

BIG SUNFLOWER RIVER MAINTENANCE PROJECT

APPENDIX N CUMULATIVE IMPACTS ANALYSIS

SCOPING PROCESS

1. Scoping for cumulative effects included the following steps:
 - a. Identified the significant cumulative effects associated with the proposed action and defined the assessment goals.
 - b. Established the geographic scope for the analysis.
 - c. Established the timeframe for the analysis.
 - d. Identified other actions affecting the resources, ecosystems, and human communities of concern.
2. A public scoping meeting for the Big Sunflower River Maintenance Project (BSRMP) was held in Greenville, Mississippi, on December 17, 1992. During this meeting, some discussion took place concerning what had been done to the stream for flood control in the 1960's. The limits of the study were discussed, as well as flooding problems and some environmental impacts. Mention was made of the Yazoo Backwater study and the Upper Yazoo Projects under construction.

3. The scoping meeting was followed later by a public status briefing at Rolling Fork, Mississippi, on June 28, 1994, in which flooding problems were discussed, and the Corps stated that the project would benefit 56,000 average annual acres. The methods of construction, alternatives, environmental resources, and compensation measures were discussed, as well as the presence and impacts to freshwater mussels.

4. A public meeting was held later at Rolling Fork, Mississippi, on August 15, 1995. During the public meeting, flooding problems and impacts to freshwater mussels were discussed, and a nonstructural plan was recommended by the U.S. Fish and Wildlife Service (FWS). The plan recommended by the Corps was also presented.

METHODS

5. Methods used to address the unique aspects of cumulative impacts were the Habitat Evaluation Procedures and a waterfowl analysis of baseline and future carrying capacities based on duck-days developed by FWS. Impact analysis was aided by use of remote sensing and Geographic Information System technologies.

WATER RESOURCES PROJECTS

6. The Upper Steele Bayou and Yazoo Backwater Area Pump Projects are in the vicinity of the BSRMP. The Yazoo Backwater Area Pump Project will include a 14,000-cubic-foot-per-second (cfs) pump with a year-round pumping elevation of 87 feet (1-year flood-plain), National Geodetic Vertical Datum (NGVD), at the Steele Bayou structure, acquisition of conservation easements from willing sellers, and reforestation on 62,500 acres of agricultural land below 87 feet, NGVD. The pump provides structural flood damage reduction above 87 feet, NGVD. Operation of the Steele Bayou structure would also be modified to maintain a 70- to 73-foot elevation during low-water periods.

7. The recommended plan for the Upper Steele Bayou Project includes the following features:

a. Selective clearing and snagging from mile 0.0 to mile 6.3 and cleanout from mile 6.3 to mile 36.5 on Black Bayou.

b. Channel enlargement from mile 0.0 to mile 25.3 on Main Canal.

c. Construction of five weirs on Black Bayou and two weirs on Main Canal.

- d. Construction of approximately 38 grade/water control structures on Black Bayou and approximately 40 grade/water control structures on Main Canal.

- e. Establishment of approximately 530 acres of greenbelts on Black Bayou and approximately 270 acres of greenbelts on Main Canal.

- f. Clearing and snagging on approximately 1.5 miles of Ditch 6.

- g. Channel enlargement on approximately 1.0 mile of Robertshaw Ditch.

- h. Purchase in fee title and reforestation of approximately 4,600 acres of frequently flooded agricultural lands.

PROJECT IMPACT ZONE

8. For this action, the area affected by the project is the project area or project impact zone. Significant resources within this zone are wetlands, bottom-land hardwoods, waterfowl, fisheries, freshwater mussels, important farmlands, historic resources, sociocultural resources, and various structures. The area of cumulative effects is the area from north to south generally between Highway 82 and Vicksburg, Mississippi, and from west to east from the Mississippi

River to Yazoo City. This area is shown on Plate 2 of Volume 1 of Supplement No. 2 to the Final Environmental Impact Statement, Flood Control, Mississippi River and Tributaries ,Yazoo Basin , Mississippi, Big Sunflower River Maintenance Project.

