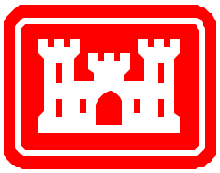

US Army Corps
of Engineers®
Memphis District

SUMMARY REPORT

OF THE
PRELIMINARY DRAFT
WHITE RIVER NAVIGATION
GENERAL REEVALUATION
REPORT

April 2003

WHITE RIVER NAVIGATION IMPROVEMENT PROJECT
SUMMARY REPORT

ABSTRACT

This Summary Report provides enough information for the Arkansas Waterways Commission (AWC; the project sponsor) to determine if there is sufficient interest in pursuing a project. The project described in this Summary Report is for navigation improvement along the Lower White River in Arkansas**.** The Summary Report is based on a preliminary draft General Reevaluation Report (GRR). To comply with WRDA 1996 and current planning and environmental policies, the project was studied in terms of examining alternatives with a view toward the Federal objectives of the National Economic Development (NED) Plan and the National Ecosystem Restoration (NER) Plan. The NED Plan's focus was on achieving the goal of 95% navigation availability from River Mile 10 to River Mile 254 of the White River. The Corps team worked under planning guidance offered by the Corps' Planning Guidance Notebook (USACE 2000).

For the White River Navigation Improvement Project, we have developed proposed recommended plans for the NED and NER. Either plan or both, combined, might be implemented, although the NER Plan requires Congressional authorization. This report presents the conclusions of the proposed NED and NER Plans. The following table summarizes Benefit to Cost (B/C) Ratios for the study. Note that NER Plans are not evaluated on B/C Ratios. Instead, they are evaluated for environmental benefits which for this study relate to measurements for fisheries annual average habitat units, general wildlife average habitat units, and waterfowl duck-use-day units.

First Costs and Benefit to Cost Ratios

Item	Non-Federal	Federal	Total	B/C Ratio
NED	$5,393,600	$24,894,400	$30,834,000	1.16
NER	3,107,311	453,645	3,560,956	**N/A**
Totals:	$ 9,046,911	$ 25,348,045	$34,394,956	

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PURPOSE

This Summary Report is based on a preliminary draft General Reevaluation Report (GRR). It *synthesizes* information from analyses associated with the White River Navigation Improvement Project (WRNIP). The report provides enough detailed information for the Arkansas Waterways Commission (AWC; the project sponsor) to determine if there is still continued interest in pursuing a project

REPORT BACKGROUND

The WRNIP is a reevaluation study of a navigation improvement project formally termed "White River Navigation to Batesville, Arkansas" (USACE-MVM 1979a,b,c). The WRNIP only addresses the portion of the White River from the city of Newport downstream to River Mile (RM) 10 joining the McClellan-Kerr Arkansas River Navigation System. This report's statements specific to environmental resources are provisional because the National Environmental Policy Act (NEPA) planning process is not finalized. Finally, USACE's planning regulations allow for the development of a recreation plan, as part of the NED Plan. This recreation plan allows for the cost-shared construction of recreation features in a project area where needs are unmet.

SCHEDULE OF STUDY ACTIVITIES

Once the AWC agrees with this report's conclusions, the U.S. Army Corps of Engineer, Memphis District (USACE-MVM) would complete the preparation of the draft GRR and the draft Supplemental Environmental Impact Statement (SEIS). The USACE Headquarters, Washington D.C., would review these reports. Upon completion of the USACE review (and revisions, if any, to these reports), the draft GRR and draft SEIS would be circulated for public review under provisions of NEPA. A state-issued water quality certification would be part of this final process. A schedule for development of plans and specifications, and construction, would be prepared after the USACE produces a Record of Decision.

AUTHORITY

Following a 1967 study resolution and recommendations in1979, the original project authorization was under the Water Resources and Development Act (WRDA) of 1986 (Public Law 99-662-Nov. 17, 1986; 100 Stat. 4139) reads as follows:

White River Navigation to Batesville, Arkansas

(1) The project for navigation, White River Navigation to Batesville, Arkansas: Report of the Chief of Engineers, dated December 23, 1981, at a total cost of $29,300,000, with an estimated first Federal cost of $20,500,000 and an estimated first non-Federal cost of $8,800,000, except that the project shall include 1,865 acres of habitat mitigation lands. The project shall include modifications (A) for additional measures that the Secretary determines to be necessary and appropriate to mitigate the adverse effects of the project on the Fat Pocketbook Pearly Mussel, and (B) for weirs in tributary areas that the Secretary determines to be necessary and appropriate to benefit aquatic habitat. The Secretary shall deposit no spoil from such project onto lands of the White River National Wildlife Refuge without the approval of the Secretary of the Interior and without mitigating fully the adverse impacts of such spoil. The Secretary, in consultation with the Fish and Wildlife Service, shall evaluate the effect of the project on the Fat Pocketbook Pearly Mussel. The Secretary, in consultation with the Fish and Wildlife Service, shall also evaluate the feasibility of including weirs in tributary areas to benefit aquatic habitat and is authorized to include them as he determines appropriate. Not later than one year after the date of enactment of this Act, the Secretary shall transmit to the Committee on Public Works and Transportation of the House of Representatives and the Committee on Environment and Public Works of the Senate a report of such evaluations. Nothing in this paragraph or such report shall be construed to affect the requirements of Public Law 89-669, as amended.

EXISTING CONDITIONS

Existing Physical and Biological Conditions

The Lower White River is essentially that portion of the White River in Arkansas where it drops from the Ozark Mountain Plateau to flow onto the Coastal Plain (Mississippi Embayment, Fenneman 1938). The upper end of the Lower White River thus is associated with the location of Batesville. For purposes of this study, the USACE-MVM focused on a more restricted portion of the river, with the upper end of the project being at Newport, about 5 miles downstream from the Black River tributary junction with the White River. The lower end is at the Arkansas Post Canal (RM 10) although at this point the confluence with the Arkansas and Mississippi Rivers is a relatively short distance away. Presently there are areas in this lower end of the WRNIP area where erosion problems exist both on riverbanks and in tributaries (i.e. head-cutting). In the upper portions of the WRNIP area, other kinds of erosion and instability problems appear to relate to landforms cleared of vegetation (e.g. agricultural fields at river's edge). Overall, the physical and biological resources of the WRNIP are complex, dynamic, and

poorly understood. For example, despite a series of field efforts various parties have conducted over many years, a scientific inventory of mussel populations is incomplete.

Existing Socioeconomic Conditions

Human Resources. The White River Basin is largely agrarian and over 70 percent of the population was classified as farm or rural non-farm in the 1970 census. Human resource needs and availabilities reflect this dependence on agriculture. Although the region is expected to retain a substantial rural population, it is anticipated that continued migration to urban centers would decrease the disparity between the local and national population distribution trends.

Population in the 8 county economic base study area (US Census Bureau 2002:222,274) increased 3.35 percent while population in the state increased 2.96 percent between 1997 and 2000. The upward trend in population in the study area indicated by the 2000 Census in expected to continue in the future.

The area will probably continue to experience a small out-migration of its population; however, the projected growth and diversification of the regional economy should expand employment opportunities and enable much of the increased labor force to remain. Educational levels attained are lower than the state average or nation, but the levels attained are expected to approach the national average in the future. Current enrollment compares favorably with the national averages.

Development and Economy. Land use is primarily agricultural with over 60 percent of the land area classified as farmland. Thirty-six percent of the total area is classified as cropland with the remaining farmland classified as range, pasture, and wooded land. Pasturelands and rangelands are more abundant in the northern portion than in the southern portion of the study area. The division between croplands and woodlands has no definite pattern with forests occurring in both northern and southern portions.

About 3 percent of the total area is classified as urban and built-up. In 1940 there were about 1.8 million acres of bottomland hardwoods in the study area, compared to 800,000 acres in 1970. Clearing of bottomland hardwoods for agricultural or other uses may continue, but it is difficult to predict precise amounts and nature of future losses. Also, the U.S. Department of Agriculture's Wetlands Reserve Program and Conservation Reserve Program are resulting in the revegetation of some private lands in the study area.

Within the WRNIP study area there are large tracts of forested public lands associated National Wildlife Refuges (NWRs) and State Wildlife Management Areas (WMAs). Approximately 288,000 acres of bottomland hardwoods are presently under Federal or state ownership. Public lands located within the basin in the study area include the White River NWR, the Cache River NWR, and the following State WMAs: Henry Gray/Hurricane Lake WMA, Bayou Des Arc WMA, Wattensaw WMA, Trusten Holder WMA., and WMAs along the Cache River (Dagmar WMA, Rex Hancock/Black Swamp WMA, and Earl Buss/Bayou de View WMA).

The economies of the study area and the State of Arkansas are oriented principally toward agricultural production cotton, rice, and soybean farming, and livestock, dairy, and poultry raising with considerable emphasis on export, storage, and processing. Secondary crops grown in the region include corn, corn silage, wheat, oats, barley, sorghum, hay, potatoes, vegetables, fruits, and nuts.

Agricultural output within the study area is expected to increase approximately 180 percent by the year 2036. The market value of all agricultural products from the study area sold in 1974 was $391.3 million, representing 20.9 percent of Arkansas's agricultural output. This is indicative of the rising importance of this area relative to Arkansas' agricultural production. Agricultural business is expected to continue its growth as investment in large food processing plants such as the Riceland Rice facility in Stuttgart, Arkansas, and grain storage facilities along the river continues. Reflecting the agricultural nature of the local economy, there is a greater percentage of total employment in the agricultural sector than in Arkansas or the Nation.

Manufacturing in the area is primarily to relatively small and dispersed plants which produce and export such items as furniture, tool handles, metal tubing, paper, rice products, electrical control devices, and wearing apparel. The majority of manufacturing activity takes place in the urban centers of Arkansas County, Independence County and White County, which have strengthened industrial bases providing an attraction for additional manufacturing concerns. Area wide employment in all manufacturing enterprises doubled from 1960 to 1970. The greatest growth within the manufacturing sector occurred within the metals industries (almost entirely those involved in secondary processing), followed by apparel and related products, and food and kindred products.

In the WRNIP economic analysis area, there were ten urban centers with 2,500 or more inhabitants as of the 2000 Census. The largest of these was Searcy, in Arkansas County, with a population of 18,928 in 2000, followed by Stuttgart (9,745), Batesville (9,445), Newport (7,811). Searcy and Stuttgart are the major trade centers, partially because they are the most populous cities in the region, and partially because they are located on the major transportation arteries. The growth of these ten centers increased over the last three decades. Although intensive urbanization is not expected in the future for the study area, significant increases in population can be expected for these urban centers, as well as other smaller population centers, reflecting the national trend toward urbanization.

The growth of these ten centers, Augusta, Batesville, Beebe, Brinkley, Clarendon, DeWitt, Newport, Searcy, Stuttgart, and Walnut Ridge, exhibited an average growth rate of 107.3 percent between 1940 and 2000, reflecting an increase in total population. These smaller urban areas increased from 32,761 to 67,901.

Employment and Earnings Income. The U.S. Census Department publication "County Business Patterns Arkansas 2000" indicates that employment in the eight county region amounted to 63,513 in 2000 and payroll earning for the same period amounted to $1,394,007,000. The county with the largest employment was White county (21,756) followed by Independence county (14,475); employment in Lonoke county was (8,855)

and Arkansas county was (8,275); these four counties accounted for 84 percent of the employment in the region and 85.2 percent of the payroll income in the region. Although intensive urbanization is not expected in the future for the study area, significant increases in employment can be expected for these urban centers, as well as other smaller population centers, reflecting the national trend toward urbanization.

The White River has historically served as an important transportation artery connecting the surrounding region with both domestic and foreign markets and it is expected to continue to play significant role in future years. The majority of barges in use on the White River are 35 X 195 feet. Tow configurations typically are 2 to 4 barges. Towboats range in size from 10 X 36 feet upward to 36 X 116 feet, and are powered by 600 to 2,600 horsepower engines. Towboats usually have drafts requiring 9 feet. In 1999 a total of 1,214 unbound and down bound trips occurred on the waterway.

During recent years (1997-2000), an average of 395,000 tons per year moved on the White River. Soybeans accounted for the largest share of the traffic, amounting to about 55 percent of the total and 95 percent of outbound tonnage. Wheat traffic is not as large as soybeans and fluctuates more, but in some years it was the only other outbound commodity.

Demographic Details. Table 1 displays demographic details of the White River surrounding area. Table 2 displays further demographic information with respect to economic aspects of the residence the counties in the proximity of the White River surrounding area. The range of median income statistics for the area reflects significant difference in standard of living between Lonoke County (which included Little Rock) to Monroe County. The 1997 data on median income range between Lonoke and Monroe counties are $35,825 and $20,702 respectively. Educational attainment shows equal disparities between the two counties, as well as, poverty rates, and house ownership rates.

Table 1, White River Adjacent Area Population, Labor-Force, and Change in Non-Farm Establishments.

County	Population	Education High School Graduates 25+	Education College Graduates	Income Per Capita	Labor Force Civilian	Change non-farm Establishments	Land Farm Land Acres
Arkansas	20,749	8,594	1,445	$20,065	10,548	-18	426,363
Independence	34,233	12,707	2,078	$18,396	16,864	89	283,126
Jackson	18,418	6,534	842	$17,537	7,832	-24	335,099
Lonoke	52,828	16,372	2,437	$19,336	25,184	264	390,705
Monroe	10,254	3,753	596	$15,650	4,000	-13	235,812
Prairie	9,539	3,509	451	$15,809	3,838	7	301,851
White	67,165	21,140	3,680	$16,408	31,162	265	394,294
Total:	213,186	72,609	11,529	$17,600	99,428	570	2,367,250
Average:	30,455	10,373	1,647	17,600	14,204	81	338,179
Standard Deviation:	22,163	6,661	1,167	1,740	10,652	131	68,948

County	Household Median Income	Full Time & Part Time Employment	Change in Full Time & PT Employment	Personal Income ($000)	Manufacturers Shipments ($000)	Unemployment	Land Square Miles
Arkansas	$28,742	12,789	583	$418,135	$916,228	521	988
Independence	$28,864	20,882	2,620	$604,076	$1,013,337	789	764
Jackson	$23,924	8,341	81	$314,620	$199,910	751	634
Lonoke	$35,825	15,873	2,857	$953,617	$269,831	635	766
Monroe	$20,702	4,574	34	$162,022	$0	275	607
Prairie	$26,039	3,189	-256	$147,391	$0	218	646
White	$28,513	31,054	6,708	$1,038,009	$646,456	1,465	1,034
Total:		96,702	12,627	$3,637,870	$3,045,762	4,654	5,439
Average:	27,516	13,815	1,804	$519,696	$435,109	$665	777
Standard Deviation:	4,741	9,838	2,505	361,241	422,644	416	172

Table 2 displays further demographic information with respect to economic aspects of the residence the counties in the proximity of the White River surrounding area. The range of median income statistics for the area reflects significant difference in standard of living between Lonoke county (which included Little Rock) to Phillips County (which included Helena). The 1997 data on median income range between Lonoke and Phillips counties are $35,825 and $18,898 respectively. Educational attainment shows equal disparities between the two counties, as well as, poverty rates, and house ownership rates.

Table 2, White River Adjacent Area Population, Poverty Rate, House Ownership Rate, and Unemployment Rate.

County	2001 Population	1990 Education High School > 25 yr	1990 Education College > 25 yr	1997 Income Median	1997 Poverty Persons Rate	1997 Poverty Children Rate	2000 Population Density / Sq Mile	2000 House Ownership Rate	1996 Unemployment Rate
Arkansas	20,588	61.1%	10.3%	$28,742	18.9%	26.8%	21.0	67.9%	5.7%
Desha	15,052	56.5%	10.4%	$23,361	27.5%	34.5%	20.1	63.5%	10.9%
Independence	34,394	63.1%	10.3%	$28,864	16.7%	23.7%	44.8	74.4%	4.7%
Jackson	17,814	51.6%	6.7%	$23,942	23.6%	33.8%	29.1	69.6%	11.4%
Lee	12,361	44.2%	7.4%	$19,194	38.0%	43.6%	20.9	63.7%	11.9%
Lonoke	54,349	67.1%	10.0%	$35,825	12.3%	16.5%	69.0	75.9%	4.3%
Monroe	9,966	52.9%	8.4%	$20,702	30.6%	40.1%	16.9	65.0%	8.8%
Phillips	25,751	51.5%	9.2%	$18,898	37.5%	45.8%	38.2	56.2%	10.6%
Prairie	9,529	56.3%	7.2%	$26,039	18.4%	25.3%	14.8	73.1%	9.5%
Woodruff	8,691	48.7%	7.5%	$20,623	30.9%	39.2%	14.9	65.4%	9.3%
White	68,542	62.6%	10.9%	$28,513	17.4%	23.7%	65.0	72.9%	6.1%
Average:	25,185	56.0%	8.9%	$24,973	24.7%	32.1%	32.2	68.0%	8.5%
Standard Deviation:	19,766	7.0%	1.5%	$5,214	8.8%	9.5%	19.7	5.9%	2.8%
Arkansas	2,692,090	66.3%	13.3%	$27,875	17.5%	25.0%	51.3	69.4%	5.4%

Major Highways and Bridges. Major highways and bridges spanning the White River within the study area between Newport in the North and Arkansas Post in the South are indicated in Table 3.

Table 3, Major Highway Bridges Crossing the White River in the Project Area.

Nearest Community	Highway	Type & Orientation	County
Newport	67	U.S.: North-South	Jackson
Newport	14	State: East-West	Jackson
Augusta	64	U.S.: East-West	Woodruff
DeValls Bluff	40	Interstate: East-West	Prairie
DeValls Bluff	70	U.S.: East-West	Prairie
Des Arc	38	U.S.: East-West	Prairie
Clarendon	79	U.S.: East-West	Monroe
Arkansas Post*	65	U.S.: North-South	Arkansas

*Arkansas Post crossing is nearest the Arkansas River.

Transportation networks are varied and well developed. Interstate Highway (IH) 40, which provides east-west access between Little Rock and Memphis, is the major thoroughfare through the lower portion of the study area. Other major east-west Federal highways include Highways 49, 70, and 79 in the south, Highway 64 in the central

region, and Highway 62 in the north. Federal Highways 63, 67, and 167 serve the northern two-thirds of the area.

While the major highway system provides convenient access to the White River area and through the region, it also marks and parallels some historic and scenic routes. The path of IH 40 that crosses the White River near DeValls Bluff approximately corresponds to the National Historic Trail, the Cherokee Indians' "Trail of Tears." Indeed, there is a plaque at DeValls Bluff commemorating this historic event. The Great River Road crosses the White River at St. Charles, the site of a notable Civil War battle.

Fishing & Hunting Associated Recreation: Trips & Travel Expenditures. Table 4 displays some of the travel expenditures (between 1985 and 1997) associated with fishing and hunting in counties associated with the WRNIP.

Table 4, White River Area Trips and Travel Expenditures.

