United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

August 12, 2008

Ms. Ginger Massie
Federal Highway Administration
South Dakota Division Office
116 East Dakota Avenue
Pierre, South Dakota 57501-3110

Mr. Terry Keller
South Dakota Department of Transportation
Office of Project Development
700 East Broadway Avenue
Pierre, South Dakota 57501-2586

Dear Ms. Massie and Mr. Keller:

This letter transmits the U.S. Fish and Wildlife Service's (USFWS) biological opinion based on our review of proposed stream crossing projects in South Dakota (with exception of those affecting the Missouri River) administered/funded by the Federal Highway Administration (FHWA) and the South Dakota Department of Transportation (SDDOT) and the effects of those projects on federally threatened or endangered species of South Dakota in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). This action is in response to the FHWA/SDDOT's reinitiation of consultation for these actions via a biological assessment which was submitted to this office on August 27, 2007.

This biological opinion is based on information provided in the FHWA/SDDOT's August 27, 2007, biological assessment; our previous consultation and April 28, 2004, biological opinion issued on these stream-crossing projects; consultation regarding actions completed under the 2004 biological opinion; telephone conversations and field investigations with FHWA/SDDOT personnel; and other sources of information. The administrative record of this consultation is available in part from this office and in part from the SDDOT's Office of Project Development – Environmental in Pierre, South Dakota.

As of this writing, we are aware that not all projects appended to the April 28, 2004, biological opinion have been completed, and some may be nearing the letting or construction phase. We acknowledge that, while the current biological opinion renders the 2004 biological opinion invalid, some projects will need to go forward under the reasonable and prudent measures and the terms and conditions of the old biological opinion due to the current scheduling of those projects. The SDDOT has indicated that efforts will be made to include as many of those upcoming projects as possible under the new biological opinion. We anticipate that, within one year of this writing, all projects appended to the 2004 biological opinion will have either been completed under that document or appended to the current opinion.

Consultation History: Details of the consultation history preceding the issuance of our April 28, 2004, biological opinion are provided in that opinion (USFWS 2004a). In brief, after several years of applying best management practices (BMP) for Topeka shiners on stream-crossing projects in South Dakota, it was determined that BMPs alone were inadequate to avoid take of Topeka shiners. The FHWA/SDDOT initiated formal consultation with the USFWS under section 7 of the ESA by submitting a January 5, 2004, biological assessment, and the USFWS responded with a programmatic biological opinion considering all endangered species known to exist in South Dakota which was issued on April 28, 2004 (USFWS 2004a).

The 2004 biological opinion contained an incidental take statement for the Topeka shiner and nondiscretionary terms and conditions designed to reduce the impact of incidental take of the Topeka shiner (Notropis topeka). The terms and conditions were based primarily on the SDDOT's Special Provision for Construction Practices in Streams Inhabited by the Topeka Shiner (December 9, 2003, version effective February 11, 2004). After administration of the 2004 biological opinion, it became apparent that these measures did not adequately address the long-term impacts of stream crossing replacement on the Topeka shiner, and evidence of reduced Topeka shiner impacts as a result of some terms and conditions was lacking. The FHWA and the SDDOT thus reinitiated formal section 7 consultation with the USFWS via submittal of a new biological assessment on August 27, 2007.

Staff and budget limitations in this office required the SDDOT's assistance in formulating the biological opinion to complete section 7 formal consultation. The SDDOT submitted their version of this document which has been edited by this office in coordination with the FHWA/SDDOT and is presented here in its final form.

If you have any questions regarding this consultation, please contact Natalie Gates of this office at (605) 224-8693, Extension 234.

Sincerely,

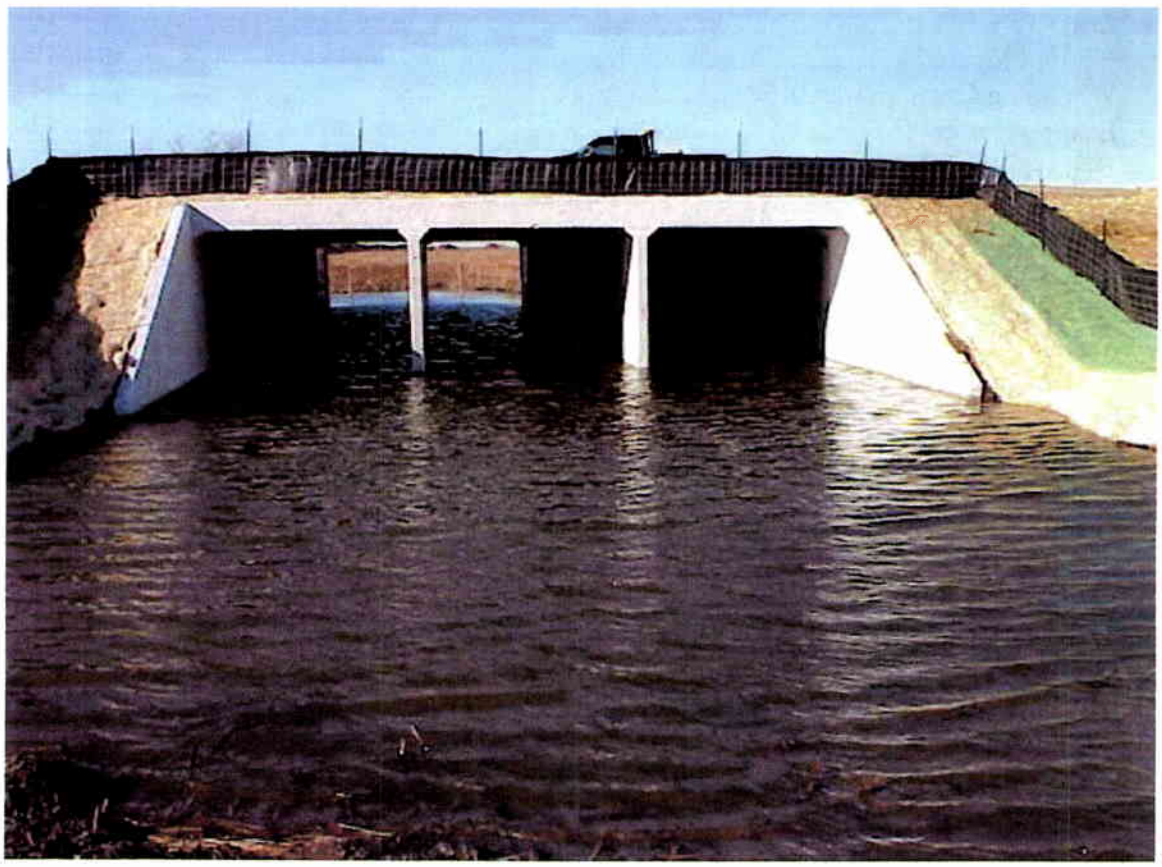
Pete Gober
Field Supervisor
South Dakota Field Office

Endangered Species Act
Formal Programmatic Section 7 Consultation

PROGRAMMATIC BIOLOGICAL OPINION

Stream-Crossing Projects Administered/Funded by the South Dakota Department of Transportation and the Federal Highway Administration

August 11, 2008



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PROGRAMMATIC BIOLOGICAL OPINION

Stream-Crossing Projects Administered/Funded by the South Dakota Department of Transportation and the Federal Highway Administration

August 11, 2008

INTRODUCTION

Consultation regarding South Dakota stream-crossing projects (with exception of those affecting the Missouri River) administered/funded by the Federal Highway Administration (FHWA) and the South Dakota Department of Transportation (SDDOT) was reinitiated by the FHWA/SDDOT three years after the U.S. Fish and Wildlife Service (USFWS), issued an April 28, 2004, biological opinion on these actions (USFWS 2004a). The FHWA/SDDOT submitted an August 27, 2007, biological assessment presenting data not included in the 2004 consultation: a) an evaluation of the impacts of suspended sediment on fishes, b) an evaluation of the long term affect of Topeka shiner mortality at individual construction sites, and c) an overview of the impact of structure design on habitat quality and fish movement. The new biological assessment focused on addressing the impacts of stream crossing design on fish habitat and fish movement. By submittal of the new BA, the FHWA/SDDOT also sought specifically to eliminate terms and conditions that limited timing of construction and caused delays in post-construction site restoration. These measures were designed to be protective of individual Topeka shiners (i.e. minimize take, as required by the Endangered Species Act (ESA)), but further analysis revealed they were logistically problematic and did not appear to provide significant conservation benefit to Topeka shiner populations. The previous biological opinion also contained detailed, numerous terms and conditions that were drawn from the SDDOT's Special Provision for Construction Practices in Streams Inhabited by the Topeka Shiner (December 9, 2003 version, effective February 11, 2004), however, it was later determined that not all of these measures were feasible on every project, thus additional flexibility was needed. This biological opinion has been issued in consideration of this new information, and it renders the incidental take permit associated with the April 28, 2004, biological opinion, invalid with exception of past-appended projects nearing the construction stage that may proceed under the 2004 opinion as needed. Efforts will be made by SDDOT to include as many previously approved projects as possible under the current opinion, and it is anticipated that within one year of this writing, all projects appended to the 2004 opinion will have either been completed under that document or appended to the current biological opinion.

DESCRIPTION OF THE PROPOSED ACTIONS

The action area for this biological opinion includes all FHWA/SDDOT crossings of waterways in South Dakota, with exception of those over the Missouri River (which will be consulted upon individually). The majority of projects considered are defined as those that involve physical disturbance to a stream channel below the two year flow elevation (Q_2) and those that withdraw water from streams for construction purposes. These include a variety of actions of varying scope and duration. Most relate to replacement of existing bridge and culvert stream crossings, however, assessment of culvert extensions, stream crossing maintenance projects, stream bank stabilization projects, and some roadway grading projects are also included. Impacts from individual projects are expected to vary greatly. Some minor maintenance projects (e.g. bridge painting), may not involve any physical disturbance of the environment while some large roadway projects involving bridge or culvert construction could impact significant upland area and lengthy and/or numerous stream segments. Similarly, project administration will vary considerably depending on structure ownership and project funding.

Per FHWA/SDDOT, the following are factors currently considered during the development of projects that may impact a stream or waterway:

- **Cost** - Initial and long term costs and state and local agency budgets.
- **Road use** - Heavy farm to market traffic, bus and mail routes, etc.
- **Hydraulics/Hydrology** - Structure type, size, locations and orientation must satisfy drainage/hydraulic design criteria. Bridges are generally preferred for streams that may experience very large discharges.
- **Safety** – The relative safety of structure alternatives is considered. For example, clear zone length culverts are considered safer for the traveling public than bridge structures due to the unobstructed clear roadway they provide (no obstacles within 30' of the edge of traffic lanes on new state highway construction). Bridge rail and associated approach guardrail by themselves are a hazard to the driver and also may result in additional safety problems such as snow drifting at bridge ends.
- **Landowner issues** – work easements may be necessary for construction.
- **Traffic issues during construction** - Some sites must have traffic maintained at all times during construction - a structure that can be quickly installed is a benefit on roads that cannot be closed.
- **Environmental issues** – Type of stream, impact on stream morphology, construction restrictions, endangered species, best management practices (BMPs), and fish passage are considered. Culvert floor elevations are currently placed at least six inches below the flow line of the stream.
- **Construction timing** - Construction during agricultural harvest is not favorable and sometimes will be restricted, which shortens the work window. Similarly, seasonal restrictions are sometimes imposed during spring and early summer for projects impacting fisheries resources.

Project Types:

A. Stream Crossing Replacements

Most stream crossing projects replace structurally insufficient crossings. In some instances, new stream crossings are constructed to accommodate highway improvements (e.g., lane expansion) and new infrastructure (e.g., a new bypass). Construction practices will vary depending on structure type, stream flow, local site conditions, geology, and potential environmental and socioeconomic impacts. Similarly, area disturbed by construction and the duration of disturbance will vary between individual projects.

Typically, box culverts are constructed by isolating the construction work area with a temporary water barrier consisting of steel sheeting or another similar device. Stream discharge is routed around the enclosed work area through a temporary water diversion at most projects. Temporary water diversions usually consist of an excavated channel lined with drainage fabric. Direct disturbance to the streambed is generally limited to the area of active construction within the temporary water barrier and encompasses an area slightly larger than the structure footprint (see description of structure footprint). Some localized disturbance to the stream bank, stream bed, and riparian area occurs during installation and removal of the temporary water diversion. Some sediment is displaced during the placement and removal of the steel sheeting water barrier and temporary water diversion. Discharge of sediment during water barrier installation and removal is limited in duration and intensity. To facilitate dry construction the area within the temporary water barrier is dewatered according to the South Dakota Department of Environment and Natural Resources' (SDDENR) General Permit for construction dewatering (SDDENR 2005).

Bridge construction is typically less invasive than culvert construction. Bridge construction seldom requires the use of an excavated diversion channel to route water around the construction site. Also, the area disturbed during bridge construction is most often smaller than the area disturbed during culvert construction. For single span bridges over small streams, a temporary water barrier consisting of either steel sheeting or silt curtain is used to isolate the bridge abutments from the stream. Stream discharge is allowed to continue to flow instream around the isolated work area. Steel sheeting is typically driven into the streambed manually with a gravity hammer suspended from a crane or with a vibratory hammer suspended from a backhoe. Silt curtain is installed by hand. Streambed sediments displaced during rip rap placement or other activities are contained within the work area by the temporary water barrier.

For multiple span bridges over larger streams, new bridge footings within the stream bed are isolated with a cofferdam consisting of steel sheeting. Steel sheeting for cofferdams is driven with a mechanical hammer suspended from a crane. The enclosed area is then dewatered to allow dry construction. Silt curtain is used to enclose the cofferdam and contain pollutants that may be released during cofferdam installation and removal. Like single span bridges, various BMPs are used adjacent to the stream to contain upland sediments. For exceptionally large bridges, a work platform or temporary stream crossing is used to allow construction equipment to place heavy bridge girders. Work platforms are built using a non-erosive fill material (i.e., coarse rock or rip rap) and are restricted to the adjacent stream bank or are built up from existing rip rap placements. Temporary stream crossings are constructed as clear span or pile supported bridges.

Frequently, stream crossing replacements will require roadway grading to improve structure safety or structure roadway connectivity. For example, a hill obstructing a traveler's ability to see an upcoming structure may be flattened to improve structure visibility. Similarly, if a bridge is replaced with a box culvert the roadway may need to be reshaped immediately around the new structure. Roadway grading in conjunction with structure replacement increases disturbed area adjacent to the stream, increasing the risk of stream sediment input during storm runoff. Erosion and sediment control measures are installed and maintained for the duration of construction as directed by the SDDENR General Permit for storm water discharge to prevent sediment or other pollutants from leaving the construction work area or entering a waterway (SDDENR 2005). During active construction, temporary BMPs measures are installed to prevent upland sediments from entering the stream. BMPs commonly used during construction include silt fence, detention ponds, rock check dams, and vegetation buffers. Similarly, permanent erosion and sediment control measures are installed to facilitate rapid site stabilization and revegetation. During low flow periods and small storm events ($\leq Q_2$) erosion and sediment control measures are effective at containing sediment; however, large storm events can exceed the capabilities of installed erosion and sediment control measures by inundating exposed soil with flood waters or by subjecting disturbed soils to concentrated overland flow (SDDOT 2004). BMPs typically used to stabilize disturbed areas after the completion of construction include silt fence, erosion waddles, erosion blanket, straw mulch, and other similar devices. For a detailed description of erosion and sediment control measures used on FHWA/SDDOT construction projects, refer to the departments erosion control manual (SDDOT 2004).

