property owners, particularly the oil and gas industry, that ...conditions of exploitation may become so onerous as to be ...hibitive. The conditions of exploitation should be worked out in ...ance and incorporated into the easement and authorizing legislation. ...State recommends the conditions contained in Appendix A be so ...orporated.

...OMLAND HARDWOODS AND EARLY SUCCESSIONAL BOTTOMLAND HARDWOODS - The ...Easement would leave ownership of the hardwoods and the right to ...ctice silviculture with the landowner.

However, the easement should be re-written to specify that those ...hts would be subject to the following conditions:

1) No land-clearing for conversion to other land uses;
2) No non-regenerative timber cutting; and
3) If silviculture is practiced, it must be on a substainable yield basis.

In addition to the A-7 Easement over the basin, an A-2 Easement ...uld be acquired over 30,000 acres of bottomland hardwoods. The A-2 ...ent is the same as the A-7 Easement except:

1) The government would obtain ownership of the bottomland hardwoods; and
2) The government would have the right to provide public access to the property.

The purpose of the A-2 Easement is to set aside this acreage in its natural state and to allow an area of public access for recreation (principally hunting.)

In addition the government should be authorized and encouraged to purchase additional acres on a willing vendor basis.

The acres acquired should be sufficiently contiguous to accomplish the purposes set forth above.

CYPRESS-TUPELO STANDS - The A-7 Easement leaves ownership and right to practice silviculture of Cypress-Tupelo stands with the property owner. Again, this easement would have to be re-written to provide that those rights are subject to the three conditions set forth in the section on Bottomland Hardwoods.

With regard to cypress, however, the condition providing for no non-regenerative cutting should aslo include a provision specifying no clearcutting. Serious concern has been expressed over the regenerative ability of cypress. Apparently, it is very difficult to determine if cypress tree cutting is in accordance with a program of sustainable yield, or is in effect a "mining" operation. It is felt that the prohibition of clearcutting of cypress stands and a vigorous program of monitoring by the Louisiana Office of Forestry is necessary to protect cypress from a possible non-regenerative level of cutting. Federal financial assistance may be necessary to properly monitor sustainable yield cutting.

In addition to the A-7 Easement over the basin, an A-2 Easement should be taken on 20,000 acres of Cypress-Tupelo stands and an A-6 Easement over 30,000 acres of Cypress-Tupelo stands. The A-6 Easement would give the government the right to allow public access to the lands, but retain ownership of the Cypress-Tupelo stands and the right to practice silviculture with the property owner.

It is recommended that the government be authorized and encouraged to obtain additional Cypress-Tupelo stands from willing vendors. Again, the acres should be sufficiently contiguous to accomplish the purposes for which they are acquired.

The conditions for practice of silviculture should be worked out in advance and incorporated into the easement and authorizing legislation.

GREENBELTS- It is recommended that two types of greenbelts be created to provide public access to land areas for recreational purposes. These would be A-2 Easements.

1) Greenbelts along specified public navigable waters - The greenbelt would consist of 300 foot-wide strips of land on each side of specified public navigable waters. It must be emphasized that the designation of public navigable waters would be for the purpose of identifying greenbelt areas and not for the purpose of determining ownership to the water or waterbottoms. The greenbelts should incorporate as much cypress-tupelo acreage as feasible.

2) Perimeter-Greenbelts - These greenbelts would consist of land areas up to 1/4 mile wide along specified areas of land inside and adjacent to the Atchafalaya Basin Guide - Levees. Except as provided below, the right would not include access to the levee. The areas considered would be those in which the 1/4 mile or less width would bring the perimeter greenbelt into contact with water. Certain areas would be specified for controlled access over the levee to the greenbelt.

The designation of a perimeter greenbelt is not to interfere with the governments right to engage in flood control activities on that property. This specifically includes the right to obtain material from the property for levee construction.

The total area set aside for the two types of greenbelts would be 23,000 acres.

The greenbelt property would be subject to the conditions of an A-2 easement. Public access includes the right of owners of property landward of a greenbelt area to cross the greenbelt to exercise on the landward property any right they would have under an A-7 Easement. Also, the existing right of the landowner to establish a camp on his property and fence off a reasonable area for privacy would not be abridge by the obtaining of the A-2 Easement for a greenbelt.

CAMPSITES, BOAT LAUNCH AREAS, ROOKERIES, SPECIAL AND UNIQUE AREAS –

Rookeries – An A-2 Easement should be obtained over 500 selected acres of rookeries.

Campsites, boat launch areas, special and unique areas – An A-1 Easement should be obtained over 1500 acres for campsites, boat launch areas and special and unique areas. An A-1 Easement would give the government fee simple title to the land. However, it would reserve mineral rights to the original property owner. In accordance with LSA R.S. 31:149, prescription will not run against the property owners.

Since the primary method of public access to the basin is by boat, every effort should be made to maximize the number of boat launch areas in the basin.

WATER ACCESS – An important element of public access in the basin is access by water to overflow lands flooded during seasonal high waters. The legal right to this access is unclear. The Louisiana Attorney General is urged to issue a legal opinion clarifying the right of public access by water to overflow lands. If this right does not exist, an A-6 Easement would be necessary to provide comparable access.

STATE OWNED LANDS – The State of Louisiana will maintain the state lands in the basin open for public recreational access. State title shall not be prejudiced by another government's acquisition of an easement from private claimants to any of these same lands. Language to this effect should be incorporated in all easements.

MANAGEMENT – The working group believes that management of non-flood control elements of the final Atchafalaya Basin Plan should be through State of Louisiana agencies.

A-7 –	Generally over basin
A-6 –	30,000 acres Cypress-Tupelo
A-2 –	30,000 acres Bottomland Hardwoods
	20,000 acres Cypress-Tupelo Stands
	23,000 acres Greenbelts
	500 acres Rookeries
A-1	1,500 acres, campsites, unique and special areas
Total –	105,000 acres

APPENDIX A

Oil and Gas Activities
in the
Atchafalaya Fish, Wildlife, and Multi-Use Area

The United States Department of the Interior's Fish and Wildlife Service, in proposing the Atchafalaya Fish, Wildlife and Multi-Use Area, recognizes that oil and gas activities would be fully compatible with any operational, multipurpose plan established for that area. It is, therefore, the intent that such activities, within the area, will not be subject to any additional restrictive regulations affecting oil and gas activities.

Furthermore, mineral owners, mineral lessees and pipeline companies shall have the right to use surface and subsurface property of the Atchafalaya Fish, Wildlife and Multi-Use Area as may be necessary for the conducting of operations for the exploration, development, production, storage, transportation and marketing of oil, gas and other liquid or gaseous minerals, including but not limited to, the construction, maintenance and operation of wells, pumping units, pipelines, storage tanks, valves, meters and other above or below ground facilities relating to such exploration, development, production, storage, transportation, or marketing. In addition, this right shall particularly include, but shall not be limited to, the fol' ing actions where normally associated with oil and gas exploration, development, production, storage, transportation, or marketing:

(1) access to all parts of the Atchafalaya Fish, Wildlife, and Multi-Use Area on a year-round basis;

(2) access via all navigable waterways;

(3) right to dredge, maintain, and use canals as needed for the exploration for and production and transportation of oil, gas, and other liquid or gaseous minerals;

(4) with respect to the construction, use, and maintenance of production facilities, the right to:

a) dike and fill

b) place facilities on pilings

(5) the right to construct, maintain, operate, and use pipelines and flowlines for the transportation of oil, gas, water (salt or fresh), and other liquid or gaseous minerals. The pipelines and flowlines will be constructed in accordance with standards prevailing in the industry;

(6) where land access is available to a location, the right to construct, use and maintain suitable roads. Water levels in management units shall be regulated, as closely as possible, to simulate natural overflow patterns, thus facilitating coordinated planning of such road locations and elevations with water management plans;

(7) the right to construct, use, and maintain electric utility and telephone lines;

(8) the right to drill, use and maintain wells for the disposal of produced water;

(9) the right to excavate, use, and maintain pits and other facilities normally needed in connection with oil and gas exploration and production operations;

(10) the right to conduct or have conducted geological surveys including those that require the use of explosives;

(11) the right to dispose of drilling muds and other waste in the manner and to the extent required by State and Federal law.

