

Compliance Report for 2015: Biological Opinion for Stream-Crossing Projects  
Administered/Funded by the South Dakota Department of Transportation and the Federal  
Highway Administration

By:

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Introduction:

In August of 2008 a new Biological Opinion (Opinion) was accepted by the United States Fish and Wildlife Service (FWS) for projects implemented by the South Dakota Department of Transportation (SDDOT) and the Federal Highway Administration (FHWA). In this newest Opinion, policy changes allowed construction projects to proceed during the previous “blackout period” (May to August). However, for implementation of this “no blackout” construction schedule some new and additional Reasonable and Prudent Measures (RPMs) were set in place:

- 1) Habitat fragmentation/ Fish Passage
- 2) Minimize Fish Mortality
- 3) Sediment and Erosion Controls
- 4) Monitoring
- 5) Training
- 6) Reporting
- 7) Including Current or New Scientific Information

In this document data will be included on 1) each RPM which can be found in the reporting forms (Appendix 1) and in the text to follow, 2) the efforts to implement a monitoring program, 3) turbidity monitoring at construction sites, and 4) a brief section on recent scientific publications.

In addition to the new RPMs, three Conservation Recommendations (CR) were implemented in the 2008 Biological Opinion:

- 1) Develop methodology to identify, track, and prioritize, for replacement, any existing structures that are found to fragment Topeka shiner habitat.
- 2) Develop strategies that can enhance riparian habitat along known and potential Topeka shiner streams.
- 3) Develop strategies to improve in-stream habitat for Topeka shiners.

There are currently discussions with three other state DOTs and two other Fish and Wildlife offices on applying tracking measures to culverts. Missouri recently implemented a tracking and mitigation program. Information on this program is being collected to see if similar procedures might be utilized by South Dakota for tracking fish passage concerns. Similarly, biologists at Kansas State University and South Dakota State University are also being contacted in regards to prioritizing culverts, particularly in Topeka shiner habitat.

During Type, Size, & Location (TS&L) and preconstruction meetings, riparian habitat protection measures are usually discussed with contractors and engineers. Typically this involves recommending bioengineering around the structure, maintaining a section of natural stream bottom through the structure (if a bridge is going in), and ensuring all BMP's will be used and maintained accurately. Development of construction practices which will protect or improve habitat available to stream fish (including the Topeka shiner) is under consideration. Other countries (New Zealand, Australia, and some African Countries) are trying to minimize in-stream work by leaving the channel

intact with work zones outside the banks two to four feet. However, more research is needed to get a complete picture of stream habitat maintenance.

Summary of Construction Activities:

In this Annual Compliance Report, data related to construction at 23 bridges, culverts, and pipes built in the State of South Dakota by the Department of Transportation will be documented (Tables 1 and 2). This data will relate to Reasonable and Prudent Measures (RPMs) and Conservation Measures (CMs) indicated in the Biological Opinion: Stream-Crossing projects funded/administered by the South Dakota Department of Transportation and the Federal Highway Administration (Opinion). All structures reported on in this document were completed between January 1<sup>st</sup> 2015 and December 31<sup>st</sup> 2015. It should be noted that with limited resources and the complications of locating projects, it is possible that a minimal number of “Affect, Not Likely to Adversely Affect” projects may be missing from this document. It is certain that all “Affect, Likely to Adversely Affect” projects have been located and totaled for this report. At present, a way to collect and file documents related to the Biological Assessments (B.A.s) is being devised.

For 20 construction projects within the Topeka shiner range during 2015, 15.17 acres of riparian area was temporarily affected by vehicles or construction activities. Three of the 20 projects listed in the SDDOT Project Reporting Forms affected over 1.0 acre in 2015. Fourteen of the 20 projects listed affected between 0.2 and 0.6 acres. Observations of projects under construction indicated that the reported 0.2 to 0.6 acres may be greater than the area that is actually affected by activities.

Summary of Problems Encountered During Construction:

Contractors and Project Engineers were informed of requirements listed in the *Biological Opinion* and the *Topeka Shiner Special Provision*. To our knowledge, requirements were followed for projects completed in 2015 with only three exceptions. During seining and project inspection, it was observed that erosion control was insufficient and installed incorrectly at structures 50-030-065, 50-030-052, and 50-030-049 in Minnehaha County (pages 35-40 of this report). The SDDOT Project Engineer, FHWA, and the primary contractor were notified of the problem. Erosion and sediment control BMPs were corrected.

Summary of Habitat Impacts:

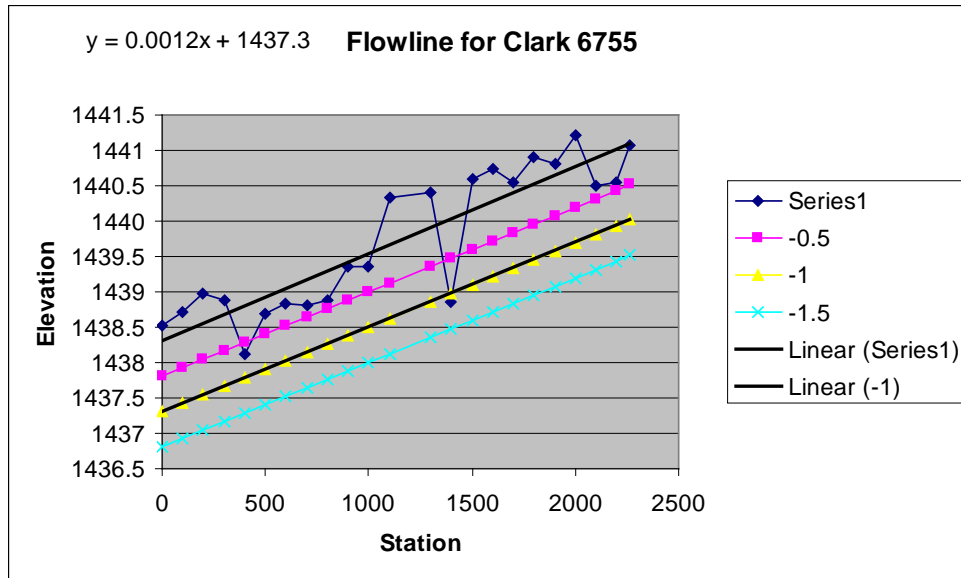
Projects in 2015 which were listed to “Affect, Likely to Adversely Affect” the Topeka shiner totaled 20; and 3 projects were listed “Affect, Not Likely to Adversely Affect” the Topeka shiner (Table 1). The RPMs of the Opinion are applied on projects which will “Adversely Affect.” This is due to the fact that anticipated “take” of Topeka shiner is expected to be zero at sites “Not Likely to Adversely Affect.”

The 20 stream crossings permanently impacted 2,763.98 feet of stream channel. This length of channel impact is primarily due to placement of structures, scour protection in and along the stream, and riprap erosion protection along the banks of the stream. Riprap placement made up 1,184.00 feet of stream channel impact. The primary cause of this impact was placement of riprap at the inlet and outlet of box culverts, and riprap placed for abutment protection at bridges. Riprap placement for scour protection projects at bridge abutments, and upstream and downstream of bridge abutments (980

feet) accounted for the majority of stream channel impact due to riprap. The remaining 204 feet of riprap placement occurred at inlets and outlets of box culverts and concrete arch pipes. The remaining 1,579.98 feet of stream channel impacts to the channel was due to replacing an old structure with a new longer structure, or extending the ends of an existing structure (Table 2).

#### *Flowlines and Bankfull Width in Relation to Fish Passage*

In general, culvert projects affect more stream channel than bridge projects. Lengths of stream impacts reported in this document do not make any suggestion of the severity of impacts at individual project sites. Although culverts impacted more stream length than bridges, RPMs implemented at culvert projects minimized impacts to stream channels. All new culverts were lowered at least twelve inches based on elevations of the stream channel per the 2008 Opinion's Fish Passage RPM. From these elevations linear regressions were run and provided an estimation of flowlines; and the expected depth culverts should be countersunk in order for natural geomorphic processes to occur within the box.