B. Stream Crossing Maintenance

Maintenance projects are programmed as preventative measures to protect against the failure of infrastructure. Maintenance projects that may impact channel morphology or discharge pollutants into a waterway include sediment removal from culverts, bank stabilization at bridges and at river channels that are encroaching on a roadway, and stream bed stabilization at culvert outlets and bridge pillars. Many maintenance projects include the use of hard stabilization (i.e., rip rap or gabion structures) to protect transportation infrastructure. Depending on the extent of maintenance to be performed, projects may be either state or federally funded. Typically, major maintenance projects include federal funds, while minor projects are state funded. Maintenance projects addressing channel degradation are very similar to stream crossing replacements, in that they go through a similar planning and design process. Maintenance projects addressing channel aggradations typically are conducted by SDDOT maintenance personnel and do not got through a formal planning and design phase. Furthermore, maintenance projects addressing channel aggradations usually impact the stream channel only during culvert clean out and do not result in any additional permanent impacts to channel morphology since new infrastructure is not placed within the stream.

Maintenance projects impacting streams often involve the installation of hard bank stabilization such as rip rap or gabion baskets. Disturbance to upland and riparian habitat is generally limited to damage caused by equipment access. For example, some tree removal may be necessary to allow equipment to access the stream bank which is to be stabilized. Generally, projects are constructed in late summer through winter to allow construction during low discharge conditions. For some projects, maintenance work can be completed in the dry when stream flow is down; however, this is not the case for all projects. Earth disturbing activities within the stream channel are conducted behind a temporary water barrier. Depending on flow conditions and extent of work, the temporary water barrier may consist of silt fence, silt curtain, steel sheeting, sandbags, or rock berms. Similarly, sediment discharge during installation varies depending on flow conditions, extent of work, and types of BMPs implemented.

C. Emergency Stream Crossing Replacement

Emergency projects occasionally arise in which a structure that is not programmed for replacement suddenly fails or is damaged to the extent that safe travel over that structure is compromised. The design/engineering/environmental clearance process is expedited for emergency projects depending on Average Daily Traffic (ADT), available alternate routes, ability of the failed structure to convey stream flow, and erosion potential due to failure. Funding used for emergency projects will vary depending on extent that traffic has been impaired. An emergency project on a low ADT rural road will typically include federal funds, and the planning and design phase may last up to one year. Conversely, an emergency project on a high ADT road near an urban setting will typically be funded with state dollars, and the planning and design phase may only last weeks due to intense public pressure to restore the roadway.

D. Water Withdrawal

Some projects will withdraw water from nearby lakes and streams for construction purposes. Water withdrawal for construction purposes is generally related to roadway grading and dewatering of stream crossing project areas. To withdraw water from a stream a Temporary Permit to Use Public Waters must first be issued by the SDDENR. Permits allowing the withdrawal of stream water generally allow between 10,000 and 100,000 gallons/day to be extracted and include provisions that prevent water extraction from impacting other water uses or rights. Dewatering at stream crossing project areas is also necessary in order to install new structures. As stated above, earth disturbing activities within the stream channel are conducted behind a temporary water barrier which (depending on flow conditions and extent of work) may consist of silt fence, silt curtain, steel sheeting, sandbags, or rock berms.

Construction Duration and Timing

Total construction time for stream crossing projects varies considerably depending on structure type, size, and seasonal restrictions. Prefabricated structures normally can be installed quickly while cast-in-place culverts take longer to construct. A prefabricated box culvert that is not affected by seasonal restrictions may have a total construction time of two weeks. Conversely, a cast in place box culvert affected by seasonal restrictions may have a total construction time of three to four months. Determination of which type to install is based on hydraulics. Typically, stream crossing replacements are constructed during the summer; however, projects are also constructed year-round pending weather, stream flow, and seasonal restrictions.

Per the terms and conditions of the 2004 biological opinion, projects potentially impacting the Topeka shiner are not initiated between May 15^{th} and July 31^{st} or during winter ice cover unless the area to be disturbed has been isolated and trapped fish have been removed prior to these dates. Those seasonal restrictions allow projects to start work during about a one to two month period in spring and a four to five month period in the fall. To compensate for this restricted work period, contractors will typically isolate the work area, install temporary water diversions, and remove fish at several projects at once in the spring and again in the fall to meet criteria allowing them to work through the restricted periods. Projects built during the two restricted periods (i.e., spawning and winter) are often prolonged because the contractor is not allowed to restore the temporary water diversion until after the restricted period has passed. For example, a box culvert project that starts construction on May 1st will typically have the structural work (i.e., building the actual culvert) completed by the end of June; however, the diversion channel is not allowed to be restored until August 1^{st}. Similarly, projects that start in the fall and are completed in the winter cannot be fully restored until spring. Restoration of vegetation is generally delayed for projects completed in winter due to unsuitable conditions for plant growth. In the spring, these projects will frequently be subjected to overland flow thru the work area or ponding water within the work area.

Structure Footprint

It is assumed that the magnitude of potential ecological impact increases in proportion to structure footprint and area disturbed; however, realized ecological impacts are determined by many factors including structure length, structure width, structure skew, stream bed material, soil type, topography, and hydrology. For the purposes of this document, structure footprint is defined as the linear stream channel length permanently impacted by the presence of a bridge or culvert and its associated structural components. Area disturbed is defined as the surrounding upland soil that is disturbed during construction. The estimate of structure footprint only quantifies the length of stream channel directly impacted by the structural components of a bridge or culvert. The degree to which stream crossings indirectly impact stream morphology is not quantified because data is not available for analysis. Impacts to stream morphology upstream and downstream of the stream crossing are likely at some stream crossings. It is anticipated that indirect impacts to stream morphology will be controlled largely by stream crossing width and channel alignment. Subsequently, two culverts with identical structure footprints (i.e., defined as linear length of direct impact) may have markedly different impacts on their respective stream landscape. In fact, a short but poorly designed culvert may a have a much greater ecological impact than a longer but well designed culvert.

Additional impacts to stream ecosystems beyond the structure footprint can result from poorly designed stream crossings. These additional impacts primarily occur when the natural geomorphic processes of the stream are altered and could include increased flow velocities through the culvert, increased streambed scour, and streambed aggradation. Effects of these impacts on endangered species could include habitat loss or fragmentation. Geomorphic impacts beyond the structure footprint are not quantified; however, it is assumed that some culverts alter geomorphic processes beyond the project footprint.

The structure footprint of a box culvert can vary considerably depending on number and size of barrels, depth of fill, number of traffic lanes, skew angle, and extent of inlet/outlet protection. Similarly, number of traffic lanes, skew angle, and depth of fill can affect the structure footprint of bridges. County road widths are generally smaller than state and interstate road widths. Subsequently, culverts and bridges under county roads are generally shorter than those under state or interstate routes. In general, bridges have a smaller structure footprint than box culverts (Figure 1). Similarly, bridges tend to disturb stream geomorphic processes less than culverts. Structures with the smallest structure footprint are single span bridges under county roads. Structures with the largest construction footprint are box culverts under interstate highways.

The area disturbed during stream crossing construction is generally between 0.5 and 2.0 acres (Figure 2). Projects disturbing the largest areas will include complex approach grading with traffic or stream diversions. Most of the area disturbed is composed of the existing roadway and adjacent right of way (ROW) or easements.

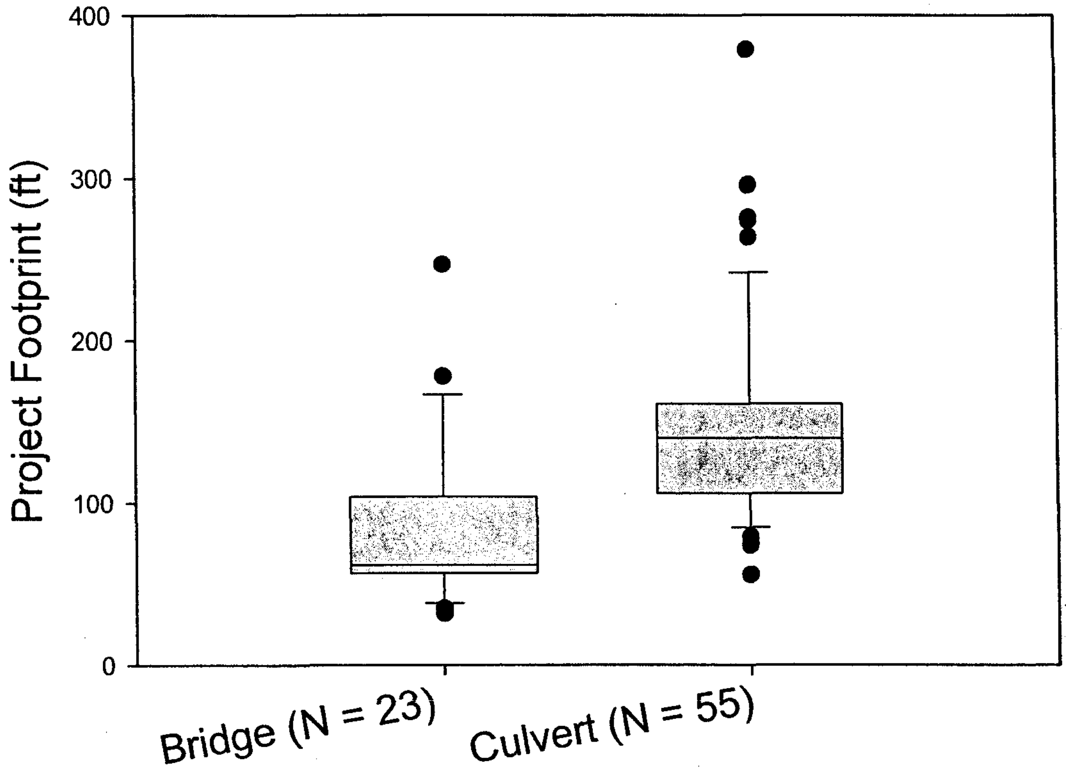

Figure 1. Box plot comparing structure footprint for bridge (N = 23) and culvert (N = 55) projects administered by FHWA/SDDOT during 2004 and 2005. The boxes represent 50% of the values and error bars represent the 10th and 90th percentiles. Dots are outlying data points.

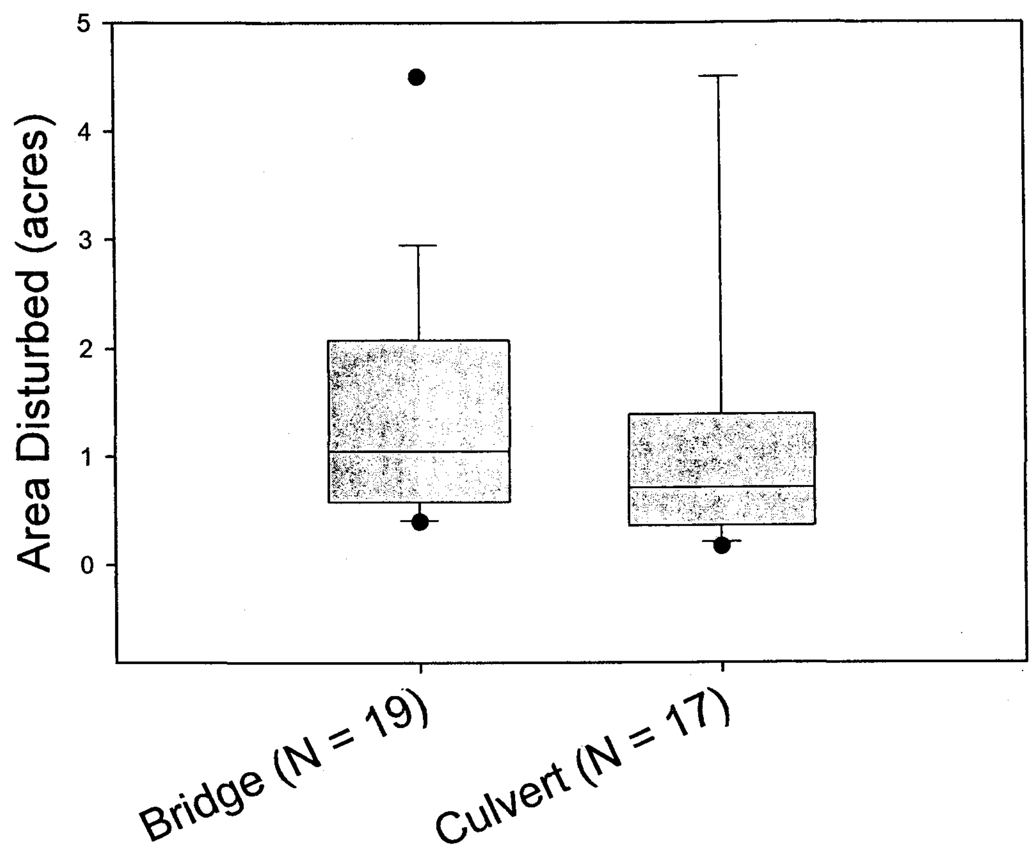

Figure 2. Box plot comparing total area disturbed for bridge and culvert stream crossings. Data used for this analysis included stand alone structure replacements only, disturbed areas represent the area that can be expected to be disturbed by structure replacement and approach grading. The boxes represent 50% of the values and error bars represent the 10th and 90th percentiles. Dots are outlying data points.

STATUS OF FEDERALLY LISTED SPECIES/CRITICAL HABITAT

The FHWA August 27, 2007, biological assessment provided a general overview of each of the federally listed species occurring in South Dakota. Brief status information is provided below on the occurrence of each species in South Dakota. For further details regarding life history, range, habitats, threats, and more, refer to the Federal Register (FR) documents cited with each species description or to the USFWS's Endangered Species Program website at: http://endangered.fws.gov/. Parenthesis after each species name indicates whether the species is listed as endangered (E), threatened (T), or is a candidate (C) species.

Dakota Skipper (C)

The USFWS recognizes the Dakota skipper (*Hesperia dacotae*) as a low priority candidate for listing under the ESA (USFWS 2006). The current range of this medium sized butterfly includes South Dakota, North Dakota, Minnesota, Iowa, and Southern Canada. The species is typically associated with undisturbed tallgrass and mixed grass prairie. Population declines are attributed to overgrazing, grassland conversion, and invasion of nonnative grasses such as smooth brome (*Bromus inermis*). In South Dakota, the Dakota skipper is known to occur in Brookings, Brown, Codington, Day, Deuel, Edmunds, Grant, Hamlin, Marshall, McPherson, Moody, and Roberts Counties (USFWS 2008a).

Least Tern (E)

The least tern (*Sterna antillarum*) was listed by the USFWS on May 28, 1985 as an endangered species without critical habitat (USFWS 1985). The least tern is a local summer resident of the Missouri and Cheyenne rivers in SD (Tallman et al. 2002). The species nests on sparsely vegetated islands. It can be found migrating through virtually all of SD with the exception of the Black Hills.

Piping Plover (T)

The piping plover (*Charadrius melodus*) is currently listed as a threatened species in the Great Plains region. It was listed on December 11, 1985 without critical habitat. On September 11, 2002, the FWS designated critical habitat for the Northern Great Plains population of piping plover. This designation includes 183,422 acres of habitat and 1,207.5 river miles in Minnesota, Montana, North Dakota, South Dakota, and Nebraska. Approximately 287.5 miles of Missouri River and Missouri River reservoir shoreline have been designated in South Dakota as critical habitat for the piping plover (USFWS 2002). The piping plover is a locally common summer resident of South Dakota, primarily in the Missouri River valley (Tallman et al. 2002). Like the least tern, the piping plover requires sparsely vegetated sandbars and will utilize similarly barren shorelines for nesting.

Whooping Crane (E)

On March 11, 1967, the whooping crane (*Grus americana*) was listed as an endangered species (CWS and USFWS 2005). The whooping crane is the tallest bird in North America standing 5 feet tall with a wingspan of 7.5 feet. The whooping crane is a rare spring and fall migrant in South Dakota with accidental summer/winter occurrences; the species does not breed nor winter here. This species' spring and fall migration corridor spans an area several counties wide in central South Dakota, extending from the Nebraska border to the North Dakota border. Whooping cranes have also occasionally been reported in South Dakota counties outside the migration corridor occurring in counties along the state's eastern and western borders (USFWS 2008a).

