CACHE RIVER BASIN:

A WATERFOWL HABITAT PRESERVATION PROPOSAL

FINAL ENVIRONMENTAL IMPACT STATEMENT

JUNE 1984

"THE CACHE RIVER CHOICE"

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FINAL

ENVIRONMENTAL IMPACT STATEMENT

CACHE RIVER BASIN: A WATERFOWL HABITAT PRESERVATION PROPOSAL

JACKSON, MONROE, PRAIRIE, AND WOODRUFF

COUNTIES, ARKANSAS

ABSTRACT: This final environmental impact statement (FEIS) considers environmental and socio-economic effects of protecting and preserving up to 92,000 acres of internationally significant waterfowl habitat within the ten-year floodplain of the lower and middle Cache River Basin. The FEIS evaluates impacts of alternative actions and determines the degree to which each would accomplish habitat preservation goals. Included in this alternative evaluation is the Preferred Alternative of the Fish and Wildlife Service (FWS), which provides for the "team approach" to preservation involving the FWS, Arkansas Game and Fish Commission (AGF), other agencies, groups and individuals. The primary means of acquisition from willing sellers will be fee title and easements; however, other methods such as donations, land exchanges, and management agreements may be used.

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EXECUTIVE SUMMARY

In accordance with the National Environmental Policy Act (NEPA), the FWS is publishing this FEIS to disclose the intent and impacts of initiating a land acquisition program in the Cache River Basin (Basin) in Arkansas. Specifically, through combined fee title, easement acquisition and other means, such as donations, land exchanges, and management agreements, the FWS, AGF, other agencies, groups, and individuals propose to preserve up to 92,000 acres of privately owned valuable waterfowl habitat within the 133,000-acre, ten-year floodplain of the middle and lower Cache River and its principle tributary, Bayou DeView. The FWS will seek to acquire by fee title and easement up to 35,000 acres of natural habitat from within the three priority areas identified on the land acquisition map, page 19. It is anticipated that most of the 35,000 acres will be located in the Priority 1 Area. Concurrently, the FWS, AGF, other agencies, groups, and individuals will seek to acquire and/or preserve the remaining valuable waterfowl habitat within the ten-year floodplain with primary emphasis directed toward the remaining 37,000 acres of natural habitat in private ownership. Any actions initiated under this proposal would occur in Jackson, Monroe, Prairie, and Woodruff Counties in northeast Arkansas.

The FWS has identified 33 categories of high priority waterfowl habitat within the United States. The bottomland hardwoods of the Lower Mississippi River Delta rank Number 7 in priority. The Cache River waterfowl habitat preservation study area includes all or portions of four areas totaling approximately 66,000 acres of natural habitat that were identified by the FWS in the April, 1978, "concept plan" for the preservation of forested wetlands in the Lower Mississippi River Delta. This concept plan was prepared to assist the FWS and other agencies in focusing on the need for preserving productive waterfowl habitat currently under threat of loss.

The FWS has a limited amount of funds available for preserving waterfowl habitat. Recognizing this fact, the FWS land acquisition program, utilizing Migratory Bird Conservation Account (MBCA) funds, is guided by certain objectives, priorities, strategies and policies. Following such guidelines helps to ensure that MBCA funds will be utilized to achieve the greatest benefits possible for waterfowl and the American people. More recently, the Administration has identified the Cache River Basin proposal as part of its $20 million wetlands initiative for funding in the FY 1985 budget. The budget proposal includes $7.3 million for acquisition of an estimated 11,000 acres. This initiative would be dependent upon passage of pending wetlands legislation (i.e., HR 3082). Under this proposal, the authorization for acquisition would be the Fish and Wildlife Act of 1956, as amended, (16 U.S.C. 742a-742j) with funding to come from the Land and Water Conservation Fund Act of 1965, as amended, (16 U.S.C. 4601-4-4601-11). Also, acquisition could come from special legislative authority from the Congress. It must be emphasized that the FWS land acquisition program represents only a small portion of the total waterfowl habitat preservation needs. Other methods of preserving habitat (State acquisition, wetland preservation laws, zoning, private landowners' initiatives, etc.) are vital to maintaining or increasing waterfowl populations.

The following guidelines or policies were adopted by the FWS in 1976 in effort to achieve the greatest waterfowl and public benefits with available funds:

Migratory bird habitats in private ownership are exceedingly important and will continue to provide the greatest share of total habitat needs. The FWS will encourage the preservation and enhancement of habitats by private interests to enhance the welfare of migratory birds consistent with national plans and flyway objectives.

FWS acquisition will be considered only after other methods have been fully considered and found to be inadequate.

The principal thrust of FWS waterfowl habitat preservation activities through 1986 will be to protect natural breeding, migration and wintering areas that require little or no development to maintain their present values to waterfowl.

The major criteria for establishing annual acquisition priorities are the biological importance of specific habitats to migratory birds and vulnerability to loss.

Acquisition of small management units is preferable to acquisition of one large unit, where this will enhance and encourage diversity of habitats and maintain a desirable distribution of birds.

Operating under the above guidelines or policies the FWS set an objective to acquire 200,000 acres within the 24,000,000 acre Mississippi River Alluvial Floodplain (MRAF). Within the MRAF over 750,000 acres in some locations have been identified as important to preserve for waterfowl.

The projected MBCA funding for preserving important waterfowl habitat in the MRAF makes it necessary to be extremely selective on the amount and location of habitat that is acquired. It is the opinion of the FWS that the valuable waterfowl habitat of the Basin is extremely important to maintaining flyway waterfowl populations. Due to funding restrictions, it is the opinion of the FWS and the AGF that a combined group acquisition effort will provide the greatest degree of benefit possible to the migratory waterfowl resources of the Mississippi Flyway. Funding limitations of all cooperating agencies, groups and individuals, and the numbers of willing sellers will preclude acquisition of 100% of the remaining valuable waterfowl habitat in the study area.

The primary purpose of this habitat preservation proposal is to protect and preserve wintering areas vital to the long-term conservation of migratory waterfowl, particularly mallards and wood ducks, in the Mississippi Flyway. The protection of this habitat will also be beneficial to resident game and non-game species; make additional lands available for public recreational uses; and result in other recognizable but intangible benefits including ground water recharge, natural water filtration/purification, floodwater storage, and others.

This proposal would acquire real estate interests ranging from fee title to easements designed to protect and preserve to a predictable degree, the existing valuable habitat. The acquisition program would be implemented under the authority of the Migratory Bird Conservation Act of 1929, using funds from the MBCA derived from the sale of "duck stamps". Another possible source of funds is the Land and Water Conservation Fund (LWCF). Other participating agencies, groups and individuals would utilize other funding sources not identified at this time.

The high value of the Basin to wintering migratory waterfowl has long been recognized by many noted waterfowl authorities. Recognizing this value, the FWS began implementation of a habitat preservation program in the Basin when the Notice of Intent (NOI) was published in the Federal Register on May 5, 1980. A Public Notice was also mailed to approximately 5,000 Federal, State, county, and local agencies, groups and individuals; and comments were sought on the need for a habitat preservation study and to determine the best means of accomplishing the study objectives. One public meeting and three workshops were subsequently held to gain further public input. Additionally, a public meeting was held on June 9, 1983, in Clarendon, Arkansas, to receive comments and suggestions on the Draft Environmental Impact Statement (DEIS) which was distributed for public review in May 1983. Broad support for the study was expressed and several concerns were voiced regarding best methods for achievement. Following public input on the scope of the issues and alternatives to be addressed, eight alternatives were developed and evaluated as a means of objectively exploring the broad spectrum of issues and impacts associated with a habitat preservation program in the Basin. These eight alternatives are:

Alternative No. 1, (Preferred Alternative) - Through Combined Fee Title, Easement Acquisition and Other Means (Donations, Land Exchanges, Management Agreements, etc.), the FWS, AGF, Other Agencies, Groups and Individuals Propose to Preserve Up to 92,000 Acres of Privately Owned Valuable Waterfowl Habitat Within the 133,000 Acre Ten-Year Floodplain;

Alternative No. 2 - Combined Fee Title and Easement Acquisition by the FWS of Up To 72,000 Acres of Natural Waterfowl Habitat Within the Ten-Year Floodplain;

Alternative No. 3 - Combined Fee Title and Easement Acquisition by the FWS of Up To 92,000 Acres of Valuable Waterfowl Habitat Within the Ten-Year Floodplain;

Alternative No. 4 - Easement Acquisition by the FWS of Up To 72,000 Acres of Natural Waterfowl Habitat Within the Ten-Year Floodplain;

Alternative No. 5 - Fee Title Acquisition by the FWS of Up To 92,000 Acres of Valuable Waterfowl Habitat Within the Ten-Year Floodplain;

Alternative No. 6 - Fee Title Acquisition by the Arkansas Game and Fish Commission of Up To 92,000 Acres of Valuable Waterfowl Habitat Within the Ten-Year Floodplain;

Alternative No. 7 - Combined Fee Title and Easement Acquisition o
Not More Than 70,000 Acres by the U.S. Army, Corps of Engineers
as Mitigation for the Construction of the Authorized Cache River
Flood Control (Channelization) Project; and,

Alternative No. 8 - No Action.

This array of alternatives covers the full range of implementation
authorities available to the FWS and includes two that are beyond its
implementation authority.

The impacts of each alternative were identified and evaluated in light
the purpose of the study (waterfowl habitat preservation) and the issue
identified during the scoping process. All of the alternatives were th
compared, so the issues and choices in the selection of a preferred
alternative could be fully identified. As a result of this process
Alternative 1 was selected as the Preferred Alternative for implementin
the best and most indepth approach to waterfowl habitat preservation in
the Basin.

Under the terms of the Preferred Alternative the FWS, AGF, other agencie
groups, and individuals would cooperate in protecting and preserving up
92,000 acres of the privately owned valuable waterfowl habitat in the
133,000-acre ten-year floodplain of the Basin. A combination of fee
title, easement, and other acquisition (protection) means would be used.
The FWS will seek to acquire through fee title and easement up to 35,000
acres of natural habitat. Concurrently, the FWS, AGF, other agencies,
groups and individuals will seek to acquire and/or preserve the remainin
valuable waterfowl habitat within the ten-year floodplain with special
emphasis placed on the remaining 37,000 acres of natural habitat in
private ownership. This alternative does not limit FWS participation to
the purchase of up to 35,000 acres should additional involvement be
determined necessary at some future date. The Preferred Alternative
embodies a flexible "team" approach to waterfowl habitat preservation by
involving as many agencies, groups and individuals as possible. The AGF,
The Nature Conservancy, and The Citizens Committee to Save the Cache have
expressed an interest in this habitat preservation effort. Other
agencies, groups and individuals have not been identified. The FWS will
exercise a leadership role in coordination efforts since management of
migratory waterfowl is a FWS responsibility.

In the case of fee title purchases all property rights, with the possible
exception of mineral rights, would be acquired. Lands acquired by other
agencies, groups, or individuals could be transferred to the FWS or AGF
for management purposes.

Easement acquisitions involving a percentage of fee value will include the
following basic easement restrictions: (1) No conversion to non-forested
land uses or conversion to monocultural timber management practices; and,
(2) No permanent drainage or filling. These basic easement features will
be required on all easements and are designed only to maintain and
propagate a homogeneous bottomland hardwood forest community. Under these
basic restrictions, the landowner(s) would retain all timber management
rights, except monoculture practices. The basic easement would provide

that the lands would remain in bottomland hardwood forest. However, the long term predictability of the forest character would be low, since the type of timber management determines the character and value of the property to waterfowl.

Optional timber management easement features which could be acquired in addition to basic easement restrictions would ensure a higher quality of forest character and increased value to waterfowl. These optional features would be considered on a case by case basis and could include the right to require the landowner to follow prescribed timber management criteria when conducting timber harvests. Two sets of criteria would be available: (1) optimum to improve waterfowl habitat; or, (2) minimum designed to maintain or restore waterfowl habitat value on the property. The acquisition of timber management criteria restrictions would not require the landowner to conduct any type of harvest, thereby decreasing the long term predictability of the easement.

Other optional easement features include: (1) the acquisition of the right to manage water levels and/or to acquire flowage rights; and, (2) the acquisition of the right of public entry for the purpose of public hunting or other public uses. The FWS will seek to acquire hunting rights on all easments, provided the landowner is willing to sell this right. Purchase of public use rights other than hunting will be determined on a case by case basis. Of the optional features listed above, each could be acquired singularly or in combinations, with the basic easement restrictions.

The goal of the Preferred Alternative is to protect as much of the valuable waterfowl habitat within the ten-year floodplain as possible through a flexible, cooperative team approach to acquisition. "Valuable waterfowl habitat" being considered for acquisition consists of:

1. Up to approximately 72,000 acres of natural waterfowl habitat (emphasis would be placed on the protection of this habitat); and,

2. Up to approximately 20,000 acres of marginal and submarginal land which was cleared for agriculture, but which is not suitable for farming in most years due to flooding.

Other valuable waterfowl habitat in the study area consists of 14,000 acres owned by the AGF and 8,000 acres of mitigation lands owned by the CE. The FWS would request transfer of the 8,000-acre area to the FWS or AGF following Department of the Interior approval of this proposal.

The balance of the ten-year floodplain acreage, approximately 19,000 acres, consists of farmland which has been altered hydrologically to the extent that these lands are of little or no value to migratory waterfowl in most years. The FWS has no desire or intent to remove prime farmland from agricultural production through any type of acquisition. Furthermore, before any land not in a natural state is purchased, an onsite inspection by professional wildlife biologists will be made to determine the value of the property to migratory waterfowl.

Adverse impacts associated with this proposal are primarily socio-econo in nature. For example, any lands acquired in fee title by either the or AGF would be removed from the county tax rolls. To mitigate the imp of FWS fee title acquisition, annual payments to the county governments and/or other taxing authorities would be made. These payments, made un the authority of the Refuge Revenue Sharing Act, as amended, would be m on all lands acquired in fee title. Those lands acquired by AGF or transferred in fee by other parties to AGF would not be subject to Refu Revenue Sharing Act payments. All taxes and assessments on areas covere or protected by easements would remain the responsibility of the individual landowner(s). The Act further requires that fee title lands reappraised every five years to avoid inequities. Currently, annual payments made by the FWS to counties in Arkansas have, in most cases, equaled or exceeded the dollar amounts the counties would have received property taxes. Records indicate reduced payments to counties resulting from AGF ownership of lands in fee title are also offset by revenues generated by user expenditures in the vicinity of Wildlife Management Areas (WMA). (Sunderland, personal communication, 1983).

Other socio-economic adverse impacts associated with this proposal relate to agricultural development interests. This impact should be minimal in that the willing seller concept will generally be followed and there is intent to acquire prime farm lands.

A significant impact of the Preferred Alternative would involve the congressionally authorized flood control project designed by the CE. The project is designed to provide maximum drainage benefits in the area. Establishing a refuge would protect natural mallard wintering habitat. The two concepts, e.g., massive drainage and concurrent protection of existing natural wintering habitats, are not complimentary.

A viable option exists wherein flood control and natural resource wintering waterfowl habitat concerns can be addressed--via a leveed floodway. The FWS concept of a compatible floodway project was proposed in the January 1978 Cache River Basin Task Force report. Two similar floodway concepts were contained in the CE's June 1974, Final Environmental Impact Statement for the authorized Cache River Basin project. The FWS would support changes in the authorized project that provide equal provisions for flood control and protection of wintering waterfowl habitat.

The Preferred Alternative would also produce numerous positive impacts to the physical, hydrological, biological and economic sectors of the local environment. It is the opinion of the FWS and AGF that these positive benefits far outweigh the negative impacts.

The final aspect in selecting the Preferred Alternative was the comparative evaluation of the Alternatives regarding the waterfowl habitat to be preserved in the proposal, impacts, their relationship to issues raised during the scoping process, and cost effectiveness. A ranking was also assigned to each alternative based on the comparative evaluation of the above factors. The Preferred Alternative and Alternatives 3, 5, and 6 all provide a mechanism for the preservation of potentially all valuable waterfowl habitat in the ten-year floodplain study area. However,

Alternatives 3, 5, and 6 are restricted in effectiveness in that only one agency would implement the alternative. Alternatives 5 and 6 are further restricted in that only one method of acquisition would be utilized. Alternatives 2 and 4 provide a means to protect only the remaining natural habitat. Both of these alternatives are restricted by the use of one acquisition agency. Alternative 4 is further restricted in its potential effectiveness in that only one method of acquisition would be utilized. Alternative 8 provides no clear means of waterfowl habitat preservation. Alternative 7 involves acquisition of lands to reduce impacts to fish and wildlife resources related to the CE project induced habitat losses. Further, it is unclear as to the amount of actual mitigation acquisition that would take place due to existing funding authorization for the channelization project. Further the hydrological alteration of the entire Basin would be severe even with authorized, structural mitigation features in place. Alternative 8 offers no long term measures for habitat protection in the study area and allows for continued conversion of the remaining bottomland hardwood habitat to other land uses.

Regarding Alternative 7, the Authorized Corps of Engineers Channelization Flood Control Project and Alternative 1 (Preferred Alternative), it must be clearly understood that flood control and waterfowl habitat preservation are not mutually exclusive. Acquisition of a NWR and WMA in the Basin would not automatically preclude the construction of the authorized project or any other flood control project. Implementation of the Preferred Alternative would, however, require that any flood control project requiring right-of-way through or on the NWR be compatible with the purposes for which the NWR was established. Thus, a compatibility determination would be required for the authorized project (or any other project when a right-of-way is requested). However, it is reasonable to assume that the existing authorized project would require significant and substantial modification to be fully compatible with the preferred alternative in light of its massive hydrological alteration of the natural stream reaches of the Cache River and Bayou DeView, and the major adverse impacts to the Basin's fish and wildlife resources. Any future flood control project in the Basin should have a multi-objective focus, including measures for protecting existing cleared land from crop season floods and provisions for maintaining the existing internationally significant wooded wetlands and their historic hydrologic regime, winter water, and total Basin water quality.

Through analysis of a broad range of alternatives, the FWS has attempted to define and clarify the key issues and choices in the selection of the Preferred Alternative. In selecting Alternative 1, the FWS is stating that the preservation of internationally significant migratory waterfowl resources of the Basin is in the broad public interest. This statement is made recognizing that there are two equally important facets of the public interest to be considered. There are, of course, the highly significant public values that the Basin provides to the Nation as a whole. The significant value of the Cache River to migratory waterfowl makes the well being of the Cache River's wetlands an item of national concern. It is in response to that concern that the FWS is proposing this habitat preservation program. However, any proposal to conserve the national interests in the Basin must demonstrate a concern and sensitivity for an

equally important facet of the public interest--the values and desires of the people who live in and use the Basin.

The selection of Alternative 1 as the Preferred Alternative is an attempt to provide a program that preserves the valuable waterfowl habitat in the Basin, within the scope of the FWS's acquisition objectives for the MRAP and those of the AGF for the Arkansas delta, and a high degree of flexibility to accommodate the desires of the individual landowner. This flexible alternative was selected in order to preserve as much of the Cache River's public values as possible in a cost-effective manner that is fully sensitive to the needs of the Basin and the residents. The end result would be an acquisition program designed to preserve valuable migratory bird and other highly significant fish and wildlife resources in order that Arkansas, and the Nation as a whole, can continue to enjoy their benefits.

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PURPOSE AND NEED

INTRODUCTION

The U.S. Fish and Wildlife Service (FWS), Department of the Interior, and the Arkansas Game and Fish Commission (AGF), other agencies, groups and individuals, propose to protect and preserve the internationally significant migratory waterfowl habitat within the 133,000-acre, ten-year floodplain of the middle and lower Cache River Basin (Basin). The middle and lower reaches of the Basin are located in the Mississippi River Alluvial Floodplain (MRAF) in northeastern Arkansas in Jackson, Monroe, Prairie, and Woodruff Counties (Figure I-1). Principal drainages of the Basin are the Cache River and its major tributary, Bayou DeView.

Conservation of migratory birds is a major responsibility of the FWS. In response to the extensive and continuing loss of natural waterfowl habitat, the FWS identified 33 categories of high priority waterfowl habitat in the United States. The Lower Mississippi River Delta ranked seventh. The "Concept Plan" for the preservation of bottomland hardwood habitat in the Lower Mississippi River Delta (Category 7) was published by the FWS in April 1978. The purpose of this document was to assist the FWS and other agencies in preserving productive waterfowl habitat currently under threat of loss. The FWS initiated a Bottomland Hardwood Preservation Program with the goal of preserving 200,000 acres of bottomland hardwood habitat in the MRAF by 1986. To date the FWS has acquired approximately 46,220 acres of Category 7 lands in Mississippi, Louisiana, Tennessee, and Arkansas. The study area for the Cache River Waterfowl Habitat Preservation Proposal includes all or portions of four areas identified in the Category 7 Concept Plan. These areas are Cache River (25,453 acres), Bayou DeView (15,736 acres), Maddox Bay (19,726 acres), and White River (4,683 acres) [See Table I-1].

Prior to 1975, the waterfowl habitat acquisition program of the FWS was designed primarily to protect and preserve breeding habitats in the prairie pothole wetland region of the north central United States. Since that time, however, the program has undergone significant changes due to an intensive evaluation of future habitat needs (Ladd, 1978). The result has been a major revision in acquisition objectives, whereby priorities have been redefined to focus on (1) preservation of the most important migratory waterfowl habitats in each flyway, and (2) those habitats which are under the greatest threat of loss.

The authority for the FWS to acquire breeding, resting, and wintering waterfowl habitat is contained in the Migratory Bird Conservation Act of 1929, as amended (16 U.S.C. 715-715d, 715e, 715f-715r). This Act authorizes the acquisition of migratory bird refuges and establishes a Migratory Bird Conservation Commission to evaluate and approve migratory waterfowl habitat acquisition proposals. Funds for approved acquisitions are derived from the sale of Migratory Bird Hunting and Conservation Stamps (duck stamps), as provided for under the Migratory Bird Hunting and Conservation Stamp Act of March 18, 1934, as amended, (16 U.S.C. 718-718h)

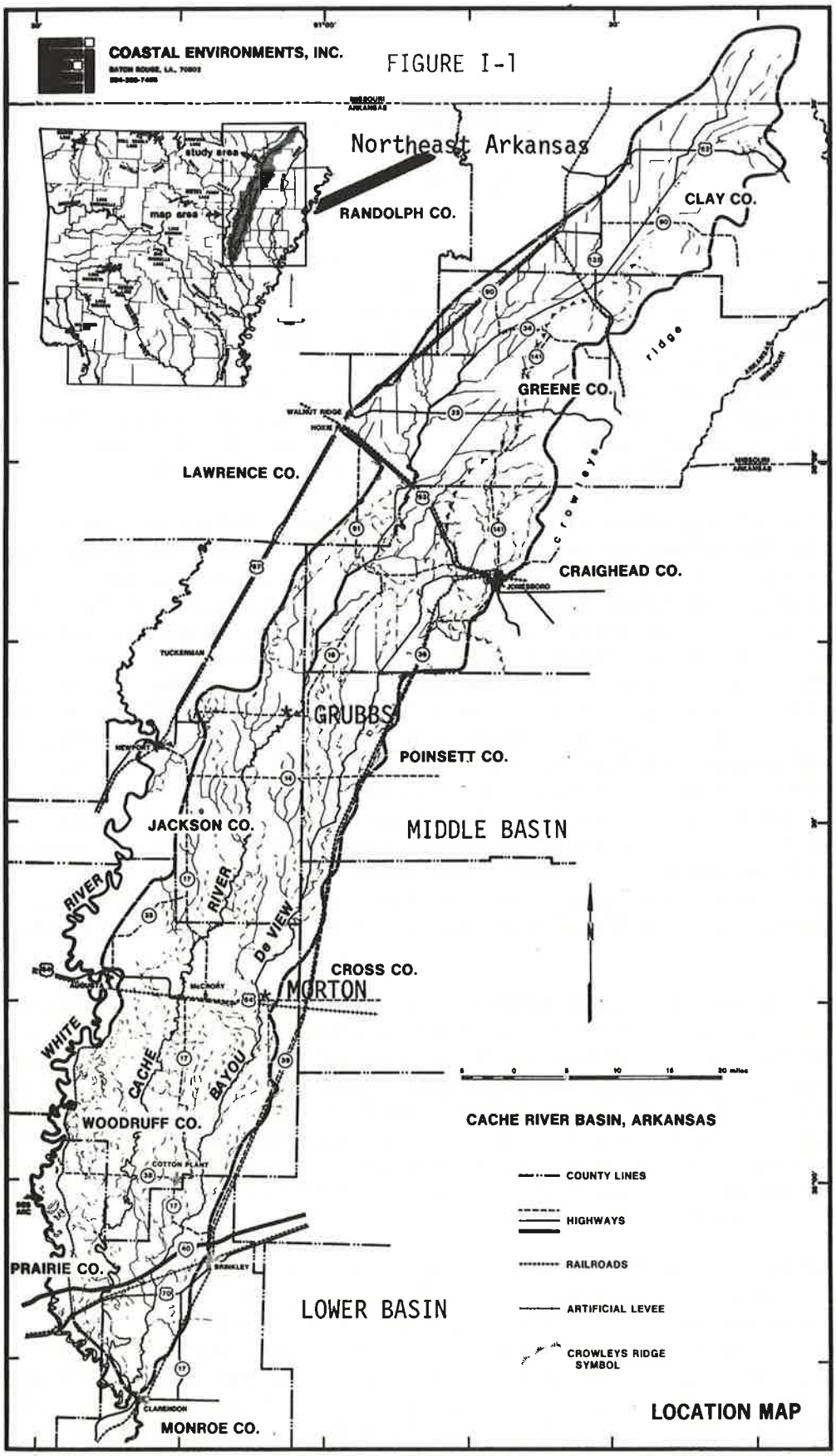

COASTAL ENVIRONMENTS, INC.
FIGURE I-1
Northeast Arkansas
study area
map area
RANDOLPH CO.
CLAY CO.
GREENE CO.
LAWRENCE CO.
CRAIGHEAD CO.
GRUBBS
POINSETT CO.
JACKSON CO.
MIDDLE BASIN
CROSS CO.
MORTON
WOODRUFF CO.
PRAIRIE CO.
LOWER BASIN
MONROE CO.
CACHE RIVER BASIN, ARKANSAS
COUNTY LINES
HIGHWAYS
RAILROADS
ARTIFICIAL LEVEE
CROWLEYS RIDGE SYMBOL
LOCATION MAP

TABLE I- 1

Arkansas Habitat Preservation Needs for Waterfowl
Lower Mississippi River Delta 1/

Project Area	Biological Value for Waterfowl Numerical Score	Total Acres	Habitat Types (Percent)					Threat of Habitat Destruction	Miles Closest NWR	Development Needs	Endangered Species Using Area	Acquisition Required to Preserve Habitat
			Open Water	Shrub and Forested Swamp	Low Flood-plain	High Flood-plain	Other					
Bayou DeView 2/	89.1	15,736	15	20	40	25	0	Imminent	48	Medium	2	Yes
L'Anguille	84.3	11,791	5	10	15	20	0	Near-term	32	Medium	None	Yes
Black River	83.9	16,525	5	10	25	60	0	Imminent	50	Low	None	Yes
White River 2/ 3/	83.6	28,700	10	10	35	45	0	Imminent	45	Medium	2	Yes
Bayou Meto	83.6	4,301	10	14	55	20	0	Near-term	24	High	1	Yes
Crain Farm	83.5	4,935	10	20	40	30	0	Imminent	47	Medium	2	Yes
Cache River 2/	83.3	25,453	15	20	40	25	0	Imminent	37	Medium	2	Yes
Otter Lake	82.6	2,790	5	20	30	45	0	Imminent	67	Medium	Unknown	Yes
Hillemann	82.3	5,076	5	20	40	35	0	Near-term	48	Medium	Unknown	Yes
Taylor Bay	80.8	3,548	10	20	35	35	0	Imminent	67	Low	2	Yes
Overflow Creek	80.6	9,611	5	10	40	45	0	Imminent	32	Low	1, 2, 4	Yes
St. Francis River	80.3	23,774	10	25	50	15	0	Imminent	17	Medium	2	Yes
Maddox Bay 2/ 4/	79.3	86,214	10	15	35	40	0	Near-term	0	Low	1, 2	Yes
Holland Bottoms	75.5	9,120	10	10	30	50	0	Near-term	56	Low	1	Yes
Boeuf River	71.5	3,680	10	25	40	25	0	Imminent	30	Medium	Unknown	Yes
Big Island	66.4	24,785	8	10	20	60	2	Far-term	6	Low	2	Yes
TOTAL		276,039										

1/ From: U. S. Department of the Interior, 1978.