**Figure 1:** Flowline regression for a prior project in Clark County (2012). “Series 1” is the actual elevations provided by our consultants, with this data a trendline is set (and can be seen in the highest solid black line). This is our expected flowline given the data and an elevation for the structure can be identified at the roadway station (in this example the roadway is at station 1000). Scour can be seen in front of and behind the roadway. Data series labeled with a (-) indicate possible culvert floor elevations.

Furthermore, the newest policy (March 2012) by the U.S. Army Corps of Engineers (COE) also requires new culverts and pipes at most stream-crossing projects to be countersunk a minimum of 12 inches.

In addition to ensuring fish passage by sinking the culvert floor, bankfull width of the channel is also measured based on the Q2 (normal discharge elevation) at five locations upstream and five locations downstream of the culvert or bridge. All channel profiles are provided by our consultants and have been standardized to every hundred feet for each measurement. Anomalies in the stream are bypassed, such as the area in close proximity to the structure or an area in which two streams come together, to give a more accurate representation of the stream channel. From this data an average bankfull width is determined, multiplied by 1.2 and then compared to the widths of potential structure



options. Structure options typically take this measurement into consideration already; if they have not then we require redesign of the structure.

The second RPM for the 2008 Opinion is to minimize fish mortality. RPMs 2 and 3 will be listed for each project in Table 3. Seining was conducted at three sites in 2015. Of these three sites, construction activities were completed at only two (PCNs 02RX, 5319) in calendar year 2015. It is expected that the third seining site (PCN 022C, structures 06-184-074/06-185-074) will be included in the Annual Report for calendar year 2016. Eleven sites where seining was conducted in calendar year 2014 (PCN 025Z (9 sites), PCN 034S, PCN 020S) are also included in this report, since construction activities were actually completed in calendar year 2015.

### Monitoring

RPM four refers to the monitoring of all replaced structures found to “Adversely Affect” Topeka shiners. During development of the Monitoring Program, a number of data sources were examined. Wayne Stancill (FWS), Nathan Morey (COE), and Ryan Huber (SDDOT) provided necessary information on measurements for such a program. The Monitoring Program Plan “*South Dakota Fish Passage Monitoring Protocol for Projects Regulated by the 2008 Programmatic Biological Opinion: Stream Crossing Projects Administered/Funded by the South Dakota Department of Transportation and the Federal Highway Administration*” was completed and approved by FWS, FHWA, and SDDOT in July, 2012 (Appendix III). After approval of the Monitoring Program Plan, representatives from FWS, FHWA, and SDDOT continued to discuss and revise data collection methods and guidelines. In October 2012, this group agreed upon a set of

data collection guidelines and a '*SDDOT Fish Passage Assessment Work Sheet*' for use beginning in 2012.

Monitoring of 9 structures where construction occurred in 2014 with a determination of 'May Affect, Likely to Adversely Affect' Topeka shiners, was conducted in July and August 4 2015. In addition, seven structures were monitored specifically because concerns or questions were raised after the 2013 and 2014 monitoring seasons. Scheduled third-year monitoring was also conducted at 21 structures constructed in 2012, as indicated in the Monitoring Plan. As a condition of the Monitoring Plan, the *2015 Monitoring Report* is submitted with the *2015 Annual Compliance Report*. Within one month of distribution of the *215 Monitoring Report* (or other time agreed to by all parties), the FWS, FHWA, and SDDOT will meet to review the *2015 Monitoring Report* findings. Revisions will be discussed and implemented as needed to meet the term and conditions of the 2008 Biological Opinion.

*Turbidity Monitoring:*

For these projects, monitoring of turbidity around the construction sites is required to ensure that measurements remain within 50 NTUs of the background turbidity. All engineers have been provided with our Turbidity Reporting Form. Engineers are informed during preconstruction meetings of the need to monitor turbidity at stream crossing construction projects. They are also informed of the need to provide copies of completed Turbidity Reporting Forms to the DOT Environmental Office within 14 days of each measurement. Observations will be made on and off through the coming

field season to check use and implementation of turbidity meters. This will also be for quality assurance purposes.

### Training and Research

The last two RPMs which will be discussed are numbers 5 (training) and 7 (new scientific information). As listed in the Opinion, RPM 5 is carried out at preconstruction meetings where we ensure that contractors are aware of all requirements for fish passage, any diversion channel work, and all erosion control methods. In addition, turbidity meters are also discussed (when, where, and how to use) in reference to quality assurance. Reporting forms for turbidity meters have been covered and a copy is taken to each preconstruction meeting in case Area Engineers or Project Engineers do not have a copy with them. These forms are completed during construction; and observed turbidity, over the background, is double checked for any anomalies.

Department of Transportation (SDDOT) employees and contractors continue to attend Sediment and Erosion Control Training each spring. As of December 31, 2015 approximately 474 people have gone through the Sediment and Erosion Control Training and have maintained their certification.

Maintaining competency in small fish identification is critical during fish rescue (seining) operations at stream crossing projects. In July 2015, the SDDOT wildlife biologist and a summer intern participated in a two day small fish identification workshop/field survey coordinated by the South Dakota Department of Environment and Natural Resources (DENR). Participating in this workshop improved fish identification

skills. Continued participation in these types of experiences is recommended as a means of maintaining small fish identification skills.

**American Burying Beetle RPMs:**

As part of the 2008 Biological Opinion (Opinion), Reasonable and Prudent Measures (RPMs) were also set in place for projects affecting the American burying beetle:

- 1) Avoidance or Minimizing Habitat Disturbance (Ground-disturbing Activities) in Riparian and Grassland Habitats
- 2) Training
- 3) Reporting
- 4) Including Current or New Scientific Information

In this document data will be included on each RPM, which can be found in the reporting forms (Appendix II) and in the text to follow.

**Summary of Construction Activities:**

In this Annual Compliance Report, data related to construction at one structure replacement project built in the State of South Dakota by the Department of Transportation will be documented (Table 4 and 5). This data will relate to Reasonable and Prudent Measures (RPMs) and Conservation Measures (CMs) indicated in the Biological Opinion: Stream-Crossing projects funded/administered by the South Dakota Department of Transportation and the Federal Highway Administration (Opinion). All structures reported on in this document were completed between January 1<sup>st</sup> 2015 and

December 31<sup>st</sup> 2015. It should be noted that with limited resources and the complications of locating projects, it is possible that a minimal number of “Affect, Not Likely to Adversely Affect” projects may be missing from this document. It is certain that all “Affect, Likely to Adversely Affect” projects have been located and totaled for this report. At present, a way to collect and file documents related to the Biological Assessments (B.A.s) is being devised.

For one structure replacement project within the American burying beetle range during 2015, approximately 1.10 acres were temporarily affected by vehicles or construction activities.

Summary of Habitat Impacts:

One project in 2015 was determined to “Affect, Likely to Adversely Affect” the American burying beetle (Table 4). The RPMs of the Opinion are applied on projects which will “Adversely Affect.” This is due to the fact that anticipated “take” of American burying beetle is expected to be zero at sites “Not Likely to Adversely Affect.”

This project did occur in a forested area associated with stream habitat. During the preconstruction meeting, work limits were pulled in to reduce the area impacted by ground-disturbing activities (Table 5).

Avoidance or Minimizing Habitat Disturbance (Ground-disturbing Activities)

The first RPM for the 2008 Opinion is to minimize riparian and grassland habitat during construction of stream crossing structures. During the environmental clearance process, we ensure that contractors, Area Engineers, and Project Engineers are aware of

all requirements for minimizing ground-disturbing activities in riparian and grassland communities located within Tripp, Todd, Gregory, and Bennett counties. We continue to provide this information at TS&L and preconstruction meetings within known American burying beetle range. Riparian and grassland habitats are 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 are reviewed by the SDDOT environmental office and are not allowed if those activities may impact the American burying beetle. All efforts are made to minimize the construction footprint at these sites.

#### Training and Research

As listed in the Opinion, RPM 2 is carried out at preconstruction meetings where we ensure that contractors and Project Engineers are aware of all requirements for minimizing ground-disturbing activities in riparian and grassland communities. Area Engineers and Project Engineers within known American burying beetle range are made aware of all requirements of the 2008 Biological Opinion.

Table 1. Project identification, location, and Topeka shiner determination for stream crossing projects covered that involved construction between January 1, 2015 and December 31, 2015. Only projects affecting the Topeka shiner are included in this table. Projects determined to “Affect, likely to adversely affect” this species are signified by ALTAA. Projects determined to “Affect, not likely to adversely affect” this species are signified by ANLTAA.