Whooping cranes are known to occupy cropland and pastures; wet meadows; shallow marshes; shallow portions of rivers, lakes, reservoirs, and stock ponds; and both freshwater and alkaline basins for feeding and loafing. They will often pause during migration to use wetlands for roosting and agricultural fields for feeding but seldom remain more than one night (Tallman et al. 2002). Overnight roosting sites frequently require shallow water in which to stand and rest. The USFWS records sightings of whooping cranes during each migration season, relying on credible public reporting to track the species.

Eskimo Curlew (E)

Effective March 11, 1967, the Eskimo curlew (*Numenius borealis*) was listed as an endangered species without critical habitat (USFWS 1970). Fall migration was known to occur along the east coast of North America while spring migration would take place in the central United States and provinces of Canada. Formerly a common to abundant spring SD migrant, the Eskimo curlew has not recently been observed alive. The last confirmed sighting (an individual shot and collected) was in 1963, although unconfirmed reports continue to occur occasionally (Faanes and Senner 1994).

Black-Footed Ferret (E)

The black-footed ferret (*Mustela nigripes*) was listed as an endangered species on March 11, 1967, without critical habitat (USFWS 1998a). A South Dakota population that disappeared in the wild in 1974 was thought to be the last remaining population until ferrets were discovered in 1981 near Meeteetse, Wyoming, and a captive rearing program was established to prevent extinction of the species. Black-footed ferrets have been reintroduced in South Dakota in the Conata Basin/Badlands National Park, Buffalo Gap National Grasslands, Wind Cave National Park, and on tribal lands of the Cheyenne River Sioux, Rosebud, and Lower Brule Sioux Reservations. The population at Conata Basin is known to be self-sustaining and the population at Cheyenne River is believed to be as well. Ferret reintroductions at Wind Cave National Park, Lower Brule Sioux Reservation and the Rosebud Sioux Reservation are recent reintroductions that are still being evaluated to determine their success (USFWS 2003; Larson 2008 personal communication).

Pallid Sturgeon (E)

The pallid sturgeon (*Scaphirhynchus albus*) is currently listed as an endangered species. It was first listed on September 6, 1990, without critical habitat. All of the pallid sturgeon's historic range has been impacted by impoundment, channelization, and altered flow regime. Alteration of great river habitat is perceived as the major cause of pallid sturgeon decline (Beamesderfer and Farr 1997; USFWS 1993). In South Dakota the pallid sturgeon is found in the Missouri River (USFWS 1993).

Western Prairie Fringed Orchid (T)

The western prairie fringed orchid (*Platanthera praeclara*) was listed as a threatened species on September 28, 1989, without critical habitat (USFWS 1996). Currently, there are no known populations of this species in South Dakota although unknown populations may exist. The orchid may occur in Bennett, Brookings, Clay, Hutchinson, Lake, Lincoln, McCook, Miner, Minnehaha, Moody, Roberts, Shannon, Todd, Turner, Union, and Yankton counties (USFWS 2008a).

Scaleshell Mussel (E)

On October 9, 2001, the scaleshell mussel (*Leptodea leptodon*) was listed as an endangered species. Within the last half century the range of this species has decreased. Presently 10 populations of scaleshell mussels are known, all of which are declining. Scaleshell mussel habitat in South Dakota includes the Missouri River in Clay, Union, and Yankton counties. The scaleshell was last found on the Missouri River in South Dakota below Gavins Point Dam in 1983 (USFWS 2004b).

Higgins Eye Pearlymussel (E)

The Higgins eye pearlymussel (*Lampsilis higginsii*) was listed as endangered in 1976. The range of this species is the upper Mississippi River including large tributaries. This species is found in large river habitat with sand to cobble substrate. Declines in this species have been attributed to modifications to riverine habitat and the introduction of zebra mussels (USFWS 2004d). In South Dakota a single record exists from the Missouri River near the mouth of the James River (SDGFP, unpublished data).

Topeka Shiner (E)

Effective January 14, 1999, the USFWS listed the Topeka shiner (*Notropis topeka*) as an endangered species pursuant to the Endangered Species Act of 1973 (USFWS 1998b). Critical habitat for the Topeka shiner was listed on July 27, 2004, but no critical habitat was designated in South Dakota because the state implemented a management plan for this species and the benefits of exclusion of South Dakota from critical habitat designation were expected to outweigh the benefits of inclusion (USFWS 2004c).

The Topeka shiner is a small pool-dwelling minnow that is found in low order prairie streams of the middle and lower Missouri River Basin and upper Mississippi River Basin. The range of this fish covers portions of South Dakota, Minnesota, Nebraska, Iowa, Kansas, and Missouri (Bailey and Allum 1962; Pflieger 1997; USFWS 1998b; Blausey 2001). The Topeka shiner has been found in 61 waterways in the James River, Big Sioux River, and Vermillion River Watersheds (Wall 2007/2008 personal communication; Figure 3). The Topeka shiner currently retains its historic distribution and can be locally abundant in some streams within South Dakota and relatively rare in others; however, population trends are unclear (Shearer 2003).

Topeka shiners use pool, run, and off-channel habitats. Streams generally have low slopes with large pools connected by small riffles (Blausey 2001). Bottom substrate in pools is usually composed of coarse substrate overlain by silt (Minckley and Cross 1959; Blausey 2001). Streams inhabited by the Topeka shiner have unique geomorphic and hydrologic characteristics that influence fish community structure and life history of the species present (Dodds et al. 2004). The hydrology of these streams is typical of most grassland streams in that flooding and seasonal intermittence are common (Dodds et al. 2004). Fish communities in streams within the Topeka shiner's distribution are generally dominated by minnows (Family: Cyprinidae) and have low species richness (Minckley and Cross 1959; Blausey 2001; Winston 2002). To persist in harsh conditions (i.e., wet and dry cycles with unpredictable frequency, magnitude, and duration) biota must have characteristics that allow them to cope with frequent disturbance. Current ecological paradigms predict that species endemic to harsh environments, such as prairie streams, would have life history traits such as highly variable population size, high reproductive potential, expansive dispersal mechanisms, high annual mortality, and short life spans (Southwood 1977; Tramer 1977; Sousa 1984; Green 2003). Life history information on the Topeka shiner supports these hypotheses. Studies indicate that life history characteristics of the Topeka shiner are: high annual mortality (60-90 %; Kerns and Bonneau 2002; Stark et al. 2002; Minckley and Cross 1959), short life span ($\leq$ 3 years; Kerns and Bonneau 2002), quick sexual maturity (age-1; Dahl 2001), omnivorous feeding (Hatch and Besaw 2001), an extended spawning period (Mid-May through Early August; Dahl 2001; Kerns and Bonneau 2002), and multiple clutch spawning (Katula 1998, Hatch 2001). Hatch (2001) determined seasonal mean clutch sizes in Minnesota of 261-284. Kerns (1983 *in* Hatch 2001) determined an average of 356 mature ova from 1 year olds and 819 from 2 year olds in a Kansas stream with a range of 140-1,712. Quantitative assessments (Minckley and Cross 1959; Kerns and Bonneau 2002) indicate that Topeka shiner populations are temporally variable and fluctuate with habitat availability, recruitment, and mortality (Figure 4). Most individuals in Topeka shiner populations are juvenile or age-1 individuals (Kerns and Bonneau 2002).

Stream fish quickly colonize rewetted streams after drought (Larimore et al. 1959; Matthews and Marsh-Matthews 2003); however, long lived fish (Meade 2004) and genetic diversity (Humphries and Baldwin 2003) may be negatively affected by severe drying. The Topeka shiner appears to exhibit exceptional drought resistance and is more tolerant of drying than some other prairie fish species (Kerns and Bonneau 2002).

During low water conditions Topeka shiners represent a greater proportion of the total fish community (Minckley and Cross 1959; Barber 1986; Kerns and Bonneau 2002). Also, the reproductive biology (Ensign et al. 1997) and life history traits of the Topeka shiner may allow it to recolonize rewetted stream sections faster than other fish. Availability of refugia (i.e., perennial stream segments) appears to be essential for the persistence of this species (Wall et al. 2001). Although it has been hypothesized that river habitat (e.g., Big Sioux River) is an important refuge for Topeka shiners during drought (USFWS 2004a), available evidence suggests that most Topeka shiners persist in pools maintained by ground water or in downstream tributary segments (Barber 1986; Wall et al. 2001; Milewski 2001; Stark et al. 2002). During wet periods fish can colonize ephemeral pools that are frequently dry.

Small stream fish like the Topeka shiner are generally sedentary, but small portions of the population move between stream reaches (Barber 1986; Hill and Grossman 1987; Freeman 1995; Johnston 2000). Most movements by adult Topeka shiners are in spring and early summer (Barber 1986). During late summer, fall, and winter; streams inhabited by Topeka shiners typically become intermittent, restricting fish movement (Schaefer 2001; Wall et al. 2001) although periods of high flow can disperse larvae downstream (Barber 1986; Harvey 1987). Because most movements by Topeka shiners are small, gene flow between distant metapopulations likely happens at a large temporal scale over many generations (Fraser et al. 1999; Johnston 2000). In South Dakota the Topeka shiner seems to be limited to habitats with perennial pools or habitats in close proximity to perennial reaches (Wall et al. 2001). Topeka shiners are rarely found in ephemeral streams unless they are in close proximity to perennial habitats with Topeka shiner populations.

When the Topeka shiner was listed as a federally endangered species, several hypotheses for decline were given: 1) altered stream morphology; 2) reduced water quality; 3) altered stream hydrology; and 4) nonnative piscivorous fish (USFWS 1998b). Recent research strongly suggests that tributary impoundment (Schrank et al. 2001; Mammoliti 2002), nonnative piscivorous fish (Schrank et al 2001; Winston 2002), and altered stream hydrology (Wall et al. 2001) have caused the Topeka shiner to decline. Winston (2002) provided support for the introduced piscivore hypothesis and rejected all hypotheses dealing with physical and chemical factors. Blausey (2001) supported the hypothesis of stream morphology and rejected the water quality hypothesis. Though it is likely that all proposed hypotheses negatively affect the Topeka shiner, disturbance to stream morphology, hydrology, and the introduction of nonnative piscivores may be primarily responsible for local extirpation range-wide. Impacts that alter large functional components of stream ecosystems are most likely to have negative effects on the Topeka shiner. For example, if disturbance frequency is reduced by tributary impoundment it is likely that piscivore abundance will increase and Topeka shiner persistence will decrease due to biotic interactions with invading species. Similarly, by increasing disturbance frequency Topeka shiner persistence is reduced by decreased habitat volume, stream connectivity, and refugia.

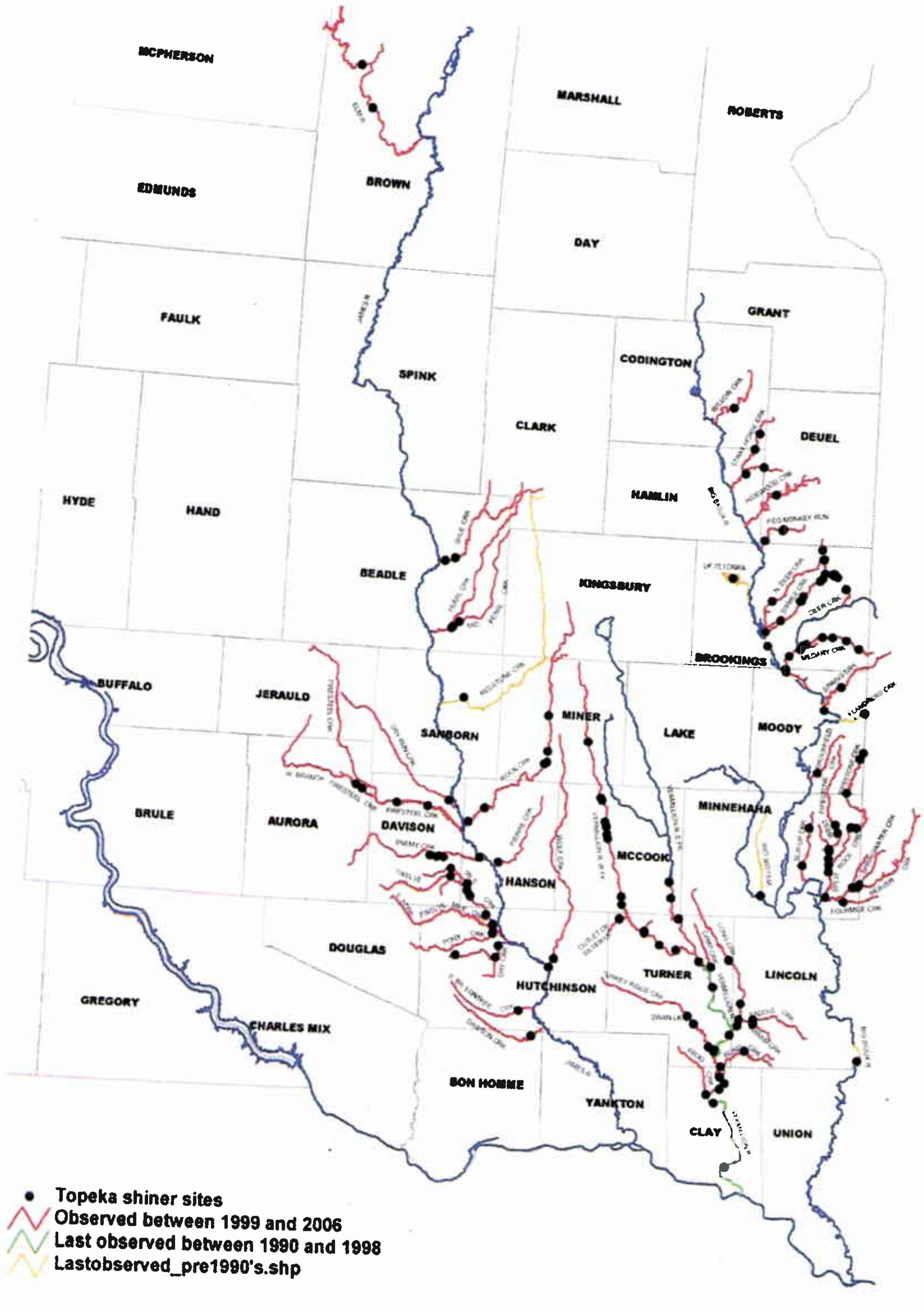

Figure 3. Known Topeka shiner occupied streams in South Dakota as of 2006 (Wall 2007 personal communication). Note that the shiner has also recently (2007-2008) been documented in Redstone Creek, Deer Creek and Lonetree Creek (Wall 2008 personal communication).

Table 1. Current (1997-June 2008) Known/Presumed Occupied Topeka Shiner Streams within the James, Vermillion, and Big Sioux River Watersheds, South Dakota (Wall 2007/2008 personal communication).