APPENDIX D

Annual Management Plan Submittal and Approval Process 6 January 1998

This document outlines the process for the submittal of Annual Management Plans by the various State agencies involved in the Operation and Maintenance of the Atchafalaya Basin Floodway System, Louisiana Project. Management plans will be submitted and reviewed to assure compliance with U.S. Army Environmental Regulation 1130-2-400. This procedure will enable the Corp to incorporate these management activities into their budget and reporting schedule.

The Park Manager, Senior Park Ranger, and Natural Resource Specialist (NRS), will meet with the LDWF representatives no later than 1 March preceding the upcoming fiscal year. At this time the Annual Management Plans will be discussed and coordinated. This plan is an annual increment of the 5-year management plan. Detailed plans for the next Fiscal Year and estimates for the following four years will be developed.

By 1 April State Agencies will submit the Annual Management Plans for Corps review and evaluation. (see attachments for format).

The review period will be completed no later than 15 April. Work items will be evaluated based on applicability to the Project objectives. Upon completion of the review period, the management plans will be signed and approved by the Operations Project Manager and returned to the state by 1 May.

Throughout the fiscal year quarterly reports will be submitted no later than 30 days following the end of each quarter. These reports will be an account of actual revenues and expenditures with a description of work accomplished (same format as the work plans).

This submittal process and reporting system will allow the Corps and LDWF to coordinate management activities on Corps fee owned land. This procedure will precisely layout our management objectives and enable us to utilize our agencies' resources to accomplish these tasks.

APPENDIX E

DRAFT RATING FACTORS

1. Management Unit
   - A. Existing Conditions
     - a. Total Land
     - b. Total Aquatic
       - 1. Natural (lakes, bayous)
       - 2. Man-made (canals, navigation channels)
       - 3. Swamp
   - B. Future
     - a. Total Land
     - b. Total Aquatic
       - 1. Natural (lakes, bayous)
       - 2. Man-made (canals, navigation channels)
       - 3. Swamp

2. Usage of Management Unit
   - A. Land
     - a. Hunting
     - b. Camping
   - B. Water
     - a. Recreational Fishing
     - b. Commercial Fishing
       - 1. Fish
       - 2. Crawfish

3. Access to Aquatic Areas
   - A. Existing
     - a. High water
     - b. Low water
   - B. Future
     - a. High water
     - b. Low water

4. Feasibility of Implementation
   - A. Opposition/Support of Agencies
   - B. Opposition/Support of Public
     - a. Commercial Fishing
       - 1. Fish
       - 2. Crawfish
     - b. Recreational Fishing
     - c. Hunting Clubs
     - d. Land Owners

APPENDIX F

State of Louisiana

M.J. "MIKE" FOSTER, JR.
GOVERNOR

JACK C. CALDWELL
SECRETARY

DEPARTMENT OF NATURAL RESOURCES

February 16, 1998

Col. William Conner
US Army Corps of Engineers
P.O. Box 60267
New Orleans, LA 70160

Dear Col. Conner:

It is our understanding that the New Orleans District is planning to address the issue of funding and constructing the Water Management Unit feature of the Atchafalaya Basin Floodway System, Louisiana Project.

It is our opinion that the construction, operation and maintenance of the water management units should have a high priority in the implementation of the Atchafalaya Basin Project. The goal of these units is to restore, where possible and to preserve, where feasible, the natural habitat that has made the Atchafalaya Basin a national treasure.

The State of Louisiana is in final preparation of the State Master Plan for the Atchafalaya Basin and will present this plan to the 1999 Legislative Session for funding. Our agencies will request the State's share of the operation and maintenance costs (75% Federal - 25% State) for the management units, along with the other features of the Plan. Once approved, the State will enter into a cost/share agreement with the Corps which will outline the details of this management. We request that the Corps allocate funds for the design and construction of the water management unit feature in addition to funds allocated for land acquisition.

If any further information is needed from us, do not hesitate to contact us.

Sincerely,

Jack Caldwell
Jack Caldwell, Secretary
Department of Natural Resources

Jimmy Jenkins, Secretary
Department of Wildlife and Fisheries

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
WASHINGTON, D.C. 20314-1000

REPLY TO
ATTENTION OF:

CECW-ON

MEMORANDUM FOR COMMANDERS, MAJOR SUBORDINATE COMMANDS

SUBJECT: Water Resources Development Act of 1996, Section 208a

1. Section 208a of the Water Resources Development Act of 1996 (Act) directed the Secretary of the Army to provide increased emphasis on, and opportunities for recreation at, water resources projects operated, maintained, or constructed by the U.S. Army Corps of Engineers and to transmit a report to Congress on specific measures taken, not later than two years after the date of enactment of this Act.

2. A five member task force has been established to develop a strategy for identifying actions which place the Corps in conformance with this Act. Part of their effort will include obtaining input and suggestions from all levels of your respective commands, as well as from our customers and partners.

3. A similar effort that will be going on at the same time is the establishment of the National Recreation Lakes Commission. The President is expected to appoint the Commission soon with H. Martin Lancaster, Assistant Secretary of the Army for Civil Works, as the Commissioner representing the Army.

4. I recognize the importance of this effort and know I can count on the support of you and your staffs so that the Corps is able to comply with the Act.

FOR THE COMMANDER:

RUSSELL L. FUHRMAN
Major General, USA
Director of Civil Works

Printing cost acknowledgement.......

This public document was published at a total cost of $3,790.00. Five Hundred copies of this public document were published in this first printing at a cost of $5,082.50. The total cost of all printings of this document including reprints is $8,872.50. This document was published by Louisiana Department of Natural Resources at LSU Graphic Services 3555 River Road, Baton Rouge, LA 70803. This material was printed in accordance with the standards for printing by state agencies established pursuant to R.S. 43:41 of the Louisiana Revised Statutes.

Appendix LL: Raynie Harlan Presentation - Crawfish Regulations, Management, and Research

Page 591

Spoil Bank Mitigation Study Group

Inland Fisheries | SR 154 | December 2017

R. Harlan and B. Salyers

Brief Overview of LDWF Crawfish Regulations, Management and Research

LDWF **Recreational** Crawfish Regulations

- Recreational license and crawfish trap fee
- No gear fee for crawfish "nets"
- Trap size (¾ X 11/16 hexagonal mesh; < 2" opening)
- Trap marking requirements (name, license number)
- 35 traps per licensed fisher
- Possession limit of 150 pounds per day per person
- WMA regulations differ slightly
- No restrictions on size or sex of crawfish harvested

LDWF **Commercial** Crawfish Regulations

- TRAPS
  - Openings in pillow top no greater than 2”
  - Unlimited trap numbers
  - No restrictions on size limit, poundage limit or sex of crawfish
  - Historic mesh size = ¾-inch X 1-inch
    - retain crawfish 75 mm or greater TL
  - 2007 Legislation (SB 732)
    - reduced mesh to ¾ X 11/16 - inch
    - retain smaller “peeler” crawfish

