



**TRIBAL HISTORIC PRESERVATION OFFICE**

August 14, 2006

Department of the Army  
Memphis District Corps of Engineers  
Attn: Mr. Jimmy McNeal  
167 North Main Street B-202  
Environmental Branch  
Memphis, TN 38103-1894

Re: Proposal to relocate a section of the Elk Chute Levee, Dunklin County Missouri

To Whom It May Concern:

The Osage Tribe of Oklahoma has evaluated the above reference sites, and we have determined that the site could have religious or cultural significance to the Osage Tribe being our former reservation & homeland. However, if construction activities should expose Osage archeological materials, such as bone, pottery, chipped stone, etc., we ask that construction activities cease, and this office be contacted so that an evaluation can be made.

Should you have any questions, you can reach me at (918) 287-5332.

Thank you.

Sincerely,

A handwritten signature in cursive script that reads "Samantha R. Gillett".

Samantha R. Gillett  
Acting Project Specialist

ONTHPO reference number: 81406005



## Sac and Fox Nation of Missouri in Kansas and Nebraska

305 North Main Street • Reserve, Kansas 66434  
Phone (785) 742-7471 • Fax (785) 742-3785

September 14, 2006

Jimmy McNeil  
District Archeologist  
Department of the Army  
Memphis District Corps of Engineers  
167 North Main Street B-202  
Memphis TN 38103-1894

Dear Mr. McNeil

Thank you for your letter, which is in compliance with Section 106 of the National Historic Preservation Act, and Section 110.

The Sac and Fox Nation of Missouri in Kansas and Nebraska do not have an interest in this site:

Elk Chute Levee, Dunklin County Missouri

There are two other bands of Sac and Fox that also need to be contacted, the Sac and Fox Nation of Oklahoma and the Sac and Fox of the Mississippi in Iowa.

Johnathan Buffalo, Sac and Fox of the Mississippi in Iowa  
349 Meskwaki Rd.  
Tama, IA 52339-9629

Sandra Massey, Sac and Fox Nation of Oklahoma  
Rt. 2, Box 246  
Stroud, OK 74079

If you have any questions, please contact me at the number or address above.

Sincerely,

Deanne Bahr  
Sac and Fox Nation of Missouri in Kansas and Nebraska  
NAGPRA Contact Representative



## CHOCTAW NATION OF OKLAHOMA

### Cultural Resources

P.O. Drawer 1210 • Durant, OK 74702-1210  
1-580-924-8280 • 1-800-522-6170 • Fax: 580-920-3102

October 4, 2006

Jimmy McNeil  
Department of the Army  
Memphis District Corps of Engineers  
167 North Main Street B-202  
Memphis, TN 38103-1894

Dear Jimmy McNeil:

We have reviewed the following proposed project (s) as to its effect regarding religious and/or cultural significance to historic properties that may be affected by an undertaking of the projects area of potential effect.

Entity Requesting Service: Proposal to re-gravel the Elk Chute East Levee and Elk Chute Levee Setback

City: Dunklin County, Missouri

Comments: After further review of the above mentioned project (s), to the best of our knowledge it will have no adverse effect on any historic properties in the project's area of potential effect. However, should construction expose buried archaeological or building materials such as chipped stone, tools, pottery, bone, historic crockery, glass or metal items, this office should be contacted immediately @ 1-800-522-6170 ext. 2137.

Sincerely,

Terry D. Cole  
Tribal Historic Preservation Officer  
Choctaw Nation of Oklahoma

By:   
Caren A. Johnson  
Administrative Assistant

CAJ: cp



Matt Blunt, Governor • Doyle Childers, Director

## DEPARTMENT OF NATURAL RESOURCES

[www.dnr.mo.gov](http://www.dnr.mo.gov)

January 25, 2007

Jimmy McNeil, District Archaeologist  
Corps of Engineers, Memphis District  
167 North Main Street B-202  
Memphis, Tennessee 38103-1894

Re: Elk Chute Levee Relocation (COE) Dunklin County, Missouri

Dear Mr. McNeil:

Thank you for submitting information on the above referenced project for our review pursuant to Section 106 of the National Historic Preservation Act (P.L. 89-665, as amended) and the Advisory Council on Historic Preservation's regulation 36 CFR Part 800, which requires identification and evaluation of cultural resources.

We have reviewed the December 2006 report entitled *A Negative Finding Report: Cultural Resources Survey of Approximately 8 km of Elk Chute Levee Relocation, Dunklin County, Missouri* by Panamerican Consultants, Inc. Based on this review it is evident that a thorough and adequate cultural resources survey has been conducted of the project area. We concur with the investigator's recommendation that there will be **no historic properties affected** and, therefore, we have no objection to the initiation of project activities.

Please be advised that, should project plans change, information documenting the revisions should be submitted to this office for further review. In the event that cultural materials are encountered during project activities, all construction should be halted, and this office notified as soon as possible in order to determine the appropriate course of action.

If you have any questions, please write Judith Deel at State Historic Preservation Office, P.O. Box 176, Jefferson City, Missouri 65102 or call 573/751-7862. Please be sure to include the SHPO Log Number (023-DJ-06) on all future correspondence or inquiries relating to this project.

Sincerely,

STATE HISTORIC PRESERVATION OFFICE

Mark A. Miles  
Director and Deputy  
State Historic Preservation Officer

MAM:jd

**Mussel Survey  
Elk Chute Levee Setback  
Dunklin County, Missouri**

Dates: 4 and 17 August 2006

Participants: K. Pigott (PM-E)  
M. Smith (PM-E)  
J. Phillips (USFWS) – 4 August 2006 only

On 4 and 17 August 2006, members of the Memphis District's Environmental Branch and the United States Fish and Wildlife Service performed mussel surveys on the proposed Elk Chute Levee Setback, Dunklin County, Missouri (Figure 1). An unexpected lightning storm prevented the completion of the surveys on 4 August. The purpose of the surveys was to determine whether Federally endangered species were present within the potential impact area resulting from the proposed work.

The existing levee (approximately 5 miles in length), provides flood damage reduction and has many structures that drain the agricultural land to the north. The proposed project is to move the existing levee north approximately 100 feet and to consolidate the existing drainage structures into approximately 5 structures. This project will be constructed over a period of several years, with the westernmost portion of the project (approximately 0.75 miles of levee setback; removing three existing drainage culverts, and replacing four existing drainage culverts with two larger box culverts) being the first item of work.

A qualitative survey was conducted by wading in creek areas where a hand search method was used to locate mussels. Site surveys continued until at least 15 minutes after the last new mussel species was collected. The surveys were conducted at six locations within the project area, and all available microhabitats were thoroughly searched (Table 1). All mussels collected were identified, enumerated, and returned to near the point of collection. The survey locations were within Belle Fountain Ditch (EC1, EC2, EC3, and EC4), one location was within a feeder ditch to Belle Fountain Ditch (EC5), and one location was located within Big Relief Ditch (EC6) (Figures 2 and 3). The substrate varied from silt over hard clay along the ditch banks, while sand/gravel over clay to silt over gravel was the predominant substrate mid-channel. Water depth varied from one to five feet, with the deeper water confined to scour areas at the existing drainage structures. A total of 89 individual mussels were identified, representing 12 species (Table 2). The majority of the mussels collected were found in Belle Fountain Ditch (see Table 2), with *Amblema plicata* and *Quadrula quadrula* being found in the highest numbers. Densities and species richness were highest at sites EC1 and EC4, which were both located in Belle Fountain Ditch. No native mussel species were collected at the site surveyed in the feeder ditch (EC5), or at site EC3 in Belle Fountain. Suitable habitat appeared to be extremely limited in much of the feeder ditch. One live *Potamilus capax* (Federally endangered species) was collected at EC6 (downstream of the proposed construction site, and upstream of the riprap structure that acts to stabilize the stream channel (Figures 4-6)). A complete fresh dead shell of *P. capax* was also collected in the vicinity of the live specimen.

Due to the estimated multi-year construction schedule of this project and the presence of a federally endangered mussel immediately downstream of the work zone, additional surveys will be conducted prior to initiating future work items, and coordination with the USFWS will continue in order to ensure no negative impact to *P. capax* results from this project.

**Table 1. Locations of Mussel Surveys.**

Waypoint	Name	X	Y
EC1	Belle Fountain Ditch	-90.05319	35.99974
EC2	Belle Fountain Ditch	-90.01802	36.00005
EC3	Belle Fountain Ditch	-90.02206	35.99995
EC4	Belle Fountain Ditch	-90.04327	35.99989
EC5	Belle Fountain feeder Ditch	-90.06324	35.99970
EC6	Big Lake Relief Ditch	-90.05422	35.99897

**Table 2. List of Freshwater Mussels observed at Project site vicinity.**

Species	Common Name	Live	EC1	EC2	EC3	EC4	EC5	EC6
<i>Amblema plicata</i>	Threeridge	27	12			12		3
<i>Corbicula fluminea</i>	Asian clam	0						
<i>Lampsilis teres</i>	Yellow sandshell	5				3		2
<i>Lasmigona complanata</i>	White heelsplitter	6	2			4		
<i>Lasmigona costata</i>	Fluted shell	0						
<i>Leptodea fragilis</i>	Fragile papershell	7	1	2		3		1
<i>Leptodea leptodon</i>	Scaleshell	0						
<i>Ligumia recta</i>	Black sandshell	0						
<i>Ligumia subrostrata</i>	Pondmussel	0						
<i>Megalonaias nervosa</i>	Washboard	0						
<i>Obliquaria reflexa</i>	Threehorn wartyback	0						
<i>Obovaria olivaria</i>	Hickorynut	2	2					
<i>Potamilus capax</i>	Fat pocketbook	1						1
<i>Potamilus ohioensis</i>	Pink papershell	3	2					1
<i>Potamilus purpuratus</i>	Bleufer	7		1		4		2
<i>Pyganodon grandis</i>	Giant floater	3				3		
<i>Quadrula nodulata</i>	Wartyback	7	3			2		2
<i>Quadrula quadrula</i>	Mapleleaf	20	11			3		6
<i>Tritogonia verrucosa</i>	Pistolgrip	1				1		
<b>TOTAL</b>		89	33	3	0	35	0	18
<b>TOTAL TAXA</b>		12	7	2	0	9	0	8





**Figure 2. Looking East on Belle Fountain Ditch.**



**Figure 3. Looking West on Belle Fountain Ditch.**



Figure 4. *P. capax*



Figure 5. *P. capax*.



Figure 6. *P. capax*.

**BIOLOGICAL ASSESSMENT**  
**OF THE**  
**FAT POCKETBOOK MUSSEL (*POTAMILUS CAPAX*)**  
**FOR**  
**ELK CHUTE SOUTH LEVEE SETBACK**  
**DUNKLIN COUNTY, MISSOURI**

**INTRODUCTION**

This Biological Assessment (BA) evaluates the potential impacts to the endangered fat pocketbook mussel (*Potamilus capax*) by construction activities that would set back approximately 5.1 miles of the existing Elk Chute South Levee and stabilize the bank of an adjacent ditch. Biological and ecological data for this endangered species is based on both published and unpublished literature, communications with experts, and findings of recent U.S. Army Corps of Engineers (USACE) investigations (See attached survey). This BA is being submitted to the U.S. Fish and Wildlife Service (USFWS) pursuant to Section 7 of the Endangered Species Act, as amended.

**BACKGROUND INFORMATION**

Development of the basic comprehensive plan for the St. Francis Basin Project was started by individuals within the basin through the St. Francis Valley Drainage Association organized in 1904. In a 1911 report by the U.S. Department of Agriculture, Office of Experiment Stations, it was proposed that construction of floodways between levees would be required to carry the St. Francis River and the Little River flood waters (Department of Army 1973). In 1929, the USACE published its first report on the St. Francis basin, House Document No. 159, 71<sup>st</sup> Congress, 2d Session. By this time a large portion of the 1911 plan had already been implemented by the St. Francis Valley Drainage District; however, their efforts were not successful in protecting against interior flooding. The Flood Control Act of 1936 authorized a USACE project study in the St. Francis basin based on the 1911 plan. A Final Environmental Impact Statement (FEIS) for St. Francis Basin Project, Arkansas and Missouri, was published in December 1973. The proposed action in this FEIS was to continue with the construction of the incomplete features of the project as authorized, continue with the operation and maintenance of the completed features for which the Federal Government has responsibility, and to assume the operation and maintenance of other project features as they are completed. A General Design Memorandum was issued by the USACE in 1975.

## DESCRIPTION OF WORK

The Memphis District intends to set back the Elk Chute South Levee, which is approximately 5.1 miles long. The levee would be set back to the north of its existing location; and the bank of the Belle Fountain West Ditch, which is adjacent to the levee, would be excavated to a stable slope (3.75H:1V) starting at top bank. A 40 to 50-foot berm would also be constructed between Belle Fountain West Ditch and the levee, five concrete drainage structures would be constructed through the levee, a 10-foot berm would be constructed on the landside of the levee, and a landside toe ditch would be constructed. Several access ramps and culverts would also be constructed to maintain current access to, and drainage of, adjacent fields. The project would be completed in five phases occurring approximately one year apart. Plans and specifications have been completed for the first phase which includes approximately 0.75 miles of the westernmost portion of the levee (See attached plans).