James River Watershed (21)	**Vermillion River Watershed (12)**	**Big Sioux Watershed (28)**
Dawson Creek – 2006	Blind Creek - 2000	Beaver Creek – 2001
Dry Creek – 2000	Camp Creek - 2000	Beaver Creek unnamed tributary. – 1999
Dry Run Creek – 2006	East Fork Vermillion - 2006	Big Sioux River[1] – 2004
Elm River – 2003	Frog Creek - 2005	Brookfield Creek – 1999
Enemy Creek – 2000	Haram Creek - 2003	Deer Creek
Firesteel Creek – 2000	Long Creek - 2000	Deer Creek unnamed trib. – 2000
Lonetree Creek - 2007	Saddle Creek - 2000	Flandreau Creek[3] – 1970 in SD, recent MN recent record
Middle Pearl Creek – 2000	Silver Lake Outlet - 2000	Four-mile Creek – 1999
North Branch Dry Creek- 2000	Turkey Ridge Creek - 2000	Hidewood Creek – 1999
Pearl Creek – 2000	Vermillion River - 1999	Medary Creek – 2000
Pierre Creek- 2006	West Fork Vermillion - 2000	North Deer Creek – 2000
Pony Creek – 2004	West Fork Vermillion unnamed tributary - 2006	Peg Munky Run – 2001
Redstone Creek - 2007		Pipestone Creek – 2000
Rock Creek – 2000		Pipestone Creek unnamed tributary[4] – MN record
Shue Creek – 2000		Sixmile Creek – 2000
South Branch Lonetree Creek – 2000		Sixmile Creek unnamed tributary[5]– 2000
South Fork Twelvemile Creek – 2006		Skunk Creek[6] – 1999 hybrid
Twelve-mile Creek - 2000		Slipup Creek – 1999
Twelve-mile Creek unnamed tributary – 2002		South Fork North Deer Creek – 1998
West Branch Firesteel Creek -1998		Split Rock Creek – 2000
Wolf Creek – 1997		Split Rock Creek unnamed tributary[7] – MN record
		Spring Creek – 2000
		Springwater Creek – 1999
		Stray Horse Creek – 2002
		Stray Horse Creek unnamed tributary – 2004
		West Pipestone Creek – 2000
		West Pipestone Creek unnamed tributary – 2004
		Willow Creek (Codington) – 2005

[1]Big Sioux River is not viewed not as primary habitat, but important as refugia/dispersal corridor.
[2]Flandreau Creek - Known to be occupied on the MN side, presume SD is occupied as well. Last known SD record was in 1970.
[3]Pipestone Creek unnamed tributary is known to be occupied on MN side, presume SD is occupied as well.
[4]Sixmile Creek unnamed trib - The Topeka shiner collection site on this tributary is very close to the mainstem of Sixmile Creek - Steve Wall didn't distinguish it from Sixmile, but FWS did in the proposed critical habitat rule of 2002.
[5]Skunk Creek - George Cunningham, Ecocentrics, reported Topeka shiner/sand shiner hybrids, not full Topekas. Status of shiner presence is uncertain, but habitat may exist.
[6]Split Rock Creek unnamed trib - This waterway is not named on USGS maps, but is called Devils Gulch Creek in the SD Gazateer. It is located approximately ½ mile north of Garretson, and presumed occupied in SD because of recent records on Minnesota side and its connection to Split Rock.

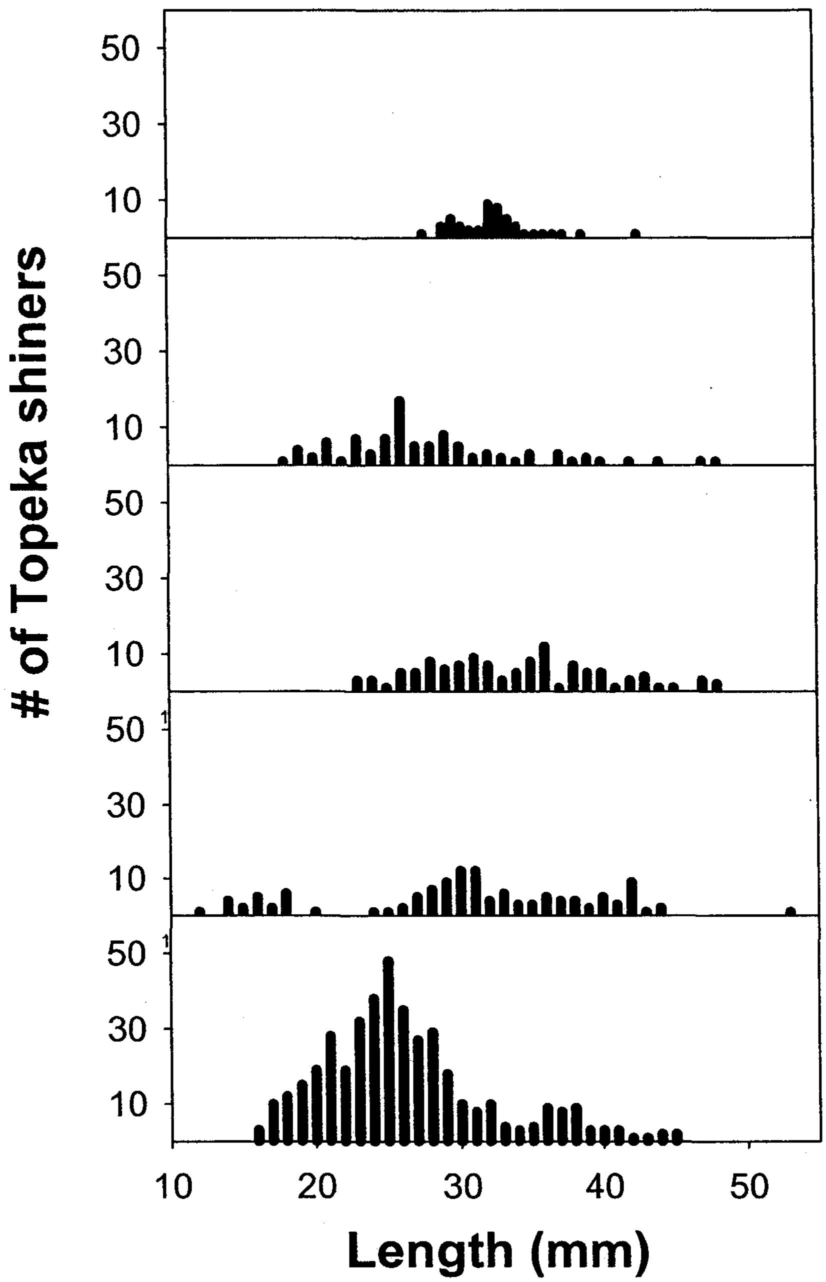

Figure 4. Temporal variability of size structure in a population of Topeka shiners from a Kansas stream (adapted from Kerns and Bonneau 2002). Size structure is heavily influenced by seasonal recruitment and mortality.

American Burying Beetle (E)

The American burying beetle (*Nicrophorus americanus*) was listed as an endangered species on July 13, 1989. The current American burying beetle range presently known in South Dakota includes portions of Bennett, Gregory, Tripp, and Todd counties. However, a comprehensive status survey has never been completed in South Dakota so the beetle could and may occur in other counties with suitable habitat. Suitable habitat is considered to be any site with topsoil that allows for burying carrion and accessible carrion of appropriate size (USFWS 1991). Once widely distributed throughout eastern North America, this species has disappeared from most of its historic range. Historical records are located in 32 states, the District of Columbia, and 3 Canadian provinces. This range covers most of the eastern United States and southeastern Canada (USFWS 1991). Presently isolated American burying beetle populations are known to exist in Rhode Island, Oklahoma, Kansas, Arkansas, South Dakota, and Nebraska (Backlund and Marone 1997; Bedick et al. 1999).

Historic collections suggest that the American burying beetle can occupy a wide range of habitats with different vegetation types. Some studies have reported drastically different vegetation preferences for carrion beetles suggesting that vegetation type is a poor indicator of species presence (Bishop et al. 2002). Although not well documented specifically with the American burying beetle, it is likely that soil texture (Bishop et al. 2002) and carrion availability (Peck and Miline 1987) are the important variables influencing species distribution. American burying beetle surveys in Nebraska (Bishop el al. 2002) and South Dakota (SDGFP, unpublished data) indicate that the species is predominantly associated with riparian habitats and alluvial soils.

Lomolino et al. (1995) rejected the hypothesis that the American burying beetle is a habitat specialist and that declines in abundance have been caused primarily by habitat loss. The authors hypothesize that decreases in carrion of a size preferred by the American burying beetle have caused the species to decline. It is likely that habitat fragmentation has decreased carrion available to the burying beetle by decreasing avian diversity and abundance and increasing scavenger density (USFWS 1991). Two formerly abundant bird species and likely carrion sources for the American burying beetle, the passenger pigeon and greater prairie chicken, have been extirpated in eastern North America (USFWS 1991). In general, avian diversity is decreased by habitat fragmentation thus reducing carrion available to the American burying beetle (Robbins et al. 1989; Yahner et al. 1989). Similarly, increased edge habitat found in fragmented landscapes typically increases densities of vertebrate scavengers (i.e., raccoons, skunks and opossums) potentially increasing competition for available carrion (USFWS 1991). Other potential threats to the American burying beetle include increased insecticide use and changes in grazing and farming practices. These hypotheses have been largely rejected, as other burying beetle species have not shown declines similar to the American burying beetle.

REVIEW OF IMPACTS TO LISTED SPECIES

The USFWS's review of FHWA/SDDOT's determinations of proposed project impacts to listed species is as follows:

Dakota Skipper

The Dakota skipper is a candidate species and accordingly is not at present provided Federal protection under the Endangered Species Act. However, their candidate status defines these butterflies as a species in decline that the USFWS believes needs to be listed as threatened or endangered, but listing is currently precluded by other priorities. In light of this, the FHWA/SDDOT has chosen to evaluate the potential impacts of stream-crossing projects to this butterfly and determine potential impacts. Since stream-crossing projects are primarily limited to instream and riparian work, not affecting upland native prairie habitats required by the Dakota skipper, the FWHA/SDDOT anticipates these projects will have "no-effect" on this species.

Least Tern

The least tern is known to occur along the mainstem Missouri River and portions of the Cheyenne River from April until the end of August. The Missouri River is excluded from this analysis, but construction and maintenance projects on the Cheyenne potentially could affect the tern. Since the Cheyenne River is a relatively large river system, bridges (rather than culverts) would be the likely structure type established on this system. Although bridge structures may serve to somewhat change water and sediment movements within the river, the presence of instream pilings are not likely to appreciably alter site conditions upstream or downstream of the structure to the extent culverts may, and are unlikely to impact least tern habitat. At present, only two bridges exist over that portion of the Cheyenne River known to harbor least terns, and historic data indicates that tern nesting sites are not located near these bridges. However, riverine systems are constantly changing and sandbar habitats may form in the future near these bridges and subsequently be inhabited by least terns.

With the possibility of least terns at a stream-crossing project sites on the Cheyenne River, the USFWS recommends FHWA/SDDOT survey proposed project sites well in advance of construction to determine the presence of terns or suitable habitat for terns if the survey is performed outside the breeding season. If terns may be present or potential habitat exists within ½ mile of the project area, the USFWS should be contacted and the activity described. There may be instances where construction activities may need to be curtailed during the nesting season of May – August while other activities may not be problematic. FHWA/SDDOT has agreed to contact the USFWS if surveys reveal the species' presence or potential habitat at any project site and jointly develop measures to prevent adverse effects if least terns are eventually found to nest within ½ mile of the bridges. The USFWS concurs with FHWA/SDDOT's determination that these projects along the Cheyenne River "may affect" the least tern, with the ultimate determination of impacts to be based upon further consultation which is required if surveys detect least terns or least tern habitat located within 1/2 mile of project sites. Unless least terns are discovered nesting along other river courses in South Dakota, all other stream crossing projects are expected to have "no effect" on the least tern.

Piping Plover, Pallid Sturgeon, Higgins Eye Pearlymussel, and Scaleshell Mussel

These four species are known to occur in South Dakota only within the mainstem Missouri River system. Since this consultation effort does not include projects that may impact this system, these species and their habitats are expected to be completely unaffected by the proposed actions. Any Missouri River projects proposed by FHWA/SDDOT will require a separate consultation effort. FHWA/SDDOT determined that the proposed stream-crossing projects will have "no effect" on these species, including critical habitat for the piping plover.

Whooping Crane

The whooping crane is unlikely to occur at a FHWA/SDDOT stream-crossing project site due to its relative rarity, even though it's preferred habitat may include stream sites. In the highly unlikely event a whooping crane(s) were to occur at a project site, the primary means to minimize impacts would be to merely wait until the bird(s) left the area. The FHWA/SDDOT has agreed to report any sightings of whooping cranes occurring within the vicinity of stream-crossing projects to the USFWS immediately and avoid harassment of the birds until they vacate the project area. If any suspension of construction activities is needed at all, it will likely be a very short one, since whooping cranes rarely stay in one location in South Dakota for more than one or two days. A project note will be included in the plans of projects that may affect the whooping crane. The USFWS concurs with FHWA/SDDOT that these projects "may affect, but are not likely to adversely affect" the whooping crane.

Eskimo Curlew

The possibility of the appearance of an Eskimo curlew at stream-crossing project is unlikely due to the extreme rarity of the species and the location of these projects and typical onsite habitat. The curlew was historically known to occur on the open grasslands of South Dakota and not typically associated with stream systems. Additionally, the curlew is historically known only as a migrant in South Dakota, not known to nest in the state but rather occurred in South Dakota only as it passed between its Canadian breeding grounds and South American wintering sites. It is highly unlikely that an individual would be detected at a stream-crossing project site. The FHWA/SDDOT has determined that the proposed stream-crossing projects will have "no effect" on the Eskimo curlew.

Black-footed Ferret

Neither the nonessential experimental status of reintroduced ferret populations at the Conata Basin/Badlands, Cheyenne River Sioux Reservation and Rosebud Reservation, nor the section 10(a)(1)(A) recovery permits for Lower Brule Sioux Reservation and Wind Cave National Park ferret reintroductions allow for purposeful take of ferrets. Take for otherwise lawful activities within the reintroduction areas was recognized in the development of final rules and/or biological opinions for each of these black-footed ferret reintroductions. Ferrets are known to occur exclusively within prairie dog towns, which are established in upland prairie areas, not in drainage ways or riparian corridors where stream-crossing projects are constructed. "No effect" to the black-footed ferret is anticipated as a result of the proposed stream-crossing projects, and the FHWA/SDDOT has preliminarily made that determination. However, to ensure no problems arise in the future, the FHWA/SDDOT will initiate additional consultation procedures should construction occur within one of the reintroduction areas.

Western Prairie Fringed Orchid

The lack of recent records of the western prairie fringed orchid in South Dakota places doubt on the continued existence of the plant in the state, although it is still considered possible. Given the plant's rarity as well as the types of habitat in which FHWA/SDDOT stream-crossing projects occur (previously disturbed riparian zones, rather than native wet prairie and sedge meadow more typical of the orchid) the occurrence of this species at an FHWA/SDDOT stream-crossing project appears unlikely. Additionally, stream-crossing projects occur on a relatively small scale, typically limited to within previously disturbed road ROW. FHWA/SDDOT has determined that the proposed projects will have "no effect" on the western prairie fringed orchid.

Topeka Shiner

The Topeka shiner is known to exist in many tributaries of the Big Sioux River, James River, and Vermillion River in eastern South Dakota. Because the Topeka shiner has a large distribution in South Dakota and is locally abundant, it is anticipated that some stream crossing projects proposed under this action will adversely affect this species, with habitat loss, disturbance, mortality and possibly habitat fragmentation. The USFWS concurs with FHWA/SDDOT that this action "may affect" and "is likely to adversely affect" the Topeka shiner.

American Burying Beetle

The disturbance of riparian and prairie habitats surrounding stream crossings in Bennett, Gregory, Todd, and Tripp Counties may result in the "take" of the American burying beetle. Stream crossing projects generally disturb very little upland habitat, much of the project impact is within the affected waterway, but there is a small chance that beetles may present within upland areas disturbed during construction. The presence of beetles onsite will be extremely difficult to determine. Some projects may result in the mortality of a small number of beetles, although it is not thought that this action will have any significant effect on the American burying beetle population size, distribution, or density. The USFWS concurs with FHWA/SDDOT that this action "may affect", and "is likely to adversely affect" the American burying beetle.

Table 2. FHWA/SDDOT's determination of effects of stream-crossing projects on Threatened (T), Endangered (E) and Candidate (C) Species in South Dakota and additional consultation requirements (if applicable).

