

FINAL
ENVIRONMENTAL IMPACT STATEMENT
AMITE RIVER AND TRIBUTARIES
LOUISIANA
COMITE RIVER BASIN

OCTOBER 1990

LEAD AGENCY: U.S. Army Corps of Engineers
New Orleans District

COOPERATING AGENCY: Louisiana Department of
Transportation and Development

ABSTRACT: A recommended solution has been developed to the flooding problems of the Comite River Basin, which is a sub-basin of the Amite River Basin within southern Louisiana. The upper reaches of the basin consist of both agricultural and forested lands, and the lower reaches are within, or adjacent to, the Baton Rouge metropolitan area. Thirteen significant floods have occurred in the Amite and Comite River Basins, the most recent of which were in 1973, 1977, 1979, 1983, and 1990. The 1983 flood was the flood of record and caused damages of \$65,300,000 in East Baton Rouge Parish and \$83,800,000 in Livingston Parish. The 1983 flood caused \$48,000,000 in damages in the Comite basin specifically. Variations of non-structural measures, reservoirs, diversions, and channel modifications were considered in early stages of planning. Three alternatives were carried into detailed planning for comparison against the no-action alternative. One is the diversion alternative and the other two are channel modification alternatives. The Recommended Plan is the diversion alternative or Plan 1B. Plan 1B was selected because of the greater net benefits produced over costs. It is also the most implementable alternative from a public acceptability standpoint. Mitigation features that would fully offset all significant project-induced wildlife and wetland losses consist of the following: acquisition of a 300-acre forested wetland tract off the lower Amite River and construction of a weir; preservation of 213 acres of existing woodlands and reforestation of 422 acres of non-forested area of an approximately 635-acre tract of overflow lands near the project diversion structures; and reforestation of 110 acres of the dredged material disposal area adjacent to the diversion channel.

DATE: See cover letter

Please send your comments to HQUSACE (CECW-P), Washington, DC 20314, by the date stamped above. If you would like further information regarding this statement, please contact Mr. Bill Wilson, U.S. Army Engineer District, New Orleans, P.O. Box 60267, New Orleans, Louisiana 70160-0267. Commercial Telephone: (504) 862-2527. FTS: 493-2527.

NOTE: Information, displays, maps, etc., discussed in the Feasibility Report are incorporated by reference in the Environmental Impact Statement.



1. SUMMARY

1.1. MAJOR CONCLUSIONS AND FINDINGS

1.1.1. Purpose and Alternatives. The purpose of this study is to determine the feasibility of providing flood protection to residential areas along the Comite River and tributary streams in East Baton Rouge Parish, Louisiana, and to a lesser extent in neighboring Livingston Parish. The study area includes, among other areas, the eastern edge of the Baton Rouge metropolitan area. Three alternatives were studied in detail. These included an alternative of diversion of Comite River flood flows to the Mississippi River and two alternatives of channel modification (enlargement) of the Comite River. Total costs as well as environmental issues were significant considerations in the study process.

1.1.2. Rationale for Recommended Plan. The 12,700 cubic feet per second (cfs) diversion of the Comite River is the Recommended Plan. This plan produces the greatest net benefits over costs and is, therefore, the National Economic Development Plan. The diversion plan is more implementable from a public acceptability standpoint, is favored by the project sponsor, and has the least environmental impacts of any alternative evaluated.

1.1.3. Environmental Losses. The most significant project losses would be to the valuable bottomland hardwood forest resource, most of which are classified as wetlands. Plan implementation would result in the reduction of flooding on forested wetland areas located primarily off the Amite River. A significant portion of that reduction would occur during the winter period when habitat for waterfowl is critical. Forested wetlands are considered a Category 2 resource by the U.S. Fish and Wildlife Service (USFWS), i.e., a habitat of high value and relatively scarce within the ecoregion or nation. Construction of the diversion plan would cause losses of 464 annualized (over the project life period) acres of forestlands.

Losses caused by the channel enlargement alternatives, including required maintenance dredging, would result in a far greater loss of forestlands than the diversion plan. Channel enlargement would be especially harmful to the valuable riparian corridors along both the Comite and Amite Rivers. Losses to the aquatic resources of the two rivers would be very severe. Not only would the rivers be enlarged, but the adjacent riparian vegetation which contributes highly to their overall nature, habitat quality, and productivity would be destroyed.

1.1.4. Environmental Features. The diversion plan results in no significant losses that are unique to aquatic resources and requires no fisheries mitigation other than the preservation of woodland flooding described below. The mitigation plan developed for losses to terrestrial resources (wildlife) has three components. One component includes acquisition and management of of a 300-acre frequently flooded wooded site off the Amite River near Port Vincent to preserve the valuable wetland characteristics of that area both for aquatic and terrestrial values as well as for wintering waterfowl value. Another component is for bottomland hardwood habitat mitigation and would include preservation of approximately 213 acres of existing woodlands and the reforestation of approximately 422 acres of open lands. The other component is for upland forest mitigation and includes reforestation of 110 acres of the dredged material disposal area. This feature mitigates esthetic losses also.

1.1.5. Endangered Species. Based upon correspondence with the National Marine Fisheries Service, it is unlikely that any endangered or threatened species occur within the project area. Previously a letter was received from the USFWS, that essentially made the same statement. However, in October 1989, the Inflated heelsplitter mussel was included as a proposed species for the threatened list. The heelsplitter has been considered in project planning. The determination was made that the diversion alternative would not affect the continued existence of the Inflated heelsplitter mussel although both channel modification alternatives would affect its continued existence. On September 28, 1990, the inflated

heelsplitter, previously described as a candidate species, was officially listed as a threatened species. The endangered species assessment included in Appendix B was prepared based upon recommendations received during informal consultation with the USFWS. Both agencies realized that the classification would most probably be changed from "proposed" or "candidate" to "listed". That assessment assures full compliance with the Act.

1.1.6. Executive Order 11988. E.O. 11988, Floodplain Management, deals with minimizing or avoiding impacts associated with the base floodplain unless there is no practicable alternative. Project implementation would result effectively in removal of 13,000 acres (approximately four percent of the total) from the 100-year floodplain of the area. This removal would occur essentially because of the reduction of river stages that would be produced by the 100-year frequency storm. Stage reductions vary in different portions of the project area. No project benefits were projected for the conversion of wooded lands to developed lands within the 100-year floodplain. Project benefits were confined to flood losses prevented to existing residential and commercial development. They did not include any possible benefits that would occur to future developed areas with project implementation. Project impacts to those significant resources within the 100-year floodplain are discussed primarily in the sections of bottomland hardwood forests, aquatic resources, and socioeconomic resources. Public notice of possible Federal actions to be recommended within the floodplain was made at the public meeting of October 30, 1984, and the public scoping meeting of November 17, 1987.

1.1.7. Executive Order 11990. E.O. 11990, Protection of Wetlands, was considered in project planning. The Recommended Plan is the plan with the least adverse effects on wetlands.

1.1.8. Section 404(b)(1) Evaluation. Use of the selected disposal sites would not harm any endangered species or their critical habitat. Placement

of the dredged and fill material for the Recommended Plan would not be expected to result in significant violation of applicable Louisiana Water Quality Standards. The proposed discharge would not result in unacceptable adverse effects on human health and welfare, including municipal and private water supplies and esthetics, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife would not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, recreational, esthetic, and economic values would not occur. On the basis of the guidelines, the proposed discharge sites for the Recommended Plan are specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects to the aquatic ecosystem.

Informal discussions were held with the State of Louisiana, Department of Environmental Quality (DEQ). The concern for augmentation of low flows of the three diverted tributary streams has been fully incorporated into project design. Informal telephone conversations with representatives of that agency indicate that non-point source concerns have also been satisfied in project design.

1.2. AREAS OF CONTROVERSY

There are no areas of controversy associated with the diversion plan. Vocal segments of the public and numerous agencies are against any channel enlargement plan.

1.3. UNRESOLVED ISSUES

A feature of the Recommended Plan, the Comite River Stage Control Structure, requires a closure in the existing river and the rerouting of the flow through the named structure. The Comite River in that locality is included in the Louisiana Natural and Scenic Rivers System (System). That

construction is expressly prohibited for streams protected by the System; therefore, the Recommended Plan as of March 1, 1991, is legally unimplementable. The District has received a letter from the non-Federal sponsor, the Louisiana Department of Transportation and Development, in which the following statement is included. "The Department will request a legislative variance in the 1991 Regular Session to allow construction of this much needed project. The dates of April 15 through July 8, 1991, are the current dates for this year's session." The Louisiana Natural and Scenic Stream System is administered by the Louisiana Department of Wildlife and Fisheries. Responsible officials of that agency have indicated that neither they nor any other state agency has the authority to circumvent enacted legislation. It should be noted that sections of the Amite River and the Comite River were included in the original list of rivers within the System created in 1975. Both rivers cause flooding in the Baton Rouge and Denham Springs urban area. A variance was enacted in the Regular Session of 1988 applicable to a segment of the Amite within the System to allow for construction of flood control features that are being planned for that river (see Para. 5.2.4.1). Since that time, significant flooding occurred in January 1990 in the Baton Rouge and Denham Springs urban area with over 700 structures flooded and damages in the \$50 million range.

1.4. ENVIRONMENTAL COMMITMENTS

A number of concerns have been raised during project planning that have resulted in mitigative environmental features being developed and included in the Recommended Plan. These environmental concerns, with the resulting commitments and where they are included in the document, are presented in Table 1.



TABLE 1
 ENVIRONMENTAL COMMITMENTS FOR THE RECOMMENDED PLAN FOR THE
 COMITE RIVER BASIN STUDY, LOUISIANA _1/

APPLICABLE RESOURCE	CONCERN	COMMITMENT	LOCATION IN EIS (Para. #)
Forestland	Wetland habitat	Excavated topsoil will be placed as a 2-3' layer on mined portion of mitigation area before planting	4.2.1.12
	Wetland habitat	About 422 acres of BLH habitat will be planted on mitigation area	4.2.1.12
	Wetland habitat	About 300 acres off Amite R. will be acquired. Slow dewatering weir (10 day empty) will be constructed.	4.2.1.12
	Wetland habitat	About 213 acres of existing BLH will be managed (individual tree deadening, removal, etc.) to increase habitat value.	4.2.1.12
	Upland habitat	About 110 acres of upland habitat will be planted on the disposal area. Approx. 1.5 feet of topsoil will be used as capping.	4.2.1.12
	Upland habitat	Counter weir at end of Diversion Channel Stage Control Structure will be set at 24.0' NGVD to minimize horizontal dimension of erosion.	4.2.1.8
Aquatic Resources	Erosion and head cutting on tributaries	Grade control structures will be constructed at inflow of White & Cypress Bayous and Bayou Baton Rouge to the Diversion Channel. Associated inflow and outflow areas would be lined with gabion mattresses.	4.2.1.4
	Tributary low-flows	Downstream low-flow augmentation features of up to 5 cfs would be installed on tributary bayous.	4.2.1.6
Cultural Resources	Construction damage	All project easement and fee title lands will be surveyed to locate cultural resources. The significance of all sites will be assessed. A Memorandum of Agreement will be developed with the State Historic Preservation Officer and Advisory Council on Historic Preservation to mitigate impacts to significant resources prior to construction.	5.2.9.3

(Continued)

_1/ Commitments to be met by inclusion in project plans and specifications with subsequent transmittal to the field.

TABLE 1
 ENVIRONMENTAL COMMITMENTS FOR THE RECOMMENDED PLAN FOR THE
 COMITE RIVER BASIN STUDY, LOUISIANA _1/ (Continued)

APPLICABLE RESOURCE	CONCERN	COMMITMENT	LOCATION IN EIS (Para. #)
Recreation Resources	Canoeing limitations	Canoe portage path will be constructed around Comite River Stage Control Structure.	5.2.10.3
	Development plan	A five-acre park with boat launch and picnicking area plus adjacent bike path and tree plantings are included.	4.2.1.13
Esthetics	Adverse views of dredged material	Dredged material to be reforested for upland habitat mitigation will be planted near highway crossings to minimize adverse views. Final shaping of dredged material will be done with the intention of eliminating harsh views from high visibility areas.	4.2.1.12 & 5.2.11.3
Noise	Construction noise	Construction will be accomplished only during daylight hours.	5.2.12.3
Land use	Land value	Perpetual flowage easements will be acquired on 607 acres adjacent to Lilly & Cooper Bayous that would receive project induced flooding.	P. 202 (Main Report)

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3. NEED FOR AND OBJECTIVES OF STUDY

3.1. STUDY AUTHORITY

The study is part of the Amite River and Tributaries Study authorized by a resolution adopted April 14, 1967, by the Committee on Public Works of the United States Senate at the request of former Senator Russell B. Long and the late Senator Allen J. Ellender. Due to the complex nature of the flood problems, the feasibility phase studies were divided along hydrological and political boundaries to advance the study process. This study focuses on the Comite River subbasin and is an interim response to the authorizing resolution.

3.2. PUBLIC CONCERNS

The public is concerned about flooding along the Comite River and its lower tributaries. This flooding originates from excessive rainfall resulting in headwater and backwater overflow of the Comite River and tributary streams. Between 1973 and 1983, four major floods occurred in the Comite basin. The maximum flood of record occurred in 1983 and caused \$48,000,000 in damages. The loss of wetlands and riverine habitat is also of concern.

3.3. PLANNING OBJECTIVES

The following planning objectives were developed by the interdisciplinary study team and guided the study process:

- o Reduce flood damages along the main stem of the Comite River and to a lesser extent along the Comite River tributary streams and the Amite River.

- o Minimize adverse environmental impacts associated with the implementation of flood control measures.

o Minimize, to the greatest extent possible, the destruction of archeological and historical resources.

o Minimize particularly the loss of bottomland hardwood forests, or if not possible, mitigate those losses "in-kind" to the extent possible.

o Mitigate for all unavoidable impacts to significant fish and wildlife resources.

o Incorporate, to the greatest extent possible, recreation facilities in flood control plans to increase recreation opportunities.

4. ALTERNATIVES

4.1. PLANS ELIMINATED FROM FURTHER STUDY

4.1.1. General. This section describes the plans eliminated in the various iterations of plan formulation. Both nonstructural and structural plans were considered and developed. Nonstructural measures were also considered in combination with structural measures. For a more detailed description of plan formulation, see the Plan Formulation section of the Feasibility Report.

4.1.2. NONSTRUCTURAL PLANS

4.1.2.1. General. Nonstructural measures to reduce flood damage described below were considered. The most effective of these were combined into four nonstructural plans.

4.1.2.2. Nonstructural Measures Considered

4.1.2.2.1. Temporary and Permanent Closures for Openings in Existing Buildings. This measure consists of temporarily or permanently closing openings in buildings utilizing wood, aluminum, or steel in conjunction with the application of waterproof sealants.

4.1.2.2.2. Raise Existing Structures. This measure consists of raising framed houses or trailers.

4.1.2.2.3. Removal of Existing Structures from the Floodplain. This measure consists of moving all floodprone structures from the floodplain. All flood damages are prevented by this measure, but costs of such a measure are prohibitive, except for trailers.

4.1.2.2.4. Build Small Walls or Levees Around Existing Structures. This measure protects not only the structure, but outside property.

4.1.2.2.5. Flood Forecast, Warning, and Evacuation. Forecasting is presently done for five locations in the study area. There are several existing stream monitoring stations. Upgrading of two gages and installation of six is recommended. This measure would be part of any structural plan.

4.1.2.2.6. Public Acquisition of Selected Flood Prone Areas. This measure is impracticable because of the large number of homes located in the floodplain. Acquiring lands in selected reaches on the Comite or Amite Rivers would not have a major effect on the hydraulics of the basin. Thus, this measure was eliminated.

4.1.2.2.7. Floodplain Regulation. Existing floodplain regulation in the area was evaluated and deemed to be effective in controlling development in the floodplain. The Federal Emergency Management Agency has determined that management of the Flood Insurance Program was adequate in the study area. The program has been effective in reducing flood damages because it has accomplished the goal of requiring development (slab elevations) to be at, or above, the 100-year flood elevation.

4.1.2.3. Nonstructural Plans Developed

4.1.2.3.1. Plan A - Floodproof Slab Structures up to 2 feet, Remove Trailers from the Floodplain, and Raise Pier Structures. This plan was found to be economically infeasible and was eliminated from consideration.

4.1.2.3.2. Plan B - Develop a System or Systems of Ring Levees for Selected Subdivisions Adjacent to the Comite River and Lower Tributary Streams. Twenty-four subdivisions were originally identified for analysis. Of these, only two were found to be economically feasible to protect and one was marginally feasible. Since this plan could not provide protection to the large number of subdivisions along the Comite River and its lower tributaries, the plan was eliminated.

4.1.2.3.3. Plan C - Floodproofing All Structures below the New 100-Year Floodplain with the Comite River Diversion. This plan was found to be economically infeasible and was eliminated from consideration.

4.1.2.3.4. Plan D - Floodproofing All Structures below the New 100-Year Floodplain with the Comite River Channel Modification. This plan was found to be economically infeasible and was eliminated from consideration.

4.1.3. STRUCTURAL PLANS FOR THE COMITE SUBBASIN CONSIDERED AND ELIMINATED IN THE INITIAL EVALUATION STUDY

4.1.3.1. Darlington Reservoir. A reservoir on the Amite River near the town of Darlington would provide protection along the Amite River, but would provide very little protection in the Comite subbasin. The State of Louisiana is actively investigating the feasibility of this reservoir; therefore, this plan was eliminated from further consideration by the Corps of Engineers. The reservoir is also now being investigated as a separate Corps of Engineers' study.

4.1.3.2. Amite River Enlargement. Enlargement of the Amite River from just below Denham Springs to Lake Maurepas via the Amite River Diversion Canal was eliminated due to the low benefit/cost ratio and extensive environmental impacts.

4.1.4. INITIAL STRUCTURAL PLANS DEVELOPED IN THE FEASIBILITY PHASE

4.1.4.1. General. Nine structural plans were developed early in the feasibility phase. Only one of these, the Comite River Diversion, Corps of Engineers, (COE) route, was retained for further study. The remaining plans are briefly described below along with the reason for their elimination.

4.1.4.2. Plan 1 - Comite River Diversion Department of Transportation and Development (DOTD route). This route left the Comite River about halfway between Zachary and Baker and used existing channels of South Canal,

Cypress Bayou and Bayou Baton Rouge to the maximum extent practicable. This plan was eliminated because the Bayou Baton Rouge outfall area is heavily contaminated with hazardous wastes. Another outfall area was located for the DOTD route, but extensive monitoring would have been but required to determine if that site was not contaminated. Lilly Bayou was considered but was too far from the DOTD route to be a feasible outfall.

4.1.4.3. Plan 3 - Comite River Diversion Minimizing Relocations and Adverse Environmental Impacts. This plan was eliminated because no other route could be found that minimized relocations and adverse environmental impacts with economic feasibility.

4.1.4.4. Plan 4 - Enlarge Amite and Comite Rivers, White and Cypress Bayous, and Hurricane Creek. This plan was eliminated due to excessive costs and the extensive environmental impacts that would occur.

4.1.4.5. Plan 5 - Enlarge Comite and Amite Rivers and Hurricane Creek with White Bayou Diversion. This plan and the four following that also called for diversion of the flows of White Bayou were all eliminated, because a diversion of White Bayou would make an insignificant contribution to stage lowerings since its contribution of flows was very small.

4.1.4.6. Plan 6 - Enlarge Comite and Amite Rivers and Hurricane Creek with DOTD White Bayou Diversion.

4.1.4.7. Plan 7 - Reservoir on Comite River and COE White Bayou Diversion.

4.1.4.8. Plan 8 - Reservoir on Comite River and DOTD White Bayou Diversion.

4.1.4.9. Plan 9 - Reservoir on Comite, Improve Comite and Amite Rivers downstream of the reservoir, Improve Hurricane Creek, and White Bayou Diversion.

4.1.5. INTERMEDIATE STAGE ANALYSIS OF STRUCTURAL PLANS

4.1.5.1. General. Because only one feasible plan, the Comite River Diversion, survived the initial screening, six additional plans were developed. Of these, five were eliminated after extensive consideration of performance, engineering, economics, and environmental concerns.

4.1.5.2. Reservoir on the Comite River. This plan was eliminated because any suitable site for the reservoir would require extensive relocation of people which would be extremely disruptive to the community. In addition, any reservoir that would be a single-feature solution would require a 7-mile dam.

4.1.5.3. Olive Branch Reservoir and Comite River Diversion. Olive Branch is the lowest location on the Comite where a reservoir can be built with a reasonable length embankment. Two sizes of reservoir were considered: one that would protect against a 25-year rainfall event and another that would protect against a 50-year event. Two sizes of diversion channels were studied: one sized for 12,700 cfs and one for 19,600. In addition, both gated and uncontrolled diversions were analyzed. Thus, a total of eight combinations of this plan were possible. All were eliminated because it was determined that the Comite Diversion plan alone produced the best benefit to cost ratio.

4.1.5.4. Olive Branch Reservoir and Comite River Channel Modifications. This set of plans analyzed 25-year and 50-year reservoirs in combination with various modifications to the Comite River that would handle 24,500, 32,500, and 42,000 cfs. All six combinations were eliminated because of excessive costs.

4.1.5.5. Comite River Diversion and Amite and Comite River Channel Modifications. Twelve sets of combinations were analyzed including gated and uncontrolled diversions of both 12,700 and 19,600 cfs with channel modifications to the Amite and Comite Rivers sized for 24,500, 32,500, and

42,000 cfs. All these combinations were eliminated due to economics and adverse environmental impacts. It was determined that only the diversion plan or the channel modification plan would provide adequate benefits.

4.1.5.6. Olive Branch Reservoir, Comite River Diversion and Comite and Amite Rivers Channel Modifications. The Olive Branch Reservoir was added to the 12 combinations discussed, totaling 24 combinations. These combinations were also eliminated on economic and environmental grounds.

4.1.6. ANALYSIS OF PLANS IN EARLY FINAL ARRAY

The conclusion of the intermediate stage analysis was that the Comite River Diversion and the Comite and Amite Channel Modification plans were the most economically feasible. Various levels of protection were then analyzed for each plan. Channel capacities of 7,600, 12,700, 19,600, 31,500, and 41,000 cfs were considered for the Diversion Channel. Four channel capacities were studied for the channel modification plan: 24,500, 32,500, 42,000, and 51,000 cfs. Further analysis indicated that the 12,700 cfs Comite River Diversion and the 32,500 cfs Comite and Amite River Channel Modification plans were the best in terms of economics and engineering considerations. Thus, these plans were carried into the early final array. A mitigation plan was fully developed for each plan. During consideration of mitigation for the channel modification plan, it became clear that the original channel modification plan, which modified both banks of each river had significant channel maintenance costs as well as severe environmental impacts. Both single bank modification and alternating bank modifications were then analyzed. In accordance with the legal prohibition by the State of Louisiana of channel modifications to any watercourse designated as a Natural and Scenic River, a plan was developed that involved no work on the 4-mile portion of the Comite so designated. Twenty-one combinations of these alternatives were analyzed. After minimization of adverse environmental impacts to the maximum extent possible, the two channel modification combinations that included or

excluded the Scenic River segment while providing the greatest benefits over costs and the diversion alternative that accomplished that same goal were selected for the final array of alternatives.

4.1.7. MITIGATION PLANS CONSIDERED BUT ELIMINATED FROM FURTHER STUDY

4.1.7.1 General. Based on the various criteria and coordination with the United States Fish and Wildlife Service (USFWS), Louisiana Department of Wildlife and Fisheries (LDWF), Louisiana Department of Natural Resources (LDNR), and other concerned natural resource agencies, numerous mitigation plans were developed and screened. Most plans initially examined were found to be implementable; however, those that warranted merit were examined in greater detail. From this group, at least four alternative mitigation plans were developed for each flood-control alternative, and a tentatively selected mitigation plan was proposed. The mitigation measures eliminated were rejected for a variety of reasons; however, the primary consideration was cost or inability to provide at least partial in-kind compensation for bottomland hardwoods and/or stream biota.

4.1.7.2. Plans Eliminated in Early Screening

- o Purchase and management of lands in the previously proposed Olive Branch reservoir. Because of existing, high quality habitats within the area, little management potential exists. The management of this area would not be cost effective when compared to similar, but cleared, lands.

- o Management of a 250-acre area of woodlands owned by the LDWF within the Baton Rouge metro area. This plan was eliminated because of the small size and limited management potential.

- o Purchase and management of a narrow strip of land adjacent to other rivers within the Florida parishes of Louisiana, such as the Tangipahoa and Tchefuncta, which are similar to the Comite and/or Amite Rivers. This plan was eliminated because adequate lands were available on the impacted

rivers, little man-impacted lands exist along the Tangipahoa and Tchefuncta rivers to maximize mitigation credit, and they were not in the political boundaries of the impacted area nor the local basin commission.

- o Placement of sills, deflectors, point bars, rip-rap, artificial cover, and other in-stream modifications to enhance fisheries in the flood-control river segments, non-flood control areas, or other rivers and streams. Because of the sandy-bottom, high-velocity floodflows, and the meandering nature of the impacted streams, these features would quickly become ineffective without constant maintenance. Certain features would also tend to restrict flow and could aggravate flooding problems.

- o Construction of control structures on low areas adjacent to the Amite/Comite River channels to create artificial reservoirs for fisheries management. This measure would restrict the movement of fish in or out of the riverine system, and could have water quality or temperature related problems. The aquatic resources of this area would be very different in species composition and ecosystem function.

4.1.7.3. Plans Eliminated After Detailed Analysis

- o Purchase of a 500-foot buffer strip along the Comite River, including the scenic stream segment upstream of the flood-control area. The purchase of a buffer strip along the Comite could replace fishery losses; however, the fisheries gains with this width strip was not found to be cost effective for the benefits derived.

- o Purchase of a 500-foot buffer strip along the Amite River, including the scenic stream segment south of the proposed Darlington Reservoir. This plan was excluded for the same reasons as the Comite River 500-foot buffer.

- o Purchase and excavation of remnant ox-bows, bayous, or other low areas to create artificial backwater areas along the Comite River within the flood-control area for aquatic mitigation. The placement of an

artificial backwater area within the flood-control area would not be as effective as it would be in an upstream location because of the changed hydraulics due to project implementation, poor water quality due to urban runoff, and the existing use of most of these sites as drainage facilities. Mitigation of this type would also be out-of-kind.

o Restoration of the Amite River Diversion Canal (ARDC) weir to divert more water down the old Amite River channel. This measure was eliminated because the weir is currently functioning as designed during flood events, and modification of the structure for augmented low flow would require substantial engineering design and hydraulic analysis. The weir has deteriorated somewhat, resulting in more flow down the ARDC; however, the extent of flow has not been determined. Because of the historic water quality problems, especially low dissolved oxygen and salinity intrusion, and present problems associated with the presence of raw or partially treated sewage, substantial improvement could not be expected. Additionally, any gains would be totally out-of-kind. An evaluation of this structure is currently being examined by the Corps from an engineering perspective.

4.2. PLANS CONSIDERED IN DETAIL

4.2.1. Plan 1B - 12,700 cfs Diversion.

4.2.1.1. This alternative would divert flood flows from the Comite River in the vicinity of Zachary, Louisiana, to the Mississippi River. Three major structures would be included in the plan and would be constructed of roller-compacted concrete. The major features are shown on Plate 24 and are described below. Environmental commitments associated with the Diversion Plan and mentioned previously are included in Table 1.

4.2.1.2. The Comite River Stage Control Structure would be constructed to create the stages necessary to divert flood flows to the Diversion Channel. The Stage Control Structure would allow the passage of normal flows through four 2.5 feet by 5.5 feet concrete box culverts within the

structure. The structure would have an overflow weir crest of 77.2 feet National Geodetic Vertical Datum (NGVD). The structure would not be constructed in the present river channel, but would be constructed immediately east of the existing channel. Following structure construction, an inflow and outflow channel would be excavated. Subsequent to this excavation, a closure would be made in the existing channel which would require flows to be passed to the new structure. Associated containment levees totaling approximately 15,200 feet in length would extend from the structure to high ground north of the structure. These levees would retain those increased stages caused by the Stage Control Structure.

4.2.1.3. An Inflow Channel of approximately 2,000 feet would carry flood flows from the river to the Comite River Diversion Structure. At that point, flood flows would go directly into the Diversion Channel. The Comite River Diversion Structure would be a weir-crested structure with a crest of 76.0 feet NGVD.

4.2.1.4. The Diversion Channel would be an unlined cut from the Comite River to just west of US Highway 61 (about 8 miles). The Diversion Channel would intersect White Bayou, Cypress Bayou, and Bayou Baton Rouge. The grade control structures would be weirs of gabion design with inflow and outflow areas being lined with gabion mattresses. The inflow area mattress would extend 100 feet upstream of the structure. The outflow area mattress would extend into the diversion channel and up onto the opposite bank. The diversion channel would be lined with riprap for a distance of 100 feet upstream and downstream of the mattress at each tributary inflow point. The channel would average approximately 35 feet in depth.

