

**ENVIRONMENTAL ASSESSMENT  
and  
SECTION 4(f) EVALUATION**

**SOUTH DAKOTA PROJECT P 0019(20)0 PCEMS 238H  
NEBRASKA PROJECT STPD-57-4(108)**

Missouri River Bridge Near Vermillion  
Clay County, South Dakota  
Cedar and Dixon Counties, Nebraska

Submitted Pursuant to 42 U.S.C. 4332(2)(c)  
49 U.S.C. 303

In Accordance with Executive Order 11990  
U.S. Department of Transportation  
Federal Highway Administration  
South Dakota Department of Transportation  
and  
Nebraska Department of Roads

The following persons may be contacted for additional information concerning this document:

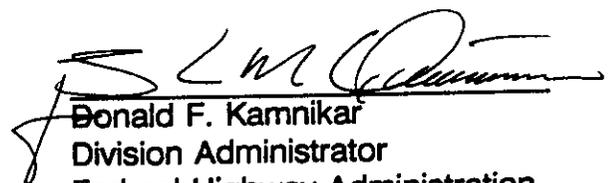
James Nelson  
SDDOT  
700 E. Broadway  
Pierre, SD 57501  
(605) 773-3268

Arthur Yonkey  
NE DEPT. OF ROADS  
P. O. Box 94759  
Lincoln, NE 68509  
(402) 479-4795

Lubin Quinones  
FHWA  
P. O. Box 700  
Pierre, SD 57501  
(605) 224-8033

Nov 18, 1994  
Date of Approval of  
Availability

Signed:

  
Donald F. Kamnikar  
Division Administrator  
Federal Highway Administration

## TABLE OF CONTENTS

Environmental Assessment .....	1
Section 4(f) Evaluation	
Missouri National Recreational River .....	15
Section 4(f) Evaluation	
Frost Wilderness Game Production Area .....	18

## LIST OF TABLES

Table 1: Cost Estimates for Crossing and Highway Alternatives .....	6
Table 2: Loss of Land in Acres Per Time Interval .....	8
Table 3: Crossing Site Impacts .....	13

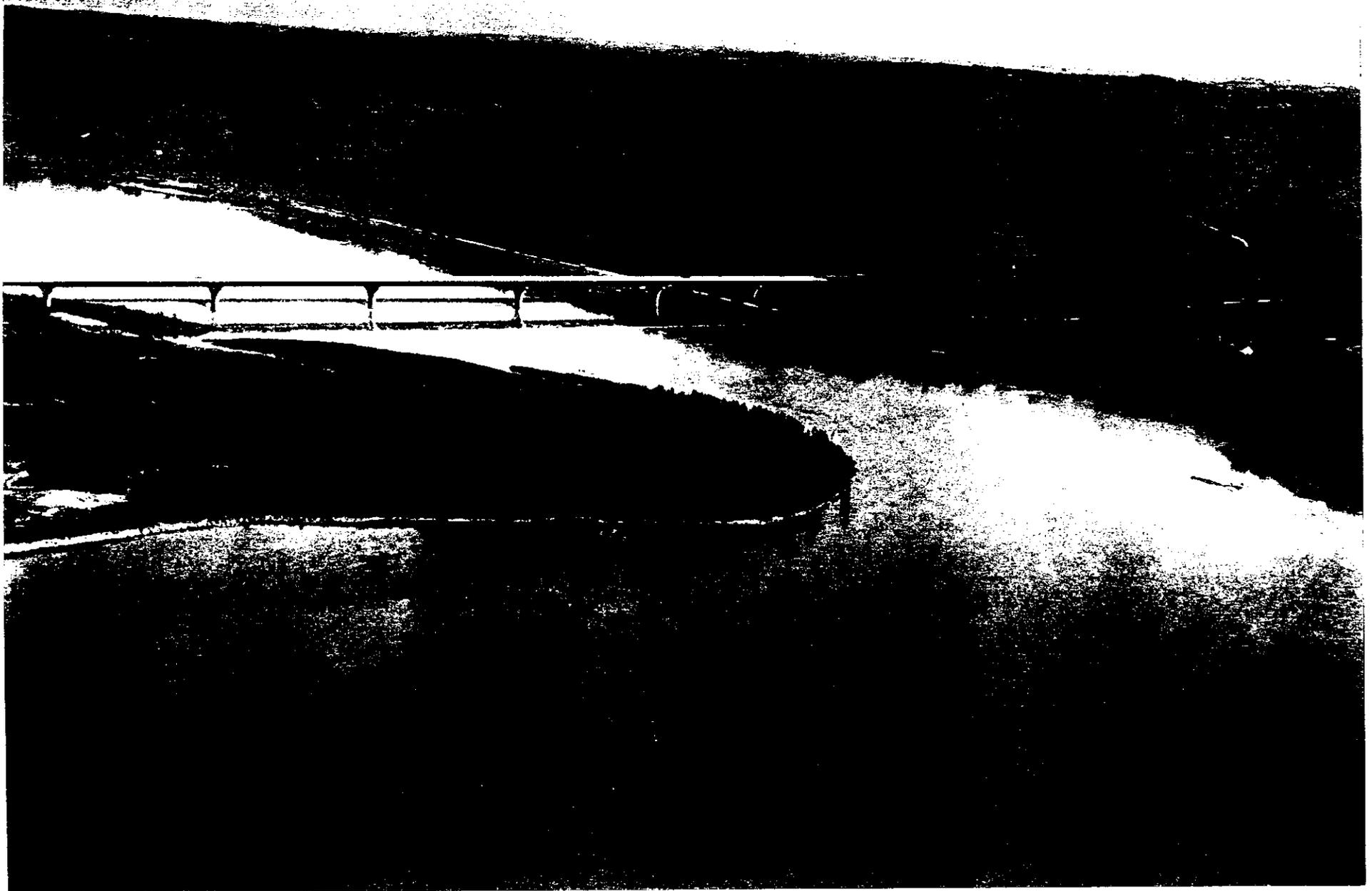
## LIST OF MAPS

- Map 1: Missouri River Bridge Crossing Alternatives
- Map 2: Highway Alignment Alternatives
- Map 3: Mitigation Locations
- Map 4: Missouri National Recreational River Boundaries
- Map 5: Frost Wilderness Game Production Area Boundary

## LIST OF ATTACHMENTS

- Attachment 1: Erosion Area on West Bank of Mulberry Point
- Attachment 2: Bank Protection Recommendations for Mulberry Point
- Attachment 3: SDDENR Project Review Letter (January 21, 1993)
- Attachment 4: SDDENR Air Quality Review Letter (August 25, 1993)
- Attachment 5: Noise Nomograph
- Attachment 6: SCS Farmland Conversion Impact Rating
- Attachment 7: SDGF&P Project Review Letter (December 14, 1992)
- Attachment 8: USFWS Project Review Letter (November 12, 1992)
- Attachment 9: State or Federal Listed Rare, Threatened or Endangered Species Encountered on Project
- Attachment 10: USFWS Initiation of Formal Consultation and Threatened and Endangered Species Determination of No Effect
- Attachment 10A: USFWS Biological Opinion on the Bald Eagle
- Attachment 11: South Dakota SHPO Determination of No Effect
- Attachment 12: Nebraska SHPO Determination of Effect
- Attachment 13: US Army COE Project Comment Letter (October 15, 1993)
- Attachment 14: US Coast Guard Project Comment Letter (August 13, 1993)
- Attachment 15: Public Hearing Transcript Cover
- Attachment 16: Nebraska Game & Parks Commission Comment Letter (August 11, 1993)
- Attachment 17: Biological Survey Final Report

FIGURE 1: Computer Image of Conceptual Design



## **ENVIRONMENTAL ASSESSMENT**

### **SOUTH DAKOTA PROJECT P0019(20)0 PCEMS 238H NEBRASKA PROJECT STPD-57-4(108) Missouri River Bridge Near Vermillion Clay County, South Dakota Cedar and Dixon Counties, Nebraska**

#### **DESCRIPTION OF PROPOSED ACTION**

The South Dakota Department of Transportation (SDDOT) and the Nebraska Department of Roads (NDOR) propose to build a bridge over the Missouri River in the vicinity of Vermillion, South Dakota and Newcastle, Nebraska. (See Figure 1 for a computer image of this proposed bridge.) SD Highway 19, SD Highway 50 and Interstate 29 would connect with Nebraska Highway 12. The Nebraska approach roadway would be designed to provide two 3.6 meter (11.8-foot) driving lanes with 1.8 meter (6-foot) shoulders. The South Dakota inter-connecting roadway will be designed to provide two 3.6 meter (11.8-foot) driving lanes with two 3 meter (10-foot) shoulders for use as bike paths. (See Maps 1 and 2.) The urban section within the City of Vermillion will be designed to provide two 3.6 meter (11.8-foot) driving lanes and a 3.6 meter (11.8-foot) center turning lane.

#### **PURPOSE AND NEED**

The purpose of the project is to provide a bridge crossing of the Missouri River approximately mid-way between Yankton, SD and Sioux City, Iowa. Presently, there are no bridges in this 119 kilometer (74-mile) segment of the Missouri River. A bridge is needed to provide access between South Dakota and Nebraska. The bridge will allow a more direct regional exchange of agricultural and commercial trade between the two states.<sup>1</sup> Access to medical, educational and recreational services will also be enhanced.<sup>2</sup> The project was included in the *Intermodal Surface Transportation Efficiency Act of 1991* (Public Law 102-240-December 18, 1991) for the engineering and construction of a bridge across the Missouri River in the vicinity of Vermillion, South Dakota.

The current traffic patterns were considered to develop an estimate of anticipated usage of the Missouri River Bridge. The cross river traffic on a bridge at existing

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<sup>1</sup> Benefit Study of Proposed Bridge Across the Missouri River at Newcastle and Vermillion Area, University of South Dakota, 1978. (Updated costs are available from the Vermillion Development Company, 5 Court Street, Vermillion, SD.)

<sup>2</sup> Newcastle Vermillion Bridge Committee Report

conditions was estimated at 752 vehicles per day by the South Dakota Department of Transportation Data Inventory Program. It is projected that in the year 2013 with the bridge completed, 996 vehicles per day would use this crossing with 10 percent of these vehicles being trucks.

## **ALTERNATIVES**

### **MISSOURI RIVER CROSSING ALTERNATIVES**

The alternatives studied would tie Highway 12 in Nebraska with South Dakota Highways 19 and 50, and Interstate 29 in South Dakota. (See Map 1.) These crossing sites were investigated because they represent the three narrowest Missouri River crossing sites in the Vermillion vicinity.

#### **Crossing Site #1**

Crossing Site #1 is located upstream from Vermillion, SD at the Myron Grove Crossing (also referred to as Highline). The Nebraska alignment would begin approximately 8.04 kilometers (five miles) northwest of Obert and extend northerly from Nebraska Highway 12 for approximately 6.4 kilometers (four miles), crossing an area where a road does not currently exist. The Missouri River is crossed in this segment of the alternative by a bridge. The alignment would then encroach upon a SD Game Production Area and tie into the existing county road system in South Dakota. The alignment would then run north for approximately 2.4 kilometers (1.5 miles), then east 12.9 kilometers (eight miles) following existing county roads to a junction with SD Highway 50 at Vermillion.

The overall project length for a bridge at Crossing #1 is about 20.9 kilometers (13 miles) with a Missouri River Bridge length of approximately 488 meters (1600 feet). The estimated total cost of this alternative is \$16.5 million.

#### **Crossing Site #2**

Crossing Site #2 is located along Deer Creek in the vicinity of Maskell, Nebraska, south of Vermillion (also referred to as Mulberry Point). The Nebraska alignment would begin approximately 2.4 kilometers (1.5 miles) southeast of Maskell and run approximately 3.2 kilometers (two miles) north from Nebraska Highway 12 following the alignment of the existing county road, parallel to and crossing Deer Creek. The alignment would then turn in a northeasterly direction for about 1.6 kilometers (one mile), crossing an area where a road does not currently exist. The Missouri River is crossed in this segment of the alternative by either a bridge or a tunnel. The "A-2" alignment would extend north along the west edge of Mulberry Point for approximately 4.8 kilometers (three miles) then gradually curve east (1.8 miles) and connect with

South Dakota Highway 19, crossing an area where a road does not currently exist. The alignment would cross approximately 0.4 kilometers (0.25 miles) of the Frost Wilderness Production Area. The Vermillion River and railroad would be crossed approximately 0.8 kilometers (one-half mile) before the intersection with SD19.

The overall project length for Crossing #2 is about 12.9 kilometers (eight miles), using South Dakota alignment "A-2", with either a Missouri River Bridge of 610 meters (2000 feet) or a Missouri River tunnel of 914 meters (3000 feet).

**Crossing Site #2 With Bridge:** The estimated total cost for this alternative is \$17.1 million.

**Crossing Site #2 With Tunnel:** The estimated total cost for this alternative is approximately \$33.4 million. Ventilation is an important concern for highway tunnels. A tunnel ventilation system to augment natural ventilation through a tunnel is required for tunnels longer than about 305 meters (1000 linear feet). Tunnels longer than 30 to 46 meters (100 to 150 linear feet) usually require lighting to provide adequate driver visibility. Given a tunnel length of about 914 meters (3000 linear feet), lighting and ventilation systems would be required for this project. Therefore, additional operation costs will be incurred in the form of lighting and ventilation.

### **Crossing Site #3**

Crossing Site #3 is located downstream from Vermillion in the vicinity of Newcastle, Nebraska (also referred to as Lembke Landing). The Nebraska alignment would begin approximately 5.6 kilometers (3.5 miles) southeast of Newcastle and extend north from Nebraska Highway 12 following the Nebraska county road system for approximately 3.2 kilometers (two miles), then turn northeasterly for approximately 2.4 kilometers (1.5 miles), crossing an area where a road does not currently exist. The Missouri River is crossed in this segment of the alternative by a bridge. The alignment would encroach upon a South Dakota Game Production Area. The alignment would then proceed northeasterly for 4.0 kilometers (2.5 miles), crossing an area where a road currently does not exist and tie into the existing county road system in South Dakota. The alignment would extend north approximately 8.0 kilometers (5 miles) to a junction with Interstate 29. At this junction the overpass would need to be converted to an interchange approximately 14.5 kilometers (9 miles) east of Vermillion.

The overall project length for a bridge at Crossing #3 is about 16.1 kilometers (10 miles) with a Missouri River bridge length of 457 meters (1500 feet). The estimated total cost of this alternative is approximately \$16.3 million. Construction of an interchange would add an additional \$1 million to this cost.

## **"Do Nothing" Crossing Site**

The "do nothing" alternative was considered but discarded because it perpetuates the existing situation with no river crossing between the Yankton Bridge and the Sioux City Veterans Memorial Bridge, thus leaving a 119 kilometer (74 mile) stretch of river without a crossing.

## **COMPARISON OF CROSSING ALTERNATIVES**

All four of the build alternatives would meet the intent of the project initiative, which is to provide a river crossing in the vicinity of Vermillion, South Dakota. However, a bridge at Crossing Site #2 is the preferred alternative.

A tunnel at Crossing Site #2 is by far the most expensive of the alternatives. This alternative would avoid impacting the Missouri National Recreational River, a Section 4(f) property. Due to the construction costs this is the least desirable of the alternatives.

All three of the bridge alternatives would impact the Missouri National Recreational River and Game Production Areas which are Section 4(f) properties. Based on construction cost, all three of the bridge alternatives are equally favored. Crossing Site #2 is the closest to Vermillion, has the shortest project length and provides the most direct route between the Vermillion area and the Newcastle/Maskell area in Nebraska. A bridge at Crossing #2 is also the most desirable when considering the views of the local citizens.

The facility provided under current plans would consist of a two-lane bridge with a 10.8 meter (35.4-foot) clear roadway. The vertical and horizontal clearances have been discussed with the U.S. Coast Guard. The planned minimum vertical clearance is 9.1 meters (30 feet) above the two percent flow line elevation and minimum horizontal clearance is 45.7 meters (150 feet) between bridge piers.

## **HIGHWAY ALIGNMENT ALTERNATIVES**

Three South Dakota highway alignments were evaluated. These alignments originate at Missouri River at bridge Crossing Site #2 and proceed northerly to Vermillion. (See Map 2.)

### **Alignment "A-1"**

Alignment "A-1" follows the "A-2" alignment for about 3.1 kilometers (1.9 miles) then turns northwesterly across the Frost Wilderness Game Production Area for approximately 0.5 kilometers (0.3 miles). The alignment continues in a northwesterly

direction for approximately 3.2 kilometers (2 miles) then runs north until it intersects South Dakota Highway 50.

The overall length for alignment "A-1" is 12.7 kilometers (7.9 miles). The estimated total cost of this alternative is \$15.7 million.

### **Alignment "A-2"**

The "A-2" alignment runs north along the west edge of Mulberry Point for approximately 3.2 kilometers (two miles) then crosses approximately 0.4 kilometers (0.25 miles) of the Frost Wilderness Game Production Area. The alignment continues north 1.2 kilometers (0.75 miles) and gradually curves westerly, connecting with South Dakota Highway 19. The Vermillion River and railroad will be crossed approximately 0.9 kilometers (one-half mile) before the intersection with SD19.

The overall length for alignment "A-2" is about 12.6 kilometers (7.8 miles). The estimated total cost of this alternative is \$17.1 million.

### **Alignment "C-1"**

Alignment "C-1" follows the "A-2" alignment for approximately 4.0 kilometers (2.5 miles) and crosses 0.4 kilometers (0.25 miles) of the Frost Wilderness Game Production Area. The alignment turns east for 2.1 kilometers (1.3 miles) before extending approximately 1.1 kilometers (0.7 miles) in a northeasterly direction. The Vermillion River is crossed in this segment of the alignment by a bridge and continues northeasterly for approximately 1.0 kilometers (0.6 miles) where it crosses the railroad. The alignment extends another 1.3 kilometers (0.8 miles) before turning north until it intersects South Dakota Highway 50.

The overall length for alignment "C-1" is about 15.1 kilometers (9.4 miles). The estimated total cost of this alternative is \$18.7 million.

## **COMPARISON OF ALIGNMENT ALTERNATIVES**

All three of the alignments serve the purpose of connecting a Missouri River bridge at Crossing Site #2 (Mulberry Point) with the city of Vermillion, South Dakota.

Alignment "A-1" is the least expensive alternative. This alternative does not require a Vermillion River bridge or railroad crossing and serves as a direct route to South Dakota Highway 50. This alignment has a significant impact on cultivated land and, of the three alignment alternatives, alignment "A-1" has the most impact on a Section 4(f) property, the Frost Wilderness Game Production Area. It also has poor accessibility to SD Highway 50.

Alignment "A-2" requires a Vermillion River bridge, a railroad crossing and a moderate grade to the top of the bluff on the west edge of town. This alignment is the shortest route, has the least impact on the irrigation center pivots and farmsteads, and has the same impact on the Frost Wilderness Game Production Area as Alignment "C-1". Alignment "A-2" is the preferred alignment alternative.

"C-1" is the most expensive alternative. This alternative has the longest route and requires a Vermillion River bridge and a railroad crossing. This alignment provides a direct route to South Dakota Highway 50 and has the same impact on the Frost Wilderness Game Production Area as alignment "A-2".

**Table I  
Cost Estimates  
Missouri River Bridge Near Vermillion**

<b>Missouri River Crossing Alternatives</b>	
<b>Alternate</b>	<b>Cost (\$ millions)</b>
Crossing Site #1	16.5
Crossing Site #2 A-2 Bridge	17.1
Crossing Site #2 A-2 Tunnel	33.4
Crossing Site #3	16.3
<b>Highway Alignment Alternatives</b>	
<b>Alternate</b>	<b>Cost (\$ millions)</b>
Alignment A-1	15.7
Alignment A-2	17.1
Alignment C-1	18.7

**IMPACTS**

**Missouri National Recreational River**

The proposed bridge is to be constructed over the Missouri River. The area being

considered for a bridge has one bank that is a bluff and the other bank that is a lowland area with wetlands identified in the low lands. Wetlands would be affected by bridge construction at any of the sites being considered in this segment of the river.

The segment of the Missouri River in the study area has been designated as a national recreational river. In 1968, Congress passed the Wild and Scenic Rivers Act which allowed for river segments to be designated as wild, scenic or recreational rivers. Since its original passage, the Act has been amended to include additional rivers. In 1978, Congress designated 95.0 kilometers (59 miles) of the Missouri River, from Gavins Point Dam downstream, as the Missouri National Recreational River.

When comparing scenic rivers and recreational rivers, recreational rivers generally have more access points and more shoreline development than scenic rivers. The Wild and Scenic Rivers Act states that these rivers are to be administered by the Secretary of Interior. This is accomplished through the National Park Service. The management and use of the river are explained in the general management plan for that river segment. During the planning process for the recreational river, the bridge was anticipated and is therefore contained in the management plan as outlined on page 43 of the U.S Army Corps of Engineers' Missouri National Recreational River Management Plan.

The river traffic in the area of the bridge site is recreational in nature. Commercial river traffic is found on the lower portion of the Missouri River, with the main ports being Kansas City, Omaha and Sioux City. Sioux City is located approximately 96.6 kilometers (60 miles) downstream from Gavins Point. River traffic upstream from Sioux City is primarily recreational. (See Section 4(f) Evaluation on page 14 for more information on the recreational river.)

## **Erosion Control**

*The Missouri National Recreational River Management Plan, prepared by the U.S. Department of the Interior, calls for the development of an erosion control plan that would protect agricultural lands, wooded areas, islands, sandbars and other natural characteristics of the river and adjacent lands. The erosion control structures will be designed and installed to be compatible with the natural characteristics of the area. One of the plan's erosion control objectives was to implement as soon as possible, erosion control measures at previously identified critical erosion problem sites.*

In 1980, the *Missouri National Recreational River Management Plan* identified the west bank of Mulberry Point as a current erosion area. (See Attachment 1.) In 1993, the SDDOT's Office of Bridge Design studied the need for bank protection along the west side of Mulberry Point. Aerial photography from 1951, 1956, 1968, 1984 and 1991 was used to determine the change in the west bank of Mulberry Point. (Gavins Point Dam, located upstream of Mulberry Point, was constructed in 1957.) By digitizing the

banks of the Missouri River for each year, a plot of river bank movement was developed. Attachment 2 shows the movement of the riverbank over time.