2/ Previously identified areas within the four county study area.

3/ Cache River Basin study area 4,683 acres.

4/ Cache River Basin study area 19,726 acres.

and advance appropriations against future duck stamp sales authorized by the Wetlands Loan Act of October 4, 1961, as amended.

More recently, the Administration has identified the Cache River Basin proposal as part of its $20 million wetlands initiative for funding in the FY 1985 budget. The budget proposal includes $7.3 million for acquisition of an estimated 11,000 acres. This initiatve would be dependent upon passage of pending wetlands acquisition (i.e. HR 3082). Under this proposal, the authorization for acquisition would be the Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742a-742j) with funding to come from the Land and Water Conservation Act of 1965, as amended (16 U.S.C. 4601-4-4601-11). Also, acquisition could come from special legislative authorization from the Congress.

PURPOSE

The primary purpose of the Cache River Waterfowl Habitat Preservation Proposal is to protect and preserve a portion of internationally significant waterfowl habitat. Resident game and non-game species would also be benefited. In addition, more lands would be available for public recreational uses. This action would also promote and protect significant intangible benefits such as ground water recharge, natural water filtration/purification, and floodwater storage.

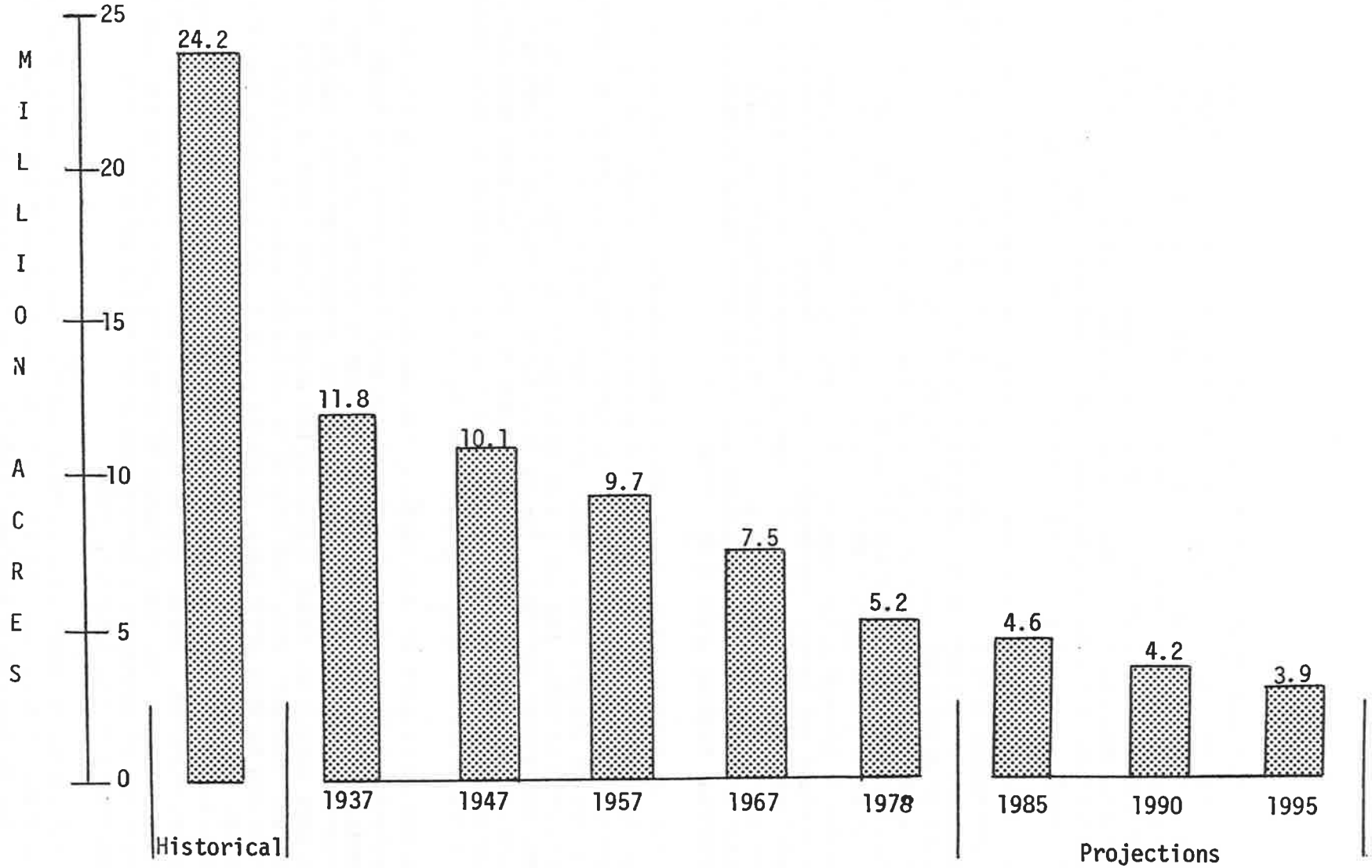
NEED

Understanding the need to protect and preserve waterfowl habitat in the Basin must begin with a knowledge of what has happened and is happening to similar areas throughout the MRAF. The 24 million acre MRAF, an area extending from Cairo, Illinois, southward to the Gulf of Mexico, was reported by early explorers and settlers to be an almost contiguous expanse of bottomland hardwood wetlands. Destruction of this habitat type began at a high annual rate, with the advent of modern agricultural practices and the initiation of federally financed flood control efforts in 1928. By 1937, approximately 11.8 million acres of bottomland hardwood habitat remained. By 1978, only slightly over 5 million acres remained in the MRAF (Figure I-2) (MacDonald et al, 1979). According to Gard (1979), these land use changes have occurred at rates as high as 300,000 acres per year, particularly where large areas of forest remain and/or where flood protection is provided. It is estimated (Figure I-2) that by the year 1995 only 3.9 million acres of bottomland hardwoods will remain in the MRAF, including 640,000 acres currently in public ownership (MacDonald et al, 1979).

The Arkansas portion of the MRAF has experienced a substantial decline in bottomland hardwood wetland acreage. About 1,069,000 acres were converted to other land uses from 1957 to 1978. Approximately 26 percent of the Arkansas portion of the MRAF was forested in 1957 compared to only 12 percent in 1978. The four counties encompassing the study area have also experienced a dramatic reduction of bottomland hardwood acreage, and projections of this trend indicates that in 1995 only 37 percent of the bottomland hardwoods present in 1957 will remain in these counties (Table

FIGURE I-2

Bottomland Hardwood Forest Acreages
Lower Mississippi River Floodplain 1/



1/ Source: MacDonald et al., 1979.

I-2). Past and projected destruction of habitat in the four-county study area has, for the most part, been in the Basin. The most graphic example of this loss can be seen by comparing Figures I-3 and I-4. Figure I-3 shows the Basin woodlands that existed in 1937, while Figure I-4 shows the woodlands remaining in 1978. Table I-2 projects this loss of habitat will continue into the foreseeable future. If the trend of bottomland hardwood destruction in the Basin continues, one of the most important areas utilized by wintering mallard ducks will eventually be lost.

The loss of these internationally important wetlands takes on added significance when the authorized Cache River Basin Flood Control project is considered. Project authorizations provide for the construction of 231.5 miles of artificial channel--140.0 miles of the Cache River, 14.6 miles of its upper tributary, and 76.9 miles of Bayou DeView. Although no construction has taken place since 1978, completion of the authorized Cache River Basin Flood Control Project would destroy 9,200 acres of bottomland hardwoods through actual construction; and, an additional 44,500 acres of bottomland and terrace hardwoods would be eliminated or substantially modified (C.E., 1977). Marginal and sub-marginal cleared lands within the ten-year floodplain would be protected from overflow as a result of this major hydrological alteration and would lose their value as temporary waterfowl feeding areas (FWS, 1978).

Losses of bottomland hardwood habitat have adversely affected many wildlife species in the study area, especially migratory waterfowl. Historically, northeast Arkansas has wintered the largest concentrations of mallards in the Nation (Figure I-5). Based on the annual mid-winter surveys by the FWS from 1958 to 1980, the Basin averaged 134,000 mallards (C.E., 1979, and FWS, Mid-winter Surveys). During this period, a high of 458,600 mallards were counted in 1971, and a low of 3,000 in 1980. Resident wood ducks average more than 35,000 and are second only to mallards in total number and frequency of harvest by waterfowl hunters.

In the early part of this century, the swamps and seasonally flooded wetlands of this area provided mallards with their preferred foods: acorns, seeds, and aquatic invertebrates. Because of extensive drainage and clearing of timbered wetland areas, mallards and other waterfowl have had to seek substitute foods including the waste grains found in agricultural fields. However, this food source is declining annually as a result of increased harvest efficiency, drainage projects which protect low-lying fields from fall and winter overflow, grain varieties resistant to blow-down and harvest shatter and fall-plowing of fields in preparation for spring planting. Conversion of wooded wetlands and improvement of farming practices have resulted in losses of wintering waterfowl habitat causing a reduction of migratory waterfowl and other bird populations (U.S. Department of the Interior, 1980).

Preservation of bottomland hardwood habitat has been vigorously endorsed by the State of Arkansas. In his work for the Arkansas Planning Commission, Trusten Holder (1970) provided a historic definition of the problems associated with the loss of wooded wetlands in eastern Arkansas. More importantly, he outlined a plan of action for the preservation of these wooded wetlands so that, "Through careful planning and judicious selection of individual areas to be preserved, the preservation effort can add

TABLE I-2

Past and Future Bottomland Hardwood Acreages by County 1/

County	1957 2/ Acres (000)	% 4/	1967 2/ Acres (000)	%	1978 3/ Acres (000)	%	1985 Acres (000)	%	1990 Acres (000)	%	1995 Acres (000)	%
Jackson	72.2	20	31.8	9	22.1	6	17.4	5	14.6	4	12.4	3
Monroe	165.0	45	149.8	40	125.0	34	112.7	31	104.9	29	97.8	27
Prairie	46.2	49	25.0	27	23.2	25	21.9	24	21.1	23	20.3	22
Woodruff	124.8	33	71.2	19	50.0	13	40.5	11	34.9	9	30.2	8
TOTAL	408.2	--	277.8	--	220.3	--	192.5	--	175.5	--	160.7	--

1/ Source: MacDonald et al., 1979.

2/ Includes 6,750 acres owned by Arkansas Game and Fish Commission (AGF) in Monroe County. Also included in this acreage figure is 19,055 acres in Monroe County owned by Fish and Wildlife Service (FWS) at White River National Wildlife Refuge (NWR), outside the study area.

3/ Includes 11,978 acres owned by AGF in Monroe and Woodruff Counties; 19,055 owned by FWS in Monroe County, which is outside the study area; and 8,000 acres owned by U. S. Army, Corps of Engineers in Monroe and Woodruff Counties.

4/ Percentages indicate the total county area in bottomland hardwood acreages.

FIGURE I-3

BOTTOMLAND HARDWOODS PRESENT IN 1937

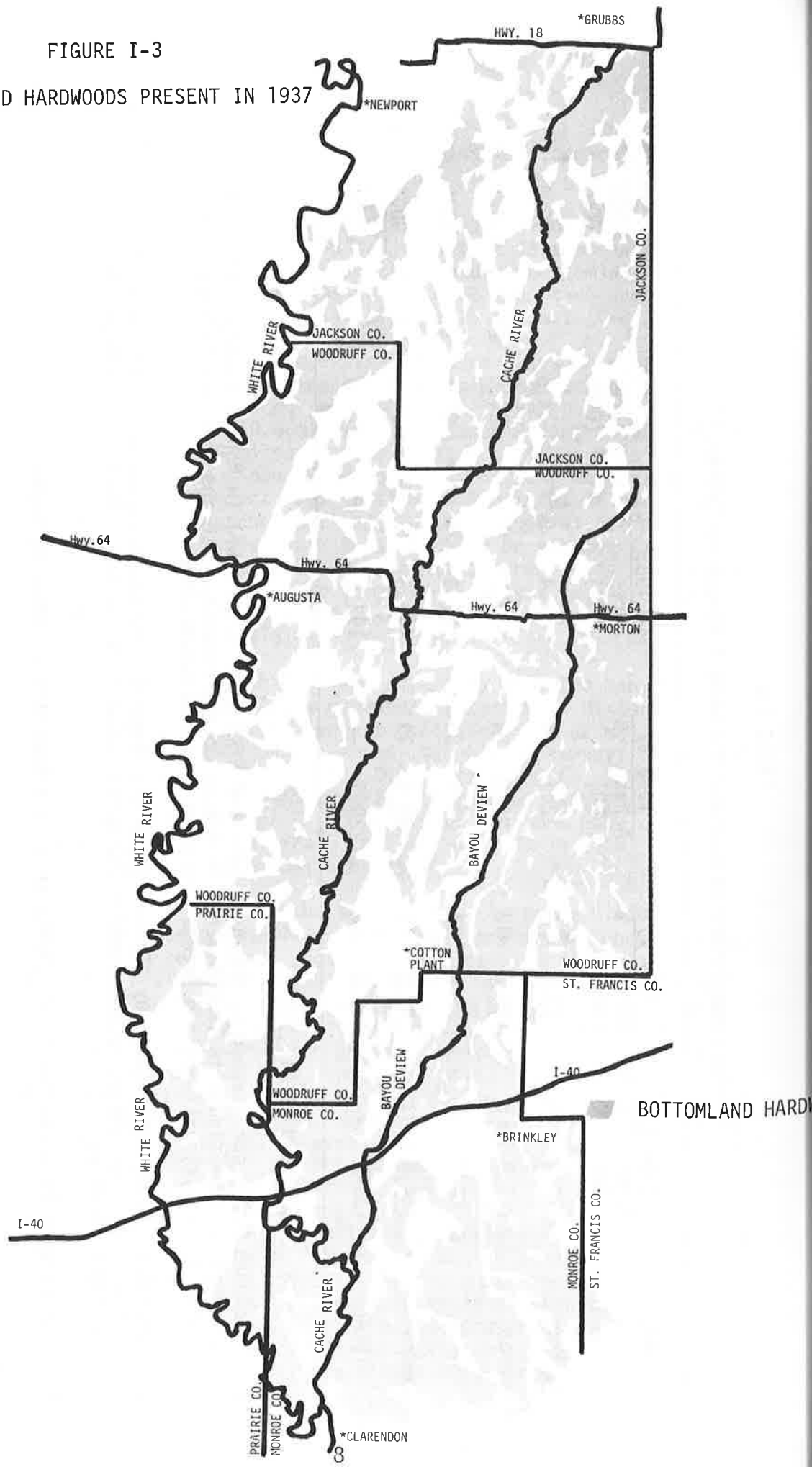


FIGURE I-4

BOTTOMLAND HARDWOODS PRESENT IN 1978

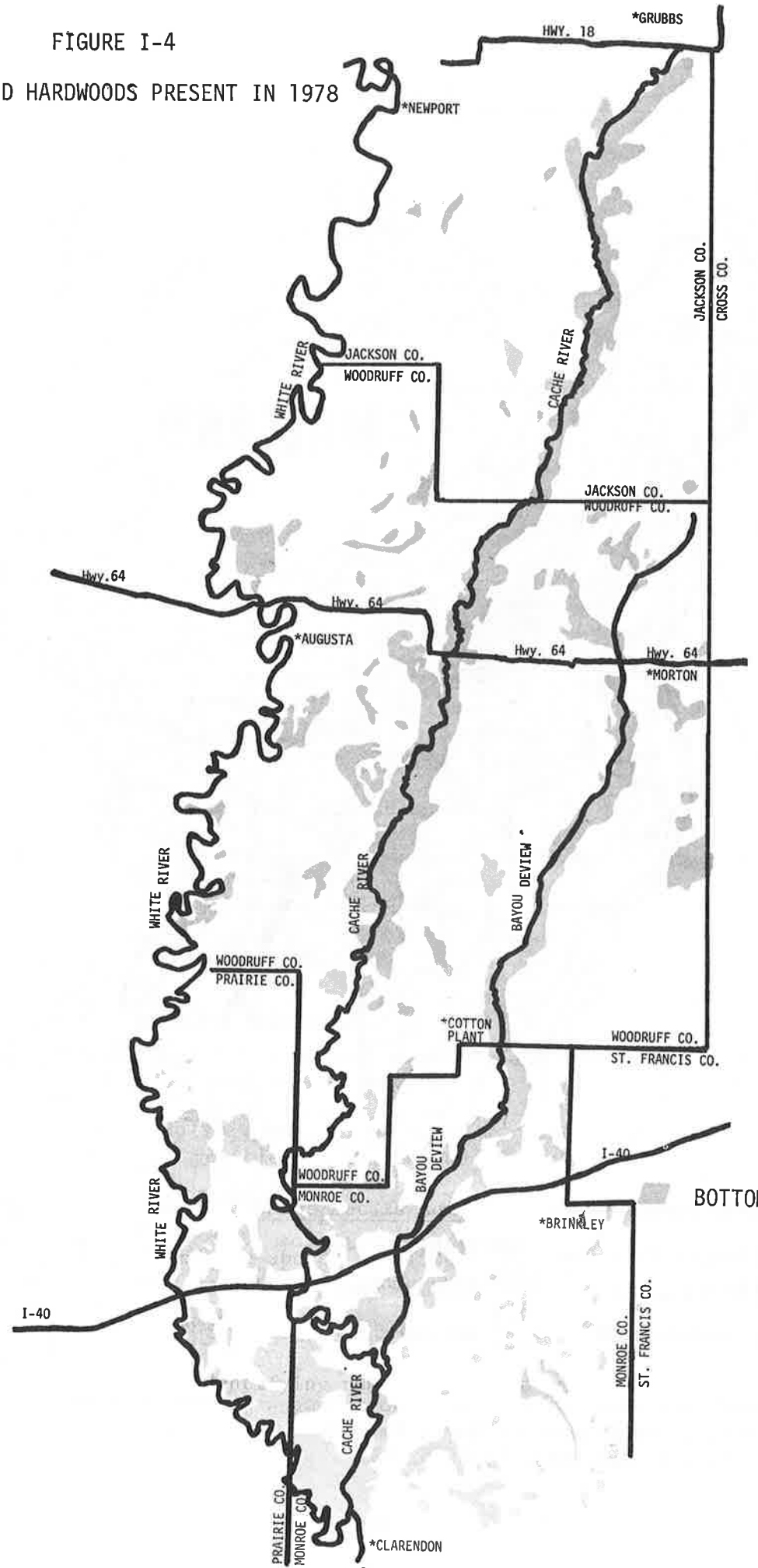
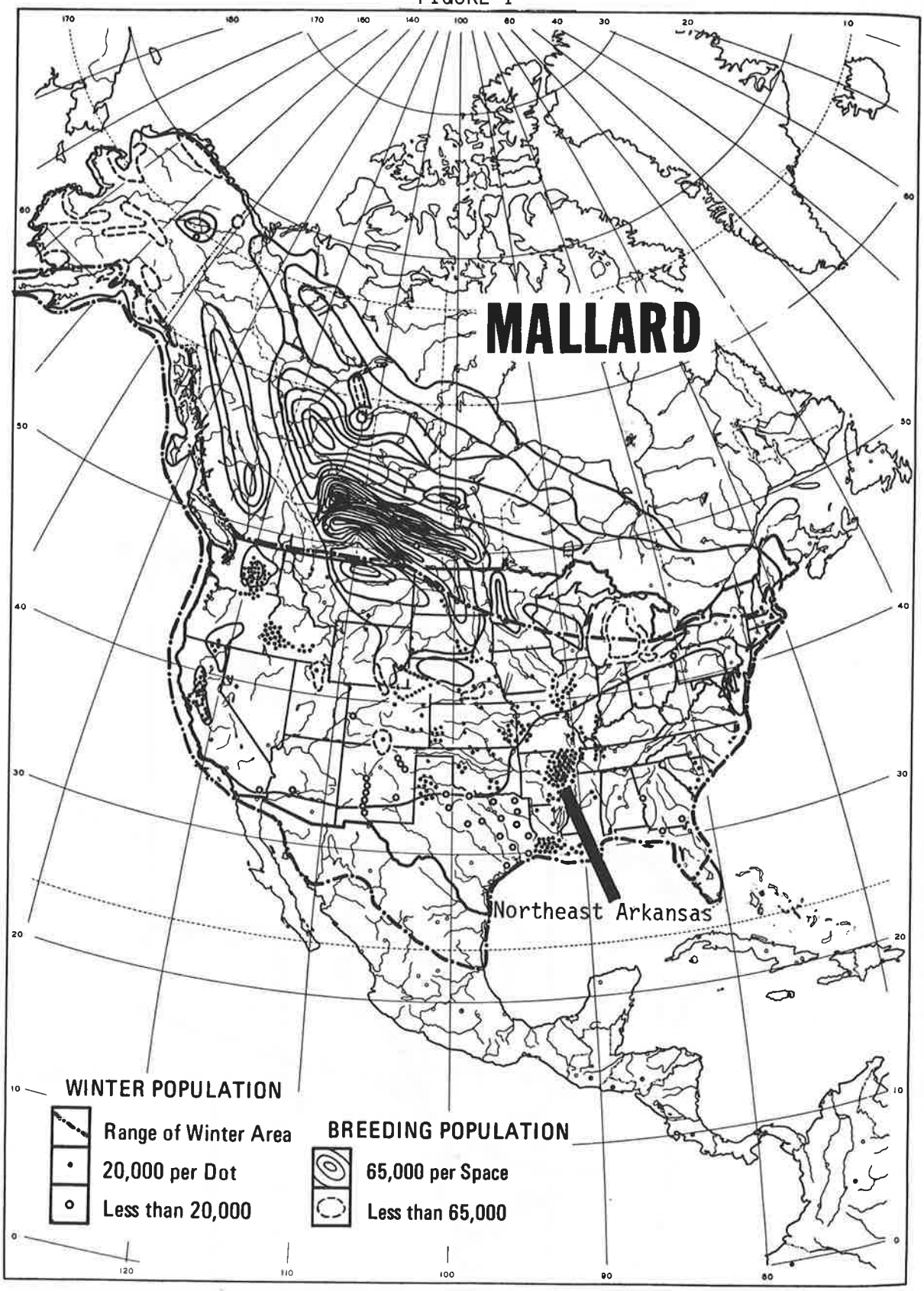


FIGURE I


MALLARD
Northeast Arkansas
WINTER POPULATION
Range of Winter Area
20,000 per Dot
Less than 20,000
BREEDING POPULATION
65,000 per Space
Less than 65,000

materially to the future prosperity and overall quality of life in the Delta Region". This philosophy is evident in the actions of the Arkansas Game and Fish Commission through their acquisition of approximately 13,700 acres of bottomland hardwoods in the 10-year floodplain of the Basin study area. The Arkansas Department of Local Services recognized in the 1980 Statewide Comprehensive Outdoor Recreation Plan (SCORP) that wetlands "...are major recreational resources and indicators of environmental quality." "...and that state and Federal agencies should devise a plan for wetlands preservation in the 1980's". More recently, the Administration has identified the Basin proposal as part of its $20 million wetlands initiative for funding in the FY 1985 budget. This initiative would be dependent upon passage of pending wetlands legislation (i.e. HR 3082).