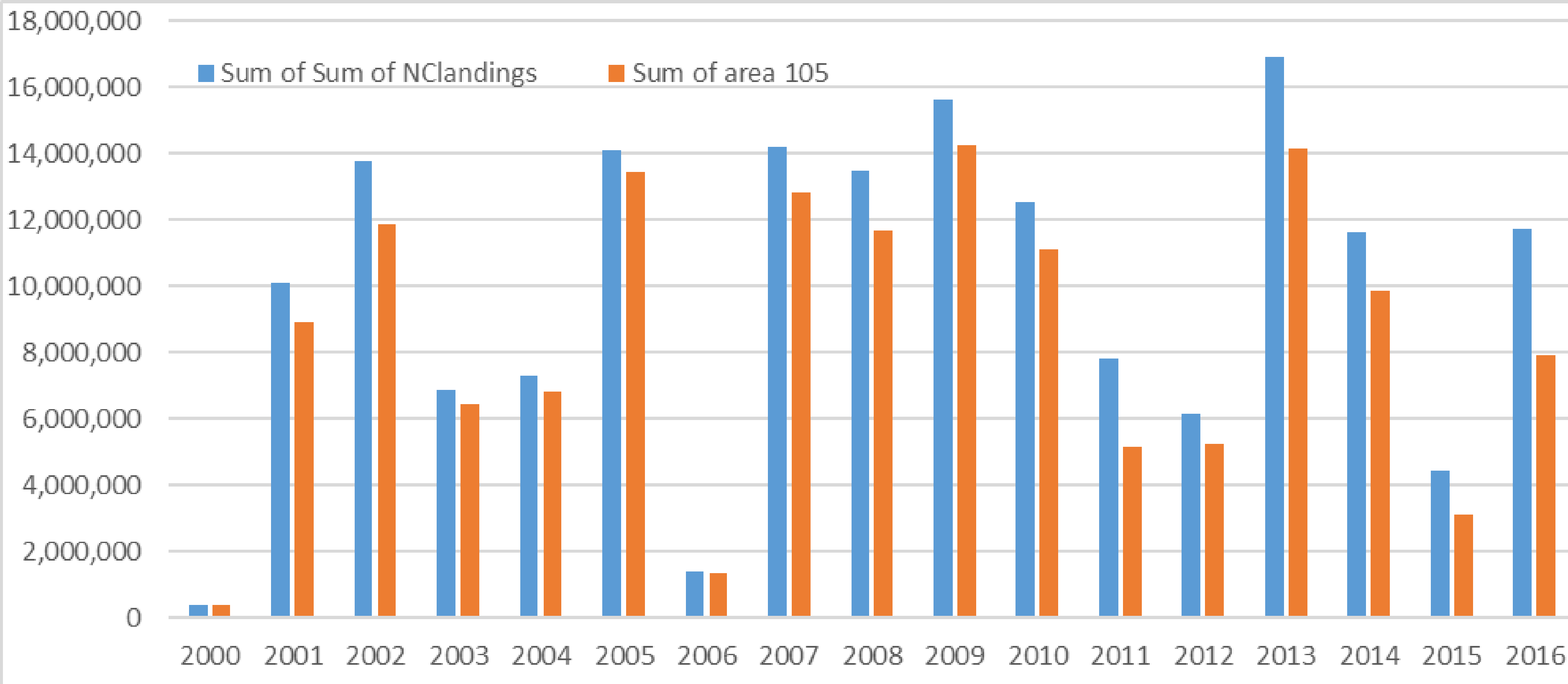
- SEASON
  - No LDWF enforced season
  - Regulated by spring river pulse and hydrograph characteristics

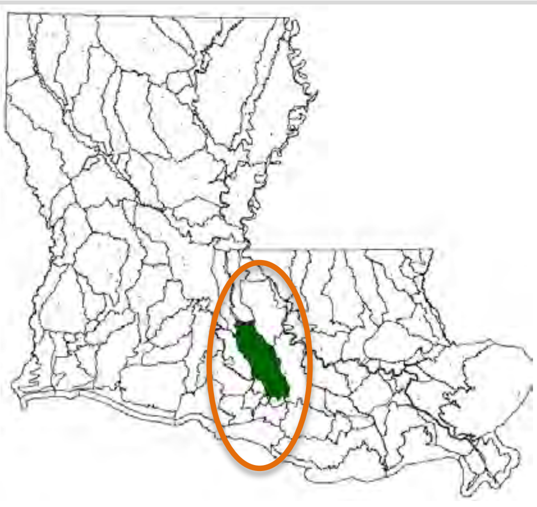
LDWF **Commercial** crawfish Regulations

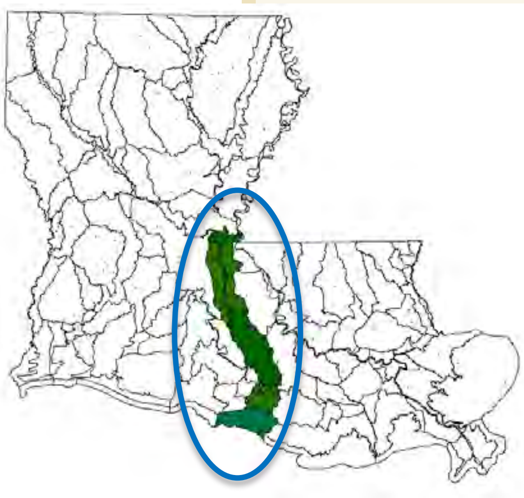
- LICENSE
  - Commercial license and crawfish trap fee
  - Dealers required to collect trip ticket data from seller/fisherman
  - If fisherman wishes to transport and sell outside the state, or sell directly to retail or consumers → required to have...
    - seafood dealers license or
    - fresh products license
    - Trip ticket still required monthly even if 0 trip tickets

- TRIP TICKET PROGRAM
  - WILD caught crawfish only
  - Licensed fisherman
  - Licensed dealer
  - Location of traps not noted; only fishing area
  - 1999 – present

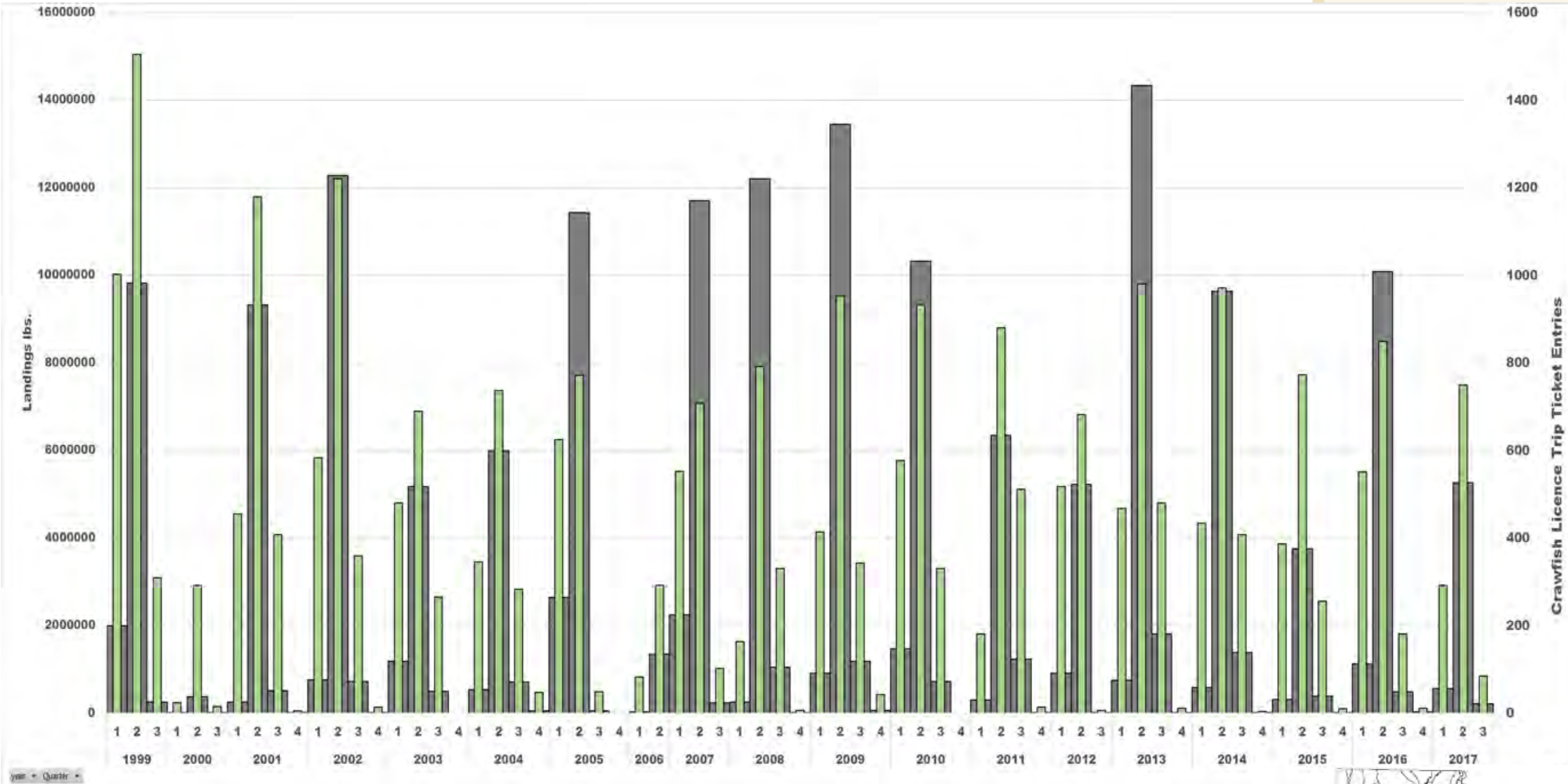
LDWF Wild Caught crawfish Trip Ticket Landings 2000 - 2016