4.2.1.5. Low-flow augmentation pumps would be installed at each tributary to pump water from the Diversion Channel or tributaries into the lower segments of the tributary bayous. An operation system was agreed upon by representatives of the State of Louisiana, Department of Environmental Quality, along with representatives of the Corps of Engineers,

New Orleans District. The system would require that the features be operated to maintain existing flows up to a discharge of 5 cfs that occur immediately upstream of the grade control structures in downstream portions of the intercepted bayous. The average pool elevation of the Diversion Channel would be 56.7 feet NGVD except for during diversion. The maximum drawdown allowable would be 3.0 feet. Therefore, the minimum pool elevation that would result from the operation of the low flow augmentation system would be 53.7 feet NGVD, the stage at which pump operation would cease.

4.2.1.6. A Dredged Material Disposal Levee would be constructed on the south side of the Diversion Channel from the material excavated from the channel. The levee would cover 87 acres, be from 7 to 12 feet in height above natural ground, and would permanently close White and Cypress Bayous and Bayou Baton Rouge where they are crossed. Excavated material in excess of that required for levee construction would be deposited adjacent to the Diversion Channel. Channel material would be placed approximately equally on each side of the channel between the Diversion Channel Stage Control Structure and Highway (Hwy.) 19. The south disposal area would also contain the levee which would encompass 50 acres. Between Hwy. 67 and Hwy. 19, excavated material would be placed to create the levee which would occupy 50 acres also. The total acreage including levee area covered by material excavated from the channel would encompass 645 acres. The excavated material would be sloped to prevent the accumulation of rainwater and would vary from 8 feet to as much as possibly 20 feet in height. Side slopes of the levee and disposal area adjacent to the channel would be seeded with grasses to minimize erosion.

4.2.1.7. The Comite River Diversion Channel Stage Control Structure would be located at the westward end of the Diversion Channel. This would be a weir-crested structure with a crest of 56.7 feet NGVD. A low-flow outlet consisting of a 3-1/4-foot by 3-1/4-foot concrete box would be incorporated into this structure to allow the passage of low flows.

4.2.1.8. Immediately below the Diversion Channel Stage Control Structure a counter weir would be constructed to dissipate the energy of the floodwaters overtopping the weir of the stage control structure. The counter weir would be set at 24.0 feet NGVD. That elevation was designed to produce a greater vertical rather than horizontal dimension to the inevitable scour that would occur to the outfall area including Lilly Bayou.

4.2.1.9. Just west of the Diversion Channel Stage Control Structure and counter weir flows would empty into Lilly Bayou. Flows would proceed to Cooper Bayou, to Profit Island Chute, and, ultimately, to the Mississippi River.

4.2.1.10. A restrictive guide levee and closure approximately 3,300 feet in length would be constructed across the natural levee and outlet at the north end of Brooks Lake Swamp. The guide levee would confine flood flows to the existing channel of Cooper Bayou in this area rather than allowing those flows and the associated sediments to enter the Brooks Lake area. Two 60-inch corrugated metal culverts with flap gates or a similar water control feature would be installed within the levee to allow the unrestricted outlet of flows from the Brooks Lake area.

4.2.1.11. Annual maintenance of the Diversion Channel would consist of herbicide applications to the channel banks to restrict the growth of woody vegetation. Common Bermuda grass or a similar low-growing grass would be desired on the channel banks. All plant control activities would be conducted in strict accordance with Environmental Protection Agency (EPA) guidelines. Essentially these guidelines are to insure that any product that is to be used will only be used for a specific purpose, and will be applied in a manner that is consistent with approved and sound pest control methods (see Appendix B-8). Herbicide application, following these guidelines, also would be conducted by a qualified licensed commercial pesticide applicator.

4.2.1.12. Mitigation features to compensate for project related damages would consist of measures primarily for wildlife species. No separate features are considered necessary for aquatic mitigation since aquatic mitigation needs would be met with the measure to preserve woodland flooding. Approximately 300 acres of frequently flooded bottomland hardwood and wooded swamp surrounding relict Amite River channels near Port Vincent would be purchased. A required water control structure would be a riprap and treated timber weir. The weir would be hydraulically designed to pass the 25-year flood in the mitigation area without appreciably increasing the 25-year stage, yet at the same time provide water retention within the area. The weir would be 180 feet wide at crest elevation 5.5 feet NGVD and 375 feet wide at crest elevation 6.0 feet NGVD. The structure would be designed with a slotted opening 1.5 feet wide to restrict the passage of flows below the lower crest elevation of 5.5 feet NGVD under a falling river condition so that dewatering of the mitigation area would occur over a period of ten days. Another mitigation feature consists of the creation of bottomland hardwood habitat by the reforestation of approximately 422 acres of non-forested lands, of which the majority is enclosed by the containment levees that tie into the Comite River Stage Control Structure. Approximately 24 inches of topsoil would be placed upon 29 acres of the previously-mined area to create favorable conditions for reforestation. Included within the tract containing the non-forested lands is approximately 213 acres of existing bottomland hardwoods that would be managed to increase habitat value and preserved. Also, approximately 110 acres of the dredged material disposal area adjacent to the Diversion Channel would be reforested with upland trees to replace upland habitat losses and to provide esthetic mitigation. Approximately 18 inches of topsoil would be placed as a capping on the disposal area to be reforested. Both of these tracts would be operated and maintained to preserve the habitats created.

4.2.1.13. Recreation features included within the plan are to be developed on a 5-acre site located along the north bank of the Diversion Channel east

of the Baker-Zachary new bridge crossing. Recreation development includes a two-lane boat launch along with two courtesy piers, a concrete bike path 8 feet in width extending from the park east 3.25 miles to Louisiana Highway 67, a 10-table picnic area with barbeque grills and trash receptacles, interior park circulation paths, appropriate landscaping, and a parking lot. Bank fishing areas would be available at the park site along the bike path and at bridge crossings along the Diversion Channel where public access will be available. Hardwood trees would be planted at 50-foot intervals along the south side of the Diversion Channel for a distance of 8 miles and along the entire length of the 3.25-mile bike path.

4.2.2. Plan 2A - 32,500 cfs Comite and Amite River Channel Modification Including Scenic Stream Segment.

4.2.2.1. This alternative consists of enlarging the Comite River for approximately 16 miles from Dyer Road near Zachary, Louisiana, to the confluence of the Amite River near Denham Springs (see Plates 25 and 26). The Amite River would be cleared and snagged for approximately 27.5 miles from the confluence of the two rivers to approximately four miles below Port Vincent. Both enlargement and clearing and snagging would be accomplished on alternating banks to minimize both maintenance costs and environmental damages. The total width of the enlargement would vary from 315 to 555 feet and would average approximately 430 feet. Excavated material would be placed on alternating banks alongside the channel enlargement sections. The width of the right-of-way for the disposal of excavated material would vary from 126 to 704 feet and would average approximately 256 feet. The dredged material disposal area would have a minimum height of 8 feet and would be sloped to prevent the accumulation of rain waters. Maintenance, consisting of removal of accumulated sediments would be required approximately every ten years. The dredged material would be stacked on the previously excavated disposal material. Annual maintenance would include herbicide spraying of all vegetation within the channel banks and would be conducted in accordance with EPA guidelines as described previously.

4.2.2.2. Mitigation features to compensate for project-related damages consist of measures designed for terrestrial (wildlife) and aquatic (fishery) species. As with Plan 1B, the 300-acre tract near Port Vincent would be acquired and a control structure constructed. A 300-foot buffer zone would be acquired and fenced on each side of the Comite River for 28.3 miles immediately upstream of the construction area. Existing agricultural lands within this buffer would be allowed to regenerate to forested habitat. A 300-foot buffer would also be acquired and fenced on each side of 9.2 miles of the Amite River, progressing downstream from the proposed Darlington reservoir dam site. Required lands for the creation of a 15-acre artificial backwater area and adjacent lands would be acquired and excavated off the Comite River near Zachary. Also included would be the acquisition, fencing, and reforestation of 669 acres of a tract of cleared Mississippi River alluvial lands, tentatively sited adjacent to the Tunica Swamp near St. Francisville.

4.2.3. Plan 2B - 32,500 cfs Comite and Amite River Channel Modification Excluding Scenic Stream Segment.

4.2.3.1. This alternative consists of enlarging the Comite River for approximately 12 miles from immediately south of the inflow point of White Bayou near Baker, Louisiana, to the confluence of the Amite River near Denham Springs (see Plates 25 and 26). The Amite River would be cleared and snagged for approximately 27.5 miles from the confluence of the two rivers to approximately four miles below Port Vincent. As with Plan 2A, both enlargement and clearing and snagging would be accomplished on alternating banks to minimize both maintenance costs and environmental damages. Total width of the enlargement would vary from 315 to 530 feet and would average approximately 410 feet. Excavated material would be placed on alternating banks along the channel enlargement sections. Width of the right-of-way for the disposal of excavated material would vary from 126 to 359 feet and would average approximately 275 feet. The dredged material would have a minimum height of 8 feet and would be sloped to prevent the accumulation of rain waters. As with Plan 2A, maintenance

consisting of removal of accumulated sediments would be required approximately every ten years. The dredged material would be stacked on the previously excavated disposal material. Annual maintenance would include herbicide spraying of all vegetation within the channel banks and would be conducted in accordance with EPA guidelines as described previously.

4.2.3.2. Mitigation features to compensate for project-related damages consist of measures designed for terrestrial wildlife and aquatic (fishery) species. As with Plan 1B, the 300-acre tract near Port Vincent would be acquired and a control structure constructed to retain and allow the slow release of rain and flood waters. A 300-foot buffer zone would be acquired and fenced on each side of 17.2 miles of the Comite River immediately upstream of the construction area. The existing agricultural lands within the buffer would be allowed to regenerate to forested habitat. A 300-foot buffer would be acquired and fenced on each side of 9.2 miles of the Amite River, progressing downstream from the proposed Darlington reservoir dam site. Also included, as with Plan 2A, would be the acquisition, fencing, and reforestation of 329 acres of a tract of cleared Mississippi River alluvial lands tentatively sited adjacent to the Tunica Swamp near St. Francisville.

4.3. PLAN IMPLEMENTATION RESPONSIBILITY

The Federal government would prepare detailed designs, plans, and specifications and would bear 50 percent of the final costs of the plan that is recommended. Non-Federal interests would bear 50 percent of the costs and would provide all lands, easements, and rights-of-way, accomplish all relocations; hold and save the U.S. free from damages; and operate and maintain all features.

4.4. FUTURE CONDITIONS WITHOUT PROJECT (NO ACTION)

With no Federal action to address the flooding problems of the study area, it is assumed that the flooding experienced in recent years would reoccur

The conversion of agricultural and forest land to urban use would not be as rapid as has occurred since the mid-1960's. The recent trend of conversion of agricultural land to forest land is most likely to continue in the northern portion of the study area. Water quality would be slightly improved due to the implementation of the Louisiana Water Quality Management Plan. The sedimentation characteristics of the rivers would remain as currently exists. The numerous fallen trees, leaf packs, shading, and other features creating the diversity that exists would remain and be replenished in the Comite and Amite Rivers. The segments of the Comite and Amite that are presently included within the Louisiana Natural and Scenic River System would remain within that system. Cultural resources along both rivers would be impacted only to the extent that natural erosive factors cause losses to those resources. No change is foreseen to those characteristics that give the rivers their esthetic appeal. Socioeconomic factors resulting from the possibility of, and after-effects of, flooding would continue to be experienced by residents and landowners in the area.

4.5. COMPARATIVE IMPACTS OF ALTERNATIVES

Table 4-5 presents in comparative form the base or existing condition and the effects of the no action alternative and each action alternative considered on significant resources and plan economic characteristics. Detailed information about impacts on significant resources described in this table is included in Section 5, Affected Environment and Environmental Effects.

TABLE 4-5

COMPARATIVE IMPACTS OF ALTERNATIVES

<u>Alternative</u>	<u>Significant Resource</u>		
	Agricultural Lands Plan 1B	Plan 2A	Plan 2B
	Construction Area (Acres)		
Base Condition (1995)	826	216	131
No Action (2047) (annualized)	727 775	208 213	126 129
Future With Project (annualized)	6	5	3
	Mitigation Areas (Acres) <u>1/</u>		
Base Condition (1995)	439	984	557
No Action (2047) (annualized)	386 412	982 983	555 556
Future With Project (annualized)	13	672	10

1/ Total of all plan components

TABLE 4-5 (Continued)
COMPARATIVE IMPACTS OF ALTERNATIVES

<u>Alternative</u>	<u>Significant Resource</u>		
	<u>Forestlands ^{1/}</u>		
	<u>Plan 1B</u>	<u>Plan 2A</u>	<u>Plan 2B</u>
	Construction Area (Acres)		
Base Condition (1995)	481	1413	975
No Action (2047) (annualized)	466 474	1381 1397	953 964
Future With Project (annualized)	10	201	193
	Mitigation Areas (Acres) ^{2/}		
Base Condition (1995)	213	2294	1481
No Action (2047) (annualized)	206 210	2291 2292	1476 1478
Future With Project (annualized)	765 755	3759 3619	2618 2492

1/ The associated wildlife value is highly correlated to acres of forested lands.

2/ Total of all plan components

TABLE 4-5 (Continued)

COMPARATIVE IMPACTS OF ALTERNATIVES

<u>Alternative</u>	<u>Significant Resource</u>
	Threatened and Endangered Species (includes species of local concern)
Base Condition	NMFS reports no species of concern in area. USFWS reports the inflated heelsplitter as a listed threatened species in the area. The LNHP reports several species of local concern in the area. Populations commonly vary with habitat quantity and quality.
No Action	Federally listed species - Nation-wide populations would be in jeopardy and would most likely continue to decline. LNHP species - Reduction in number of forested acres would commonly result in reduction of populations. Aquatic species populations would probably increase with improvement of water quality.
Plan 1B	Federally listed species - The inflated heelsplitter would not be affected. LNHP species - Negligible impacts to river species. Forested land inhabitants would be impacted to the extent of forested acres impacted but mitigation activities would provide some compensation for those impacts. Lilly and Cooper Bayous area species would receive severe dispersal impacts with each diversion, but recolonization would begin immediately afterwards.
Plan 2A	Federally listed species - The inflated heelsplitter would be severely affected by project construction. LNHP species - Woodland species (especially riparian) would receive severe impacts proportional to acres impacted. River species would receive severe impacts.
Plan 2B	Same as Plan 2A

- * NNFS is National Marine Fisheries Service
- * USFWS is United States Fish and Wildlife Service
- * LNHP is Louisiana Natural Heritage Program

TABLE 4-5 (Continued)

COMPARATIVE IMPACTS OF ALTERNATIVES

<u>Alternative</u>	<u>Significant Resource</u>
	Natural and Scenic Rivers
Base Condition	A segment of the Comite and a segment of the Amite are in this system.
No Action	These segments of these rivers will be in this system, and will continue to receive the protection of the system.
Plan 1B	A stage control structure, inflow and outflow channels, closure, and associated levees will be constructed in and adjacent to the Comite segment. Implementation of this alternative would require passage of enabling legislation by the Louisiana Legislature. Such legislation would be pursued by the project local sponsor.
Plan 2A	Four miles of the Comite segment would be enlarged (channelized). A buffer strip would be acquired and protected on 28.3 miles of the Comite and 9.2 miles of the Amite.
Plan 2B	No segment of either river in this system would be adversely impacted. A buffer strip would be acquired and protected on 17.2 miles of the Comite and 9.2 miles of the Amite.

TABLE 4-5 (Continued)

COMPARATIVE IMPACTS OF ALTERNATIVES

<u>Alternative</u>	<u>Significant Resource</u>
	Aquatic Resources: Physical Features Sedimentation Characteristics
Base Condition	The channel characteristics of both rivers are based upon the steep slope of the upper reaches and flatter slope of downstream reaches. The bed is braided in upper reaches and highly mobile. The rivers have a tendency to seek a wide, shallow cross-section.
No Action	Channel migration and bank erosion are natural and continuing processes and should not be expected to abate.
Plan 1B	Diversion channel design should minimize deposition of sediments during normal operation. Course sediment withdrawal should be minimized. Severe erosion would occur at outfall area at head of Lilly Bayou. Severe erosion would also occur at lower end of Cooper Bayou. Brooks Lake Closure would prevent excessive erosion and project caused sedimentation of Brooks Lake area.
Plan 2A	The channel is likely to fill and widen at top-of-bank. Deposition of sediments would require removal approximately every 10 years.
Plan 2B	Same as Plan 2A

TABLE 4-5 (Continued)

COMPARATIVE IMPACTS OF ALTERNATIVES

<u>Alternative</u>	<u>Significant Resource</u>
	Aquatic Resources: Physical Features Water Quality Characteristics
Base Condition	Comite River is designated as effluent limited. Comite and Amite have low dissolved oxygen and high fecal coliform levels at low flow conditions.
No Action	Quality should improve with current plan to direct Baton Rouge municipal waste to Mississippi River.
Plan 1B	Adverse impacts would be associated with construction only and would be short-term.
Plan 2A	Short-term adverse impacts would occur during construction and scheduled maintenance. Long-term adverse impacts would include loss of shading, elevated stream temperatures, and depressed dissolved oxygen levels.
Plan 2B	Same as Plan 2A

TABLE 4-5 (Continued)

COMPARATIVE IMPACTS OF ALTERNATIVES

<u>Alternative</u>	<u>Significant Resource</u>
	Aquatic Resources: Ecological Features
Base Condition	Comite River is a bass/longear stream with spotted bass being the primary predator. Comite standing crop is 98 lbs/acres. Amite standing crop is 39 lbs/acre. Lilly Bayou is intermittent in uppermost reach, but is contributor to productivity of downstream resources. Cooper Bayou is floodplain stream and is subject to regular overbank flooding from backwaters of Mississippi River.
No Action	No change is projected from base conditions.
Plan 1B	The variability of stream flows on the Comite River would receive some reduction. Negligible adverse impacts would occur to these resources. Amite backwater flooding would be preserved with construction of weir to allow slow release of retained waters. High velocities in Lilly Bayou during diversions would cause adverse impacts.
Plan 2A	Aquatic and riparian habitat associated with 16 miles of Comite and 28 miles of Amite would be significantly adversely impacted. Pounds of fish lost would equal 10,647 on the Comite and 6,080 on the Amite. Amite backwater flooding preserved as with Plan 1B.
Plan 2B	Aquatic and riparian habitat associated with 12 miles of Comite and 28 miles of Amite would be adversely impacted. Pounds of fish lost would equal 7,995 on the Comite and 6,080 on the Amite. Amite backwater flooding preserved as with Plan 1B.

TABLE 4-5 (Continued)

COMPARATIVE IMPACTS OF ALTERNATIVES

<u>Alternative</u>	<u>Significant Resource</u>
Mineral Resources	
Base Condition	Three oil fields are in the area. Sand and gravel deposits are found on the Comite and Amite Rivers in the vicinity of the project area. One sand mine is in the project route.
No Action	No change other than the decline as extractions continue.
Plan 1B	One sand/topsoil mining area would be affected by project features on the east side of the Comite River.
Plan 2A	Deposits would be affected minimally if at all. No existing surface development would be affected.
Plan 2B	Same as Plan 2A
Groundwater Resources	
Base Condition	Both freshwater and saltwater sand aquifers occur in the area. Freshwater sands are relatively shallow below Denham Springs. A shallow freshwater sand is found along the Comite and Amite River.
No Action	No changes are predicted
Plan 1B	Little or no impact to important resources. Shallow surface aquifer in Holocene alluvium would be impacted.
Plan 2A	Same as Plan 1B
Plan 2B	Same as Plan 1B

TABLE 4-5 (Continued)

COMPARATIVE IMPACTS OF ALTERNATIVES

<u>Alternative</u>	<u>Significant Resource</u>
	National Register of Historic Places
Base Condition	There are 17 National Register of Historic Places properties and 3 National Register eligible sites within the economically benefitted area of the project.
No Action	Sites 16EBR35, 16EB51 and 16AN39 have been threatened by pipeline or road construction. Similar impacts are possible in the future. The majority of the 20 National Register properties are historic structures that may be impacted from urban development.
Plan 1B	No National Register properties would be affected. Significance assessment of known sites in the project easement is incomplete.
Plan 2A	Site 16AN39 is located adjacent to the Amite River bankline immediately across the river from a site selected for clearing and snagging. It will not be impacted by the present design. Significance assessment of other known sites in the project easement is incomplete.
Plan 2B	Same as for Plan 2A.

TABLE 4-5 (Continued)

COMPARATIVE IMPACTS OF ALTERNATIVES

<u>Alternative</u>	<u>Significant Resource</u>
	<u>Cultural Resources</u>
Base Condition	There are 32 recorded archeological sites and 56 underwater anomalies within the economically benefitted area. Five potential sites were identified by literature search close to specific project alternatives. An additional 14 sites and 23 potential sites are located in mitigation areas outside the economically benefitted area. The potential is high for locating additional prehistoric and historic sites adjacent to channels and shipwrecks in the Amite River.
No Action	Actions affecting sites in the basin are urban expansion, camp building along the Amite River, vandalism, insensitive alternation of historic structures, cropping, and prolonged flooding. All of these impacts can be expected to continue at present rates.
Plan 1B	Site 16EBR54, potentially a significant site, may be impacted by levee construction or lateral erosion from run-off from the structure. Springfield Landing may be subject to erosion from increased outfall runoff. Thirty structures and 11 bridges would be removed or relocated. Camp Misery, a Civil War site, is thought to be located in the diversion alinement. The number of sites located on mitigation acreage is not yet known.
Plan 2A	Sites 16EBR16, 16EBR27, 16LV78, 56 underwater anomalies, and two potential sites (British colonial military installations) are located within the clearing and snagging segment of the Amite River. Four bridges will be relocated. Two potential sites (Civil War camps) have been identified in the channel modification segment along the Comite River. Fourteen recorded sites and 23 potential sites are located within the mitigation acreage adjacent to the Comite and Amite Rivers.
Plan 2B	Same as for Plan 2A except one potential site, a Civil War camp, would be located on mitigation acreage rather than within a construction easement.

TABLE 4-5 (Continued)

COMPARATIVE IMPACTS OF ALTERNATIVES

<u>Alternative</u>	<u>Significant Resource</u>		
	Recreation Resources		
Base Condition	Recreation activities taking place in the project area include boat and bank fishing, hiking, nature-trail walking, picnicking, hunting and many other outdoor recreational pursuits. In the 1985-86 reporting year 65,400 resident fishing licenses and 49,000 resident hunting licenses were issued, along with 40,000 boat registrations. This resource is commonly measured in demand rather than in spatial area.		
No Action	Populations in the area will increase, population growth translates into increased recreation demand. Future expanded populations will require additional recreation facility development as well as expansion of existing facilities.		
Plan 1B	Net Change <u>1/</u> User Days Value	Construction - 282 -\$ 3,135	Mitigation <u>2/</u>
Recreation Development	Net Change <u>1/</u> User Days Value	Construction + 55,044 +\$215,439	Mitigation <u>2/</u>
Plan 2A	Net Change <u>1/</u> User Days Value	Construction - 7,754 -\$41,609	Mitigation + 4,207 +\$21,300
Plan 2B	Net Change <u>1/</u> User Days Value	Construction - 6,188 -\$32,339	Mitigation + 1,862 +\$ 9,991

1/ From the No-Action quantity

2/ A net gain in non-consumptive user days will be realized. The mitigation land will pass from private ownership with no public recreation use to public ownership with limited recreational use.

TABLE 4-5 (Continued)

COMPARATIVE IMPACTS OF ALTERNATIVES

<u>Alternative</u>	<u>Significant Resource</u>
	Esthetics
Base Conditions	The river corridors are areas of high aesthetic appeal. Overhanging tree branches, raised river banks, and perceived depth toward the shore line create an intimate environment. Filtered sunlight reaches the river with varied intensity, in places highlighting the upper bankline and providing interest to the varied textures of tree foliage. Positive psychological benefits are realized by recreationists moving through the river corridor.
No Action	Any impacts to esthetic conditions would be a result of selective bank clearing by landowners and natural succession.
Plan 1B	This plan would not significantly impact esthetic conditions. The diversion structure would provide low esthetic features when compared to the remainder of the stream. Excavation of the diversion channel would alter the appearance of the land, however, tree plantings would improve long-term esthetic conditions. Extensive adverse impacts would occur to the Lilly Bayou area; however, those impacts would not be in an area of high public use.
Plan 2A	Channel work would result in severe visual and esthetic impacts. Areas cleared of vegetation would experience a decline in visual appeal by the elimination of corridor vegetation and tree canopy overhanging the bayou. This would eliminate shade, enclosure and perceived depth. Reflected light and glare would replace shade and shadow patterns previously created by the branches which would decrease intimacy caused by enclosure and low-light situations.
Plan 2B	Same as above, but to a less extensive linear area.

TABLE 4-5 (Continued)

COMPARATIVE IMPACTS OF ALTERNATIVES

<u>Alternative</u>	<u>Significant Resource</u>
	Noise
Base Condition	Noise levels are low at all locations except in areas of highway and railroad crossings.
No Action	Noise levels would increase moderately with moderate growth.
Plan 1B	A total of approximately 8 residences and 1 church are within 400 feet of the construction site and would receive noise levels of at least 84 dBA during construction.
Plan 2A	A total of approximately 158 residences and commercial establishments would receive noise levels of at least 84 dBA during construction.
Plan 2B	A total of approximately 149 residences and commercial establishments would receive noise levels of at least 84 dBA during construction.
	Vectors
Base Condition	Common vectors include <u>Anopheles</u> , <u>Aedes</u> , and <u>Culex</u> . Common diseases include equine anemia, anaplasmosis, and equine encephalitis.
No Action	No change in populations or factors affecting populations are projected.
Plan 1B	Construction techniques would be implemented to eliminate standing water; thus, long-term adverse effects would not occur.
Plan 2A	Same as Plan 1B.
Plan 2B	Same as Plan 1B.

TABLE 4-5 (Continued)

COMPARATIVE IMPACTS OF ALTERNATIVES

<u>Significant Resource</u>	<u>Alternative</u>					
	Socioeconomic Resources		No Action <u>1/</u>	Plan 1B <u>1/</u>	Plan 2 (A&B) <u>1/</u>	
Land Use	SLIGHT	+	MODERATE	+	MODERATE	+
Property Values	SLIGHT	+	MODERATE	+	MODERATE	+
Business/Industrial Activity	SLIGHT	+	SLIGHT	+	SLIGHT	+
Employment	SLIGHT	+	SLIGHT	+	SLIGHT	+
Displacement of People	NONE		SLIGHT	-	NONE	
Housing	SLIGHT	-	MODERATE	+	MODERATE	+
Community Growth	SLIGHT	+	SLIGHT	+	SLIGHT	+
Tax Revenues	SLIGHT	-	NONE		NONE	
Public Facilities & Services	SLIGHT	-	SLIGHT	+	SLIGHT	+
Displacement of Farms	NONE		SLIGHT	-	NONE	
Community Cohesion	SLIGHT	-	SLIGHT	+	SLIGHT	+
Regional Growth	NONE		SLIGHT	+	SLIGHT	+

CODES: + = Positive - = Negative

1/ Net impact, i.e, there may be both positive and negative impacts.

TABLE 4-5 (Continued)

COMPARATIVE IMPACTS OF ALTERNATIVES

<u>Alternative</u>	<u>Economic Characteristics</u>			
	<u>Annual Benefits</u>	<u>Annual Costs</u>	<u>Net Benefits</u>	<u>B/C Ratio</u>
Base Condition	N/A	N/A	N/A	N/A
No Action	N/A	N/A	N/A	N/A
Plan 1B	\$11,175,000	\$7,822,000	\$3,284,000	1.43
Plan 2A	\$7,263,000	\$4,647,000	\$2,616,000	1.56
Plan 2B	\$5,932,000	\$3,369,000	\$2,563,000	1.76

5. AFFECTED ENVIRONMENT/ENVIRONMENTAL EFFECTS

5.1. Environmental Conditions

The overall study area discussed in this document is the Amite River basin. The Amite River basin encompasses an area of approximately 2,000 square miles and includes portions of East Baton Rouge, Ascension, Livingston, East Feliciana, St. Helena, Iberville, St. James, and St. John the Baptist Parishes within Louisiana, and Amite County within Mississippi (see Plate 1). The study area of this report is within this basin and consists of the eastern portion of East Baton Rouge Parish subject to flooding of the Comite River and its tributaries, as well as lands immediately adjacent to the Amite River from its confluence with the Comite southward to the north end of the Amite River Diversion Canal (see Plate 2). Action alternatives considered in this document would result in socioeconomic impacts and benefits to this described study area. Direct construction activities necessary for the implementation of any structural alternative would affect only a portion of the study area. That area and the area of project-induced flooding for the remainder of this document is referred to as the affected area and is but a small part of the total study area. Separate mitigation sites include an area adjacent to the lower Amite River near Port Vincent, narrow (300-foot) buffer strips parallel and adjacent to both the Amite and Comite Rivers from above the construction area to the Mississippi state line, low areas of up to 15 acres off the main channel of the Comite between Dyer Road and the East Baton Rouge Parish line, artificial backwater areas within abandoned sand and gravel mines of the Amite between Greenwell Springs and Grangeville, and lands within the alluvial floodplain of the Mississippi River tentatively sited adjacent to the Tunica swamp near St. Francisville.