SCOPING

In compliance with National Environmental Policy Act (NEPA) guidelines and the Council on Environmental Quality (CEQ), the FWS published a Notice of Intent (NOI) in the Federal Register on May5,1980. The purpose of the scoping process is to provide the maximum interface and input from concerned agencies and individuals. This action was undertaken to inform interested parties of the FWS decision to initiate a migratory waterfowl habitat preservation study in the Cache River Basin and officially announce its intent to prepare an Environmental Impact Statement (EIS). It was also stated that the end result of this study could be the implementation of a land acquisition program in the Basin. Following the NOI, public meetings, workshops, and group presentations to Federal and State agencies, the general public, and citizen's organizations were conducted; and methods for accomplishing the objectives of waterfowl habitat preservation in the Basin were evaluated. The evaluation criteria included:

1. Accomplishes the goal of waterfowl habitat preservation,
2. Degree of potential management of fish and wildlife resources,
3. Degree for maintaining or providing public and private recreational uses with particular emphasis on hunting,
4. Complies with applicable Federal, State, and local laws and regulations,
5. Ability to accomplish waterfowl habitat preservation in a timely and cost efficient manner,
6. Accomplishes waterfowl habitat preservation goal utilizing willing seller concept,
7. Conforms with FWS land acquisition guidelines,
8. Degree to which the alternative preserves the hydrological integrity of the study area.

The following is a chronological summary of the scoping process.

1. May 1980. A NOI published in Vol. 45, No. 88 of the Federal Register and a Public Notice was mailed to approximately 5,000 Federal, State, County, local agencies, citizen's groups, individuals, and media representatives.

2. May 1980. A FWS representative, at the request of Governor Bill Clinton, met with the Arkansas Natural Resources Subcabinet and presented the waterfowl habitat preservation study proposal to the Arkansas Game and Fish Commission, the Arkansas Natural Heritage Commission, the Arkansas Department of Pollution Control and Ecology, and the Arkansas Wildlife Federation.

3. June 1980. Informal workshops were held in Little Rock and Newport, Arkansas, and Memphis, Tennessee, to introduce the study proposal to the maximum number of Basin residents, landowners, and the public, as well as address questions or issues raised by Federal, State, County, local government agencies, and individuals.

4. November 1980. The results of 1 through 3 above were summarized in a Public Interaction Summary (Appendix A) and mailed to agencies, individuals, and the news media.

5. November 5, 1980. FWS representatives met with Memphis District (MED), Corps of Engineers in Memphis to discuss the comments presented by the District Engineer at the June 12, 1980, Public Meeting. The purpose of this meeting was also to obtain input from the MED staff regarding potential impacts which could occur with acquisition of lands within the Basin.

6. December 1980. At the request of Phillip Stovall, president of the Woodruff County Farm Bureau, an FWS representative attended a Farm Bureau meeting to discuss the Cache River proposal and answer questions.

7. May 27, 1981. A coordination meeting between MED and FWS was held to discuss preparation of the preliminary DEIS. The MED staff was informed of the proposed site of the Public Meeting to be held concurrently with public release of the DEIS.

8. June 9,1983. A public meeting was held in the Clarendon, Arkansas High School Auditorium to brief the public and receive comments on the DEIS prepared by the FWS. Written and oral comments received at the meeting and during the comment period and FWS responses are included in the FEIS as Appendix B.

A total of 2,237 people provided oral or written responses to the FWS proposal. Over 98 percent of the responses favored a waterfowl habitat preservation program in the Basin. Based on the degree of public input and subsequent evaluations conducted as part of the EIS process, the FWS concluded that most of the study objectives of this proposal can be achieved by implementation of Alternative No. 1 (Preferred Alternative). It provides for preservation of up to 92,000 acres of privately owned valuable waterfowl habitat within the 133,000 acre 10-year floodplain by the FWS, AGF, other agencies, groups and individuals. Fee title and

easement acquisition will be the principal means of preserving this habitat. The FWS will seek to acquire by fee title and easement approximately 35,000 acres of natural habitat within the 92,000 acre area. The FWS anticipates most of the acreage to be acquired will be located in the Priority 1 Area (see map on page 19). Concurrently, the FWS, AGF, other agencies, groups, and individuals will seek to acquire and/or preserve the remaining valuable waterfowl habitat within the ten-year floodplain with primary emphasis directed toward the remaining 37,000 acres of natural habitat in private ownership. This action is compatible with study goals and objectives.

SECTION II

ALTERNATIVES INCLUDING THE PROPOSED ACTION

INTRODUCTION

This section of the EIS describes the alternatives that have been considered, summarizes their impacts, and compares each alternative as a means of explaining the rationale for the selection of Alternative 1 as the Preferred Alternative (PA). For this analysis, an assumption has been made that the presently authorized CE project has been deauthorized or that flood control is achieved by use of a floodway plan (see impact discussion, page 37). While Section II fully describes the alternatives, it only summarizes their impacts. Section IV provides a description of the impacts associated with all alternatives. The purpose of Section II is to compare impacts as a means of defining the issues and the choices implicit in selecting the PA. The remainder of this Section is organized into two basic segments:(1) Description of the Alternatives and Summary of Impacts; and, (2) Comparative Evaluation of Alternatives.

DESCRIPTION OF THE ALTERNATIVES AND SUMMARY OF IMPACTS

Alternative means of accomplishing the habitat preservation goal of this study were first identified in the May 5, 1980, NOI to prepare an EIS published in the Federal Register. Subsequently, a public meeting and three scoping meetings were held to provide maximum public and agency interaction and input. Relevant comments, both written and oral, were reviewed and utilized in developing modifications of the alternatives contained in the NOI. Comments not relevant to the proposal were noted, but not given further consideration. Based on the comments received during the scoping process and in-house review, the FWS modified and added to the initial alternatives. These modified alternatives are:

Alternative No. 1, (Preferred Alternative) - Through Combined Fee Title, Easement Acquisition, and Other Means (Donations, Land Exchanges, Management Agreements, etc.), the FWS, Arkansas Game and Fish Commission (AGF), Other Agencies, Groups, and Individuals Propose to Protect and Preserve Up to 92,000 Acres of Privately Owned Valuable Waterfowl Habitat Within the 133,000 Acre Ten-year Floodplain;

Alternative No. 2 - Combined Fee Title and Easement Acquisition by the FWS of up to 72,000 Acres of Natural Waterfowl Habitat Within the Ten-year Floodplain;

Alternative No. 3 - Combined Fee Title and Easement Acquisition by the FWS of up to 92,000 Acres of Valuable Waterfowl Habitat Within the Ten-year Floodplain;

Alternative No. 4 - Easement Acquisition by the FWS of up to 72,000 Acres of Natural Waterfowl Habitat Within the Ten-year Floodplain;

Alternative No. 5 - Fee Title Acquisition by the FWS of up to 92,000 Acres of Valuable Waterfowl Habitat Within the Ten-year Floodplain;

Alternative No. 6 - Fee Title Acquisition by the AGF of up to 92,000 Acres of Valuable Waterfowl Habitat Within the Ten-year Floodplain;

Alternative No. 7 - Combined Fee Title and Easement Acquisition of Not More Than 70,000 Acres by the U.S. Army, Corps of Engineers as Mitigation for the Construction of the Authorized Cache River Flood Control (Channelization) Project;

Alternative No. 8 - No Action; and,

Alternative No. 9 - Reliance on Existing Federal, State, and Local Legislation and Regulations.

It was determined that each alternative considered must be an independent action and a discrete and implementable plan. After reviewing the responses received during the scoping process and considering the modified alternatives, the FWS determined that Alternative 9 - Reliance on Existing Federal, State, and Local Legislation and Regulations was not a discrete and implementable plan, but rather an integral feature of Alternative 8 - No Action. It was therefore dropped from further consideration as a separate entity, with existing legislation and regulations evaluated as an element of Alternative 8.

The following discussion will examine eight alternatives in detail:five that cover the full range of implementation authorities available to the FWS (Alternatives 1, 2, 3, 4, and 5); two that are beyond the implementation authority of the FWS, including one that involves action by a State agency (Alternative 6) and one that involves action by a Federal agency other than the FWS (Alternative 7); and finally, No Action (Alternative 8). The legislative authorities for the implementation of the alternative actions are summarized in Appendix B, Legislative Review.

Alternative No. 1, (Preferred Alternative) - Through Combined Fee Title, Easement Acquisition and Other Means (Donations, Land Exchanges, Management Agreements, etc.), the FWS, AGF, Other Agencies, Groups, and Individuals Propose to Preserve Up to 92,000 Acres of Privately Owned Valuable Waterfowl Habitat Within the 133,000 Acre Ten-year Floodplain.

Under this alternative the FWS proposes to preserve approximately 35,000 acres of natural habitat primarily by fee title and easement acquisition from within the three priority areas identified on the acquisition map, page 19. The FWS anticipates most of the acreage to be acquired will be in the Priority 1 Area. Concurrently, the FWS, AGF, other agencies, groups and individuals will seek to acquire and/or preserve the remaining valuable waterfowl habitat within the ten-year floodplain by other means. The primary emphasis will be directed to 37,000 acres of the remaining natural habitat in private ownership. "Other means" includes but is not restricted to commonly used habitat preservation methods such as donations, land exchanges, management agreements, purchases with term (occupancy) reservations, etc. Considering several preservation methods will insure

the cost effectiveness of the acquisition program. The ten-year floodplain study area consists of the middle and lower reaches of the Cache River and Bayou DeView, in Jackson, Monroe, Prairie, and Woodruff Counties in Arkansas (Figure II-1).

Under the PA the FWS would acquire up to 35,000 acres of natural habitat and assist in the acquisition and/or preservation by other means of the remaining valuable waterfowl habitat in the study area. This alternative does not limit FWS participation to 35,000 acres--additional acreage could be acquired depending on circumstances and availability of funds. The AGF, The Nature Conservancy, and The Citizens Committee to Save the Cache have expressed an interest in assisting with the preservation effort. Other agencies, groups and individuals cited in the PA have not been identified at this time, nor has any determination been made concerning the degree to which such parties would be able to participate.

The terms natural and valuable waterfowl habitat are used in the description of alternatives. The FWS estimates there are approximately 114,000 acres of valuable waterfowl habitat in the study area--22,000 acres in public ownership and 92,000 acres in private ownership. The terms natural and valuable habitat are defined as follows:

Natural Waterfowl Habitat - includes forested and non-forested lands where the hydrological regime and the vegetative make up have essentially been unaltered. There are approximately 94,000 acres of natural habitat in the Basin--approximately 14,000 acres owned by the AGF; 8,000 acres owned by the C.E.; and 72,000 acres in private ownership.

Valuable Waterfowl Habitat - includes both natural habitat and habitat that has been altered by man in some manner but not hydrologically. Such non-hydrologically altered lands include property that has been cleared for agriculture but, due to the flooding regime, usually is not planted. "Valuable" lands also include those areas which receive flood damages during the growing season which drastically reduces or eliminates the fall harvest. These lands must flood during the winter months to be of significant benefit to migratory waterfowl. These cleared lands totalling approximately 20,000 acres are considered to be marginal and submarginal from the standpoint of agricultural productivity but have substantial value to migratory waterfowl. The FWS does not intend to acquire prime farmlands in the Cache River Basin Study Area. Furthermore, before any land not in a natural state (marginal farmland) is purchased, an onsite inspection by professional wildlife biologists will be made to determine the value of the property to migratory waterfowl.

Acquisition Priority

As stated previously the FWS plans to acquire up to 35,000 acres of natural habitat in the study area. Due to national responsibilities concerning migratory waterfowl, the FWS would assist the AGF, other agencies, groups and individuals in the acquisition and/or preservation of the remaining valuable waterfowl habitat with primary emphasis placed on the preservation of natural habitat. Acquisition priorities will be based primarily on the biological significance of areas as well as known and/or anticipated land use conversion threats that will be detrimental to the waterfowl resource.

Acreages are identified by priority area and county in Table II-1. Priority acquisition areas are also visually displayed in Figure II-1. These priorities are meant to guide not limit the acquisition process and should not be construed as absolute or binding. For example, all of Priority 1 acquisition area would not have to be acquired before lands in Priority 2 acquisition area are acquired.

Several acquisition methods will be considered in protecting and preserving the internationally valuable waterfowl habitat in the Basin. However, the principle methods will be fee title and habitat preservation easements. The FWS policy is to acquire the minimum interest necessary to accomplish the waterfowl habitat preservation goals. A description of the principle methods follow:

Fee Title Purchase

Under fee title purchase the landowner usually sells all property rights on those lands. The acquiring agency would hold title to the property and manage the lands in a manner beneficial to waterfowl and other wildlife. In the case of acquisition by another agency, group, or individual, the management responsibility for those lands could be transferred to the FWS or AGF. Management of timber on the fee title properties would emphasize tree species beneficial to waterfowl. Water levels could also be managed when desirable on such lands. Public hunting, fishing, and other compatible types of wildlife oriented recreational uses could be permitted.

Habitat Preservation Easement

The rights needed to preserve and protect the habitat quality of a given tract of land would be purchased under this type of easement. It is actually a combination of basic easement restrictions and other options which could be acquired depending on factors such as:

1. Existing habitat quality.

2. Habitat needs for waterfowl and other wildlife.

3. Timber types.

4. Type of timber harvest/management practices being applied on the property.

5. Willingness of the landowner(s) to sell easement rights.

The basic restrictions to be acquired in all cases are:

1. Acquisition of the right to prevent land use alterations. Examples include, row crop agriculture, industrial/commercial uses, or conversion of the forest composition to single tree species stands through artificial regeneration, such as pulpwood monoculture. Preventing these land uses would not for example restrict other timber production and harvest.

TABLE II-1

Preferred Alternative: Acquisition Priorities By County and Drainage Basin 1/

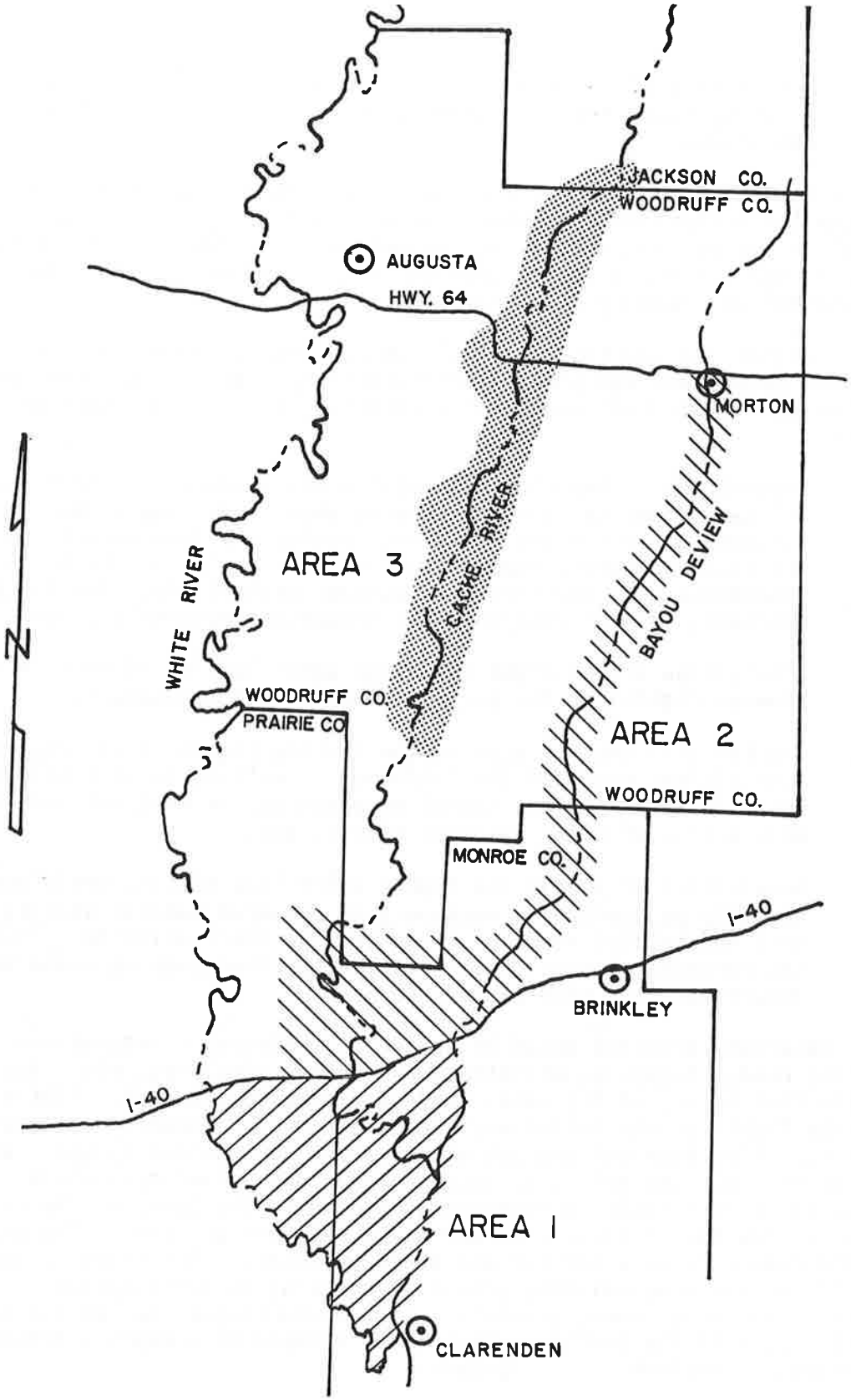
County	Priority I		Priority II		Priority III	
	Bayou DeView	Cache River	Bayou DeView	Cache River	Bayou DeView	Cache River
Jackson		2,485		6,341		
Monroe	3,350			5,378		7,527
Prairie				6,187		9,830
Woodruff	9,670	19,480		2,190		
Totals	13,020	21,965		20,096		17,357

Rounded Total Combined Acres 72,500

1/ FWS Planimetric of October 23, 1980 Satellite Imagery.

Updated August 1983.

FIGURE II-1. Ten-year Floodplain Habitat Preservation Study Area with Acquisition Priorities



Note: A map detailing current Federal and State ownerships in the study area along with the three acquisition priorities is in a pocket on the back cover of this document.

2. Acquisition of the right to prevent alteration of the historic flooding regimen through permanent draining and/or filling activities.

These basic easement restrictions would provide for the maintenance of a homogenous bottomland hardwoods species composition and provide a minimum level of protection to existing habitat quality. However, the actual habitat quality would depend upon and vary with the type of timber management utilized by the landowner(s).

Other rights and restrictions could be acquired to ensure higher levels of habitat protection and greater predictability regarding the habitat quality and needs of waterfowl and other wildlife. The more important of these are:

1. Acquisition of the right to require the landowner(s) to follow defined timber management criteria when conducting timber harvests. Purchase of this right would not require the landowner(s) to conduct any timber harvest; however, any harvest would have to be in accordance with the timber management criteria included in the easement. Timber management is discussed separately on page 20.

2. Acquisition of the right to manage water levels and/or to acquire flowage rights for the purpose of waterfowl management.

3. The FWS will seek to acquire the hunting rights on all easement acquisitions provided the landowner is willing to sell this right. However, if this right cannot be acquired, it will not preclude the acquisition of other easement rights; and,

4. Acquisition of public use rights other than hunting would not normally be considered necessary to preserve habitat quality or to meet the habitat needs of waterfowl and other wildlife. Therefore, the purchase of public use rights other than hunting would be determined on a case-by-case basis.

Any interests acquired would be subject to existing rights-of-way for public roads, highways, utilities, railroads, pipelines, etc. New activities on any of the above lands would be covered under "Title 50 Refuge Rights-of-Way Guidelines" (Appendix D). Proceeds from access rights and royalties from oil and gas rights would be retained by the grantor(s), their heir(s), assign(s), or successor(s). The grantor(s) would also be free to conduct timber management according to the terms of the easement and receive the receipts from any timber harvest or sale. The grantor(s) would remain responsible for all property taxes. The easement agreement would include a non-binding provision relating to notification of intended future sale of easement property. This would enable the FWS and others to participate in the bidding process. An example of a habitat preservation easement is included as in Appendix E.

Timber Management Practices

The main distinction between the basic required features of the habitat preservation easement and the optional timber management features relate directly to how timber can be harvested. Proposed timber management criteria fall under two categories: (1) minimum criteria designed to maintain or restore waterfowl values; and, (2) optimum criteria designed to improve waterfowl habitat values. Two methods of timber harvest are utilized in the forest cover types found in the study area: (1) Even-Age Harvest; and, (2) Uneven-Age Harvest. These terms are defined as follows:

(1) Even-Age Harvest--All trees theoretically belong to the same age class and at the end of the rotation cycle all trees are removed.

(2) Uneven-Age Harvest--A tree-by-tree, acre-by-acre evaluation is made. Trees representing all age classes are present and at no time are all trees removed.

Criteria used to regulate either of these types of harvest practices are listed below. The optimum and minimum criteria for each method of harvest is presented in Appendix F and includes the goal of management for each forest cover type. These criteria govern:

1. Stand rotation age;

2. Harvest percentage and frequency of cutting;

3. Size and spacing of harvested area;

4. Frequency of intermediate thinnings;

5. Species composition and spacing for artificial regeneration;

6. Minimum size of harvestable trees; and,

7. Numbers of den/seed trees that must be retained.

These timber management practices would apply only to lands where the optional timber management criteria feature is acquired. When implemented, these practices would ensure the maintenance, restoration, or improvement of migratory waterfowl values. Although not applicable to the basic required easement features, the FWS would recommend that the landowner(s) apply the timber management practices outlined in Appendix C to ensure high levels of waterfowl habitat preservation.

Acquisition Process

The basic considerations in establishing acquisition priorities are: (1) biological significance of the tract; (2) existing and anticipated threats; and, (3) landowners willingness to sell or otherwise make the property available to the project. Actual acquisition by the FWS would begin following: (1) approval of the Record of Decision that is submitted after the final Environmental Impact Statement is completed; (2) approval of the FWS Land Protection Plan; (3) endorsement by the State of Arkansas; and (4)

approval by the Migratory Bird Conservation Commission (MBCC). Purchase of lands and easements would proceed according to availability of funds. The willing seller concept will be applied to the extent possible in negotiations with landowners. The FWS will retain all legislated acquisition authorities including the power of imminent domain. Condemnation procedures would not be used unless authorized by the Director and only after written notice is sent to the landowner, the MBCC, and the Congressional Delegation. Condemnation is considered a last resort action and would not be utilized merely to add to the size of FWS refuge holdings. Such authorities would be utilized only when areas vital to the project cannot be acquired or protected by other methods. Condemnation proceedings could be applied to both fee and easement acquisitions.

The Refuge acquisition schedule is normally set up for a six-year period. However, due to the large number of ownerships, the use of varying methods of acquisition (donations, easements, fee simple, etc.), and the willing seller concept, the period of acquisition may extend beyond six years. The time from project approval to acquisition from any given landowner is variable and dependent upon title information, surveys, appraisals, negotiations, and availability of funds.

In all instances, payments to the landowner(s) for rights acquired would be based upon a real estate appraisal to determine fair market values as set forth in the "Uniform Appraisal Standards for Federal Land Acquisition, 1973". Persons and/or businesses displaced through FWS acquisition, are eligible for benefits under "The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646". The purpose of the Act is "To provide for uniform and equitable treatment of persons displaced from their homes, businesses, or farms by Federal and federally assisted programs, and to establish uniform and equitable land acquisition policies for Federal and federally assisted programs."

Under provisions of Public Law 95-469, commonly called the "Refuge Revenue Sharing Act", the Fish and Wildlife Service would on an annual basis, reimburse counties and/or other taxing authorities with certain monies for revenue lost as a result of fee title acquisition of private property. This Law states that the Secretary of the Interior shall pay out of the funds to each county in which any fee area is situated the greater of the following amounts:

(1) An amount equal to the product of 75 cents multiplied by the total acreage of that portion of the fee area which is located within such county; or,

(2) An amount equal to three-fourths of one percent of the fair market value, as determined by the Secretary, for that portion of the fee area (excluding any improvements made after the date of Federal acquisition) which is located within such county; or,

(3) An amount equal to 25 percent of the net receipts collected by the Secretary in connection with the operation and management of such fee area during such fiscal year. However, if a fee area is located in two or more counties, the amount for each county shall be proportioned in relationship to the acreage in that county.