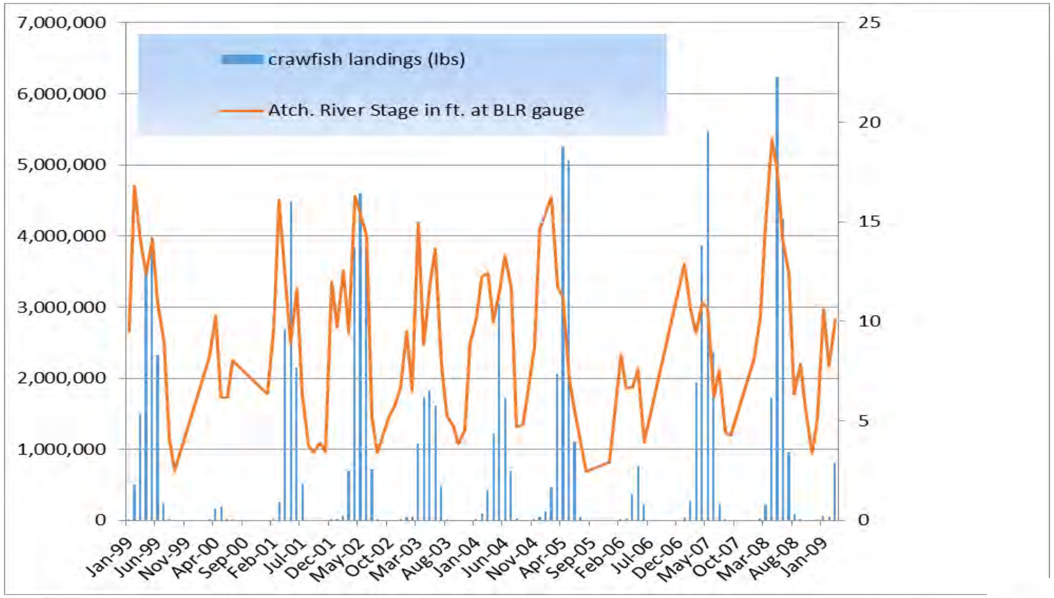
LDWF Wild Caught crawfish Trip Ticket Landings 2000 - 2016



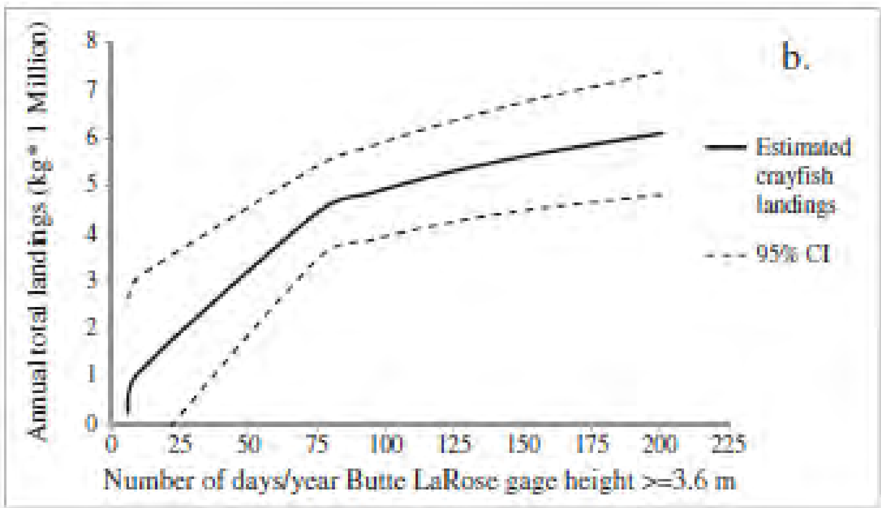
Trip Ticket landings per quarter (grey bar)

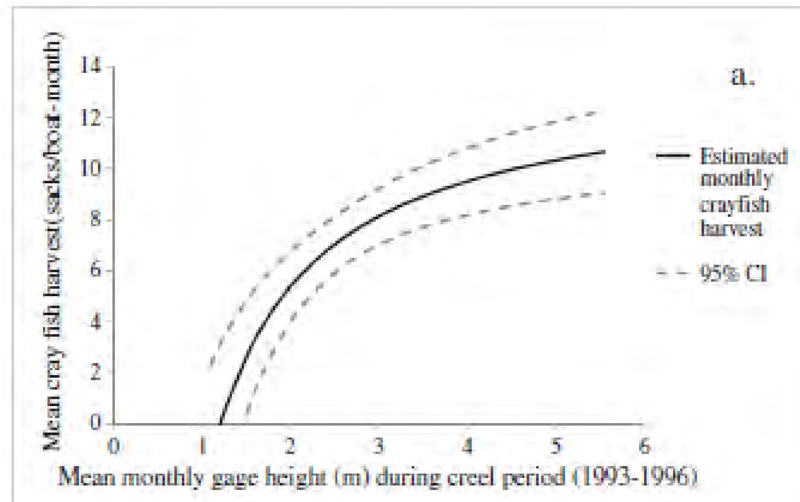
VS.

Number of licensed crawfish fishermen submitting trip ticket data (green bar).



crawfish management is complex and directly related to yearly flood pulse characteristics.





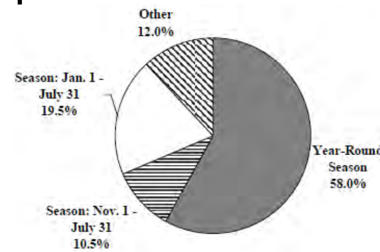
Commercial production estimates ambiguous; crawfish catches associated positively with flood magnitude and duration.

Alford and Walker (2013) Managing the flood pulse for optimal fisheries production in the Atchafalaya River Basin, Louisiana USA. River Research and Applications (29)279-269

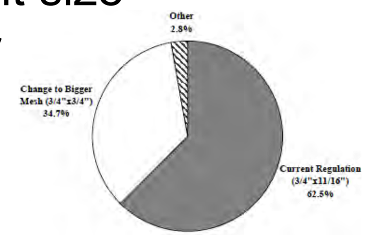
LDWF Crawfish Harvester Survey 2010

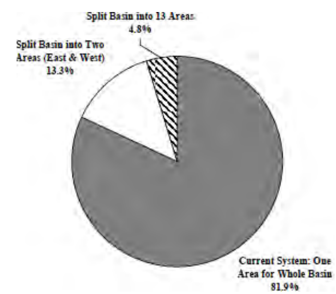
LDWF conducted a survey of resident wild crawfish harvesters to learn more about these individuals and their preferences and perspectives of selected actual and hypothetical regulations and management practices.

1. crawfish season : 60% year round



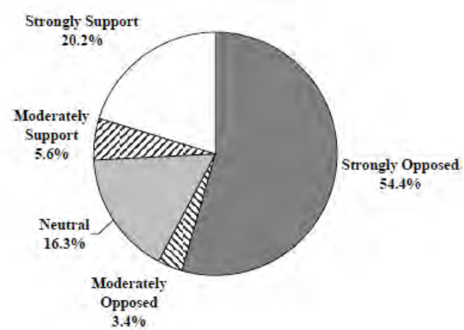
2. Minimum mesh size : 63% current size
34% larger





3. Area designation Trip Ticket : 82% single area*

4. Commercial tag requirements :
54% strongly opposed
20% strongly support



Isaacs, J. C., and D. Lavergne. 2010. Louisiana commercial crawfish harvesters Survey Report. Louisiana Department of Wildlife and Fisheries, Baton Rouge, Louisiana.