PAST EFFECTS

9. Because the baseline conditions and effects of past actions prior to about 1970 are unknown or scarce, analysis of past effects is largely qualitative. The Lower Mississippi Region Comprehensive Study completed in 1974 contains 10 appendixes which describe environmental conditions of the Yazoo Basin in 1970 which include the study area for the Big Sunflower River Maintenance Project. These appendixes and other reports by state and Federal agencies document both non-Federal and Federal actions that have affected the area. Land use in the area is presently predominantly agricultural with a few larger cities and rural communities. Close coordination has been maintained with other agencies and groups to ensure that all past, present, and future actions were considered.

RECOMMENDED PLAN

10. The recommended plan consists of 104.8 miles of channel cleanout and 28.3 miles of channel clearing and snagging. Channel excavation will be done by both hydraulic dredge (7.75 million cubic yards (MCY's)) and dragline (0.67 MCY's), totaling about 8.42 MCY's of material. The hydraulic dredge method, accomplished in compliance with applicable Federal

dredging regulations, will be employed where constructibility constraints are not evident. The dragline will be utilized on reaches that display constructibility constraint characteristics such as shallow streams, low clearance bridges, and along reaches where calculated excavated quantities are insufficient to economically justify dredge disposal facilities. The clearing and snagging reaches will be accomplished by dragline (Big Sunflower River Maintenance Project Report pages 21-28).

ENVIRONMENTAL CONSEQUENCES

11. In order to determine the environmental consequences of cumulative effects, this analysis has been scoped, including stipulating geographic and time boundaries, and appropriate data were gathered for the resources. To determine the consequences of the proposed action on the resources, the cumulative environmental changes from the proposed action and other actions in the vicinity were determined.

EFFECTS ON ECOLOGICAL RESOURCES

12. Techniques for evaluating ecological resources included Habitat Suitability Index models (HSI) developed by FWS, its Habitat Evaluation Procedures (HEP) and the Functional Capacity Index (FCI) for wetland functions developed by the U.S. Army Engineer Research and Development Center. These models use cause-and-effect relationships for several key

environmental variables to determine the suitability of different habitats for a variety of species or functions. The change in the number of average annual habitat units and average annual functional capacity units (FCU) as a result of multiple actions is a useful measure of cumulative effects. These average annual units are derived by multiplying the indices by the number of acres of habitat or function and annualizing the result over the life of the project for each alternative. The adverse cumulative impacts to terrestrial and aquatic resources without compensation measures are given in Table N-1 (see Appendixes F and H, Supplement No. 2 to the Final Environmental Impact Statement). The average annual FCU's lost without compensation measures are given for each function evaluated in Table N-2 (see Appendix G, Supplement No. 2 to the Final Environmental Impact Statement).

TABLE N-1
ADVERSE CUMULATIVE IMPACTS TO
TERRESTRIAL AND AQUATIC RESOURCES
WITHOUT COMPENSATION MEASURES a/

Resources	Average Annual Habitat Unit Losses
Wildlife	1,739
Aquatic	5,508

a/ Units lost over the life of the project (25 years).

TABLE N-2
ADVERSE CUMULATIVE IMPACTS TO
WETLAND RESOURCES
WITHOUT COMPENSATION MEASURES a/

Function	Average Annual FCU Losses
Short-term water storage	1,233
Long-term water storage	1,114
Water velocity reduction	1,133
Sediment detention	1,064
Onsite erosion control	678
Nutrient and dissolved substance removal	693
Organic carbon export	1,154

a/ Units lost over the life of the project (25 years).

13. Cumulative impacts to waterfowl resources include the combined loss of soybean, rice, and moist/fallow lands and also bottom-land hardwoods that all provide foraging habitat for waterfowl. Wintering migratory waterfowl foraging habitat would be reduced by 2,831 average annual daily acres or 10 percent. Using food as an index for carrying capacity, wintering migratory waterfowl foraging values would be reduced by approximately 481,200 duck-days or 11 percent of total duck-days available.