The Refuge Revenue Sharing Act also mandates the FWS to request from Congress supplemental funds to compensate local governments for any shortfall in revenue sharing payments. The Act also requires that FWS lands be reappraised every five years to ensure that payments to local governments remain equitable. Payments under the Refuge Revenue Sharing Act would be made only on lands which the FWS acquires in fee title. Although there have been occasions in the past when payments to the counties have been less than the legislated amounts due to funding deficits, the average payments have, in most cases, equaled or exceeded the dollar amounts counties would have received had the lands remained in private ownership. On lands where the FWS might acquire partial interest through easement, all taxes will remain the responsibility of the individual landowner. Those lands to be acquired under the PA by non-Service entities would not be covered under the Refuge Revenue Sharing Act. Only those properties which the FWS acquires title, through fee purchase, transfer or donations, would be covered under the Act. In the case of lands acquired by AGF reduction of county revenue would be offset through local expenditures by users of WMA lands (Sunderland, personal communication, 1983).

Administration and Management of Acquired Lands

Lands or interests in lands acquired by the FWS would become a part of the National Wildlife Refuge System (NWRS) and would be administered according to the interests that are obtained. Such lands could be managed either directly by the FWS or by the AGF through a cooperative agreement. Lands acquired by the AGF would be administered as part of the State Wildlife Management Area System (WMA). Lands acquired by other agencies, groups or individuals could be transferred to the FWS or AGF for management purposes.

Management and use of lands may vary according to the method of acquisition used. Detailed management plans would be developed by the FWS for lands acquired in fee title. Compatible public use activities will be permitted on lands the FWS owns in fee title. These lands would be designated as a non-inviolate sanctuary. Under this designation, up to 100 percent of the land could be open to public waterfowl hunting with the exception of areas set aside for resting and feeding. Other hunting and fishing activities would be provided in general conformity with State seasons and bag limits. In acquiring easements, the FWS would retain the authority to alter seasons and bag limit on lands if hunting rights are acquired. The season and bag limits will generally conform to State season regulations. Other forms of public use rights not acquired by easement would be controlled by the landowner. General management objectives for refuge operations are contained in Appendix G. Specific management plans will be developed at a later date.

Summary of Impacts - Alternative No. 1 (Preferred Alternative)

The PA would preserve a significant portion of the wooded wetland habitat of the Basin. The rate of accomplishment will be dependent on the availability of funds; the degree of participation by other agencies, groups, and individuals; and willing sellers. This action would maintain the physical and hydrological features on lands acquired. The natural

flood storage capability would be preserved as would the groundwater recharge and water quality functions. The natural environment would be maintained as a result of the Basin's wooded wetlands being preserved.

Preservation of the forest resource base will affect socio-economic conditions in the study area. Future agricultural encroachment into this wetland environment would be prevented. This would produce long-term positive impacts on the forest products industry. Halting agricultural expansion could result in a long-term adverse impact on agri-development interests. Existing agricultural developments would experience little or no adverse impacts. Acquisition would partially reduce annual flood damages through implementation of non-structural flood control measures. Preservation of natural resources within the study area would provide increased public use opportunities and have a positive impact on tourism and recreation. Preservation of a portion of this highly valued segment of the rapidly disappearing bottomland hardwoods of the MRAF would benefit the social, cultural, and archeological values that have historically been associated with the "Delta" region of Arkansas and the Lower Mississippi River Valley. Table II-2 further summarizes the impacts of the PA. A detailed discussion is contained in Section IV. A cost analysis of each alternative is included in Table II-5, Summary of Costs for Alternatives Being Considered.

Alternative No. 2 - Combined Fee Title and Easement Acquisition by the FWS of up to 72,000 Acres of Natural Waterfowl Habitat Within the Ten-year Floodplain

This alternative is very similar to the PA with two significant exceptions--Alternative 2 relates to acquisition of only the natural habitat that is privately owned in the ten-year floodplain, e.g., up to 72,000 acres. Secondly, the FWS would be the only agency involved. Methods of Acquisition, Timber Management Practices, the Acquisition Process, and the Refuge Management Objectives would be the same as presented in the discussion of the PA.

Summary of Impacts - Alternative No. 2

Under Alternative 2, all wooded wetlands in the ten-year floodplain could be maintained and preserved. This alternative could preclude further agricultural expansion in the ten-year floodplain and ensure the natural flood storage capability, ground water recharge, and water quality functions inherent with the existing wooded wetland ecosystem. However, this alternative would not provide any protection to the hydrologic features outside of the acquisition area. The impacts of Alternative 2 are summarized in Table II-2 and discussed further in this Section as part of the "Comparative Evaluation of Alternatives". Section IV presents the detailed discussion of impacts for all Alternatives.

Alternative No. 3 - Combined Fee Title and Easement Acquisition by the FWS of up to 92,000 Acres of Valuable Waterfowl Habitat within the Ten-year Floodplain

This alternative is identical to the PA except the FWS would be the only agency involved in acquisition of lands and interests in lands. Methods of

TABLE II-2

Impact Evaluation Summary [1/]

Impacts	Preferred Alternative[2/]	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7	Alternative 8
1. PHYSICAL								
a. Topography	+	+	+	+	+	+	-	-
b. Soils	+	+	+	+	+	+	-	-
2. HYDROLOGICAL								
a. Ground Water	+	+	+	+	+	+	-	-
b. Surface Water	+	+	+	+	+	+	-	-
c. Water Quality	+	+	+	+	+	+	-	-
3. BIOLOGICAL								
a. Migratory Waterfowl	+	+	+	+	+	+	-	-
b. Fisheries	+	+	+	+	+	+	-	-
c. Wildlife Game Specialist	+	+	+	+	+	+	-	-
d. Wildlife Non-Game Species	+	+	+	+	+	+	-	-
4. SOCIO-ECONOMIC								
a. Economic								
1) Forest Products Industry	+	+	+	+	+	+	-	-
2) Flood Damages	+	+	+	+	+	+	+	-
3) Agriculture	-	-	-	-	-	-	+	-
4) Tax Revenue	+[3/]	+[3/]	+[3/]	-	+[3/]	-	+	+
5) Tourism/Retail Sales and Services	+	+	+	0	+	+	+	-
b. Human Resources								
1) Labor Force/ Employment	-	-	-	-	-	-	+	+
2) Historical	+	+	+	+	+	+	-	-
3) Cultural/Lifestyle	+	+	+	+	-	-	+	-
4) Recreational Opportunity	+	+	+	0	+	+	+	-
5) Aesthetic Quality	+	+	+	+	+	+	-	-

1/ All impacts are compared to the study objective, i.e., habitat preservation in a cost efficient manner.
2/ The Preferred Alternative is Alternative 1.
3/ Positive impacts as they relate to tax revenues are dependent on annual payment to the counties under the authority of the Refuge Revenue Sharing Act, 1978.

Acquisition, Timber Management Practices, the Acquisition Process, and the Refuge Management Objectives would be the same as presented in the discussion of the PA.

Summary of Impacts - Alternative No. 3

Under Alternative 3, all valuable waterfowl habitat in the study area could be maintained and preserved. The duration of the acquisition period would be greatly extended by restricting the preservation effort to one agency as a result of funding limitations. The hydrological character of the ten-year floodplain would be preserved and improved under this alternative. The distinction between the impacts of the PA and Alternative 3 are shown in Table II-2 and discussed further in this Section as part of the "Comparative Evaluation of Alternatives". Section IV presents the detailed discussion of impacts for all Alternatives.

Alternative No. 4 - Easement Acquisition by the FWS of 72,000 Acres of Natural Waterfowl Habitat within the Ten-year Floodplain

This alternative is identical to Alternative 2 with the exception that easements would be the only method of acquisition utilized. All other facets of this Alternative such as Timber Management Practices, the Acquisition Process, and the Refuge Management Objectives would be the same as presented in the easement discussion of the PA.

Summary of Impacts - Alternative No. 4

Under Alternative 4, all of the biological and hydrological features associated with natural habitat of the study area could feasibly be maintained at existing levels. As in Alternatives 2, 3, 5, and 6, the degree to which Alternative 4 could provide protection to wintering waterfowl resources of the study area would be restricted by single agency funding limitations. The effectiveness of Alternative 4 would be decreased as a result of only one method of acquisition being utilized. Socio-economic impacts would be very similar to those in Alternative 2 with the exception that no Refuge Revenue Sharing payments would be made to any counties--property taxes would remain the responsibility of the individual landowners. Furthermore, the easements purchased would prohibit improvements to those properties thereby reducing long-term potential county tax revenue. Table II-2 provides a summary of the impacts of Alternative 4. A detailed discussion of the impacts of Alternative 4 is contained in Section IV.

Alternative No. 5 - Fee Title Acquisition by the FWS of up to 92,000 Acres of Valuable Waterfowl Habitat within the Ten-year Floodplain

Under this alternative, the FWS would seek to acquire in fee title up to 92,000 acres of valuable waterfowl habitat in the ten-year floodplain study area. The Acquisition Priorities, Timber Management Practices, Acquisition Process, and Refuge Management Objectives (pertaining to fee title) would be the same as presented in the previous discussion of the PA. Since all FWS acquisition would be fee title purchases, payments to the counties under the terms of the Refuge Revenue Sharing Act would apply to all lands acquired.

Summary of Impacts - Alternative No. 5

Alternative 5 would maintain the high quality of the wooded wetland habitat within the ten-year floodplain of the Basin. Limited acreages of existing marginal or submarginal cleared lands in the ten-year floodplain could be acquired and managed to provide additional waterfowl benefits. These actions would have a positive impact on the physical and hydrological features of the study area. The natural flood storage capability of the wooded wetlands in the study area would be preserved and improved as would ground water recharge and water quality functions. Marginal and sub-marginal cleared lands that were revegetated would ultimately produce wooded wetlands benefits.

The principle adverse impacts associated with Alternative 5 would be decreased agricultural expansion into the flood-prone study area. Any existing marginal cleared lands to be acquired by the FWS under this alternative, would be managed for migratory waterfowl. Agricultural lands within the study area not acquired by the FWS would not be adversely affected by FWS acquisitions. Further, the present continued growth of annual flood damages would be abated through nonstructural flood control.

Preservation and enlargement of the existing wooded wetland ecosystem would have a long-term positive impact on the forest products industry. The increased public use opportunities, especially hunting, would have a positive impact on tourism and recreational services industries. A significant element of Arkansas' natural heritage would be preserved. Finally, the preservation of a highly valued segment of the rapidly disappearing bottomland hardwood wetlands of the MRAF would have a positive impact on the social, cultural, and archeological values historically associated with the "Delta" region of Arkansas and the Lower Mississippi River Valley. Table II-2 provides a summary of the impact of Alternative 5. For a detailed discussion of the impacts of Alternative 5, refer to Section IV.

Alternative No. 6 - Fee Title Acquisition by the Arkansas Game and Fish Commission of up to 92,000 Acres of Valuable Waterfowl Habitat within the Ten-year Floodplain

Alternative 6 is similar to the discussion just presented for Alternative 5 with two significant exceptions:

1. All lands would be acquired and managed by the AGF and,

2. Payments would not be made to the affected counties under the Federal Refuge Revenue Sharing Act.

The general Acquisition Priorities, Acquisition Process, and Management Objectives would be similar to those identified for the FWS in Alternative 5 and PA discussions, except when AGF policies differ on these aspects.

Alternative No. 7 - Combined Fee Title and Easement Acquisition of Not More than 70,000 Acres by the U.S. Army Corps of Engineers as Mitigation for the Construction of the Authorized Cache River Flood Control (Channelization) Project

Alternative 7 is described in detail in the CE's June 1974 Final Environmental Impact Statement for the Cache River Basin Project, Arkansas. Table II-3, taken from the CE's FEIS, highlights the key physical elements of the authorized project. Approximately, 115,500,000 cubic yards of dirt would be moved in channelizing 140.0 miles of the main channel of the Cache River, 14.6 miles of its upper tributaries, and 76.9 miles of its major tributary, Bayou DeView. Sixty-one highway crossings and 5 railroad bridges would be altered as would 157 pipe, electric, and telephone lines. Water control structures would be placed on 14 major cutoff bendways. Approximately 21,792 acres would be required for channel construction, and maintenance would ultimately be required on a total of 231.5 miles of channel. The authorized project would also include acquisition of real estate interests on not more than 70,000 acres (not less than 30,000 acres with public use and no more than 40,000 acres with private use easements). The proposed location of these lands is displayed in Figure II-2. The expenditure of no more than $7,000,000 is authorized for acquiring these lands and local interests shall contribute 50 per centum of any cost in excess of $6,000,000. Refuge revenue sharing payments would be made on the 11,000 acres projected to be purchased in fee, if transferred in fee title to the FWS.

Summary of Impacts - Alternative No. 7

Implementation of Alternative 7 would not maintain nor preserve the existing wooded wetland complex in the Basin. Instead, several miles of the natural reaches of the Cache River below Highway 18 and Bayou DeView below Highway 64 would be converted into large straight river channels with spoil piles replacing the natural riparian habitat along the stream banks. From 9,200 to 10,852 acres of wetlands would be destroyed for right-of-way and another 44,500 acres of seasonally flooded bottomland hardwoods would be eliminated or substantially modified (CE, 1977). Additionally, 5,900 acres of existing agricultural land would be eliminated from production for project rights-of-way requirements (CE, 1977). Over 1,000 acres of existing agricultural lands have been identified as integral to the authorized mitigation plan.

Mitigatory features consist of fee title or easement acquisition with public use on not less than 30,000 acres and provisions for easement acquisition of an additional 40,000 acres with private control over use. A dollar limitation of $7,000,000 is included in the authorizing legislation, over one-half of which has been expended to acquire 8,000 acres in fee title. No easements have been acquired.

Directly or indirectly, 156 miles of previously unchannelized streams in the Basin will be altered to convey and contain the ten-year crop season flood waters (CE, 1974). Groundwater recharge and water quality functions of the floodplain ecosystem will be adversely impacted due to reductions in frequency, depth, and duration of overbank flooding. Further, both short-term and long-term adverse impacts from increased quantities of

TABLE II-3

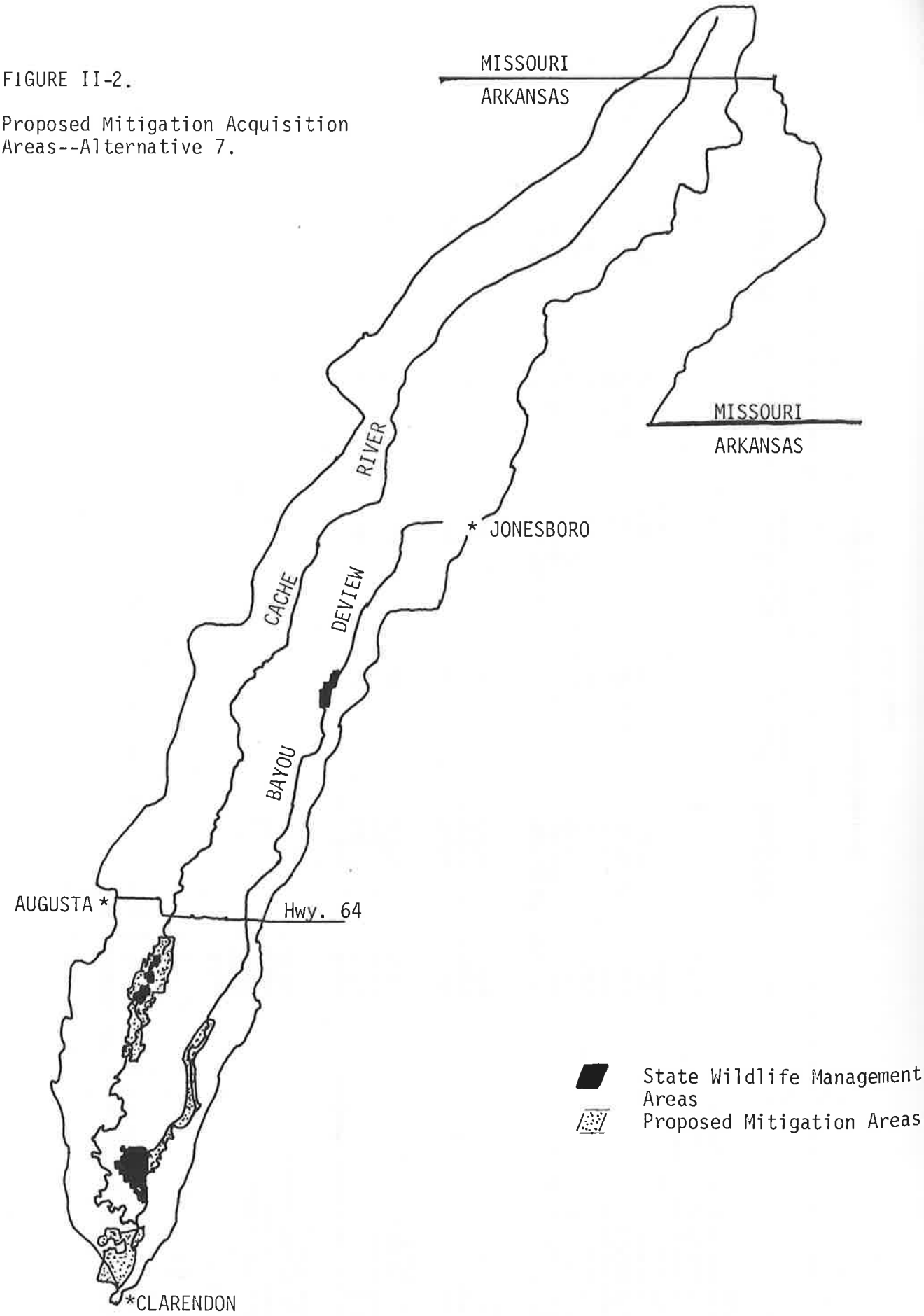
Physical Elements of Authorized Project

Item	Unit	Cache River	Main Canal Cache River	Little Cache River Ditch	Little Cache River Ditch #1	Bayou DeView	Totals
Channels							
Enlargement & Realignment (unchannelized reach)	Miles	69.0	-	-	-	29.0	98.0
Enlargement (previously channelized reach)	Miles	71.0	2.1	8.8	3.7	47.9	133.5
Bottom Widths	Feet	70-200	50	35	25	50-140	25-200
Side Slopes	Feet	IV on 2H	IV on 2H	IV on 2H	IV on 2H	IV on 2H	IV on 2H
Range of Depths	Feet	11-23	8-15	11-15	10-14	10-20	8-23
Berm Widths	Feet	40-50	40	40	40	40-50	40-50
Spoil Heights	Feet	15-20	15-20	15-20	15-20	15-20	15-20
Spoil Weights (base)	Feet	100-300	70-90	40-50	50-80	50-160	40-300
Excavation	Cu. Yds.	85,967,000	390,000	1,123,000	400,000	27,620,000	115,500,000
Area							
Channels	Acres	4,132	25	93	33	1,530	5,813
Berms	Acres	1,628	20	85	36	839	2,608
Spoil	Acres	6,195	70	100	80	2,555	9,000
Right-of-Way							
Cleared Land	Acres	4,314	80	295	130	1,051	5,870
Wooded Land	Acres	7,193	15	30	15	3,599	10,852
Stream	Acres	1,488	25	105	45	607	2,270
Bendway Development (wooded)	Acres	2,072	-	-	-	728	2,800
Relocations							
U.S. & State Bridges	Number	19	-	2	1	6	28
County Bridges	Number	15	1	5	1	11	33
Railroad Bridges	Number	3	-	-	-	2	5
Utilities	Number	93	-	13	6	45	157
Roads	Miles	2.8	-	-	-	2.1	4.9
Mitigation							
Land	Acres						70,000 1/

1/ Not more than 70,000 acres fee or easements.

FIGURE II-2.

Proposed Mitigation Acquisition Areas--Alternative 7.



sedimentation and turbidity will be experienced in Cache River and Bayou DeView (CE, 1974). Similar adverse impacts will be evident in the White River below its confluence with the Cache River (CE, 1974).

These major physical alterations will lower biological productivity of the natural wooded wetland complex of the Basin. Adverse impacts to the wintering waterfowl habitat of the Basin would be such that the current wintering waterfowl population could no longer be sustained.

The principle socio-economic benefits of the CE project would result from long-term positive impacts to future agricultural interests at the expense of long-term negative impacts to the present forest products and tourism industries. Agricultural expansion into the floodplain will be encouraged and flood damages will increase accordingly. Long-term commitments of resources and dollars for maintenance activities of structural features will be imperative. If local entries operate and maintain structural features drainage taxes will increase directly with inflationary impacts to structural maintenance requirements.

Values associated with the social, cultural, and archeological resources of the "Delta" region of the Lower Mississippi River Valley will decline. Much of the tree-lined, naturally meandering channels of the middle and lower reaches of the Cache River and Bayou DeView will be replaced by large straight ditches. These long-term impacts will irretrievably alter the current physical features of the Basin's wooded wetland complex. Table II-2 summarizes the impacts of Alternative 7. A detailed discussion of the impacts of Alternative 7, is included in Section IV.

Alternative No. 8 - No Action

Under this alternative, the FWS would acquire no real estate interests in the study area. Habitat preservation in the study area would be dependent on individual property owner actions and existing Federal, State, and local legislation and regulations. Existing Federal legislation which could possibly preserve wooded wetlands in the study area includes Section 404 of the Clean Water Act of 1977; the Water Bank, Forestry Incentives, and Agricultural Incentives Programs; (with all financial and technical assistance administered by the Agricultural Stabilization and Conservation Service, U.S. Department of Agriculture); and the Land and Water Conservation Fund Grants administered by the National Park Service, U.S. Department of the Interior.

The more important State programs providing legal, financial, and/or technical assistance which could possibly help accomplish the habitat preservation study objectives include: Act 142 of 1971 which prohibits the removal of cypress trees below the normal high water mark on certain navigable rivers; Act 297 of 1971 which would establish a system to preserve natural areas within the state; technical assistance through the "Acres for Wildlife" program administered by the AGF; technical assistance in forestry management from the State Forestry Commission; and regulation of water quality standards carried out by the Department of Pollution Control and Ecology. Additionally, local cities have the ability to exercise zoning laws for the health, safety, and welfare of the community.

The No Action Alternative relates primarily to individual landowners exercising their prerogative with respect to ownership and use of lands within the study area. Use should be consistent with existing legislation and regulations and will be influenced by the economics of the market place and the provisions of the Federal, State, and local programs listed above.

Summary of Impacts - Alternative No. 8 (No Action)

Implementation of the No Action Alternative would do little to protect or preserve the wooded wetlands of the Basin. Agricultural expansion within the ten-year floodplain would continue. The inability of Federal, state, and local legislation to provide the financial, technical, or regulatory means for habitat preservation has been amply demonstrated. Long-term agricultural benefits, although constrained by increasing annual flood losses, would be realized by sacrificing existing natural resources. Long-term economic losses would be prevalent in the forest products, tourism, and recreational industries, and the commercial utilization of the Basin's fish and wildlife resources. Quality and quantity of instream flows and groundwater supplies would decline. Existing physical and topographical features would be altered. Archeological resources could be destroyed and aesthetic qualities lowered. Finally, a high percentage of the internationally significant wooded wetland habitat of the study area so important to migratory waterfowl would be irreversibly committed to agricultural production. This commitment would ensure that the current wintering waterfowl population could no longer be sustained. Table II-2 further summarizes the impacts of Alternative 8. A detailed discussion of the impacts of Alternative 8, is included in Section IV.

COMPARATIVE EVALUATION OF ALTERNATIVES

The purpose of the EIS is to disclose the environmental considerations given during the decision-making process. To document impacts is not enough. The reason "why" one alternative is chosen over other potentially viable alternatives must be clear. This segment of the EIS defines the rationale of selecting the PA, and compares the alternatives on the basis of these impacts; their relationship to issues raised during the Scoping Process; and their contributions to the goal of preserving valuable waterfowl habitat.

From the beginning of the Scoping Process, the stated purpose or goal of this study has been the protection and preservation of internationally significant migratory waterfowl resources of the Basin in a timely and cost-efficient manner. The Scoping Process indicates there is broad public support for that goal with several issues raised regarding the method for achievement. As presented in Section I of this document, these issues or criteria, formed the basis for evaluating alternative methods to accomplish the goal. Thus, when comparing alternatives the decision must be whether or not an alternative accomplishes the goal of habitat preservation in a timely and cost-efficient manner and to what degree. An important secondary level of comparison relates to the degree of the "best" method to accomplish that goal based on the established criteria.

It is the view of the FWS that when the criteria are applied to the PA, the goal of habitat preservation will be accomplished in a timely and cost-efficient manner and conforms to established acquisition policies. In varying degrees five of the remaining alternatives would also accomplish the FWS' goal; however, some would not be timely or cost-efficient. The rationale used in selection of the PA and comparison of alternatives follows.

The PA will first be compared to Alternatives 2 and 4 and 3, 5, and 6, due to similarities of these groups. Alternatives 7 and 8 will be compared individually because of the inherent differences between them and the other Alternatives. The primary comparative factors will include: accomplishment of waterfowl habitat preservation goals, cost effectiveness, conformance to FWS land acquisition policies, and impacts of the Alternatives. The numerical ranking of alternatives is based on anticipated degree of migratory waterfowl habitat preservation.

The PA and Alternatives 3, 5, and 6 provide a potential means of protecting and preserving all remaining privately owned valuable waterfowl habitat in the ten-year floodplain study area. The methods of accomplishment to be used by the implementing agency will vary. These alternatives were ranked according to the anticipated degree of waterfowl habitat that will be preserved, which will be influenced by projected availability of funds, and the degree of acquisition flexibility.

