

during an average year would drop from 374,000 acres to 247,000 acres. Increases in pesticides and turbidity would be caused by the dramatic increase in agricultural activity that would occur. The pesticides would be concentrated in the food web and would adversely impact aquatic organisms. As a result of all the above factors, it is estimated that crawfish harvest could drop by 40 percent. Catches of sport fish would also decrease by approximately 40 percent. (Methodology for these calculations is described in Section 6 of Appendix A.)

5.41 It is difficult to predict the future of fishery resources of the backwater area. Rising water would cover more bottomland hardwoods and would reduce the amount of ground cover which could decrease the amount of detritus available to sustain fishery resources. Increased agricultural activity would increase pesticides and turbidity which would adversely impact fishery resources. On the other hand, rising waters would create more aquatic habitat, and as the cypress trees were cut, rooted aquatic plants could provide food and hiding and spawning areas for fish. Thus, the fishery resource could increase.

5.42 Cypress-tupelo swamps could start growing in what is now marsh in areas southwest of Morgan City as sedimentation raises ground levels. These swamps would help replace the nutrients, detritus, and aquatic habitat lost as Lower Atchafalaya Basin Floodway swamps become filled with sediment. As described earlier, marshes are eroding and subsiding and being converted into ponds. This would normally decrease the fishery as the detritus that sustains it disappears. However, the lost marshes would be replaced by newly developing deltaic marshes in the bay. Calculations of the possible harvest of shrimp and menhaden in the project-affected area indicate that by 2030, the harvest might be slightly less than present levels.

5.43 It is extremely difficult to estimate future without-project conditions trends in fisheries from 2030 to 2080. It is probable that the 1980 to 2030 decline in the Lower Atchafalaya Basin Floodway would continue. The fate of the fisheries resource in the backwater area and marsh complex is more difficult to predict, but it would decrease. As Wax Lake Outlet captured more of the Lower Atchafalaya River flow, salinity intrusion would hasten the demise of the Terrebonne Parish marshes.

#### **WILDLIFE**

5.44 Wildlife resources occur abundantly throughout the forests, swamps, lakes, bayous, and marshes that make up the basin. Each year large flocks of migratory waterfowl winter in the overflow swamps and lakes of the floodway, and large numbers of resident water birds use

the area all year long. Usage of marshland areas by these species is also heavy. In the drier parts of the area, large populations of white-tailed deer may be found along with small mammals, such as swamp rabbits and squirrels. The area also contains large numbers of aquatic and semi-aquatic mammals, such as the river otter, muskrat, nutria, raccoon, and mink. Many species of salamanders, frogs, lizards, snakes, and turtles are also present. The area serves as the probable home of several endangered species. The significance of these wildlife resources is large from the standpoints of ecology, recreation, and commercial trapping. Each year thousands of persons are attracted to the area to pursue both consumptive and nonconsumptive uses of the resources. Under future without-project conditions there would be a highly significant decrease in wildlife due primarily to land clearing within the Lower Atchafalaya Basin Floodway.

#### **ROOKERIES**

5.45 Numerous rookery areas for sea birds and wading birds have been identified within or near the project-affected area (Portnoy, 1977; Kennedy, 1977; LeBlanc, 1981) (Figure 5-2). Two of these, located on dredged material islands in Atchafalaya Bay, have been utilized by terns and skimmers. The other rookeries, located to the north in and around the leveed portion of the floodway, are utilized by various species of herons, egrets, ibis, and the anhinga. The majority of these rookery areas are found in forested swampland. Several of these areas have been used by 20,000 or more individual birds during a single breeding season. Under future without-project conditions, a number of these rookeries would disappear due to a decline in the acreage of feeding habitat for the birds that use them.

#### **AUDUBON SOCIETY BLUE LIST SPECIES**

5.46 The "Blue List" published by the National Audubon Society is a list of bird species that are showing indications of noncyclical population decline or range contraction, either locally or throughout their range. This list, compiled by interested observers throughout the country, serves as an early warning to indicate those species that might be in danger of extinction in the future. The 1979 Blue List (see Appendix G) lists 64 species. The normal range of 50 of these includes the project area. Certain species, such as the white pelican, king rail, and gull-billed tern, are abundant in the project area. Gull-billed terns are known to have large nesting colonies in the coastal part of the Atchafalaya Basin, which is important to the preservation of these species. Under future without-project conditions, those Blue List species living in forest or more saline marshland habitats would decline in numbers.

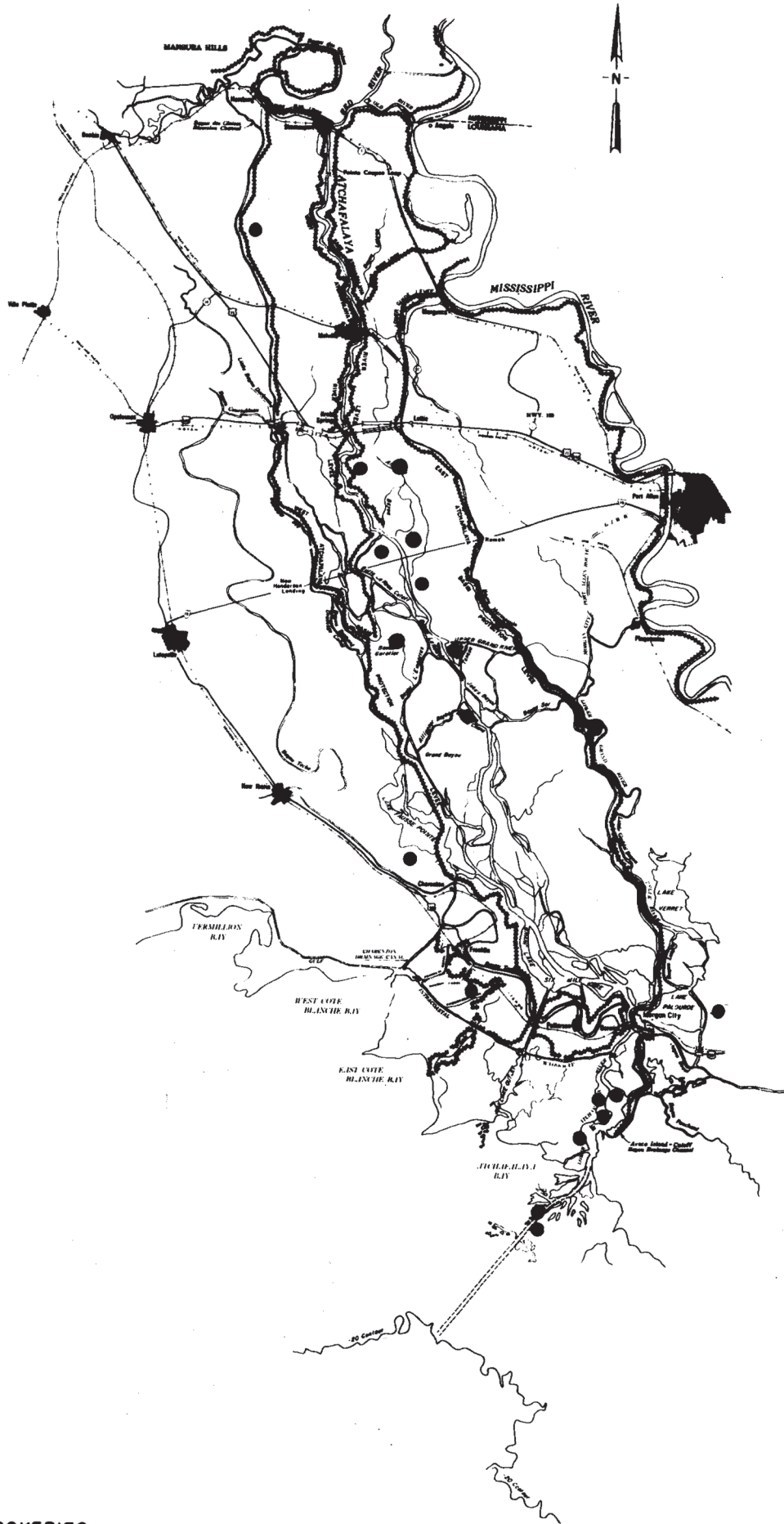


Figure 5-2 BIRD ROOKERIES  
 ● SITE LOCATION

## **ENDANGERED AND THREATENED SPECIES**

5.47 Fourteen endangered and two threatened species of animals occur or might be expected to occur within the project area (US Fish and Wildlife Service, personal communication; US National Marine Fisheries Service, personal communication). The threatened species include the loggerhead and green sea turtles. The endangered species include the Florida manatee that may occur in coastal waters; the leatherback, and Kemp's ridley sea turtles that may be found in Atchafalaya Bay and along the gulf coast; the ivory-billed woodpecker that has been sighted in the Atchafalaya Floodway; the Arctic peregrine falcon that migrates through the area and winters along the gulf coast; the bald eagle, a winter resident in the lower parts of the project area; the Eskimo curlew that may pass through during its northward migration in the spring; the brown pelican that occurs along the gulf coast; Bachman's warbler that may be a summer resident of the bottomland hardwood forests of the area; the Florida panther that has been sighted in the southern basin near the Attakapas Wildlife Management Area (Watson, personal communication) and the sei, finback, and sperm whales which may occur along the gulf coast. Population levels of all these species are very low. Under future without-project conditions, it is probable that the ivory-billed woodpecker, Bachman's warbler (if it now exists), and the Florida panther would cease to exist within the project area. Other species might decline in numbers or disappear as well.

## **RECREATIONAL FEATURES**

5.48 The project-affected area offers diverse recreational opportunities. The two major recreational activities, hunting and fishing, are sustained by the great abundance of wildlife and fishery resources of the area.

5.49 Approximately 80 percent of the project-affected area is in private ownership. More than 250 private hunting clubs either own or lease lands having permanent camps in the northern portion of this area (Miller, personal communication). Public hunting is restricted more to state-owned lands, such as the Attakapas and Atchafalaya Delta Wildlife Management Areas or to public water bodies.

5.50 Fishing and crawfishing occur throughout the area but are more concentrated in the southern part.

5.51 Public access is achieved by public or commercial boat ramps. Many of the commercial-type ramps adjoin a totally commercial operation, offering guide service, fishing bait and tackle, and groceries. Launching fees are nominal. Most public boat ramps are parish-maintained and offer free launching and parking.

5.52 Several commercial campgrounds are located in the project-affected area. Campgrounds generally offer sites having electrical hookups, water and sanitation facilities and, in some instances, boat-launching ramps to enter the basin.

5.53 The Lower Atchafalaya Basin Floodway provides a focal point for the pursuit of many nonconsumptive recreational activities. Nature seekers engage in canoeing, photography, nature study, and exploring. Commercial operations catering to the nature enthusiast are on the rise and offer such services as basin tours and guided canoe outings.

5.54 Although a variety of recreational activities are sustained by the project-affected area and recreational pursuits are increasing, the area's full recreational potential has not been fully realized. There would be, however, a significant decrease in recreational opportunities under future without-project conditions. A loss of about 49,000 annual user-days worth \$1,590,000 would occur by 2030.

#### **WILDLIFE REFUGES AND MANAGEMENT AREAS**

5.55 One national wildlife refuge and 11 state wildlife management areas are located within the project area, primarily in the Red River backwater area. The majority of the approximately 322,000 acres of primarily bottomland hardwood forests making up these areas is in public ownership. These forests provide recreational opportunities to thousands of persons annually, and provide needed habitat for game and nongame species of wildlife, such as deer, squirrels, rabbits, songbirds, waterfowl, and others. Two of the 11 state-owned wildlife management areas lie within the project-affected portion of the study area (Plate 1). They are the Atchafalaya Delta and Attakapas Wildlife Management Areas.

5.56 The Atchafalaya Delta Wildlife Management Area is comprised of some 125,000 acres of emergent and semi-emergent delta lands at the mouth of the Atchafalaya River, containing fresh to intermediate marshlands, bayous, shallow bay areas, and extensive mudflats. This area contains high quality habitat for wintering waterfowl and is one of the best duck hunting locations in the state.

5.57 The Attakapas Wildlife Management Area is comprised of some 26,000 acres of mainly accretion lands located in Grand Lake. Much of the area is subject to seasonal overflow from the Atchafalaya River. The area contains cypress-tupelo swamp and early successional stage bottomland hardwood forests. The most important game animals in the area are deer, swamp rabbits, squirrels, and wood ducks. In addition to hunting, both fishing and crawfishing are important activities in the area.

5.58 Under future without-project conditions, the size and habitat quality of both of these areas would increase due to plant succession, sedimentation within the floodway, and delta development in Atchafalaya Bay. Public usage would also increase.

#### **TIMBER**

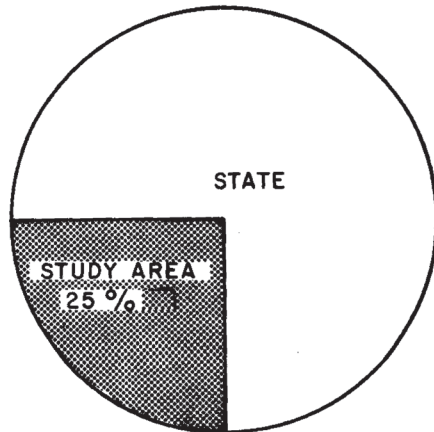
5.59 Commercial forests comprise almost 40 percent of a 19-parish economic study area (Figure 5-3). In fact, 25 percent of the commercial forests and 51 percent of the bottomland hardwood forests of the state are located in this economic study area. Although this area abounds in trees, commercial forests are decreasing faster than the state average. During the period 1964-1974, commercial forests decreased 15.7 percent, compared with a 9 percent decrease in the state. Sixteen of the 19 parishes had a decrease in commercial forest areas from 1964-1974. The total stumpage value of harvested timber amounts to only a small portion of the state's total timber value due to high value and volume of pine produced in other areas. However, the economic study area accounts for over 70 percent of the cypress and 41 percent of the cottonwood and willow harvested in the state. This area accounted for 36 percent of all hardwood timber harvested in the state in 1977. In 1976, the total stumpage value of harvested timber in the economic area was about 13.5 million dollars, or 11.2 percent of the state total, with about 69 percent of this income ascribable to pine and pulpwood pine. About two-thirds of the total study area timber sales occurred in the northern parishes of Caldwell, LaSalle, and Ouachita. Under future without-project conditions, timber resources would decrease significantly as land clearing continued and harvest of the existing cypress-tupelo forest progressed.

#### **OIL, GAS, AND MINERALS**

5.60 While no statistics are collected for the Atchafalaya Basin or backwater area northeast of Morgan City specifically, the following data for the 19-parish economic area and state demonstrate the importance of oil, gas, and mineral production.

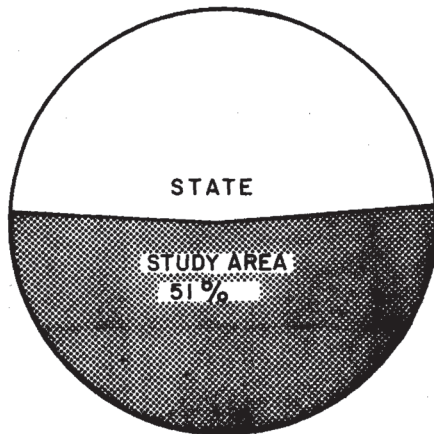
5.61 Minerals produced in the 19-parish economic area include petroleum, natural gas, natural gas liquids, salt, sulfur, sand, and gravel, shell, clay, and lime. By-products of the natural gas and shell include carbon black and cement. Petroleum production in Louisiana increased from 104 million barrels in 1940 to 209 million in 1950, to 401 million barrels in 1960, and to 907 million in 1970. Its value increased from \$107 million in 1940 to \$3,062 million in 1970. The preprint of the Bureau of Mines Minerals Yearbook for 1974 reported crude petroleum production in Louisiana to be 737 million

## COMMERCIAL FORESTS



25 PERCENT OF STATE'S  
COMMERCIAL FORESTS ARE  
LOCATED IN THE STUDY AREA, 1974

## BOTTOMLAND HARDWOODS



51 PERCENT OF STATE'S BOTTOMLAND  
HARDWOODS ARE LOCATED IN THE  
STUDY AREA, 1974

SOURCE: U.S. DEPT. OF AGRICULTURE, "FOREST  
STATISTICS FOR LOUISIANA PARISHES, 1975."

FIGURE 5-3 COMMERCIAL FOREST AREAS

barrels valued at \$4,812 million. Natural gas production in the state increased from 343 million cubic feet (mmcf) valued at \$64 million in 1940 to 7,754 mmcf valued at \$2.38 billion in 1974. Oil and gas have accounted for almost 90 percent of the value of the state's mineral production. In 1974, the value of mineral production in the area's four coastal parishes alone totaled \$3.2 billion or 5.8 percent of the United States total. More than any other single factor, the expansion of mineral production has led to the area's employment, income, and population growth. Only six of Louisiana's 64 parishes have unemployment levels below 6 percent. Five of them are in south Louisiana and three of the five (Iberia, Lafourche, and Terrebonne) are coastal parishes of the Atchafalaya economic area. The 1970 census reported that direct employment in mineral production accounted for 14 percent of the total in coastal parishes and 8 percent in the economic area overall. Since the late 1950's some of the construction associated with mineral production has declined; nevertheless, the 1970 census indicated that the three parishes producing the greatest quantities of oil and gas (Lafourche, St. Mary, and Terrebonne) also were the three parishes with median family incomes exceeding the state's median family income. Under future without-project conditions, extraction of oil, gas, and minerals would continue but would eventually decrease in importance.

#### **CULTURE OF THE BASIN**

5.62 The project-affected area has a rich cultural heritage. The unique folk culture that developed there attests to that fact. The area was settled both by English speakers and French-speaking Acadians who developed techniques for curing moss, removing cypress logs, and catching crawfish (Comeaux, 1972).

5.63 The Acadians who settled in the area abandoned agriculture and learned to utilize the swamps' resources. Folk culture in the area did not develop in isolation, but adjusted through time to new technology and demands. At present, the heart of the swamps has largely been abandoned and the inhabitants have moved to the edges of the Atchafalaya Basin Floodway. This abandonment was due to the loss of wetlands caused by levee construction and sedimentation, discovery of oil and gas in the basin, and the technological advances and conveniences of the 20th century (Comeaux, 1972). However, there remains today an abundance of folk behavior and tradition adapted to swamp utilization which comprises an "Atchafalaya Basin Culture." The rich cultural heritage of the project-affected area offers great scientific, educational, and interpretative potential.

5.64 Under future without-project conditions, the continuing sedimentation and draining of the swamps would adversely impact the swamp dependent economic base, and thus, the lifestyle of the people who



live on the edges of the floodway. The deterioration of the economic resource base would have far-reaching effects upon folk culture. Few people presently live in the floodway, since the trend has been a movement to the margins of the basin where employment opportunities have increased. It is expected that this trend would continue.

#### **NATIONAL TRUST PROPERTIES**

5.65 There are no National Trust properties in the project-affected area.

#### **NATIONAL REGISTER PROPERTIES**

5.66 The National Register of Historic Places as published in the "Federal Register," dated 6 February 1979, and the monthly supplements through 27 October 1981, have been consulted and only two cultural resources, 16SM45 and 16SMY52, located within the Lower Atchafalaya Basin Floodway have been determined eligible for the National Register (US Department of Interior, 1979). The Nutgrass site, 16SM45, is an important shell midden located on the west bank of the Morgan City-Port Allen Route of the Gulf Intracoastal Waterway south of Belle River Landing, Louisiana. Subsequent to its determination of eligibility to the National Register, the Nutgrass site was protected from erosion by placement of stone on the bank and adjacent underwater slope by the US Army Corps of Engineers in 1975. The Avoca Island Pumping Plant Number 1, 16SMY52, is located on the east bank of Bayou Shaffer south of Morgan City, Louisiana. Built between 1910 and 1914, the plant was one in a system of three pumping stations which drained the 16,000 acres of Avoca Island. The property was investigated during the intensive cultural resources survey of the East and West Atchafalaya Basin Protection Levees conducted by the University of Southwestern Louisiana in 1979-80 under contract to the US Army Corps of Engineers, New Orleans District (Gibson et al., 1980). No other cultural resources in the project-affected area are presently listed in or have been determined eligible for inclusion in the National Register. The draft report on the findings of the cultural resources survey of the East and West Atchafalaya Basin Protection Levees identified 12 cultural resources in the survey corridor as significant and eligible for inclusion in the National Register. These 12 resources include the Nutgrass archeological site, 16SM45, which had previously been determined eligible for the National Register and the Avoca Island Pumping Plant Number 1, 16SMY52, which has subsequently been determined eligible to the National Register. In addition, the intensive cultural resources survey of the other project features of the selected plan, which will be conducted during the next stage of planning, may locate additional cultural resources eligible for inclusion in the National Register.

5.67 Under future without-project conditions, any effects on sites 16SM45, 16SMY52, and other possibly significant sites identified by the cultural resources survey due to the enlargement of the East and West Atchafalaya Basin Protection Levees would be addressed in accordance with existing laws and regulations.

#### **ARCHEOLOGICAL RESOURCES**

5.68 Over 252 prehistoric and historic archeological sites are recorded within the project-affected area. The recorded prehistoric sites in the basin range from small midden deposits to large ceremonial mound centers. However, the recorded sites represent only a biased and incomplete sample of the archeological resources suspected to exist. The known site locations are largely a function of where cultural resources surveys have been undertaken. The inaccessibility of many areas of the swamp, subsidence, and the heavy sedimentation rate in the lower floodway have and will continue to influence man's ability to locate, identify, and evaluate cultural remains. Therefore, it is reasonable to assume that many as yet unrecorded archeological resources exist. Moreover, the considerable number of ship disasters and the Civil War-related vessel sinkings in the project-affected area indicate the existence of subsurface or underwater ship remains.

5.69 Under future without-project conditions, archeological resources would be adversely affected. Obscuration of sites by sedimentation, unregulated development, and the widening and deepening of the Atchafalaya River by natural processes would continue to impact the archeological resources of the project-affected area.

#### **NATIONAL REGISTER OF NATURAL LANDMARKS SITES**

5.70 The National Natural Landmarks Program is administered by the National Park Service of the US Department of Interior. Its purpose is to identify and encourage the preservation of areas that reflect the ecological and geological character of the United States and to strengthen an appreciation of natural history and concern with conservation. Designating an area as a national landmark does not affect the ownership of the site, nor does it allow public access. It merely seeks to foster a greater awareness of one's national heritage and allows agencies or individuals to consider its special significance. The Lower Atchafalaya Basin Floodway has been studied for inclusion on this registry. Preliminary evaluation has revealed that it probably has significance as a natural landmark. Further evaluation will be carried out subsequent to completion of this study. Future without-project conditions would degrade much of the lower floodway; thus,

less land would be available for inclusion as a potential national landmark.

#### **OPEN SPACE**

5.71 The project-affected area south of I-10 contains the largest contiguous tract of land in the State of Louisiana that is roadless and in a semi-natural condition. This open space serves as a valuable retreat from the pressures of urban life for thousands of persons who reside in the nearby cities of Lafayette, Baton Rouge, New Orleans, and Houma, Louisiana, as well as for those in the smaller towns of the area. Such semi-natural open space is becoming increasingly rare in south Louisiana due to the rapid industrialization and expansion of agriculture and the attendant increase in population, as well as to the demands on the available open space for home construction, roads, and related facilities. These demands would increase under future without-project conditions and open space would decrease proportionately. Rising water levels in the backwater area would preserve open space there under future without-project conditions.

#### **AIR QUALITY**

5.72 Air quality within the project-affected area is generally good except in the vicinity of certain industrial sites located near Krotz Springs and along the Teche and Bayou Black Ridges. Under future without-project conditions, this would change as increasing development takes place within the lower floodway and further industrialization occurs along the Baton Rouge-New Orleans corridor to the east. These changes would tend to degrade air quality. On the other hand, rising water levels in the backwater area around Morgan City could serve to force the existing industries there to relocate elsewhere. This would improve air quality in the immediate area.

#### **ESTHETIC VALUES**

5.73 The project-affected area is noted for having high esthetic values, although in many areas these values have been severely degraded by the construction and operational activities of the oil and gas industry, as well as extensive sedimentation, which has filled in many former open water areas. Many parts of the area are riddled with a maze of access and pipeline canals that have destroyed the wilderness nature of the swamplands. Numerous portions remain, however, in a scenic, semiwilderness state. Under future without-project

conditions, the esthetic qualities of the project-affected area would continue to deteriorate.

#### **UNDEVELOPED LAND**

5.74 The project-affected area includes several hundred thousand acres of undeveloped land, primarily marsh and forest. Some of this land could be converted immediately to agricultural land while, in other cases, the probability of flooding is so great that conversion for agricultural developments is not economically feasible. In most of the project-affected area, the primary development alternative would be for the purpose of raising soybeans. In the backwater area northeast of Morgan City, in particular in the vicinity of Bayous Boeuf and Black, the primary development potential is for conversion to industrial purposes. Under future without-project conditions, most existing undeveloped bottomland forest would eventually be developed. Rising water levels would prevent forests in the backwater area from being cleared.

#### **PROPERTY OWNERSHIP**

5.75 In the Lower Atchafalaya Basin Floodway, it is estimated that in excess of 265,000 acres, approximately 60 percent of privately-owned land, is vested in 13 major property owners. Each of these owners controls acreage ranging from 5,000 acres to more than 44,000 acres. The remaining privately-owned land, approximately 175,000 acres, is controlled by some 3,200 landowners. In addition to the privately-owned land, the state has claim to approximately 150,000 acres. This land ownership pattern would probably continue under future without-project conditions.

## Section 122 Items

5.76 The following items are not considered to be significant resources. However, legal requirements of Section 122, 1970 Rivers and Harbors Act, Public Law 91-611, require addressing the impacts of each proposed plan upon these items. The following paragraphs explain briefly what these refer to and how they relate to the project-affected area.

## **NOISE**

5.77 The project-affected area, because of the semiwilderness nature of much of it, is a relatively noise-free environment. However, few areas are totally noise-free. The activities of the oil and gas industry, water-based shipping industry, and sport and commercial fishermen occur throughout the area. Much of the noise that does occur is due to boat traffic originating with these groups. At times, even in the most remote parts of the area, noise levels are high. Under future without-project conditions, noise levels would increase due to the increasing development that would occur.

## **DISPLACEMENT OF PEOPLE**

5.78 Alternative plan impacts as they relate to the displacement of people are concerned with the direct and indirect consequences of plan implementation on areas of existing habitation. An example of a direct plan impact would be those persons forced to move because they inhabit lands required for project construction. An example of an indirect impact would be individuals induced to move as a result of altered flood conditions caused by plan implementation. Under future without-project conditions, displacement of people would increase from both direct and indirect consequences. There would be relocations from construction of the floodway guide levees, which is part of the future without-project condition, as well as from rising water levels in the backwater area northeast of Morgan City.

## **COMMUNITY COHESION**

5.79 The unique cultural heritage of the project-affected area is linked directly to a way of life based on swamp resource exploitation. The preservation of this traditional lifestyle and the continued existence of some ethnic groups and folk society is therefore dependent on preservation of the swamp habitat. Under future without-project conditions, there would be a loss of the habitat necessary to provide the occupations that support the traditional lifestyle.

## **COMMUNITY GROWTH**

5.80 The potential for community growth exists in the Morgan City and vicinity area. This growth is directly linked to the continued viability and expansion of the Morgan City oil and gas-related industrial complex. Under future without-project conditions, rising water levels in the backwater area could adversely affect the

expansion and even the existence of some facilities, thereby retarding the growth of the area.

#### **LOCAL GOVERNMENT FINANCE, TAX REVENUES, AND PROPERTY VALUES**

5.81 The area of local government finance is concerned with items such as the tax base, property values, and tax revenues. Each of these, and other items, are important because they impact the financial condition of local governmental units. Financial soundness is important because it often determines the level and quality of the necessary public services provided by local governments. Under future without-project conditions, there probably would be a slight increase in property values on forestland converted to cropland and a corresponding potential for increase in property tax revenue. On the other hand, rising water levels in the backwater area could force the relocation of industrial facilities and thereby remove the tax base.

#### **PUBLIC SERVICES AND FACILITIES**

5.82 The area of public services and facilities is concerned with the ability of local units of government to provide the basic public services; e.g., sanitation, water supply, education, and police protection. Under future without-project conditions, it is not expected that the ability to provide such services would be significantly altered.

#### **BUSINESS AND INDUSTRIAL ACTIVITY AND REGIONAL GROWTH**

5.83 Within the project-affected area, the industrial complex located in and around the Morgan City area holds the greatest potential for spurring regional growth. As the focal point for the manufacture of items used in the exploration and production of oil and gas resources in the Louisiana gulf region, growth of this industrial complex is directly linked to national and international developments in the energy-related industries. Under future without-project conditions, the growth potential for this area could be greatly hampered as a result of rising water levels and increased flood hazards in the backwater area northeast of Morgan City.

#### **EMPLOYMENT AND LABOR FORCE**

5.84 In the 19-parish economic study area, employment in 1970 was concentrated in trade, services, manufacturing, government,

construction, agriculture, forestry, fisheries, and mining. Economic area employment was more concentrated in agriculture, forestry, fisheries, and mining in 1970 relative to comparable statewide data. About 24.1 percent of the economic area civilian labor force was employed in these industry sectors while the statewide average was about 15.6 percent. Under future without-project conditions, there would be a minor increase in employment resulting from raising the East and West Lower Atchafalaya Basin Protection Levees. There also would be some small increase in agricultural employment as forestland became converted to cropland, and commercial fishing employment would decrease because the habitat necessary for fish populations would be lost. There could also be a loss of jobs in the manufacturing sector if rising water levels in the backwater area force portions of the Morgan City industrial complex to relocate.

#### **DISPLACEMENT OF FARMS**

5.85 Displacement of farms refers to the forced abandonment of existing farms due to the completion of project features or conditions. Under future without-project conditions, some displacement of farms in the backwater area northeast of Morgan City could occur due to rising water levels associated with enlargement of the Atchafalaya delta.

#### **VECTORS**

5.86 Vectors in the project area include a variety of mosquitoes with 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.

## 6. ENVIRONMENTAL EFFECTS

6.1 This section describes the effects of each detailed plan on the previously described significant resources and serves as a supplement to the "Comparative Impacts of Alternatives" table in Section 4. It should be noted that due to the dynamic nature of the project area, any attempt to assess impacts in a quantitative matter beyond the year 2030 (2036 for economic assessments) was deemed inappropriate and highly speculative except for projection of the amount of land clearing for agricultural conversion that might occur in the post-2030 period. In discussing the impacts of each plan on most significant resources, the impacts that could occur during the first 50 years of project life are examined in detail, and a brief, nonquantitative description of possible impacts during the final 50 years follows. In certain appropriate cases, impacts throughout project life are treated as a unit. Major impacts of proposed project features, such as channel training, management units, environmental easements, etc., are discussed first and are followed by a brief discussion of impacts due to operation and maintenance of these features. Impacts of mitigation measures are also discussed. At the end of each significant resource section, a brief discussion of impacts due to operation and maintenance of existing project features is included. Details of direct construction impacts or operation and maintenance impacts of the various plans are shown in Tables 4-4, 6-1, 6-2, 6-3, 6-4, 6-5, and 6-6; and changes in acreage of habitat types are shown in Table 6-7. Plates 5 through 18 show the locations of the various construction features. For a better comprehension of plan impacts, the reader may wish to refer to these tables and plates as remaining sections of this report are read. It should be noted that, for Plans 4 and 9, this section does not attempt to discuss potential impacts of measures that could eventually be implemented to solve backwater flooding problems. These would be discussed in the future in a supplement to this EIS.

6.2 It should be noted that four major data gaps exist that may have influenced the following impact analysis. The first is the lack of detailed data to enable the separation of the effects of the two sediment control features that were originally proposed, distributary realignments and sediment traps. The effects of these features were treated together in making land-use projections for the future. Since sediment traps were eliminated for environmental reasons from the final three plans, land-use projections overestimate the benefits to be gained from sediment control and do not fully assess loss of water bodies. However, relative comparison of the detailed plans is possible.

6.3 A second data gap is incomplete technical information concerning all possible impacts of management units upon the aquatic and terrestrial environment. In concept, these units should be highly valuable in preserving the aquatic resources of the basin, but in



TABLE 6-1

DIRECT CONSTRUCTION IMPACTS OF FLOODWAY PROTECTION LEVEES (ACRES)  
1972 TO 1980 AND 1980 ON

	Plan 2		Plan 4		Plan 7		Plan 9	
	All Plans 1972 to 1980	FWO 1980 on	EQ 1980 on	Total	1980 on	NEE Total	1980 on	R Total
<b>RIVER LEVEES</b>								
Early successional BLHW <sup>1/</sup>	-20	-250	-160	-180	-150	-170	-150	-170
Late successional BLHW	-10	-20	-10	-20	-10	-20	-10	-20
Open land	-40	-	-	-40	-	-40	-	-40
Bayous, canals, and borrow	+70	+270	+180	+250	+160	+230	+160	+230
<b>FLOODWAYS LEVEES</b>								
Early successional BLHW	-1,400	-730	-720	-2,120	-690	-2,090	-670	-2,070
Late successional BLHW	-2,050	-5,540	-4,020	-6,070	-3,630	-5,680	-3,840	-5,890
Cypress-tupelo	-1,460	-880	-720	-2,180	-700	-2,160	-710	-2,170
BLHW-CT mix <sup>2/</sup>	-10	-20	-20	-30	-20	-30	-20	-30
Open land	+1,190	-	-150	+1,040	+530	+1,720	+90	+1,280
Bayous, canals, and borrow	+3,720	+7,190	+5,620	+9,340	+4,510	+8,230	+5,140	+8,860
<b>LEVEES OUT OF FLOODWAY</b>								
Early successional BLHW	-170	-110	-50	-220	-50	-220	-50	-220
Late successional BLHW	-360	-270	-120	-480	-140	-500	-140	-500
Cypress-tupelo	-40	-	-1,100	-1,140	-1,260	-1,300	-1,350	-1,390
Open land	0	+100	+140	+140	+140	+140	+170	+170
Fresh marsh	-100	-	-170	-270	-200	-300	-200	-300
Bayous, canals, and borrow	+620	+160	+1,420	+2,040	+1,500	+2,120	+1,360	+1,980

<sup>1/</sup> Bottomland hardwood.

<sup>2/</sup> Bottomland hardwood - cypress-tupelo mix.

TABLE 6-2

## DIRECT CONSTRUCTION IMPACTS OF CHANNEL WORK (ACRES)

	Plan 2 FWO	Plan 4 EQ	Plan 7 NED	Plan 9 R
<b>CHANNEL TRAINING ATCHAFALAYA RIVER<sup>1/</sup></b>				
Early successional BLHW <sup>2/</sup>	0	+2,670	+2,670	+2,670
Late successional BLHW	0	-1,000	-1,000	-1,000
Cypress-tupelo	0	-1,730	-1,730	-1,730
Borrow	0	+60	+60	+60
<b>CHANNEL TRAINING LOWER ATCHAFALAYA RIVER<sup>3/</sup></b>				
Early successional BLHW	0	0	+1,510	+1,510
Cypress-tupelo	0	0	-200	-200
Fresh marsh	0	0	-700	-700
Riverine	0	0	-610	-610
<b>BANK STABILIZATION</b>				
Late successional BLHW	0	-130	-130	-130
Cypress-tupelo	0	-120	-120	-120
Riverine	0	+250	+250	+250

<sup>1/</sup>All plans 2,550 acres early successional BLHW to open to early successional BLHW.

<sup>2/</sup>Bottomland hardwood.

<sup>3/</sup>All plans 220 acres early successional BLHW to open to early successional BLHW.

TABLE 6-3

## DIRECT CONSTRUCTION IMPACTS OF OUTLETS WORK (ACRES)

	Plan 2 FWO	Plan 4 EQ	Plan 7 NED	Plan 9 R
<u>OUTLET CHANGES</u> <sup>1/</sup>				
Early successional BLHW <sup>2/</sup>	0	-90	-90	-180
Cypress-tupelo	0	-20	-20	-60
Riverine	0	0	0	+240
Borrow	0	+110	+110	
<u>WIDEN WAX LAKE OUTLET OVERBANK</u>				
Early successional BLHW	0	+650	+650	+650
Late successional BLHW	0	-590	-590	-590
Cypress-tupelo	0	-180	-180	-180
Open land	0	-80	-80	-80
Fresh marsh	0	-90	-90	-90
Borrow	0	+290	+290	+290
<u>INCREASE SEDIMENT WAX LAKE OUTLET</u>				
Early successional BLHW	0	-400	0	0
Riverine	0	+400	0	0

<sup>1/</sup>Plans 4 and 7 - 190 acres early successional BLHW to open to early successional BLHW, Plan 9 - 180 acres early successional BLHW to open to early successional BLHW.

<sup>2/</sup>Bottomland hardwood.

TABLE 6-4

DIRECT CONSTRUCTION IMPACTS OF SEDIMENT CONTROL,  
MANAGEMENT UNIT, AND RECREATION FEATURES (ACRES)

	Plan 2 FWO	Plan 4 EQ	Plan 7 NED	Plan 9 R
<b>SEDIMENT CONTROL</b>				
Early successional BLHW <sup>1/</sup>	0	+440	+440	+440
Late successional BLHW	0	-710	-710	-710
Riverine	0	+270	+270	+270
<b>MANAGEMENT UNITS<sup>2/ 3/</sup></b>				
Early successional BLHW	0	+315	0	+315
Late successional BLHW	0	-310	0	300
Cypress-tupelo	0	-1	0	-1
Open land	0	+20	0	+20
Bayou	0	-10	0	-10
Headwater Lake	0	-20	0	-20
<b>RECREATION</b>				
Early successional BLHW	0	-5	-5	-5
Late successional BLHW	0	-60	-60	-60
Cypress-tupelo	0	-5	-5	-5
Open land	0	+70	+70	+70

<sup>1/</sup> Bottomland hardwood.

<sup>2/</sup> 145 acres early successional BLHW to open to early successional BLHW.

<sup>3/</sup> Assumes that five units would be built although initial construction would involve only two pilot units.

TABLE 6-5

DIRECT CONSTRUCTION IMPACTS OF THE AVOCA ISLAND LEVEE<sup>1/</sup>

	Plan 2 FWO	Plan 4 EQ	Plan 7 NED	Plan 9 R
Fresh Marsh	0	0	-1,455	0
Brackish Marsh	0	0	0	0
Delta	0	0	-2,910	0
Open Land	0	0	+2,180	0
Fresh Bayous	0	0	+2,180	0
Brackish Bayous		0		0

<sup>1/</sup>Assumes that all reaches would be built although initial construction would involve only the first reach. Additional reaches might never be built.

TABLE 6-6

SUMMARY OF DIRECT CONSTRUCTION IMPACTS<sup>1/</sup>

	Plan 2 FWO	Plan 4 EQ	Plan 7 NED	Plan 9 R
Early Successional BLHW <sup>2/</sup>	-2,690	+1,040	+2,585	+2,940
Late Successional BLHW	-8,220	-9,360	-8,670	-9,190
Cypress-Tupelo	-2,390	-5,366	-5,705	-5,760
BLHW/CT MIX <sup>3/</sup>	-30	-30	-30	-30
Open Land	+1,270	+1,140	+3,980	+1,410
Fresh Marsh	0	-360	-2,545	-1,090
Brackish Marsh	0	0	0	0
Delta	0	0	-2,910	0
Riverine	0	+920	-90	+150
Fresh Bayous	+12,040	+12,090	+13,220	+11,530
Brackish Bayous	0	0	0	0
Headwater Lake	0	-20	0	-20
ES To Open To ES <sup>4/</sup>		2,695	2,960	2,875

<sup>1/</sup> Assumes all reaches of the Avoca Island levee (Plan 7 only) and five management units would be built. Initial construction would involve building of only two management units and the first reach of the Avoca Island levee. Additional reaches of the levee might never be built.

<sup>2/</sup> Bottomland hardwood.

<sup>3/</sup> Bottomland hardwood/cypress-tupelo mix.

<sup>4/</sup> Early successional bottomland hardwood to open to early successional bottomland hardwood.

TABLE 6-7

ACRES WITHIN THE PROJECT AFFECTED AREA  
(1,000's)

Habitat type	1980	2030			
		Plan 2 FWO	Plan 4 EQ	Plan 7 NED	Plan 9 R
Early successional BLHW <sup>1/</sup>	93.9	35.2	58.5	42.1	60.4
Late successional BLHW <sup>2/</sup>	332.0	186.1	339.3	177.7	339.5
Cypress-tupelo <sup>2/</sup>	451.0	415.0	408.2	364.1	407.7
Composition unknown	0.0	51.6	44.1	44.6	44.1
BLHW/Cypress-tupelo mix	8.4	20.2	44.2	44.6	44.2
Open land	97.2	283.8	100.1	326.5	100.3
Fresh marsh <sup>3/</sup>	321.3	243.1	242.8	238.5	242.1
Brackish marsh <sup>3/</sup>	89.0	64.4	64.4	63.2	64.4
Saline marsh <sup>3/</sup>	107.3	69.3	69.3	69.2	69.3
Delta <sup>3/</sup>	10.1	135.0	135.0	130.7	135.0
River and distributary	31.1	32.1	33.1	32.1	32.3
Fresh bayous and slow canals	38.0	50.9	51.0	52.1	50.4
Headwater lakes	18.2	1.9	2.2	1.8	2.2
Backwater lakes	42.0	34.0	38.3	33.4	38.3
Cropland lakes	0.03	4.1	.03	4.9	.03
Brackish bayous and canals	6.2	8.1	8.1	8.3	8.1
Saline bayous and canals	6.1	7.4	7.4	7.4	7.4
Fresh marsh ponds and lakes	87.6	141.6	141.6	142.4	141.6
Brackish marsh ponds and lakes	55.2	75.3	75.3	76.3	75.3
Saline marsh ponds and lakes	64.4	99.0	99.0	99.1	99.0
Fresh bays	200.0	75.1	75.1	79.4	75.1
Brackish bays	58.9	58.9	58.9	58.9	58.9
Saline bays	53.8	53.8	53.8	53.8	53.8
Shallow gulf	804.0	804.0	804.0	804.0	804.0
Late Successional BLHW <sup>4/</sup> (flooded in floodway)	128.0	66.8	75.0	57.3	75.2
Early successional BLHW <sup>4,5/</sup> (flooded in floodway)	73.3	35.7	40.3	30.1	40.3
Cypress-tupelo <sup>4,6/</sup> (flooded in floodway)	173.0	146.3	138.0	116.0	137.9

<sup>1/</sup>Bottomland hardwood.

<sup>2/</sup>Figures given do not include acreage changes which would be caused by disposal of dredged material associated with maintenance dredging of existing waterways. This activity would cause about 1,400 acres of cypress-tupelo and about 600 acres of late successional bottomland hardwood forest to convert to early successional bottomland hardwood forest during project life.

<sup>3/</sup>Includes impacts of all reaches of the Avoca Island levee extension (Plan 7 only) for comparative purposes.

<sup>4/</sup>These categories reflect the number of acres of forest that would be flooded on an annual basis. The decrease in acreage in the future reflects the lowering of the flowline in all plans and a conversion of forest to other habitat types in Plan 7.

<sup>5/</sup>Includes composition unknown.

<sup>6/</sup>Includes cypress-tupelo bottomland hardwood mix.

reality, some resource management problems could be created. For purposes of assessing environmental impacts of management units, an unbiased effort was made to determine both the positive and negative impacts that could arise due to construction of five units. These units were the ones which seemed to offer the best potential for ultimate implementation. These impacts will be discussed in detail as they relate to pertinent significant resources. It should be noted that only two pilot units are proposed for initial implementation. Should major modification of the management unit concept occur during subsequent detailed studies of the two pilot units, then construction and operation of others could be significantly different from the present concept. Therefore, actual impacts could differ significantly from those assessed in this report and a supplement to this EIS would have to be prepared.

6.4 A third data gap is the lack of adequate information about the effects of Avoca Island levee extensions upon the natural resources of the backwater area northeast of Morgan City and the Terrebonne Parish marshes. It was necessary to use preliminary hydraulic, water quality, and marsh loss data to project future conditions and to calculate mitigation needs. It was assumed that as the delta developed, it would naturally reduce the amount of sediment transported to the western Terrebonne Parish marshes. This reduction was not quantified. Because of these uncertainties, future projections based on subsequent studies of these areas could change significantly. In the NED plan, only the first reach of the levee extension is proposed. However, as a basis for comparison, the impact assessment which follows assumes that all reaches of the levee would ultimately be built. This in no way presupposes that extension of the Avoca Island levee for the full length is desirable. The final solution to the backwater flooding problem would result from studies to be made over the next several years.

6.4a A fourth data gap is lack of details about modification of existing minor features to pass the project flood. These should have few significant environmental impacts; however, if any significant impacts become apparent, an EIS Supplement would be prepared.