Counties	**Population**									
	2000	1985	1990	1991	1992	1993	1994	1995	1996	1997
Independence	34,233									
Person-Trips		78	153	161	105	112	108	110	113	116
Travel Expenses		$9,600	$21,251	$23,284	$14,840	$16,647	$16,480	$17,287	$18,325	$19,057
Jackson	18,418									
Person-Trips		81	60	59	56	58	58	59	55	57
Travel Expenses		$10,023	$8,430	$8,646	$7,970	$8,539	$8,810	$9,421	$8,925	$9,352
White	67,165									
Person-Trips		99	124	103	110	114	145	148	154	155
Travel Expenses		$12,219	$18,063	$15,660	$16,270	$17,428	$22,760	$23,851	$25,744	$26,233
Woodruff	8,741									
Person-Trips		12	7	6	16	16	18	18	18	18
Travel Expenses		$1,540	$1,072	$1,042	$2,970	$2,859	$3,290	$3,451	$3,599	$3,592
Prairie	9,539									
Person-Trips		4	5	6	11	10	17	15	14	16
Travel Expenses		$488	$666	$731	$1,820	$1,508	$2,620	$2,378	$2,347	$2,568
Monroe	10,254									
Person-Trips		113	166	171	164	172	156	156	157	143
Travel Expenses		$13,931	$23,364	$24,979	$23,900	$26,044	$24,190	$24,986	$25,930	$24,041
Arkansas	20,749									
Person-Trips		85	100	89	107	103	118	115	118	121
Travel Expenses		$10,492	$14,017	$13,002	$16,560	$15,181	$17,870	$17,939	$18,908	$19,682
Phillips	26,445									
Person-Trips		80	96	97	106	111	102	100	103	102
Travel Expenses		$9,888	$13,354	$14,147	$15,620	$17,021	$16,140	$16,170	$17,322	$17,409

STATEMENT OF PROBLEMS AND OPPORTUNITIES

Table 5, below, identifies currently perceived problems and/or opportunities, along with those identified in the 1979 WRNIP feasibility report (USACE-MVM 1979b). One or more of the planning perspectives for NED and NER fit the problems and opportunities.

Table 5, Concise Statement of Problems and Opportunities.

Problems / Opportunities Identified in 1979	**Current Problems**	**Current Opportunities**	**Comments**
Water depths not reliable; 75% availability for 9 ft depth noted in 1970s	Problem worsened, annual availability reduced to 50% in late 1990s	Improve navigation	9 ft depth sought for 95% availability; *Example(s): dike fields used to establish needed depths.*
Channel widths too restrictive	No change	Improve navigation	200 ft sought in 1979, 125 ft appears feasible today (utilize mix of one-way and two-way widths, to minimize impacts to environment); *Example(s): operate barges within limits of one-way traffic (125 ft) where necessary.*
Bank caving detrimental to shipping	No change	Improve navigation	*Example(s): Stabilize banks, combining with National Ecosystem Restoration (NER) features where appropriate.*
Not addressed in the 1970s (nothing specific to NWRs)	Bank caving detrimental to NWRs	Ecosystem restoration or other environmental protection	*Example(s): Stabilize banks,* which has two benefits: (1) protection of highly significant NWR land resources, and (2) lessens erosion of sediments thus improving river's water quality.

Current maintenance dimensions fail to link efficiently to Arkansas Nav. and MS River systems	No change	Improve navigation	9 ft depth sought for 95% availability; *Example(s): dike fields used to establish needed depths;* USACE Little Rock District has a study underway focused on the Arkansas River Navigation System, and Phase II of that study will consider the alternative of changing the navigation channel from 9 ft to 12 ft depth.
Lack of barge access is detrimental to commodity movement and economic growth	No change	Improve navigation	9 ft depth sought for 95% availability; *Example(s): dike fields used to establish needed depths.*
Various recreational facilities in WRNIP area are critically deficient	No change	Construct recreational features in WRNIP area	*Example(s): nature trails; boat ramps; scenic overlooks; etc.*
Natural environment, loss of bottomland forest habitat	No change and added concern for aquatic habitat	Ecosystem restoration	1979 study focused on aquatic habitat (weirs), endangered mussel protection, and acquisition of 1865 ac. for mitigation; current focus on natural environment is greater and influenced by new perspective related to NER guidance; *Example(s): acquisition of lands for reforestation, easements on private lands, etc.*
Streambank erosion	No change	Ecosystem restoration or other actions to protect water quality	1979 concern focused on protecting urban development; current focus more upon water quality and reducing sedimentation; *Example(s): Stabilize banks, combining with NER features where appropriate.*

Improvements desired by locals	Improvements desired by locals, with extra emphasis on protecting environment	Improve navigation	This is the general request for improving navigation for the 95% availability, etc.; *Example(s): dike fields used to establish needed depths, combined with NER features where appropriate.*
Not addressed in the 1970s	Surface water, restoring flow to oxbow lakes	Ecosystem restoration	Prompted by NER perspective; *Example(s) could include locations near RMs 126, 138, 145, 178, etc.*
Not addressed in the 1970s	River morphology, instability of river especially along NWRs	River engineering combined with ecosystem restoration	FWS NWRs did not identify this as a problem in 1979, but now do; NER perspective encourages approach unlike that of 1970s; *Example(s): some form of bank stabilization to slow rate of land loss from meandering river.*
Not addressed in the 1970s	River morphology, head-cutting at tributaries	River engineering combined with ecosystem restoration	Related to bank erosion but impacts more extensive and away from river; NWRs did not identify this as a problem in 1979; NER perspective encourages approach unlike what might have been employed in 1970s; *Example(s): install weirs or other engineering structures to stop head-cutting.*
Not addressed in the 1970s	River morphology, restoring flow to tributaries (at low flow conditions)	River engineering combined with ecosystem restoration	Not identified as a problem in 1979; NER perspective encourages approach unlike what might have been employed in 1970s; *Example(s): install ponding structures to maintain desired water levels, etc. such as at mouth of Taylor Bay, Horseshoe Lake, Raft Creek, and Scrubgrass Bayou/Brushy Bayou.*
Not addressed in the 1970s	River morphology, stabilization at mouth of Cache River and restoration of portion of Cache River	River engineering combined with ecosystem restoration	Not identified as a problem in 1979; NER perspective encourages approach unlike what might have been employed in 1970s; *Example(s): install low flow weirs in the new channel to return hydrology to original natural channel.*
Not addressed in the 1970s	Soil: sediment runoff from farmland contributing to sediment load, and impacting water quality	River engineering combined with ecosystem restoration	Not identified as a problem in 1979; NER perspective encourages approach unlike what might have been employed in 1970s; linked to bank caving and stream bank erosion, above; *Example(s): vegetated buffer strips placed along the river to reduce runoff.*

Not addressed in the 1970s	Native vegetation declining off NWRs and WMAs	Ecosystem restoration	Not identified as a problem in 1979; NER perspective encourages approach unlike what might have been employed in 1970s; pertains to loss of specific vegetation types within bottomland hardwoods habitat earlier identified; also reflects loss of vegetation due to agricultural land clearing; *Example(s): none specified at present.*
Not addressed in the 1970s	Ensuring health of region's waterfowl	Ecosystem restoration	Not identified as a problem in 1979; NER perspective encourages approach unlike what might have been employed in 1970s; *Example(s): employ habitat restoration or other actions under provisions of Corps-other party agreement.*
Not addressed in the 1970s	Possible habitat problems for song birds and others birds (non-consumptive resources); lack of facilities for recreational "birding"	Ecosystem restoration	Not identified as a major opportunity in 1979; NER perspective encourages approach unlike what might have been employed in 1970s; *Example(s): target creating specific types of bird habitat as part of other ecosystem restoration work conducted; construction of features to facilitate recreational "birding" related to song birds, and other birds.*
Not addressed in the 1970s	Regional pressure on black bear habitat	Ecosystem restoration	Not identified as a major opportunity in 1979; NER perspective encourages approach unlike what might have been employed in 1970s; *Example(s): improve, extend habitat; ecosystem restoration; expand wildlife corridors along river bottom.*

Not addressed in the 1970s	Possible declining habitat for various fishes	Ecosystem restoration	Not identified as a major opportunity in 1979; NER perspective encourages approach unlike what might have been employed in 1970s; *Example(s): aquatic habitat for fisheries could be improved with river engineering structures, ecosystem restoration of spawning habitat, etc.*
Mussels were considered only in terms of mitigation needs due to proposed construction	Possible declining habitat for various mussels (not restricted to threatened and endangered species)	Ecosystem restoration	Not identified as a major opportunity in 1979; NER perspective encourages approach unlike what might have been employed in 1970s; *Example(s): aquatic habitat improvement for mussels; create gravel features attractive to mussel colonization.*
Not addressed by 1970s WRNIP (USACE-MVM 1979a,b,c) *but see* WRBCC (1968)	Potential destruction of submerged and terrestrial cultural resources within and adjacent to the river (including bank erosion)	Preservation of cultural resources	Not identified as a major opportunity in 1979 although comprehensive basin study earlier did so (WRBCC 1968); now more applicable under environmental stewardship and integrated water resources perspectives; *Example(s): protect cultural resources with engineering features, management plans; integrate same with ecosystem features targeting other needs, especially where stabilization of landscape or channel occurs.*
Not addressed in the 1970s	Development of agriculture has created a loss of naturally vegetated wetlands	Ecosystem restoration targeting wetlands	Not identified as a major opportunity in 1979; current water resources policy and NER perspective encourages approach unlike what might have been employed in 1970s; *Example(s): acquire and modify land by re-establishing hydrology, filling ditches, removing levees, and re-vegetating with native plants.*

PROJECT-SPECIFIC STUDY OBJECTIVES

The major objective of this project is to achieve 95% or greater annual availability of a 9-foot-channel for commercial barge traffic along the Lower White River between RM 254 at Newport, and downstream to RM 10 near the Arkansas Post Canal. The entire study process has followed the procedures of NEPA and the Corps' own planning procedures (USACE 2000). Both procedures require a range of alternatives (including that of no action) to be considered to determine which recommended action would produce 95% or greater annual availability for barge traffic and, at the same time, provide the optimal balance of protecting the existing environment, maximizing ecosystem restoration benefits, and maximizing economic benefits to our Nation. Two Federal objectives are most applicable to the planning process applied to the WRNIP. The NED Federal objective is "the Federal objective of water and related land resources planning " … "to contribute to national economic development (NED) consistent with protecting the Nation's environment, …" (USACE 2000:2-1). The NER Federal objective is "…to contribute to national ecosystem restoration (NER) [with] increases in the net quantity and/or quality of desired ecosystem resources." (USACE 2000:2-1). The Combined NED/NER Plan contributes to both NED and NER outputs, attempts to maximize the sum of net NED and NER benefits, and offers the best balance between the two Federal objectives (USACE 2000:2-1,2-7).

The objectives below were revised to account for the passage of time from deauthorization in the 1980s, to reauthorization in 1996 (especially changed conditions and/or changed perspectives, guidance, and procedures for protecting the environment) and to reflect new input from various parties (see following section on Planning Process and Participation) communicated with in the planning process. A list of objectives for the reauthorized WRNIP is:

1. To achieve 95% or greater annual availability for commercial barge traffic to utilize the Lower White River between Newport (RM 254) and Arkansas Post Canal (RM 10).

2. To provide a bottom width of 125 feet (38.1 m) and depth of 9 feet (2.74 m) 95% of the time for the same stretch of river cited above (more narrow width employed to minimize potential effects to the environment).

3. To minimize construction aimed at stabilization of riverbanks.

4. To install and maintain shore aids to navigation.

5. To provide recreational features such as overlook and park complexes, or otherwise improve the recreational development of the Lower White River.

6. To acquire land to serve as mitigation, if necessary, for impacts to wildlife.

7. To provide mitigation for the Fat Pocketbook Pearly Mussel (based on the original authorization) and/or other endangered species of freshwater mussel in the WRNIP area.

8. To improve aquatic habitat through construction of weirs (based on the original authorization) and/or other current needs and opportunities identified.

9. To place no dredged materials on terrestrial settings adjacent to the river channel.

10. To implement features that facilitate sustaining and/or improving environmental resources of the WRNIP area. This objective is centered on the NER planning perspective.

PLANNING PROCESS AND PARTICIPATION

Study Participation and Coordination

The WRNIP was reauthorized by WRDA 1996. The resulting study was coordinated under provisions of the Corps' Planning Guidance Notebook (USACE 2000). This involved the Corps' six step planning process (USACE 2000:Chapter 2). In a complimentary fashion, and as an "umbrella" planning effort to ensure protection of the environment, the planning process associated with NEPA also was followed. The aim of NEPA is to disclose potential impacts *prior* to decisions being made (and actions implemented) and to identify truly significant issues related to a range of alternatives including that of "no action" (Council on Environmental Quality (CEQ) Regulations for Implementing NEPA, 40 CFR Part 1500 etc.). The NEPA "scoping" process identifies public and agency concerns, and it ensures that problems are identified early and properly studied (CEQ 1983:Section 1501.7; CEQ 1981; USACE 2000:C-7). This process also identifies issues of little significance, allowing Federal agencies to avoid unnecessary effort and time delays. Issues of significance under NEPA may include effects bearing on economic, social, natural, or physical aspects of the environment. These effects and their mitigative treatment are summarized for the NED and NER Plans described below, although greater detail would be provided in the SEIS yet to be completed.

During the six step planning process, various NED Alternatives and NER Features were analyzed and screened out. Where aspects of time, funding, complexity, and other factors were associated with an alternative or feature becoming “eliminated,” it is recognized this is not necessarily an irreversible condition. That is, this Summary Report constitutes proposed recommendations, and it does *not* document a final determination.

Study Management. The USACE-MVM was responsible for planning and managing activities for the reauthorized WRNIP study. A project management plan (USACE-MVM 1998) was produced to outline these activities necessary for re-evaluation of the WRNIP.

Study Participants. Besides the USACE-MVM WRNIP study team, an interagency team was formed to facilitate the WRNIP study process. Public agencies and other parties ranging to the general public also were involved to various degrees with the study. Participants are further described, below.

Interagency Team for Environmental Issues. The importance of understanding environmental issues and incorporating advice from key public agencies led to the formation of an interagency "team" for the WRNIP. This team has focused on natural resources issues, and it consists of representation from the following agencies:

U.S. Fish & Wildlife Service
U.S. Environmental Protection Agency
Arkansas Waterways Commission
Arkansas Game and Fish Commission
Arkansas Soil and Water Conservation Commission
Arkansas Natural Heritage Commission, and
Arkansas Department of Environmental Quality.

The team has special concern with aquatic resources including fisheries and mussels, and that interest resulted in the formation of two working "sub-teams" focused on those subjects. The interagency team's staff presence has been dynamic and flexible, and it would continue to be so should the WRNIP proceed into completion of the SEIS, construction monitoring, etc. For example, at times members of the Arkansas Chapter of The Nature Conservancy (TNC) participated in these team meetings.

Other Federal Agencies. A number of other Federal agencies were communicated to regarding the WRNIP study. Communications ranged from formal to informal information-providing and information-seeking. Certain consultations are required under various laws and regulations. The two Federal agencies considered prominent in the planning process for this study are the U.S. Environmental Protection Agency (EPA) and the U.S. Fish & Wildlife Service (FWS). Regarding coordination under the Fish and Wildlife Coordination Act, the most recent Planning Aid Letter for the WRNIP, and USACE-MVM's reply to it, are provided as Appendix 1. That communication focused on the NER. Also, Appendix 2 reflects very recent FWS comments regarding fisheries studies.

State and Local Agencies. Public agencies at the state and local level also played key roles in the WRNIP study process. The AWC served as the non-Federal project sponsor. Should the project proceed to construction and operation, the AWC would have a crucial role in funding and operation of the WRNIP. Other state agencies maintained key consultation roles, particularly regarding protection of the environment and other resources for which the State of Arkansas maintains substantial interests. These agencies include the Arkansas Game and Fish Commission (AGFC), the Arkansas Soil and Water Conservation Commission (ASWCC), the Arkansas Natural Heritage Commission (ANHC), and the Arkansas Department of Environmental Quality (ADEQ).

Navigation Interests. A number of parties related to navigation interests communicated concerns during the earlier authorized WRNIP planning (ca. 1970s). These interests included the AWC, the White River Navigation District Commission, Lockhart-Thomson Grain Company, Bunge Corporation, and the Mississippi Chemical Corporation (USACE-MVM 1980:9-10). Following reauthorization in 1996, the WRNIP study team has received communications of interest from the AWC, the Arkansas Waterways Association, the White River Valley Association, and Carter Construction Company, Benton, Arkansas. Other groups contacted USACE-MVM during the NEPA scoping meetings conducted in 1999: Arkansas Steel Associates, Augusta Barge Company, Potlatch Forests, Inc., American Agricultural Movement, Inc., City of Helena and Port Authority, Agricultural Council of Arkansas, and Chicot-Desha Metropolitan Port Authority. In a sense, any party with concerns regarding navigation might be considered to have "navigation interest." However, the entities identified above are either involved directly in the commercial movement of goods upon the Lower White River, or they have a potential business-related interest in commercial navigation in the WRNIP.

Federally Recognized American Indian Tribes. No tribal lands exist at or near the WNRIP area. However, under provisions of NEPA, the National Historic Preservation Act, and recent Executive Orders and Corps policy directives, Federally recognized American Indian tribes were consulted regarding their interest in the WRNIP. Two tribes expressed interest regarding ancestral affiliation interpreted for the WRNIP area. These tribes are the Quapaw Tribe of Oklahoma and the Tunica-Biloxi Tribe of Louisiana.

Special Interest Groups. The WRNIP attracted the keen interest of special interest groups in the original study process from the 1970s. This interest continued, if not increased, for the present study. While some groups from the 1970s may not be listed below, the following special interest groups (listed alphabetically) have expressed direct interest in the re-authorized WRNIP study:

American Rivers
Arkansas Chapter, American Fisheries Society
Arkansas Chapter, Sierra Club
Arkansas Chapter, The Wildlife Society
Arkansas Nature Conservancy
Arkansas Wildlife Federation
Central Flyway Council
Defenders of Wildlife
Delta Waterfowl Association
Ducks Unlimited
Lower Mississippi River Conservation Committee
Memphis Audubon Society
Mississippi Flyway Council
National Audubon Society
National Wildlife Federation
National Wildlife Refuge Association

National Resources Defense Council
Taxpayers for Common Sense
The Nature Conservancy
The Wilderness Society
Wild South
Wildlife Management Institute, and
Yell County Wildlife Federation.

The Public. The general public consists of citizens and individuals not necessarily representing special interest groups or governmental agencies. However, this segment of our Nation plays an increasing role in both the Corps and the NEPA planning process. To gain input from the general public during the NEPA scoping process, two major public scoping events were conducted. These events were in the form of information "open houses" with walk-by graphic information displays combined with the presence of Corps staff who communicated information often on a person-to-person basis. The events were located at Des Arc, Arkansas, on April 26, 1999, and the following day at Clarendon, Arkansas. A total of approximately 112 individuals (including some repeat visitors) attended the events. Comments from the scoping events and other communications including the Post Scoping Report would be documented in the SEIS. Leading topics of concern documented from the public scoping events included protecting wildlife and associated public land refuges; protecting the economic benefits of the wildlife resources, particularly regarding duck hunting in the region; and protecting the White River's water levels, water quality, and esthetics.

NED

A number of NED alternatives and measures were considered and discussed both within the USACE-MVM staff and among outside parties. Initial alternatives were developed starting in 1999 with a series of communications including NEPA scoping activities such as public meetings. Particular focus also was made on communications among the interagency team. NED and engineering related topics, along with related environmental considerations, were discussed. Some measures were determined to be either not feasible, not acceptable, or otherwise failing to address the needs and opportunities under re-evaluation. For example, the interagency team suggested that NED Alternatives 6a, 6b, and 6c (lesser reaches of development, see below) be considered for economic analysis with the goal of minimizing potential adverse environmental effects. From these overall preliminary efforts, ten alternatives including that of "no action" were developed for further analysis. No alternatives were identified outside the jurisdiction of the Corps.