PCN	County	Project Number	Structure Number	Stream	Latitude	Longitude	Topeka shiner Status
034S	Brown	BRF 6251(06)	07-200-234	Elm River	45.5985	-98.3112	ALTAA
020S	Brown	BRF 6170(01)	07-010-070	Elm River	45.83758	-98.70161	ALTAA
02RX	Brown	NH 0281(94)220	07-100-086	Maple River	45.8136	-98.5176	ALTAA
01W7	Brookings	BRO 8006(50)	06-209-150	Deer Creek	44.325968	-96.71063	ALTAA
00K2	Lincoln	BRO 8042(39)	42-163-137	Beaver Creek	43.1815	-96.3614	ALTAA
5319	Lincoln	BRO 8042(29)	42-016-140	Long Creek	43.3015	-96.8971	ALTAA
025Z	Minnehaha	P-PH 0019(31)73	50-030-065	W Br Skunk Creek	43.7535	-97.0696	ALTAA
025Z	Minnehaha	P-PH 0019(31)73	50-030-052	Trib to W Br Skunk Creek	43.7711	-97.0695	ALTAA
025Z	Minnehaha	P-PH 0019(31)73	50-030-049	Trib to W Br Skunk Creek	43.7768	-97.0695	ALTAA
025Z	Minnehaha	P-PH 0019(31)73	50-030-044	Trib to W Br Skunk Creek	43.7859	-97.0695	ALTAA
025Z	Minnehaha	P-PH 0019(31)73	50-030-017	Trib to Buffalo Lake	43.8248	-97.0695	ALTAA
025Z	Lake	P-PH 0019(31)73	40-150-239	Trib to Buffalo Lake	43.8494	-97.0695	ALTAA
025Z	Lake	P-PH 0019(31)73	40-150-196	Negro Creek	43.9117	-97.0690	ALTAA
025Z	Lake	P-PH 0019(31)73	40-150-210	North Buffalo Creek	43.8917	-97.0690	ALTAA
025Z	Lake	P-PH 0019(31)73	40-149-155	Park Creek	43.9723	-97.0713	ALTAA
03T6	McCook	P 0038(43)321	44-031-090	Trib. to Wolf Creek	43.71707	-97.54732	ALTAA
03T6	McCook	P 0038(43)321	None	Wolf Creek	43.71044	-97.6021	ALTAA
03T6	McCook	P 0038(43)321	None	Trib. to W. Fork Vermillion River	43.71717	-97.42370	ALTAA
03A7	Aurora	NH 0281(97)85	02-180-013	Firesteel Creek	43.91933	-98.45149	ALTAA
03A7	Jerauld	NH 0281(97)85	37-239-014	Sand Creek	44.17943	-98.45360	ALTAA
00KE	Minnehaha	P 1282(06)	50-183-195	Big Sioux River	43.5661	-96.76564	ANLTAA
00KE	Minnehaha	P 1282(06)	50-183-196	Big Sioux River	43.5658	-96.7656	ANLTAA
01E2	Minnehaha	BRO 8050(63)	50-210-018	Big Sioux River	43.8209	-96.7067	ANLTAA

Table 2. Stream length impacted by the new stream crossing (2015) and stream length impacted by the previous stream crossing. Structure width was defined as the opening width of a culvert including all barrels or the opening width of a bridge measured from abutment to abutment. Structure length was defined as the longitudinal length of stream channel impacted by a culvert, bridge abutment, or bridge column. Total impacted length was defined as the longitudinal stream length impacted by both the stream crossings structure and riprap scour protection.

PCN	Structure Number	Old Structure Type	Old Structure Length (ft)	Old Structure Width (ft)	New Structure Type	New Structure Length (ft)	New Structure Width (ft)	Total Impacted Length (ft)
034S	07-200-234	Bridge	24.00	206.50	Bridge	32.00	167.00	90.00
020S	07-010-070	Bridge	24.00	150.00	Bridge	32.50	166.25	174.00
02RX	07-100-086	Bridge	30.00	134.00	Bridge	42.75	150.50	170.00
01W7	06-209-150	Bridge	28.00	63.50	Bridge	30.75	65.50	74.00
00K2	07-200-234	Bridge	30.00	60.00	Bridge	48.00	82.00	150.00
5319	42-016-140	Bridge	28.00	60.00	Box Culvert	134.33	36.00	174.33
025Z	50-030-065	Bridge	32.30	53.67	Box Culvert	115.00	33.00	127.00
025Z	50-030-052	Box Culvert	42.00	20.00	Box Culvert	122.00	22.00	139.00
025Z	50-030-049	Box Culvert	43.00	10.00	Box Culvert	110.50	11.00	122.50
025Z	50-030-044	Box Culvert	62.00	7.00	Box Culvert	122.50	16.00	134.50
025Z	50-030-017	Box Culvert	38.00	30.00	Box Culvert	106.00	48.00	118.00
025Z	40-150-239	Box Culvert	46.00	18.00	Box Culvert	145.40	33.00	160.40
025Z	40-150-196	Box Culvert	45.00	16.00	Box Culvert	156.25	16.00	176.25
025Z	40-150-210	Box Culvert	90.00	30.00	Box Culvert	166.00	33.00	178.00
025Z	40-149-155	Box Culvert	34.00	20.00	Box Culvert	114.00	20.00	126.00
03T6	44-031-090	Box Culvert	48.00	5.00	Box Culvert	108.00	14.00	120.00
03T6	None	Box Culvert	46.00	5.00	RCP Arch	108.00	8.00	122.00
03T6	None	Box Culvert	52.00	5.00	RCP Arch	72.00	4.50	86.00
03A7	02-180-013	Bridge	34.00	151.50	Scour Protection	NA	NA	193.00
03A7	37-239-014	Bridge	34.00	117.00	Scour Protection	NA	NA	129.00
								Ttl 2763.98



Table 3. A summary of RPMs implemented at 2015 projects that were “Likely to Adversely Affect” the Topeka shiner. A description of the RPMs listed in this table is given in the introduction of this report.

PCN	Structure #	RPM 1	RPM 2	RPM 3	RPM 4	RPM 5	RPM 6	RPM 7
034S	07-200-234	Yes*	Yes	Yes	Yes	Yes	Yes	Yes
020S	07-010-070	Yes*	Yes	Yes	Yes	Yes	Yes	Yes
02RX	07-100-086	Yes*	Yes	Yes	Yes	Yes	Yes	Yes
01W7	06-209-150	Yes*	Not Applicable ‡	Yes	Yes	Yes	Yes	Yes
00K2	07-200-234	Yes*	Not Applicable ‡	Yes	Yes	Yes	Yes	Yes
5319	42-016-140	Yes	Yes	Yes	Yes	Yes	Yes	Yes
025Z	50-030-065	Yes	Yes	Yes	Yes	Yes	Yes	Yes
025Z	50-030-052	Yes	Yes	Yes	Yes	Yes	Yes	Yes
025Z	50-030-049	Yes	Not Applicable ‡	Yes	Yes	Yes	Yes	Yes
025Z	50-030-044	Yes	Yes	Yes	Yes	Yes	Yes	Yes
025Z	50-030-017	Yes	Yes	Yes	Yes	Yes	Yes	Yes
025Z	40-150-239	Yes	Not Applicable ‡	Yes	Yes	Yes	Yes	Yes
025Z	40-150-196	Yes	Yes	Yes	Yes	Yes	Yes	Yes
025Z	40-150-210	Yes	Not Applicable ‡	Yes	Yes	Yes	Yes	Yes
025Z	40-149-155	Yes	Yes	Yes	Yes	Yes	Yes	Yes
03T6	44-031-090	Yes	Not Applicable ‡	Yes	Yes	Yes	Yes	Yes
03T6	None	Yes	Not Applicable ‡	Yes	Yes	Yes	Yes	Yes
03T6	None	Yes	Not Applicable ‡	Yes	Yes	Yes	Yes	Yes
03A7	02-180-013	Yes	Not Applicable ‡	Yes	Yes	Yes	Yes	Yes
03A7	37-239-014	Yes	Not Applicable ‡	Yes	Yes	Yes	Yes	Yes

‡ Structures did not utilize a dewatering and a stream diversion, therefore, not requiring fish removal but all projects did comply with water withdrawal.