The loss of land area in acres during each time interval is shown below in Table 2.

**TABLE 2  
Loss of Land In Acres Per Time Interval**

<b>Dates</b>	<b>Interval</b>	<b>Lost</b>	<b>Hectares/Yr.</b>	<b>Acres/Yr.</b>
1951-56	5 years	180	14.6	36
1956-62	6 years	40	2.8	7
1962-68	6 years	100	6.9	17
1968-84	16 years	242	6.0	15
1984-91	7 years	29	1.6	4
<b>1951-91</b>	<b>40 years</b>	<b>591</b>	<b>6.0</b>	<b>15</b>

As Table 2 indicates, the potential for significant additional erosion exists, therefore, bank stabilization should take place as soon as possible. It is recommended that the absolute minimum bank stabilization take place from point "A" to point "B", approximately 1,524 meters (5000 feet) while the desired amount of bank stabilization be from point "A" to point "C", approximately 2,438 meters (8000 feet). (See Attachment 2.)

Since the site chosen for the bridge is located in a narrow reach of the river, no channelization or causeways will be required. The existing riverbank will be stabilized to prevent future erosion. The river will still meander through the existing riverbed as it does today.

### **Water Quality Impacts and Water Body Modifications**

A bridge will be constructed over the Missouri River, and, depending which alternative is selected, a bridge will be constructed over the Vermillion River. The South Dakota Department of Environment and Natural Resources (DENR) has reviewed the project (Attachment 3). At minimum, construction techniques for sediment and erosion control will be utilized such as "Best Management Practices" (DWRN 1981) and the U.S. Department of Transportation's "Best Management Practices for Erosion and Sediment Control". The contractor will comply with all DENR requirements listed in

### **Attachment 3.**

A Section 404 permit, an NPDES stormwater permit and a U.S. Coast Guard permit will be required for the project. A floodplain permit will be required for the Deer Creek crossing in Nebraska.

### **Air Quality**

The SD Department of Environment and Natural Resources (DENR) Division of Air Quality and Solid Waste Program was contacted concerning air quality and hazardous waste impacts associated with the project. No hazardous waste sites or generators were noted along the project route. Dust control measures will be utilized during project construction to minimize fugitive dust. (See Attachment 4.)

### **Wetlands**

All of the alternatives would impact wetlands at the Missouri River crossing locations. Although most of the wetlands adjacent to the Missouri River will be bridged, wetland impacts will occur. For example, the Mulberry Point crossing will impact approximately 0.1 hectares (one-third acres) of wetlands in Nebraska's Deer Creek vicinity and approximately 0.04 hectares (one-tenth acre) of wetlands in South Dakota. These wetland losses will be mitigated adjacent to the project. Alternate C-1 would have the greatest wetland impacts.

### **Floodplain**

National Flood Insurance Program maps exist for the Missouri River and at the Vermillion River. Based on preliminary design concepts, it is anticipated that there will be no encroachment of the base (100 year) floodplain.

### **Noise**

The projected noise level for the closest receptor is 59 dBA after construction. (See Attachment 5.) This is below the noise abatement criteria of 67 dBA for recreation areas and residences. As traffic increases, the noise level is projected to increase to 61 dBA in the year 2012. This value is also below the noise abatement criteria. Noise levels will increase in the areas where roads do not exist but because of the relative low traffic volume, the values are below the noise abatement criteria. Therefore, noise abatement measures are not planned for the project.

## **Land Use**

Land use along the alternatives is predominately agricultural. Much of the land on the South Dakota side of Mulberry Point is irrigated. Except for agricultural land used directly for the project (see Farmland Impacts below), agricultural land use is not expected to change as a result of the project. Land along the Missouri River has been designated as the Missouri National Recreational River. The *Missouri National Recreational River Management Plan* addresses the bridge project on page 43. The following is an excerpt from the management plan:

*"This is another project that has been in the planning stages for many years. Unlike the navigation project there is nothing in the legislation which would preclude the bridge. In answer to statements in support of the bridge, the management plan team indicated that this project would be judged on its own merits."*

## **Farmland Impacts**

Farmland impacts were evaluated. The Farmland Conversion Rating Form indicates that the alternatives received scores less than 160. A further evaluation of farmland impacts was not performed since SCS regulation [7CFR658.4(c)(2)] provides that sites receiving a total score of less than 160 points be given a minimal level of consideration for protection and no additional sites be evaluated. (See Attachment 6.)

## **Social Impacts**

The areas considered for the bridge project are currently used for agricultural or recreational purposes. Its use for highway purposes will not result in the splitting of neighborhoods nor will it affect neighborhood cohesion. The bridge will allow for more direct social interaction between communities in Nebraska and South Dakota, particularly Newcastle, Nebraska and Vermillion, South Dakota. South Dakota would gain more direct access to Ponca State Park, a major tourist attraction at Ponca, Nebraska.

## **Relocation Impacts**

The project will not require the relocation of any households or businesses. However, right of way will be required throughout this project and it is anticipated that one out building may be taken on the Nebraska side.

## **Economic Impacts**

The bridge will provide for an increase in economic activity between the Vermillion, South Dakota, Newcastle, Nebraska and the surrounding area. Retail, medical, educational, agricultural and transportation services will benefit from the bridge project. Additional economic information is available in the *Newcastle Vermillion Bridge Committee Report* prepared by SIMPCO and *Benefit Study of Proposed Bridge Across the Missouri River at Newcastle and Vermillion Area*.

## **Joint Development/Pedestrian and Bicyclists**

No joint development projects are planned with the bridge project. However, a bike path will be provided from Vermillion to the river to provide access for pedestrians and bicyclists to the Missouri National Recreational River. The Lewis and Clark Rural Water System is considering a diversion system or wells near the Mulberry Point site as one alternative for a regional water supply. (See *Feasibility Level Evaluation of a Missouri River Regional Water Supply for South Dakota, Iowa and Minnesota*.) The City of Vermillion is considering the development of a park in the Mulberry Point area. Any development within the Missouri National Recreational River will need to comply with the Missouri National River Management Plan.

## **Threatened and Endangered Species**

The Missouri National Recreational River contains some of the last sandbar, forested floodplain and floodplain wetland habitats remaining along the Missouri River. Several federal and state listed threatened and endangered species have been preserved with these habitats. The U.S. Department of the Interior, U.S. Fish and Wildlife Service and the South Dakota Department of Game, Fish and Parks have provided lists of endangered and threatened species that may occur in the project area. (See Attachments 7 and 8.) The SDDOT contracted with the University of South Dakota to perform biological surveys to address the threatened and endangered species concerns. The report submitted by the University of South Dakota contained a list of the state and federally listed threatened and endangered species that were encountered in the study site. Each species on the list is coded with a letter/number code. A map is also included which shows the location of the sighting of the listed species by the placement of the species code. (See Attachment 9.)

The U.S. Fish and Wildlife Service has determined that there will be "no effect" on the following species: peregrine falcon, Eskimo curlew, piping plover, interior least tern, pallid sturgeon and the American burying beetle. (See Attachment 10.) The U.S. Fish and Wildlife Service has also determined that the project is not likely to jeopardize the

bald eagle. Attachment 10A lists the proposed mitigation and enhancement features for the project, developed through formal consultation with the U.S. Fish and Wildlife Service. The recommendations listed in Attachment 10A will be implemented during the design and construction of the project.

### **Historic and Archaeological Preservation**

The South Dakota State Historic Preservation Office (SHPO) has issued a "No Effect" Determination for project impacts in South Dakota. (See Attachment 11.) An archaeologist will be on site during construction to monitor for deeply buried sites. On the Nebraska side, an archaeological site will be impacted. The Nebraska SHPO has determined that the archaeological resource is important chiefly because of what can be learned by data recovery and has minimal value for preservation in place. (See Attachment 12.) A recovery plan will be developed and the site will be excavated prior to construction.

### **Visual**

The bridge over the Missouri River will alter the existing appearance of the river for any of the crossing alternatives. To minimize the visual impacts, the bridge will be as low in profile as possible and still provide for existing navigation usage. The view of the Missouri River from the new bridge should be spectacular.

### **Energy**

Project construction is not expected to consume large amounts of energy and will be short term, therefore, a detailed analysis was not made.

### **Construction**

Dust, noise and general construction procedures will prevail during construction. These impacts, however, are of a temporary nature. Reseeding will be accomplished throughout the project to re-establish vegetation removed during construction.

**Summary of Environmental Impacts of Bridge Crossing Sites**

**TABLE 3  
Crossing Site Impacts  
Missouri River Bridge Near Vermillion**

<b>Impacts</b>	<b>Crossing #1</b>	<b>Crossing #2 Bridge</b>	<b>Crossing #2 Tunnel</b>	<b>Crossing #3</b>
Mo National Rec River	Yes	Yes	No	Yes
Water Quality	M	M	M	M
Air Quality	M	M	M	M
Wetlands	Yes	Yes	Yes	Yes
Floodplain	M	M	M	M
Land Use	M	M	M	M
Noise	M	M	M	M
Farmland	Yes	Yes	Yes	Yes
Social	M	M	M	M
Economic	Yes	Yes	Yes	Yes
Threatened & Endangered	P	P	P	P
Historic	P	Yes	Yes	P
Visual	Yes	Yes	Yes	Yes
Construction	Yes	Yes	Yes	Yes
M = Minimal		P = Potential		

**PROPOSED MITIGATION**

The following lists the mitigation proposed for the preferred alignment. It is estimated that these measures will cost over \$1.8 million.

1. The river bank at Mulberry Point will be stabilized to prevent further erosion.

2. Best Management Practices will be used to minimize siltation and erosion during construction.
3. Wetland lost will be mitigated adjacent to the project.
4. The shoulder on the roadway will be of sufficient width to allow for pedestrian and bicycle travel to the Missouri National Recreational River.
5. The bridge over the Missouri River will be low in profile and designed to minimize visual impacts to the Missouri National Recreational River.
6. A buffer strip will be left between the new highway and the Missouri River on Mulberry Point.
7. Trees conducive to eagle habitat will be planted within the buffer strip.

### **COORDINATION**

On October 15, 1992, a public hearing was held in Vermillion to discuss the proposed construction of a bridge over the Missouri River near Vermillion. (Attachment 15.)

This project was coordinated with the following agencies:

- \* SD Dept. of Environment & Natural Resources (Attachments 3 & 4)
- \* US Dept. of Agriculture - SCS (Attachment 6)
- \* SD Dept. of Game, Fish & Parks (Attachment 7)
- \* US Fish & Wildlife Service (Attachments 8 & 10)
- \* SD State Historic Preservation Office (Attachment 11)
- \* NE State Historic Preservation Office (Attachment 12)
- \* US Army Corps of Engineers (Attachment 13)
- \* US Coast Guard (Attachment 14)
- \* NE Game & Parks Commission (Attachment 16)

**SECTION 4(f) EVALUATION  
MISSOURI NATIONAL RECREATIONAL RIVER**

**SOUTH DAKOTA PROJECT P0019(20)0 PCEMS 238H  
NEBRASKA PROJECT  
Missouri River Bridge Near Vermillion  
Clay County, South Dakota  
Cedar and Dixon Counties, Nebraska**

**PROPOSED ACTION**

This project is the construction of a bridge over the Missouri River between Nebraska and South Dakota, crossing a reach of the river where a bridge does not exist. Vermillion, South Dakota is the largest city along the entire 3726 kilometers (2315 miles) of the Missouri River which is not served by a Missouri River Bridge. Construction of the bridge would provide a crossing between the Vermillion area and the Newcastle/Maskell areas in Nebraska. The bridge will allow a more direct regional exchange of agricultural and commercial trade between the two states. (See footnote 1, page 1.) Access to medical, educational and recreational services will also be enhanced. (See footnote 2, page 1.) The project was included in the *Intermodal Surface Transportation Efficiency Act of 1991* (Public Law 102-240-December 18, 1991) for the engineering and construction of a bridge across the Missouri River in the vicinity of Vermillion, South Dakota.

**SECTION 4(f) PROPERTY**

The Section 4(f) property used by the project or the alternatives is administered by the Secretary of the Interior through the National Park Service. Map 4 shows the Section 4(f) property designated as the Missouri National Recreational River. A 95.0 kilometer (59 mile) segment of the Missouri River from Gavins Point Dam, South Dakota, to Ponca State Park in Nebraska has been designated a National Recreational River because of the outstanding natural and cultural values in this reach which are worthy of preservation. When comparing scenic rivers and recreational rivers, generally, recreational rivers have more access points and more shoreline development than scenic rivers.

**USE OF THE SECTION 4(f) PROPERTY**

Crossing Site #2 is located within the confines of the Missouri National Recreational

River in the vicinity of Maskell, Nebraska south of Vermillion, South Dakota. A bridge at this crossing would provide the most direct route for anticipated traffic from the Vermillion, South Dakota area and the Newcastle/Maskell area in Nebraska. The proposed project should not impair but enhance the purposes for which the 4(f) resource exists. The project will aid and allow for erosion control, woodland Management, and recreational and related development envisioned in the 1978 *Missouri National Recreational River Management Plan*.

## **AVOIDANCE ALTERNATIVES**

Three alternative crossings were analyzed for Section 4(f) lands. All three crossing sites are located within the Missouri National Recreational River and would impact South Dakota Game Production Areas. No feasible alternate routes which would avoid Section 4(f) lands currently exist to serve traffic between South Dakota and Nebraska in the vicinity of Vermillion, South Dakota. As Map 4 illustrates, this segment of recreational river is of sufficient length and its location such that the only way to cross the river is over or under Section 4(f) property.

A tunnel at Crossing Site #2 was analyzed as an alternative to avoid impacting the Missouri National Recreational River. A 914 meter (3000-foot) tunnel would need to be constructed at an estimated cost of \$28.195 million. This is a cost increase of 316% over constructing a 610 meter (2000-foot) bridge at the same location. This is the least desirous of the alternatives based on construction costs.

Crossing Site #2, Mulberry Point, is the proposed alternate primarily because it is the most direct and shortest route for anticipated traffic from the Vermillion, South Dakota area and the Newcastle/Maskell area in Nebraska. A bridge at this site will connect South Dakota Highways 19 and 50 with Nebraska Highway 12 via approximately eight miles of state highways. The proposed South Dakota road alignment will cross the Frost Wilderness Game Production Area. (See attached Section 4(f) Evaluation.)

Crossing Site #1 is located 17.7 kilometer (11 miles) upstream from Vermillion, South Dakota at the Myron Grove Crossing (also referred to as Highline). This alternative would bridge the Missouri National Recreational River and connect South Dakota Highway 50 with Nebraska Highway 12 via approximately 20.9 kilometers (13 miles) of State highways. The proposed road alignment will encroach upon a South Dakota Game Production Area in Clay County.

Crossing Site #3 is located 17.7 kilometers (11 miles) downstream from Vermillion in the vicinity of Newcastle, Nebraska (also referred to as Lembke Landing). A bridge at this location would cross the Missouri National Recreational River connecting Interstate 29 and Nebraska Highway 12 via 16.0 kilometers (ten miles) of State highways. The proposed South Dakota road alignment will encroach upon a South Dakota Game

Production Area in Union County.

### **DO NOTHING**

The "do nothing" alternative would not impact any 4(f) property. However, the "do nothing" option perpetuates the existing situation with no river crossing between the Yankton Bridge and the Sioux City Veterans Memorial Bridge which leaves a 119.1 kilometer (74 mile) reach of the river without a crossing.

### **MEASURES TO MINIMIZE HARM TO THE 4(f) RESOURCE**

Mitigation of affected woodlands will occur along the project site. In coordination with this project, bank stabilization will be established on the west bank of Mulberry Point. This bank stabilization will protect the agricultural lands, wooded areas, and other natural characteristics of the river and adjacent lands. To ensure continued recreational use, the bridge would provide adequate navigational clearance with a minimum vertical clearance of 9.1 meters (30 feet) above the two percent flow line elevation and a minimum horizontal clearance of 45.7 meters (150 feet) between bridge piers.

### **COORDINATION**

This project was coordinated with the following agencies:

- \* SD Dept. of Environment & Natural Resources (Attachments 3 & 4)
- \* US Dept. of Agriculture - SCS (Attachment 6)
- \* SD Dept. of Game, Fish & Parks (Attachment 7)
- \* US Fish & Wildlife Service (Attachments 8 & 10)
- \* SD State Historic Preservation Office (Attachment 11)
- \* NE State Historic Preservation Office (Attachment 12)
- \* US Army Corps of Engineers (Attachment 13)
- \* US Coast Guard (Attachment 14)
- \* NE Game & Parks Commission (Attachment 16)

On October 15, 1992, a public hearing was held in Vermillion to discuss the proposed construction of a bridge over the Missouri River near Vermillion. (Attachment 15.)

**SECTION 4(f) EVALUATION  
FROST WILDERNESS GAME PRODUCTION AREA**

**PROJECT P0019(00)0 PCEMS 238H  
Missouri River Bridge near Vermillion  
Clay County, South Dakota**

**PROPOSED ACTION**

This project is the construction of a bridge over the Missouri River between Nebraska and South Dakota crossing a reach of the river where a bridge does not exist. Vermillion, South Dakota is the largest city along the entire 3726 kilometers (2315 miles) of the Missouri River which is not served by a Missouri River Bridge. Construction of the bridge and approach roadways would connect South Dakota Highway 50 with Nebraska Highway 12 providing a crossing between the Vermillion area and the Newcastle/Maskell area in Nebraska. The bridge will allow a more direct regional exchange of agricultural and commercial trade between the two states. (See footnote 1, page 1.) Access to medical, educational and recreational services will also be enhanced. (See footnote 2, page 1.) The project was included in the *Intermodal Surface Transportation Efficiency Act of 1991* (Public Law 102-240-December 18, 1991) for the engineering and construction of a bridge across the Missouri River in the vicinity of Vermillion, South Dakota.

**SECTION 4(f) PROPERTY**

In 1966, the State of South Dakota (Department of Game, Fish and Parks) purchased the Frost Trust Estate to be managed as a Game Production Area. According to the Trustee's Deed description, the Frost Wilderness Game Production Area is located in Sections 15 and 22, in Vermillion Township, between the Missouri River on the north and west and a private road running from the northwest corner of the farm in a northeasterly direction to the north boundary of said farm, containing approximately 44.5 hectares (110 acres) of timber land between said road and said river. (See Map 5). Game Production Areas are generally managed for the production and maintenance of all wildlife species. Although species emphasis varies from site to site, all wildlife benefit.

**USE OF SECTION 4(f) PROPERTY**

Alignment "A-2" would provide the anticipated traffic from the bridge at Mulberry Point to Vermillion, South Dakota. The 7.9 kilometer (4.9 mile) alignment extends north along the

west edge of Mulberry Point for approximately 3.2 kilometers (two miles) then crosses the Frost Wilderness Game Production Area. The alignment continues north 1.2 kilometers (0.75 miles) then gradually makes a westerly curve which connects with South Dakota Highway 19. The Vermillion River and railroad will be crossed approximately 0.8 kilometers (one-half mile) before the intersection with SD 19. Along the alignment approximately 1.9 hectares (4.8 acres) of Section 4(f) property will be used leaving the remaining 95.6% of the property for public hunting and wildlife production. Therefore, the land used for the highway project will not impair the existing use on the remaining Section 4(f) land in whole or in part for its intended use as a game production area.

### **AVOIDANCE ALTERNATIVES**

No feasible alternate routes which would avoid Section 4(f) lands currently exist to serve traffic from the bridge to Vermillion, South Dakota. As Map 5 illustrates, the Frost Wilderness Game Production Area is of sufficient size and its location is such that the only way the alignment could avoid the game production area would be to go around it. This would have a significant impact on the irrigation center pivots and farmsteads in the area. This alternative was rejected because of the additional farmland impact.

Alignment "A-1" follows the "A-2" alignment for about 3.0 kilometers (1.9 miles) then turns northwesterly across the Frost Wilderness Game Production Area. The alignment continues in a northwesterly direction for approximately two miles then continues north until it intersects South Dakota Highway 50. This alignment would disturb 2.5 hectares (6.2 acres) of the Section 4(f) land.

Alignment "C-1" would follow the same alignment through the game production area as Alignment "A-2". After crossing the Frost Wilderness Game Production Area the alignment turns east for 2.1 kilometers (1.3 miles) before extending approximately 1.1 kilometers (0.7 miles) in a northeasterly direction. The Vermillion River is crossed in this segment of the alignment by a bridge then continues in a northeasterly direction for approximately 1.0 kilometers (0.6 miles) where it crosses the railroad. The alignment extends another 1.3 kilometers (0.8 miles) before turning north until it connects with South Dakota Highway 50. This alignment would disturb 1.9 hectares (4.8 acres) of the Section 4(f) land.

### **DO NOTHING**

The "do nothing" alternative would not impact any 4(f) property. However, the "do nothing" option perpetuates the existing situation with no river crossing and roadway between the Vermillion area and the Newcastle/Maskell area in Nebraska.

## **MEASURES TO MINIMIZE HARM TO THE 4(f) RESOURCE**

Mitigation of the affected game production area will occur along the project site. It is anticipated that land will be obtained to mitigate for the affected Frost Wilderness Game Production Area. In addition, trees will be planted as shown on Map 3.