Species	Determination	Additional Requirements
Dakota Skipper (C)	No Effect	Not Applicable (N/A)
Least Tern (E)	Cheyenne River projects: May Affect, Not Likely to Adversely Affect All other projects: No Effect	Surveys required on Cheyenne River projects. Coordinate with USFWS if individuals and/or habitat are identified within ½ mile of project.
Piping Plover (T)	No Effect	N/A
Whooping Crane (E)	May Affect, Not Likely to Adversely Affect	Cease activities and avoid harassment. Notify USFWS of any sightings.
Eskimo Curlew (E)	No Effect	N/A
Black-Footed Ferret (E)	No Effect	Coordinate with USFWS if work will occur in/near known occupied areas
Pallid Sturgeon (E)	No Effect	N/A
Western Prairie Fringed Orchid (T)	No Effect	N/A
Scaleshell Mussel (E)	No Effect	N/A
Higgins Eye Pearlymussel (E)	No Effect	N/A
American Burying Beetle (E)	May Affect, Is Likely to Adversely Affect	See Incidental Take Statement
Topeka Shiner (E)	May Affect, Is Likely to Adversely Affect	See Incidental Take Statement

ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of the collective effects of past and ongoing human and natural factors leading to the current status of the species or its habitat and ecosystem, the effects of the proposed action, and the cumulative effects in the action area. This analysis describes the status of the species and factors affecting the environment of the species in the proposed action area during the consultation. The baseline includes state, local, and private actions already affecting the species. Unrelated Federal actions that have completed formal or informal consultations also are part of the environmental baseline, as are Federal and other actions within the action area that may benefit listed species. The environmental baseline is discussed only for the two species which are "likely to be adversely affected" by the proposed stream-crossing projects; the Topeka shiner and American burying beetle.

Topeka shiner

The Topeka shiner is currently known to occur in 61 waterways in eastern South Dakota all located within the watersheds of the James, Vermillion and Big Sioux Rivers; this includes the Vermillion River mainstem (where the species resides) and the Big Sioux River mainstem (where the species is occasionally documented) (Figure 3, Table 1). The species also occupies some off-channel habitats associated with those waterways. Topeka shiners have been documented in new tributaries annually for several years now, thus it is possible that additional occupied waterways will be discovered in South Dakota.

While no trend information is available in South Dakota to determine whether Topeka shiner populations are decreasing, increasing or stable, surveys within the state since the species was first proposed for listing have lead to our current tally of 61 occupied waterways (50 more than the eleven that were known in South Dakota at the time of listing). The South Dakota Department of Game, Fish and Parks developed a management plan for this species (Shearer 2003) with an associated monitoring plan. Those efforts should eventually provide some measure of persistence or trends within currently known occupied habitats.

Many factors affecting Topeka shiners have, and currently are, occurring in South Dakota. However, South Dakota contains the most known extant Topeka shiner populations across its six-state range. The species has been found in nearly every waterway where it was historically known to occur here, and new streams have found annually for the past several years. So, while the baseline information described below likely detrimentally affects the species in South Dakota, none of the factors listed currently appear to be affecting the species as much as in other states where the species has experienced greater declines.

Agriculture: Conversion of the prairie to agricultural lands significantly altered the uplands, wetlands, and thereby condition of prairie streams likely to the detriment of the Topeka shiner and many other aquatic species; many streams throughout the geographic range of the Topeka shiner were believed to be occupied "prior to plowing of the prairie sod" (Cross 1967). Minckley and Cross (1959) reported that watersheds with high levels of cultivation and subsequent siltation and domestic pollution are unsuitable for the species. Pflieger (1975) reported that increased siltation as a result of intensive cultivation may have reduced the amount of Topeka shiner habitat in Missouri. Many of South Dakota's Topeka shiner occupied streams are located within watersheds subject to extensive row cropping. This type of agricultural setting may now be characteristics of the vast majority of the natural range of the species (Menzel et al. 1984). Sediment within formerly gravel-bottomed streams is prevalent. An increase in plowing of grasslands to grow corn for ethanol production has escalated here in recent years, although it appears that the majority of areas that could be plowed within the range of the Topeka shiner, may have already been disturbed. The largest increase in conversion of prairie to agricultural lands appears to be occurring west of the shiner's known occupied watersheds. Despite significant upland conversion, however, many riparian areas remain relatively intact, perhaps due to local topography that does not lend itself to cropping immediately adjacent to streambeds. The SDDENR has implemented watershed improvement programs within the range of the Topeka shiner to boost water quality issues and improve the condition of river and stream ecosystems, thus benefits to the Topeka shiner are anticipated.

Livestock Grazing/Feedlots: Intensive grazing within riparian areas and feedlot operations on or near streams are also known to impact prairie fishes due to organic input and subsequent stream eutrophication (Cross and Braasch 1968) and in South Dakota, as of May 2007, 222 Concentrated Animal Feeding Operations, exist in the known occupied watersheds of the Topeka shiner (Woodmansey 2007 personal communication). The SDDENR issues a General Permit that includes numerous containment requirements for these feedlots (See: http://www.state.sd.us/denr/DES/Surfacewater/feedlot.htm) and the USDA Natural Resources Conservation Service works with landowners to implement conservation practices in association with grazing practices and feedlots that often involve fencing to exclude cattle from riparian areas. Thus some beneficial actions are occurring.

Groundwater Withdrawal: Recent modeling efforts indicate groundwater flows can be an important component of Topeka shiner habitat, particularly critical during periods of drought (Wall et al. 2001). Cross (1970) indicates that some of the areas where depeletion of the species has occurred also coincide with areas having poor aquifers. Various entities apply for surface water withdrawal permits from the SDDENR, and this agency has recently incorporated information in their surface water withdrawal permits regarding the Topeka shiner and restrictions on these withdrawals are included to prevent impacts to the species. Recent establishment of ethanol plants in South Dakota has raised concern over groundwater withdrawals as well. As of May 2007, there were eleven ethanol plants currently existing in South Dakota with plans for three more (see: http://www.sdcorn.org/images/photo_ethproduction.jpg), however, we currently have no data regarding effects of these plants on Topeka shiners or their habitat.

Impoundments: Construction of dams (mainstem reservoir development and tributary impoundment) has a significant negative effect on the Topeka shiner. These structures are detrimental to the natural habitat required by the Topeka shiner, and they may increase predatory fish which have been implicated in the decline of this species (Mammoliti 2002). As of 2003, there were 10 large scale impoundments in Topeka shiner watersheds (Shearer 2003). Although dam construction has not been as prevalent in South Dakota Topeka shiner streams as in other states, in the past several years prior to this writing, one dam was reconstructed at the town of Scotland (Lake Henry Dam on Dawson Creek, which increases the number of large scale impoundments on Topeka shiner streams to 11), reconstruction of a dam at the town of Centerville (Centerville Dam) was proposed but dropped due to high cost of construction, and one additional dam across the upper portion of the Big Sioux River north of the city of Watertown (Mahoney Dam) is currently proposed (this area may not harbor Topeka shiners, but known occupied streams exist approximately 10 miles south of the proposed dam). Thus new impoundments continue to be proposed/constructed in South Dakota.

Culverts: Stream-blocking also occurs with improperly installed and/or maintained transportation stream-crossing structures. Affects may be similar to impoundments which are known to preclude fish passage and prevent use of upstream spawning sites, downstream migration of juveniles and adults during times of low water, and post-drought recolonization of upstream reaches (Mammoliti 2002). These are known to exist in South Dakota, though to our knowledge these are not currently quanitified. Many perched structures, commonly corrugated metal culverts, are placed by local (county or township) transportation entities (Wall and Berry 2004) that typically do not consult with the USFWS regarding their projects.

Channelization: Stream channelization has occurred throughout much of the Topeka shiner's range, but is not as common in South Dakota as in the other occupied states. Channelization negatively impacts many aquatic species, including the Topeka shiner, by eliminating and degrading instream habitat types, altering the natural hydrography (physical characteristics of surface waters), and changing water quality (Simpson et al. 1982). Menzel (1980 *in litt.*) reports the extirpation of Topeka shiners from previous collection sites following stream channelization. Although portions of some streams have been channelized in South Dakota, this is not a common practice in the state. The majority of streams in the occupied Topeka shiner watersheds continue to occupy their natural channel, although each of these streams experiences some degree of channelization on a relatively small scale with the installation of transportation related stream-crossing structures. As of 1997, only about 3.1% of South Dakota streams had been channelized (Johnson et al. 1997).

Tiling: Tiling is an emerging activity in South Dakota that may have detrimental effects on the Topeka shiner. The intent is to remove water from wetlands, linear drainage ways, and high water table areas in order to increase crop production, typically for corn and soybeans. The water is then delivered via drain pipe to streams and rivers. We do not currently have data regarding the amount of tiling that currently exists in South Dakota. It is not apparent that tiling activities are causing extirpation of Topeka shiner populations, however, monitoring of Topeka shiner populations by the SDDGFP (Shearer 2003) is in its infancy and not tailored to detect tiling impacts. The SDDENR does not regulate the discharge of water and contaminants transported by tile to South Dakota waterways; the practice is occurring without regulatory oversight as of this writing.

Urbanization: Expansion of the City of Sioux Falls is occurring at a rapid pace, however, as with tiling, we currently have no evidence to indicate that this urbanization is currently to the detriment of Topeka shiner populations in those occupied streams near the City of Sioux Falls. The City of Sioux Falls has been made aware of the presence of this species and potential impacts to it as a result of city/urban expansion, various consultations have occurred on city projects, but no action is currently being undertaken to address the issue of private developments on a large scale.

American burying beetle

The American burying beetle's known range in South Dakota includes portions of Bennett, Gregory, Tripp, and Todd counties. Although surveys outside of these counties have occurred, a statewide comprehensive survey has never been completed in South Dakota, thus, the beetle potentially could occur in other counties with suitable habitat. In 2005, Backlund et al. (2008) conducted a population estimate of the American burying beetle in South Dakota utilizing mark and recapture methods within an approximately 85 mi^2 area within its known range. An estimated 333-624 adults existed in June, 2005 (prior to emergence of young), and the number increased to 714-1,177 individuals (adults plus teneral adults) in August, 2005 (Backlund et al. 2008).

Compared to the Topeka shiner, significantly less is known about the factors that have, or currently are, affecting the American burying beetle. It is highly mobile, not easily observed, dependent upon the presence of suitably sized carrion to reproduce, and occurs underground much of the time. A variety of factors may have worked in combination to impact American burying beetles over time, and many of these actions have occurred and/or are still occurring today in South Dakota. Fire suppression allows encroachment of invasive species. Conversion of native habitats to agriculture and other developments leads to direct loss of individuals, loss of habitat, pesticide spraying, increased edge effect and thus competition from other scavengers for carrion, and alteration of the carrion base (USFWS 2008b). Generally, any actions that resulted in loss of habitat, reduction in available carrion of the appropriate size, and ground disturbance (the beetles reproduce and winter underground) may have historically impacted American burying beetle populations in South Dakota, and those actions still have that potential today including FHWA/SDDOT projects.

The South Dakota population of American burying beetles has been monitored almost annually since 1995 and has remained stable in abundance and distribution (Backlund, unpublished data *in* Backlund et al. 2008). Thus, while potential factors impacting the species can, and are, occurring in the range of the beetle in South Dakota, they are apparently not currently occurring at a level to the detriment of the existing population.

EFFECTS OF THE FEDERAL ACTION

Topeka shiner

The Topeka shiner is expected to occur at approximately 20% of projects found to adversely affect this species (SDDOT 2005; SDDOT 2006). The relative number of Topeka shiner adults, eggs, and/or larvae expected to be trapped within the work limits of individual projects is anticipated to vary greatly. If suitable habitat exists onsite, then it is presumed the area could be occupied by Topeka shiners at any time of the year. Previous fish removals, performed outside the primary spawning period, have found that if Topeka shiners are present within a construction work area, they typically occur at low densities although they are sometimes abundant (SDDOT 2005; SDDOT 2006). Stream surveys indicate that Topeka shiners may be present at high densities in some streams potentially impacted by this action (Wall et al. 2001; Wall 2005). Rapid fish community recovery after disturbance is well documented in warm water streams (Larimore et al. 1959; Brandt and Schreck 1975; Peterson and Bayley 1993; Sheldon and Meffe 1994; Matthews and Marsh-Matthews 2003).

A. Mortality

Construction related mortality is most likely to occur at stream crossing projects over streams with high quality habitat and robust Topeka shiner populations or at projects in close proximity to stream segments with robust Topeka shiner populations. Surveys of stream crossing work areas have not found the Topeka shiner to be present in streams that do not have suitable habitat or are not in close proximity to known populations or quality habitat (Wall 2004; SDDOT 2005; SDDOT 2006).

All locations where Topeka shiners were found during stream-crossing projects constructed under the April 28, 2004, biological opinion were found were in watersheds known to harbor the species. At two stream crossings the Topeka shiner was abundant. Although not quantified, it was reported that high mortality of Topeka shiners was likely at both locations in which they were abundant due to difficulty in seining and/or high sedimentation onsite (SDDOT 2005; SDDOT 2006).

1. Within Project Limits

Some mortality of Topeka shiner adults, juveniles, larvae and eggs is expected to occur within the work limits of stream crossing projects. Desiccation resulting from stream dewatering during box culvert construction is the principle source of fish mortality, though some may also occur when fish are seined from the project area. Handling mortality of fishes removed by seining at FHWA/SDDOT projects is positively related to fish density and amount of stream bed silt (SDDOT 2005; Figure 5; Figure 6). At some stream crossing projects over streams with heavy sediment deposits, >40 % of fishes removed from some work areas died during capture. Incidences of high fish mortality occurred when seine nets accumulated large quantities of fine streambed sediment temporarily subjecting captured fish to a "sediment slurry". During 2004 and 2005, Topeka shiners were found trapped within the project work area at 8 of 44 FHWA/SDDOT stream crossing projects in which fish removal was conducted. Topeka shiner mortality caused by construction is expected to be limited to small habitat patches and impact relatively few individual fish. Topeka shiner density within impacted work areas is anticipated to recover to pre-disturbance levels quickly (several days to several months) if habitat conditions are not changed. Sheldon and Meffe (1994) found that fish density and richness recovered completely in one to two months in experimentally defaunated pools in a small stream. The experimental design used by Sheldon and Meffe (1994) closely duplicates the impacts of fish mortality during stream crossing construction.

2. **Outside Project Limits**

Some fish may be killed by sediment discharged from projects or by entrainment into water pump intakes. Fish sensitivity to suspended sediment varies by species and life stage. Larval fish and fish eggs generally are more susceptible to effects of sediment than adult fish (Newcombe and Jensen 1996; Wood and Armitage 1997). Quantitative data regarding the susceptibility of the Topeka shiner to suspended sediment is not available; however, general guidelines are available for warmwater fishes. Some studies suggest that the Topeka shiner is at least somewhat tolerant of suspended sediment. Recent research has documented high density reproducing Topeka shiner populations in floodplain dugouts regularly disturbed by livestock watering (Thomson and Berry 2005). Also, many robust Topeka shiner populations have been documented from watersheds in South Dakota and Minnesota that are impacted by increased sediment loading due to changes in land use (Hatch 2001; Wall et al. 2001).

Little quantitative data is available to describe sediment discharge from stream crossing work sites; however, numerous qualitative data is available. Sediment discharges from stream crossings may occur at construction sites during storm events and when temporary water diversions are removed and installed (SDDOT 2005; SDDOT 2006). Sediment discharges from stream crossing construction sites are expected to be of short duration, occurring during temporary water barrier installation and removals, and limited to the period of active streambed disturbance. Installation and removal of temporary water barriers is normally completed in several hours. Large temporary water barriers such as coffer dams may be installed over a period of several days in which the disturbance to the streambed (i.e., driving steel pile into the stream bed) occurs at pulsed intervals during several eight to ten hour periods. Monitoring of water quality during water barrier installation suggests that turbidity is generally increased by 0 to 300 Nephelometric Turbidity Units

(NTUs) during the period of installation (SDDOT unpublished data). Sediment discharges resulting from storm water runoff are expected to be limited to the period of overland flow during the storm event. During most of the construction process it is anticipated that sediment discharges will not be significantly greater than background levels.