## Significant Resources

### **EARLY SUCCESSIONAL STAGE BOTTOMLAND HARDWOOD FOREST**

Plan 4 (EQ)

#### Major Impacts of Proposed Project Features

6.5 With this plan, existing early successional forest acreage would decrease in the future by about 35,000 acres so that by the year



2030, there would be an estimated 59,000 acres in the project-affected area. This would be about 23,000 more acres than under future without-project conditions. Much of the decrease would be due to the natural process of plant succession, which would cause about 25,000 acres to convert to the late successional bottomland hardwood type during the first decade of project life. (Project levee construction between 1972 and 1980 eliminated 1,600 acres of this habitat.) About 2,700 acres would be temporarily altered by direct construction impacts within and adjacent to the Lower Atchafalaya Basin Floodway between 1980 and 1990. These acres would be converted initially to open land but would soon revegetate with early successional species such as willow or cottonwood. Additionally, construction work would create about 2,600 new acres of this forest type through conversion of other forest or open water habitats to open land, which would rapidly revegetate with early successional species during the first decade of project life. Widening Wax Lake Outlet overbank area and sediment control measures would also increase acreage. Additional gains in acreage of early successional forest would occur due to formation of new accretion lands in open water areas. This accretion process would continue throughout project life.

6.6 During the second half of project life, early successional forest acreage would continue to change as accretion and plant succession created new forest stands or converted old stands into the mid-to-late successional type. By 2080, virtually all of the currently existing stands would no longer exist but would be replaced by new ones continually forming as the accretion process continued. It is probable that implementation of Plan 4 would insure that more acres of this forest type would exist in 2080 than under future without-project conditions, as the environmental easement feature of this plan would help prevent their being cleared.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.7 Repair of erosion along the main channel or near a distributary realignment could adversely affect a minor amount of early successional bottomland hardwoods. Policing of the real estate features would prevent unauthorized clearing of forest. There would be no impacts due to mitigation measures.

Plan 7 (NED)

#### Major Impacts of Proposed Project Features

6.8 With this plan, existing acreage of early successional forests would decrease in the future by about 52,000 acres. By the year 2030, there would be an estimated 42,000 acres remaining within the project-affected area. With this plan, there would be only about 7,000 future acres more than under future without-project conditions.

As with Plan 4, some of the decrease would be due to the process of plant succession. Also important in decreasing the acreage would be the conversion of forestland to agricultural land. (As with Plan 4, levee construction between 1972 and 1980 destroyed 1,600 acres.) Changes in acreage due to direct construction impacts would be similar to those of Plan 4 within the Lower Atchafalaya Basin Floodway, but additional impacts due to channel training of the Lower Atchafalaya River and Wax Lake Outlet would result in the conversion of about 1,500 acres of riverine habitat, cypress-tupelo swamp, and fresh marsh to this habitat type during the first decade of project life. Additional gains in acreage would occur due to formation of accretion land in open water areas.

6.9 As with Plan 4, plant succession and accretion would continue to change the acreage of early successional forest during the second half of project life. By 2080, there would, however, be less of this forest type than with Plan 4 in effect. The reason for this would be the process of land clearing for agricultural conversion, which would result in the elimination of a portion of this forest. It is probable that more of this forest would be cleared under Plan 7 conditions than under future without-project conditions.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.10 Impacts would be similar to those of Plan 4 but the only real estate features to be policed would be the recreational lands and nondevelopment flowage easements.

Plan 9 (R)

Major Impacts of Proposed Project Features

6.11 Under this plan, the existing acreage of early successional forests would decrease in the future slightly less than under Plan 4 and there would be about 25,000 more future acres than under future without-project conditions. Direct construction impacts would be very similar to those of Plan 4 with the addition of a 1,500-acre gain due to channel training south of Morgan City. As in both Plans 4 and 7, formation of accretion lands in open water areas would increase the overall acreage of this forest in the future.

6.12 The impacts of this plan in the second half of project life would be virtually the same as for Plan 4.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.13 These would be the same as for Plan 4.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.14 Approximately 3,000 acres of early successional bottomland hardwood forest has been dedicated to disposal of dredged material from existing project features. These areas are not used yearly. Disposal in Sixmile Lake covers 2,000 acres and occurs only once every 3 years. As the early successional forests are covered, most existing ground cover, understory, and trees are killed, but the area usually starts revegetating as soon as the ground is dry. In areas where disposal is annual, revegetation rarely gets past the herbaceous plant and willow saplings stage. In areas where dredging is less frequent, further succession would occur.

6.15 Erosion repair around culverts, control structures, and canals could cause minor disruption to some early successional communities.

6.16 Prolonged flooding, as would be caused by operation of the floodway system, would have an adverse impact on early successional forests each time it occurred. Most mature trees would probably be able to withstand flooding. Some trees along eroding edges of channels would be lost. Understory and ground cover would probably be killed or defoliated by floodwaters; however, within 1 to 2 months after the flood, regrowth should be only slightly below pre-flood levels (Noble and Murphy, 1975).

**LATE SUCCESSIONAL STAGE BOTTOMLAND HARDWOOD FOREST**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.17 With this plan, existing acreage of this forest type would increase in the future by about 7,000 acres so that by the year 2030, there would be an estimated 339,000 acres. This represents an increase of about 153,000 acres above the projected future without-project conditions, due primarily to the environmental easement feature of this plan although some increases in acreages of this habitat type would occur due to succession of early successional bottomland hardwood stands to the late successional state. Construction impacts due primarily to implementation of sediment control measures, channel training of the Lower Atchafalaya River, and raising the east and west protection levees would destroy about 6,940 acres during the first decade of project life. (Levee construction from 1972 to 1980 has already destroyed about 2,400 acres.)

6.18 The management unit features of the plan could have varied impacts upon growth of bottomland hardwood species. As reported by

Broadfoot and Williston (1973), annual impoundment of water in the Mississippi Delta on bottomland hardwood species from December through June caused increased diameter growth in species such as cottonwood, sweetgum, and green ash. Rudolph and Hunter (1964) reported that increased flooding would increase mast production in oak trees. On the other hand, McQuilkin and Musbach (1977) reported that production of sound pin oak acorns did not vary significantly between flooded and nonflooded areas, and Hosner (1962) reported that overwinter flooding that extended into the growing season resulted in the destruction of the seeds of pumpkin ash, green ash, and boxelder when flooding extended until 4 June. Observations indicate that the existing water regime in certain areas of the Lower Atchafalaya Basin Floodway and backwater area may be having an inhibitive effect on hardwood regeneration, especially on the more desirable species, when viewed from a silvicultural standpoint. In some areas, only low-value species that break dormancy late, such as overcup oak and bitter pecan, are able to reproduce, and in other areas, only highly water tolerant species, such as swamp privet and water elm, appear to reproduce successfully. Construction of management units that would attempt to maintain the existing water regime could have significant adverse impacts on bottomland hardwood species when growth of these forests are compared to what would occur under future without-project conditions. Estimates derived using the average annual shifted hydrograph indicate that about 30,000 acres of these forests would be inundated until 15 June during an average year within the five management units most likely to be built, and about 14,000 acres until 15 July. Under future without-project conditions, these acreage figures would be lower. (It should be noted, however, that under future without-project conditions, these forests might not in fact exist as the areas they occupy might be cleared for agricultural conversion.) Also, it should be pointed out that by maintaining the existing water regime, potential growth of ground cover and understory vegetation would be inhibited. This would significantly decrease the value of this habitat for terrestrial wildlife, such as deer. On the other hand, building of management units would slightly increase the peak of the annual hydrograph in some areas, at least during the first decades of project life, thus flooding for a 2- to 3-week period, areas that would not have been flooded in the absence of the management unit. This short period of flooding could benefit timber growth during most years. Due to the uncertainty associated with evaluating the impacts of management units on bottomland hardwood forests, a feature of Plan 4 would be to study carefully the impacts of the two pilot units on timber growth before building remaining units. Should problems be discovered, adjustments could then be made to correct them before additional units are built.

6.19 During the second half of project life, the total acreage of late successional bottomland hardwood forest would increase as early successional stages changed to more mature late successional stages. Species composition of the forest would also tend to change with time

so that by 2080, the proportion of less water tolerant species, such as sweetgum and oak, would increase in the northeastern parts of the project-affected area. Corresponding increases in the extent of ground cover plants would also occur.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.20 Erosion repair along the main channel or at distributary realignments might destroy a small amount of this habitat type. Policing of easements would preserve forest. No impacts due to mitigation measures would occur.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.21 With this plan, a 154,000-acre reduction in the existing acreage of forest could occur so that by 2030, about 178,000 acres would remain within the project-affected area. Most of this decrease would be due to land clearing for agricultural conversion, both within the floodway system and in the backwater area northeast of Morgan City. Construction impacts would add to the decrease, with about 6,400 acres being destroyed during the first decade of project life, primarily due to sediment control, channel training, and raising the east and west protection levees. (Levee construction between 1972 and 1980 destroyed about 2,400 acres.) This decrease is about 8,000 acres more than would occur under future without-project conditions and would be due to additional land clearing caused by the lowered water levels brought about with Plan 7. Changes in forest species composition would be similar to those discussed for Plan 4.

6.22 During the second half of project life, additional decreases in forest acreage would occur due to further land clearing. The exact magnitude of this activity cannot be projected with certainty but it is probable that most of the land that would be dry enough to clear in the year 2030, but which would not have been cleared at that time, would be cleared before 2080. Most clearing would occur in the bottomland hardwood habitat type. Thus, as much as about 20,000 additional acres, and possibly more, could be cleared by 2080. The amount of land that would be cleared during the second half of project life with Plan 7 in effect would be about the same as under future without-project conditions. (These land clearing projections are based on a worst-case analysis. Actual rates of clearing could be lower if legal controls, such as the Section 404 permitting program, continue in the future.)

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.23 Impacts would be similar to those of Plan 4 except that the only real estate features which would be policed would be 1,500 acres of recreational land and the nondevelopment and flowage easements. The mitigation features of this plan would preserve about 16,800 acres which would otherwise be cleared for agricultural conversion.

Plan 9 (R)

6.24 The impacts of this plan would be similar to those of Plan 4.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.25 Maintenance dredging of existing project features has destroyed approximately 600 acres of this habitat type by disposal of dredged material. Since this disposal would be necessary only every 5 to 10 years, the areas would revegetate with early successional species between uses.

6.26 Operation of the floodway system would be expected to have a minor adverse impact on this habitat type. Some trees would be destroyed by heavy sedimentation or flooding, but the beneficial impact of nutrients carried into bottomland areas would probably outweigh this. As discussed under the early successional habitat type, ground cover and understory would be temporarily destroyed but would recover fairly quickly. During 1973, studies showed that approximately 707,400 acres of wooded land of all habitat types were flooded in the floodway system (US Army Corps of Engineers, 1974).

**CYPRESS-TUPELO SWAMP**

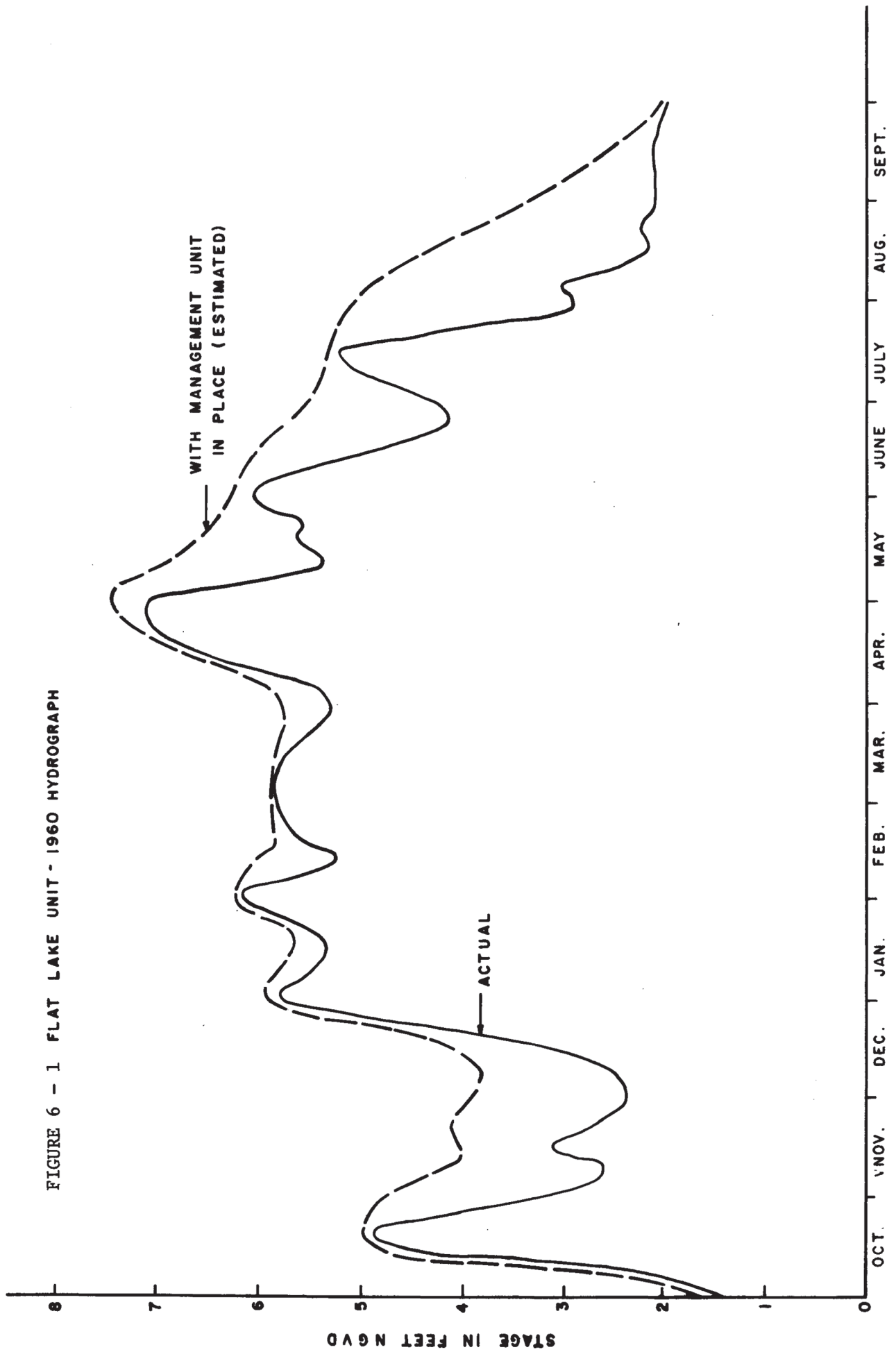
Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.27 With this plan, existing acreage of this type would decrease in the future by about 43,000 acres so that by the year 2030, there would be an estimated 408,000 acres in the project-affected area. This represents a decrease of about 7,000 acres more than would occur under future without-project conditions. It should be noted, however, that this plan would not prevent most of the cypress-tupelo forests in the backwater area northeast of Morgan City from becoming subjected to increased depth and duration of flooding. This flooding could have an inhibitory effect on tree growth and reproduction. A major cause of acreage decrease in this habitat type would be plant succession

occurring in response to falling water levels within the floodway as the Atchafalaya River matures. As swamps located at higher elevations become drier, they would be invaded by bottomland hardwood species and would convert to the early successional bottomland hardwood mixed with cypress-tupelo habitat type. This category could increase by about 36,000 acres by 2030. Construction impacts during the first decade of project life would also decrease the total acreage by about 3,860 acres. (Levee construction between 1972 and 1980 destroyed about 1,500 acres.) About half of these construction impacts would be due to conversion of cypress-tupelo areas to borrow pits as a result of raising the east and west protection levees and about half to channel training of the Lower Atchafalaya River. An additional impact of Plan 4 on cypress-tupelo swamps would be the preservation of about 20,000 acres within the lower floodway in its existing seminatural state due to acquisition of an environmental easement which prevents timber harvesting. Under future without-project conditions, it is estimated that half of the cypress-tupelo forests would be logged by 2030 (this is a worst-case estimate). Thus, Plan 4 with its easement could preserve 10,000 acres of cypress-tupelo forests that might be logged under future without-project conditions. Plan 4 would recommend implementation of two pilot management units and based upon their operational success, possible future implementation of other units. At the present time, the possible impacts of management units upon timber resources are not fully understood. Within the five areas of highest potential for development as management units, there are currently about 43,000 acres of cypress-tupelo forests. It is possible that management units could affect these cypress-tupelo forests in either a positive or negative way. Management units would be designed to attempt to maintain, as nearly as possible, the current water regime in the areas. Therefore, water levels in the future would not decline as much as would be the case if no management units were in place. This would insure that the existing acreage of "pure stand" cypress-tupelo forest remains rather than being converted, in part, to the category of bottomland hardwoods mixed with cypress-tupelo. It will not be possible, however, to exactly mimic the existing water regimes and hydrologic conditions in the future. To maintain water levels in the future that approximate those present today, it would be necessary to restrict the natural outlets by construction of weirs and, in some cases, low level levees (see Plate 11). Proposed plans also call for construction of new inlets and for closure of certain bayous and canals that now convey water into the areas (see Plate 11). The effect of all these features would be to reduce, by as much as one-half, the net amount of water flowing into and through the management unit during an average water year, while at the same time maintaining water levels that approximate existing conditions (the peaks of the average hydrographs for some units would actually be slightly higher than at present, at least during the first decades of project life). Management units would also reduce the degree of short-term water level fluctuation that occurs within each area (see Figure 6-1). This reduction in water

FIGURE 6 - 1 FLAT LAKE UNIT - 1960 HYDROGRAPH





level fluctuation along with reduced flows through the units could result in reduced current velocities. It is possible that these altered conditions could have deleterious effects upon timber growth, reproduction, and total net primary productivity of the swamp forest. For example, Hook et al. (1970) reported that tupelo trees seldom, if ever, reach saw-log size in ponds and oxbow swamps having stagnant water, and Harms (1973) reported that tupelo seedlings grew more rapidly in a moving water regime. Hook et al. (1973) also reported that tupelo grew best under a fluctuating water regime where the water table alternated from 9 or 18 inches below the surface to 8 inches above the surface. Further, Schlesinger, as cited by Conner and Day (1976), reported that the Okefenokee swamp in Georgia is unproductive, presumably because of the very slow movement of the water. Therefore, much of the available evidence indicates that growth of trees such as tupelo is correlated with the degree of water level fluctuation and current velocity of a given site. Management units could decrease both current velocity and degree of water level fluctuation more than would be the case under future without-project conditions, and could, therefore, adversely affect the growth of trees such as tupelo. A feature of Plan 4 that might offset some of the potential problems that could arise due to reduced flow through in the management units is the provision for improvement of circulation within each unit by creating openings in dredged-material embankments (spoil banks), which presently impede water movement. Plan 4 includes provisions for evaluating the effects of the two pilot management units on timber resources, and if the problems mentioned above occur, corrective steps could be taken in building future units to eliminate them.

6.28 Another feature of Plan 4 that might adversely affect cypress-tupelo forests in the Lower Atchafalaya Basin Floodway is the state-proposed forestry management plan (see Appendix B), which calls for restricting cutting to maintain or increase the ratio of cypress to tupelo. Certain sites within the lower floodway are better suited to the growth of tupelo than to cypress. To favor cypress on these sites could decrease the overall biological productivity of the area although it would increase timber production as little market presently exists for tupelo.

6.29 During the second half of project life, total acreage of cypress-tupelo swamps would probably tend to stabilize at a level near that existing in 2030. However, continued logging could result in an increase in the amount of cut-over swampland. Also, the unfavorable water regime of the lower floodway and backwater area might make it difficult for these areas to regenerate as true cypress-tupelo swamp similar to that existing today. These conditions would not differ greatly, however, from what would occur under future without-project conditions.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.30 Policing of the real estate easements would prevent unauthorized clearing of this habitat type.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.31 With this plan, existing acreage of cypress-tupelo forests would decrease in the future by about 87,000 acres so that by 2030, there would be about 364,000 acres in the project-affected area. This represents a decrease of about 51,000 acres more than would occur under future without-project conditions. Much of this decrease would be due to land clearing in the backwater area northeast of Morgan City and to plant succession within the Atchafalaya Basin Floodway system, which would convert some of the swamp areas at higher elevations into forests of cypress-tupelo mixed with bottomland hardwood species. Additionally, some areas of this habitat type within the floodway would be cleared for agriculture, and construction impacts during the first decade of project life would decrease the total acreage by about 4,200 acres. (Levee construction from 1972 to 1980 destroyed about 1,500 acres.) Timber harvesting effects would be similar to those of Plan 4, except that no planned preservation of uncut tracts would occur. Management units are not a part of this plan and would not affect the forest (except in Buffalo Cove where mitigation measures would be implemented).

6.32 During the second half of project life, the acreage of cypress-tupelo forests would probably continue to decrease as additional areas were cleared for agricultural use when lands became sufficiently dry as a result of continued lowering of water levels within the floodway. These impacts would probably be greater with Plan 7 than under future without-project conditions. Continued timber harvest would also occur and would have much the same effect as under future without-project conditions.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.33 There would be no significant impacts due to operation and maintenance. Creation of the Buffalo Cove management unit as a mitigation measure could help prevent the invasion of much of the existing cypress-tupelo swamp in that area with willow due to the lowered water levels that would occur if no management unit were built. Some detrimental impacts on growth of existing cypress and tupelo in the Buffalo Cove area could result from the reduced flow through and water level fluctuation brought about by construction of the management unit. Freshwater diversion into swamplands south of

Donaldsonville, Louisiana, as a mitigation measure should increase the productivity of that area.

#### Plan 9 (R)

6.34 Impacts to cypress-tupelo forests with this plan would be somewhat similar to those of Plan 4. However, a slight increase in acreage eliminated due to construction impacts caused by channel training of the Lower Atchafalaya River and Wax Lake Outlet and due to work at the outlets would occur. This additional work would eliminate about 260 acres. Also, this plan would not guarantee the preservation of about 20,000 acres of these forests in their existing semi-natural state. The real estate provisions of this plan would allow timber harvest throughout most of the lower floodway. Since hydrologic conditions in parts of this area are not conducive to regeneration of cypress, these areas, if logged, might never regenerate as a true cypress-tupelo forest.

#### Impacts of Operation and Maintenance of Existing Features (All Plans)

6.35 Maintenance dredging has destroyed approximately 1,400 acres of this habitat type. Approximately 900 acres along the east freshwater distribution channel is used every 5 years. Initial disposal destroyed the existing trees and raised the elevation of the area. Revegetation was with early successional species which would be destroyed with subsequent disposals. Nearly 400 acres near the Bayou Sorrel lock would be used annually and would probably never pass beyond a herbaceous plant-young willow stage.

6.36 Operation of the floodway system would adversely impact this habitat type by bringing large amounts of sediment into swamps. After the waters receded, early successional species would invade the newly emergent land. It is impossible to estimate the acreage that would be affected, although it could be quite large.

#### **AGRICULTURAL LANDS**

#### Plan 4 (EQ)

#### Major Impacts of Proposed Project Features

6.37 With this plan, there would be no significant increase in the amount of agricultural land in the future. Although total agricultural acreage would not increase in the future under Plan 4, there would be a highly significant decrease in such lands when compared to what would occur under future without-project conditions. This decrease would amount to about 184,000 acres of open land and would be

due primarily to the environmental easement feature of Plan 4, which would prevent land clearing within the Lower Atchafalaya Basin Floodway. Construction impacts would also eliminate a small amount of land. It should be noted that some of the land that would be affected by the land clearing prohibition of Plan 4 is classified as potential prime farmland (Plates 20 through 22). Moreover, this plan would not provide flood protection to about 10,000 acres of existing prime and unique farmland, used primarily for sugarcane production, in the backwater area northeast of Morgan City. Future rising water levels could render this land unusable for agriculture although projects such as the Terrebonne Parish Forced Drainage Project would provide protection to about 3,000 acres of the land. Within the lower floodway, the restriction on row-crop agriculture would insure that pesticide pollution, due to agricultural runoff, would not affect thousands of existing acres of potential unique farmland in the area that could be suitable for commercial crawfish production (Plates 20 through 22).

6.38 With this plan, total net income due to agricultural activity would rise from about \$522,000 at the beginning of project life to about \$3,028,000 by 2030. Much of this increase would be due to conversion of agricultural activity in the backwater area northeast of Morgan City from production of sugarcane to production of soybeans. The environmental easement feature of Plan 4 would prevent further agricultural expansion in the lower floodway and because of this, Plan 4 would actually cause a net project loss of about \$6,317,000 in annual net income by the year 2030, when compared to future without-project conditions.

6.39 During the second half of project life there should be no further increase in farmland acreage while under future without-project conditions, there would be a highly significant increase due to the continued land clearing that would take place in the post-2030 period within the Lower Atchafalaya Basin Floodway. The difference would amount to about 25,000 acres of open land, most of which would be agricultural.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.40 Operation and maintenance of proposed features would have a significant negative impact on agricultural lands within the Wax Lake Outlet overbank area, which is presently protected by ring levees. This land would be subjected to increased flooding following widening of the overbank area.

Major Impacts of Proposed Project Features

6.41 With Plan 7, there would be a dramatic increase in the amount of agricultural land in the future. Open land, which is primarily agricultural, would increase by about 229,000 acres by 2030. This represents a 43,000-acre increase over what would occur under future without-project conditions. This increase over present conditions would occur due to land clearing in the backwater area northeast of Morgan City and in the lower floodway. Construction impacts would eliminate only a small amount of this land. Much of the land cleared north of I-10 would be prime farmland, and most of that cleared in the backwater area would be both prime and unique farmland. This plan would have beneficial impacts upon the presently existing unique farmlands of the backwater area due to the lessened flood hazard it would create, but it would have an adverse impact upon the potential unique farmlands in the lower floodway that could be commercially farmed for crawfish. This would occur because of the increased water pollution that would follow expansion of row-crop agriculture on the higher lands surrounding the swamplands, where crawfish could be raised commercially.

6.42 With this plan, total net income due to agricultural activity would rise from about \$1,522,000 at the beginning of project life to about \$11,297,000 by 2030. About one-third of this increase would be due to agricultural expansion in the backwater area northeast of Morgan City and two-thirds due to similar expansion in the lower floodway. These increases would represent a net project gain of about \$1,952,000 by the year 2030 compared to future without-project conditions.

6.43 During the second half of project life, there would be continued expansion of agricultural land in the lower floodway. By 2080, there would be about the same amount of agricultural land as would occur under future without-project conditions. As the acreage continued to expand, the adverse impacts discussed previously on the potential unique farmlands of the lower basin, where crawfish could be grown commercially, would become more severe.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.44 Operation and maintenance impacts would be the same as for Plan 4. The purchase of 16,800 acres of bottomland hardwood forest and the building of the Buffalo Cove management unit for mitigation purposes would both reduce the overall future acreage of agricultural land within the project-affected area.

Plan 9 (R)

6.45 The impacts of this plan would be similar to those of Plan 4.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.46 Maintenance of existing features would have no impact on agricultural land.

6.47 Operation of the floodway system would adversely impact agricultural lands. The following discussion of flooding impacts of the 1973 flood (US Army Corps of Engineers, 1974) will indicate the types of impacts that could occur with future uses. During 1973, approximately 24,300 acres of agricultural lands within the floodways were flooded. An accurate estimate of the impacts assignable to operation of the floodway is complicated by the existing US Army Corps of Engineers flowage easement program. Owners retained virtually all rights to development that do not interfere with the use of the area as a floodway. Most of the agricultural lands are cropped on a yearly basis. Thus, crops lost during operation of the system have, in a sense, already been charged to the cost of the project and are more accurately described as losses of speculative investment. Holding this concept in mind, the following are the agricultural losses which were estimated to have resulted from the 1973 flood: crop, \$2,021,000; pasture, \$164,000; livestock, \$673,000; and other, \$101,000. The most significant agricultural losses were sustained by the soybean crop located mainly in Pointe Coupee Parish, and by livestock. Many cattle were lost because not all were evacuated in time to prevent drowning. Evacuation costs, forced sales at reduced prices, and extra feed costs all contributed to livestock losses.

6.48 It is likely that losses similar to those that occurred in 1973 would occur with future uses of the Morganza Floodway. If the West Atchafalaya Floodway were to be utilized, damages would be even greater because agricultural development there is more intense. However, frequency of use of the West Atchafalaya Floodway is estimated to be less than once in 100 years. These losses would be similar for all plans in the near future, but losses in the more distant future would be much greater if Plan 7 were implemented. This would occur because this plan would not prevent future agricultural development in the Lower Atchafalaya Basin Floodway.

## FRESH MARSH

### Plan 4 (EQ)

#### Major Impacts of Proposed Project Features

6.49 With this plan, there would be an estimated future reduction of fresh marsh of about 78,500 acres so that by 2030, about 243,000 acres would exist within the project-affected area. This reduction would represent a loss of approximately 300 acres more than that which might occur under future without-project conditions. Direct construction impacts of levee improvement west of Berwick and widening the Wax Lake Outlet overbank would account for most of this loss. (Levee raising from 1972 to 1980 destroyed about 100 acres of fresh marsh.)

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.50 Operation and maintenance would have no impact on fresh marsh.

### Plan 7 (NED)

#### Major Impacts of Proposed Project Features

6.51 With this plan, there would be an estimated reduction in acreage of fresh marsh of about 82,800 acres so that by 2030, nearly 238,500 acres might exist within the project-affected area. This would be a loss of about 4,600 acres above that which would occur under future without-project conditions. The primary cause of this reduction would be increased marsh deterioration in the Terrebonne Parish area that might occur due to construction of the Avoca Island levee extension. The levee extension would markedly reduce river overflow into the fresh marshes and, thus, would reduce the input of sediment and nutrient-laden waters that nourish the marsh. The amount of sediment reduction is unknown, but a preliminary approximation has been made. (See Appendix G for a rationale for calculating marsh loss). Based upon this preliminary data, if only Reach 1 were built, the loss would be nearly 200 acres, while if the entire extension were constructed, nearly 2,100 acres could be lost. Direct construction impacts of other project features would destroy about 1,100 acres. If the first reach of the Avoca Island levee were built, an additional 700 acres would be destroyed due to direct construction and if the entire extension became a reality, nearly 1,500 additional acres would be lost due to construction. Construction of channel training works would decrease sediment and nutrient input into adjacent fresh marshes and increase their rate of deterioration. (Levee construction between 1972 and 1980 destroyed about 100 acres of marsh.) There is evidence that the reduction in stages of approximately 1 foot during a normal water year that would occur following extension of the levee would

have some beneficial effects on fresh marshes by converting them to a drier type with increased plant diversity. Moreover, there is evidence that a large amount of marsh in this area deteriorated following prolonged flooding during the floods of 1973, 1974, and 1975 (US Fish and Wildlife Service, 1981). Stabilization of water levels by the levee could help counteract this trend should it occur again. The secondary impacts of the Avoca Island levee extension are difficult to predict due to the complexity of the estuarine system and lack of data. Due to this lack of data numerous studies would have to be conducted prior to construction of Reach 2 of the levee. These studies would determine impacts and clarify mitigation needs. Table 6-8 describes some proposed studies.

TABLE 6-8

TYPES OF STUDIES WHICH MIGHT BE CONDUCTED TO DETERMINE  
IMPACTS AND MITIGATION MEASURES ASSOCIATED WITH  
AVOCA ISLAND LEVEE EXTENSION

- 
1. Determine present and future rates of river-borne sediment deposition and patterns of distribution in Terrebonne Parish wetlands.
  2. Determine water circulation patterns in the Terrebonne Parish wetlands.
  3. Identify factors responsible for marsh loss and quantify the degree to which each factor contributes to the loss.
  4. Determine the volume of freshwater necessary to maintain the existing and future without-project salinity regime over project life.
  5. Develop a technique for conveying sediment-rich river water across the Avoca Island Cutoff Channel into the Terrebonne Parish marshes.
  6. Determine and quantify the adverse and beneficial impacts on biological resources due to the higher stages which would occur in the Terrebonne marshes and in the backwater area northeast of Morgan City under future without-project conditions.
  7. Determine the magnitude of subsidence in the Terrebonne Parish marshes and the backwater area northeast of Morgan City and what effects it may be having on existing biological communities.
-



6.52 During the second half of project life, marsh deterioration in Terrebonne Parish would probably continue due to reduction in sediments caused by the Avoca Island levee and natural causes.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.53 Operation and maintenance would have no impacts. Water diversion structures built for mitigation would offset project-induced losses to marsh productivity.

Plan 9 (R)

6.54 Most impacts of this plan would be identical to those of Plan 4, except an additional 700 acres of marsh would be lost to construction impacts associated with channel training works along the Lower Atchafalaya River and Wax Lake Outlet. These works would also increase marsh deterioration by decreasing sediment and nutrient input.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.55 Maintenance of existing features would have no impact on fresh marsh. Operation of the floodway system would generally have a net beneficial impact on fresh marsh. The nutrients and sediments carried by the floodwaters would enrich the marsh and replenish subsiding areas. However, if flooding were excessively prolonged and deep, it would be possible that marsh plants could be killed and erosion could occur. This is apparently what happened in the project area during the high water periods of 1973, 1974, and 1975.

**BRACKISH MARSH**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.56 With this plan, existing brackish marsh would decrease by about 24,600 acres by the year 2030 due to natural marsh deterioration. This same decrease would occur under future without-project conditions.

6.57 During the second half of project life marsh deterioration would continue.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.58 Operation and maintenance of proposed features would have no impact on brackish marsh.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.59 Brackish marsh could decrease by 25,800 acres by 2030, compared to existing conditions. This would be a decrease of 1,200 acres over future without-project conditions. This loss would be due to construction of Reaches 3 to 5 of the channel alignment of the Avoca Island levee, which could decrease sediment and nutrient transport to brackish marshes and thereby increase the land loss rate. If only Reach 1 were built, no impacts would occur due to the levee extension.

6.60 During the second half of project life marsh deterioration would continue.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.61 Operation and maintenance of proposed project features would have no impact on brackish marshes. The water diversion structure built for mitigation would offset project-induced losses to marsh productivity.

Plan 9 (R)

6.62 Impacts would be similar to those described for Plan 4.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.63 Maintenance would have no impact on brackish marsh.

6.64 Operation of the floodway system would probably have an overall beneficial impact on brackish marshes because the floodwaters would enrich the marsh with sediments and nutrients. However, prolonged flooding could kill marsh plants and increase erosion.

## SALINE MARSH

### Plan 4 (EQ)

#### Major Impacts of Proposed Project Features

6.65 With Plan 4, there would be approximately 69,300 acres of saline marsh in the project-affected area by 2030. This represents a decrease of nearly 38,000 acres from the present and is the same amount as would occur under future without-project conditions. The majority of this decrease would occur as the saline marsh deteriorates.

6.66 During the second half of project life, marsh deterioration would continue as erosion and subsidence persisted.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.67 Operation and maintenance would have no impact upon saline marsh.

### Plan 7 (NED)

#### Major Impacts of Proposed Project Features

6.68 The loss of saline marsh with this plan would be slightly greater than with any other plan. By 2030, there would be 38,100 fewer acres than exist at present. Compared to future without-project conditions, Plan 7 could cause a loss of about 100 acres as a result of possible indirect impacts of construction of Reach 3 of the Avoca Island levee in 2003. This reach would slightly reduce river sediment and nutrient flows to the saline marshes. Construction of only Reach 1 would have no impact on saline marsh due to the levee extension.

6.69 During the second half of project life, marsh deterioration would continue.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.70 Operation and maintenance would have no impact on saline marsh. The freshwater diversion structure proposed for mitigation would offset marsh productivity losses caused by this plan.

### Plan 9 (R)

6.71 Impacts would be similar to those described for Plan 4.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.72 Maintenance of existing features would have no impact on saline marsh.

6.73 Operation of the floodway would have a net beneficial impact on saline marshes by nourishing them with nutrients and sediments. Extensively prolonged flooding might kill plants and increase erosion.

**ATCHAFALAYA DELTA**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.74 With this plan, the development of the delta in Atchafalaya Bay would be a major occurrence in the project-affected area. Delta growth is difficult to predict, but it is possible that with Plan 4 and under future without-project conditions the delta would increase from the present 10,100 acres to approximately 135,000 acres by 2030. Since Louisiana appears to be losing 39 square miles of marsh a year (Wicker et al., 1980), this plan (and Plan 9) offers the best chance to preserve the newly developing delta. These plans might allow the creation of an average of 4 square miles of land per year, continuing for at least 50 years.

6.75 During the second half of project life, the delta would probably continue to grow in elevation and aerial extent and become more densely vegetated with additional species of plants. By 2030, delta would be developing in the open gulf at an unquantifiable rate. Growth in this water, 10 to 20 feet deep, would be slower than in the more shallow Atchafalaya Bay.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.76 There would be no impacts due to mitigation measures. Operation of the widened Wax Lake Outlet overbank area would increase delta formation in the western part of Atchafalaya Bay.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.77 This plan would have an adverse impact on delta development in Atchafalaya Bay due to the channel alignment of the Avoca Island levee. If Plan 7 were implemented by 2030, there might be 4,300 fewer

acres of delta than under future without-project conditions. Direct construction impacts, if the entire Avoca Island levee extension were built, would cause a loss of 2,900 acres. Reach 3, to be built by 2003, would block the eastern distributary of the first major bifurcation of the delta channel. This channel would be responsible for the sediment transport that would have built and nourished the delta east of the channel. Blockage of this channel, combined with the high rate of subsidence and compaction, might cause increased deterioration of the isolated portion of the delta. Possible construction of Reaches 4 and 5 might similarly impact the eastern isolated portion of the delta. The net result of this levee construction might be the deterioration of 4,300 acres of newly developed delta. Thus, this plan would allow the creation of only an average of 3.4 square miles of new delta per year for 50 years. If only Reach 1 were built, no impacts to delta would be caused by the levee extension.

6.78 During the 2030-2080 period, the western delta would probably continue to grow, but the eastern area cut off by the levee would show an increasing deterioration rate and approximately 17,000 acres would become open water.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.79 Impacts would be the same as described for Plan 4.

Plan 9 (R)

6.80 Impacts would be the same as described for Plan 4.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.81 The removal of 1,228,500 cubic yards of dredged material each year from the Atchafalaya Basin and disposal of this on land would remove a small amount of the total sediment available for delta building. It is impossible to calculate the loss of delta that would be due to this maintenance dredging, but it would probably be minor.

6.82 Floodflows passing through the floodway system would have a significant beneficial impact on the delta. In 2 months, the flood of 1973 produced several hundred acres of land in Atchafalaya Bay. Not only would sediment-rich waters from the Mississippi River be diverted into the floodway, but the floodwaters would erode channel banks and the next operation of the floodway would be expected to dramatically increase the amount of deltaic land. Future use of the floodway would be expected to increase the percentage of sediment diverted to Atchafalaya Bay since the existing mainstem lakes are nearly filled with sediment.

## RIVER, MAJOR DISTRIBUTARY, AND MAIN STREAM LAKES

### Plan 4 (EQ)

#### Major Impacts of Proposed Project Features

6.83 With this plan, there would be a gain of 2,000 acres of habitat by 2030. Under future without-project conditions there would be a 1,000-acre gain from the present acreage. This 1,000-acre gain would be due to bank erosion. In reality, the amount of riverine habitat would increase as the delta builds; however, this increase due to delta development has been included in the delta habitat type. Approximately 900 acres of the 2,000-acre increase in Plan 4 would be due to construction impacts of bank stabilization, changes at the outlets and sediment control. The volume of riverine habitat would be increased by channel training, but it would be difficult to quantify the amount of increase.

6.84 During the second half of project life, the acreage of this habitat type would probably continue to increase due to erosion.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.85 Repair of main channel crevassing would prevent the river from taking another course. No impacts due to mitigation measures would occur.

### Plan 7 (NED)

#### Major Impacts of Proposed Project Features

6.86 Riverine habitat would increase by 1,000 acres with this plan. Direct construction impacts of channel training in the Lower Atchafalaya River would decrease the amount of riverine waters, and channel stabilization and sediment control would offset this increase. The 1,000-acre increase would be due to erosion.

6.87 Acreage would probably continue to increase during the 2030-2080 period.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.88 Impacts would be as described for Plan 4.

Plan 9 (R)

Major Impacts of Proposed Project Features

6.89 Riverine habitat would increase by 1,200 acres with Plan 9. Direct construction losses due to channel training in the Lower Atchafalaya River would be more than offset by construction gains due to changes at the outlets and sediment control. The bulk of the gains would be due to erosion.

6.90 During the second half of project life, riverine habitat would probably increase slightly.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.91 Impacts would be as described for Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.92 Maintenance of the low sill structure and outflow channel at Old River prevents capture of the Mississippi River by the Atchafalaya River. Maintenance dredging in the main channel from Old River to Morgan City removes sediment in the river. Maintenance dredging of the east and west access channel and the east freshwater distribution channel maintains these habitats.

6.93 Operation of the floodway system would increase the volume of riverine habitat by scouring the channel deeper. The surface area would probably increase slightly since deposition of sand bars would probably not equal erosion. The acreage of mainstem lakes would be decreased with each usage of the floodway until at some period, the lakes would no longer exist.

**FRESH BAYOUS, CANALS, AND BORROW PITS**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.94 Plan 4 would increase the amount of bayou, canal, and borrow pit habitat in the project-affected area from 38,000 acres in 1980 to 51,000 acres in 2030. (Construction of borrow pits between 1972 and 1980 increased this habitat type by 4,410 acres due to raising of various levees.) Between 1980 and 2030, this habitat type would increase by an additional 7,220 acres because of raising various levees; 60 acres because of channel training in the Atchafalaya River;

110 acres because of construction at the outlets; and 290 acres because of widening the Wax Lake Outlet overbank. Thus, the total direct construction impacts would cause an increase of 12,090 acres. Compared to future without-project conditions, this plan would cause an increase of 100 acres due to construction impacts. Sediment control features would help to keep existing bayous slightly deeper than they would be under future without-project conditions and the management unit feature would prevent draining of some bayous during low water.

6.95 During the second half of project life, it is probable that an unquantifiable acreage of bayous within the basin would fill due to sedimentation, but the acreage would be less than under future without-project conditions.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.96 Mitigation measures and operation and maintenance of proposed project features would have no impact on this habitat type.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.97 As described for Plan 4, prior construction has increased borrow habitat by 4,410 acres. By 2030, there would be 14,100 more acres in the project-affected area than there are at present. Between 1980 and 2030, the following acreage gains would occur due to construction of borrow pits for the following features: levees, 6,170; channel training in the Atchafalaya River, 60; outlet construction, 110; widening of Wax Lake Outlet overbank, 290; and the Avoca Island levee extension, 2,180. These direct construction impacts would total 13,220 acres. Compared to future without-project conditions, this plan would cause an increase of 1,180 acres due mostly to construction of the Avoca Island levee extension. Sediment control would help to keep existing bayous deeper than under future without-project conditions.

6.98 Impacts between 2030 and 2080 would be similar to those described for Plan 4.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.99 No impacts would occur due to operation and maintenance.

6.100 Building Buffalo Cove management unit and the purchase of 16,800 acres of bottomland hardwood forest as mitigation measures would benefit some fresh bayous by helping maintain them in a more natural state than would otherwise be the case.



Plan 9 (R)

Major Impacts of Proposed Project Features

6.101 By 2030, there would be an additional 12,400 acres of this habitat in the project-affected area. Prior to 1980, there were 4,410 acres of borrow created. During the 1980-2030 period, gains in borrow pits would occur due to construction of the following: levees, 6,660 acres; channel training of the Atchafalaya River, 60 acres; widening Wax Lake Outlet overbank, 290 acres. Thus, the total direct construction impacts would include a gain of 11,530 acres of borrow pits. Compared to future without-project conditions, this plan would decrease borrow pit acreage by 500 acres because the lowered flowline would allow lower levees.

6.102 During the second half of project life, impacts would be similar to those described for Plan 4.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.103 No impacts would occur.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.104 Removal of debris and shoaling material from existing drainage canals would keep flows fairly constant and prevent clogging.

6.105 Operation of the floodway system would have a minor impact on this habitat type. Some waterways would be scoured deeper and eroded by floodwaters while others would become more shallow after the flood due to sediment deposition.

**HEADWATER LAKES**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.106 With this plan, there would be a loss of 16,000 acres of headwater lakes by 2030 because these lakes would become filled with sediment and water levels in the floodway would fall. These changes would occur despite the inclusion of sediment control and management units in this plan. For purposes of impact assessment, it was assumed by the Agency Management Group that management units would preserve present water levels. If present levels are compared to those that would occur under future without-project conditions, it can be seen

(Table 6-9) that levels would drop 1 to 1.5 feet without units. If present levels were maintained, units would preserve approximately 40 acres of headwater lakes as water levels fall. However, US Army Corps of Engineers data indicate that management units could not maintain present water levels until 2030. Management units would prevent draining of lakes at low water. Compared to future without-project conditions, the environmental easements of Plan 4 would prevent 160 acres of lakes from becoming classified as cropland lakes. Sediment control would help in preservation of headwater lakes by keeping the remaining lakes deeper.