Alternative 1, the PA - was ranked first based on the projected ability to provide the highest degree of waterfowl habitat preservation in the shortest period of time. One must remember that none of the alternatives will provide 100% protection of the waterfowl habitat of the study area. Limiting factors relate primarily to availability of funds and the willingness of landowners to make their property available to the habitat preservation program. The PA through the involvement of several agencies, groups, and individuals insures that the largest amount of funds possible would be available to acquire lands or interests in lands in the study area. The primary preservation methods to be considered--fee title, easements, donations, land exchanges, cooperative agreements, existing legislation, and zoning--will result in the needed flexibility to satisfy the wishes of the largest number of landowners. This will expedite the acquisition process and minimize costs. The PA complies with Department of the Interior land acquisition policies and guidelines. The PA also complies with the initiatives identified and incorporated in former Secretary Watt's "Protect Our Wetlands and Duck Resources Program" (POWDR).

Alternative 3 ranked second. The primary methods of acquisition (fee and easement) used in the PA and this Alternative will maintain the same degree of acquisition flexibility. However, Alternative 3 involves only one acquisition agency thereby restricting the level of habitat protection which could be provided as a result of decreased availability of funds.

Alternative 5 ranked fourth. This alternative considers only fee title acquisition. This would reduce the amount of waterfowl habitat that could be preserved as a result of the availability of funds and decreased flexibility in dealing with individual landowners. However, appropriate

public use could be provided on all properties acquired via fee title purchase. Lands acquired would receive the highest degree of habitat protection possible. Long-term habitat quality would also be assured.

Alternative 6 also ranked fourth. The only difference between Alternative 6 and Alternative 5 is that the AGF would implement Alternative 6 whereas Alternative 5 would be implemented by the FWS.

In comparing the PA to Alternatives 2 and 4, the primary differences relate to all remaining privately-owned valuable waterfowl habitat (92,000 acres) within the ten-year floodplain study area. Alternatives 2 and 4 address only the remaining natural waterfowl habitat (72,000 acres) in the study area. The PA could enable all remaining valuable waterfowl habitat to be protected and preserved. Alternatives 2 and 4 provide for the preservation of the hydrologic character of those lands only in the natural state. Should the hydrology of the other lands (marginal cleared lands) in the study area be altered, the hydrology of the natural habitat would in turn be affected. The extent to which the hydrology of these lands would be affected could only be determined by the degree to which the other lands are altered in the future. Alternatives 2 and 4 do not address the value to waterfowl of the marginal and sub-marginal cleared lands in the study area for temporary resting and feeding sites. The PA does provide for the protection and preservation of those marginal lands for migratory waterfowl.

Alternative 2 ranked third in regards to its potential for preserving waterfowl habitat in the study area. This ranking was based primarily on the flexibility of the acquisition methods which would be employed--fee title and easements. This approach results in the purchase of property rights on more lands suitable for migratory waterfowl. The cost of implementing Alternative 2 would also be reduced by employing a fee and easements acquisition approach. However, by restricting acquisition to only one agency and precluding the purchase of any non-natural waterfowl habitat the effectiveness of Alternative 2 would be somewhat reduced.

Alternative 4 consisting of easement only acquisition ranked sixth primarily as a result of: only one means of protecting the habitat being used (easements) and only habitat in its natural state being purchased. An easement only approach would offer a reduced degree of predictability and control of the habitat quality of the study area over a long-term. Alternative 2 however, would offer the lowest initial cost for providing a measure of habitat preservation, although the long-term costs of administering the terms of the easements might well prove to be very costly. Public use of the resource base protected under Alternative 2 easements would in all probability not be significantly greater than what is currently being experienced in the study area. This projection of public use remaining relatively constant is based on the expected high costs of acquiring public hunting and other public use rights via easements.

The most fundamental difference between the PA and Alternative 7 relates to project purpose. The primary and only purpose of the PA is to preserve habitat within the ten-year floodplain that is valuable to migratory waterfowl. The primary purpose of Alternative 7, is to provide ten-year

frequency crop season flood control through channelization and drainage. The contrast between purpose and result is clear and explicit. It is a contrast between continued drainage and development of wetlands versus the protection and conservation of wetlands. Alternative 7 would subsidize agricultural intensification, e.g., 61 percent of project benefits come from intensifying development as opposed to protecting existing development (CE, 1974) in obvious flood prone areas; while the PA would maintain a portion of the social, economic, and environmental values inherent in the wooded wetland environment. It is important to remember that Alternative 7 has and would result in habitat being acquired 1/. However, by definition and CE policy, this acquisition only reduces adverse impacts resulting from the project. Assuming the required additional funds are obtained, the amount of waterfowl habitat that could be preserved under Alternative 7 would be significantly less than the amount of habitat to be acquired under the PA. The contrast between these alternatives is clear--enhanced drainage and development of wetlands versus the preservation of internationally significant migratory waterfowl habitat. It was on the basis of these differences that the PA was selected over Alternative 7. Furthermore, Alternative 7 was ranked seventh in relationship to the other alternatives as a result of the immediate and serious environmental impacts which would occur with project construction. Also considered in the establishment of these rankings was the uncertainty as to whether the authorized mitigation would or could be implemented.

Waterfowl habitat preservation and flood control in the Basin are not mutually exclusive. The authorized flood control project would not be compatible in light of its serious adverse impacts on the Basin's fish and wildlife resources. Any future flood control project or modification of the authorized project should be multi-objective. This would require that measures for protecting existing cleared land from crop season floods should likewise include provisions for maintaining the Basin's hydrologic regime relating to waterfowl populations and water quality during the winter months. Such a plan was recommended by a special Task Force Report in 1978 (p. 10, Plan 5), and entails the following:

> "Rechannelization of 119 miles of previously constructed artificial channels in the upper basin of Cache River and Bayou DeView.

1/ The funding limit placed on the acquisition of the Cache River mitigation lands by Section 99 of P.L. 93-251 would preclude the acquisition of the authorized acreages. Acquisition of all authorized lands would require additional congressional legislative action.

Flood protection for all headwater 10-year crop season floods (or less) except in locally created backwater areas created for a distance of 12 miles upstream from Grubbs on the Cache River and 10 miles upstream from Highway 64 on Bayou DeView.

Provides for reduced flooding (same as Plans 1 and 2) in upper basin for floods larger than the 10-year crop season flood.

Levees will be constructed approximately along the 10-year floodplain to convey the 10-year crop season flood southward from Grubbs on Cache River and Highway 64 on Bayou DeView to the northern most limit of White River backwater flooding.

Borrow pits would parallel the levees and convey the 2-year crop season flood. The borrow pits would also provide outlets for lateral drainage improvements to the tablelands essentially as in Plan 1.

Sediment traps in the upper basin (at 7 locations) will trap bed loads and suspended sands and thereby improve water quality in the Basin.

Provides for dedication of 116,500 acres within the 10-year floodplain in the middle and lower basins of Cache River and Bayou DeView and the White River Backwater area for fish and wildlife resources (91,500 acres of woodlands/wetlands and 25,000 acres of agricultural lands); 93,625 acres of public access;and 22,875 acres for private access."

In addition to the Task Force plan, the CE's 1974 EIS listed two other alternatives that could have the potential to be compatible with the establishment of a NWR. Each of the Plans, including the Task Force plan, use leveed floodways with some form of acquisition between the proposed levees.

The authorized CE channelization project is not acceptable for protection of the natural functioning wetland ecosystem which requires seasonal overflow of the bottomland hardwoods. The FWS has, in the past, proposed a levee floodway alternative for the Basin but it has been rejected by the CE as not being feasible. Such things as clearing, snagging, and removing river channel blockages could be accommodated without adversely affecting the FWS's proposed project.

Alternative 8, No Action, includes no specific measures for habitat preservation in the Basin and was ranked sixth. Ranking it above Alternative 7 was made as a result of the minimum levels of non-specific waterfowl habitat protection provided under the Clean Water Act. While Alternative 8 also has an inherent uncertainty as to long-term projection of the future habitat quality, it is preferred over the construction of the authorized flood control project. This preference is based primarily on the uncertainty of funds for acquisition of mitigation acreages and construction of structural features to restore a portion of the study area's altered hydrology for migratory waterfowl management. Also, there

is no assurance that funds will be provided to operate and maintain the lands and structural features acquired for mitigation. Alternative 8 basically involves a continuation of the historic trend of agricultural development and diminishing fish and wildlife resources. Federal regulation in the form of Section 404 of the Clean Water Act and non-point source pollution control features of Section 208 of the same Act, provide some opportunity to consider the consequences of development on fish and wildlife. The Water Bank Program is potentially an excellent short-term (20 years or less) method of habitat preservation. However, current financial and institutional constraints apparently will continue to restrict its viability. Alternative 8 does not make a positive contribution to the habitat preservation goals.

In summary, the selection of any one of the eight alternatives essentially becomes a choice between certain basic issues, and the most fundamental choice to be made is whether or not there should be a waterfowl habitat preservation program. This issue alone segregates the alternatives into two classes, those that contribute to the preservation goal (Alternatives 1, 2, 3, 4, 5, 6 and 7) and those that do not (Alternative 8). Alternative 1 (PA), will preserve and maintain the maximum amount of internationally significant fish and wildlife resources in the Cache River and will satisfy broad public interests. Alternative 1 is preferred over Alternatives 2, 3, 4, 5, 6 and 7 because it will preserve habitat in a timely and cost-efficient manner by involving several entities and using several methods of acquisition. It will provide public hunting and other recreational opportunities while at the same time preserving waterfowl habitat in areas where the landowner is unwilling to accept fee title acquisition. We have thus selected the Preferred Alternative in an attempt to preserve and maintain the largest possible portion of the Cache River's public values in a manner that is fully sensitive to the wishes of the Basin's residents. Tables II-4 and II-5 further summarizes the comparative evaluation of alternatives.

floodplain. Progressing from the lowest to the highest elevation, the vegetational responses are graphically displayed in Figure III-1 as adapted from Fredrickson (1979). The plant communities' response to frequency, depth, and duration of overbank flooding ranges from species adapted to constant or near constant inundation to communities inundated only on rare occasions. Commonly the species groupings referred to as wooded and shrub swamps occupy the wettest sites; followed by first and second overflow bottoms oftentimes referred to as bottomland hardwoods; and, although not shown on Figure III-1 but at the extreme or highest elevations, mixed hardwoods are flooded often enough to be termed wooded wetlands whereas the remaining tableland hardwoods are recognized as non-wetland uplands.

The animal communities of the study area are also dependent upon the annual flooding cycles. While some species are directly dependent, i.e., fishes, reptiles, amphibians, and resident and migratory waterfowl, others are dependent on the resultant wetland vegetative communities for life requisites. Figure III-2 (Fredrickson, 1979) shows the spatial distribution of representative animal communities in the study area. While the more mobile species can be found throughout the study area, their presence is determined not by the availability of habitat that meets some life requisites, but rather by habitat that meets all life requisites. This is particularly critical for the less mobile species or species that require very specific habitat requirements.

While providing near optimum conditions for wooded wetland communities, the overbank floodwaters of the Basin also gradually deposit rich alluvial soils well suited for agricultural production. The underlying layer of clay present in much of the study area retards water infiltration and dependable sources of surface and ground water are available for irrigation. Although overbank flooding still occurs with historic frequencies, by more modern standards the higher tablelands are considered flood free.

The annual flooding cycle, large expanses of wooded wetlands, and a relatively mild climate also provide excellent conditions for wintering (and nesting) migratory waterfowl. During winters when the Cache River and Bayou Deview do not experience headwater floods, White River backwaters frequently inundate much of the study area. Resting and feeding habitats are optimum and the flowing stream waters do not freeze--or at least freeze for only relatively short periods. During the mid 1900 period of agricultural expansion, the mobile and highly opportunistic waterfowl populations capitalized on waste grain as a natural food supplement.

The earliest evidence of man in the study area is from the Paleo-Indian period, circa 10,000 B.C. (more detailed information for this and later periods is found in the CE's 1974 EIS and Appendix P, of the Mississippi River Comprehensive Study). Spanish followed by French explorers ventured into Arkansas in the sixteenth and seventeenth centuries, and by 1682 the French established the first permanent European settlement in the MRAF on the lower Arkansas River. Settlement continued through 1819 when Arkansas was made a U.S. Territory and then admitted into the Union in 1836.

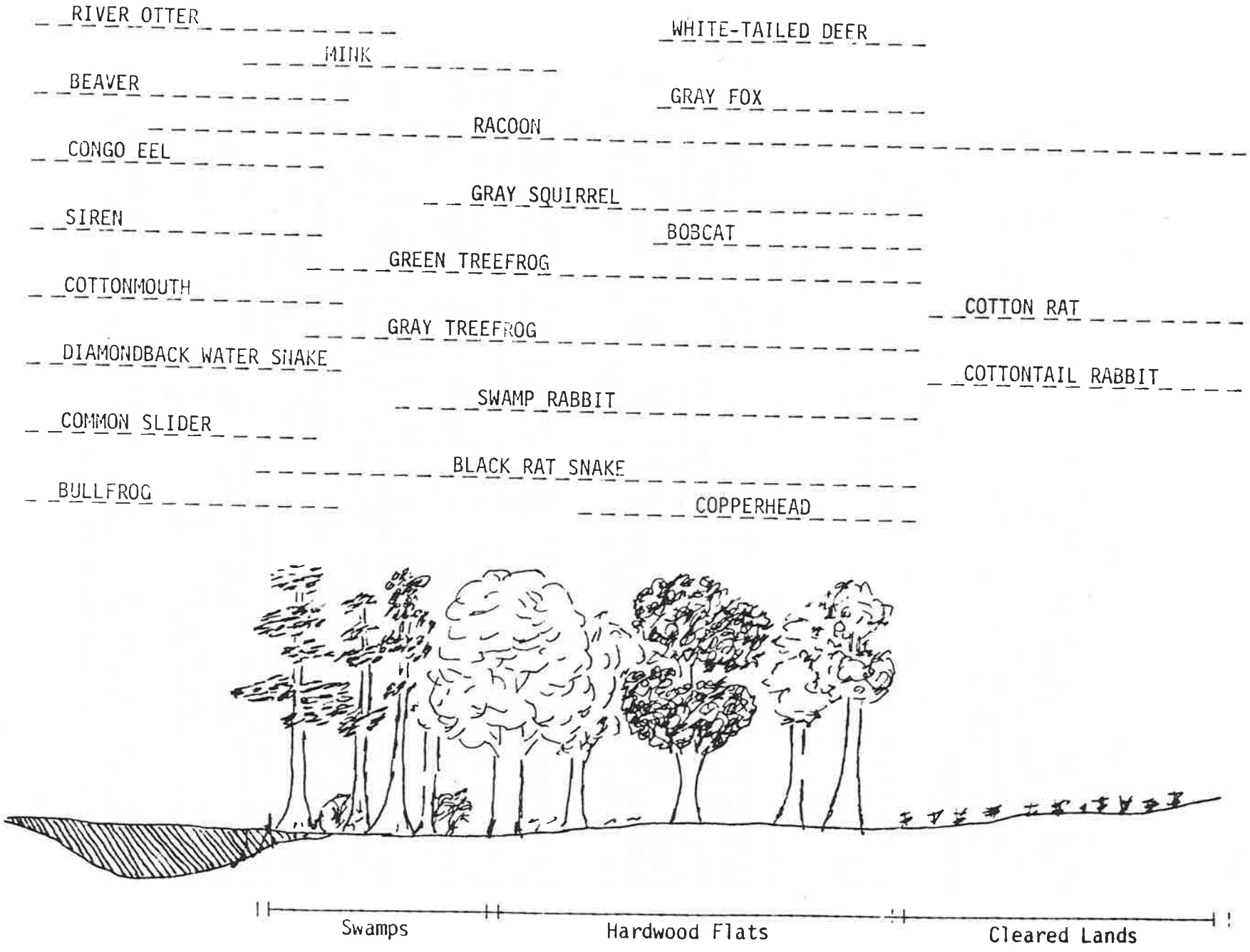


Figure III- 2. Typical distribution of amphibians, reptiles, and mammals in the Cache River ten-year floodplain. Adapted from Fredrickson, 1979.

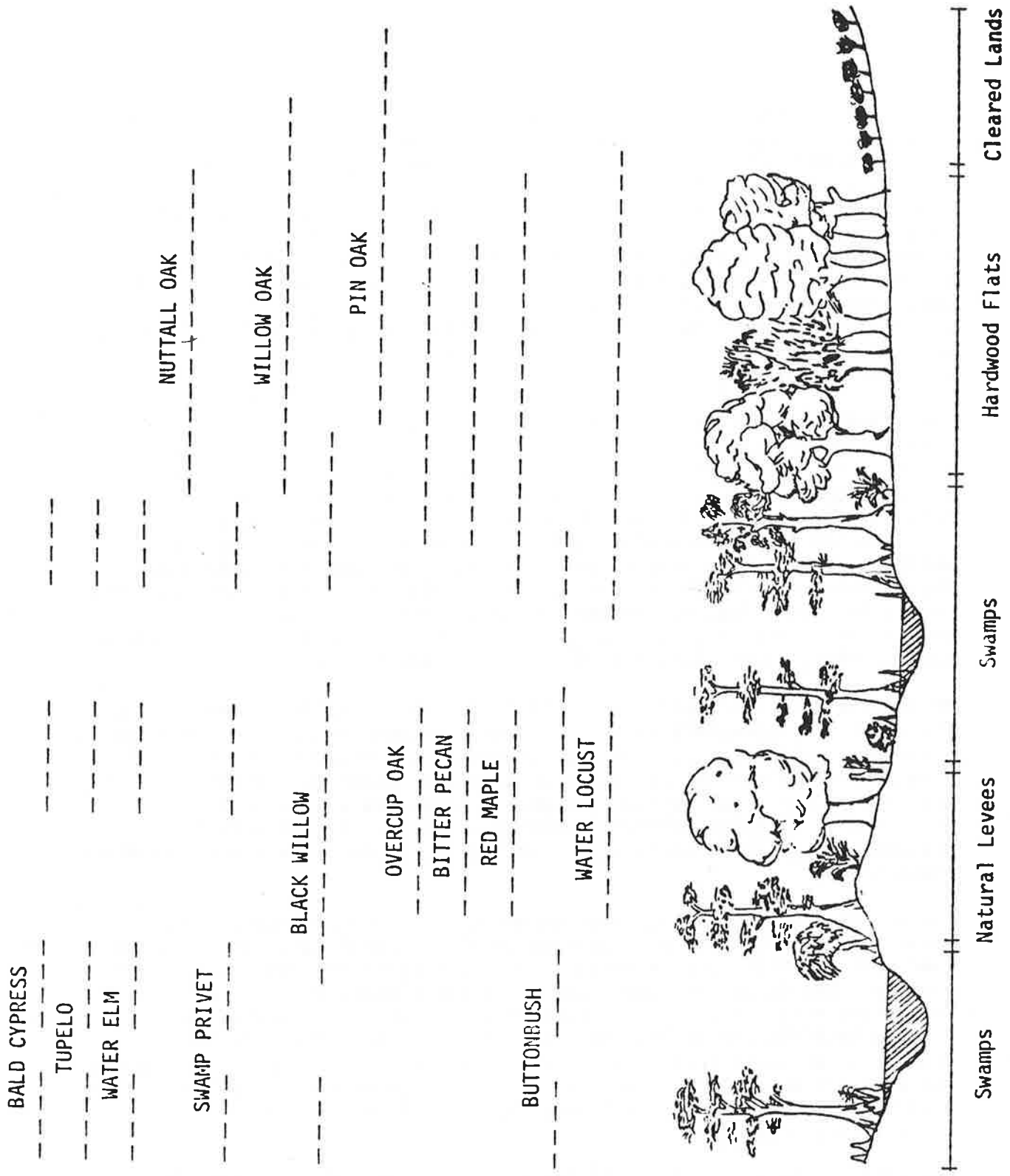


Figure III-1. Typical Cross Section of the Cache River Ten Year Floodplain Showing Plant Distribution (horizontal bar) in Relation to a Permanently Flooded Stream and an Oxbow. Adapted from: Fredrickson, 1979.

Holder (1970) describes the years from 1770 to 1920 as a period when man's pioneer spirit continued to drive him into the forests and swamps of the eastern Arkansas Delta. Due to floodwaters, settlement activities were confined to the higher, less flood prone ridges. The Swamp Land Acts of 1848 and 1850 provided for donation of over 7.6 million acres of Federal (public domain) lands to Arkansas provided the funds derived from their sales were utilized to drain and reclaim the swamp lands. Land sales prompted many attempts at reclamation; however,most of these attempts failed due to insufficient funding. Subsequent reclamation efforts by organized drainage and/or levee districts failed for similar reasons. The great flood of 1927 revealed the almost total inadequacy of previous piecemeal local drainage and flood control efforts and was ultimately responsible for active Federal participation in flood control; a role which has persisted to the present time.

With an active Federal role in flood control and reclamation efforts assured, agricultural development in the MRAF was quick to capitalize on the rich alluvial soils and favorable climate. By the early 1930's the best and highest farmlands were in production and the remaining forests, which had been heavily cut over, were for sale at bargain prices. Holder (1970) indicated the period from 1880 through 1920 was the "hey-day" of lumbering in the Delta. As the major timber companies began moving out, agricultural interests moved in and quickly became the dominant force in the study area.

The economy of the study area is still based predominantly on agriculture and is quite typical of rural areas in the MRAF. Whereas the CE's 1974 EIS predicted an increase in population for the four-county study area from 1970 to the year 2020, preliminary 1980 census figures show a continued population decrease in all counties except Jackson. Coastal Environments (1977) found an average of over 70 percent of the population in the four counties lived in rural areas. Coastal Environments also found that while agricultural employment was constant from 1960 to 1970, manufacturing in Jackson, Woodruff, and Monroe Counties increased 87 percent in the same period. This trend is further supported by 1975-1979 employment data for the four counties (Hudson, personal communication). Furthermore, Prairie County, the only county in the study area not experiencing an upturn in non-agricultural job opportunities, has the highest unemployment rate in the study area and the lowest labor force participation rate (CE, 1974). The past dependence on an agricultural based economy also resulted in 1970 poverty levels two to four times greater than the national average (CE, 1974).

Appendix B of the Lower Mississippi Region Comprehensive Study (1974) describes the symptoms of the economic problems of Water Resource Planning Area 2 (which includes the study area) as follows:

1. Low per capita incomes.

2. High rates of unemployment reflecting the loss of employment opportunities in agriculture with a failure of other job opportunities to absorb displaced workers.

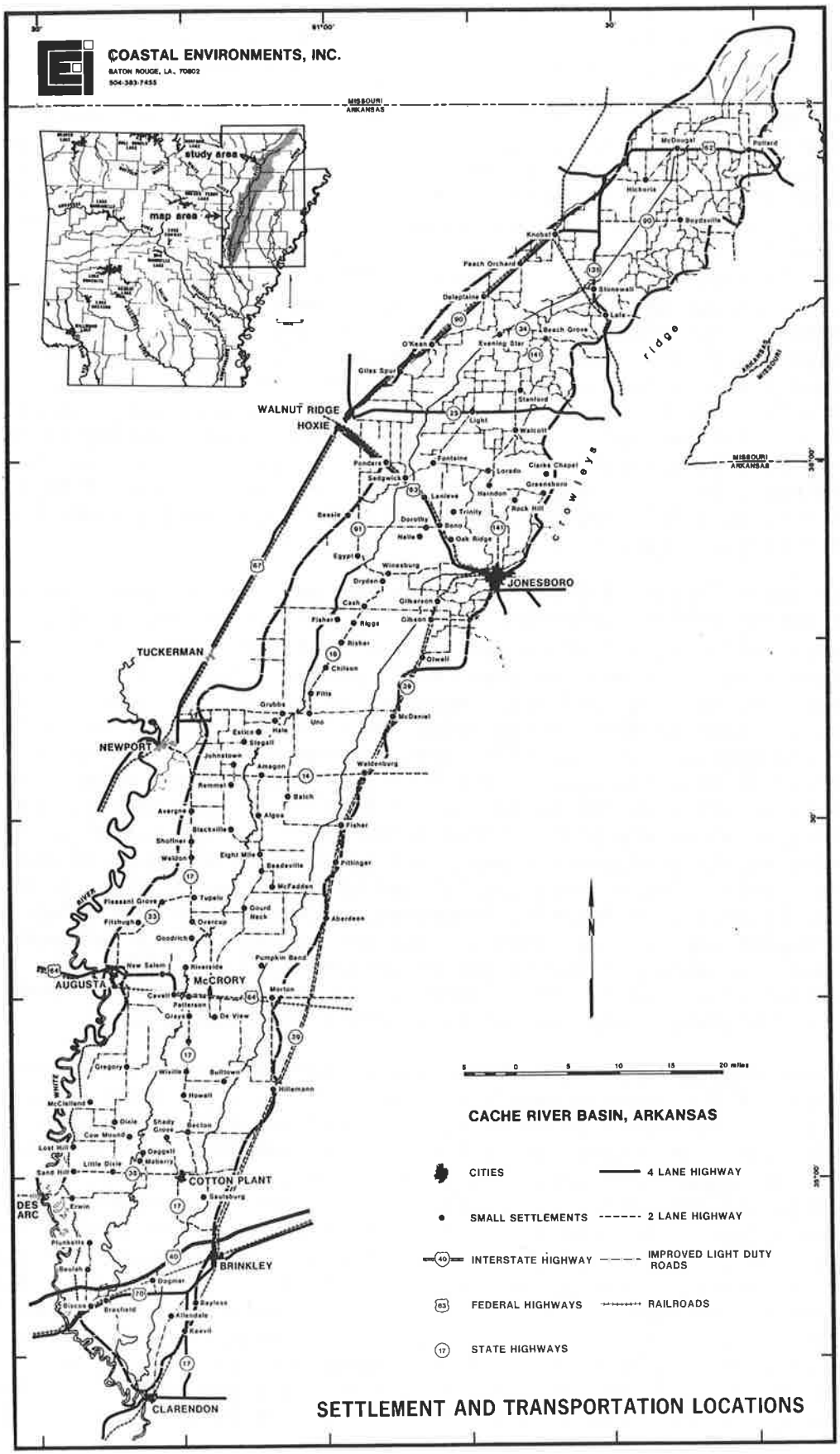
3. High unemployment over extended periods which encourages high rates of emigration and impedes economic growth and development.