Based on a summary of studies on sediment impacts on other fishes it is anticipated that suspended sediment levels downstream of a project area would need to exceed 2981 mg/L for at least a 24 hr period to cause mortality of adult fishes (Newcombe and Jensen 1996). Model predictions reported by Newcombe and Jensen (1996) suggest that adult darters (*Percidae*) and creek chubs (*Semotilus atromaculatus*) are resilient to short term exposure (i.e., several hours) to intense sediment loads. It is expected that sediment discharges will not rise to a level that results in any adult Topeka shiner mortality outside project work limits. Larvae and eggs of freshwater fishes are more susceptible to suspended sediment than adults; however they are resilient to short duration exposure to intense sediment loads (Newcombe and Jensen 1996). We anticipate that for a sediment discharge to result in the mortality of Topeka shiner eggs and larvae discharge duration would need to approach or exceed 24 hrs (Newcombe and Jensen 1996). Sediment discharges causing mortality of Topeka shiner eggs and larvae may occur infrequently during large storm events that exceed the functional capacity of installed erosion and sediment control devices. It is unlikely that sediments discharged from stream crossing work areas during large storm events will be solely responsible for any mortality of Topeka shiner eggs or larvae that may occur near stream crossing projects. Processes independent of stream crossing construction that will likely cause Topeka shiner egg and larvae mortality to increase during storm events include elevated suspended sediment levels from other watershed sources (Bergstedt and Bergersen 1997), mobilization of streambed material (Leopold et al. 1964), and increased stream velocity (Harvey 1987). It is not anticipated that any Topeka shiner mortality outside the work limits of the project will occur due to sediment discharge during normal flow or minor storm events. If any Topeka shiner populations in downstream stream reaches are affected by project runoff, quick recovery from any impacts is anticipated. Brandt and Schreck (1975) found that baitfish density in a small stream did not differ between control reaches without harvest and experimental reaches in which baitfish were repeatedly harvested throughout the summer.

Some mortality of Topeka shiners may occur when fish are entrained in water pumps, impinged on intake screens at water pumps, or left stranded after dewatering. Guidelines are available to allow proper screen sizing at pump intakes to prevent fish entrainment and impingement (DFO 1995); if these are implemented it is anticipated that mortality at water pump intakes will occur infrequently and affect few individual fish. Wire mesh screens can reduce the entrainment of fishes $\geq$ 5 mm in length. Fishes $\geq$ 10 mm in length can be largely avoided through the use of wire mesh screens (Weisberg et al. 1987). Additional measures - such as avoiding placement of intakes in pool habitats during dewatering and use of larger screens surrounding those attached directly to pump intakes (to reduce vacuum effect) - would further minimize the risk of entrainment/impingement. Most larval cyprinids are 4 mm to 6 mm in length at hatch (Holland-Bartels et al. 1990). Detection, quantification, and removal of any Topeka shiner eggs within project boundaries is not logistically feasible. Any eggs present onsite may be entrained/impinged or, more likely, left to dessicate upon dewatering of project areas.

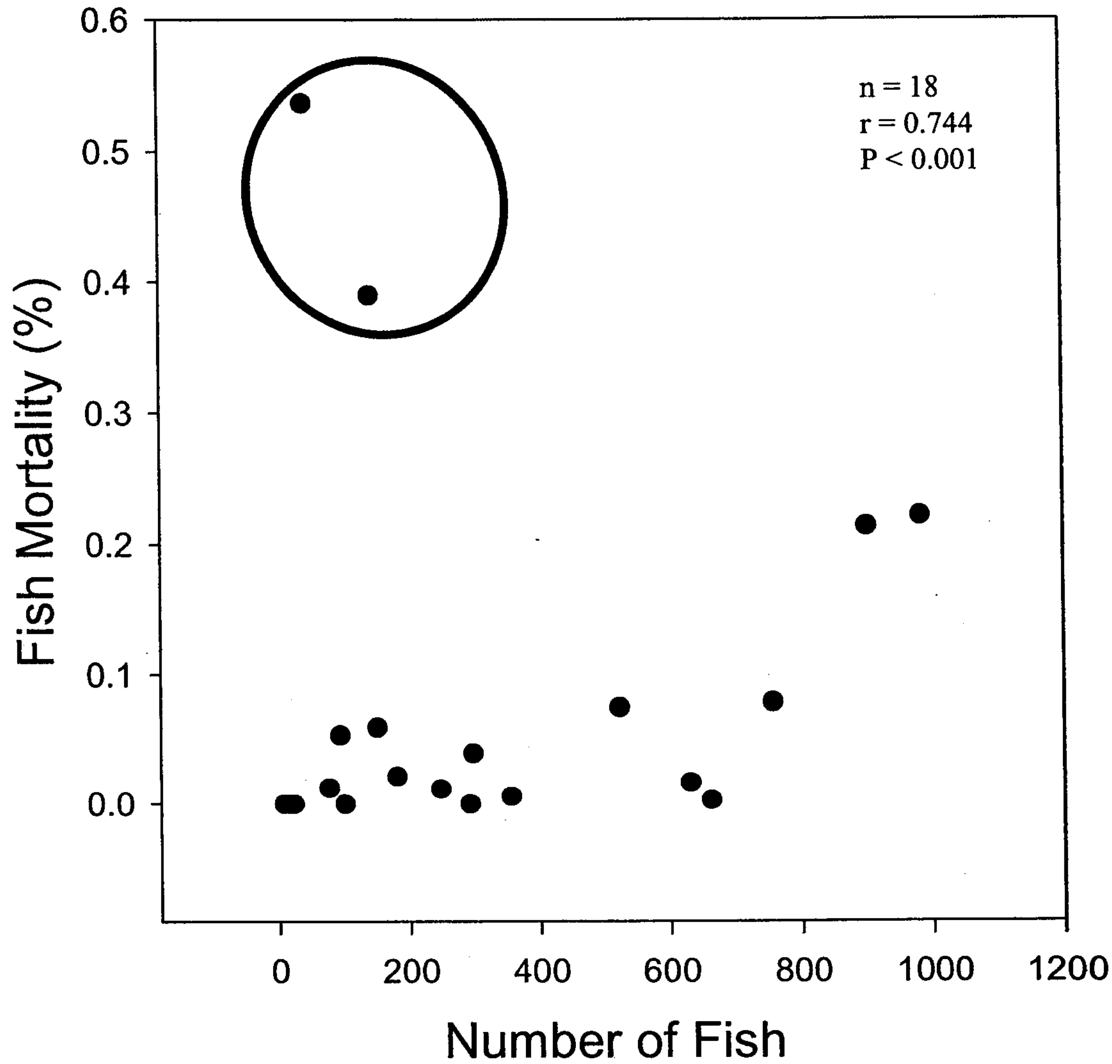

Figure 5. Relationship between total fish captured and % mortality of all fish removed from stream crossing construction sites. Two outlying data points (circled) were omitted from analysis. Both outliers were influenced by abundant silt (SDDOT 2005).

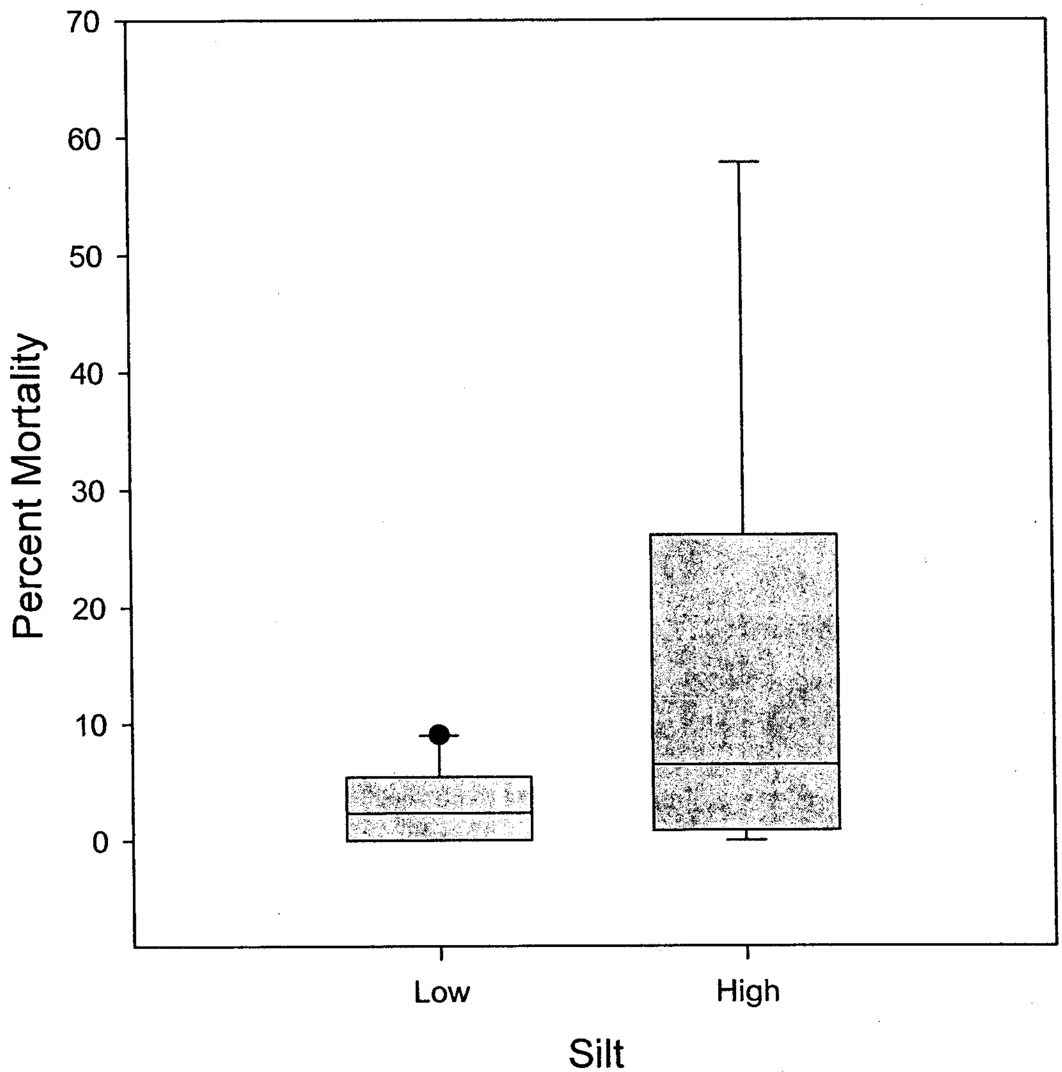

Figure 6. Box plot comparing total % fish mortality for fish removed from stream crossing construction sites with low silt (no sediment accumulated in the nets during seining) and high silt (silt accumulated in the nets during seining) (SDDOT 2005). The boxes represent 50% of the values and error bars represent the 10^{th} and 90^{th} percentiles. Dots are outlying data points.

B. Disturbance

It is expected that disturbance to Topeka shiners in close proximity to project work areas will likely occur at some stream crossing projects. Disturbance to Topeka shiners may occur because of construction noise (e.g., equipment, pile driving) or sub lethal pollutant discharges that cause fish behavior to be modified (Newcombe and Jensen 1996; Bergstedt and Bergersen 1997). Disturbance to Topeka shiners is expected to occur sporadically over the duration of active construction and may cause some individuals to avoid habitat immediately adjacent to the project. It is expected that if stream crossing projects comply with state water quality standards during construction no significant disturbance to fish outside the project work area will occur due to sediment discharge, however, occasional weather events may occur that will exceed the capacity of established sediment/erosion control measures and result in downstream disturbance.

C. Habitat Modification

It is anticipated that Topeka shiner habitat previously undisturbed by stream crossing presence will be directly impacted by the replacement of bridges with culverts and habitat will also be impacted by altered geomorphic processes and sediment loading at some structure replacement sites. Culverts can punctuate stream flow and substrate movement causing quantifiable changes in channel morphology (Gubernick 2003). It is expected under current practices that substrate accumulation will occur upstream of some culverts and streambed scour may occur downstream of some structures. Sediment loading during culvert construction may degrade stream habitat.

Several studies have indicated that large highway construction projects may negatively impact fish community structure and fish productivity (Sharma 2006; Taylor and Roff 1986; Barton 1977); however, impacts from bridge and culvert construction has not been demonstrated (Wellman et al. 2000). Fine sediment deposition associated with culvert presence and construction may reduce Topeka shiner density locally in the areas affected by silt (Taylor and Roff 1986; Barton 1977). Conversely, Topeka shiner density will likely increase locally in areas where perennial pool habitat is created. It is anticipated that sediment discharge from construction work sites will be positively related to total disturbed area, slope of the disturbed area, and duration of the disturbance (i.e., length of time soils are exposed).

D. Habitat Fragmentation

Current culvert design methods do not fully utilize upstream and downstream channel morphology to aid in determining placement depth of the structures. Culverts designed without consideration of stream geometry or geomorphic process may restrict or block free movement of Topeka shiners. Fragmentation of Topeka shiner habitat by blocked passage at culverts would likely cause quantifiable deceases in distribution, population size, and population viability.

Wall and Berry (2004) found that some culverts in South Dakota may restrict the free movement of Topeka shiners. Culverts examined by the authors were mostly corrugated metal pipe (CMP) culverts under the jurisdiction of county governments, and are not part of this federal action. However, some potential barriers identified by Wall and Berry (2004) would be included in the action. Typically, box culverts do not disrupt fish passage (Warren and Pardew 1998); however, culvert design and setting may cause some box culverts to block or restrict fish passage (Wall and Berry 2004). When stream geomorphic processes are not considered during the design phase of projects, some box culverts may isolate Topeka shiner subpopulations decreasing population viability and potentially leading to local extinction. Habitat fragmentation caused by this action is expected to occur infrequently; however, it represents the largest potential impact to the Topeka shiner.

In some instances habitats may be temporarily fragmented during construction. Based on the available literature, impacts from restricted fish passage during construction are unlikely to cause any biologically significant impacts to the Topeka shiner due to the short duration of fragmentation. Diversion channels used at box culvert construction sites typically allow fish passage during normal or base flow conditions but may restrict fish passage during abnormally high and low discharges (SDDOT 2005; SDDOT 2006).

E. Beneficial Effects

It is anticipated that some stream crossing replacements will result in a net ecological benefit for the Topeka shiner. Some stream crossing projects will replace existing structures that are suspected of blocking fish movement. For these projects it is expected that benefits from decreased habitat fragmentation will greatly exceed negative impacts caused by fish mortality, disturbance, and temporary impacts to habitat. For example, some projects will replace perched CMP with new box culverts. Also, it is expected that at some stream crossing projects impacts to stream habitat will be decreased when a small bridge or culvert is replaced with a larger structure (SDDOT 2005). Many stream crossings within the range of the Topeka shiner are small bridges that are approximately the width of that stream's two year channel. In some cases these structures are replaced with a bridge or culvert of similar width; however, frequently a wider structure is chosen. In cases when a narrow bridge is replaced by a much wider bridge, impacts to stream geomorphic processes are likely to be decreased. The positive benefits of projects that increase the streams ability to function in a natural manner will likely far outweigh any negative impacts that may occur during project construction.

American Burying Beetle

A. Mortality and Disturbance

Some mortality and disturbance of adult and larval beetles may occur when uplands adjacent to stream crossings are disturbed during construction. For mortality to occur beetles would need to be actively tending their young or over-wintering underground. It is assumed that beetles present above ground would flee the immediate area upon disturbance. Temporary water diversions, temporary traffic diversions, material borrow areas, and equipment staging areas may cause some beetle mortality. The majority of disturbance will occur in the road ROW and the actual stream channel. It is not anticipated that beetles will be present in those areas. Any American burying beetle mortality that may occur is expected to occur when riparian or upland habitat is disturbed during construction.