The Comite River is the westernmost of the rivers draining an area of Louisiana described as the Florida Parishes. The term Florida Parishes is used quite commonly when referring to this area and describes that portion of the state located east of the Mississippi River and north of

Lakes Maurepas and Pontchartrain. The area is part of the original land area known as West Florida during colonial times.

The study area is of relatively low relief, with most portions being on the Pleistocene terrace land formation. Surrounding land elevations vary from highs of 130 feet National Geodetic Vertical Datum (NGVD) near the East Feliciana and East Baton Rouge Parish line to approximately 5 feet NGVD near the beginning of the Amite River Diversion Canal near Port Vincent. Land elevations in the lower portion of the study area are approximately 30 feet NGVD at the western edge of the Pleistocene terrace before the drop-off occurs to the Mississippi River alluvial floodplain. The Mississippi River east bank levee within Louisiana begins at Baton Rouge. The study area contain a portion of the city limits of Baton Rouge. Commercial and residential development is essentially adjacent to or near major traffic arteries. Larger concentrations of undeveloped land are found in the northern portion of the study area as well as in the proximity to the Comite River. Lands on the east side of the Comite River are less developed than on the west side. Major developments on the Amite River are associated with the city of Denham Springs.

5.2. SIGNIFICANT RESOURCES AND ALTERNATIVE EFFECTS

A given resource is considered significant if it is identified in the laws, regulations, guidelines, or other institutional standards of national, regional, and local public agencies; if it is specifically identified as a concern by local public interests; or if it is judged by the responsible Federal agency to be of sufficient importance to be designated as significant (see Table 5-1). This section discusses each significant resource occurring in the study area and listed previously in Table 4-5, Comparative Impacts of Alternatives. The significance of the resource and existing conditions are first described, then the effects of the no-action alternative and each of the three action alternatives carried into the final array are analyzed.

TABLE 5-1
IDENTIFICATION OF SIGNIFICANT RESOURCES

RESOURCE	EDUCATIONAL ATTRIBUTES	CULTURAL ATTRIBUTES	ESTHETIC ATTRIBUTES	INSTITUTIONAL RECOGNITION	TECHNICAL RECOGNITION	PUBLIC RECOGNITION
AGRICULTURAL LANDS	Minor wildlife value.	Reflects both past and present way of life for segment of population.	Visitas of open land	CEQ Memorandum of Aug 11, 1980 Farmland Protection Policy Act	SCS recognizes value of agricultural land for crop production	Public recognizes value of productive agricultural land
FORESTLANDS Bottomland Mounds Upland Mounds	Very valuable habitat for both game and non-game wildlife. Many BLM provide wetland functions.	Supports traditional extractive economy of area. Protects archeological and historical sites by discouraging disturbance.	Typical Louisiana woodland landscape has scenic beauty and provides escape from urbanization.	EO 11796, EO 11788, Fish and Wildlife Coordination Act, Water Resources Development Act of 1986.	Habitat for 5 species of special emphasis. BLM being lost at rapid rate in Lower Mississippi Valley. Fairly rare in region.	Environmental groups and general public strongly desire preservation of this habitat.
THREATENED AND ENDANGERED SPECIES (including species of local concern)	These species are of increased value due to their rarity.	These species are a valuable part of a cultural heritage.	Seeing a rare animal or plant in its natural habitat is often esthetically pleasing.	Endangered Species Act, Bald Eagle Act.	USFWS, MFS, LDMF, & COE recognize importance of endangered species. Audubon Society Blue List recognizes rare species.	Environmental groups and general public desire the preservation of these rare species.
NATURAL AND SCENIC RIVERS	These streams which are kept natural provide for high quality habitat for many species, especially riffle communities.	These streams are part of a valuable cultural heritage of the state.	Streams are chosen for scenic attributes and designation preserves this value.	La. Scenic Streams Act includes portions of two rivers in the study area.	LDMF, USFWS, MFS, & COE recognize value of such streams.	Environmental groups and general public recognize value of these streams. Recreational use is high on streams.
ARIATIC RESOURCES	Numerous species of fish and invertebrates use the area. Estuarine waterbodies provide nursery habitat for many species of fish and shellfish.	Traditional extractive economy of area partially relies on fishing for subsistence. Fish and shellfish are a valuable part of our cultural heritage.	Roading watercourses and open water areas provide scenic appeal. Viewing of wildlife in these natural settings is esthetically pleasing.	Clean Water Act of 1977, La. Water Control Act, Fish and Wildlife Coordination Act, Coastal Zone Mgmt. Act of 1972, Estuary Protection Act, La. State and Local Coastal Resources Mgmt. Act of 1978.	USFWS, MFS, LDMF, & COE recognize value of water quality and aquatic habitat.	Environmental groups and general public desire the preservation of good water quality and aquatic habitat.
MINERAL RESOURCES	None	A factor in economy of study area.	None	Numerous laws regulate the gravel and petroleum industries.	Important resources used in the area throughout the nation.	Public realizes value of mineral resources in the area especially gravel, oil, and gas.
GROUNDWATER RESOURCES	Groundwater affects vegetation composition.	None	None	Various laws regulate use of groundwater.	Hydrologists recognize the value of groundwater.	The public recognizes the importance of protecting groundwater resources.
NATIONAL REGISTER OF HISTORIC PLACES	None	Nation's list of properties worthy of preservation for significance in history (architecture, archeology, and culture).	Most National Register properties have great esthetic appeal.	Nat. Historic Preservation Act of 1966, Reservoir Salvage Act of 1989, Archeological Resources Protection Act of 1979, E.O. 11593.	20 National Register properties in study area.	Public recognizes and supports preservation of historic resources.
CULTURAL RESOURCES	None	Indicators of previous residents.	Some cultural resources have esthetic appeal.	E.O. 11593, National Environmental Policy Act, National Historic Preservation Act, Nat. Historic Preserv. Act.	Numerous cultural resources sites have been documented in the study area.	Public recognizes importance of preservation of cultural sites.
RECREATION RESOURCES	Potential for interacting with nature, fishing, and hunting in study area.	Hunting and fishing are integral part of rural culture in area.	Canoeing on scenic stream is esthetically pleasing. Natural forested setting enhances recreational experience.	Land and Water Conservation Fund Act of 1965, La. Scenic Streams Act.	65,400 fishing licenses and 49,000 hunting licenses sold in recent year in market area.	Public desires expansion of recreation base.
SECTION 122 ITEMS	N/A	N/A	N/A	River and Harbor Flood Control Act.	N/A	Public recognition of these items is strong.

5.2.1. Agricultural Lands

5.2.1.1. Significance. Approximately 85,000 acres are cleared and used for agricultural purposes in the study area (see Table 5-2). Some of this is prime farmland. Prime, unique, and statewide or locally important farmland is protected by the Farmland Protection Policy Act. Within the parishes of East Baton Rouge and Livingston (combined), St. Helena, East Feliciana, and West Feliciana, there are 128,643; 24,000; 252,000; and 160,000 acres, respectively, that fit into those categories. The most extensive use of this land is as pasture for both beef and dairy cattle; however, a small amount is planted in soybeans, corn, and wheat. The use of cleared land for agricultural purposes in the study area is continually declining as urbanization of Baton Rouge and the surrounding communities proceeds. Value of these lands is based only in part by their ability to produce a crop, but is also heavily based upon their potential for development into economically higher uses. Agricultural land has value for some forms of wildlife, but because of the regional abundance, that value is not considered significant in this study area.

5.2.1.2. Effects of No Action. Historical trends as well as recent economic conditions were used to develop projections of all land uses within the entire study area. Appendix D presents the rationale for land use changes within the study area. Approximately 54,000 acres of land are projected to be in the cleared agricultural category within the study area in year 2047 (see Table 5-2). Year 2047 is projected to be effectively the end of the flood control project life for economic analysis purposes. The trend of conversion of cleared agricultural land to woodlands on the periphery of the study area (away from the urban area) will continue because management of land for forest products is year-round less labor-intensive than management for traditional agricultural crops. The trend of rapid conversion of cleared agricultural lands for urban and industrial use as occurred from the late 1950's through the early 1980's is not expected to continue, but will instead be replaced by a reduced rate of conversion. Future conversion of cleared/agricultural lands that may potentially be affected by any alternative within any of the affected areas are displayed in Tables 5-3 and 5-4.

TABLE 5-2

LAND USE ACREAGE
WITHIN THE ENTIRE STUDY AREA

Target Year	1985	2040	2047
Forest lands	172,523	145,199	144,426
Agricultural lands	84,629	55,196	54,119
Developed lands	84,447	143,630	147,308
Transitional lands ^{1/}	4,876	2,450	622
Total lands	346,475	346,475	346,475

^{1/} Lands not definitely identifiable as to category.

TABLE 5-3

CONSTRUCTION AREAS
CLEARED AGRICULTURAL IMPACTED ACREAGE

Plan	Year	Affected Area					
		Plan 1B <u>1/</u>	Plan 2A <u>2/</u>	Plan 2B <u>3/</u>	Upper Comite	Lower Comite	Amite River
FWOP	1995	826	216	131	85	131	0
FWOP	1997	822	216	131	85	131	0
FWOP	2047	727	208	126	82	126	0
FWOP	Annldz	775	213	129	84	129	0
FWP	1995	826	216	131	85	131	0
FWP	1997	0	0	0	0	0	0
FWP	2047	0	0	0	0	0	0
FWP	Annldz	16	5	3	2	3	0
Change	Annldz	-759	-208	-126	-82	-126	0

1/ Diversion Area

2/ Total of Upper and Lower Comite River, plus Amite River

3/ Total of Lower Comite River plus Amite River

TABLE 5-4

MITIGATION AREAS
CLEARED AGRICULTURAL IMPACTED ACREAGE

Plan	Year	Affected Area							
		<u>1/</u>	<u>2/</u>	<u>3/</u>	Amite Structure Area 1,2, <u>3/</u>	Comite Buffer 28.3 mi <u>2/</u>	Comite Buffer 17.2 mi <u>3/</u>	Comite Bkwter Area <u>2/</u>	Amite Buffer 9.2 mi 2, <u>3/</u>
FWOP	1995	422	669	329	0	299	228	16	0
FWOP	1997	418	669	329	0	299	228	16	0
FWOP	2047	371	669	329	0	297	226	16	0
FWOP	Annld	396	669	329	0	298	227	16	0
FWP	1995	422	669	329	0	299	228	16	0
FWP	1997	0	0	0	0	0	0	0	0
FWP	2047	0	0	0	0	0	0	0	0
FWP	Annld	12	6	3	0	9	7	0	0
Change	Annld	-384	-663	-326	0	-289	-220	-16	0

1/ Plan 1B component2/ Plan 2A component3/ Plan 2B component

5.2.1.3. Effects of Plan 1B. Implementation of this alternative would result in the conversion of 1,158 annualized acres of cleared agricultural lands. The analysis of farmlands converted, which is required by the Farmland Protection Policy Act, is presented within Appendix B, Section 5. (The combination of the lands converted shown on the three areas for which the Forms AD-1006 apply totals 2,103 acres; however, both wooded and cleared lands are required to be included in that analysis.) Flood control measures would convert 759 areas, while fish and wildlife mitigation would convert 399 acres of agricultural lands. These lands would no longer be available for agricultural pursuits following project construction. This alternative, as well as any other action alternative, would reduce the annual flooding on a minimal amount of wetlands, including farmed wetlands, in the affected area (see Appendix B-5). The socio-economic effects of producing a commodity crop on those lands are described in Paragraph 5.2.14.8.3.

5.2.1.4. Effects of Plan 2A. Implementation of this alternative would result in the conversion of 1,175 annualized areas of cleared agricultural lands. (The analysis as shown in Appendix B, Section 5 totals 4,749 acres for this alternative.) Flood control measures would convert 208 acres and fish and wildlife mitigation measures would convert 968 acres of cleared agricultural lands.

5.2.1.5. Effects of Plan 2B. Implementation of the alternative would result in the conversion of 672 annualized areas of cleared agricultural lands. (The analysis in Appendix B, Section 5 totals 3,129 acres for this alternative.) Flood control measures would convert 126 acres and fish and wildlife mitigation measures would convert 546 acres of cleared agricultural lands.

5.2.2. Forestlands

5.2.2.1. Significance. Forests of the overall study area are made up of both natural forest communities and pine plantations. Approximately

172,523 acres of the area were in forests in 1985 (see Table 5-2). Plantations of both loblolly and slash pines are planted on higher sites on the northern fringe of the study area. The natural forests of this area, other than a relatively small amount of baldcypress and tupelogum swamp, are hardwoods mixed with varying amounts of loblolly and spruce pines. The term mixed hardwood is the local descriptive term for these lowland forests. The term bottomland hardwood is ecologically and physiographically correct for these forests, however, and is applicable to streambottom forests of the southeast that also contain associated loblolly and spruce pines (Whorton et al., 1982). These forests in the study area are located on the Pleistocene terrace rather than on the alluvial floodplain. A limited amount of upland forests that are almost exclusively hardwoods are found on the northwestern side of the study area.

Within this natural forest, is a narrow band described by the Louisiana Natural Heritage Program as a riparian forest community, which is typical of small streams and rivers of the Florida Parishes of Louisiana. This forest intergrades into a beech-magnolia community on narrow ridges, and progresses to mixed hardwoods with varying amounts of pines on higher elevations. Spruce pines are generally scattered to common on lowlands along the Comite River and are common to abundant along the Amite.

Some overstory hardwood species of the riparian and beech-magnolia community includes black willow and river birch (immediately adjacent to or within the banks of streams), as well as sweetgum, blackgum, water oak, cow oak, southern magnolia, American beech, white ash, yellow poplar, and red maple. Midstory and understory species include ironwood, eastern hopbournbeam, arrowwood, bigleaf snowbell, silverbell, sweetleaf, and sourwood. These plant communities commonly occur on Cascilla and Ochlockonee soil associations (Dance et al., 1968), which are silt loam and fine sandy loam overflow soils that are naturally flooded once or twice each year, but are well-drained. There are some hardwood forests occurring in the affected area that tolerate more prolonged flooding. These contain a much greater percentage of water oak, cow oak, and sweetgum in the

overstory, with poison ivy as a common understory species. This forest type is typically found on Oliver-Calhoun-Loring soil associations and the Calhoun-Zachary-Frost associations. These soil associations are dominantly level, generally poorly drained to moderately well drained and occur on broad flats and in slight depressions. These forests clearly resemble the bottomland hardwood forests of the Mississippi Alluvial Valley. The remaining mixed hardwood forests contain a greater amount of pines and are formed on more well-drained soils. Southern red oak, white oak, hickories, and blackgum are common hardwoods that occur along with pines in the overstory.

A type of forest considerably different to the remainder of the forests of the area is located immediately adjacent to the outfall end of the proposed diversion route. This area is the southernmost extension of the loess soil formation that occurs on the east bank of the Mississippi River from southern Tennessee to Louisiana. These soils support forests that are described as upland hardwoods. The trees of this region (Brown, 1945) are described as white oak, cherrybark oak, redgum, white ash, tulip tree, cucumber tree, water oak, Shumard oak, post oak, bitternut hickory, shagbark hickory, sugar maple, beech, black cherry, dogwood, and redbud. The most common trees occurring on the slopes adjacent to Lilly Bayou through which the diversion route would extend are American beech, sweetgum, and southern magnolia. Water oak and ironwood are common trees of the stream edge in this area.

The woodlands through which Lilly Bayou flows after coming down from the escarpment and the upper portion of Cooper Bayou are bottomland hardwoods that resemble those bottomland hardwoods in the remainder of the study area. Those bottomlands along the lower reaches of Cooper Bayou are made up almost totally of hackberry. Box elder and sycamore also occur in this reach, but are not nearly as numerous as is hackberry.

All forested lands within the study area have value as timber resources. Within the parishes of East Baton Rouge, East Feliciana, and Livingston,

the average annual removal for all species for growing stock is 14.4 million cubic feet and for sawtimber is 63.8 million board feet. Processing markets are readily available for forest products either within, or in the proximity to, the study area.

Some forestlands of the area are considered to be wetlands. Factors that identify areas as wetlands are hydrophytic vegetation, soils classified as hydric, and wetland hydrology. Wetland hydrology is a term used to describe the presence of permanent or periodic soil saturation for a significant period (usually a week or more) during the growing season. Areas adjacent to the Comite and Amite Rivers frequently are inundated by flooding during the growing season. However, the rise and fall of these rivers is a rapid process with out-of-bank flows commonly returning back to the rivers after the second day. Soils of the adjacent areas are typically coarse grained and are not known for their moisture retention capabilities. There are depressional areas or flats in the basin, however, where fine-grained soils are more prevalent. These soils are more likely to stay saturated for longer periods after significant storms. The most extensive depressional area that receives extended soil saturation is located on the southeast side of Zachary. The area is east of Louisiana Highway 19, south of the Lower Zachary road, west of the McHugh road, and north of the proposed diversion channel route.

Wooded wetlands such as the depressional areas described above have functions of groundwater recharge, floodwater retention, habitat for fisheries, recreation, and others. However, the function considered most significant in these areas is wildlife habitat value.

The habitat provided by bottomland hardwood forests is considered to be most significant of any habitat type of the area. Bottomland hardwood soils provide high fertility, readily available soil moisture, and associated high vegetative productivity. These forests are highly productive in wildlife carrying capacity because of these factors. Bottomland hardwood areas receiving winter inundation are utilized by

migratory puddle ducks generally because of the acorns available but also because of the invertebrate fauna that occurs in abundance in leaf litter on the wet forest floor (Hubert and Krull, 1973). Fredrickson (1980) reports that natural wooded wetlands provide protein sources that have a diversity of amino acids that are common to wood duck eggs. Wildlife species of bottomland hardwood forests, for which there is significant concern as game animals, include white-tailed deer, gray squirrel, swamp rabbit, raccoon, and wild turkey. In addition to raccoon, other furbearers include mink, Virginia opossum, red fox, and gray fox. Numerous passerine birds are found in this habitat while raptors such as barred owls, screech owls, and red shouldered hawks are common.

The value of bottomland forests to some waterfowl species is affected by the amount of winter flooding. Presently, both the Amite River and the Comite overflow their banks into low-lying wooded areas during the critical November through February period which enhances these woodlands for wintering waterfowl, particularly wood ducks. The most significant area on which this occurs is a site adjacent to the Amite between Denham Springs and Port Vincent. Hydraulic analysis indicates, based on historical records, that overbank flooding near the Clay Cut Bayou gauging station occurs for approximately 12 days, on an average, or 10 percent of the November through February period. This overbank flooding spreads over approximately 714 acres and approximately 565 of these are contiguous. Because of the elevated nature of the banks of natural streams and the depressional nature of the low woodlands, particularly the area near Clay Cut Bayou, it is estimated that these woodlands are actually flooded or maintain enough moisture to be attractive to wintering waterfowl for an additional amount of time equal to that of the out-of-bank stage exceedence computed.

Upland areas provide wildlife habitat that is not as valuable for most species as is bottomland hardwood habitat. However, a preponderance of hardwoods instead of pines in this type habitat may provide habitat that approaches that of bottomland hardwoods. Upland forests that contain high

numbers of mast-producers such as American beech, various oaks, and hickories provide a much higher quality habitat than forests with few mast-producing species. American beech and various oaks are abundant in the upland forests of the Lilly Bayou area.

Lands adjacent to streams are described as riparian zones. The width of a riparian zone is very arbitrary in a forested area, but for the purpose of this study is considered to be 300 feet. The 300-foot width is the width used as an evaluation parameter in the United States Fish and Wildlife Service (USFWS) Habitat Suitability Index Model: North American Mink (Allen, 1986). Wooded riparian zones of the study area provide an especially valuable habitat to an abundance of animals because of the diversity of forest and shrub vegetation in the near proximity to flowing water. Most animals require access to water for survival even though they may spend most of their time elsewhere. The riparian zone provides protected access to water (Martin and Allen, 1988). Many small mammals, reptiles and amphibians are restricted to the riparian zone. Because of the abundance of insects, open areas for feeding, and woody cover, forested riparian habitat provides vital nesting and feeding habitat for songbirds (Stauffer and Best, 1980). Population densities of birds breeding in riparian habitats are exceptionally high (Brinson et al., 1981). Migratory birds rely on riparian habitat to provide protection from predators and cover from the elements. Riparian ecosystems support a greater diversity of wildlife than non-water-related habitats (Brinson et al., 1981). Riparian vegetation provides the bulk of food, cover, and nesting habitat for much of the wildlife in the study area (Nunnally and Shields, 1985). Forested riparian zones are important in maintaining gene flow between wildlife populations because they are used as travel corridors for animals moving between forested tracts that otherwise would be separated by open areas. Wooded riparian areas also provide esthetically pleasing green areas in an otherwise agricultural and urban landscape.

Forested riparian areas also have high value in the maintenance of warmwater stream productivity. Adjacent and overhanging trees provide

shade so that lower water temperatures and higher dissolved oxygen levels are maintained during critical hot weather periods. Forested riparian areas provide leaf litter which is the principal source of organic input to the aquatic system. Fallen trees and branches provide practically the only source of instream cover that exists. Riparian vegetation also retards bank erosion, retains flood waters, and filters sheetflow, thereby minimizing turbidity and detrimental excess nutrient inflow. The significance of riparian zones has been documented in numerous publications (Teskey and Hinckley, 1977; Johnson and McCormick, 1978; Warner, 1979; Stauffer and Best, 1980; Brinson et al., 1981; Johnson et al., 1985; USDA Forest Service, 1987). The U.S. Congress recognized the value of riparian zones in the Wild and Scenic Rivers Act in 1968 which affords protection to rivers and their immediate environment. The Louisiana Legislature passed the Natural and Scenic Streams Act in 1970 to provide a mechanism for protecting rivers and adjacent riparian areas.

5.2.2.2. Effects of No Action. Approximately 144,426 acres of land are projected to be in the wooded land category within the study area in year 2047 (see Table 5-1). The majority of these wooded lands would be bottomland hardwoods. According to the two most recent published sources on forest acreages in Louisiana (Earles, 1975 and May and Bertelson, 1986) an increase of approximately four percent of the total woodland acreage within the parishes of East Feliciana, East Baton Rouge, and Livingston occurred during the 1974 to 1975 period. These data reflect the conversion of agricultural land to woodlands during that period. Tables 5-5 and 5-6 show the residual acreage within the potentially impacted area by increment and alternative for both no action and action alternative implementation. The woodland acreage shown in Table 5-5, except for the diversion plan, consists largely of woodlands within the riparian zone. The effects of no action to the wildlife species occupying that entire potentially impacted area are directly related to the changes in acres of that resource. Additionally, inundation occurring for periods of approximately 12 days during the designated November through February period would continue to occur as at present over approximately 714 acres of woodlands.

5.2.2.3. Effects of Plan 1B. Approximately 435 annualized acres of bottomland hardwoods and 29 acres of upland forests would be destroyed by flood control construction measures with implementation of this alternative (see Table 5-5). This would represent a permanent loss of potential forest products and high quality wildlife habitat. Considerable erosion would occur at the outfall area adjacent to the counter weir of the Diversion Channel State Control Structure since this area would not receive erosion protection. A worst case analysis was used to project the acreage that would erode at the outfall area. The assumptions of a minimal vertical scour and a maximum horizontal scour were used (see Paragraph 5.2.5.2.1.3). This resulted in a projection of 40 total acres that may erode in this area. The projected sediment deposition and subsequent scouring in the two-mile segmentn of lower Lilly Bayou and middle Cooper Bayou may result in some forest losses in this area. However, both headwater flooding from these two bayous and backwater flooding from the Mississippi have resulted in the occurrence of this phenomenon on a much smaller scale in this area for many, many years. A similar analysis of the outfall of Cooper Bayou into Profit Island Chute resulted in a projection of 50 total acres that may erode at that location.

Inundation during the November through February period in the Clay Cut Bayou/Amite River area would be reduced due to the out-of-bank stage in this area being exceeded approximately seven percent, or eight days of the November through February period. This translates into a reduction of approximately three percent, or four days and 5,500 acre-days during that period.

The mitigative control structure to be constructed in this area would pass and withstand the designed flood event. However, it would restrict the subsequent dewatering of the area in a manner similar to existing conditions at all times through project design. Dewatering of the forested wetland area would occur over an intended period of ten days. This would result in a net change from without project conditions of approximately 1,700 additional acre-days of woodland winter flooding, and thus would

TABLE 5-5

CONSTRUCTION AREAS
FOREST LAND IMPACTED ACREAGE

Plan	Year	Affected Area						
		Plan 1B <u>1/</u> UPL	Plan BLH	Plan 2A <u>2/</u>	Plan 2B <u>3/</u>	Upper Comite	Lower Comite	Amite River
FWOP	1995	30	451	1413	975	438	809	166
FWOP	1997	30	451	1412	974	438	808	166
FWOP	2047	29	437	1381	953	428	791	162
FWOP	Ann1zd	30	444	1397	964	433	800	164
FWP	1995	30	451	1413	975	438	809	166
FWP	1997	0	0	188	188	0	105	83
FWP	2047	0	0	167	167	0	88	79
FWP	Ann1zd	1	9	201	193	8	111	82
Change	Ann1zd	-29	-435	-1196	-771	-425	-689	- 82

1/ Diversion Area (UPL = Upland; BLH = Bottomland hardwoods)

2/ Total of Upper and Lower Comite River plus Amite River

3/ Total of Lower Comite River plus Amite River

TABLE 5-6

MITIGATION AREAS
FOREST LAND IMPACTED ACREAGE

Plan	Year	Affected Area								
		Project Land		Alluvial Floodplain Land		Amite Structure Area	Comite Buffer 28.3 mi	Comite Buffer 17.2 mi	Comite Bkwter Area	Amite Buffer 9.2 mi
		<u>1/</u> UPL	BLH	<u>2/</u>	<u>3/</u>	1,2, <u>3/</u>	<u>2/</u>	<u>3/</u>	<u>2/</u>	2, <u>3/</u>
FWOP	1995	0	213	0	0	300	1718	905	23	226
FWOP	1997	0	213	0	0	300	1717	905	23	226
FWOP	2047	0	206	0	0	300	1715	900	23	226
FWOP	Annlzd	0	210	0	0	300	1716	902	23	226
FWP	1995	0	213	0	0	300	1718	905	23	226
FWP	1997	110	213	669	329	299	2072	1271	41	669
FWP	2047	110	635	669	329	299	2072	1271	41	669
FWP	Annlzd	109	626	662	326	299	2052	1261	40	556
Change	Annlzd	+109	+416	+662	+326	- 1	+336	+359	+17	+330

1/ Plan 1B component (UPL = Upland; BLH = Bottomland hardwoods)

2/ Plan 2A component

3/ Plan 2B component

preserve and enhance the habitat characteristics of the area. Some adverse impacts to forest stand vigor and a change in species composition could result during extended dormancy as well as growing period flooding (Dr. Harvey E. Kennedy, Southern Forest Experiment Station, U.S. Forest Service, Stoneville, MS, pers. comm.); however, the structure design of a 10-day dewatering period rather than maintaining extended inundation should minimize that possibility.

Ground cover grasses to be planted on the floodside slopes of the levee on the south side of the diversion channel and on the slopes of the remaining excavated material on the north side of the channel would minimize erosion; however, initially erosion is likely to occur on the steep side slopes of the two areas. The channel lower slopes of Bayou Baton Rouge, Cypress Bayou, and White Bayou immediately south of the diversion canal may become more heavily vegetated with various species due to the removal of a portion of the source waters. The dredged material disposal area on the north side of the channel would provide a very poor substrate for species inhabiting bottomland areas, and would more likely support upland species requiring low moisture conditions. It is reported that materials excavated from depths necessary for creation of the diversion channel are typically very tight clays in this locality and they tend to restrict the movement of both soil moisture and plant roots (Whitney Autin, Louisiana Geological Survey, Louisiana State University, Baton Rouge, LA, pers. comm.). The reforestation of 110 acres of the dredged material disposal area which includes capping with topsoil would provide mitigation of that upland habitat lost due to the projected erosion in the Lilly Bayou area. The use of forested lands either for construction or wildlife mitigation measures would constitute complete removal of that acreage from utilization as commercial forest products. The effect of this alternative upon wildlife is directly related to the areas of forest land affected (see Table 5-5). The significant wetland functions, wildlife habitat and floodwater retention, would be provided in the reforested bottomland hardwood area between the containment levees. The placement of approximately 24 inches

of topsoil upon 29 acres of the previously-mined portion of the mitigation area would provide the substrate needed to retain sufficient moisture for good bottomland hardwood growth. The mitigation required as determined by the Habitat Evaluation System (HES) of the U.S. Army Corps of Engineers reflects the replacement of those losses. (The Habitat Evaluation Procedures (HEP) analysis of the U.S. Fish and Wildlife Service is provided in Appendix B, Section 9). The net effect of the mitigation plan upon woodlands (both bottomland hardwoods and uplands) is +545 annualized acres and is shown in Table 5-6. (The effect of mitigation is essentially the creation of forest and the habitat that it provides, by the conversion of open lands. The upland habitat mitigation upon the dredged material disposal area would not result in the conversion of open lands, however, since conversion would already have been caused by dredged material placement.) A comparison of the action alternatives with the no action plan results in the net effect of the project. The construction of the flood control features of this plan would result in the loss of 275 annualized habitat units for bottomland forests and 19 annualized habitat units for upland forest habitat according to the HES analysis. (The losses and effectiveness of these measures according to the HEP analysis of this and all other plans are shown in Appendix B, Section 9.) The mitigation measures incorporated fully mitigate those losses, including wetland function losses, according to the HES analysis and the analysis of winter flooding reduction.