## **COORDINATION**

This project was coordinated with the following agencies:

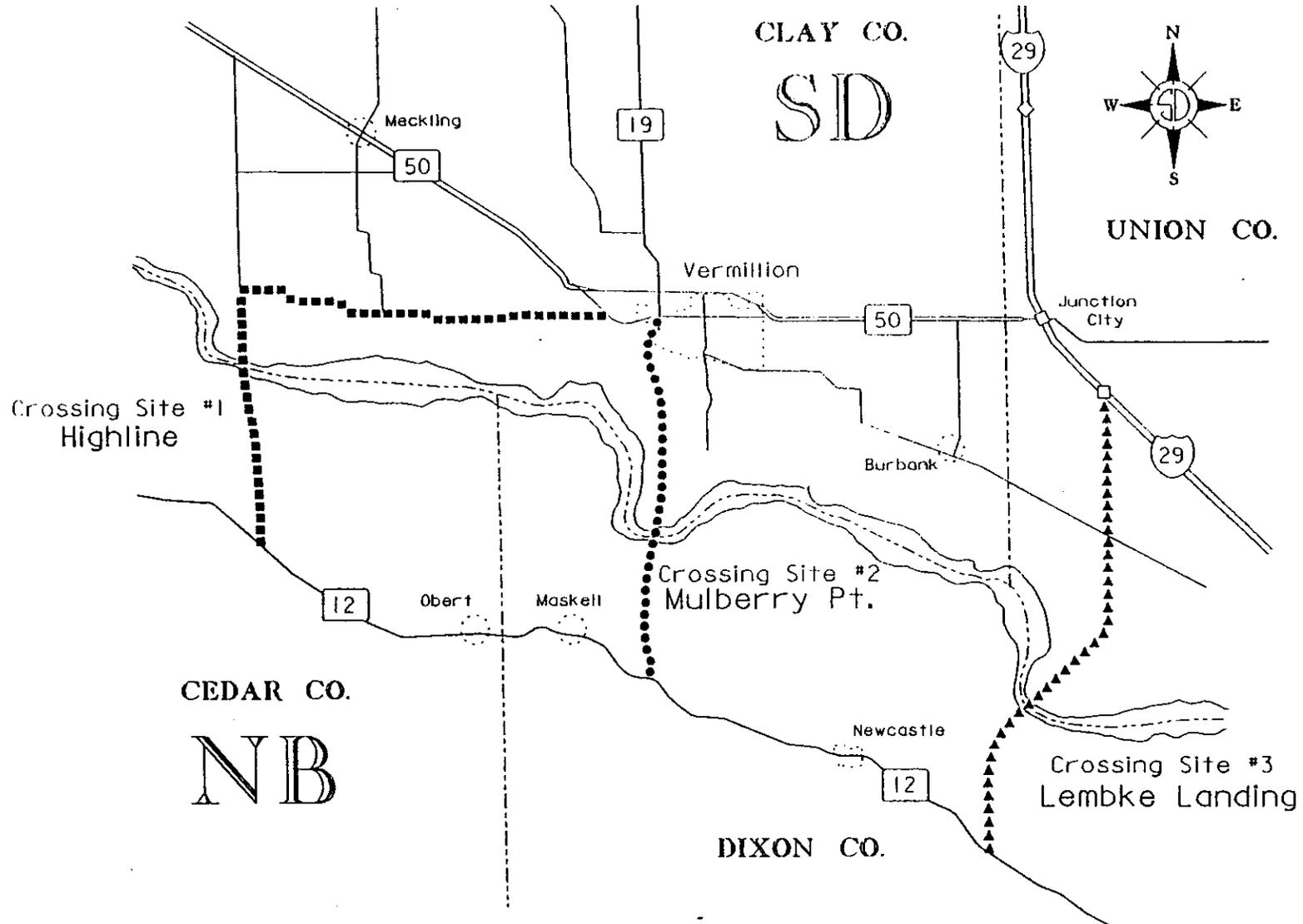
- \* SD Dept. of Environment & Natural Resources (Attachments 3 & 4)
- \* US Dept. of Agriculture - SCS (Attachment 6)
- \* SD Dept. of Game, Fish & Parks (Attachment 7)
- \* US Fish & Wildlife Service (Attachments 8 & 10)
- \* SD State Historic Preservation Office (Attachment 11)
- \* NE State Historic Preservation Office (Attachment 12)
- \* US Army Corps of Engineers (Attachment 13)
- \* US Coast Guard (Attachment 14)
- \* NE Game & Parks Commission (Attachment 16)

On October 15, 1992, a public hearing was held in Vermillion to discuss the proposed construction of a bridge over the Missouri River near Vermillion. (Attachment 15.)

# MAPS

# Missouri River Bridge at Vermillion CROSSING ALTERNATIVES

F 0019(00)0 PCEMS 238H

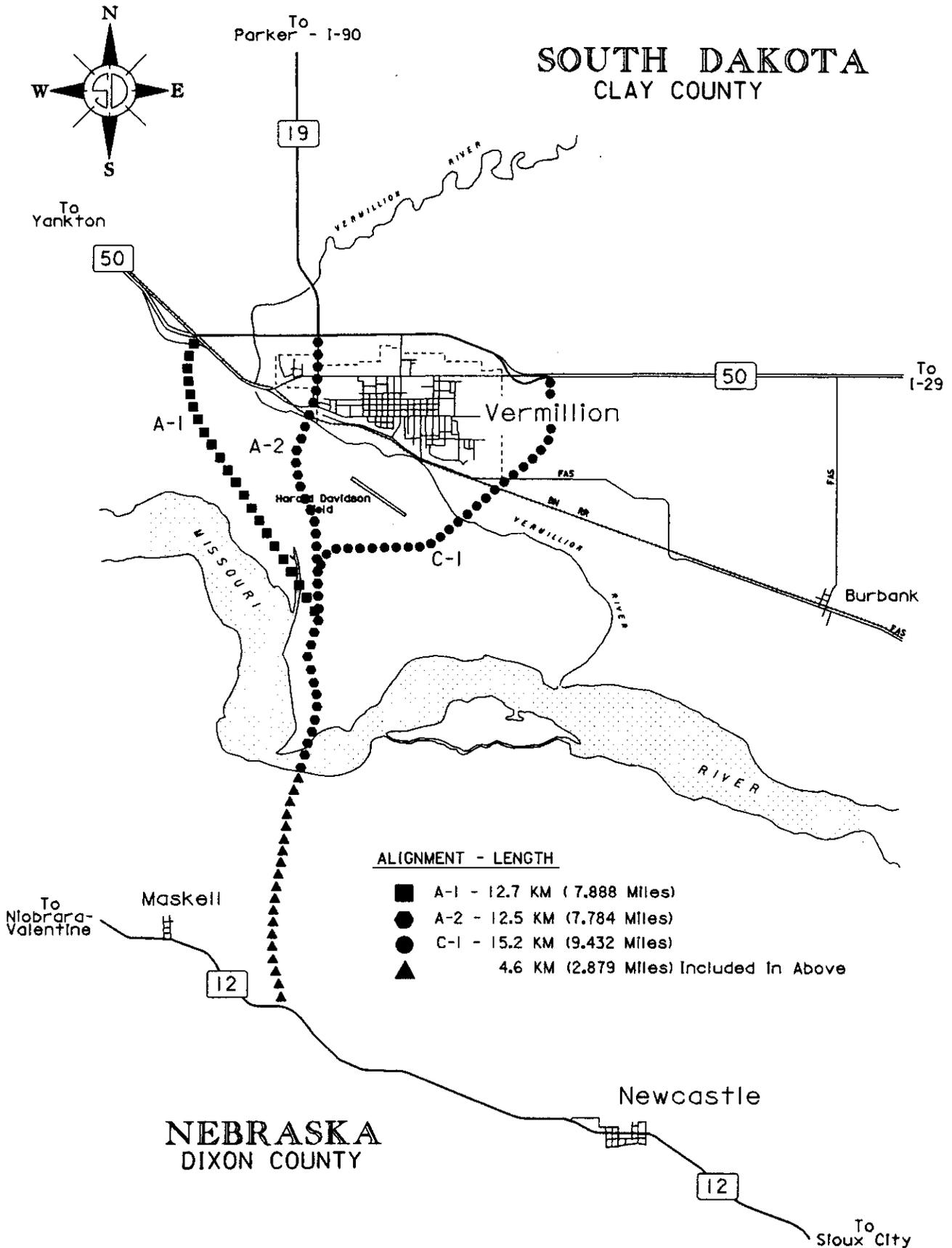


Map 1: Missouri River Bridge Crossing Alternatives

Map 2: Highway Alignment Alternatives

# Missouri River Bridge at Vermillion

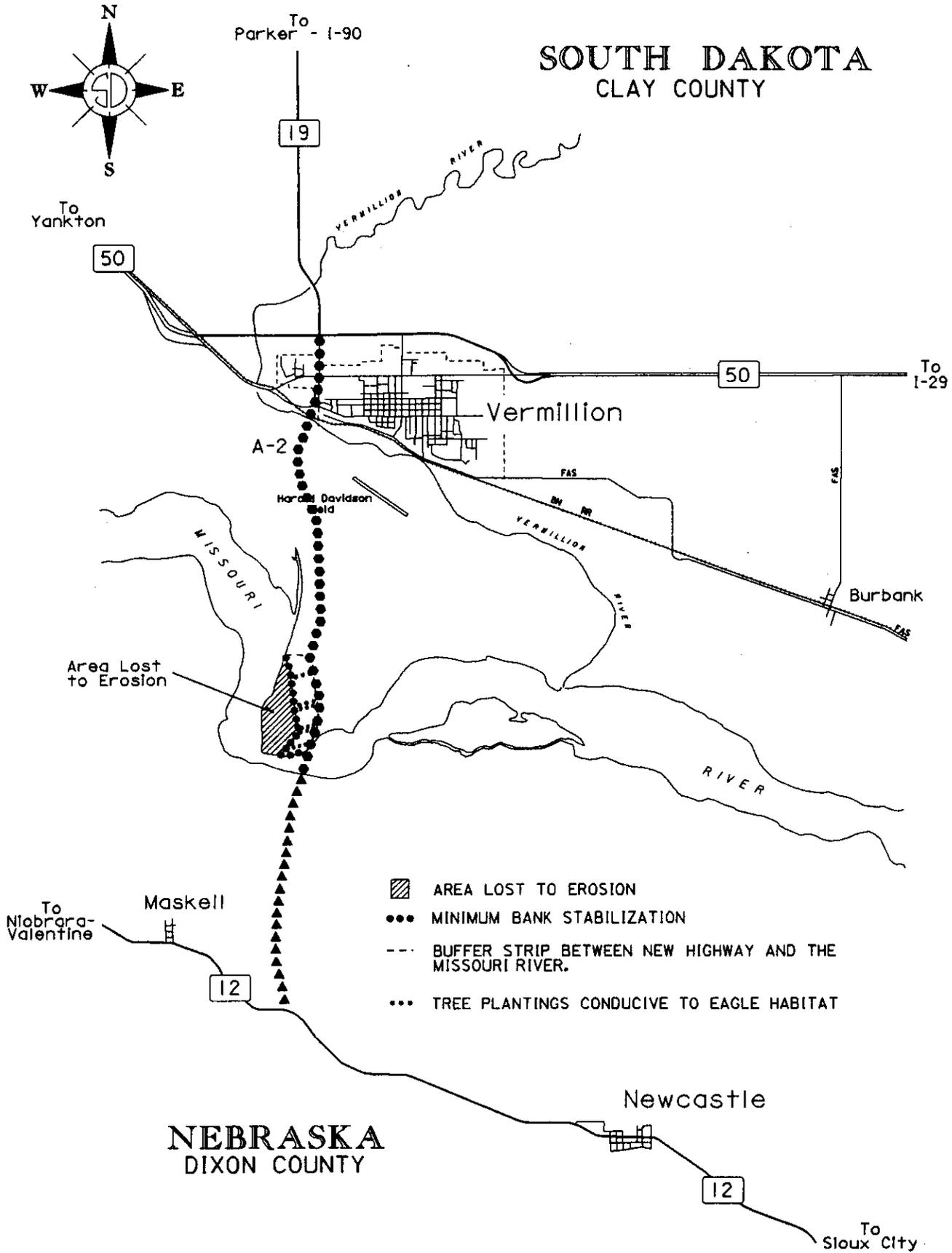
F0019(00)0      PCEMS 238H      Clay County, South Dakota



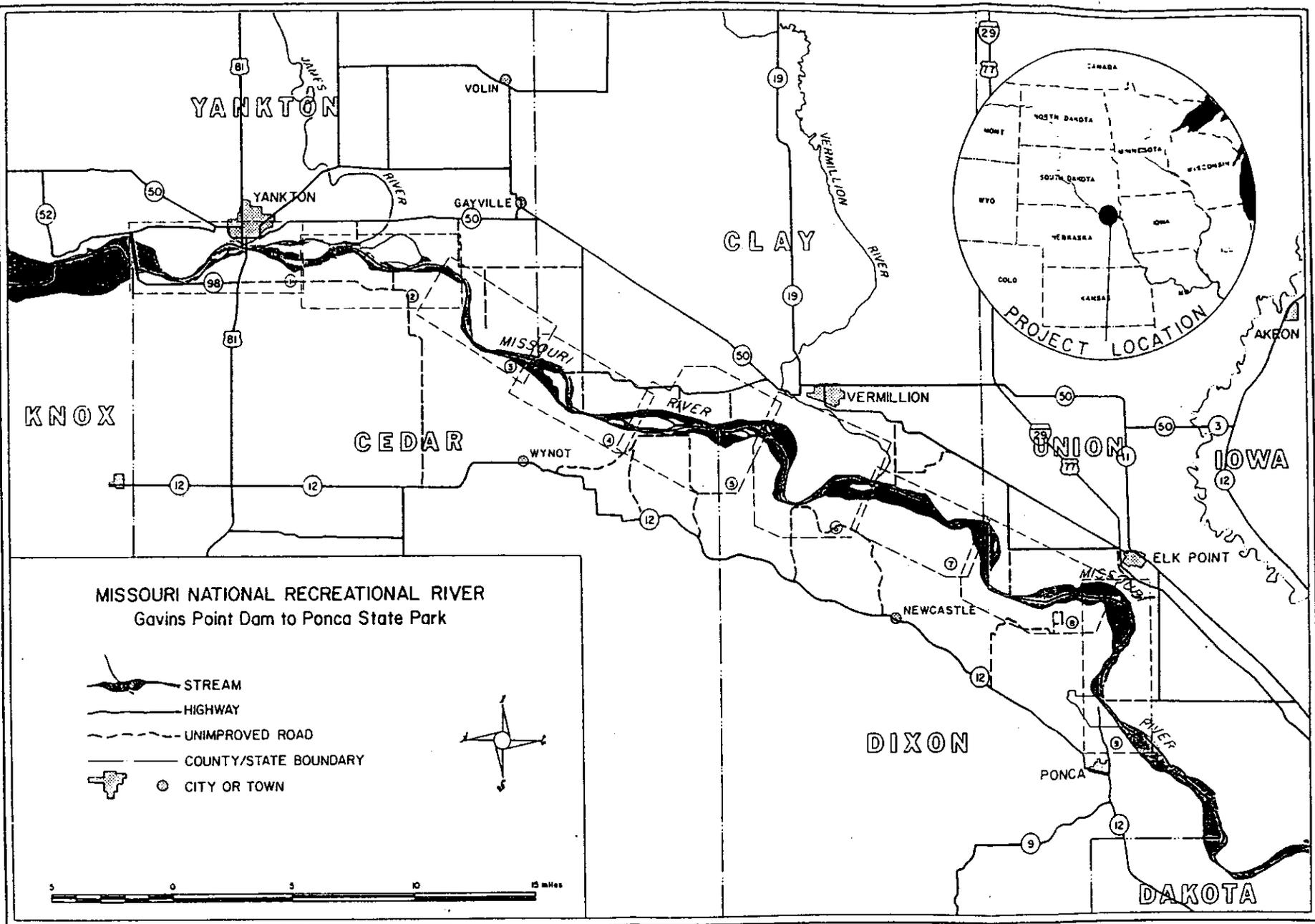
Map 3: Mitigation Locations

# Missouri River Bridge at Vermillion

F0019(00)0    PCEMS 238H    Clay County, South Dakota

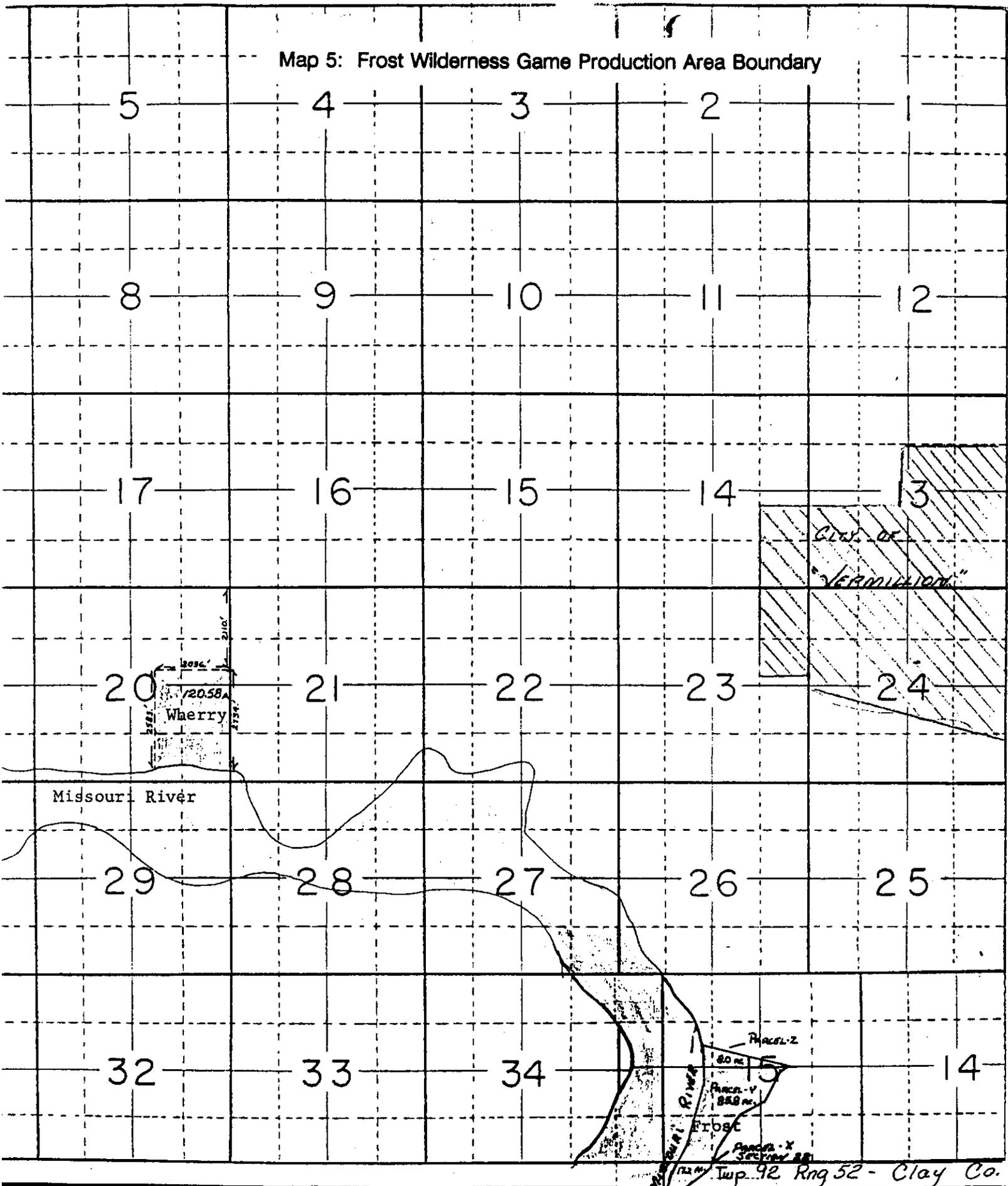


Map 4: Missouri National Recreational River Boundaries



Maps identifying recommended recreational river boundaries, scenic areas, potential public use areas, and erosion control works completed and planned.