LDWF Input SR 154

- Risks spoil banks pose to Louisiana’s living aquatic resources and habitat

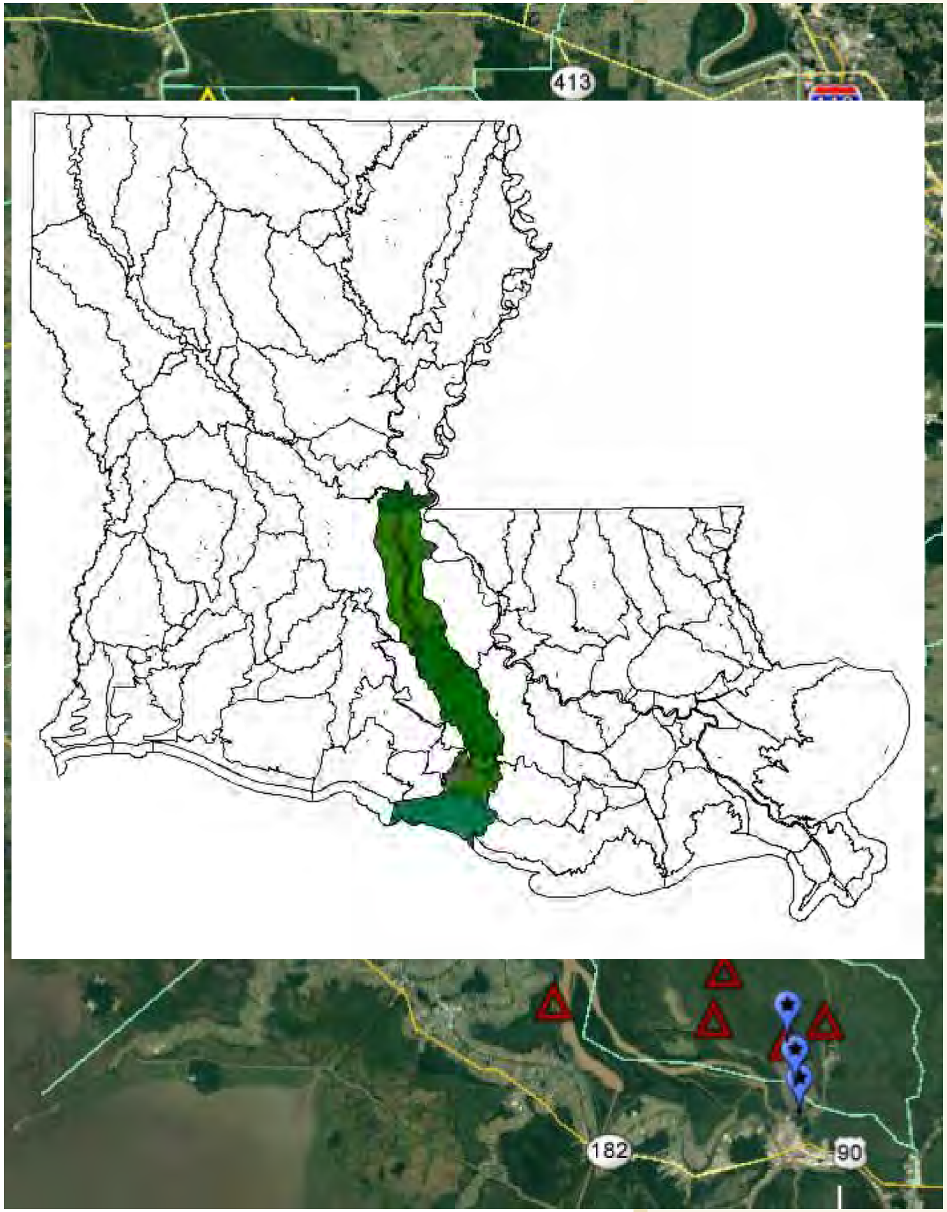
- Availability of LDWF data to facilitate analysis of the risks to resources and habitat

LDWF Input SR 154

- **Risks Spoil banks pose to Louisiana's living aquatic resources and habitat.**
  – Gagliano and van Beek 1975 - An Approach to Multiuse Management in Mississippi Delta System
  – USACE 1982 – ABFS Louisiana Feasibility Study
  – USACE 2003 – Buffalo Cove Pilot Water Management Unit EA #366
  – Chadwick 2009 – Overview and Planning Process of the East Grand Lake Water Quality Improvement and Sediment Management Plan
  – Hupp et. al 2009 – Geomorphic Processes and Environmental Impacts of Human Alteration along Coastal Plain Rivers.
  – LDNR 2012 – ABFS Louisiana Master Plan
  – Pasco et. al 2015 - Predicting Floodplain Hypoxia in the Atchafalaya River, Louisiana, USA, a Large, Regulated Southern Floodplain River System
  – Kozak 2015 – Restoration and Water Management in the ARB (Dissertation)
  – CPRA 2017 – Louisiana's Comprehensive Mater Plan for a Sustainable Coast
- Water quality and floodplain hydrology impacts; biotic impacts less studied

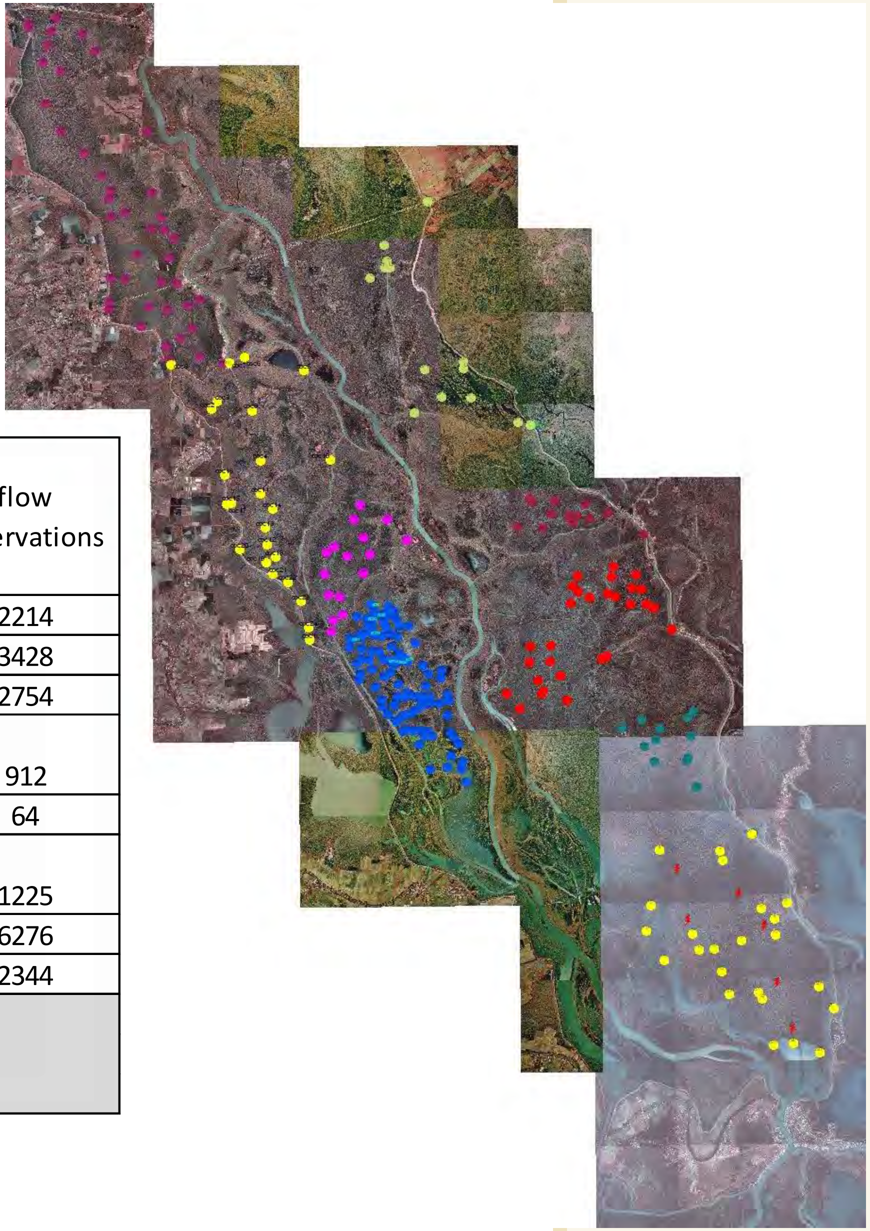
LDWF Input SR 154

- **Availability of LDWF data to facilitate analysis of the risks to resources and habitat**
  - Fishery-dependent Trip Ticket data not appropriate for this evaluation (spatial resolution)
  - Future evaluation of fishery-independent LDWF water quality and fisheries sampling from Henderson Lake and Atchafalaya Basin Waterbodies.
    - Red = Atchafalaya Waterbody
    - Blue = Henderson Lake Waterbody
    - Yellow = Sherburne WMA
    - Date of spoil bank creation/mitigation needed, crawfish not included, still issues with spatial resolution.