5.2.2.4. Effects of Plan 2A. Approximately 1,196 annualized acres of bottomland hardwood forests would be impacted by flood control construction measures (see Table 5-5). Approximately 520 of these forested acres would be in the riparian zone. All of the previously described benefits of riparian vegetation to wildlife would be lost along one side of the lower 16 miles of the Comite River and 27.5 miles of the Amite River. Losses of wildlife habitat value of both wetland and non-wetland forests would be significant. The numbers and diversity of mammals, birds, reptiles, and amphibians would be greatly reduced. Included within the 1196 acres are 425 acres that would be converted to channel and dredged material disposal

areas located in that segment of the Comite River upstream of White Bayou. That segment of the construction area is within that reach of the Comite River designated as a Natural and Scenic River in accordance with the Louisiana Natural and Scenic River System. This alternative consists of the process of "channelization" which is a restricted activity within the Louisiana Scenic Rivers Act that implemented the system. All trees on the adjacent land on the side that would be enlarged would be destroyed. The net effect of the mitigation plans upon woodlands is +1,327 annualized acres and is shown in Table 5-6. All these acres would be removed from possible utilization for forest products.

As with the preceding plan, reduction of winter flooding affecting wintering waterfowl on some forested lands would occur with project implementation. Out-of-bank stages would be exceeded approximately six percent of the days in the November through February period. This translates into a reduction of approximately four percent of the time period, or 5 days and 7,200 acre-days. The effects of the mitigation structure described off the Amite River for Plan 1B would be identical for this plan. A net increase of approximately 1,700 acre-days would be provided. The structure design would allow the slow dewatering of the area after being overtopped by floodwaters to fully offset the losses that would occur.

Construction of the flood control features of this alternative would result in the loss of 827 annualized habitat units for bottomland forests, according to the HES analysis. The losses according to the HEP analysis are shown in Appendix B, Section 9. The mitigation plan would fully mitigate the losses of both wetlands and non-wetlands according to the HES analysis and the analysis of reduction of winter flooding. The effects of the flood control measures upon the habitats within the riparian zone are measured in the HES and HEP analysis.

Woody vegetation would develop upon the dredged material disposed area adjacent to the flood control channel. The species that would succeed

would be dependent upon the seed source as well as the elevation of the disposal area. A one vertical on four horizontal slope up to a minimum of 8 feet in height is planned for the stream side of the disposal area. Willows commonly succeed on dredged material disposal areas and are likely to occur here initially. However, seeds of trees adjacent to the stream such as water oak, loblolly pine, and sweetgum, would also be likely to germinate and become established on the area. Herbaceous plants would appear soon after construction and would succeed until dominated by woody plants. Routine maintenance activities, estimated to be necessary every 10 years to provide the designated flood protection, would result in the placement of dredged material on top of any vegetation that would develop on the area. Revegetation of the disposal area would then be repeated as described after each maintenance event. The vegetation succeeding on the dredged material disposal area would provide approximately 855 acres of wildlife habitat. However, this habitat would not be the same as that of adjacent areas. The elevated disposal area would not retain soil moisture as would adjacent non-elevated areas and thus would not support the abundance of species that succeed in more mesic soils. The habitat provided on the disposal area would be better described as upland rather than bottomland hardwood habitat. The covering of the great majority of the disposal area when channel maintenance occurs would result in the destruction of the trees that would have developed and the death of the occupying wildlife or dispersal to adjacent habitats. Those adjacent habitats would most likely have already reached their carrying capacity.

5.2.2.5. Effects of Plan 2B. Approximately 771 annualized acres of bottomland hardwood forests would be impacted by flood control measures with implementation of this alternative (see Table 5-5). The net effect of the mitigation plan on woodlands is +1,014 annualized acres and is shown in Table 5-6.

All these areas would be removed from possible utilization for forest products. As with the preceding plans, project implementation would result in the reduction of winter flooding on some forested lands of the study

area. Out-of-bank stages would be exceeded only approximately six percent of the days during the winter period. This translates into a reduction, as with Plan 2A, of approximately four percent of the period, or 5 days and 7,200 acre-days. The construction of the flood control features of this alternative would result in the loss of 534 annualized habitat units for bottomland forests according to the HES analysis (see Appendix B, Section 1). The losses according to the HEP analysis are shown in Appendix B, Section 9. The mitigation plan would fully mitigate the habitat losses of both wetlands and non-wetlands according to the HES analysis and would fully mitigate the reduction of winter flooding. The effects of the mitigation structure described off the Amite River for Plan 1B would be identical for this plan. The loss to habitats within the riparian zone are measured in the HES analysis. Woody vegetation would develop on the dredged material disposal area adjacent to the flood control channel with this alternative, as with the previous alternative. Routine maintenance, conducted approximately every 10 years, would have effects identical to the previous alternative except on a smaller scale. The dredged material disposal area would provide approximately 566 acres of wildlife habitat that would be described as upland rather than bottomland habitat due to the low moisture conditions of the soil.

5.2.3. Threatened and Endangered Species (and Species of Local Concern)

5.2.3.1. Resource Significance. Letter requests were made to the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) to determine if any listed threatened or endangered species or any species proposed for such listing occur in the study area. A similar request was also made to the Louisiana Natural Heritage program (LNHP) for information on species of their concern. The NMFS replied that no species under their purview was likely to occur in the project area (see Appendix B, Section 2). The USFWS replied that there are no threatened or endangered species within the project area. The USFWS letter did point out, however, that the Alabama heelsplitter (Potamilus [Proptera] inflatus), a freshwater mollusk is known to inhabit the Amite River system,

and is a candidate species for listing. Subsequent to that letter, however, the classification of the inflated (Alabama) heelsplitter was changed to "proposed" as noted in the October 27, 1989, Federal Register. The September 28, 1990, Federal Register noted the official change of classification to "listed" as a threatened species.

The inflated heelsplitter is a freshwater mussel, the existence of which is reportedly threatened by gravel dredging, flood control, and navigation interests. Stern (1976) reports the preferred habitat of the inflated heelsplitter is soft, stable substrates in slow to moderate currents. Hartfield (1988) reports it has been found in sand, mud, silt, and sandy-gravel, but not in large gravel or armored gravel. It is usually found on the protected side of bars and may occur in depths of over 20 feet. Limited amounts of siltation may suffocate juveniles whereas adults could survive. Historically, the heelsplitter occurred in the Tangipahoa River as well as the Amite River in Louisiana. It has not been reported from the Comite River. It also occurred in the Pearl River in Mississippi as well as the Tombigbee, Black Warrior, Alabama, and Coosa Rivers in Alabama. Recent surveys indicate the heelsplitter is no longer found in the Alabama River, nor in the Coosa River, although the original records within the Coosa have been doubted. Also, the heelsplitter is no longer found in the Tangipahoa and Pearl Rivers. Populations within the remaining rivers have been much reduced. Listed species are accorded protection under the Endangered Species Act and are subject to its provisions, including Section 7.

The LNHP letter listed the following species of concern as possibly occurring in the project area: Lobelia inflata (Indian tobacco), Sida elliotii (a perennial herb with no common name), Eleocharis wolfii (a spike rush with no common name), Alosa alabamae (Alabama shad), Farancia erytrogramma (rainbow snake), Mustela frenata (long-tailed weasel), Sorex longirostris (southeastern shrew), and Trinox muticus calvatus (Gulf coast smooth softshell turtle). A brief description and status report on each of these species is presented in Appendix B, Section 2. Also listed are Felis concolor coryi (Florida panther) and Trichechus manatus (West Indian manatee), two endangered species.

These species of concern are restricted in Louisiana due to the state's geographic position at the periphery of their ranges. All of these species are "apparently secure globally," with many of them "demonstrably secure globally" according to the ranking system of the LNHP. No legal protection is afforded these species at any level of government. The two endangered species noted by the LNHP will not be discussed further since their occurrence in the project area would be highly unlikely.

The LNHP letter mentioned two champion trees (largest trees of a given species) in the area; the national champion pignut hickory (Carya glabra) and the state champion black tupelo (Nyssa sylvatica). Also, the natural communities of cypress-tupelo swamp and bottomland forest occurring in the proposed project area are of concern to the LNHP. The LNHP could not provide a definitive statement on the presence, absence, or degree of health of any of the listed environmental elements in the proposed project area.

Additional letters were sent to NMFS and USFWS requesting information on threatened or endangered species relative to fish and wildlife mitigation areas. A letter was also sent to the LNHP requesting information on species of their concern (see Appendix B, Section 2).

The NMFS responded by letter stating that it is unlikely for any species under their jurisdiction to occur in the project area. The USFWS responded again that the Alabama heelsplitter, known to inhabit the Amite River, is still a candidate species. A status survey for this species has been completed. The USFWS suggests that the status of the heelsplitter be monitored. The September 1990 status change to "listed" as a threatened species reflects definite national concern.

The LNHP responded with positive comments about the incorporation of buffer strips and reforestation of Mississippi alluvial lands and with negative comments toward the creation of artificial backwater areas. The LNHP contends that the artificial backwater areas do not qualify as in-kind

mitigation and also species of concern in the Amite and Comite Rivers could be negatively impacted by the invasive manipulation of the riparian habitat. The species of concern that could be impacted by the artificial backwater mitigation plan are Podostemum ceratophyllum (riverweed), Elliptio crassidens (elephants ear, a mollusk), Lampsillis ornata (southern pocketbook, a mollusk), Potamilus inflatus (Alabama heelsplitter, a mollusk), Fundulus euryzonus (broadstripe topminnow). In this letter, it was further stated that although the above species were not mentioned in their letter of April 25, 1988, recent data has documented the occurrence of these species in the Amite River and therefore they could be affected by the project. Appendix B, Section 2 contains a brief description and status report on these species.

Reservations were expressed by LNHP regarding water management at the Amite River wooded wetland area. A subsequent telephone clarification of the proposed management plan, explained as an attempt to mimic the existing winter flooding conditions to the extent practicable resulted in the withdrawal of reservations, followed by positive comments on that measure. The responses of each agency are included in Section 2 of Appendix B.

5.2.3.2. Effects of No Action. Since the NMFS has indicated no species under their purview inhabit the affected area, no further comments are appropriate regarding those species. The inflated heelsplitter will become threatened. A definite statement, however, of whether this species would or would not be present for the next 50 years cannot be made with any degree of accuracy. The most limiting factor to the existence of the heelsplitter is the amount of activity of any action that abruptly cuts away or buries heelsplitter colonies in the Amite River. Preservation of sediment transport is a very necessary factor to the existence of the heelsplitter mussel. A description of the sedimentation characteristics of the rivers is included in Paragraph 5.2.5.2.1. Populations of the species of local concern would probably decline as the projected urbanization, agriculture, and other land-use changes occur. The champion trees mentioned by the LNHP would probably be left undisturbed due to their unique designations.

5.2.3.3. Effects of Plan 1B. No Federally endangered or threatened species would be impacted. The proposed inflated heelsplitter would not be impacted by this alternative. Although the construction features of this alternative would divert 12,700 cfs at the 10-year frequency storm, the four 2.5 feet by 5.5 feet low-flow outlets would pass the existing average daily flow of the Comite River. The existing average daily flow of the Comite River at the location of the proposed diversion structure is approximately 350 cubic feet per second (cfs). This flow is approximately five percent of the 1-year frequency discharge at the site which is 6,850 cfs. The existing average daily flow of the Amite River at the Denham Springs gage is approximately 2,033 cfs.

The design of the diversion structures on the Comite River is to divert flood waters from the top of the water column where the sediments are least concentrated. A projection of the changes in sediment transport characteristics of the Comite River as affected by the construction of the diversion features was done by HEC-6 hydraulic models. A basic premise of the modeling is that sediment transport or introduction is closely related to discharge. The model predicted a reduction in volume of sediments that would be delivered to the Amite River. The projected reduction was expected to be the result of material being diverted and deposited into storage above the Comite River stage control structure. These losses (of sediment volume) would then be accounted for through removal of (would be resupplied by) material from the channel bed downstream of the structure. Based upon the model results, a projection was made of a reduction of 20,000 cubic yards of the total volume of sediment introduced into the Amite River annually. However, the average transport capacities of the lower Comite River for the existing discharges of the 5 and 10-year storm events past any given point near its mouth are 375 and 750 cubic yards per day. For those same storms with the project in place, the transport capacities past the same point would be approximately 75 and 185 cubic yards per day, respectively. This reduction of sediment transport characteristics of the Comite River is attributed to the change in discharge past this point caused by the diversion. In summary, two

conclusions were made from the results of the hydraulic modeling: the magnitude of deposition occurring at the mouth of the Comite River would either remain unchanged or possibly be reduced by the project, and the reduction in sediment transported into the Amite River is not of a magnitude that would induce scour.

Existing discharges at the Denham Springs gage on the Amite River which is located approximately 700 feet below the confluence of the two rivers are 25,350, 42,300, 63,400, and 87,000 cfs, respectively, for the 1-year, 2-year, 5-year, and 10-year frequency floods. Project implementation will result in discharges of 24,350, 40,000, 58,500, and 80,000 cfs for the same frequency floods at that location. This is a reduction of four, five, eight, and eight percent, respectively, for those floods.

Utilizing the basic premise of the modeling analysis, it could be inferred that similar reductions of sediment transport would occur at the Denham Springs gage on the Amite. However, these reductions of sediment transport that occur at such infrequent events would be of no effect to a species that has continued to exist in a stream that has an average daily flow of 2,033 cfs. Also, these differences in discharge would in no way increase the amount of slack water situations over mussel beds that could cause release of suspended particles and result in suffocation. In summary and based upon the projections and analyses made, the implementation of this alternative would have no effect upon the continued existence of the Inflated heelsplitter mussel.

This plan could affect species of concern to the LNHP that may be living in the corridor of the diversion canal and in Lilly and Cooper Bayous. Any of these plant species growing in these areas would be lost, while some wildlife species should be able to escape to nearby areas. Aquatic species in Lilly Bayou would be severely impacted by the increased flows and erosion.

Any species of concern to the LNHP inhabiting or depending on the portions of White Bayou, Cypress Bayou, and Bayou Baton Rouge downstream of the diversion canal would be subjected to decreased water flow since the flow from the upper reaches of these bayous would be captured by the diversion canal. Aquatic animal passage between the upper and lower sections of these bayous would be obstructed by the diversion canal disposal embankment.

Mitigation plans include preservation of existing winter flooding conditions for wintering waterfowl on 300 acres of bottomland hardwood and wooded swamp adjacent to the Amite River near Clay Cut Bayou. Any LNHP species of concern in this area would be protected from future land-use changes. Mitigation plans also include the purchase and reforestation of cleared lands between the containment levees that are presently of little value to wildlife. Reforestation and management would benefit wildlife in general and possibly species of concern to the LNHP.

The two champion trees cited by LNHP are not in the immediate project or mitigation areas and, therefore, would not be affected by this plan.

5.2.3.4. Effects of Plan 2A. The proposed inflated heelsplitter would be impacted. The extensive clearing and snagging on the Amite River would result in severe and possibly annihilating direct impacts to this species from this segment of the river. Any species of concern to LNHP living in and adjacent to a 16-mile section of the Comite River and a 27.5-mile section of the Amite River could be seriously impacted by the proposed channel enlargement and clearing and snagging operations. Impacts would be caused by the disturbance of aquatic and riparian habitats during initial channel modification work and continuing effects of the altered river channel and banks. Changes expected from this plan normally produce wildlife habitat of reduced value, resulting in decreased species diversity.

Mitigation plans are similar to Plan 1B in concept but not locality, but an additional quantity of cleared lands would be purchased and reforested for wildlife habitat replacement purposes. Also, acquisition and natural reforestation of a 300-foot buffer on each side of the Comite River for a distance of 28.3 miles immediately upstream of the construction area and for 9.2 miles on the Amite River progressing downstream from the proposed Darlington Reservoir site could benefit species of concern to LNHP. Maintenance of a wooded buffer area along this natural and scenic stream would be the primary benefit derived from this mitigation plan. The preservation of the wetland characteristics of the mitigation area off the Amite would also benefit species to the LNHP.

Another part of the proposed mitigation plan involves construction of an artificial backwater area near the Comite River. This area is presently used for agricultural purposes and is of little value to wildlife. Construction of a water control structure, planting with desirable bottomland forest trees, and management for wildlife would provide desirable wildlife habitat and would possibly benefit species of concern to the LNHP. Species of concern in the Amite and Comite Rivers could be negatively impacted during construction by physical disturbance and by increased turbidity downstream. The champion trees mentioned by the LNHP would not be affected by this plan.

5.2.3.5. Effects of Plan 2B. The proposed inflated heelsplitter would be impacted. The extensive clearing and snagging on the Amite River would result in severe and possibly annihilating direct impacts to this species from this segment of the river. Any species of concern to the LNHP living in or adjacent to a 12-mile stretch of the Comite River and a 27.5-mile stretch of the Amite River could be seriously impacted by the proposed channel enlargement and by snagging and clearing operations. Effects from this alternative would be similar to, but less than, those expected from Plan 2A because 4 miles less of the Comite River channel would be enlarged. Effects on species of concern to LNHP in the mitigation areas would be similar to those expected from Plan 2A, except the artificial

backwater area is not included in the mitigation plan for this alternative. The champion trees mentioned by the LNHP would not be affected by this plan.

5.2.4. Natural and Scenic Rivers

5.2.4.1. Significance. The Natural and Scenic Rivers System within the State of Louisiana is a system of rivers and streams and an intended means of protection of those watercourses. Initial legislation creating this system of rivers was enacted by the Louisiana Legislature by Act 398 of 1970 and Act 947 of 1988. The system was established for the purpose of protecting, preserving, developing, reclaiming, and enhancing the wild and scenic beauty of designated free-flowing rivers, streams, bayous, or segments thereof. To be so designated, they must not have been channelized, cleared, nor snagged within the past 25 years, nor realigned, inundated, or otherwise altered. Their shoreline must be covered by native vegetation and have no, or few, man-made structures. Sections of the Comite River and Amite River were designated as Instantaneous Natural and Scenic Rivers by Act 655 of 1975 by the Louisiana legislature. The section of the Comite River from the Wilson-Clinton Highway in East Feliciana Parish to the entrance of White Bayou in East Baton Rouge Parish is included, as well as a portion of the Amite River extending (as described in the 1988 Natural and Scenic River Act) "from the Louisiana-Mississippi state line to the permanent pool level of the Darlington Reservoir; and from the Darlington Reservoir Dam to LA Hwy. 37; provided, however, that portion of the Amite River from the Louisiana-Mississippi state line to LA Hwy. 37 shall remain within the Natural and Scenic River System until the issuance of a permit by the U.S. Army Corps of Engineers issued pursuant to 33 U.S.C. 1344 and 33 C.F.R. 232; provided, however, that if the said Darlington reservoir and dam are not approved, funded, and under construction within five years of the effective date of this Act (dated July 27, 1988), that portion of the Amite River within the Natural and Scenic Rivers System shall be as follows: From the Louisiana-Mississippi state line to LA Hwy. 37." There are no Federal Wild and Scenic Rivers in the study area.

5.2.4.2. Effects of No Action. If no Federal action is taken, these segments of the Comite and Amite Rivers will continue to receive protection presently provided by the Louisiana Natural and Scenic Rivers System. Included within this system of protection is wording that states, "Channelization, clearing and snagging, channel realignment and reservoir construction of these rivers and streams included within this system are hereby prohibited." It is assumed that none of the actions prohibited would occur.

5.2.4.3. Effects of Plan 1B. Implementation of this alternative would result in construction of the Comite River Stage Control Structure adjacent to the Comite River approximately 6,000 feet south of the crossing of LA Highway 64 in the Scenic River segment. The structure would allow the passage of low flows due to the design (see Paragraph 4.3.1.2). Energy produced by floodflows overtopping the control structure crest would be dissipated by a counter weir located approximately 110 feet downstream. An inflow and outflow channel to and from the new structure would be constructed as well as a closure across the existing river channel. Implementation of this alternative at this time, October 1990, is prohibited by Louisiana statute. Action by the State Legislature would be required to remove this prohibition.

5.2.4.4. Effects of the Plan 2A. Implementation of the flood control features of this alternative would result in the prohibited channelization of approximately 4 miles of the Scenic River portion of the Comite River from Dyer Road east of Baker to its terminus at the confluence of White Bayou with the Comite (approximately 8,000 feet upstream of Hooper Road).

Implementation of the mitigation features of this alternative would result in increased protection of 300-foot buffer corridors on each side of segments of the Comite River and the Amite River. The acquisition and fencing of the corridor would provide protection from grazing and timber cutting, and would also allow natural succession of a forest community where openland presently exists. The total linear area provided increased protection would consist of 37.5 miles.

5.2.4.5. Effects of Plan 2B. Implementation of the flood control features of this alternative would not directly affect any segment of the Scenic River. Indirect effects would include slightly more rapid evacuation of floodwaters from the lower end of the Scenic River segment of the Comite. That effect would be reduced as distance increases upstream from the construction area.

The mitigation features of this alternative would also result in the increased protection of the 300-foot buffer corridor on each side of the segments of the Comite and Amite Rivers, as would Plan 2A. The total linear area provided increased protection would consist of 26.4 miles.

5.2.5. Aquatic Resources

5.2.5.1. General. For the purpose of this document, aquatic resources of the study area are separated into physical and ecological features. Physical features are concerned with sedimentation and water quality characteristics primarily of the river itself. Ecological features are concerned with the biological community and the characteristics closely associated with that community.

5.2.5.2. Physical Features

5.2.5.2.1. Sedimentation Characteristics

5.2.5.2.1.1. Significance. Both the Amite and Comite Rivers can be described as meandering streams. The upper reaches of both streams are characterized by relatively steep slopes and highly mobile beds. Active migration and braided channels are typical of both streams in their upper reaches. Both streams also are similar in their lower reaches because they have markedly flatter slopes and the presence of coarser sediments in the bed material is reduced. The lack of coarser bed material in the lower reaches of these systems is the result, not only of the decrease in slope but also of the presence of sand and gravel mining operations on the upper

reaches. These operations have impacted the volume of sediment being transported downstream. Comparison of cross-sections taken prior to, upon completion, and seven years after completion of channel improvements on the Comite River demonstrate the tendency of these streams to seek a wide shallow channel cross-section. The channel improvements, completed in 1960 and performed primarily on the upper reaches of the Comite River, reveal a large volume of deposition during the seven years between surveys. This type of deposition normally continues until the channel cross-section reaches relatively stable proportions for the given range of discharges and sediment grain sizes.

5.2.5.2.1.2. Effects of No Action. The impact of sedimentation as a result of taking no action should be minimal. The Lower Mississippi Region Comprehensive Study estimates average sediment yield for the Amite River basin at 750 tons/sq. mile/year. It is also estimated that 98 percent of this yield is developed from silty upland soils, found primarily in the upper reaches of the basin. Bank erosion appears to be the primary source of sediment in the lower reaches of both streams. An estimated yield of sediment from bank erosion could be placed at 1,535 tons/mile/year. Channel migration and bank erosion are natural and continuing processes and should not be expected to abate.

5.2.5.2.1.3. Effects of Plan 1B. The diversion channel itself was designed to facilitate channel stability during the passage of flood flows. The gradual slope of the diversion channel between Comite River and Lilly Bayou should maintain flow velocities near 2 feet per second. This magnitude of velocity should keep sediments from depositing in the diversion channel during normal operation. Additionally the presence of the control weir on the Comite River and the side withdrawal of the flood flows from the resulting pool should minimize the diversion of coarse sediments. The segment of the diversion channel between the head of Lilly Bayou and the Mississippi River is extremely steep in slope. Flow velocities through this segment of the diversion are projected to be well in excess of the limits for channel stability. A HEC-6 sedimentation model

of the Comite River Diversion Channel was developed, including the Lilly and Cooper Bayous segments. The model indicates a tendency to scour in the 1-mile reach of Lilly Bayou just below the stage control structure and in the 1-mile reach of Cooper Bayou just above the confluence with Profit Island Chute. The depth of scour indicated is eight feet in each of these reaches. HEC-6, being a one-dimensional model, indicates channel enlargement in the vertical direction only. If the indicated channel enlargement occurred horizontally instead of vertically, a top width of approximately 350 feet would be expected. However, because of the counter weir elevation of the diversion channel stage control structure at 24.0 feet NGVD, the expectation is that the scour will be primarily vertical. Some moderate bank sloughing will occur to accommodate channel development. The projected scouring and associated channel enlargement should occur early in the project life.

The two-mile segment of lower Lilly Bayou and middle Cooper Bayou between the scour areas would be an area of both sediment transport and deposition. Scouring and subsequent deposition would both occur in this zone as sediments are transported with each flood event toward the Mississippi River.

The guide levee/closure at the westward bend of Cooper Bayou toward the Mississippi River would confine flows to the Cooper Bayou channel itself and thereby prevent excessive erosion at this location. Sediments would continue to be transported within Cooper Bayou and would not be transported into and deposited within Brooks Lake.

Channel degradation in the tributary streams cut by the diversion is also a concern. The tributaries of upper White Bayou, upper Cypress Bayou, and upper Bayou Baton Rouge will require grade/stage control structures or extensive riprap protection. The gabion control structures would be placed where necessary to prevent the possibility of head-cutting in the tributary streams. With these structures in place the sediment contribution of the tributaries to the diversion channel should be minimal.

The Comite River will experience some deposition downstream of the diversion structures as a result of the reduction in flood flows below that point. This deposition should not have an impact on either the project function or the Comite River channel. Diversion of peak flood flows would not affect the characteristics of the Comite River channel. The channel would continue to exhibit the tendency to meander and maintain a shallow or braided channel in its steeper reaches.

5.2.5.2.1.4. Effects of Plan 2A. It is anticipated that the improved channel cross-section would have a tendency to fill and possibly widen at the top-of-bank. This would be consistent with the regime characteristics for stable streams similar in physical nature. It is also probable that in the course of the channel bottom filling a low flow channel may develop. This is due to the large disparity in the normal daily volume of even lesser magnitude flood events. This disparity is also reflected in the cross-sectional area necessary to carry either of these flows. As a result, a low flow channel may develop as the stream attempts to adapt to the modified channel. The volume of deposition necessary for the physical dimensions to approach those of a stable cross-section over the entire reach of improved channel is approximately 2,140,500 cubic yards. With the occurrence of a normal pattern of runoff events it is conceivable that this volume could occur over a ten-year period.

The physical characteristics of the improved channel cross-section within the scenic reach of the Comite River do not drastically differ from those that regime theory would deem stable. For this reason no deposition was estimated in this reach. As a result, estimated volume of deposition in the hydraulically improved channel is not effected by the inclusion or exclusion of the segment of "scenic river".

Clearing and snagging along the Amite River would have no appreciable effect on the volume of deposition in that stream. However, certain locations on the lower Amite River currently experience high rates of bank erosion. Clearing and snagging of the banks has the potential to accelerate this process. A number of specific locations have been found

using aerial photography taken in 1955 and 1985. These sites would require protection to avert any possible increase in the rate of bank failure. Other locations along the lower Amite River presently exhibiting less severe erosion could be stabilized by grading and seeding after clearing operations are completed.

Some deposition may also be expected within the proposed artificial backwater mitigation area. The combination of a shifting stream bed and a backwater invert elevation which is lower than that of the natural channel should result in deposition in the mouth of the backwater area. This deposition should appear in the bottom-filling of the artificial channel and also as a point bar near the channel entrance. The volume of deposition is estimated at 1900 cubic yards occurring over a 3-year period.

5.2.5.2.1.5. Effects of Plan 2B. The effects of this alternative are essentially the same as for Plan 2A, exclusive of the backwater area.

5.2.5.2.2. Water Quality Characteristics

5.2.5.2.2.1. Significance. The Comite River has been categorized as an effluent-limited stream, which, by definition, is any stream segment in which the best practicable treatment levels for point source discharges are required to maintain the stream's standards. The scarce data collected on the Comite River and its tributaries suggest low dissolved oxygen and high fecal coliform levels at low-flow conditions. Generally, the quality of water in the Amite River decreases as the water passes downstream. At low flow conditions, there are low dissolved oxygen and high fecal coliform levels.