Map 5: Frost Wilderness Game Production Area Boundary



Missouri River

Wherry

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"VERMILION"

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Parcel-3

Parcel-4

Parcel-5

Parcel-6

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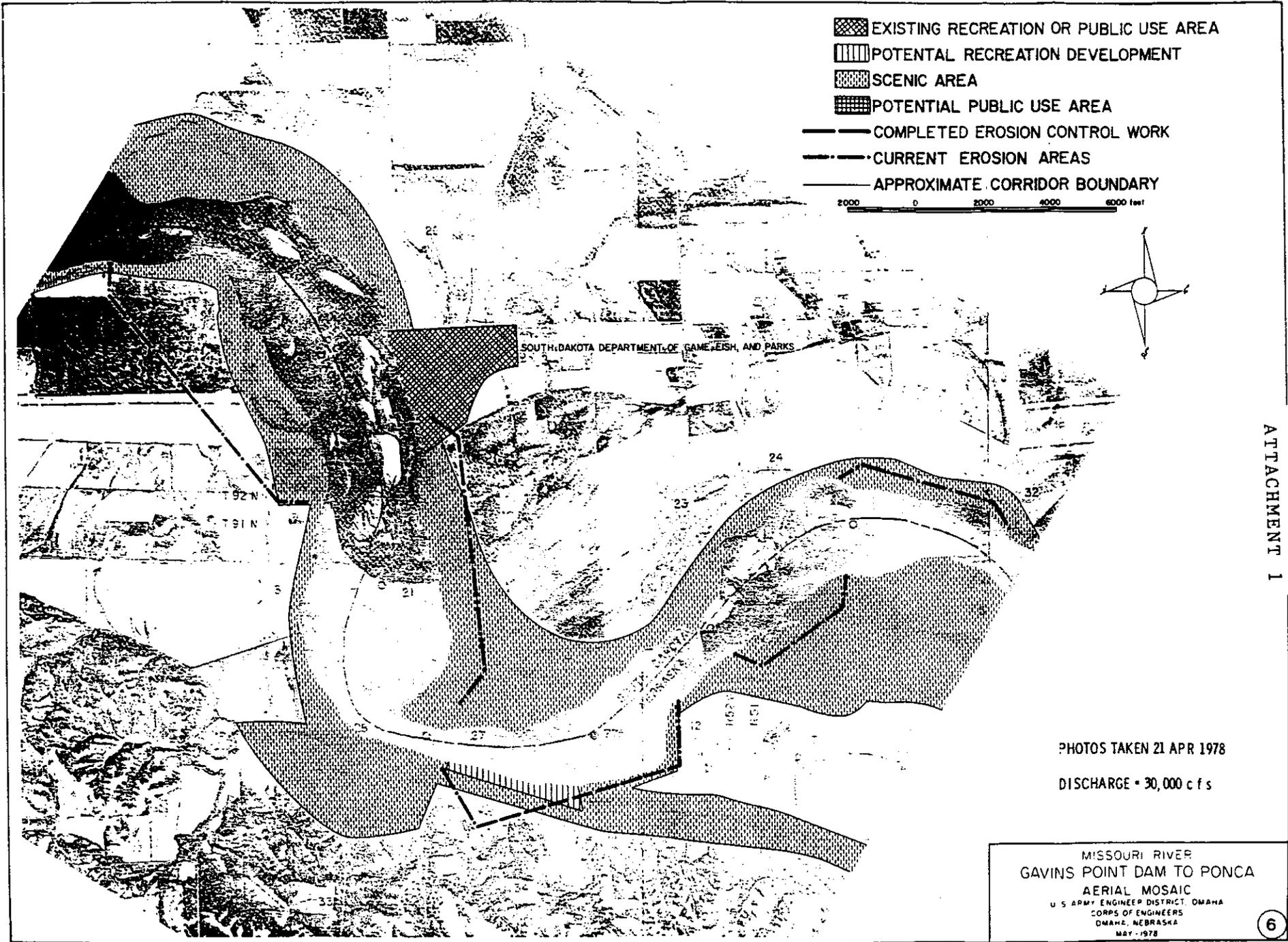
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Parcel-305

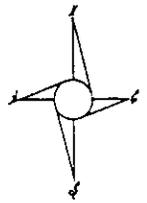
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# **A T T A C H M E N T S**



-  EXISTING RECREATION OR PUBLIC USE AREA
-  POTENTIAL RECREATION DEVELOPMENT
-  SCENIC AREA
-  POTENTIAL PUBLIC USE AREA
-  COMPLETED EROSION CONTROL WORK
-  CURRENT EROSION AREAS
-  APPROXIMATE CORRIDOR BOUNDARY

2000 0 2000 4000 6000 feet



ATTACHMENT 1

PHOTOS TAKEN 21 APR 1978  
DISCHARGE • 30,000 cfs

MISSOURI RIVER  
GAVINS POINT DAM TO PONCA  
AERIAL MOSAIC  
U S ARMY ENGINEER DISTRICT, OMAHA  
CORPS OF ENGINEERS  
OMAHA, NEBRASKA  
MAY - 1978

ATTACHMENT 2

INTER OFFICE MEMO

TO: Larry L. Weiss, PE - Director of Engineering

FM: Clyde H. Jundt, PE - Chief Bridge Engineer

RE: Bank Protection for Mulberry Point  
F 0019(00)0 Clay County, PCEMS 238H  
Missouri River Bridge at Vermillion

RECEIVED:  
DIRECTOR OF  
ENGINEERING

OCT 6 1993

DT: October 6, 1993

Distribution:	BRDG DESIGN	83
PROJ DEV	81	MAT & SURF 84
RD DESIGN	82	R. O. WAY 85

The Office of Bridge Design has studied the need for bank protection along the West side of Mulberry Point to determine the urgency of providing bank stabilization ahead of construction of the bridge crossing.

Aerial photography from 1951, 1956, 1968, 1984 and 1991 was used to determine the change in the west bank of Mulberry point. By digitizing the banks of the Missouri River for each year, a plot of river bank movement was developed. By comparison it was found that little erosion has occurred above point "C" on the west bank of Mulberry Point. See Attachment No. 1 for location of Point "C". Since 1984, very little erosion has occurred above point "B". Attachments No. 2 through No. 6 are provided to show the movement of the river bank over time and the loss of land area in acres during each time interval.

Attachment No. 7 shows the river bank from Point "C" to Point "A" and the presumed centerline of the river crossing. It is interesting to note that during the forty years, represented by the photography, approximately 591 acres have been lost to erosion between Points "A" and "C". In comparison, the acreage remaining, west of centerline between points "A" and "B" is approximately 150 acres and between Points "B" and "C" is approximately 145 acres for a total of 295 acres. The information on erosion is shown in tabular form on Attachment No. 8.

RECOMMENDATIONS:

1. We recommend that the absolute minimum bank stabilization be placed from Point "A" to Point "B", approximately 5000 feet.
2. We recommend that the desirable amount of bank stabilization be from Point "A" to Point "C", approximately 8000 ft.
3. Bank stabilization should take place as soon as possible.

**ADDITIONAL OBSERVATIONS**

1. Between Point "A" and "B" the closest point to centerline is approximately 950'.
2. Point "B" is approximately 2400' from centerline.
3. On Attachment 1, please note Zone 1. Erosion along this bank is eliminating the circled point. When this point is eliminated, the river will have a straight shot at the west bank of Mulberry Point.
4. It is almost certain that the entire West bank of Mulberry Point will need stabilization in the future.

**APPROVED**

*[Signature]*  
Date 10/6/93

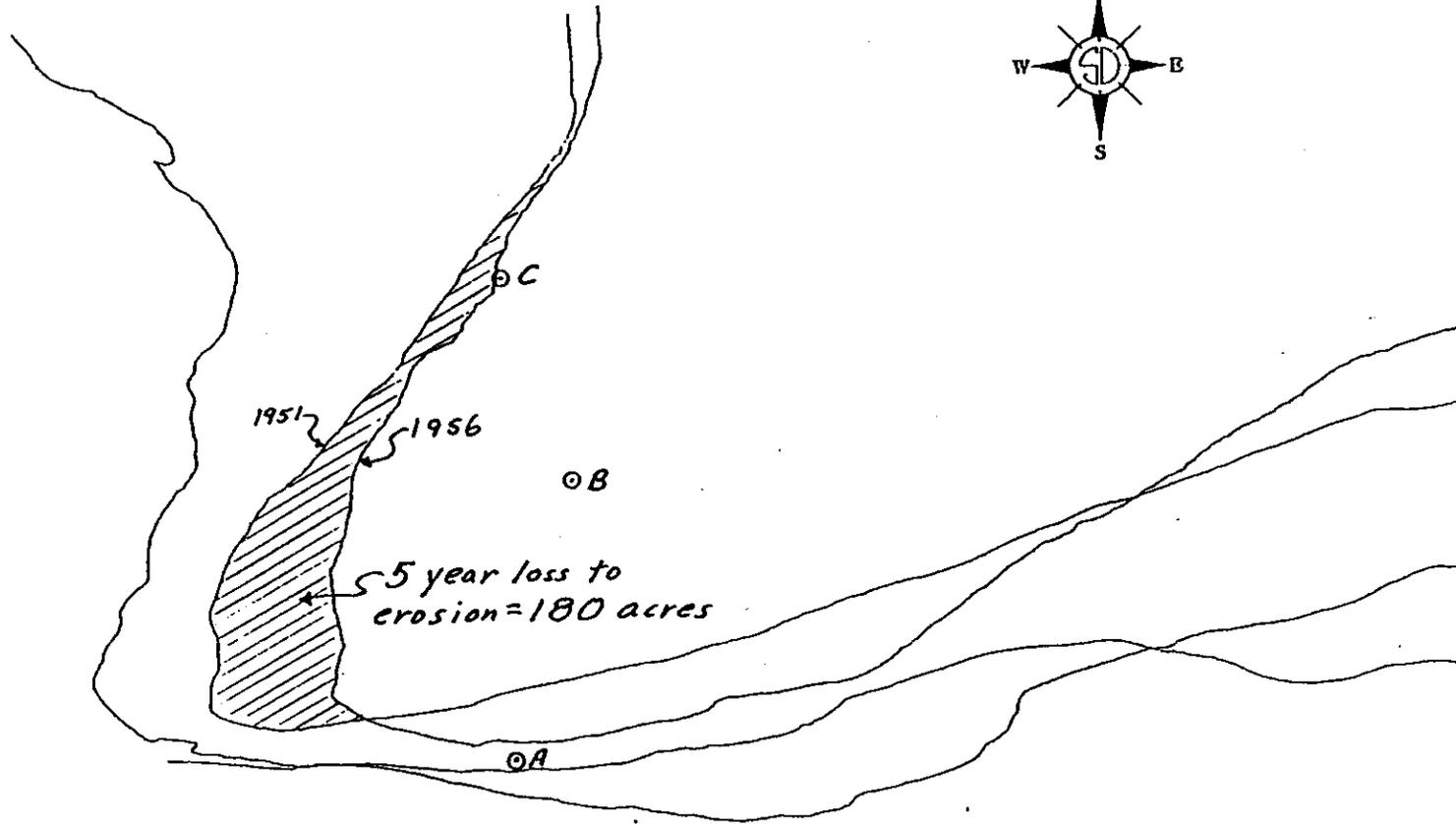
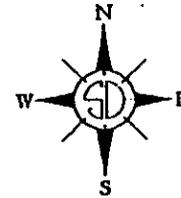


ZONE 1

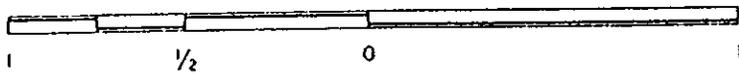
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# MISSOURI RIVER SHORELINES

at Mulberry Point near Vermillion, South Dakota  
1951 to 1991



S C A L E

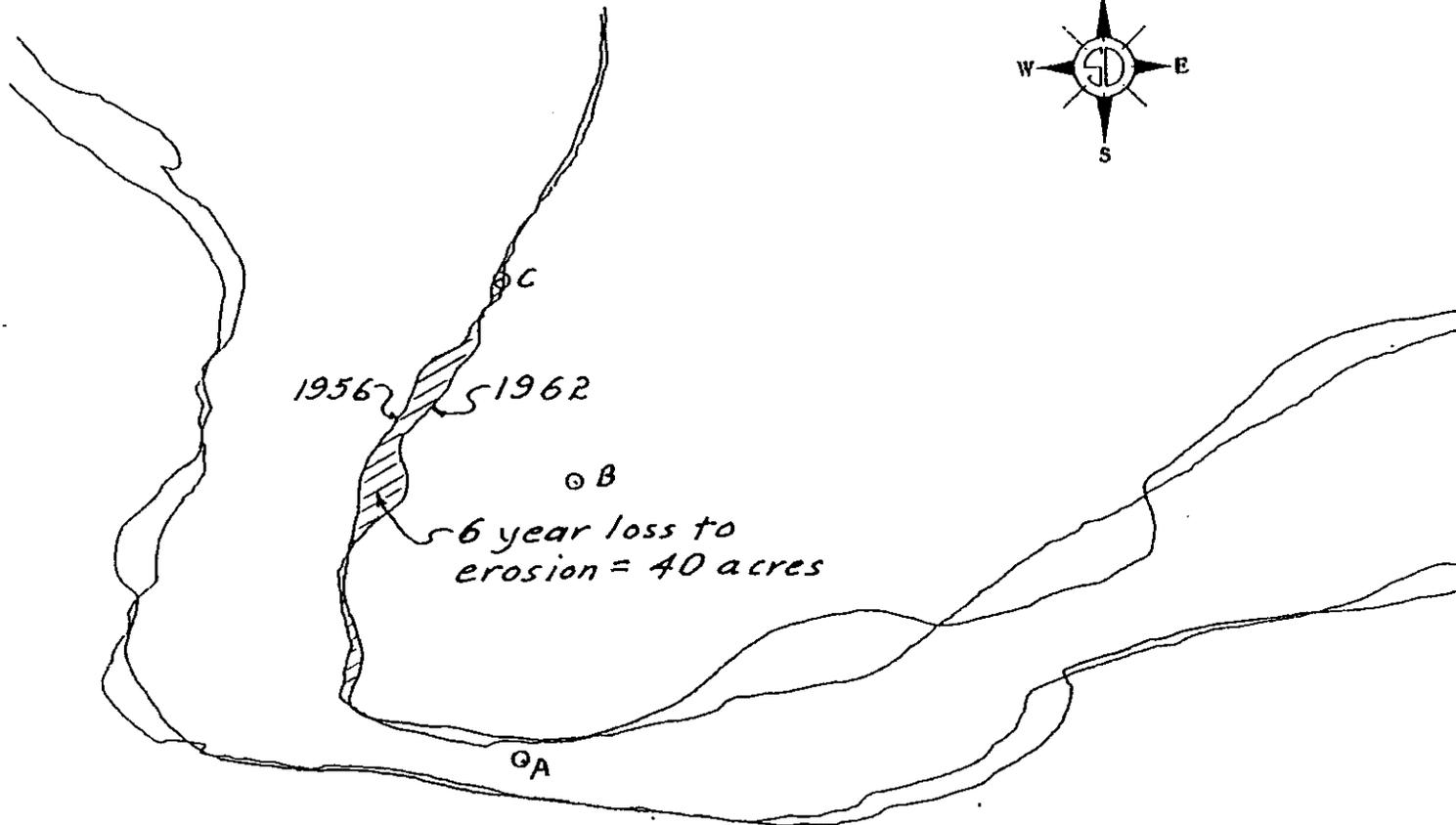
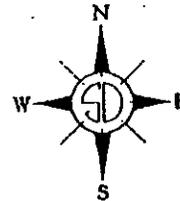


— 1951  
- - 1956

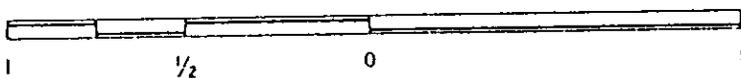
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# MISSOURI RIVER SHORELINES

at Mulberry Point near Vermillion, South Dakota  
1951 to 1991



S C A L E

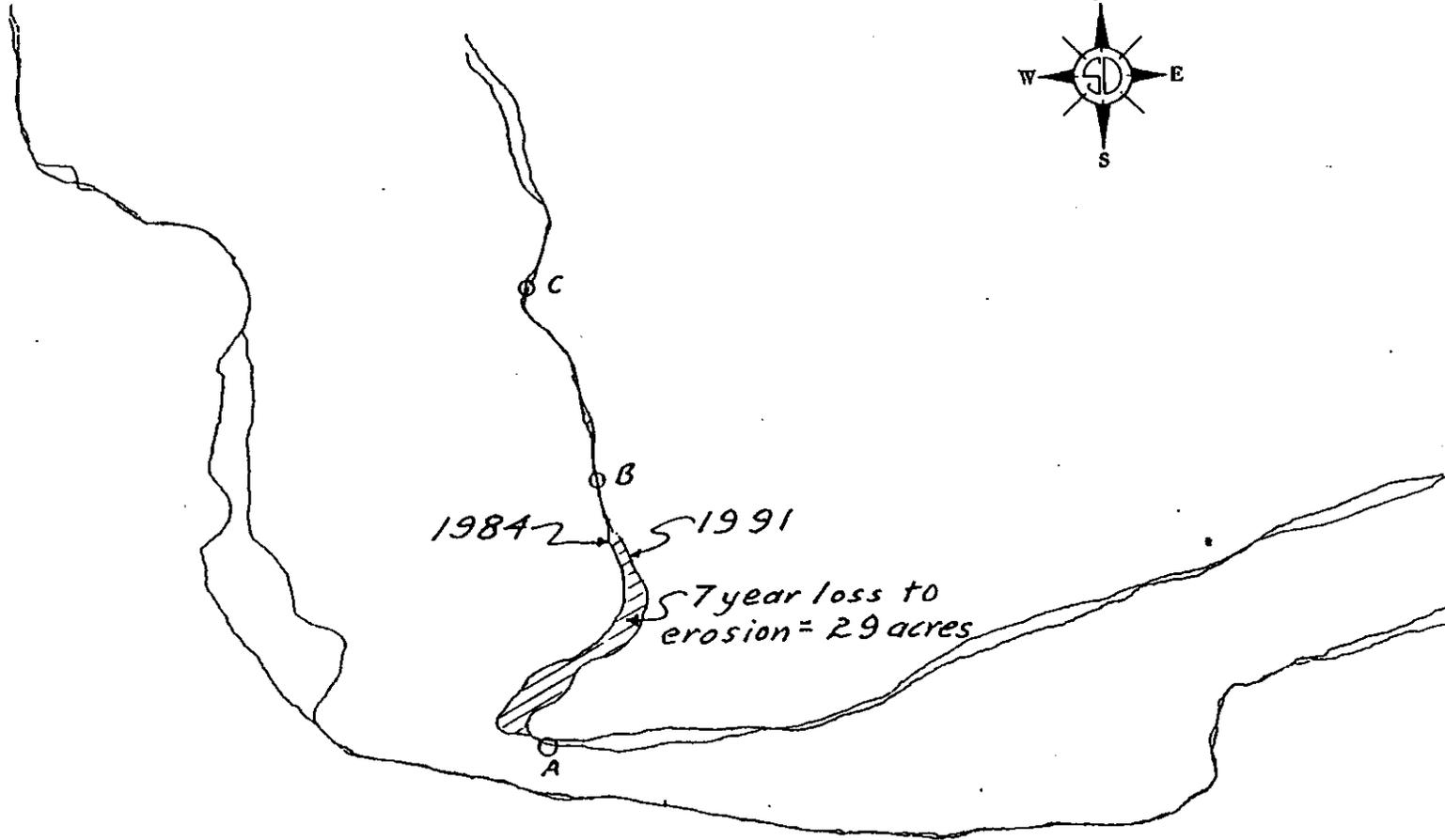
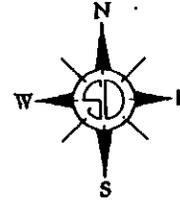


— 1956  
— 1962

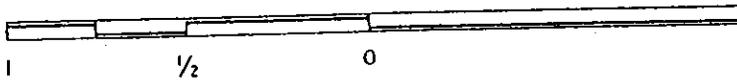
(5)

# MISSOURI RIVER SHORELINES

at Mulberry Point near Vermillion, South Dakota  
1951 to 1991



S C A L E



— 1984  
- - - 1991

7-26-92

POD:9(2010)

2-11-47

24

7-26-92

POD:9(2010)

2-11-47

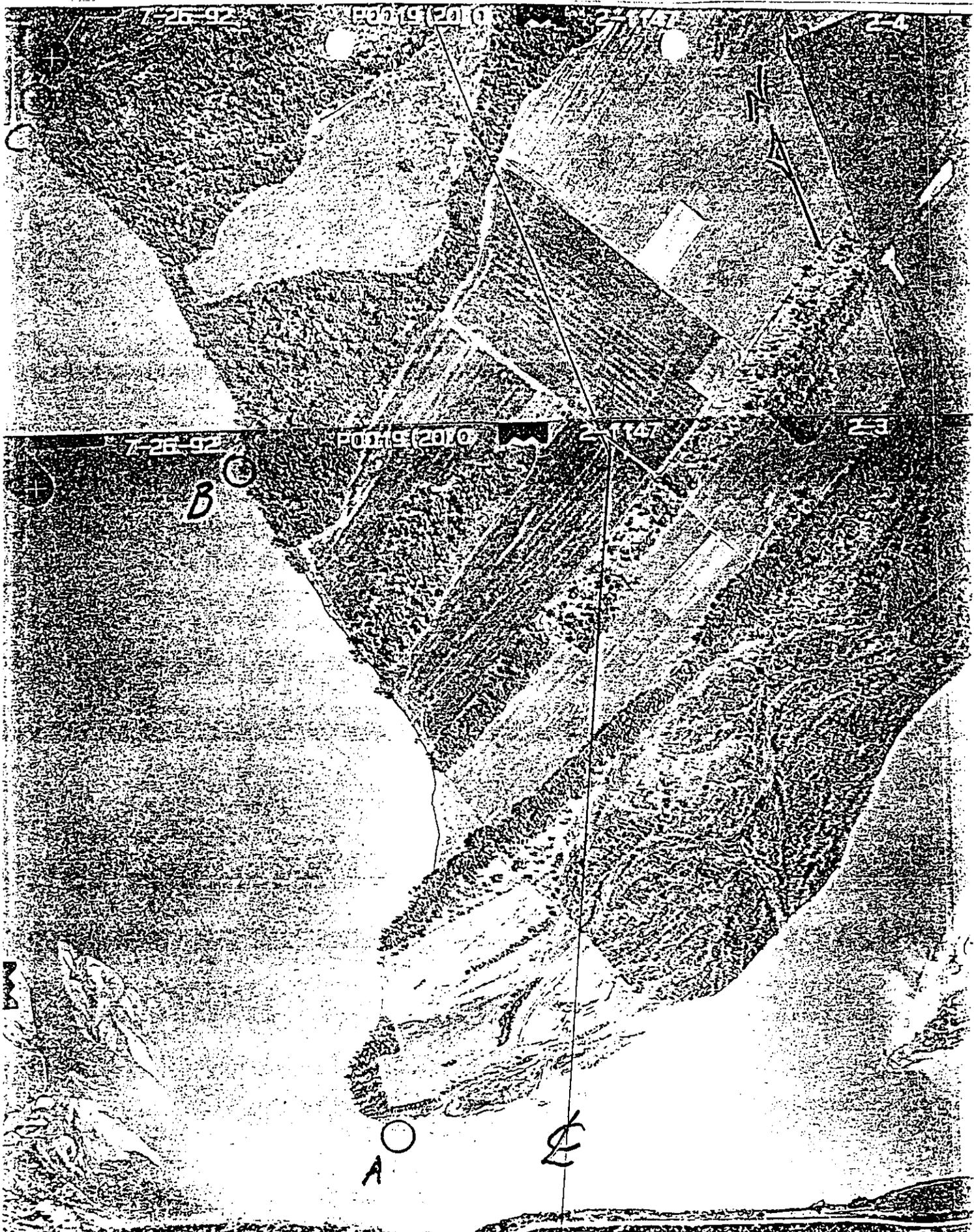
23

B

A

⊕

(9)



Dates	Time Interval	Acreage Lost	Loss Ac/yr
51-56	5 Yrs.	180	36
56-62	6 Yrs.	40	7
62-68	6 Yrs.	100	17
68-84	16 Yrs.	242	15
84-91	7 Yrs.	29	4
51-91	40 Yrs.	591	15

Acreage west of centerline between A & B = 150 Ac.

Acreage west of centerline between B & C = 145 Ac.

Total acreage west of centerline  
between A & C = 295 Ac.