Louisiana State University Data

- **Availability of <u>other</u> data to facilitate analysis of the risks to resources and habitat**



Areas of Interest	main funding agency	Years of obs	No. of sites	WaterQuality Observations	flow observations
Sorrel	DNR	2002-2009	13	6583	2214
Murphy Lake	DNR	2000-2009	35 - 50	10773	3428
Postillion	DNR	2001-2009	28	8413	2754
East Grand Lake- Inlet	DNR	2010-2012	50	2477	912
Dog Leg	DNR	2013-2015	8+	168	64
DOE/21"	DNR	(2001-2003) (2006-2007)	30	3969	1225
Henderson	USACE	2005-2014	36	17998	6276
Buffalo Cove	USACE	2004-current	46	6604	2344
Cocodrie	USACE	2006	25		
Beau Bayou	USACE	2006	~10		
Upper Flats	USACE	2003-2006	14		

* totals last updated 2016

Summary

- LDWF does manage crawfish; future discussions possible

- LDWF fishery-dependent Trip Ticket crawfish and finfish data **NOT** appropriate for evaluating effects of spoil banks on fishery (spatial resolution)

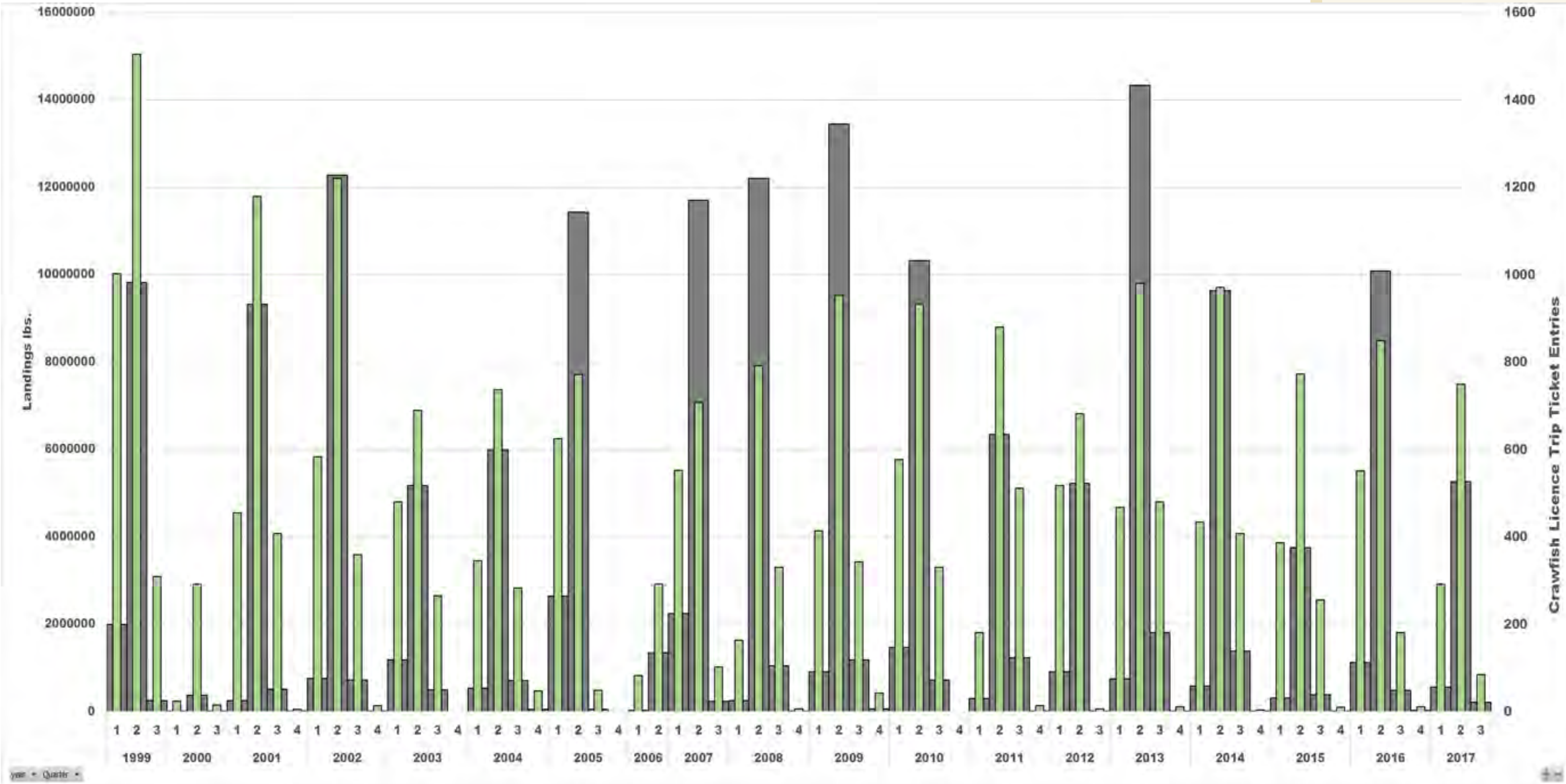
- LDWF fishery-independent water quality and fishery data **MAY** be appropriate from LDWF waterbody samples (spatial resolution and spoil bank creation/mitigation dates needed – future evaluation)

- LDWF suggests shifting future efforts to evaluating and modeling water quality and floodplain hydrologic responses to spoil bank creation and mitigation using already available data from LSU, LDNR, USGS, USFWS and others (Atchafalaya TAG).

    - Buffalo Cove Water Management Unit
    - Henderson Water Management Unit
    - East Grand Lake Area

QUESTIONS OR COMMENTS?

LDWF Wild Caught crawfish Trip Ticket Landings 2000 - 2016



"active resident wild crawfish harvesters" = those individuals who hold a resident commercial fisherman license and have completed and submitted trip tickets that indicated the landing and sale of crawfish in Louisiana within the previous license year.

Based on 2008 -2009 trip ticket data 1,142 qualified as active resident commercial wild crawfish harvesters under these criteria.

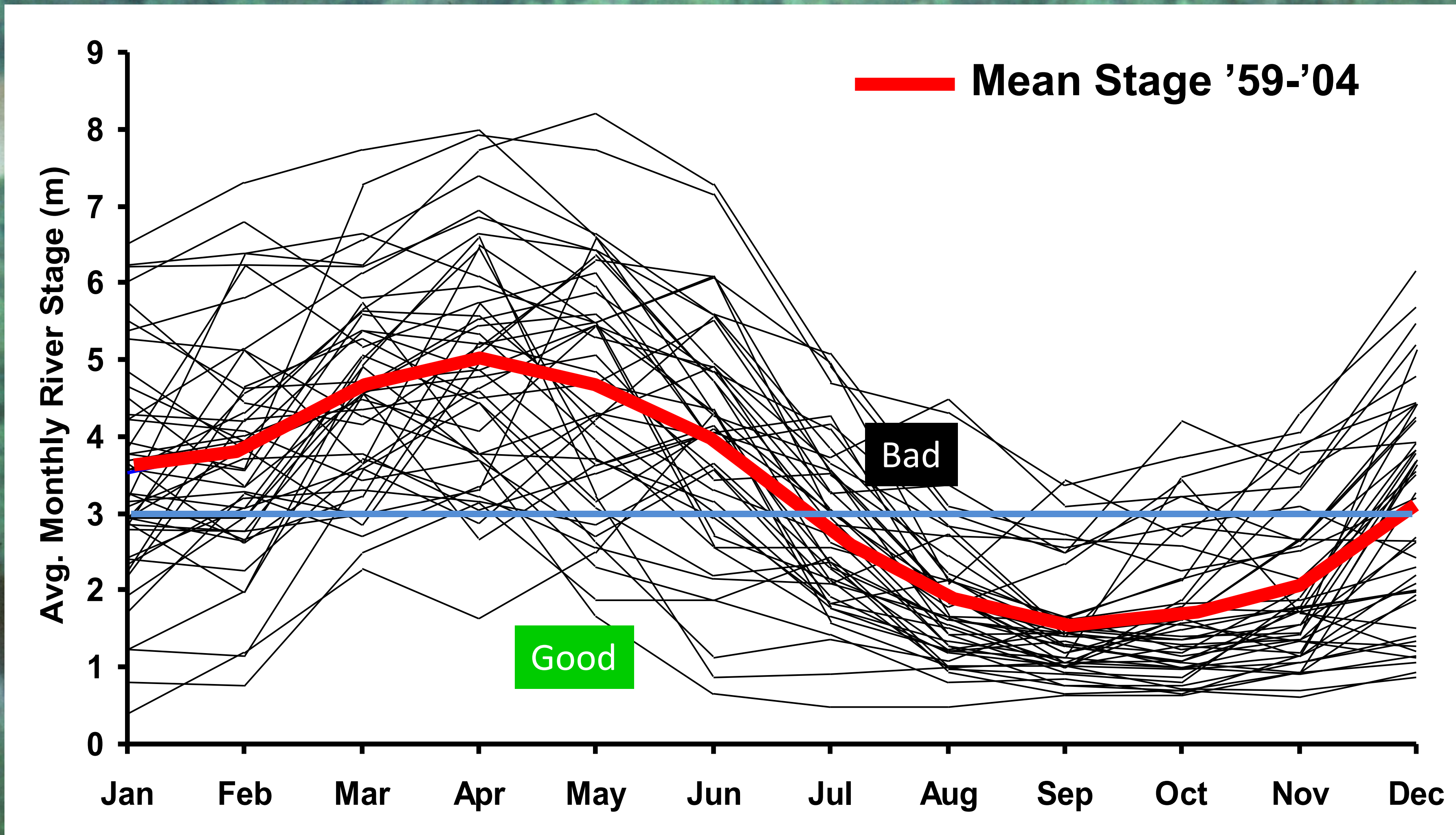
Appendix MM: Dr. Kelso LSU Presentation - Atchafalaya Basin Water Quality