A planning feature under NED is recreation. The development of a recreation plan for unmet needs has been started. If the AWC agrees with the present Summary Report's conclusions, then the study phase for recreation will be completed and added to the GRR. Recreation features might consist of scenic area overlooks, picnic areas with pavilions, nature trails, boardwalks, boat ramps, interpretive centers, etc.

NED Alternatives

The following is the initial list of alternatives identified for the NED.

Alternative 1, No Action (Without Project). The "no action" alternative for this study would involve continuation of the existing navigation maintenance program, under the separate authority provided by the River and Harbor Act of 1892 and later, Section 107 of the River and Harbor Act of 1960. It is assumed the estimated 50% annual availability for commercial barge traffic would continue (if not worsen) into the future, regarding access upstream to RM 254 at Newport. Future conditions would apply as indicated in the Problems and Opportunities section. In the USACE planning process the "no action" alternative is not irreversibly eliminated. However, this alternative does not meet the objective of providing 95% availability for commercial barge traffic.

Alternative 2 (the 1979 Selected Plan). This is the plan recommended by the 1979 study (USACE-MVM 1979a:1-3, 1979b, c), and authorized by WRDA 1986 with additional specifications including environmental mitigation. This was one of five action plans (Plans I, II, III, and IV and Selected Plan; USACE-MVM 1979a:27). The Selected Plan consisted of a 9-foot (2.74 m) depth by 200-foot (60.96 m) width channel at 95% reliability, created by dredging 154 locations along 56 miles of the 244 miles of waterway. It also consisted of 36 stone dikes, 9 bank paving revetment locations, 381 unlighted navigation aids, an "aids to navigation boat," 993 acres of land for disposal of dredge materials, a 5-acre scenic overlook and park at Georgetown (RM 167), a 10-acre scenic overlook and park at Crocketts Bluff (RM 68), a 25-acre campground at Clarendon (RM 98), and acquisition of 1,865 acres of bottomland hardwoods, to mitigate wildlife losses. This alternative was eliminated because it relied heavily on large amounts of construction dredging and use of land sites for disposal, both likely to produce unacceptable adverse effects on the environment.

Alternative 3 (Dikes and Dredging, Full Project). This is an engineering plan devised following the 1996 reauthorization of the WRNIP. It consists of achieving 95% reliability with a 9-foot (2.74 m) depth by 125-foot (38.1 m) width channel, including construction of approximately 94 stone dikes and 4 chevron dikes among approximately 26 dike fields, and maintenance dredging reduced from current levels. It is estimated that 100% of the dikes would require key trenches. An estimated 75% or less of dike locations would require toe protection on the opposite bank for an approximate distance of 750 feet. A 125-foot-bottom-width from River Mile 10 to River Mile 254 would be established to provide for a significant improvement to navigation while minimizing costs and adverse environmental impacts. The 125-foot-bottom already exists from RM 10 to RM 198, and an existing 100-foot-width-channel from RM 198 (Augusta) to Newport (RM 254) would be widened to 125 feet width. Following detailed analysis, this alternative was eliminated because it did not produce the largest excess benefits.

Alternative 4 (Dikes and Dredging, Full Project, Chevron Dikes at Refuges). This is essentially the same as Alternative 3 except where dikes were planned in the portion of

the river adjacent to National Wildlife Refuges (RM 10 - 99), these dikes would be replaced with chevron dikes. The chevron dikes would not directly connect to the river banks along the NWRs. However, near-shore bank protection associated with chevron dikes might be required. Such bank protection would be below Ordinary High Water Mark (i.e. not upon NWR land). It is estimated that 100% of the dikes (excluding chevron dikes) would require key trenches. An estimated 75% or less of dike locations (excluding chevron dikes) would require toe protection on the opposite bank for an approximate distance of 750 feet. A 125-foot-bottom-width from River Mile 10 to River Mile 254 would be established to provide for a significant improvement to navigation while minimizing costs and adverse environmental impacts. The 125-foot-bottom already exists from RM 10 to RM 198, and an existing 100-foot-width-channel from RM 198 (Augusta) to Newport (RM 254) would be widened to 125 feet width. This alternative was eliminated because USACE-MVM did not have detailed river survey information necessary to explore specific locations, structure size and placement, etc. for chevron dikes in this portion of the Lower White River. This NED Alternative could be further studied if additional funds and time later become designated to address it.

Alternative 5 (no features at NWRs). This alternative would be similar to that of Alternatives 3 and 4 but no permanent engineering features would be constructed upon the NWRs (i.e. RM 10 to RM 99). Between RM 10 to RM 99, it is estimated that to increase the channel depth from 8 feet to 9 feet, 12% more dredging (27,180 cubic yards) would be required. Between RM 99 to RM 254, it is estimated that 100% of the dikes would require key trenches. An estimated 75% or less of dike locations would require toe protection on the opposite bank for an approximate distance of 750 feet. A 125-foot-bottom-width from River Mile 10 to River Mile 254 would be established to provide for a significant improvement to navigation while minimizing costs and adverse environmental impacts. The 125-foot-bottom already exists from RM 10 to RM 198, and an existing 100-foot-width-channel from RM 198 (Augusta) to Newport (RM 254) would be widened to 125 feet width. Materials would be disposed of as performed in the existing maintenance program (hydraulic disposal and snag material placed outside channel and against riverbanks). This alternative is the proposed recommended NED Plan.

Alternative 6a (Dike Fields & 95% availability RM 10 to Clarendon). This alternative is a variation of Alternative 3 but with stone dikes constructed only in the portion of the river between approximate RM 10 to RM 100. This alternative does not fully address achieving 95% tow availability to Newport (RM 254) but it was studied, at the request of the interagency team, to explore economic benefits with a goal of minimizing potential adverse effects (if any) to the environment. Construction and maintenance dredging, as needed, would ensure the 95% availability of a channel 9 feet (2.74 m) deep and 125 feet (38.1 m) wide only to Clarendon (RM 100). Materials would be disposed of as performed in the existing maintenance program (hydraulic disposal and snag material placed outside channel and against riverbanks). Maintenance above Clarendon would continue under the present maintenance authority, providing less than 95% availability. Following detailed analysis, this alternative was eliminated because it did not produce the largest excess benefits.

Alternative 6b (Dike Fields & 95% availability RM 10 to Des Arc). This alternative is a variation of Alternative 3 but with stone dikes constructed only in the portion of the river between approximate RM 10 to RM 143. This alternative does not fully address achieving 95% tow availability to Newport (RM 254) but it was studied, at the request of the interagency team, to explore economic benefits with a goal of minimizing potential adverse effects (if any) to the environment. Construction and maintenance dredging, as needed, would ensure the 95% availability of a channel 9 feet (2.74 m) deep and 125 feet (38.1 m) wide only to Des Arc (RM 143). Dredging and snagging material would be disposed of as performed in the existing maintenance program (hydraulic disposal and snag material placed outside channel and against riverbanks). Maintenance above Des Arc would continue under the present maintenance authority, providing less than 95% availability. Following detailed analysis, this alternative was eliminated because it did not produce the largest excess benefits.

Alternative 6c (Dike Fields & 95% availability RM 10 to Augusta). This alternative is a variation of Alternative 3 but with stone dikes constructed only in the portion of the river between approximate RM 10 to RM 198. This alternative does not fully address achieving 95% tow availability to Newport (RM 254) but it was studied, at the request of the interagency team, to explore economic benefits with a goal of minimizing potential adverse effects (if any) to the environment. Construction and maintenance dredging, as needed, would ensure the 95% availability of a channel 9 feet (2.74 m) deep and 125 feet (38.1 m) wide only to Augusta (RM 198). Materials would be disposed of as performed in the existing maintenance program (hydraulic disposal and snag material placed outside channel and against riverbanks). Maintenance above Augusta would continue under the present maintenance authority, providing less than 95% availability. Following detailed analysis, this alternative was eliminated because it did not produce the largest excess benefits.

Alternative 7 (Shallow Draft Tows). This alternative would seek to utilize an approach where shallow draft tows (one "tow" consists of one or more barge(s) pushed by a tow boat) could be utilized for the existing channel configurations to achieve 95% availability. Note that while this alternative is labeled "shallow draft," a 9-foot-depth channel actually is equivalent to "shallow draft" barge traffic requirements under Federal guidelines (as opposed to "deep draft" at 12-15 feet or more). Existing configurations of the Lower White River's navigation channel are 125 feet wide and 8 feet deep (in reference to a stage of 12 feet on the Clarendon gauge) along the river from RM 10 to Augusta, with a minimum depth of 5 feet maintained when river stages fall below 12 feet on the gauge at Clarendon. From Augusta to Newport (ca. RM 254) a channel is maintained 100 feet wide and 4.5 feet deep at any stage. Alternative 7's shallow draft tow approach is *not* that of "light loading" where traditional tow boats simply push less than fully loaded barges. Instead, the tow boat requirements (including underkeel clearance, USACE 1996) would need to be less than the 8 feet of draft typically required by today's inland waterway tow boats (regardless of what is being pushed). Some form of lighterage operations could be anticipated regarding linkage to the Arkansas Navigation System (the lower 10 miles of the White River connecting to the Mississippi

River). This alternative was eliminated because no existing technological alternatives appear to exist for tow boats that would be able to operate in channel depths under 9 feet.

Alternative 8 (Dredging Only). This alternative is that of increased construction and maintenance dredging only, with no engineering features, to achieve the goal of 95% availability for commercial barge traffic. At a minimum this would establish a channel configuration like that of Alternative 3. This alternative was eliminated because it was judged to most likely represent the ultimate in construction and maintenance costs, and potential for maximum net adverse effects to the environment.

Comparison of NED Alternatives

The previous alternatives looked at in detail can be described as a range of scenarios in reference to the primary objective of seeking 95% availability for commercial navigation at the WNRIP area. The action alternatives revolve around issues related to engineering and cost factors. The exception is that Alternatives 6a, 6b, and 6c were examined (as requested by the interagency team) to develop cost and benefit values. Comparison of alternatives is shown in Table 6, below, reflecting the NED perspective. Review of Table 6 indicates that Alternative 5 is the NED alternative with an optimal B/C Ratio.

Table 6, Comparison of NED Alternatives.

NED Alternatives	Total Cost AAE* ($)	Benefits AAE* ($)	Excess Benefits AAE* ($)	B/C Ratio
Alternative 3	2,764,416	3,041,364	+276,948	1.10
Alternative 5	**2,628,255**	**3,041,364**	**+413,109**	**1.16**
Alternative 6a	1,740,258	153,810	-1,586,488	0.09
Alternative 6b	1,767,955	943,115	-824,840	0.53
Alternative 6c	1,933,581	1,653,340	-280,241	0.86

*AAE stands for Average Annual Equivalent.

NED Recommended Plan

NED Plan's Engineering Description. As shown in Table 7, the design contains approximately 81 stone dikes and 4 chevron dikes between RM 99 and RM 254 for the purpose of improving and stabilizing the navigation channel and reducing current maintenance dredging by 50%. Between RM 10 to RM 99, it is estimated that to increase the depth from 8 feet (existing condition) to 9 feet it would require an additional 12% more dredging (27,180 cubic yards). If the NED Plan is implemented, the change in maintenance dredging would modify, to a degree, an *existing* navigation operations and maintenance program (annual dredging and snagging) performed under separate authorities originating with the River and Harbor Act of 1892 (USACE-MVM 1961; USACE-MVM 1979a:9; USACE-MVM 1976). The NED Plan's First Costs are

$30,834,000 with an AAE Operations and Maintenance Costs of $706,063. The excess benefits for the plan are $413,109, and produce a B/C Ratio of 1.16.

The height of the dikes at most locations would range from a +5 LWRP to a +10 LWRP, starting at a minimum elevation, then later raised if channel conditions are not achieved. Dikes would have a sloping crest approximately 1 to 3 feet higher at the landward end. Depending upon the geometry of the reach and environmental concerns, some dike systems would have succeeding downstream dikes stepped up or down in elevation (about 1 foot) to decrease or increase accumulation of fill within the dike field. Crown widths would be 4 to 6 feet where the work is accessible to floating construction equipment and loaded stone barges. Most dike locations would be where construction can be performed from barges. Dikes that are not assembled by floating plant can be constructed by offloading floating plant equipment onto land, and built from top bank out into the river. A crown width of 14 feet is required for this later type of dike construction. At areas of heavy gravel deposits where dikes are to be built, a one-time construction excavation may be required to establish project channel depth.

It is assumed that all non-chevron dikes would require a key trench dug into the bank to prevent high water river currents from flanking the dike (isolating it from the bank). These key trenches would be necessary in areas where the existing top bank is subject to frequent overtopping and not protected by heavy vegetation, such as areas currently used for agriculture purposes that are cleared to top bank. It is estimated that approximately 100% of the dikes would require key trenches. Side slopes of the dikes would be the angle of repose of the stone, approximately 1V on 1.25H. In typical dike construction, the upstream slope would be approximately 1V on 1.25H and the downstream slope 1V on 1.5H or flatter depending on river current conditions, the size and gradation of stone, and the particular construction method utilized. Riverward end slopes of the dikes would vary from 1V on 3H to 1V on 5H.

Environmental notches would be constructed in every stone dike where the height of the dike is 6 feet or greater. These notches would promote environmental benefits by creating a scour hole below them, and by encouraging a back channel to remain open and create an isolated sand bar during a wider range of stages. This type of environmental notch currently is used in dike construction on the Mississippi River. A typical environmental notch is shown on the typical stone dike drawing (Figure 1).

Paving the bank toe opposite and downstream of some dike locations may be necessary if significant scour occurs or is expected to occur. This may be necessary in locations where there is no heavy vegetation along the opposite top bank of dike locations. In areas where agriculture extends up to top bank opposite a dike location, toe protection may be needed to hold the desired channel. This toe protection would consist of a strip of riprap paving placed along the toe of the slope to prevent toe scour, which could lead to major bank failure. It is estimated that 75% or less of dike locations for an approximate distance of 750 feet would require toe protection on the opposite bank. Stone placed above the water level but below the Ordinary High Water Mark at the time of paving would be ten to twelve inches thick. Underwater paving, where coverage and thickness

cannot be accurately controlled, would be placed at the rate of eight tons per square (100 square feet), which amounts to an average thickness of approximately 18 inches. Alternative revetment methods, including bioengineering, also would be considered in preconstruction planning.

A 9-foot depth and 125-foot bottom width from River Mile 10 to River Mile 254 provides for a significant improvement to navigation while minimizing costs and adverse environmental impacts related to all other channel sizes considered. From reviewing the 1979 report, the WRNIP study team concluded that to achieve the 200-foot-width, large amounts of construction dredging would be required. Therefore, the existing authorized width of 125 feet from RM 10 to RM 198 was chosen as the project width to be studied in detail. This width is essentially equivalent to the minimum 130-foot-width recommended for commercial traffic by Engineering Manual (EM) 1110-2-1611 (USACE 1980). Extending this width from RM 198 to RM 254 (Newport) was considered to be an improvement by providing greater maneuvering room for tows when entering and exiting tight bends. In the 1979 report, it was stated that the economic and environmental costs for the large number of bendways that would have to be altered were unacceptable. Therefore, no bendway alignments are part of this NED Plan. Additionally, a 9-foot-depth with 95% availability was chosen over 100% availability because economic and environmental concerns (as in 1979) eliminated construction of locks and dams on the Lower White River.

A mussel bed near Hick's Lake Bend (RM 147) would be monitored for potential scour effects. Dike construction near this mussel bed would take place early in the NED construction phase, and the monitoring would be done annually at this location for a period of 5 years after dikes are complete. Results from this monitoring would be considered for adjusting construction details at this and other locations.

Table 7, Alternative 5 Design.

Structure	Dike Number	Length in Feet	Approx. Tons
Dike	254.40L	200	2,400
Dike	254.35L	250	3,000
Dike	254.28L	200	2,400
Chevron dike	254.05R	250	3,000
Chevron dike	253.90R	250	3,000
Dike	253.75L	250	3,000
Dike	252.9R	200	2,400
Dike	252.8R	250	3,000
Dike	250.43R	100	1,200
Dike	250.32R	200	2,400
Dike	250.18R	200	2,400
Dike	250.02R	200	2,400
Dike	249.94R	250	3,000

Dike	249.1R	250	3,000
Dike	248.9R	200	2,400
Dike	248.8R	200	2,400
Dike	248.65R	200	2,400
Dike	245.7L	300	3,600
Dike	245.57L	350	4,200
Dike	244.5L	250	3,000
Dike	244.4L	300	3,600
Dike	244.3L	300	3,600
Chevron dike	243.0L	250	3,000
Chevron dike	242.9L	250	3,000
Dike	242.8R	200	2,400
Dike	242.7R	250	3,000
Dike	239.9L	150	1,800
Dike	239.78L	200	2,400
Dike	239.65L	250	3,000
Dike	239.5L	250	3,000
Dike	236.3R	250	3,000
Dike	236.2R	250	3,000
Dike	235.95R	150	1,800
Dike	235.86L	150	1,800
Dike	235.71L	250	3,000
Dike	235.60L	300	3,600
Dike	230.1L	250	3,000
Dike	224.47R	200	2,400
Dike	224.37R	250	3,000
Dike	223.55L	200	2,400
Dike	223.43L	250	3,000
Dike	223.31L	300	3,600
Dike	222.0L	200	2,400
Dike	205.57L	150	1,800
Dike	205.45L	200	2,400
Dike	205.35L	200	2,400
Dike	205.2L	200	2,400
Dike	202.1R	100	1,200
Dike	202.0R	100	1,200
Dike	201.9R	100	1,200

Dike	201.1L	100	1,200
Dike	201.0L	100	1,200
Dike	196.00R	100	1,200
Dike	195.85R	200	2,400
Dike	195.68R	200	2,400
Dike	194.93L	100	1,200
Dike	194.81L	150	1,800
Dike	194.67L	150	1,800
Dike	194.55L	200	2,400
Dike	166.8R	100	1,200
Dike	166.7R	175	2,100
Dike	166.5R	200	2,400
Dike	166.35R	225	2,700
Dike	166.2R	250	3,000
Dike	166.1R	250	3,000
Dike	158.6L	150	1,800
Dike	158.5L	200	2,400
Dike	158.4L	175	2,100
Dike	158.3L	175	2,100
Dike	158.2L	150	1,800
Dike	158.1L	125	1,500
Dike	147.8L	100	1,200
Dike	147.7L	150	1,800
Dike	147.6L	200	2,400
Dike	147.5L	250	3,000
Dike	146.6R	150	1,800
Dike	146.5R	200	2,400
Dike	143.3R	175	2,100
Dike	143.2R	150	1,800
Dike	129.6L	275	3,300
Dike	129.5L	250	3,000
Dike	126.2R	200	2,400
Dike	126.1R	150	1,800
Dike	99.8R	175	2,100
Dike	99.7R	200	2,400
TOTAL		17,100 feet	205,200 tons

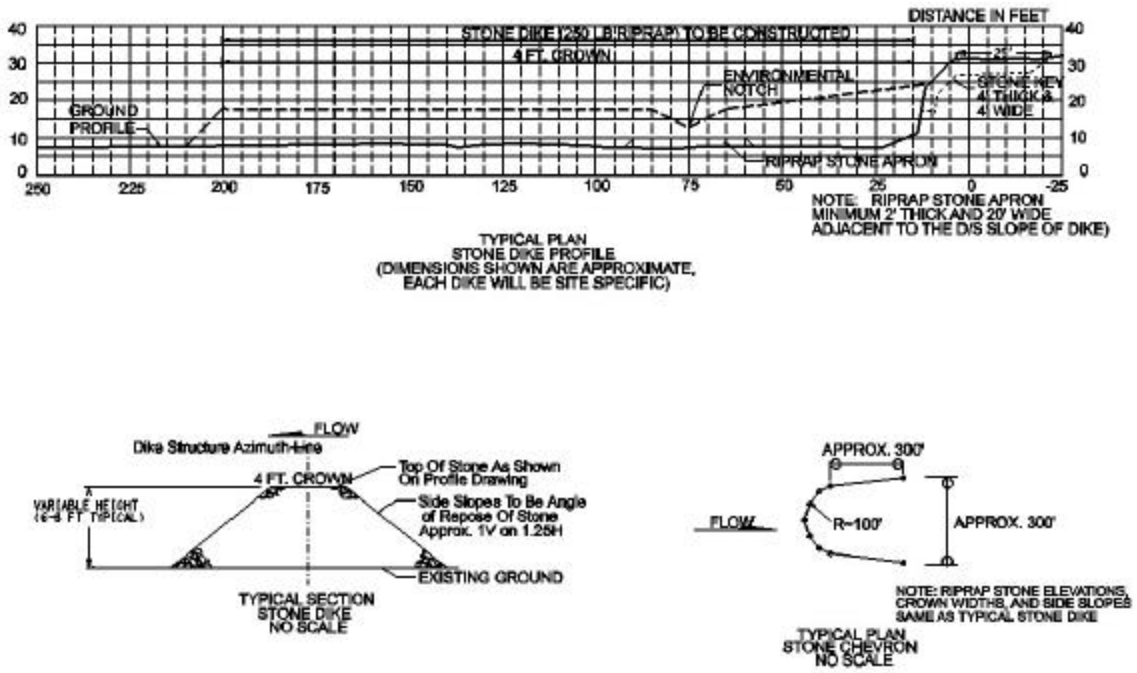

Figure 1. Typical Plan of Stone Dike.