## ENDANGERED SPECIES ASSESSMENT

FAT POCKETBOOK MUSSEL (*Potamilus capax*) (Endangered)

### Description

The shell is round to oblong, greatly inflated, and thin (young) to moderately thick (adults). Anterior and posterior ends are rounded. Umbos are greatly inflated, elevated above hingeline, and turned inward. The surface is usually smooth and very shiny. The periostracum is rayless, yellow, yellowish tan, or olive, becoming dark brown in older individuals. The nacre is white, sometimes tinged with pink. The expected length at maturity is 5 inches (Cummings & Mayer 1992).

### Life History

The fat pocketbook mussel is a dioecious species; eggs are produced in the ovaries, released into the suprabranchial chamber, then into the right and left gill plates which become modified as brood pouches. Spermatozoa are released into the water column by the males, taken into the female through the incurrent siphon, passed through the ostia in the gill lamellae into the brood pouches where they fertilize the eggs. The resulting zygotes are deposited in the lumina of the marsupial gills and undergo early cleavage stages. Often the embryos are embedded in a secreted, acellular matrix. Development proceeds to the glochidium, a bivalved larval stage. Glochidia are retained in the marsupia for a period of time. As is the case with most North American mussels, glochidia of *P. capax* are obligate parasites on fish hosts that metamorphose into juvenile mussels (Cummings & Mayer 1992). Dr. Chris Barnhart documented that the freshwater drum (*Aplodinotus grunniens*) is a fish host for *P. capax*. It is believed other species may also be host species (Barnhart 1997). After metamorphosing, glochidia (now juvenile mussels) release from the host and drop to the substrate (Cummings & Mayer 1992).

### Distribution

Historically, *P. capax* inhabited large slow-flowing rivers in mud or sand substrate (Cummings & Mayer 1992) and were reported in the White River of Arkansas and Missouri, the St. Francis River and tributaries in Arkansas and Missouri, the middle Mississippi River (Oesch 1995), and the Cumberland River near the confluence of the Ohio River (USFWS 1985). Recent accounts include the lower Wabash River, the Ohio River, backwater areas in the lower Mississippi River (Personal communication, Paul Hartfield, USFWS, Jackson, MS), the White River in Arkansas (Harris and Christian 2003), and the St. Francis Basin, including the Tyronza River (USACE surveys).

#### Reason for decline

Activities related to navigation and flood control such as channelization and channel maintenance dredging can adversely impact mussel populations by destroying individuals as well as mussel habitat. The impoundment of rivers also has a deleterious impact on freshwater mussels by reducing current velocities and eliminating fish species required as hosts for many species. Siltation also plays a part in the mussel population decline by clogging their gills and often completely covering the shell, thus smothering the mussel (USFWS 1989). Siltation has increased due to bank erosion, land clearing activities near stream banks, and agricultural operations immediately adjacent to waterways. Aerial application of seed, fertilizers, pesticides and herbicides discourages growth of mature trees along the bank. Shrubs and grasses could be utilized as buffer strips to trap sediment; however, farmers tend to infringe upon this zone and increase sedimentation from their fields.

#### Status of species in the project area

In 1997, USACE repaired several slides and culvert scours along the Elk Chute South Levee (see appendix) within the current proposed project area. Prior to construction, a mussel survey was conducted within the project limits and adjacent areas (Barnhart 1997). Five live *P. capax*, were collected during this survey from the lower end of west-flowing Main Ditch 1 and the south-flowing connector ditch. According to Barnhart (1997), the Belle Fountain West Ditch (east-flowing) was too small and unstable to provide significant mussel habitat. All specimens of *P. capax* collected were older adults and had severely eroded shells, which is likely a reflection of the poor quality habitat in this area. Barnhart concluded that the construction of the riprap low water weir in the connector ditch many years ago may have altered the habitat significantly by reducing flow and impeding fish movement, and therefore, may have had a negative effect on the mussel community upstream. Barnhart's report states that the proposed repairs would not be harmful to the mussels due to the unsuitable habitat around the scoured areas. During the survey, current velocity was very slow, in spite of recent precipitation, and the report concluded that any silt from construction activities would settle out a short distance downstream of the repair areas.

Qualitative surveys were conducted in and adjacent to the proposed project area during August 2006 to determine whether *P. capax* were present. No live *P. capax* were collected in Belle Fountain West Ditch or Main Ditch 1 within the construction limits; however, one live specimen was collected in the connector ditch approximately 150 meters downstream from the confluence of Main Ditch 1 and Belle Fountain West Ditch (Figure 1). During this survey, conditions in the Belle Fountain West Ditch were similar to conditions found in 1997, and no *P.*

*capax* were collected in Main Ditch 1. Upstream areas of Main Ditch 1 were not considered to be suitable mussel habitat; however, the habitat begins to become more and more suitable continuing downstream to the confluence with the south-flowing connector ditch.

Discussions between USFWS and USACE biologists regarding the existing habitat and survey information resulted in the general opinion that the species probably occurs within the project area, but in extremely low numbers. However, Stateline Outlet Ditch is located downstream, and is a waterbody that supports a significant population of *P. capax* (personal communication Drs. Al Christian and John Harris, report in preparation).

### Evaluation of Potential Impacts

Although there would be no direct impacts to this species resulting from implementation of the ditch bank stabilization, there may be direct impacts from the placement of riprap around the five new drainage structures. There would be rock aprons approximately 60 feet wide and extending 40 feet out from top bank at each drainage structure. Any individuals located in areas where riprap would be placed are likely to be buried or crushed. The locations of the five drainage structures have been determined (See attached map): one is located in the Belle Fountain West Ditch in the vicinity of what USACE determined to be suitable habitat.

There may be inadvertent indirect impacts to any individuals located within the reach approximately 200 meters downstream of the construction area due to sediment inputs from the construction site. However, any impacts are expected to be temporary and would most likely be insignificant. Large rain events could cause considerable sedimentation in the ditch without preventative measures to reduce the amount of runoff. To minimize the effect of siltation, silt fences along top bank of Main Ditch 1 and Belle Fountain West Ditch would be reinforced with bales of straw to aid in filtering sediment out from runoff that may occur during construction. The ditch bank would be seeded with a switchgrass (*Panicum virgatum*), Indiangrass (*Sorghastrum nutans*), and eastern gamagrass (*Tripsacum dactyloides*) grass mixture if construction is completed during appropriate planting period. These species were chosen because they provide erosion control and brooding, rearing, and cover for various species of wildlife. If construction is completed at a time when the native warm season grasses cannot be planted (June through November), then a temporary cover would be planted to stabilize the bank and prevent additional silt from entering the ditch. Prairie cord grass and native river cane would also be planted along the shoreline

With the above erosion control measures in place, the proposed construction is not likely to adversely affect the *P. capax* population in the connector ditch or Stateline Outlet Ditch. This assessment is based on the low current velocities found within Main Ditch 1 and Belle Fountain West Ditch, the nature of the construction activities (work would start at top bank of the ditches), the proposed sediment control measures (silt fence would be placed at top bank and reinforced with straw bales and the site would be planted immediately following completion of work with permanent vegetative cover). In the long-term, the proposed project may have beneficial effects to the aquatic habitat in the area by removing excess sediment which would enhance flow and water quality. Completion of the proposed stabilization project would greatly reduce the frequency of future maintenance work. Also, a more stable bank along Main Ditch 1 and Belle

Fountain West Ditch would decrease sediment inputs into the channel and would potentially reduce channel scouring during flood events.

## CONCLUSION

The federally endangered *P. capax* is present in extremely low numbers at the lower end of the proposed project area and immediately downstream. A significant population of the species exists in Stateline Outlet Ditch beginning approximately 250 meters downstream of the project site. Some impacts of the proposed project are likely to adversely affect the fat pocketbook including placement of riprap in the channel and sedimentation from erosion of newly constructed areas. Several measures are proposed that will minimize those impacts to the species including bank erosion and sedimentation control.

Preparer: This document was prepared by Leighann Gipson, (901) 544-4015.

## LITERATURE CITED

- Cummings, K.S. & Mayer, C.A. 1992. Field Guide to Freshwater Mussels of the Midwest. Illinois Natural History Survey Manual 5. 194 pp.
- Department of Army Corps of Engineers Memphis District 1973. Final Environmental Impact Statement, St. Francis Basin Project, Arkansas and Missouri. 107pp.
- Harris, J. L. and A. D. Christian. 2003. Qualitative survey for mussels, White River navigation maintenance, Arkansas, Desha, and Prairie Counties, Arkansas. Prepared for the U. S. Army Corps of Engineers, Memphis, TN. 10 p.
- Oesch, R.D. 1995. Missouri Naiades A guide to the Mussels of Missouri. Missouri Department of Conservation. Jefferson City, Missouri. 269 pp.
- U.S. Fish and Wildlife Service. 1989. A Recovery Plan for the Fat Pocketbook Pearly Mussel *Potamilus capax*. U.S. Fish and Wildlife Service, Southeast Region, Atlanta, Georgia. 22 pp.

## APPENDIX

Figure 1. Mussel survey locations

Plans and specifications for the first item of work

Coordination with USFWS for 1997 construction activities

Summary Letter of the 1997 Barnhart mussel survey

USACE 2006 mussel survey report

Map of proposed drainage structures

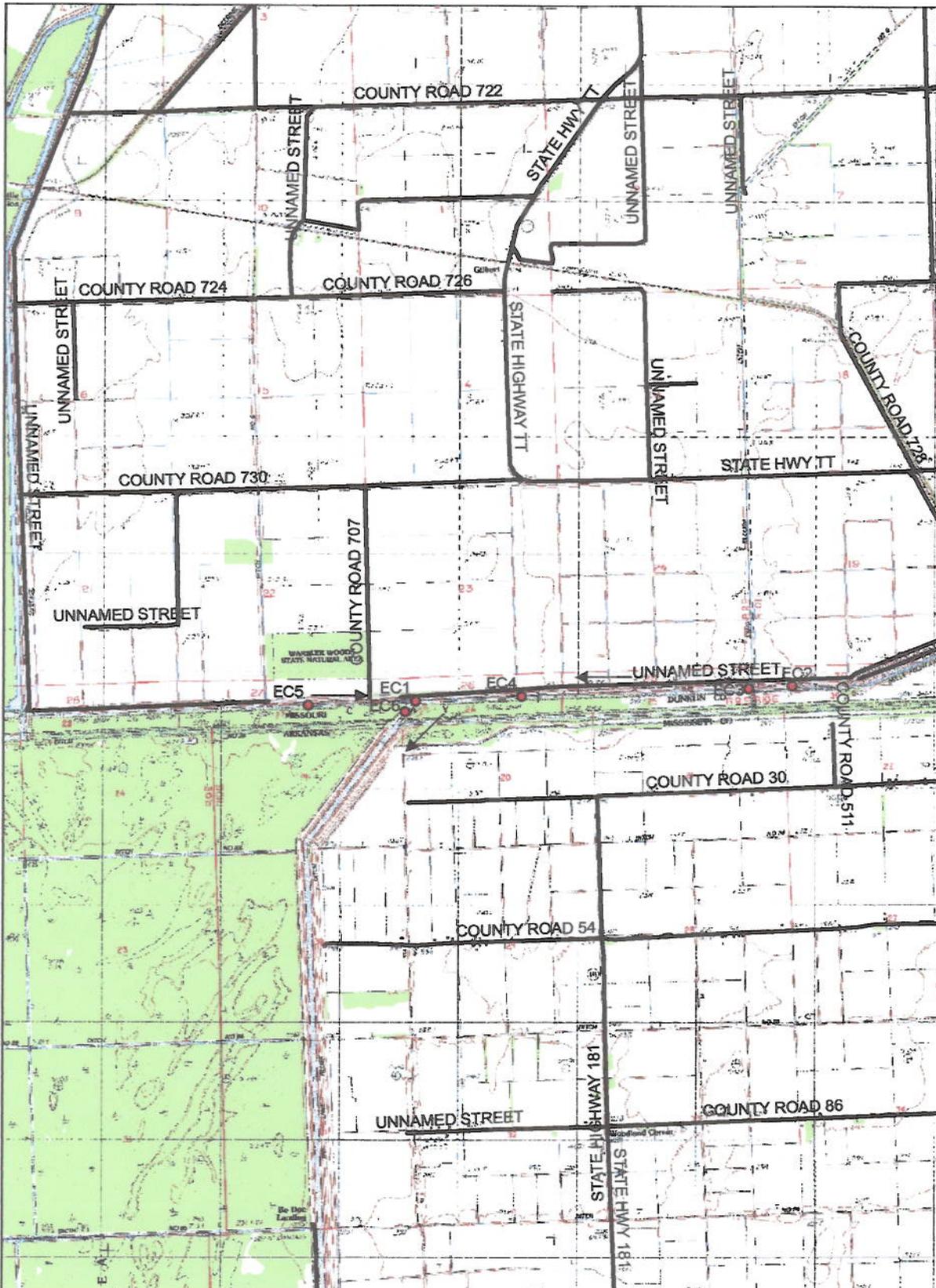


Figure 1. Elk Chute South Levee Project Mussel Survey Locations. Arrows indicate direction of flow.



## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Columbia Ecological Services Field Office  
101 Park DeVille Drive, Suite A  
Columbia, Missouri 65203-0057  
Phone: (573) 234-2132 Fax: (573) 234-2181

January 10, 2008

Mr. Edward Lambert  
Department of the Army  
Memphis District Corps of Engineers  
167 North Main Street B-202  
Memphis, Tennessee 38103-1894

RE: Biological Opinion for the Proposed Elk Chute South Levee Setback, Dunklin County, Missouri

Dear Mr. Lambert:

The U.S. Fish and Wildlife Service (Service) has reviewed the biological assessment that evaluates the potential impacts of the proposed setback of Elk Chute Levee in Dunklin County, Missouri on the federally endangered fat pocketbook (*Potamilus capax*). The Service received and accepted the U.S. Army Corps of Engineers (USACE) September 7, 2007, request for formal consultation on the proposed project. This document is the Service's biological opinion on the effects of the proposed levee setback on the fat pocketbook in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended, (16 U.S.C. 1531 et seq.). This biological opinion is based on information provided in the biological assessment, the recovery plan for the fat pocketbook pearly mussel (Service 1989), and additional sources of information. A complete administrative record of this consultation is on file at the U.S. Fish and Wildlife Service, Columbia Missouri Field Office, 101 Park DeVille Drive, Suite A, Columbia, Missouri 65203.

### INTRODUCTION/PROJECT DESCRIPTION

The network of ditches and floodways in the St. Francis River basin, Mississippi County, Arkansas, was constructed in the early 1900's. The USACE is required to continue with operation and maintenance of these ditches as necessary. Because many of the natural streams in the area have been channelized or bypassed, the constructed ditches have become refugia for much of the displaced fauna. The endangered fat pocketbook is one of those species and has proliferated in ditches throughout much of St. Francis River basin, including Stateline Outlet Ditch, which is connected to the ditches in the proposed project area of the Elk Chute South Levee Setback.

The USACE Memphis District proposes to set back the Elk Chute South Levee, which is approximately 5.1 miles long (Figure 1 and 2). The levee would be set back to the north of its existing location; and the bank of the Belle Fountain West Ditch, which is adjacent to the levee, would be excavated to a stable slope starting at top bank. A 40 to 50-foot berm also would be constructed between Belle Fountain West Ditch and the levee, five concrete drainage structures would be constructed through the levee, a 10-foot berm would be constructed on the landside of the levee, and a landside toe ditch would be constructed. Several access ramps and culverts also would be constructed to maintain current access to and drainage of adjacent fields. The project would be completed in five phases occurring approximately one year apart. Plans and specifications have been completed for the first phase which includes approximately 0.75 miles of the westernmost portion of the levee.

The proposed project includes several measures to reduce erosion and sedimentation into Main Ditch 1 and Belle Fountain West Ditch during the construction and post-construction phase. Silt fences will be installed along the top bank of both ditches and reinforced with bales of straw. The area from the ditch bank to the toe of the levee would be seeded with a mixture of switchgrass (*Panicum virgatum*), Indiangrass (*Sorghastrum nutans*), and eastern gamagrass (*Tripsacum dactyloides*) immediately following construction, if the construction ends during the appropriate planting period. These species were chosen because they provide effective erosion control as well as brooding, rearing, and cover for various species of wildlife. If construction is completed at a time when the native warm season grasses cannot be planted (June through November), then a temporary cover would be planted to stabilize the bank and reduce sedimentation until the warm season grasses can be planted. Prairie cord grass and native river cane would also be planted along the shoreline in reaches that would be determined at a later date. River cane would provide habitat for Swainson's warbler, and prairie cord grass would provide food for waterfowl, marshbirds, aquatic furbearers, and deer.

### CONSULTATION HISTORY

On August 4 and 17, 2006, USACE and Service personnel conducted a survey of the project area to determine the presence of fat pocketbook. This information was provided to the Columbia Missouri Field Office of the Service on July 17, 2007 along with information on the proposed project. On August 7, 2007, a draft Biological Assessment (BA) for the fat pocketbook was received by the Service and comments were provided to the USACE on August 21, 2007.

On September 11, 2007, the Service received the USACE's draft EA and accompanying September 7, 2007, letter initiating formal consultation. In a letter dated, October 25, 2007, the Service concurred with the USACE's finding that the proposed levee setback is likely to adversely affect the fat pocketbook and accepted the request for formal consultation. This formal consultation began on September 11, 2007, the date the USACE's initiation letter was received in the Columbia Missouri Field Office.

On December 13, 2007, the Service provided to the USACE a copy of the draft BO for its review and comment. Because potential downstream impacts of the proposed project could occur in Arkansas, we also provided a copy of the draft BO to the Service's Conway Arkansas Field Office on December 19, 2007, for review.

## STATUS OF THE SPECIES

### Species/critical habitat description

The fat pocketbook was first described by J. Green (1832) as *Unio capax*. The anterior end of the fat pocketbook is broad, rounded, and slightly angular near the hinge; the posterior margin is very narrow and rounded. The valves do not close perfectly on each other but gape at the posterior margin. This is more obvious in older individuals. The visceral tissue is smooth, yellowish, and frequently clouded with brown. The nacre is bluish white and often iridescent. The beaks are curved over the tegument. The teeth resemble those of *Lampsilis cardium*, but they are much thinner. The type locality is the upper Mississippi River at the Falls of St. Anthony in Minnesota. Critical habitat for this species has not been designated.

### Life history

The fat pocketbook occurs primarily in sand and mud substrates, although the species has occasionally been found in fine gravel and hard clay (Parmalee 1967, Bates and Dennis 1983, Clarke 1985, Jenkinson and Ahlstedt 1988). Water depth ranges from a few inches to several feet (Parmalee 1967). The life cycle of the fat pocketbook is similar to that of other freshwater mussels, in which the glochidia (larvae) require a fish host to transform into the juvenile stage. The fat pocketbook is a long term brooder, with females becoming gravid in the fall, retaining glochidia over winter, and releasing the progeny during spring and summer. The fish host for this species is the freshwater drum (*Aplodinotus grunniens*; Barnhart 1997).

### Status and distribution

The historic range of the species includes the upper Mississippi River upstream of Jackson, Mississippi; the Ohio River; the Wabash and White Rivers in Indiana; the St. Francis, White, and Black Rivers in Arkansas; the Spoon and Illinois Rivers in Illinois; the Des Moines and Iowa Rivers in Iowa; the Cumberland River in Kentucky; and the Neosho River in Kansas. Since 1970, it has been collected from the St. Francis River and Right Hand Chute Little River and drainage ditches associated with these streams in Arkansas and Missouri, the lower Wabash and White Rivers in Indiana, the lower Cumberland River in Kentucky, and the upper Mississippi River. Specimens have also been found in the Mississippi River from near Helena, Arkansas downstream to Jackson, Mississippi (P. Hartfield Pers. Comm.) and from the Tyronza River in Arkansas (A. Christian Pers. Comm.). A single specimen of fat pocketbook was collected in 2003 from the White River in Arkansas near river mile 11, the first collection in that river since the 1960's (Harris and Christian 2003). The fat pocketbook was listed as endangered in the Federal Register on June 14, 1976.

### Analysis of the species/critical habitat likely to be affected

No critical habitat has been designated for the fat pocketbook in Missouri; therefore, none will be affected.

## ENVIRONMENTAL BASELINE

The environmental baseline is defined as the effects of past and ongoing human induced and natural factors leading to the current status of the species, its habitat, and ecosystem within the project area. The environmental baseline is a snapshot of fat pocketbook status in the action area at this time.

### Status of the species within the action area

The fat pocketbook occurs throughout the St. Francis River system and its associated network of ditches. Dennis (1985) summarized much of the known distribution for the fat pocketbook when it was listed from the St. Francis River and tributaries in Arkansas, the upper Mississippi River (above St. Louis, MO), and the Wabash River in Indiana. Recent surveys have revealed additional populations of fat pocketbook in the St. Francis Basin (Harris 2001; Harris 2003; USACE 2004; A. Christian Pers. Comm.). Data from these and other surveys suggests the St. Francis River Basin contains the most abundant populations of the fat pocketbook in the United States.

In 1997, USACE repaired several slides and culvert scours along the Elk Chute South Levee within the current proposed project area. Prior to construction, a mussel survey was conducted within the project limits and adjacent areas (Barnhart 1997). Five live fat pocketbooks were collected during this survey from the lower end of Main Ditch 1 and in the south-flowing connector ditch. According to Barnhart (1997), the Belle Fountain West Ditch was too small and unstable to provide significant mussel habitat. All specimens of fat pocketbook collected were old adults and had severely eroded shells, which is likely a reflection of poor habitat quality in this area. Barnhart concluded that the construction of the rip-rap low water weir in the connector ditch many years ago may have altered the habitat significantly by reducing flow and impeding fish movement, and therefore, may have had a negative effect on the mussel community upstream. Barnhart's report states that the proposed repairs would not be harmful to the mussels due to the unsuitable habitat around the scoured areas. During the survey, current velocity was very slow, in spite of recent precipitation, and the report concluded that any silt from construction activities would settle out a short distance (within 100 meters) downstream of the repair areas.

Qualitative surveys were conducted in and adjacent to the proposed project area during August 2006 to determine the presence of fat pocketbook. No live fat pocketbook specimens were collected in Main Ditch 1 or Belle Fountain West Ditch within the construction limits; however, one live specimen was collected in the connector ditch approximately 150 meters downstream from the confluence of Belle Fountain West Ditch and Main Ditch. During this survey, conditions in the Belle Fountain West Ditch were similar to conditions found in 1997. Additionally, no fat pocketbook were collected in Main Ditch 1. Upstream areas of Main Ditch 1 were not considered to be suitable mussel habitat; however, the habitat begins to become more suitable continuing downstream to the confluence with the south-flowing connector ditch.

Discussions between the Service and USACE biologists regarding the existing habitat and survey information resulted in the general opinion that the species probably occurs within the project

area in Main Ditch 1, but in extremely low numbers. Stateline Outlet Ditch is located just downstream in Missouri and Arkansas, a waterbody that contains a significant population of fat pocketbook (Roberts *et al.* 1997).

#### **Factors affecting species environment within the action area**

To adequately evaluate the effects of this proposed project covered in this biological opinion, the Service must not only consider the impacts from the activities addressed in the biological opinion, but also must consider other separate effects currently ongoing and likely to occur in the foreseeable future that also could have adverse impacts to the fat pocketbook. To accomplish this, the Service considers other incidental take statements, incidental take permits issued, recovery permits issued, other section 7 consultations, and cumulative impacts.

Currently, three individuals or entities in Missouri and four in Arkansas retain active survival and recovery permits under section 10(a)(1)(A) of the Act for fat pocketbook. There have been no reports of incidental take in the form of injury or death reported by any of these permittees in recent years. Service programmatic biological opinions in Region 3 and 4 regarding section 10(a)(1)(A) permits for mussel species, including fat pocketbook, anticipates the incidental take of five individuals per year, per permit.

In an April 27, 1999, biological opinion to the Federal Highway Administration (FHWA) concerning scour repairs on ditches in Mississippi County, Arkansas, the Service anticipated the incidental take of five fat pocketbooks. In an October 3, 2001, biological opinion to USACE Memphis District, the Service anticipated the incidental take of 35 fat pocketbook from Stateline Ditch in Arkansas. A November 8, 2001, biological opinion to the FHWA for a bridge replacement project over the St. Francis River near Parkin, Arkansas, anticipated the incidental take of two fat pocketbook. In an October 31, 2002, biological opinion for the Arkansas Highway 14 bridge replacement over Ditch 10 near the city of Harrisburg, Arkansas, the Service anticipated that this action could result in the incidental take of one fat pocketbook. The Service's June 10, 2003, emergency biological opinion for a sewage lagoon embankment stabilization near the city of Madison, Arkansas, anticipated the incidental take of two fat pocketbook. In an October 29, 2003, biological opinion for construction of a Union Pacific Railroad bridge across the St. Francis River floodway near Madison, Arkansas, the Service anticipated the incidental take of three fat pocketbook. The effects of cleanout operations for drainage purposes conducted by the USACE Memphis District, in Ditch 10 in northeast Arkansas was addressed in the Service's April 28, 2004, biological opinion. The Service determined that this action would result in the incidental take of 10 fat pocketbook.

The greatest impact on the fat pocketbook throughout its historic range has been from activities related to navigation and flood control. Channel maintenance dredging has been particularly destructive to the species (Service 1989). Dredging operations physically remove mussels from the water and may also bury or crush mussels (Watters 2000). Long term effects of these activities involve the alteration or destruction of important unionid habitat that can extend upstream and downstream of the excavated area.

Sedimentation and pollution from agricultural runoff and low water levels in the summer impact the fat pocketbook populations in the St. Francis River basin. The ditches within the proposed Elk Chute Levee setback project area primarily drain farmland and there is very little riparian vegetation in its watershed. Siltation has long been associated with reductions in freshwater mussel assemblages (Brim Box and Mossa 1999). Detrimental effects of fine sediment from erosion on freshwater mussels have been documented (Watters 2000). Although sedimentation is a natural process, heavy sediment loads in the water column can interfere with mussel respiration and feeding (Kat 1982, Brim Box and Mossa 1999). Due to their difficulty in escaping smothering conditions (Imlay 1972, Aldridge *et al.* 1987), either sudden or gradual blanketing of the stream bottom with sediment can suffocate freshwater mussels (Ellis 1936). Various mussel species have demonstrated a slower growth rate in turbid waters (Stansbery 1970), which may be related to reduced feeding under high sedimentation levels. Fine sediment plumes may also reduce feeding in mussels by diluting the density of food particles in the water column (Widdows *et al.* 1979). Heavy sediment loads can directly affect freshwater mussel survival by interfering with respiration and feeding. Due to their difficulty in escaping smothering conditions (Imlay 1972, Aldridge *et al.* 1987), either sudden or gradual blanketing of the stream bottom with sediment can suffocate freshwater mussels (Ellis 1936). Sediment particles also may carry contaminants toxic to mussels (Naimo *et al.* 1992).