Atchafalaya Basin Hypoxia

Influences on Atchafalaya Basin hypoxia

1. Flood pulse timing
   - floodwaters access the floodplain at approximately 3 m BLR gage
   - “early” flood years → water exits the floodplain in May-June when water T^{o} is still below 18-20C; minimal hypoxia
   - “late” flood years → water exits the floodplain in after June when floodplain waters have warmed above 18-20C; spatially extensive and temporally protracted hypoxia
   - managing the ORCS to promote early floods only partially achievable
     - federally-mandated 30% combined flow of MR and RR calculated over a year
     - additions/reductions in dam releases must be compensated for
     - ideal situation would be to increase releases significantly during the winter and early spring, and “shut off” in late May
       - however, MR flooding later in the spring would make this impossible
       - impacts on crayfishing activities would also be problematic

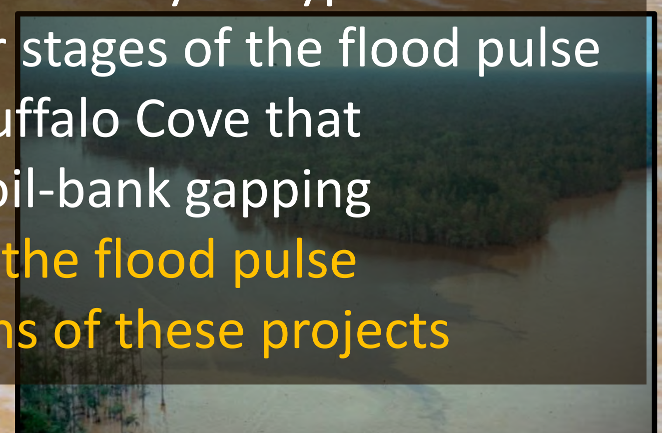
Atchafalaya Flood Pulse



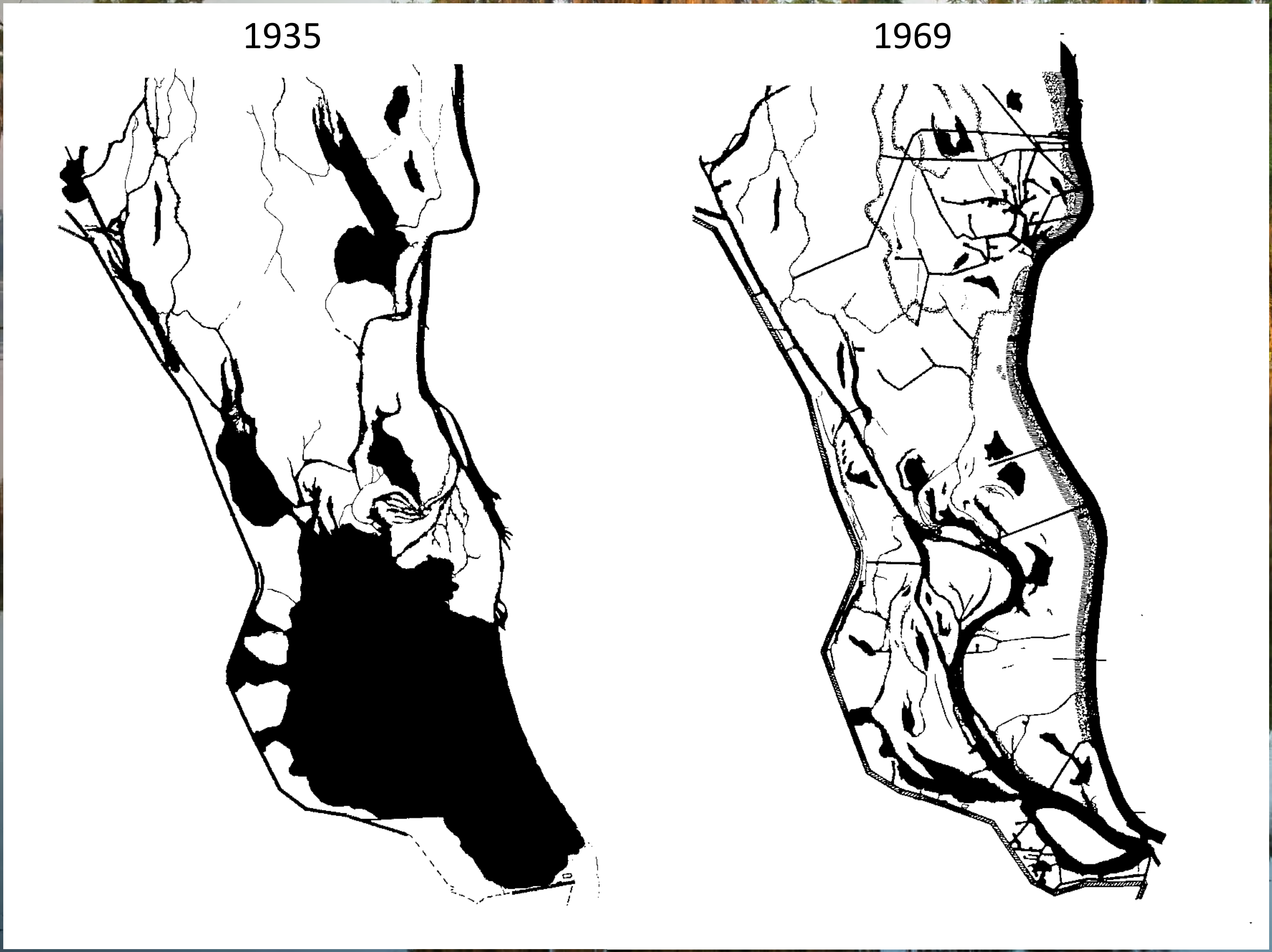
Atchafalaya Spoil Banks

Influences on Atchafalaya Basin hypoxia

2. Floodplain circulation
   - when floodwaters access the floodplain, water movement is restricted by spoil banks associated with dredged canals
   - this water warms quickly when air temperatures increase, and floodplain hypoxia related to organic decomposition becomes pervasive throughout the lower Basin
   - this problem synergistically interacts with “late flood” inundation patterns to create the worst hypoxia conditions, which spread to all canals and bayous as floodwaters finally recede
   - without the spoil banks, water can move onto and off of the floodplain as water levels fluctuate, likely reducing the severity of hypoxia and its impact throughout the ARB during the latter stages of the flood pulse
   - we have monitoring data on Postillion and Buffalo Cove that demonstrates improved circulation after spoil-bank gapping
     - determining effects can be confounded by the flood pulse
     - high sedimentation rates affect the lifespans of these projects