January 21, 1993

**DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES**

JOE FOSS BUILDING  
523 EAST CAPITOL  
PIERRE SOUTH DAKOTA 57501-3181

RE: SD DOT Project  
P 0019(00)0 PCEMS 238H  
Clay County

JAMES NELSON  
DEPARTMENT OF TRANSPORTATION  
700 BROADWAY AVENUE EAST  
PIERRE SD 57501

Dear Mr. Nelson:

The South Dakota Department of Environment and Natural Resources (DENR), Division of Environmental Regulation, has reviewed the above referenced project which concerns three alternate proposals for a Missouri River Bridge between Vermillion, SD and Newcastle, NE, in Clay County, South Dakota.

This office has no objections to the project, which should not result in any violations of applicable statutes or regulations provided the Department of Transportation and/or its contractor(s) comply with the following requirements.

**SURFACE WATER QUALITY**

1. All fill material shall be free of substances in quantities, concentrations, or combinations which are toxic to aquatic life.
2. Removal of vegetation shall be confined to those areas absolutely necessary to construction.
3. At a minimum, construction techniques for sediment and erosion control be utilized, such as those presented in either "Best Management Practices" by DWNR (1981), "Best Management Practices" by the Federal Department of Transportation, or the "Erosion Control Manual" by the Colorado Department of Transportation.

4. All material identified in the application as removed waste material, material stockpiles, dredged or excavated material shall be placed for either temporary or permanent disposal in an upland site that is not a wetland, and measures taken to insure that the material cannot enter the watercourse through erosion or any other means.
5. Methods shall be implemented to minimize the spillage of petroleum, oils and lubricants used in vehicles during construction activities. If a discharge does occur, suitable containment procedures such as banking or diking shall be used to prevent entry of these materials into the waterway.
6. All newly created and disturbed area above the ordinary high water mark which are not riprapped shall be seeded or otherwise revegetated to protect against erosion.
7. Measures shall be taken to minimize any increase in suspended solids and turbidity.
8. The Missouri River is classified by the South Dakota Surface Water Quality Standards and Uses Assigned to Streams for the following beneficial uses:
  - (1) Domestic water supply waters;
  - (4) Warmwater permanent fish life propagation waters;
  - (7) Immersion recreation waters;
  - (8) Limited contact recreation waters;
  - (9) Wildlife propagation and stock watering waters;
  - (10) Irrigation waters; and
  - (11) Commerce and industry waters.

Because of these beneficial uses, special construction measures may have to be taken to insure that the total suspended solids standard of 90 mg/L is not violated.

9. The Vermillion River is classified by the South Dakota Surface Water Quality Standards and Uses Assigned to Streams for the following beneficial uses:
  - (5) Warmwater semipermanent fish life propagation waters;
  - (8) Limited contact recreation waters;
  - (9) Wildlife propagation and stock watering waters; and
  - (10) Irrigation waters.

Because of these beneficial uses, special construction measures may have to be taken to insure that the total suspended solids standard of 90 mg/L is not violated.

## HAZARDOUS WASTES

1. It is not expected that any hazardous wastes sites will be encountered during road construction in any rural area. However, if road construction is planned for areas within a city or town, the DOT or contractor should contact this Department prior to construction.
2. Should any hazardous waste be generated during the implementation of this project, the generator must abide by all applicable hazardous waste regulations found in ARSD 74:28 and 40 CFR Part 262.

## AIR QUALITY

1. It appears that Department of Transportation projects may have only a minor impact on the air quality in South Dakota. This impact would be through point source and fugitive emissions.
2. Equipment with point source emissions in many cases are required to have an air quality permit to operate. Permit applications can be obtained from the Air Quality Section in either the Point Source Control or Minerals and Mining Programs.
3. Fugitive emissions although not covered under State air quality regulations are a common source of public concern and may be subject to local or county ordinances. Fugitive emissions add to the deterioration of the ambient air quality and should be controlled to protect the health of communities within the construction areas.
4. For further Air Quality information, please contact Brad Schultz, Point Source Control Program, Air Section, telephone number (605) 773-3351.

This Office requests the opportunity to review and comment on any significant changes that may be proposed before the project is completed. Thank you for the opportunity to comment on the proposed project. If you have any questions, please contact this Office.

Sincerely,



John Miller  
Natural Resources Scientist  
Point Source Control Program  
Phone: (605) 773-3351

cc: S.D. Department of Game, Fish, and Parks, Tim Olson  
U.S. Fish and Wildlife Service, Pierre, Bob Kibler



**DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES**

JOE FOSS BUILDING  
523 EAST CAPITOL  
PIERRE SOUTH DAKOTA 57501-3181

August 25, 1993

Darla Peters  
Department of Transportation  
Division of Engineering  
700 Broadway Avenue East  
Pierre, SD 57501

RE: F0019(00)0 Clay County PCEMS 238H  
Missouri River Bridge Between Vermillion, SD & Newcastle, NE

Dear Ms. Darla Peters:

The review of your August 6, 1993 letter, describing the proposed bridge construction project F0019(00)0 in Clay County PCEMS 238H, has been completed for air quality compliance. It appears that the proposed project may have only a minor impact on the air quality in South Dakota. This impact would be by fugitive emissions during the construction part of the project.

Although fugitive emissions are not covered under State air quality regulations, these emissions are a common source of public concern. Efforts should be made to reduce the dust being emitted into the air from vehicle traffic and construction equipment. This includes covering the trucks hauling dirt or rubble from the site, watering bare dirt areas and haul roads to reduce fugitive dust, and using water to control any other sources of fugitive dust or emissions.

Based upon the information provided, the road construction project should not cause a significant impact on the air quality of the State if the proper control measures are implemented. If you have questions or require further information please contact me at (605) 773-3351.

Thank you for supplying this information to the Air Quality Section for review.

Sincerely,

Brad Schultz  
Natural Resources Program Scientist  
Point Source Control Program

ATTACHMENT 5

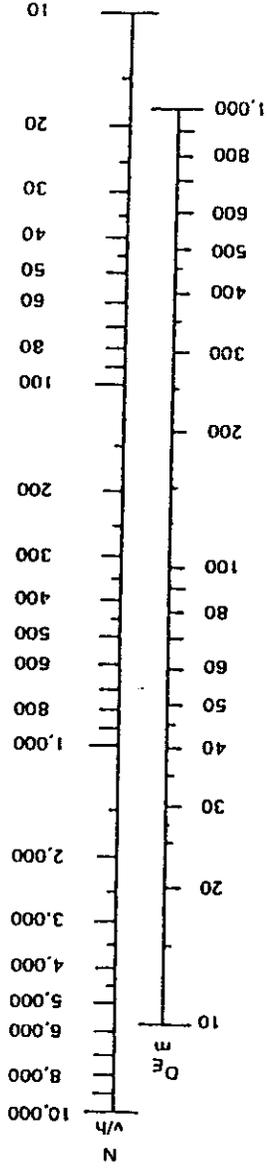
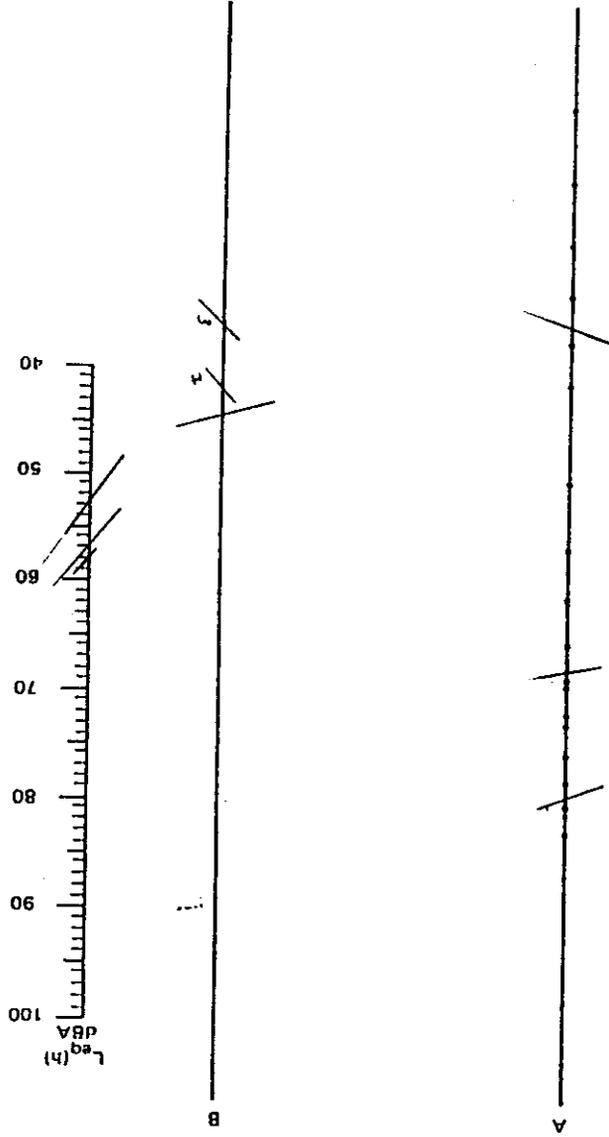


Figure 20. FHWA Highway Traffic Noise Prediction Nomograph (Soft Site)



- ASSUMPTIONS: (1) SOFT SITE ( $\alpha = 1/2$ )  
 (2) INFINITE ROADWAY ( $\phi_1 = -90^\circ, \phi_2 = +90^\circ$ )  
 (3) CONSTANT SPEED  
 (4) NO SHIELDING  
 (5)  $(L_{eq})_{EA} = 38.1 \text{ LOG}(S) - 2.4$   
 (6)  $(L_{eq})_{MT} = 33.9 \text{ LOG}(S) + 16.4$   
 (7)  $(L_{eq})_{HT} = 24.6 \text{ LOG}(S) + 38.5$



Auto - 58  
 Truck - 53  
 Truck - 57  
 61.88A  
 Speed = 88 km/h  
 D<sub>e</sub> - 27.4 m  
 Hu. Truck - 3  
 Med. Truck - 3  
 Auto - 134  
 Future

01-7

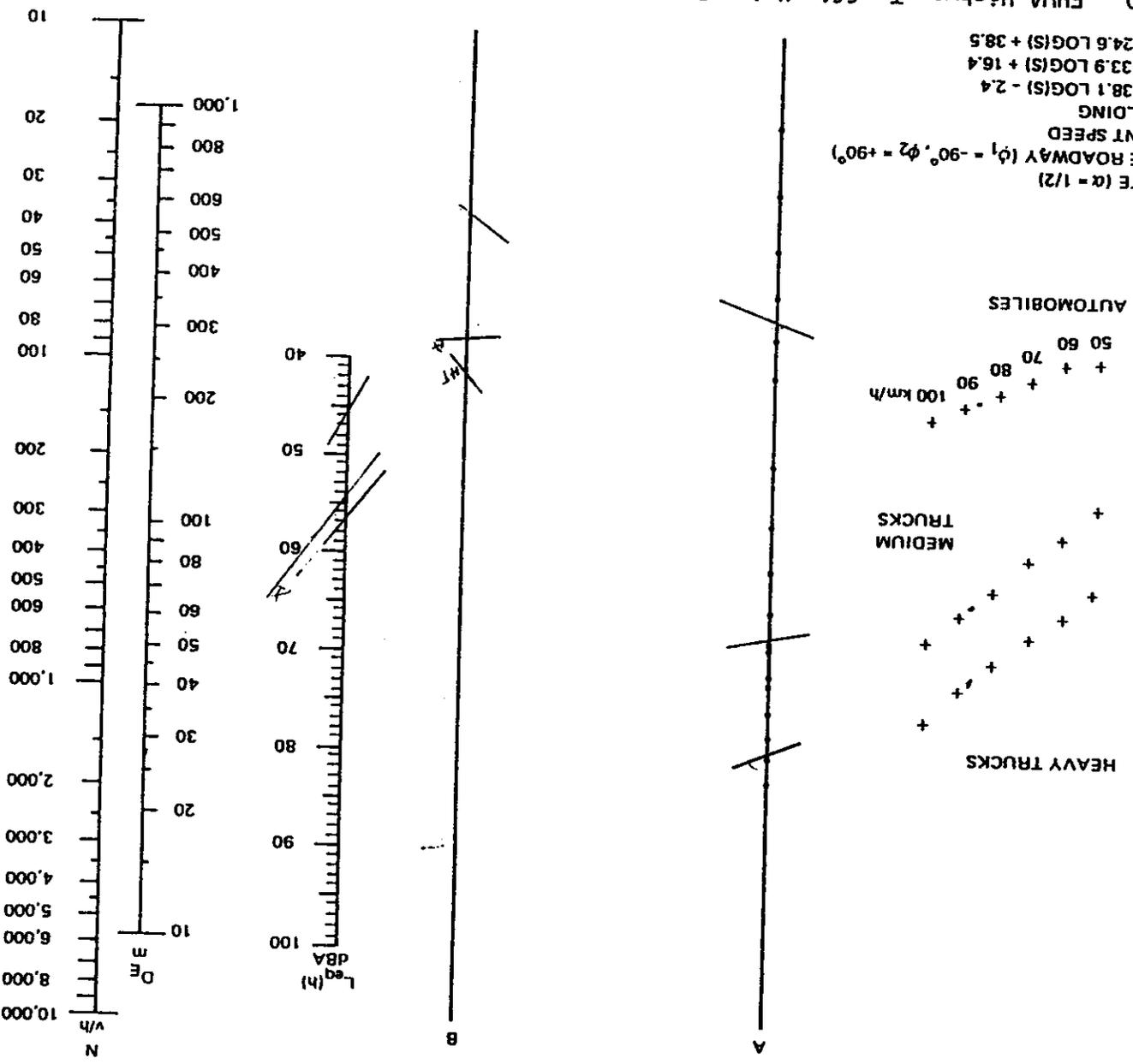
L-10

Auto - 100  
 Truck<sub>m</sub> - 3  
 Truck<sub>H</sub> - 2  
 D<sub>E</sub> - 27.4  
 Speed = 88 km/h  
 Auto = 59  
 Truck<sub>m</sub> = 52  
 Truck<sub>H</sub> = 57  
 59ABA

STARTING POINT

- ASSUMPTIONS:
- (1) SOFT SITE ( $\alpha = 1/2$ )
  - (2) INFINITE ROADWAY ( $\phi_1 = -90^\circ, \phi_2 = +90^\circ$ )
  - (3) CONSTANT SPEED
  - (4) NO SHIELDING
  - (5)  $(L_0)_{EA} = 38.1 \text{ LOG(S)} - 2.4$
  - (6)  $(L_0)_{MT} = 33.9 \text{ LOG(S)} + 16.4$
  - (7)  $(L_0)_{HT} = 24.6 \text{ LOG(S)} + 38.5$

Figure 20. FHWA Highway Traffic Noise Prediction Nomograph (Soft Site)



Present

FARMLAND CONVERSION IMPACT RATING  
FOR CORRIDOR TYPE PROJECTS

ART I (To be completed by Federal Agency)		3. Date of Land Evaluation Request 8-16-93	4. Sheet 1 of 1
Name of Project F 0019(00)0 PCENS 238H		5. Federal Agency Involved FMDA	
Type of Project Highway		6. County and State Clay Co., SD	
ART II (To be completed by SCS)		1. Date Request Received By SCS 8-17-93	2. Person Completing Form Koberner
Does the corridor contain prime, unique, statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional parts of this form)		YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	4. Acres Impacted Average Farm Size
Major Crop(s) Corn	5. Farmable Land In Government Jurisdiction Acres: 239,779	7. Amount Of Farmland As Defined In FPPA Acres: 221,353	8.6
Name Of Land Evaluation System Used SD Dept. of Revenue	9. Name of Local Site Assessment System	10. Date Land Evaluation Returned By SCS 8-21-93	

ART III (To be completed by Federal Agency)	Alternative Corridor For Segment			
	Corridor A	Corridor B	Corridor C	Corridor D
Total Acres To Be Converted Directly	80.314	75.783	96.034	29.313
Total Acres To Be Converted Indirectly, Or To Receive Services				
Total Acres In Corridor	80.314	79.255	96.034	29.313
ART IV (To be completed by SCS) Land Evaluation Information				
Total Acres Prime And Unique Farmland	8.1	10.2	28.6	
Total Acres Statewide And Local Important Farmland	57.9	46.1	67.7	
Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	<.0003	<.0003	<.0005	
Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	80	90	78	
ART V (To be completed by SCS) Land Evaluation Criterion Relative Value (Farmland to Be Serviced or Converted) (Scale of 0 - 100 Points)				
	67	80	78	

ART VI (To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))	Maximum Points	Corridor A	Corridor B	Corridor C
1. Area In Nonurban Use	15	15	15	15
2. Perimeter In Nonurban Use	10	10	10	10
3. Percent Of Corridor Being Farmed	20	16	16	17
4. Protection Provided By State And Local Government	20	0	0	0
5. Size Of Present Farm Unit Compared To Average	10	10	10	10
6. Creation Of Nonfarmable Farmland	25	0	0	0
7. Availability Of Farm Support Services	5	3	3	3
8. On-Farm Investments	20	5	5	5
9. Effects Of Conversion On Farm Support Services	25	0	0	0
10. Compatibility With Existing Agricultural Use	10	0	0	0
<b>TOTAL CORRIDOR ASSESSMENT POINTS</b>	160	59	59	60

ART VII (To be completed by Federal Agency)	Maximum Points	Corridor A	Corridor B	Corridor C
Relative Value Of Farmland (From Part V)	100	67	80	78
Total Corridor Assessment (From Part VI above or a local site assessment)	160	59	59	60
<b>TOTAL POINTS (Total of above 2 lines)</b>	260	126	139	138

Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES <input type="checkbox"/> NO <input type="checkbox"/>
--------------------	---	-----------------------	--

Reason For Selection:

Signature of Person Completing This Part: \_\_\_\_\_ DATE \_\_\_\_\_

NOTE: Complete a form for each segment with more than one Alternative Corridor.


**DEPARTMENT OF GAME, FISH AND PARKS**

Foss Building  
523 East Capitol  
Pierre, South Dakota 57501-3182

December 14, 1992

James D. Nelson  
Environmental Engineer  
Office of Project Development  
Department of Transportation  
700 E. Broadway Avenue  
Pierre, SD 57501

RE: P 0019(00)0 Clay County PCEMS 238H  
Missouri River Bridge Between Vermillion, SD and Newcastle, NE

Dear Mr. Nelson:

We have reviewed the November 12, 1992 comment letter from the U.S. Fish and Wildlife Service. We agree that this area of the Missouri River contains some of the last remaining sandbar, cottonwood forest, and floodplain wetland habitat along the Missouri River. The Service recognizes the possible impacts this project could have on federal threatened, endangered and candidate species that have been preserved with these habitats.

The SD Game Fish and Parks also anticipates impacts on state listed threatened and endangered species. There is a documented occurrence of the eastern hognose snake (Heterodon platirhinos) at the proposed Mulberry Point site. The eastern hognose snake is listed as state threatened. The sandbar habitat, floodplain wetlands and riparian forests that occur at the three alternative sites have the potential to harbor other state threatened or endangered species. The following state listed species could occur:

Banded killifish  
Fundulus diaphanus  
State endangered

Osprey  
Pandion haliaetus  
State threatened

River otter  
Lutra canadensis  
State threatened

False map turtle  
Graptemys pseudogeographica  
State threatened

Spiny softshell  
Apalone spinifera  
State threatened

Northern redbelly snake  
Storeria occipitomaculata  
State threatened

Lined snake  
Tropidoclonion lineatum  
State threatened

There are a number of other species that are rare or declining in South Dakota. These could be considered South Dakota's candidates for state listing species. Since the Missouri National Recreational River contains habitat for some of these species, surveys for rare species that have not been listed may be needed. These species include:

Silver chub  
Macrhybopsis storeriana

Silverband shiner  
Notropis shumardi

River shiner  
Notropis blennioides

Blacknose shiner  
Notropis heterolepis

Northern water snake  
Nerodia sipedon

Black sandshell  
Ligumia recta

King rail  
Rallus elegans

Pygmy shrew  
Sorex hoyi

We recommend that surveys be done for state and federal threatened and endangered species and rare or candidate species before a site is favored or chosen. With planning and cooperation, there should be minimal conflict with any of the federal or state listed species or the rare species. Because of the variety of species to be surveyed for, it is important that surveys be conducted by qualified biologists. The University of South Dakota has the necessary expertise and is nearby. We recommend that you consider contracting the surveys with the biology department at USD.

Please contact myself or Eileen Dowd Stukel, Wildlife Biologist (773-4229) if you have any questions.

Sincerely,



Doug Backlund  
Resource Biologist  
773-4345

cc: John Kirk, GFP  
Eileen Dowd Stukel, GFP  
Dave Ode, GFP  
Tom Olson, GFP  
W. LARSEN 11 Jan 93



# United States Department of the Interior



## FISH AND WILDLIFE SERVICE

Fish and Wildlife Enhancement  
420 S. Garfield Avenue, Suite 400  
Pierre, South Dakota 57501-5408

November 12, 1992

Mr. James D. Nelson  
Environmental Engineer  
SD Department of Transportation  
700 East Broadway Avenue  
Pierre, South Dakota 57501-2586

Dear Mr. Nelson:

This is in regard to the October 15, 1992, public meeting held at the Vermillion Public Library. The meeting was held to discuss three alternative sites that the South Dakota Department of Transportation (SDDOT) is considering for a Missouri River bridge at Vermillion, South Dakota. This proposal is identified as Project F 0019(00)0, PCEMS 238H, Clay County, South Dakota. The U.S. Fish and Wildlife Service (Service) has several preliminary comments which the Federal Highway Administration (FHWA) and the SDDOT should consider during planning and while developing their Environmental Assessment (EA) or Environmental Impact Statement (EIS), whichever is determined to be appropriate.

This letter provides additional comments relative to the proposed project and provides a list of endangered and threatened species for planning purposes. It also discusses transfer funding needs and how to develop funding agreements.

The Vermillion Bridge project is located within the Missouri National Recreational River (MNRR), which was established in 1978 as part of the National Wild and Scenic Rivers System, to be administered by the National Park Service. Although, over the years, various proposals for this bridge have been held in planning stages, the bridge structure was not included within the MNRR management plan by the MNRR management planning team. Instead, the management planning team indicated that the proposed bridge would have to be judged on its own merits. Please be aware that the MNRR contains some of the last sandbar, forested floodplain, and floodplain wetland habitats remaining along the Missouri River. Many candidate and listed threatened and endangered species habitats have been preserved by this protected length of river. Bald eagle, interior least tern, and piping plover habitats have already been confirmed near the three proposed bridge sites.