\* These structures were bridges, by USFWS permission, which did not require countersinking but all other fish passage measures were implemented.

Table 4. A summary of seining information at 2015 completed projects that were “Likely to Adversely Affect” the Topeka shiner. Additional information for individual structures listed in this table is provided in Appendix I of this report.

PCN	Structure #	County/Stream	Seined	Topeka Shiners/ Mortality	Comments
034S	07-200-234	Brown/Elm River	Yes	0/0	Project was bridge. Two cofferdams seined. Species: shortnose gar, white crappie
020S	07-010-070	Brown/Elm River	Yes	0/0	Project was bridge. One cofferdam seined. Species: none
02RX	07-100-086	Brown/Maple River	Yes	0/0	Project was bridge. Two cofferdams were seined. Species: black bullhead, channel catfish, common carp, orange-spotted sunfish
01W7	06-209-150	Brookings/Deer Creek	No	NA	Project was bridge and had minimal impact to steam channel. Dewatering did not occur
00K2	07-200-234	Lincoln/Beaver Creek	No	NA	Project was bridge and had minimal impact to steam channel. Dewatering did not occur
5319	42-016-140	Lincoln/Long Creek	Yes	20/0	Other species: creek chub, Johnny darter, brassy minnow, green sunfish, pumpkinseed, brook stickleback, common shiner, red shiner, common carp, yellow bullhead
025Z	50-030-065	Minn/W Br Skunk Creek	Yes	0/0	Other species: common shiner
025Z	50-030-052	Minn/Trib W Br Skunk Creek	Yes	0/0	Species: none
025Z	50-030-049	Minn/Trib W Br Skunk Creek		NA	Stream was dry when diversion installed. No seining was needed.
025Z	50-030-044	Minn/Trib W Br Skunk Creek	Yes	0/0	Species: common shiner, fathead minnow, green sunfish, stickleback
025Z	50-030-017	Minn/ Trib Buffalo Lake	Yes	0/0	Species: stickleback, brassy minnow, crayfish
025Z	40-150-239	Lake/ Trib Buffalo Lake		NA	Stream was dry when diversion installed. No seining was needed.
025Z	40-150-196	Lake/Negro Creek	Yes	30/1	Other species: brassy minnow, creek chub, green sunfish
025Z	40-150-210	Lake/ North Buffalo Creek		NA	Stream was dry when diversion installed. No seining was needed.
025Z	40-149-155	Lake/Park Creek	Yes	0/0	Species: brassy minnow, common shiner, yellow bullhead, green sunfish, largemouth bass, common carp, white sucker
03T6	44-031-090	Trib to Wolf Creek	No	NA	Stream was dry when diversion installed. No seining was needed.

<b>PCN</b>	<b>Structure #</b>	<b>County/Stream</b>	<b>Seined</b>	<b>Topeka Shiners/ Mortality</b>	<b>Comments</b>
03T6	None	Wolf Creek	No	NA	Stream was dry when diversion installed. No seining was needed.
03T6	None	Trib to W Fork Vermillion River	No	NA	Stream was dry when diversion installed. No seining was needed.
03A7	02-180-013	Firesteel Creek	No	NA	Project was bridge berm scour protection and had minimal impact to steam channel. Dewatering did not occur.
03A7	37-239-014	Sand Creek	No	NA	Project was bridge berm scour protection and had minimal impact to steam channel. Dewatering did not occur.

Table 5. Project identification, location, and American burying beetle determination for stream crossing projects covered that involved construction between January 1, 2015 and December 31, 2015. Only projects affecting the American burying beetle are included in this table. Projects determined to “Affect, likely to adversely affect” this species are signified by ALTAA. Projects determined to “Affect, not likely to adversely affect” this species are signified by ALTAA.

<b>PCN</b>	<b>County</b>	<b>Project Number</b>	<b>Structure Number</b>	<b>Stream</b>	<b>Section</b>	<b>Township &amp; Range</b>	<b>American Burying Beetle Status</b>
00JN	Gregory	BRO 8027(11)	27-342-262	North Scalp Creek	Sec. 23	T96N R68W	ALTAA

Table 6. Stream length impacted by the new stream crossing (2015) and stream length impacted by the previous stream crossing. Structure width was defined as the opening width of a culvert including all barrels or the opening width of a bridge measured from abutment to abutment. Structure length was defined as the longitudinal length of stream channel impacted by a culvert, bridge abutment, or bridge column. Total impacted length was defined as the longitudinal stream length impacted by both the stream crossings structure and riprap scour protection.

<b>PCN</b>	<b>Structure Number</b>	<b>Old Structure Type</b>	<b>Old Structure Length (ft)</b>	<b>Old Structure Width (ft)</b>	<b>New Structure Type</b>	<b>New Structure Length (ft)</b>	<b>New Structure Width (ft)</b>	<b>Total Impacted Length (ft)</b>
00JN	27-342-262	Bridge	16.60	32.60	4 – RCP Low Water Crossing	74.00	27.00	100.45

Table 7. A summary of RPMs implemented at 2015 projects that were “Likely to Adversely Affect” the American burying beetle. A description of the RPMs listed in this table is given on page 11 of this report.

<b>PCN</b>	<b>Structure #</b>	<b>RPM 1</b>	<b>RPM 2</b>	<b>RPM 3</b>	<b>RPM 4</b>
00JN	27-342-262 Gregory County, Sec.23,T96N,R68W	Yes	Yes	Yes	Yes

**Appendix I. Individual stream crossing reporting forms for projects that were constructed in 2015 and also impacted the Topeka shiner.**

**SDDOT Project Reporting Form**

PCN: 00K2	DOT Region: Mitchell
Project Number: BRO 8042(39)	DOT Area: Sioux Falls
Structure Number: 42-163-137	Project Biologist: Craig Olawsky
Latitude: 43.1815	Project Engineer: Harvey Odens
Longitude: -96.3614	Primary Contractor: Sioux Falls Construction
County: Lincoln	Start Date: 05/12/2014
Stream Name: Beaver Creek	Completion Date: 04/28/2015
Watershed: Big Sioux	Existing Structure: Bridge
Structure Ownership: City of Canton	New Structure: Bridge

**Stream Habitat**

Description of stream habitat: Classic prairie stream habitat. Heavily wooded in project vicinity.

Impacts to Stream Habitat:

Disturbed Area (acres):	0.90
Structure Length (ft):	48.00
Permanent Impacted Length (ft):	150.00
Structure Width (ft):	82.00
Length Previous Structure (ft):	30.00
Width of Previous Structure (ft):	60.00
Countersink Depth (inches):	Not applicable

Comments: This project was a bridge and had minimal impact to the active stream channel. Dewatering of stream habitat did not occur.

**Diversion Channel**

Diversion channel type: A diversion channel was not used.  
 Temporary water barrier type:  
 Date installation:  
 Date removed:

Description of stream flow: High flows.

Comments: Construction zone was isolated with floating silt curtain to maintain normal stream flow and provide fish passage during construction.

## **Erosion and Sediment Control**

BMPs implemented: High flow silt fence, erosion control wattle, floating silt curtain, straw mulching, class B riprap, type 2 erosion control blanket, permanent seeding.

Comments: BMPs appear to have been effective and functional. Permanent seeding was completed early spring 2015.

## **Fish Removal**

Topeka shiners present: Construction zone was isolated with floating silt curtain to allow continued normal stream flow; no seining was required.

Topeka shiner mortality: Presumed to be zero

Comments: None

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**



## SDDOT Project Reporting Form

PCN: 034S	DOT Region: Aberdeen
Project Number: BRF 6251(06)	DOT Area: Aberdeen
Structure Number: 07-200-234	Project Biologist: Craig Olawsky
Latitude: 45.5985	Project Engineer: Brian Rogness
Longitude: -98.3112	Primary Contractor: Grangaard Construction
County: Brown	Start Date: 05/02/2014
Stream Name: Elm River	Completion Date: 05/04/2015
Watershed: James	Existing Structure: Bridge
Structure Ownership: County	New Structure: Bridge

### Stream Habitat

Description of stream habitat: Slow moving river.