TABLE 6-9

PEAKS OF AVERAGE ANNUAL SHIFTED STAGE HYDROGRAPHS

Management Unit	1980 Level (feet NGVD)	Future Without-Project Conditions (Estimated 2030 Level Without Management Unit) (feet NGVD)
Henderson	18.1	16.3
Cocodrie Swamp	15.8	14.1
Beau Bayou	14.6	13.1
Buffalo Cove	13.0	12.1
Flat Lake	9.1	8.0

6.107 By 2080, it is probable that the 2,200 acres of headwater lakes existing in 2030 would be almost eliminated due to sedimentation. Some lakes would remain, but it is difficult to estimate the acreage.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.108 No impacts would occur.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.109 With Plan 7, there would be only 1,800 acres of headwater lakes in the basin by 2030, a loss of 16,400 acres. The majority of this loss would be caused by sedimentation and lowering of water levels. The extensive clearing of forests that this plan allows would cause many acres of headwater lakes to be classified as cropland lakes by 2030.

6.110 Compared to future without-project conditions, there would be 100 fewer acres of headwater lakes by 2030. This reduction would be due to sedimentation and conversion of headwater lake habitat to cropland lake habitat, since Plan 7 allows more clearing than would occur under future without-project conditions.

6.111 Impacts during the second half of project life would be similar to those described for Plan 4.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.112 No impacts due to operation and maintenance would occur. Purchase of 16,800 acres of bottomland hardwood forest for mitigation purposes could benefit some headwater lakes by helping to maintain them in a more natural state than would otherwise be the case.

Plan 9 (R)

6.113 Impacts would be similar to those described for Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.114 Maintenance of existing features would have no impact on headwater lakes.

6.115 Operation of the floodway system would hasten sedimentation in headwater lakes. Most sediment enters these lakes during flood events. All rooted aquatic plants would probably be smothered by the blanket of sediment.

**BACKWATER LAKES**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.116 With this plan, there would be a reduction of 3,700 acres in backwater lakes by 2030. This entire loss would be in the Lower Atchafalaya Basin Floodway and would occur because these lakes would become filled with sediment and water levels would drop. The inclusion of management units and sediment control in this plan would slow these processes but not halt them. It is estimated that management units would prevent the loss of approximately 1,100 acres of backwater lakes due to falling water levels. Sediment control would prevent the filling of additional acres and would keep water deeper in existing lakes than would occur under future without-project

conditions. Plan 4, with its environmental easements, would prevent 3,800 acres in the lower floodway from becoming classified as cropland lakes, as would occur under future without-project conditions.

6.117 During the second half of project life, it is highly probable that the acreage of backwater lakes in the lower floodway would continue to decline rapidly. In the backwater area, the acreage of backwater lakes would probably stay constant.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.118 No impacts would occur.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.119 The acreage of backwater lakes would decrease by 8,600 acres during the next 50 years. Approximately 3,930 acres of the total decrease would be due to sedimentation and lowering of the water levels in the Lower Atchafalaya Basin Floodway. Nearly 4,670 acres would be lost as backwater lakes and become reclassified as cropland lakes. Compared to future without-project conditions, this plan would cause the loss of an additional 600 acres due to such reclassifications and sedimentation.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.120 No impacts would occur due to operation and maintenance. Impacts due to mitigation measures would be the same as for fresh bayous, canals, and borrow pits.

Plan 9 (R)

6.121 Impacts of this plan on backwater lakes would be similar to those of Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.122 Maintenance of existing features would have no impact on backwater lakes.

6.123 Operation of the floodway system would result in increased sedimentation in backwater lakes.

## **CROPLAND LAKES**

### **PLAN 4 (EQ)**

#### Major Impacts of Proposed Project Features

6.124 Plan 4, with environmental easements, would preserve the existing cropland lakes through 2080, but would not create any additional acreage. Compared to future without-project conditions, there would be 4,070 fewer acres of such lakes.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.125 No impacts would occur.

### **Plan 7 (NED)**

#### Major Impacts of Proposed Project Features

6.126 If Plan 7 were implemented, cropland lakes would increase from the present 30 acres to 4,900 acres by 2030. This would occur as the clearing of forests caused headwater and backwater lakes to become surrounded by agricultural lands and then become reclassified as cropland lakes. The extensive clearing allowed by Plan 7 would cause 800 acres to become cropland lakes which would have remained other lake types under future without-project conditions.

6.127 During the second half of project life, the continued clearing south of I-10 would cause some of the remaining headwater and backwater lakes to be reclassified as cropland lakes.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.128 No impacts would occur due to operation and maintenance. Building Buffalo Cove management unit and purchase of 16,800 acres of bottomland hardwood forest would prevent certain existing lakes from becoming classified as cropland lakes due to land clearing.

### **Plan 9 (R)**

6.129 Impacts would be similar to those of Plan 4.

#### Impacts of Operation and Maintenance of Existing Features (All Plans)

6.130 Maintenance of existing features would have no impact on cropland lakes. Operation of the floodway system would cause a more rapid sedimentation in cropland lakes.

**BRACKISH AND SALINE MARSH BAYOUS, CANALS, AND BORROW PITS**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.131 Brackish bayous, canals, and borrow pits would increase by 1,900 acres with this plan and under without-project conditions. This change would occur as erosion occurred in the brackish marsh. Saline bayous, canals, and borrow pits would increase by 1,300 acres, also due to erosion.

6.132 During the 2030-2080 period, acreage of both these habitat types would increase.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.133 No impacts would occur.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.134 Construction of the channel alinement of the Avoca Island levee would increase deterioration rates in the brackish marsh, which would lead to creation of approximately 200 more acres of brackish bayous and canals with this plan than under future without-project conditions.

6.135 Between 2030 and 2080 these habitat types would continue to increase.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.136 No impacts would occur.

Plan 9 (R)

6.137 Impacts would be similar to those of Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.138 Maintenance of existing features would have no impact on these waterways. Operation of the system as a floodway would have only a minor impact on such waterways. Some would be scoured slightly deeper by fast moving currents while others would become more shallow due to sedimentation.

## MARSH PONDS AND LAKES

### Plan 4 (EQ)

#### Major Impacts of Proposed Project Features

6.139 Fresh marsh ponds and lakes would increase by 54,000 acres by 2030 with this plan and under future without-project conditions. This increase would occur as fresh marsh deteriorates, erodes, and subsides naturally.

6.140 Brackish marsh ponds and lakes would expand to 75,300 acres with Plan 4 and under future without-project conditions. This increase would occur due to natural erosion of marsh.

6.141 Saline marsh ponds would increase by 34,600 acres compared to present conditions. The increase would be due to naturally occurring marsh loss.

6.142 During the second half of project life, existing trends of marsh erosion and conversion to marsh ponds would probably continue.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.143 No impacts would occur.

### Plan 7 (NED)

#### Major Impacts of Proposed Project Features

6.144 With Plan 7 fresh marsh ponds and lakes would increase by 54,800 acres from the present and by 800 acres over future without-project conditions. The increase from present would be due to the ongoing processes of marsh deterioration and erosion while the increase from the future without-project conditions would be increased pond formation due to marsh deterioration caused by the Avoca Island levee. Plan 7 would create the largest gain in brackish marsh ponds of any plan. By 2030, there would be 21,100 more acres than exist at present and 1,000 acres more than would exist under future without-project conditions. The additional gain over future conditions would be due to construction of Reaches 3 to 5 of the Avoca Island levee, which might increase marsh loss and pond gain. Saline marsh pond acreage might also increase in 2030, because Reach 3 of the levee might cause increased pond formation. Saline ponds might increase by 34,700 acres over present and by 100 acres over the future without-project conditions. If only Reach 1 were built, an additional 100 acres of fresh marsh ponds might form and no additional brackish or saline marsh ponds would form compared to the future without-project conditions.

6.145 Trends in the 2030-2080 period would be similar to those between 1980 and 2030.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.146 No impacts would occur.

Plan 9 (R)

6.147 Trends in fresh, brackish and saline ponds would be similar to those described in Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.148 Maintenance of existing features would have no impact on marsh ponds and lakes.

6.149 Operation of the floodway system would slightly increase sedimentation in these water bodies and could also adversely affect rooted aquatic plants therein. However, the aquatic plants would probably recover quickly. A pre- and post-flood study done in Lake Pontchartrain indicated that operation of the Bonnet Carre Spillway in 1973 had little impact on submerged vegetation in the lake (US Army Corps of Engineers, 1974).

**BAYS AND OPEN GULF**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.150 Deltaic growth in Atchafalaya Bay would cause the loss of 124,900 acres of fresh bay habitat if Plan 4 were implemented. This acreage is the same as that under future without-project conditions. Brackish and saline bays would be expected to show no future change with this alternative or under future without-project conditions. Open gulf waters would also be expected to stay at approximately the present 804,000 acres, both under future without-project conditions and if Plan 4 were implemented.

6.151 It is difficult to project trends from 2030-2080. Atchafalaya Bay would probably be converted entirely to delta by 2010 (Adams and Baumann, 1980) and adjacent fresh bays might begin filling with sediment. Acreage of brackish and saline bays would be expected to stay constant. Acreage of the open gulf would probably decrease slightly as the delta continued its southward growth.



Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.152 Operation of the widened Wax Lake overbank area would speed the loss of fresh bay habitat by increasing delta development.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.153 With this plan, fresh bays might decrease by 120,600 acres in 2030. Compared to future without-project conditions, there might be an increase of 4,300 acres of fresh bay habitat. This increase would occur because construction of the channel alignment of the Avoca Island levee might isolate portions of newly developed delta and thus cause it to deteriorate faster than it would without the levee. If only Reach 1 were built, there would be no impacts to fresh bays. As with Plan 4, brackish and saline bays, and open gulf would be expected to remain at their present acreage.

6.154 Impacts during the second half of project life would be similar to those described for Plan 4.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.155 Impacts would be the same as for Plan 4.

Plan 9 (R)

6.156 Impacts would be similar to those discussed for Plan 4.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.157 Maintenance of existing features would have no impact on bays and open gulf.

6.158 Operation of the floodway system would hasten the demise of Atchafalaya Bay by increasing the rate of deltaic accretion. Salinities in all bays and portions of the gulf would be decreased by the influx of floodwaters.

## FLOOD-CARRYING CAPACITY

Plan 4 (EQ)

### Major Impacts of Proposed Project Features

6.159 This plan would provide for safely conveying the project flood to the gulf, but because of its somewhat higher flowline and accompanying higher costs, it might require longer to achieve the desired capacity than would be the case with other plans.

### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.160 Maintenance of the raised protection and river levees would insure the ability of the floodway system to pass the project flood. Maintenance of the widened Wax Lake overbank area, channel training, distributary realignments and outlet controls would also contribute to the flood-carrying capacity of the project. No impacts due to mitigation measures would occur.

Plan 7 (NED)

### Major Impacts of Proposed Project Features

6.161 This plan would provide for safely conveying the project flood through the Atchafalaya Basin and the outlets to the gulf.

### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.162 Impacts would be the same as for Plan 4.

Plan 9 (R)

6.163 The impacts of this plan would be the same as those of Plan 4.

### Impacts of Operation and Maintenance of Existing Features (All Plans)

6.164 By maintaining the existing features, the flood-carrying capacity of the Atchafalaya Basin Floodway system would be assured. Operation of the floodway would decrease flood-carrying capacity by filling it with additional sediment.

## WATER QUALITY

### Plan 4 (EQ)

#### Major Impacts of Proposed Project Features

6.165 Management units would attempt to maintain historic water levels and overflow regimes in the backswamp areas as the floodway generally becomes drier. This would support the bacterial-detritus basis of productivity and the export of fixed carbon. Channel training works in the Atchafalaya River would decrease overbank flows and the amounts of sediment entering the backswamp areas. Realignment of the Atchafalaya distributaries and closure of other canals would be accomplished for sediment control. The sediment control features would limit slightly the amount of sedimentation occurring in backswamp areas, and would help to preserve the depth and extent of existing aquatic areas. The management units would contribute very little to sediment control and appreciable sedimentation within the management units would still be expected to occur. Inundation of overflow areas for longer periods of time could prevent some aquatic areas from becoming more frequently isolated and stagnant due to lack of flushing. However, holding water within management units would generally increase retention times and decrease velocities, which would limit the physical processes of flushing and aeration. Backswamp areas which are presently subject to low dissolved oxygen conditions in the spring high water season could experience worsened oxygen problems within the management units, especially if inflowing waters do not circulate to all parts of the unit. This could occur, for example, by short-circuiting or impedance of water circulation caused by the creation of dredged-material embankments during canal dredging by the oil and gas industry. In summary, while the management unit provision of the EQ plan could have both positive and negative effects on some key water quality parameters, particularly dissolved oxygen, the units would contribute positively to water quality and water quality-related values in the Lower Atchafalaya Basin Floodway by helping to maintain the physical conditions, which would be more similar to the present than to the future without-project conditions.

6.166 The EQ plan provision proposing environmental easements over most of the floodway would prevent water quality degradation, which would occur under future without-project conditions due to the encroachment of agricultural and residential development into or adjacent to present wetland areas. Limitations on development would preserve the natural purification processes of wetlands and restrict the amount of residential wastes, storm runoff, agricultural runoff or sediment, excess nutrients, and pesticides, which the natural system would have to assimilate.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.167 Operation and maintenance of proposed features should not result in significant adverse impacts on water quality.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.168 With this plan, water quality within the upper and lower floodway areas would generally be poorer than under the EQ plan. Lower average main channel flowlines and fewer diversion routes into overbank areas would lessen their water supplies. The resultant shortening of wet periods and reduced circulation in those areas would cause reductions in dissolved oxygen and nutrient concentrations. As wetland areas became drier, there would be a gradual tendency, in the absence of legal restrictions, for lands to be cleared and converted to agricultural use. Such changes would entail a rise in the levels of pesticides and other toxicants in the lower basin. Only in the extreme southern portion of the floodway would sufficient water remain to support a highly productive aquatic ecosystem. Even there, however, a preponderance of backwater inflows would promote somewhat reduced dissolved oxygen and nutrient concentrations. Seasonal dewatering would, in turn, transport fewer nutrients downstream to the estuary.

6.169 Sediment deposition in the basin would, of course, decrease except below Morgan City, where natural delta formation would occur.

6.170 Construction of the Avoca Island levee extension would greatly limit freshwater input to the Terrebonne marshes. The utilization of one or more properly managed freshwater diversion structures through the levee would, however, be essential to the maintenance of acceptable salinity levels for preservation of existing marsh and its associated ecosystem. This plan would also encourage an increase in agricultural and urban activity in the backwater area northeast of Morgan City as a result of the lowered water levels. Without any controls, runoff from these lands would eventually impact adversely upon water quality conditions in water bodies and marshes in the southern portion of the area. Shellfish and other aquatic species would tend to uptake and concentrate pesticides, metals, and other toxicants introduced to the estuarine waters and sediments.

6.171 The widening of the Wax Lake Outlet overbank area, and the limitation of freshwater outflows to infrequent flood events would deter the freshening trend in the East and West Cote Blanche Bay areas, although the extent of this impact is difficult to predict.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.172 Operation and maintenance impacts would be the same as for Plan 4, but additional favorable impacts due to building the Buffalo Cove management unit and to water diversion measures for mitigation would occur. Some adverse impacts could result if water diversion measures introduced pollutants into areas not presently highly contaminated.

Plan 9 (R)

Major Impacts of Proposed Project Features

6.173 Water quality impacts of Plan 9 would equate to those of the EQ plan with respect to management unit operations and environmental easements in the floodway. Fee purchases and the Dow Chemical Company donation would also preserve water quality.

6.174 This plan provides for channel training in the Lower Atchafalaya River below Morgan City, as does the NED plan. This structural feature would produce a slight lowering of flowlines below those of the EQ plan, thereby contributing to a somewhat more pronounced drying trend in the backswamp areas. Although this plan provides for maintenance of the present outflow distribution from the floodway of 70 and 30 percent in the Lower Atchafalaya River and the Wax Lake Outlet, respectively, the Wax Lake Outlet portion could be reduced to 20 percent if the ecosystem's response were favorable. Such a restriction would deter somewhat the freshening trend in East and West Cote Blanche Bay. Total nutrient transport from the floodway to the estuary would probably be slightly less than under the EQ plan, as a result of more restricted flow interchange with backwater areas, and reduced outflows from the Lower Atchafalaya River directly into Atchafalaya Bay.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.175 Impacts would be the same as for Plan 4.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.176 Maintenance dredging would increase turbidity of the water, release nutrients, and depress oxygen levels.

6.177 Dredging below Bayou Sorrel Lock could increase the amount of pesticides available for uptake into the food web. This impact would be local and short-term.

6.178 Dredging in Berwick Harbor and Berwick Lock Forebay could increase the amounts of heavy metals and PCB's available for uptake. This impact would be local and short-term.

6.179 Barge and ship traffic along maintained waterways would cause spillage of petroleum and other products which would decrease water quality.

6.180 Painting, oiling, and greasing of control structures and locks has the potential to slightly decrease water quality in the immediate area.

6.181 Operation of the floodway would temporarily decrease the water quality in the floodway and in the estuarine area. Turbidity would be greatly increased and temperature would be decreased. Dissolved oxygen in flowing waters would be increased but the debris, detritus, and aquatic plants deposited by floodwaters could lower dissolved oxygen levels as waters recede. Operation of some of the intercepted drainage features would have adverse impacts on water quality because they would introduce waters with high pesticide content into the floodway.

#### **NATURAL AND SCENIC STREAMS**

##### Plan 4 (EQ)

###### Major Impacts of Proposed Project Features

6.182 Plan 4 would have no direct construction impacts on any natural or scenic stream, nor should it have any indirect adverse impact.

###### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.183 No impacts would occur.

##### Plan 7 (NED)

6.184 The scenic qualities of Bayou Penchant could be enhanced by the flood protection this plan would afford due to the Avoca Island levee extension because high water levels along this stream may be killing some of the trees along the banks.

##### Plan 9 (R)

6.185 Impacts would be similar to those described for Plan 4.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.186 Maintenance of existing features and operation of the floodway would have no significant impact on Bayou Penchant. It is possible that extra sediment carried by floodwaters could help rebuild its subsiding and eroding natural banks.

**NAVIGABLE WATERWAYS**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.187 Channel training works on the Atchafalaya Basin main channel, restriction of flows at Wax Lake Outlet, and management units all would have adverse impacts on navigable waters and navigation. Because channel training includes the closure of all side channels and canals except the east and west access channels, the east and west freshwater distribution channel, the Old Atchafalaya River, American Pass, and the GIWW, access to the basin's interior from the main channel would be limited to those waterways, affecting sport and commercial fishing boats as well as vessels servicing energy facilities within the basin's interior. These impacts would be for the project life.

6.188 Restriction of flows through Wax Lake Outlet would also have adverse impacts on vessels entering that waterway via the Atchafalaya Basin main channel. This too would be for the life of the project. Impacts resulting from the construction of management units would be significant for sport and commercial fishing boats and for energy facility service vessels. Artificial ringing of the management units and the closure of incoming bayous and canals would require boats or vessels entering the management unit do so via the outlet or possibly the inlet. This could involve substantial time-travel requirements. Construction of boat rollovers at some closures would partially mitigate the impacts to small boats but not the impacts to large fishing boats or other vessels.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.189 Maintenance of boat rollovers associated with the management units would assure small boat access to the interior of the units. No impacts due to mitigation measures would occur.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.190 Training works on the Atchafalaya Basin main channel and extension of the Avoca Island levee would have adverse impacts on navigation. Similar impacts could be expected as a result of channel training below Morgan City, with additional impacts on navigation resulting from complete closure of Bayou Shaffer. Closure of Wax Lake Outlet would also have adverse impacts on vessels entering that waterway via the main channel. These impacts would last for the life of the project.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.191 Impacts would be as described for Plan 4, except that building Buffalo Cove management unit for mitigation purposes would hinder boat access in that area.

Plan 9 (R)

Major Impacts of Proposed Project Features

6.192 Navigation impacts associated with this plan would be the same as those resulting from the NED plan (except that no impacts from extension of the Avoca Island levee would occur) including impacts related to constructing management units as discussed in the EQ plan.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.193 Impacts would be the same as for Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.194 The maintenance dredging in the main channel, east freshwater distribution channel, east and west access channels, Berwick Bay Harbor, Wax Lake crossing and below Bayou Sorrel Lock all contribute to keeping navigable waterways open to traffic. Maintenance of the lock structures and dredging of forebays and tailbays also keep barge and crew boat traffic flowing smoothly. Routine maintenance and repair of locks should prevent any major breakdowns and consequent long waits by vessels. Traffic is forced to use alternate routes when the locks are dewatered every 10-15 years. Travel time and costs are, therefore, increased for the few months necessary to repair the lock.



6.195 Operation of the floodway system would adversely impact navigable waterways. The swift currents would make navigation difficult or impossible in the main channel and along the floodside Alternate Route of the Gulf Intracoastal Waterway. However, the landside route is maintained for just such occurrences. High water could cause closure of various locks which would cause substantial delays in navigation (US Army Corps of Engineers, 1974).

## FISHERIES

### Plan 4 (EQ)

#### Major Impacts of Proposed Project Features

6.196 To illustrate the impact of each plan on fisheries, the harvest of various species has been estimated. (The methodology used is described in Appendix A, paragraph A.6.61.) Plan 4 would permit the highest estimated harvest of freshwater sport fish in 2030 (Table 6-10). Since management units would be responsible for much of the increased fishery productivity of Plan 4, impacts of this feature are discussed separately.

TABLE 6-10

#### ESTIMATED HARVEST OF VARIOUS AQUATIC SPECIES IN 2030

	Plan 2 FWO	Plan 4 EQ	Plan 7 NED	Plan 9 R
Sunfish <sup>1/</sup>	840.1	1,003.0	736.2	1,002.8
Largemouth Bass <sup>1/</sup>	289.9	343.0	255.7	342.9
Shrimp <sup>2/</sup>	46.8	46.8	46.5	46.7
Menhaden <sup>2/</sup>	170.0	169.9	169.0	169.7
Oysters <sup>3/</sup>	2.2	2.2	2.2	2.2

<sup>1/</sup>Harvest, thousands of fish, Lower Atchafalaya Basin Floodway.

<sup>2/</sup>Harvest, millions of pounds, entire project area.

<sup>3/</sup>Harvest, thousands of pounds, entire project area.

6.197 Management units would maintain water levels in lakes and bayous higher than would occur under future without-project conditions, and would also retain water on the land longer. Compared to future without-project conditions in 2030, units would flood land an average of about 3 to 4 weeks longer from mid-March to mid-May and 2 months longer from January through July. Both the additional depth and longer flooding period would create fishery habitat that would not exist under future without-project conditions. This overflow habitat which would be created would be exceedingly valuable to crawfish and finfish, especially juveniles. Crawfish are dependent on seasonal water level fluctuations to produce high populations. Seasonal water levels within management units would fluctuate more than within the same areas under future without-project conditions. However, day to day fluctuations would be less than they are under present conditions. Severe sedimentation would still occur with units; therefore, the present crawfish harvest would not be maintained. Under future without-project conditions, the maximum sustainable yield has been predicted to drop 39 percent from present levels, but with Plan 4 the decline would be reduced to 28 percent. By retaining higher water levels, units would prevent delay in production of juvenile crawfish and cannibalism of young in burrows.

6.198 By keeping forests flooded for additional time, small fish would be able to stay longer in this nursery area and would therefore, be larger and more able to escape predators as their habitat became restricted by falling water levels. Management units would preserve aquatic habitat in the summer, and these areas would become available for fish as higher temperatures made shallower areas uninhabitable. Management units would flood more forestland than would be flooded under future without-project conditions. Flooding these forests would increase the amount of detritus available to the system and, thereby, increase fishery productivity (Mitzner, 1981).

6.199 At present, the flooding and dewatering of the basin plays a vital role in the cycles of distribution of phytoplankton, zooplankton, and benthos throughout the system. The restriction of flow caused by management units may slow these cycles. However, compared to future without-project conditions, construction of management units would preserve the cycle as the basin dries out. This restriction of flow would probably reduce the amount of organic matter exported to the system downstream. Brinson (1976) has shown a positive correlation between organic matter export and runoff for several watersheds. Thus, management units would probably reduce export compared to the present, but would provide more export than would occur under future without-project conditions. Thus, on balance, management units would be beneficial to the aquatic ecosystem.

6.200 As discussed under headwater lakes, there is doubt that management units could actually preserve present water levels. In that case, the harvest estimates for freshwater species shown in

Table 6-10 are best-case estimates. In Buffalo Cove and Cocodrie Swamp where future levels may be temporarily higher than exist at present, groundcover might be reduced, and the loss of this potential detritus could slightly decrease fishery productivity. If water levels in Henderson and Flat Lakes drop below those at present, the outlets may be restricted to maintain water levels. However, this could cause a lowering of dissolved oxygen and a decrease in fishery productivity.

6.201 Widening of the Wax Lake overbank would have a beneficial impact on fisheries. As the existing levee is degraded, 7,800 acres of cypress-tupelo forests would be reconnected to the river and tidal systems and its detrital output would be available over a larger area. Also, as these forests flooded, more fishery habitat would be available.

6.202 During levee construction, some existing borrow pits would be filled with material for the levee, thus destroying all organisms in them. However, Plan 4 would cause a net increase of 12,090 acres of borrow pits, which would increase fishery productivity. Construction of borrow pits would create temporary turbidity that would have a short-term, minor impact on fisheries. Construction of levees would destroy approximately 5,500 acres of flooded forest and the detritus these forests produce would be permanently lost.

6.203 Bank stabilization of the Atchafalaya main channel after 1980 would temporarily disrupt 1,300 acres; however, these areas should return to benthic production within 1 year. (Prior to 1980, approximately 1,100 acres were disrupted.) The concrete revetments and riprap used for stabilization would harbor different organisms than the existing mud banks, but post-construction productivity should be similar to that of pre-construction times. Channel training along 17.6 miles of the Atchafalaya River would create additional fishery habitat as the river is deepened. However, this would not be a high quality habitat because of swift currents and high turbidity. The placement of dredged material over 2,670 acres of river banks would destroy habitat that is presently available to aquatic animals during high water. Realignment of distributaries would create temporary turbidity and destroy some aquatic habitat while creating more. On the whole, direct construction impacts of the sediment control feature should be minimal. Construction of inlets and outlets for management units would have only a minor impact to fisheries. If levees are required along the border of some units, these levees would remove some presently flooded land from the aquatic system. Direct construction impacts of widening the Wax Lake Outlet overbank would be more than compensated for by the beneficial impacts stated previously.

6.204 By far the most important commercial fishing resource in the Lower Atchafalaya Basin Floodway is the crawfish, which accounts for approximately 78 percent of the ex-vessel value of the total fishery

harvest. The maximum sustainable yield (MSY) of crawfish in the lower floodway is currently estimated at 43 million pounds per year (Bell, 1981), which is considerably in excess of current demand. Projections of demand indicate that by 1992, the demand will exceed potential MSY. Table 6-11 shows how the potential crawfish MSY in the lower floodway is expected to decrease over time under different scenarios. Plan 4 (and 9) would create conditions which would permit the greatest MSY in 2030 of any plan, although there would be a decrease of 28 percent from 1986 harvest levels.

TABLE 6-11

MAXIMUM SUSTAINABLE YIELD FOR WILD CRAWFISH  
IN THE LOWER ATCHAFALAYA BASIN FLOODWAY  
(million of pounds)

Year	Plan 2 FWO	Plan 4 EQ	Plan 7 NED	Plan 9 R
1986	43.00	42.22	43.00	42.22
2036	26.11	30.60	22.24	30.58
Difference	-39%	-28%	-48%	-28%

6.205 In general, all primary commercial species (crawfish, catfish, and buffalo fish) would suffer a decline in MSY in the future. Table 6-12 describes the net income of commercial fishermen in the Atchafalaya Basin Floodway under different alternatives. Again, it can be seen that Plan 4 (and 9) would allow the commercial fishermen the highest net income of all plans.

TABLE 6-12

NET INCOME OF ATCHFALAYA BASIN FLOODWAY  
COMMERCIAL FISHERMEN UNDER DIFFERENT ALTERNATIVES  
(in millions of 1980 dollars)

Year	Plan 2 FWO	Plan 4 EQ	Plan 7 NED	Plan 9 R
1986	2.80	2.80	2.80	2.80
1996	5.47	5.80	5.20	5.79
2006	7.30	8.31	6.86	8.31
2016	8.69	10.38	7.77	10.37
2026	10.16	12.02	8.74	12.02
2036	10.73	12.57	9.14	12.57

6.206 On the whole, the EQ plan would be the best for preserving the fishery resource. It would allow the harvest of more freshwater fish and shellfish than would occur under future without-project conditions. It would be the best of any plan except future without-project conditions to preserve the estuarine fishery.

6.207 During the second half of project life, aquatic habitat in the Lower Atchafalaya Basin Floodway would probably continue to disappear. The management units would probably continue to function. Within the marsh it is even more difficult to predict the fate of fisheries. Marsh degeneration would probably continue as the result of natural causes, and fishery losses would parallel those of the marsh losses.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.208 Operation and maintenance of the proposed features would have no significant impact on fisheries.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.209 Compared to future without-project conditions, Plan 7 would cause a loss in fishery resources in the Lower Atchafalaya Basin Floodway (Table 6-11), the backwater area, and the estuarine area. Compared to other plans, the NED plan would bring about the lowest overall fishery productivity.

6.210 In the lower floodway, sedimentation would continue, but since no management units are included in this plan (except for mitigation purposes in Buffalo Cove), even the 1,500 acres of lakes they would preserve would be lost. As the management unit areas became ringed off by sediment deposits, water quality problems might occur. The increased agricultural production in the lower floodway would introduce sediments and pesticides that would reduce fisheries production. All these conditions would contribute to the loss of fisheries (Tables 6-10 and 6-11). The estimated MSY for crawfish would be 48 percent lower than for 1986 conditions and 9 percent lower than for future without-project conditions (see Table 6-11). Plan 7 would create conditions which would leave the commercial fishermen with the lowest net income of any plan.

6.211 The fishery in the backwater area northeast of Morgan City is much less productive than that of the lower floodway. As land clearing proceeded, the additional pesticides and sediments that would be introduced into the water would cause a decrease in fish production. The increased turbidity could be especially detrimental to the sport fish in Lake Verret.

6.212 In the marshes, channel alinement of the Avoca Island levee would cause a loss of marsh and delta, and hence the greatest fishery loss of any plan. Table 6-10 shows estimated harvests of various estuarine-dependent fish and shellfish if the entire Avoca Island levee extension were built with Plan 7. Marsh and delta loss caused by construction of the Avoca Island levee would reduce fisheries over future without-project conditions. Supplemental water would prevent any more salinity intrusion into the Terrebonne Parish marshes than would occur without the project, but the fisheries resource would still decline compared to future without-project conditions.

6.213 Impacts of other features would be similar to those described under Plan 4, with the exception that levee raising would create 13,220 acres of borrow pits, one of the few fishery benefits of the entire plan. Approximately 5,300 acres of wooded wetlands would be destroyed, which would remove these areas from the aquatic ecosystem permanently. Direct construction impacts of channel training below Morgan City would decrease fishery resources. These channel training works would also decrease the flow of sediment, nutrients, and water to the marshes and forests along the Lower Atchafalaya River and Wax Lake Outlet. This would reduce fisheries productivity by causing losses of marsh and aquatic habitat. The widening of Wax Lake Outlet overbank would have beneficial effects as described for Plan 4.

6.214 Conditions from 2030 to 2080 would be similar to those described under Plan 4, but sedimentation in the Lower Atchafalaya Basin Floodway would be even more severe and the remaining lakes would be classified as cropland lakes. As clearing proceeded below I-10,

the remaining water bodies would have increased levels of pesticides and sediments which would further degrade water quality and fisheries.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.215 No significant impacts due to operation and maintenance would occur. Impacts due to mitigation measures would occur because of building Buffalo Cove management unit and preserving 16,800 acres of bottomland hardwood forest which would offset project-induced fisheries losses (see discussion on the impacts of the major project feature of Plan 4 above). The freshwater diversion into swamplands and marsh outside the basin would also offset fisheries losses attributable to this plan.

Plan 9 (R)

Major Impacts of Proposed Project Features

6.216 Impacts to fisheries would be similar to those described for Plan 4. In the lower floodway and backwater area, impacts should be nearly equal. Channel training below Morgan City would have the same adverse effects described for Plan 7.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.217 Impacts would be similar to those of Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.218 Slow, small benthic organisms would be destroyed both by dredging and by disposal in the waterways. Larger benthic organisms would leave the area and escape harm. If the covering of dredged material were less than 20-30 cm, most burrowing organisms would free themselves (Slotta and Williamson, 1974; Oliver and Slattery, 1976). Repopulation of dredged areas is usually quite rapid and population density and diversity should be restored in 6 months to 1 year. In shallow areas, aquatic plants would be destroyed by dredging.

6.219 Turbidity due to river disposal would adversely affect fish spawning and rearing areas, impact development of juvenile fish and crustaceans, and interfere with filter-feeding fish and zooplankton. Turbidity would also decrease light penetration which would reduce primary productivity.

6.220 Barge traffic would create constant stress on benthic organisms and would limit diversity and abundance.

6.221 Removal of debris from canals and channels would remove fishery habitat and could decrease the fishery productivity of the area.

6.222 Dewatering of locks at 10-15 year intervals would destroy the fish and shellfish trapped within the locks. This would be a minor and infrequent impact.

6.223 The riprap and articulated concrete mattresses to be placed in the Old River Outflow Channel would temporarily destroy some benthic organisms. However, the new habitat would be populated with a different community within 1 to 2 years.

6.224 Operation of the picket boat and radar system at Old River should prevent any barges from being drawn into the low-sill structure. This would have a beneficial impact on fisheries because when a barge accident occurs, the low-sill structure would be closed as far as possible and the amount of water entering the basin would be drastically reduced. This reduction in water would have a significant adverse impact on fisheries by reducing both available habitat and nutrients.

6.225 Operation of the floodway system would have varying impacts on the basin. Many benthic organisms would be destroyed by scouring or by the high quantities of sediment deposited during flooding. Clams, snails, and worms would be the most severely affected (US Army Corps of Engineers, 1973). The nutrients and detritus carried by the floodwaters would increase the fishery productivity of the basin. All levels of the food web would be benefited. The amount of available aquatic habitat would be greatly increased. Thus, more young fish would be produced and more would survive. Certain commercial fish such as catfish, freshwater drum, and buffalo would do exceptionally well after prolonged flooding (Viosca, 1927). Crawfish populations would respond immediately to flooding and catches would be far higher than normal. On the whole, operation of the floodway system would greatly benefit fisheries on a short-term basis. Over the long term, however, operation would have adverse impacts due to loss of habitat due to sedimentation.

6.226 In the coastal zone, most estuarine and marine fish and shellfish would move gulfward ahead of floodwaters. The colder waters and low salinities would adversely influence production of brown shrimp (Barrett and Gillespie, 1973). The indigenous estuarine plankton apparently would remain in the area, but populations would be augmented by freshwater forms (Hawes and Perry, 1978).

6.227 The nutrients carried by the flood would increase productivity of some estuarine species. However, Odum and Wilson (1962) and Odum et al. (1963) found only small changes in total metabolism of coastal waters due to flooding in Texas.



6.228 The increased turbidity in coastal waters caused by operation of the floodway would reduce the amount of phytoplankton present; however, extra nutrient input would probably counteract this.

6.229 Operation of the floodway could also prevent or delay the influx of the juvenile animals that enter the estuarine system in order to mature. Another adverse impact would be that oyster mortality would increase in the Terrebonne Parish oyster beds due to the large influx of fresh water.

6.230 On the whole, the impact of operation of the floodway system on estuarine fisheries would be beneficial.

## **WILDLIFE**

### Plan 4 (EQ)

#### Major Impacts of Proposed Project Features

6.231 With this plan, there would be a slight decrease in certain wildlife resources of the project-affected area in the future. The primary reasons would be the gradual deterioration of the marshlands in Terrebonne Parish and direct destruction of habitat caused by construction during the first decade of project life. It should be noted, however, that plan implementation would cause a highly significant net gain in these resources when compared to what would exist under future without-project conditions. To illustrate the magnitude of these changes, theoretical estimates of population levels of nine representative species were calculated for present and 2030 conditions (Table 6-13). Differences between 2030 levels under future without-project conditions and future with plan conditions were also calculated (Table 6-14). Losses or gains in numbers compared to future without-project conditions are discussed for each of these nine species individually. Other species having similar habitat needs are also discussed. (It should be cautioned that determination of population levels of most species of wildlife is a very inexact procedure. The estimates provided were calculated from data obtained from a survey of literature and from the professional judgment of several biologists.

TABLE 6-13

ESTIMATED POPULATION LEVELS OF REPRESENTATIVE  
WILDLIFE SPECIES IN 1980 AND 2030

Species	1980 Population	2030 POPULATION			
		FWO	With Plan 4	With Plan 7	With Plan 9
White-tailed Deer	12,400	10,700	14,900	10,200	14,900
Swamp Rabbit	371,000	387,000	393,000	385,000	393,000
Black Bear	50	0	More than 50	0	More than 50
Wood Duck <sup>1/</sup>	15,000	14,000	14,000	11,000	14,000
American Robin	453,000	295,000	469,000	289,000	470,000
Clapper Rail	393,000	267,000	267,000	265,000	267,000
Bobwhite Quail	15,000	34,000	16,000	39,000	16,000
Mink	73,000	63,000	73,000	60,000	73,000
Red-eyed Vireo	1,658,000	1,182,000	1,634,000	1,141,000	1,639,000

<sup>1/</sup> Resident birds only.

TABLE 6-14

ESTIMATED DIFFERENCE BETWEEN 2030 POPULATION LEVELS OF REPRESENTATIVE  
WILDILFE SPECIES UNDER FUTURE WITHOUT-PROJECT AND  
FUTURE WITH PROJECT CONDITIONS

Species	With Plan 4	With Plan 7	With Plan 9
White-tailed Deer	+4,200	-500	+4,200
Swamp Rabbit	+6,000	-2,000	+6,000
Black Bear	+ More than 50	0	+ More than 50
Wood Duck <sup>1/</sup>	0	-3,000	0
American Robin	+174,000	-6,000	+175,000
Clapper Rail	0	-2,000	0
Bobwhite Quail	-18,000	+5,000	-18,000
Mink	+10,000	-3,000	+10,000
Red-eyed Vireo	+452,000	-41,000	+457,000

<sup>1/</sup> Resident birds only.

These estimates should be used for comparative purposes only. They do not necessarily represent actual population levels.)

#### DEER

6.232 Net project-induced gain in deer population would be an estimated 4,200 animals. The primary reasons would be the environmental easement feature of this plan, and the gradual drying of the lower floodway which would result as the Atchafalaya River matures. Reduction in extent and duration of flooding coupled with plant successional processes should improve habitat quality for both deer and other primarily terrestrial animals, such as the box turtle or the seasonally abundant white-throated sparrow, which could lead to population increases in these species. It should be noted that the management unit feature of this plan would prevent these improvements in habitat quality in the areas where units would be built.

#### SWAMP RABBIT

6.233 Net project-induced gain in swamp rabbit populations would be an estimated 6,000 animals. As in the case of deer, these animals would benefit somewhat from a reduction in the extent and duration of flooding as long as flooding was not eliminated completely and from the environmental easement feature of this plan which would preserve habitat. Moreover, these animals would greatly benefit from the new habitat created as the Atchafalaya delta enlarges.

#### BEAR

6.234 With Plan 4 in effect, bear populations would be maintained within the project-affected area, and they could possibly expand into habitat not presently occupied. Under future without-project conditions, bears would undoubtedly be eliminated entirely. A similar situation exists for wild turkey, although under future without-project conditions a remnant population might persist in the southern basin.

#### WOOD DUCK

6.235 There would probably be no net project-induced gains or losses in resident wood duck population levels with Plan 4. The reason for this is that the primary limiting factor for resident wood duck populations is the amount and quality of brood-rearing habitat. Under future without-project conditions, there would be large losses of potential wintering habitat for migrant wood ducks but much smaller losses of brood-rearing habitat. Plan 4 would, however, benefit migrant wood duck populations by preserving much of the seasonally flooded bottomland hardwood areas, which are heavily utilized during the winter months. Similar benefits would accrue to other migrant ducks, such as the mallard.

#### AMERICAN ROBIN

6.236 There could be a highly significant estimated net project gain of about 174,000 individuals with Plan 4. Preservation of bottomland hardwood areas with this plan would be the primary reason. Similar benefits would accrue to other migratory winter resident songbirds that utilize the project-affected area.

#### CLAPPER RAIL

6.237 With Plan 4, there would be no net project-induced loss of clapper rails, birds of the brackish and saline marshes. Overall population levels would continue to decline as the coastal marshes continue to deteriorate. Similar changes might occur in populations of other rail species that inhabit the fresh marshes as well as to furbearers such as the nutria and muskrat.

#### BOBWHITE QUAIL

6.238 With this plan, there would be an estimated net project-induced loss of about 18,000 birds. The reason for this would be the prevention of land clearing, which would occur if Plan 4 were implemented. Similar impacts would also occur to populations of other animals of open land or farm areas.

#### MINK

6.239 There would be an estimated net project-induced gain of about 10,000 animals. This gain would largely be due to the preservation of bottomland hardwood and cypress-tupelo forests, which Plan 4 would insure.

#### RED-EYED VIREO

6.240 This small summer-resident songbird could benefit greatly from Plan 4. An estimated net project-induced gain of 452,000 individuals could occur. This gain would result almost exclusively from the prevention of forest clearing that this plan would insure. Similar gains would also be expected to accrue to other species of forest-dwelling songbirds.

6.241 During the construction phase of the project, most sedentary or slow-moving animals living in construction areas would be killed immediately while more active species, forced to flee the area, would probably ultimately die. Certain structural features of this plan could also cause increased animal mortality throughout project life. Probably the most damaging from this standpoint would be the use of sheet-pile and I-wall construction to raise the protection levees. This type construction prevents passage of animals and is particularly damaging to semi-aquatic species, such as turtles, which must seek nesting areas on dry land away from the floodway. These walls could also be highly disruptive to deer and other larger animals

during times of extreme high water when they are forced to flee the floodway to seek dry ground.

6.242 With Plan 4, net income to trappers would increase from about \$185,000 in 1980 to \$186,000 in 2030. This would be a value of about \$16,000 greater than would be expected under future without-project conditions.

6.243 Overall population levels of some species of wildlife would probably continue a slow decline in the post 2030 period of project life. The natural deterioration of the Terrebonne Parish marshes, due to subsidence and erosion, would continue. Within the backwater area northeast of Morgan City, urban and industrial encroachment upon wetland areas, would probably continue, and this would have adverse impacts upon wildlife populations. Within the floodway proper, overall population levels would probably stabilize, although increases in numbers of certain species might occur as forest succession proceeded to a more mature stage. On the other hand, continued loss of wetland areas would cause water-dependent animals, such as wading birds, to continue to decline. By the year 2080, the basin would probably become an "island" of forested habitat surrounded by urban and agricultural land and as such, it would be of immense value to wildlife.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.244 Any loss of forest habitat caused by maintenance of proposed project features would be reflected in a loss in wildlife. Such impacts are expected to be minor. Mowing of the levees could disturb ground-nesting birds and destroy young or slow moving animals. Policing of the lands on which easements have been taken would prevent unauthorized land clearing and preserve wildlife habitat.

#### Plan 7 (NED)

#### Major Impacts of Proposed Project Features

6.245 With this plan in effect, there would be a highly significant decrease in most wildlife resources of the project-affected area in the future. The primary reason for this decline would be the loss of existing bottomland hardwood habitat, both within the floodway proper and in the backwater area northeast of Morgan City. Additional losses would occur due to environmental degradation caused by pollution of the remaining forested habitats, the result of expanded urban and agricultural activities and to extension of the Avoca Island levee. To illustrate the magnitude of these losses, estimates of population levels of representative species are examined, as was done in the case of Plan 4 (see Tables 6-13 and 6-14 for a comparison of plans).

#### DEER

6.246 There would be an estimated net project-induced loss of about 500 deer by the year 2030. This loss would be almost entirely due to loss of bottomland hardwood forests caused by clearing of these areas for agriculture. By 2030, most of the higher quality deer habitat now present in the project-affected area would no longer exist.

#### SWAMP RABBIT

6.247 Estimated net project-induced losses in swamp rabbit population would be 2,000 animals. The reason for these losses would be the same as that described for deer.

#### BEAR

6.248 Bear would probably cease to exist within the project-affected area by 2030. Thus, with Plan 7, the situation would be the same as under future without-project conditions.

#### WOOD DUCK

6.249 Estimated net project-induced losses to resident wood duck populations would be about 3,000 birds. Loss of brood-rearing habitat would be the primary reason for this decline. Project losses to migratory wood duck population would be even higher than under future without-project conditions because Plan 7 would eliminate much of the seasonably flooded forestland that these birds need for survival during winter. Similar losses to other migratory species, such as the mallard, would occur.