Land use and ownership patterns in the study area are probably representative of smaller non-channelized river basins in the MRAF. Approximately 31 percent or 39,000 acres, of the 133,000 ten-year floodplain has been cleared while the remaining, 69 percent or 94,000 acres, is almost entirely wooded wetlands. Minimal acreages are devoted to small urban areas, rural residences, rights-of-way, and other miscellaneous uses. The AGF owns 13,700 acres of wooded wetlands in their Dr.Rex Hancock and Dagmar Wildlife Management Areas and the CE has purchased approximately 8,000 acres of wooded wetlands for partial mitigation of their authorized flood control, channelization project. Forest products companies own an additional 14,000 acres of wooded wetlands. The Cache River Basin EIS (CE, 1974) provides land ownership patterns for the entire Basin. These data (probably collected in the early 1970's) indicate the majority of the land ownership was in small holdings with an average size of 155 acres. It is expected that ownership patterns have followed the national trend of decreasing numbers of farms but increasing farm size.

Each public school district in the study area has a supervisor of schools for administrative guidance. Local funding for the school districts is almost exclusively from property taxes with each school district determining individual mileage rates, provided those rates are within prescribed state guidelines. Revenues generated by property taxes are also utilized by each County Judge, an elected official, who with an elected quorum court, provides most governmental services to the individual counties outside the limits of incorporated areas. Police functions are provided by an elected Sheriff in each county. County-wide health services are administered primarily by county nurses or federally funded health care centers and there is at least one general hospital in each county. The nearest specialized hospital facilities are in Little Rock, Arkansas, or Memphis, Tennessee. Other health facilities such as pharmacies and nursing homes are present in each county in varying numbers (Industrial Research and Extension Center, 1973 a). Adequate transportation facilities (Figure III-3) including one interstate highway, two U.S.highways, and two railroads cross the study area.

Outdoor recreational activities have historically been an important segment of the socio-economic component of the study area. This is still the case. Residents of rural agricultural areas in the MRAF have always participated in outdoor activities such as hunting, fishing, and trapping at rates higher than urban inhabitants. With leisure time, standards of living, and population increases, more and more recreational demands are being placed on natural areas including the wooded wetlands of the study area. This is especially true since the population centers of Little Rock and Jonesboro, Arkansas, and Memphis, Tennessee, are within a 75-mile radius of the study area. The traditional hunting, fishing, and trapping activities, and more recently general non-consumptive outdoor recreation, are experiencing heretofore unanticipated demands. Due to the decreasing fish and wildlife habitat base in the MRAF and the study area, these demands are not increasing arithmetically, but rather geometrically. The

FIGURE III-3


COASTAL ENVIRONMENTS, INC.
BATON ROUGE, LA., 70802
504-383-7455
MISSOURI
ARKANSAS
study area
map area
WALNUT RIDGE
HOXIE
JONESBORO
TUCKERMAN
NEWPORT
AUGUSTA
McCRORY
COTTON PLAIN
BRINKLEY
DES ARC
CLARENDON
Crowleys ridge
WHITE RIVER
CACHE RIVER BASIN, ARKANSAS
CITIES
SMALL SETTLEMENTS
INTERSTATE HIGHWAY
FEDERAL HIGHWAYS
STATE HIGHWAYS
4 LANE HIGHWAY
2 LANE HIGHWAY
IMPROVED LIGHT DUTY ROADS
RAILROADS
SETTLEMENT AND TRANSPORTATION LOCATIONS

following discussion, specific to the study area, relates to the recreational demand in terms of annual usage rates.

The wooded wetlands of the study area provide excellent hunting opportunities for white-tailed deer and small game species including squirrels and rabbits, and waterfowl. Of these, waterfowl is the most popular. Table III-1 presents the annual user-days of hunting on the Dagmar and Dr.Rex Hancock Wildlife Management Areas located in the habitat preservation study area. These data, supplied by the AGF, are based on existing wildlife population estimates, annual harvest rates, and hunter success. Figures for general outdoor recreation and fishing were taken from the 1978 Task Force Report on the Cache River Basin. Cumulatively, these data indicate that annual public utilization on the two state areas approximates 1.5 user-days per acre per year.

Exclusive of the two state WMA's, Table III-2 provides an estimate of the maximum potential user-days and dollar values that could be expended annually with the acquisition and transfer of the 80,000 acres of natural habitat in the study area. The expenditures cited in Table III-2 include total cost per day of expenses such as licenses, clothing and equipment and would not necessarily be expended in the four county study area. These data, taken from various sources, generally assume that hunting and fishing uses would be maximized.

Recreational demands for hunting and fishing activities in the Cache River, Table III-2, were projected to the year 2020 by the CE's 1974 EIS. These demands, from the 1965 National Survey of Hunting and Fishing, were based upon per capita demand of rural and urban populations within a 125-mile radius of the 13-county Basin. Over 3.8 million annual consumptive recreational demands are projected in the year 2020.

The preceding pages have provided historic and current overview discussions of the physical and socio-economic components of the study area. The physical and socio-economic characteristics of the Basin have been described in many previous studies, reports, and publications. Rather than duplicate these well documented and widely circulated efforts, we have provided appropriate references for more detailed examinations. It is also relevant to note that the CE's 1974 Final EIS for the Basin is replete with socio-economic data for the study area. Although these data are seven years old, the findings would only vary in degree from today's conditions. The concerned reader is directed to that document for a more indepth discussion of the socio-economic base for the study area.

BIOLOGICAL COMPONENTS OF THE STUDY AREA

Previous discussions including Figure III-1 described the vegetative communities in the study area beginning with wooded and shrub swamps that occupy the lowest elevations, through the seasonally flooded bottomland hardwood wetlands, and finally to the terrace hardwoods which occur at the highest elevations and are seldom inundated by overbank flows. Acreages of wooded wetlands and agricultural lands are detailed in Table III-3.

TABLE III-1

Population, Annual Harvest, Annual User-Days, and Success Rate for Selected Species on Dagmar and Dr. Rex Hancock Wildlife Management Areas

Management Area	Species	Population Estimate	Annual Harvest	Annual User-days	Hunter Success (No./User-days)
Dagmar (8,000 A)	Deer	400	43	1,800	1/76
	Waterfowl	25 to 30,000	6,000	5,500	1.1
	Squirrel	8,000	1,250	625	2
	Rabbit	1,000	650	325	2
	General Recreation	---	---	4,000	---
Dr. Rex Hancock (5,700 A)[1/]	Deer	130	20	900	1/90
	Waterfowl	12 to 15,000	2,500	2,500	1
	Squirrel	1,300	875	440	2
	Rabbit	500	325	160	2
	General Recreation	---	---	2,000	---
Fishing (both areas combined)	---	---	---	6,750[2/]	---
TOTAL				25,000	

1/ Based on 450 acres of permanent water within the management areas.

2/ Total acreage includes a recent 1.700 acre acquisition. Estimates in this table approximately 4,000 areas in the WMA.

TABLE III-2

Values of Selected Activities in 80,000 Acres of
Bottomland Hardwood Habitat in the Ten-Year Floodplain. 1/

Activity	User-Days/ Acre 2/	Annual User-Days	1970 Value User-Days 5/	1978 Value/ User-Days 6/	Annual Value 8/
Big Game	.40	32,000	$47.18	$71.40	$ 2,284,800
Small Game	.43	34,400	$42.97	$65.03	$ 2,237,032
Waterfowl	.75	60,000	$55.63	$84.18	$ 5,050,800
Trapping	.17 3/	13,600 3/	N/A	$ 6.88 7/	$ 93,568
General Recreation	N/A 4/	30,700 4/	$32.08	$48.55	$ 1,490,485
Sport Fishing	N/A 4/	31,500 4/	$38.14	$57.72	$ 1,818,180
Commercial Fishing	N/A 9/	N/A 9/	N/A	N/A 9/	$ 50,000 9/
TOTAL		198,700			$13,024,865

1/ Includes 72,000 acres of privately owned and 8,000 acres of Corps owned bottomland hardwoods.

2/ Values were calculated utilizing such factors as population densities, sustained annual harvest rates, and hunter success rates. Factors were derived from literature review and personal communication with various biologists. Values are based upon the assumption that hunting and other uses are presently at maximum capacity.

3/ Trapping values represent pelts per acre of bottomland hardwoods.

4/ Annual user-days utilized from: U. S. Army, Corps of Engineers, 1974. Appendix A, Table I-1.

5/ Basic data from: Economic Research Group, 1974. (Derived from 1970 data which represents the average daily monetary value placed on participation. Does not represent expenditures).

6/ The 1970 values were updated to 1978 (to match the acreage calculations) by using Consumer Price Index from: Bureau of Census, 1979.

7/ The average 1978 price per pelt of species occurring in bottomland hardwoods.

8/ Represents the 1978 values x the annual user-days or "pelt" days.

9/ Annual value utilized from: U. S. Army, Corps of Engineers, 1974. Appendix A, Table B-1, the updated to 1978 using Consumer Price Index.

TABLE III-3

Land Use Acreages in the Four-County Habitat Preservation Study Area 1/ 2/

	Wooded/Shrub Swamps	Bottomland Hardwoods	Cleared Lands
Jackson County	853	7,874	4,772
Monroe County	7,973	25,783	16,906
Prarie County	1,013	12,701	4,679
Woodruff County	6,987	30,799	12,712
TOTAL (Rounded)	17,000	77,000	39,000
COMBINED TOTAL		133,000	

1/ McDonald Et Al; 1979
2/ FWS Planimetry of October 23, 1980, Satellite Imagery. Updated August 1983.

TABLE III-4

Average Carrying Capacity (individual/acre) of Selected Game Species for Different Habitat Types 1/

SPECIES	HABITAT TYPES			
	Bottomland Hardwoods	Upland Hardwood/Pine	Upland Pine	Cleared Land
White-tailed deer	1/10	1/30	1/35	0
Squirrel	1/2	1/20	1/50	0
Swamp rabbit	1/2	0	0	0
Turkey	1/15	N/D 2/	1/90	0

1/ Adapted from Glasgow and Nobel, 1971; and Yancey, 1969.
2/ No Data Available.

The 94,000 acres of wooded wetlands in the study area are among the most valuable fish and wildlife resources in the Nation. As shown in Table III-4, bottomland hardwood wetlands typically support larger and more diverse animal populations than most other habitats. The primary reason for this level of productivity is the seasonal overflow cycle. The biological function of season overflow is elaborated in Appendix H, The Yazoo Basin: An Environmental Overview. Kennedy (1977) found that bottomland hardwoods and cypress/tupelo swamps provided habitat for 86 and 74 species of resident and migratory birds, respectively. Dickson (1978) also reported higher bird densities in bottomland hardwood forests than upland pine or pine-hardwood, particularly during the winter. Figure III-4 displays the typical distribution of birds in the study area and AppendixB of the CE's 1974 EIS provides a listing of birds recorded on four, one-day field trips in the Basin.

Dependency of fishery resources in the study area upon annual overbank floodwaters for spawning and nursery habitat are well documented in the CE's 1974 EIS. Following the 1972 and 1973 flooding, the EIS documented a high rate of fishery reproduction resulting in increased populations in subsequent years. The CE's EIS also reported a diverse fish population with standing crops (weight per unit area) in the study area of up to 300 pounds/acre in the Cache River and 239 pounds/acre in Bayou DeView. Fifty-six species (Appendix B, 1974 EIS) of fishes were recorded in the Basin.

Migratory waterfowl are the most highly acclaimed wildlife resource in the Basin (Bellrose, personal communication. Wood ducks, although migratory, are also considered residents since they nest and raise their young in the study area. Although second in number to mallards, comprehensive population data for this species are lacking because they are associated almost exclusively with wooded wetlands and are therefore difficult to census. In the 1978 Task Force Report on the Cache River, the average wood duck population in the Basin was estimated to be 35,000. The majority of these birds would be found in the 94,000 acres of wooded wetlands in the study area.

Wood ducks are specifically adapted to nesting in tree cavities and are dependent on foods occurring within natural forest systems. The feeding areas most important to wood ducks are the flooded zones where the water is 12 inches or less in depth (Drobney and Fredrickson, 1979). Here the ducks consume mast and invertebrates associated with wooded wetland habitats. Both the quantity and quality of the foods required by wood ducks vary seasonally and between sexes. In the winter, both males and females depend primarily on mast. Wood ducks are early nesters, and the females depend primarily on mast. The females shift to a diet of invertebrates in the period prior to nesting in order to acquire the proteins necessary for egg laying. Young wood ducks also require invertebrates, but after about 4 weeks of age, their diet contains a higher proportion of plant foods.

For successful reproduction, wood ducks require nest cavities that are located near both seasonally and permanently flooded swamps so that necessary natural foods will be available to the nesting female and developing young. Since female wood ducks exhibit precise homing

Figure III-4. Typical Distribution of Birds in the Cache River Ten-Year Floodplain. Adapted from: Fredrickson, 1979.

instincts to nesting areas (Drobney, 1977), the specific nesting and feeding requirements are lost when wooded wetland habitats are converted to other land uses. Due to the widespread destruction of wooded wetlands for agricultural uses, almost 80 percent of the wood duck habitat within the Mississippi Flyway has been eliminated. In addition, much of the remaining privately-owned wood duck habitat is in danger of being lost (Korte and Fredrickson, 1977; Holder, 1970; MacDonald et al. 1979). As a result, although the wooded wetlands currently in public ownership in the study area and the remainder of the MRAF may ensure survival of the wood duck, it will probably not provide a surplus for hunting at the 1978 harvest rate of 760,000 in the Mississippi Flyway if other habitats are destroyed (Fredrickson, personal communication). Generalized life histories of wood ducks and life histories and numbers and species of migratory waterfowl are found in the CE's 1974 EIS.

The mallard is by far the most numerous migratory waterfowl species occurring in the study area. Each January, the FWS in conjunction with state conservation agencies, conducts midwinter waterfowl surveys throughout the United States. The study area and all of the MRAF are included in the Mississippi Flyway, one of the four migration corridors established to manage the recreational hunting of waterfowl. Historically, Arkansas has wintered the largest percentage of the flyway's mallard population (Figure I-5). Of the 3,100,000 mallards that winter in the Mississippi Flyway, the Nation's "Mallard Flyway", about 1,100,000 are found in Arkansas (Bellrose, 1976).

Bellrose's estimate is supported by the midwinter waterfowl data for the last 12 years (Table III-5). The apparent reason for the reduced number of birds in 1977 was record low temperatures that froze most shallow water areas and forced the birds further south during the period in which the survey was conducted. A combination of low water levels, unseasonally warm weather, and the absence of snow cover to the north of Arkansas probably accounts for the low numbers of mallards observed during the 1980 survey.

Many waterfowl experts (Donaldson, Fredrickson, personal communications; Bellrose, 1976) believe that the aerial midwinter survey data underestimate waterfowl populations including mallards as much as 25 to 50 percent. This bias occurs for several reasons. First, when waterfowl are feeding and resting in flooded wooded wetland habitat, visual sightings are incomplete and populations are underestimated. This problem becomes particularly acute during the adverse weather conditions prevalent during early January. Secondly, there is an inherent bias that causes most observers to underestimate the number of waterfowl in large flocks; the larger the flock, the greater the error. Finally, the midwinter survey is conducted prior to the onset of the most severe winter conditions to the north of Arkansas, particularly in Illinois. When a widespread freeze does occur there, over 62 percent of the mallards wintering in Illinois, Indiana, Iowa, and Missouri, are forced to migrate to Arkansas (Bellrose, 1977).

The importance of the Basin, and therefore of the study area as a wintering habitat for mallards, is illustrated not only by the winter surveys (CE, 1974) but by other sources of data as well. First, band

TABLE III-5

January Mallard Surveys for Mississippi Flyway and the State of Arkansas

Year	Flyway Count (1,000)	Arkansas Count (1,000)	% of the Flyway Total Count in Arkansas
1969	2,123.7	881.6	41.5
1970	3,942.9	1,498.6	38.0
1971	3,751.3	1,678.8	44.8
1972	2,794.0	1,014.5	36.3
1973	2,911.6	667.5	22.9
1974	2,056.6	841.7	40.9
1975	2,860.6	1,064.6	37.2
1976	3,945.4	999.0	25.3
1977	2,133.2	254.3	8.1
1978	2,604.9	601.6	23.1
1979	3,072.8	569.0	18.5
1980	2,359.5	359.4	15.2
Average	2,963.0	922.6	31.1

TABLE III-6

Average Annual Harvest of Mallards and Wood Ducks in Four Counties in Arkansas During 1966-1975. 1/

County	Mallard Harvest	% of Arkansas Harvest	Wood Duck Harvest	% of Arkansas Harvest
Jackson	8,211	2.3	692	2.2
Monroe	21,644	5.9	2,495	8.0
Prairie	13,701	3.8	386	1.2
Woodruff	11,096	3.0	1,145	3.7
TOTAL PERCENT		15.0		15.1

1/ From: Carney et al., 1978.

recoveries indicate that the Basin is a major wintering area for mallards in the Mississippi Flyway (Bellrose and Compton, 1970). Secondly, harvest records for the study area counties indicate that 15 percent of the total mallard harvest in Arkansas occurs there. (Table III-6).

Finally, there is evidence that when the Mississippi Flyway population of mallards is high, the wintering grounds in Arkansas reach or exceed their carrying capacity in late December and early January (Bellrose, 1976). Severe weather in January and early February, however, often forces the Arkansas wintering habitats to accommodate mallards in excess of their carrying capacities (Bellrose, Public Meeting Statement, 1977). This, of course, produces greater stress in the population and may result in higher mortality.

Dr. Frank Bellrose, in his March 28, 1977, public meeting statement at Jonesboro, Arkansas, stated "Breeding ground population estimates show that in the last 22 years (1954-1976) mallard populations have gradually declined almost 24 percent. The destruction of both breeding and winter habitat is responsible for this decline Heitmeyer, Fredrickson, 1981)." Regulated hunting pressure essentially has no effect on mallard populations (Anderson and Burnham, 1976). During the same period, however, the midwinter surveys do not indicate a decline in the number of wintering mallards in either Arkansas or the Mississippi Flyway. These somewhat contradictory statements can be reconciled by taking into account the problems encountered while conducting the annual midwinter surveys. Simply stated, with fewer wooded wetlands, a higher percentage of mallards must spend more time feeding in open agricultural fields and there they are more readily observed. As a result, a higher percentage of the birds actually present are seen. Although the number of birds present is undoubtedly underestimated, the percentage observed has probably increased because of the loss of wooded wetlands.

The loss of wooded wetlands in the MRAF has been spectacular. What was originally an almost contiguous wetland complex of 24,000,000 acres had been reduced to 11,800,000 acres by 1937. Approximately 6.6 million additional acres were lost by 1978, and an annual loss of 285,000 acres was projected through 1985 (MacDonald et al. 1979). Further, this same report projected that by the year 1995 only 3.9 million acres, or only 16 percent of the original MRAF wetland complex would remain, including the 685,000 acres currently in public ownership.

This conversion of wooded wetland habitat has had a pronounced impact on the feeding habits of wintering mallards. Historically, mallards wintered in the wooded wetlands and utilized the acorns, seeds, and invertebrates found in these flooded forests as their primary food sources. Indeed, they had little other choice. Although optimal feeding sites varied with local flooding conditions, actual foods were available in sufficient amounts. For example, Arner et al. (1963), found seed production of Japanese millet in small wetland forest clearings to be as high as 30 bushels per acre (Bu/A). Low and Bellrose (1944) in a similar study in the Illinois River Valley, reported natural wetland seed production ranging from 14 to 60 Bu/A. Soybean crop residues apparently range from 5 to 10 percent of the yield (Mayeaux et al., 1980). This loss when expressed in bushels per acre ranges from 2.5 to 5 Bu/A. Arner et al.

(1974), also measured invertebrates standing crop of 506, 34, and 385 pounds per acre in the bottomland hardwoods of Mississippi's Noxubee National Wildlife Refuge during the fall, winter, and spring, respectively.

The importance of available natural foods on the wintering grounds and their role in the annual cycle of migratory waterfowl is only now being studied. The majority of research to date concerning mallard population ecology has primarily addressed migration movements and pathways, behavior, and breeding biology (Heitmeyer and Fredrickson, 1981). It has been generally accepted that harvestable populations are dependent on breeding ground conditions and breeding populations (Pospahala et al. 1974), and that the availability of wintering wetlands is not a limiting factor for mallard populations. Also, the past assumption has been made that winter foods are of little or no importance to reproductive success of the breeding grounds. These assumptions and others are now being questioned (Heitmeyer and Fredrickson, 1981).

Recent studies have documented the importance of wintering grounds and migration staging areas to successful mallard nesting. Krapu (1981) determined that early nesting mallards normally arrive on the breeding grounds with sufficient stored lipids to produce the first clutch of eggs. It has also been demonstrated that the first clutch is generally the largest (Dzubin and Gollop, 1972). Finally, Heitmeyer and Fredrickson (1981) demonstrated a positive correlation between mallard age ratios and the abundance and quality of winter wetland habitat.

It would appear that any loss of natural food resources would be replaced by the availability of the thousands of acres of agricultural grain fields within the MRAF and the counties surrounding the study area. However, this is not the case. To be generally attractive to mallards, grain fields must be flooded although in some instances waterfowl will feed in dry soybean and corn fields. Furthermore, although flooded grain is readily available; soybeans, the most frequently grown crop in the Basin, deteriorate rapidly and begin losing their nutrient value after 30 days of inundation (Reineeke, personal communication). Currently, this may be a moot point as economics and farming efficiency are encouraging more and more landowners to till their fields during the fall and thereby effectively prevent access to any waste grain. Where fields are not fall plowed, flood control and drainage activities often prevent annual overbank flooding during the winter season. The high cost of fuels and reduction in underground aquifer levels frequently prohibit artificial flooding to attract waterfowl. In addition, the efficiency of mechanical grain harvesting is steadily improving, grain dryers are permitting earlier harvests and are reducing grain losses from shattering, and improved plant strains are being developed that produce a uniform stand of grain more resistant to lodging and result in less waste during harvest.

Wintering waterfowl, particularly mallards, commonly utilize available agricultural crop residues in the study area. Rice and seeds of grasses associated with rice culture constituted almost 66 percent of the volume of foods eaten by 583 mallards taken in the Delta region around Stuttgart, Arkansas, during the relatively dry 1958-1959 hunting season (Wright 1959). However, during the wetter fall and winter of 1957-58, natural

foods, especially acorns, were consumed at 3 times (35.5 percent in 1957-58 vs. 12.6 percent in 1958-59) the volume compared to 1958-59.

Indirect data suggest winter usage of wetland foods and waste grain may vary among sex and age of mallards. Paired and hen mallards may have different physiological and behavioral needs during mid and late winter (Heitmeyer 1980; Heitmeyer and Fredrickson 1981) and wintering waterfowl differentially select natural wetlands and foods when given a choice (Heitmeyer 1980, Fredrickson 1980). Recent evidence has also suggested that grains may not provide a balanced nutritional diet for waterfowl (Reed 1976, Sugden and Driver 1980).

These studies indicate that migratory waterfowl, particularly mallards, may be dependent on the wooded wetlands in the wintering grounds for successful annual recruitment. Research concerning the little understood relationship between winter foods and breeding success has been lacking and only now is beginning to explore this critical problem. Early results have demonstrated there may indeed be a strong relationship between the availability of wooded wetland wintering habitats, such as exist in the study area, and wood duck and mallard population levels in the flyway (Heitmeyer and Fredrickson, 1981).

The importance of this possible relationship must be considered in light of the alarming and well documented levels of destruction of the wooded wetlands of the MRAF. It is important to remember during the last 25 years, as the acreage of wooded wetlands in the MRAF decreased, so did the breeding ground estimates of mallard populations. This decrease of mallard population occurred in spite of the fact that the vast majority of the acreage cleared was and is devoted to agricultural grain crops, particularly soybeans. The relationship of declining bottomland hardwoods and the concomitant decrease in the mallard and other migratory bird populations (FWS, 1980) can no longer be overlooked.

Four federally listed endangered species, the American alligator, Arctic peregrine falcon, bald eagle, and the fat pocketbook pearly mussel formerly occupied the habitat preservation study area. The range and occurrence of these species have been primarily affected, directly or indirectly, by the reduction in wooded wetland habitats and the modification of aquatic habitat; either direct physical damages to instream habitats or the alteration of historic flood regimens. The American alligator was reduced in numbers in a direct manner by extensive over harvest. Indirect impacts resulting from the reduction of terrestrial and aquatic habitats including increased erosion rates and subsequent water quality degradation affected the fat pocketbook pearly mussel. Similar indirect impacts from the extensive use of pesticides, which commonly reduced eggshell thickness and increased hatching mortality rates, contributed to a decline in both the Arctic peregrine falcon and the bald eagle. A Section 7 Evaluation required by the Endangered Species Act of 1973, as amended, is included as Appendix I.