#### Impacts to Stream Habitat:

Disturbed Area (acres):	0.75
Structure Length (ft):	32.00
Permanent Impacted Length (ft):	90.00
Structure Width (ft):	167.00
Length Previous Structure (ft):	24.00
Width of Previous Structure (ft):	206.50
Countersink Depth (inches):	Not applicable

Comments: This project was a bridge and had minimal impact to the active stream channel. Dewatering of stream habitat only occurred within the two cofferdams.

### Diversion Channel

Diversion channel type: A diversion channel was not used.  
 Temporary water barrier type:  
 Date installation:  
 Date removed:

Description of stream flow: Typical flow.

Comments: Construction zone was isolated with floating silt curtain to allow continued normal stream flow. Cofferdams were installed around the two piers, and water was pumped out of the area inside the cofferdams.

## **Erosion and Sediment Control**

BMPs implemented: High flow silt fence, floating silt curtain, erosion control wattles, type 2 erosion control blanket, straw mulching, permanent seeding, class B riprap.

Comments: BMPs appear to have been effective and functional.

## **Fish Removal**

Topeka shiners present: No Topeka shiners were found during seining events (5/27/2014 and 8/21/2014) inside cofferdams.

Topeka shiner mortality: Presumed to be zero.

Comments: Other species included shortnose gar, white crappie.

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**

## SDDOT Project Reporting Form

PCN: 020S	DOT Region: Aberdeen
Project Number: BRF 6170(01)	DOT Area: Aberdeen
Structure Number: 07-010-070	Project Biologist: Craig Olawsky
Latitude: 45.83758	Project Engineer: Brian Rogness
Longitude: -98.70161	Primary Contractor: Grangaard Construction
County: Brown	Start Date: 06/30/2014
Stream Name: Elm River	Completion Date: 08/03/2015
Watershed: James	Existing Structure: Bridge
Structure Ownership: County	New Structure: Bridge

### Stream Habitat

Description of stream habitat: Slow moving river.

#### Impacts to Stream Habitat:

Disturbed Area (acres):	2.00
Structure Length (ft):	32.50
Permanent Impacted Length (ft):	174.00
Structure Width (ft):	166.25
Length Previous Structure (ft):	24.00
Width of Previous Structure (ft):	150.00
Countersink Depth (inches):	Not applicable

Comments: This project was a bridge and had minimal impact to the active stream channel. Dewatering of stream habitat did not occur.

### Diversion Channel

Diversion channel type: A diversion channel was not used.  
 Temporary water barrier type:  
 Date installation:  
 Date removed:

Description of stream flow: Typical summer flow.

Comments: A temporary Class B riprap stream crossing was constructed for equipment access. A corrugated metal pipe was installed through the rock stream crossing to maintain water flow and provide fish passage during construction. Construction zone was also isolated with floating silt curtain to allow continued normal stream flow.

## **Erosion and Sediment Control**

BMPs implemented: High flow silt fence, floating silt curtain, erosion control wattles, type 2 erosion control blanket, straw mulching, permanent seeding, class B riprap.

Comments: BMPs appear to have been effective and functional.

## **Fish Removal**

Topeka shiners present: Construction zone was isolated with floating silt curtain to allow continued normal stream flow; no seining was required.

Topeka shiner mortality: Presumed to be zero.

Comments:

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**

## SDDOT Project Reporting Form

PCN: 02RX	DOT Region: Aberdeen
Project Number: NH 0281(94)220	DOT Area: Aberdeen
Structure Number: 07-100-086	Project Biologist: Craig Olawsky
Latitude: 45.8136	Project Engineer: Bruce Schroeder
Longitude: -98.5176	Primary Contractor: Duininck, Inc.
County: Brown	Start Date: 04/21/2015
Stream Name: Maple River	Completion Date: 12/19/2015
Watershed: James	Existing Structure: Bridge
Structure Ownership: State	New Structure: Bridge

### Stream Habitat

Description of stream habitat: Slow moving river.

Impacts to Stream Habitat:

Disturbed Area (acres):	5.00
Structure Length (ft):	42.75
Permanent Impacted Length (ft):	170.00
Structure Width (ft):	150.50
Length Previous Structure (ft):	30.00
Width of Previous Structure (ft):	134.00
Countersink Depth (inches):	Not applicable

Comments: This project was a bridge and had minimal impact to the active stream channel.

### Diversion Channel

Diversion channel type: A diversion channel was not used.  
 Temporary water barrier type: Steel sheet pile (cofferdams)  
 Date installation:  
 Date removed:

Description of stream flow: Minimal late summer flow.

Comments: Construction zone was isolated with floating silt curtain to allow continued normal stream flow. A large cofferdam was installed around the southernmost pier, and water was pumped out of the area inside the cofferdam to create a dry work zone. Later in the summer, after the first cofferdam was removed, the process was repeated by constructing a large cofferdam around the northernmost two piers and pumping water out of that work zone.

## **Erosion and Sediment Control**

BMPs implemented: Low flow silt fence, floating silt curtain, gabions, erosion control wattles, type 2 erosion control blanket, straw mulching, surface roughening, permanent seeding, class C riprap.

Comments: BMPs appear to have been effective and functional. Final seeding will be completed as soon as conditions allow in spring 2016.

## **Fish Removal**

Topeka shiners present: No Topeka shiners were found during seining events (7/6/2015 and 8/17/2015) inside cofferdams.

Topeka shiner mortality: Presumed to be zero.

Comments: Other species included channel catfish, black bullhead, common carp, orange-spotted sunfish.

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**

## SDDOT Project Reporting Form

PCN: 01W7	DOT Region: Aberdeen
Project Number: BRO 8006(50)	DOT Area: Watertown
Structure Number: 06-209-150	Project Biologist: Craig Olawsky
Latitude: 44.325968	Project Engineer: John Rittershaus
Longitude: -96.710636	Primary Contractor: Prahm Construction
County: Brookings	Start Date: 10/12/2015
Stream Name: Deer Creek	Completion Date: 12/14/2015
Watershed: Big Sioux	Existing Structure: Bridge
Structure Ownership: County	New Structure: Bridge

### Stream Habitat

Description of stream habitat: Slow moving stream

Impacts to Stream Habitat:

Disturbed Area (acres):	1.02
Structure Length (ft):	30.75
Permanent Impacted Length (ft):	74.00
Structure Width (ft):	65.50
Length Previous Structure (ft):	28.00
Width of Previous Structure (ft):	63.50
Countersink Depth (inches):	Not applicable

Comments: This project was a bridge and had minimal impact to the active stream channel. No dewatering of stream habitat occurred.

### Diversion Channel

Diversion channel type: A diversion channel was not used.  
 Temporary water barrier type:  
 Date installation:  
 Date removed:

Description of stream flow: Minimal autumn flow.

Comments: Construction zone was isolated with floating silt curtain to allow continued normal stream flow.

## **Erosion and Sediment Control**

BMPs implemented: High flow silt fence, floating silt curtain, straw mulching, permanent seeding, class B riprap.

Comments: BMPs appear to have been effective and functional.

## **Fish Removal**

Topeka shiners present: Construction zone was isolated with floating silt curtain to allow continued normal stream flow; no seining was required.

Topeka shiner mortality: Presumed to be zero.

Comments:

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**



## SDDOT Project Reporting Form

PCN: 5319	DOT Region: Mitchell
Project Number: BRO 8042(29)	DOT Area: Yankton
Structure Number: 42-016-140	Project Biologist: Craig Olawsky
Latitude: 43.3015	Project Engineer: Mike Border
Longitude: -96.8971	Primary Contractor: Grangaard Construction
County: Lincoln	Start Date: 03/30/2015
Stream Name: Long Creek	Completion Date: 07/02/2015
Watershed: Vermillion	Existing Structure: Bridge
Structure Ownership: County	New Structure: Box Culvert

### Stream Habitat

Description of stream habitat: Typical prairie stream habitat.