Agricultural runoff is frequently laden with chemicals associated with fertilizers and pesticides. Several crops are produced in the watershed surrounding the proposed Elk Chute Levee setback project area in Missouri and Arkansas including cotton, soybeans, and rice. Numerous fertilizers and pesticides are sprayed on these crops including defoliant and Malathion (for boll weevil eradication). Contaminants have played a major factor in the nation-wide decline of freshwater mussels [Havlik and Marking 1987, Bogan 1993, Williams *et al.* 1993, The National Native Mussel Conservation Committee (NNMCC) 1998]. Like sedimentation, mussels can tolerate short term exposures to pollutants by valve closure, but most cannot tolerate long term exposure to contaminated water (Neves 1997). Pesticides from row crops are a major source of agricultural contaminants, and are known to have direct affect on mussels (Havlik and Marking 1987). Mussels are also sensitive to ammonia (Augspurger *et al.* 2003, Wang *et al.* 2007a, Wang *et al.* 2007b), which is a common pollutant in streams associated with animal feedlots, nitrogenous fertilizers, and the effluents of municipal wastewater treatment plants (Goudreau *et al.* 1993).

Direct freshwater mussel mortality from toxic spills and polluted water is well documented (Ortmann 1909, Baker 1928, Cairns *et al.* 1971, Goudreau *et al.* 1988). Decline and elimination of populations may be due to acute and chronic toxic effects that result in direct mortality, reduced reproductive success, or compromised health of the animal or host fish. On October 16, 2007, an undetermined amount of glycerin from a biodiesel plant was released into the Belle Fountain Ditch, Missouri, causing a fish and mussel kill in the vicinity of the Elk Chute Levee setback project. The point of entry of this release was approximately 8 miles upstream from the confluence of Main Ditch 1 and State Line Ditch (Figure 2). The Missouri Department of Conservation (MDC) monitored the effects of the spill and estimated that over 100,000 fish and an undetermined number of mussels and crayfish were killed. The chemical oxygen demand resulted in recorded dissolved oxygen concentrations of 0.3 mg/L at Missouri Highway TT on October 17, 2007. Methanol and pH of the waste were recorded at 1,440 mg/L and 10.6,

respectively, at the same time near the release site. Further information obtained by response agencies indicated that other releases of glycerin or other waste products had occurred over a period of months, and was not limited to this single release. Officials from MDC also made collections of fresh dead mussels (most with intact soft tissues) shortly after previous fish and mussel kills in the same area in early October 2007.

On October 18, 2007, the Service conducted a mussel survey in the Belle Fountain and State Line ditches to determine the downstream extent of the reported mussel kill and number of mussels killed by the glycerin releases (Davidson 2007). A total of 552 mussels were collected at five sites in the Belle Fountain Ditch from Missouri Route TT downstream to Mississippi County Road 122W in Arkansas. Of these, 301 individuals were collected fresh dead, including 84 fat pocketbook. It was determined that the area of impact in the Stateline Ditch ended somewhere between 1.5 miles upstream to 0.5 mile downstream of the mouth of Main Ditch 1. This ditch is a major tributary to the Stateline Ditch, and therefore, it is likely that the inflow from this ditch served to dilute the glycerin release. Percent fat pocketbook collected fresh dead versus live ranged from 78.9 to 100 percent at sites upstream of Elk Chute Ditch. No dead fat pocketbook specimens were found at the downstream-most site.

### EFFECTS OF THE ACTION

This section includes an analysis of the direct and indirect effects of the proposed action on the fat pocketbook and effects from interrelated and interdependent activities.

Construction activities associated with the levee setback may directly and indirectly adversely affect the fat pocketbook and its habitat. The species could be located in areas where riprap aprons will be placed in the channel of Main Ditch. Any individuals located in these areas would likely be buried or crushed. However, the low numbers of individuals present within this ditch and within the immediate project area makes this unlikely.

Increased sedimentation may occur downstream from recently disturbed areas of the construction site. Erosion control measures such as erosion control fencing, straw bails, and reseeding of the area post-construction will be implemented, but some degree of increased siltation is unavoidable, particularly if frequent and/or intense rains occur. This impact is likely to occur in Main Ditch 1, but less likely to occur in the Stateline Ditch, downstream from its confluence with Main Ditch 1. An existing rip-rap low-water weir on the lower end of Main Ditch 1 will help reduce sedimentation that may occur by acting as a check dam. Further, low current velocities in Main Ditch 1 and Belle Fountain West Ditch and sedimentation control measures implemented during project construction will further reduce sedimentation in Stateline Ditch. Other effects may include runoff from staging areas from sites within the construction area where most equipment and materials are stored. These areas often are accessed frequently, and when fuel and oil are stored here, there is the potential for contaminants and sediment to enter the stream.

Once construction work has been completed, there may be long-term beneficial effects of the project on fat pocketbook habitat in Main Ditch 1 and Stateline Ditch. A more stable bank along Main Ditch 1 and Belle Fountain West Ditch would decrease sediment inputs into these ditches.

Furthermore, setting back the levee would increase the storage of the associated floodplain and would potentially reduce channel scouring in Stateline Ditch during flood events. Direct and indirect effects of the proposed levee setback will likely result in take of fat pocketbook within Main Ditch 1, along the Elk Chute Levee to the confluence of Stateline Ditch, approximately 200 meters downstream of the footprint of the levee setback.

### **CUMULATIVE EFFECTS**

Cumulative effects are those effects of future non-federal (state, local, government, private, or any other non-federal entity) activities on endangered or threatened species or critical habitat that are reasonably certain to occur in the action area. Future federal actions are subject to the consultation requirements established in section 7 and, therefore, are not considered cumulative effects.

Cumulative pressure on existing populations of fat pocketbook and its host fish can be caused by agricultural activities and forest conversion activities related to agriculture or silviculture. The land immediately to the southwest of the project area, along Stateline Ditch, is a state Wildlife Management Area (Big Lake) and is therefore protected. Impacts from agricultural and silviculture activities upstream of the project area that may affect the species are likely to occur but are not quantifiable within the scope of this document.

### **CONCLUSION**

After reviewing the current status of fat pocketbook, the environmental baseline for the project area, the effects of the proposed levee setback, and the cumulative effects, it is the Service's biological opinion that the setback of Elk Chute Levee, as proposed, is not likely to jeopardize the continued existence of the fat pocketbook. No critical habitat has been designated for this species; therefore, none will be affected.

### **INCIDENTAL TAKE STATEMENT**

Section 9 of the ESA and federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species without special exemption. Take is defined as to harm, harass, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering. Harass is defined as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited take under the ESA, provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the USACE so they become binding conditions of any grant or permit issued to an applicant, as appropriate, for the exemption of section 7(o)(2) to apply. The Memphis District USACE has a continuing duty to regulate the activities covered by this incidental take statement. If the USACE (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the USACE must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(I)(3)]

#### **Amount or extent of take anticipated**

Take may occur of fat pocketbook in Main Ditch 1 in the footprint of the rip-rap aprons placed around the drainage structures, as mussels will not be able to quickly move away from disturbance. Additional take may occur along and downstream of construction areas in Main Ditch 1 from increased sedimentation. With preventative measures to reduce erosion in place, take is not anticipated in Stateline Ditch, approximately 250 meters downstream of the project area.

It will be difficult to detect death or injury of fat pocketbook individuals because of the low densities of the species in the project area. Furthermore, it will be difficult to determine when individuals might be buried by rip-rap or harmed by sedimentation. Based on the best scientific information available, the Service anticipates that a maximum of five fat pocketbook may be killed incidental to actions required for construction of the proposed project. This level of anticipated incidental take is based on previous survey efforts.

#### **Effect of the take**

The Service determined that this level of anticipated incidental take is not likely to jeopardize the continued existence of the fat pocketbook because of the small area of impact and low number of the individuals within the action area.

#### **Reasonable and prudent measures to reduce incidental take**

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the incidental take of the fat pocketbook:

1. Measures to reduce erosion will be implemented during and after construction as described in the above project description.
2. Erosion control measures, and details related to those measures outlined in the Terms and Conditions section below, will be explained directly to construction crews by a USACE biologist to ensure that these measures will be implemented correctly.

3. Staging areas for crew, equipment, and materials will be established on the outside of the levee (north side) and well away (at least 100 feet) from highly erodible soils that lead to Main Ditch 1 or the Belle Fountain West Ditch (i.e. where water will not drain directly into these ditches). Storage of fuel, oil, and other chemicals will remain within the staging areas or another confined area to avoid accidental spills into these ditches stream systems.

### **Terms and Conditions**

In order to be exempt from the prohibitions of section 9 of the ESA, the USACE must comply with the following terms and conditions, which implement reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

Several measures to control sedimentation were discussed in the project description. These measures have been restated below, so that additional details concerning erosion control can be included. This will ensure that sedimentation will be carefully controlled and minimized due to the proximity of the federally endangered fat pocketbook.

Required actions shall include, but are not limited to, the following:

1. Silt fences will be installed before construction begins and will remain in place until the new levee and the area between the ditch banks and levee are fully re-vegetated. The silt fences will be removed in such a way that its removal will not cause further disturbance. Straw bails will be left in place to decompose naturally.
2. The silt fence will be routinely inspected and maintained by the construction crew, particularly after rain events. Any compromised areas along the fence will be repaired immediately.
3. The construction site will be evaluated by USACE personnel during the construction phase to ensure erosion practices are being implemented and maintained correctly.
4. Temporary and permanent cover crops will be planted using the methods outlined in Natural Resources Conservation Service's Conservation Practice Standard and Specifications (Attachment I).
5. A temporary cover crop (i.e. winter wheat or other species as appropriate) will be planted immediately after project completion on both sides of the levee and between the top ditch banks and the toe of the levee. This temporary cover crop may not be necessary if the permanent vegetation can be planted immediately following construction and during the appropriate planting time period for those species.
6. Post-construction evaluation of vegetation establishment and inspection of erosion control structures shall be conducted periodically until permanent vegetation is established.

7. Materials excavated during construction shall not be stockpiled inside the levee or where it can be eroded or washed into Main Ditch 1 or the Belle Fountain West, unless the material is clean gravel to be used for backfilling around drainage control structures.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. The Service believes that up to five fat pocketbook may be killed during the levee setback, and an indeterminate number may be harmed due to sedimentation. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The USACE must immediately provide an explanation of the causes of the take and review with the Service the need for possible modification of the reasonable and prudent measures.

### **CONSERVATION RECOMMENDATIONS**

Section 7(a)(1) of the ESA directs federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service appreciates the active involvement of the USACE in the recovery of the fat pocketbook over the last several years. Achieving the down-listing or de-listing criteria for this species will require the continued involvement of the USACE in the future as well as other partners. Because of the recent mussel kill on the Stateline ditch, actions to help reestablish fat pocketbooks in Missouri may be proposed in the near future. Additionally, recovery actions are currently underway in Arkansas in the Stateline Ditch in Arkansas. We encourage your involvement and support of these projects that are near the proposed Elk Chute South Levee Setback project.

### **REINITIATION-CLOSING STATEMENT**

This concludes formal consultation on the potential impacts of the proposed levee setback on the fat pocketbook. As provided in 50 CFR Sec. 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species that was not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the action. Should the incidental take level be reached, project work will cease immediately pending reinitiation.

Any specimens killed during project construction will be retained for scientific study. Dead mussels may be frozen or preserved in 95% ethanol. Any losses will be reported within 72 hours to the Field Supervisor at the U.S. Fish and Wildlife Service Office, 101 Park DeVille Drive, Suite A, Columbia, 65203, 573-234-2132.

The Service appreciates this opportunity to work with the USACE in fulfilling our mutual responsibilities under the ESA. Please contact Andy Roberts of this office at 573-234-2132 extension 110 if you have any questions or require additional information.

Sincerely,

A handwritten signature in black ink that reads "Charles M. Scott". The signature is fluid and cursive, with a long, sweeping tail on the final letter.