#### AMERICAN ROBIN

6.250 Estimated net project-induced loss to populations to the American robin could be about 6,000 birds, Loss of forest habitat would be the cause, and similar decreases would occur in populations of other winter-resident, migratory songbirds that are dependent upon this type of habitat.

#### CLAPPER RAIL

6.251 There would be an estimated net project loss to clapper rail populations of about 2,000 birds. Plan 7 would be more destructive than any other plan to marsh-dwelling forms of wildlife, such as the rails, and also to furbearers, such as the nutria. The reason for this is the channel alinement of the Avoca Island levee, which would affect delta development and accelerate marsh losses in the Terrebonne Parish marshland area.

#### BOBWHITE QUAIL

6.252 There would be an estimated net induced project gain in bobwhite quail populations of about 5,000 birds. This and other species of wildlife that utilize farmlands and other open areas would benefit from this plan.

#### MINK

6.253 Estimated net project-induced losses of 3,000 animals would occur due to reduced forestland, swamp, and marshland habitat.

#### RED-EYED VIREO

6.254 Plan 7 would be extremely damaging to these summer-resident songbirds. An estimated net project-induced loss of 41,000 individuals could result, primarily from forest loss associated with agricultural expansion.

6.255 Other impacts similar to those described for Plan 4 would also occur with this plan due to construction activity and structural features such as erection of sheet piling.

6.256 With Plan 7, net income due to commercial trapping would decrease from \$185,000 in 1980 to \$163,000 in 2030. This change represents a loss of about \$7,000 of net revenue when compared to future without-project conditions in 2030.

6.257 The overall decrease in population levels of wildlife that would occur from 1980 to 2030 would continue in the post-2030 period. As the lower floodway continued to become drier, due to maturation of the Atchafalaya River and to sedimentation in wetland areas, continued land clearing for agriculture would no doubt occur; therefore, by 2080, only remnants of the unbroken forest and swampland



that exists today would be found. This habitat loss would cause population decreases in most forms of wildlife, which would be similar to what would happen under future without-project conditions. In the marshland areas of the project-affected area, the completed Avoca Island levee would continue to cause accelerated land loss in Terrebonne Parish. It is probable that much of the existing marsh in that area would be converted into open water. Corresponding losses in marsh dependent wildlife would occur.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.258 Operation and maintenance impacts would be similar to those of Plans 4 and 9; however, policing of the real estate easement features of this plan would not produce significant benefits in terms of preventing habitat loss since these easements would not prevent land clearing for conversion to agricultural uses.

6.259 Project-induced losses would be offset by mitigation measures such as preservation of 16,800 acres of bottomland hardwood forest, preservation of forest and aquatic habitat due to the building of Buffalo Cove management unit, and freshwater diversion into swampland and marshland outside the basin.

Plan 9 (R)

6.260 The impacts of Plan 9 upon wildlife resources would be similar to those of Plan 4 (Tables 6-13 and 6-14). However, additional construction needed for channel training on the Lower Atchafalaya River and Wax Lake Outlet would cause slight changes in the population levels of certain species. Species requiring old growth forests would not be benefited as much by this plan as by Plan 4, since it would preserve little land which would not be subject to lumbering activities.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.261 Less mobile species of wildlife would be destroyed by maintenance dredging activities. Mobile species would be forced to go to adjacent areas where it is unlikely that they would survive. As disposal areas revegetated, they would again be available as wildlife habitat, but annually used disposal areas would probably never become valuable habitat since they would be perpetually in early stages of succession.

6.262 If wildlife fed on any disposal areas polluted with heavy metals or pesticides, these materials could cause the death or injury of the animals or affect their offspring. Carnivores would be the most likely to accumulate high levels of these toxic substances.

Noise related to maintenance of existing features would have only minimal impacts. Mowing of the levees could disturb some ground nesting birds or destroy slow-moving or young animals.

6.263 Operation of the floodway system would have adverse impacts on most wildlife species. Wildlife would be subjected to two basic kinds of stress, one from the initial surge of floodwaters and the other from crowding and isolation of populations by rising waters. Deer, rabbits, opossums, raccoons, and others all would be forced to leave their home ranges and would utilize the levees and other high ground (Yaeger and Anderson, 1944; US Army Corps of Engineers, 1973). During the 1973 operation of the floodway, 150 to 200 of the estimated 5,000 to 6,000 white-tailed deer in the basin were killed. Reproductive success was also reduced that year. The loss was reduced because of rescue efforts by state and Federal agencies. Similar losses could occur in the future. Concentration of deer on the levees would subject them to harassment, predation, and starvation. On the other hand, mammals such as the raccoon and mink, that feed on aquatic animals would be benefited by flooding.

6.264 Small mammal populations would be severely affected. Blair (1939) found essentially no small mammals in a stream bottom 1 year after flooding. McCarley (1959) found that prolonged flooding had a severe impact on mouse populations. Observations in the basin after the 1973 flood indicated that virtually all mice were killed (US Army Corps of Engineers, 1973). Within a year, such populations should regain their pre-flood populations.

6.265 Salamander and lizard populations would be severely depleted by operation of the floodway because they are very poor swimmers. Turtle egg laying would be adversely affected by high water, but the percentage survival of young actually hatched would be high.

6.266 There would be few adverse impacts to most birds due to operation of the floodway. Most would simply leave the flooded area. However, ground nesting birds such as turkey and quail would have their eggs and nests destroyed. (Approximately 90 percent of the 1973 turkey hatch was lost.) Ground feeding birds, such as towhees, would be adversely affected. Wading birds would be benefited by the increase in fish and crawfish caused by the flood. Carrion-consuming birds would also have an increased food supply because of flood-induced animal mortality.

## ROOKERIES

### Plan 4 (EQ)

#### Major Impacts of Proposed Project Features

6.267 Plan 4 would have beneficial impacts upon rookeries because it would permit the acquisition of protective easements on up to 500 acres of such sites. The management unit and environmental easement features of this plan would also benefit rookeries by providing more feeding habitat for the various wading birds using rookery sites than would be the case under future without-project conditions. On the other hand, the recreational development features of the plan would increase annual use of the lower floodway by over 1 million user days. This increased human presence could have adverse impacts due to illegal hunting or to persons attempting to enter rookery sites during the nesting season.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.268 Operation and maintenance of proposed features would have a minor impact on rookeries. Policing of the area to prevent unauthorized land clearing and poaching would benefit rookeries. No impacts due to mitigation measures would occur.

### Plan 7 (NED)

#### Major Impacts of Proposed Project Features

6.269 This plan would have no beneficial impacts on rookery sites. It would not protect feeding habitat as well as Plan 4, and the agricultural expansion that it would allow would result in increased pollution of the wetland areas needed as feeding sites by the adult birds. This increased pollution would have a detrimental effect but the extent is not quantifiable. The recreational development features of this plan would have the same disruptive impacts as those of Plan 4. Additionally, channel training of the Lower Atchafalaya River during the first decade of project life could directly disturb four rookery sites.

6.270 During the second half of project life, this plan would have an increasingly detrimental effect upon rookery sites and the birds that use them because of continued expansion of agricultural activity that this plan would permit.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.271 There would be no rookeries on the 1,500 acres of recreational lands; therefore, operation and maintenance would have

no impact. Building Buffalo Cove management unit and preserving 16,800 acres of bottomland hardwood forest would benefit certain rookeries by preserving feeding habitat needed by adult birds using the rookeries. Water diversion into marsh and swamplands outside the basin for mitigation purposes would likewise benefit rookeries by increasing the productivity of feeding habitat used by adult birds.

Plan 9 (R)

6.272 This plan would have the same impacts as Plan 4 except that it could also cause disturbance of four rookery sites along the Lower Atchafalaya River due to the channel training features that would be built during the first decade of project life.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.273 Maintenance of existing features would have only a minor impact on rookeries. It is possible that heavy metals or pesticides resuspended by maintenance dredging could adversely affect birds using rookery areas. The rookeries in Sweetbay Lake south of Morgan City would be the ones most likely to be affected.

6.274 Operation of the floodway system would increase wading bird productivity by increasing the number of fish and shellfish upon which wading birds feed.

**AUDUBON SOCIETY BLUE LIST SPECIES**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.275 Generally, Plan 4 would benefit most Blue List species when compared to future without-project conditions since it would preserve existing forestland habitat.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.276 Operation and maintenance of proposed features would have a minor impact on Blue List species. Policing of the land to prevent unauthorized clearing and poaching would protect Blue List species.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.277 Generally, this plan would be detrimental to most Blue List species particularly those inhabiting marshlands and bottomland hardwood forests. Loss of habitat due to marsh deterioration and land clearing for agriculture, coupled with increased pollution and decreasing water levels caused by this plan, would be the primary reasons.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.278 Few Blue List species would inhabit the 1,500 acres of recreational lands so operation and maintenance of these lands would have little impact.

6.279 Beneficial impacts due to mitigation measures would occur due to the building of the Buffalo Cove management unit, preserving 16,800 acres of bottomland hardwood forest, and water diversion into marsh and swampland outside the basin. These actions would preserve and raise the productivity of the habitat of many forest dwelling species.

Plan 9 (R)

6.280 The impacts of this plan would be almost identical to those of Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.281 Maintenance of existing features would have a minor impact on Blue List species that utilize forested areas. Dredged material disposal which would create pioneer early successional communities would slightly decrease available forest habitat.

6.282 Operation of the floodway would benefit species that depend on the aquatic ecosystem for their food. Ground-nesting or feeding species would be adversely impacted, but the impact should not cause a permanent decline in population levels.

## ENDANGERED AND THREATENED SPECIES

### Plan 4 (EQ)

#### Major Impacts of Proposed Project Features

6.283 With this plan, 11 of the 16 kinds of endangered and threatened species which may occur within the project-affected area would not be affected at all. Six would be affected beneficially and four would be affected adversely by various project features. The net impact of these beneficial and adverse impacts would be that two species, the Arctic peregrine falcon and Bachman's Warbler could be affected beneficially while two species, the ivory-billed woodpecker and the Florida panther, could be affected adversely. The primary reason for beneficial impacts would be the environmental easement feature of this plan, which would preserve needed habitat and prevent increased pollution. Potential adverse impacts could arise primarily due to the increased human presence within the area, which would be brought about by the recreational development features of this plan. This could lead to increased harassment and possible death or injury due to shooting. Additional details on impacts to endangered species are found in Appendix H.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.284 Operation and maintenance should have negligible impacts.

### Plan 7 (NED)

#### Major Impacts of Proposed Project Features

6.285 With Plan 7, 10 of the 16 kinds of endangered and threatened species would not be affected at all. Six would be affected adversely due primarily to either a loss of habitat or increased pollution occurring as a result of expanded agricultural activity within the Lower Atchafalaya Basin Floodway. These six are the ivory-billed woodpecker, the Arctic peregrine falcon, the bald eagle, the brown pelican, Bachman's Warbler, and the Florida panther. No species would be beneficially affected by this plan to any significant degree.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.286 Water diversion as a mitigation measure would benefit both marsh and swamp dwelling species. Purchase of 16,800 acres of bottomland hardwood forest for a public hunting area could benefit the ivory-billed woodpecker, Bachman's warbler, and the Florida panther by preserving needed habitat, but increased hunting could lead to accidental or deliberate shooting of the ivory-bill and the panther.

Creation of the Buffalo Cove management unit could also benefit the above mentioned species. Operation and maintenance should have minimal impacts.

Plan 9 (R)

6.287 The impacts of this plan would be similar to those of Plan 4.

Impacts of Operation and Maintenance of Existing Project Features (All Plans)

6.288 Operation of the floodway during a major flood could have significant impacts upon several species. All marsh dwelling forms would be benefited by the floodwaters, which would overflow the marshes and contribute toward increasing their long-term productivity as well as the aerial extent of the delta marsh habitats. Floodwater caused mortality of bottomland hardwood trees could benefit the ivory-billed woodpecker by creating additional feeding habitat. On the other hand, floodwaters could adversely affect the Florida panther by direct inundation of land areas and by causing a reduction in its principal food source, the white-tailed deer, as well as other smaller prey species.

**RECREATIONAL FEATURES**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.289 With this plan, total existing recreation user-days in the project-affected area would increase in the future by 1,272,000 so that by the year 2030, there would be 1,541,000 annual recreation user-days available. This is an increase of 1,321,000 recreation user-days over future without-project conditions and represents an average annual net worth increase of \$18,338,000. Plan 4 would cause a major increase in recreation user-days due to the environmental easement features that prevent land clearing and conversion in the lower floodway and backwater area; and it would also provide for access to lands therein, which would be managed or developed to enhance recreational use.

6.290 The impacts of this plan on the total number of water surface acres of supply available to support boating activities versus acres needed over the project life were comparatively analyzed (see Appendix F of this report). This analysis revealed that water surface acreage losses would not preclude future use, based upon existing and proposed boat-launching access and available water surface acres of supply. Losses would, however, decrease the quality of the outdoor

experience as headwater and backwater lake acreage would be lost, causing a shift in future use concentrations to the less preferred bayous and canals.

6.291 Data are not available to forecast exact conditions beyond the year 2030, but if trends continue into the future, recreational use potential in the lower floodway would increase slightly over time. This increase would result from the natural succession of certain habitat type acreage to a type with higher recreational use potential. Marsh acreage would, however, continue to decline, lowering associated user-day potentials. Because much land outside the floodway in the region would probably be cleared for agricultural purposes, the nonconsumptive recreational use potential in the floodway would probably increase because of the nonavailability of the resource elsewhere. Use occurring on the developed recreational features proposed by this plan would remain constant and at optimal design-carrying capacity levels.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.292 Operation and maintenance of proposed features would have a beneficial impact on recreation features. Maintenance of the boat rollovers into the management units would allow access by fishermen and hunters. The policing of the lands protected by easements would prevent unauthorized land clearing and preserve the existing forests. Preservation of such forests would maintain existing and future recreation potentials.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.293 With this plan, total existing recreation user-days in the project-affected area would increase in the future by 962,000 so that by the year 2030, there would be 1,231,000 annual recreation user-days available. This increase of 1,011,000 recreation user-days over future without-project conditions represents an average annual net worth increase of \$16,462,000. Losses of recreation user-days are attributed to extensive clearing of forestlands for agricultural purposes in both the lower floodway and backwater area; to the natural process of marsh deterioration; and to the Avoca Island levee extension, which would directly interfere with delta development and increase marsh deterioration. Increases in recreation user-days under this plan would result from the fee acquisition of 1,500 acres for recreational development. Impacts of this plan on water-based recreational activities are the same as those of Plan 4.

6.294 Data are not available to forecast conditions beyond the year 2030, but if land clearing continued throughout the remainder of the



project life, at least 25,000 additional acres of forestland would be cleared resulting in an additional loss of at least 9,500 annual recreation user-days worth \$286,000.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.295 Operation and maintenance of proposed features would be similar to that described for Plan 4, however, there would be considerably less recreation land to police. Mitigation measures would make available for recreational use, about 16,800 acres of bottomland hardwood forest for a wildlife management area.

Plan 9 (R)

Major Impacts of Proposed Project Features

6.296 With this plan, total existing recreation user-days in the project-affected area would increase in the future by 1,055,000 so that by the year 2030, there would be 1,324,000 annual recreation user-days available. The increase of 1,104,000 recreation user-days over future without-project conditions would represent an average annual net worth increase of \$18,052,000. The reasons for these increases would be the same as those discussed under the EQ plan. The impacts of the recreational development plan would be identical to those discussed under the NED plan.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.297 These impacts would be the same as those of Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.298 Maintenance of existing features would have only a minor impact on recreation. The conversion of forest to the pioneer early successional type due to disposal of dredged material would slightly decrease the available supply for hunting and wildlife-oriented recreation. Boat and barge traffic due to operation of navigable waterways would create a hazard to recreational users of these areas.

6.299 Since it is most likely that the floodway system would be operated in the spring, actual operation could adversely affect turkey hunting. Deer, turkey, quail, squirrels and rabbits lost in the flood would decrease the quality of the following hunting season. It was estimated that the 1973 flood caused a loss of 7,050 days of hunting on three management areas in the Red River backwater area (US Army Corps of Engineers, 1973). Fishing is disrupted during flooding due to swift currents and turbidity. The same study estimated a 1,500

user-day loss of fishing in these wildlife management areas. In the Atchafalaya Basin floodway, fishing was reported to have declined about 90 percent during the flood; however, post-flood fishing was greatly improved. This improvement was due to increased fish numbers and to the opening of previously inaccessible areas due to flushing by the floodwaters. Crawfishing activity was high during the flood, increasing about 50 percent above normal. It has been estimated that the net loss in fishing due to the 1973 flood was 55 percent. Similar impacts would be expected to occur each time the floodway system is used but they would be of a greater magnitude under Plan 4 (EQ) and Plan 9 (R) conditions since these plans would protect the resource base upon which recreational activities are founded.

#### **WILDLIFE REFUGES AND MANAGEMENT AREAS**

##### Plan 4 (EQ)

###### Major Impacts of Proposed Project Features

6.300 Plan 4 would increase the public use of the two state wildlife management areas within the lower floodway and Atchafalaya Bay. The recreation features of this plan would enable many more people to visit these areas than would be possible under future without-project conditions. On the other hand, certain construction features of this plan would have adverse impacts upon these areas. Channel training of the Atchafalaya River main channel would destroy or alter small portions of the Attakapas Wildlife Management Area from river miles 90 to 95 (Plate 6), and the management unit feature would hinder boat access into the Buffalo Cove portion of the area due to channel closures and weir construction (Plate 1).

###### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.301 Operation and maintenance of proposed features would have a minor adverse impact on Attakapas Wildlife Management Area. Maintenance of the boat rollovers would preserve small boat access into the area.

##### Plan 7 (NED)

###### Major Impacts of Proposed Project Features

6.302 Plan 7 would also increase public use of the two management areas due to its features for recreational development. This plan would, however, cause additional disruptions due to possible construction of the entire Avoca Island levee through the center of the developing delta, which comprises the Atchafalaya Bay Wildlife

Management Area. The levee would reduce delta development and thereby reduce the overall size of the marsh areas making up the management areas. Thus, future users would have fewer acres to utilize. The presence of the Avoca Island levee would also have adverse esthetic impacts. If only Reach 1 were built, there would be no impact on the delta.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.303 Impacts due to operation and maintenance would be similar to those of Plan 4. Impacts of mitigation measures would be the same as those discussed for recreation resources.

Plan 9 (R)

6.304 The impacts of Plan 9 on existing wildlife management areas would be similar to those of Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.305 Maintenance of existing features would have a positive impact on Three Rivers Wildlife Management Area. By preventing erosion in the Old River control structure outflow channel, the Three Rivers lands would be protected.

6.306 Operation of the floodway system would have a beneficial impact on the Atchafalaya Delta Wildlife Management Area by rapidly increasing the amount of valuable marsh habitat. Floodway operation would tend to fill lakes in the Attakapas area and cause the loss of cypress-tupelo habitat. On the other hand, it could alter the process of succession in bottomland hardwoods by elevating the land and allowing desirable species more adapted to dry sites to grow.

**TIMBER**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.307 With this plan, there would be a slight overall decrease in timber resources in the project-affected area in the future (see section on forest habitat types for acreage changes that would affect timber resources). Within the lower floodway proper, however, an increase would occur due to the nondevelopment easement feature of this plan coupled with plant successional changes. Net income from timber production would decrease from about \$5,960,000 in 1980 to

about \$5,458,000 in 2030. The 2030 net income figure is, however, about \$1,096,000 higher than would be the case under future without-project conditions. Additional information on the impacts of this plan on timber resources may be found in the sections on bottomland hardwood forests and cypress-tupelo swamps.

6.308 During the second half of project life, timber resources would probably increase in quality and value as the lower floodway continued to become drier in the north and plant succession led to improved stand composition in the bottomland hardwood areas. This would be in marked contrast to future without-project conditions where most bottomland hardwood forests in the northern portion of the lower floodway would be cleared for agricultural use. On the other hand, logging of cypress in the southern floodway could lead to decreases in timber resources similar to those that would occur under future without-project conditions.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.309 Policing of the easement lands would prevent unauthorized clearing of forests, which would preserve the timber resource. No impacts due to mitigation measures would occur.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.310 With Plan 7, about half of the timber resources of the project-affected area would be lost by 2030 due to land clearing in both the Lower Atchafalaya Basin Floodway and in the backwater area northeast of Morgan City. This is slightly more than would be the case under future without-project conditions (see sections on forest habitat types for acreage changes affecting timber resources). Net income from timber production would decrease from about \$5,960,000 in 1982 to about \$4,148,000 in 2030. This represents an additional decrease of about \$214,000 more than would occur under future without-project conditions in the year 2036. (Additional information about impacts of this plan on timber resources may be found in the sections on bottomland hardwood forests and cypress-tupelo swamps).

6.311 Continued loss of timber resources would occur during the second half of project life due to further land clearing. The magnitude of these losses would be about equal to what would occur under future without-project conditions.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.312 Operation and maintenance of proposed project features would have little impact on timber. Purchase of 16,800 acres of bottomland hardwood forest and the building of Buffalo Cove management unit would preserve timber resources that might otherwise be lost due to land clearing.

Plan 9 (R)

6.313 The impacts of this plan would be similar to those of Plan 4; however, there would be no prohibition of timber harvest on 20,000 acres of cypress-tupelo forest as there could be with Plan 4. Net income from timber production would, however, be slightly less in 2030 than under Plan 4 conditions. This difference would amount to about \$17,000.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.314 The maintenance of existing features would have an adverse impact on about 5,000 forested acres. Disposal of dredged material on these areas would destroy existing trees and regular disposal would prevent growth of marketable timber.

6.315 It is unlikely that timber resources would be heavily damaged by operation of the floodway. Few substantial losses were reported due to the 1973 opening of the Morganza Floodway. As discussed under forest types, some seedlings, saplings and trees would be lost due to sedimentation and scouring, but growth of others would be benefited by the flood-carried nutrients. Estimated losses of timber in the 1973 flood were \$500,000 (US Army Corps of Engineers, 1974). Substantial losses would occur in the timber industry due to curtailment or reduction of operations caused by high waters. Estimated losses in the 1973 flood due to such causes were \$5.7 million.

**OIL, GAS, AND MINERALS**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.316 Flood control easements and the construction of management units might create situations where oil and gas exploration would be inconvenienced. With construction of management units, situations could develop where dredging of access or pipeline canals would disrupt the functioning of the management unit by interrupting water circulation patterns, unless special steps are taken. For example,

dredged material from the access canal might have to be deposited in a manner that would not restrict or disrupt the water flow, thus preserving the hydrological integrity of the management unit. The frequency and magnitude of these impacts are presently unknown; however, the potential for significant impacts would exist. Such impacts would not occur under future without-project conditions.

6.317 If oil and gas extraction is still occurring in the second half of project life, then it could be affected as described above.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.318 Operation and maintenance of proposed project features would have a minor beneficial impact on the oil and gas industry. By keeping the main channel from severely eroding and crevassing, oil and gas installations would be protected.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.319 With this plan, minor impacts to oil, gas, and mineral exploration could occur due to the nondevelopment flood control easement feature.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.320 Operation and maintenance impacts would be the same as for Plan 4. Building Buffalo Cove management unit could inconvenience oil and gas exploration and extraction.

Plan 9 (R)

6.321 Impacts would be the same as for Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.322 Maintenance of existing features would have a positive impact on oil and gas interests by keeping navigable waterways open for crew boats and barges. The maintenance of locks would allow their continued use by mineral related industries.

6.323 Operation of the floodway system during major floods would cause substantial damages to the petroleum and natural gas industries within the basin. All oil and gas fields in the basin would suffer losses with production dropping by 60-90 percent (US Army Corps of Engineers, 1974). Besides production losses, damages to physical equipment facilities would occur.

## **CULTURE OF THE BASIN**

### **Plan 4 (EQ)**

#### Major Impacts of Proposed Project Features

6.324 The increased flooding in the backwater area northeast of Morgan City could lead to disruption of communities and displacement of commercial fishermen and other swamp users currently residing on natural levees. The nondevelopment flood control and environmental easements and the management units under this plan would serve to enhance the natural resources upon which the economy of the basin's folk culture is based. When compared to future without-project conditions, implementation of this plan would lessen the sedimentation rate and restrict land clearing in the lower floodway. This would slow the deterioration of the natural conditions, which have traditionally supported the economy of the basin's inhabitants. However, the greatly increased recreational use of the Lower Atchafalaya Basin Floodway, resulting from expanded public access and recreational development, would bring recreationists into conflict with existing commercial use of the floodway. The disruption of existing access routes and the limited access, which would be provided by the management units, would affect the traditional utilization of the basin's resources and cause competition over limited access facilities. The ongoing levee enlargement would continue to displace people in the Henderson Lake and Catahoula areas (Plate 5).

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.325 Operation and maintenance of proposed project features would generally have a beneficial impact on the culture of the basin by maintaining features which serve to preserve and enhance natural swamp productivity. The effects of the policing of easements on the culture of the basin would be decided by the relative allocation of swamp resources to recreational use versus the established commercial use of these resources.

### **Plan 7 (NED)**

#### Major Impacts of Proposed Project Features

6.326 The siltation and clearing for conversion to agriculture of thousands of acres of presently forested land in the floodway and backwater area would have detrimental and far-reaching effects upon the folk culture of the project-affected area. The loss of this natural habitat would result in a concurrent decline in the quantity and quality of the resources available for utilization by the area's inhabitants. Traditional occupations would necessarily be abandoned in favor of employment in the petroleum and other industries.

Folk traditions, adaptive skills, and crafts would be lost in a relatively short time. This plan would allow more clearing than would occur under future without-project conditions and would, therefore, be more detrimental to the folk culture. The increased recreational use of the lower floodway above the base and future without-project conditions would lead to conflicts between the recreationists and the traditional commercial fishermen over the dwindling resource base. Therefore, the deterioration of the resource base and the increased competition from recreational users would adversely and irrevocably impact the folk culture existing in the project-affected area.

6.327 During the second half of project life, swamp productivity would continue to deteriorate, thereby further disrupting the traditional folk culture.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.328 Operation and maintenance of proposed features would have no impact on the culture of the basin. Acquisition of 16,800 acres of bottomland hardwoods and implementation of the Buffalo Cove management unit would generally have a beneficial impact. However, increased recreational use and the limited access provided to the management unit would adversely affect culture of the basin.

Plan 9 (R)

6.329 The impacts of this plan would be similar to those of Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.330 Maintenance of existing features would have a beneficial impact on the culture of the project-affected area. Continued maintenance dredging would keep navigation open for commercial fishing vessels.

6.331 Operation of the floodway system would have long-term beneficial impacts on the culture of the basin due to the subsequent increase in fishery productivity. The short-term effects would be mixed, as fishing success during a flood greatly decreases and crawfishing yield increases significantly.

**NATIONAL TRUST PROPERTIES**

6.332 There are no National Trust properties in the project-affected area.



## NATIONAL REGISTER PROPERTIES

### Plan 4 (EQ)

#### Major Impacts of Proposed Project Features

6.333 The draft report on the findings of the cultural resources survey of the East and West Atchafalaya Protection levees identified 12 cultural resources in the survey corridor as significant and eligible for inclusion in the National Register, including the two National Register-eligible properties in the project-affected area. Because the Avoca Island Pumping Plant Number 1, 16SMY52 is located in the potential environmental impact area of the project, a determination of eligibility was requested from the Keeper of the National Register pursuant to Title 36CFR Part 800. The resource was determined eligible on 14 September 1981 and a determination of no effect was executed on 14 September 1981 after minor alteration of the project design to avoid any impacts on the property. Four of the 12 significant resources (16SMY104, 16SMY107, 16AV33, and 16AV35), although located in the survey corridor, would not be affected by the project and therefore no further action is planned. For the remaining seven significant resources (16IV4, 16SM75, 16SMY130, 16SMY66, 16SMY2, 16SM50, and Register-eligible 16SM45) precise construction limits have not yet been determined. As project design continues, a determination of eligibility will be requested and the compliance procedures outlined in Title 36CFR Part 800 would be initiated for each of these resources located in the potential impact area of the project. Both Plan 4 and the future without-project condition include the levee raising feature. Thus, with both conditions, the ongoing levee enlargements would possibly affect one National Register property in the project-affected area, 16SM45, and six of the sites identified by cultural resources survey as potentially eligible for inclusion in the National Register. The full impact of other features of Plan 4 upon National Register properties cannot be addressed without the benefit of an intensive cultural resources survey of all areas to be affected by project features. Such a survey would be conducted for all features of the plan during the next stage of planning.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.334 Impacts of operation and maintenance of proposed project features and mitigation measures cannot be determined until cultural resources surveys of all the project features are completed. Upon completion of the cultural resources surveys, sufficient information would be available to avoid or protect significant cultural resources determined eligible for inclusion in the National Register, or, in the absence of a feasible alternative, mitigate any adverse effects by data recovery.

Plans 7 and 9 (NED and R)

6.335 The impacts of these plans would be the same as those of Plan 4.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.336 Maintenance of existing features would not have an adverse impact on any cultural resources currently listed in or determined eligible for inclusion in the National Register. Upon completion of the cultural resources survey of all project features, sufficient data would be available to avoid or protect significant sites, or, in the absence of a feasible alternative, mitigate any adverse effects by data recovery.

6.337 Operation of the floodway system could adversely impact sites eligible for the register by eroding them or covering them with sediment.

**ARCHEOLOGICAL RESOURCES**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.338 Since both Plan 4 and future without-project conditions include levee raising, these plans would have similar impacts on archeological resources and both would adversely affect numerous recorded sites. All other construction impacts of this plan must be measured against the zero construction impacts of future without-project conditions. Although the full impact of this plan cannot be determined due to an incomplete data base and the preliminary levels of design, the effects can be estimated based upon known site locations and prehistoric and historic settlement information. The land alteration related to recreation development and construction of other major project features would impact many recorded sites and undoubtedly more presently unrecorded sites. With this plan, urban development would occur mostly along the natural levees in the backwater area. Archeological sites now protected by their location in forestland along the edges of plowed fields would be affected by urban expansion.

6.339 The environmental easements of this plan would be beneficial to the conservation of archeological resources by regulating land clearing and excavation over all property in the lower floodway except some developed ridges. Although such an easement would protect cultural resources from unregulated land development, oil and gas

exploration would not be restricted, and these activities would continue to damage archeological resources. Additionally, public use of the 105,000 acres of public access lands under the real estate feature would subject archeological resources in these areas to vandalism and destructive artifact hunting.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.340 Operation and maintenance of proposed project features should not have an adverse impact on archeological resources. Upon completion of a cultural resources survey of all project features, sufficient information would be available to avoid or protect significant sites or, if required, to develop a mitigation plan.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.341 With this plan, the agricultural development that would occur in the project-affected area would result in adverse impacts to scores of archeological resources. Sites presently protected by their location in seasonally flooded areas would be impacted by agricultural expansion. The increased recreational use of the basin would subject archeological sites to vandalism and destructive artifact hunting. Additionally, construction related to major project features would impact numerous recorded sites.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.342 Purchase of 16,800 acres of bottomland hardwood forest and the building of Buffalo Cove management unit would protect any sites present in these areas.

Plan 9 (R)

6.343 The impacts of this plan would be similar to those of Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.344 The impacts of maintaining existing features cannot presently be determined as only a portion of the affected areas have been subject to cultural resources surveys. Upon completion of cultural resources survey of all project features, sufficient information would be available to avoid or protect significant sites, or, in the absence of a feasible alternative, mitigate any adverse impacts by data recovery.

6.345 Operation of the floodway system would adversely impact archeological sites by erosion and sedimentation.

#### **NATIONAL REGISTRY OF NATURAL LANDMARK SITES**

##### Plan 4 (EQ)

###### Major Impacts of Proposed Project Features

6.346 Plan 4 would preserve large amounts of habitat in the natural state. This would allow the Registry to include the maximum amount of land if the final evaluation indicates the Lower Atchafalaya Basin Floodway or portions thereof are a significant landmark. The environmental easement would also allow flexibility in choosing lands, since the decision makers prefer to list lands already under some governmental protection.

6.347 If the lower basin is not chosen as a national landmark during the next 50 years, Plan 4 should preserve enough natural areas to allow it to be considered as a landmark in the future.

###### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.348 Operation and maintenance of proposed project features would have a positive impact on a potential national landmark. Policing of the easements would preserve the timber and prevent illegal land clearing.

##### Plan 7 (NED)

###### Major Impacts of Proposed Project Features

6.349 Plan 7 would preserve less land in the natural state than Plans 4 or 9. Thus, the amount of land available for consideration as a natural landmark would be less with this plan. Also, most of the lower basin would remain in private ownership, which might further discourage any designation as a national landmark.

6.350 In the second half of project life, the additional land clearing below I-10 that would occur would limit availability for consideration.

###### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.351 Mitigation measures and operation and maintenance of proposed project features would have no impact on a potential national landmark.

Plan 9 (R)

6.352 Impacts would be similar to those discussed under Plan 4, since this plan would also preserve large amounts of the lower floodway in a natural condition.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.353 Operation and maintenance of existing features would have no impact on any potential national landmark.

**OPEN SPACE**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.354 This plan would provide for preservation of much of the existing open space within the project area, which would be lost under future without-project conditions.

6.355 During the 2030-2080 period, the open space protected by Plan 4 would become even more valuable as development surrounded the floodway.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.356 Policing of easements would prevent illegal clearing and preserve the naturalness of the area.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.357 This plan would stimulate the elimination of much of the open space in both the lower floodway and in the backwater area northeast of Morgan City. Loss of open space of a similar magnitude would also occur under future without-project conditions within the floodway but not within the backwater area.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.358 Impacts would be the same as for Plan 4. However, the real estate feature would be minimal and it is unlikely that policing to prevent clearing would be necessary.

6.359 Purchase of 16,800 acres of bottomland hardwood forest and building of Buffalo Cove management unit would preserve the existing open space of these areas.

Plan 9 (R)

6.360 This plan would have similar impacts upon open space as would Plan 4.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.361 Maintenance of existing features would have a minor adverse impact on open spaces. Disposal of dredged material would destroy some existing forest.

6.362 Operation of the system as a floodway would have no impact on open space.

**AIR QUALITY**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.363 Emissions from machinery and dust created during construction would slightly degrade air quality during the first decade of project life. This impact would be minor and temporary. Compared to future without-project conditions, this plan would prevent land clearing. Thus, the air pollution caused by burning of cleared timber and emissions from farm machinery would be prevented.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.364 Emissions from and dust caused by equipment utilized for maintenance of proposed features would cause a slight, temporary degradation in air quality.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.365 Direct construction impacts would be similar to those of Plan 4. However, the conversion to agriculture that would occur with this plan would be even greater than under future without-project conditions. Thus, the air pollution associated with clearing and farming would be increased over future without-project conditions.

Air quality in the Morgan City area would be degraded due to expansion of industrial activity made possible by extension of the Avoca Island levee.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.366 These impacts would be similar to those of Plan 4.

Plan 9 (R)

6.367 Impacts of this plan would be the same as those of Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.368 Impacts would be similar to the operation and maintenance impacts of proposed features described for Plan 4.

**ESTHETIC VALUES**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.369 With Plan 4 in effect, esthetic values within the project-affected area would continue to decline due to the process of sedimentation and to the activities of the oil and gas industry. Harvesting of timber in the cypress-tupelo swamps would also cause a loss in esthetic values. These adverse changes would also occur under future without-project conditions. Certain project features, such as raising the east and west protection levees, would permanently degrade esthetic values, especially where sheet-piling construction is used. Other project construction would cause a short-term decrease in esthetic values early in project life. On the other hand, environmental easements of this plan would greatly enhance esthetic values by preserving the vast bottomland hardwood forest of the area. Overall, Plan 4 would greatly benefit esthetic values when compared to what would occur under future without-project conditions.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.370 Operation and maintenance of proposed project features would have a beneficial impact on esthetic values. Policing of the easements would protect existing forestlands from illegal clearing.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.371 This plan would bring about even greater degradation of esthetic values within the lower floodway and Atchafalaya Bay than would occur under future without-project conditions. Increased agricultural development within the floodway and the construction of the Avoca Island levee through the center of the developing delta would be the primary reason for this. Construction impacts would be similar to those of Plan 4.

6.372 Continued degradation of esthetic values would occur during the second half of project life due to continued development of the lower floodway.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.373 Operation and maintenance of proposed project features would have no impact on esthetic values. Mitigation measures would bring about gains in esthetic values due to preservation of 16,800 acres of bottomland hardwood forest and the building of Buffalo Cove management unit.

Plan 9 (R)

6.374 The impacts of Plan 9 would be similar to those of Plan 4. However, channel training of the Lower Atchafalaya River and Wax Lake Outlet would slightly increase losses to esthetic values and the real estate features of this plan would not preserve the esthetic values of cypress-tupelo swamp and bottomland hardwood forests as well as would Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.375 Maintenance of existing features would have an adverse impact on esthetics in the basin. The trees killed during maintenance dredging as well as the dredges and noise would decrease esthetic values. By permitting the continuance of barge traffic, maintenance would decrease esthetics.

6.376 Operation of the floodway system would have only minor impacts on esthetic values of the floodway. It is probable that people would visit the area to watch the flow of floodwaters.



## UNDEVELOPED LAND

### Plan 4 (EQ)

#### Major Impacts of Proposed Project Features

6.377 With this plan, most of the undeveloped land within the project affected area that could be developed under future without-project conditions would remain undeveloped due to the flood control and environmental easement feature of the plan or due to the rising water levels in the backwater area northeast of Morgan City.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.378 Operation and maintenance of proposed features would have a positive impact on undeveloped land. Policing of easements would prevent illegal clearing.

### Plan 7 (NED)

#### Major Impacts of Proposed Project Features

6.379 With this plan, much of the undeveloped land within the lower floodway would be developed for agriculture and in the backwater area northeast of Morgan City; such land would eventually be developed for agriculture, industry, or housing. Under future without-project conditions, much of this development could not occur in the backwater area, but could occur within the floodway.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.380 Operation and maintenance of proposed features would have no impact on undeveloped land. Building Buffalo Cove management unit and the purchase of 16,800 acres of bottomland hardwood forest would maintain these areas in an undeveloped state.

### Plan 9 (R)

6.381 The impacts of this plan would be the same as those of Plan 4.

#### Impacts of Operation and Maintenance of Existing Features (All Plans)

6.382 Operation and maintenance of existing features would have no impact on undeveloped land.

**PROPERTY OWNERSHIP**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.383 In addition to the land requirements necessary for construction, this plan would affect property ownership in the lower floodway through the easements and fee acquisitions that are part of the plan. It has not been precisely determined at this time how these acquisitions would affect the existing pattern of property ownership because the exact location of some specific easements have yet to be pinpointed.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.384 No impacts would occur.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.385 This plan would impact property ownership as a result of the land requirements necessary for construction. It would also impact the lower floodway as a result of easement and fee acquisition but to a lesser extent than Plans 4 and 9, since real estate features are limited to acquisition of nondevelopmental easements plus a small amount of fee land for recreational development features.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.386 Impacts due to purchase of 16,800 acres of bottomland hardwood forest for mitigation would occur.

Plan 9 (R)

6.387 The impacts of this plan would be the same as those of Plan 4 except that fee purchase from willing sellers would replace the public access and timber ownership easements.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.388 Operation and maintenance of existing features would have no impact on property ownership.

# Section 122 Items

## **NOISE**

### Plan 4 (EQ)

#### Major Impacts of Proposed Project Features

6.389 This plan would increase noise levels within the lower floodway and in the area south of Morgan City during the initial construction phase of the project. Following completion of initial construction, noise levels in the southernmost parts of the project-affected area would continue to be higher than under future without-project conditions due to the increased recreational use of the area that would occur with this plan. In the northern parts of the floodway, noise levels would probably be lower than under future without-project conditions, since the future without-project condition includes the noise associated with agricultural development.

6.390 From 2030 to 2080, noise levels would continue to be higher than under future without-project conditions in the south and lower in the north.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.391 Operation and maintenance of proposed project features would cause a minor increase in noise levels due to operation of equipment necessary to maintain project features.

### Plan 7 (NED)

#### Major Impacts of Proposed Project Features

6.392 Plan 7 would significantly increase noise above future without-project conditions levels. This would be brought about by initial project construction as well as by the increased recreational usage and industrial and agricultural development that would follow the construction phase of this plan.

6.393 Continuing expansion of agricultural and industrial development during the 2030-2080 period could continue to increase noise above future without-project levels.

#### Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.394 Impacts would be the same as for Plan 4.

Plan 9 (R)

6.395 Noise levels with this plan would not differ significantly from those of Plan 4, except during the initial construction phase when they would be slightly higher in the areas south of Morgan City due to the dredging activities associated with channel training the Lower Atchafalaya River and Wax Lake Outlet.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.396 Maintenance of existing features would have a minor adverse impact with regard to noise. The dredges and other equipment necessary to maintain various control structures, locks, etc., would increase noise levels as would machinery used to mow levees and grounds around structures.

6.397 Operation of the floodway system would not significantly increase noise levels.

**DISPLACEMENT OF PEOPLE**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.398 This plan would cause considerable displacement of people, with consequent relocations. This would occur primarily due to the raising of the east and west guide levees (Plate 5) during the first part of project life. This work would impact hundreds of additional structures located primarily in the Henderson Lake and Courtableau areas. (Similar impacts would occur under future without-project conditions.) Many of these structures are residential and would require relocation. Additional displacement of people could occur due to realignment of distributary channels (Plate 7) and to widening the Wax Lake Outlet overbank area (Plate 9). It should be noted that this plan would not prevent the displacement and relocation of people in the backwater area northeast of Morgan City, which could occur under future without-project conditions due to rising water levels in that area. Several thousand people could be harmed by the water level increases, which would occur.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.399 No impacts would occur.

Plan 7 (NED)

6.400 The impacts of this plan would be the same as those of Plan 4 except that extension of the Avoca Island levee would prevent displacement of some people in the backwater area northeast of Morgan City.

Plan 9 (R)

6.401 The impacts of this plan would be the same as those of Plan 4.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.402 Maintenance of existing features would cause no displacement of people.

6.403 Operation of the floodway system would cause displacement of people from camps in the interior of the basin. Temporary displacement of people could also occur in the Upper Pointe Coupee Loop area, Krotz Springs, Melville, Butte La Rose, and Morgan City.

**COMMUNITY COHESION**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.404 Under future without-project conditions, the lower floodway would become drier and extensive conversion of forestland to agricultural land would occur. These changes would make it more difficult to preserve traditional lifestyles in the area, causing a shift from employment in fishing and trapping to such activities as oil and gas production or agriculture. This plan would reduce the drying out process and subsequent agricultural development of the lower floodway compared to future without-project conditions and would result in less loss of fishing and trapping habitat. This would help to preserve the traditional lifestyle of the area. There are, however, other features of this plan that could unfavorably impact community cohesion. Public access to large areas of the lower floodways, made available by the easements and recreation features of the plan, could create a conflict between commercial and sport fishermen. Expanded activities by sport fishermen could be viewed as encroachment into the "territorial claims" of commercial fishermen. Increased public access could also disrupt traditional patterns and habits of the many private hunting clubs in the lower floodway. Future rising water levels in the backwater area northeast of Morgan City would also tend to disrupt community cohesion.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.405 No impacts would occur.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.406 This plan's impacts would be essentially the same as under future without-project conditions, except that the Avoca Island levee would benefit community cohesion in the backwater area by preventing forced displacement of homes and businesses.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.407 No impacts would occur.

Plan 9 (R)

6.408 This plan's impacts would be the same as those of Plan 4.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.409 Maintenance of existing features would benefit community cohesion. Maintenance of intercepted and interior drainage would assure protection of people and property. Continued maintenance of the Old River complex would increase public trust in the structures.

6.410 Operation of the floodway system would not significantly impact community cohesion.

**COMMUNITY GROWTH**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.411 The flood control and environmental easements of this plan would restrict community growth in the lower floodway.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.412 No impacts would occur.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.413 This plan would remove a potential hindrance to community growth in the backwater area by extending the Avoca Island levee. By preventing rising water levels, the area's growth potential would not be artificially impeded by an unacceptably high flood hazard.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.414 No significant impacts would occur.

Plan 9 (R)

6.415 The impacts of this plan would be the same as those of Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.416 Operation and maintenance of existing features would have no significant impact on community growth.

**LOCAL GOVERNMENT FINANCE, TAX REVENUES, AND PROPERTY VALUES**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.417 The recreational development features of this plan would increase use of the lower floodway, thereby generating increase in sales and other taxes. On the other hand, the environmental easements of this plan would preclude agricultural expansion in the floodway and would prevent the generation of additional tax revenues above what would occur under future without-project conditions in that area.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.418 No impacts would occur.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.419 In the floodway area, there would be a significant change from future without-project conditions since the developmental control

easements of this plan would prevent expansion of urban or industrial development within the floodway. In the backwater area northeast of Morgan City, conversion of forestland to agricultural land and expansion of other forms of development could increase local property tax revenues.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.420 Purchase of 16,800 acres of bottomland hardwood forest as a mitigation measure would lower tax revenues by removing this land from the tax rolls.