#### Impacts to Stream Habitat:

Disturbed Area (acres):	0.80
Structure Length (ft):	134.33 (73.50' barrel+60.75' wing walls)
Permanent Impacted Length (ft):	174.33 40' is riprap
Structure Width (ft):	36.00 (3 - 12' x 9')
Length Previous Structure (ft):	28.00
Width of Previous Structure (ft):	60.00
Countersink Depth (inches):	12

Comments: The new culvert is wider than the bankfull stream channel width and is not expected to impact channel morphology or fish movement.

### Diversion Channel

Diversion channel type:	Corrugated metal pipe diversion channel with excavated fabric lined ends
Temporary water barrier type:	Steel sheet pile
Date installation:	04/13/2015
Date removed:	06/15/2015

Description of stream flow: Normal flow

Comments: None

## **Erosion and Sediment Control**

BMPs implemented: Low flow silt fence, erosion control wattle, straw mulching, class B riprap, permanent seeding.

Comments: BMPs appear to have been effective and functional at the time of site visit.

## **Fish Removal**

Topeka shiners present: Twenty (20) Topeka shiners were found during seining event, 4/13/2015.

Topeka shiner mortality: Presumed to be zero. Fish were observed swimming away.

Comments: Other species included creek chub, Johnny darter, brassy minnow, green sunfish, pumpkinseed, brook stickleback, common shiner, red shiner, common carp, yellow bullhead.

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**

## SDDOT Project Reporting Form

PCN: 025Z	DOT Region: Mitchell
Project Number: P-PH 0019(31)73	DOT Area: Sioux Falls
Structure Number: 50-030-065	Project Biologist: Craig Olawsky
Latitude: 43.7535	Project Engineer: Jared Pfaff
Longitude: -97.0696	Primary Contractor: Loiseau Construction
County: Minnehaha	Start Date: 02/18/2014
Stream Name: W Br Skunk Creek	Completion Date: 12/10/2015
Watershed: Big Sioux	Existing Structure: Bridge
Structure Ownership: State	New Structure: Box Culvert

### Stream Habitat

Description of stream habitat: Classic prairie stream habitat.

Impacts to Stream Habitat:

Disturbed Area (acres):	0.30
Structure Length (ft):	115.00 (82' barrel+33' wing walls)
Permanent Impacted Length (ft):	127.00 12' is riprap
Structure Width (ft):	33.00 (3 - 11' x 8')
Length Previous Structure (ft):	32.30
Width of Previous Structure (ft):	53.67
Countersink Depth (inches):	12

Comments: The new culvert is wider than the bankfull stream channel width and is not expected to impact channel morphology or fish movement.

### Diversion Channel

Diversion channel type:	Fabric lined excavated channel
Temporary water barrier type:	Steel sheet pile
Date installation:	05/16/2014
Date removed:	07/30/2014

Description of stream flow: Minimal flow.

Comments: None

## **Erosion and Sediment Control**

BMPs implemented: Low flow silt fence, high flow silt fence, erosion control wattles, type 2 erosion control blanket, soil stabilizer, straw mulching, riprap, permanent seeding.

Comments: BMPs associated with the temporary traffic diversion around the box culvert site were not installed correctly. The contractor was contacted and directed to correct the situation. BMPs appeared to be effective and functional on follow-up inspection (6/5/2014).

## **Fish Removal**

Topeka shiners present: No Topeka shiners were found during seining event, 5/16/2014.

Topeka shiner mortality: Presumed to be zero.

Comments: Other species included common shiner.

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**

## SDDOT Project Reporting Form

PCN: 025Z	DOT Region: Mitchell
Project Number: P-PH 0019(31)73	DOT Area: Sioux Falls
Structure Number: 50-030-052	Project Biologist: Craig Olawsky
Latitude: 43.7711	Project Engineer: Jared Pfaff
Longitude: -97.0695	Primary Contractor: Loiseau Construction
County: Minnehaha	Start Date: 02/18/2014
Stream Name: Trib to W Br Skunk Creek	Completion Date: 12/10/2015
Watershed: Big Sioux	Existing Structure: Box Culvert
Structure Ownership: State	New Structure: Box Culvert

### Stream Habitat

Description of stream habitat: Classic prairie stream habitat. Pasture/hayland adjacent land use.

#### Impacts to Stream Habitat:

Disturbed Area (acres):	0.30	
Structure Length (ft):	122.00	(88' barrel+34' wing walls)
Permanent Impacted Length (ft):	139.00	17' is riprap
Structure Width (ft):	22.00	(2- 11' x 8')
Length Previous Structure (ft):	42.00	
Width of Previous Structure (ft):	20.00	(2 - 10' x 6')
Countersink Depth (inches):	12	

Comments: The new culvert is wider than the bankfull stream channel width and is not expected to impact channel morphology or fish movement.

### Diversion Channel

Diversion channel type:	Fabric lined excavated channel
Temporary water barrier type:	Steel sheet pile
Date installation:	04/16/2014
Date removed:	07/09/2014

Description of stream flow: Normal spring flow

Comments: None

## **Erosion and Sediment Control**

BMPs implemented: Low flow silt fence, high flow silt fence, erosion control wattles, type 2 erosion control blanket, soil stabilizer, straw mulching, riprap, permanent seeding.

Comments: BMPs associated with the temporary traffic diversion around the box culvert site were not installed correctly. The contractor was contacted and directed to correct the situation. BMPs appeared to be effective and functional on follow-up inspection (6/5/2014).

## **Fish Removal**

Topeka shiners present: No Topeka shiners were found during seining event, 4/17/2014.

Topeka shiner mortality: Presumed to be zero.

Comments: No fish of any species were encountered during seining event.

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**

## SDDOT Project Reporting Form

PCN: 025Z	DOT Region: Mitchell
Project Number: P-PH 0019(31)73	DOT Area: Sioux Falls
Structure Number: 50-030-049	Project Biologist: Craig Olawsky
Latitude: 43.7768	Project Engineer: Jared Pfaff
Longitude: -97.0695	Primary Contractor: Loiseau Construction
County: Minnehaha	Start Date: 02/18/2014
Stream Name: Trib to W Br Skunk Creek	Completion Date: 06/01/2015
Watershed: Big Sioux	Existing Structure: Box Culvert
Structure Ownership: State	New Structure: Box Culvert

### Stream Habitat

Description of stream habitat: Ephemeral prairie stream habitat.

Impacts to Stream Habitat:

Disturbed Area (acres):	0.30
Structure Length (ft):	110.50 (86' barrel+24.5' wing walls)
Permanent Impacted Length (ft):	122.50 12' is riprap
Structure Width (ft):	11.00 (1 - 11' x 6')
Length Previous Structure (ft):	43.00
Width of Previous Structure (ft):	10.00 (1 - 10' x 5')
Countersink Depth (inches):	12

Comments: The new culvert is wider than the bankfull stream channel width and is not expected to impact channel morphology or fish movement.

### Diversion Channel

Diversion channel type:	Fabric lined excavated channel
Temporary water barrier type:	Steel sheet pile
Date installation:	04/02/2014
Date removed:	05/20/2014

Description of stream flow: Ephemeral stream. Minimal flow.

Comments: None

## **Erosion and Sediment Control**

BMPs implemented: Low flow silt fence, high flow silt fence, erosion control wattles, type 2 erosion control blanket, soil stabilizer, straw mulching, riprap, permanent seeding.

Comments: BMPs associated with the traffic diversion around the box culvert site were not installed correctly. The contractor was contacted and directed to correct the situation. BMPs appeared to be effective and functional on follow-up inspections (6/5/2014).

## **Fish Removal**

Topeka shiners present: Stream was dry when diversion installed. No seining was required.

Topeka shiner mortality: 0

Comments:

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**



## SDDOT Project Reporting Form

PCN: 025Z	DOT Region: Mitchell
Project Number: P-PH 0019(31)73	DOT Area: Sioux Falls
Structure Number: 50-030-044	Project Biologist: Craig Olawsky
Latitude: 43.7859	Project Engineer: Jared Pfaff
Longitude: -97.0695	Primary Contractor: Loiseau Construction
County: Minnehaha	Start Date: 02/18/2014
Stream Name: Trib to W Br Skunk Creek	Completion Date: 06/01/2015
Watershed: Big Sioux	Existing Structure: Box Culvert
Structure Ownership: State	New Structure: Box Culvert

### Stream Habitat

Description of stream habitat: Ephemeral prairie stream.