NED Hydraulics and Hydrology Analysis. The Hydraulics and Hydrology Branch of the USACE-MVM's Engineering Division performed analyses specific to the WRNIP. These efforts included utilizing output from the USACE Little Rock District's "Super Model" regarding the flow of the Lower White River; determining water surface profiles using a HEC-2 computer model; and considering qualitative data from a physical micro model which assessed bathymetric response to dike structures. The USACE-MVM Hydraulics and Hydrology staff concluded: (1) the NED Plan would not change water levels, (2) the NED Plan would not change flow characteristics, and (3) sediment transport capacity of the river would not change, although there would be minor localized changes in sedimentation near dikes. In 2003, following distribution of a hydraulics appendix for the preliminary GRR, the AGFC requested additional analysis be performed in terms of median monthly flows. Results of this additional analysis supported the original findings described above.

NED Relocations. The NED Plan would require the relocation of a railroad bridge at RM 196.3 (Federal expense) and two gas pipelines at RM 236.1 (non-Federal expense).

NED Project Monitoring. After the final dike system is constructed, the project's construction phase would remain open for five years to monitor the effects of the dikes and channel on the river system. This monitoring would produce the hydraulic and environmental information used to determine if alterations of either the dikes or channel are needed to achieve project goals. This activity is not to be confused with the specific monitoring planned for the mussel bed located at RM 147.

NED Sequence of Construction. The number of dikes constructed each year would be dependent on project funding. However, the dike field constructed near RM 147, Hick's Lake Bend, would be built in the first phase of project construction so that project monitoring can determine the impact on the adjacent non-endangered mussel bed. The results from this monitoring would be used to determine further details of construction at this and other locations.

NED Plan Benefits from Commodity Movement on White River. The proposed recommended NED Plan offers transportation savings that would accrue to firms located in the White River area who ship commodities by non-barge modes. Tangible economic justification of the NED Plan is determined by comparing benefits expected to be realized during the period of economic analysis, with costs incurred during this time. According to Section 7a of the 1966 Transportation Act, Public Law 89-670, the primary direct navigational benefit of a water resource project is defined as the product of the transportation savings to shippers using the waterway and the estimated traffic that would use the waterway. Transportation savings are defined as the net difference between the full transportation costs, with and without the recommended NED Plan. Navigational benefits were calculated by commodity group, and in order to calculate transportation savings it was necessary to estimate the baseline tonnage (372,000 tons) and the costs for railing, barging, and trucking between transportation modes.

Benefits are based on modal shifts as revealed from surveys from potential shippers and estimates provided by the Tennessee Valley Authority. They are computed on the basis of savings due to shifts from rail or truck to barge. With the current barge shipments identified, we thus assumed that new cost savings would arise from the new traffic contributed by firms that indicated by survey that they would shift transportation mode if the White River were made more reliable.

The commodities and their respective tonnages identified by these shippers indicated the major portion (approximately 93%) of these commodity shipments would be grain and oilseed: wheat, corn, sorghum grain, rice, and soybeans. Agricultural chemicals, and fabricated metal products constituted remaining commodity shipments. The benefits attributed to the project were those benefits net of those benefits associated with existing shipments. The average annual equivalent transportation savings benefits for the NED Plan are $3,041,364.

Environmental Effects of NED Recommended Plan. Habitat losses would result from direct impacts of dike construction. Two habitat types are impacted: terrestrial and aquatic. For terrestrial habitat, construction of dikes would require some disturbance of the riparian zone on top bank in order to secure each dike to the bank. This activity would require between 150 to 200 feet of right-of-way from top bank landward. An estimated 155 acres of bottomland hardwood forest would be cleared during project construction. This terrestrial habitat would be allowed to regenerate following project construction. By the end of the 50-year project life, this habitat loss would be restored. Most dikes would be located in the upper reach of the river associated predominantly with agricultural lands and an occasional narrow forested riparian zone at some locations. A small number of trees would be removed in the riparian zone in order to "key in" the

dikes. For aquatic habitat, approximately 92 acres would be impacted as a result of dike placement, filling between dikes with sediment, or hydraulic changes during low water conditions. However, notches would be constructed in stone dikes to promote environmental benefits by creating a scour hole downstream, encouraging a back channel to remain open and create an isolated sand bar during a wider range of stages. Dike pools, both as feeding and rearing areas, would become inhabited by recreational and commercial fishes. These pools would have high standing crops and diversity of fishes, and they would provide recreational fishing opportunities.

Approximately 49.1 acres of gravel substrates would be impacted from the direct placement of dike features, potentially affecting mussels and fish that utilize gravel bars. Precise effects, if any, are not known at this time regarding mussel species considered under the Endangered Species Act (ESA). The Fat Pocketbook Pearly Mussel cited in WRDA of 1986, specific to this project, has not been confirmed to exist in the WRNIP area since the mid-1960s. Coordination required under the ESA for applicable plants or animals would be completed prior to any NED-related construction impacts. Potential effects to other components (not addressed above) of the human and physical environment might be identified during the completion of the NEPA and USACE planning processes.

Mitigation for NED Recommended Plan. To offset impacts (155 acres) on terrestrial habitat *and* loss (92 acres) of aquatic habitat, 160 acres of cleared land would be acquired for reforesting. This mitigation land would be monitored for tree survival. Creation or extension of approximately 49.1 acres of submerged gravel deposits would mitigate for impacts (49.1 acres) to mussels and fishes. Monitoring of these newly created (or extended existing) gravel bars would be done on a 5-year cycle for the life of the project (50 years) or until mussel populations become established (whichever is earlier). In addition, prior to any NED-related construction (including dikes), a field survey for mussel beds would be conducted to ensure accurate and complete information exists to support modification, if any, to the mitigation plan. Should one-time construction excavation of gravel be required to establish channel depths (as earlier described), consultation regarding additional mitigation would be made with pertinent agencies. At this time no specific mitigation is identified for adverse effects to cultural resources. Additional cultural resources planning activities and mitigation treatment, as appropriate under provisions of Federal law (and state law as applicable), would take place prior to any irreversible commitments to construction and operation of the NED Plan.

NER

The NER is a new and important aspect of the Corps' recent mission shift into ecosystem restoration activities. The current NER planning perspective (USACE 2000:Chapter 2) became part of the WRNIP during the study process (i.e. it was formalized several years after the 1996 project re-authorization). The USACE-MVM WRNIP team formulated NER features in a preliminary fashion, including input from environmental specialists among the WRNIP interagency team. The USACE presently is

developing its NER cost-sharing rate guidelines. Therefore, the NER rate used in this report is the same as the rate for NED. When the USACE finalizes NER cost-sharing guidance, NER cost-sharing can be determined.

NER Alternatives

Forty-five NER features were identified initially. These features were analyzed individually and those not eliminated became, as a group, the single recommended NER Plan. Among the full sequence described below, NER features are designated in three categories: (1) retained for detailed analysis, (2) eliminated due to technical (or other) factors, or (3) eliminated due to factors of scale and complexity where determining restoration potential exceeded the present funding capability of the WRNIP study. This status is indicated in underlined wording following the feature's title. All NER features retained for detailed analysis later became assembled as the proposed recommended NER Plan (see following sections on Comparison of NER Features, and NER Recommended Plan).

NER Feature A, No Action (Without Project). Eliminated due to technical (or other) factors. The nature of the overall existing conditions for the ecosystem(s) of the WRNIP area are poorly understood. The WRNIP area scale is such that multiple ecosystems can be interpreted within this large area, while at the same time a major ecosystem exists beyond the WRNIP reference the full Lower Mississippi River Valley. In discussions both in-house at MVM and within the interagency team, it became clear there is a consensus substantial needs and opportunities exist for various kinds and levels of ecosystem restoration. Therefore, this “no action” alternative cannot be recommended under the mandated NER planning perspective.

NER Feature B, Prevent Erosion and Control Water at Mossy Lake Outlet (RM 18.2L). Eliminated due to scale and complexity. This is the Mossy Lake "failed plug" area of major concern to FWS's White River NWR and TNC, and visited by Corps staff in August 2002. The problem is uncontrolled drainage of a system of oxbow lakes consisting of Mossy Lake, Parish Lake, East Moon Lake, and associated connections. Also, there is erosion more directly at the outlet’s junction with the White River’s left bank. Loss of water in this system has impacted its aquatic (and to some degree other) life forms dependent on the ecosystem associated with this water system. An engineering structure(s) or other action to control the outflow from Mossy Lake could improve this situation. The USACE-MVM could address repairing the plug under existing navigation maintenance authority. However, that authority could not be invoked to construct a water control feature, and no such feature should be built until the extensive system of lakes is studied, an activity requiring funding and time (including substantial coordination with the NWR) not available under the present study.

NER Feature C, Reestablishment of Water Levels in Bear Slough (RM 95.1L). Eliminated due to technical (or other) factors. This tributary is approximately 4.5 miles south of Clarendon, Arkansas. Placement of a weir at the mouth of Bear Slough would raise water levels enough to support fisheries for a longer period of time during the year.

This site is located on the White River NWR. Engineering feasibility analysis showed insufficient elevation for construction of a weir.

NER Feature D, Restoring Water Levels to Horseshoe Lake (RM 213.5R - 2 connection points). Retained for detailed analysis. The body of water known as Horseshoe Lake is part of an old meander of the river and it also is fed by the Departee Creek drainage. At present the flow in this lake is not optimal for aquatic life forms.

NER Feature E, Reestablishment of Water Levels in Scrubgrass Bayou and backwaters (RM 23.7L). Eliminated due to technical (or other) factors. This feature was suggested as mitigation for fisheries losses by the FWS in a comment letter on the 1979 EIS (USACE 1979a). This property is located within the White River NWR. Field inspection found existence of a natural plug, precluding need for construction of a weir.

NER Feature F, Reestablishment of Water Levels in Whirl Creek and Whirl Lake (RM 178.5R). Eliminated due to technical (or other) factors. Construction of a weir in the mouth of Whirl Creek would provide more stable water levels to Whirl Lake, enhancing fish habitat in the lake as well as the creek. This property is owned by AGFC. Consultation with that agency showed no need for a weir at this location.

NER Feature G, Restoring Water Levels to Clark Creek/Moores Lake Oxbow (RM 127.5R). Retained for detailed analysis. This tributary, Clark Creek, feeds an oxbow adjacent to the river's western side just upstream from where IH 40 crosses the White River. It is situated on the Wattensaw WMA (state lands). This location's ecosystem problem relates to deficiencies in water levels, impacting fisheries.

NER Feature H, Reestablishment of Water Levels in Hopspinkle Slough and Hopspinkle and Otto Lakes (RM 225.1R). Eliminated due to technical (or other) factors. Reestablishment of historic water levels in Hopspinkle Slough and associated lakes would benefit aquatic habitat as well as other life forms (such as waterfowl). Field inspection led to a decision to eliminate this feature, due to private land ownership and proximity of structures/utilities.

NER Feature I, Water Control Structure on Des Arc Lake WMA. Eliminated due to scale and complexity. This potential NER feature was voiced by AGFC staff at a meeting 17 Jan 2002. Des Arc Lake is part of Bayou Des Arc WMA, situated near where Bayou Des Arc enters the White River near RM 145. Des Arc Lake is a 320-acre public fishing lake with adjacent bottomland hardwood ecosystem components. The problem in terms of ecosystem restoration is that the lake's hydrologic connection with Bayou Des Arc and the nearby White River does not presently support ideal conditions for the aquatic ecosystem present in and near Des Arc Lake. Placement of an engineering control structure at the lake would benefit aquatic life forms and the local ecosystem associated with the lake. Apart from NER, this feature might be associated with needs and opportunities related to recreation.

NER Feature J, Restoring Water Levels to Raft Creek (RM 157.5R). Eliminated due to technical (or other) factors. Raft Creek is located not far south of the White County and Prairie County boundary against the western side of the White River. It has a problem in terms of water level not being maintained for optimal conditions related to aquatic life forms. It is surrounded by private land, and some water control structures already exist within the creek system. These structures enhance waterfowl habitat (specifically, moist soil units) and benefit duck hunting. Consultation with a state agency, including discussion of these factors of private land and the existing control structures, led to a conclusion that no substantial ecosystem restoration opportunity exists.

NER Feature K, Water Control Structure on Tubbs Creek Lake at Des Arc (RM 143.3 R). Retained for detailed analysis. This potential NER feature was voiced by AGFC staff at a meeting 17 Jan 2002, and field-visited that same year. The Tubbs Creek drainage system includes an oxbow lake located near the river and the town of Des Arc. Present conditions are such that water flow from the oxbow lake connecting to the river is detrimental to the Tubbs Creek ecosystem at and upstream from the oxbow lake. Some form of engineering structure(s) might stabilize and/or improve this situation. In addition, this oxbow lake's proximity to Des Arc offers opportunities for interpreting its ecosystem, thereby providing benefits from the local public becoming more educated on the benefits of ecosystem restoration.

NER Feature L, Reestablishment of Water Levels in Cache Bayou/Little Blue Hole (RM 189L). Eliminated due to technical (or other) factors. Fisheries would be improved by returning water depths in Cache Bayou and Little Blue Hole to historical levels. The study of this feature was halted when it became apparent construction of a weir might cause flooding on private lands, including agricultural fields.

NER Feature M, Reestablishment of Water Levels in Deep Bank Slough (RM 166.5R). Retained for detailed analysis. Fisheries would improve in this tributary if water levels were increased slightly. This property is owned by AGFC. Following analysis based on maps and other records, and a field visit during 2002, a weir structure was proposed to control the slough's water levels.

NER Feature N, Channel Stabilization in Newmann Lake and Kellum Slough (RM 172.5R; originally " Reestablishment of Water Levels …"). Retained for detailed analysis. It was initially believed that by placement of a weir at the mouth of the unnamed tributary leading from Newmann Lake and Kellum Slough, water levels in the tributary, lake, and slough would be restored to historical levels, enhancing fisheries and waterfowl habitat. However, a natural plug was identified during field investigation. If a weir were constructed, it would cause standing water throughout the low-lying bottoms, and excavation of the tributary channel would be required. Focus thus shifted to stabilizing the channel bottom to prevent scouring at the mouth, along with minor bank paving in the river at the junction of the creek. This channel stabilization would protect the natural plug from eroding, which would lower the lake's water level.

NER Feature O, Channel Stabilization in Hicks Lake (RM 147.3R; originally " Reestablishment of Water Levels …"). Retained for detailed analysis. The original opportunity appeared linked to placement of a weir at the mouth of the old oxbow lake, to stabilize water levels within the lake, hence improving habitat for fisheries and waterfowl. An AGFC representative recommended that water levels be raised two feet above current levels. However, field investigation discovered that scouring was occurring at the mouth. After further review, it was evident the tributary channel is very small and not much top bank exists. Because of these conditions, the same effect could be achieved by lining the creek's channel bottom and sides, which would slightly raise the bottom elevation (in effect acting like a weir).

NER Feature P, Reestablishment of Water Levels in Spring Lake (RM 139L). Eliminated due to technical (or other) factors. By placement of a weir in an unnamed tributary from Spring Lake, lake levels would be raised to historic levels thus improving fish habitat. Field inspection found an existing road culvert already functions as a weir.

NER Feature Q, Reestablishment of Flow to Old River (RM 130L). Eliminated due to scale and complexity. This old river channel runs parallel to the main stem of the river. Topographic maps show no landforms that indicate any connection to the river. A water control structure could be installed in the Old River and a pumping system could be installed in the White River to allow manipulation of water levels within Old River.

NER Feature R, Restoring Connectivity in Lower Portion of the Cache River. Eliminated due to technical (or other) factors. Install low flow weirs in the new (straightened) channel to restore hydrology to original natural channel. The problem is that previous channelization of the lower Cache River potentially adversely changed the ecosystem in this area. It is highly likely any return of this portion of the river to its natural configuration would restore significant aspects of the region's ecosystem. Pursuing further analysis of this matter was not continued because the Corps' involvement with the Cache River is authorized under separate Federal authority.

NER Feature S, Restoring Flow to Roc Roe Lake (RM 112R-upper end & RM 111.5R-lower end). Eliminated due to technical (or other) factors. This site is an oxbow lake situated just west of the river about 10 river miles downstream from DeValls Bluff. The upstream connection to the river is still evident; however, the downstream channel appears to be cut off from the river. Water levels within Roc Roe Lake are such that restoring greater flow would improve the aquatic ecosystem. The site is located on lands of the Cache River NWR. The lake's existing conditions include frequent seasonal recharge from river flooding. The feature was eliminated because field inspection showed extensive excavation would be needed to reestablish flows, and construction might cause substantial adverse impacts to existing habitat and wildlife.

NER Feature T, Restoring Flow to Cook's Lake (RM 78R). Eliminated due to scale and complexity. This is a major oxbow lake along the western side of the river about four river miles downstream from Preston Ferry in the northeastern portion of Arkansas County. The lake is part of the White River NWR including its nearby Cook's Lake

Lodge facility. The lower end of this oxbow lake suffers from problems with flow connecting with the river as well as access to this lake from the river at lower water levels. If flow could be restored and/or better controlled, the aquatic ecosystem of the lake in addition to public access would be much improved. Scale and complexity issues include a need for geomorphic analysis. Also, field inspection revealed that if the natural plug was removed, the lake might receive detrimental effects. The FWS staff suggested bioengineering should be considered for bank stabilization problems here.

NER Feature U, Reestablishment of Flow to Old River Lake near RM 118. Eliminated due to scale and complexity. The Old River Lake is a major oxbow lake about four miles downstream from DeValls Bluff, and it is on Cache River NWR land east of the river. A levee structure bisected this lake prior to its becoming part of the NWR. That impact clearly affected this natural lake's ecosystem and largely if not totally shut off half of its connectivity to the river. The levee could be modified to allow a more natural connectivity within the lake, and its link to the river's hydrology. This would restore aquatic habitat, substantially benefiting the lake's ecosystem.