14. Cumulative beneficial effects of recommended compensation measures on wetland resources by the purchase of 1,912 acres of frequently flooded lands and reforesting them, total 7,069 average annual FCU's. These cumulative beneficial impacts compensate for the adverse cumulative wetland impacts shown in Table N-2 and will more than compensate for adverse terrestrial and aquatic losses shown in Table N-1. In addition, the recommended alternative will more than compensate for adverse waterfowl losses.

15. Four freshwater mussel beds in the Big Sunflower River were characterized by high density and often extreme dominance by a single specie. Typically, there was little or no evidence of recent recruitment. It is likely that all of the living mussels in the river have been recruited since channel maintenance in the 1960's.

16. Economic value of the mussels in the study area was estimated utilizing a comprehensive mussel survey. Commercial value for mussel shells is based primarily on the demand for thick shelled species for use as cultured pearl inserts. The value per pound changes as market demand changes. The most common market for shell is overseas, principally Japan.

17. Utilizing an interest rate of 7-5/8 percent, it was estimated that approximately 43 percent of the mussel value in the Big Sunflower River would be affected by the proposed maintenance work. This percentage was derived considering existing bed sites, proposed dredging locations, and dredging techniques. It was assumed that no mussels would survive if they passed through a dredge.

MONETARY COMPARISON

18. Flood control benefits associated with the proposed maintenance features reflect the significant reduction in average annual flooding damages to the project area. The proposed construction would negatively impact the commercial value of mussels within the Big Sunflower River. The average annual flood control benefits associated with the proposed maintenance features were \$8,598,000, compared to losses of \$397,000 to the mussel industry.

19. A plan to improve 315,000 square feet of the substratum of the project area for freshwater mussels is a part of the recommended plan. This plan consists of two dike fields, two bank stabilization measures and also some substratum improvement by the use of gravel. These measures will be monitored for 10 years.

COMPARISONS WITH OTHER WATER RESOURCE PROJECTS

20. A comparison of environmental impacts of the BSRMP and other water resources projects in the vicinity is presented in Table N-3. These impacts and impacts of other actions by other agencies were used to estimate the effects of the present, proposed, future, and cumulative effects of all likely actions in the project impact area. These effects are presented in Table N-4.

TABLE N-3
COMPARISON OF WATER RESOURCES
PROJECTS IN THE VICINITY

Resource	Upper Steele Bayou	Big Sunflower	Backwater
Terrestrial	9 percent increase in habitat.	<1 percent decrease in habitat	22.8 percent increase in habitat
Waterfowl	105 percent increase in foraging habitat value	10.6 percent decrease in foraging habitat value	42.1 percent decrease in foraging habitat value <u>a/</u>
Wetlands	9 percent increase in wetlands	<1 percent decrease in forested and farmed wetlands	42.0 percent increase in forested wetland average daily acres
Aquatics	105 percent increase in instream habitat value	10 percent decrease in flood plain habitat	18.7 percent increase in flood plain habitat value
Water quality	Short-term construction impacts. Long-term improvement	Short-term construction impacts. No long-term effects.	Reforestation should reduce nutrient and sediment loading. May increase methyl-mercury production which could elevate mercury levels in fish tissue.
Threatened and endangered species	No direct or indirect impacts to pondberry	No direct or indirect impacts to pondberry, pallid sturgeon or Louisiana black bear	No direct or indirect impacts. Increase in Louisiana black bear and pondberry habitat.
Compensatory mitigation	5,250 acres of reforestation. Fully offset terrestrial and wetlands losses. Net gain of 2,684 acres of forested wetlands.	1,912 acres of reforestation. Fully offset wetlands and fisheries impacts. Net gain of 1,090 acres of terrestrial habitat. Net gain of 957 acres of bottom-land waterfowl foraging habitat.	Although compensatory mitigation is not required, the nonstructural flood control component includes reforestation of 62,500 acres of agricultural land below elevation 87 feet, NGVD.

a/ Although reforestation results in a loss of waterfowl foraging habitat, there are other important waterfowl habitat requirements that are met with reforestation (loafing, pair bonding, shelter, etc.) and that are notably absent in agricultural fields. According to FWS, the overall benefit that results from reforestation far exceeds losses of foraging habitat.