Impacts to Stream Habitat:

Disturbed Area (acres):	0.30	
Structure Length (ft):	122.50	(96' barrel+ 26.5' wing walls)
Permanent Impacted Length (ft):	134.50	12' is riprap
Structure Width (ft):	16.00	(2 - 8'x6')
Length Previous Structure (ft):	62.00	
Width of Previous Structure (ft):	7.00	(1 - 7'x5')
Countersink Depth (inches):	12	

Comments: The new culvert is wider than the bankfull stream channel width and is not expected to impact channel morphology or fish movement.

### Diversion Channel

Diversion channel type:	Fabric lined excavated channel
Temporary water barrier type:	Steel sheet pile
Date installation:	06/04/2014
Date removed:	08/11/2014

Description of stream flow: Minimal flow.

Comments: None

## **Erosion and Sediment Control**

BMPs implemented: Low flow silt fence, high flow silt fence, erosion control wattles, type 2 erosion control blanket, soil stabilizer, straw mulching, riprap, permanent seeding.

Comments: BMPs appear to have been effective and functional.

## **Fish Removal**

Topeka shiners present: No Topeka shiners were found during seining event, 6/5/2014.

Topeka shiner mortality: Presumed to be zero.

Comments: Other species included common shiner, fathead minnow, green sunfish, stickleback.

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**

## SDDOT Project Reporting Form

PCN: 025Z	DOT Region: Mitchell
Project Number: P-PH 0019(31)73	DOT Area: Sioux Falls
Structure Number: 50-030-017	Project Biologist: Craig Olawsky
Latitude: 43.8248	Project Engineer: Jared Pfaff
Longitude: -97.0695	Primary Contractor: Loiseau Construction
County: Minnehaha	Start Date: 02/18/2014
Stream Name: Trib to Buffalo Lake	Completion Date: 12/10/2015
Watershed: Big Sioux	Existing Structure: Box Culvert
Structure Ownership: State	New Structure: Box Culvert

### Stream Habitat

Description of stream habitat: Ephemeral prairie stream. Pasture/hayland adjacent land use.

#### Impacts to Stream Habitat:

Disturbed Area (acres):	0.30	
Structure Length (ft):	106.00	(82' barrel+ 24' wing walls)
Permanent Impacted Length (ft):	118.00	12' is riprap
Structure Width (ft):	48.00	(4 - 12' x 6')
Length Previous Structure (ft):	38.00	
Width of Previous Structure (ft):	30.00	(3 - 10' x 5')
Countersink Depth (inches):	12	

Comments: The new culvert is wider than the bankfull stream channel width and is not expected to impact channel morphology or fish movement.

### Diversion Channel

Diversion channel type:	Fabric lined excavated channel.
Temporary water barrier type:	Steel sheet pile
Date installation:	06/26/2014
Date removed:	09/26/2014

Description of stream flow: Low flow.

Comments: None

## **Erosion and Sediment Control**

BMPs implemented: Low flow silt fence, high flow silt fence, floating silt fence, erosion control wattles, type 2 erosion control blanket, soil stabilizer, straw mulching, riprap, permanent seeding.

Comments: BMPs appear to have been effective and functional.

## **Fish Removal**

Topeka shiners present: No Topeka shiners were found during seining event, 6/27/2014.

Topeka shiner mortality: Presumed to be zero.

Comments: Other species included stickleback, brassy minnow, crayfish

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**

## SDDOT Project Reporting Form

PCN: 025Z	DOT Region: Mitchell
Project Number: P-PH 0019(31)73	DOT Area: Sioux Falls
Structure Number: 40-150-239	Project Biologist: Craig Olawsky
Latitude: 43.8494	Project Engineer: Jared Pfaff
Longitude: -97.0695	Primary Contractor: Loiseau Construction
County: Lake	Start Date: 02/23/2014
Stream Name: Trib to Buffalo Lake	Completion Date: 06/01/2015
Watershed: Big Sioux	Existing Structure: Box Culvert
Structure Ownership: State	New Structure: Box Culvert

### Stream Habitat

Description of stream habitat: Intermittent prairie stream habitat.

#### Impacts to Stream Habitat:

Disturbed Area (acres):	0.30	
Structure Length (ft):	145.40 (118' barrel + 27.4' wing walls)	
Permanent Impacted Length (ft):	160.40	15' is riprap
Structure Width (ft):	33.00	(3 - 11' x 5')
Length Previous Structure (ft):	46.00	
Width of Previous Structure (ft):	18.00	(3 - 6' x 3')
Countersink Depth (inches):	12	

Comments: The new culvert is wider than the bankfull stream channel width and is not expected to impact channel morphology or fish movement.

### Diversion Channel

Diversion channel type:	Fabric lined excavated channel
Temporary water barrier type:	Steel sheet pile
Date installation:	07/23/2014
Date removed:	09/30/2014

Description of stream flow: Stream was dry from before installation of diversion channel until after removal.

Comments: None

## **Erosion and Sediment Control**

BMPs implemented: Low flow silt fence, high flow silt fence, erosion control wattles, type 2 erosion control blanket, soil stabilizer, straw mulching, Class B riprap, permanent seeding.

Comments: BMPs appear to have been effective and functional.

## **Fish Removal**

Topeka shiners present: Stream was dry. No seining was required.

Topeka shiner mortality: 0

Comments:

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**

## SDDOT Project Reporting Form

PCN: 025Z	DOT Region: Mitchell
Project Number: P-PH 0019(31)73	DOT Area: Sioux Falls
Structure Number: 40-150-196	Project Biologist: Craig Olawsky
Latitude: 43.9117	Project Engineer: Jared Pfaff
Longitude: -97.0690	Primary Contractor: Loiseau Construction
County: Lake	Start Date: 02/25/2014
Stream Name: Negro Creek	Completion Date: 06/01/2015
Watershed: Big Sioux	Existing Structure: Box Culvert
Structure Ownership: State	New Structure: Box Culvert

### Stream Habitat

Description of stream habitat: Classic prairie stream habitat.

#### Impacts to Stream Habitat:

Disturbed Area (acres):	0.30	
Structure Length (ft):	156.25 (126' barrel+30.25' wing walls)	
Permanent Impacted Length (ft):	176.25	20' is riprap
Structure Width (ft):	16.00	(2 - 8' x 8')
Length Previous Structure (ft):	45.00	
Width of Previous Structure (ft):	16.00	(2 - 8' x 6')
Countersink Depth (inches):	12	

Comments: The new culvert is wider than the bankfull stream channel width and is not expected to impact channel morphology or fish movement.

### Diversion Channel

Diversion channel type:	Fabric lined excavated channel
Temporary water barrier type:	Steel sheet pile
Date installation:	09/04/2014
Date removed:	10/02/2014

Description of stream flow: Minimal late summer/early autumn flow.

Comments: Minimal flow present in the diversion channel.

## **Erosion and Sediment Control**

BMPs implemented: Low flow silt fence, high flow silt fence, erosion control wattles, type 2 erosion control blanket, soil stabilizer, straw mulching, Class B riprap, permanent seeding.

Comments: BMPs appear to have been effective and functional.

## **Fish Removal**

Topeka shiners present: 30 Topeka shiners were found during seining event, 9/5/2014.

Topeka shiner mortality: 1 known. Remaining Topeka shiners were observed swimming away after release.

Comments: Other species included brassy minnow, creek chub, green sunfish. Extremely clear water at time of seining.

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**



## SDDOT Project Reporting Form

PCN: 025Z	DOT Region: Mitchell
Project Number: P-PH 0019(31)73	DOT Area: Sioux Falls
Structure Number: 40-150-210	Project Biologist: Craig Olawsky
Latitude: 43.8917	Project Engineer: Jared Pfaff
Longitude: -97.0690	Primary Contractor: Loiseau Construction
County: Lake	Start Date: 02/25/2014
Stream Name: North Buffalo Creek	Completion Date: 12/10/2015
Watershed: Big Sioux	Existing Structure: Box Culvert
Structure Ownership: State	New Structure: Box Culvert

### Stream Habitat

Description of stream habitat: Intermittent and flashy stream habitat.