B. Habitat Modification

American burying beetles may use a range of habitats, but locally appear to prefer riparian areas. This may be due to the availability of carrion and/or characteristics of the habitat itself. Regardless of the reason, the projects proposed herein have the potential to impact small areas of upland and riparian habitat, at least on a temporary basis.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Topeka Shiner

As stated in the Environmental Baseline section above, agricultural tiling is an emerging activity in South Dakota that may have detrimental effects on the Topeka shiner. It appears, anecdotally, that tile installation is on the rise. If this practice becomes more prevalent within the Topeka shiner's range in South Dakota, it potentially could impact Topeka shiner streams via several factors including, but not limited to: alteration of the flow regime; lowering of groundwater tables; direct transport of fertilizers, pesticides, and herbicides to the stream, and scour of the streambed.

As noted earlier, the expansion of the City of Sioux Falls has occurred and continues as of this writing at a rapid pace. The development of urban areas along occupied streams adjacent to the city has the potential to impact the species in the future via loss of adjacent wetlands and riparian area, increased surface runoff, pollutants, channelization, and more.

Actions related to the ethanol industry may affect the Topeka shiner if it the industry continues to expand. New ethanol plants may affect groundwater supplies to Topeka shiner streams and alter instream flow regimes and/or temperature by water discharges into occupied waterways. Increased corn production in areas that would otherwise remain in grass cover may affect Topeka shiner habitat as well, although as previously stated, much of the farmable grasslands in eastern South Dakota have already been converted to agriculture.

There is also ongoing interest in development of additional and larger confined animal feeding operations. By-products of these facilities can include wastewater with pollutants, warmwater discharges, and increased turbidity. However, these operations have to meet water quality standards (see SDENR's website regarding their CAFO General Permit: http://www.state.sd.us/denr/DES/Surfacewater/feedlot.htm) if discharges are to Topeka shiner streams or tributaries and therefore such development is not expected to have significant adverse affects on Topeka shiners.

In South Dakota it does not appear that the Topeka shiner is currently threatened by any imminent or substantial threats (Shearer 2003).

American Burying Beetle

The known range of the American burying beetle in South Dakota occurs in counties dominated by agriculture and grazing activities, with agriculture more prevalent in the eastern portion of the beetles range. These practices are likely to continue into the future, with little change anticipated. The relative isolation of these areas indicates that significant increases in urbanization are not likely, and in fact, the human population in the area may even decline over time, as has generally been the case in many areas of rural South Dakota over time. No large scale practices or activities are currently known or anticipated in this area that might affect the beetle.

INCIDENTAL TAKE STATEMENT

INTRODUCTION

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

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

AMOUNT, EXTENT, AND EFFECT OF TAKE

Topeka Shiner

Impacts to the Topeka shiner resulting from current FHWA/SDDOT stream crossing construction projects may include mortality of individuals, temporary disturbance of individual fish, habitat loss/modification, and habitat fragmentation.

It is expected that if Topeka shiners are present at individual stream crossing project sites, the number trapped within the enclosed work area will range between several fish and several hundred fish (Wall et al. 2001; SDDOT 2005; Wall 2005; SDDOT 2006). Typically the number is between 0 and 50 but up to approximately 300 adult and juvenile Topeka shiners at a site have been detected within FHWA/SDDOT construction zones to date (SDDOT 2005; SDDOT 2006). Direct mortality is expected to be significantly less than 300 at most sites, and will be minimized wherever possible via efforts by SDDOT to remove fish prior to dewatering.

It is not possible to estimate with any level of accuracy the number of eggs and/or larval Topeka shiners that may occur within project areas. As noted previously, seasonal egg production from individual Topeka shiners is known (documented under controlled conditions) to range from 140 to 1,712 (Kerns 1983 *in* Hatch 2001), with averages documented at 261-284 in the northern part of its range (Minnesota) (Hatch 2001). Determining the number of eggs spawned at locations in the field would be extremely difficult. Despite the inability to quantify this level of take, however, the Topeka shiner's r-selected life history strategy likely renders the effects of occasional construction-induced mortality insignificant at any meaningful ecological scale. Construction activities causing disturbance are expected to be short term (i.e., weeks to several months) and impart minimal or no effects on Topeka shiner distribution/abundance.

Similarly, the true number of adults, juveniles, larvae and eggs that may be impacted by disturbance and sedimentation outside the project construction zone cannot be determined with accuracy. Disturbances causing individual fish avoid the area would be very difficult to ascertain, but any affects would likely be insignificant and temporary as fish merely avoid the project area. Sedimentation affecting downstream habitat and individuals of the species would also be difficult to ascertain, but by implementation of comprehensive and effective sediment and erosion control measures, FHWA/SDDOT strives to uphold water quality standards necessary to be protective of the Topeka shiner. Major weather events that might breach these measures and exceed state water quality standards are anticipated to be short-lived and will be quickly remedied so as to avoid chronic long-term conditions that are more likely to adversely affect downstream populations.

It is anticipated that Topeka shiner habitat previously undisturbed by stream crossing presence will be directly impacted by the replacement of bridges with culverts and by culvert extensions or placement of longer culverts at a rate of 600 – 900 ft/yr. In 2004 and 2005, such stream crossing projects impacted 686 ft and 787 ft of Topeka shiner habitat. In addition to habitat modified by culvert presence, an unspecified amount of habitat will be impacted by altered geomorphic processes and sediment loading at some structure replacement sites. Sediment loading during culvert construction may degrade stream habitat; however, impacts to fish community structure may not be quantifiable (Wellman et al. 2000).

An estimated 1,144 stream crossings structures presently impact about 19.46 stream miles (approximately 1.1%) of Topeka shiner habitat. Of these structures 750 are eligible for federal bridge replacement funds, while the remaining 394 structures do not meet size requirements to qualify for federal replacement funds. Approximately 4,092 linear ft of Topeka shiner habitat is anticipated to be directly impacted if 10 % of bridges eligible for federal bridge replacement funds are replaced with culverts. Based on a 25 % bridge to culvert conversion ratio, an estimated 10,320 linear ft of Topeka shiner habitat would be affected. The total impact, if every existing structure that could be replaced were replaced, would be between 4,092 and 10,320 linear ft of stream channel resulting from the replacement of between 66 and 168 bridges with culverts. This additional impact represents between 0.04 % and 0.1 % of the stream miles inhabited by the Topeka shiner (Figure 7).

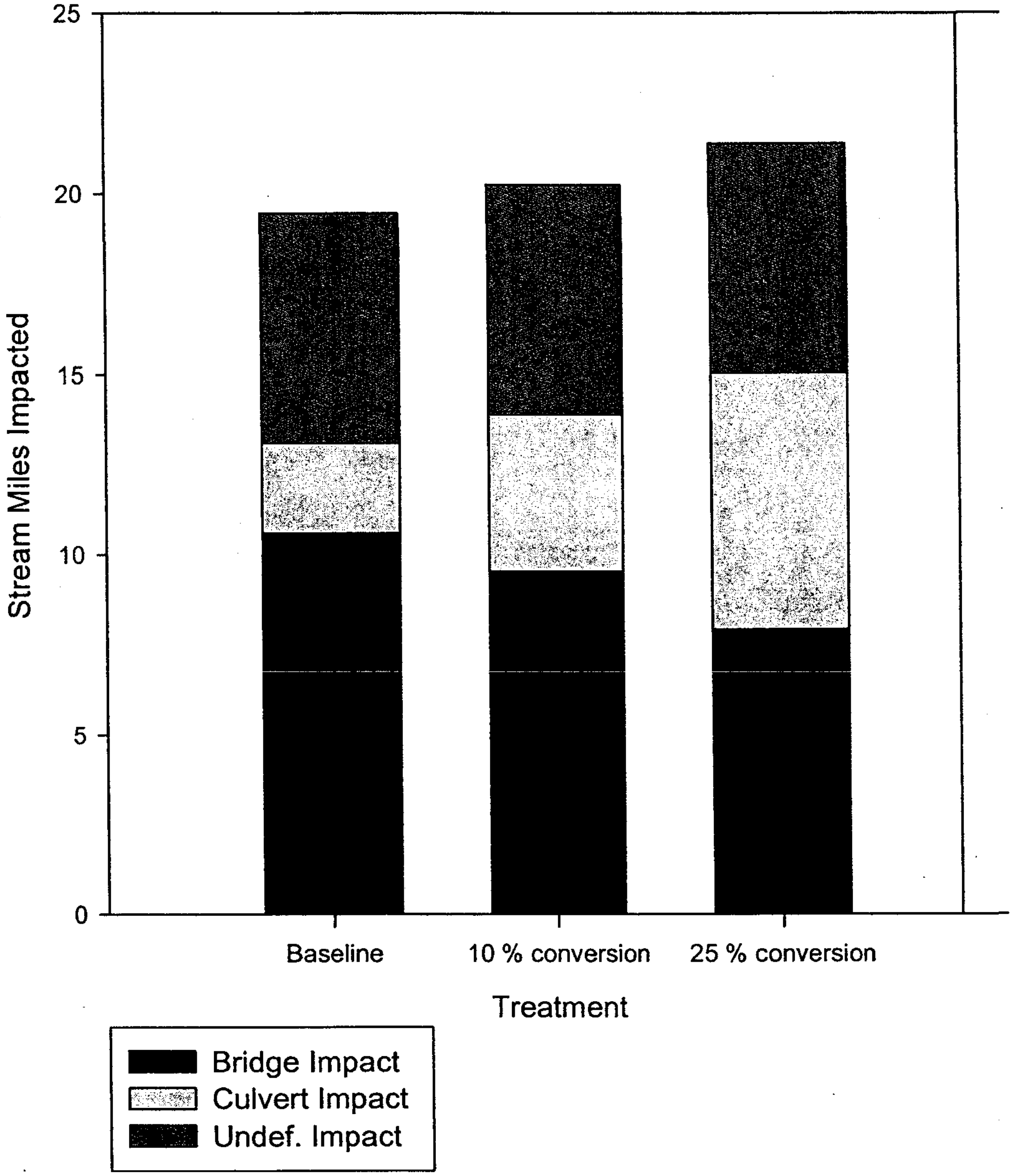

Figure 7. Bar graph displaying stream miles estimated to be impacted by stream crossing presence at the current level (baseline), if 10 % of existing bridges are converted to culverts, and if 25 % of existing bridges are converted to culverts. Undefined Impacts are those from stream crossings not included in this action (e.g., local government or private crossings).

Projects replacing stream crossings typically disturb < 2 acres of ground, while large grading projects may disturb several hundred acres. The number of projects constructed annually varies and is dependent on funding. Typically about 20-25 projects may occur in Topeka shiner areas in a given year, but may range from 10-40. It is not expected that habitat modification resulting from structure replacement will cause declines in Topeka shiner distribution (Wellman et al. 2000); however, local abundance may either increase or decrease in the areas where habitat is altered.

With exception of habitat fragmentation (where a stream-crossing structure precludes Topeka shiner passage and results in extirpation of the species from much, or all, of the isolated stream segment), the extent of take is anticipated to be localized and not likely to impact entire instream populations of the Topeka shiner. The overall effect of take would be a reduced number of individuals occupying a stream segment, but again, unless fragmentation occurs, is not expected to occur at a scale that would be detrimental to the persistence of an entire population in a given waterway.

The amount, extent, and ultimate effect of the anticipated incidental take of the Topeka shiner, as well as strategies to minimize that take, are summarized in Table 3.

Table 3: Summary of incidental take that may occur under the proposed action, estimated biological impact of that take, and means to minimize the effect of incidental take.

Impact Type	Expected Take and Frequency of Take	Impact of Take	Means to Minimize Impact
Mortality	Between 1 and 300 adult and age-0 fish trapped within the construction work limits at approximately 20 % (2-10/year) of projects likely to affect the Topeka shiner. It is anticipated that up to 1,000 linear feet of stream may be dewatered during construction activities (most culvert projects will disturb 200 - 500 ft, bridge projects disturb less)	Temporary, localized impacts anticipated to rebound to pre-project conditions within 1 year or less. Not expected to cause long-term declines in fish density or species distribution.	Limit project work area to minimum practical area. Remove fish from work areas prior to dewatering.
	Unspecified number of Topeka shiner eggs/larvae both inside and outside of construction work limits occurring infrequently.	Likely isolated single-time events, not expected to cause long-term declines in downstream fish density.	Implement, monitor and maintain comprehensive and effective erosion and sediment control measures. Adhere to warmwater fishery water quality standards. Minimize project footprint and duration. Use fish screens on pump intakes.
Disturbance	Disruption of unspecified number fish in close proximity to project work limits at approximately 20 % (2 – 10/year) of projects likely to affect the Topeka shiner.	Temporary, localized avoidance behavior, will not incur any long-term effects.	Limit project duration to minimum practical.
Habitat Loss	Direct alteration of habitat by placement of concrete and rip rap at rate of approximately 600 - 900 ft/yr.	Fish density in the area impacted may decrease; significant affects to instream population and species distribution not expected.	Design structures based on channel geometry and allow for natural channel substrate within culverts.
	Indirect alteration of unspecified amount of habitat by punctuation of geomorphic processes. Frequency of occurrence not known.	Fish density in the area impacted may increase or decrease; overall instream species distribution not expected to significantly change.	Design structures based on channel geometry. Monitor for indirect impacts to stream outside of direct project footprint.
	Direct alteration of unspecified amount of habitat by sediment discharge during construction. Occurrence expected to be infrequent.	Localized habitat use (fish density) may decrease if spawning areas are impacted; overall distribution not expected to decline long-term.	Implement, monitor and maintain comprehensive and effective erosion and sediment control measures. Adhere to warmwater fishery water quality standards. Minimize project footprint and construction duration.
Habitat Fragmentation	Isolation of unspecified number of Topeka shiner subpopulations. Occurrence expected to be infrequent.	Species distribution/abundance may decrease if populations are extirpated from isolated stream segments.	Design structures based on channel geometry. Monitor long term for fish passage. Remedy problematic structures.
	Fish movement temporarily restricted for several weeks to several months during construction. Occurrence is expected to be infrequent.	Long term impacts to species distribution and/or density or population not expected.	Minimize duration of projects. Design diversion channels to accommodate fish passage.

American Burying Beetle

The American burying beetle may be adversely affected by the proposed stream-crossing projects via disturbance, direct mortality of adults and juveniles, and/or modification of available habitat. Disturbance effects would likely be minimal; the beetles are mobile and are anticipated to leave the project area with commencement of disturbance activities, unless they are underground tending their young or overwintering. Direct mortality of adults, juveniles, and/or eggs may occur at project sites, however, determining actual level of mortality (e.g. number of dead beetles on an annual basis) would be extremely difficult. Determining that the habitat disturbed by a project that is actually utilized by the beetles is also difficult, but the presence of carrion is possible nearly anywhere and if soils are suitable for carcass burial then use is assumed and loss of available habitat may occur with projects affecting riparian areas.

Despite the difficulty in assessing actual impacts to the beetle, consideration of factors relating to the biology of the beetles and aspects of stream-crossing projects infers that any impacts as a result of these are not likely to affect the South Dakota population of American burying beetles. The species is very mobile, relatively wide-ranging, generally solitary, and reproduction involves a single pair laying eggs on a single small buried carcass. Other than breeding adults with eggs/juveniles, groups of the beetles are not likely to be encountered underground. Therefore if mortality of beetles as a result of ground disturbances occur, relatively few individuals of the population would be lost. The scale of most stream-crossing projects is small (<1 – 3 acres), the work is usually isolated to the streambed and immediately adjacent riparian area/ROW, and relatively few stream-crossing projects (0 – 3) occur annually in the South Dakota range of the burying beetle. Thus, while the extent of take as a result of these projects would be a direct loss of (or temporary disturbance to) an unquantified number of individual beetles, the level of impact to the South Dakota population overall as a result of FHWA/SDDOT stream-crossing structures is expected to be negligible. Impacts to the American burying beetle may be best reported/assessed via area of upland and riparian habitat disturbed during construction which may range from 0-9 acres annually.