Charles M. Scott  
Field Supervisor

cc: MDC, Columbia, MO; (Attn: Steve McMurray)  
USFWS, Conway Field Office; (Attn: Chris Davidson)  
MDC, Jefferson City; (Attn: Policy Coordination Division)

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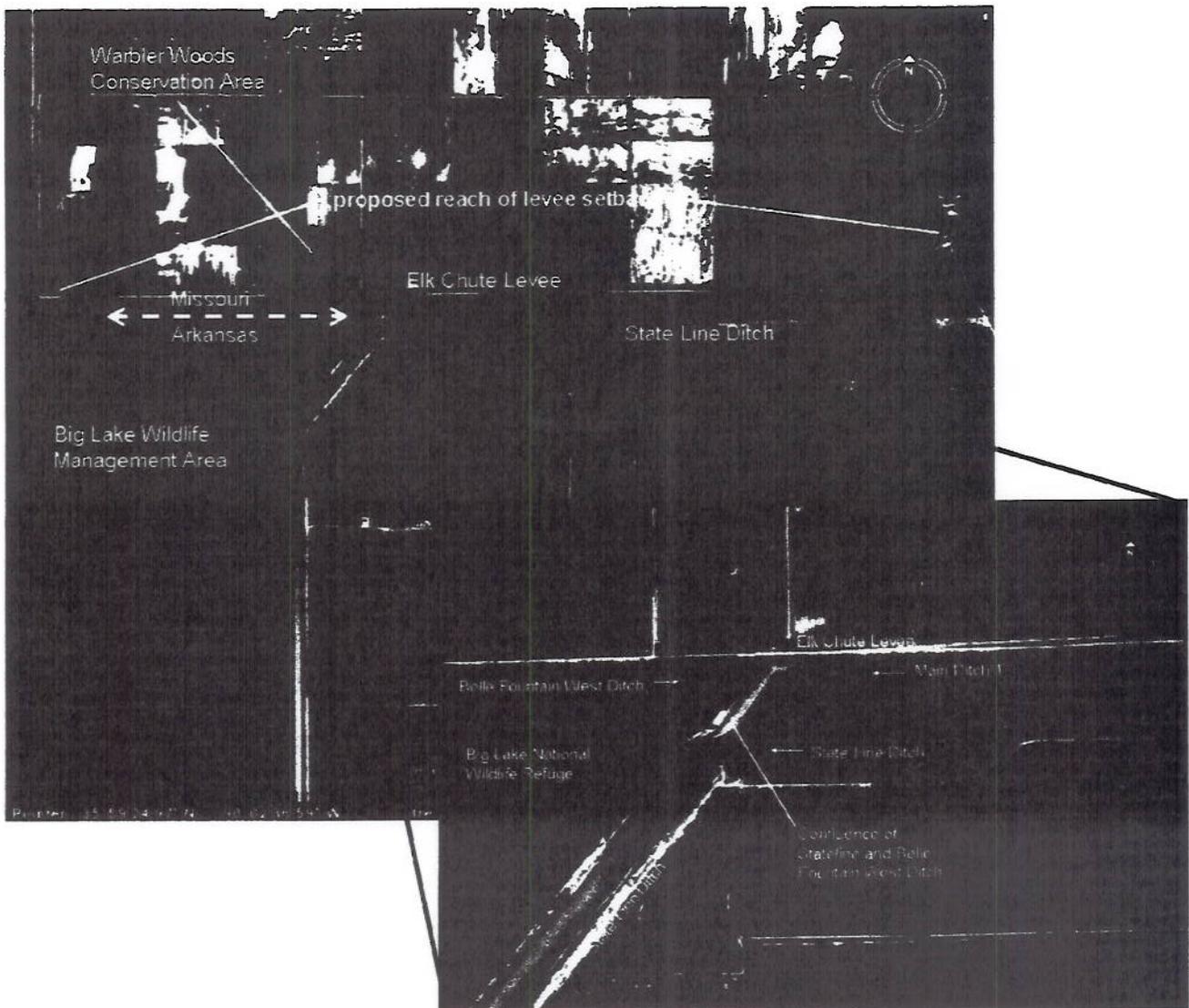


Figure 1. Aerial Photograph of proposed Elk Chute Levee Setback project site showing levee setback reach (top) and flow conveyance (inset) in ditches in the project vicinity (indicated by white arrows).

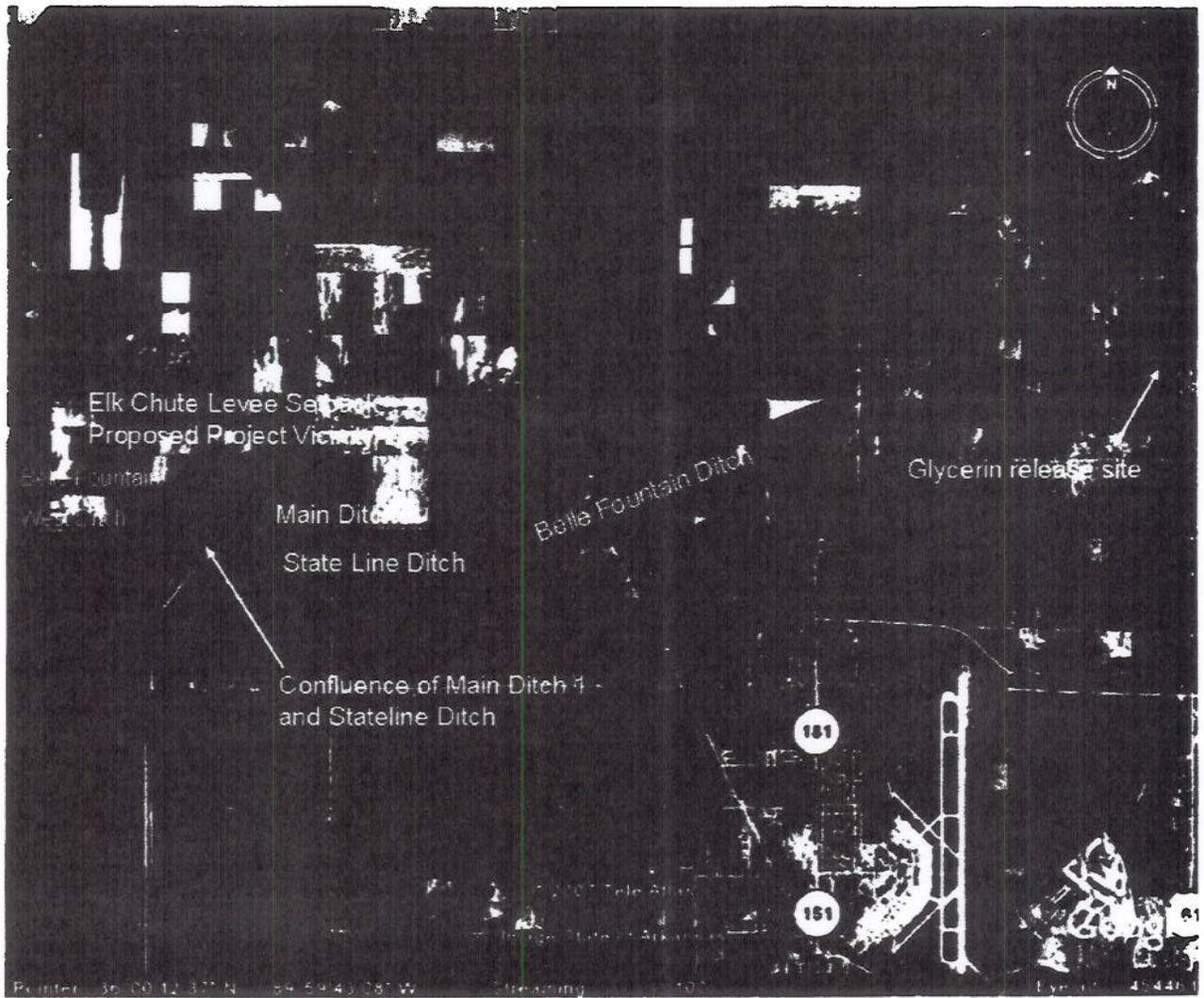


Figure 2. Location of Glycerin release point of entry in relation to the vicinity of the proposed Elk Chute Levee Setback project area.

**Attachment I**

**Natural Resources Conservation Service  
Conservation Practice Standard and Specifications**

NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD AND SPECIFICATIONS

CONSERVATION COVER

(Acre)  
CODE 327

DEFINITION

Establishing and maintaining perennial vegetative cover to protect soil and water resources.

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following:

- \* Reduce soil erosion and sedimentation.
- \* Improve water quality.
- \* Enhance wildlife habitat.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on land to be retired from agricultural production requiring permanent protective cover and on other lands needing permanent protective cover. This practice does not apply to plantings for forage production or to critical area plantings.

CRITERIA

General Criteria Applicable to All Purposes

Grasses, forbs, legumes, and woody plants shall be handled and planted in a manner that will enhance survival of all species. When formulating mixtures, select species that are compatible according to Table 3 of this standard. Species and selected varieties will be suited for the planned purpose.

Species will be adapted to the soil and site conditions. Use Table 4 of this standard for a rating of grass and legume species based on Pasture Suitability Groups. Use Woodland Suitability Groups, Section II-(iii)-C and Conservation Tree / Shrub Suitability Groups, Section II-(iii)-I in the Field Office Technical Guide for recommendations on woody species.

Trees and shrubs will be established according to the TREE / SHRUB ESTABLISHMENT (612) and FOREST SITE PREPARATION (490) conservation practice standards.

Recommendations for the appropriate planting period will be based on the species availability, species characteristics, and site preparation needs.

Acceptable planting dates shall be used for grasses and legumes. Dates for planting are listed on Table 1 of this standard.

Seeding Rates

Seeding rates are based on the amount of seed necessary to provide vegetative cover in a reasonable amount of time. The base seeding rates in Table 2 of this standard are the minimum rates for planting a single species into a well prepared seedbed with good planting equipment. The base rates are decreased as a percentage of the desired stand when used in a mixture of two or more species. Any species listed in Table 2 and included in a mixture will comprise a minimum of 10 percent of the mix.

Calculate seeding rates per species on a pure live seed (PLS) basis using either the JS-AGRON-25

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version, contact the Natural Resources Conservation Service.

form or the automated version, Missouri SeedRate Program.

#### Rate Adjustments

The base rates will be used without adjustment when the seeding method used is likely to provide good seedling establishment due to: uniformly metering the seed; placing the seed at the desired depth (usually ¼ inch); and firming the soil around the seed to provide seed to soil contact. Refer to Table 2, Column 1 for the base seeding rates. Table 2, Columns 3 and 5 are the base rate adjustments when legumes are included in the mixture with cool-season grasses.

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*Planting on a prepared seedbed with grain drills or planters that have a seed delivery system designed for and adequate to handle the types of seed being planted meets this definition. Air-flow fertilizer spreaders uniformly applying seed over bare soil or light residue (less than 20 percent ground cover) and no-till drills specifically designed to handle grass and legume seeds and constructed to cut a seed slot through the surface residue also meet this definition of good conditions for seed placement.*

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Increase the base seeding rates when the seeding method used is likely to provide fair seedling establishment due to: a deficiency in seedbed preparation; poor seed metering; poor seed placement; or less than desirable seed to soil contact. Refer to Table 2, Column 2 for the adjusted base rate due to a fair condition. Table 2, Columns 4 and 6 also include this adjustment along with an increase in seeding rates when legumes are included in the mixture with cool-season grasses.

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*Broadcast seeding methods such as all cyclone style spreaders or air-flow fertilizer spreaders used for seed distribution over heavier residues (equal to or exceeding 20 percent ground cover) and no-till plantings with grain drills not totally suited to plant the desired species meet this definition of fair conditions for seed placement.*

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All broadcast seeding operations require rolling or culti-packing prior to and immediately after seeding.

When cool-season grasses are included in mixtures with legumes and planted at the same time, the cool-season grass seeding rates will be

increased according to Table 2 of this standard. Use Table 2, Columns 3 and 4 for fall planted mixtures of grass with legumes and Columns 5 and 6 for all dormant season and spring planted mixtures of grass with legumes. Use Table 2, Columns 1 and 2 for planting mixtures or single species of legumes and mixtures or single species of grasses without legumes included.

#### Seed Quality

Only viable, high quality and adapted seed will be used. Seed must be clean and relatively free of weed seed and other contaminants. Seed that has become wet, moldy, or otherwise damaged in transit or storage is not acceptable. Certified seed is preferred.

Legume seed shall be inoculated with the proper, viable *Rhizobium* bacteria species prior to planting. Pre-inoculated seed shall be planted prior to the expiration date on the inoculum tag or be re-inoculated with the appropriate inoculum within 24 hours prior to seeding.

#### Seedbed Preparation

Site and seedbed preparation shall be sufficient for establishment and growth of the selected species. Provide a firm, weed-free seedbed that ensures seed will contact soil moisture uniformly, facilitates seedling emergence, and provides a medium that does not restrict root growth.

Adequate seedbed preparation following annual tilled crops will consist of:

- 1) Conventional Tillage: A seedbed may be prepared by moldboard plowing and secondary tillage to make a clean, firm seedbed. Roll or culti-pack immediately prior to seeding.
- 2) Conservation Tillage: Prepare a seedbed with a chisel, disk or other similar tool that will leave enough residue to provide erosion protection. Apply herbicides or tillage operations early enough to assure a kill of existing vegetation. Roll or culti-pack immediately prior to seeding.
- 3) No-Till into Crop Residue (includes Temporary Cover Crops): Select crop harvest equipment and methods conducive to no-till planting operations and successful establishment. Prescribed burning may be used when residue is excessive for the proper operation of no-till equipment or for proper seed placement on sites with low erosion potential. Till and roll or culti-pack only those areas where excessive residue occurs such as chaff or straw

windrows. Apply herbicides to kill existing weeds or crops prior to the planting operation. In all cases, follow herbicide label instructions. Identify and treat insect or rodent problems prior to planting.

#### Soil Fertility and Lime

Fertilizer and lime will be applied according to a current soil test. A current soil test will be an analysis made during the last four years and since the most recent application of lime or manure.

Apply all or a portion of the nitrogen (N) requirement immediately prior to or during seeding. Rates of 10 to 20 pounds per acre for grass and legume mixtures and 20 to 40 pounds per acre for grasses are desired at planting. If a split N application is used, apply the remainder of the N topdress after the planting is established.