Lake Maurepas also has been designated an effluent-limited segment. However, with respect to dissolved oxygen and fecal coliform levels, Lake Maurepas has had few water quality problems associated with waters of the Amite River entering into it.

5.2.5.2.2.2. Effects of No Action. There is no indication that the water quality of the Comite River, Amite River, or Lake Maurepas would worsen without the proposed project. In fact, it seems that the water quality of the aforementioned water bodies would improve as a result of the implementation of the best management practices as set forth in the Louisiana Water Quality Management Plan. Implementation of East Baton Rouge Parish's plan to divert a large portion of the municipal waste that is currently being discharged into tributaries of the Amite River into the Mississippi River would also improve the water quality.

5.2.5.2.2.3. Effects of Plan 1B. The impact on the Comite River from site preparation and construction of the Comite River diversion channel and structures would be short-term, resulting in high turbidity levels, elevated stream temperatures, and depressed oxygen levels. However, since these impacts occur in a river designated as a Louisiana Natural and Scenic Stream, the effect would be more consequential. Taking into consideration the assimilative capacity of the Mississippi River and the relative discharges of the Mississippi River and the diverted flows from the Comite River, any long-term impacts associated with the diversion of floodwaters from the Comite River to the Mississippi River would be insignificant. As only flood flows are to be diverted from the Comite River, it is unlikely that this project would have any significant long-term effects on the quality of the lower Comite River waters or the surrounding groundwater. The peak discharge of the combined Amite and Blind River system inflowing to Lake Maurepas would be reduced by approximately two percent when compared to existing conditions for the 100-year frequency storm. The difference in peak discharge of all lesser storms, when compared to existing conditions would be less. Therefore, the effects of this plan on salinities of Lake Maurepas would be negligible. Mitigation for this alternative includes constructing a control structure off the Amite River between Denham Springs and Fort Vincent to allow the slow release of retained floodwaters. No negative water quality impacts are anticipated as

a result of this mitigation. The water provided to the Diversion Channel by the three tributary bayous is likely to have low dissolved oxygen values and high fecal coliform counts as a result of sluggish to non-existent flows and inadequately treated sewage. This is cause for concern of potential water quality problems in the Diversion Channel, especially when no water is being diverted. Subsequent monitoring studies to be conducted will provide a basis for best management practices. Minimal shade cover on the Diversion Channel would cause water temperatures to rise which, in turn, would decrease the solubility of oxygen in the water, resulting in depressed oxygen levels. Tree plantings on the bench on the south side of the channel would provide some abatement for this concern. Grass plantings on channel side slopes and on the floodside slope of disposal areas would minimize anticipated erosion. The low-flow augmentation measures included on the three tributary bayous would restore low flows to the lower portion of those bayous and prevent the loss of downstream dilution characteristics that these flows provide. The 3-foot maximum allowable drawdown of the Diversion Channel to supplement the downstream low flows of the bayous would result in minor changes of water quality in a water body of this depth and configuration. Conducting herbicide application activities in accordance with EPA guidelines (see Appendix B-8) with this or with any other alternative would minimize the chances of unintentional adverse effects.

5.2.5.2.2.4. Effects of Plan 2A. Channel enlargement would have a much greater impact on the water quality of the project area than would clearing and snagging alone. Since both modification techniques disturb the bottom sediment of the stream, the immediate short-term impacts of this alternative are high turbidity levels, elevated stream temperatures, and depressed oxygen levels. While these adverse impacts are temporary in nature and would diminish soon after completion of the project, annual or regular channel maintenance would continue to prevent the shade cover of the stream from reestablishing itself. Thus, elevated stream temperatures and consequent depressed dissolved oxygen levels could be a long-term impact of the alternative.

After the Comite River enlargement is complete, low flows may soon establish themselves in a low-flow channel within the enlarged channel, similar to the same condition that presently exists. However, higher water temperatures caused by loss of shade could result in lower dissolved oxygen levels. No significant differences in nutrient and contaminant fecal levels are expected because these levels are usually related to types of land use and their distribution within the drainage basin.

Since the water quality in the Amite River is largely determined by the quality of the water entering the river from its tributaries, it is unlikely that clearing and snagging would result in any significant long-term improvement in water quality of the Amite River. During low flows, the Amite River below the diversion canal south of Port Vincent would continue to exhibit severe water quality problems. In fact, the low dissolved oxygen levels during low-flow conditions may be further reduced as a result of the elevated temperature of the water entering this portion of the river. No significant difference in nutrient and fecal levels is expected.

By and large, channel improvements facilitate water flow and flushing. As a result of this increased assimilative capacity of the stream, the water quality with respect to many parameters, and particularly dissolved oxygen content, may increase after the channel improvements, especially at times of moderate to high flows.

This project should not have any significant long-term impacts on Lake Maurepas. Short-term turbidity increases are expected in the Amite River Diversion Canal and the lower Blind River. The quality of the groundwater in the project area is not likely to be adversely impacted by this project alternative.

No negative water quality impacts are anticipated as a result of either of the fisheries habitat mitigation measures. The buffer strip on the Comite and Amite Rivers would have positive water quality impacts, such as

providing shade cover for the streams, preventing soil erosion and contaminant leaching from surface runoff into the stream, and precluding future development adjacent to the stream.

5.2.5.2.2.5. Effects of Plan 2B. The water quality impacts associated with this alternative are much the same as discussed for the previous plan, except no Louisiana Natural and Scenic stream would be impacted. Except for the artificial backwater channel on the Comite River, mitigation for this alternative is similar to that in the aforementioned section.

5.2.5.3. Ecological Features

5.2.5.3.1. Significance.

5.2.5.3.1.1. The Comite River, which is the largest tributary of the Amite, receives its source waters in southwestern Mississippi in the predominantly pine-forested uplands. The segment of the Comite so designated as a scenic river has no recent history of channel modifications. Below the confluence with White Bayou, the Comite has been subjected to channel dredging and some straightening which has caused some degradation to the general ecology. This dredging was done in 1961 in an attempt to deepen and widen the channel to better convey floodwaters. However, the channel was not maintained and stream cross-sections indicate that most of the channel filled in with sediment to predredging conditions within a few years. Today, the channel has almost totally recovered. An operating sandmine is located along the river approximately one mile below the White Bayou confluence near the Highway 408 crossing. Sand mining adds to turbidity problems and sediment shift, which inhibits overall productivity.

5.2.5.3.1.2. In September 1985, aquatic sampling was done in conjunction with the USFWS to determine some of the physical, chemical, and biological relationships that were occurring in the Comite River. The area sampled included sections along the lowermost 20 miles of the river designated as a

Louisiana Natural and Scenic River. The river was wide, clean, clear, and shallow with a bottom of sand, sand and gravel, and a few out-croppings of clay "bedrock." There were a few sand and clay cliffs, but mostly the river meanders and continues to change course through recently deposited materials. The deepest water was near vegetated banks and most holes deep enough to hold catchable size fish were associated with trees that had fallen into the river. The banks were lined with willows and river birches, along with water oaks, magnolias, hickories, and other bottomland hardwood species appearing to a lesser extent. The banks were largely vegetated with blackberry and honeysuckle with Chasmanthium grass dominating the shaded areas. Alligatorweed and smartweed were common along the banks.

5.2.5.3.1.3. Shoreline sampling for fish was done primarily with a minnow seine. Species collected were; largemouth bass, longear sunfish, bluefill, redear, speckled madton, blackspotted topminnow, two species of shiners and one species of darter. Benthic and other aquatic organisms collected included mayflies, caddisfly, damselfly, dragonfly, Asiatic clam, and river shrimp. Measurements of the following water quality parameters were recorded: total hardness - 20.6 ppm, total alkalinity - 27.5 ppm, Secchi disk visibility - 6 feet (estimated), conductivity - 60 to 70 mmhos, pH - 7 to 8, and dissolved oxygen - 6 to 8 ppm.

5.2.5.3.1.4. The benthic taxa collected, as well as dissolved oxygen readings, indicated a clean stream. Characterization of benthic secondary production in the stream on the basis of single qualitative samples is difficult due to the natural temporal and spatial variability in stream benthic populations. Although low hardness may indicate low primary production from phytoplankton, the major energy source is probably allochthonous (introduced) input from the adjacent riparian zone. The fact that alkalinity was higher than hardness indicates that some of the carbonates and bicarbonates are probably sodium and potassium compounds in addition to the usual calcium and magnesium.

5.2.5.3.1.5. Laiche, in 1980, reported 37 species of fish in the Comite River and its tributaries. The clear chub and the longear sunfish were found at all of the sampling stations in the Laiche study. The majority of collected were cyprinids. The blacktail shiner was the most frequently encountered species. This species was also collected in all samples taken in the September 1985 reconnaissance. The greatest number of species in Laiche sampling was in the Centrarchid family, the longear sunfish being the most abundant centrarchid. Species found in the September 1985 sampling not reported in the Laiche study were the readear sunfish and the largemouth bass. It is likely that several other species are present in the Comite that were not found in either survey. As noted by Laiche, the minnow seine affords only a limited sampling capability. Fish that inhabit deep pools, such as channel catfish, would be difficult to capture with the seine. Channel catfish are known to be included in the catch of bank fishermen using the river. The spotted bass is the primary predator fish of the Comite and, from a fishery standpoint, the river could be considered a bass/longear stream. See Table 4 in the USFWS Coordination Act Report (Appendix B, Section 9) for a listing of fish as found in the Comite River and their preferred habitats. Sampling by Lambou in 1959 showed the Comite to possess a total standing crop of fish of 98 pounds per acre.

5.2.5.3.1.6. In addition to the Comite River, the Amite River would also be impacted by flood control work. The Amite River is the largest of the rivers that drain the Florida Parishes of Louisiana into the Lake Maurepas and Lake Pontchartrain system. Its headwater originates in Lincoln and Franklin counties, Mississippi. In the northern part of the Amite River Basin, the Amite River and its tributaries are relatively swift, clear, shallow streams that flow over mostly sand and gravel bottoms.

5.2.5.3.1.7. South of the Scenic Stream segment the Amite River and vast areas of adjacent riparin habitat have been greatly altered by sand and gravel dredging operations. Much of the streambank cover has been eliminated, resulting in increased turbidity and silting of the stream

bottom. At Denham Springs, the average elevation of the Amite River during non-flood conditions is only about +9 feet NGVD; therefore, downstream from that point, the Amite is a relatively sluggish stream. Adjacent to Port Vincent, the average elevation of the Amite during non-flood conditions is only about 1 foot NGVD. From that point to its mouth at Lake Maurepas, turbidity in the Amite is somewhat reduced.

5.2.5.3.1.8. The most comprehensive study of the Amite River dealing with factors affecting fish populations was done by Lantz (1970). This study included annual fish collections, monthly measurements of chemical and physical parameters, and quarterly benthos samples at five stations in the Amite. While Lantz made no attempt to catalogue the fishes of the Amite, Laiche (1980) inventoried the fish and determined the distribution of the fishes collected. Table 5, Appendix B, Section 9 contains a list of the fishes found in the lower Amite and their preferred habitats. Another survey conducted in the general project area involved an examination of ecological factors affecting anadromous fishes in Lake Pontchartrain and its tributaries (Davis et al. 1970). This study included fish collections at the mouth of the Amite River and in the lower portions of other tributaries to Lake Pontchartrain.

5.2.5.3.1.9. Lantz (1970) found the Amite River to be a relatively infertile stream with a standing crop of fishes ranging from 19 to 48 pounds per acre and a mean 3-year value of only 39 pounds per acre. However, an average of 54 percent of the standing crop was made up of available-size game and food fish, and only 46 percent was made up of under-sized predator fish and forage fish. The Amite watershed has moderately soft water with low alkalinity. The shifting sand bottom and occasional high turbidity probably contribute to the low productivity and low species diversity of bottom fauna found by Lantz. According to the U.S. Geological Survey (1981), sodium and potassium are present within the Amite River at higher levels than calcium and magnesium. Predominance of sodium and potassium is also an indication of reduced productivity (Jenkins 1967). U.S. Geological Survey data also showed that total

dissolved solids in the Amite River are about 46 milligrams per liter, which is only about 38 percent of the concentration generally considered necessary for optimum fish production. Laiche (1980) collected 82 fish species representing 18 families and 40 genera in the Amite River. He also obtained literature records for an additional 10 species, bringing the total for the drainage area to 92 species.

5.2.5.3.1.10. The Amite River below the confluence with the Comite is noted for the heaviest fishing pressure. From about five miles upstream from Port Vincent to the mouth of the Amite River at Lake Maurepas, there are many fishing camps and weekend homes along the Amite River. Lantz (1970) found that the lower section of the Amite had the largest number of benthic fauna, with about 76 percent of the total population consisting of tubificid worms. The lower stream segment supports sport fishing for white crappie, black crappie, largemouth bass, bluegill, redear, warmouth, channel catfish, blue catfish and bowfin. This section of the Amite River also supports a good commercial fishery for such species as blue catfish, channel catfish, flathead catfish, freshwater drum, and smallmouth buffalo.

5.2.5.3.1.11. In addition to the Comite and Amite Rivers, there are numerous tributaries of the rivers that could be impacted by a flood control project. Most of the tributaries of the Comite River below the point of Zachary, Louisiana, are affected to varying degrees by urban and/or agricultural runoff. Massive mollusk die-offs resulting from pesticide spraying have occurred in White Bayou. Cypress Bayou is hypereutrophic as a result of excessive nutrient loading but does provide some fish habitat where it approaches the Comite. Blackwater Bayou drains a sparsely populated residential area. Beaver Bayou, which drains into the lower Comite, was channelized in the past; however, it has recovered significantly from the effects of dredging and now offers fair fish habitat. Major tributaries of the Amite below the confluence of the Comite and Amite include Jones Creek, Clay Cut Bayou, Bayou Manchac, and Grays Creek. Most of the tributaries in this area carry runoff from urban Baton Rouge and have little fishery value. The lower end of Grays Creek is

characterized by a sand and gravel bottom, riffles, and other fishery enhancing features. Grays Creek, however, is used as a conveyance for sewage runoff from Denham Springs.

5.2.5.3.1.12. Five bayous that could be impacted by the diversion project drain into the Mississippi River. They are Bayou Baton Rouge, White Bayou, Cypress Bayou, Lilly Bayou, and Cooper Bayou. The first three bayous have fairly extensive watersheds on the prairie terrace, with that of White Bayou being the most extensive. All three receive heavy inputs of agricultural runoff. The entire White Bayou watershed once emptied into the Comite, but now most of its waters flow to Cypress Bayou via South Canal. Cypress Bayou then joins Bayou Baton Rouge which empties into the Mississippi River north of Baton Rouge. Bayou Baton Rouge runs adjacent to a hazardous waste site before it empties into the Mississippi. Lilly Bayou is very small, only 5 to 10 feet wide in some parts and is intermittent in its upper length. Although it is too small to provide an extensive fishery within itself, it does provide quality habitat for many contributing aquatic organisms. Cooper Bayou is within the floodplain of the Mississippi for much of its length. It would be characterized by fish found in Mississippi River backwater areas.

5.2.5.3.2. Effects of No Action. The ecological features of aquatic resources are related to use of the upstream and adjacent lands and to the physical features, including water quality, of the overall aquatic system. Current land-use practices of periodic timber harvests or isolated cutting adjacent to both rivers would cause continuation of topsoil eroding into the rivers, which results in a loss to feeding and spawning habitat quality. Ongoing sand and gravel mining activities on the upper Amite would result in continuation of the detrimental effects, especially turbidity, to aquatic species. However, the adverse impacts of mining are expected to be reduced in the future as more stringent environmental regulations are imposed. A more stable channel configuration that a natural channel commonly seeks would eventually result in less eroded material being introduced into the rivers. Any reduction of eroded material would produce overall positive effects on fish feeding and spawning areas. The projected improvement of water quality resulting from actions of the City of Baton Rouge would ultimately increase the dissolved

oxygen content of the water and would result in an improvement of habitat for most river fish species. The continued introduction of fallen trees from adjacent banks would provide the diversity of the present system. The continued input of leaves, twigs, and branches from trees on adjacent banks and from out-of-bank flooding of wooded wetlands would provide a constant supply of the primary source of organic material which provides the energy for the system. Overall, the ecological features of the aquatic system would remain similar to existing conditions because of the continued current land use practices, but would be improved due to the projected improvement in water quality.

5.2.5.3.3. Effects of Plan 1B.

5.2.5.3.3.1. Implementation of this alternative would involve placing a structure in the Comite River, intersecting three smaller tributary bayous, and routing flows to a tributary of the Mississippi. Adverse impacts on aquatic habitat would occur, but not to the extent of channel enlargement. The stage control structure placed in the river would cause the loss of approximately one acre of river bottom. Although four 2.5 feet by 5.5 feet concrete box culverts would be placed in the structure to allow for the downstream movement of water, flows would tend to be uniformly regulated. During certain high river stages, only a regulated amount of water would be able to pass through the structure, thus depriving downstream areas of out-of-bank or even full bank-to-bank flooding. (This would not be the case during times when river stages approached the 5-year frequency flood event and the weir of the stage control structure itself would be overtopped.) This could limit habitat or the input from detrital sources that would normally be periodically available to aquatic organisms. (see Paragraphs 5.2.5.3.3.6. and 5.2.5.3.3.7.). The structure would provide little restriction to the movement of highly-mobile aquatic species but would to less-mobile species. Average daily flows of 391 cfs would have a velocity of approximately 7.1 feet per second (fps) through the low-flow culverts. The maximum projected velocities of 21.0 fps would occur as headwater stages approach the crest of the weir (77.2 feet NGVD) on the structure. These velocities would provide considerable restriction to upstream fish movement. Less-mobile species may receive considerable

impingement while being transported through the low-flow culverts when flows are in excess of the average daily flows. Upstream of the structure, water would be impounded during flood events. The increase from existing conditions in river stages immediately upstream of the stage control structure of approximately 1.6 feet for the 10-year frequency storm, 2.4 for the 25-year, 3.0 for the 50-year, and 3.2 for the 100-year would result in some additional out-of-bank flooding within the area confined by the containment levees during these events (see Plate 24). The out-of-bank flooding would result in an increased input of organic matter to the aquatic system which would be a positive effect. Some of this material would go to the diversion channel and some to the Comite River. However, stage durations associated with those increases are negligible (approximately one to two days) when considering the possibilities of increased spawning areas within this area. Those increases would make it unlikely that species composition would change.

5.2.5.3.3.2. In making its way to the Mississippi River, the diversion channel would intersect White Bayou, Cypress Bayou, and Bayou Baton Rouge. All bayous, at the point of intersection would be diverted, via the diversion channel, to the Mississippi River. Flows from Cypress Bayou and Bayou Baton Rouge presently enter the Mississippi, as do most of the flows of upper White Bayou via the South Canal and Baker Canal (above the proposed diversion channel). Thus, the Comite would be deprived of a portion of the flood flows of White Bayou that presently go to the Comite. However, this is typically of poor quality due to agricultural, petroleum extraction, and urban runoff. Water diverted to the Mississippi River from the intersected bayous would be of low quality but would have minimal impact on the river where it would be quickly diluted and, at times, not significantly different from the receiving waters.

5.2.5.3.3.3. The obstruction of flows created by the diversion channel embankment to White and Cypress Bayous and Bayou Baton Rouge would cause a loss in biological productivity to all downstream segments of these watercourses. Since source waters would be removed, a complete barrier to the upstream movement of aquatic organisms would result. The bayous would become intermittent in these areas throughout a portion of the year and would result in adverse habitat quality impacts. These impacts should not

be significant in Cypress Bayou and Bayou Baton Rouge since their watersheds above the diversion channel are not extensive. It is quite likely that these two bayous are intermittent now during dry seasons. Impacts to the distributaries of White Bayou would vary since a previous flood control project has resulted in radical changes to distribution of flows to this waterway. Since normal flows of White Bayou are now diverted to South Canal and then to Baker Canal, the loss of these flows would be of little ecological consequence to these man-made channels. The loss of the infrequent flood flows that reach Lower White Bayou would be of minor significance. Those flood stages that result in the weir on the south side of the South Canal being overtopped and causing flows to move into Lower White Bayou would quite likely never occur again. However, the overtopping of this weir is an infrequent event, since the major purpose of the two canals is to move flood flows.

5.2.5.3.3.4. To alleviate the impacts described previously, low-flow augmentation has been added to project design at White Bayou, Cypress Bayou, and Bayou Baton Rouge. The five cubic-feet-per-second augmentation to each of these streams at times of low flows (based upon downstream stage indicators) would prevent those impacts that could occur.

5.2.5.3.3.5. West of Highway 61, the channel incorporates Lilly Bayou within its route to the river and, as the diversion channel drops out of the terrace into the alluvial floodplain, it incorporates Cooper Bayou. The severe initial erosion that the upper reach of Lilly Bayou would receive (see Paragraph 5.2.5.2.1.3) as flows pass from the counter weir downstream of the stage control structure would completely change the nature of this small stream. Velocities during flood events would be so excessive that only the most motile species could negotiate the current. However, at all other times only the seepage-type flows from springs that presently occur in the upper limits of this watershed would feed the stream. The small stream community that would colonize the stream after the initial scouring would be significantly dispersed with each flood event, but recolonization would begin immediately afterwards. The lower reach of Lilly Bayou and middle to lower reach of Cooper Bayou are described as sediment transport zones. The stream bed and stream edge

communities would be both covered to varying depths and subsequently uncovered by sediments as these eroded materials move through this zone.

5.2.5.3.3.6. The diversion channel is designed with a stage control structure at the outlet end with a crest of 56.7 feet NGVD. A low-flow outlet is included that would allow the passage of normal flows. An absence of shading, sinuosity, and shape or structural diversity, coupled with predominantly sluggish flows would result in very low quality fish habitat. However, some minor increase in biological productivity to downstream systems would be achieved by creation of a thin strip of wetlands at the edge of the channel. Planting trees on the south side of the channel would provide some shade on that edge. The planned maximum drawdown of three feet to supplement low flows to downstream portions of the three intercepted bayous would limit successful spawning locations but would have minimal effects on fish survival within the Diversion Channel.

5.2.5.3.3.7. The diversion channel is not expected to reduce annual out-of-bank flooding significantly. The stage duration for the vicinity of Clay Cut Bayou, where reductions would be greatest, indicated that spring 90-day, out-of-bank stages would be reduced by approximately three percent, which would be from 9 days to 6 days. Acknowledging that low-lying areas adjacent to the river may drain slowly, it may be assumed that these areas may be flooded twice the time out-of-bank stages are actually exceeded. However, no effects upon fish spawning can be projected from this minor duration of flooding regardless of the acreage from which reductions occur. Losses of detrital exchange and organic matter input to the receiving waters that affect productivity would occur if these reductions were not to be mitigated.

5.2.5.3.3.8. The mitigative control structure feature off the Amite River would provide an area for maintenance of invertebrate production from this wooded wetland area, which should preserve the food sources for all higher species within the aquatic system. The mitigative feature of reforestation of cleared agricultural lands would result in a reduction of sheet erosion

and thus an improvement in water quality and an increase in organic material input to the receiving aquatic system.

5.2.5.3.4. Effects of Plan 2A.

5.2.5.3.4.1. Benthic and fish communities that occupy the river bottom and one side of 44 miles of the Comite and Amite Rivers would be severely impacted during project construction. The importance of the benthic macroinvertebrate community lies in its dual role in the aquatic ecosystem as part of the food web for fish and as a processor of organic material. The occurrence and abundance of species are determined by current velocity, water temperature, substrate composition, and water quality (Hynes, 1970). All of these factors would be negatively impacted because of the project.

5.2.5.3.4.2. Obstructions (logs, snags, debris, sandbars) and variations (pools, riffles, overhanging banks) within the existing channel provide microhabitats essential for aquatic invertebrates and the fish that feed upon them. Widening and deepening the Comite River would result in a homogenous channel exhibiting uniform bank slopes, water depth, and substrate composition with no instream cover. All variation in bottom depth and side slopes could be eliminated. Only those organisms that can survive in sand deposits would recolonize and they would be periodically buried by shifting sands. Sand is generally less productive than other substrates because of its instability and lack of food and cover (Benson and Weithma, 1980). All of this would lead to a reduction in invertebrates and fish biomass and diversity.

5.2.5.3.4.3. The anticipated hydraulic tendency of the modified rivers to continually fill and possibly widen at the top of bank, if it occurs, would hinder the recovery of fish spawning and feeding areas following construction. Additionally, the continued movement of material as the rivers attempt to adapt to their modified channels would result in a continued effect on spawning areas. These effects would not be entirely limited to the enlarged channel segments only, but would also occur to a

limited extent to the segment of the Comite that is immediately adjacent to and upstream of the segment to be modified.

5.2.5.3.4.4. Increased temperatures caused by reduced depths at low-flow conditions and the elimination of shading vegetation along affected banks would be a severe impact. This further warming of temperatures at a time of year when threshold limits are already being approached for many aquatic organisms would cause a further reduction of aquatic habitat suitability for those species. If a low-flow channel develops as the stream adjusts to its new conditions, the severity of this impact would be reduced.

5.2.5.3.4.5. There are a number of subdivisions near the Comite River with sewage outfall pipes directly emptying into the river and into tributaries of the river. It is likely that the problems of excessive nutrient loading associated with low flows would be intensified with the reduced velocities, which would further degrade the value of the fishery. In addition to the possibility of excessive nutrient loading from undesirable sources, there would be a decrease in allochthonously derived organic matter from desirable sources. Removal of bankside vegetation as well as trees from the riparian zone, would eliminate the source of much of this material. Leaves that fall into the river and accumulate into leaf packs provide the very base of the food chain in many southern streams. Since the channel would be maintained approximately by clearing, snagging, and dredging, with deposition of materials into adjacent disposal areas once every 10 years, it is unlikely that mature trees would ever become reestablished. As a result, the input of leaves, as well as large organic matter which is supplied from adjacent forested areas, would be reduced. This would impact not only the area of channelization, but energy transport into downstream areas as well.

5.2.5.3.4.6. Clearing and snagging approximately 27.5 miles of the Amite River along with clearing the 25-foot right-of-way has impacts similar to the enlargement. All instream cover and bank vegetation would be eliminated. Turbidity levels would be increased due to removal of

sandbars, increased bank erosion, and the fact that the Amite would be receiving turbid water from the Comite. Disposal areas would be minimal when compared to the Comite River, since selected rather than continuous clearing of sand bars would be accomplished on the Comite. Water quality degradation from residential sewage would not be as much a problem as it would be in the Comite because the Amite would still be receiving waters from sources other than the nutrient-enriched and oxygen-depleted Comite.

5.2.5.3.4.7. Enlargement of the Comite River and clearing and snagging of the Amite River would have a minor impact on the frequency and duration of out-of-bank flooding. Out-of-bank flooding provides new spawning and nursery habitat for fish and adds to overall productivity of the aquatic ecosystem by joining the stream with new sources of detrital input. However, reduction in out-of-bank flooding would be minimal. One stage duration curve from the vicinity of Clay Cut Bayou indicated an annual out-of-bank stage of only nine days during the April through June spawning period for existing conditions. This out-of-bank flooding would be reduced to six days with the project in place. Analysis indicates that other areas along the rivers would have even less difference between pre-project and post-project out-of-bank flooding. The topography of the Comite River Basin and the cleared and snagged portion of the Amite does not lend itself to either long term or widespread out-of-bank flooding. As with Plan 1, impacts to fish spawning would be relatively insignificant as a result of the decrease in out-of-bank flooding. However, the loss of organic material input would result in a definite reduction of biological productivity in the downstream system.

5.2.5.3.4.8. Several studies have been conducted that documented changes in fish populations following channelization. Tarplee et al., 1971, found that channelization reduced game fish standing crop by 68 percent in North Carolina coastal plain streams. Bayless and Smith, 1965, found that total standing crop in eastern North Carolina streams was reduced from 121 to 14 pounds per acre following channelization. Congden, 1971, found an 83 percent reduction in total standing crop following channelization of the

Chariton River in Missouri. Based on these studies, it is reasonable to assume that a reduction in total standing crop of 40 percent of the impacted reach could occur in the Comite River following channelization (assuming an estimate of 80 percent multiplied by .5 because one side would be impacted). Based on Lambou's study showing 98 pounds per acre in the Comite, the population could be reduced to 39 pounds per acre following construction. Over the 16 miles of the Comite directly impacted by construction activities, this would amount to a reduction in total standing crop of 10,647 pounds.

5.2.5.3.4.9. Clearing and snagging of the Amite River should cause a reduction in total standing crop of fish within the 27.5 miles directly impacted. Although most of the deep water habitat of the river would not be immediately lost, removal of streamside vegetation and much of the in-stream cover would result in a significant loss to fish spawning and feeding areas. Based on conversations with state and Federal fish biologists, there is general concensus that a 25-percent reduction in total standing crop could occur (assuming an estimate of 50 percent multiplied by .5, because one side would be impacted). Based on the Lantz estimate of 38 pounds per acre for a 3-year mean over the 28 miles of aquatic habitat impacted, project caused reductions in standing crop would amount to 6,080 pounds. Based on the analysis performed, loss to total standing crop because of the total channelization modification project to both rivers would amount to 16,727 pounds.