NER Feature V, Reestablishment of Flow to Escronges Lake (RM 36.5R). Eliminated due to technical (or other) factors. Escronges Lake, located on the White River NWR, is no longer connected to the main stem of the White River. Reestablishing a connection between the river and the lake (along with backwaters) would enhance fisheries for a longer period of time since the area is merely seasonally connected by floodwaters. The feature was eliminated for several reasons. Field inspection showed extensive excavation would be needed to reestablish flows, and construction might cause substantial adverse impacts to existing habitat and wildlife. Also, the lake's existing conditions include frequent seasonal recharge from river flooding.

NER Feature W, Reestablishment of Flow to Miller Lake (RM 114.6L and 114.5L – upper and lower connections). Eliminated due to technical (or other) factors. By allowing proper flow into Miller Lake, fish habitat would be improved by increasing dissolved oxygen levels. This property is part of the Cache River NWR. Blockages exist some distance from the two junctions with the White River. Field inspection revealed that removal of these natural plugs might cause the lake to drain, a potential highly adverse effect. For this reason the feature was eliminated from additional consideration.

NER Feature X, Reestablishment of Flow to East Bayou (RM 96.5L). Eliminated due to technical (or other) factors. This bayou runs through a forested area on White River NWR three miles south of Clarendon. Excavation of this channel at the connection to the river would benefit the bayou as well as the backwater area. Field inspection showed extensive excavation would be needed to reestablish flows. The feature was eliminated because such construction might have substantial adverse impacts to wildlife and existing bottomland hardwood wetlands. Also, existing conditions here include frequent seasonal recharge from river flooding.

NER Feature Y, Restoring Water Levels at the Mouth of Taylor Bay (RM 201.9L). Eliminated due to technical (or other) factors. Taylor Bay is a backwater area

along the White River near Augusta. The problem is a combination of water flow and water quality issues, including keen interest on behalf of local citizens. This feature was not appropriate for WRNIP study because a similar study specific to this problem was in progress by the USACE Little Rock District's (USACE-SWL) Continuing Authorities Program.

NER Feature Z, Restoring Flow to The Basin (RM 121.5R). Eliminated due to scale and complexity. This is an oxbow river meander nestled below the town of DeValls Bluff. It has a lack of water quality and connectivity to the modern river, which in turn has impacted its aquatic ecosystem. It also might serve as a point for interpreting the value of ecosystem restoration, and the historic context of this feature. The proposed feature was eliminated when it became apparent during field inspection that an adequate study effort was beyond the current capability of the WRNIP.

NER Feature AA, Reestablishment of Flow to Lofton Lake near RM 252.5R. Eliminated due to technical (or other) factors. An unnamed tributary from Lofton Lake still connects with the White River just downstream of Newport, Arkansas. This tributary has silted in over the years and the lake area has shrunk. By excavating this channel, flows could be restored into Lofton Lake. The feature was eliminated when inspection of aerial photographs revealed the locality is extensively farmed, and modifying lake flow could adversely impact these lands.

NER Feature BB, Reestablishment of Flow to Horseshoe Lake near RM 243.9R. Eliminated due to technical (or other) factors. An unnamed tributary from Horseshoe Lake is located approximately 10 miles south of Newport, Arkansas. It initially appeared that excavation in the tributary could restore water flow to Horseshoe Lake. However, the feature was eliminated when inspection of aerial photographs revealed the locality is extensively farmed, and modifying flow could adversely impact agricultural lands.

NER Feature CC, Reestablishment of Flow in Horseshoe Lake (RM 145.5R). Eliminated due to technical (or other) factors. The fisheries in this lake would benefit by reestablishing flow during times other than seasonal floods. However, the feature was eliminated due to several reasons. Engineering analysis revealed modifying the flow might adversely impact lake levels. Next, field inspection identified an existing plug that appears to be functioning adequately. Also, agency representatives outside USACE-MVM communicated that if flow was reestablished, the lake might be drained.

NER Feature DD, Reestablishment of Flow to Arm Lake (RM 222R). Eliminated due to technical (or other) factors. An unnamed tributary from Arm Lake has been cut off from the White River. By excavating the channel, aquatic habitat would be recharged, hence improving fisheries. Inspection of aerial photographs and topographic maps showed a plug exists, and it was concluded that no weir is needed.

NER Feature EE, Prevent Erosion at Tributary at RM 14.4R (Prosperous Bayou). Eliminated due to technical (or other) factors. This is one "headcutting" area of major concern to the White River NWR and the Arkansas chapter of TNC. It was visited by

USACE-MVM and FWS staff in August 2002. The problem is associated with river morphology and hydrology, where it appears an unnamed tributary inlet is eroding at a rate (and orientation) threatening major adverse impacts to the bottomland ecosystem west of the river in the vicinity of RM 14.4 downstream to ca. RM 12. Some form of engineering structure(s) might stabilize and/or improve this situation. This potential feature was not considered for further study because USACE-SWL may address this opportunity under separate authority.

NER Alternative FF, Bank Stabilization at RM 189.5R. Eliminated due to scale and complexity. This potential NER feature was identified by AGFC staff at a meeting in January 2002. The site is located on AGFC lands and it is approximately 10 miles south of Augusta. Bank caving is occurring at the site, and stabilization would preserve the integrity of the river. It appeared approximately 7.76 acres would be involved, and mitigation would be necessary. However, field inspection in October 2002 revealed bank caving at greater distances surrounding this location. Resolving this matter would require a detailed feasibility study, including geomorphic analysis. Such level of effort exceeded the present capability of funding for the WRNIP.

NER Feature GG, Provide Public Access and Bank Stabilization near Whirl Creek (RM 178.4R). Eliminated due to technical (or other) factors. A primitive boat ramp currently exists at this location. However, it is inadequate and is causing bank caving at the site. A concrete boat ramp with associated riprap would improve water quality in the area. Field inspection revealed this opportunity was better suited as a recreational opportunity.

NER Feature HH, Sediment Control at the Mouth of the Cache River. Eliminated due to technical (or other) factors. This feature would establish vegetative buffer strips along portions of Cache River where agricultural lands adjoin it. The buffer strips would control runoff that contributes excessive sediment to the river. The problem this feature addresses is that of known or potential adverse impacts to water quality of the Lower White River. This feature was not studied further because the Cache River is authorized under separate Federal authority.

NER Feature II (multiple), Establish Riverine Buffer Strips to Improve Water Quality Along White River. Retained for detailed analysis. The objective was to establish vegetated buffer strips to control runoff where agricultural lands adjoin portions of the White River (in the WRNIP area). The problem is that development of land, particularly privately held land with expanding agricultural development, has resulted in sediment runoff and loss of wildlife habitat. Where agricultural fields border the river or its tributaries, farming practices often extend to "top bank" of the channel. Placing vegetative buffer strips of ca. 100 feet or more width along watercourses would slow and decrease the amount of surface land sheet flow sediment reaching the river, and depending on particulars of vegetation used, local context, etc. contribute toward ecosystem restoration associated with wildlife habitat. Nine site-specific "sub-features" (NER Features II-1 through II-9) were identified through interpretation of maps, other

records, and/or discussion with staff of other agencies. The locations of these proposed features are as follows:

II-1, RM 156-157R
II-2, RM 160.5-162R
II-3, RM 165-166R
II-4, RM 102.5-103R
II-5, RM 169-172R
II-6, RM 182-183R
II-7, RM 186-191R
II-8, RM 191.5-193R, and
II-9, Little Red River, southern bank (mouth of Little Red River near RM 177R).

NER Feature JJ, Restore Wetlands within TNC's Big Woods. Eliminated due to technical (or other) factors. This NER feature would contribute toward restoring natural aspects of the wetlands ecosystems of the Big Woods, an ecosystem conservation area defined and promoted under efforts of TNC. Under provisions of a recent Memorandum of Understanding (*not* specific to WRNIP) between TNC and the USACE, potential exists to define and implement restoration features related to natural wetland ecosystems such as the Big Woods, which largely coincides with the WRNIP study area. A substantial problem for the Big Woods ecosystem, overall and for the past 20 years or so, has been continued human-induced modifications to its natural wetlands. Also, NER benefits for the Big Woods would likely compliment public land held by NWRs and WMAs, and contribute to relevant aspects of the WRNIP ecosystem as a whole. However, this proposal was eliminated because Arkansas TNC staff communicated they have no interest in considering the Big Woods program under WRNIP NER analysis. NER Feature OO, elsewhere, was linked to the Big Woods under the theme of reforestation.

NER Feature KK, Black Bear Habitat. Retained for detailed analysis. This feature first involved an approach to establish wildlife corridors connecting various State of Arkansas (AGFC) Wildlife Management Areas (WMAs). The feature's original title was "NER Feature KK, Wildlife Corridors between AGFC WMAs." The problem was a lack of habitat connectivity for various target species to move across the landscape for optimal functioning within their ecosystem. However, subsequent discussions including input from agencies such as AGFC and FWS resulted in a shift of perspective, and concentration on one species. The original objective of a wildlife corridor was replaced with that of improving habitat for black bear, a large mammal species found in portions of the WRNIP study area (particularly in the White River NWR). Following additional consultation with other agencies, particularly the AGFC, approximately 291 acres of land was proposed for acquisition in the vicinity of RM 135-137R. Forest growth would be re-established on this land.

NER Feature LL, Jack's Bay Landing Area, White River NWR. Retained for detailed analysis. This feature centered on design and construction of an erosion stabilization feature at an eroding inlet associated with a significant archeological site

near RM 17R. The problem is twofold: erosion of sediment into the White River, which detracts from water quality in the river's ecosystem, and loss of archeological materials. The archeological materials have a link to ecosystem restoration in that the nature of certain materials (known or potential) in the deposit likely could provide information on the paleoenvironment of the locality and region. Having such data is crucial to understanding what the ecosystem's characteristics were prior to historic development. In other words, a poor understanding of past conditions detracts from knowing "where one is at" and "where one wants to go" in ecosystem restoration. The proposed feature would be a small action with probable minor benefits for water quality. However, it would have major benefits in halting destruction of a special form of ecological database.

NER Feature MM, Interpretation Facility at Jacksonport, for Ecosystems of AGFC WMAs. Eliminated due to scale and complexity. This NER feature would establish an interpretive facility at Jacksonport (RM 260). This facility's function would include interpreting ecosystems associated with WMAs in the WRNIP area. The problem for this feature relates to educating local and regional residents of Arkansas, along with visitors to the WRNIP region, on the nature and significance of the WRNIP's ecosystems, and the benefits of ecosystem restoration. Actual restoration features could be developed and made a part of the interpretative program. Conducting educational activities would improve protection and benefit the broader WRNIP ecosystem. This proposed undertaking was eliminated because the WRNIP's present budget and schedule could not support a detailed feasibility study suitable for a feature of this complexity. This feature also would have recreational benefits, and detailed study would carefully and explicitly show the relationship between recreation and ecosystem restoration within this feature.

NER Feature NN, Restoring Left Bank at Mouth of Cache River (RM 100). Eliminated due to scale and complexity. The Cache River enters the White River at a point (approximately RM 100L) just upstream from the city of Clarendon. Below the Cache's confluence, the White River's channel is migrating partly due to this influence. This migration is eastward, along the river's left descending bank where a major mussel bed (or complex of mussel beds) exists. If the migration is allowed to progress, this mussel population may be adversely effected. If this portion of the river's bank could be restored through some form of engineering work (e.g. armoring, bioengineering, etc.), this mussel bed would be protected from partial or greater losses. This NER feature was eliminated because the WRNIP's funding and time schedule could not support the level of study necessary to adequately (1) understand the hydrological variables and river geomorphology, (2) evaluate the mussel bed(s), (3) fully assess ongoing and future effects under the "no action" alternative, and (4) identify viable action alternatives.

NER Feature OO, Reforest Areas within TNC's Big Woods. Eliminated due to technical (or other) factors. This NER feature would contribute toward restoring natural aspects of the forest ecosystems of the Big Woods, an ecosystem conservation area defined and promoted under efforts of TNC. Under provisions of a recent Memorandum of Understanding (*not* specific to WRNIP) between TNC and the USACE, potential exists to define and implement restoration features related to natural forest ecosystems

such as the Big Woods, which largely coincides with the WRNIP study area. A substantial problem for the Big Woods ecosystem, overall and for the past 20 years or so, has been continued human-induced modifications to its forest cover (i.e. mainly clearing impacts). Loss of forest cover contributes to erosion and sedimentation run-off problems, and destruction of wildlife habitat. Wetlands were addressed under NER Feature JJ. Benefits of NER Feature OO would likely compliment public land held by NWRs and WMAs, and contribute to relevant aspects of the WRNIP ecosystem as a whole. However, this proposal was eliminated because Arkansas TNC staff communicated they have no interest in considering the Big Woods program under WRNIP NER analysis.

NER Feature PP, Woody Debris Placement. Eliminated due to scale and complexity. This potential NER feature was voiced by AGFC staff at a meeting in January 2002. Portions of the lower White River's aquatic ecosystem have been impacted by the removal of woody debris. Placement (or "replacement") of such material via a carefully reasoned methodology would benefit and/or restore aspects of the aquatic ecosystem. Such placement activities could be conducted to avoid conflicts with navigation activities and maintenance. In fact, snagging operations for navigation maintenance under existing authority could be coordinated with implementing this feature. Specific locations for such restoration features are not identified at this time. This feature was not developed due to a lack of funding and time for the present WRNIP study.

NER Feature QQ, Reestablishment of Historic Mussel/Fish Populations. Eliminated due to scale and complexity. Staff of the AGFC identified this potential NER feature in a meeting with USACE-MVM staff in January 2002. The aquatic ecosystem of the Lower White River and WRNIP area of the river has changed substantially from what might be termed its "natural" state. While no single factor caused this, the creation of reservoirs in the Ozark Mountain Plateau portion of the river, commercial harvesting of mussels during "boom years" in the historic past, and other cumulative effects poorly understood but real none-the-less changed the original aquatic ecosystem. The problem could be addressed at least partly if the diversity and richness of the original mussel and fish populations were encouraged. Not only the river but its tributaries and the entire watershed network would offer potential aquatic habitat opportunities. Exactly how or where to do such restoration of aquatic life forms is unknown at this time, but the WRNIP stretch of river (RM 10 to RM 254) largely coincides with the context of the White River system within the Gulf Coastal Plain, and thus it appears to be an ideal area to consider in determining localities for such restoration efforts. Sufficient funding and time were not available for developing a plan for NER Feature QQ.

NER Feature RR, Bank Stabilization Above Georgetown Boat Ramp (RM 167R). Eliminated due to scale and complexity. Field investigations during October 2002 revealed a need for stabilizing the bank at this location and replacing an existing primitive boat ramp. A new boat ramp also would benefit aspects of recreation. However, the inspection also revealed substantial bank caving is evident upstream of this location. The feature was eliminated from additional study because detailed feasibility study, including geomorphic analysis, could not be supported by existing WRNIP

funding. The ramp feature alone might be improved under the perspective of recreational development, assuming the ramp could be improved *without* addressing the NER-related bank erosion problems.

NER Feature SS, Bank Stabilization at RM 178R. Eliminated due to scale and complexity. Field investigations in October 2002 revealed a need for stabilizing the bank at several locations within this reach. However, it also was apparent substantial bank caving is evident elsewhere within the locality; and the larger area would need detailed feasibility study, including geomorphic analysis, prior to additional planning efforts. The feature was eliminated because the WRNIP could not support this degree of additional study.

NER Feature TT, Waterfowl Habitat within the Lower White River Basin. Retained for detailed analysis. The creation of, or enhancement to, waterfowl habitat would benefit the resource as well as encouraging recreational uses of the WRNIP area. This NER feature could be achieved by obtaining easements or acquisition of properties for reforesting/management specifically for waterfowl. Analysis included map study, examination of other records, and professional communications with others. In November 2002 a meeting was held among USACE-MVM, AGFC, ANHC, and FWS staff. A specific locality proposed for development of waterfowl habitat was discussed and eliminated at that time. However, approximately 700 acres remain targeted for acquisition as a waterfowl feature.

Comparison of NER Features

All NER features listed above as "retained for detailed analysis" were carried into detailed analysis. Of these 18 total features, all but one (NER Feature LL) were examined using the decision support software IWR-PLAN (Institute for Water Resources, web site at http://www.pmcl.com/iwrplan/DevelopmentTeam/Contact.htm). In essence, this cost effectiveness approach was developed by IWR to provide a means of examining the incremental (marginal) costs associated with varying sized environmental restoration projects. The analytical processes involved in this cost analysis are: (1) cost effectiveness analysis to ensure the least cost solution is identified for each possible level of environmental output, and (2) incremental cost analysis of the least cost solution is conducted to reveal the changes in cost associated with increasing levels of environmental outputs. The resulting benefits and costs associated with the WRNIP were used (as input data) in conjunction with the IWR-PLAN software to analyze three separate benefit categories: fisheries annual average habitat units (AAHUs), general wildlife average habitat units (AHUs), and waterfowl duck-use-days (DUDs). The selection of the various plans was made by examining the slope of the incremental cost curve and by identifying relatively large changes in benefits for relatively small changes in costs. This was the method used to evaluate and compare the 17 features, all of which were supported for inclusion in the NER Plan. Also retained was NER Feature LL although it was not suited to the cost effectiveness analysis. Instead, enough information existed for USACE-MVM staff to make a qualitative judgment to recommend that small proposed action become part of the NER Plan.

NER Recommended Plan

The NER features listed below (Table 8) constitute the proposed NER Plan for the WRNIP. These features, as a whole, constitute the NER Plan. The numerous NER features rejected for detailed analysis due to scale and complexity, technical factors, or other reasons are not included in this table. Some of those features (NER Features B, I, Q, T, U, Z, FF, MM, NN, PP, QQ, RR, and SS) later could be added to the NER Plan should additional funding and time be provided to support further analyses, and should such analyses support their inclusion. The First Costs and the AAE Operation and Maintenance Costs associated with the NER Plan are $3,560,955 and $629, respectively. The average annual habitat unit value benefits associated with these expenditures are: 1,185 fish AAHUs, 477 wildlife AHUs, and 265,965 waterfowl DUDs.

Table 8, Proposed NER Plan.