At the October 15, 1992, meeting, it appeared that Mulberry Point crossing was a favored alternative. We caution favoring one site over the others prior to consideration of impacts to the listed and candidate species and other habitats at these sites. One source that should be considered is the Service's 1986 report titled "Location of Habitat Important to Federally Listed Bird Species on the Missouri National Recreational River." We are providing you with a copy of this report.

The bridge construction, maintenance, and anticipated secondary activities associated with the new bridge, such as the Mulberry Point recreational use area and marina proposed by the City of Vermillion, have the potential to adversely impact these species and their habitats if not designed and managed properly. Therefore, the Service encourages the FHWA and the SDDOT to request early informal consultation from this office in order to identify and avoid unnecessary conflicts with these protected species. For planning purposes, we are providing a list of endangered and threatened species that may occur in the project area so that information may be compiled. An official list should be requested when planning is complete and when a preferred plan has been selected.

American burying beetle  
(Nicrophorus americanus)

Bald eagle  
(Haliaeetus leucocephalus)

Eskimo curlew  
(Numenius borealis)

Interior least tern  
(Sterna antillarum)

Pallid sturgeon  
(Scaphirhynchus albus)

Peregrine falcon  
(Falco peregrinus)

Piping plover  
(Charadrius melodus)

Western prairie fringed orchid  
(Platanthera praeclara)

Candidate species for federal listing which may occur in the project area include:

Black tern  
(Chlidonias niger)

Blanding's turtle  
(Emydoidea blandingi)

Blue sucker  
(Cycleptus elongatus)

Dakota skipper butterfly  
(Hesperia dacotae)

Henslow's sparrow  
(Ammodramus henslowii)

Lake sturgeon  
(Acipenser fulvescens)

Long-billed curlew  
(Numenius americanus)

Migrant loggerhead shrike  
(Lanius ludovicianus migrans)

Paddlefish  
(Polyodon spathula)

Plains spotted skunk  
(Spilogale putorius interrupta)

Plains topminnow  
(Fundulus sciadicus)

Regal fritillary butterfly  
(Speyeria idalia)

Scaleshell mussel  
(Leptodea leptodon)

Sicklefin chub  
(Hybopsis meeki)

Sturgeon chub  
(Hybopsis gelida)

Topeka shiner  
(Notropis tristis)

White-faced ibis  
(Plegadis chihi)

The development of an EA or an EIS by the FHWA and the SDDOT will require an assessment of the impacts of the proposed bridge to these candidate and listed endangered and threatened species as well as impacts to migratory birds and aquatic and terrestrial habitats. The FHWA and the SDDOT will thus need to compile existing information and collect up-to-date data on the listed and candidate species, migratory birds, and aquatic and terrestrial habitats. The Service anticipates that this may include the field surveys for species such as the pallid sturgeon to assess the species' presence, use patterns, and other life history information. Status surveys may also be needed for candidate species. The FHWA and the SDDOT should coordinate closely with the U.S. Army Corps of Engineers and the National Park Service in reviewing the status of the listed species in the project area and in planning and conducting additional field work.

The Service anticipates that there will be costs associated with the above needs that should be weighed as the FHWA and the SDDOT develop contracts or transfer funding agreements in order to complete the EA or the EIS. It is quite common for other federal agencies to request the technical expertise and resources of the Service through a Scope of Work to have the Service complete a draft Fish and Wildlife Coordination Act Report for their federal project. Because of the effort required to review these large projects, a transfer funding agreement is usually made between agencies to reimburse the Service's costs. Examples of such agreements are enclosed.

The SDDOT and the FHWA should submit to the Service a draft Scope of Work in a format favored by your agency in order to develop an agreement on funding transfer for the Vermillion Bridge project between the FHWA, the SDDOT, and the Service. The Service will then provide the FHWA and the SDDOT with an estimate of man effort and funding that will be required by our office in Fiscal Year 1993 and other years to cover the costs for the requested tasks defined by the Scope of Work. Please feel free to contact me at (605) 224-8693 if you have questions concerning the process of transfer funds.

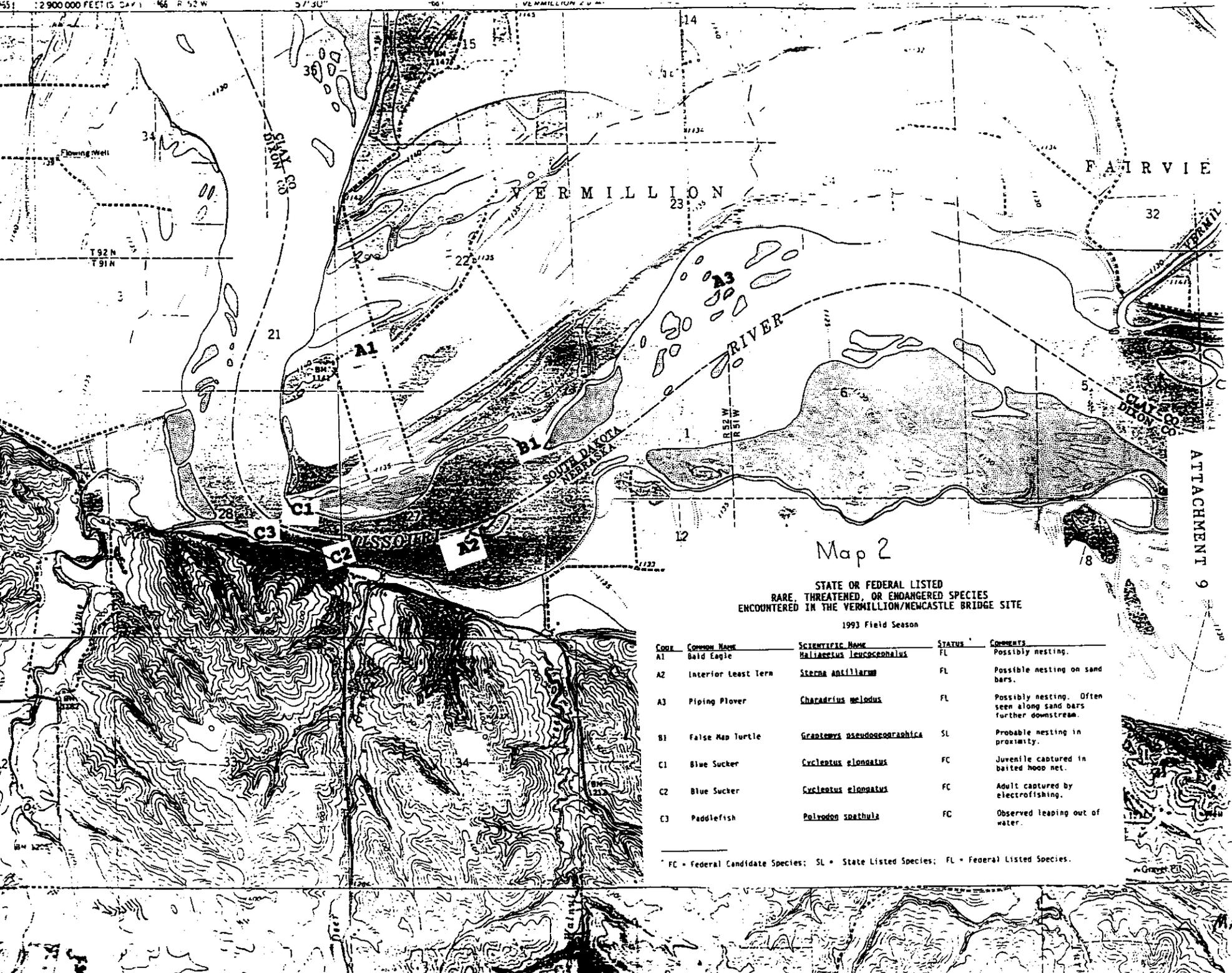
Sincerely,



M.S. Zschomler  
State Supervisor  
South Dakota State Office

Enclosures

cc: Don Castleberry, NPS; Omaha, NE  
Bob Ten Eyck, FHWA; Pierre, SD  
Richard Gorton, COE; Omaha, NE  
Steve Anschutz, FWS; Grand Island, NE  
Field Supervisor, FWE; Bismarck, ND  
SE File  
W. LARSEN 11/2/93



Map 2

STATE OR FEDERAL LISTED  
 RARE, THREATENED, OR ENDANGERED SPECIES  
 ENCOUNTERED IN THE VERMILLION/NEWCASTLE BRIDGE SITE

1993 Field Season

Code	Common Name	SCIENTIFIC NAME	STATUS	Comments
A1	Bald Eagle	<i>Haliaeetus leucoccephalus</i>	FL	Possibly nesting.
A2	Interior Least Tern	<i>Sterna antillarum</i>	FL	Possible nesting on sand bars.
A3	Piping Plover	<i>Charadrius melodus</i>	FL	Possibly nesting. Often seen along sand bars further downstream.
B1	False Map Turtle	<i>Gratemys pseudogeographica</i>	SL	Probable nesting in proximity.
C1	Blue Sucker	<i>Cyprinostomus elongatus</i>	FC	Juvenile captured in baited hoop net.
C2	Blue Sucker	<i>Cyprinostomus elongatus</i>	FC	Adult captured by electrofishing.
C3	Paddlefish	<i>Polyodon spathula</i>	FC	Observed leaping out of water.

FC = Federal Candidate Species; SL = State Listed Species; FL = Federal Listed Species.

ATTACHMENT 9



ATTACHMENT 10

# United States Department of the Interior



## FISH AND WILDLIFE SERVICE

Fish and Wildlife Enhancement  
420 S. Garfield Avenue, Suite 400  
Pierre, South Dakota 57501-5408

September 8, 1994

Mr. Donald Kamnikar  
Division Administrator  
Federal Highway Administration  
P.O. Box 700  
Pierre, South Dakota 57501

Re: NH 0019(20)0 in Clay County, South  
Dakota, and Cedar County and Dixon  
County, Nebraska

Dear Mr. Kamnikar:

This acknowledges the Fish and Wildlife Service's (Service) August 19, 1994, receipt of your August 16, 1994, letter requesting initiation of formal section 7 consultation under the Endangered Species Act. Accordingly, formal consultation has been initiated as of August 19, 1994. The section 7 consultation concerns the possible effects of the above referenced bridge project on the bald eagle (Haliaeetus leucocephalus), peregrine falcon (Falco peregrinus), Eskimo curlew (Numenius borealis), piping plover (Charadrius melodus), interior least tern (Sterna antillarum), pallid sturgeon (Scaphirhynchus albus), and American burying beetle (Nicrophorus americanus).

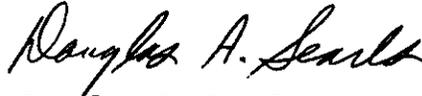
We have assigned log number 6-SD-F-002 to this consultation. The Service concurs with the Federal Highway Administration's (Administration) conclusion that the proposed bridge over the Missouri River in the vicinity of Vermillion, South Dakota, is likely to adversely affect the bald eagle. We also concur with the Administration's assessment of "no effect" on the peregrine falcon, Eskimo curlew, piping plover, interior least tern, pallid sturgeon, and American burying beetle.

Section 7 allows the Service up to 90 days to conclude formal consultation with your agency and an additional 45 days to prepare our biological opinion. Therefore, we expect to provide you with our biological opinion on or before December 31, 1994. Because we have already coordinated very closely with the South Dakota Department of Transportation on this project, we hope to have a biological opinion to you long before the statutory deadline and prior to anticipated public hearings in November.

As a reminder, the Endangered Species Act requires that, after initiation of formal consultation, the Federal action agency make no irreversible commitment of resources that limits future options. This practice ensures that agency actions do not preclude the formulation or implementation of reasonable and prudent alternatives that avoid jeopardizing the continued existence of endangered or threatened species.

If you have any questions or concerns about this consultation or the consultation process in general, please contact Nell McPhillips of this office or me at (605) 224-8693.

Sincerely,



Douglas A. Searls  
Acting Field Supervisor  
South Dakota Field Office



ATTACHMENT 10A

# United States Department of the Interior



## FISH AND WILDLIFE SERVICE

Fish and Wildlife Enhancement  
420 S. Garfield Avenue, Suite 400  
Pierre, South Dakota 57501-5408

November 10, 1994

Mr. Donald Kamnikar  
Division Administrator  
Federal Highway Administration  
P.O. Box 700  
Pierre, South Dakota 57501-0700

Re: NH 0019(20)0 in Clay County, South  
Dakota, and in Cedar and Dixon  
Counties, Nebraska

Dear Mr. Kamnikar:

This is the Fish and Wildlife Service's (Service) biological opinion on the Federal Highway Administration's (Administration) proposal to build a bridge over the Missouri River in the vicinity of Vermillion, South Dakota, and Newcastle, Nebraska, as requested in your August 16, 1994, letter. This biological opinion is being issued to the Administration after review and analysis of the best available scientific and commercial data contained in reports and surveys received from the South Dakota Department of Transportation (Department), information in our files, information from recognized authorities on the species under consultation, and information from other reliable sources.

This biological opinion considers the effects that the proposed bridge construction will have on the bald eagle (Haliaeetus leucocephalus). The Service has examined the proposed action in accordance with the procedural regulations governing interagency cooperation under section 7 of the Endangered Species Act of 1973, as amended (50 CFR 402 and U.S.C. 1531 et seq.).

### BIOLOGICAL OPINION

After reviewing the current status of the bald eagle, the environmental baseline for the action area, the effects of the proposed Missouri River bridge construction, and the cumulative effects, it is the Service's biological opinion that the proposed Missouri River bridge, as described below, is not likely to jeopardize the Northern States recovery unit of the bald eagle (Haliaeetus leucocephalus).

## PROJECT DESCRIPTION

The Department and the Nebraska Department of Roads propose to build a bridge over the Missouri River in the vicinity of Vermillion, South Dakota, and Newcastle, Nebraska. South Dakota Highway 19 and South Dakota Highway 50 would connect with Nebraska Highway 12. Two 12-foot driving lanes with 6-foot shoulders are proposed for the interconnecting roadway. Stabilization of the bank is anticipated, but the degree or extent of the stabilization is unknown at this time.

The Department has agreed to complete the following actions to offset ecosystem impacts from bridge construction:

1. Leave a buffer strip between the new highway and the Missouri River.
2. Stabilize the Missouri River banks to minimize erosion thereby reducing tree loss.
3. Purchase and/or obtain an easement to place land between the new highway and the Missouri River in public ownership or easement, as recommended in the "Missouri National Recreational River Management Plan."
4. Plant trees conducive to bald eagle habitat, i.e., cottonwood trees in the area presently farmed within the proposed buffer strip.

## STATUS OF BALD EAGLE

### Historical Perspective and Current Distribution

The Lewis and Clark Journals document bald eagle use along the Missouri River in both summer and winter (Hosmer 1902). However, bald eagle populations that might once have been widely distributed over thousands of acres of Missouri River bottomland timber habitat adjacent to the river are now confined to smaller areas of suitable habitat. Of an original 500 river miles of riparian area that existed in South Dakota along the Missouri River, less than 80 miles remain (U.S. Fish and Wildlife Service 1984).

The breeding range of the bald eagle greatly diminished during the 19th and 20th centuries. Present-day breeding occurs primarily in northern California; Alaska; Oregon; Washington; Minnesota; Wisconsin; Michigan; Maine; the Chesapeake Bay area; Florida; the tri-state corner of Idaho, Montana, and Wyoming; and in parts of Canada.

During the late 1800's, breeding populations were a regular occurrence along the Missouri River (Stewart 1975). Breeding records for the bald eagle in South Dakota are rare. Agersborg (1885, cited by the South Dakota Ornithologists Union 1991) reported the bald eagle as a rare breeder in the southeastern part of the state. Hoffman (1877, cited by the South Dakota Ornithologists Union 1991) reported seeing bald eagles in May 1873 on the Missouri River near the Grand River.

However, recent nesting attempts were documented in 1992, one at the Sand Lake National Wildlife Refuge in Brown County and two at the Karl Mundt National Wildlife Refuge along the Missouri River in Gregory County. In 1993, breeding birds were documented in South Dakota for the first time in over 100 years when two birds were fledged from a nest on the Missouri River at the Karl Mundt National Wildlife Refuge. Bald eagles nested and fledged birds on the Karl Mundt National Wildlife Refuge again this year. Another new nest successfully fledged birds in Brown County in 1994.

Bald eagles winter in the lower 48 states but are most abundant in the West and Midwest. Wintering surveys have shown that "core" or high abundance bald eagle wintering areas are associated with the Missouri and Mississippi Rivers and their tributaries. Based on counts in the lower 48 states from 1979-1982, 50 percent of all sightings were from core wintering areas (Millsap 1986). Approximately 15,000 bald eagles were counted during the 1992 nationwide midwinter survey of the lower 48 states. There are three major areas of mature cottonwood timber remaining on the Missouri River in South Dakota that are known to support wintering populations of bald eagles. They are the Pierre/Fort Pierre, Oahe Dam area; the Karl Mundt National Wildlife Refuge/Fort Randall Dam area; and portions of the Missouri National Recreational River, particularly in the Yankton/James River Island area.

#### Habitat Requirements

Breeding bald eagles are associated almost exclusively with shorelines of lakes, rivers, or seacoasts where they build large nests in mature trees or on cliffs. Adults tend to use the same breeding area and often the same nest each year. The diet of nesting bald eagles is mostly composed of fish, although they are opportunistic and will take carrion. Bald eagles tend to nest away from residential development and human activity.

An abundant, readily available food supply in conjunction with one or more suitable night roost sites is the primary characteristic of winter habitat. The same roosts are used every year and are usually located in areas protected from the wind, harsh weather, and human disturbance (Stalmaster 1976; Steenhof 1978; Fisher et al. 1981). In addition to natural factors, freedom from human disturbance is important in communal night roost site selection (Stalmaster and Newman 1978; Fisher et al. 1981). Continued human disturbance of a night roost may cause bald eagles to abandon an area (Steenhof 1976; Hansen et al. 1981; Keister 1981). The use of large, live trees in sheltered areas provides a more favorable thermal environment and therefore helps to minimize the energy stress encountered by wintering birds. Communal roosting may also facilitate food finding (Steenhof 1976) and pair bonding. The proximity of adequate night roosts to other habitat requirements of wintering bald eagles, such as hunting perches and feeding sites, is important. As conditions change, bald eagles often shift their emphasis from one food source to another (Spencer 1976; Schwilling 1980). The majority of wintering bald eagles are found near open water where they feed on fish and waterfowl, often taking those that are dead, crippled, or otherwise vulnerable (U.S. Department of the Interior 1983). However, some bald eagles spend a substantial portion of the wintering period in terrestrial habitats removed from open water, relying on prey they can easily catch or can scavenge such as big game or livestock

carrion and small mammals (Vian 1971; Platt 1976; Spencer 1976; Fisher et al. 1981). In some locations, the absence of a suitable night roost may limit the use of otherwise suitable habitat.

### Reasons For Species Decline

Nesting populations of bald eagles were seriously reduced in many states during the 19th century. These early declines are attributed primarily to the loss of habitat plus mortality from shooting and trapping. These problems have continued and have even accelerated in some localities. Reported bald eagle mortalities in South Dakota alone averaged over ten birds per year (1980-1985, [data not recorded 1986-1988], and 1989-1992). These figures are for reported birds only and do not account for birds that were sent to rehabilitation centers and later died. Reported mortalities were attributed to poisoning (including pesticide misuse, lead poisoning, and intentional poisoning), shooting and trapping, electrocution, line strikes, road kills, and unknown causes.

Loss of habitat is perhaps the most serious negative factor and certainly the most difficult to halt and reverse. The destruction of wild areas through land development and increased human activity is adversely affecting the suitability of both breeding and wintering areas. Buehler et al. (1991) suggests that, when shoreline bald eagle habitat (both nesting and wintering) is developed, it is irretrievably lost.

While much of the floodplain forested habitat used by bald eagles was lost due to construction of the Missouri River main-stem system (system), additional habitat has been lost due to regulation of the system. Operating the system to reduce periodic flooding has reduced the productivity of the remaining forest lands in the Missouri River floodplain (Hesse et al. 1988). Evidence suggests that large cottonwood trees along the Missouri River have reached maturity and are beginning to degenerate. Studies indicate that system dams may be having major and long-term effects on the dynamics of remnant forest ecosystems (Johnson 1988). The absence of annual soil profile saturation (Reilly and Johnson 1982), the lack of nutrient salt deposition (Burgess et al. 1973), and the lowering of the water table in the spring to reduce downstream flooding during the period of high water demand for trees (Reilly and Johnson 1982) all contribute to decreased productivity. Research has found low seedling recruitment rates in cottonwood trees (Johnson 1988) which are favored as winter roosting habitat for bald eagles along the Missouri River. Cottonwoods require fresh alluvium for germination and establishment, and their populations have been maintained in the past by rapid lateral accretion of the river. River meandering has more or less ceased under system operations. Therefore, cottonwood forests are quickly being replaced by ash as the cottonwood forests age and are not regenerated.

Disturbance, although difficult to assess and evaluate, has been suggested as a cause of reproductive failure in some breeding areas and a factor that adversely affects suitability of wintering areas. Research has found that increased human disturbance on wintering areas, with its consequent higher energy demands, could have a negative impact on survivorship, particularly as bald eagle populations continue to grow (Craig et al. 1988). Bald eagles may

vary in their response to human activity with some individuals being tolerant while others are easily disturbed.

During the mid-20th century, the effects of organochlorine insecticides caused further significant declines in the remaining nesting population. Dieldrin and endrin were implicated most often in acute poisonings, that is, those resulting in deaths of individual birds. However, it was DDE, a metabolite or breakdown product of DDT, that caused the gravest contaminant problems for bald eagle welfare by inducing production of thin-shelled eggs. With curtailment of the use of DDT and other organochlorine insecticides in the early 1970's, the problem is gradually being reduced. Unfortunately, in recent times, other insecticides are surfacing as killers of bald eagles, including Carbofuran, Famphur, and Phorate. Contaminant concerns continue in the Northern Great Plains Region with impacts to both breeding and wintering bald eagles.