5.2.5.3.4.10. Annual channel maintenance consisting of herbicide spraying of any vegetation within the confines of the channel would continually prevent the establishment of shading and sheltering vegetation at channel edges. Channel maintenance consisting of excavation of obstructing sediments within the channel bed is projected to be accomplished approximately once every ten years. In addition to the immediate effects of excavation as already described for the initial channel modifications, fish feeding and spawning in all downstream reaches of both rivers would be severely impacted during maintenance operations. Additionally, any

siltation due to erosion of the channel banks and spoil disposal areas following stream maintenance operations would also hinder the recovery of fish spawning and feeding areas.

5.2.5.3.4.11. Mitigation features would result in beneficial effects to this resource. As stated previously, operation of the control structure feature off the Amite would provide positive effects due to an increase in invertebrate populations. The buffer strip acquisition feature of 28.3 miles on the Comite and 9.2 miles on the Amite is an in-kind measure that would replace the losses of primary productivity due to the lost riparian vegetation, which affects the entire aquatic system. The strips also would create shading, reduce temperatures, and help in bank stabilization, thereby improving spawning area quality, and through the input of fallen material, provide feeding areas, loafing areas, refuges, and general diversity of habitat. The addition of the backwater area off the Comite would result in the creation of available spawning, nursery, and foraging habitat for several species. This measure would not be in-kind because it would not replace the loss of productivity as would the buffer strip. It would, however, result in the full replacement of losses of total standing crop. Adverse impacts associated with the backwater areas would consist of maintenance activities necessary for removal of accumulated sediment at the mouth of the channel. This would be performed approximately once every five years and would result in the destruction of all benthic organisms at the maintenance site and a temporary increase in turbidity at and downstream of the site. The benthic population affected would recover in approximately one year. Acquisition and reforestation of cleared land, wherever located, would retard sheet erosion and ultimately reduce sedimentation and would increase organic material input, thereby increasing productivity into any downstream waters.

5.2.5.3.5. Effects of Plan 2B.

5.2.5.3.5.1. The implementation of this alternative results in impacts that qualitatively are essentially identical to Plan 2A. However, the

extent of those impacts are significantly different due to the elimination of four miles of construction impacts. Total standing crop reduction from without-project condition would be 14,075 pounds (7,995 pounds on the Comite and 6,080 pounds on the Amite).

5.2.5.3.5.2. Aquatic mitigation measures incorporated into this alternative that affect these resources are designed to accomplish one of two needs. The 300-foot buffer strips are designed to protect segments of the Comite and Amite Rivers that are not affected by the flood control features of this alternative. The buffer strips of 17.2 miles on the Comite and 9.2 miles on the Amite would provide all the same effects or benefits as described for this feature in Plan 2A, but to a less extensive area. They would insure preservation of a source of organic matter for the stream that is essential for the productivity of a lotic system such as this. The remaining mitigation measure of acquisition of cleared land with reforestation, wherever accomplished, would also benefit any downstream aquatic resources through increases of organic material input and improvement of water quality by sediment retention. The acquisition of the 300-acre tract off the Amite with construction of a water control structure would minimally affect aquatic resources. An increase in invertebrate production would be achieved with this measure. The buffer strip would result in an increase in organic material input to both rivers.

5.2.6. Mineral Resources

5.2.6.1. Significance. Mineral resources within the proposed project area consist of hydrocarbon fields and sand and gravel deposits. Three hydrocarbon fields are located near the potentially affected portions of the project area. These are the Alsen Oil Field located approximately 2-3 miles southwest of Zachary, the Irene Oil Field approximately 6 miles east of Baker and 2-3 miles east of the Comite River, and the oil field near Melton Lake located approximately 5 miles northwest of Port Vincent. Sand and gravel deposits are found along the Comite and Amite Rivers in the vicinity of the project. Along the Comite River sand deposits, with

minimal amounts of gravel, predominate in the Holocene alluvium. These deposits occur from upstream of the north end of the project to the junction of the Comite and Amite Rivers. Sand and gravel deposits occur in the Holocene alluvium along the Amite River above Denham Springs; however, below Denham Springs the deposits are predominantly sand in nature. The Pleistocene terraces adjacent to the Comite River and Amite River floodplains in the project area are not known to contain any sand or gravel deposits of commercial value.

5.2.6.2. Effects of No Action. Future conditions with no Federal action relative to flood control activities in the project area would result in no change to these resources other than an expected decline in reserves as extractions continue.

5.2.6.3. Effects of Plan 1B. The implementation of this plan would have little or no impact on any hydrocarbon field and little impact on sand and gravel deposits. All the hydrocarbon fields are too deep to be affected. However, some impact may occur on surface facilities, operations, and pipelines associated with hydrocarbon production, depending upon final alignment. Sand and gravel deposits do not occur in the Pleistocene terrace deposits through which the diversion channel would be excavated. The spillway and guide levees near the Comite River would have some impact on sand and gravel resources since the site of the spillway is located in a sand borrow area that has been active in the early to mid-1980's.

5.2.6.4. Effects of Plan 2A. Implementation of this plan would have little impact on any hydrocarbon field and some impacts on sand and gravel deposits. Hydrocarbon fields are too deep to be affected. However, some impact may occur on surface operations, facilities, and pipelines, depending upon final alignment. Sand and gravel deposits are economical above Denham Springs and are being developed; however, these deposits are outside the affected area limits. Along the Amite River below Denham Springs and along the Comite River throughout the study area, sand deposits occur in the Holocene alluvium but they are not presently being extensively developed.

5.2.6.5. Effects of Plan 2B. Implementation of this plan would have essentially the same affects as implementation of Plan 2A, except these impacts, should any occur, would be less severe because of the overall shorter construction length.

5.2.7. Groundwater Resources

5.2.7.1. Significance. Groundwater resources within the project area consist of shallow freshwater aquifers. These freshwater aquifers extend to a maximum depth of approximately 3,000 feet below mean sea level in the northern portion of the project and to a depth of approximately 600 feet below mean sea level at the extreme southern limit of the project. Below these freshwater sands, brackish and salt water sands occur. At least ten freshwater sands exist from the Denham Springs vicinity towards the northern limits of the project. These include: the 400-foot sand, the 600-foot sand, the 800-foot sand, the 1,000-foot sand, the 1,200-foot sand, the 1,500-foot sand, the 1,700-foot sand, the 2,000-foot sand, and the 2,800-foot sand. Below the vicinity of Denham Springs, the occurrence of brackish and saltwater increases in elevation from approximately 2,500 feet below mean sea level to approximately 500 feet below mean sea level near the southern limit of the project. This increase in elevation of brackish and saltwater reduces the number of freshwater sands below Denham Springs to approximately two, the 400-foot and 600-foot sands. In addition to the shallow subsurface freshwater sand aquifers, a shallow less extensive freshwater aquifer exists along the Comite and the Amite Rivers in the Holocene alluvium.

5.2.7.2. Effects of No Action. Future condition regarding this resource with no Federal action relative to flood control activities would result in no predicted changes within the study area.

5.2.7.3. Effects of Plan 1B. The implementation of this plan would have little or no impact on the important groundwater resources of the area. All subsurface freshwater aquifers are too deep to be influenced by the

project. Only the shallow aquifer associated with the Holocene alluvium along the Comite River and the Amite River would be affected; however, the exact details of this impact are difficult to anticipate at the present due to lack of data. Although the diversion canal would not penetrate any important aquifers as the project crosses the Pleistocene terraces, excavations would lower the available pore water in the Pleistocene silts and clays immediately adjacent to the canal and may minimally reduce the growth rate of vegetation due to successional changes resulting from pore water changes in these areas. Recharge into any shallow aquifer would be minimal due to the low permeabilities that exist in the Pleistocene silts and clays and the limited discharge through the diversion canal.

5.2.7.4. Effects of Plan 2A. Implementation of this plan would have little impact on the groundwater resources. The deeper subsurface aquifers would not be penetrated by the project. Only the shallow surface aquifer associated with the Holocene alluvium along the Comite and Amite Rivers could be measurably affected. However, the exact details of this impact can only be determined with additional data.

5.2.7.5. Effects of Plan 2B. Implementation of this plan would, as with Plan 2A, have little impact on groundwater resources. Impacts to the shallow surface aquifer associated with the Holocene alluvium along the Comite and Amite River would be similarly affected but to a lesser extent because of the reduced linear extent of the construction.

5.2.8. National Register Properties

5.2.8.1. Significance. There are 20 National Register of Historic Places properties within the economically benefitted area of the project, which includes portions of East Baton Rouge, Ascension and Livingston Parishes. These are listed and identified in Appendix B. The majority of these occur in East Baton Rouge Parish (N=18). The remaining two are located in Ascension Parish. Fourteen of the total are nineteenth century domestic structures or complexes of structures (i.e., Magnolia Mound Plantation House and several of its outbuildings). Zachary Railroad Depot and

Louisiana State University fall under the category of public buildings. The remaining properties are archeological sites that are evenly divided between prehistoric (16EBR6, 16EBR51) and historic (16AN39, 16EBR35) components. Site 16EBR6 (Louisiana State University Campus Mounds) is located within the boundaries of a listed property, Louisiana State University. Sites 16AN39 (Galveztown) and 16EBR35 (Woodstock Plantation) were recommended to the State Historic Preservation Officer as significant sites potentially eligible to be listed on the National Register of Historic Places, a status which affords them equivalent protection under preservation law.

5.2.8.2. Effects of No Action. Of the 20 properties under discussion, only sites 16EBR35, 16EBR51 and 16AN39 appear to be in potential jeopardy. Unlike the architectural properties on the list, which are highly visible and whose National Register listing was sought, for the most part, by their owners as a desirable status, these three archeological sites could be affected at any time by development, pipeline or road construction. All three sites are presently outside principal urban development corridors, but have been recorded because of their proximity to proposed construction easements. Site 16AN39 has already been impacted by highway construction. Further impacts could occur independently of the project.

5.2.8.3. Effects of Plan 1B. There are two National Register architectural properties in proximity to the diversion corridor. The closest is Fairhaven Plantation House, located at 18630 Samuel Road, approximately 0.45 mile north of the diversion right-of-way. It is outside the project easement. The house and its immediate setting will not be affected by construction because access to the property is by private road off LA Highway 61. The project is sufficiently distanced from the structure to avoid visual, air quality, noise or esthetic impact. The second property is the Zachary Railroad Depot, located at 4434 W. Central Avenue in Zachary. It is 1.75 miles north of the diversion corridor, well outside the project impact zone.

5.2.8.4. Effects of Plan 2A. Two National Register architectural properties and one eligible site have been identified in the vicinity of this alternative. The first is Audubon Plantation House, located at 21371 Hoo Shoo Too Road in Baton Rouge Parish. The structure is just west and outside the project impact zone. The second architectural property is the Kraemer House, situated off US 61 near Prairieville, in Ascension Parish. The house is five miles southwest of the Amite channel. It is on the edge of the economically benefitted area and would not be affected by the project.

Galveztown (16AN39), a Spanish Colonial militia post, is located on the south bank of the Amite River and is within the project easement. Current project design would avoid the Galveston. Clearing and snagging is proposed for the opposite, north bank of the Amite channel. The final design should take the location of the site into account and avoid it.

5.2.8.5. Effects of Plan 2B. Same as for Plan 2A.

5.2.9. Cultural Resources

5.2.9.1. Significance. There are 32 recorded archeological sites within the economically benefitted area of the project. These are distributed unevenly over East Baton Rouge (N=19), Ascension (N=4), and Livingston Parishes (N=9). They range in age and function from Paleo-Indian Period lithic scatters and Archaic Period mound sites to nineteenth century plantations, farmsteads, shipwrecks, landings, and sawmills. In addition to recorded sites are the many potential sites (i.e., historic houses, early roads, and Civil War campsites) which may eventually receive formal site designation from the State of Louisiana. Examples of potential sites are discussed under each project alternative.

The majority of sites in the project area have been recorded since 1976, with the advent of Federal compliance surveys. Current knowledge of prehistoric settlement history is based on implications from the few known

sites and inference from settlement pattern similarities across Pleistocene terraces north and east of the study area. Understanding of historic settlement pattern is supported by a wealth of colonial documents and maps, augmented recently by historic site investigation at 16EBR65 (the Kleinpeter-Knox Site). In general, surveys that followed cross-country alignments yielded negative results except where the alignment correlated with a road and where historic structures were recorded. Survey alignments that followed natural drainages usually located prehistoric and historic sites. To date, surveys have not focused upon defining or testing correlations of site placement with environmental features. Also yet to be studied are geomorphic conditions affecting site preservation and degradation, such as alluviation, channel movement, erosion and subsidence. Extant surveys cover less than 1 percent of the economically benefitted area. Of the 32 known sites only two have been tested to determine their eligibility to the National Register of Historic Places. The State of Louisiana's inventory of standing structures in Ascension Parish is complete. Downtown Baton Rouge has been the focus of the East Baton Rouge Parish inventory. There has been no survey of Livingston Parish structures to date.

There are 10 recorded shipwrecks in the study area. Six vessels went down in the vicinity of Profit Island, one burned in Bayou Manchac, and three were lost in the Amite River. One prehistoric vessel, the Fluker's Bluff Canoe, was found just north of the economically benefitted area in the bank line of the Amite River. Its location amplifies the need to develop a survey strategy in the basin that would routinely gather subsurface stratigraphic data. The Amite River was a major commercial waterway, from its mouth at Lake Maurepas to 100 miles above its Head of Navigation, from the eighteenth through early twentieth centuries. Bayou Manchac was seasonally navigable to smaller vessels throughout the eighteenth century until its closure at the Mississippi River in 1826. Navigability of the Comite River has not been established although the granting of lands to grow indigo for European markets as early as 1763, when there were few overland roads, suggests that the Comite may have been navigable by raft or

small boat. The State of Louisiana completed magnetometer survey of approximately 20.3 miles of the Amite River within the economically benefitted area. Over 56 anomalies were recorded, with recommendations for future study. Some 8.3 miles of Bayou Manchac were subjected to exploratory magnetics, and 19 anomalies were located. The Comite has not been magnetically surveyed. Data patterns identified by these studies predict an additional 20 sensitive areas on the Amite River between miles 25.75 and 54.0, and 17 sensitive areas on the upper Amite adjacent to acreage identified for possible mitigation use. Although both the Comite and Amite Rivers have been modified (either cleared and snagged or dredged), these magnetic surveys demonstrate that there is a substantial number of underwater resources requiring additional investigation in these formally commercial waterways, and that prior channel modification, improvement or maintenance may damage and scatter underwater resources, but may not be destroy them entirely.

5.2.9.2. Effects of No Action. Six trends affect preservation of cultural resources in the study area. The first is urbanization encroaching on the central basin from its western and southern edges. The region's annual flooding pattern has limited twentieth century settlement choices. As a consequence, construction has been roughly contained within corridors along major highways, inadvertently protecting riverine oriented prehistoric sites and early homesteads from rezoning and large scale clearing usually associated with construction of tract housing or light industry. This trend is slowly changing as developmental corridors widen. Clearing removes sites that are close to the surface, then exposes remaining deposits to horizontal erosion from increased localized run-off. Riverine sites are directly impacted by development of recreational camps along the Amite River. Camp building, a second trend, localizes construction impact without areal clearing. Campsite selection echoes prehistoric and eighteenth century site selection, disturbing and adding a modern component to sites on the natural levee. Vandalism, a third trend, has been identified by the State Archeologist as prevalent near urban areas where obvious sites, such as mounds or those exposed by construction, are at

jeopardy because of their accessibility. A fourth trend, also associated with development and land use change, is insensitive alteration or modification of historic structures that otherwise might be eligible to the National Register of Historic Places. Fifth is agricultural cropping north and east of Baton Rouge, which disturbs subsurface deposits during clearing, plowing, and deep-tilling of the soil. The final trend is prolonged flooding, followed by either scouring or alluviation of sites adjacent to natural drainages. Scouring destroys site integrity by stages and is influenced by the elevational slope of sites, the speed of lateral run-off across site surfaces, and natural channel migration into site deposits. Horizontal scouring exposes sites to erosion and eventual stratigraphic deflation. Alluvial and colluvial deposition occurs on lesser slopes and has positive benefit. As a site loses its proximity to the surface it is less likely to be damaged by horizontal erosion, shallow plowing, surface grading and collection by avocational archeologists. All six of these trends are prevalent in the study area and can be expected to continue at present rates.

5.2.9.3. Effects of Plan 1B. The analysis of impact for this alternative is heavily dependent upon six surveys of gas transmission pipeline, microwave tower or Louisiana highway construction corridors that cross the proposed easement. None of the surveys located cultural resources. There are two previously recorded archeological sites (16EBR21 and 16EBR54) in proximity to the diversion corridor. Site 16EBR54 may be affected. There are additional potential sites in or near segments of the diversion alignment.

Site 16EBR54, the Narcille Drouin Mound, is a multicomponent site located immediately west and above the deeply cut channel of Bayou Baton Rouge, approximately 500 feet south of the embankment which would parallel the diversion channel. The site appears to be significant and includes a mound, a large surface scatter of prehistoric lithics and historic artifacts, and the pre-Civil War Woodley Homestead complex (house, smokehouse, and barn). It is recommended that the site be located with

reference to the final easement, its significance assessed, and the complex protected from direct construction impact, heavy equipment movement during levee construction and future maintenance, and from indirect impact such as erosion. Project-induced erosion could be avoided by excavating a drainage ditch parallel to the toe of the diversion embankment to capture runoff from the levee itself. Uncontrolled lateral surface erosion would destroy the non-structural components of 16EBR54.

Site 16EBR21, Tucker Mound, is located on the east bank of the Comite above Saunders Bayou, 0.7 miles south of the diversion stage control structure. There would be no construction impact to the site.

Potential sites within the alternative alignment include Camp Misery, the encampment of the 25th Connecticut Regiment on March 16, 1863, prior to the Union siege of Port Hudson. The exact location of Camp Misery is not known but should be researched during assessment of the final design. The outlet of the diversion through Lilly Bayou to Cooper Bayou and Profit Island Chute may affect additional Civil War period sites. Cooper Bayou was picketed by both Confederate and Union troops. Remains of these encampments should be anticipated. Their floodplain location suggests that they may be buried under several feet of alluvium. During diversions increased scouring and enlargement of Cooper Bayou is expected to expose and erode sites in the bank line. Profit Island Chute was a navigation channel in the nineteenth century and the site of Springfield Landing, just downstream from Cooper Bayou's outlet into the chute. The landing was the central supply depot of General Nathaniel Banks' army during the siege of Port Hudson. The Confederates burned the depot, with its stores of supplies and ammunition, in a surprise raid in 1863. The site was found in the chute bank line in 1983, under several feet of alluvium by an amateur, but was neither tested nor recorded with the State Archeologist's office. Monitoring since then has documented annual scouring during high water on the Mississippi River and loss of an unknown portion of the site. A literature search of shipwrecks associated with Profit Island yielded the names of six vessels that foundered between 1837 and 1899. The exact

locations of these wrecks are not known. The pre-1858 chute channel associated with these vessels is filled. Wreck remains sealed in point bar deposits are possible. The chute is cutting eastward into its former channel, increasing the possibility that scouring may expose nineteenth century remains.

Mitigation planned for this alternative includes land acquisition and construction of a water control structure off the Amite River. There are insufficient archeological data from the vicinity to preclude forecasting the presence of sites in the area to be flooded behind the control structure.

Additional impacts of this alternative include removal of 30 structures and relocation of 11 bridges, all of which would require assessment. Archeological survey would be required of the permanent project construction and mitigation lands, all permanent and temporary easements, the acreage to be flooded between the guide levees, the confluences of Cypress, White and Baton Rouge Bayous with the diversion channel, the banks of Lilly and Cooper Bayous, and the confluence of Cooper Bayou and Profit Island Chute. A plan for additional investigation of this alternative appears in Appendix B, Section F.

5.2.9.4. Effects of Plan 2A. Neither the Comite nor Amite River bank lines have been surveyed for cultural resources. Survey data from other bayous in the study area indicate that continuous settlement can be expected along these channels, dating from 6000 BC. There are no recorded archeological sites along the Comite River within the channel modification segment of this alternative. Literature search did locate two potential sites. These are Camp Breckinridge, an 1862 Confederate campsite on the Comite at the Baton Rouge-Greenwell Springs Road crossing, and a second Confederate camp located at the confluence of the Comite, Amite, and Sandy Creek. This particular confluence was frequently used by the troops garrisoned at Baton Rouge (circa 1820s to 1850s) as a summer bivouac to avoid yellow fever and other epidemics common in the city. There are nine

recorded archeological sites adjacent to the Amite River channel below Mile 54.0, three of which may be impacted by clearing and snagging. Survey of 20.3 miles of the Amite River channel located over 56 underwater anomalies that may represent remains of a wide variety of commercial vessel types. An active navigation channel from its discovery in the late 1600s through the early 1920s, the Amite attracted plantation settlement and development of numerous landings, fords, ferry crossings, and weirs. Colyell Bay and the communities of Port Vincent and Denham Springs were important points of commercial exchange. These resources are discussed in more detail in Appendix B, Section 7.

The small number of recorded sites fails to convey the full impact of this alternative. It is potentially the most destructive to cultural resources of any of the alternatives studied. Assuming that the Comite was at one time navigable by small vessels, the shaping of the channel bottom would remove or scatter any vessel remains. Buried terrestrial sites located in the bank face would be removed during bank slope shaping and excavation of a 10-foot-wide berm into the upper bank line. Sites within 500 feet of the new top of bank have a high probability of being buried under dredged material. Stacking on alternating banks would save some sites from burial but not from removal by channel modification. Clearing and snagging along the Amite would require some clearing of bank line vegetation by bulldozer to facilitate dragline movement and to create burning areas for trees and channel debris. Vegetation removal typically destroys surface sites and shallowly buried sites within 3 feet of the ground surface. Project impact includes relocation of four bridges and four pipelines. The bridges will require assessment, as will the perpetual channel right of way, disposal easements and temporary construction easements. Impact to campsites along the Amite, some of which have been in place since the last century, should be considered. Of particular note are the Horseshoe Bend and Sportsman Lake vicinities.

The known sites adjacent to the Amite channel are 16EBR2, 16EBR16, 16EBR27, 16EBR68, 16LV3, 16LV26, 16LV27, 16LV39 and 16LV78. Of these, sites

16EBR16, 16EBR27 and 16LV78 are located close to bank line reaches currently selected for clearing and snagging. Site 16EBR16 (Redman Lake Site) is a prehistoric lithic surface scatter and possible campsite. Site 16EBR27 (Addison Site) is a multicomponent prehistoric site which was exposed during construction of I-55. Site 16LV78 is the Port Vincent Ferry Landing, associated with a 1,000-foot-long magnetic anomaly in the channel that could represent vessel wreckage, modern trash, or magnetic disturbance from the LA Highway 42 bridge. None of these sites has been tested to determine its significance and present condition. Further investigation is required. Two important, potential sites are referenced in the literature. These are the British Amite Barracks and storehouse (circa 1763) on the east bank of the Amite below its confluence with Bayou Manchac, and Fort Graham (1779), a small British stockade thought to have been located in the same general vicinity. These need to be physically located with reference to clearing and snagging reaches.

The most ubiquitous resource class projected to fall within the alternative easement is vessel wreckage in the Amite River. Watercraft and, subsequently, magnetic anomalies cluster at former landings and in bends of the channel where they restrict flow. Clearing and snagging would concentrate on the bends where shipwrecks are most likely to be found. Recent magnetometer surveys conducted by the State of Louisiana concluded that prior channel modification of the Amite does not imply that wrecks have been removed or destroyed. Dredging damages and scatters whole vessels, disrupting their context, but seldom removes them in their entirety. Small boats, such as skiffs and bateaux, are most likely to be totally removed. Issues regarding watercraft are presented in Appendix B, Section F.

The natural reforestation proposed in mitigation of this alternative is not without impact. It is assumed that all sites along the Comite and Amite have been forested over at some time. When in direct contact, root systems disturb and distort subsurface features, foundations and middens, complicating archeological interpretation of soils. The moisture carried

downward by root systems contributes to the leaching of cultural deposits, making interpretation of early prehistoric living surfaces particularly difficult. Root casts are often mistaken for post molds in excavation. Treefalls, which occur naturally as timber ages, uproot in situ debris, then are filled in over time, creating distinctive feature-like signatures in which the stratigraphy of cultural lenses is redeposited out of sequence. The positive aspects of reforestation include protection from further clearing and erosion, and eventual obscuring of surface sites by vegetative cover. There are six recorded sites along the Comite channel (16EBR21, 16EBR53, 16EF6, 16EF11, 16EF36, and 16EF52) and 8 recorded sites along the Amite channel (16LV29, 16LV30, 16LV31, 16LV32, 16LV33, 16EBR14, 16SH4, and 16SH11). These are identified more fully in Appendix B.

Potential sites in mitigation reaches identified in the literature include six military camps, ranging in date from 1855 to 1878, and 17 landings, fords, and weirs on the Amite above Mile 54.0. The impact of excavation of a 15-acre artificial backwater channel at Saunders Bayou cannot be projected without specific survey data. While there are no recorded sites at the Saunders Bayou locale, 16EBR21 (Tucker Mound) is located just upstream in a similar setting. Its presence suggests the possibility of prehistoric sites being located adjacent to Saunders Bayou. The potential effects of land acquisition with construction of a control structure off the lower Amite are discussed under Plan 1B.

5.2.9.5. Effects of Plan 2B. The impacts of this alternative are the same as for Plan 2A, with the exception that a potential site, Camp Breckinridge, is located in a mitigation reach rather than in a construction reach. The effects of site reforestation are discussed under Plan 2A.

5 2.10. RECREATION RESOURCES

5.2.10.1. Significance

5.2.10.1.1. This heavily forested area of southeastern Louisiana supports a large year-round resource base that offers a variety of popular

recreational pursuits. The recreation study area is relatively rural with the exception of the Baton Rouge area. Existing recreational lands and facilities can be categorized into private, public, and commercial use types. Currently, existing within the nine parish recreational market area is one state wildlife management area, six state commemorative areas, and numerous tent and recreational vehicle campgrounds, along with boat launching facilities, picnic areas, hiking trails, hunting lands, scenic streams, and scenic roads. Recreational activities include hunting, boating, boat and bank fishing, water skiing, picnicking, jogging, bicycling, horseback riding, nature trail walking, sightseeing, and observing wildlife. Within the recreation study area are five scenic streams. Depending on the stream or segment of the stream, one may observe numerous canoes on a river in any summer weekend day. Some smaller streams are canoed less intensively; however, they are used to search the upper stretches for fishing and nature study sites.

5.2.10.1.2. The recreation inventory for this study was compiled from information obtained from the Louisiana Department of Culture, Recreation, and Tourism, Division of Outdoor Recreation, Office of State Parks, Louisiana State Comprehensive Outdoor Recreation Plan (SCORP), and field investigations. The inventory was compiled for all major recreational facilities and activities within the recreation market area. A summary of the facilities includes 71 boat launching ramps, numerous fishing piers, 1495 picnic tables, 972 recreational vehicle camping spaces, 220 tent camping spaces, and 10 hiking trails.

5.2.10.1.3. Of the many recreational activities within the area, the most significant are hunting and fishing. Recreational fishing is by far the most popular and heavily pursued activity in the study area. In the recreation market area, 65,400 resident sport fishing licenses were issued during the 1986-1987 season. Most of the fishing that occurs is by boat. Boat use is reflected in the number of motorboat registrations (40,000) issued in 1986 - 1987 within the nine parish area. Results of the 1983 (SCORP) Demand Survey indicate boat fishing as the second most preferred

activity of recreationists statewide. Hunting activities within the study area are as varied as fishing activities. Hunting for small game is the most prevalent activity and a wide range of species and habitat types are available. Big game hunting is generally relegated to the more productive habitats such as bottomland hardwood areas. For the 1986-87 hunting season, 49,000 resident hunting licenses were issued in the nine parish market area.

5.2.10.1.4. Overall, the primary users of the recreation resources in the study area are residents of southern Louisiana, and their primary recreational activity is hunting and fishing. The 1980 recreation survey conducted by the Louisiana Department of Culture, Recreation, and Tourism indicates that 81.7 percent of boat fishing activity occasions and 86.6 percent of small game hunting activity occasions occur within 45 miles of the participant's residence.

5.2.10.2. Effects of No Action In the future, the study area is expected to continue to experience a slow increase in rural population, while urban areas, such as Baton Rouge, will gain a more rapid population growth. Future expanded populations will require additional recreational facility development as well as expansion of existing facilities.