REASONABLE AND PRUDENT MEASURES

By incorporating the following reasonable and prudent measures (RPMs) in this incidental take statement they become non-discretionary and must be implemented on projects impacting the Topeka shiner and/or American burying beetle so that they become binding conditions of construction activities authorized, funded or carried out by FHWA/SDDOT in order for the exemption in section 7(o)(2) to apply. The FHWA/SDDOT has a continuing duty to regulate the activity covered by this incidental take statement. If the FHWA/SDDOT fails to ensure compliance with these reasonable and prudent measures and their associated terms and conditions, the protective coverage of section 7(o)(2) may lapse. The following RPMs are necessary and appropriate to minimize take:

RPMs that apply to projects affecting the Topeka shiner:

1. Stream crossings constructed under this biological opinion will not impact stream

connectivity or fish movement and diversion channels installed will be designed to allow for fish passage during construction.

2. Topeka shiner mortality will be minimized by a) removing fish from isolated work zones, b) applying measures to avoid entrainment/impingement of fish at pump intakes, and c) ensuring the volume of water withdrawn outside of isolated work zones does not lower instream flows to a level that may impact fish.
3. Comprehensive and effective sediment/erosion control plans will be implemented, monitored and maintained during all phases of construction, including post-construction, until sites are permanently stabilized. Construction practices will minimally impact stream habitat and adjoining riparian and grassland habitat.
4. Long term monitoring will be required to ensure stream crossing structures constructed under this biological opinion do not fragment Topeka shiner habitat and the degree/level of indirect effects of instream habitat modifications due to structure placement, post-construction, will be evaluated.
5. FHWA/SDDOT personnel, construction contractors, and engineering consultants will receive appropriate training regarding the requirements of this biological opinion.
6. An annual report will be provided that reviews activities conducted under this biological opinion.
7. New scientific information will be integrated into the terms and conditions of this opinion as it becomes available.

RPMs that apply to projects affecting the American burying beetle:

1. Construction practices used to build stream crossing structures will minimally impact adjoining riparian and grassland habitat.
2. FHWA/SDDOT personnel, construction contractors, and engineering consultants will receive appropriate training regarding the requirements of this biological opinion.
3. An annual report will be provided that reviews activities conducted under this opinion.
4. New scientific information will be integrated into the terms and conditions of this opinion as it becomes available.

TERMS AND CONDITIONS FOR THE TOPEKA SHINER

In order to be exempt from the prohibitions of section 9 of the ESA, the FHWA/SDDOT must comply with the following terms and conditions (TCs), which implement the RPMs described above and outline required reporting/monitoring requirements. These TCs are non-discretionary.

TCs related to Topeka shiner RPM 1 – habitat fragmentation/fish passage:

A. Natural channel forming processes will be maintained by sizing stream crossings according to bankfull (Q_2) channel size, streambed slope, and channel complexity.
B. The floor elevation of culverts will be set below flow line of the stream as appropriate to facilitate the development of normal channel features within the culvert. The stream flow line will be determined with survey points collected longitudinally along deepest point in

the stream channel. Linear regression will be used to describe the mean flow line and associated variability. At a minimum the culvert floor elevation will be set six inches below the stream flow line.

C. Culvert width shall be at least 1.2 times the Q_2 width unless special circumstances dictate otherwise. The Q_2 channel width shall be estimated using project survey data and peak flow estimation models; however, other methods may be used if appropriate.
D. Installed diversion channels must be at grade with stream bed with no obstructions to fish passage.

<u>TCs related to Topeka shiner RPM 2 - minimize fish mortality</u>:

A. Fish trapped within a project work area will be captured and relocated into an adjacent stream section unless site conditions prohibit fish seining. Oversight for final water enclosures, de-watering, fish seining and any fish transfer or movement shall be conducted by a biologist under contract to the SDDOT.
B. Fish screens shall be attached to all pump intakes that withdraw water from locations that may harbor the Topeka shiner. Fish screens shall be sufficient to prevent fish entrainment and impingement at pump intakes and should be utilized in conjunction with other methods (e.g. avoiding pool habitats, placing screened intakes within larger screened containers to reduce vacuum effect) if determined necessary to minimize impacts to individuals.
C. Withdrawing water from Topeka shiner inhabited streams (outside of stream-crossing construction sites where dewatering is necessary) will not be allowed if the amount of water withdrawn affects habitat volume. A case-by-case analysis shall be conducted that considers current stream discharge and the volume of water to be extracted. The amount of water allowed to be withdrawn will be based on stream discharge.

<u>TCs related to Topeka shiner RPM 3 - sediment, & erosion controls and minimization of construction footprint</u>:

A. Construction activities shall not cause state water quality standards established by the SDDENR to be exceeded; any such actions will cease and resume only when comprehensive and effective BMPs are implemented and downstream water quality criteria has been restored to levels allowed by the water quality standard.
B. Construction activities will not be allowed within the active stream channel unless the area to be impacted has been isolated from the remaining stream channel with a temporary water and/or sediment barrier. Temporary barriers will be designed to preclude violation of state water quality standards described above.
C. Construction activities at all times within the stream, along the stream banks, and in areas that drain into the stream will not be allowed unless a comprehensive and effective erosion and sediment control plan is maintained throughout all phases of construction, including post-construction stabilization.
D. Comprehensive and effective measures to prevent contaminants such as fuels, chemicals, cement sweepings, washings, and any other associated by-products of stream-crossing projects from entering waterways will be utilized at all times during all phases of each project.

E. Riparian and grassland habitats will be avoided with exception of activities critical to the construction process and that are specified in the project plans. Ground disturbing activities outside of the project work limits will only be allow if first approved by the SDDOT environmental office.

TC related to Topeka shiner RPM 4 - monitoring:

A. Within 1 year of completion of this consultation, a monitoring plan shall be developed and implemented by the FHWA/SDDOT in coordination with the USFWS to evaluate current design plans of stream-crossing structures for success in precluding fish passage problems and fragmentation of Topeka shiner habitat, as well as to determine adverse affects to upstream/downstream habitats. Upon completion, the plan shall be appended to this biological opinion.

B. The following proposed actions/criteria are anticipated for this plan:
   1. Monitoring will be conducted on an annual or perhaps biennial basis and will continue until such time as it is determined that the protocol requires modification or is determined to be unnecessary.
   2. Initial evaluation may be qualitative or quantitative, but projects suspected of impacting stream connectivity will be quantitatively evaluated.
   3. Swimming capabilities of the Topeka shiner, the existence of natural stream channel morphology and substrates within culverts, the presence of aggradation areas and/or scour holes upstream and downstream of culverts, and the presence of fish upstream and downstream of culverts should be among the factors considered in development of this plan.
   4. A fish passage research study, ongoing as of this writing via SDDOT's research branch, may yield information to guide development of monitoring protocols. Results of that study shall be reviewed and any pertinent information shall be incorporated into the monitoring plan.
   5. Provisions will be established as part of this plan to remedy any stream-crossing structures identified as prohibiting Topeka shiner passage and/or significantly altering upstream/downstream habitat.

TCs related to Topeka shiner RPM 5 - training:

A. A pre-construction meeting shall be held with the primary contractor, pertinent sub-contractors, project engineer and project biologist to ensure all permit conditions and plans are clearly understood.

B. Appropriate training shall be provided for FHWA/SDDOT personnel, engineering consultants, construction contractors, regarding erosion control, water withdrawal methods, diversion channel construction to allow fish passage, and permanent fish passage design criteria.

C. Contractors working on stream-crossing projects will be certified by SDDOT as having expertise in required sediment/erosion control measures.

TCs related to Topeka shiner RPM 6 – reporting:

A. Instances resulting in noncompliance with any of the RPMs and TCs herein shall be immediately reported to the USFWS Field Office, Pierre.
B. The FHWA/SDDOT shall submit to the USFWS by March 1 of each year, a report of the previous year's actions conducted under this biological opinion to document implementation of the above mentioned terms and conditions, to evaluate the effectiveness of those terms and conditions, and to quantify project impacts.
C. Relevant reported information in the annual report shall include, but not be limited to:
    1. Number, locations, and types of projects completed.
    2. Notification of any changes from template biological assessments regarding descriptions of proposed projects, and any additional pertinent information.
    3. Information regarding fish passage design specifications.
        a) Culvert floor elevation or top elevation of channel rip rap.
        b) Longitudinal profile of stream channel.
        c) Estimate of Q_2 channel width.
        d) Culvert width.
        e) Assessments of finished culverts.
    4. Project timing and duration.
    5. Quantitative results of water quality monitoring, including information regarding the use/success of BMPs.
    6. A list of fish species collected when fishes are moved from project work areas.
    7. Number of sites where Topeka shiners were collected, number or estimate of the number of individuals occurring onsite, and mortality estimates, if any.
    8. Any pertinent information regarding the impact of the project(s) on federally listed species which were determined by FHWA/SDDOT to fall under either the "no effect" or "not likely to adversely affect" categories of impacts.
    9. Length of stream (linear feet) impacted by the project.
        a) Stream banks: permanent length impacted.
        b) Stream bed: temporary and permanent length impacted.
    10. Estimate upland or riparian area (acres) disturbed during construction.
    11. A description of water extraction activities.
        a) Location of extraction.
        b) Maximum daily rate of extraction.
        c) Stream discharge at locations where water extraction is suspected of impacting habitat volume.
        d) Effectiveness of measures utilized to preclude entrainment/impingement.
    12. A qualitative description of any temporary water diversions used to route water around project work areas and success in allowing fish passage during construction.
    13. A description of conservation recommendations implemented.

TC related to Topeka shiner RPM 7 – incorporation of new scientific information:

The agencies recognize that ongoing research and further knowledge about the impacts of transportation infrastructure on the Topeka shiner may lead to revision of the terms and conditions of this biological opinion. Such revisions will be reviewed to determine if reinitiation of formal consultation is required. Revisions or alterations to the terms and conditions of this opinion or special provision shall be agreed upon by FHWA, SDDOT, and the USFWS prior to implementation, and may be included as amendments to this opinion.

TERMS AND CONDITIONS FOR THE AMERICAN BURYING BEETLE

TC related to American burying beetle RPM 1 - minimization of construction footprint impacts:

Riparian and grassland habitats will be avoided with exception of activities critical to the construction process and that are specified in the project plans. Ground disturbing activities outside of the project work limits will be reviewed by the SDDOT environmental office and will not be allowed if those activities may impact the American burying beetle.

TC related to American burying beetle RPM 2 - training:

A pre-construction meeting shall be held with the primary contractor, pertinent sub-contractors, project engineer and project biologist to ensure all permit conditions and plans are clearly understood.

TCs related to American burying beetle RPM 3 – reporting:

A. The FHWA/SDDOT shall submit to the USFWS by March 1 of each year, a report of the previous year's actions conducted under this biological opinion to document implementation of the above mentioned terms and conditions, to evaluate the effectiveness of those terms and conditions, and quantify project impacts.
B. Relevant information in the annual report shall include, but not be limited to:
   1. Area (acres) of riparian and grassland habitat disturbed during construction.
   2. Description of contractor option work areas that were not included in the original project plans.
   3. Number and location of project impacting the American burying beetle.

TC related to American burying beetle RPM 4 - application of new scientific information:

The agencies recognize that ongoing research and further knowledge about the impacts of transportation infrastructure on the Topeka shiner may lead to revision of the terms and conditions of this biological opinion. Such revisions will be reviewed to determine if reinitiation of formal consultation is required. Revisions or alterations to the terms and conditions of this opinion or special provision shall be agreed upon by FHWA, SDDOT, and the USFWS prior to implementation, and may be included as amendments to this opinion.

APPENDING STREAM-CROSSING PROJECTS TO THIS BIOLOGICAL OPINION

A template biological assessment will be submitted for each project proposed by FHWA/SDDOT for inclusion under this biological opinion. The format of this template biological assessment will be formulated jointly by FHWA, SDDOT and the USFWS and may be modified in the future as deemed necessary by all parties without reinitiation of formal consultation.

In order to streamline the consultation process, the template biological assessments will contain sufficient information to indicate the eligibility of the proposed stream-crossing project to be appended to this biological opinion. If the USFWS concurs, and no additional environmental impacts to USFWS trust resources are identified, a stamp of "No Objection" may be applied to the template biological assessments. A copy will be retained in USFWS files, a copy sent to the FHWA, and the original returned to the SDDOT. If the USFWS does not concur, or the FHWA/SDDOT submits a proposal that falls outside the parameters outlined in their biological assessment and this biological opinion, individual consultation procedures may be utilized.

Project proposals submitted for consideration under this biological opinion will be in the form of this template biological assessment should include, but not be limited to:

A. Location of the proposed project.
B. The eligibility of the proposed project to be covered under this biological opinion.
C. Listed species that may occur at the project site, the application of the determinations to each listed species made by FHWA with USFWS concurrence as described in this biological opinion, and any additional pertinent information.
D. If appropriate, reference the version, by date, any SDDOT special provisions to be complied with. It is anticipated that special provisions may change as new information and technologies are developed, thus it is important to reference the most current version.
E. A preliminary description of fish passage design criteria and project footprint.
F. A list of any conservation recommendations to be applied at the project.

CONSERVATION RECOMMENDATIONS

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

1. Develop methodology to identify, track, and prioritize for replacement any existing structures (those not appended to this biological opinion) that are found to fragment Topeka shiner habitat.
2. Develop strategies that can enhance riparian habitat along known and potential Topeka shiner streams and within the South Dakota range of the American burying beetle. This could include measures such as fencing of riparian zones to prevent over grazing, off site water development for livestock, planting of buffer strips, or the use of bioengineering bank stabilization techniques.
3. Develop strategies to improve instream habitat for Topeka shiners. For example, the FHWA/SDDOT may provide technical assistance to other agencies addressing fish

passage issues.

REINITIATION OF CONSULTATION

As required by 50 CFR 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 impact listed species or critical habitat in a manner or extent not considered in this biological opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the action.

The USFWS believes that with implementation of the reasonable and prudent measures and terms and conditions herein, the amount of incidental take of Topeka shiners as a result of transportation-related stream-crossing projects in South Dakota will be at a level that would not compromise any known Topeka shiner streams' ability to continue supporting populations of Topeka shiners. These measures are designed to minimize the impact of incidental take that might otherwise result from the proposed actions. If, during the course of the monitoring required for these projects, it is discovered that this level of incidental take is exceeded, such incidental take represents new information which may indicate the inadequacy of the reasonable and prudent measures provided. The FHWA/SDDOT shall contact the USFWS to provide an explanation of the causes of the taking and review with the USFWS the need for possible modification of the reasonable and prudent measures and terms and conditions.

The level of anticipated incidental take is difficult to definitively quantify. Therefore in order to assist our evaluation of project impacts we require that our office be contacted if: (a) activities at single project fragment a previously continuous segment of stream habitat, (b) if extensive impacts occur outside of the normal project footprint, (c) if contaminant, sediment, and erosion controls fail causing violation of water quality standards, and (d) mortality of high numbers (greater than 300) of Topeka shiners occur or have the potential to occur (e.g. a spill of fuel in a Topeka shiner stream that could cause downstream impacts). If these conditions are violated, we will conduct further analysis and consider possible adjustments to the reasonable and prudent measures and terms and conditions as necessary. The FHWA/SDDOT must immediately provide an explanation of the causes of any exceedances of the take level described above and review with the USFWS the need for possible modification of the reasonable and prudent measures.

CLOSING STATEMENT

This biological opinion is based on the best scientific and commercial data available as described herein. The USFWS has determined that the impacts of the proposed action are not likely to jeopardize the continued existence of the Topeka shiner nor the American burying beetle. Reasonable and prudent measures and terms and conditions designed to minimize incidental take of the species were identified through this consultation.

This concludes formal consultation on the actions outlined in the FHWA biological assessment regarding stream-crossing projects administered/funded by FHWA/SDDOT in South Dakota with exception of Missouri River projects.

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