TABLE N-4
 NARRATIVE DESCRIPTION OF EFFECTS
 ON RESOURCES IN THE LOWER BIG SUNFLOWER RIVER BASIN

Resource	Past Actions	Present Actions	Proposed Action	Future Actions	Cumulative Effects
Water quality	Significant increases in turbidity and pesticides	Effects not as significant as past actions	Temporary increases in turbidity and suspended solids	Reduction in levels of turbidity and suspended solids	Reduction in levels of turbidity and suspended solids
Aquatic	Increase in rough fish	Decrease in rough fish	Minor additional decrease in rough fish	Minor additional decrease in rough fish	Minor/moderate decrease in rough fish
Terrestrial	Significant reduction in forested habitat	Minor increase in forested habitat	Minor increase in forested habitat	Minor/moderate increase in forested habitat	Moderate increase in forested habitat
Waterfowl	Significant reduction in forested habitat	Minor increase in forested habitat	Minor increase in forested habitat	Minor/moderate increase in forested habitat	Moderate increase in forested habitat
Freshwater mussels	Significant reduction in quality of mussel habitat	Minor increase in quality of mussel habitat	Moderate decrease in mussels of Big Sunflower River	Minor/moderate improvement in mussel habitat	Minor/moderate improvement in mussel habitat
Sociocultural	Significant increase in agribusiness and related businesses	Moderate increase in agribusiness and related businesses/reduced flood damages to structures	Moderate increase in agribusiness and related businesses/reduced flood damages to structures	Moderate increase in agribusiness and related businesses/reduced flood damages to structures	Moderate increase in agribusiness and related businesses/reduced flood damages to structures

ACTIONS AFFECTING PAST, PRESENT, FUTURE,
 AND CUMULATIVE ACTIONS

21. The conversion of significant acres of bottom-land hardwoods to agricultural lands in the past has had significant effects on environmental resources. Congress recognized these effects and passed the Fish and Wildlife Coordination Act in 1958 to allow water resource projects to be modified to reduce impacts to fish and wildlife resources that were important to the Nation. In recent years, legislative authorities and Executive Orders have addressed the issue of wetland protection and restoration. Section 404 of the Clean Water Act requires permits for the discharge

of dredged or fill material into waters of the United States. The Food Security Act of 1985 (referred to as "Swampbuster") removed some incentives for wetland development by eliminating agricultural subsidies to parties that produce commodities on wetlands converted after enactment. The Wetlands Reserve Program is a voluntary program to restore wetlands. Participating landowners can establish conservation easements of either permanent or 30-year duration or can enter into restoration cost-share agreements where no easement is involved. Executive Order 11990 directs Federal agencies to avoid, to the extent possible, long-and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands if a practical alternative exists. Executive Order 11988 directs Federal agencies to reduce flood loss risk; minimize impacts on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by flood plains.

22. Water Resource Development Acts and the North American Waterfowl Management Plan have also affected environmental resources in the study area. The Water Resources Development Acts of 1986 and 1990 require compensation of impacts of water resource projects on bottom-land hardwoods and no net loss of wetlands, respectively. In addition, the North American Waterfowl Management Plan should significantly improve waterfowl habitat in the study area.

CONCLUSION

23. The combined effects of all foreseeable actions on the project impact zone of the Big Sunflower River Maintenance Project should result in improved ecological and sociocultural conditions. These actions will substantially improve the human environment.

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