Soil test requirements for nitrogen, phosphate, and potash may be waived when the soil test calls for individual requirements of less than 25 pounds per acre and the total amount of fertilizer to be applied is less than 50 pounds per acre. Lime requirements of less than 600 pounds per acre effective neutralizing material (ENM) may be waived.

On warm season grass and legume plantings where nitrogen is not recommended but where the fertilizer vendor cannot provide a blend without nitrogen, up to 30 pounds per acre of N may be applied.

#### Temporary Cover

When existing residue will not provide at least 30 percent ground cover until the planned planting date and the permanent vegetation will not be planted within 60 days, temporary cover will be established.

All temporary cover crops must be clipped or destroyed before heading to prevent excessive competition with the permanent seeding. Winter wheat or rye must be killed by tillage or herbicides prior to seed set. Establish temporary cover according to the COVER AND GREEN MANURE CROP (340) conservation practice standard.

#### Planting into Cover

When planting on seedbeds with up to 50 percent ground cover, place the seed at the proper depth using a grassland drill, grain drill with press wheels,

multi-packer seeder or similar tool. Seed may be broadcasted and rolled or culti-packed immediately after broadcasted.

On seedbeds with greater than 50 percent ground cover, grasses must be planted using a grassland drill, grain drill with press wheels or similar tool. Legumes should be drilled but may be broadcast as dormant plantings only.

#### Planting into Existing Stands

When planting into an existing vegetative stand, herbicides or mechanical tillage may be used to suppress the current vegetation. Both methods used separately or in combination will provide different levels of control.

Evaluate existing cover to determine the most effective treatment to allow interseeding success. Use mowing, grazing where permitted, and prescribed burning to remove or reduce vegetative growth that will interfere with herbicide applications, mechanical tillage, or planting operations. A combination of mowing, heavy grazing, and burning at the correct times will also weaken the existing stand.

All tillage must allow the operation of planting equipment to properly place the seeded species. A disk or similar tool disturbing 50 to 60 percent of the existing stand is desired. Tillage will result in undesirable vegetation germinating and competing with planted species.

When herbicides are used, mow in mid-summer and allow time for the vegetation to regrow prior to applying herbicides. Late summer to early fall herbicide applications prior to the killing frost can provide adequate control. Evaluate and treat again in the spring if necessary.

When the goal is to reduce the competition of an existing cover without total control, the same herbicides may be used with adjustments to the application pattern, rate, or timing. Plug nozzles on the spray boom to band apply herbicides or spray strips or patches to reduce the stand.

Plant areas that were tilled or controlled with herbicides to an acceptable seed mixture. On a site where a portion of the vegetation was maintained either with band spraying or prepared strips, seed the selected mixture on the entire

disturbed area. Delete any grass or legume species from the planting mixture that currently survives on the site in an adequate population.

Remove early spring regrowth of the existing stand by mowing to reduce competition and allow the new seedlings to become established. Mow as needed during the establishment year to reduce competition. Cease mowing operations when planted seedlings are tall enough to be damaged by the mowing operation.

When a broadcast seeding method is planned, evaluate the potential for seed to soil contact to occur. Select site preparation techniques and seeding methods that allow seeding success.

#### Companion Crops

Where erosion may be a problem during the initial establishment period for cool season grass plantings, a companion or nurse crop may be desirable. Seed a companion crop of spring oats at a rate of 25 to 30 pounds per acre for spring or fall plantings. Winter wheat and rye are not acceptable as fall companion crops but may be planted at a rate not to exceed 20 pounds per acre in the spring.

Companion crops will be grazed or mowed when 8 to 12 inches tall or before heading (which ever occurs first) to avoid seed-set and reseedling of the companion crop. Mowing will be high enough to avoid damage to the permanent seeding. Mow as often as necessary to keep the canopy from becoming competitive with the planted species. Herbicides may be used to kill or retard cover crop growth when benefits have been achieved.

#### Sprigs and Cuttings

Planting sprigs, rhizomes, stolons, or cuttings of bermudagrass may provide quicker and easier cover than planting seed. The basic planting rate will be 10 bushels of sprigs per acre. The steps to follow are:

1. Plant only in moist, fertile weed-free soil.
2. Plant bermudagrass either in the spring or summer but early enough to take advantage of available precipitation and the growing season.
3. Plant pure live sprigs as soon as possible after harvesting.

4. Plant sprigs at least 2 inches deep to ensure continued soil moisture, but leave tips above ground.
5. Firm soil around the sprigs to keep them moist.
6. Control weeds with selective herbicides applied immediately after planting.
7. Fertilize to hasten ground coverage as soon as new stolons or rhizomes are evident.

#### Additional Criteria to Reduce Soil Erosion and Sedimentation

The selected seed mixture will contain no less than 50 percent perennial grasses based on pure live seed rated excellent, good, or fair for erosion control in Table 2 of this standard. No more than 20 percent of the desired stand will be comprised of species rated poor for erosion control.

Erosion will be controlled prior to seeding permanent cover. Temporary cover will be used when:

1. the required seeds or plant stock are not available;
2. the acceptable planting period for the selected species has passed;
3. pesticide residues will not allow establishment of the desired species; or
4. weed pressure will require an interim annual crop to assist in suppression of weedy species.

Establish temporary cover according to the COVER AND GREEN MANURE CROP (340) conservation practice standard.

Final tillage, planting, and other mechanical operations will occur on the contour and across areas of concentrated flows.

When a woody component is desired, shrubs and trees will be planted on the contour. Permanent cover will be planted between the proposed woody rows, leaving a 36 inch minimum strip for the trees and shrubs, or the entire field can be seeded prior to planting the woody component and herbicides or strip tillage used to kill the permanent cover in the tree and shrub row prior to planting. A strip 36 inches wide along the planned tree and shrub row or areas 36 inches in diameter around each individual planting site should be treated prior to planting the trees and shrubs.

### Additional Criteria to Enhance Wildlife Habitat

When the primary objective is to improve wildlife habitat, the seed mixture should not contain species with a poor wildlife rating from Table 2. Select species that create an open structure that allows increased forb production and wildlife movement.

Native, perennial forbs are important to many species of wildlife. Adding multiple species to a seeding mixture is advised. Since native forbs are generally planted at low rates, do not adjust seeding rates of grasses or legumes when 0.5 pounds or less good quality seed of native forbs is incorporated into the mixture. Refer to the RESTORATION OF DECLINING HABITATS (643) conservation practice standard for acceptable species.

If native forbs are the only species to be added to an existing plant community, the seeding rate is usually quite small. As planting equipment will not deliver small amounts of seed uniformly, the forbs are best established as patch or strip plantings within the field. These plantings shall be a minimum size of one-tenth acre to a maximum size of one acre. For patch and strip plantings only, the seeding rate shall be equivalent to five (5) pounds of pure live seed per acre.

Use the following formulas to calculate the area to be planted and the seed requirement per field:

- Field acreage multiplied by 0.25 pounds per acre equals the pounds of seed required.

- Field acreage multiplied by 0.05 equals the acres to be planted in patches or strips.

- Acres to be planted multiplied by 43,560 square feet per acre divided by the desired width equals the length of the strip to be planted. Determine the width and length of each patch or strip based on the equipment to be used and the site characteristics. At least one forb planting will be established in each separate field that is two acres or more in size. Seedbed preparation may be mechanical tillage or chemical controls to remove competition prior to planting the forbs.

Establish as many of these plantings as necessary to disperse the forb seed source in the field. Plant

the forbs with a companion crop or complete field operations on the contour to reduce the erosion potential. Manage the entire field to encourage the increase and spread of the forb population across the field.

When wildlife habitat development is the producer's primary objective and will occur only on NHEL soil map units, seeding rates under this standard may be multiplied by a factor of 0.75. This reduced rate will provide for a more "open stand". Erosion rates must remain within the tolerable limit (T) after treatment. Gully erosion must be controlled by proper treatment. Refer to the WILDLIFE UPLAND HABITAT MANAGEMENT (645) conservation practice standard.

Maintenance practices and field activities are not to disturb cover during the primary avian nesting period (May 1 to July 15) for grassland species. Mowing will be needed during the establishment period but should be minimized to lessen negative impacts on wildlife. Annual mowing of the stand for generic weed control is not recommended. Annual mowing is discouraged as it greatly reduces residual cover for next year's nesting. When mowing is needed, mow between July 15 and August 15.

To benefit insect food sources for grassland nesting birds, spraying or other control of noxious weeds will be done on a "spot" basis to protect forbs and legumes that benefit native pollinators and other wildlife.

### CONSIDERATIONS

This practice may be used to promote the conservation of declining species, including threatened and endangered species. The food and cover value of the planting can be enhanced by using a habitat evaluation procedure to aid in selecting plant species and providing and managing for other habitat requirements necessary to achieve the objective.

The use of native species on appropriate soil types should be encouraged. Planting native forbs, shrubs, or trees will add diversity and vertical structure to the restored habitat. If a native plant cover develops other than those planted and meets the intended purpose, the cover may be considered adequate.

327-6

Grasses, forbs, and legumes may be planted to encourage maximum plant diversity. The best wildlife planting mixes should contain multiple species with 60 percent or more of species having an excellent wildlife rating.

Rotating treatments such as strip disking and patch burning throughout the managed area creates vegetative edges and diversity desired for wildlife habitat.

To increase the population of forbs, prescribed burns should be completed during the dormant season from late fall to early spring. Do not burn after spring green-up has occurred. Dormant season burns should be used in areas of the field only where erosion is not a concern.

Install structural measures prior to planting conservation cover.

*Rhizobium* bacteria inoculum does not readily adhere to seed. Use a sugar-water solution as a sticking agent. Do not use carbonated beverages as the low pH of these products may harm the bacteria.

Lime, phosphate ( $P_2O_5$ ), and potash ( $K_2O$ ) should be incorporated during tillage operations prior to seeding. For no-till plantings where incorporation is not possible, it is advised that lime be broadcast 6 to 12 months prior to seeding and phosphate and potash be broadcast 30 to 60 days prior to seeding.

Fertilizer spreaders may be used to broadcast seed along with a portion of the lime and fertilizer requirements. Inert materials such as cracked corn or rice hulls may also be used as bulk material to aid in seed dispersal. Adequate coverage of the site is required if this method of seeding is used.

Herbicide carryover may dictate postponing the permanent seeding. In such cases, temporary cover may be required until that time when the permanent plantings can be made. Refer to the Crop Replant and Rotation Guides in UMC publication MP-575, "Weed Control Guide for Missouri Field Crops", for identification of those "problem" herbicides and the selection of plant species suitable for temporary cover.

Allelopathy and autotoxicity effects have been documented with certain cereal grains used as temporary cover and alfalfa. These crops produce chemical substances that inhibit the growth or establishment of succeeding plantings. Tillage is often used to reduce these negative effects prior to seeding permanent cover.

Where applicable, this practice may be used to conserve and stabilize archeological and historic sites.

#### PLANS AND SPECIFICATIONS

Site specifications for establishment and maintenance of this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations, and Operation and Maintenance described in this standard.

Site specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation.

#### OPERATION AND MAINTENANCE

Vegetative manipulation to maximize plant and animal diversity can be accomplished by prescribed burning, mechanical, biological, chemical, or cultural methods or any combination of these. Select maintenance treatments that meet the objectives of the participant.

Mow, clip or use approved herbicides as often as necessary to control noxious weeds and undesirable plants during the establishment period. Manage plantings to reduce competition of companion crops or undesired vegetation.

After the stand is established, spot mowing, patch burns, or spot herbicide treatments to control noxious weeds and other undesirable plants should be used in lieu of treating the entire field. The minimum height for mowing cool-season grasses and introduced warm-season grasses is 3 inches and native warm-season grasses is 8 inches.

Maintain soil pH and fertility at levels necessary to meet landuse objectives.

Re-establish permanent cover as needed to provide adequate ground cover and maintain structures for erosion control.

Occasional grazing and/or haying may benefit the stand. If grazing is to be used, develop a planned grazing system and follow management recommendations outlined in the PRESCRIBED GRAZING (528A) conservation practice standard. Develop management criteria for haying based on the FORAGE HARVEST MANAGEMENT (511) conservation practice standard. Some USDA programs may prohibit grazing and/or haying of conservation cover.

Damage due to insects and diseases must be monitored. If an infestation threatens stand survival, timely corrective action must be taken.

Maintenance measures must be provided to control outbreaks of noxious weeds and other invasive species in order to comply with state noxious weed laws and stand maintenance requirements.

When pesticides are needed, only those labeled for the specific use will be recommended. University of Missouri publications, MP 581 "Weed and Brush Control Guide for Forages, Pastures and Non-cropland in Missouri" will be used for reference as well as the specific product labels. Use of a pesticide that exceeds the information stated on the label is a misuse of the product and is in violation of state law.

Optional strategies for maintenance of conservation cover are:

1) Light Disking

- No more than one-third of the field should be disked in any one year.
- Disking can begin the fourth year after establishment of the vegetative stand.

- Disking should be 2 to 4 inches deep and occur between October 1 and April 30. One or two passes are allowed with two passes the recommended treatment.
- Disk strips a maximum of 75 feet wide on the contour or across the slope with a minimum width of two times the disked width (150 feet) of undisturbed vegetation between the treated strips to reduce potential erosion problems.
- The same acreage within a field will not be disked more often than every third year.