Plan 9 (R)

6.421 The impacts of Plan 9 would be the same as those of Plan 4.

Impacts of Operation and Maintenance of Existing Features (All Plans)

6.422 Maintenance of existing features would have no impact on these factors.

6.423 The losses in agriculture, industry, and commerce that would occur due to operation of the floodway would cause a minor reduction in tax revenues and property value.

**PUBLIC SERVICES AND FACILITIES**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.424 Increased visitation in the lower floodway resulting primarily from the recreational development feature of this plan would impact, to a minor degree, the public services and facilities of the area. The additional activity, for example, could necessitate a greater level of sanitation and law enforcement services.

Impacts of Mitigation Measures and Operation and Maintenance of Proposed Project Features

6.425 Operation and maintenance of proposed features would necessitate increased employment in the area of public services in order to manage the recreation facilities and the easement areas.



Plan 7 (NED)

6.426 The impacts of this plan would be similar to those of Plan 4.

Plan 9 (R)

6.427 The impacts would be the same as those discussed for Plan 4.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.428 Maintenance of existing features would have no impact on public services and facilities.

6.429 Operation of the floodway system would cause substantial utility losses. In the Morgan City area it is likely that gas transmission lines would rupture, and telephone and electric service would be disrupted. Road and bridge damage would be substantial. During the 1973 flood, approximately \$1,635,000 in losses were incurred by utilities (US Army Corps of Engineers, 1974). Similar losses could occur in the future. These losses would be greater under Plan 7 (NED) conditions than would be the case if the other plans were implemented.

**BUSINESS AND INDUSTRIAL ACTIVITY AND REGIONAL GROWTH**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.430 The developmental control and environmental easement features of this plan would prevent further regional growth that could occur due to business, industrial, and agricultural expansion in the lower floodway.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.431 No impacts would occur.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.432 Within the lower floodway, developmental control easements would prevent business and industrial expansion but in the backwater area northeast of Morgan City, extension of the Avoca Island levee would encourage such expansion.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.433 No impacts would occur.

Plan 9 (R)

6.434 The impacts of this plan would be the same as those of Plan 4.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.435 Maintenance of existing features would have a positive impact on these activities. Dredging of navigation channels would allow continued use of waterways by business and industry.

6.436 Operation of the floodway system would adversely impact industrial and commercial developments located on the river side of the levee in Morgan City and Berwick and within the floodway south of Krotz Springs. In 1973, losses to such industries were \$25,176,000, while commercial losses were \$7,511,000. It should be remembered, however, that operation of the system would occur on the average of only once every 20 years.

**EMPLOYMENT AND LABOR FORCE**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.437 With this plan there would be additional employment opportunities, of a minor degree of importance, generated by construction of the various structural features of this plan. There would also be additional employment opportunities resulting from the increased visitation generated by the recreational development features of this plan. In the backwater area, existing employment opportunities, could be lost due to abandonment of industrial and other commercial activities resulting under Plan 4 conditions. Within the lower floodway, the environmental easement and management unit features of this plan would help to maintain existing employment opportunities in commercial fishing and the timber industry, but would restrict potential opportunities in agriculture that could develop under future without-project conditions.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.438 Operation and maintenance of proposed project features would have a minor beneficial impact on employment because it would take numerous people to operate and maintain project features.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.439 In the floodway, conditions affecting employment and the labor force would be similar to those that would occur under future without-project conditions except that nonagricultural employment opportunities would be limited. In the backwater areas northeast of Morgan City, extension of the Avoca Island levee would help maintain existing employment opportunities which could be lost due to rising water levels under future without-project conditions.

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.440 Impacts would be the same as for Plan 4.

Plan 9 (R)

6.441 The impacts of Plan 9 would be the same as those of Plan 4.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.442 Operation of the floodway system would cause a temporary decrease in employment in the project-affected area because of flood caused interruptions, but an increase following the flood due to the need to repair and rebuild damaged structures.

**DISPLACEMENT OF FARMS**

Plan 4 (EQ)

Major Impacts of Proposed Project Features

6.443 This plan could allow approximately 10,000 acres currently used primarily for growing sugarcane to go out of production due to rising water levels in the future. (About 3,000 of these acres could eventually be protected by the proposed Terrebonne Parish Forced Drainage Project.)

Impacts of Mitigation Measures and Operation and Maintenance  
of Proposed Project Features

6.444 No impacts would occur.

Plan 7 (NED)

Major Impacts of Proposed Project Features

6.445 This plan incorporates the Avoca Island levee extension which would provide lower stages in the backwater area and would therefore help prevent about 10,000 acres of farmland from going out of production.

Plan 9 (R)

6.446 The impacts of this plan would be similar to those of Plan 4. This plan would, however, cause the loss of several thousand acres of existing farmland within the lower floodway, which would be purchased in fee for public access purposes.

Impacts of Operation and Maintenance of Existing Features  
(All Plans)

6.447 Maintenance of existing features would not displace any farms.

6.448 Operation of the floodway system would not permanently displace farms, but would temporarily disrupt production of all farms within the floodway system.

**VECTORS**

Plans 4 (EQ), 7 (NED), and 9 (R)

All Features

6.449 Deposition of dredged material has the potential to increase the breeding and development habitat for permanent water mosquitoes in confined disposal areas and habitat for temporary water breeders in unconfined areas and drying confined areas. Features such as channel training, sediment control, and widening Wax Lake Outlet overbank could also slightly increase mosquito potential. The district would incorporate into its plans measures to reduce mosquito breeding conditions to a minimum. Adult and larval pesticide spraying by local interests could become necessary.

## 7. LIST OF PREPARERS

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

<u>Name</u>	<u>Discipline/Expertise</u>	<u>Experience</u>	<u>Principal Role in Preparing EIS</u>
Mr. Howard R. Bush	Recreation Resource Management/Outdoor Recreation Planning	5 years, Outdoor Recreation Planner, Department of Planning, State of Arkansas; 3 years, Outdoor Recreation Planner, New Orleans District	Effects on Recreation Resources/ Effects of Recreation Development Plan on the Environment
Mr. Eugene C. Buglewicz	Limnology	1 year, Water Quality Specialist, Department of Environmental Control, Nebraska; 5 years, Limnologist, Corps of Engineers, Walla Walla District; 3 years, Research Limnologist, Corps of Engineers, Waterways Experiment Station, Vicksburg, Mississippi; 1 year, Environmental Studies, Corps of Engineers, Lower Mississippi Valley Division.	Preparation of 404(b)(1) Evaluations on Bank Stabilization and Maintenance Dredging
Mr. Nicholas G. Constan	Economics	12 years, Economic and Social Analysis Branch, New Orleans District	Economic and Social Impacts
Mr. Marvin A. Drake	Engineering/Environmental Engineering	12 years, Hydraulic and Environmental Engineer, New Orleans District	Effects on Water Quality
Mr. Donald M. Dunn <sup>1/</sup>	Civil Engineering/Water Resources Planning	2 years, Civil Engineer, Arkansas State Highway Department; 5 years, Civil Engineer, Memphis District, Corps of Engineers; 3 years, Civil Engineer, New Orleans District	Study Manager, Needs Assessment Plan Formulation Rationale, Effects on Flood-Carrying Capacity and Prime and Unique Farmlands Public Involvement
Miss Jessica Fox	Economics	2 years, Economist, Bureau of Labor Statistics, Atlanta and Philadelphia Regions; 8 months, Economist, New Orleans District	Socio-Economic Effects

<u>Name</u>	<u>Discipline/Expertise</u>	<u>Experience</u>	<u>Principal Role in Preparing EIS</u>
Mr. Paul J. Hanley <sup>1</sup> / Mrs. Suzanne Hawes	Economics Botany/Fisheries/Marsh Ecology	4 years economic studies, New Orleans District 1 year Lab Associate, LSU Medical School; 10 years, Environmental Studies, New Orleans District	Socio-Economic Effects Effects on Fisheries and Marshes 404(b)(1) Evaluations
Mr. Jeffrey S. Heaton	Oceanography/Water Quality Specialist	2 years, Oceanographer, Naval Oceanographic Office, Bay St. Louis, MS; 1 year, Water Quality Section, New Orleans District	Effects on Water Quality
Mr. G. Gordon Hebert	Mechanical, Civil and Environmental Engineering/ Recreation Resource Management/Water Resources Planning	14 years, Project Engineering-Design and Construction Management for various manufacturing, construction, and consulting engineering firms; 6 years, Recreation Resource Management and Water Resources Planning New Orleans District	Study Manager, Coordination and Preparation of Final Report
Mr. Theodore G. Hokkanen	Recreation Resource Management/ Outdoor Recreation Planning	5.5 years, Chief Park Ranger, Pennsylvania Bureau of State Parks; 4 years, Chief Resource Ranger, Corps of Engineers, Vicksburg District; 2 years, Outdoor Recreation Planning New Orleans District	Effects on Recreation Resources/ Effects of Recreation Development Plan on the Environment
Mr. H. Tom Holland	Aquatic Biology	4 years, Fishery Research Biologist, US Fish and Wildlife Service; 1 year, Fishery Biologist, Corps of Engineers, St. Louis District; 4 years, District Biologist, Corps of Engineers, Jacksonville District; 9 years, Environmental Studies, Corps of Engineers, Lower Mississippi Valley Division	Section 404(b)(1) Evaluations on Channel Training (Atchafalaya River) and Maintenance Dredging
Miss June S. Holley	Secretary/Typist	7 months, New Orleans District; 3 years, US Army Reserve, New Orleans	Typing
Mr. Binford Johnson	Technical Publications/ writing/editing	9 years, Technical writer/editor, Boeing Company and Bell Aerospace; 10 years, managing and chief editor of trade publications, Chamber of Commerce of the Greater New Orleans area; 3.5 years, public information specialist with NO DRC and EPA. Kansas City, MO; 2 years, Technical publications/editor, New Orleans District	Editing and Coordination

<u>Name</u>	<u>Discipline/Expertise</u>	<u>Experience</u>	<u>Principal Role in Preparing EIS</u>
Ms. Elizabeth L. Johnson	Secretary/Typist	6 years, New Orleans District	Typing
Mr. Everett K. Johnson	Economics	30 years with Federal Government; 12 years, Chief Economist, New Orleans District	Review and Editing
Mr. Richard Manguno	Economics	5 years, Economic Studies, New Orleans District	Socio-Economic Effects
Mr. Gregory Martinez	Biology/Zoology/Fisheries	3 years Environmental Planning and Functions, Corps of Engineers, Nashville District; 5 months, Environmental Planning, New Orleans District	Effects on Fishery Resources 404(b)(1) Evaluation on Levees
Ms. Toni L. Massa	Secretary/Typist	7 years, New Orleans District	Typing
Dr. Tom Pullen, Jr.	Wildlife Biology/Ecology	5 years, Assistant Professor of Zoology, Auburn University; 2 years, Coordinator of Wildlife, Office of National Parks and Wildlife, El Salvador C.A.; 3 years planning and EIS studies, New Orleans District	EIS Coordinator, Effects on Terrestrial Habitat Types and Wildlife Resources
Mr. Oscar F. Rowe, Jr.	Mechanical and Civil Engineering/Water Resources Planning/Outdoor Recreation Planning and Resources Management	4 years, Mechanical Design, Air Force and Chrysler Corp.; 6 years, Mechanical, Civil, and General Engineering, Design, New Orleans District; 8 years, Civil Engineering Supervision, Operations, Maintenance, and Recreation and Resources Management, Planning and Design for New Orleans District's Dam and Lake Water Resource Projects; 2.3 years, Civil Engineering Supervision, Water Resources Planning, New Orleans District	Study Management Supervision, Coordination and Review, Preparation of draft and final reports.
Mr. James F. Roy <sup>1/</sup>	Planning/Civil Engineering, Water Resources	8 years, Civil Engineer (hydraulics); 25 years, Planner, Water Resources Studies and Reports; 5 years Chief Planner, New Orleans District	Management, Policy Directing and Review
Mr. Robert H. Schroeder, Jr.	Civil Engineering/Water Resources, Planning	3 years, Civil Engineering Consultant; 2 years, Construction Engineer, City of New Orleans; 18 years Civil Engineering, New Orleans District	Management, Supervision, Coordination and Review

<u>Name</u>	<u>Discipline/Expertise</u>	<u>Experience</u>	<u>Principal Role in Preparing EIS</u>
Mr. Daniel Smith <sup>1/</sup>	Engineering/Environmental Engineering	3 years, Environmental Engineer, New Orleans District	Effects on Water Quality
Mr. Michael E. Stout	Archeology/Cultural Resource Management	4 years, Corps of Engineers, New Orleans District	Effects on Cultural Resources
Mr. James E. Warren	Engineer/Environmental Engineer	3 years, Water Quality Section, New Orleans District	Effects on Water Quality
Mr. John C. Weber	General Biology/Zoology	3.5 years, Chemist, Texas Parks and Wildlife Department; 10 years, Environmental Planning and Regulatory Functions, New Orleans District	Review and Editing

<sup>1/</sup>Formerly employed by New Orleans District.



## 8. PUBLIC INVOLVEMENT

8.1 This chapter describes the public involvement program to date and discusses how public views were incorporated into the study process. It includes the list of agencies, groups, and individuals, to whom the report/EIS was sent.

### Public Involvement Program

8.2 This project has a long history of public involvement (as discussed in Section 1 of the main report). Prior to 1975, in the early stages of planning, 13 formal public meetings were held at various locations from Monroe to Morgan City to determine the desires of local interests. As a result, major requests were received for completion of the authorized flood control project and for preservation of fish, wildlife, and recreation resources. In 1972, a Steering Group, comprised of representatives from the National Wildlife Federation, the Louisiana Department of Public Works, the Louisiana Department of Wildlife and Fisheries, the US Department of the Interior, the US Environmental Protection Agency (US EPA), and the Louisiana State University, School of Environmental Design, was created to aid the US Army Corps of Engineers in EIS preparation. This group was active until 1976. A preliminary draft EIS, covering the previously authorized plan, was made public in November 1974, and a public meeting was held in January 1975. Concern was expressed that the plan was inadequate and would not protect Morgan City and other communities located at the lower end of the floodway system from flooding. Many people felt that the plan was lacking in methods to preserve environmental values in the floodway. In response, the Steering Group developed a multipurpose concept for the basin. Concurrently, in April 1974, an Agency Management Group, chaired by the US Army Corps of Engineers, and including the US EPA, the US Fish and Wildlife Service (US FWS), and the State of Louisiana, was formed to manage studies for development of a multipurpose plan for the basin. In 1976, studies of the authorized plan and preparation of an EIS were combined with Agency Management Group studies so that a comprehensive multipurpose plan for the basin could be developed. In late 1978, the Agency Management Group developed 10 multipurpose alternatives that were presented at a series of five public meetings in January 1979. These meetings attracted more than 5,000 people. Afterwards, approximately 25,000 comments centered on the primary focus of the meetings, which was a discussion of a plan developed by the US FWS to purchase the Lower Atchafalaya Basin Floodway. In 1980, representatives from environmental organizations, hunting clubs, the

oil and gas industry, the League of Women Voters, landowner organizations, sport fishing clubs, commercial fishing groups, agricultural interests, timber interests, and minority groups were invited and attended Agency Management Group meetings so that they could keep their constituents informed on the status of planning efforts. During 1979 and 1980, three meetings to review the status of the project were held in Washington, DC, with national level representatives of the Agency Management Group and other interested Federal agencies, national officers of environmental groups, and officials of the State of Louisiana.

8.3 In July 1981, five public meetings were held to discuss the tentatively selected plan, presented to the public in the draft report/EIS. These meetings attracted about 1,000 people, and about 4,000 written responses were subsequently received. Oral comments made during these meetings and the written comments received afterwards centered upon the proposed real estate feature of the tentatively selected plan.

## Required Coordination.

8.4 Circulation of the draft EIS accomplished the required coordination with the appropriate state, regional, and metropolitan Office of Management and Budget Circular A95 Clearinghouses, as provided under Executive Order 11988 (Floodplain Management); the Heritage Conservation and Recreation Service (HCRS) or their successor, and State Historic Preservation Officer, as provided under the National Historic Preservation Act; and the HCRS and National Park Service, as provided under the Federal Water Project Recreation Act. Circulation to the list of agencies, groups, and individuals mentioned in the following paragraph satisfied requirements of the National Environmental Policy Act. The participating state and Federal agencies and other interests such as landowners, hunting clubs, and the environmental groups are expected to continue an active role in this study.

## Statement Recipients

8.5 All members of Congress and Federal and state agencies and environmental groups listed below were furnished copies of the draft main report/EIS (Volume 1). Each received Report Appendixes (Volumes 2, 3, and 4) that apply to their respective field(s) of expertise.

All others listed below received copies of Volume 1. For those interested in reviewing Volumes 2 through 4, but who were not mailed copies for review, copies were furnished the libraries listed below. The final report/EIS will be distributed to everyone on this list. In addition, each will receive a copy of the Public Views and Responses Appendix (Appendix J), which is Volume 4.

#### FEDERAL

J. Bennett Johnston, US Senator  
Russell B. Long, US Senator  
Corinne C. Boggs, US Congresswoman  
John B. Breaux, US Congressman  
Jerry Huckaby, US Congressman  
Robert L. Livingston, US Congressman  
Gillis W. Long, US Congressman  
W. Henson Moore, US Congressman  
William "Billy" Tauzin, US Congressman  
Joe D. Waggoner, Jr., US Congressman  
US Department of the Interior, Assistant Secretary for Program  
Development and Budget, Office of Environmental Project Review  
US Fish and Wildlife Service, Regional Director, Atlanta, Georgia  
US Fish and Wildlife Service, Area Manager, Jackson, Mississippi  
US Fish and Wildlife Service, Field Supervisor, Vicksburg,  
Mississippi  
US Fish and Wildlife Service, Field Supervisor, Bay St. Louis,  
Mississippi  
US Fish and Wildlife Service, Field Supervisor, Lafayette,  
Louisiana  
Environmental Protection Agency, Chief EIS Review Section,  
Region IV  
Environmental Protection Agency, Regional Administrator,  
Region VI  
Environmental Protection Agency, Administrator, Washington, DC  
US Department of Commerce, Deputy Assistant Secretary for  
Environmental Affairs  
US Department of Commerce, National Oceanic and Atmospheric  
Administration, Office of Ecology and Conservation  
US Department of Commerce, Director, National Oceanic and  
Atmospheric Administration, National Ocean Survey  
US Department of Commerce, Meteorologist in Charge, National  
Weather Service, New Orleans Area  
US Department of Commerce, Regional Director, National Marine  
Fisheries Service  
US Department of Commerce, Area Supervisor, National Marine  
Fisheries Service, Water Resources Division  
US Department of Agriculture, Regional Forester, Forest Service  
US Department of Agriculture, State Conservationist, Soil  
Conservation Service  
US Department of Transportation, Division Engineer, Federal  
Highway Administration

FEDERAL (Continued)

US Department of Transportation, Commander, Eighth Coast Guard District

US Department of Health, Education, and Welfare, Regional Director, Public Health Service, Region VI

US Department of Health, Education, and Welfare, Water Resources Activity, Vector Biology and Control Division

Federal Energy Administration, Director, Environmental Impact Division, Office of Environmental Programs

Federal Power Commission, Acting Advisor on Environmental Quality, Washington, DC

Federal Maritime Commission, Office of Environmental Analysis

US Department of Housing and Urban Development, Regional Administrator, Region VI, Fort Worth, Texas

US Department of Housing and Urban Development Area Office, District, New Orleans, Louisiana

Advisory Council on Historic Preservation

STATE

Louisiana Department of Health and Human Resources, Office of Health and Environmental Quality

Louisiana Department of Transportation and Development, Office of Public Works

Office of Intergovernmental Relations, Office of Governor

Louisiana Department of Highways, Public Hearings and Environmental Impact Engineer

Louisiana Department of Agriculture, Commissioner

Louisiana Department of Wildlife and Fisheries, Director

Louisiana Department of Wildlife and Fisheries, Oysters, Water Bottoms, and Seafoods Division, Chief

Louisiana Department of Wildlife and Fisheries, Game Division, Chief

Louisiana Department of Wildlife and Fisheries, Fish Division, Chief

Louisiana Department of Wildlife and Fisheries, Coordinator, Environmental Section

Louisiana Department of Wildlife and Fisheries, Monroe District Office No. 2

Louisiana Department of Wildlife and Fisheries, Alexandria District Office No. 3

Louisiana Department of Wildlife and Fisheries, Ferriday District Office No. 4

Louisiana Department of Wildlife and Fisheries, Opelousas District Office No. 6

Louisiana Department of Wildlife and Fisheries, Baton Rouge District Office No. 7

Louisiana Department of Wildlife and Fisheries, New Orleans District Office No. 8

STATE (Continued)

Louisiana State Parks and Recreation Commission  
Louisiana Archaeological Survey and Antiquities Commission, State  
Archaeologist  
Louisiana Office of Environmental Affairs  
Louisiana Coastal Commission  
Louisiana Public Service Commission  
Louisiana Department of Natural Resources, Office of Forestry  
Louisiana Department of Natural Resources, Office of Conservation  
Louisiana Department of Natural Resources, Office of  
Environmental Affairs, Water Pollution Control Station  
Louisiana Department of Commerce and Industry  
Louisiana Department of Culture, Recreation, and Tourism, State  
Historic Preservation Officer  
Louisiana Assistant Attorney General  
Louisiana Department of Justice, Environmental Section  
Louisiana Joint Legislative Committee on Environmental Quality,  
Louisiana Legislature  
Louisiana State Land Office Register  
Louisiana State Planning Office  
Louisiana State Soil and Water Conservation Committee  
Louisiana State University, Associate Director, Sea Grant  
Program, Center for Wetland Resources  
Louisiana State University, Coastal Studies Institute  
Louisiana State University, Curator of Anthropology, Department  
of Geography and Anthropology  
University of New Orleans, Coordinator, Environmental Impact  
Section, Department of Environmental Affairs  
University of New Orleans, Department of Anthropology and  
Geography

ENVIRONMENTAL

Ecology Center of Louisiana, Inc.  
Orleans Audubon Society, c/o Mr. Clifford Danby  
Orleans Audubon Society, c/o Mr. Barry Kohl  
National Audubon Society, Library  
National Audubon Society, Southwestern Regional Office, Regional  
Representative  
National Audubon Society, Field Research Director  
National Audubon Society, Director of Audubon Sanctuaries  
National Sierra Club, Thibodaux, LA  
National Sierra Club, San Francisco, CA  
Delta Chapter Sierra Club, New Orleans, LA  
Baton Rouge Sierra Club  
Chappepeela Group Sierra Club (Florida Parishes) Hammond, LA  
National Wildlife Federation, Washington, DC  
Louisiana Wildlife Federation, Baton Rouge, LA

ENVIRONMENTAL (Continued)

Louisiana Wildlife Federation, Water Control Projects Committee,  
Chairman, New Iberia, Louisiana  
Wildlife Management Institute, Washington, DC  
Wildlife Management Institute, South-Central Field Representative  
The Conservation Foundation  
Environmental Defense Fund  
National Resources Defense Council  
Environmental Information Center, Inc.  
Trout Unlimited, San Antonio, Texas  
Trout Unlimited, Sanford, Mississippi  
League of Women Voters of US  
Slidell Sportsmen's League  
Louisiana Environmental Professional Association  
South Louisiana Environmental Council, Houma, Louisiana  
The Fund for Animals, Inc., Field Agent  
St. Tammany Environmental Council

OTHERS

Terrebonne Parish Jury, Waterways and Permit Committee  
Gulf States Marine Fisheries Commission

CLEARINGHOUSES

Northeast Regional Clearinghouse  
Acadiana Regional Clearinghouse  
Teche Regional Clearinghouse  
Central Regional Clearinghouse  
Lafayette Regional Planning Commission

LOUISIANA ACADEMIC LIBRARIES

Delgado Junio College  
Dillard University  
Louisiana State University at Alexandria  
Louisiana State University Library  
Louisiana State University in Eunice  
Louisiana State University in Shreveport  
Loyola University  
Nicholls State University  
Northeast Louisiana University  
Northwestern State University  
Southeastern State University  
Southern University in New Orleans  
Tulane University  
University of New Orleans  
University of Southwestern Louisiana  
Xavier University

LOUISIANA SPECIAL LIBRARIES

Gulf South Research Institute  
Huey P. Long Memorial Law Library  
Louisiana Department of Commerce and Industry - Library  
Louisiana Department of Public Works  
Louisiana Department of Urban and Community Affairs  
Louisiana State Planning Office

LOUISIANA PUBLIC LIBRARIES

Acadia Parish Library  
Allen Parish Library  
Ascension Parish Library  
Assumption Parish Library  
Audubon Regional Library  
Avoyelles Parish Library  
Beauregard Parish Library  
Bienville Parish Library  
Bossier Parish Library  
Shreve Memorial Library  
Calcasieu Parish Public Library  
Caldwell Parish Library  
Cameron Parish Library  
Catahoula Parish Library  
Claiborne Parish Library  
Concordia Parish Library  
Concordia Parish Library  
East Baton Rouge Parish Library  
East Carroll Parish Library  
Evangeline Parish Library  
Franklin Parish Library  
Grant Parish Library  
Iberia Parish Library  
Iberville Parish Library  
Jackson Parish Library  
Jefferson Parish Library Division  
Jefferson Davis Parish Library  
Lafayette Public Library  
Lafourche Parish Library  
LaSalle Parish Library  
Lincoln Parish Library  
Livingston Parish Library  
Madison Parish Library  
Morehouse Parish Library  
Natchitoches Parish Library  
Orleans Parish Library  
Ouachita Parish Public Library  
Plaquemines Parish Library  
Pointe Coupee Parish Library

## LOUISIANA PUBLIC LIBRARIES (Continued)

Rapides Parish Library  
Red River Parish Library  
Richland Parish Library  
Sabine Parish Library  
St. Bernard Parish Library  
St. Charles Parish Library  
St. James Parish Library  
St. John the Baptist Parish Library  
St. Martin Parish Library  
St. Mary Parish Library  
St. Tammany Parish Library  
Tangipahoa Parish Library  
Tensas Parish Library  
Terrebonne Parish Library  
Union Parish Library  
Vermilion Parish Library  
Vernon Parish Library  
Washington Parish Library  
Webster Parish Library  
West Baton Rouge Parish Library  
Winn Parish Library

## CITY PUBLIC LIBRARIES

Jennings Public Library  
Morgan City Public Library  
Opelousas Eunice Public Library

## INDIVIDUALS

Appendix J, Volume 4, contains a listing of all individuals who received the draft report/EIS.

# Letters of Comment on the Draft EIS

8.6 Comments specifically pertaining to the draft EIS were received from the following:

## FEDERAL

Advisory Council on Historic Preservation  
Department of Agriculture, Forest Service  
Department of Commerce, General Counsel  
Department of Commerce, National Marine Fisheries Service



FEDERAL (Continued)

Department of Commerce, National Ocean Survey  
Department of Health and Human Services, Public Health Service,  
Center for Disease Control  
Department of Health and Human Services, Public Health Service,  
Regional Office IV  
Department of Housing and Urban Development  
Department of the Interior, Office of the Secretary  
Department of Transportation, Federal highway Administration  
Department of Transportation, US Coast Guard  
Environmental Protection Agency  
Gulf of Mexico Fisheries Management Council

STATE

Department of Natural Resources, Office of Environmental Affairs  
Department of Natural Resources, Office of Forestry

LOCAL

Police Jury, Parish of Terrebonne  
Sewerage and Water Board of New Orleans

ORGANIZATIONS AND BUSINESSES

Atchafalaya Land Corporation  
Louisiana Land and Exploration Company  
Mid-Continent Oil and Gas Association  
Schiff, Hardin, and Waite  
Tenneco Oil Exploration and Production  
Texaco Incorporated  
Wildlife Management Institute

INDIVIDUALS

D. S. Garden, Jr.  
B. W. Hallmon

## Public Views and Responses

8.7 The first part of this section discusses the public views that influenced the tentatively selected (TS) plan presented in the draft Feasibility Report/EIS and at the five July 1981 public meetings. The remaining portion presents opinions stated at those meetings, opinions addressed in letters commenting on the draft EIS,

and those expressed in about 4,000 letters included in the public record of the meetings.

#### **VIEWS INFLUENCING THE TENTATIVELY SELECTED PLAN**

8.8 Two major public views heavily influenced selection of the TS plan. These were concern about flood control and environmental issues. The public is profoundly concerned about flood control and desires a plan that will safely pass the project flood and protect southern Louisiana from Mississippi River flooding. Inhabitants of Morgan City, who live at the lower end of the floodway, have consistently stated that it is vitally important to increase the capacity of the outlets to allow floodwaters to reach the gulf without damaging Morgan City. People to the east and northeast of Morgan City desire protection from backwater flooding, a problem that will become increasingly severe in the future. All these views were incorporated into the decision-making process by providing channel training, levee raising, sediment control, increase in outlet capacity, widening of Wax Lake Outlet overbank, channel training below Morgan City, and construction of the 14,000-foot extension of the Avoca Island levee in the TS plan.

8.9 The other major concern has been expressed by the environmental community who desires preservation of fish and wildlife resources, public access into the Lower Atchafalaya Basin Floodway, and recreational facilities. Numerous features of the TS plan, such as nondevelopmental flood control easements, environmental easements that would prevent forest clearing throughout the entire Lower Atchafalaya Basin Floodway, public access to more than 105,000 acres of the Lower Atchafalaya Basin Floodway, boat-launch ramps, campgrounds, management units, and sediment control, addressed these concerns.

8.10 Another matter of major public concern was the independent proposal of the US FWS to purchase the Lower Atchafalaya Basin Floodway in fee. This proposal created a dispute of exceptional magnitude with the basin landowners and hunting club members opposing the environmental groups. After extensive study, the outcome was the above-described real estate interests of the TS plan.

8.11 Various interest groups have expressed a desire to vary operation of the Old River control structure slightly during May, June, and July. Farmers in the Red River backwater area would benefit some years from a reduction in flow into the Atchafalaya River so that stages would not rise above 45 feet at Acme. The US FWS would like to see flows increased some years in order to benefit fishery resources in the lower floodway. This concern was recognized in project planning and short-term changes in flow distribution were proposed

when such changes could be accomplished without adversely impacting other resource uses.

8.12 While maximizing public access was a study objective, it was a concern of the public that this objective is not altogether compatible with preservation of fish and wildlife resources and esthetics.

#### **VIEWS EXPRESSED ON THE TS PLAN THAT INFLUENCED THE RECOMMENDED PLAN**

Views expressed at the July 1981 public meetings.

##### Baton Rouge Meeting

8.13 The first meeting attracted 343 people of which 40 gave statements. The trend of the meeting was set quickly as half of the speakers were in favor of public access easements, especially greenbelts, and the other half opposed any expropriation of land for recreational purposes. Statements were made for and against management units, opposition was voiced about the Avoca Island levee extension, and other project features were mentioned, but the major subject of discussion was the real estate plan.

##### Morgan City Meeting

8.14 A meeting was held in Morgan City on 16 July, which had 241 people in attendance who presented 34 statements. This meeting centered on two underlying themes: real estate and the Avoca Island levee extension. The only support for the extension was voiced at this meeting located in the area affected by backwater flooding. Two local mayors and one state representative spoke in favor of quick completion of the levee while two officials from Terrebonne Parish and numerous individuals opposed the extension on environmental grounds. Several landowners voiced opposition to expropriation of private property and greenbelts and favored the Louisiana Landowners Association (LLA) real estate plan. A few members of the environmental community spoke in favor of the proposed multipurpose easement, including greenbelts.

##### Lafayette Meeting

8.15 This meeting was held on 20 July. Approximately 243 people attended and 54 presented statements. The speakers were nearly evenly divided between those opposing expropriation of private land, except for the LLA proposal, and those who favored the real estate plan

presented in the TS plan. Management units were also discussed, with some speakers expressing opposition and others favoring them.

#### Jonesville Meeting

8.16 This meeting, held 20 July, attracted 65 people and 13 statements were made. The major theme of most speakers at this meeting in the Red River backwater area was control of flows at the Old River control structure. Some individuals and groups, representing agricultural interests, were in favor of decreasing flows during May, June, and July to provide flooding relief to farmers of the affected area. Representatives of environmental groups favored maintenance of the existing 70/30 division of flows.

#### New Orleans Meeting

8.17 This last meeting on 22 July attracted the greatest number of speakers (77) while only 216 people were in attendance. Environmental interests were heavily represented and generally favored all elements of the TS plan except the Avoca Island levee extension and reduction of flows at Old River. Basin landowners were almost equally well represented and all were against expropriation of private property, especially for greenbelts. Most were in favor of the LLA plan. Management units also received some attention with environmental interests being in favor of them and a few landowners registering opposition.

8.18 In summary, the meetings attracted about 1,000 people and 218 made statements. Concerns over the real estate plan and extension of the Avoca Island levee were the major opinions expressed.

#### Views expressed in comments on the draft EIS (DEIS).

8.19 Twenty-six letters were received, specifically commenting on the DEIS. Most of this correspondence expressed opinions on the TS plan, while other letters expressed concern over data gaps in the DEIS. These comments are discussed below as they relate to each major feature of this plan.

#### Flows at the Old River control structure

8.20 The US FWS, US EPA and Mr. B. W. Hallmon requested that the Recommended Plan not include reduction of flows at Old River control structure to hold 45 feet at Acme, Louisiana, during May, June, and July in order to aid agricultural interests. They requested that flows be increased, when possible, to aid fishery interests in the basin. The Sewerage and Water Board of New Orleans requested that a minimum flow of 150,000 cubic feet per second be maintained at the Mississippi River passes, regardless of flows at Old River. Subsequent to the publication of the DEIS, further analysis was made

of the flow variation at Old River. If only a decrease in flows into the Atchafalaya occurred, there would be substantial environmental losses in the Red River Backwater area and in the Lower Atchafalaya Basin Floodway. Induced clearing of approximately 1,000 acres of bottomland hardwoods in the backwater area would occur. Fishery productivity in several areas would be significantly decreased for the following reasons: increased agricultural pollution and severely reduced water exchange in the backwater area; elimination of overbank flooding on 77,000 acres of forest and swamp in the floodway; and reduction of freshwater, sediment, and nutrient input into the Atchafalaya delta-Terrebonne marsh complex. On the other hand, it is not feasible from an engineering standpoint to increase flows significantly into the Atchafalaya River because this would enhance the possibility of capture of the Mississippi River by the Atchafalaya River. Thus, increasing flows is infeasible and decreasing flows is not only environmentally unacceptable, but only marginally necessary, since approximately half of the benefits that would be realized from decreasing flow would be generated in parts of the backwater area for which authorized ring levees are planned. Accordingly, this alternative was not included in the Recommended Plan. Instead, maintenance of the existing 70/30 annual distribution of flows is recommended.

#### Management units

8.21 The US FWS, US EPA, Wildlife Management Institute, and Mr. Hallmon requested that all 13 management units be implemented. Mr. Gardner was opposed to construction of any management units. Mid-Continent Oil and Gas Association was concerned about the lack of specific detail on management units and about their impact on the oil and gas industry. Texaco, Incorporated, felt that units would create access and operational problems. The US Coast Guard requested that consideration be given the input from oil companies, commercial fishermen, and recreational boaters prior to finalizing plans for units. These comments were noted and the Recommended Plan is considered the best proposal due to the uncertainty over impacts of the units. The New Orleans District would construct two pilot units, monitor and evaluate them in conjunction with cooperating agencies. Then the group would recommend possible funding for other units. Input from the oil and gas industry, fishermen, and boaters would also be considered. This procedure would not preclude eventual construction of all 13 units.

#### Avoca Island levee extension

8.22 The US FWS, US EPA, National Marine Fisheries Service, Gulf of Mexico Fisheries Management Council, Louisiana Land and Exploration Company, Wildlife Management Institute, and Mr. Hallmon all objected to inclusion of the Avoca Island levee extension in the Recommended Plan. Mr. Gardner was in favor of the levee extension. The opposition centered on potential loss of environmental values in the

Terrebonne Parish marshes and on uncertainty concerning potential impacts of the proposed extension. These concerns, coupled with reduced flooding projections caused by further investigating engineering data to consider the effect of widening of the Wax Lake Outlet overbank area and other project features, have led to a delay on implementing the extension of the levee and/or other structural and nonstructural measures until completion of additional detailed studies by 1985. A supplemental EIS would be prepared for this plan feature.

#### Delta development

8.23 The National Marine Fisheries Service, US FWS, US EPA, and Mr. Hallmon all desired commitment to a plan that would maximize delta formation in Atchafalaya Bay. They generally favored waiting until the delta model and delta management plans are completed before varying the percentage of flows at the outlets to the floodway. The Recommended Plan proposes that the present 70/30 distribution of flows be stabilized and that delta growth and marsh deterioration be monitored. By this time the delta model should be usable. If it were found necessary to further restrict flows to 80/20 and if desirable, sediment could be redistributed to Wax Lake Outlet at this point. On the other hand, if found environmentally beneficial, flows could be restricted to 80/20; then, due to engineering constraints, no increase in sediment transport to Wax Lake Outlet would be possible.

#### Sediment traps

8.24 The US FWS, US EPA, and Mr. Hallmon requested that further study be conducted on the use of sediment traps. Unfortunately, sediment traps would actually do little to reduce the amount of sediment entering the backswamps, since they would tend to fill with sand-sized particles which normally are deposited on existing natural overbank levees and not in the backswamps proper. These sands would need to be dredged annually, and over the life of the project, 3,000 acres of forestland would be destroyed from dredged material disposal. Thus, sediment traps were not included in the Recommended Plan. The US EPA claims significant sediment control benefits for management units. However, analysis indicated that such units would do little to reduce sedimentation in the basin.

#### Channel training below Morgan City

8.25 The US EPA and Mr. Hallmon stated that they opposed channel training below Morgan City claiming it was unnecessary. The US FWS reserved judgment on this matter. It was retained in the Recommended Plan because it provides the lowest flowline and, therefore, makes the levee raising feature less costly.

### Real estate features

8.26 The real estate feature of the TS plan received a great deal of attention in the EIS review. The Atchafalaya Land Corporation opposed any real estate purchases in the basin for recreational interests. Mid-Continent Oil and Gas Association opposed any easement that controlled excavation and fill and wanted future access rights to be assured. Schiff, Hardin, and Waite were concerned about the impacts of the TS plan on a client's tree farm in St. Landry Parish. Texaco, Incorporated, was opposed to the greenbelts because of problems with liability, trespass, and upkeep. Mr. Gardner opposed expropriation of private lands for recreation, greenbelts, and any restrictions on land clearing. The US EPA supported the TS plan real estate feature. The US FWS was concerned that the TS plan would allow the Corps to set up a "permit" program, which would allow land use changes and that Section 404 of the Clean Water Act would not protect wetlands. They also opposed separation of benefits attributable to recreation and land use controls. Mr. Hallmon favored fee title purchase of 443,000 acres of basin lands.

8.27 Just prior to the public meetings, the Louisiana Landowners Association proposed to the state, an alternative for the public access part of the real estate feature that consisted of fee purchase of approximately 40,000 to 50,000 acres in the lower floodway from willing sellers, a 30,000-acre donation from Dow Chemical Company, and comprehensive multipurpose easements for flood control and environmental protection as was proposed in the TS plan. The state chose not to incorporate this proposal into their prior real estate recommendations, so it was not included in the TS plan.

8.28 Subsequent to the July 1981 public meetings, major interests (landowners, environmental groups, and the state) met and negotiated a new proposal for public access. The major considerations were the elimination of greenbelts and a recommendation to tighten provisions of the comprehensive multipurpose easement to prohibit land use conversion. The Dow land donation and purchase of 40,000 to 50,000 acres from willing sellers was also part of the new proposal. Governor Treen announced this new substitute recommendation at a press conference on 19 November 1981. Generally, this new proposal has been incorporated in the Recommended Plan.

### Simultaneous implementation of features

8.29 Since most flood control features have been previously authorized, it is possible to proceed with implementation without further congressional approval. However, few of the environmental features are authorized and would need congressional authorization prior to construction. The US FWS, US EPA, and Mr. Hallmon requested that an effort be made to simultaneously implement the flood control and environmental features so that the entire plan would be kept

intact throughout authorization and funding. The validity of this concern was recognized, but it was considered unwise to allow the flood threat to southern Louisiana to continue any longer than necessary. The responsibility of the US Army Corps of Engineers is limited to recommending solutions to problems facing the Atchafalaya Basin; whereas, authorization for the plan features to be implemented, if any, is at the discretion of the US Congress.

#### Management entity

8.30 The US FWS, US EPA, and Mr. Hallmon all favored a state/Federal management entity to oversee the management of the basin. This entity was envisioned as including the US FWS and US EPA. The Recommended Plan calls for a management entity composed of the Corps of Engineers and appropriate state agencies. Since these agencies possess more than adequate expertise to manage all aspects of the basin, there would be little gained by involving other Federal agencies.

#### Other comments on DEIS

8.31 Other agencies and individuals had comments on the EIS which are summarized in this paragraph. The US FWS and Mr. Hallmon mentioned several other issues such as utilization of a true future without-project, period of analysis, operation and maintenance costs, and assessment of acceptability, which they felt were unresolved. The Advisory Council on Historic Preservation desired a formal request from the Corps for Council comment. The National Ocean Survey requested that they be notified of any activity that would disturb or destroy geodetic control survey movements. The National Weather Service requested that the areas of disagreement discussed by the US FWS and US EPA be investigated in greater detail. The Centers for Disease Control requested that the project features not increase vector populations and that the vector problem be addressed in the EIS. The Federal Highway Administration requested that allowances be made for upgrading and expanding the highway system in the basin, when necessary. The US Forest Service was apprehensive that clearcutting could be interpreted as conversion to other land uses and requested additional information on timber and the impacts thereon be included in the final EIS. The State of Louisiana Office of Forestry also requested that such data be included in the final EIS. They also stated that clearcutting is the best method of regenerating cypress and expressed a desire to perpetuate the present forested diversity in the floodway. These comments have been generally addressed in the final report/EIS.



Views expressed in letters contained in the public record of the July 1981 public meetings.

8.32 The distribution of the Draft Report/EIS and the July 1981 public meetings caused an outpouring of responses to various features of the TS plan. Many form letters were received and numerous individuals wrote personal letters expressing their concern about various project features. Some of these letters expressed views that caused a reevaluation on the TS plan and an alteration of certain features. The role that the letters played in the development of the Recommended Plan is described below.

Flood control features

8.33 An analysis of the correspondence indicated that nearly all respondents were in favor of flood control. Virtually no adverse mention was made of features such as levee raising, bank stabilization, or widening of the Wax Lake Outlet. Channel training above Morgan City was favorably mentioned a few times and had very little opposition. Numerous people saw distributary realignments as a positive method of flood control. Several letters suggested that sediment traps be reconsidered. For the reasons delineated in paragraph 8.24 above, this feature was not included in the Recommended Plan. Very few letters stated any opinion on the TS plan proposal for distribution of flows at the outlets to the floodway, but several people expressed the desire of encouraging natural delta formation. It is possible that the Recommended Plan could accommodate this view as indicated in paragraph 8.23 above.

Flows at the Old River control structure

8.34 Several letters and a petition stated opinions on the alternative to decrease the flows at Old River some years and to increase flows other years. Agricultural interests and landowners were generally in favor of the portion of the alternative that decreased flows during May, June, and July, while environmental interests favored the portion of the alternative that would increase flows down the Atchafalaya River. Other favored maintaining a strict 70/30 distribution. For the reasons discussed in paragraph 8.20 above, the Recommended Plan calls for a 70/30 annual distribution at Old River.

Management units

8.35 Management units received considerable attention in the correspondence. A few letters, mostly from affected landowners who were justifiably concerned about the possibility of damage to their timber, opposed management units. Numerous letters proposed that all 13 units be authorized and implemented. As described in paragraph

8.21 above, the original proposal in the TS plan would be the most responsible approach to take in implementing this feature.

#### Freshwater diversion structures and related features

8.36 Very few people expressed opposition to the authorized freshwater diversion structures. However, many residents and users of Bayou Courtableau opposed that bayou as the location for one of the structures. The New Orleans District subsequently studied alternative sites, met with local residents and cooperating agencies and tentatively identified Big Bayou Graw as a better site for the structure. The circulation improvements proposed in the TS plan received no opposition and were retained in the Recommended Plan.

#### Avoca Island levee extension

8.37 Numerous comments were received on the extension of the Avoca Island levee. Individuals, corporations, environmental groups, the Terrebonne Parish School Board, and the Terrebonne Parish Police Jury all expressed opposition to the extension while one corporation in the backwater area was in favor of the levee because they felt it would reduce flooding of their timber. For reasons delineated in paragraph 8.22 and elsewhere in the final EIS and appendixes, implementation of the backwater protection alternative has been delayed pending completion of additional studies.