The historic range of five other endangered species encompassed the study area. These species include the American peregrine falcon, Bachman's warbler, Eastern cougar, ivory-billed woodpecker, and the red wolf.

SECTION IV

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This Section describes and evaluates the physical, environmental, and socio-economic impacts which would occur with implementation of the alternatives identified in Section II. The evaluations used in the selection of the PA are also included. The impacts of each alternative are discussed in relation to five common areas: (1)impacts; (2)unavoidable adverse impacts; (3)mitigation for unavoidable adverse impacts; (4)short-term use vs. long-term productivity; and (5)irreversible and/or irretrievable commitment of resources. Where possible, the discussions include the energy requirements or energy conservation potentials of each detailed alternative. The PA will be discussed first, followed by the remaining alternatives in numerical order.

Implementation of Alternatives 1, 2, 3, 4, or 5, by the FWS; or 6, by the AGF would involve land acquisition to accomplish the waterfowl habitat preservation objective. One must keep in mind the fact that none of the alternatives will provide 100% preservation of the waterfowl habitat base in the study area even with assistance by other agencies, groups, or individuals. Limiting factors relate primarily to availability of funds and willingness of landowners to make their property available to the project. Furthermore, while not a specific habitat preservation alternative, Alternative 7, involving the CE which provides for acquisition of up to 70,000 acres for mitigation of project induced fish and wildlife habitat losses would require additional congressional authorization to acquire all authorized mitigation lands. Implementation of Alternative 7 would also involve major structural alteration of the study area. This action would significantly alter the hydrological cycles, reduce the amount of fish and wildlife habitat, and lower the quality of the remaining bottomland habitat. Implementation of Alternative 8 would primarily involve continued agricultural encroachment into the ten-year floodplain study area. Drainage and flood proofing works would alter hydrologic cycles and significantly reduce the amount of fish and wildlife habitat. Flood damages would also increase under Alternative 8 as a result of increased agricultural clearing. These type impacts and their relationship to the waterfowl habitat preservation objective are discussed in this Section of the EIS.

DISCUSSION OF IMPACTS FOR EACH ALTERNATIVE

Alternative 1, (Preferred Alternative) - Through Combined Fee Title, Easement Acquisition, and Other Means (Donations, Land Exchanges, Management Agreements, etc.), the FWS, AGF, Other Agencies, Groups, and Individuals Propose to Preserve Up to 92,000 Acres of Privately Owned Valuable Waterfowl Habitat Within the 133,000-Acre Ten-Year Floodplain.

Impacts

Physical - Implementation of the PA would result in up to 92,000 acres of the floodplain study area being preserved primarily to benefit migratory waterfowl. This area consists of approximately 72,000 acres of natural bottomland hardwoods and approximately 20,000 acres of marginal lands that were cleared for agriculture that are also important to waterfowl. Implementation of the PA would result in net positive impacts to the physical features of the Basin. Altering the topography of the Basin, through land leveling or conversion of wooded wetlands to agricultural lands, would not occur on lands where an interest is acquired. The retention of natural contours would aid in the revegetation of any marginal and sub-marginal lands acquired. Fee title or easement acquisition would insure present soil fertility through the preservation of vegetative cover and detrital decomposition. Land clearing and the subsequent increased erosion rates would be prevented on these lands. Also, revegetation and/or moist soil management of marginal and sub-marginal lands subject to flooding would decrease erosion and reestablish soil fertility. Waterfowl habitat not protected would still face some threat of land use conversion. Changes of land use on these properties would bring about increased erosion rates on these lands. However, the protection of other lands would offset to some extent the impacts of converting waterfowl habitat not afforded protection to agricultural or other purposes.

Hydrological - The existing flood storage capacity and floodwater retention time of the study area would remain relatively constant due to the continuation of topographical features and revegetation of some marginal and sub-marginal agricultural lands. These actions would also have a positive impact on ground water recharge due to the percolation during periods of overbank flows. However, the present withdrawal rate of ground or surface water would not be appreciably altered. The extent to which lands were preserved through fee title, easement, and other means would prevent future demands on ground or surface water withdrawal to the extent that future agricultural encroachment into the ten-year floodplain is prevented. Expected increases in ground water recharge and the maintenance of surface waters would also provide water for irrigation and other uses outside the acquisition area.

The annual flooding regimen in the study area would be altered to a small degree by implementation of the PA. Preservation of up to 92,000 acres within the ten-year floodplain would improve the current state of stream transition whereby the runoff, sediment discharge, and the capacity of the drainage systems of both the Cache River and Bayou DeView are developing new equilibriums. Floodwater storage in the study area would be preserved and improved to the extent that the hydrologic regime is preserved and protected. The amounts of sediment entering both streams from the highly developed upstream areas would not be altered neither would the existing discharge capacity of the confluence of the White River. The rate at which the current stream transition process has been accelerated by man's intervention would also be reduced. Finally, the major structural modifications that have taken place since the early 1920's would not be adversely impacted.

It is the intent of the participants in the PA to revegetate, implement moist soil management practices, or implement cooperative farming agreements on flood prone marginal and sub-marginal lands which may be obtained. The character of each tract will determine the action to be taken. These management practices would: reduce erosion, reduce demands for ground or instream water, increase flood water storage capacity and retention time, and improve existing water quality and soil fertility. Improving water quality and lowering the turbidity levels of Basin waters would also reduce the eutrophication (aging) process in off-channel oxbow lakes and sloughs. Further, a reduction in existing erosion rates would lessen the amount of pesticide-laden sediments entering waters of the study area.

Biological - Implementation of the PA will preserve and improve the environmental integrity of 92,000 acres within the study area in that the existing wooded wetlands would be maintained and some marginal lands would revert, through natural succession or a revegetation program, to wooded wetlands. As previously stated, the authorized CE channelization project is not acceptable for protection of the natural functioning wetland ecosystem which requires seasonal overflow of the bottomland hardwoods. The FWS has, in the past, proposed a levee floodway alternative for the Basin but it has been rejected by the CE as not being feasible. Such things as clearing, snagging, and removing river channel blockages could be accommodated without adversely affecting the FWS's proposed project. The following discussion will provide the biological impacts of the PA on migratory waterfowl, fisheries, and game and non-game wildlife species in the study area.

Migratory Waterfowl - The importance of wooded wetlands to wintering mallards and resident wood ducks was presented in detail in Section III. Although some questions remain unanswered, recent research efforts have established a positive link between wooded wetlands in the wintering areas and annual waterfowl recruitment. For wood ducks, this link involves natural tree cavities, mast and invertebrates, and the presence of both permanently and seasonally flooded wetlands for nesting sites and seasonal feeding requirements for both young and adult birds. For mallards, the relationship involves adequate natural foods in the form of mast and invertebrates in the wooded wetlands of the wintering areas which are needed for successful annual recruitment at the breeding grounds. The flyway mallard population has declined in recent years.

Implementation of the PA would insure the continuation of a wooded wetland complex in the study area. It would also insure the continuation of seasonal overbank flooding in the wooded wetlands complex and thus, maintain adequate and available feeding and nesting areas. Acquisition of up to approximately 20,000 acres of marginal lands would insure the preservation of temporary resting and feeding areas, as well as allowing for the expansion of natural successional or revegetated habitat. Collectively, these actions would result in a major net positive benefit to migratory waterfowl.

placed into a moist soil management program. The adverse impacts associated with reduced agricultural expansion are offset by positive impacts relating to reduced flood damages.

The tax revenues in Jackson, Monroe, Prairie, and Woodruff Counties would be affected under the PA. On those lands in which easements were acquired, the landowner would be responsible for all taxes and assessments. Thus, the current tax base would be maintained on these lands. There would be a potential negative impact in that the sale of development rights on easements would preclude the possibility of an increased tax valuation resulting from land use conversion. On those lands acquired in fee title, the FWS would make payments to the counties on an annual basis and reappraise those properties every five years under the authority of the Refuge Revenue Sharing Act. The Refuge Revenue Sharing Act does not apply to fee title lands acquired by AGF. As was discussed in Section II and detailed in Table IV-1, the history of payments made to other counties in Arkansas by existing FWS refuges indicates that the Refuge Revenue Sharing Act generally equals or exceeds the existing tax revenues. The net effect of the PA on county revenues would be positive in the case of fee title purchase by the FWS. AGF records indicate that local expenditures by users of WMA lands offset reduced county revenue (Sunderland, personal communication, 1983).

The PA would result in increased tourism and outdoor recreation. Hunting, fishing, and trapping have historically been important recreational activities in the Basin. With the alarming reduction in wooded wetland areas throughout the MRAF, there has been a corresponding decrease in recreational opportunities. By preserving a significant part of Arkansas' natural heritage, the study area's outdoor recreational activities and their associated economic benefits would be promoted. FWS policies would encourage public use opportunities, especially hunting, on all areas acquired in fee title. Compatible wildlife oriented public use opportunities on easement areas will vary according to the owners wishes concerning sale of public use rights. Seasons and bag limits would generally be in accordance with AGF regulations. Some of the other activities include fishing, environmental education, and wildlife observation and photography.

Implementation of the PA would have both positive and negative impacts on the labor force within or near the study area. Instituting a sustained yield timber management program would produce favorable impacts on the labor force associated with the forest products industry. The impacts on the agricultural labor force would be somewhat negative in that further agricultural expansion into a large portion of the existing forested wetlands would be stopped. The CE's 1974 EIS indicated the agricultural labor force was declining at that time and the decline was expected to continue with or without the channelization flood control project. The increased tourism and recreation associated with this waterfowl habitat preservation project would have a positive impact on the associated retail sales and services industries. Biologically trained and other staff members will be needed to administer FWS areas of responsibility.

TABLE IV-1

Refuge Revenue Sharing Act Payments to Counties in Arkansas
1978 - 1982

County	FWS Facility	Acreage	1978 Payments Due	1978 Payments Received	1979 Payments Due	1979 Payments Received	1980 Payments Due	1980 Payments Received	1981 Payments Due	1981 Payments Received	1982 Payments Due	1982 Payments Received
Arkansas	White River NWR	57,363	$ 28,508	$ 14,772	$ 43,022	$ 32,639	$199,950	$199,950	$199,950	$175,245	$199,950	$181,248
	Fish Farm Experimental Station	86	-0-	-0-	900	683	900	900	900	789	900	816
Clay	Corning NFH	137	-0-	-0-	1,219	925	1,219	1,219	1,219	1,068	1,219	1,105
Crittenden	Wapanoca NWR	5,484	30,259	15,680	30,260	22,957	30,260	30,260	39,375	34,510	39,375	35,692
Desha	White River NWR	25,084	9,000	4,633	18,813	14,273	84,210	84,210	84,210	73,805	84,210	76,333
	Fish Farm Experimental Station	213	-0-	-0-	1,598	1,213	1,316	1,316	1,316	1,153	1,316	1,193
Fulton	Mammoth Springs NFH	37	-0-	-0-	585	443	966	966	966	847	966	876
Mississippi	Big Lake NWR	2,160	1,956	1,013	3,042	2,308	6,483	6,483	6,501	5,698	6,480	5,874
Monroe	White River NWR	19,055	11,910	6,172	14,291	10,842	72,488	72,488	72,488	63,532	72,488	65,708
Phillips	White River NWR	10,846	5,307	2,750	8,135	6,171	36,720	36,720	36,720	32,183	36,720	33,285
Pope	Holla Bend NWR	4,968	10,068	5,217	10,068	7,683	10,068	10,068	13,298	11,655	13,298	12,054
Yell	Holla Bend NWR	15	106	55	107	81	107	107	79	69	79	72
	TOTALS	124,548	$ 97,117	$ 50,326	$132,040	$100,173	$444,687	$444,687	457,022	400,554	457,001	414,256

Unavoidable Adverse Impacts

The significant, unavoidable adverse impacts of the PA would be directly related to the acquisition of non-development rights on the wooded wetlands of the study area. The purchases of non-development rights, through either fee title, easement, or other means, would have the unavoidable effect of precluding future agricultural development. This impact is an unavoidable consequence to attaining the numerous beneficial environmental impacts inherent in the objective of waterfowl habitat preservation. Stated another way, the nationally significant migratory waterfowl habitat of the Basin cannot be preserved without adversely impacting on agricultural interests, primarily those associated with the clearing and conversion of wooded wetlands.

Mitigation

The concept of mitigation is fundamental to meeting the objectives and policies of NEPA. It is a concept whereby adverse impacts are to be avoided, prevented, reduced, or compensated wherever feasible. Mitigation is generally associated with biological impacts. However, as the PA would result in significant beneficial impacts to the biological components of the environment, the mitigation features of the PA involve measures to prevent or minimize adverse socio-economic impacts.

Implementation of the PA could result in an adverse impact on county tax revenues; however, it is expected to be minimal. Annual payments to the affected counties would be made according to provisions of the Refuge Revenue Sharing Act on lands acquired by the FWS. As discussed in Section II, the payments that have been made on existing refuges in Arkansas generally exceed the tax revenues that would otherwise be obtained. These additional revenues would be used to offset the reduced payments resulting from fee title acquisitions by the AGF. For example, the presently assessed tax rate for land valued at $700 per acre in the Grubbs and Cotton Plant school districts is $2.24 per acre and $1.58 per acre, respectively. Under the terms of the Refuge Revenue Sharing Act, the payments made to these school districts as a result of FWS acquiring lands in fee title would be 3/4 of one percent of the appraised value of $700 or $5.25 per acre. The Act also requires reappraisals every five years to prevent appraisal inequities.

The Relationship Between Short-Term Use and the Maintenance and Enhancement of Long-Term Productivity

Table IV-2 summarizes the tradeoffs inherent in the PA between short-term use and long-term productivity. The sale of development rights would restrict the land use options of individual landowners in order to preserve the public human resource values associated with the existing cultural, historical, and biological resources. Likewise, further agricultural encroachment into wooded wetlands would be precluded in order to preserve the beneficial values, economic and environmental, inherent in forested wetland ecosystems. Relative to recreational use, a short-term decrease in the area available for private recreation would be traded for the long-term preservation of the existing resource base for both private and public recreation. The net effect of the PA would be to insure the

TABLE IV-2

Summary of Tradeoffs: Short-Term Use vs. Long-Term Productivity
Alternative 1 (Preferred Alternative)

Resource	Short-Term	Long-Term	Tradeoffs	Net Effect Over The Long-Term
Human Resources	The purchase of fee title and easements will result in a direct reduction of freedoms for the individual landowner(s).	The preservation of the natural resources will maintain the aesthetic, cultural, and historical resources of the Basin, thereby enhancing the human resource.	The sale of private ownership rights will be traded off for long-term benefits to the human resources of the Basin.	Improvement
Agriculture/ Economy	1) In the short-term there will be a decrease in developable land for agricultural production.	1) In the long-term there will be a reduction in agricultural flood damages.	1) The decrease in developable land in the flood prone areas will be traded off for future reduction in flood damages.	1) Improvement
	2) Refuge Revenue Sharing payments on fee title purchases by FWS will probably exceed the present tax rate in all four counties.	2) The Refuge Revenue Sharing payments by FWS will probably continue to exceed the present tax rate on developed and undeveloped lands in the counties in the long-term barring major tax increases.	2) In the case of fee title purchases, Refuge Revenue Sharing Act payments by the FWS will be received on a larger scale than private landowner property taxes.	2) Improvement
	3) County tax revenue for undeveloped land acquired under easements would continue at the present rate.	3) Tax revenues for fully developed agricultural land would exceed the tax rate paid by easement holding landowners for undeveloped lands.	3) The short-term preservation of present tax rates on easement lands would be traded off for a long-term potential decline in tax revenue on those lands.	3) Adverse
	4) No Refuge Revenue Sharing payments would be made on lands the AGF acquires in fee title.	4) No Refuge Revenue Sharing payments would be made on lands the AGF acquires in fee title.	4) A decrease in county revenue on these lands would be offset by the preservation of important fish and wildlife habitat.	4) No Change
Recreational Use	There will be a decrease in lands which are available for private outdoor recreation.	Outdoor recreational opportunities will increase for the general public while private recreation will be preserved on a lessor scale.	Portions of the exclusive private recreation will be traded off for use by the general public.	Improvement
Fish and Wildlife Resources	Fish and wildlife resources will receive a high level of protection in the immediate vicinity of fee title and easement acquisition.	The protection, preservation, and enhancement of the fish and wildlife habitat in the ten-year floodplain will result in population increases for some species due to habitat stabilization.	Fish and wildlife resources will be preserved and enhanced at the expense of agricultural development within the highly floodprone areas of the ten-year floodplain.	Improvement

long-term productivity of nationally significant fish and wildlife resources and, in so doing, preserve and increase the public values associated with these resources.

Irreversible and Irretrievable Commitment of Resources

The PA would result in no irreversible or irretrievable commitment of nonrenewable resources. A purpose of the PA is the preservation of the benefits associated with existing renewable resources. As the basic intent is to preserve existing benefits rather than create new benefits of a different nature, the PA would not require an irreversible or irretrievable commitment of resources. From this standpoint, implementation would not require the significant use of energy resources and would promote energy conservation by maintaining the existing natural ecosystem.

Based on the assumption described in Section II, Alternatives Including The Proposed Action, implementation of the PA would not conflict with any known Federal, regional, State, or local land use plans, laws, or directives. Conceptually speaking, flood control in the Basin and the PA are not mutually exclusive.

There are no known commitments or losses to archeological or historical sites. Prior to implementation of any management measures which might affect archeological or historical sites, the FWS would ensure that the necessary surveys were carried out and sites identified would be protected.

Alternative 2 - Combined Fee Title and Easement Acquisition by the FWS of up to 72,000 Acres of Natural Waterfowl Habitat within the Ten-year Floodplain

Impacts

Physical - Implementation of Alternative 2 would reduce and prevent short- and long-term negative impacts to the physical features of the Basin. Altering the topography through land leveling, construction of farm draining systems, or the conversion of wooded wetlands to agricultural lands would not occur on up to 72,000 acres where the FWS would acquire an interest. Further, FWS interest's on those lands would ensure present soil fertility through the preservation of vegetative cover and detrital decomposition. Increased erosion rates associated with changes in land use would be prevented on up to 72,000 acres, thus maintaining current Basin water quality. The threat of continued land use conversion of wooded wetlands in the study area would be eliminated on the lands acquired by the FWS.

Hydrological - The existing flood storage capacity and floodwater retention time would remain constant under this alternative if the entire 72,000 acres were purchased. Ground water recharge at present rates during periods of overbank flows would continue. However, if any of the existing cleared lands are isolated from flood waters by levees or other structures, the rate of ground water recharge in the study area would

decrease. Acquisition of up to 72,000 acres by the FWS in fee and easements would reduce agricultural demands for ground water.

There would be no alteration in the flooding regimen in the study area as a result of the implementation of Alternative 2. The water volume and sediments entering Cache River and Bayou DeView from the highly developed upstream areas would not be altered. The major structural modifications that have taken place since the early 1920's would not be adversely impacted. Existing discharge capacity at the confluence of White River would not be affected. Since there would be no significant land use changes in the study area, floodwater storage and retention time would remain fairly constant. Flood heights at the confluence with the White River would not be altered by FWS acquisition. Furthermore, since runoff and stream sedimentation would not increase as a result of implementing Alternative 2, sediments and lateral runoff in the study area would not be altered. However, if large amounts of the existing 39,000 acres of cleared land are structurally improved to prevent flooding, storage and retention would decrease and flood water velocity would increase. The flooding regimen of the study area would be altered if these actions occur.

Biological- Implementation of Alternative 2 would entail acquisition of up to 72,000 acres of natural wooded wetland habitat within the ten-year floodplain by fee title and easements (see Figure II-2). The biological impacts of Alternative 2 on migratory waterfowl, fisheries, and game and non-game wildlife species in the study area follow.

Migratory Waterfowl - The importance of wooded wetlands to wintering mallards and resident wood ducks was presented in detail in Section III. Although some questions remain unanswered, recent research efforts have established a positive link between wooded wetlands in the wintering areas and annual waterfowl recruitment. For wood ducks this link is well documented and involves natural tree cavities, mast and invertebrates, and the presence of both permanently and seasonally flooded wetlands to satisfy the nesting and seasonal feeding requirements for both young and adult birds. For mallards, the relationship is less well understood but involves the availability of adequate natural foods in the form of mast and invertebrates in the flooded wooded wetlands of the wintering areas for successful annual recruitment on the breeding grounds.

Implementation of Alternative 2 would ensure the preservation of existing wooded wetlands in the study area which provides the necessary natural feeding and nesting areas for current waterfowl populations. Seasonal overbank flooding on these wooded wetlands would also be preserved. This alternative would insure that the study area's benefits to migratory waterfowl populations would be partially maintained. However, the temporary resting and feeding areas on the marginal lands would not be protected under Alternative 2. Acquisition of some form of interest in the remaining wooded wetlands in the study area would halt the current trend of decreasing waterfowl usage in the area.

Fisheries - Preservation of the wooded wetlands in the study area and the associated overbank flooding cycle is essential to maintaining current fishery resources. Continued overbank flooding on up to 72,000 acres of

wooded wetlands would provide suitable fish spawning and nursery area
Since there would be no expected declines in Basin water quality, spa
success would remain at its current level. The present fishery resour
in the study area would be maintained.

Wildlife Game and Non-Game Species - Preservation of the study area's
wooded wetlands and the continuation of overbank flooding would preser
the habitat base necessary to maintain current wildlife game species
populations. Wildlife management practices to be implemented under
Alternative 2 would improve wildlife game and non-game species
populations.

Socio-Economic - Implementation of Alternative 2 would result in both
positive and negative socio-economic impacts. Preservation of the
existing forest resource base would have a favorable impact on the fores
products industry by maintaining harvestable timber stands. Timber
management practices on areas acquired in fee title would provide for
sustained yield timber harvests as a means of wildlife management. Timbe
sales would be accomplished through a competitive bidding process. On
easement areas, application of established timber management practices
that are consistent with maintaining or restoring the waterfowl values
would enable landowners to maximize economic returns. Basic easement
restrictions would enable the landowner to pursue any type forest
management; however, the landowner could not permanently drain, fill, or
convert easement properties to agricultural production, industrial
development or monocultural forest through artificial regeneration.

Alternative 2 would reduce future flood damages in that agricultural
expansion into the wooded wetlands of the study area would be stopped.
Protection of the wooded wetlands would preserve and maintain natural
floodplain values and prevent flood susceptible land uses. Flood damages
to existing cleared lands would continue at the present frequency.

Acquisition of wooded wetlands would result in an adverse impact on future
agricultural development interests in that they could not convert the
wooded wetlands in the study area to agricultural land. Under fee title
or easement acquisition, the FWS would purchase the right to prohibit the
conversion of forested wetlands to agricultural production. The existing
agricultural lands would continue to be subjected to flood damages.

This alternative could have an adverse impact on tax revenues in Jackson,
Monroe, Prairie, and Woodruff Counties. On those lands where easements
were acquired, the individual landowner would be responsible for paying
all taxes and assessments. The current tax base would be maintained on
easement lands. There would be a potential negative impact in that the
sale of development rights could preclude the possibility of an increased
tax valuation resulting from land use conversion. On those lands acquired
in fee title, the FWS would make payments to the counties on an annual
basis and reappraise those properties every five years under the authority
of the Refuge Revenue Sharing Act.

The PA, by preserving up to 72,000 acres of wooded wetlands, would provide
for maintenance and improvement of economic benefits associated with
tourism and outdoor recreation. Hunting, fishing, and trapping have

historically been important activities in the study area. FWS policies would encourage appropriate public use activities on all areas acquired in fee title with special emphasis on waterfowl hunting. Public hunting opportunities would also be available on easement areas where this right is acquired. Seasons and bag limits would generally be in accordance with established AGF regulations.

Implementation of Alternative 2 would have both positive and negative impacts on the labor force in and adjacent to the study area. Maintaining up to 72,000 acres of wooded wetlands and instituting a sustained yield timber management plan on portions of that acreage would benefit the labor force associated with the forest products industry. This would not be the case with the agricultural labor force in that agricultural expansion into the forested wetlands of the study would be significantly reduced. The increased tourism and recreation associated with establishment of the NWR would benefit the associated retail sales and services industries. A limited number of employment opportunities would be created by establishing the NWR.

Unavoidable Adverse Impacts

The significant, unavoidable adverse impacts of Alternative 2 would be directly related to the acquisition of non-development rights on up to 72,000 acres of wooded wetlands within the study area. The purchase of non-development rights, through either fee title or easement, would have the unavoidable effect of precluding future agricultural development in this area. This impact is an unavoidable consequence of preserving the internationally important waterfowl habitat. The acquisition of up to 72,000 acres in the Basin cannot be accomplished without adverse impacts on agricultural development interests associated with the clearing and conversion of wooded wetlands. Economic losses associated with flooding will continue to occur on existing cleared land at the same frequency as now exists.

Mitigation

Refer to the Mitigation section of the PA.