2) Prescribed Burning

- Prescribed burns reduce mulch buildup, improve wildlife cover, and prepare ground for interseeding and control of undesirable plants.
- Follow criteria in the PRESCRIBED BURNING (338) conservation practice standard.
- Burns should be performed no more than every third year due to the adverse effects on soil organic matter and soil quality.
- Timing of the burns can be used to either set back or stimulate targeted vegetation.
- When burning to control undesirable sprouting or woody vegetation, it may be necessary to burn two or more consecutive years.

3) Herbicide Application

- Use of herbicides can begin the fourth year after establishment.
- Areas can be treated in strips totaling no more than one-third of the field in any one year.
- Only approved herbicides will be applied according to label directions.
- Use application rates that will temporarily retard vegetation without a complete kill.

4) Mowing and Shredding

- After the stand is established, mowing will be performed as needed to limit weeds while maintaining cover for erosion control and wildlife cover.
- No more than one-half of the field may be mowed in any growing season.

TABLE 1: PLANTING DATES

Plantings with:	Planting Date		
	Spring	Summer/Fall 2/	Dormant

327-8

Planting Date

Plantings with:

	Spring	Summer/Fall 2/	Dormant
Cool Season Grasses in: 1/			
Northern Missouri	3/16 - 5/31	8/01 - 9/30	12/01 - 3/15
Southern Missouri	3/01 - 5/15	8/15 - 10/15	12/15 - 2/29
Warm Season Grasses in: 1/			
Northern Missouri	4/01 - 6/30		11/15 - 3/31
Southern Missouri	4/01 - 6/15		11/15 - 3/31

1/ Planting dates are based on plant suitability zones. Northern Missouri is all counties north of Bates, Henry, Benton, Morgan, Moniteau, Cole, Osage, Gasconade, Franklin, and St. Louis Counties. Southern Missouri is all counties including and south of those listed.

2/ Mixtures containing legumes will be planted by September 15 in Northern Missouri except as a dormant seeding.

TABLE 2: SEEDING RATES BASED ON PLANTING METHOD AND PERIOD  
(POUNDS PURE LIVE SEED PER ACRE)

Species	Erosion Control Rating*	Wildlife Rating*	Base Rate with Planting Conditions		Adjusted Rates of Fall Planting w/ Legumes Good or Fair	Adjusted Rates of all Dormant and Spring Plant w/ Legumes Good or Fair		
			Good	Fair				
<b>Cool Season Legumes:</b>			Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Birdsfoot Trefoil	F	F	5.0	7.5	5.0	7.5	5.0	7.5
Alsike Clover	G	G	3.2	4.8	3.2	4.8	3.2	4.8
Ladino Clover	G	F	3.0	4.5	3.0	4.5	3.0	4.5
Red Clover	F	F	6.1	9.1	6.1	9.1	6.1	9.1
<b>Warm Season Legumes:</b>								
Alfalfa	F	E	7.5	11.2	7.5	11.2	7.5	11.2
Common Lespedeza	P	E	7.5	11.2	NA	NA	7.5	11.2
Grownvetch	G	P	8.0	12.0	8.0	12.0	8.0	12.0
Sweetclover	P	F	6.3	9.5	6.3	9.5	6.3	9.5
<b>Cool Season Grasses:</b>								
Canada or Virginia Wildrye	F	E	8.0	12.0	10.0	14.0	12.0	16.0
Kentucky Bluegrass	G	G	2.2	3.3	2.7	3.8	3.3	4.4
Orchard Grass	F	E	4.0	6.0	5.0	7.0	6.0	8.0
Redtop	G	G	1.7	2.5	2.1	3.0	2.5	3.4
Reed Canarygrass	E	P	4.8	7.2	6.0	8.4	7.2	9.6
Smooth Brome	E	F	8.0	12.0	10.0	14.0	12.0	16.0
Tall Fescue	E	P	8.0	12.0	10.0	14.0	12.0	16.0
Timothy	G	E	3.1	4.6	3.9	5.4	4.6	6.2
Western Wheatgrass	G	F	8.0	12.0	10.0	14.0	12.0	16.0
<b>Warm Season Grasses:</b>								
Bermudagrass (seed)	E	P	2.1	3.1	NA	NA	2.1	3.1
Bermudagrass (sprigs)	E	P	10 bushel	15 bushel	NA	NA	10 bushel	15 bushel
Big Bluestem	F	G	7.0	10.5	NA	NA	7.0	10.5
Old World Bluestem	G	P	2.4	3.6	NA	NA	2.4	3.6
Eastern Gamagrass	P	G	8.0	12.0	NA	NA	8.0	12.0
Indiangrass	F	E	7.0	10.5	NA	NA	7.0	10.5
Little Bluestem	G	E	6.4	9.6	NA	NA	6.4	9.6
Side-oats Grama	G	E	7.5	11.2	NA	NA	7.5	11.2
Switchgrass	G	G	4.0	6.0	NA	NA	4.0	6.0

Columns 1 (good) & 2 (fair): Select the planting rate depending on the method of planting (good or fair chance of seedling establishment).  
 Column 3 (good) & 4 (fair): Adjusted seeding rates if cool-season grasses are fall planted with legumes.  
 Column 5 (good) & 6 (fair): Adjusted seeding rates if cool-season grasses are dormant or spring planted with legumes.  
 \*Wildlife and Erosion Control Ratings of E - Excellent, G - Good, F - Fair, and P - Poor.

TABLE 3: SPECIES COMPATIBILITY FOR CONSERVATION COVER

SPECIES	LEGUMES											C/S GRASSES											W/S GRASSES										
	SYMBOL	bitr	alsi	laci	recl	alfa	col	cro	sw	ca	kebr	orc	red	rec	ism	faf	tim	we	ber	bib	cab	eag	ind	libl	sig	swi							
<b>Cool Season Legumes:</b>																																	
Birdsfoot Trefoil	bitr	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G							
Aisike Clover	alsi	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F							
Ladino Clover	laci	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G							
Red Clover	recl	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F							
<b>Warm Season Legumes:</b>																																	
Alfalfa	alfa	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G							
Common Lespedeza	cole	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F							
Crownvetch	crow	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F							
Sweetclover	swcl	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F							
<b>Cool Season Grasses:</b>																																	
Canada or Virginia Wildrye	cawi	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F							
Kentucky Bluegrass	kebl	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F							
Orchard Grass	orch	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G							
Redtop	redt	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F	G	F							
Reed Canarygrass	reca	P	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F							
Smooth Brome	smbr	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G							
Tall Fescue	tafe	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G							
Timothy	timo	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G							
Western Wheatgrass	wewh	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F							
<b>Warm Season Grasses:</b>																																	
Bermudagrass	berm	F	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P							
Big Bluestem	bibl	G	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F							
Old World Bluestem	cabl	F	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P							
Eastern Gamagrass	eaga	G	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F							
Indiangrass	indi	G	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F							
Little Bluestem	libl	G	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F							
Side-oats Grama	sigr	G	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F							
Switchgrass	swit	G	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F							

Good (G), Fair (F), or Poor (P)-Species rated G can be in a mix without restrictions when compatible with the PSG. If rating is F, it should make up no more than 25 percent of the mix. If rating is P, it will not exceed 10 percent of the mix.

## **DRAFT**

### **SECTION 404(b)(1) EVALUATION Elk Chute South Levee Setback Dunklin County, Missouri**

#### **I. PROJECT DESCRIPTION**

a. Location. The location for this item of work is located in Dunklin County, Missouri, just north of the Missouri-Arkansas state line, approximately 9 miles northwest of Blytheville, Arkansas. The Elk Chute South Levee is approximately 5.1 miles long and extends from Missouri State Highway TT westward to its intersection with the Elk Chute West Levee.

b. General Description. The project consists of setting approximately 5.1 miles of the existing levee back approximately 50 feet; stabilizing the Belle Fountain West Ditch bank by creating a stable (3.75H:1V) slope; constructing a 50-foot berm between the ditch and the levee; consolidating the existing twenty-five drainage outlets of various sizes and elevations into five concrete drainage structures, and constructing a landside toe ditch. Several access ramps and culverts would also be constructed to maintain current access to, and drainage of adjacent fields. Some trees, brush, and debris would need to be cleared for this work to be performed, and would be disposed of on site. A total of five items of work are proposed for the entire project, with an estimated one mile of work to be completed annually. Fill material would be obtained from the degraded levee section and the borrow area adjacent to the existing landside levee toe of slope.

c. Authority and Purpose. This project was authorized by the Flood Control Act of 15 June 1936. Local cooperation requirements were modified by the Flood Control Act of 24 July 1946 which limited local responsibility to ordinary maintenance as defined by Section 3 of the Flood Control Act of 15 May 1928.

#### d. General Description of Dredged and/or Fill Material.

(1) General Characteristics of Fill Material. Soils in the area consist of fat and lean clays with some sand and silty sands. The Belle Fountain West Ditch banks would be consistent with these soils. Fill material would be obtained from the degraded levee section and the borrow area adjacent to the existing landside levee toe of slope. Limestone rock riprap and gravel will be placed at the five proposed drainage outlet structures into Belle Fountain West Ditch for stabilization.

(2) Quantity of Material. Construction would require nearly 812,375 cubic yards of fill material from the existing levee and borrow area adjacent to the existing landside levee toe. Preliminary design estimates indicate that 3,300 tons of R200 riprap, along with 825 tons of crushed stone filter material placed beneath the riprap, would be placed in Belle Fountain West Ditch to prevent the scour on the banks and channel bottom at the five consolidated drainage outlets.

(3) Source of Material. The earthen material would be obtained from the degraded levee section and the borrow area adjacent to the existing landside levee toe of slope. The riprap and other rock would be hauled in from a quarry located outside the project area.

e. Description of Proposed Discharge Sites.

(1) Location. The location for the proposed levee setback structure is approximately 50 feet north of the existing levee. In addition, the proposed project would consolidate the existing twenty-five drainage outlets of various sizes and elevations into five concrete drainage structures.

(2) Size. Limestone rock riprap and gravel will be placed at the five proposed drainage outlet structures into Belle Fountain West Ditch for stabilization. The riprap apron would extend for approximately 40 feet into Belle Fountain West Ditch.

(3) Type of Habitat. A narrow strip of small willow, boxelder, and red maple trees, with associated understory and groundcover, line the ditchbank from the top banks to the waterline. All species are typical and common to the area. This vegetation would be removed during construction. Most of the rights-of-way are in agricultural crop or fallow field. The majority of the excavated material for levee construction would be placed in prior converted cropland; however, approximately 8.5 acres of wetland vegetation will be lost from an existing permitted wetland mitigation site due to levee placement. The Memphis District Regulatory Branch is currently coordinating with the landowner to submit a permit modification to offset construction impacts to the mitigation site. At a minimum, the Regulatory Branch will require a 2:1 ratio (17 acres) to offset the impacts. The 31-acre area between top bank and the levee toe will be planted in native warm season grasses. The streamside embankments would be planted in wetland grasses. The above measures would offset any impacts to vegetation.

(4) Timing and Duration of Discharge. A total of five items of work are proposed for the entire project, with an estimated one mile of work to be completed annually. Construction would take place during drier periods and low flow conditions.

f. Description of Disposal Method. Conventional logging and earth moving equipment would be used during construction to clear the trees and excavate the ditches.

## II. FACTUAL DETERMINATION

a. Physical Substrate Determinations.

(1) Substrate Elevation and Slope. The project is located in a relatively flat area with elevations ranging from 240 to 250 feet above mean sea level.

(2) Sediment Type. The excavated material would be comprised of various quantities of sands, silts, and clays previously washed from nearby loess-covered uplands. The riprap would be large limestone rock and gravel.

(3) Dredged and Fill Material Movement. Fill material would be obtained from the degraded levee section and the borrow area adjacent to the existing landside levee toe of slope. Rock would be hauled in from a quarry and deposited with conventional earthmoving equipment

along Belle Fountain West Ditch to stabilize the drainage outlet structures. All exposed earth would be planted in a grass cover to minimize erosion.

(4) Physical Effects on Benthos. Excavation would cause a temporary perturbation on benthos. The placement of rock riprap for stable banks and a stable bottom channel would be expected to increase and diversify benthic habitat. In addition, the consolidation of the 25 existing drainage structures into five would have a positive impact on existing benthos.

(5) Other Effects. N/A

(6) Action Taken to Minimize Impacts. The project would be constructed during periods of low rainfall and low water stages. It is expected that approximate one linear mile of levee will be setback annually. Best Management Practices, check dams, silt fences, sediment basins, and the planting of warm season grasses including switchgrass, indiangrass, and eastern gamagrass.

b. Water Circulation, Fluctuation, and Salinity Determination.

(1) Water. No change in water quality of Belle Fountain West Ditch or other ditches within the project area is expected due to construction of this project.

(a) Salinity. N/A

(b) Water Chemistry. The water chemistry of the project-affected area should not change as a result of the excavated material or riprap rock deposition.

(c) Clarity. There would be a temporary increase in Belle Fountain West Ditch turbidity at the project site due to construction. Turbidity levels should return to pre-construction levels shortly after project completion. A more stable bank in Belle Fountain West Ditch and Main Ditch 1 could possibly decrease sediment inputs into these ditches

(d) Color. No expected change.