#### Real estate features

8.38 The bulk of the comments on the TS plan concerned the real estate features. The comprehensive multipurpose easements for environmental and flood control purposes received wide support. On the other hand, numerous letters opposed any expropriation of private lands and favored private ownership. Many of these writers preferred the LLA plan. The specific real estate concept that drew the most opposition was greenbelts. They were opposed because individuals felt that they would take the higher ridge land from an owner, would increase poaching and trespassing onto adjacent land, would attract litter, and would leave the owner liable for personal injury suits. Environmental groups and others were in favor of the 1980 State of Louisiana plan and many expressly supported the greenbelt concept. As described in paragraphs 8.27 and 8.28, a new proposal that addresses many of the above concerns about greenbelts, expropriation, and public access has been negotiated by major interests, accepted by the State of Louisiana and is generally included in the Recommended Plan.

#### Timing of construction of plan features

8.39 Several letters were received concerning the timing of construction of various features of the TS plan. The environmental community expressed desire for simultaneous implementation because of

a fear that the flood control features would be built while the environmentally beneficial features may not be authorized by a budget-conscious US Congress.

#### **CONCLUSIONS**

8.40 The public views expressed on the TS plan have caused several changes to be made in the Recommended Plan. It is now recommended that the flow at Old River be maintained at the existing 70/30 annual basis, that a new public access plan, apparently favored by all interests, be included, and that implementation of further extension of the Avoca Island levee and/or other structural or nonstructural features associated with backwater flooding east of the lower floodway be delayed pending the completion of additional studies of the bay-marsh complex.

# 9. INDEX

(ATCHAFALAYA BASIN FLOODWAY SYSTEM, LOUISIANA)

SUBJECTS	ENVIRONMENTAL IMPACT STATEMENT	MAIN REPORT (References Incorporated)	REPORT APPENDICES (References Incorporated)
Affected Environment	pp. EIS-73-102	pp. 15-29	App. A, pp. A-13 - A-195
Alternatives	pp. EIS-23-72	pp. 33-39	App. B, pp. B-10 - B-43; App. C, pp. C-29 - C-45
Aquatic Habitat Evaluation, Methodology and Analysis			App. G, pp. C-3 - C-18
Areas of Controversy	pp. EIS-6-10		App. A, pp. A-26 and A-27
Atchafalaya Basin Floodway Project, Operation			App. A, pp. A-23 - A-25, A-27 - A-50
Atchafalaya Basin Floodway Project, Principal Features	pp. EIS 23-29		App. D, pp. D-7 - D-56
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# RECOMMENDATIONS

1. The following features of the Atchafalaya Basin, Louisiana, project are authorized and have been approved by the Chief of Engineers and will continue to be implemented by the New Orleans District Engineer.

a. Continued operation of the Old River control complex and the new auxiliary structure to maintain an average annual latitude flow division at Old River, Louisiana, of 70 percent Mississippi River/30 percent Atchafalaya River;

b. Modification of existing features, where required, to pass the project flood, including raising to grade the East and West Atchafalaya Basin Protection Levees and the levees west of Berwick; construction of service roads on levee crowns; modifying Bayou Sorrel, Bayou Boeuf, and Berwick locks; modifying the Charenton and East Calumet floodgates; modifying the Wax Lake East and Wax Lake West drainage structures; modifying culverts in the East and West Bayou Sale levees; and modifying the Upper Pointe Coupee, Centerville, Ellerslie, Franklin and Franklin Enlargement, Gordy, Maryland, North Bend, Wax Lake East, Wax Lake West, Bayou Yokely and Bayou Yokely Enlargement, Morgan City, and Tiger Island pumping plants; and such other miscellaneous modifications as deemed appropriate; and

c. Continued construction of bank stabilization measures, as required, along the Atchafalaya River main channel above river mile 55.0.

2. It is recommended that the Chief of Engineers approve implementation of the following features of the Atchafalaya Basin project under existing authorization.

a. Enlargement of the main channel by construction of training works along the Atchafalaya River to a height sufficient to confine average annual peak flows, from river mile 116.0 to mile 90.0, and maintenance of existing channel banks from river mile 90.0 to mile 53.0 on the east side and mile 55.0 on the west side;

b. Realignment of the four principal distributaries of the Atchafalaya River main channel: the Old Atchafalaya River, the east freshwater distribution channel, the west access channel, and the east access channel to provide the optimum channel entrance angles for sediment control;

c. Construction of a rock weir and connecting levees above the head of Grand Lake to control the present distribution of low to

normal floodway outlet flows to approximately 30 percent through the Wax Lake Outlet and 70 percent through the Lower Atchafalaya River. For flows exceeding a 10-year frequency event, the low-level levees above Wax Lake Outlet would be overtopped. Operation of the outlet system will be monitored, and provided that the area's ecosystem responds favorably, then flow into Wax Lake Outlet may be further restricted by modification of the rock weir to limit low to normal flows entering the outlet to approach 20 percent;

d. Enlargement of Wax Lake Outlet overbank by setting back the existing west Wax Lake Outlet levee an average of about 3 miles and degrading the old levee to natural ground level and construction of a new West Calumet floodgate;

e. Enlargement of the outlet channels by construction of training works below Morgan City on both the Wax Lake Outlet and Lower Atchafalaya River and closure of Bayou Shaffer. Training works will simulate the formation of natural levees along about 15 miles of existing channel length by placing dredged material to a height sufficient to confine average annual peak flows, in an irregular series of low mounds about 1 vertical on 40 horizontal, with gaps in between;

f. Construction of further extensions of the East Atchafalaya Basin Protection Levee beyond the Avoca Island Cutoff channel and/or other structural and nonstructural measures, after completion of further studies of the engineering and biologic parameters affecting the complex, dynamic and delicate ecosystem of the Atchafalaya Bay-Terrebonne Marsh-backwater complex; and

g. Construction of freshwater distribution structures for the Henderson Lake and Alabama Bayou areas in the lower floodway. The Courtableau structure site will be relocated to a site in the vicinity of Bayou Graw near river mile 45.0 on the west Atchafalaya River levee, and the Sherburne structure will be located in the east river levee at approximate river mile 43.0.

3. It is recommended that the Atchafalaya Basin Feature of the Mississippi River and Tributaries Project, authorized by the Flood Control Act, approved 15 May 1928, as amended, be further modified and expanded to provide improvements as follows, with such modifications, substitutions, additions, or deletions as in the discretion of the Chief of Engineers may be advisable in the interest of flood control and environmental improvements.

a. Acquisition of additional real estate interests, excluding minerals, in the Lower Atchafalaya Basin Floodway for:

(1) Flood Control Purposes - Flowage easements on approximately 59,000 acres and developmental control easements on approximately 367,000 acres, excluding developed ridges.

(2) Environmental Protection Purposes - In addition to developmental control rights, environmental protection rights will be included in a comprehensive multipurpose easement on the same 367,000 acres, excluding developed ridges.

(3) Recreation Development Purposes - Fee simple title, excluding minerals, on 1,500 acres.

(4) Public Access - Participation with the State of Louisiana in the fee title purchase, excluding minerals, of approximately 50,000 acres of lands identified by the State as being available from "willing sellers." Federal cost participation will be limited to \$32,000,000.00 (The State will provide additional public access within the lower floodway on 150,000 acres of existing State-owned lands and more than 30,000 acres of lands donated to the State by the Dow Chemical Company.);

b. Construction of recreation facilities to provide three destination-type campgrounds, seven primitive campgrounds, boat-launching ramps, and other facilities complementary to outdoor recreational activities;

c. Initial construction of two "pilot" Management Units, with implementation of future units to be dependent on operational success of the pilot units; and

d. Construction of miscellaneous canal closures and water circulation improvements in the lower floodway.

4. The recommendations for those features requiring authorization are made with the provision that, prior to implementation, the State of Louisiana will agree to comply with the following requirements:

a. Provide, without cost to the United States, all equivalent real estate interests necessary for the project purposes of flood control and environmental protection on lands owned by the State; and, at a cost to the United States not to exceed \$32,000,000.00, all equivalent real estate interests necessary for the project purposes of flood control and environmental protection on lands to be acquired by the State for the project with Federal participation; and

b. Maintain and operate the nonflood control features of the project, or integral parts thereof, in accordance with regulations prescribed by the Secretary of the Army.

5. Governor David C. Treen, by letter dated 5 November 1980, recommended that management of nonflood control elements of the final Atchafalaya Basin Plan be through State of Louisiana agencies.



Thomas A. Sands  
Brigadier General, USA  
Reporting Officer

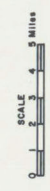






**LEGEND**

1. MID TO LATE SUCCESSIONAL BOTTOMLAND HARDWOODS
2. CYPRESS-TUPELO OR CYPRESS-TUPELO MIXED WITH BOTTOMLAND HARDWOODS
3. HARDWOODS SUCCESSIONAL BOTTOMLAND
4. CROPLANDS, PASTURE AND LEVEES
5. OPEN WATERS
6. BRACKISH MARSH
7. SALINE MARSH
8. URBAN DEVELOPMENT
- UNDEFINED AREAS - OPEN WATER



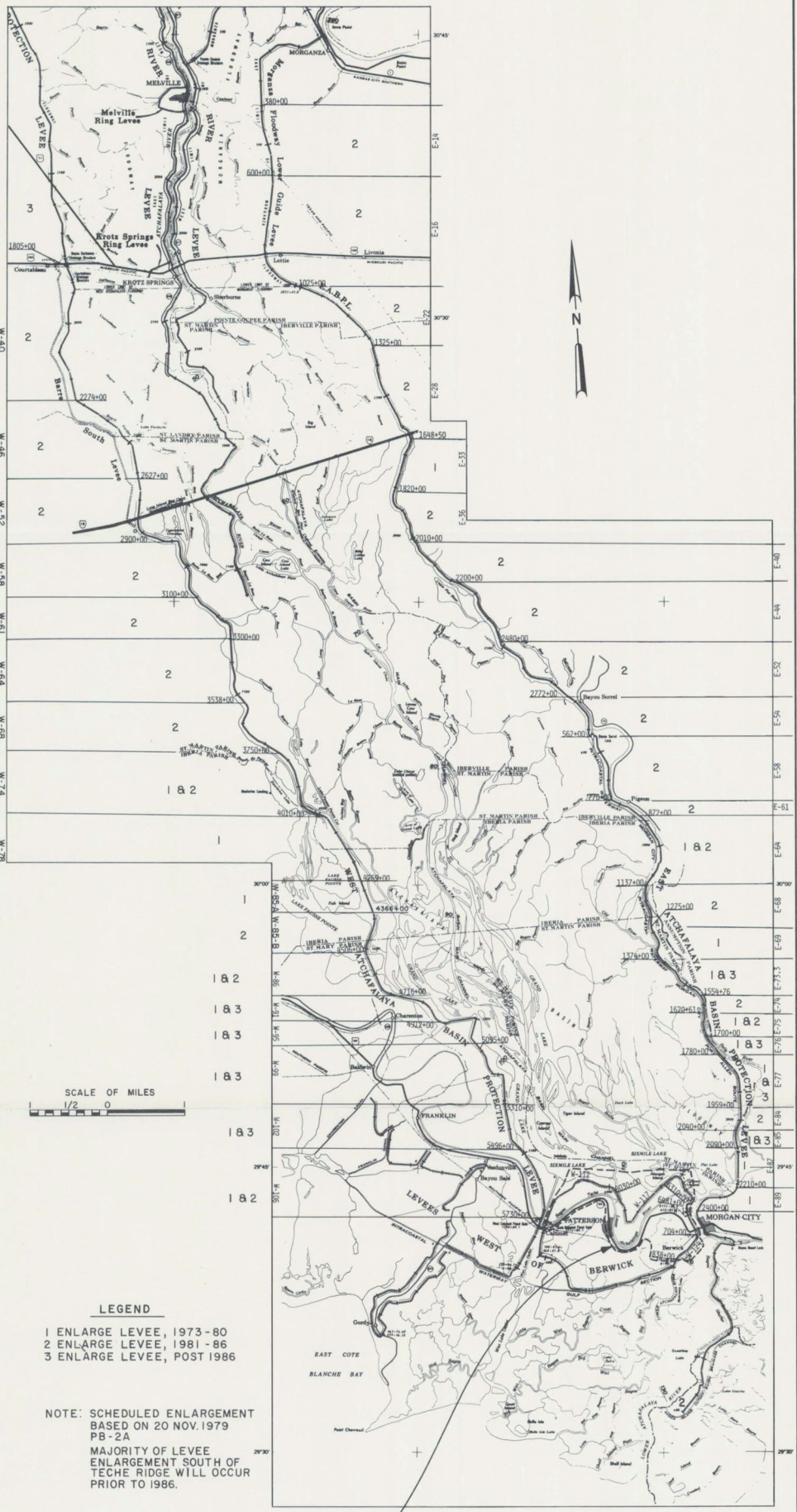
ATCHAFALAYA BASIN  
FLOODWAY SYSTEM, LOUISIANA

**EXISTING LAND USE**

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
CORPS OF ENGINEERS  
FILE NO.







**LEGEND**

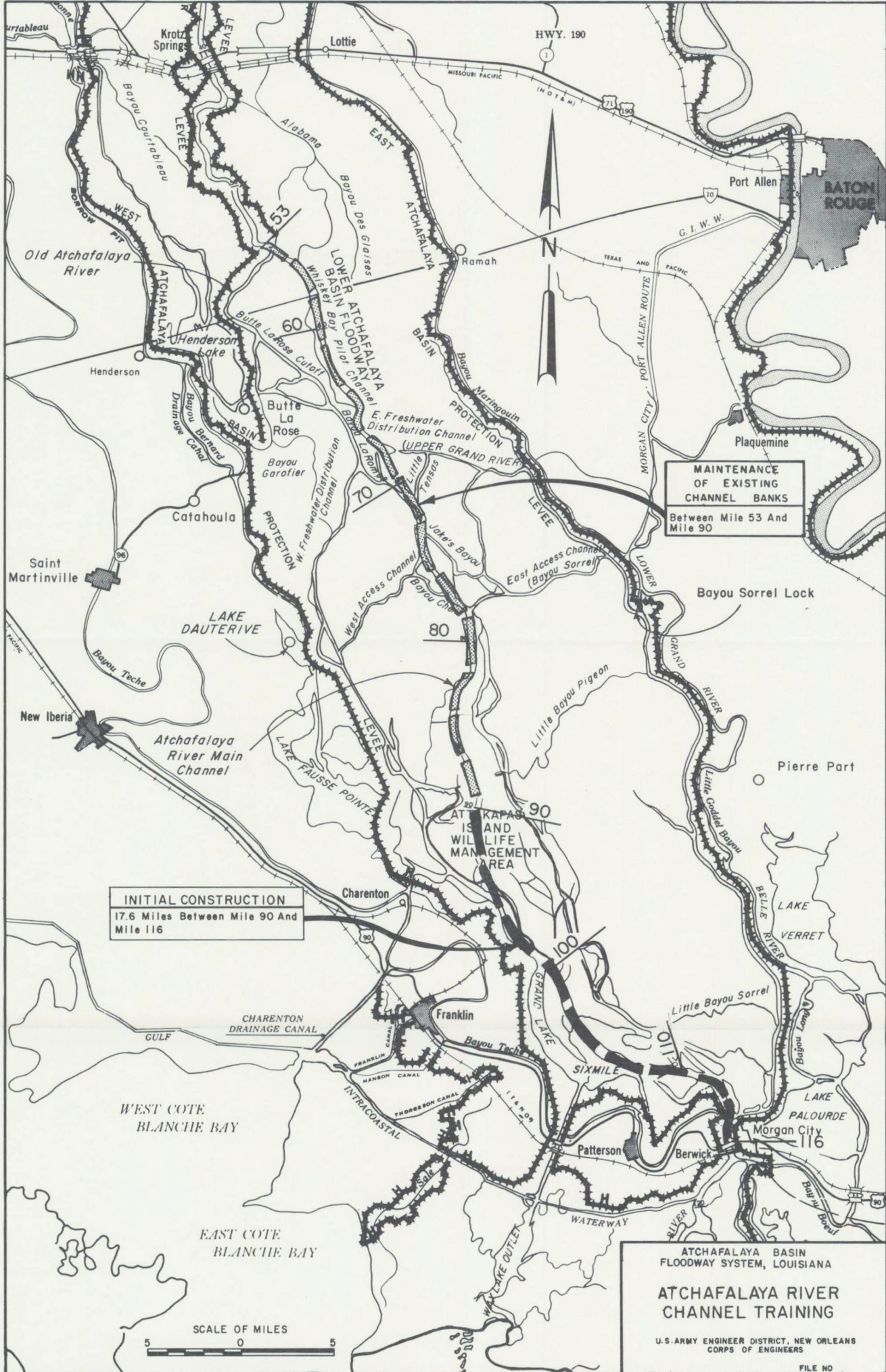
1 ENLARGE LEVEE, 1973 - 80  
 2 ENLARGE LEVEE, 1981 - 86  
 3 ENLARGE LEVEE, POST 1986

NOTE: SCHEDULED ENLARGEMENT  
 BASED ON 20 NOV. 1979  
 PB - 2A  
 MAJORITY OF LEVEE  
 ENLARGEMENT SOUTH OF  
 TECHE RIDGE WILL OCCUR  
 PRIOR TO 1986.

W-112 1 & 3  
 W-117 1  
 W-121 1  
 W-123 2  
 W-124 2

ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
**MODIFICATION OF EXISTING  
 LEVEE FEATURES**  
 U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
 CORPS OF ENGINEERS  
 FILE NO.

PLATE 5



**INITIAL CONSTRUCTION**  
 17.6 Miles Between Mile 90 And  
 Mile 116

**MAINTENANCE OF EXISTING CHANNEL BANKS**  
 Between Mile 53 And  
 Mile 90

ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
**ATCHAFALAYA RIVER  
 CHANNEL TRAINING**  
 U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
 CORPS OF ENGINEERS  
 FILE NO

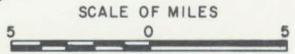
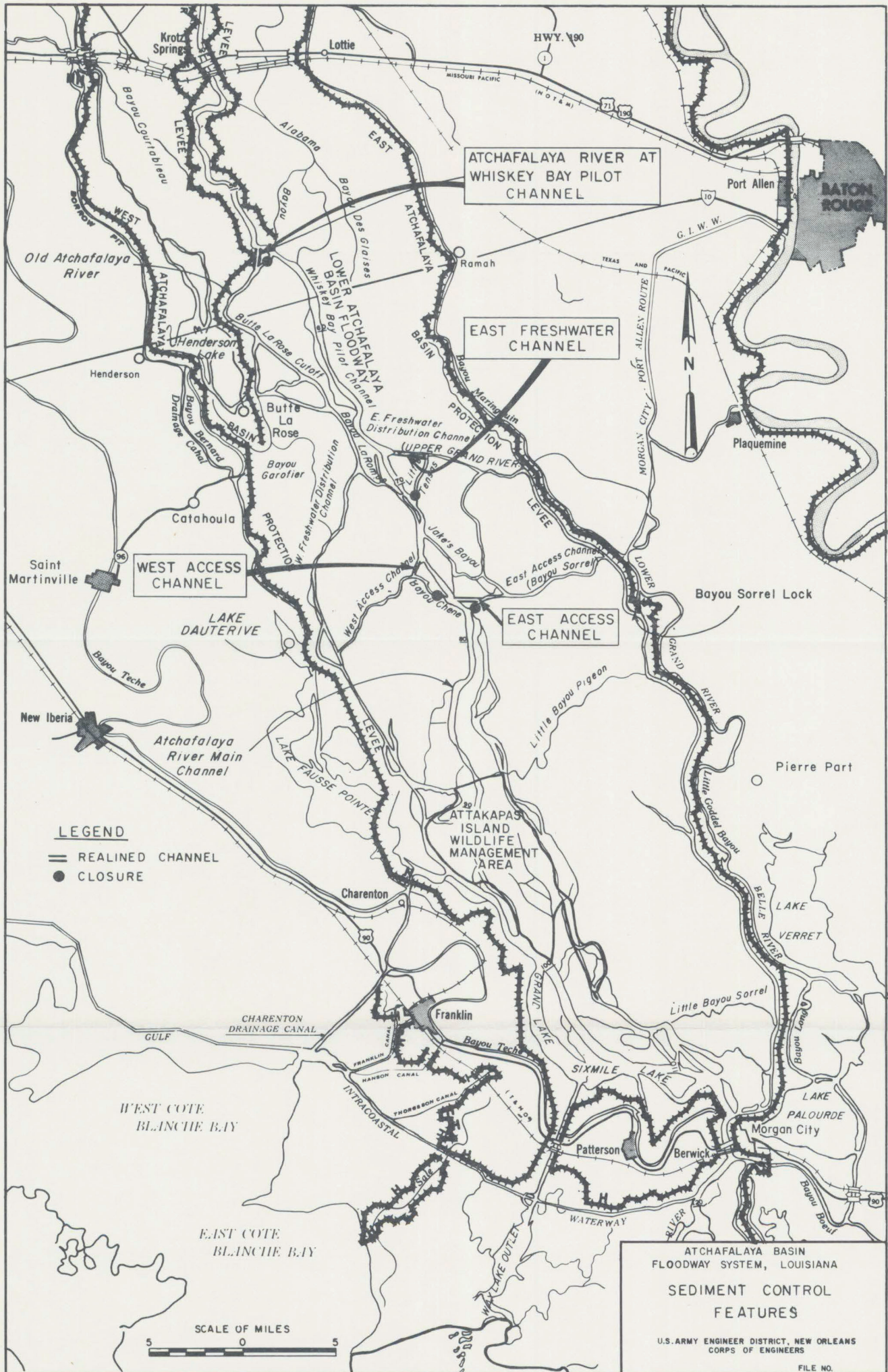


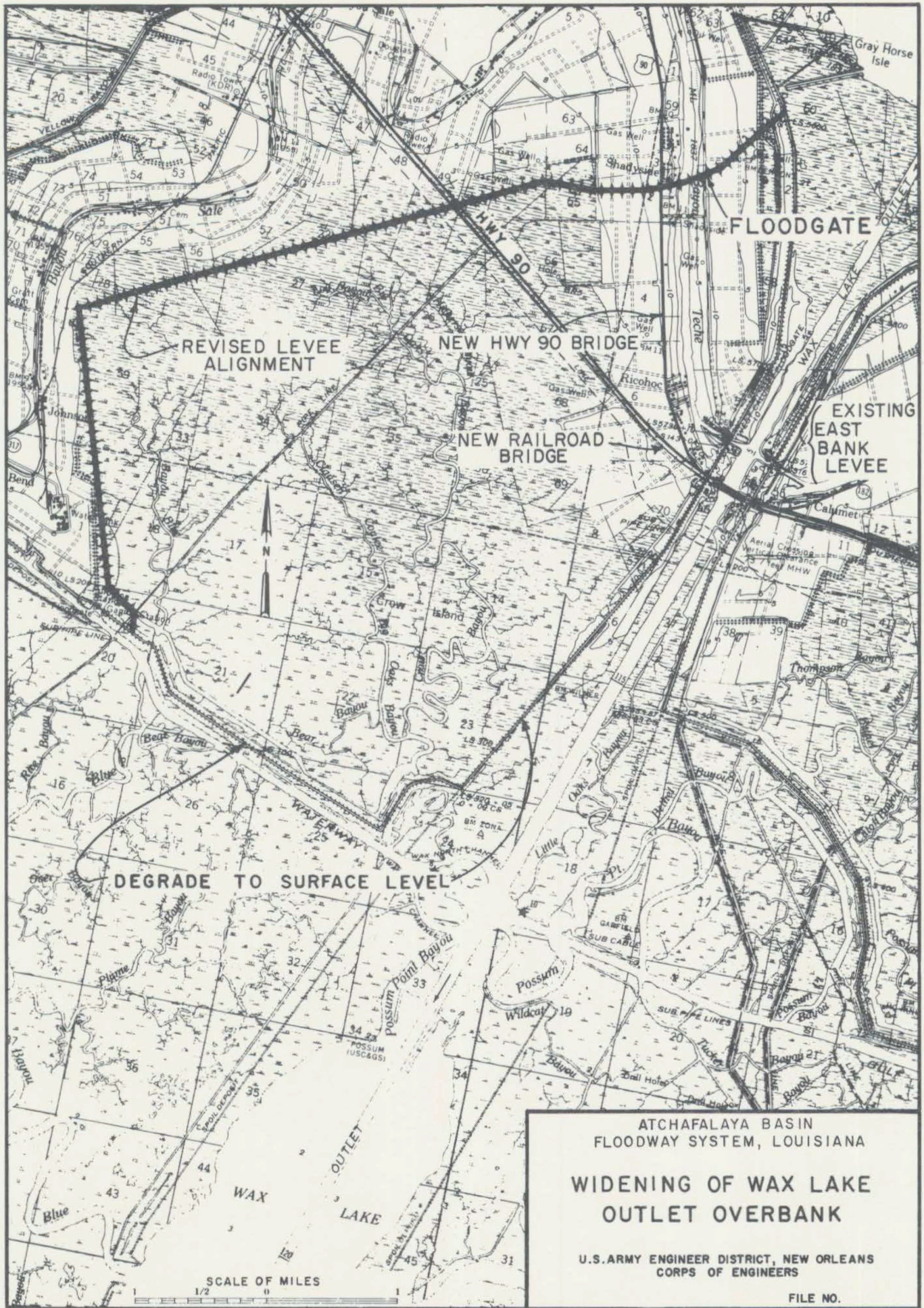
PLATE 6

PLATE 6









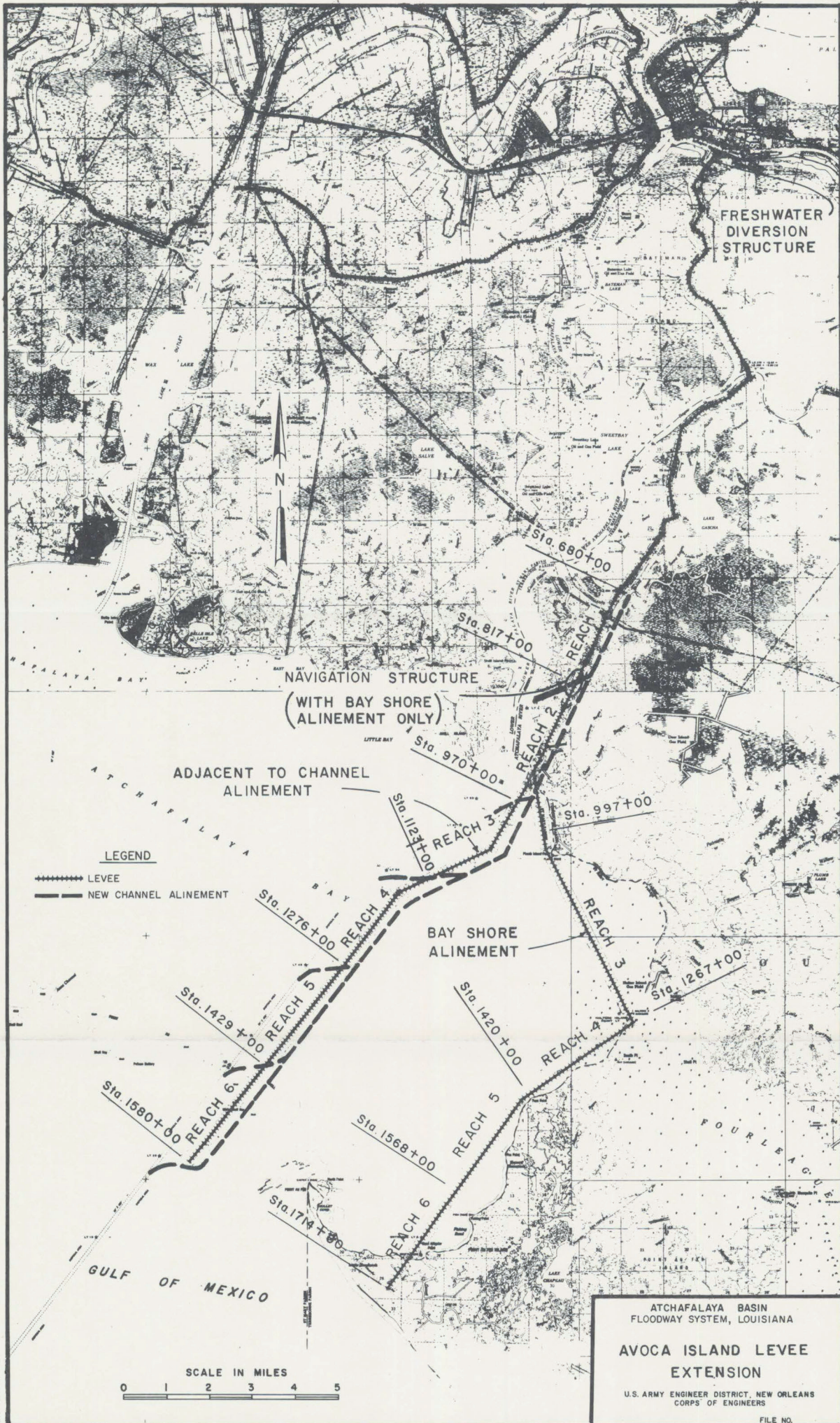
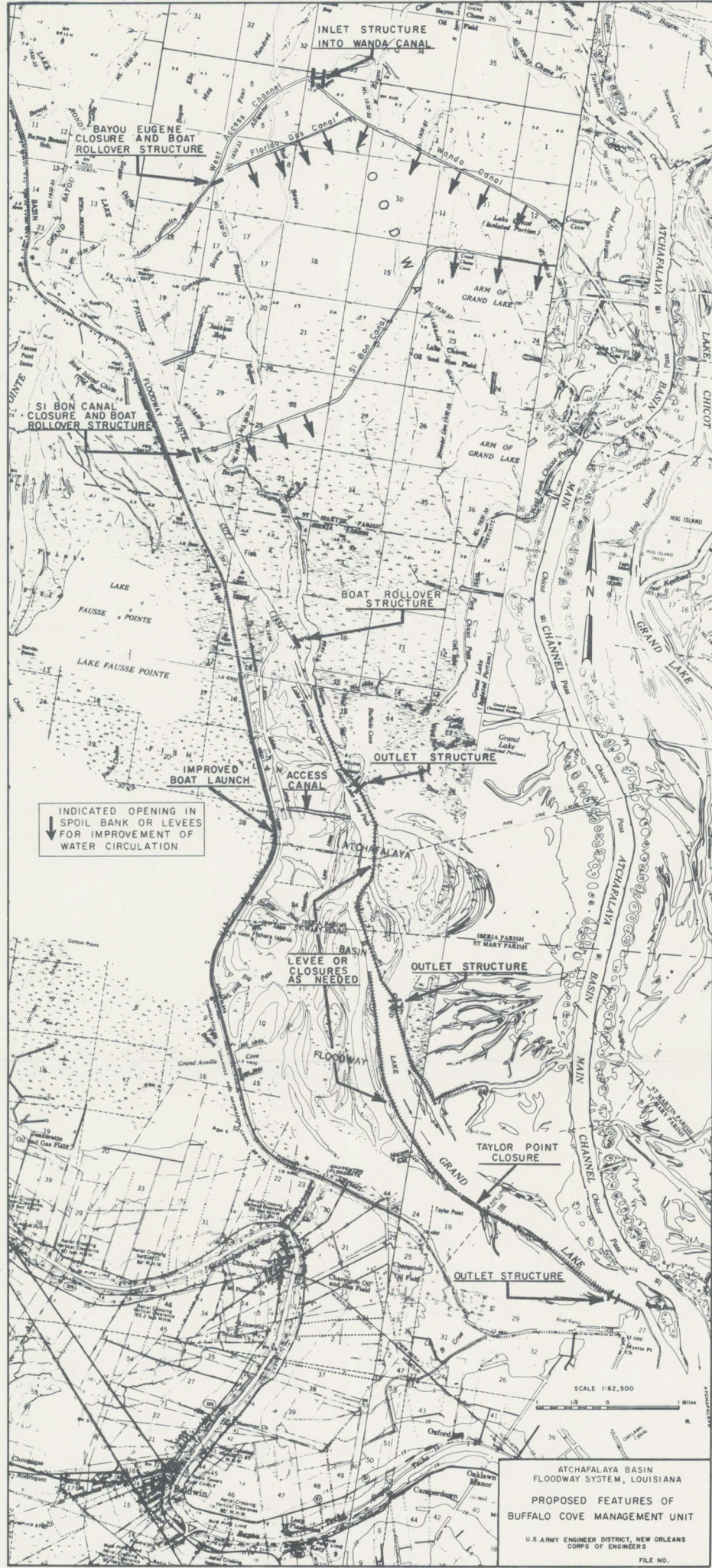


PLATE 10

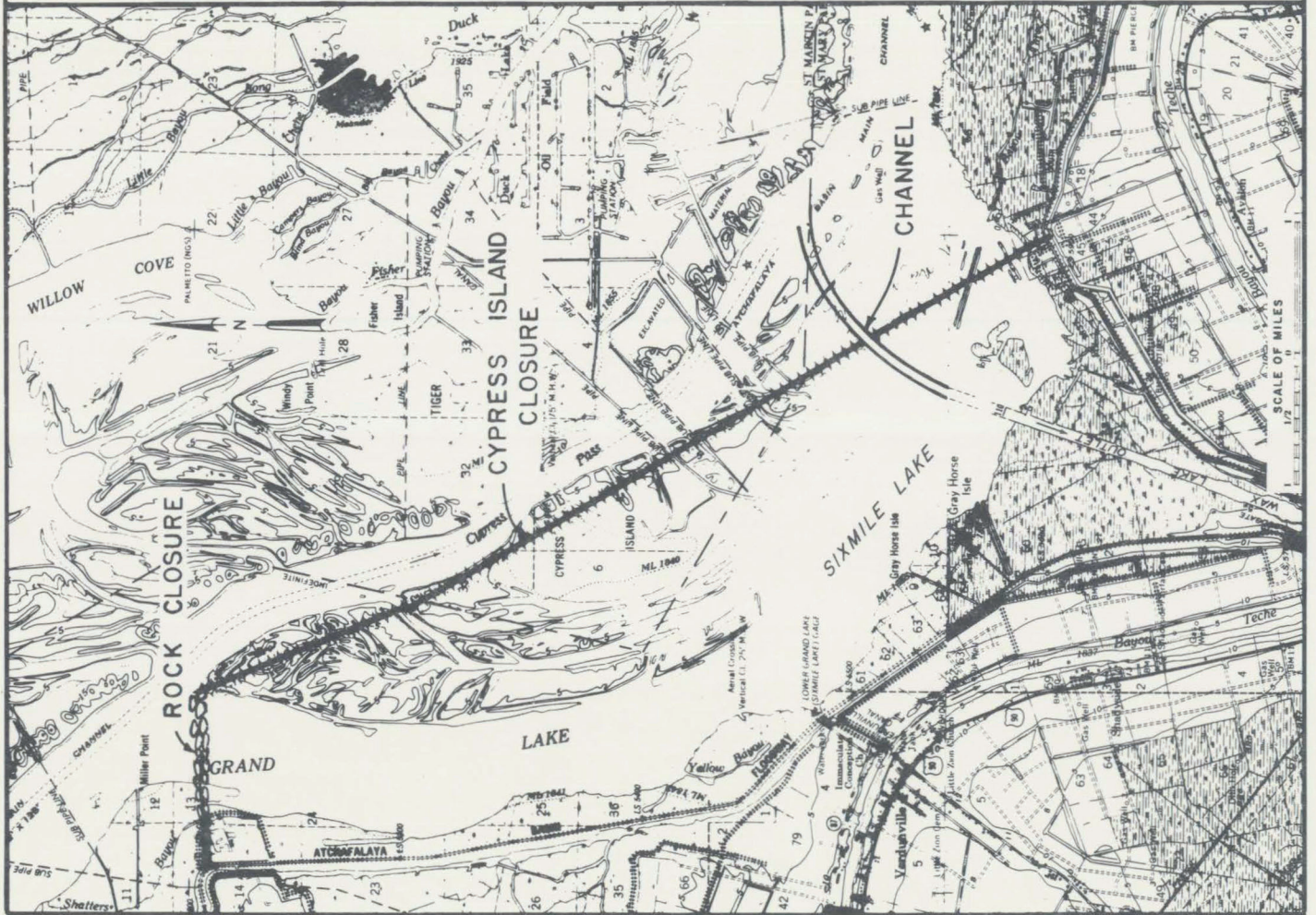
ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
**AVOCA ISLAND LEVEE  
 EXTENSION**  
 U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
 CORPS OF ENGINEERS  
 FILE NO.

PLATE 10

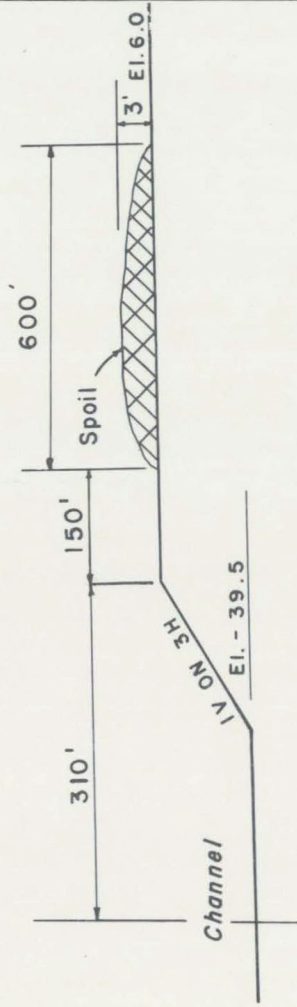


INDICATED OPENING IN  
SPOIL BANK OR LEVEES  
FOR IMPROVEMENT OF  
WATER CIRCULATION

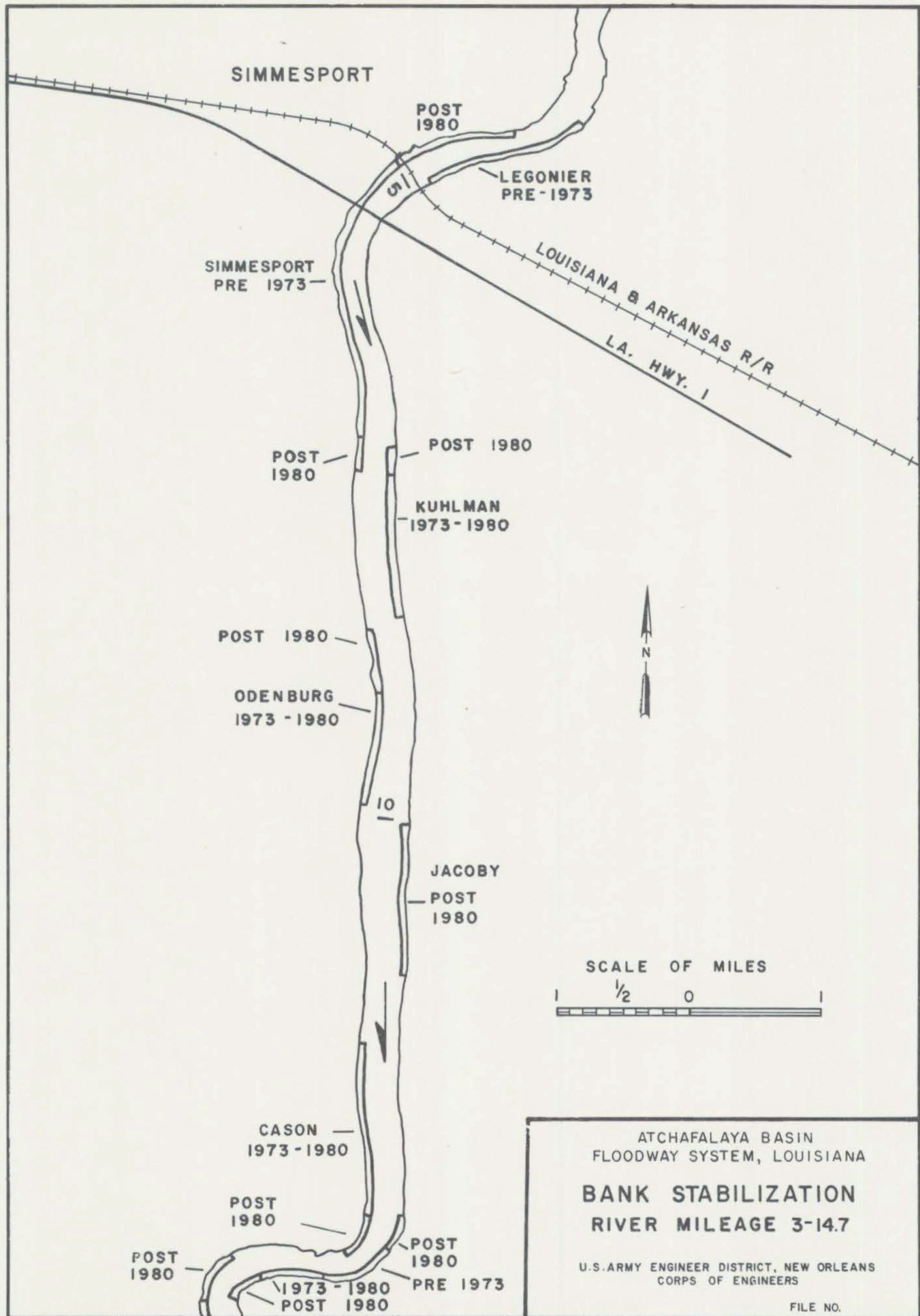
ATCHAFALAYA BASIN  
FLOODWAY SYSTEM, LOUISIANA  
PROPOSED FEATURES OF  
BUFFALO COVE MANAGEMENT UNIT  
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
CORPS OF ENGINEERS  
FILE NO.



**TYPICAL SECTION**  
 NOT TO SCALE



ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
**INCREASED SEDIMENT  
 THROUGH  
 WAX LAKE OUTLET**  
 U.S. ARMY  
 ENGINEER DISTRICT NEW ORLEANS  
 CORPS OF ENGINEERS  
 FILE NO.