NER Feature	River Mile(s) location	Acreage Impacted	AAHU Gains Fisheries	AHU Gains General Wildlife	DUD Gains Waterfowl	First Costs	AAE O & M Costs
D - weirs	**213.5R**	**0.44**	**173.0**	**N/A**	**N/A**	**$24,326**	**$ 66**
G – weir	**127.5R**	**0.66**	**99.0**	**N/A**	**N/A**	**49,824**	**197**
K – weir	**143.3R**	**0.47**	**73.0**	**N/A**	**N/A**	**16,518**	**26**
M – weir	**166.5R**	**0.41**	**8.0**	**N/A**	**N/A**	**16,640**	**27**
N – channel stabilization	**172.5R**	**0.91**	**13.0**	**N/A**	**N/A**	**43,358**	**153**
O – channel stabilization	**147.3R**	**0.29**	**10.0**	**N/A**	**N/A**	**37,868**	**134**
KK – black bear	**135-137R**	**291.00**	**189.0**	**135.02**	**11,834**	**1,193,020**	**0**
II-1 – erosion buffer	**156-157R**	**15.30**	**9.9**	**6.96**	**610**	**48,752**	**0**
II-2 – erosion buffer	**160.5-162R**	**23.13**	**15.0**	**10.67**	**976**	**65,232**	**0**
II-3 – erosion buffer	**166-165R**	**13.18**	**8.6**	**6.03**	**488**	**44,540**	**0**
II-4 – erosion buffer	**102.5-103R**	**9.24**	**6.0**	**4.18**	**378**	**28,286**	**0**
II-5 – erosion buffer	**169-172R**	**51.24**	**33.3**	**23.66**	**2,074**	**150,313**	**0**
II-6 – erosion buffer	**182-183R**	**12.74**	**8.3**	**6.03**	**488**	**59,288**	**0**

II-7 – erosion buffer	**186-191R**	**62.47**	**40.6**	**29.23**	**2,562**	**142,738**	**0**
II-8 – erosion buffer	**191.5-193R**	**16.29**	**10.60**	**7.42**	**610**	**43,320**	**0**
II-9 – erosion buffer	**Little Red River, northern side**	**50.40**	**32.80**	**23.20**	**2,074**	**156,832**	**0**
TT – waterfowl	**145-148R**	**700.00**	**455.00**	**224.58**	**243,871**	**1,433,586**	**0**
*LL - stabilization	**17R**	**0.06**	**N/A**	**N/A**	**N/A**	**6,514**	**23**
TOTALS	**N/A**	**1,248.23**	**1,185.10**	**476.98**	**265,965**	**$3,560,955**	**$629**

*This NER feature involves stabilizing erosion at an archeological site of significant importance, containing paleoenvironmental deposits.

Environmental Effects of NER Recommended Plan. The beneficial effects to the environment for the NER Plan include improvements of approximately 291 acres for the general wildlife community, with possible benefits for black bear habitat; 700 acres for waterfowl habitat; and 254 acres for erosion buffers. Also, the NER Plan would improve fish habitat by increasing or maintaining oxbow lake levels. One NER feature (LL) would offer ancillary benefits regarding protection of paleoenvironmental deposits.

Approximately 3.2 acres of bottomland hardwoods would be adversely impacted by the placement of water control structures and channel protection for oxbow lakes, and moist-soil levees could have minor adverse effects on frequently flooded agricultural lands. However, adverse construction impacts associated with NER features would not be significant and would be offset by NER benefits. Potential NER effects on endangered or threatened species would be closely coordinated with the U.S. Fish and Wildlife Service pursuant to the Endangered Species Act.

None of the proposed NER features within the NER Plan are known to have adverse effects upon cultural resources. Cultural resources surveys and additional activities, as appropriate under provisions of Federal law, would take place prior to irreversible commitments to construction and operation of the NER Plan.

COMBINED NED/NER PLAN

The Combined NED/NER Plan is the addition of costs and benefits from both the NED and NER Plans (Table 18). The Combined NED/NER Plan should be viewed as two independent plans combined to meet two Federal objectives (USACE 2000). The NER Plan does not mitigate for environmental effects associated with the NED Plan.

Table 9, Costs for Combined NED/NER Plan.

Plan	First Costs	AAE O&M Costs
NED Plan	**$ 30,834,000**	**$ 706,063**
NER Plan	**3,560,956**	**629**
Combined NED/NER Plan	**$ 34,394,956**	**$ 706,692**

PROJECT COSTS OF ALL PLANS

Based on present USACE policy, either of the plans shown in Table 10 can be initiated. Additionally, a Combined NED/NER Plan can be initiated. Therefore, the overall First Costs and AAE Operation and Maintenance Costs associated with the entire project including NED and NER are $ 34,394,956 and $ 751,846 respectively.

Table 10, Project Costs of All Plans.

Item	Non-Federal	Federal	Total	B/C Ratio
NED	$5,939,600	$24,894,400	$30,834,000	1.16
NER	3,107,311	453,645	3,560,956	N/A
Total:	$9,046,911	$25,348,045	$34,394,956	

RESPONSIBILITY AND COST SHARING

Division of Plan Responsibility

The following Federal and non-Federal responsibilities apply to the construction, and operations and maintenance of the NED and NER Plans.

Federal Responsibilities.

a. Perform engineering and design, and supervision and administration necessary for the Federal portion of the project.

b. Construction of approximately 81 stone dikes and 4 chevron dikes, all in 26 dike fields, and with no dikes constructed along the National Wildlife Refuges. Additionally, construction (and/or revegetation) of the following 18 NER features: four water control weirs, two channel stabilizations, one general wildlife habitat area, nine erosion control buffer strips, one waterfowl area and one archaeological site (paleoenvironmental deposit) protection.

c. Perform annual maintenance of the channel improvement throughout the life of the project.

d. Share with the non-Federal interests in an amount not to exceed 80% of the First Costs for the NED Plan, NER Plan, or Combined NED/NER Plan. The NER cost-sharing rate procedures are under development by the USACE. When the NER cost-sharing procedures become finalized, NER cost sharing will be identified precisely. For the WRNIP, we are assuming that the NER Plan will be cost-shared at the same rate as the NED Plan (80% Federal, 20% non-Federal).

e. Share with local interests for fish and wildlife mitigation features, including development costs. Mitigation costs would be shared in proportion to the Federal and Non-Federal costs for construction of the navigation feature adjusted to compensate local interests for annual O&M costs which are the responsibility of the Federal Government based upon the Federal-Non-Federal navigation feature cost split.

f. The U.S. Coast Guard would install and maintain shore aids to navigation. The 75-foot buoy tender and crane barge, permanent mooring, vehicle and shore side facilities would be operated and maintained by them.

Non-Federal Responsibilities.

a. Provide without cost to the United States, all lands, easements and rights-of-way required for the construction and maintenance of the recommended improvements.

b. Hold and save the United States free from damages due to the construction, operation and maintenance of the completed project except for damages due to the fault or negligence of the United States or its contractors.

c. Provide, without cost to the United States, such alterations and relocations to existing improvements including highways, buildings, utilities, sewers, pipelines, and other facilities that may be required because of the project, except for alteration or replacement costs for obstructive railroad bridges.

d. Pay or contribute in-kind at least 20% of the First Costs for the NED Plan, NER Plan, or Combined NED/NER Plan. The NER cost-sharing rate procedures are under development by the USACE. When the NER cost-sharing procedures become finalized, NER cost sharing will be identified precisely. For the WRNIP, it is assumed the NER Plan will be cost-shared at the same rate as the NED Plan (80% Federal, 20% non-Federal).

e. Cost-share with the United States for fish and wildlife mitigation features. Mitigation would be cost-shared in proportion to the Federal and Non-Federal costs for construction of the navigation feature.

f. Comply with the provisions of the Uniform Relocations Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646.

g. Comply with provisions of Section 221 of the Flood Control Act of 1970, Public Law 91-611.

Federal and Non-Federal Cost Sharing

The tables below (Tables 20-21) show the breakdown of Federal and non-Federal costs associated with the NED and NER Plans for the project.

Table 11, Project Costs of the Recommended NED and NER Plans.

Item	Non-Federal $	Federal $	Total $
NED PLAN			
Lands & Damages	427,000	0	427,000
Relocations	2,695,000	3,204,000	5,899,000
Fish & Wildlife Facilities	183,000	732,000	915,000
Dikes, Channels & Canals	1,653,600	6,614,400	8,268,000
Cultural Resource Preservation	72,000	288,000	360,000
Permanent Operating Equipment	0	10,420,000	10,420,000
Planning, E&D	607,400	2,429,600	3,037,000
Construction Management	301,600	1,206,400	1,508,000
NED Subtotal	**5,939,600**	**24,894,400**	**30,834,000**
NER PLAN			
Lands & Damages	2,993,,900	0	2,993,,900
Construction Cost	92,960	371,840	464,800
Planning, E&D	11,155	44,621	55,776
Construction Management	9,296	37,184	46,480
NER Subtotal	**3,107,311**	**453,645**	**3,560,956**
Total All Plans' First Costs	**$9,046,911**	**$25,348,045**	**$31,190,956**

Table 12, AAE Operation and Maintenance Costs of the Recommended Plan.

Item	Non-Federal $	Federal $	Total $
NED Plan	0	706,063	706,063
NER Plan	126	503	629
Total	**$ 126**	**$ 706,566**	**$ 706,692**

Note: 2002 price levels shown

SUMMARY AND CONCLUSIONS

The following is the summary and conclusions of the preliminary draft WRNIP GRR: It is presented in the format of highlighted statements sorted by plan. An individual plan or both plans combined might be implemented if suitable support is developed. Additionally, authority to construct each plan is discussed below.

Highlights of NED Recommended Plan

The NED Recommended Plan directly addresses the objective of achieving 95% or greater annual availability for commercial barge traffic on the White River between Newport (RM 254) and Arkansas Post Canal (RM 10).

The proposed recommended plan contains approximately 81 stone dikes and 4 chevron dikes between RM 99 to RM 254 for the purpose of improving and stabilizing the navigation channel and reducing current maintenance dredging by 50 %. Between RM 10 to RM 99, it is estimated that to increase the depth from 8 feet (existing condition) to 9 feet it would require an additional 12% more dredging (27,180 cubic yards).

Environmental notches would be constructed in every stone dike where the height of the dike is 6 feet or greater. This would promote environmental benefits by creating a scour hole below them, and by encouraging a back channel to remain open and create an isolated sand bar during a wider range of stages. Dike pools, both as feeding and rearing areas, would become inhabited by recreational and commercial fishes. These pools would have high standing crops and diversity of fishes, and they would provide recreational fishing opportunities.

The plan would produce no measurable change of flow characteristics of the White River.

The plan would not change the sediment transport capacity of the White River (i.e. total sediment deposition in the river would not change).

Terrestrial habitat that would be disturbed by construction of the plan is approximately 155 acres.

Aquatic habitat that would be disturbed by construction of the plan is 92 acres. Specific to mussel resources (and to a degree fisheries) approximately 49.1 acres of the above mentioned 92 acres of aquatic habitat at gravel substrates would be impacted.

Terrestrial habitat mitigation would involve acquisition and reforesting and monitoring of tree survival of 160 acres of cleared land. Also, this mitigation land would offset loss of fisheries (aquatic) habitat.

To mitigate for impacts to mussel habitat, creation or extension of gravel deposits (approximately 49.1 acres) would provide habitat for expansion of the mussel population.

The Fat Pocketbook Pearly Mussel cited by WRDA of 1986, in reference to the WNRIP, has not been confirmed to exist in the project area since the mid-1960s.

The WRDA 1986 provided authority for the construction of channel improvements from RM 10 to RM 254, to provide a channel width of 200 feet, and a channel depth of 9 feet, available 95% of the time. This would have been accomplished with the construction of stone dikes at 36 locations with related revetment, at nine locations to help stabilize the navigation channel. The present NED Plan (items cited above) accomplishes the 9 feet deep channel available 95% of the time but it would maintain the existing channel width, 125 feet, from RM 10 to RM 198, and it would slightly widen the existing 100-foot-wide-channel to 125 feet width from RM 198 (Augusta) to Newport (RM 254). Therefore, under WRDA 1986 sufficient authority exists to construct the present recommended NED Plan.

Highlights of NER Recommended Plan

The proposed recommended NER Plan directly addresses the Federal objective consistent with protecting the Nation's environment. It is a plan that reasonably maximizes ecosystem restoration benefits compared to costs, and fosters environmental sustainability.

The plan contains 18 separate features that would be constructed across various locations within the WRNIP area. These features include weirs, channel stabilization, erosion buffers, and development of waterfowl habitat.

The average annual habitat unit value benefits of the proposed recommended NER Plan are 1,185.1 fish AAHUs, 476.98 general wildlife AHUs, and 265,965 waterfowl DUDs.

The plan includes approximately 291 acres of land for general wildlife, with possible benefits for black bear; 700 acres for waterfowl habitat; 254 acres of erosion buffers; and increasing or maintaining oxbow lake levels to improve fisheries habitat.

While WRDA 1986 stipulates explicit mitigation pertinent to the 1979 NED Plan's potential effects on natural resources, it also emphasized attention to constructing environmental features to benefit natural resources such as aquatic habitat. However, the WRDA 1986 authority did not address environmental features *directly* equivalent to those that might result from USACE's relatively new NER planning perspective. Therefore, under WRDA 1986, sufficient authority does not exist to construct the recommended NER Plan. Additional Congressional authorization would be necessary to construct the NER Plan.

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USACE-MVM (U.S. Army Corps of Engineers, Memphis District)

1961 White River Navigation. Letter (11 pages) from MVM District Engineer Marvin L. Jacobs, sent to Division Engineer, Lower Mississippi Valley Division,

Vicksburg, dated 6 April 1961. Copy on file USACE-MVM.

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1976 *Final Environmental Statement, Channel Maintenance of the White River, Mile 9.8 to Newport, Arkansas.* USACE-MVM, July 1976.

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1979a *Final Environmental Impact Statement, White River Navigation to Batesville, Arkansas.* Prepared by USACE-MVM, May 1979. Copy on file, USACE-MVM.

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1979b *White River to Batesville, Arkansas, Feasibility Report*. USACE-MVM. Copy on file, USACE-MVM.

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1979c *Transcript of Final Public Meeting for White River to Batesville, Arkansas.* Meeting held at Augusta, Arkansas, 10 April 1979. USACE-MVM. Copy on file, USACE-MVM.

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US Census Bureau
2002 *U.S. Census Bureau, County Business Patterns 2000, Arkansas.* U.S. Census Bureau, U.S. Department of Commerce, Economics and Statistics Administration, Washington D.C. (see also http://www.census.gov/prod/2002pubs/00cbp/cbp00-5.pdf)

WRBCC (White River Basin Coordinating Committee)
1968 *Comprehensive Basin Study, White River Basin, Arkansas and Missouri.* Coordinating Committee included Federal Departments of: Army; Agriculture; Commerce; Health, Education, and Welfare; and Interior; and Federal Power Commission, also State of Arkansas, and State of Missouri. Volumes I-VI, copy on file, USACE-MVM.

APPENDIX 1

Fish and Wildlife Coordination Act Correspondence: Letter dated December 23, 2002, from U.S. Fish and Wildlife Service, Ecological Services, Arkansas, and response dated January 31, 2003, USACE, Memphis District.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1500 Museum Road, Suite 105
Conway, Arkansas 72032
Tel.: 501/513-4470 Fax: 501/513-4480

IN REPLY REFER TO:

December 23, 2002

Colonel Jack V. Scherer
District Engineer
Memphis District, Army Corps of Engineers
167 N. Main St., B-202
Memphis, TN 38103-1894

RE: White River Navigation Enlargement Project Feasibility Study, National Environmental Restoration Plan Features

Dear Colonel Scherer:

This planning aid letter provides fish and wildlife related concerns, comments, and recommendations on the Environmental Features proposed for inclusion in the National Ecosystem Restoration Plan (NER) portion of the White River Navigation Enlargement Reevaluation Study. The study is being conducted by the Memphis District, Army Corps of Engineers (Corps) under the authority of the Water Resource Development Act of 1996. This letter has been coordinated with the Arkansas Game and Fish Commission (AGFC) and is submitted in accordance with the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). It does not constitute the Service's Fish and Wildlife Coordination Act report required by section 2(b) of that act.

The Corps is scheduled to complete a preliminary draft of the General Reevaluation Report (GRR) and Environmental Impact Statement (EIS) for internal review by the end of December 2002. A determination of continued federal interest will be made pending outcome of the review. If you determine that continued federal interest is warranted, the Corps would complete work on the GRR and EIS during FY 03. Corps personnel contacted Service staff on November 6, 2002 to ask if we could produce a Fish and Wildlife Coordination Act Report (CAR) for the preliminary GRR and EIS. At that time we had only received a preliminary list of NER features. We had not received results of the fish Habitat Evaluation Procedure, the connectivity study, or revised engineering plans and project alternatives. We received a copy of the initial draft engineering appendices on November 15, 2002. Due to the limited time for review and incomplete study results and project plans, the Service advised the Corps that we could not produce a CAR in the specified time frame. Instead, we agreed to produce a planning aid letter that would concentrate on the NER features.

The NER is a component of the Corps' planning process intended to identify ecosystem restoration opportunities, the results of which could contribute to net benefits of the National Economic Development Plan. The features identified in the NER are separate and not to be confused with any mitigation that may be required if the project is authorized and constructed. The initial list of NER features was developed between the Corps and AGFC and facilitated by two meetings held between these agencies in January and February 2002. Service staff accompanied representatives of the Corps and AGFC on October 8, 2002 to evaluate several proposed features. Upon seeing the list being used by Corps staff during this field inspection, the Service requested a copy of NER features. We received these on October 10, 2002. Service national wildlife refuge and ecological services personnel attended a meeting with the Corps and other resource agencies on November 22, 2002 to review identified NER features and to get an update on the status of the study. We received a revised list of NER features at that time.

Of the 45 possible environmental features identified by the Corps and AGFC, 10 were presented for possible action. The remaining 35 features were screened out by the Corps due to degree of complexity or other reasons. Item TT, establishment of waterfowl habitat on the Little Red River, was eliminated at the interagency meeting because all but 290 acres of this land had previously been acquired and reforested by the Service for the Bald Knob National Wildlife Refuge. Item KK-4, corridor, was eliminated because this site has been enrolled and reforested through the Wetland Reserve Program, and KK-9 was eliminated because it is part of the Bald Knob National Wildlife Refuge and has been reforested.

The lower White River ecosystem functions through a complex interaction between the mainstem, tributaries, sloughs, oxbow lakes, and floodplain. Through normal riverine processes these resources are constantly changing, such as the formation of new oxbow lakes through meander cutoffs and succession of existing oxbow lakes from deep water systems to swamps and forested wetlands. The introduction to the NER Plan states that "It is recognized that various levels of ecosystems are associated with the WRNIP, from basin-wide and regional levels to distinctive ecosystems associated with small areas of land and/or water." While ecosystems of varying scales exist within the navigation project area, it must also be understood that these smaller ecosystems function as components of a larger ecosystem that is defined at a landscape scale. In addition, many of the natural resource problems within the basin relate to the cumulative impacts on this larger ecosystem. Therefore, we recommend that the NER features be evaluated in the context of their relationship to the larger ecosystem.

The Corps identified water level restoration as the objective for items D, G, K, and M. Weirs and other water level controls would be used. The narrative accompanying the NER features stated that flow is not optimal for aquatic life in Horseshoe Lake, item D; deficiencies in water levels were impacting fisheries in Clark Creek/Moores Lake, item G; flow from the oxbow connecting to the White River is detrimental to the ecosystem at and upstream of the Tubbs Creek Lake, item K; and that fisheries would be improved if water levels were increased slightly in Deep Bank Slough, item M. Conflicting information was presented for items N, Newman Lake, and O, Hicks Lake. The objective for both of these is reestablishment of water levels through placement of weirs at the mouths of the lakes and distributary sloughs. The table

identifying the selected NER alternatives, however, indicates channel stabilization as the action for those elements. Since habitat units (HU) were calculated for gains in fish habitat at these sites and presented in another table, we will assume the objective of these items is as stated in the text.

Existing and post project conditions (average depth, Habitat Suitability Indices (HSI), acres, HU, and gain in HU) for items D, G, K, M, N, and O (oxbow lakes weir construction) were presented in the table "White River NER Features - Fish Habitat Units (HU) for Oxbow Lakes". The average depths of the oxbow lakes were assumed based on observations from the bank during a site visit conducted during the first two weeks of October 2002. This estimated depth was used to determine current and post project conditions and to calculate HU.