(e) Odor. No expected change.

(f) Taste. No expected change.

(g) Dissolved Gas levels. No expected change.

(h) Nutrients. No expected change.

(i) Eutrophication. No expected change.

(j) Others as Appropriate. N/A

(2) Current Patterns and Circulation.

(a) Current Patterns and Circulation. The project consists of consolidating the twenty-five drainage structures into five drainage structures and moving the levee back approximately 50 feet. No additional flow or change in circulation is expected to result from this proposed construction.

(b) Velocity. Upon completion of the project construction, the water velocity of Belle Fountain West Ditch should reach its previous elevation and thus return flows to normal. The water velocity of the ditch should not change.

(c) Stratification. No expected change.

(d) Hydrologic Regime. The proposed project may increase floodplain storage and reduce scouring in Stateline Ditch during flood events.

(3) Normal Water Level Fluctuations. The existing water levels in the watershed are governed by rainfall and channel capacity. Setting the levee back would increase the storage of the floodplain during flood events, but water level fluctuation should be minimal.

(4) Salinity Gradients. N/A

(5) Action Taken to Minimize Impacts. Construction would take place during low rainfall and low water stages. Best Management Practices, check dams, silt fences, sediment basins, and other measures will be utilized to reduce pollutants entering the system during construction activities.

c. Suspended Particulate/Turbidity Determination.

(1) Expected Changes in suspended Particulates and Turbidity Levels in Vicinity of Disposal Sites. Excavation and rock riprap deposition are not expected to significantly increase the level of suspended particulates or increase turbidity for an extended period of time. Ambient conditions will return shortly after construction.

(2) Effects on Chemical and Physical Properties of the Water Column.

(a) Light Penetration. Excavation and rock deposition would slightly increase turbidity in Belle Fountain West Ditch with a corresponding decrease in light penetration. The volume of water in Belle Fountain West Ditch would dilute these effects. Ambient conditions will return shortly after construction. A more stable bank in Belle Fountain West Ditch and Main Ditch 1 should decrease sediment inputs into these ditches.

(b) Dissolved Oxygen. A slight increase in dissolved oxygen may occur upon completion of the project resulting from water flowing over deposited rock riprap.

(c) Toxic Metals and Organics. No change is expected.

(d) Pathogens. N/A

(e) Aesthetics. Small shrubs, trees, and debris will be cleared along banks of Belle Fountain West Ditch and disposed of on site. All exposed earth will be planted with grass. Warm season grasses would be planted within the 50-foot area between the levee toe and top bank of the ditch; this would include planting wetland grasses along the water line.

(f) Others as Appropriate. None noted.

(3) Effects on Biota.

(a) Primary Production. Aquatic vegetation is very limited within Belle Fountain West Ditch and the local drainage ditch. Warm season grasses would be planted within the 50-foot area between the levee toe and top bank of the ditch. In addition, wetland grasses would be planted along the water line.

(b) Suspension/Filter Feeders. These organisms may be disturbed upon excavation and riprap deposition. However, after construction the new rock substrate would provide additional niches for the organisms, and any organisms that are impacted should repopulate the area after project completion.

(c) Sight Feeders. Resident fish are adapted to turbidity increases that occur after every rainstorm. Project-related turbidity increases would be minor compared to these natural events. Since fish and other sight feeders are highly mobile, project impacts to sight-feeding organisms would be insignificant and short term.

(4) Actions Taken to Minimize Impacts. Construction would be done during low water stages, and vegetation would be cleared only to the extent necessary to permit adequate construction mobility. Best Management Practices would be exercised to minimize silt and runoff impacts.

d. Contaminant Determinations. It is not expected that any contaminants would be introduced or translocated due to project construction.

e. Aquatic Ecosystems and Organism Determination.

(1) Effects on Plankton. Effects, if any, on plankton communities are expected to be insignificant and of short duration.

(2) Effects on Benthos. Benthic organisms within the immediate area of the drainage structures will be removed with excavation. Those downstream of the project may be disturbed with the turbidity increase, but no more than what would naturally occur during high flow events. The benthic communities are expected to quickly return after the project completion. Rock deposition is not expected to adversely impact benthos as rock will be placed on the recently excavated banks and channel bottom. However, the hard rock substrate would make

more niches available and eventually increase benthic diversity where the rock deposition occurs.

(3) Effects on Nekton. No construction impacts are expected to occur. The new rock riprap may provide more cover and food producing areas for these species than what presently exists.

(4) Effects on Aquatic Food Web. No construction impacts are expected. After construction, the rock riprap would provide greater niches and substrate, which should increase the numbers and diversity of benthic organisms, thereby improving the food web at the site.

(5) Effects on Special Aquatic Sites.

(a) Sanctuaries and Aquatic Sites. N/A

(b) Wetlands. Approximately 8.5 acres of wetland vegetation will be lost from an existing permitted wetland mitigation site due to levee placement. The Memphis District Regulatory Branch is currently coordinating with the landowner to submit a permit modification to offset construction impacts to the mitigation site. At a minimum, the Regulatory Branch will require a 2:1 ratio (17 acres) to offset the impacts. The remaining 18.30 acres of the mitigation sites is adjacent to Warbler Woods State Natural Area that consists of 84.29 acres. The proposed project will not change the hydrology or jurisdictional status of the mitigation sites or Warbler Woods. No indirect impacts are anticipated to occur.

(c) Mud Flats. N/A

(d) Vegetated Shallows. N/A

(e) Riffle and Pool Complexes. None exist within the project area.

(6) Threatened and Endangered Species. In a letter dated 10 January 2008, the USFWS stated implementation of prudent and reasonable measures to minimize construction impacts, which included the sediment reduction measures proposed in the BA and additional reporting and monitoring requirements that would exempt the project from the prohibitions in Section 9 of the Endangered Species Act. A take of up to five *P. capax* was permitted to account for any individuals that might be buried by riprap or by increase sedimentation. Personal communication with the U.S. Fish and Wildlife Service revealed that no other Federally listed, or proposed, endangered or threatened plant or animal species, or critical habitats, are known to occur within the proposed work area. Requirements of Section 7 of the Endangered Species Act have been fulfilled.

(7) Other Wildlife. There will be minimal adverse construction impact to wildlife communities that use the ditch bank as habitat.

(8) Actions taken to Minimize Impacts. The project would be constructed during low-flow periods. Impact areas would be limited to the extent necessary for construction of the project features. In addition, the Biological Assessment (BA) proposed minimizing the indirect impacts of sedimentation through the use of sediment control measures including silt fencing, straw bales, and the planting of warm season grasses including switchgrass, indiangrass, and eastern gamagrass. The BA proposed that these grasses be planted within the 50-foot area between the levee toe and top bank of the ditch along the entire project length. These species were proposed because they provide erosion control and brooding, rearing, and cover habitat for various species of wildlife. Prairie cord grass and native river cane would also be planted along the shoreline of the ditch.

f. Proposed Disposal Site Determinations.

(1) Mixing Zone Determination. N/A

(2) Compliance with Applicable Water Quality Standards. The Missouri Department of Natural Resources is being coordinated with for the purpose of issuing water quality certification for this project.

(3) Potential Effects on Human Use Characteristics.

(a) Municipal and Private Water Supply. N/A

(b) Recreational and Commercial Fishing. N/A

(c) Water Related Recreation. N/A

(d) Aesthetics. The loss of small trees and shrubs on banks would have minimal impacts to the aesthetics of the area.

(e) Parks, National Historical Monuments, National Seashore, Wilderness Areas, Research Sites and Similar Preserves. The levee continues to slide and slough on the riverside, creating the need for extensive repairs to the levee, the drainage structures and the channel. The structural integrity of the levee continues to be at risk. The project would be preventing the presently threatening conditions from affecting Warbler Woods State Natural Area located approximately 250 feet north of the project site. The southeast corner of Hornersville Swamp State Wildlife Area is immediately to the west of a local drainage ditch at the extreme western edge of the project area. Neither area would be adversely affected by construction activities.

g. Determination of Cumulative Effects on the Aquatic Ecosystem. The initial loss of benthos due to excavation will be replaced with an increased and more diverse benthic community within a short time of rock riprap deposition. Flows should return to normal and degradation at the project site should cease after culmination of project construction. The Memphis District Regulatory Branch is currently coordinating with the landowner to submit a permit modification to offset construction impacts to the mitigation site (approximately 8.5 acres). At a minimum, the Regulatory Branch will require a 2:1 ratio (17 acres) to offset the impacts. In addition, the 31-acre area between top bank and the levee toe will be planted in

native warm season grasses. The streamside embankments would be planted in wetland grasses. Therefore, the proposed work should have no significant cumulative adverse effects on the environment.

h. Determination of Secondary Effects on the Aquatic Ecosystem. N/A

### III. FINDING OF COMPLIANCE FOR ELK CHUTE LEVEE SETBACK.

a. No significant adaptations of the Section 404(b)(1) guidelines were made relative to this evaluation.

b. The levee continues to slide and slough on the riverside, creating the need for extensive repairs to the levee, the drainage structures and the channel. The structural integrity of the levee continues to be at risk. In order to prevent the failure of the levee and improve existing conditions; levee relocation, bank stabilizing of the adjacent ditch, and consolidating existing drainage structures is required.

c. The Missouri Department of Natural Resources Water Pollution Control Program is in coordination.

d. No Federally listed, or proposed, threatened or endangered species will be adversely impacted by the proposed project.

e. The proposed project will not significantly affect human health and welfare, the municipal water supply, or commercial or sport fishing. No long-term impacts on plankton communities; fishery breeding, spawning, or nursery habitats; or shellfish areas are expected. Approximately 8.5 acres of wetland vegetation will be lost from an existing permitted wetland mitigation site due to levee placement. The Memphis District Regulatory Branch is currently coordinating with the landowner to submit a permit modification to offset construction impacts to the mitigation site. At a minimum, the Regulatory Branch will require a 2:1 ratio (17 acres) to offset the impacts. The remaining 18.30 acres of the mitigation sites is adjacent to Warbler Woods State Natural Area that consists of 84.29 acres. The proposed project will not change the hydrology or jurisdictional status of the mitigation sites or Warbler Woods. No indirect impacts are anticipated to occur.

f. No significant adverse impacts to aquatic life or terrestrial wildlife, dependent on aquatic ecosystems, are expected.

g. The proposed project should not cause significant adverse impacts on ecosystem diversity, productivity, or stability.

h. No adverse impacts on recreational, aesthetic, or economic values are anticipated. The proposed project would prevent economic and infrastructure damages.

i. In order to minimize potential environmental impacts, construction will be conducted during periods of low stream flow and low rainfall. Additionally, vegetative clearing will be limited to the extent necessary for construction of project features.

**DRAFT**

**FINDING OF NO SIGNIFICANT IMPACT  
ELK CHUTE LEVEE SETBACK  
DUNKLIN COUNTY, MISSOURI**

The U.S. Army Corps of Engineers, Memphis District, intends to set approximately 5.1 miles of the existing levee back approximately 50 feet; stabilize the Belle Fountain West Ditch bank by creating a stable (3.75H:1V) slope; constructing a 50-foot berm between the ditch and the levee; consolidate the existing twenty-five drainage outlets of various sizes and elevations into five concrete drainage structures, and construct a landside toe ditch. An environmental assessment (EA) was prepared to address potential impacts of this work on wildlife and aquatic resources, wetlands, prime and unique farmland, endangered species, cultural resources, and human environment.

The Missouri Department of Natural Resources issued water quality certification on **DATE Pending.**

Excavated material and existing levee material would be deposited in 8.5 acres of a permitted wetland mitigation site to create the new levee. The Memphis District Regulatory Branch is currently coordinating with the landowner to submit a permit modification to offset construction impacts to the mitigation site. At a minimum, the Regulatory Branch will require a 2:1 ratio (17 acres) to offset the impacts. The remaining 18.30 acres of the mitigation sites is adjacent to Warbler Woods State Natural Area that consists of 84.29 acres. The proposed project will not change the hydrology or jurisdictional status of the mitigation sites or Warbler Woods. No indirect impacts are anticipated to occur. In addition, Native warm season grasses will be planted on 31 acres between the levee and Belle Fountain West Ditch.

No HTRW sites are located in the immediate vicinity of the proposed work. There will be no impacts to prime and unique farmland. Any adverse impacts to wildlife and aquatic resources resulting from construction will be minimal and of short duration.

Due to the nature and location of the proposed work, work will not impact any cultural resources. The State Historic Preservation Officer has no objection to the undertaking proceeding as planned. In a letter dated 10 January 2008, the USFWS stated implementation of prudent and reasonable measures to minimize construction impacts, which included the sediment reduction measures proposed in the biological assessment and additional reporting and monitoring requirements that would exempt the project from the prohibitions in Section 9 of the Endangered Species Act. A take of up to five *P. capax* was permitted to account for any individuals that might be buried by riprap or by increase sedimentation. Personal communication with the U.S. Fish and Wildlife Service revealed that no other Federally listed, or proposed, endangered or threatened plant or animal species, or critical habitats, are known to occur within the proposed work area. Requirements of Section 7 of the Endangered Species Act have been fulfilled.

As the environmental documentation for the proposed project does not indicate this to be a major federal action significantly affecting the human environment, I have determined that an environmental impact statement is not required.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Thomas P. Smith  
Colonel, Corps of Engineers  
District Engineer