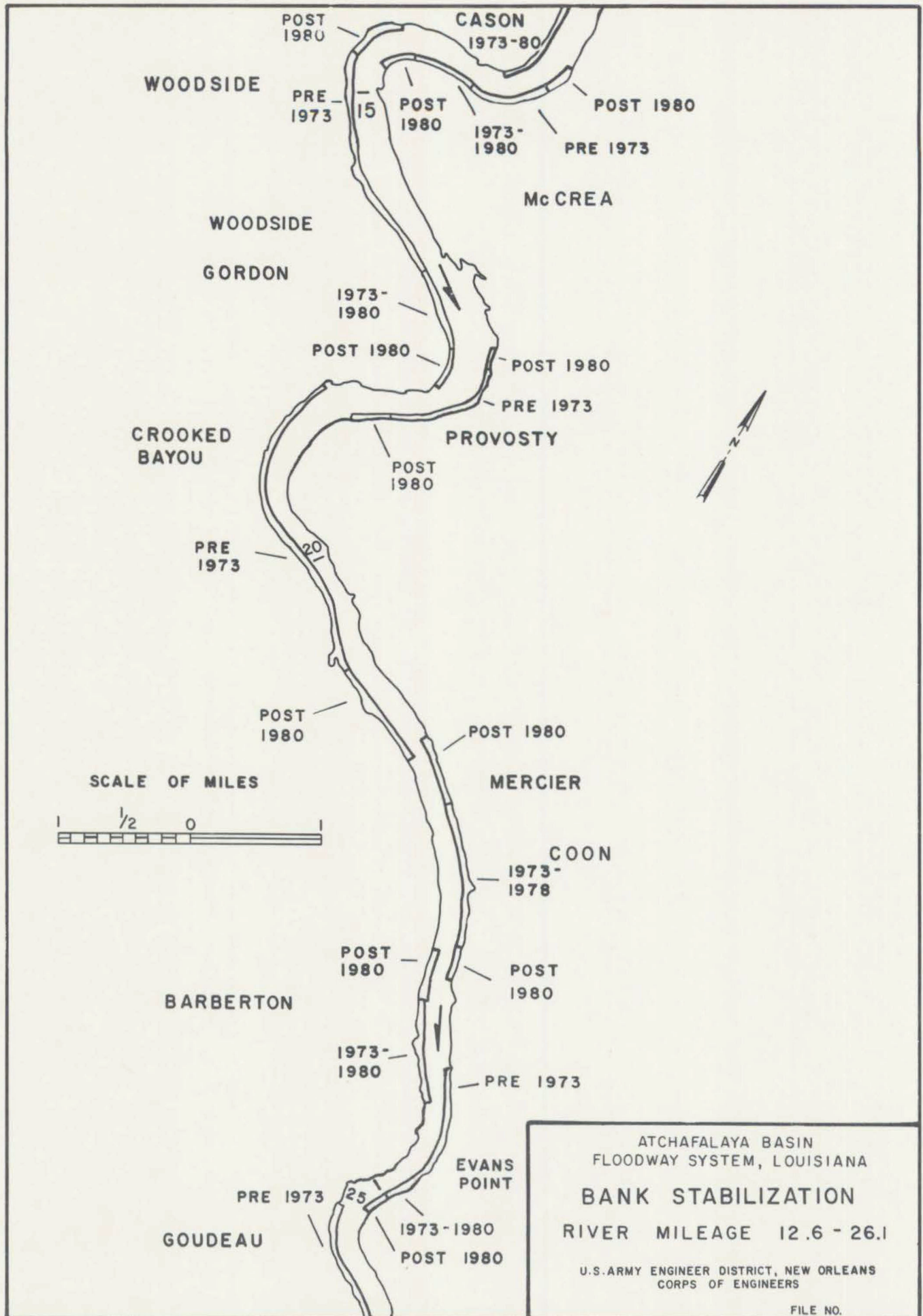


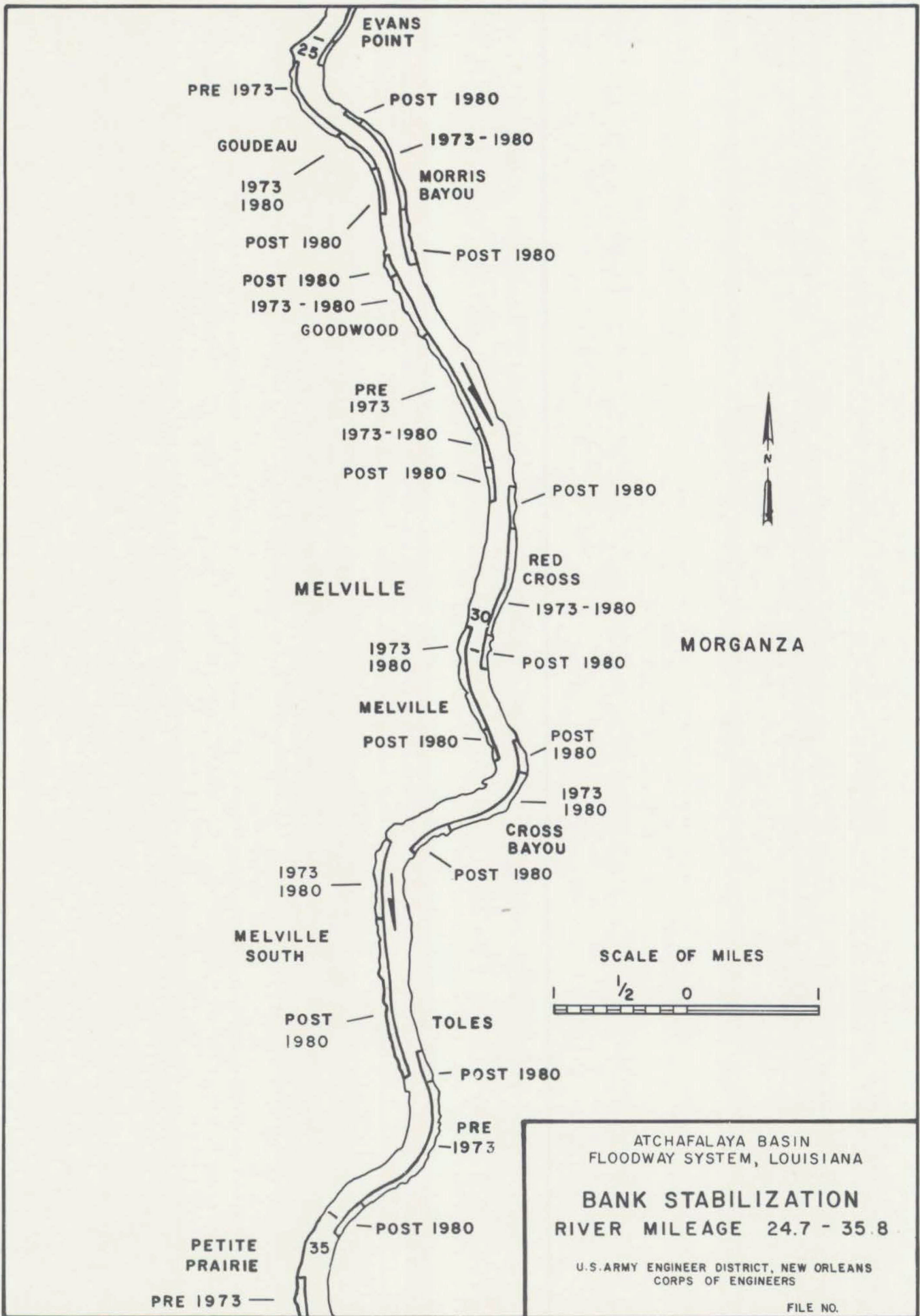
ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA

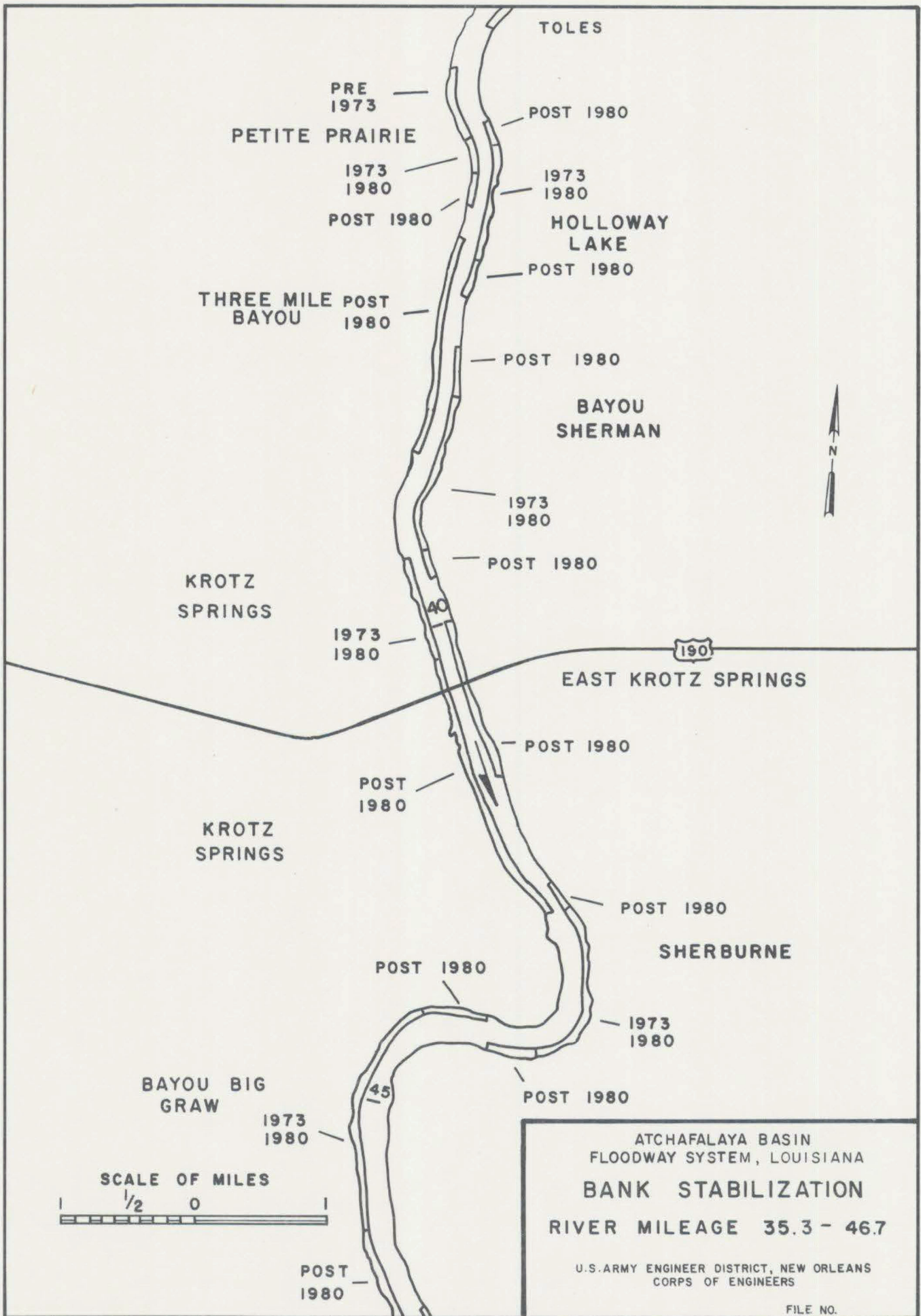
**BANK STABILIZATION  
 RIVER MILEAGE 3-14.7**

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

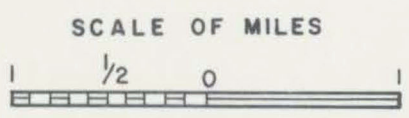
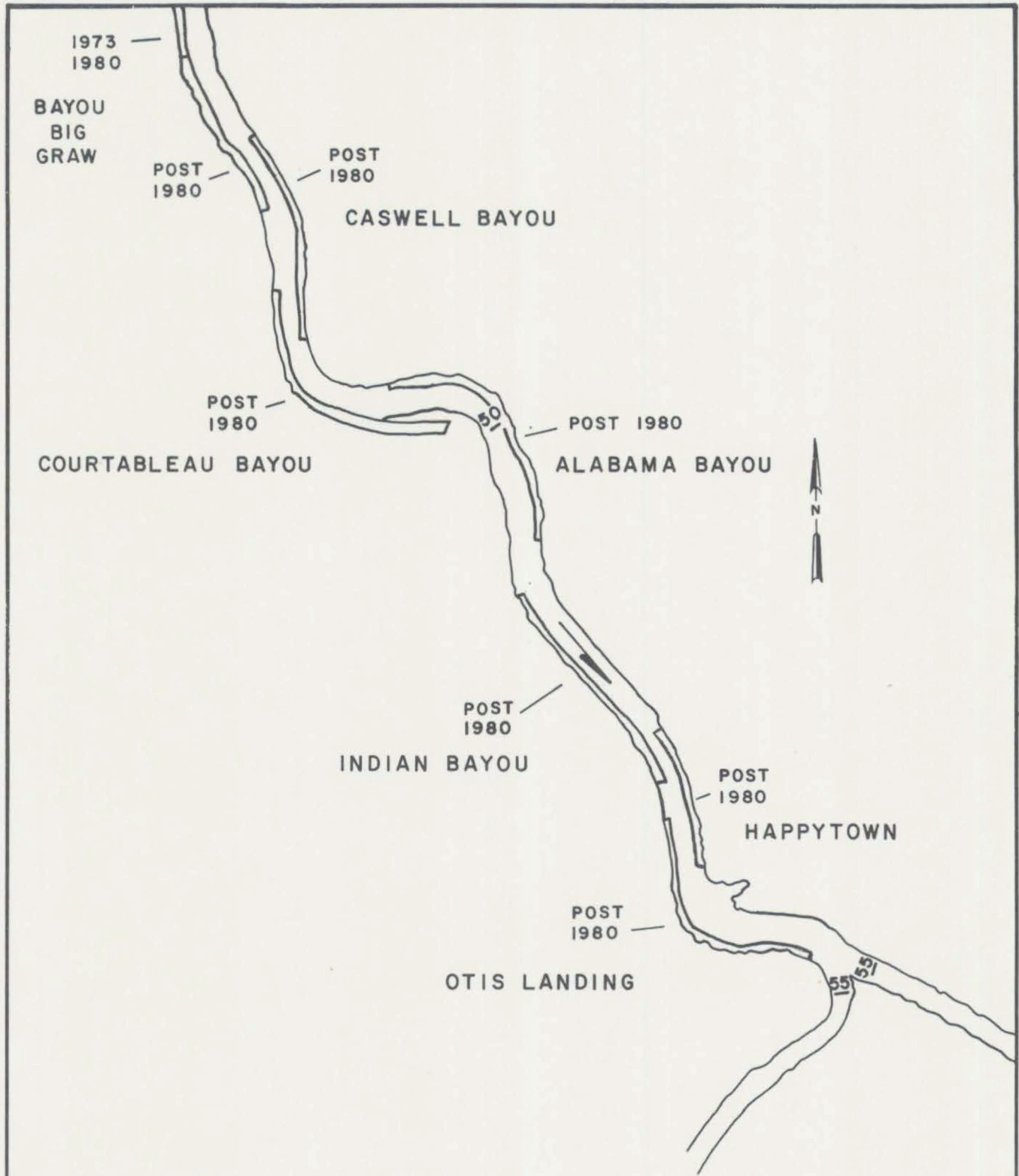
FILE NO.











ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA

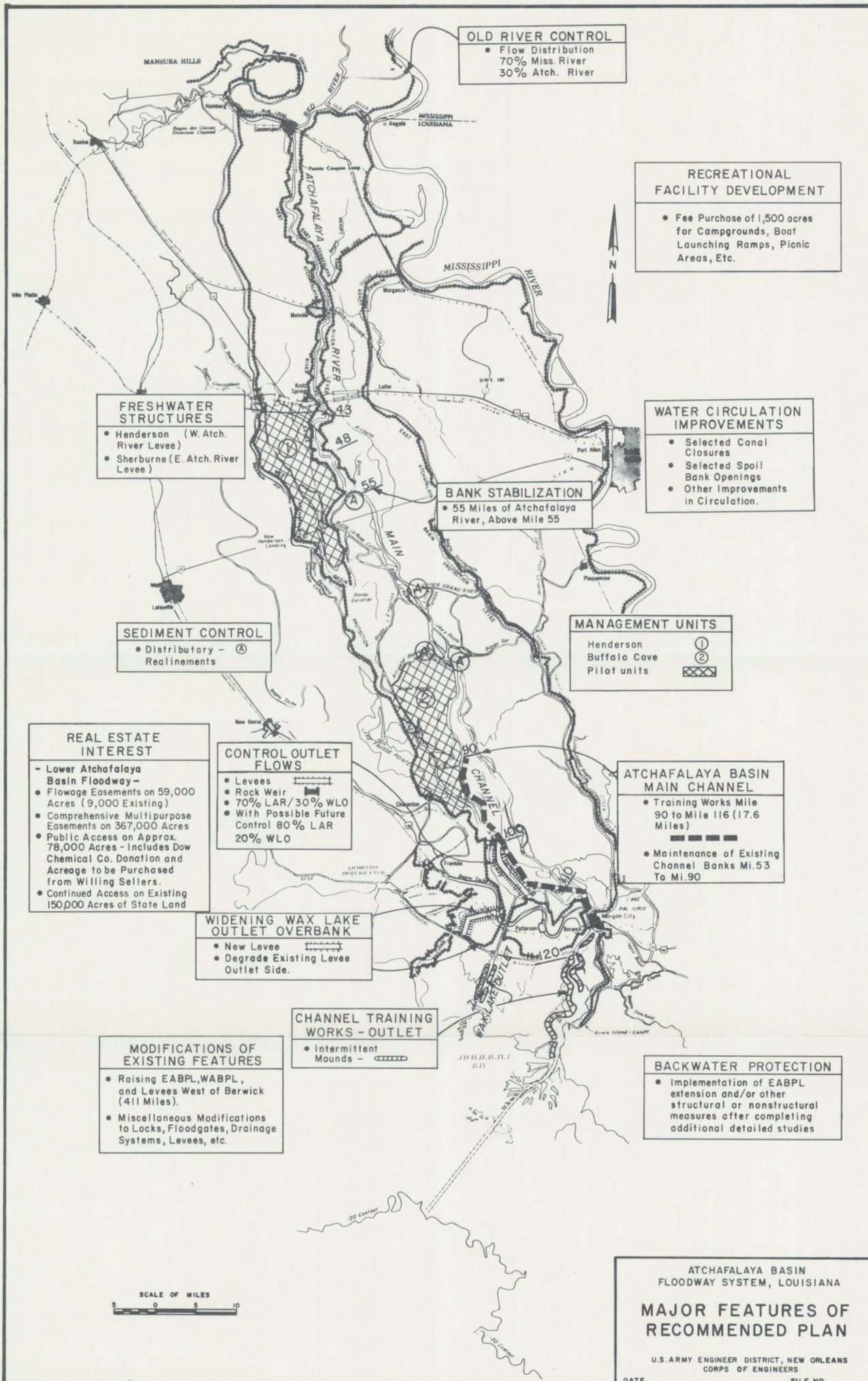
**BANK STABILIZATION**

**RIVER MILEAGE 46.2 - 55**

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

FILE NO





**OLD RIVER CONTROL**  
 • Flow Distribution  
 70% Miss. River  
 30% Atch. River

**RECREATIONAL FACILITY DEVELOPMENT**  
 • Fee Purchase of 1,500 acres for Campgrounds, Boat Launching Ramps, Picnic Areas, Etc.

**FRESHWATER STRUCTURES**  
 • Henderson (W. Atch. River Levee)  
 • Sherburne (E. Atch. River Levee)

**WATER CIRCULATION IMPROVEMENTS**  
 • Selected Canal Closures  
 • Selected Spoil Bank Openings  
 • Other Improvements in Circulation.

**BANK STABILIZATION**  
 • 55 Miles of Atchafalaya River, Above Mile 55

**SEDIMENT CONTROL**  
 • Distributary - (A)  
 Realignments

**MANAGEMENT UNITS**  
 Henderson (1)  
 Buffalo Cove (2)  
 Pilot units (X)

**REAL ESTATE INTEREST**  
 - Lower Atchafalaya Basin Floodway -  
 • Flowage Easements on 59,000 Acres (9,000 Existing)  
 • Comprehensive Multipurpose Easements on 367,000 Acres  
 • Public Access on Approx. 78,000 Acres - Includes Dow Chemical Co. Donation and Acreage to be Purchased from Willing Sellers.  
 • Continued Access on Existing 150,000 Acres of State Land

**CONTROL OUTLET FLOWS**  
 • Levees  
 • Rock Weir  
 • 70% LAR / 30% WLO  
 • With Possible Future Control 80% LAR 20% WLO

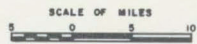
**ATCHAFALAYA BASIN MAIN CHANNEL**  
 • Training Works Mile 90 to Mile 116 (17.6 Miles)  
 • Maintenance of Existing Channel Banks Mi.53 To Mi.90

**WIDENING WAX LAKE OUTLET OVERBANK**  
 • New Levee  
 • Degrade Existing Levee Outlet Side.

**CHANNEL TRAINING WORKS - OUTLET**  
 • Intermittent Mounds -

**MODIFICATIONS OF EXISTING FEATURES**  
 • Raising EABPL, WABPL, and Levees West of Berwick (411 Miles).  
 • Miscellaneous Modifications to Locks, Floodgates, Drainage Systems, Levees, etc.

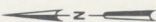
**BACKWATER PROTECTION**  
 • Implementation of EABPL extension and/or other structural or nonstructural measures after completing additional detailed studies



ATCHAFALAYA BASIN FLOODWAY SYSTEM, LOUISIANA  
**MAJOR FEATURES OF RECOMMENDED PLAN**  
 U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
 CORPS OF ENGINEERS  
 DATE FILE NO.



- LEGEND**
- POTENTIAL PRIME FARMLANDS**
    - 75% - 100%
    - 25% - 75%
    - 0% - 25%
  - EXISTING (CLEARED) PRIME FARMLAND**
  - UNIQUE FARMLANDS**
  - SUGARCANE**
  - COMMERCIAL CRAWFISH FARM**
  - POTENTIAL UNIQUE FARMLANDS**
  - NATURAL CRAWFISH HARVEST AREA**

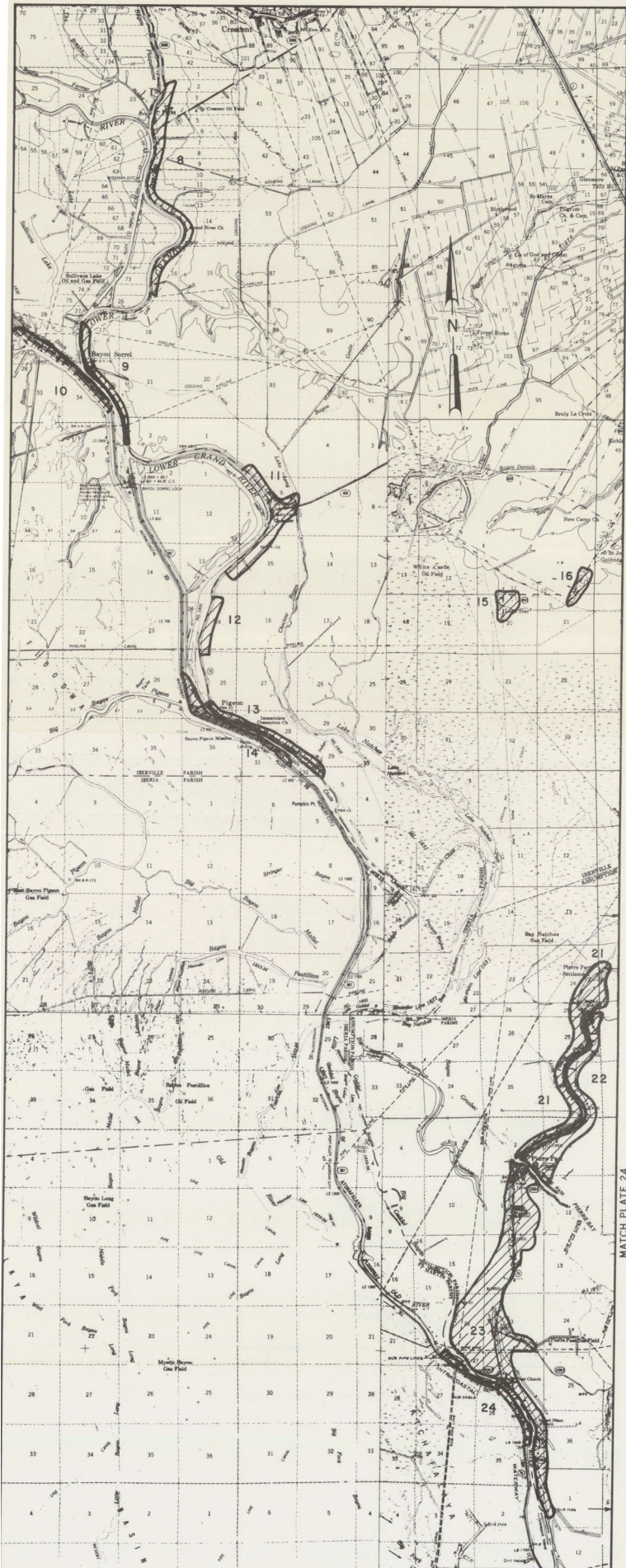


ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
**EXISTING OR POTENTIAL PRIME  
 AND UNIQUE FARMLANDS**  
 U.S. ARMY ENGINEERS DISTRICT, NEW ORLEANS  
 FILE NO.





ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
 EXISTING OR POTENTIAL PRIME  
 AND UNIQUE FARMLANDS  
 U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
 CORPS OF ENGINEERS  
 FILE NO.



**LEGEND**  
 RINGED AREAS

**SCALE OF MILES**  
 1/2 0

ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
**RING LEVEE ALTERNATIVE  
 FOR BACKWATER AREA**  
 U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
 CORPS OF ENGINEERS  
 FILE NO.

MATCH PLATE 23



PLATE 24

LEGEND  
 ▨ RINGED AREAS

SCALE OF MILES  
 1/2 0 1

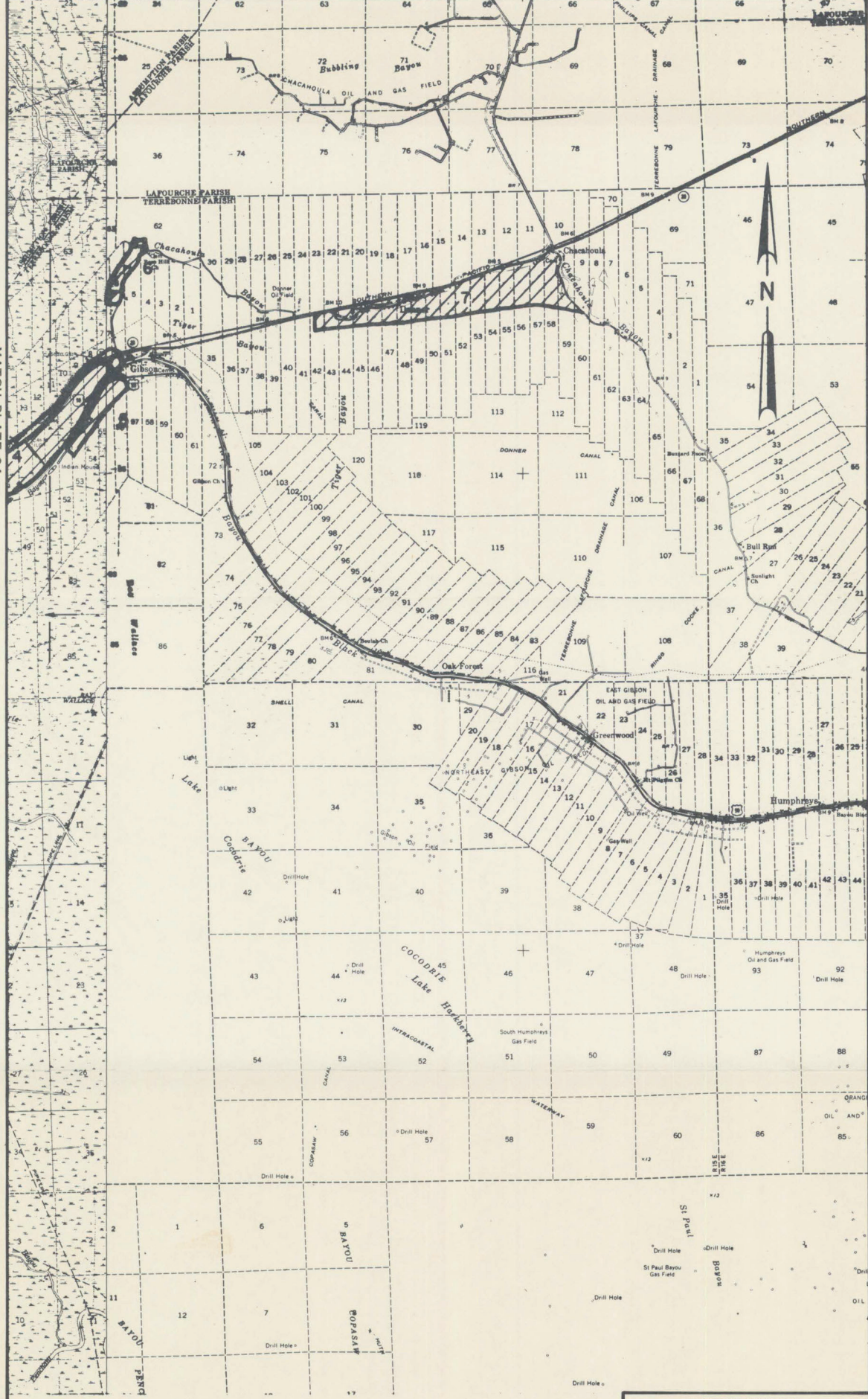
ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
 RING LEVEE ALTERNATIVE  
 FOR BACKWATER AREA  
 U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
 CORPS OF ENGINEERS  
 FILE NO.

PLATE 24

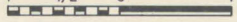


MATCH PLATE 24

PLATE 25



**LEGEND**  
 RINGED AREAS

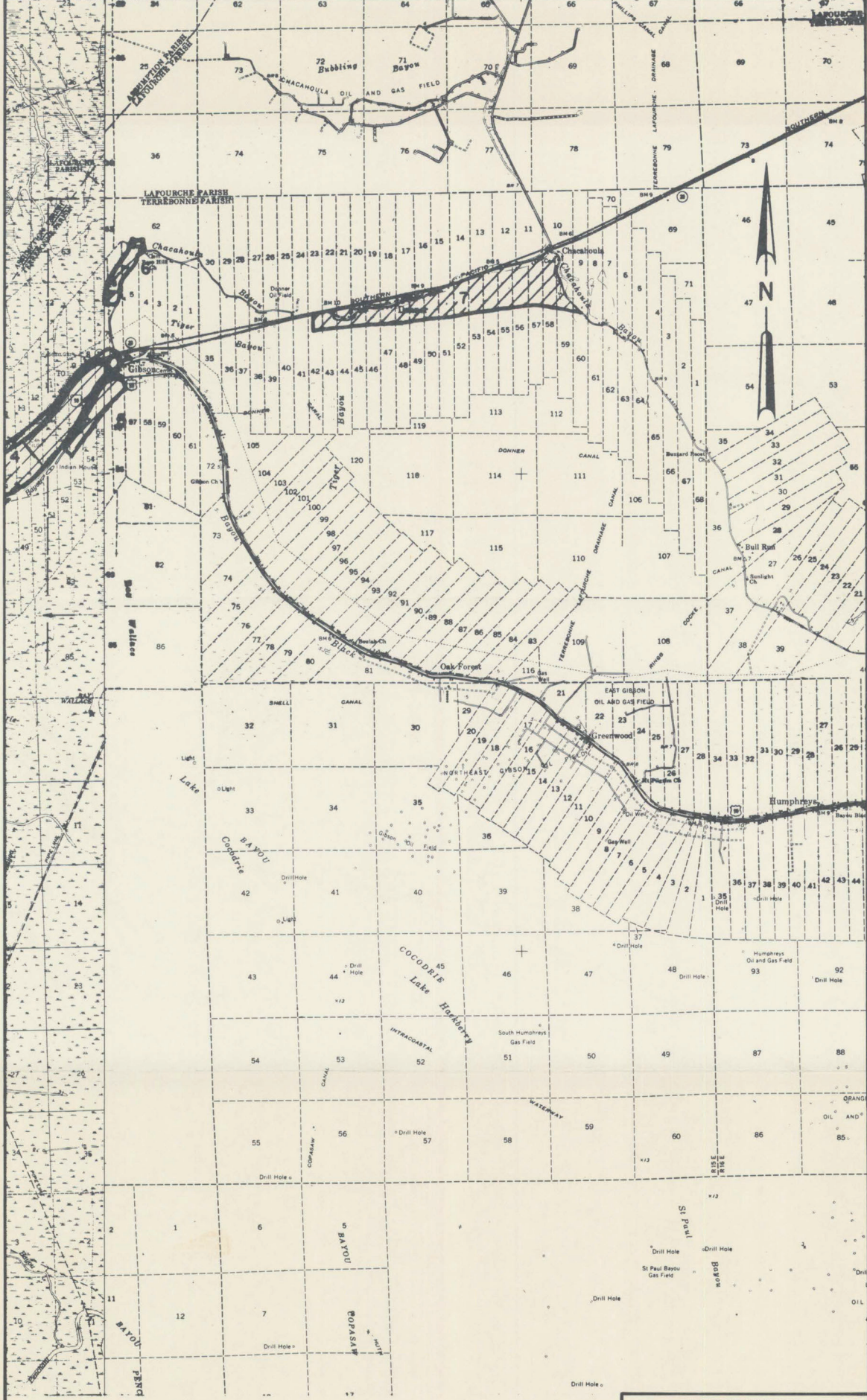
SCALE OF MILES  
 0 1/2 1  


ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
**RING LEVEE ALTERNATIVE  
 FOR BACKWATER AREA**  
 U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
 CORPS OF ENGINEERS  
 FILE NO.

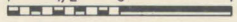
PLATE 25

MATCH PLATE 24

PLATE 25



**LEGEND**  
 RINGED AREAS

SCALE OF MILES  
 0 1/2 1  


ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
**RING LEVEE ALTERNATIVE  
 FOR BACKWATER AREA**  
 U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
 CORPS OF ENGINEERS  
 FILE NO.

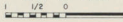
PLATE 25

MATCH PLATE 23



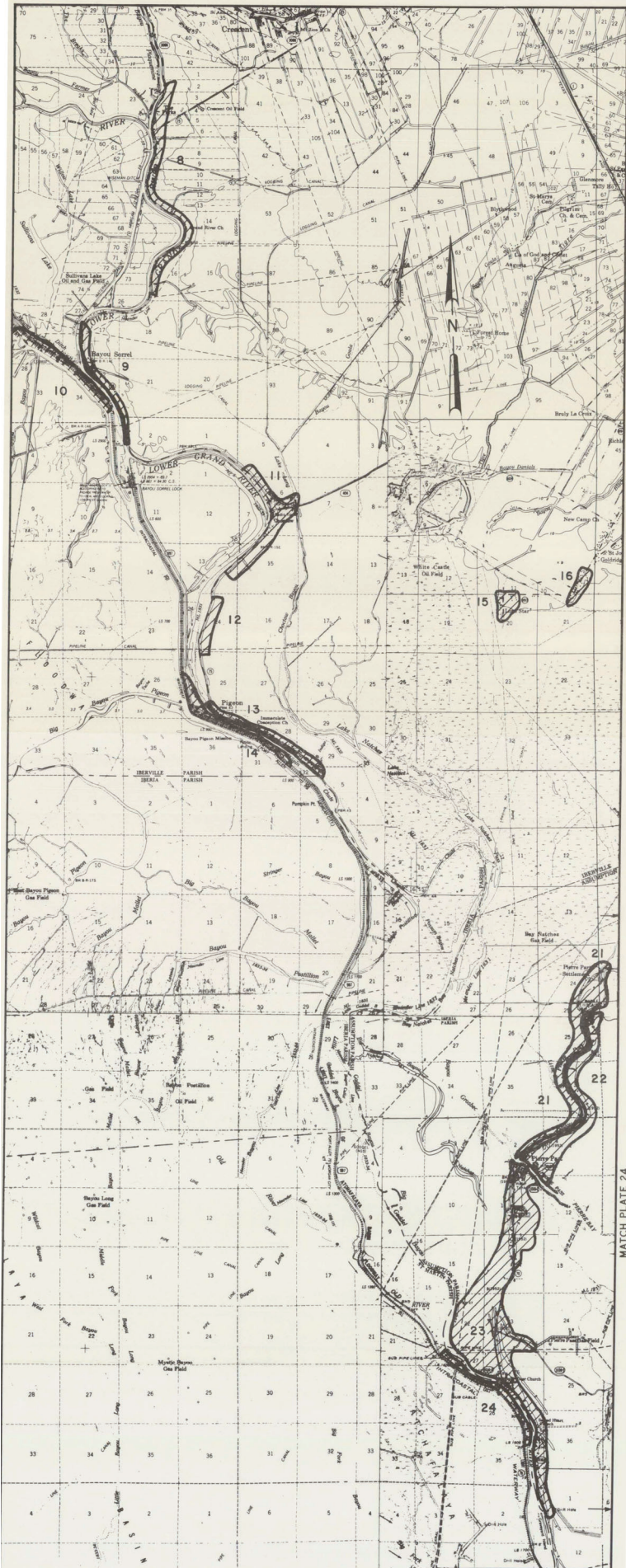
PLATE 24

LEGEND  
 RINGED AREAS

SCALE OF MILES  


ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
**RING LEVEE ALTERNATIVE  
 FOR BACKWATER AREA**  
 U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
 CORPS OF ENGINEERS  
 FILE NO.

PLATE 24



MATCH PLATE 24

**LEGEND**  
 RINGED AREAS

**SCALE OF MILES**  
 1/2 0

ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
**RING LEVEE ALTERNATIVE  
 FOR BACKWATER AREA**  
 U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
 CORPS OF ENGINEERS  
 FILE NO.



**LEGEND**

**POTENTIAL PRIME FARMLANDS**

- 75% - 100%
- 25% - 75%
- 0% - 25%

**EXISTING (CLEARED) PRIME FARMLAND**

**UNIQUE FARMLANDS**

- SUGARCANE
- COMMERCIAL CRAWFISH FARM

**POTENTIAL UNIQUE FARMLANDS**

- NATURAL CRAWFISH HARVEST AREA

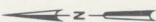
SCALE 0 1 2 3 4 5 Miles

ATCHAFALAYA BASIN  
FLOODWAY SYSTEM, LOUISIANA  
**EXISTING OR POTENTIAL PRIME  
AND UNIQUE FARMLANDS**  
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
CORPS OF ENGINEERS  
FILE NO.

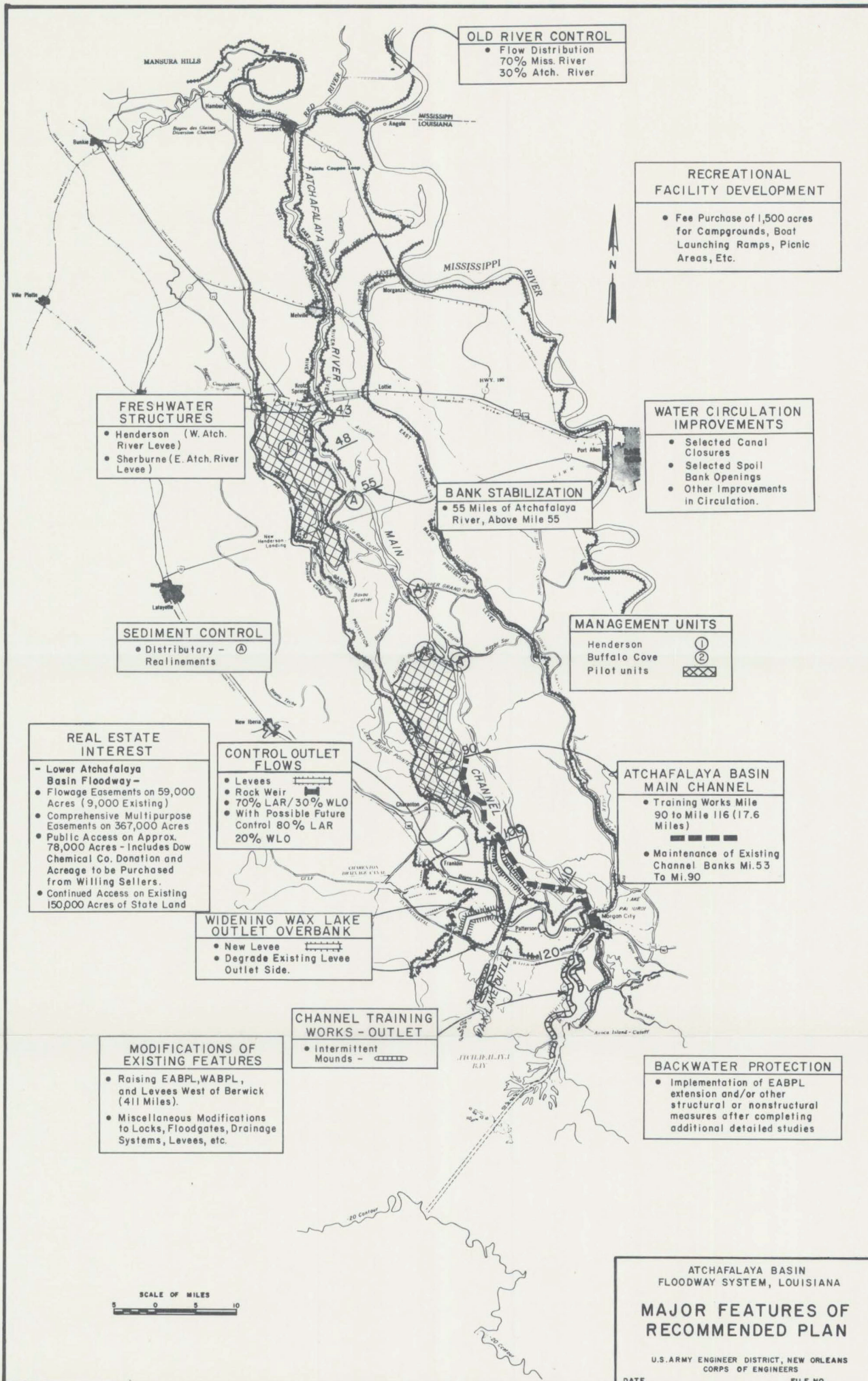




- LEGEND**
- POTENTIAL PRIME FARMLANDS**
    - 75% - 100%
    - 25% - 75%
    - 0% - 25%
  - EXISTING (CLEARED) PRIME FARMLAND**
  - UNIQUE FARMLANDS**
  - SUGARCANE**
  - COMMERCIAL CRAWFISH FARM**
  - POTENTIAL UNIQUE FARMLANDS**
  - NATURAL CRAWFISH HARVEST AREA**



ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
**EXISTING OR POTENTIAL PRIME  
 AND UNIQUE FARMLANDS**  
 U.S. ARMY ENGINEERS DISTRICT, NEW ORLEANS  
 FILE NO.



**OLD RIVER CONTROL**

- Flow Distribution  
70% Miss. River  
30% Atch. River

**RECREATIONAL FACILITY DEVELOPMENT**

- Fee Purchase of 1,500 acres for Campgrounds, Boat Launching Ramps, Picnic Areas, Etc.

**FRESHWATER STRUCTURES**

- Henderson (W. Atch. River Levee)
- Sherburne (E. Atch. River Levee)

**WATER CIRCULATION IMPROVEMENTS**

- Selected Canal Closures
- Selected Spoil Bank Openings
- Other Improvements in Circulation.

**BANK STABILIZATION**

- 55 Miles of Atchafalaya River, Above Mile 55

**MANAGEMENT UNITS**

Henderson ①  
Buffalo Cove ②  
Pilot units [X]

**SEDIMENT CONTROL**

- Distributary - (A) Realignments

**REAL ESTATE INTEREST**

- Lower Atchafalaya Basin Floodway-
- Flowage Easements on 59,000 Acres (9,000 Existing)
- Comprehensive Multipurpose Easements on 367,000 Acres
- Public Access on Approx. 78,000 Acres - Includes Dow Chemical Co. Donation and Acreage to be Purchased from Willing Sellers.
- Continued Access on Existing 150,000 Acres of State Land

**CONTROL OUTLET FLOWS**

- Levees
- Rock Weir
- 70% LAR / 30% WLO
- With Possible Future Control 80% LAR 20% WLO

**ATCHAFALAYA BASIN MAIN CHANNEL**

- Training Works Mile 90 to Mile 116 (17.6 Miles)
- Maintenance of Existing Channel Banks Mi.53 To Mi.90

**WIDENING WAX LAKE OUTLET OVERBANK**

- New Levee
- Degrade Existing Levee Outlet Side.

**CHANNEL TRAINING WORKS - OUTLET**

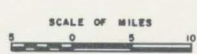
- Intermittent Mounds - [Symbol]

**MODIFICATIONS OF EXISTING FEATURES**

- Raising EABPL, WABPL, and Levees West of Berwick (411 Miles).
- Miscellaneous Modifications to Locks, Floodgates, Drainage Systems, Levees, etc.