5.2.10.3. Effects of Plan 1B. Implementation of this alternative would adversely affect canoeists on the Comite River by creating the requirement to pull around the diversion structure. However, a portage path that is included in the plan to allow canoe transport around the structure would mitigate that impact. Recreational hunting currently occurring that would be lost by project implementation is estimated to be 282 man-days, valued at \$3,135 annually (see Table 5-7). This hunting is a combination of large and small game varieties. To compensate for habitat losses, a mitigation plan was formulated. The development of the mitigation tract adjacent to the diversion structure and diversion channel would provide an area for people to enjoy wildlife-oriented activities. No hunting would be allowed on this site if it is developed as a park. However, non-consumptive

TABLE 5-7
RECREATION ANALYSIS

Alternative	Activity	Unit ^{1/}	Construction Impact (losses) ^{2/}	Mitigation Impact (hunting) ^{2/3/}
Plan 1B	Hunting	User days	294	0
	Hunting	Value	\$3,219	\$0
Recreation Development ^{4/}	Non-Consumptive	User days	55,044	N/A
		Value	\$215,439	N/A
Plan 2A	Hunting	User days	868	1,184
		Value	\$9,593	\$7,238
	Fishing	User days	6,886	3,023
		Value	\$32,016	\$14,062
	Total	User days	7,754	4,207
Value		\$41,609	\$21,300	
Plan 2B	Hunting	User days	556	836
		Value	\$6,150	\$5,215
	Fishing	User days	5,632	1,026
		Value	\$26,189	\$4,776
	Total	User days	6,188	1,862
Value		\$32,339	\$12,014	

^{1/} User days are quantified by simple annualizing over the project life; dollar values are annual equivalents based upon present worth methods.

^{2/} When compared to the No Action alternative for the designated area.

^{3/} Mitigation for Plan 1B would compensate habitat losses only; hunting would most likely not be allowed on this area.

^{4/} Recreation development is a positive feature and would produce monetary gains instead of losses.

activities such as observation of wildlife, nature walking, and picnicking would be allowed. The mitigative water control structure off the Amite would preserve the existing recreational value of these wooded wetlands. Recreation features developed on five acres of project land would attract visitors from the Baker, Zachary, and Baton Rouge Area. It is anticipated that the park would receive 55,044 annual visitors, participating in activities such as biking, boating, fishing, picnicking, walking for pleasure, etc. Bank fishing areas would be created at the park site along the bike path and along the Diversion Channel at the new bridge crossings accessible to the public. The five-acre waterfront park would be selectively cleared of underbrush thereby preserving dominant trees and shrubs. Also, approximately 150 hardwood trees would be planted to increase park ambiance and provide much needed shade and esthetic appeal. Trees would also be planted along the bike path and the south side of the Diversion Channel to provide shade over the water and over the bike path. These trees would provide tall vertical features, enhancing the feeling of special enclosure in an otherwise long horizontal corridor of channel banks and bike trail.

5.2.10.4. Effects of Plan 2A This plan would adversely impact the hunting and fishing activity on project-affected lands and waters. Implementation of this plan would eliminate 868 man-days of hunting annually and 6,886 man-days of sport fishing annually, valued at \$9,593 and \$32,016 respectively. Total hunting and fishing impacts equal 7,754 man-days and \$41,609 dollars annually. The developed mitigation plan has the potential to accommodate 1,184 annual man-days of hunting and 3,023 annual man-days of fishing valued at \$7,238 and \$14,062 respectively. Total hunting and fishing gains with implementation of this mitigation plan equal \$4,207 man-days and \$21,300 dollars. Development of the mitigation plan would return approximately half the lost man-days and dollar value attributed to project imposed impacts on the hunting and fishing resource.

5.2.10.5. Effects of Plan 2B Implementation of this plan would eliminate 556 man-days of hunting annually and 5,632 man-days of sport fishing

annually, valued at \$6,150 and \$26,189 respectively. Total hunting and fishing impacts equal 6,188 man-days and \$32,339 dollars annually. The mitigation plan has the potential to accommodate 836 annual man-days of hunting and 1,026 annual man-days of fishing, valued at \$5,215 and \$4,776 respectively. Total hunting and fishing gains with implementation of this mitigation plan equal 1,862 man-days and \$9,991. The mitigation plan would return approximately one-third the lost man-days and dollar value attributed to project imposed impacts on the hunting and fishing resource.

5.2.11. ESTHETICS

5.2.11.1. Significance

5.2.11.1.1. The portions of the Amite and Comite classified as natural and scenic are free-flowing streams that have not been channelized, cleared, snagged, or otherwise altered. Below White Bayou on the Comite, the esthetics and overall landscape regime, with the exception of few cleared areas of shoreline vegetation, are similar to the portion of the river that has been classified as scenic.

5.2.11.1.2. Along the Amite and Comite Rivers, little contrast exists in the appearance of the water, which generally has a smooth laminar surface, joined by a rippling in places where the natural channel is constricted by snags, bridges, or sand bars. The rivers meander around many curves and bends where white sandbars develop on the inner banks. Limited straight portions of the natural channel exist between the numerous curves. The abundant sand bars found along the river's curved inner banks provide an interesting contrasting edge variety between the water and the beginning of bankline vegetation. These white sand bars are used to a great extent for relaxation by canoeists and fishermen.

5.2.11.1.3. Generally, the banks along the Comite River are 8 to 10 feet high. These banks, consisting of a silty light brown sandy soil, have a tendency to erode; however, vegetation, such as trees, vines, shrubs, and

grasses with their fibrous root systems, protect against erosion which, in turn, minimizes turbid water conditions. Views from the river toward the banks are partially masked by vegetation. Vegetation along the river corridor consists of both evergreen and deciduous trees; however, deciduous hardwoods such as willows and river birch are dominant. These trees will be without leaves throughout the winter months providing clearer, less restricted views toward the upper bankline and sky.

5.2.11.1.4. Vegetation along the river corridor generally consists of deciduous trees. Willows and river birch are the dominant trees adjacent to the water's edge. Both tree species overhang the water, providing shade and depth of views toward the shoreline. The river's bankline is not always visible due to the existence of heavy tree cover. The visual lower and upper boundry of foliage form the interface with the water and sky giving the viewer a feeling of enclosure and isolation from outside interferences.

5.2.11.1.5. Each element in the landscape is visually appealing (water, landform, and vegetation); however, when viewed together they form a composite scene of unique beauty. These three elements interact with each other in harmonious yet conflicting ways. Vegetation provides diversity along the bank, shadow patterns in the reflective water, perceived depth toward the bank, and enclosure within the river corridor. Filtered sunlight shining through the tree cover reaches the river with varied intensity, in places highlighting the upper bankline and providing interest to the varied textures of the tree foliage. Views from the water toward the top of the bank are screened by this variation and create mystery in the mind of the beholder. Reduced air temperatures caused by shading from the tree canopy and overhanging branches provide an inviting environment on hot summer days. The bankline forms the edge between the land and water. Views toward the light-colored soil on the vertical banks and numerous sand bars provide visual diversity.

5.2.11.1.6. When viewed overall, the Comite River, Amite River, and Lilly Bayou provide a setting of esthetic beauty having few man-made interferences or impacts to the bankline and environs.

5.2.11.2. Effects of No Action. Esthetic conditions existing along the Comite River corridor would continue in a natural state of scenic beauty. In the future, river banks will continue to slowly erode, causing tree roots in adjacent banks to become unstable. Undermined trees would eventually fall into the river and become snags. Any impacts experienced in the no action alternative would be a result of time and natural conditions.

5.2.11.3. Effects of Plan 1B. Construction of the diversion channel would have no significant impact on the overall esthetic environment within the Comite River. The diversion structure would be built within the river and would adversely impact esthetics in the vicinity of its location. Excavation of the diversion channel would alter the appearance of the landscape it traverses predominately by the placement of freshly mounded excavated material on each bank. Parts of the disposal areas and levee would be seeded to prevent erosion and would return some of the lost esthetic attributes. Although annual maintenance herbicide applications would keep the channel banks clear of woody vegetation, volunteering trees and shrubs outside of the channel proper would begin to line the banks. Reforestation of the 110 acres of the dredged material disposal area near road crossings would minimize some of the adverse esthetic impacts of project construction. Lilly Bayou, an area of heavy vegetation cover and significant topographic variation, would exhibit a significant decline in its intimate visual appeal. However, impacts resulting from the removal of bankline vegetation would be short-lived and in time native vegetation, as along the diversion channel, would begin to cover the denuded banklines. Clearing of banklines and removal of overhanging tree canopy would provide less shade over the bayou resulting in more sunlight reaching the water. This increase in sunlight would increase bankline vegetation growth and increase reflected glare. The recreation area would selectively cleared,

upgraded, and re-vegetated with various hardwood trees. These trees would provide shade and increase park ambiance and esthetic appeal. Hardwood trees planted in other areas, such as the south side of the diversion canal and along the bike path, would enhance the feeling of spacial enclosure for recreationists within its corridor. All trees planted within the project area would provide positive esthetic benefits.

5.2.11.4. Effects of Plan 2A. This plan would impact a portion of the Comite River designated as a scenic river, an adjacent portion of the Comite River, and a segment of the Amite River. All channel work would be accomplished on one bank, alternating sides, thus minimizing esthetic impacts. Affected banks would be cleared of vegetation by modifications involving clearing and channel re-shaping. Areas cleared of vegetation would exhibit a decline in visual appeal by the elimination of corridor vegetation and tree canopy overhanging the rivers. This loss of cover would eliminate shade, enclosure, and percieved depth created by heavy linear and canopy vegetation. This tree loss would result in more open space in the area surrounding the river. The absence of overhanging trees would increase reflected light and glare from the water surface. The absence of shadow patterns and depth toward the shoreline would decrease intimacy caused by loss of enclosure and low-light situations. Banklines denuded of vegetation would require maintenance once every ten years. The vegetation succeeding on the maintenance disposal area would be very homogenous but generally much smaller when compared to unmaintained areas. Shadow patterns would be shorter, reflected glare would be more extensive, and overall diversity that stimulates interest and intimacy would be reduced and would provide overall negative impacts to the esthetic environment in the vicinity of work for the life of the project.

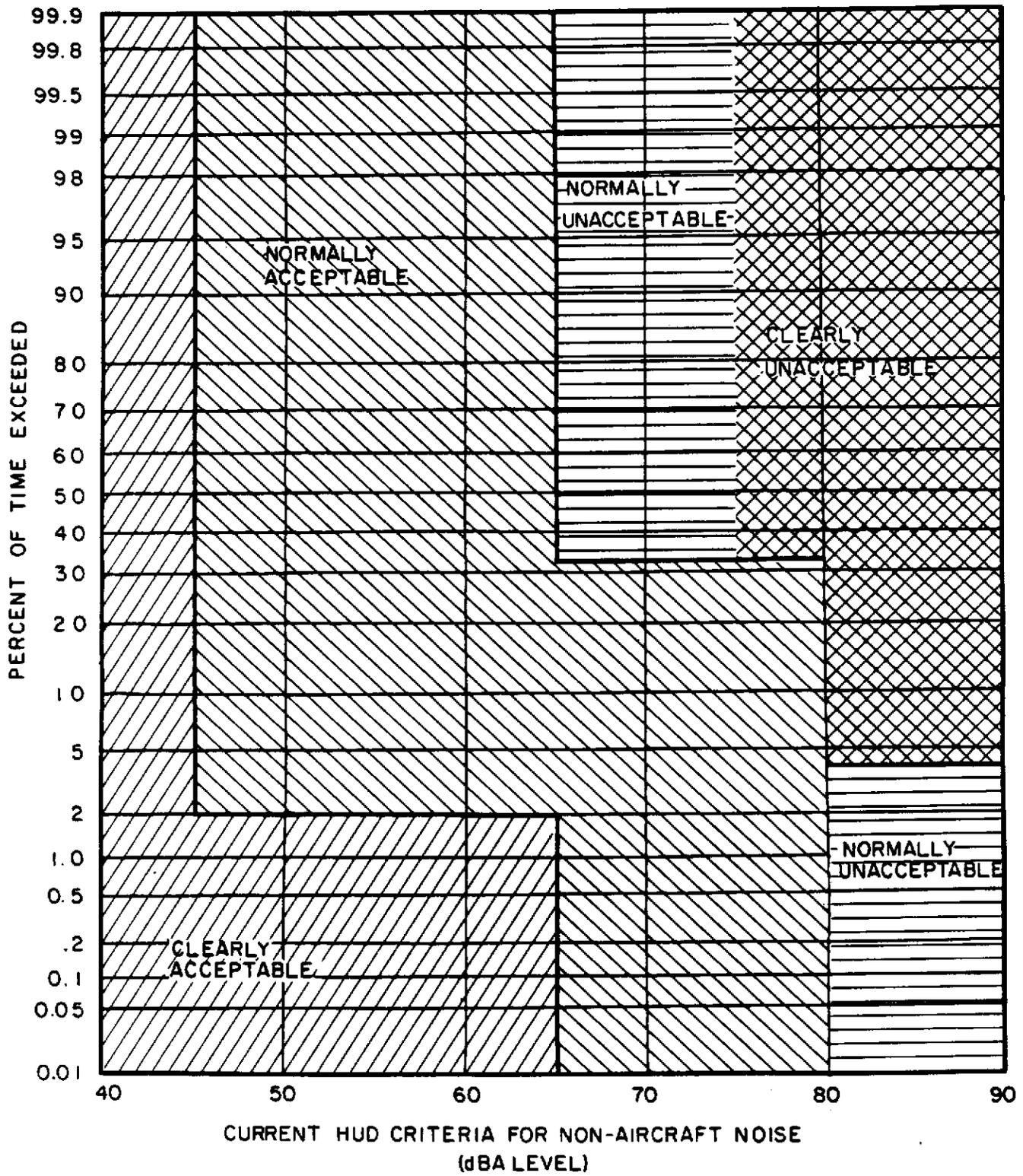
5.2.11.5. Effects of Plan 2B. Impacts imposed on the esthetic environment by this plan are similar to those of Plan 2A; however, the Comite River scenic portion is not included in this plan.

5.2.12. Noise

5.2.12.1. Significance. Noise can be defined as unwanted sound or sound in the wrong place at the wrong time. Noise can also be defined as any sound that is undesirable because it interferes with speech and hearing, is intense enough to damage hearing, or is otherwise annoying. Noise levels in the effected area are typically low except in the proximity of highway and railroad bridges. Neither the State of Louisiana nor East Baton Rouge Parish nor Livingston Parish has established criteria or standards for environmental noise. In the absence of local criteria, the Department of Housing and Urban Development (HUD) criteria for non-aircraft noise were used. These criteria are shown in Figure 1 in weighted decibels (dBA). The ambient dBA level in an urban residential community has been determined by the Environmental Protection Agency (EPA) to be 60. The ambient noise along a major traffic corridor would be higher, possibly to 70 dBA.

5.2.12.2. Effects of No Action. Noise levels would be expected to increase moderately with the projected increase in residential and commercial growth.

5.2.12.3. Effects of Plan 1B. Noise levels would essentially be increased for all plans during construction due to the operation of equipment. It is assumed that for this and each other alternative, the construction equipment would operate for 10 hours per day, six days per week. Project construction would require approximately three years for completion. Construction is projected to progress from the outlet end of the route to the inlet end. Noises produced by construction of the two stage control structures and the diversion structure would essentially be confined to one location for a lengthy period of time. Noises associated with excavation and deposition of excavated material would progress gradually down the right-of-way. During certain phases of construction, noise impacts actually would be insignificant for certain periods of time. However, this analysis assumes that the noise is essentially constant. A decreasing circle of noise would be produced by the equipment as it moves along the



FIGURE

construction route. Project construction would progress at the rate of about 50 feet per day. The equipment (dozers and dragline) assumed to be working on the excavation and control structures are expected to produce sound levels of approximately 102 dBA at 50 feet, 96 dBA at 100 feet, 90 dBA at 200 feet, and 84 dBA at 400 feet. Any specific location would be exposed to these levels for varying amounts of time. Pile drivers, that would be working on the control structures, produce noise levels of 95 dBA at 50 feet, 89 dBA at 100 feet, 83 dBA at 200 feet, and 77 dBA at 400 feet. However, no residences or commercial establishments are presently (1989) located within 400 feet of the structure sites. The approximate number of structures within given noise level bands and estimated construction progress rate for linear construction for Plan 1B and other alternatives are presented in Table 5-8. All dBA levels are classified by HUD as clearly unacceptable. However, noise impacts generally would be short-term, except for control structures. A buffer area would be essential during project construction for operation and storage of various construction equipment. EPA has a limit of 85 dBA for eight hours of continuous exposure to protect against permanent hearing loss. The decibel levels associated with channel construction would be higher than this, but for a relatively short duration; therefore, no hearing impairment should occur. Construction workers would have protective hearing devices. Since construction would take place during daylight hours, sleep interference should occur only for napping children and day sleepers. Noise affects many bodily functions (heart rate, respiratory volume, digestive secretions, hormonal secretions, etc.). If prolonged, the construction noise levels could produce significant physiological damage. However, the relatively short duration of the noise should prevent such problems. The noise would definitely be annoying to inhabitants of all buildings within 400 feet of the actual work site. During the time the noise was higher than 85 dBA, it would be difficult to hold a conversation within the impacted structures.

TABLE 5-8

AFFECTED STRUCTURES AND
NOISE LEVELS EXPERIENCED
ACCORDING TO ALTERNATIVE AND PROGRESS RATE

<u>Alternative</u>	<u>Construction Progress (Ft) Per Day</u>	<u>Number Structures ^{1/} Within Given Noise Level (dBA) Range</u>			
		<u>102 dBA ^{2/}</u>	<u>96-102 ^{3/}</u>	<u>90-96 ^{4/}</u>	<u>84-90 ^{5/}</u>
Plan 1B	50'	0	1	1	7
Plan 2A	433'	34	9	33	82
Plan 2B	394'	31	9	32	77

1/ Primarily residences and camps but also includes churches and commercial establishments.

2/ Experienced at 0-50 feet from edge of ROW.

3/ Experienced at 50-100 feet from edge of ROW.

4/ Experienced at 100-200 feet from edge of ROW.

5/ Experienced at 200-400 feet from edge of ROW.

5.2.12.4. Effects of Plan 2A. The general effects of noise upon hearers resulting from the implementation of this plan would be the same for this alternative as for Plan 1B. The approximate number of structures within given noise level bands and estimated construction progress rate for this alternative are presented in Table 5-8.

5.2.12.5. Effects of Plan 2B. The general noise effects of this alternative are similar to those of the other alternatives. Table 5-8 presents specific data applicable to this alternative.

5.2.13. Vectors

5.2.13.1. Significance. Vectors in the project area include a variety of mosquitoes, the most common genera being Anopheles, Aedes, and Culex. Some species inhabit a wide variety of habitats while others are more restricted. Some species, such as Aedes sollicitans, breed only in temporary water while others, such as Culex salinarius, require permanent water for breeding. The most common vector-borne diseases are infectious equine anemia, anaplasmosis, and Venezuelan equine encephalitis.

5.2.13.2. Effects of No Action. No change in the present populations or factors affecting the populations of mosquitoes are projected in the project area.

5.2.13.3. Effects of Plan 1B. Implementation of this alternative would result in no projected change in vector populations. Constructed channels and dredged material disposal areas would be sloped to eliminate the occurrence of standing water. Depressions made by equipment during construction would provide the potential for development of mosquito habitat. Control would be necessary if noticeable population increases occurred.

5.2.13.4. Effects of Plan 2A. Implementation of this alternative would result in the same general impacts as for Plan 1B.

5.2.13.5. Effects of Plan 2B. Implementation of this alternative would result in the same general impacts as for Plan 2A but to a somewhat lesser extent because of reduced construction area.

5.2.14. Socioeconomic Resources.

The purpose of this section is to describe the more significant social and economic conditions of the area and to identify potential impacts of various project alternatives, including no Federal action. While earlier studies discussed the larger basin, extending from the pine forests of Franklin County, Mississippi, southward to the wetlands of St. James Parish, Louisiana, this report focuses primarily on sub-basins within, or near, the Baton Rouge metropolitan area. Unless otherwise indicated, the socioeconomic study area includes East Feliciana Parish and the East Bank portions of the Baton Rouge Metropolitan Statistical Area (MSA) (East Baton Rouge and Livingston Parishes, and Wards 5, 6, 7, 8, 9, and 10 of Ascension Parish). The Baton Rouge MSA also includes West Baton Rouge Parish and the West Bank wards of Ascension Parish.

5.2.14.1. Land Use.

5.2.14.1. Significance. Table 5-9 below estimates land types and uses within the Baton Rouge MSA and East Feliciana Parish. While East Feliciana Parish is technically outside the metropolitan area, it is within commuting distance of the city's central business district (CBD) and was part of earlier studies that included an Olive Branch Reservoir, which is no longer among the project alternatives being considered.

The demand for urban land has originated largely by the growth of petro-chemical processing industries, deep-water port facilities, the development of state government, increases in higher education, and the need for additional residential developments. The state capitol and the main campuses of Louisiana State University (LSU) and Southern University are located in Baton Rouge. As Table 5-9 shows, urban lands within the

TABLE 5-9
LAND USE IN THE SOCIOECONOMIC STUDY AREA
(in acres)

Parish	Urban	Agricultural	Forest	Wetlands	Other
Ascension	20,787	73,961	40,586	51,351	1,004
East Baton Rouge	81,357	97,697	91,226	14,872	7,830
Livingston	30,686	43,474	269,818	70,038	3,135
West Baton Rouge	9,499	46,254	58,115	6,434	1,143
Baton Rouge MSA*	142,329	261,386	459,745	143,195	13,112
East Feliciana	6,070	124,615	155,874	2,656	2,455
Total, 1978	148,399	386,001	615,619	145,851	15,567
Sub-basins within the Study Area, 1978	119,184	162,574	258,919	101,480	10,547
Sub-basins within the Study Area, 1985	144,544	155,254	243,688	100,470	8,306

*Baton Rouge Metropolitan Statistical Area

SOURCE: Louisiana Office of State Planning.

sub-basins of the study area increased from 119,184 acres in 1978 to 144,544 in 1985, an increase of more than 21 percent over a seven-year period. Growth rates have moderated as oil prices have declined. The relatively large amount of wetlands at lower elevations of the basin has significantly influenced development trends. As urbanization has increased, the availability of well-protected lands has declined.

5.2.14.1.2. Effects of No Action. The general effects of no action would include the continued level of flood hazard in the basin, particularly significant to urban developments within the City of Baton Rouge and surrounding suburban developments extending from Zachary (above Baton Rouge) to Port Vincent (below Baton Rouge). As the area's economy recovers from the effects of falling oil prices and declining production, the trend of increasing urban growth can be expected to continue, although probably not at the rate experienced during the late 1970's and early 1980's. Increases in urban land will occur through the continued conversion of agricultural and forest lands, influenced in part by an area's level of flood protection.

5.2.14.1.3. Effects of Plan 1B. The immediate effects of the Diversion Channel on land use would be a reduction in the current level of flood hazard that threatens developments in the less protected areas of the basin, primarily residential developments. The project right-of-way would require some 1,300 acres of land extending over the 12-mile length of the Diversion Channel and control structures. Direct changes in land use due to construction are discussed in the sections on agricultural lands and bottomland hardwood forest.

5.2.14.1.4. Effects of Plan 2A. Similar to Plan 1B, Plan 2A would reduce the flood hazard in the basin. The mitigation plan could possibly enhance recreational uses of land along the Amite and Comite.

5.2.14.1.5. Effects of Plan 2B. Similar to Plans 1 and 2A, Plan 2B would reduce the level of flood hazard to developed lands of the basin, primarily in urban and suburban areas of Baton Rouge.

5.2.14.2. Housing

5.2.14.2.1. Significance. Much of the urban land and some of the rural portions of the flood plain are used for residential developments. The total number of housing units within the East Bank portion of the Baton Rouge MSA increased by more than 50 percent from 1970 to 1980, from approximately 109,500 to about 167,600 units. The total number of housing units in East Baton Rouge Parish alone increased from 88,937 to 133,635. The total number of housing units in Livingston Parish increased from 11,979 to 21,190. This rapid increase in housing demand stalled during the 1980's as unemployment increased and as petro-chemical and port activities fluctuated.

5.2.14.2.2. Effects of No Action. The effect of no action, or the lack of any other flood control program, would result in the continued periodic flooding of those houses within the basin that have inadequate flood protection. Recent surveys of the sub-basins along the Comite and Amite

Rivers indicate that approximately 9,100 residential structures within the surveyed area have floor elevations at or below the current 100-year level of flood protection. Current insurance programs for homeowners encourage new construction to provide greater protection.

5.2.14.2.3. Effects of Plan 1B. Completion of the Diversion Channel would substantially reduce the threat of flooding within the sub-basins along the Comite and Amite Rivers. With the project in place the number of residential structures with floor elevations at or below the 100-year level of protection would decline, from 9,100 to 5,500. As discussed previously, this plan would require relocation of approximately 25 residences currently within, or immediately adjacent to, the right-of-way for the diversion channel.

5.2.14.2.4. Effects of Plan 2A. Similar to Plan 1B, Plan 2A would reduce the threat of flood damage to unprotected residential structures within the sub-basins along the Comite and Amite Rivers. The modified channel would not involve the residential relocations required by the Diversion Channel. This plan, however, would not provide flood protection to as many houses. Plan 2A would leave approximately 6,400 residential structures at or below the 100-year level of protection.

5.2.14.2.5. Effects of Plan 2B. The effects of Plan 2B would be similar to Plan 2A. The shorter channel on the Comite would result in a somewhat lower level of flood protection, leaving an estimated 6,900 residential structures with floor elevations at or below the 100-year level of protection.

5.2.14.3. Property Value.

5.2.14.3.1. Significance. Property values in the basin are influenced by a wide variety of factors, including the level of flood protection. Other factors influencing property values include such things as economic development, urban amenities, access to transportation systems, and

proximity to scenic landscapes and recreational opportunities. All other things being equal, the unit values of protected land tends to be higher than unprotected land. This is particularly significant in or around urban developments where a wide variety of interests, both private and public, must compete for a limited amount of land. The potential for expansion in the Baton Rouge urbanized area is restricted by the Mississippi River to the west and south, and by wetlands to the south and east. These factors significantly influence existing and future property values. Table 5-10 compares the median value of occupied housing units in the urbanized area of Baton Rouge with other urbanized areas of the state.

Table 5-10

MEDIAN VALUE OF OCCUPIED HOUSING UNITS,
IN URBANIZED AREAS, 1980

Baton Rouge	\$53,200
New Orleans	\$52,700
Lafayette	\$57,700
Lake Charles	\$41,600
Houma	\$49,900
Alexandria	\$34,900
Monroe	\$34,900
Shreveport	\$38,300

Source: U.S. Dept. of Commerce, Bureau of the Census, 1980 Census of Housing.

5.2.14.3.2. Effects of No Action. Under no Federal action the value of property with adequate flood protection in the vicinity of Baton Rouge would tend to increase as the general economy of the metropolitan area improves and as the demand for development increased, if not at the rate experienced during the 1960's and 1970's, at a rate eventually approaching national averages. The value of property in areas without adequate flood protection, however, is unlikely to increase as rapidly and could eventually decline, as developers seek opportunities for investment

elsewhere. Scenic qualities of land along the Comite and Amite Rivers could enhance the value of this property as well, although limited in the areas where flood protection is inadequate.

5.2.14.3.3. Effects of Plan 1B. The drainage improvements offered by Plan 1 would tend to raise the value of existing developments within sub-basin where the potential for flood damage is the greatest. This plan would also tend to raise the value of undeveloped areas. As discussed in the main report, Plan 1B offers the greatest economic benefits from average annual damages prevented. It would also help maintain properties considered valuable for their scenic qualities.

5.2.14.3.4. Effects of Plan 2A. Impacts to property values would be similar to Plan 1. Reductions in average annual damages to property values would be somewhat less than in the case of Plan 1B. Channel modifications could result in a perceived loss in the scenic qualities of property along the river banks thus negatively affecting property values. Property values would be maintained and enhanced by the 28.3-mile buffer along the Comite and 9.2-mile buffer along the Amite.

5.2.14.3.5. Effects of Plan 2B. Impacts would be similar to Plan 2A. Reduction in average annual damages prevented would be somewhat less than in the case of Plan 2A. Property values would be maintained and enhanced by the 17.2-mile buffer along the Comite River and the 9.2-mile buffer along the Amite.

5.2.14.4. Business and Industry

5.2.14.4.1. Significance. Business and industry in the vicinity of Baton Rouge have developed largely by the expansion of port activities, petro-chemical processing plants, and related sales and services. Wholesale, retail, and service industries have been attracted by these basic industries as well as by the professional and technical needs of State government. Baton Rouge is also where the main campuses of Louisiana

State University and Southern University are located. Table 5-11 shows the growth of business and industry in the four parishes comprising the Baton Rouge MSA.

5.2.14.4.2. Effects of No Action. Recent trends and the existing infrastructure suggest an eventual recovery of port activities and potential for continued economic growth, although at rates somewhat below those experienced during the rapid expansion of the Gulf Coast's oil boom.

5.2.14.4.3. Effects of Plan 1B. Improved flood protection would reduce physical flood damages to businesses and industries as well as reduce possible disruption of normal business activities, with an accompanying income loss.