#### Productivity and Recovery Objectives

The Northern States Bald Eagle Recovery Plan (Recovery Plan) reports that changes in survival have more impact on the population of bald eagles than similar changes in reproductive rates. Depending on adult survival, it is possible for populations with lower reproduction to do better than others with higher reproduction (Grier 1980). The initial tentative goal for recovery is to have 1,200 occupied breeding areas distributed over a minimum of 16 states within the Northern States Region by the year 2000 with an average annual productivity of at least 1.0 young per occupied nest.

Currently, the Northern States bald eagle population is more than 84 percent of the way toward the recovery goal (Grier 1988). There are no recovery goals established for wintering populations of bald eagles. However, the Recovery Plan specifically states that, to ensure the survival and recovery of bald eagles, significant wintering areas must be protected and managed.

The Service has proposed to reclassify the bald eagle from endangered to threatened in the Chesapeake and Southwest Recovery Regions and in those portions of the Northern and Pacific Recovery Regions where it is currently classified as endangered (U.S. Fish and Wildlife Service 1994).

#### Importance of Missouri River and Winter Roost Sites to Bald Eagles

The Missouri River floodplain along most of the flowing reaches has sufficiently large cottonwood trees for nesting. As nationwide populations increase, nesting occurrence should also increase. Present-day breeding on the Missouri River occurs above the Fort Peck Reservoir in Montana, below the Garrison Dam in North Dakota, and below the Fort Randall Dam in South Dakota.

In northern latitude states where natural lakes and smaller rivers freeze during winter, the Missouri River provides the only open water for wintering bald eagles. Wintering bald eagles have found that the reservoir system provides a relatively easy source of food in limited areas. Open water areas on the reservoir system, particularly below tailrace areas, provide bald eagles with the opportunity to feed on dead, crippled, and otherwise

vulnerable waterfowl and fish. However, these abundant food sources are of little use to bald eagles unless they are within a reasonable distance to communal roost areas. Communal roost areas are often characterized by large, old cottonwoods with stout horizontal branching. At night, wintering bald eagles often congregate at communal roost trees, in some cases traveling 12.42 miles or more from feeding areas to a roost site (Platt 1976; Fisher et al. 1981).

In addition to natural factors, freedom from human disturbance is important in communal night roost site selection (Stalmaster and Newman 1978; Fisher et al. 1981). Continued human disturbance of a night roost may cause bald eagles to abandon an area (Steenhof 1976; Hansen et al. 1981; Keister 1981).

Limited information exists on population dynamics of wintering bald eagles; and, aside from a small sample of color-marked birds and the first year recovery rates of banded nestlings, there is virtually no information on survival rates (U.S. Department of the Interior 1983). Hypothetical modeling of bald eagle populations has shown that both reproduction and survival are important. However, changes in survival appear to have more of an impact on the population than similar changes in reproductive rates. The implications of modeling are (1) that variation in reproductive rates may not be quite as important as formerly thought (although it is still important and cannot be ignored), and (2) that more attention should be given to survival and the habitat upon which survival depends.

Survival of individual bald eagles, particularly those in their first year of life, is probably heavily dependent upon the conditions they encounter during the winter season (U.S. Department of the Interior 1983). The physiological condition of adults at the beginning of each breeding season, an important factor influencing reproductive success, also is affected by how well their energy demands are met in wintering areas. Thus, the survival and recovery of nesting bald eagle populations in the Northern States Region is more than partly dependent upon the existence and abundance of suitable winter roost sites.

According to the Recovery Plan (U.S. Department of the Interior 1983), the consistent presence of birds at a particular location indicates the presence of required habitat. Therefore, wintering areas in the Northern States Region that meet any of the following criteria should be considered essential habitats:

1. Locations used annually for two weeks or longer by adult or immature wintering bald eagles known (or strongly suspected) to be from nearby breeding areas.
2. Locations (excluding those along the Mississippi River) used annually by five or more bald eagles for two weeks or longer in Connecticut, Indiana, Iowa, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, North Dakota, Ohio, Pennsylvania, Rhode Island, Vermont, and Wisconsin.

3. Locations used annually by 15 or more bald eagles for 2 weeks or longer in Colorado, Illinois, Kansas, Missouri, Nebraska, Oklahoma, South Dakota, Utah, or along the Mississippi River.
4. Locations used by bald eagles during periods of extremely harsh weather when suitable feeding areas and night roosts are limited in number.

The rationale for the first criterion is that the presence of suitable winter habitat near breeding areas reduces the energy expenditure and the risks entailed in migration and could result in increased survivorship for resident bald eagles of all age classes and higher reproductive success for resident adults.

The second, third, and fourth criteria deal with areas utilized by migrant bald eagles. The importance of any location is ultimately determined by its contribution to survival and reproductive success. Since this cannot be directly measured, consideration is given instead to factors such as (1) the length of time an area is occupied by bald eagles each year, (2) the amount of use it receives and its potential for supporting more use, (3) the regularity of use over a period of years or during extreme weather when suitable habitat is most limited, and (4) the number and extent of other wintering areas in the vicinity.

Except for locations used primarily during winters with severe weather, essential habitats should have a history of long-term use (e.g., five years or more) or, if such documentation is lacking, there should be evidence that the area is capable of supporting bald eagles on a long-term basis. The configuration of each essential habitat area should include roost sites and associated aquatic and terrestrial feeding areas, prey habitat, and other biological or physical features necessary for continued use of the site (U.S. Department of the Interior 1983).

The levels of use identified in the second and third criteria are based on the analysis of midwinter survey data as well as input from bald eagle researchers. The criterion of five or more bald eagles is used in the Great Lakes and Northeast States since this area supports such a low percentage (probably less than 15 percent) of the current winter use by bald eagles in the region. A location within these states that regularly supports five or more bald eagles is unusual. The number of wintering areas and bald eagles are higher within the states farther west. Therefore, essential wintering habitat in the western portions of the Northern States Region is considered to be those locations that annually support 15 or more bald eagles.

#### Bald Eagle Use on the Missouri National Recreational River and Project Area Vicinity

A Service report (1986) identified locations of habitat important to bald eagles on the Missouri National Recreational River. The portion of the proposed bridge site that includes lands owned by the South Dakota Department of Game, Fish and Parks was identified in the report as Priority I habitat with extensive recorded use by wintering bald eagles. The trees to the south were identified as potentially suitable habitat. However, the report

conducted for the proposed bridge site titled "Biological Survey, Proposed Missouri River Bridge Site, Vermillion, South Dakota" does identify the south tree area as being used by bald eagles during the summer of 1993. Recent wintering bald eagle survey information from the Missouri National Recreational River is contained in Table 1.

Table 1. Bald eagle aerial survey results from Gavins Point Dam to Ponca State Park, Missouri River, South Dakota/Nebraska, 1990-1993 (surveys conducted by the South Dakota Department of Game, Fish and Parks).

<u>Date</u>	<u>Adult</u>	<u>Immature</u>	<u>Unknown</u>	<u>Total</u>
January 1993	5	4	0	4
January 1992	80	22	3	103
January 1991	22	1	1	24
January 1990	26	5	0	31

Unfortunately, the proposed bridge site is not specifically surveyed year after year during wintering bald eagle counts. Therefore, it is difficult to determine the importance of this site to wintering bald eagles, i.e., how it rates in regard to criteria established by the Recovery Plan for essential habitat.

In warmer years, it is likely that cottonwood habitats at the proposed bridge site are occupied by bald eagles. However, in colder years when the river is frozen and snow cover is extensive, it is less likely that the area would be occupied by bald eagles because of the lack of prey availability.

#### EFFECTS OF THE ACTION

The proposed alignment will eliminate approximately 16-18 acres of cottonwood forest habitat adjacent to the Missouri River. These timbered areas provide roosting and perching habitat for wintering and migratory bald eagles. The use of large, live trees in sheltered areas, as found on the proposed project site, provides a more favorable thermal environment and helps to minimize the energy stress encountered by wintering birds. The project area is also relatively free of human disturbance in the winter. Communal roosts are often found in areas protected from wind, harsh weather, and human disturbance (Stalmaster 1976; Steenhof 1978; Fisher et al. 1981).

The proposed bridge construction will run a 150-foot swath through the forested acres adjacent to the Missouri River. The loss of this habitat may limit bald eagle use in this area. The loss of communal roost sites can be critical to bald eagle use of an area. Unfortunately, it has not been determined if there are any critical roost sites in the project vicinity. The proximity of adequate night roosts to other habitat requirements of wintering bald eagles, such as hunting perches and feeding sites, is important. However, the absence of a suitable night roost may limit the use of otherwise suitable habitat. Thus, the loss of a communal roost may result in abandonment or use of other timbered areas in the vicinity.

The loss of cottonwood habitat along the Missouri River is not new. Unfortunately, it has been a continual process resulting from man's desire to harness the Missouri River. Channelization of the river accounted for the loss of 309,000 acres of riparian timber (U.S. Fish and Wildlife Service 1980). There were 116,520 acres of bottomland timber and brush inundated by main-stem reservoirs in South Dakota and Nebraska. Encouraged by channelization and dam construction, including subsequent operations and flood control, there has been an expansion of agriculture onto the floodplain. On the Missouri National Recreational River, over 5,300 acres of cottonwood habitat were lost from 1944 to 1977, of which most could be contributed to agriculture conversion. Today, other types of economic development adjacent to the river (i.e., housing, industrial, and recreational) contribute to the loss of Missouri River cottonwood forests.

The cumulative effects of all of these past habitat losses have not been quantified nor have they been adequately addressed in the Recovery Plan. However, we do know that there is no equivalent increase in habitat occurring on the Missouri River.

The intrusion of noise pollution and human disturbance that the proposed bridge will bring to the project area will also impact bald eagles wintering in the project area. Wintering populations of bald eagles have been found to be very sensitive to human activities or interferences (Shea 1973; Servheen 1975; Steenhof 1976; Spencer 1976; Stalmaster 1976; Stalmaster and Newman 1978; Russell 1980; Skagen 1980; Knight and Knight 1984; Craig et al. 1988; Buehler et al. 1991). Results of many of these studies demonstrate the complexity of human-eagle interactions and the difficulty in predicting the outcomes of human-eagle interactions. Housing development has been implicated in the abandonment of a large communal roost in Oklahoma (Lish and Lewis 1975). Buehler et al. (1991) showed that bald eagles avoided developed and human-used habitats and suggested that, when shoreline habitat is developed, it is irretrievably lost.

Stalmaster (1983) indicated that flight is principally responsible for influencing energy budgets. Flight or flushing is the typical response of bald eagles to human interaction. Buehler et al. (1991) found that flushing distances are greater in winter than they are in the summer. Craig et al. (1988) found that increased human disturbance, with its consequent higher energy demands, could have a negative impact on winter survivorship, particularly as a bald eagle population continues to grow. Disturbance, although difficult to assess and evaluate, has been suggested as a factor that

adversely affects the suitability of wintering areas. Thus, human disturbance factors on wintering areas are critical to survivorship and thus recovery of bald eagles.

Survival of individual bald eagles, particularly those in their first year of life, depends heavily upon conditions they encounter during the winter period. Reproductive success is also affected by what conditions are encountered in wintering areas. Thus, the survival and recovery of birds in the Northern States recovery unit is dependent on stable wintering sites.

#### 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.

The cumulative losses of wintering habitat are continuing to occur from residential, commercial, and agricultural development. There is increased interest by developers in taking advantage of the amenities that rivers offer. Several recent proposals that key into tourism potential have been completed or proposed in South Dakota. The Governor of South Dakota has promoted Missouri River development in his "Missouri River Resource Enhancement Program." While there may be no direct Federal involvement in this program, it does indicate a renewed interest in economic development along the Missouri River.

The development of the bridge itself is likely to increase the development potential of the area since it will provide convenient crossing of the Missouri River between Nebraska and South Dakota.

Clearing of forested lands for economic development is likely to accelerate with increased developmental pressure.

Time is playing against nature as the replacement of cottonwoods is not keeping pace with the loss of cottonwoods. Since the cottonwood trees used by wintering bald eagles are large in diameter, most trees may be 40-50 years old. Cottonwoods are relatively short lived but, under favorable conditions, may remain vigorous for 80-90 years. Under the right conditions, it would take a cottonwood about 20 years to reach a size and quality to attract bald eagles.

Increased development of Missouri River areas will likely increase recreation use days on the river. The current estimated level of recreation use on the Missouri River is 5.9 million annual recreation days (U.S. Army Corps of Engineers 1994). An increase in recreational pressure will exacerbate human disturbance problems in bald eagle habitat areas.

Additionally, habitat is being lost due to dam and reservoir caused changes in floodplain hydrology. The cumulative effects of all of these habitat losses have not been quantified. However, it is apparent that there is no equivalent increase in habitat occurring. The Recovery Plan states "to insure the survival and recovery of birds from U.S. nesting populations, significant wintering areas must be protected and managed."

In summary, loss of habitat is perhaps the most serious negative factor impacting bald eagle populations and is certainly the most difficult to halt and reverse (U.S. Department of the Interior 1983). Destruction of bald eagle habitat through land development and increased human disturbance is adversely affecting the suitability of wintering areas. Actions or developments that detrimentally affect individual areas may not jeopardize the species as a whole, but the cumulative effect of many small, seemingly inconsequential actions on bald eagles may be significant (U.S. Department of the Interior 1983).

Hypothetical modeling of bald eagle populations, using a variety of models and reproduction survival schedules, shows that reproduction and survival are important. Of the two, changes in survival have more impact on the population than similar changes in reproduction (U.S. Department of the Interior 1983). Depending on survival, populations with lower reproduction may do better than those with higher reproduction (Grier 1980). Implications are that variations in reproductive rates may not be as important as once thought and that more attention should be given to survival and the habitat upon which survival depends (U.S. Department of the Interior 1983). The ultimate success of efforts to restore breeding populations depends largely on survivorship. Providing improved habitat conditions, particularly during the winter, is probably the most important means of maximizing survivorship (U.S. Department of the Interior 1983).

Management of bald eagle wintering habitat is sorely lacking. Bald eagle wintering habitat has continued to deteriorate since the placement of the dams. As wintering bald eagle habitat is continually "chipped away," impacts to remaining bald eagle habitat become even more critical. Bald eagle wintering habitat continues to deteriorate without compensation.

#### INCIDENTAL TAKE

The Service does not anticipate that the proposed action, with the conservation measures noted above, will result in any incidental take of bald eagles. This incidental take statement satisfies the requirements of the Endangered Species Act, as amended. This statement does not constitute an exemption from the prohibitions of take of migratory birds under the more restrictive provisions of the Migratory Bird Treaty Act, the Bald Eagle Protection Act, or any other Federal statutes.

## CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Endangered Species Act directs Federal agencies to utilize their authorities to further the purposes of the Endangered Species Act by carrying out conservation programs for the benefit of endangered and threatened species. We recommend that these conservation recommendations be included as part of the bridge project.

1. Surveys and monitoring of wintering bald eagles should be conducted to determine bald eagle use of the project area beginning in November 1994. This information will be necessary in planning for mitigation measures that the Department has already agreed to implement and in determining timing of construction activities.
2. From November 15 to March 15, no heavy construction work should occur within 800 meters of identified bald eagle communal roost areas and within 400 meters of any active bald eagle forage, perch, or roost trees located in the project vicinity.
3. Construction workers will be informed of bald eagles wintering in the area and restrictions regarding heavy construction work. The Department may want construction workers to report any bald eagle activity to aid in their monitoring efforts.
4. The mitigation plan by the Department should be completed prior to project construction and implemented prior to or concurrent with commencement of construction.
5. Tree replacement for trees lost due to project construction should be at the minimum of a 2:1 ratio. Replacement of trees should be to enhance the area for wintering bald eagles and should follow guidelines found in Steenhof (1978). The Department should coordinate with the South Dakota Department of Game, Fish, and Parks and the Service in regard to the project mitigation plan and tree replacement.
6. The mitigation plan proposed by the Department should also include funding for management of the replacement or mitigation habitats.

In order for the Service to be kept informed of actions that either minimize or avoid adverse effects or that benefit listed species and their habitats, the Service requests notification of the implementation of any conservation recommendations.

## CONCLUSION

This concludes formal consultation on the proposed bridge over the Missouri River in the vicinity of Vermillion, South Dakota, and Newcastle, Nebraska, outlined in your August 16, 1994, letter requesting formal consultation. As required by 50 CFR Section 402.16, reinitiation of formal consultation is required 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 biological opinion, (3) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this biological opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such a take must cease pending reinitiation.

If the Administration decides to revise its proposed plans for the Missouri River bridge in a manner other than was considered in this biological opinion, section 7 consultation should be reinitiated immediately.

We appreciate the cooperation of the Department throughout this consultation process and look forward to continued cooperation between our agencies. Thank you for your interest in the conservation of threatened and endangered species. If you have any specific questions regarding the contents of this biological opinion, please contact Nell McPhillips of this office at (605) 224-8693.

Sincerely,

*Richard Ruelle*  
Richard Ruelle  
Acting Field Supervisor  
South Dakota Field Office

## LITERATURE CITED

- Agersborg, G.S. 1885. The birds of southeastern Dakota. *Auk* 2:267-289.
- Buehler, D.A., T.J. Mersmann, J.D. Fraser, and J.K. Seegar. 1991. Effects of human activity on bald eagle distribution on the northern Chesapeake Bay. *J. Wildl. Manage.* 55(2):282-290.
- Burgess, R.L., W.C. Johnson, and W.R. Keaninerer. 1973. Vegetation of the Missouri River floodplain in North Dakota. Technical Completion Report. Office of Water Resources Research Project No. A-022-NDAK.
- Craig, R.J., E.S. Mitchell, and J.E. Mitchell. 1988. Time and energy budgets of bald eagles wintering along the Connecticut River. *J. Field Ornithology* 59(1)22-32.
- Fisher, L.E., J.G. Hartman, J.A. Howell, and D.E. Busch. 1981. A survey of wintering bald eagles and their habitat in the Lower Missouri Region. USDI, Bureau of Reclamation, Lower Missouri Region, Denver, CO. 96 pp.
- Grier, J.W. 1980. Modeling approaches to bald eagle population dynamics. *Wildl. Soc. Bull.* 8(4):316-322.
- \_\_\_\_\_. 1988. Northern states bald eagle recovery team report. Presented at the *Haliaeetus* eagle symposium. Raptor Research Foundation Annual Meeting, Minneapolis, MN.
- Hansen, A.J., M.V. Stalmaster, and J.R. Newman. 1981. Habitat characteristics, function, and destruction of bald eagle communal roosts in western Washington. Pages 221-229 *In*: R.L. Knight, C.T. Allen, M.V. Stalmaster, and C.W. Servheen, eds. Proceedings of the Washington bald eagle symposium. The Nature Conservancy, Seattle, WA. 254 pp.
- Hesse, L.W., C.W. Wolfe, and N.K. Cole. 1988. Some aspects of energy flow in the Missouri River ecosystem and a rationale for recovery. *In*: The Missouri River, the resources, their uses, and values. N.G. Benson, ed. North Central Division, American Fisheries Society. Sp. Publ. 8:13-29.
- Hoffman, W.J. 1877. List of birds observed at Grand River Agency, Dakota Territory, from October 7, 1872, to June 7, 1873. *Proc. Bos. Soc. Nat. Nest.* 18:169-175.
- Hosmer, J.K. 1902. History of the expedition of Captains Lewis and Clark, 1804-5-6. Reprinted from the edition of 1814 with introduction and index by J.K. Hosmer, Chicago, IL. A.C. McClurg and Co., 2 Volumes. 500 pp. and 586 pp.
- Johnson, W.C. 1988. Dams and riparian forests: case study from the Upper Missouri River. Submitted for publication *In*: Symposium on restoration, creation, and management of riparian ecosystems in the American West. November 14-16, 1988. Denver, CO.

REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
CORPS OF ENGINEERS, OMAHA DISTRICT  
215 NORTH 17TH STREET  
OMAHA, NEBRASKA 68102-4978

October 15, 1993

Planning Division

RECEIVED:  
DIRECTOR OF  
ENGINEERING

OCT 20 1993  
*sent JCB*

Distribution:	BRDG DESIGN	83	✓
PROJ DEV	81	MAT & SURF	84
RD DESIGN	82	R.O. WAY	85

Lawrence L. Weiss  
Director of Engineering  
Department of Transportation  
700 East Broadway Avenue  
Pierre, South Dakota 57501-2586

Dear Mr. Weiss:

Thank you for providing me the opportunity to review your October 7, 1993, memorandum summarizing our meeting of September 1, 1993. The analysis developed by Clyde Jundt provides a good description of the historic bank erosion that has occurred in that river reach. We have no further comments or additions to it.

Your proposal to include bank stabilization in this reach prior to construction of the proposed Vermillion bridge appears to be a sound approach, consistent with the Missouri River Recreation River project. It is, however, important to note that the land to be protected must be in public ownership. That element is missing from your list of actions following the public hearing. Once acquisition is complete, we can begin the process of obtaining approval to construct the bank stabilization project.

Please contact me at (402) 221-4575 if I can be of further assistance.

Sincerely,

Kenneth S. Cooper  
Chief, Planning Division

U.S. Department  
of Transportation

United States  
Coast Guard



ATTACHMENT 14  
Second Coast Guard District

1222 Spruce St.  
St. Louis MO 63103-2832  
Staff Symbol: (ob)  
Phone: (314) 539-3724

16591.1/806.0 MOR  
August 13, 1993

Ms. Darla J. Peters  
South Dakota Department of Transportation  
Division of Engineering  
Office of Project Development  
700 East Broadway Avenue  
Pierre, SD 57501-2586

Subj: PROPOSED NEW VERMILLION HIGHWAY BRIDGE, MILE 860.0,  
MISSOURI RIVER

Ref: F0019(00)0 Clay County PCEMS 238H

Dear Ms. Peters:

We reviewed your letter of August 6, 1993, regarding river crossings and road alignments for the above referenced project and have no comments to offer at this time. If you have any questions, please call Mr. Bruce McLaren at the above telephone number.