The Relationship Between Short-Term Use and the Maintenance and Enhancement of Long-Term Productivity

Table IV-3 summarizes the tradeoffs between short-term and long-term productivity inherent with Alternative 2. Acquisition of non-development rights would restrict the land use options of individual landowners but would preserve the public human resource values associated with the existing cultural, historical, and biological resources. Likewise, further agricultural encroachment would be precluded in order to preserve the beneficial values, economic and environmental, associated with a forested wetland ecosystem. Relative to recreational use, a short-term decrease in the area available for private recreation would be foregone for the long-term preservation of up to 72,000 acres available for public recreation. The net effect of Alternative 2 would be to ensure the long-term productivity of fish and wildlife resources on up to 72,000

TABLE IV-3

Summary of Tradeoffs: Short-Term Use vs. Long-Term Productivity
Alternative No. 2

Resource	Short-Term	Long-Term	Tradeoffs	Net Effect Over The Long-Term
Human Resources	The purchase of fee title and easements will result in a direct reduction of freedoms from the individual landowner(s).	The preservation of the natural resources will maintain the aesthetic, cultural, and historical resources of the Basin, thereby enhancing the human resource.	The sale of private ownership rights will be traded off for long-term benefits to the human resources of the Basin.	Improvement
Agriculture/ Economy	1) In the short-term there will be a decrease in developable land for agricultural production.	1) In the long-term agricultural flood damages will be prevented on 72,000 acres.	1) The decrease in developable land in the flood prone areas will be traded off for future prevention in flood damages on 72,000 acres.	1) Improvement
	2) Refuge Revenus Sharing payments on fee title puchases will exceed the present tax rate on those lands in all four counties.	2) The Refuge Revenue Sharing payments will continue to exceed the present tax rate on developed and undeveloped lands in the long-term barring major tax increase.	2) In the case of fee title purchases, Revenue Sharing Act payments will be received on a larger scale than private landowner property taxes.	2) Improvement
	3) County tax revenue for undeveloped land acquired under easements would continue at the present rate.	3) Tax revenues for fully developed agricultural land would exceed the tax rate paid by easement holding landowners for undeveloped lands.	3) The short-term preservation of present tax rates on easement lands would be traded off for a long-term potential decline in tax revenue on those lands.	3) Adverse
Recreational Use	There will be a decrease in lands which are available for private outdoor recreation.	Outdoor recreational opportunities will increase for the general public while private recreation will be preserved on a lessor scale.	Portions of the exclusive private recreation will be traded off for use by the general public.	Improvement
Fish and Wildlife Resources	Fish and wildlife resources will receive a high level of protection in the immediate vicinity of fee title and easement acquisition.	The protection, preservation, and enhancement of the forested fish and wildlife habitat in the ten-year floodplain will result in wildlife population stabilization.	Fish and wildlife resources will be preserved and enhanced at the expense of agricultural development within the highly flood prone areas of the ten-year floodplain.	Improvement

acres of wooded wetlands and, in so doing, preserve the public values associated with those resources.

Irreversible and Irretrievable Commitment of Resources

Alternative 2 would result in no irreversible or irretrievable commitment of nonrenewable resources. The preservation of the benefits associated with existing renewable resources on up to 72,000 acres of bottomland hardwood forest is inherent with the purpose of this alternative. From this standpoint, implementation would not require the significant use of energy resources and would promote energy conservation by maintaining the existing natural system.

Implementation of Alternative 2 would not conflict with any known Federal, regional, State, or local land use plans, laws, or directives. Further, this alternative is in compliance with all FWS land acquisition policies. No known losses of archeological or historical sites would occur within the 72,000-acre acquisition area. Prior to the implementation of any management measures which might affect or damage archeological or historical sites, the FWS would ensure that necessary surveys were performed. Should any unknown sites be located, all measures necessary to protect or avoid those sites would be carried out.

Alternative 3 - Combined Fee Title and Easement Acquisition by the FWS of up to 92,000 Acres of Valuable Waterfowl Habitat within the Ten-year Floodplain

Impacts

The impacts of this alternative are identical to the impacts of the PA, with one exception. Since the FWS would be the only acquisition agency, the affected counties would receive Refuge Revenue Sharing payments on all fee title lands purchased under this alternative.

Physical - See Section IV, PA.

Hydrological - See Section IV, PA.

Biological - See Section IV, PA.

Socio-Economic - See Section IV, PA.

Unavoidable Adverse Impacts - See Section IV, PA.

Mitigation - See Section IV, PA.

The Relationship Between Short-Term Use and the Maintenance and Enhancement of Long-Term Productivity

See Section IV, PA; Table IV-2.

Irreversible and Irretrievable Commitment of Resources

See Section IV, PA.

Alternative 4 - Easement Acquisition by the FWS of up to 72,000 Acres of Natural Waterfowl Habitat within the Ten-year FloodplainImpacts

Alternative 4 is identical to Alternative 2 except that easements would be the only method of acquisition employed by the FWS. As a result of the easement only approach to acquisition, no payments under the Refuge Revenue Sharing Act would be made to any of the affected counties.

Physical - See Section IV, Alternative 2.

Hydrological - See Section IV, Alternative 2.

Biological - See Section IV, Alternative 2.

Socio-Economic - See Section IV, Alternative 2.

Unavoidable Adverse Impacts - See Section IV of Alternative 2.

Mitigation - See Section IV, Alternative 2.

The Relationship Between Short-Term Use and the Maintenance and Enhancement of Long-Term Productivity

See Section IV, Alternative 2; Table IV-3.

Irreversible and Irretrievable Commitment of Resources

See Section IV, Alternative 2.

Alternative 5 - Fee Title Acquisition of the FWS of up to 92,000 Acres of Valuable Waterfowl Habitat within the Ten-Year Floodplain

Impacts

The impacts of this Alternative are identical to the impacts of the PA with two exceptions: (1) the FWS would be the sole acquisition agency; and (2) fee title purchase of lands would be the only method of acquisition utilized. With the FWS as the sole acquisition agency and fee title as the only method of acquisition, Refuge Revenue Sharing Act payments would be made on all purchased properties in the affected counties.

Physical - See Section IV, PA.

Hydrological - See Section IV, PA.

Biological - See Section IV, PA.

Socio-Economic - See Section IV, PA.

Unavoidable Adverse Impacts - See Section IV, PA.

Mitigation - See Section IV, PA.

The Relationship Between Short-Term Use and the Maintenance and Enhancement of Long-Term Productivity

See Section IV, PA; Table IV-1.

Irreversible and Irretrievable Commitment of Resources

See Section IV, PA.

Alternative 6 - Fee Title Acquisition by the AGF of up to 92,000 Acres of Valuable Waterfowl Habitat within the Ten-year Floodplain

Impacts

The impacts of this alternative are identical to those of the PA except: (1) the AGF would be the sole acquisition agency; (2)fee title would be the only method of acquisition; and, (3)no Refuge Revenue Sharing Act payments would be made to any of the affected counties. Funds generated by user expenditures on WMA lands would offset the loss of revenue to counties.

Physical - See Section IV, PA.

Hydrological - See Section IV, PA.

Biological - See Section IV, PA.

Socio-Economic - See Section IV, PA.

Unavoidable Adverse Impacts - See Section IV, PA.

Mitigation - See Section IV, PA.

The Relationship Between Short-Term Use and the Maintenance and Enhancement of Long-Term Productivity

See Section IV, PA; Table IV-2.

Irreversible and Irretrievable Commitment of Resources

See Section IV, PA.

Alternative 7 - Combined Fee Title and Easement Acquisition of Not More than 70,000 Acres by the U.S. Army Corps of Engineers, as Mitigation for Construction of the Authorized Cache River Basin Flood Control, Channelization, Project

A Final EIS on the Cache River Basin Project was prepared by the CE in June 1974 and sent to the Council on Environmental Quality in November 1974. The adequacy of the document was upheld by the 8th Circuit Court of

Appeals on October 25, 1977. Two hundred copies were published and the document is available for review in the CE's Memphis District Office; FWS and CE offices in Vicksburg, Mississippi, and Washington, D.C.; and various State agencies in Arkansas that are part of the A-95 clearinghouse process. The interested reader is directed to this document for an indepth review of the authorized project. The following FWS discussion summarizes the impacts of the authorized project as they relate to the purposes of waterfowl habitat preservation.

Implementation of Alternative 7 requires construction of a major Federal flood control, channelization, project throughout the entire Cache River Basin. Directly or indirectly, 156 miles of unchannelized natural reaches of the Cache River below Highway 18 and Bayou DeView below Highway 64, the habitat preservation study area, would be altered. Several miles would be converted into large straight river channels with spoil piles replacing the natural riparian stream banks. Approximately 9,200 acres of wooded wetlands would be destroyed and an additional 44,500 acres of wooded wetlands and terrace hardwoods would be destroyed or substantially modified (CE, 1978). Also, 5,695 acres of existing agricultural land would be eliminated from production through project rights-of-way requirements (CE, 1978), and 1,000 acres of agricultural lands would be purchased for other project purposes (CE, 1976).

Impacts

Physical - Under this alternative, 232 miles of the Cache River and Bayou DeView would be channelized from the mouth to the headwaters. This activity would include direct or indirect alteration or channelization of 156 miles of natural stream reaches in the middle and lower Basin. The placement of the excavated spoil would alter the topography of specific spoil disposal sites. The agricultural intensification which would occur as a result of project construction would alter the natural contour of the land through land leveling and on-the-farm ditching. The soils of the Basin would be adversely affected in that project construction and maintenance activities and the project-induced land clearing would accelerate the current rates of erosion in the Basin. Further, land clearing would reduce the soil organic rebuilding capability.

Hydrological - Ground water resources would be adversely affected by the construction of the authorized project. Noticeable affects would include: (1) lowered water table in the general vicinity of the deepened channel reaches; (2) reduced percolation recharge of the ground water resources due to decreases in occurrence and duration of overbank flooding; and (3)increased demands placed on the ground water resources. The lowering of the water table in the vicinity of the channel will decrease the soil moisture in these areas and to some extent affect hardwood radial growth and row crop production. This dewatering could also lead to soil compaction and to lowered agricultural productivity.

Ground water supplies in much of the Basin are currently declining, mainly from intensive pumping for rice irrigation. As a result, underground water levels in wells west of Crowleys Ridge in parts of Craighead, Cross, and Poinsett Counties are declining about two feet per year. Projecting the 1978 pumping rate of 1,460,000 acre-feet per year, the pumping rate

would have to be reduced by about 110,000 acre-feet per year by 1990 to sustain sufficient aquifer saturation for water needs through 2000 in all parts of Craighead, Cross, and Poinsett Counties west of Crowleys Ridge (U.S.G.S., 1981). Planting additional acreages of rice or other crops requiring irrigation will further aggravate this already critical situation.

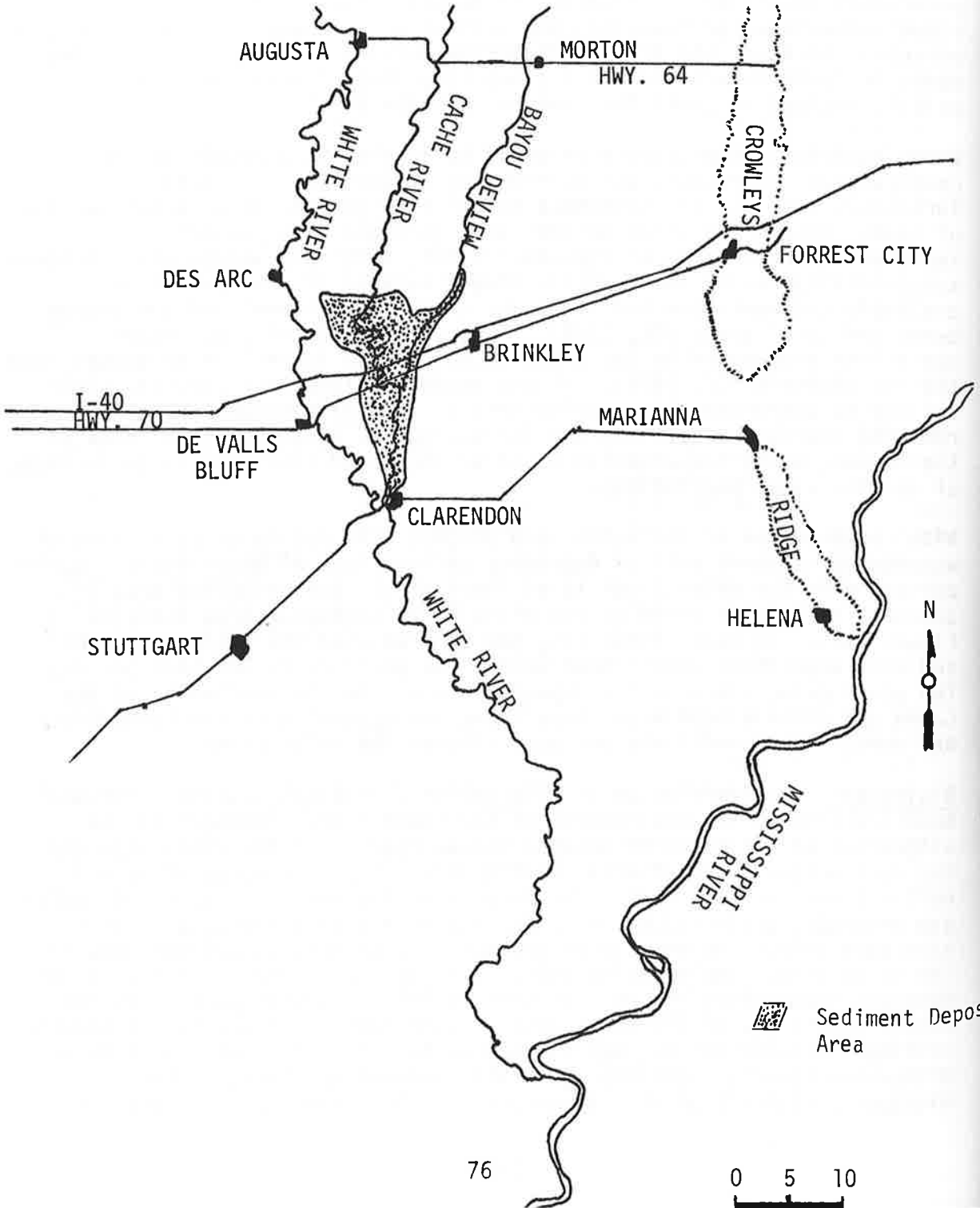
Surface waters would also be affected by project construction. Natural lakes would be isolated from frequently occurring overbank flows, and normal in-stream low flows would drop to levels considerably lower than preproject conditions. Isolation of natural lakes would prevent annual flood pulsations (or flushing) and artificially enhance the eutrophication process. In turn, the present filtering actions of these isolated lakes would be foregone and indications are they would likely turn into pollution traps or sinks for chemically-laden silts.

Water quality in the study area would be lowered as a result of project construction, operation, and maintenance activities (CE, 1974). Turbidity, that is, all suspended matter that interferes with the passage of light through the water column, will increase with project implementation for several reasons. First, turbidity values will increase substantially during construction stages because of new sources of available sediment--the bed and banks of the new channel and the channel berms and spoil areas (CE, 1974). Secondly, new farming and other operations encouraged by the project, will cause topsoil to be washed into the new channels (CE, 1974). As the wooded wetlands are cleared, their ability to store and remove pollutants will be eliminated. Further, by removing overbank vegetation and increasing the cross sectional area of the stream, water temperatures would be increased resulting in an increase of aquatic algal populations.

With construction of the authorized project, the points of deposition of waterborne sediment will be dependent on the stage of White River. During periods when the White River is at flood stage, the principle area of sediment deposition would be the White River backwater area depicted in Figure IV-1. In their final EIS, the CE predicted the maximum rate of sediment deposition under these conditions would be 22,000 tons per day. The other principle area for deposition would be the confluence of the Cache and White Rivers when flood flows are occurring on the Cache River and normal flow conditions are occurring on the White River.

Biological - Implementation of Alternative 7 dictates massive structural modifications to the environment of the study area. Foremost is the alteration of 156 miles of natural stream reaches in the study area and the destruction or substantial modification of 53,700 acres of wooded wetlands and terrace lands. The purpose of the alternative, flood control and drainage, would reduce the frequency of historic overbank flows and adversely affect the biological productivity of most wooded wetlands in the study area. Implementing authorities also provided for fee title or easement acquisition of not less than 30,000 acres with provisions for public access and 40,000 acres with private control of access. A monetary ceiling of $7,000,000 was established to fulfill this fish and wildlife mitigation figure; a ceiling which will prevent enactment of the mitigatory features of this alternative, unless that ceiling level is

Figure IV-1. Area of Predicted Sediment Deposition



raised. Additionally, 14 bendway cutoffs totaling 448 acres of permanent water would be partially developed to mitigate fishery losses.

As previously stated, the authorized CE channelization project is not acceptable for protection of the natural functioning wetland ecosystem which requires seasonal overflow of the bottomland hardwoods. The FWS has, in the past, proposed a levee floodway alternative for the Basin but it has been rejected by the CE as not being feasible. Such things as clearing, snagging, and removing river channel blockages could be accommodated without adversely affecting the FWS's proposed project.

Migratory Waterfowl - Primarily as a result of direct habitat destruction, migratory waterfowl populations in the study area will decline. Secondary adverse impacts resulting from alterations to the historic water regimen will also be evidenced. These impacts will directly affect migratory and resident waterfowl due to losses of wooded wetland nesting and feeding areas as well as declines in food availability. As the frequency of overbank flows declines, mast production will decrease. The reduction in acreage of permanently or seasonally inundated wetlands will also result in the decrease of important aquatic invertebrate waterfowl foods. Collectively, these reductions in wooded wetland habitats have forced many species of waterfowl to rely on agricultural waste grains for food. Other species, such as wood ducks, are so specifically dependent on wooded wetlands that losses of this habitat will directly reduce wood duck numbers in the study area.

The mobile and opportunistic mallard has been able to partially offset the loss of wooded wetlands through increased utilization of available waste grains. As a result of increasingly more efficient grain harvest, reduction in acreages of flooded agricultural fields during the wintering period, more widespread practice of fall plowing, and the rapid deterioration of inundated soybeans, dependence on waste grain has proved to be a poor substitute for natural wetland waterfowl foods. As a result, breeding mallard populations in the Mississippi Flyway have declined almost 24 percent since 1958. The loss of wooded wetlands and the decrease in winter water resulting from implementation of Alternative 7 will accelerate this decline and result in net adverse impacts to resident and migratory waterfowl in the study area.

Fisheries - The fishery resources of the study area would be adversely affected by the construction of the authorized project. As a result of widening and straightening the stream, the project will eliminate almost all cover and habitat diversity now present in natural stream reaches. Also, the project's purpose of flood control will eliminate most spawning opportunities due to decreased occurrences of overbank flows. Additionally, water temperature increases will occur with the removal of riparian vegetation and the widening of the natural stream. The combined result of these activities will result in reduction of up to 90 percent of the numbers and weights of game fish and a reduction of 85 percent of the standing crop. Finally, the planned operation and maintenance of project channels will increase sediment loads; thus, there will be virtually no recovery of the stream fishery. As a result of these adverse impacts, implementation of Alternative 7 will have net adverse impacts to the study area's fishery resources.

Wildlife Game Species - As stated in the CE's 1974 EIS for the authorized project, practically all wildlife game species, birds and mammals, will experience population decreases as a result of the loss or substantial modification of bottomland hardwood habitat. Where the woodlands are cleared and converted to other land uses, game species population losses will be at least directly proportional to habitat losses. On those wooded wetlands where historic overbank flows are reduced in frequency, most wildlife game species will be reduced in numbers due to a reduction in biological productivity.

Wildlife Non-Game Species - Due to the presence of all age classes of both bottomland hardwood and wooded swamp wetlands, the annual winter and spring overbank flooding cycle followed by mid-summer and fall dry cycles, and its location relative to migration rates, the Cache River is utilized annually by at least 268 species of birds including the bald eagle, golden eagle, and the osprey. Some 65 species of herptiles have been identified, as have 59 species of mammals. As was the case with wildlife game species, the CE's 1974 EIS also projects population decreases of non-game birds and mammals as a result of loss or substantial modification of bottomland hardwood habitats.

Socio-Economic - Implementation of Alternative 7 would have both positive and negative impacts--positive impacts to the agricultural segment of the economy and negative impacts to the forest products industry, and fish and wildlife resources and their utilization. These impacts will be the direct result of the conversion of wooded wetlands to agricultural lands, and the reduction of frequently occurring overbank flows on wooded wetlands and agricultural lands located at lower floodplain elevations. It is noted, however, that when overbank floods do occur, the economic losses will be considerably more severe than without project conditions and damages to public and private properties will be of a much greater magnitude than previously experienced. This is due to expansion of agricultural practices outside the three mitigation areas.

Recognizing the data are several years old, the reader is directed to the CE's 1974 EIS for a critical review of the socio-economic impacts of the authorized project. The majority of the changes in impacts that have occurred since publication of the EIS would likely be in degree rather than in substance. As will be discussed, changes from the recommended mitigatory measures for adverse impacts resulting from project-caused damages to fish and wildlife and related recreational resources that were present in the 1974 EIS are substantial. As such, they will be treated in depth under the heading Mitigation.

Unavoidable Adverse Impacts

Under Alternative 7, there will be unavoidable impacts to the physical, biological, and socio-economic components of the study area in the Basin. These impacts will be a direct result of project construction, operation and maintenance, and mitigation. With the exception of project mitigation, which will be discussed elsewhere under a separate heading, all other impacts have been previously discussed in detail. As such, impacts are only highlighted below.

Massive channelization and the resultant spoil disposal will directly alter the existing physical features of the study area. These actions will include land clearing, land leveling, and on-the-farm drainage works by the private sector. In turn, the biological component of the study area will experience a decrease in the existing habitat base for both terrestrial and aquatic species. Animal population declines are guaranteed. With these declines, the closely associated tourism and recreational opportunities dependent on fish and wildlife resources and their utilization will also decline. The forest products industry will be adversely affected by the loss of stumpage as private landowners convert wooded wetlands to agricultural lands. Finally, the historical resources, both known and unidentified, will undergo disruption and alteration from private landowner activities associated with or induced by the authorized project.

Mitigation

Included as part of the authorized project are certain measures that would mitigate for project damages to fish and wildlife resources. The concept of mitigation, which is fundamental to meeting NEPA objectives, applies to the authorized project and will help reduce adverse biological impacts. Since most of the adverse biological impacts would occur in the study area, the authorizations, if implemented, would not make a net positive contribution to the environmental quality of a large part of the Basin.

The authorized mitigation "plan" for the Basin flood control (channelization) project is based on Section 99 of the Water Resources Development Act of 1974 and Section 204 of the Flood Control Act of 1965. Collectively, these two Acts contain provisions for:

1. Acquisition by fee title or easement of not more than 70,000 acres of land for fish and wildlife management, recreation, and environmental purposes, of which not less than 30,000 acres shall be available for public use;

2. Construction of water control structures on about 14 major bendway cutoffs for fishery management; and,

3. Smoothing and shaping of spoil piles and the subsequent establishment of vegetation.

The most important of these authorized mitigatory features is the acquisition by fee title or easement of not more than 70,000 acres for fish and wildlife management, recreation, and recreational purposes. Virtually all terrestrial mitigatory benefits resulting from implementation of the authorized project depend on this feature. Included, however, in the authorizing document is a monetary ceiling of $7,000,000. At the present time, 7,959 acres have been acquired in fee title at a cost in excess of $3,000,000. This indicates the authorized mitigation plan cannot be implemented without additional Congressional appropriation. Since implementation of the entire authorized plan does not make a net positive impact on the environmental quality of the habitat preservation study area or the goal of habitat preservation, certainly

implementation of only a part of the authorized mitigation plan would do little to lessen the impact of intensive agricultural development.

The Relationship Between Short-Term Use and the Maintenance and Enhancement of Long-Term Productivity

Periodic flooding, characteristic of the study area, subjects agricultural lands and associated improvements thereon to losses. These losses are the result of indiscriminate encroachment and development inside the ten-year floodplain. The maintenance and enhancement of the agricultural lands so affected requires flood control for a continuation of long-term productivity. Implementation of Alternative 7 would aid and protect this existing agricultural base in the study area and promote the expansion of additional marginal operations. Private property owners, capitalizing on the reduced frequency of overbank flooding, would expand and intensify agricultural production. This expansion is possible through changes in land use and reduction of flooding on existing cleared land within the base floodplain. Wooded wetlands in the study area would, therefore, be drained, cleared, and converted to row crop agricultural lands. Additional wooded wetlands in the study area would be destroyed for project rights-of-way.

The existing native plant and animal life along with the future land uses will be foregone on the land devoted to spoil piles and the artificial channel that replaces the natural stream. The character of much of the study area will undergo a complete change from that of a wooded wetland forest with its indigenous animal life, to an area of intensive agricultural production. Aquatic resources will also be adversely impacted by the habitat destruction associated with massive channelization of the natural stream, increased siltation and turbidity, increased levels of pesticides, increased water temperatures, and reduced water quality.

The adverse impacts to the existing natural resources represent a sacrifice or tradeoff of the long-term productivity of renewable natural resources for short-term agricultural uses. To accomplish this tradeoff, in excess of $166,231,000 must be expended. An additional $627,000 will have to be expended annually to maintain the construction project. Table IV-4 summarizes the full range of tradeoffs between the short-term use and long-term productivity inherent in Alternative 7.

Irreversible and Irretrievable Commitment of Resources

Those areas dedicated to the channel enlargement will experience irretrievable and irreversible commitments of land and related wooded as well as wetland and fish and wildlife products for a period extending over at least the economic life of the project; i.e., fifty years. In all probability, this change will become a permanent situation and will not return to the natural condition. Similarly, the conversion of wooded wetlands to agricultural lands resulting from the implementation of Alternative 7 is also expected to represent irreversible and irretrievable commitments of natural resources. Fish and wildlife resources destroyed from spoil disposal and access areas are considered irreversible since periodic operation and maintenance requirements will, in all likelihood, prevent establishment of more than early successional vegetation. Energy