"Grand" Lake



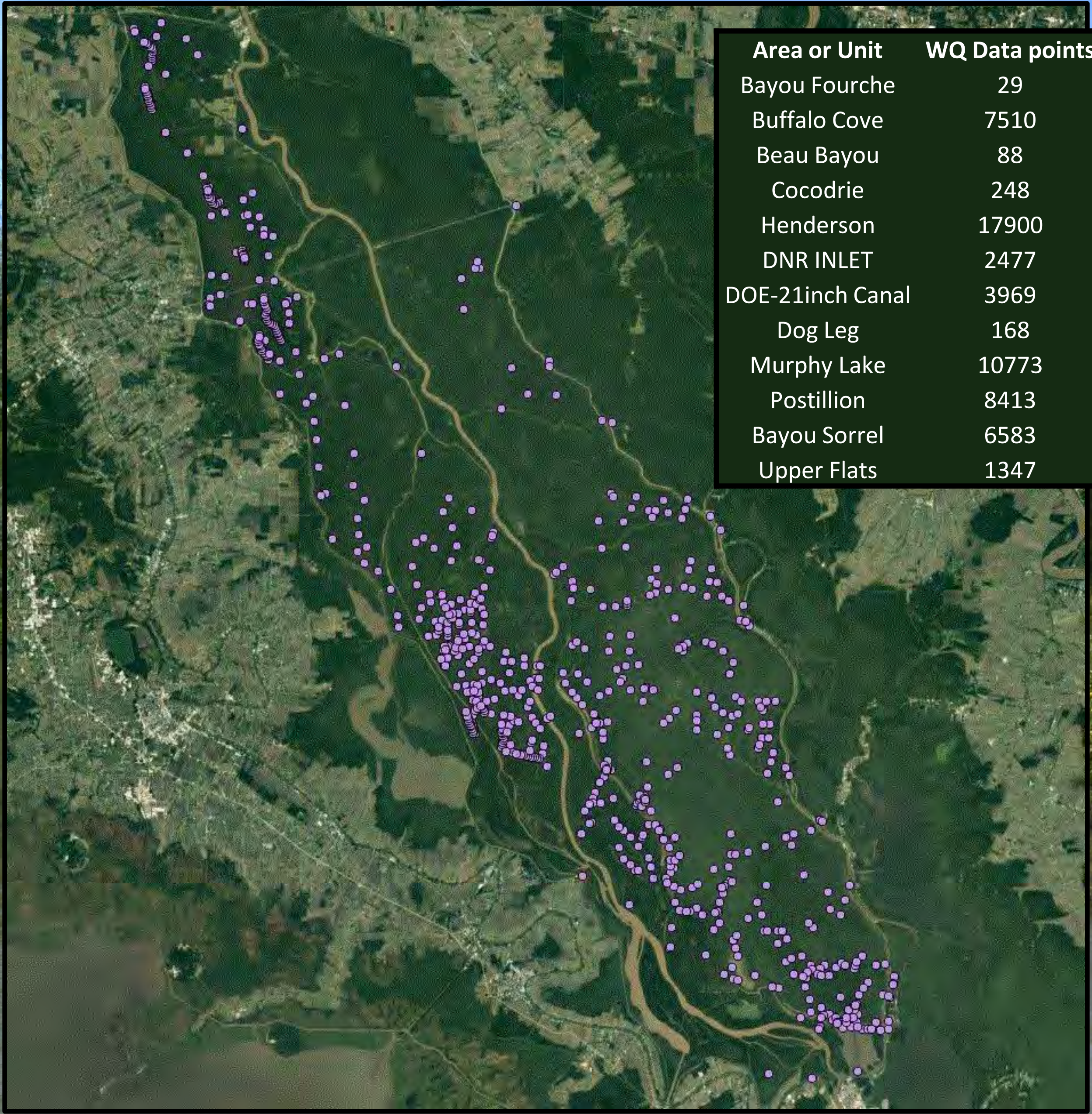
Atchafalaya Macrophytes

Influences on Atchafalaya Basin hypoxia

3. Aquatic plants

- exacerbate hypoxia
- dense beds of floating plants such as *Eichhornia* and *Salvinia* eliminate turbulence and phytoplankton production
- dense beds of submergents such as *Hydrilla* eliminate water flow and create sub-canopy hypoxia
- the annual flood pulse brings sediment and nutrients to the ARB, which complicates all of these factors
- maintaining water inputs while minimizing sedimentation of deep water areas, with a constant influence of highly competitive and deleterious exotic plants is a complex problem

LSU Monitoring Sites



Area or Unit	WQ Data points	Velocity readings	Fish samples
Bayou Fourche	29	13	0
Buffalo Cove	7510	2695	107
Beau Bayou	88	32	0
Cocodrie	248	92	0
Henderson	17900	6302	347
DNR INLET	2477	915	0
DOE-21inch Canal	3969	1352	239
Dog Leg	168	64	0
Murphy Lake	10773	3945	430
Postillion	8413	3058	382
Bayou Sorrel	6583	2390	298
Upper Flats	1347	540	0

Atchafalaya Spoil Banks

Spoil bank assessments

- spoil bank gapping (or shaving) appears to be a reasonable approach to improving water movement onto and off of the floodplain
  - as long as the water has somewhere to go
  - drainage points just as important as inflow sites, not much gradient
- pre/post studies require several years of water quality (and biotic) data to be able to statistically remove the overriding influence of the flood pulse and assess the effects of spoil bank gapping
- comparison of water quality and biotic composition in canals and adjacent floodplain habitats in gapped and non-gapped areas would be feasible, sample site selection would be critical given the complex flow patterns in the ARB (i.e., influences on flow at a site from nearby gapped banks, ungapped banks, and water sources)
- comparisons of dredged canals and adjacent floodplains (gapped and ungapped) with “natural” bayous could also provide important data on the effects of spoil banks and gapping on water quality and biota, but again, selection of study sites would be critical

Appendix NN: LLA Opinion Letter
Page 616

LOUISIANA LANDOWNERS ASSOCIATION

Comments for inclusion into the 2017 Regular Session of the Louisiana Legislature Senate Resolution 154 Final Report

The Statement of Issue in the Final Report is, in our opinion, flawed. A thorough assessment of deteriorating water quality in the Atchafalaya Basin should have been conducted *before* tasking the Department of Natural Resources (DNR) to study potential solutions that *may* mitigate spoil banks within the Basin. Currently, there is insufficient scientific data to confirm spoil banks created during construction of pipelines in the lower Atchafalaya Basin do, in fact, block natural water flows in the floodway so as to adversely impact water quality. This proposition, which is based in large part on anecdotal evidence and hearsay, is illogical and misguided.

The vast majority of these pipelines and related spoil banks were built between 1960 and 1985 on private property by for-profit pipeline companies. The construction and operation of these pipelines are governed by written contracts that contain specific obligations, and were built in accordance with permits issued by the U.S. Army Corps of Engineers (USCE) that required, at a minimum, all natural drains be left open.

Based on harvest data from the Louisiana State University Agricultural Center, crawfish production in the Atchafalaya Basin averaged 36 million pounds annually from 1985-1999, before plummeting to an average annual harvest of less than nine million pounds for the period of 2000-2016. Crawfish production peaked in the years following construction of these spoil banks, supporting the idea that they had little, if any, negative impacts on water quality and/or crawfish production in the Basin.

The decline in crawfish yields that began at the turn of the last century is more likely related to the growing isolation of highly oxygenated and fertile floodwaters of the Main Channel of the Atchafalaya River from the adjacent swamplands, brought about by the USCE's successful implementation of channel training projects during the mid-1980s. In addition, the demise of wild crawfish population over the last 17 years has been exacerbated by the absence of any long-term management plan. To our knowledge, wild crawfish is the only commercial and/or recreational fishery in this State for which the Louisiana Department of Wildlife & Fisheries has not developed and implemented a comprehensive management plan.

Finally, what has been lost in this study is recognition of the inherent values of these spoil banks to terrestrial and aquatic wildlife and other fisheries in the lower Atchafalaya Basin. These elevated areas provide critical diversity of habitat in what are otherwise expansive, homogenous, permanently flooded, dead and dying cypress-tupelo swamps. Moreover, these spoil banks support a variety of trees and shrubs, which provide food, cover, and nesting and feeding sites for residential and migratory song and wading birds, as well as birds of prey. Finally, during periods of high water, these raised banks provide refuge for deer, rabbits, squirrels and furbearers, along with essential nesting sites for alligators.

Looking forward, the State of Louisiana should remain mindful that if its water management plan of the lower Atchafalaya Basin is to be successful, it *must* recognize that (i) this floodway is an integral component of the USCE's flood protection plan for the lower Mississippi River Valley; (ii) much of the lands included within its boundaries are privately owned, for which private property rights must be respected; and (iii) it will require a holistic approach that incorporates sound management practices for all of the forest, wildlife and fishery resources.