Sincerely,

*Wanda G. Renshaw*

WANDA G. RENSHAW  
Project Manager  
By direction of the District Commander

Operations Division  
Bridge Branch

U.S. Department  
of Transportation  
United States  
Coast Guard



**BRUCE L. McLAREN**  
Environmental Protection  
Specialist

Commander (ob)  
Second Coast Guard District  
1222 Spruce Street  
St. Louis, MO 63103-2832

TEL (314) 539-3724  
FAX (314) 539-3017

STATE OF SOUTH DAKOTA  
 COUNTY OF CLAY

BEFORE THE  
 SOUTH DAKOTA STATE  
 TRANSPORTATION COMMISSION

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IN THE MATTER OF THE MISSOURI RIVER  
 BRIDGE AT VERMILLION HEARING, Held on  
 Economic, Social and Environmental  
 Effects of Project F0019(00)0 (PCEMS  
 238H) Construction in Clay County,  
 South Dakota

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TRANSCRIPT

The following individuals represented the South Dakota Department of  
 Transportation:

Larry Weiss, Chief Roadway Design Engineer  
 Jim Nelson, Environmental Engineer  
 Carl Chambers, Right of Way Program Manager  
 Larry DeJong, Asst. Roadway Design Engineer  
 Bob Kirwan, Mitchell Region Engineer  
 Tom Week, Yankton Area Engineer

Proceedings were held October 15, 1992, at the Vermillion Public Library in  
 Vermillion, South Dakota.



# Nebraska Game and Parks Commission

District III/P.O. Box 934/Norfolk, NE 68702-0934/Phone: 402-370-3374/Fax: 402-370-3256

August 11, 1993

Darla J. Peters  
Office of Project Development  
D.O.T.  
700 E. Broadway Ave.  
Pierre, SD 57501-2586

Dear Ms Peters:

Thank you for the most recent information on the Missouri River Bridge Project - Clay County. Has Mulberry Bend been selected as the ultimate site? At this stage in the project there is very little I can input. We are still interested, however, in working with you on some site specific studies when you reach that stage in the environmental assessment. Please let me know when I can be of help.

Sincerely,

Larry W. Hesse  
Aquatic Research  
Fisheries Division

LWH/le



# **BIOLOGICAL SURVEY PROPOSED MISSOURI RIVER BRIDGE SITE VERMILLION, SOUTH DAKOTA**

## **FINAL REPORT**

### **I. INTRODUCTION**

The Federal Highway Administration (FHWA), in cooperation with the South Dakota Department of Transportation (SDDOT), is planning the construction of a bridge over the Missouri River between Newcastle, Nebraska and Vermillion, South Dakota. Correspondence between M.S. Zschomler, South Dakota State Supervisor of the U.S. Fish and Wildlife Service; Doug Backlund, Resource Biologist of the South Dakota Department of Game, Fish, and Parks; and James Nelson, Environmental Engineer of the South Dakota Department of Transportation; indicates the need for threatened and endangered species surveys in the proposed areas of construction and in areas that would be secondarily affected. Proposed bridge sites include some of the last remaining sandbar, cottonwood forest, and floodplain wetland habitat along the Missouri River. At the recommendation of Doug Backlund, Biology Department faculty of the University of South Dakota have been contacted to perform the needed species surveys. A proposal was submitted and a contract was awarded to the Biology Department, University of South Dakota (Dr. Frederick J. Peabody as principal investigator) to conduct the species surveys. Surveys were conducted during the 1993 field season by Biology Department faculty and graduate students. This report represents the final report of findings.

### **II. FIELD METHODS**

Species that might be considered rare, threatened, or endangered were identified by consultation with appropriate state and federal agencies (see introduction). This allowed for the compilation of a list of target taxa and their associated habitat parameters. Field surveys were then designed to search for these species and habitats in the proposed bridge site. In the remainder of this section we have provided a brief description of field methods used for each taxon group.

## A. PLANTS

Only one species, Western Prairie Fringed Orchid (Plantanthera praeclera) has been identified as an endangered species in this region. Although the habitat parameters for this species are not commonly found on the South Dakota bank of the bridge site, field survey teams did attempt to locate populations. Methods used were first to identify any potential areas that might contain the species, and second to systematically search for any sign of the species in the field.

## B. INSECTS

Three species of insects are on our target species list: American Burying Beetle (Nicrophorus americanus), Dakota Skipper Butterfly (Hesperia dacotae), and Regal Fritillary Butterfly (Speyeria idalica). Field sampling methods for the American Burying Beetle were as follows. Twelve pitfall traps were placed in six different locations. The traps consisted of 5 gallon buckets that were buried in the ground and made level with the surface. Decaying beef liver was used as bait. The traps were covered by a one foot square piece of plywood with one inch block supports at each corner. This would allow for a clearance of approximately one inch so that insects could enter. The traps were camouflaged and weighed down with surrounding soil. For a period of six consecutive days in August the traps were checked for the presence of the burying beetle.

Field sampling methods for the butterfly species were as follows. Open sections (areas not planted with crops) within a radius of approximately 300 yards of the proposed bridge crossing site were sampled. This was done by walking individual transects that were spaced approximately 20 yards apart. Insect beating-nets were used to sweep the foliage while walking the transects. Any insects caught in the nets were examined, as well as insects that took flight in advance of the net sweeps. This sampling was done in early August, with additional visual sampling done throughout the field season.

### C. MOLLUSKS

Two species of mollusks are on our target species list: Scaleshell Mussel (Leptodea leptodon) and Black Sandshell (Ligumia recta). Field sampling methods used for mollusk surveys were as follows. Shoreline samples were acquired by digging soil or sand in areas of the Missouri River that would most likely support mollusks, i.e. loose sand or dirt in shallow eddies, behind logs, rocks, or fallen trees. The entire length of both the South Dakota and Nebraska bridge site shorelines were sampled. Open river and sand bar samples were taken by digging and raking, often with the use of bare hands and feet. A small outboard motor boat was used for transportation to the sand bars as well as to the Nebraska side of the river.

### D. ICHTHYOFAUNA

Thirteen species of fish are on our target species list: Pallid Sturgeon (Scaphirhynchus albus), Blue Sucker (Cycleptus elongatus), Paddlefish (Polyodon spathula), Plains Topminnow (Fundulus sciadicus), Lake Sturgeon (Acipenser fulvescens), Sicklefins Chub (Hybopsis meeki), Sturgeon Chub (Hybopsis gelida), Topeka Shiner (Notropis tristis), Banded Killifish (Fundulus diaphanus), Silver Chub (Macrhybopsis storeriana), Blacknose Shiner (Notropis heterolepis), Silverband Shiner (Notropis shumardi), and River Shiner (Notropis blennioides).

The methods used were dependant on the species and relative size of the fish being sampled. Current velocity and depth were also taken into account when sampling the various predetermined sites. Areas with a average depth of 0 to 2 meters were sampled with a 9.14 x 1.5 m bag seine with a mesh diameter of 6 mm. Sampling sites were primarily in shallow bays and adjacent to sand bars. Sampling sites were 50 m in length. Seine hauls were done on the 12 and 26 of June and also the 24 of July. There were no fish found in the seine hauls that were on the endangered species list.

Areas with a depth of greater than 2 m were sampled with electrofishing techniques. Areas sampled consisted of river banks, back waters and the river channel itself. Sampling was done using AC current at 8-10 amps with 210-240 volts. Sampling duration was 20 minutes at each site. Six separate sites were sampled on 12 and 15 June and 10 September.

Baited hoop nets with a mesh size of 6 mm were used to sample sites at depths greater than 1.5 m. Two different sized hoop nets (.45 and .91 m) were used to sample the various sites along the river bank. Hoop nets were baited with a commercial cheese bait contained in a nylon sack. Hoop nets were set overnight for a duration of approximately 12-15 hours. Hoop nets were set on 20 June and 10 September. We did not use drift nets in our sampling methods because of the amount of submersed and emergent material throughout the sampling area.

Mr. Larry Hesse, Chief of Fisheries, Nebraska Game and Parks Commission, was contacted with regard to native fish species of special concern and the possible influence of bridge construction on these fish populations. In a publication that is still in press, Mr. Hesse lists 18 species of fish that are of special concern to the State of Nebraska. They are as follows:

<u>Species</u>	<u>Status</u>
Sturgeon Chub	Declining
Sicklefin Chub	Declining
Flathead Chub	Declining
Silver Chub	Declining
Speckled Chub	Declining
Plains Minnow	Declining
Western Silvery Minnow	Declining
Burbot	Declining
Sauger	Declining
Blue Catfish	Declining
Lake Sturgeon	Extirpated?
Pallid Sturgeon	Very Rare
Shovelnose Sturgeon	Declining
Paddlefish	Stable to declining
Longnose Gar	Declining
Shortnose Gar	Stable to declining
Blue Sucker	Stable to declining
Flathead Catfish	Endangered

In this same publication, Mr. Hesse, indicates that the primary factor for the decline of native fish populations is the destruction of habitat. This destruction has resulted from the flood plain reclamation activities of the past 50 years. He proposes some remediation suggestions that would have a positive influence on native fish populations. These suggestions will be addressed in the mitigation section of this report.

## E. HERPETOFAUNA

There are six species of reptiles and amphibians on our target list: Blanding's Turtle (*Emydoidea blandingi*), Spiny Softshell (*Apalone spinifera*), Lined Snake (*Tropidoclonion lineatum*), False Map Turtle (*Graptemys pseudogeographica*), Northern Redbelly Snake (*Storeria occipitomaculata*), and Northern Water Snake (*Nerodia sipedon*). Four methods were used for sampling the herpetofauna.

1. Pittraps. A 50 ft. by 18 in. galvanized steel drift fence was cut into six partitions of equal size and placed between two ten gallon buckets. The drift fence was buried about 3-4 cm into the soil and supported by buried sticks on each side. The buckets were placed against each edge of the drift fence and buried so that they were flush with the ground. Square boards (30 cm on each side) with 4 cm legs were positioned over the buckets and weighted down with soil. The pittraps were placed in different locations and checked daily for one week in late August. Two sets of traps were located near the shoreline, one set was in the center of sandy and sparsely vegetated habitat, two sets were in densely vegetated shaded areas about 300 m from the shore, and one set was placed near a bog approximately 700 m from the river.

2. Boards. Six boards (2 m x 3 m) were placed flat on the ground at various locations on the site. Two were placed a few meters from the access roads, two were placed in shaded densely vegetated areas, and two were placed in sandy areas nearer to the shore. The undersides of the boards were checked weekly for four weeks during August and September.

3. Turtle Trap. A wire turtle trap (1 m x 1.5 m) was baited with ground fish and submerges 5 - 10 meters from a location on the shore where turtle tracks had been noticed earlier. The trap was checked three times each week for the first three weeks, then weekly for two additional weeks.

4. Random Search. Piles of decaying logs and the undersides of boards were searched at random. Transects along the shoreline were walked each time turtle traps were checked.

## F. BIRDS

There are twelve species of birds on our target species list: Eskimo Curlew (Numenius borealis), Piping Plover (Charadrius melodus), Bald Eagle (Haliaeetus leucocephalus), Interior Least Tern (Sterna antillarum), Peregrine Falcon (Falco peregrinus), Black Tern (Chlidonias niger), Henslow's Sparrow (Ammodramus henslowii), Migrant Loggerhead Shrike (Lanius ludovicianus migrans), White-faced Ibis (Plegadis chihi), Long-billed Curlew (Numenius americanus), Osprey (Pandion haliaetus), and King Rail (Rallus elegans).

Bird census techniques for routes leading to the bridge site in Clay County, South Dakota and along the bluffs on the Nebraska side were those specified as the Breeding Bird Atlas Technique. These involve carefully observing birds within a designated area and documenting breeding behaviors or nesting evidence. The purpose of these techniques is to assess not only what birds are observed in an area, but also to note evidence for breeding. We surveyed both Clay County, South Dakota and Dixon County, Nebraska twice each in June and July. For both areas we confined our observations to 1/4 mile on each side of the proposed routes. Total atlas time for each separate atlas period ranged from 2.5 to 3 hours. We recorded the species of birds observed and the highest category of breeding or nesting behavior exhibited by these birds (Observed, Possible Breeder, Probable Breeder, Confirmed Breeding) according to standardized atlas measures. All atlas observations were carried out from 1030-1730 CDT.

Bird census techniques for the bridge site included two methods: Variable Circular Plot, and Constant Effort Mist-netting. Variable circular plot censuses provide accurate population density estimates and were conducted according to standard procedures. We established two parallel 1 km transects, separated by at least 500 m at Mulberry Point on the South Dakota side of the river. Each transect consisted of 5 stations separated by 200 m. Censuses were conducted between sunrise and 5 hours after sunrise. The basic census procedure consisted of identifying all birds heard or seen at each station during an 8 minute counting period and measuring their distance from the station center with a rangefinder. Density estimates were then calculated from these records. Censuses were conducted two times each in June and July and once in August.

Constant effort mist-netting provides relative density estimates for birds using specific habitats and is particularly useful for secretive species. Due to the extremely wet weather this past summer, the roads leading to Mulberry Point were impassable for most of the study period and prevented us from transporting out mist-net equipment to the study site. We were only able to net three times (9, 10, and 17 June). Nets were operated from sunrise to 5 hours after sunrise on each of these dates. For each bird captured we recorded sex (if determinable), age, (by skulling), and morphometric measurements including mass, wing length, tarsus length, tail length, and visible fat scores.

Together, these techniques provided a useful index of what birds were using the areas potentially affected by the bridge and the probable breeding status for each of these birds. This index should prove useful in defining impacts of the bridge on breeding bird populations in the immediate area.

#### G. MAMMALS

There are three species of mammals on our target species list: Plains Spotted Skunk (Spilogale putorius interrupta), River Otter (Lutra canadensis), and Pygmy Shrew (Sorex hoyi). Field sampling methods included the following. The South Dakota shoreline was searched for otter sign (tracks, etc.), otherwise little effort was made to locate otters since no specimens have been known in the area in recent years. Four "Havahart" traps (24" x 7" x 7" and 30" x 7" x 7", two of each size) were set in selected areas of suitable habitat for spotted skunks. Traps were baited with canned tuna or canned cat food. Sherman traps and pitfall traps were set for shrews. Sherman traps were set along a previously determined 100 m transect. The transect line transversed a willow scrub community and a dry river bed. Sherman traps were set 440 m, alternating 3 m left and right, perpendicular to the transect line. Pitfall traps were set in strategic areas and consisted of one gallon plastic buckets buried flush with the ground surface. Pitfall traps were covered with a one foot square piece of plywood which was raised 2 inches off of the ground surface by blocks of wood. Drift fences fashioned from aluminum flashing were used in conjunction with pitfall traps. All traps were checked daily. Trapping efforts lasted three days for each type of trap. Sherman traps were set from 4 through 7 September. Pitfall and "Havahart" traps were set from 11 through 13 September.

### **III. FINDINGS**

The occurrence of seven species that are on either federal or state rare, threatened, or endangered species lists have been observed in the Missouri River bridge site during the 1993 field season. These are presented in the accompanying table. Each species is given a code which is used to place the species on the accompanying map. Also, comments for each species are provided that indicate the nature of the sighting and any other pertinent information.

**STATE OR FEDERAL LISTED  
RARE, THREATENED, OR ENDANGERED SPECIES  
ENCOUNTERED IN THE VERMILLION/NEWCASTLE BRIDGE SITE**

1993 Field Season

<u>CODE</u>	<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>	<u>STATUS</u> *	<u>COMMENTS</u>
A1	Bald Eagle	<u>Haliaeetus leucocephalus</u>	FL	Possibly nesting.
A2	Interior Least Tern	<u>Sterna antillarum</u>	FL	Possible nesting on sand bars.
A3	Piping Plover	<u>Charadrius melodus</u>	FL	Possibly nesting. Often seen along sand bars further downstream.
B1	False Map Turtle	<u>Graptemys pseudogeographica</u>	SL	Probable nesting in proximity.
C1	Blue Sucker	<u>Cycleptus elongatus</u>	FC	Juvenile captured in baited hoop net.
C2	Blue Sucker	<u>Cycleptus elongatus</u>	FC	Adult captured by electrofishing.
C3	Paddlefish	<u>Polyodon spathula</u>	FC	Observed leaping out of water.

\* FC = Federal Candidate Species; SL = State Listed Species; FL = Federal Listed Species.

#### IV. ADDITIONAL FIELD OBSERVATION NOTES

The following are additional field notes made by researchers during the field surveys. They contain specific sighting data, including numbers of individuals seen, dates seen, and possible additional locations.

1. Bald Eagle
 

17 Jun 1993	Mulberry Point	One mature bird; possibly nesting
28 Aug 1993	Burbank Access	One mature bird; possibly an early migrant
16 Sep 1993	Clay Co. Park	One immature bird; possibly an early migrant
Winter 93/94	Throughout Area	Mature birds have been seen utilizing this area throughout the winter months
  
2. Interior Least Tern
 

16 Jun 1993	Mulberry Point	Commonly seen along this reach of the Missouri River during summer months. Nesting on sand bars very probable.
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3. Piping Plover
 

10 Jun 1993	Burbank Access	Commonly seen along this reach of the Missouri River during summer months. Nesting on sand bars very probable.
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4. False Map Turtle
 

26 Aug 1993	Mulberry Point	One mature individual; possible nesting in the area
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5. Blue Sucker
 

10 Sep 1993	Mulberry Point	One individual 21 cm long; captured in a baited hoop net; possibly reproducing in the area
10 Sep 1993	Mulberry Point	One individual 58 cm long; captured by electrofishing; possibly reproducing in the area
  
6. Paddlefish
 

10 Sep 1993	Mulberry Point	Frequently seen leaping out of the water; possibly reproducing in the area
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## V. RECOMMENDED MITIGATION COMPONENTS

Many of the detrimental effects on native plant and animal populations in this area can be traced to Missouri River floodplain reclamation activities over the past 50 years. These have had a combined effect to significantly reduce native populations, especially fish species. While many of these factors cannot be attributed to bridge or highway construction, it would be in the best interest of the native plant and animal species associated with the Missouri River to provide habitats that are similar to those that are known to have existed prior to reclamation.

### A. SNAGS

Large woody debris plays a vital role in the dynamics of stream ecology. The presence of relatively large amounts of carbon in the system provide food materials for many smaller species which, in turn, serve as food materials for larger species. In addition, the presence of dead trees and branches in the main channel provides micro-habitats by slowing the water flow, thereby modifying the substrate and lateral flow patterns. The systematic removal of "snags" (large fallen trees) has deprived the river system of an important source of food and habitat.

It is suggested that regions of the river adjacent to bridge construction be planted with tree species that are native to the area. Species selected should be of sufficient mature size to allow for large stature close to the river bank. This will permit the inclusion of organic matter in the river, and provide roosting and nesting sites for raptors.

### B. FLOODPLAIN CONNECTIVITY

Reclamation activities along the Missouri River over the past 50 years or so have added about 178 million hectares of former floodplain to agricultural or residential use. This represents a loss of a vital resource to the river system. It is estimated that standing fish stock may decline as much as 98% when the lateral linkage between the floodplain and the channel is severed. In its natural condition, the Missouri River exhibited pulse flooding over regions of the floodplain. This periodic inundation of the floodplain allowed for the inclusion of large amounts of organic matter into the water flow, making them available for consumption. It also produced shallow water habitats for utilization by plant

and animal species. The construction of levees and dikes have channelized the river, severing the connection between the main channel and the floodplain.

It is suggested that the bridge construction project include areas within the floodplain that are hydraulically reconnected to the main channel, thereby reestablishing the link between floodplain resources and riverine species. Candidate areas might include old cut-off sections of the erosion zone.

### **C. ALTERED HYDROGRAPH**

With the construction of mainstem and tributary dams in the Missouri River watershed, the natural hydrograph of the river has been altered dramatically. In its natural condition, the Missouri River exhibited two periods of higher flow: March-April and June. Currently, the river flow is metered by the controlled release from impoundments with the resulting loss of periodic floodplain inundation.

There is considerable interest in the academic and management communities in restoring the natural hydrograph of the Missouri River. While it is beyond the scope of the bridge project to specify river flow regimes, it is important to take into consideration the effect that the restoration of the natural hydrograph might have on bridge engineering designs. In addition, if restoration of the natural hydrograph is likely, any mitigation plans associated with the bridge site should take this into consideration.

### **D. SEDIMENT TRANSPORT**

The amount of sediment transported by the Missouri River has been altered dramatically with the construction of dams on the mainstem and tributaries. Reservoirs associated with these dams have short-stopped sediment loads as compared to pre-control conditions. Under natural conditions, the river was in a state of equilibrium, i.e. the amount of sediment entering a reach replaced an equal amount leaving.

There is some interest in investigating a sediment bypass system for the Missouri River and its tributaries. Some of the benefits might include increased water storage in hydropower

reservoirs, elimination of sedimentation in reservoirs, and reduced degradation. The reduction of degradation would have a direct impact on bridge abutment maintenance costs. Again, it is beyond the scope of the bridge project to specify sediment bypass systems, but this factor should be taken into consideration in the planning stages.

#### **E. OTHER FACTORS**

There are other factors that generally have had a negative impact on the biota of the Missouri River. These include: reduction in water temperature caused by the release of water from mainstem dams from depths of 42 to 59 meters; loss of fish migration routes; and overfishing of certain native species as their densities declined and their habitat shrank. Each of these are of concern to conservation biologists, but are beyond the scope of the bridge project mitigation activities.

### **VI. RECOMMENDATIONS**

As I am sure that you are aware, the large amounts of rainfall this spring and summer have made access to the study site very difficult. The survey crews have made every attempt to gain access to the area on a timely basis. Some of them have been able to complete their work only after being transported into the area by way of boat on the river. Others have completed their surveys to the extent that they were able to do so.

The accompanying table and map indicates the occurrence in the study site of a number of state and federally listed species. It is for this reason that we recommend that the planning stages of this project should include a complete environmental impact assessment. Since our baseline study is designed to determine only the presence of listed species, it is imperative that further studies be conducted in order to determine the complete extent of site utilization by these species. This would permit a better prediction of potential impacts of all phases of the proposed bridge project on the populations of listed species.