5.2.14.4.4. Effects of Plan 2A. Impacts would be similar to Plan 1B.

5.2.14.4.5. Effects of Plan 2B. Impacts would be similar to Plan 2A.

5.2.14.5. Employment

5.2.14.5.1. Significance. Table 5-12 shows employment and unemployment trends in the four parishes making up the Baton Rouge MSA. Civilian employment increased by 35 percent from 1950 to 1960 and 33 percent from 1960 to 1970. During the 1970's, however, total employment increased by 62 percent. National civilian employment increased by less than 30 percent during the 1970's. Employment trends tend to be influenced by a wide variety of factors, including the availability of arable land, abundance of minerals, access to navigation and other transportation systems, education, public policy, and the international nature of the regional economy, as well as the availability of adequate flood protection. The decline of oil production and related petro-chemical industries, fluctuations in port activities, and reductions in related services have resulted in high unemployment rates in the Baton Rouge area during the 1980's. In November of 1988, for example, unemployment in the Baton Rouge MSA was about 8.8 percent while unemployment nationwide was reported to be 5.3 percent.

Table 5-11

BUSINESS AND MANUFACTURING TRENDS
IN THE BATON ROUGE MSA

	1954	1967	1977	1982
Manufactures				
No. of Establishments	211	282	407	425
No. of Employees	20,035	18,700	24,100	25,500
Wholesale Trade				
No. of Establishments	220	520	752	910
No. of Employees	2,312*	5,638*	9,566	12,482
Retail Trade				
No. of Establishments	2,032	2,564	3,257	3,771
No. of Employees	11,455	16,328	27,638	34,352
Services				
No. of Establishments	785	1,764	3,303	N/A
No. of Employees	2,957*	5,666	15,450	N/A

N/A - not available

* Figures do not include data withheld to avoid disclosure of confidential records.

Sources:

U.S. Department of Commerce, Bureau of the Census, Census of Business, 1954 and 1967; Census of Manufactures 1954, 1967, 1977, and 1982; Census of Retail Trade, 1977 and 1982; Census of Wholesale Trade, 1977 and 1982; and Census of Service Industries, 1977 and 1982.

Table 5-12

CIVILIAN EMPLOYMENT/UNEMPLOYMENT TRENDS
IN THE BATON ROUGE MSA PARISHES

	Civilian Employment						
	<u>1950</u>	<u>1960</u>	<u>1970</u>	<u>1980</u>	<u>1983</u>	<u>1988</u>	
East Baton Rouge	55,959	78,567	102,577	161,997	160,000	**	
Livingston	6,028	6,985	11,066	21,380	27,600	**	
Ascension	6,112	7,432	10,805	18,682	22,700	**	
West Baton Rouge	3,527	3,976	4,583	7,187	8,200	**	
Total	71,626	96,960	129,031	209,246	218,500	242,600	
	Unemployed (percent)						
	<u>1960</u>	<u>1970</u>	<u>1980</u>	<u>1984*</u>	<u>1986*</u>	<u>1987*</u>	<u>1988**</u>
East Baton Rouge	6.1	4.5	5.3	7.4	9.4	8.5	
Livingston	11.3	6.6	7.5	11.4	15.7	14.3	8.8
Ascension	9.7	5.4	6.0	13.0	15.9	14.9	
West Baton Rouge	7.4	8.0	7.1	9.5	12.8	11.6	
Louisiana	6.1	5.4	6.0	10.0	13.1	12.0	9.6

* From unpublished estimates compiled by the Louisiana Department of Labor.

** Provisional estimate of the latest (November) monthly report by the La. Department of Labor was not available for individual MSA parishes.

Data for the years 1950 through 1980 were taken from the U.S. Department of Commerce Country and City Data Book for 1956, 1962, and 1983.

5.2.14.5.2. Effects of No Action. Table 5-13 shows anticipated employment trends in the Baton Rouge MSA as projected by 1985 OBERS BEA Regional Projections. Employment is projected to continue to increase at a rate slightly greater than the population increase, anticipating a greater number of women in the work place.

Table 5-13

TOTAL EMPLOYMENT IN THE BATON ROUGE MSA
(1,000'S)

	<u>1983</u>	<u>1990</u>	<u>2000</u>	<u>2015</u>	<u>2035</u>
Baton Rouge MSA	229.5	274.4	322.6	358.5	367.2

Source: U.S. Dept. of Commerce, Bureau of Economic Analysis, 1985 OBERS BEA Regional Projections Vol. 2, Metropolitan Statistical Area Projections to 2035.

5.2.14.5.3. Effects of Plan 1B. Employment generated by construction of the project would tend to be temporary. In addition to employment generated by construction of the project, the improved flood protection would indirectly help control overall economic development costs and enhance employment opportunities.

5.2.14.5.4. Effects of Plan 2A. Impacts would be similar to those of Plan 1B. The smaller project would limit the effects of employment created directly by the project.

5.2.14.5.5. Effects of Plan 2B. Impacts would be similar to those of Plan 2A.

5.2.14.6. Community and Regional Growth

5.2.14.6.1. Significance. Community and regional growth trends in the vicinity of Baton Rouge have been influenced largely by economic developments, including port and petro-chemical activities, by the expansion of governmental services centered at the state capitol, and the

growth of LSU and Southern University. As a result of this growth and continued population increases, the communities and region have required additional flood protection.

5.2.14.6.2. Effects of No Action. Historically, growth has occurred from the Baton Rouge urbanized area to the east-southeast. This trend should continue even without additional flood protection.

5.2.14.6.3. Effects of Plan 1B. Improved drainage along the Comite and Amite Rivers would facilitate continued growth between the urbanized area of Baton Rouge and the rivers.

5.2.14.6.4. Effects of Plan 2A. Impact would be similar to that of Plan 1B. The reduced level of protection would probably result in continued growth in higher elevations north of the current urbanized area.

5.2.14.6.5. Effects of Plan 2B. Impacts would be similar to Plan 2A.

5.2.14.7. Displacement of People.

5.2.14.7.1. Significance. As discussed in the section on Housing, some 9,100 residential structures are located within the 100-year flood zone. Assuming that the size of an average household within this zone is about the same as an average household in East Baton Rouge Parish as reported in the 1980 census, or 2.84 persons, the total population living within this 100-year flood zone is about 25,800.

5.2.14.7.2. Effects of No Action. The periodic flooding into residences within the subbasins could cause those living in the lower elevations to move, seeking shelter in more protected areas.

5.2.14.7.3. Effect of Plan 1B. Assuming the average number of persons per household within the 100-year flood zone would be 2.80 (similar to the number of persons per household living in East Baton Rouge Parish in 1980),

Plan 1 would reduce the total number of people in the 100-year floodplain from 25,800 to 15,300, a reduction of 10,500. Flooding which occurs with greater frequency, would also be reduced, reducing the possibility of displacement to people living in houses with less than 100-year flood protection. The 25 residential structures located within or near the project right-of-way may require as many as 70 people to relocate.

5.2.14.7.4. Effects of Plan 2A. The impacts of Plan 2A would be similar to Plan 1B. An estimated 7,800 people currently living in the 100-year flood zone would no longer be subject to floods of this frequency, and possible displacement.

5.2.14.7.5. Effects of Plan 2B. Impacts would be similar to Plan 2A. Based on anticipated project benefits and the existing level of residential development within the 100-year flood zone, an estimated 6,200 people living within the 100-year flood zone would no longer be subject to floods of this frequency, and possible displacement.

5.2.14.8. Displacement of Farms

5.2.14.8.1. Significance. While most of the study area is within the Baton Rouge metropolitan area, a large portion of the basin north of the metro area is rural including farmland. As discussed previously, the pattern of urban expansion has resulted largely from the conversion of agricultural and forested land to urban land for residential, commercial, industrial, recreational, and institutional purposes.

5.2.14.8.2. Effects of No Action. Under without-project conditions this trend is expected to continue as the population grows and as changes in technology continue.

5.2.14.8.3. Effects of Plan 1B. Improved flood protection would probably have a minimal impact on farms. The right-of-way for the diversion channel would pass through a largely rural area of East Baton Rouge Parish

including agricultural land. The cost of the project would reflect any losses in agricultural land and the displacement of farms. Improved flood protection could enhance the forage value of the pasture lands in the vicinity of the rivers. The acres of agricultural land impacted by construction of the various plans, plus agricultural lands impacted by mitigation measures are shown in Tables 5-3 and 5-4. While the purpose of this project is largely to improve flood protection in urban and suburban sections of the Baton Rouge Metropolitan Statistical Area, certain sections include lands which are still farmed and may be subject to the wetland conversion provisions of the Food Security Act of 1985 (Public Law 99-198). These provisions discourage conversions of farmed wetlands and abandoned farmed wetlands for the production of an agricultural commodity. The means of discouraging such activities include sharply reducing the participating landowner or operator's eligibility in a number of USDA programs including any type of price support, certain farm loans including house loans, disaster payments, and crop insurance. Therefore, the financial consequences to any individual unfamiliar with Public Law 99-198 who produces agricultural commodities on farmed wetlands or even abandoned farmed wetlands that are converted (by the flood reductions of this alternative), could be severe. However, the District Conservationist of the USDA's Soil Conservation Service indicates (see Appendix B-5) that there is very little land that would be classified as farmed wetland (that could be converted) within the area where flood reductions would be produced (wetlands converted) by the project.

5.2.14.8.4. Effects of Plan 2A. Impacts would be similar to Plan 1B, but fewer acres would be impacted.

5.2.14.8.5. Effects of Plan 2B. Impacts would be similar to Plan 2A.

5.2.14.9. Public Facilities and Services.

5.2.14.9.1. Significance. Public facilities and services in the Baton Rouge area include roads, bridges, streets, utilities, schools, fire and

police protection, and other facilities and services normally available in a metropolitan area. Baton Rouge is also the seat of state government and is the location of the main campuses of Louisiana State University and Southern University. Adequate drainage and flood control are necessary to sustain the continued maintenance and development of these public facilities and services.

5.2.14.9.2. Effects of No Action. The expansion of public facilities and services would probably follow previous patterns of growth to the east-southeast along the interstate highways.

5.2.14.9.3. Effects of Plan 1B. With improved flood protection in the city and surrounding suburbs, economic developments and residential expansion would probably follow previous patterns; and the demand for public facilities and services would follow as well. This plan would require relocation of 11 road and railroad bridges, 10 pipelines, 4 telephone lines, and 8 power lines.

5.2.14.9.4. Effects of Plan 2A. Plan 2A would have the same general effect as Plan 1B, accommodating growth between the city and surrounding suburbs, resulting in continued demand for public facilities and services. Unlike Plan 1B, however, Plan 2A would not require relocations of the same public and quasi-public facilities and services (e.g. roads, bridges, etc.).

5.2.14.9.5. Effects of Plan 2B. Impacts would be similar to Plan 2A.

5.2.14.10. Tax revenues

5.2.14.10.1. Significance. Tax revenues directly related to changes in the level of flood protection do not represent a major source of local or state revenue. More significant sources of revenue come from the collection of sale and income tax, only indirectly influenced by an area's level of flood protection.

5.2.14.10.2. Effects of No Action. Without additional flood protection in the marginally protected sub-basins, economic development would be attracted to other areas where the potential for revenues would be greater.

5.2.14.10.3. Effects of Plan 1B. Improved flood protection could attract development in areas where protection is currently marginal or inadequate. The increased development and improved protection would help to maintain stability of the area's tax base.

5.2.14.10.4. Effects of Plan 2A. Impacts would be similar to Plan 1B.

5.2.14.10.5. Effects of Plan 2B. Impacts would be similar to Plan 2A.

5.2.14.11. Community Cohesion.

5.2.14.11.1. Significance. While the general consensus of community opinion within the Baton Rouge area seems to support the level of flood protection required for economic and residential growth along traditional trends, concerns over the potential for adverse environmental impacts appear to have increased in recent years, including the impacts to fish and wildlife resources and scenic streams as well as to other conditions affecting human health and the quality of life. The Corps' environmental review process is designed to give the public an opportunity to comment on proposals influencing individual concerns and the concerns of the community at large. In general, the level of support expressed by local and state officials reflects the desires of the community.

5.2.14.11.2. Effects of No Action. If no action is taken to improve flood protection along the Amite and Comite Rivers, residents who are experiencing frequent flooding may eventually chose to relocate. The remaining residents of communities along the rivers may decide to stay, satisfied with the conditions which first attracted them to the area. This includes such things as the lower cost of land in flood-prone areas, the higher population density of urban areas, or esthetic considerations.

5.2.14.11.3. Effects of Plan 1B. Based on correspondence received from interested groups, individuals, and elected officials, the comments of people attending the scoping meeting, and the comments reported through the news media, communities impacted by the various project alternations appear to favor Plan 1B because they feel that it would maximize flood protection and cause the least environmental changes.

5.2.14.11.4. Effects of Plan 2A. Based on comments received during the scoping process, Plan 2A was found less desirable because of the feeling that the plan would have significant adverse impacts to the scenic quality of the rivers and to recreational fishing, swimming, and related activities. The mitigation plan for this alternative has been developed to respond to public concern over the effects of channel modifications.

5.2.14.11.5. Effects of Plan 2B. Impacts and mitigation would be similar to Plan 2A.

5.3. CUMULATIVE IMPACTS

Historical land use from 1972 through 1985 reflects trends of land development upon which projections of future land use in the entire study area was based. Periods of both rapid and moderate development are included during this period. The data in Table 5-2 reflect the study area developing to higher economic uses at an annual rate of .9 percent. Appendix D provides a brief basis for the projection used in project planning that development occurs in areas without regard to level of flood protection.

In addition to this project, studies are being conducted for other flood control projects within the Amite River Basin. The Initial Evaluation Study, Amite River and Tributaries, Louisiana, flood control project, dated November 1984, included a list of preliminary alternative plans that were determined to be economically justified or nearly justified (see Table 5-14). Since that time, other watercourses and measures have been

TABLE 5-14

ALTERNATIVE PLANS DETERMINED TO BE ECONOMICALLY JUSTIFIED OR NEARLY SO

Name	Parish Affected	Benefit-Cost Ratio
Darlington Reservoir	East Feliciana, St. Helena, East Baton Rouge, Livingston, Ascension, St. James, Amite County	1.4 <u>1/</u>
Grays Creek Enlargement	Livingston	3.2
Monte Sano Bayou	East Baton Rouge	3.1
New River, Black Bayou, Bayou Narcisse, and Bayou	Ascension	0.7
Ring Levee Around Denham Springs	Livingston	0.8
Ring Levee Around Sorrento	Ascension	0.6
Raise structures in place on piers and build oval earthen levees around structures on slab	East Baton Rouge, Livingston Ascension, Iberville	1.0-4.8
Ring Levee Around O'Neal Place	East Baton Rouge	0.90
Ring Levee Around Cimmaron Place	East Baton Rouge	2.9
Ring Levee Around Stevendale Estate and Park	East Baton Rouge	0.70

1/ Dual purpose reservoir.

SOURCE: Initial Evaluation Report, Amite River and Tributaries, LA

included in the list and are being evaluated. Four separate studies, based upon political boundaries within the Amite River Basin, are being conducted which include evaluation of the listed alternatives as well as others developed since that time. A feasible and effective solution to the flooding problems in each of the separate study areas is the primary goal of all flood control planning. Adverse environmental impacts anticipated with these projects that would be realized by the entire region include additional forest habitat destruction due to construction, forest habitat destruction caused by reservoir filling, more rapid runoff of poor quality water from the basins due to improved hydraulic capability of outlets, reduction of habitat quality to aquatic resources through direct construction and loss of riparian vegetation, and loss of total aquatic productivity.

6. LIST OF PREPARERS

The following people were primarily responsible for preparing this Environmental Impact Statement.

NAME	DISCIPLINE/ EXPERISE	EXPERIENCE	ROLL IN PREPARING EIS
Mr. William Wilson	Wildlife Biology	6 yrs, Wildlife Biologist, Georgia Dept Natl Resources; 10 yrs, Biologist, Corps of Engineers, New Orleans District	EIS Coordinator: Effects on Agricultural Lands, Bottomland Hardwoods, Natural and Scenic Rivers, Noise, and Vectors
Mr. Malcolm Hill	Civil Engineer	17 yrs, Civil Engineering Study Manager, Corps of Engineers, New Orleans District	Study Manager, Land Use Appendix
Mr. E. Scott Clark	Biologist/ Ornithology	8 yrs, Biologist, Corps of Engineers, New Orleans District	Mitigation Appendix
Mrs. Suzanne Hawes	Marsh Ecology	16 yrs, Biologist/Planner Corps of Engineers, New Orleans District	Plans Eliminated, Public Involvement 404 (b)(1) Evaluation
Mr. Robert Lacy	Socio-economics	17 yrs, Regional Economist, Corps of Engineers, New Orleans District	Effects on Section 122 Items
Mr. Timothy Lookingbill	Economics	26 yrs, Regional Economist, Corps of Engineers, New Orleans District	Project Benefits
Mr. David L. Reece	Fisheries Biology	4 yrs, Biologist, Florida Game and Freshwater Fish Commission; 11 yrs, Biologist, Corps of Engineers, New Orleans District	Effects on Aquatic Resources (Ecological Features)
Mr. Stephen Finnegan	Recreation Esthetics	12 yrs, Landscape Architect, Corps of Engineers, New Orleans District	Effects on Esthetics and Recreation Resources

6. LIST OF PREPARERS (Continued)

The following people were primarily responsible for preparing this Environmental Impact Statement (EIS).

NAME	DISCIPLINE/ EXPERTISE	EXPERIENCE	ROLL IN PREPARING EIS
Mr. Tim Axtman	Engineer	7 yrs, Hydraulic Engineering, Corps of Engineers, New Orleans District	Effects on Sedimentation (Aquatic Resources: Physical Features)
Mr. Bill Hicks	Civil Engineer	3 yrs, Civil Engineering, Corps of Engineers, New Orleans District	Effects on Water Quality (Aquatic Resources: Physical Features)
Mr. Nicholas Constan	Economics	20 yrs, Regional Economist, Corps of Engineers, New Orleans District	Overall Economic Review
Ms. Carroll H. Kleinhans	Archeology	4 yrs, Field & Analysis; 2 yrs, NPS, Dept of Interior; 10 yrs, Corps of Engineers, Memphis & New Orleans Districts	Effects on National Register Sites and Cultural Resources
Mr. Allan Blake	Geology	8 yrs, Dept of Interior 8 yrs, Corps of Engineers, New Orleans District	Effects on Mineral Resources and Groundwater Resources
Mr. Richard Boe	Fishery Biology	11 yrs, Fishery Research Biologist, La Dept of Wildlife and Fisheries	Effects on Threatened and Endangered Species and Species of Special Concern

7. PUBLIC INVOLVEMENT, REVIEW, AND CONSULTATION

7.1. PUBLIC INVOLVEMENT PROGRAM

The initial public meeting was held October 30, 1984, in Baton Rouge, Louisiana, to allow the public to comment on the plans developed in the Initial Evaluation Report. A scoping meeting, attended by approximately 15 people, was held in Baker, Louisiana, on November 17, 1987, to allow input into the planning process. Major concerns expressed involved alternatives, mitigation of fish and wildlife impacts, relationship with the Darlington Reservoir, and impacts on scenic streams. During the scoping comment period, letters were received from the National Park Service, Environmental Protection Agency, Amite River Conservation League, and two individuals. A Scoping Document was provided to interested parties on February 17, 1988. Between 1984 and 1987, numerous meetings were held with Federal, state, and local agencies and individuals to provide forums to discuss the status and direction of the study. Close coordination was maintained with the Amite River Basin Drainage and Water Conservation District (ARBDWCD). Corps of Engineers personnel attended all of the District's meetings. Corps personnel have met with local mayors, state legislators, Baton Rouge Chamber of Commerce, East Baton Rouge Department of Public Works, Lower Amite River Protection Association, Louisiana Department of Wildlife and Fisheries, Louisiana Department of Natural Resources, Louisiana Department of Environmental Quality, and Louisiana Department of Transportation and Development. For a more complete discussion of the public involvement program, see Appendix J, Public Views and Responses.

7.2. REQUIRED COORDINATION/COMPLIANCE

As stated in the above paragraph, close coordination has been maintained with the appropriate state and Federal agencies. Table 7-1 indicates environmental laws, executive orders, and memorandums for which compliance has been fully or partially achieved as of the date of this document. It also lists other pertinent documents that have been prepared to reach compliance.

TABLE 7-1

ENVIRONMENTAL COMPLIANCE

LEGISLATION	COMPLIANCE DOCUMENT	FNOTE	LOCATION	STATUS
BALD EAGLE ACT	USFWS RESPONSE TO REQUEST		APPENDIX B	FULL
CLEAN AIR ACT	EIS			FULL
CLEAN WATER ACT	404(b)(1) EVALUATION		APPENDIX B	FULL
COASTAL ZONE MANAGEMENT ACT	CONSISTENCY DETERMINATION		APPENDIX B	FULL
ENDANGERED SPECIES ACT	NMFS RESPONSE & BIO. ASSM'T	*1	APPENDIX B	FULL
ESTUARY PROTECTION ACT	EIS			FULL
FARMLAND PROTECTION POLICY ACT	EIS & FARMLAND RATING		APPENDIX B	FULL
FED. INSECTICIDE, FUNGICIDE, & RODENTICIDE ACT	EIS		APPENDIX B	FULL
FED. WATER. PROJ. RECREATION ACT	EIS			FULL
FISH & WILDLIFE COORD. ACT	FWS COORD. ACT REPORT		APPENDIX B	FULL
FOOD SECURITY ACT OF 1985	EIS		APPENDIX B	FULL
LAND & WATER CONSERV. FUND ACT	EIS			FULL
MARINE PROTECT., RESEARCH, AND SANCT. ACT	EIS			FULL
NAT. ENVIRONMENTAL POLICY ACT	EIS	*2		PARTIAL
NAT. HISTORIC PRESERV. ACT	EIS	*3	APPENDIX B	PARTIAL
PRESERV. OF HISTOR. & ARCHED. DATA ACT	EIS	*3	APPENDIX B	PARTIAL
RIVER AND HARBOR ACT	EIS			FULL
WILD AND SCENIC RIVERS ACT	EIS			FULL
WATER RES. DEVEL. ACT OF 1976	EIS			FULL
WATER RES. DEVEL. ACT OF 1986	EIS AND MITIGATION REPORT		APPENDIX B	FULL
E.O. 11988	EIS			FULL
E.O. 11990	EIS			FULL
MEMO ON PRIME & UNIQUE FARMLANDS	EIS & FARMLAND RATING		APPENDIX B	FULL
LA. AIR CONTROL LAW	EIS			FULL
LA. SCENIC STREAMS ACT	EIS	*4		NON-COMPLIANCE
LA. PROTECTION OF CYPRESS TREES ACT	EIS			FULL
LA. COASTAL ZONE MGMT. ACT	CONSISTENCY DETERMINATION		APPENDIX B	FULL

*1 Biological assessment was prepared during informal consultation with USFWS and upon their recommendation even though heelsplitter was only "candidate" or "proposed" species at that time.

*2 Signing of Record of Decision will achieve full compliance.

*3 Full compliance will be achieved during the PED stage with survey of right-of-way, testing of all cultural resources located, review by the SHPO, and data recovery from all resources found eligible for the National Register of Historic Places for which impact cannot be avoided.

*4 Compliance can be achieved only by specific action of the Louisiana Legislature. A variance passed by this body would enable compliance.

7.3. DRAFT STATEMENT RECIPIENTS

Copies of the draft Environmental Impact Statement were mailed to those listed in Appendix B, Section 6. This includes Senators and Representatives to both the State of Louisiana and Federal governments; Departments of Agriculture, Interior, Commerce, Energy, Health and Human Services, Housing and Urban Development, and Transportation; Federal Emergency Management Agency; and Environmental Protection Agency. Copies were also sent to state agencies, local governing bodies, environmental groups, libraries, and interested individuals.

7.4. PUBLIC VIEWS AND RESPONSES

7.4.1. Early Public Involvement. The views expressed during the scoping period were considered in the Draft EIS and Main Report. Impacts to scenic streams and endangered species were explored and mitigation was developed. Various alternatives were considered. In mid-1988, the general public in the study area was given the impression by news articles, not from the Corps of Engineers, that the District was going to recommend the Comite and Amite Rivers Channel Modification Plan. Numerous letters were received from state agencies, parish officials, environmental organizations and residents of the basins opposing the channel modification plan on environmental grounds. Several articles were published in major newspapers in the area discussing opposition to the plan. During this whole time, no letter of support was received for the channel modification plan. Most agencies and individuals expressed support for the diversion plan. A public announcement was made on January 9, 1989, at a meeting of the ARBDWCD that the channel diversion plan was the tentatively selected plan. This announcement received wide media coverage and no opposition was received to the selection of the diversion plan.

7.4.2. Later Public Involvement. The draft Feasibility Report and Environmental Impact Statement were mailed for a 45-day review period to agencies and individuals known to have an interest in the project. A

public meeting was also held July 10, 1990, in Baker, Louisiana, to receive public input. Agencies and elected officials expressed positive views toward the project. Individuals to be displaced by the project, as well as some individuals that are situated within the watersheds of the three tributary streams on the north side of the Diversion Channel, were opposed to the project. Letters of comment were received from 24 agencies, 6 businesses, and 30 individuals. Copies of those letters and the appropriate response, as well as a summary of the public meeting, are included in Appendix J, Public Views and Responses. Recreation features and the Brooks Lake levee and closure were added to the plan following the later stage public involvement.

7.4.3. U.S. Fish and Wildlife Service (USFWS) Recommendations

The recommendations made by the USFWS in their Coordination Act Report are listed below along with Corps of Engineers responses.

USFWS recommendation 1:

The Recommended Plan should be the least damaging plan, i.e., the Channel Diversion (10-year flood protection level).

Response - The 12,700 cfs Comite diversion is the Recommended Plan.

USFWS recommendation 2:

Impacts from the Diversion Channel should be avoided by minimizing spoil disposal on forested land. Where spoil disposal is necessary, impacts can be minimized by spreading the spoil material after deposition and placing the overburden on top to create favorable conditions for revegetation.

Response - Disposal of dredged material on forested lands will be minimized to an extent by the need for topsoil on the sand mined area within the

project lands that are to be reforested and that are enclosed by the containment levees. Forested land disposal also may be minimized by the need for daily covering and capping material at the existing or proposed East Baton Rouge Parish landfill. Although additional material is not presently thought to be required for the proposed landfill, if conditions change and a need for material arises from this or any other source, forested land disposal can be minimized in that manner. Stockpiling of the excess overburden material (one to two feet upper soil layer) for final capping would definitely provide a source for more favorable revegetation substrate. This is incorporated into final environmental commitments that will be emphasized and adhered to at time of construction.

USFWS recommendation 3:

Impacts to fish and wildlife resources remaining after the above measures are taken should be compensated by preserving 213 acres of existing forested lands and planting 420 acres of cleared land within the collection levees and by planting 107 acres of the spoil disposal area. The loss of 5,452 acre-days of flooding in backwater areas should be fully compensated by construction of a weir on a tributary of the Amite River and acquisition of the lands to be flooded by that weir.

Response - The acreage of lands required for evaluating wildlife habitat losses and mitigating those losses for this project was determined by the Habitat Evaluation System (HES) in addition to the Habitat Evaluation Procedures (HEP). The HES is an acceptable tool for evaluating habitat losses in the Lower Mississippi River Valley as well as the HEP. The HES analysis produced a need for reforestation of 422 acres of cleared land for bottomland hardwood habitat which would be done on project lands that would receive periodic induced flooding by the project. An additional 213 acres of currently wooded lands would be managed to improve habitat quality within the mitigation area. Approximately 110 acres of the dredged material disposal area would be reforested to replace upland habitat and esthetic losses. The acquisition of the 300-acre tract with construction

and passive management of the slotted weir structure would produce the recommended 5,450 acre-days plus an additional 1,750 excess of winter flooding.

USFWS recommendation 4:

The initial development, replacement, and annual operation and maintenance costs for the mitigation features shall be provided by the Corps as an integral project expense.

Response - Cost sharing on mitigation for this project is mandated in the Water Resources Development Act of 1986 which states that implementation, operation, maintenance, and rehabilitation to mitigate damages to fish and wildlife shall be allocated among authorized project purposes in accordance with applicable cost allocation procedures, and shall be subject to cost sharing at the same extent as such other project costs are shared. Since implementation is shared on a 50 percent Federal, 50 percent local basis, mitigation implementation will be shared in the same ratio. However, all operation, maintenance and rehabilitation is 100 percent local, so the local sponsor will be responsible for all operation, maintenance and rehabilitation costs of the mitigation plan.

USFWS recommendation 5:

The management of mitigation lands and the design of water control structures required for mitigation should be refined, in consultation with the Service and the Louisiana Department of Wildlife and Fisheries, during post-authorization planning.

Response - We concur.

USFWS recommendation 6:

Administration and management of lands acquired in fee simple should be in accordance with the General Plan process contained in Section 3b. of the Fish and Wildlife Coordination Act.

Response - We concur.

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