**BACKWATER PROTECTION**

- Implementation of EABPL extension and/or other structural or nonstructural measures after completing additional detailed studies



ATCHAFALAYA BASIN FLOODWAY SYSTEM, LOUISIANA

**MAJOR FEATURES OF RECOMMENDED PLAN**

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

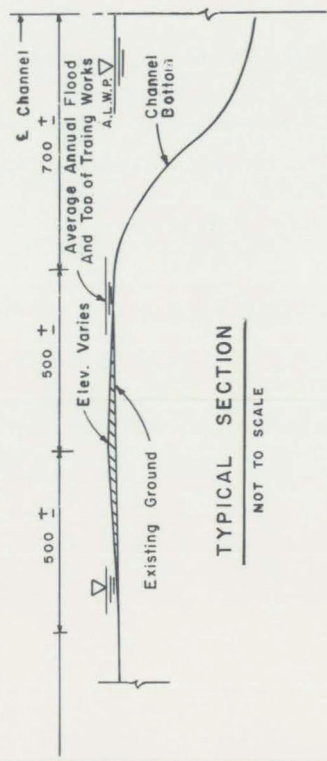
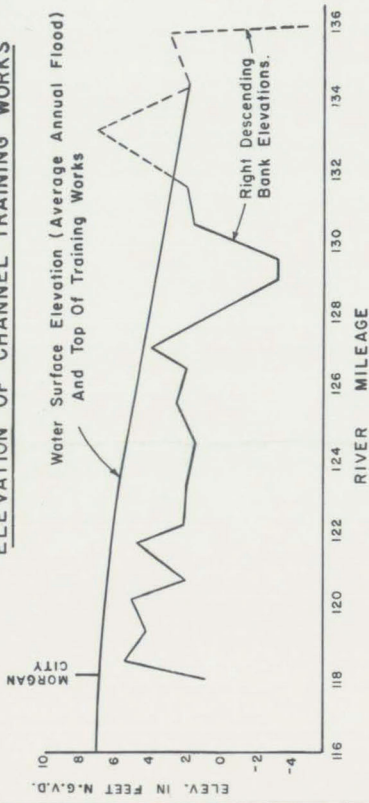
DATE \_\_\_\_\_ FILE NO. \_\_\_\_\_

PLATE 19

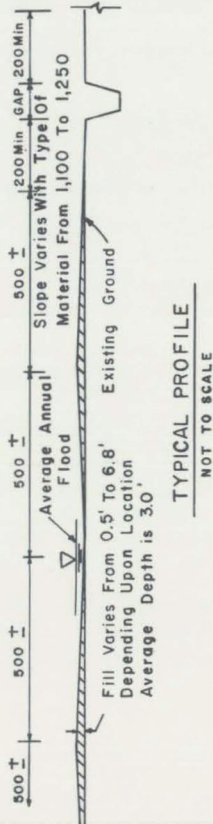
PLATE 19



**ELEVATION OF CHANNEL TRAINING WORKS**

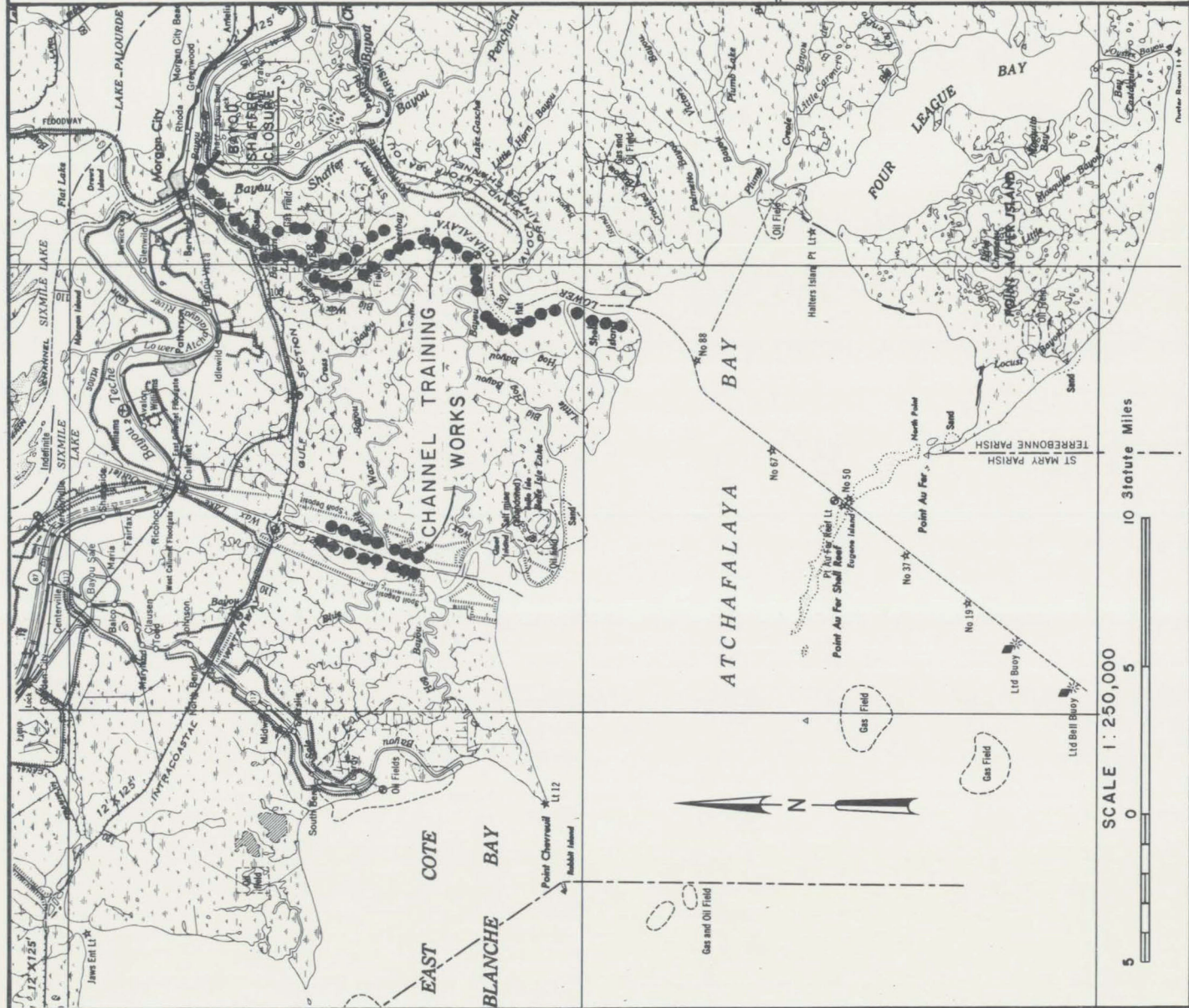


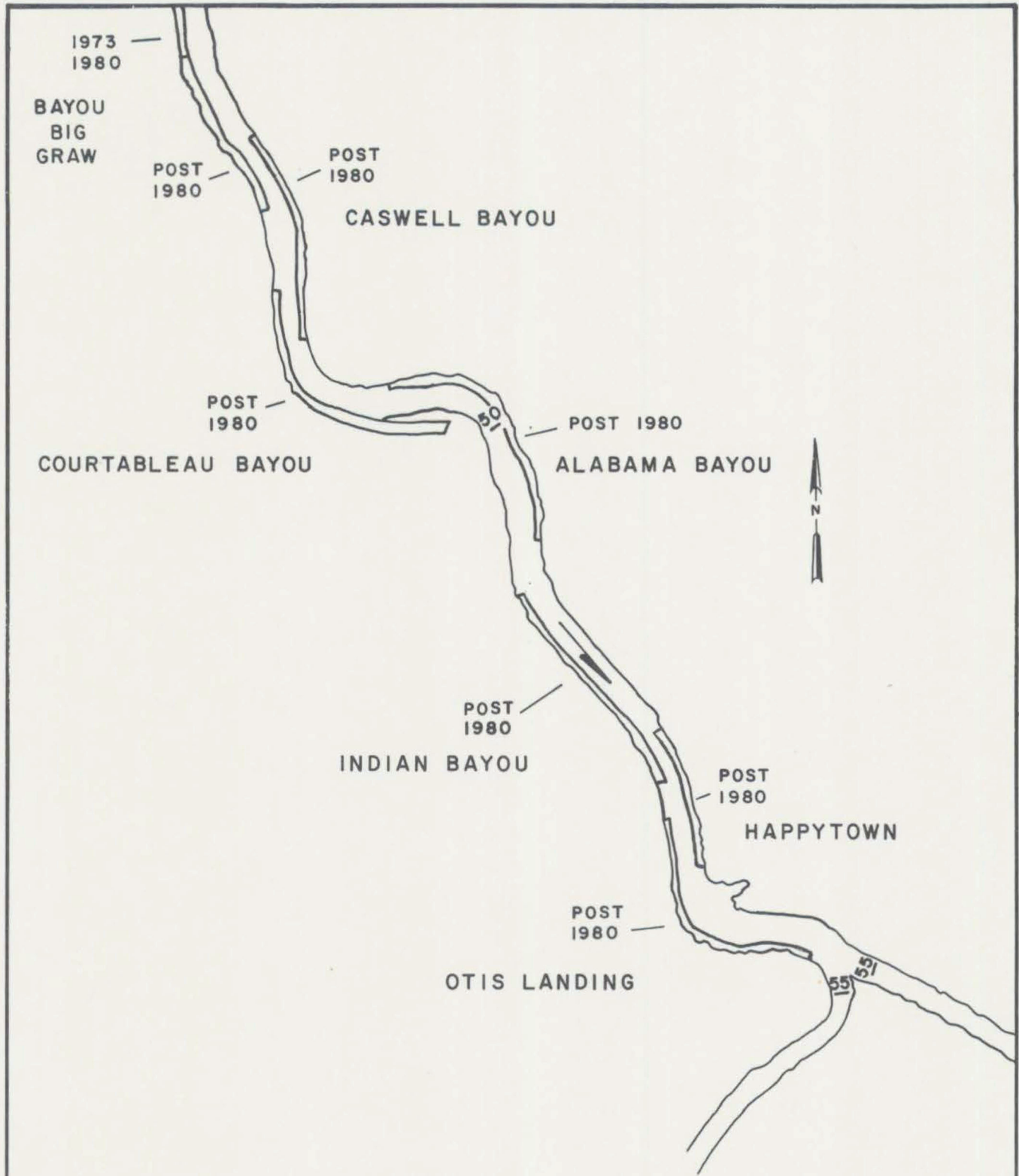
**TYPICAL SECTION**



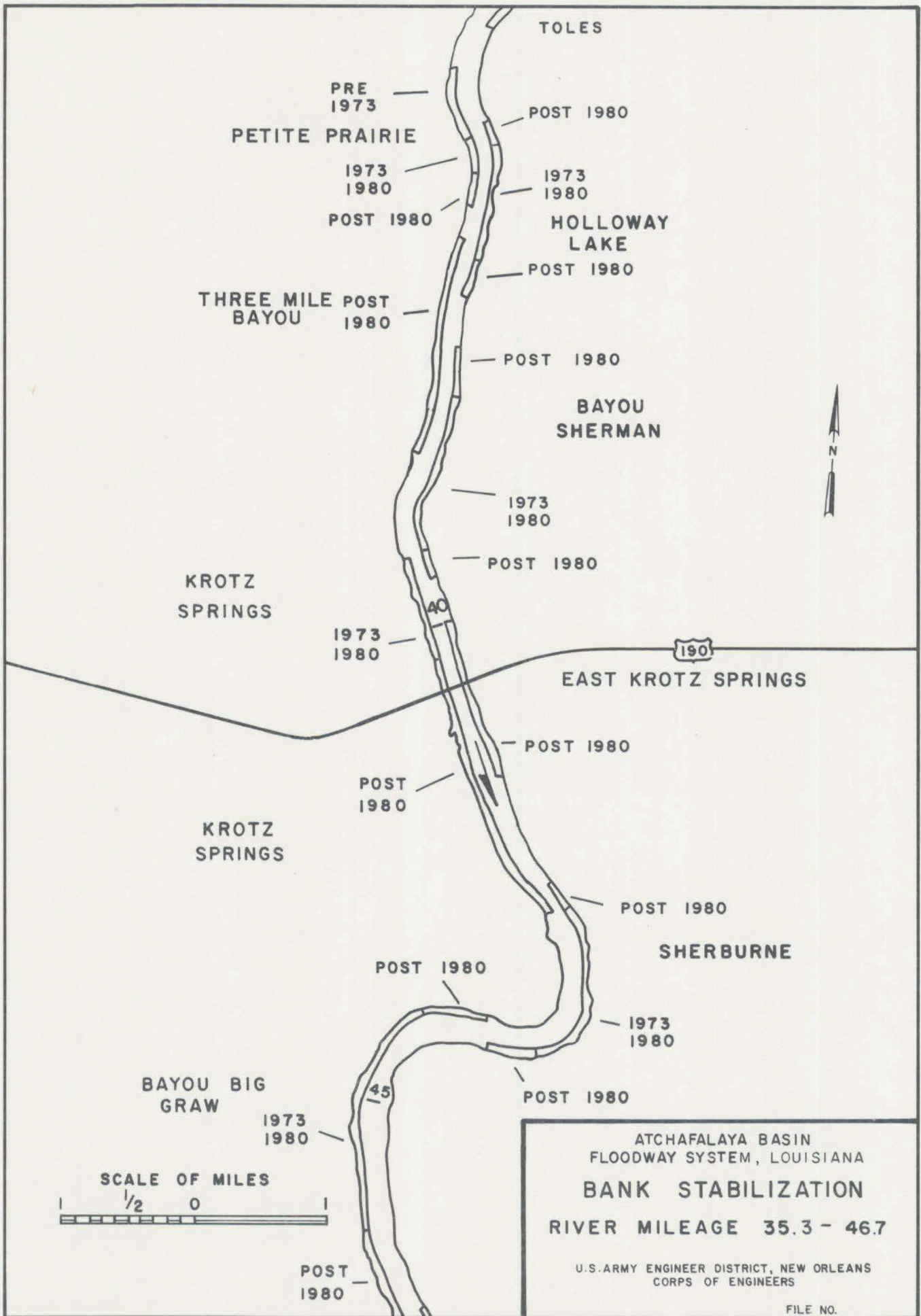
**TYPICAL PROFILE**

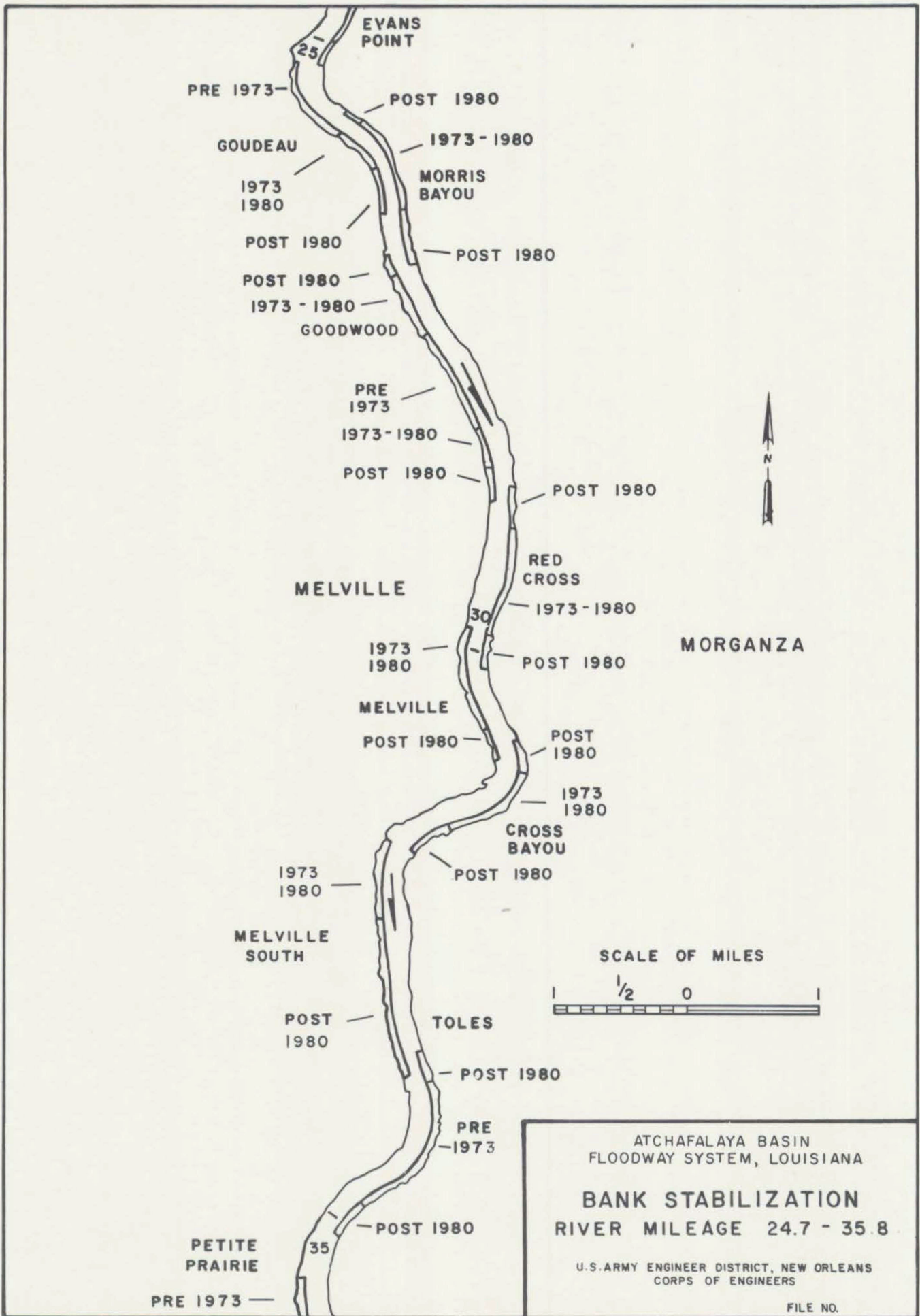
ATCHAFALAYA BASIN  
FLOODWAY SYSTEM, LOUISIANA  
**LOWER ATCHAFALAYA RIVER  
AND WAX LAKE OUTLET  
CHANNEL TRAINING**  
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
CORPS OF ENGINEERS  
FILE NO.

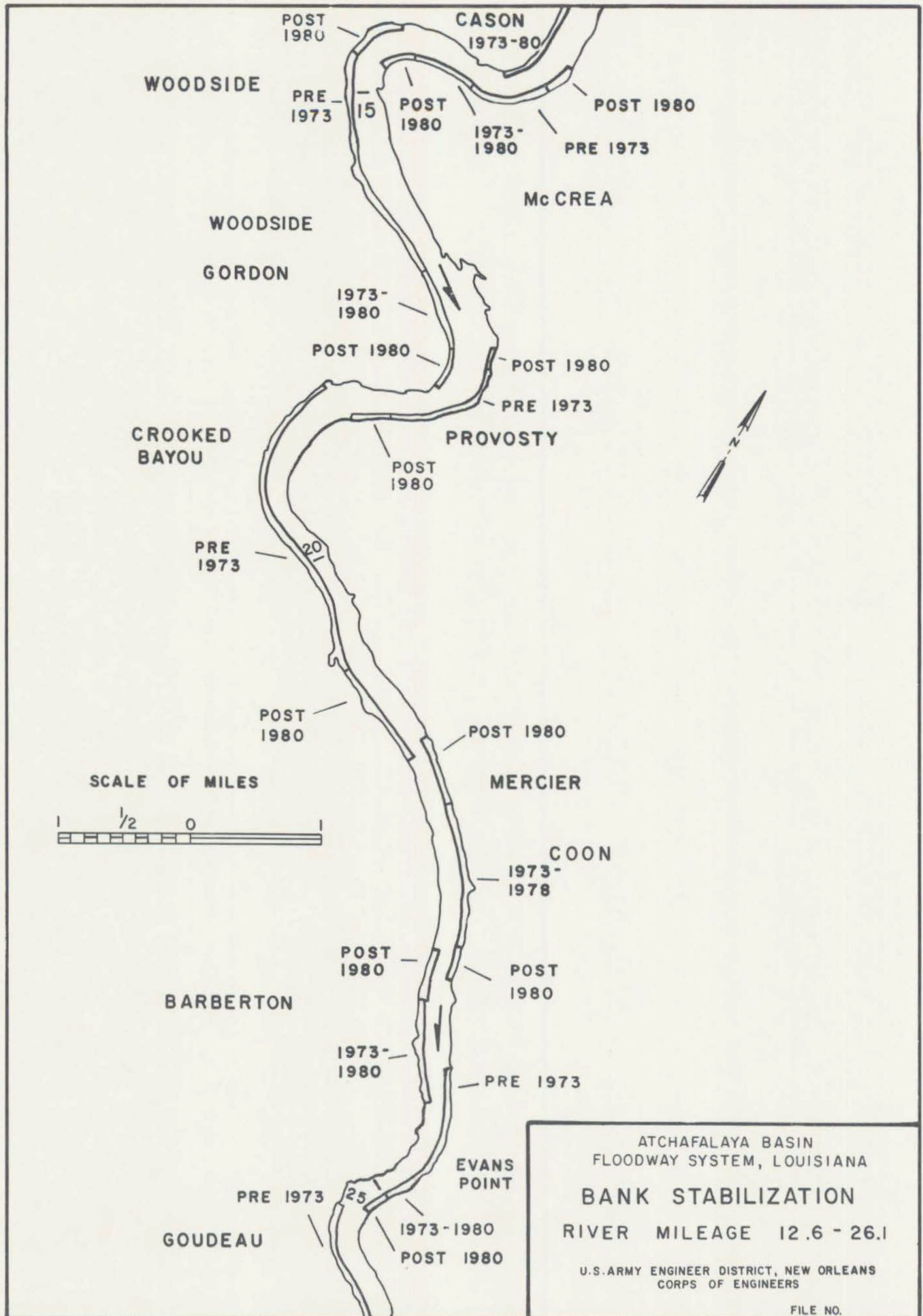


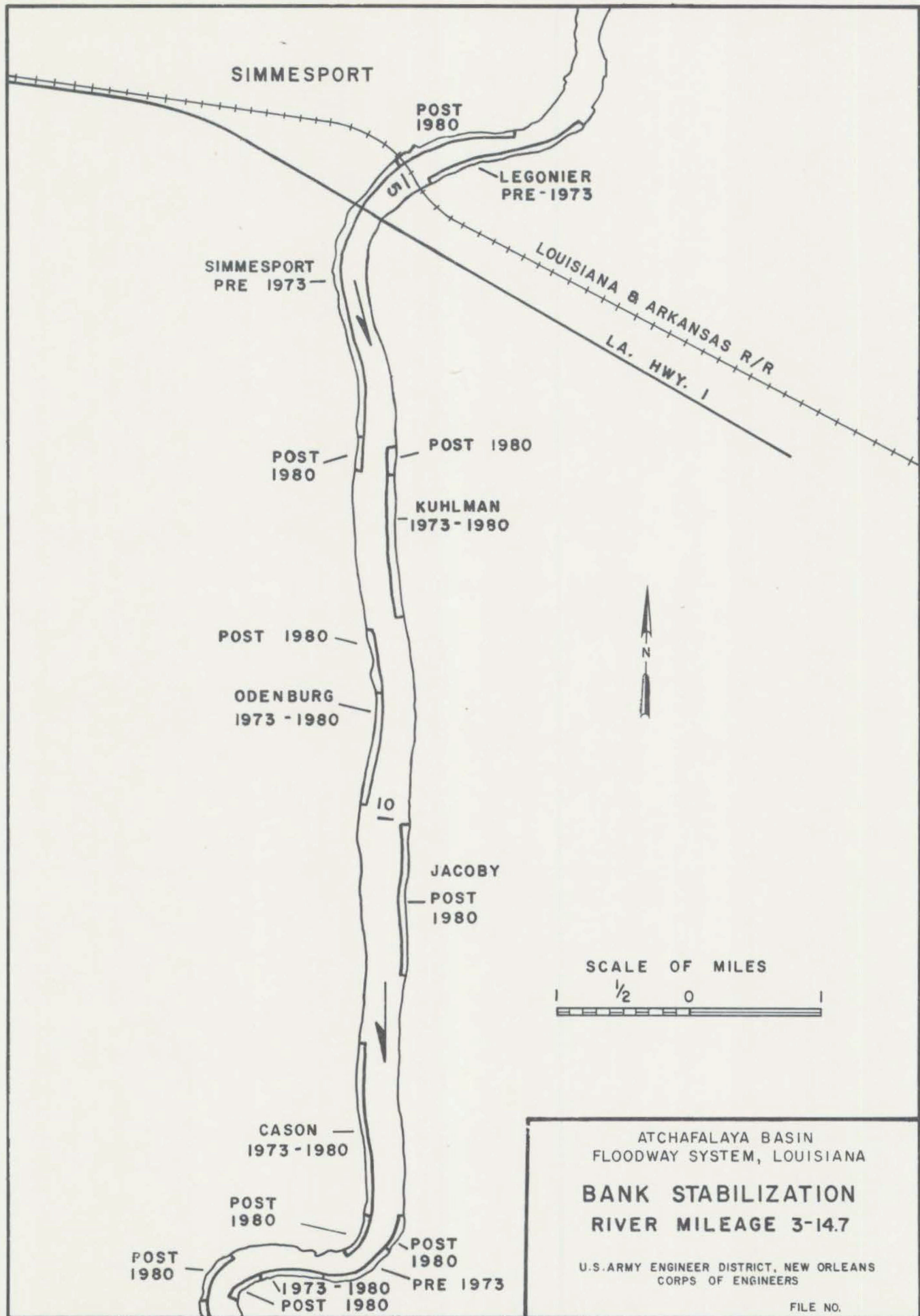


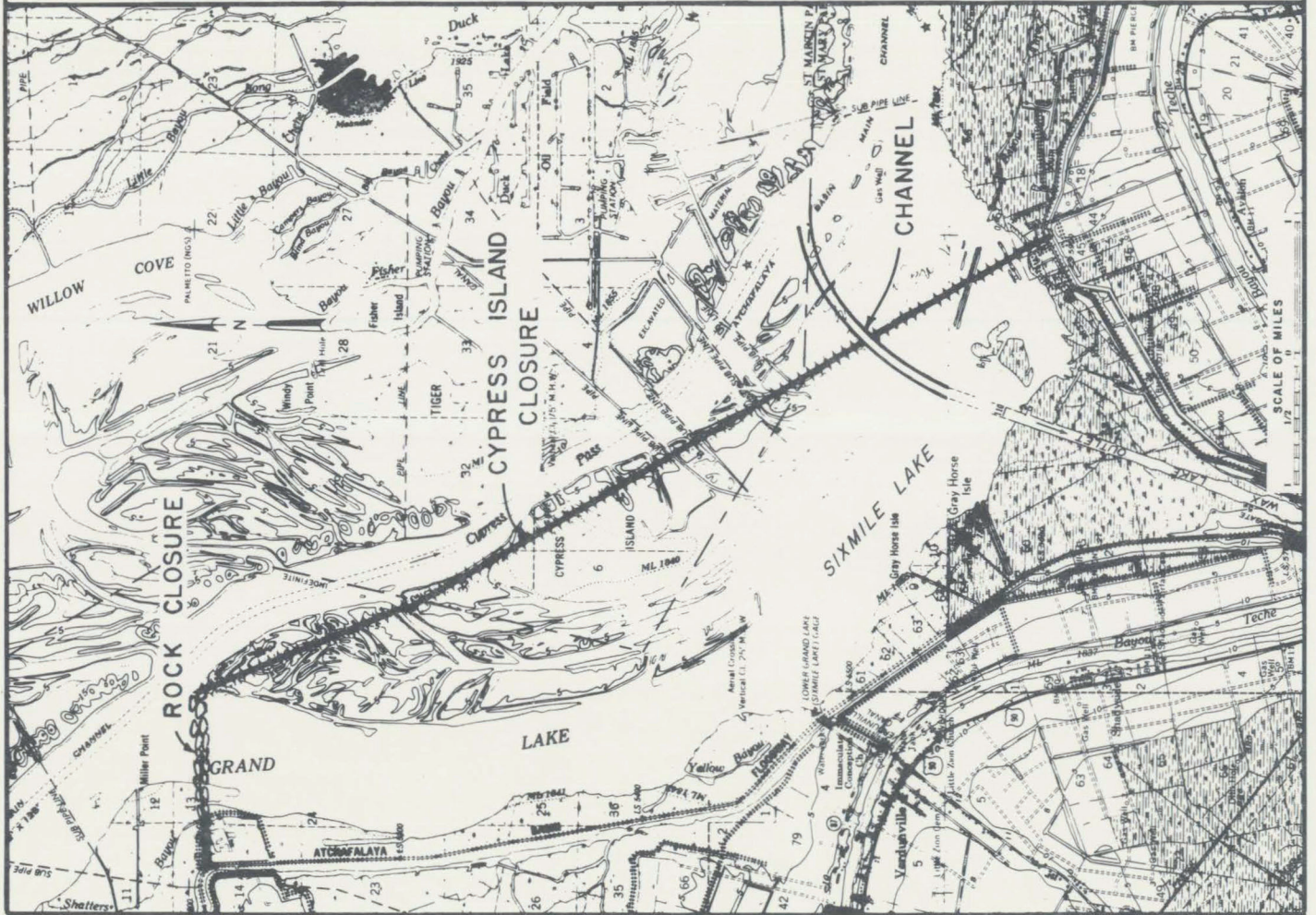
ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
**BANK STABILIZATION**  
 RIVER MILEAGE 46.2 - 55  
 U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
 CORPS OF ENGINEERS  
 FILE NO



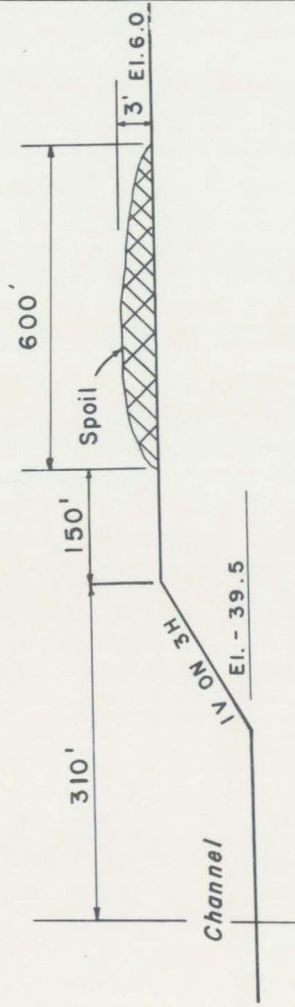








**TYPICAL SECTION**  
 NOT TO SCALE



ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
**INCREASED SEDIMENT  
 THROUGH  
 WAX LAKE OUTLET**  
 U.S. ARMY  
 ENGINEER DISTRICT NEW ORLEANS  
 CORPS OF ENGINEERS  
 FILE NO.





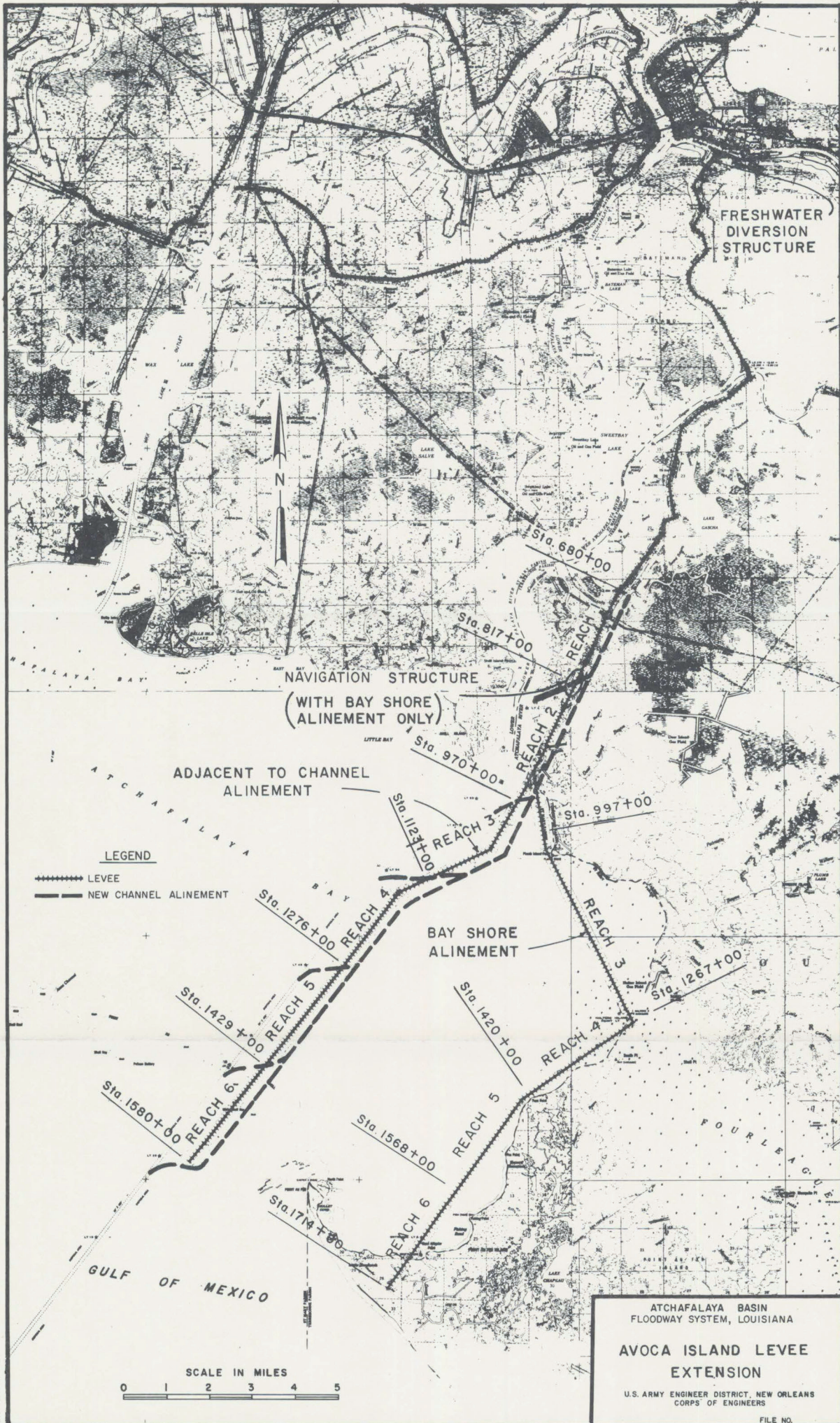
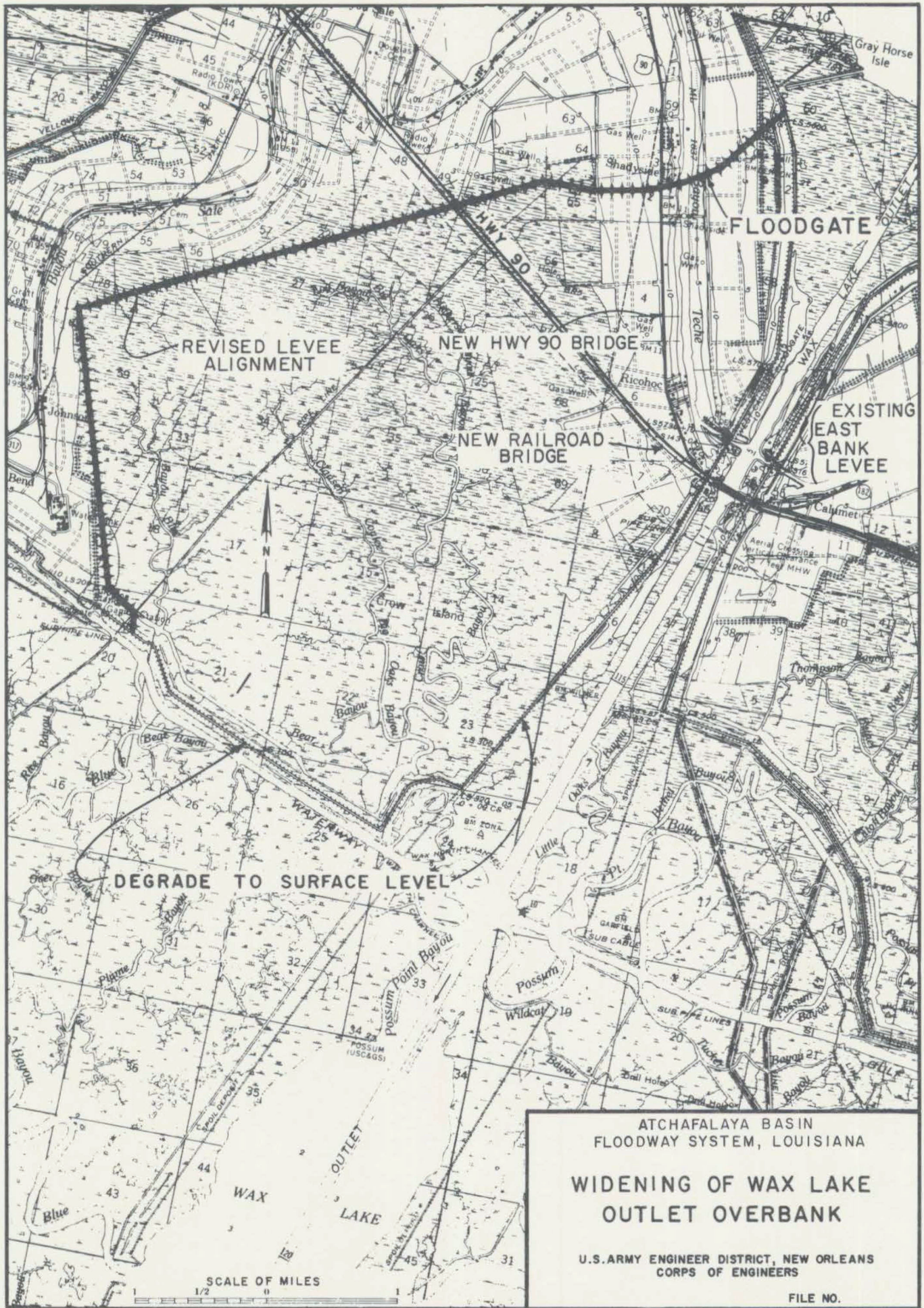


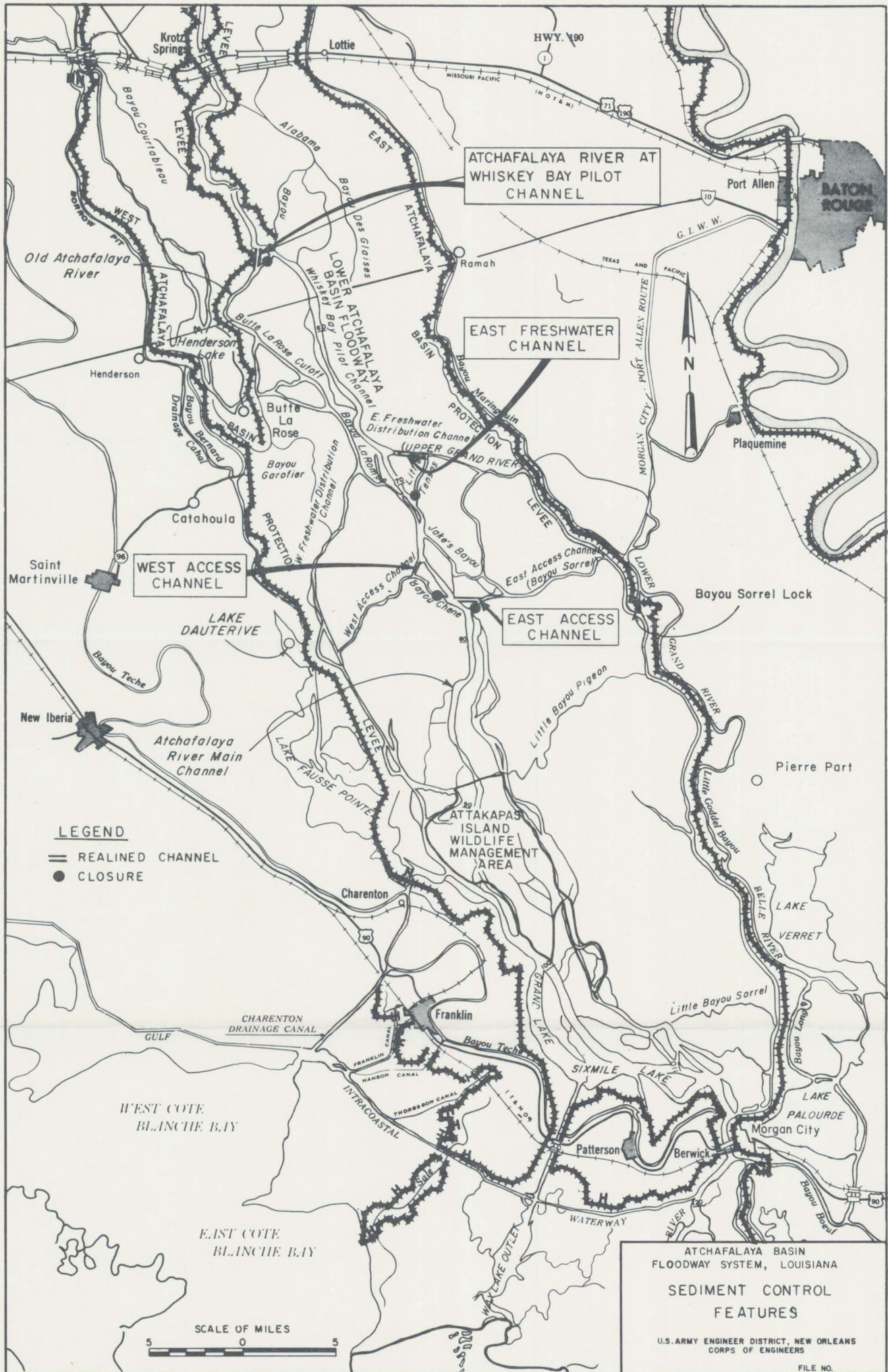
PLATE 10

ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
**AVOCA ISLAND LEVEE  
 EXTENSION**  
 U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
 CORPS OF ENGINEERS  
 FILE NO.

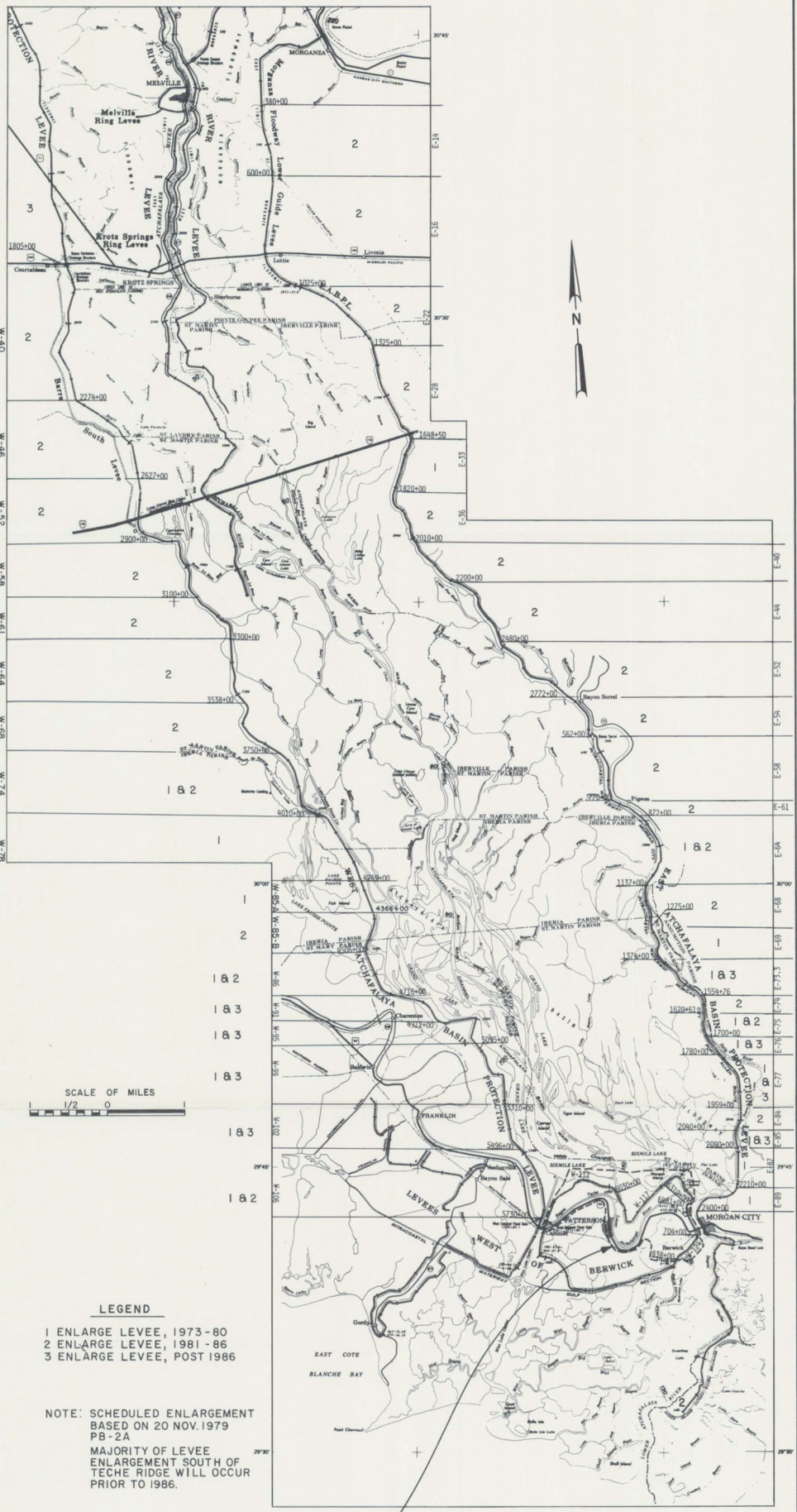
PLATE 10











**LEGEND**

- 1 ENLARGE LEVEE, 1973 - 80
- 2 ENLARGE LEVEE, 1981 - 86
- 3 ENLARGE LEVEE, POST 1986

NOTE: SCHEDULED ENLARGEMENT  
 BASED ON 20 NOV. 1979  
 PB - 2A  
 MAJORITY OF LEVEE  
 ENLARGEMENT SOUTH OF  
 TECHE RIDGE WILL OCCUR  
 PRIOR TO 1986.

W-112 1 & 3  
 W-117 1  
 W-121 1  
 W-123 2  
 W-124 2

ATCHAFALAYA BASIN  
 FLOODWAY SYSTEM, LOUISIANA  
**MODIFICATION OF EXISTING  
 LEVEE FEATURES**  
 U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
 CORPS OF ENGINEERS  
 FILE NO.

PLATE 5



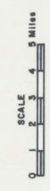






**LEGEND**

1. MID TO LATE SUCCESSIONAL BOTTOMLAND HARDWOODS
2. CYPRESS-TUPELO OR CYPRESS-TUPELO MIXED WITH BOTTOMLAND HARDWOODS
3. HARDWOODS SUCCESSIONAL BOTTOMLAND
4. CROPLANDS, PASTURE AND LEVEES
5. OPEN WATERS
6. BRACKISH MARSH
7. SALINE MARSH
8. URBAN DEVELOPMENT
- UNDEFINED AREAS - OPEN WATER



ATCHAFALAYA BASIN  
FLOODWAY SYSTEM, LOUISIANA

**EXISTING LAND USE**

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
CORPS OF ENGINEERS  
FILE NO.