Water levels in the floodplain lakes vary depending on numerous factors independent of the invert elevation at the river's edge. Substrate composition and the subsurface connection to the river, river stage, water table, water withdrawals, aquatic and terrestrial vegetation within and adjacent to the lake, and precipitation can all affect the seasonal and annual variation in water depth. Age of the lake as well as the type and quality of runoff into the lake can have a significant influence on water depth. That is, a lake surrounded by agricultural land would generally receive runoff with higher sediment loads than lakes surrounded by forest. Old lakes would be expected to be shallower as they undergo succession.

Water depth is a critical variable for calculating HSI and HU. It is extremely difficult, if not impossible, to determine the average depth of a body of water by standing on the bank. Therefore, a survey of the lake should be conducted and empirical data collected. HU calculations should be based on real numbers.

Heterogeneity in the White River floodplain aquatic habitats is an important characteristic. That is, lakes, sloughs, and backswamps connect to the river at varying stages and conditions. The value of a particular lake to fisheries, wildlife, or other ecological functions is dependent on these conditions, as well as its successional stage. Determination of desirable actions in oxbow lakes, therefore, should be based on these considerations. Data on the frequency of the lake's connection to the river under current or historic conditions should be collected. The fish habitat table indicates that the oxbow lakes will increase their size by up to 253 acres. Elevation and species composition of the forested fringe should be measured to determine how much additional land would be inundated and whether this vegetation would be degraded or killed by raising the lake levels. The value of floodplain lakes to other wildlife, particularly birds should be determined. Potential impacts including eliminating or reducing availability of mud flat habitat used by shorebirds. Environmental losses should be evaluated along with environmental gains. The Service should be consulted with and involved in calculation of environmental gains from the proposed actions. Supporting documentation that would allow the results to be verified by independent parties should be provided.

Item II entails establishment of vegetated buffer strips to control runoff where agricultural lands adjoin portions of the White River. Riparian buffers provide multiple benefits to both the terrestrial and aquatic communities, and vegetated buffers, especially wooded ones, are preferred

to no buffers. There is conflicting information on where the buffer strips would be established. The text describing this feature indicates that buffers of 100 feet or greater in width would be established along the White River. The table of selected features indicates that 50.4 acres of buffers would be established on the south side of the Little Red River.

The value of riparian buffers to a particular wildlife species varies with width of the buffer and vegetative species composition. Riparian zones of mature trees less than approximately 100 feet wide receive little use and appear incapable of maintaining squirrel populations (Dickson 1989, Dickson and Huntley 1987) while small mammals, especially fulvous harvest mice, are more abundant in narrower riparian zones without mature forest (Dickson and Williamson 1988). Zones wider than 300 feet are used more by neotropical migratory birds than narrower zones. Corridors less than 164 feet wide do not provide much habitat for area-sensitive migrants and are dominated by short-distance migrants (Keller *et al.* 1993). Fischer and Fischenich (2000) made a general recommendation that buffers should be at least 300 feet wide "to ensure values related to wildlife habitat".

Average annual habitat unit gains of 32.8, 23.2, and 2.074 were calculated for fisheries, general wildlife community, and waterfowl, respectively for the 100+ foot wide buffer feature. Due to the complicated relationship between buffer width and species benefit, determination of habitat unit gains should be referenced to specific fish and wildlife species, and the habitat characteristics that provide those benefits should be described. Species benefitting from habitat as it develops from initial planting until overstory species reach maturity will change. This change should be noted and quantified to the degree possible.

The value of riparian buffers to waterfowl depends on topography as well as the type, condition, and age of vegetation. Natural levees along alluvial rivers flood less frequently and for a shorter duration than adjacent flats and backswamps. Consequently, determination of their contribution of duck-use-days must take this into account. Oak trees generally begin producing acorns between 25 and 35 years of age. Calculation of duck-use-days for the these buffers must factor this into the equation. The Corps should work with the Service to calculate duck-use-days.

The Corps calculated a gain of 32.4 HU for fisheries from the buffer feature. These calculations should be done in cooperation with the Service. You should provide supporting documentation that specifies what aspects of buffer creation will benefit fisheries and data used to derive the HU.

Item KK entails creation of corridors connecting Wattensaw Wildlife Management Area (WMA) to Hurricane Lake WMA to facilitate movement of black bears between these areas. The features table indicates that approximately 1,066 acres would be forested to widths ranging from 150 to 500 feet. At least some segments of the proposed corridor are across the river from existing blocks of forest. Because of this, the corridors would do little to facilitate bear movements between these areas. However, these corridors would benefit other species of wildlife even if they are of limited value to bears. Species benefitting from these corridors should be listed and HU gains calculated for them. Calculations of HU and duck-use-days should include the same considerations and constraints as those described for the buffer feature.

Supporting documentation should be provided and the Corps should work with the Service to derive these values.

Item LL specifies stabilization of the river bank at Jack's Bay. The stated problems are erosion of sediment into the White River, which degrades water quality, and loss of archaeological materials. The White River is currently undergoing significant geomorphic adjustments in response to the numerous land and water development projects on it and the Mississippi River. Headcuts moving up drainages, excessive bank erosion, and channel migration are evident over much of the lower White River. The Corps has stabilized banks in other portions of the river. While bank paving will protect a particular area, it is only a band aid applied to a symptom of a larger problem. It does not solve the problem; rather, it moves the problem to another reach. The Service supports protection of the archaeological resources at Jack's Bay. However, this action should not be construed as ecosystem restoration. It is erosion control. A geomorphic study of the lower White River is needed. Results of such a study would provide agencies with the information needed to solve the problems in a holistic manner rather than in piecemeal fashion. It would guide actions on the river that would help it achieve stability.

The Corps' mission of ecosystem restoration and efforts to identify and include ecosystem restoration features in water development projects is laudable. However, the Service is opposed to the White River Navigation Enlargement Project, and we have concerns and problems with the NER features presented. First, we are concerned that the Corps and the project proponents will use these features to help garner support for this environmentally destructive project; second, the NER features for the project have not received the degree of study and planning needed. The current study has been underway since 1999, yet work on the NER did not begin until January 2002. We understand that budgetary constraints have delayed completion of the study; however, the Corps has continued to conduct engineering analyses, economic analyses, and environmental studies since the project was initiated. Third, many of the features presented are fisheries management, which is not necessarily synonymous with ecosystem restoration. Environmental benefits for elevating water levels in the six oxbow lakes were derived from data on assumed water depths. No attempt was made to identify or quantify adverse impacts of these actions. Fourth, there is no assurance that the NER would be implemented if the project was authorized. Features identified on private land would first need permission of the landowner and are dependent on acquisition of fee title or easements from willing landowners. Fifth, engineering components (dikes and revetments) of the navigation project itself would have an 80 percent federal:20 percent local cost share while NER features would be cost shared at a 50:50 rate. This reduces the likelihood of support by a local sponsor and increases the difficulty of finding the funding necessary to implement. Sixth, maintenance of these features would be the responsibility of either the landowner or the local sponsor. This further discourages their implementation and makes the long term success of the features questionable.

Close coordination with the Service on the White River navigation project is essential for our agencies to meet the requirements of the FWCA and the National Environmental Policy Act. Additional information on the White River navigation project would greatly increase our ability to work with the Corps and to evaluate impacts. Specific information on engineering designs, data and results of hydrologic and hydraulic analyses, and environmental studies would be

especially useful. We have requested information and results of the connectivity study and fisheries HEP three times. We have not yet received anything on these studies. We would appreciate it if you could provide this information. This would enable us to respond in a more timely manner to your requests for Coordination Act Reports and other documents from us.

Please contact Allan Mueller at 501-513-4475 or Joseph Krystofik at 870-347-1506 if you have any questions or need any additional information.

Sincerely,

Jon Wessman

Jon Wessman
Acting Field Supervisor

cc: Larry Mallard, White River National Wildlife Refuge, DeWitt, AR
Dennis Widner, Cache River National Wildlife Refuge, Augusta, AR
John Hefner, USFWS, Atlanta, GA
David Reece, U.S. Army Corps of Engineers, Planning Branch, Memphis, TN
Craig Uyeda, Arkansas Game and Fish Commission, Little Rock, AR
Tom Foti, Arkansas Natural Heritage Commission, Little Rock, AR
Ken Brazil, Arkansas Soil and Water Conservation Commission, Little Rock, AR
Sandy Formica, Arkansas Department of Environmental Quality, Little Rock, AR
Sharon L. Osowski, U.S. Environmental Protection Agency, Region VI, Dallas, TX
U.S. Army Corps of Engineers, Little Rock District, Little Rock, AR
U.S. Army Corps of Engineers, Vicksburg District, Vicksburg, MS

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DEPARTMENT OF THE ARMY
MEMPHIS DISTRICT CORPS OF ENGINEERS
167 NORTH MAIN STREET B-202
MEMPHIS TN 38103-1894

Reply to
Attention of:

January 31, 2003

Planning, Programs, & Project
Management Division
Project Management Branch

Allan J. Mueller
U.S. Fish & Wildlife Service
1500 Museum Road, Suite 105
Conway, Arkansas 72032

Dear Mr. Mueller:

This is in response to Acting Field Supervisor, Mr. Jon Wessman's Planning Aid Letter dated December 23, 2002, concerning the White River Navigation Improvement Project.

We take issue with some of the comments. Additionally, we are concerned with your agency's opposition to a potential project while studies are yet on-going. We do not believe this premature positioning to be within the spirit of the Fish and Wildlife Coordination Act. Enclosed are our responses.

If you have any questions, please contact Jim Lloyd at 901-544-3343.

Sincerely,

for Jack V. Scherer
Colonel, Corps of Engineers
District Engineer

Enclosure

Cc:
Joe Krystofik, U.S. Fish & Wildlife Service, Augusta, AR
Larry Mallard, White River National Wildlife Refuge, DeWitt, AR
Dennis Widner, Cache River National Wildlife Refuge, Augusta, AR
John Hefner, U.S. Fish & Wildlife Service, Atlanta, GA
U.S. Army Corps of Engineers, Little Rock District, Little Rock, AR
U.S. Army Corps of Engineers, Vicksburg District, Vicksburg, MS
Michael Jansky, Environmental Protection Agency, Region VI, Dallas, TX
Sharon L. Osowski, Environmental Protection Agency, Region VI, Dallas, TX
Keith Garrison, Arkansas Waterways Commission, Little Rock, AR
Craig Uyeda, Arkansas Game & Fish Commission, Little Rock, AR
Tom Foti, Arkansas Natural Heritage Commission, Little Rock, AR
Ken Brazil, Arkansas Soil & Water Conservation Commission, Little Rock, AR
Sandy Formica, Arkansas Department of Environmental Quality, Little Rock, AR

USACE, Memphis District
Response to USFWS Planning Aid Letter Dated December 23, 2002

Note: The sequence of 18 comments below corresponds with portions of the referenced U.S. Fish & Wildlife Service (USFWS) letter. The pertinent quote from the USFWS letter is followed by a response, in bold, from the U.S. Army Corps of Engineers, Memphis District (USACE-MVM). Any mention in USACE-MVM comments regarding a "meeting" refers to the meeting held November 22, 2002, among the USACE-MVM, USFWS, Arkansas Game & Fish Commission (AGFC), and Arkansas Natural Heritage Commission (ANHC). That meeting focused on proposed National Ecosystem Restoration (NER) features.

Comment #1: "... the White River Navigation Enlargement Reevaluation Study."

Response #1: The project's precise title as authorized is "White River Navigation to Batesville, Arkansas" (WRDA 1996:Sec. 363, Project Reauthorizations). For general study purposes, the project also is referred to as the White River Navigation Improvement Project (WRNIP).

Comment #2: "The Corps is scheduled to complete a preliminary draft of the General Reevaluation Report (GRR) and Environmental Impact Statement (EIS) for internal review by the end of December 2002. A determination of continued federal interest will be made pending outcome of the review. If you determine that continued federal interest is warranted, the Corps would complete work on the GRR and EIS during FY 03."

Response #2: During the meeting, attendees were updated on the schedule for the draft GRR and Supplemental EIS (SEIS) reports. Recall the USACE-MVM considers the forthcoming SEIS to be a supplement in relation to the original 1979 EIS, although we recognize the SEIS would be essentially a new, standalone document. It was conveyed at the meeting that a draft GRR with an Environmental Appendix would be completed by late December 2002 for in-house review. To clarify the most current status on this matter, the draft GRR's information is being condensed into a Summary Report to be distributed, upon completion, to the project sponsor and the USFWS.

Comment #3: "We had not received results of the fish Habitat Evaluation Procedure, the connectivity study, or revised engineering plans and project alternatives. We received a copy of the initial draft engineering appendices on November 15, 2002."

Response #3: Mr. Joe Krystofik, USFWS, was informed as early as January 15, 2002, that difficulties had been encountered in the connectivity study. When the essential analysis is completed, we will provide the USFWS a preliminary report on the results of the connectivity study. Our best estimate for providing this report is late March 2003. The draft fisheries study report should be available for distribution no later than February 2003. Project alternatives have been discussed repeatedly over the past 3 years with USFWS and other agency representatives.

Comment #4: The NER is a component of the Corps' planning process intended to identify ecosystem restoration opportunities, the results of which could contribute to net

benefits of the National Economic Development Plan."

Response #4: You are incorrect in stating that the National Ecosystem Restoration (NER) Plan "...could contribute to net benefits of the National Economic Development Plan". The NER and National Economic Development (NED) Plans are studied as separate, stand-alone components of the WRNIP. It is true that NER and NED Plans are considered under a Combined NED/NER Plan, as stated by Engineering Regulation (ER) 1105-2-100. However, while this perspective does seek to maximize the sum of net NED and NER benefits, it should not be construed as a contribution of the NER to the NED. Staff of the USACE-MVM earlier provided your office with the web site location for ER 1105-2-100. We understand the NER perspective is relatively new (dated 2000). In fact, our staff have indicated earlier to your agency, in a variety of communications, that the essential written summary defining the NER is stated in Chapter 2 of ER 1105-2-100. An interesting aspect of the present state of NER, as a newer component of the Corps planning process, is that flexibility exists for being creative in the NER planning process.

Comment #5: "Of the 45 possible environmental features identified by the Corps and AGFC, 10 were presented for possible action. The remaining 35 features were screened out by the Corps due to degree of complexity or other reasons."

Response #5: It was explained during the meeting that even though many of the NER features had been screened out for possible action at this time, some of these features could be recommended for further feasibility study, if funded. Under present restraints of the WRNIP study, sufficient funding and time were not available to conduct feasibility level studies on many of these potential features.

Comment #6: "Item TT, establishment of waterfowl habitat on the Little Red River, was eliminated at the interagency meeting because all but 290 acres of this land had previously been acquired and reforested by the Service for the Bald Knob National Wildlife Refuge."

Response #6: Even though a specific site for NER Alternative TT (waterfowl habitat) was eliminated at the meeting, this location was proposed only as a representative waterfowl area. Specific NER sites, including Alternative TT, would be determined pending willing participants. The actual sites would not be obtained until the WRNIP enters final planning and construction phases. At this time, approximately 700 acres have been targeted for acquisition as a waterfowl feature under the NER Plan.

Comment #7: "While ecosystems of varying scales exist within the navigation project area, it must also be understood that these smaller ecosystems function as components of a larger ecosystem that is defined at a landscape scale. In addition, many of the natural resource problems within the basin relate to the cumulative impacts on this larger ecosystem. Therefore, we recommend that the NER features be evaluated in the context of their relationship to the larger ecosystem."

Response #7: Small-scale NER benefits should have positive effects on the larger ecosystem. Although cumulative effects thereof are not analyzed for the preliminary report, they would be addressed in the draft EIS.

Comment #8: "The Corps identified water level restoration as the objective for items D, G, K, and M. Weirs and other water level controls would be used. The narrative accompanying the NER features stated that flow is not optimal for aquatic life in Horseshoe Lake, Item D; deficiencies in water levels were impacting fisheries in Clark Creek/Moores Lake, item G; flow from the oxbow connecting to the White River is detrimental to the ecosystem at and upstream of the Tubbs Creek Lake, item K; and that fisheries would be improved if water levels were increased slightly in Deep Bank Slough, item M. Conflicting information was presented for items N, Newman Lake, and O, Hicks Lake. The objective for both of these is reestablishment of water levels through placement of weirs at the mouths of the lakes and distributary sloughs. The table identifying the selected NER alternatives, however, indicates channel stabilization as the action for those elements. Since habitat units (HU) were calculated for gains in fish habitat at these sites and presented in another table, we will assume the objective of these items is as stated in the text."

Response #8: It was stated that "conflicting information" was presented for Items N and O. Both sites were initially selected for weir construction; however, field investigations on October 3, 2002, revealed that channel stabilization was required at both sites. This would provide benefits because we assume future without-project conditions include degradation of the tributary channel. This was explained during the meeting.

Comment #9: "Water depth is a critical variable for calculating HSI and HU. It is extremely difficult, if not impossible, to determine the average depth of a body of water by standing on the bank. Therefore, a survey of the lake should be conducted and empirical data collected. HU calculations should be based on real numbers."

Response #9: Numerous statements were made at our meeting regarding calculations of Habitat Suitability Indices (HSIs) and Habitat Units (HUs) as related to water depths of oxbow lakes. The depths used were typical of such lakes located in the lower White River basin. It was explained that more detailed surveys would be conducted when the project entered the design phase. If necessary, weirs would be modified, and HUs recalculated. Also, weirs could be eliminated following further evaluation. However, for this feasibility level of effort, the HSIs and HUs were adequate for the relative comparison made in cost effectiveness and incremental analyses.

Comment #10: Heterogeneity in the White River floodplain aquatic habitats is an important characteristic. That is, lakes, sloughs, and backswamps connect to the river at varying stages and conditions. The value of a particular lake to fisheries, wildlife, or other ecological functions is dependent on these conditions, as well as its successional

stage. Determination of desirable actions in oxbow lakes, therefore, should be based on these considerations. Data on the frequency of the lake's connection to the river under current or historic conditions should be collected. The fish habitat table indicates that the oxbow lakes will increase their size by up to 253 acres. Elevation and species composition of the forested fringe should be measured to determine how much additional land would be inundated and whether this vegetation would be degraded or killed by raising the lake levels."

Response #10: We concur that careful consideration must be given to oxbow lake hydrology and connectivity during the design of the water control structures. Hydraulic/hydrologic data and detailed topographic surveys would be utilized in developing final designs and operation plans. Also, the USFWS and AGFC would be consulted throughout the design process to ensure that desired benefits are achieved and adverse impacts to fish and wildlife are avoided. HUs were calculated for the general wildlife community.

Comment #11: "The value of floodplain lakes to other wildlife, particularly birds should be determined. Potential impacts including eliminating or reducing availability of mud flat habitat used by shorebirds. Environmental losses should be evaluated along with environmental gains."

Response #11: It was implied that mud flats which are used by numerous wildlife and wading birds would be eliminated by increasing the oxbow lake levels. We believe no adverse effects would occur to mud flat habitat. Levels would continue to fluctuate as they do now. Again, final weir designs and evaluation for potential effects would be coordinated with the USFWS and AGFC.

Comment #12: "The value of riparian buffers to a particular wildlife species varies with width of the buffer and vegetative species composition. Riparian zones of mature trees less than approximately 100 feet wide receive little use and appear incapable of maintaining squirrel populations (Dickson 1989, Dickson and Huntley 1987) while small mammals, especially fulvous harvest mice, are more abundant in narrower riparian zones without mature forest (Dickson and Williamson 1988). Zones wider than 300 feet are used more by neotropical migratory birds than narrower zones. Corridors less than 164 feet wide do not provide much habitat for area-sensitive migrants and are dominated by short-distance migrants (Keller *et al.* 1993). Fischer and Fischenich (2000) made a general recommendation that buffers should be at least 300 feet wide "to ensure values related to wildlife habitat"."

Response #12: The proposed riparian buffers are primarily for erosion control resulting from agricultural field runoff. Any assumptions of HUs calculated for fisheries or general wildlife communities were merely incidental to reduction of sediment into the stream. Therefore, optimal widths for wildlife were not a primary objective, although we believe incidental benefits for natural resources should be recognized.

Comment #13: "Species benefiting from habitat as it develops from initial planting until overstory species reach maturity will change. This change should be noted and quantified to the degree possible.... The value of riparian buffers to waterfowl depends on topography as well as the type, condition, and age of vegetation. Natural levees along alluvial rivers flood less frequently and for a shorter duration than adjacent flats and backswamps. Consequently, determination of their contribution of duck-use-days must take this into account. Oak trees generally begin producing acorns between 25 and 35 years of age. Calculation of duck-use-days for these buffers must factor this into the equation. The Corps should work with the Service to calculate duck-use-days."

Response #13: Calculations presented at the meeting were made assuming trees had reached mast-bearing age. Duck-use-days (DUDs) were derived from a table developed by a USFWS employee. The USFWS directed the USACE-MVM to employ this same table in deriving DUDs for the Grand Prairie Area Demonstration Project. Average annual DUDs could easily be calculated for NER features; these figures would reflect the delay in benefits until oaks reached mast-bearing age. The USACE-MVM appreciates the offer of assistance in calculating waterfowl benefits, and we would utilize any updated DUDs data the USFWS could provide.

Comment #14: "The Corps calculated a gain of 32.4 HU for fisheries from the buffer feature. These calculations should be done in cooperation with the Service. You should provide supporting documentation that specified what aspects of buffer creation will benefit fisheries and data used to derive the HU."

Response #14: A proposed NER feature of the WRNIP is creating 50 acres of buffer strips adjacent to the lower White River. Forested buffer strips directly benefit fish assemblages because many species utilize inundated bottomland hardwood wetlands as spawning, nursery, and foraging areas. In addition, forested wetlands stabilize substrates, contribute woody debris to the river, filter sediment-laden runoff, and provide structurally complex habitat for other aquatic and terrestrial fauna.

Average Annual Habitat Units (AAHUs), as used in the Habitat Evaluation Procedure (HEP), are typically calculated to depict long-term changes in habitat quality. AAHUs were developed from extant data to predict benefits of reforestation on the reproductive success of fishes in the White River over the 50-year project life. Habitat Suitability Index (HSI) values were initially calculated from larval fish collections made in seasonally inundated wetlands (agricultural land, fallow fields, and bottomland hardwoods). Larval fish studies were conducted in the Cache River, Arkansas, during 1988-1989 and the Big Sunflower System, Mississippi, during spring and early summer 1994.

These data, along with consensus of opinion by other biologists, indicated that agricultural land has the lowest habitat value (HSI=0.2) for larval and juvenile fish communities (Figure 1). Habitat value increases as floodplains become more structurally complex. Therefore, fallow fields were rated as intermediate (HSI=0.5) and bottomland hardwoods were considered optimum habitat for fish reproduction

(HSI=1.0). Permanent waterbodies on the floodplain also were considered optimum habitat primarily because larval fish densities were often highest in these locations. Calculation of AAHUs per acre of reforested agricultural land assumed a 20-year transition from cleared to forested lands (Figure 1). The HSI for the transition period is 0.75, which is the median value between fallow and bottomland hardwoods. Based on a 50-year project life, buffer strips would result in a gain of 0.70 AAHU per acre of reforested, agricultural land.

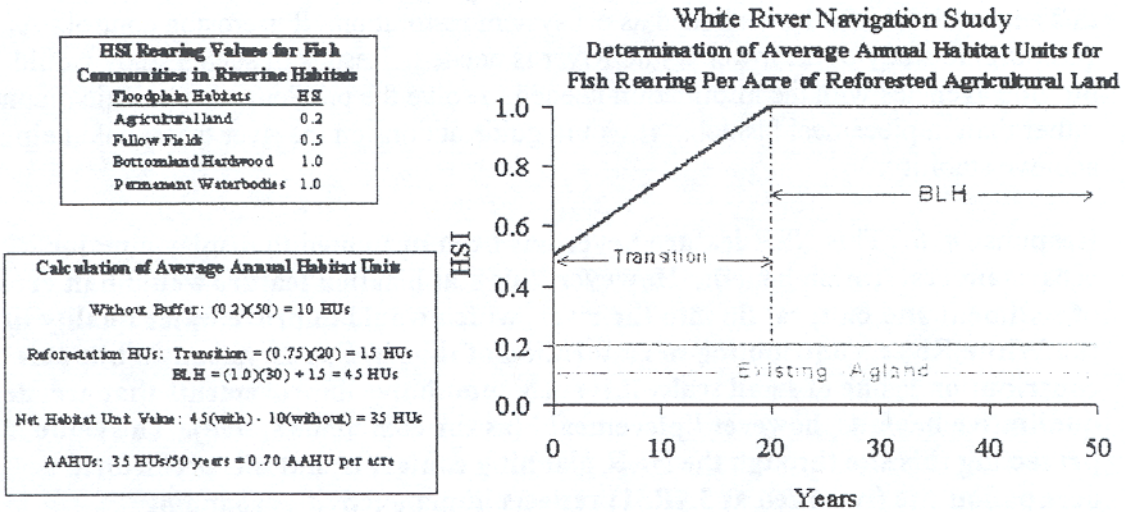

Figure 1, Information on calculation of fisheries benefits.

Comment #15: "Item KK entails creation of corridors.... The features table indicates that approximately 1,066 acres would be forested to widths ranging from 150 to 500 feet. At least some segments of the proposed corridor are across the river from existing blocks of forest. Because of this, the corridors would do little to facilitate bear movements between these areas. However, these corridors would benefit other species of wildlife even if they are of limited value to bears. Species benefiting from these corridors should be listed and HU gains calculated for them."

Response #15: The proposed wildlife corridors were developed for use by black bear as travel lanes between larger tracts of woods. Little information on corridor widths utilized by bear has been published; however, a literature search did reveal that a minimal width of 150 feet has been documented. The wildlife corridors presented at the meeting were 500 feet in width. The benefits to waterfowl, fisheries, and the general wildlife community would be calculated for corridors. The AGFC bear biologist is assisting the USACE-MVM in identifying appropriate bear corridors.

Comment #16: Item LL specifies stabilization of the river bank at Jack`s Bay. The stated problems are erosion of sediment into the White River, which degrades water quality, and loss of archaeological materials. The White River is currently undergoing significant geomorphic adjustments in response to the numerous land and water development projects on it and the Mississippi River. Headcuts moving up drainages, excessive bank erosion, and channel migration are evident over much of the lower White River. The Corps has stabilized banks in other portions of the river. While bank paving will protect a particular area, it is only a band aid applied to a symptom of a larger problem. It does not solve the problem; rather, it moves the problem to another reach. The Service supports protection of the archaeological resources at Jack's Bay. However, this action should not be construed as ecosystem restoration. It is erosion control. A geomorphic study of the lower White River is needed. Results of such a study would provide agencies with the information needed to solve the problems in a holistic manner rather than in piecemeal fashion. It would guide actions on the river that would help it achieve stability."

Response #16: This NER feature never has been promoted to display a major ecosystem restoration benefit. However, this stabilization feature would halt erosion of sediment and cultural fill into the river, which would improve water quality in the White River, contributing to restoration of the river's ecosystem. While this contribution is one of small scale, it is such cumulative improvements that accrue qualitative benefits, however "piecemeal" (as the comments stated). The value in protecting this site through the NER planning context is that this prehistoric occupation site (recorded as 3AR31) reflects human activities spanning approximately 3,000-1,500 B.C., and it is considered to be among the most important such physical resources known anywhere along the Lower White River. The connection to NER goals is as follows: archeological materials at the site likely have a direct link to ecosystem restoration in that the nature of certain materials (e.g. ancient pollen, other plant remains, animal bone, artifacts with organic chemical residues, geomorphic information dated through association with charcoal, artifacts, etc.) here could provide information on the paleoenvironment of the locality and region. Protecting these deposits is crucial to understanding what the ecosystem's characteristics were *prior* to modern impacts. Allowing erosion to continue would destroy a potential ecological "databank" of unread information that could substantially benefit future study of local and regional ecosystems. Such an effort also is part of our agency's stewardship responsibilities for an integrated approach to protect our Nation's physical resources. We wish to retain this proposed NER feature, allowing the completion of our agency's planning process to determine its pertinence to the NER.

Regarding the request for a geomorphic study for the lower White River, archeological site 3AR31 also likely has physical deposits and context that could be interpreted to contribute to understanding regional geomorphology. The WRNIP's cultural resources reconnaissance study addressed geomorphology (Buchner and Krivor 2001; briefing provided to USFWS in January 2000; report delivered August 2000) although we recognize the geomorphology of the lower White River remains

poorly understood (e.g. Saucier 1994:269). The WRNIP has not been funded or scheduled to the level necessary to conduct the extensive and detailed regional geomorphic study you seek.

Comment #17: "The Corps' mission of ecosystem restoration and efforts to identify and include ecosystem restoration features in water development projects is laudable. However, the Service is opposed to the White River Navigation Enlargement Project, and we have concerns and problems with the NER features presented. First, we are concerned that the Corps and the project proponents will use these features to help garner support for this environmentally destructive project; second, the NER features for the project have not received the degree of study and planning needed. The current study has been underway since 1999, yet work on the NER did not begin until January 2002. We understand that budgetary constraints have delayed completion of the study; however, the Corps has continued to conduct engineering analyses, economic analyses, and environmental studies since the project was initiated. Third, many of the features presented are fisheries management, which is not necessarily synonymous with ecosystem restoration. Environmental benefits for elevating water levels in the six oxbow lakes were derived from data on assumed water depths. No attempt was made to identify or quantify adverse impacts of these actions. Fourth, there is no assurance that the NER would be implemented if the project was authorized. Features identified on private land would first need permission of the landowner and are dependent on acquisition of fee title or easements from willing landowners. Fifth, engineering components (dikes and revetments) of the navigation project itself would have an 80 percent federal:20 percent local cost share while NER features would be cost shared at a 50:50 rate. This reduces the likelihood of support by a local sponsor and increases the difficulty of finding the funding necessary to implement. Sixth, maintenance of these features would be the responsibility of either the landowner or the local sponsor. This further discourages their implementation and makes the long term success of the features questionable."

Response #17: We recognize your agency's opposition to the WRNIP, documented by your regional director's letter dated March 8, 1999. Six statements were made rationalizing this position in Mr. Wessman's letter. The first point was that the project is "environmentally destructive." NER and NED features each would be judged on their merits. Second, the USFWS criticized USACE-MVM for starting the NER analysis late. NER features have been studied to the degree feasible based on factors of time and funding. We attempted to initiate the study of NER and failed to receive your agency's assistance. Therefore, we developed NER features with the aid of the AGFC and other agencies. The third concern focused on the idea that "fisheries management" features do not necessarily equate ecosystem restoration. As the AGFC informed your office, restoration of historic oxbow lake levels and fluctuations can be accomplished through properly designed water-control structures and operation plans. The USACE-MVM has recently completed construction of a weir at Tunica Lake, Arkansas and Mississippi. This Section 1135 ecosystem restoration project was supported by the AGFC; Mississippi Department of Wildlife, Fisheries and Parks; Lower Mississippi River Conservation Committee; and National Audubon Society, Mississippi State Office. Also, the AGFC is

sponsoring a Section 1135 study of Horseshoe Lake, Arkansas; one of the items being considered is a water-control structure. If development of NER features continues into the planning, engineering, and design phase, additional data would be collected and analyzed prior to developing final plans for oxbow lake restoration. Additional detailed design might result in adjustments to further increase ecosystem benefits and/or reduce projected adverse impacts. Potential direct impacts associated with construction were disclosed at the meeting. It is important to note that the goal of the NER Plan is to increase net ecosystem benefits, and detailed designs will be thoroughly coordinated with your office and other resource agencies to ensure restoration features succeed. The fourth point was that the NER is not assured of implementation. NER features would be implemented based on the identification of properties associated with willing landowners. Flexibility would be provided in the NER Plan implementation, so that if difficulties result, additional lands would be acquired. The fifth point was that NED cost-sharing is not the same as NER cost-sharing. The NER cost-sharing rate procedures are under development. When the Corps finalizes NER cost-sharing procedures, NER cost sharing can be determined. The sixth and final point was that maintenance of NER features would reside with the "the landowner or the local sponsor." Many NER features were formulated to require minimal maintenance. However, there is project sponsor responsibility for NER features as there are for any project features. A Project Cooperative Agreement (PCA) citing an operation and maintenance plan would require specific sponsor activities to maintain project features.

Comment #18: "Close coordination with the Service on the White River Navigation Project is essential for our agencies to meet the requirements of the FWCA and the National Environmental Policy Act. Additional information on the White River navigation project would greatly increase our ability to work with the Corps and to evaluate impacts. Specific information on engineering designs, data and results of hydrologic and hydraulic analyses, and environmental studies would be especially useful. We have requested information and result of the connectivity study and fisheries HEP three times. We have not yet received anything on these studies. We would appreciate it if you could provide this information. This would enable us to respond in a more timely manner to your requests for Coordination Act Reports and other documents from us."

Response #18: We understand USFWS concern regarding additional information. The hydrologic connectivity study remains underway, and we regret that an initial draft document on this aspect of the WRNIP is not yet available. We do wish to point out that earlier communications to your staff on this subject have stressed the perspective that this study is focused on existing conditions. You were provided informal feedback on the study, and you were invited to participate in data collection, which you declined. Likewise, the fisheries HEP study is not yet available, but very close to completion. You will be provided a draft report no later than February 2003. As you know, our consultant on that effort, Dr. Jack Killgore, earlier has provided, as possible, briefings and preliminary information to your staff and the interagency team. As you are aware, the report will be preliminary in

nature, as was the information provided in the Planning Aid Letter. We will continue to provide additional information as it becomes available, and we look forward to improved cooperation as our agencies fulfill our respective responsibilities under the Fish and Wildlife Coordination Act and other applicable laws and regulations.

APPENDIX 2

Fish and Wildlife Coordination Act Correspondence: Letter dated March 31, 2003, from U.S. Fish and Wildlife Service, Ecological Services, Arkansas, and response dated April 4, 2003, USACE, Memphis District.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1500 Museum Road, Suite 105
Conway, Arkansas 72032

IN REPLY REFER TO:

March 31, 2003

Colonel Jack V. Scherer
U.S. Army Corps of Engineers
167 North Main Street, Room B-202
Memphis, TN 38103-1894

RE: White River Navigation to Newport, Arkansas, Summary Report and Briefing

Dear Colonel Scherer:

We have been informed by Memphis District (District) staff that the Corps has completed the White River Navigation to Newport, Arkansas Summary Report and intends to provide it to the project sponsor (Arkansas Waterways Commission) and U.S. Fish and Wildlife Service (Service) at briefings scheduled for Thursday, April 10, 2003. While we were aware that you intended to prepare and deliver this summary document to the aforementioned parties, we were also aware that the internal Memphis District review document completed in December 2002 had gaps relating to economic and environmental impacts. It was also our understanding that the Summary Report would acknowledge these deficiencies and identify the data that would be needed to fully assess the impacts of the proposed project. At least two environmental studies, the fishery evaluation and the connectivity study, were not completed when the internal review document was produced.

Contrary to our previous expectations, we were advised by district staff that the Summary Report now contains information on fish and mussel impacts and mitigation. The draft fishery evaluation report was only provided to the District on January 28, 2003, and distributed to the Service in early February. We have not received any information from the District regarding your mussel impact evaluation and mitigation recommendations, results of the connectivity study, or results of the gravel bar survey that was used in the fishery evaluation.

During our review of the draft fishery evaluation report we identified several items of significant concern. We met with members of the Fisheries HEP team on March 28, 2003, to discuss these concerns, and will provide detailed comments on the fishery evaluation in separate correspondence. As a result of the meeting, the Corps agreed to address many of the Service's concerns and include them in a revised fishery evaluation report; however, some issues remain unresolved and require additional discussion between our agencies. Consequently, these will not be in the report you are about to give to the project sponsor.

We are now faced with a Summary Report of unknown content being presented to the project sponsor. We have not seen the Summary Report, but we suspect that it will include the conclusions of the draft fishery evaluation with its still unresolved issues. If that is the case, the project sponsor is likely to conclude that all fishery issues have been resolved. Since all fishery

issues have not been resolved, it would be misleading to give that impression to the project sponsor.

Because aspects of the reevaluation study; especially the mussel, fishery, and connectivity evaluations; have not been fully reviewed by the Service and other review agencies, and because of significant concerns over the draft fishery evaluation report, the Summary Report could contain inaccurate information about environmental impacts from the proposed project. We recommend that you attach this letter to the Summary Report as well as add a disclaimer in the document advising the readers that the information in the document is preliminary, has not been reviewed, may not accurately portray potential environmental impacts, and is being produced with the knowledge that there are still unresolved issues.

I appreciate your attention to this issue.

Sincerely,

Allan J. Mueller
Field Supervisor

cc: Larry Mallard, White River NWR, DeWitt, AR
Dennis Widner, Cache River NWR, Augusta, AR
Tom Foti, Arkansas Natural Heritage Comm., Little Rock, AR
Craig Uyeda, Arkansas Game and Fish Comm., Little Rock, AR
Sue Osowski, USEPA, Region VI, Dallas, TX
Ken Brazil, Arkansas Soil and Water Conservation Comm., Little Rock, AR
Sandy Formica, Arkansas Department of Environmental Quality, Little Rock, AR

DEPARTMENT OF THE ARMY
MEMPHIS DISTRICT CORPS OF ENGINEERS
167 NORTH MAIN STREET B-202
MEMPHIS TN 38103-1894

Reply to
Attention of:

April 4, 2003

Planning, Programs, & Project
Management Division
Environmental Branch

Mr. Allan J. Mueller
U.S. Fish & Wildlife Service
1500 Museum Road, Suite 105
Conway, Arkansas 72032

Dear Mr. Mueller:

This is in response to your letter dated March 31, 2003, regarding the summary report and briefing on the White River Navigation to Newport, Arkansas Project. This summary report is based on information developed to date on the general reevaluation study. The report provides enough detailed information for the sponsor to determine if there is continued interest in pursuing a project.

The summary report acknowledges the fact that statements specific to environmental resources are provisional because the National Environmental Policy Act (NEPA) planning process is not finalized. It should be noted that the fisheries Habitat Evaluation Procedure (HEP) analysis was completed in accordance with the scope of work agreed upon by the Service and Arkansas Game and Fish Commission in 1998. However, the Corps has agreed to address most of the Service's concerns stated during the Fisheries HEP team meeting on March 28, 2003. Any additional fishery analyses that would require more funding would only be pursued if the sponsor is able to show sufficient interest in continuing the general reevaluation.

Hydrology and hydraulics analyses have determined that there would be no changes to water elevations resulting from the selected plan. Therefore, there would be no impacts to the connectivity of tributaries, oxbow lakes or wetlands resulting from the selected plan.

Suggested fish and mussel mitigation measures presented in the summary report are contingent upon further coordination with the resource agencies. The sponsor has been informed that any mitigation proposals presented at this time are preliminary in nature and could change as the project progresses.

A copy of your letter, along with this response, will be attached to the summary report. You will be provided with a copy of this summary report at our upcoming briefing on April 10, 2003.

Sincerely,

Todd A. Gile
Major, Corps of Engineers
Acting District Engineer