Impacts to Stream Habitat:

Disturbed Area (acres):	0.30	
Structure Length (ft):	166.00	(166' barrel+0' wing walls)
Permanent Impacted Length (ft):	178.00	12' is riprap
Structure Width (ft):	33.00	(3 - 11' x 7')
Length Previous Structure (ft):	90.00	
Width of Previous Structure (ft):	30.00	(3 - 10' x 5')
Countersink Depth (inches):	12	

Comments: The new culvert is wider than the bankfull stream channel width and is not expected to impact channel morphology or fish movement.

### Diversion Channel

Diversion channel type:	Fabric lined excavated channel
Temporary water barrier type:	Steel sheet pile
Date installation:	08/28/2014
Date removed:	09/24/2014

Description of stream flow: Dry at time of construction.

Comments: None

## **Erosion and Sediment Control**

BMPs implemented: Low flow silt fence, high flow silt fence, erosion control wattles, type 2 erosion control blanket, soil stabilizer, straw mulching, Class B riprap, permanent seeding.

Comments: BMPs appear to have been effective and functional.

## **Fish Removal**

Topeka shiners present: Stream was dry when diversion installed. No seining was required.

Topeka shiner mortality: 0

Comments:

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**

## SDDOT Project Reporting Form

PCN: 025Z	DOT Region: Mitchell
Project Number: P-PH 0019(31)73	DOT Area: Sioux Falls
Structure Number: 40-149-155	Project Biologist: Craig Olawsky
Latitude: 43.9723	Project Engineer: Jared Pfaff
Longitude: -97.0713	Primary Contractor: Loiseau Construction
County: Lake	Start Date: 02/26/2014
Stream Name: Park Creek	Completion Date: 12/10/2015
Watershed: Big Sioux	Existing Structure: Box Culvert
Structure Ownership: State	New Structure: Box Culvert

### Stream Habitat

Description of stream habitat: Classic prairie stream habitat.

Impacts to Stream Habitat:

Disturbed Area (acres):	0.30	
Structure Length (ft):	114.00	(86' barrel+28' wing walls)
Permanent Impacted Length (ft):	126.00	12' is riprap
Structure Width (ft):	20.00	(2 - 10' x 7')
Length Previous Structure (ft):	34.00	
Width of Previous Structure (ft):	20.00	(2 - 10' x 8')
Countersink Depth (inches):	12	

Comments: The new culvert is wider than the bankfull stream channel width and is not expected to impact channel morphology or fish movement.

### Diversion Channel

Diversion channel type:	Fabric lined excavated channel
Temporary water barrier type:	Steel sheet pile
Date installation:	10/23/2014
Date removed:	12/23/2014

Description of stream flow: Minimal late summer/autumn flow.

Comments: None

## **Erosion and Sediment Control**

BMPs implemented: Low flow silt fence, high flow silt fence, erosion control wattles, type 2 erosion control blanket, soil stabilizer, straw mulching, Class B riprap, permanent seeding.

Comments: BMPs appear to have been effective and functional.

## **Fish Removal**

Topeka shiners present: No Topeka shiners were found during seining event, 10/24/2014.

Topeka shiner mortality: Presumed to be zero.

Comments: Other species included brassy minnow, common shiner, yellow bullhead, green sunfish, largemouth bass, common carp, white sucker.

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**

## SDDOT Project Reporting Form

PCN: 03T6	DOT Region: Mitchell
Project Number: P 0038(43)321	DOT Area: Mitchell
Structure Number: None	Project Biologist: Craig Olawsky
Latitude: 43.71044	Project Engineer: Rick Brandner
Longitude: -97.6021	Primary Contractor: Spencer Quarries Unltd
County: McCook	Start Date: 07/08/2015
Stream Name: Trib. to Wolf Creek	Completion Date: 09/21/2015
Watershed: Vermillion	Existing Structure: Box Culvert
Structure Ownership: State	New Structure: RCP Arch

### Stream Habitat

Description of stream habitat: Intermittent prairie stream habitat.

#### Impacts to Stream Habitat:

Disturbed Area (acres):	0.20
Structure Length (ft):	108.00 (84' barrel+2x12' end sections)
Permanent Impacted Length (ft):	122.00 14' is riprap
Structure Width (ft):	8.00 (96")
Length Previous Structure (ft):	46.00
Width of Previous Structure (ft):	5.00
Countersink Depth (inches):	12

Comments: The new reinforced concrete arch pipe is wider than the bankfull stream channel width and is not expected to impact channel morphology or fish movement.

### Diversion Channel

Diversion channel type:	Fabric lined excavated channel
Temporary water barrier type:	Steel sheet pile
Date installation:	08/11/2015
Date removed:	09/04/2015

Description of stream flow: Stream was completely dry during entire process.

Comments: None

## **Erosion and Sediment Control**

BMPs implemented: Low flow silt fence, erosion control wattles, type 2 erosion control blanket, straw mulching, Class B riprap, permanent seeding.

Comments: BMPs appear to have been effective and functional.

## **Fish Removal**

Topeka shiners present: Stream was dry entire time diversion was in place. No seining was required.

Topeka shiner mortality: 0

Comments:

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**

## SDDOT Project Reporting Form

PCN: 03T6	DOT Region: Mitchell
Project Number: P 0038(43)321	DOT Area: Mitchell
Structure Number: 44-031-090	Project Biologist: Craig Olawsky
Latitude: 43.71707	Project Engineer: Rick Brandner
Longitude: -97.54732	Primary Contractor: Spencer Quarries Unltd
County: McCook	Start Date: 07/08/2015
Stream Name: Trib. to Wolf Creek	Completion Date: 09/21/2015
Watershed: Vermillion	Existing Structure: Box Culvert
Structure Ownership: State	New Structure: Box Culvert

### Stream Habitat

Description of stream habitat: Intermittent prairie stream habitat.

#### Impacts to Stream Habitat:

Disturbed Area (acres):	0.30
Structure Length (ft):	108.00 (80' barrel+ 2x14' wing wall)
Permanent Impacted Length (ft):	120.00 12' is riprap
Structure Width (ft):	14.00
Length Previous Structure (ft):	48.00
Width of Previous Structure (ft):	5.00
Countersink Depth (inches):	12

Comments: The new box culvert is wider than the bankfull stream channel width and is not expected to impact channel morphology or fish movement.

### Diversion Channel

Diversion channel type:	The new box culvert was placed 20' to the east of the existing box culvert, which was used as the diversion. Sheet pile was used as barrier between old box culvert and new box culvert.
Temporary water barrier type:	Steel sheet pile
Date installation:	08/11/2015
Date removed:	09/21/2015

Description of stream flow: Stream was completely dry during entire process.

Comments: None

## **Erosion and Sediment Control**

BMPs implemented: Low flow silt fence, erosion control wattles, type 2 erosion control blanket, straw mulching, Class B riprap, permanent seeding.

Comments: BMPs appear to have been effective and functional.

## **Fish Removal**

Topeka shiners present: Stream was dry entire time diversion was in place. No seining was required.

Topeka shiner mortality: 0

Comments:

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**



## SDDOT Project Reporting Form

PCN: 03T6	DOT Region: Mitchell
Project Number: P 0038(43)321	DOT Area: Mitchell
Structure Number: None	Project Biologist: Craig Olawsky
Latitude: 43.71717	Project Engineer: Rick Brandner
Longitude: -97.42370	Primary Contractor: Spencer Quarries Unltd
County: McCook	Start Date: 07/08/2015
Stream Name: Trib. to W. Fork Vermillion River	Completion Date: 09/21/2015
Watershed: Vermillion	Existing Structure: Box Culvert
Structure Ownership: State	New Structure: RCP Arch

### Stream Habitat

Description of stream habitat: Intermittent prairie stream habitat.

Impacts to Stream Habitat:

Disturbed Area (acres):	0.30
Structure Length (ft):	72.00 (56' barrel+2x8' end sections)
Permanent Impacted Length (ft):	86.00 14' is riprap
Structure Width (ft):	4.50 (54")
Length Previous Structure (ft):	52.00
Width of Previous Structure (ft):	5.00
Countersink Depth (inches):	6

Comments: The new reinforced concrete arch pipe is wider than the bankfull stream channel width and is not expected to impact channel morphology or fish movement.

### Diversion Channel

Diversion channel type: A diversion channel was not used.  
 Temporary water barrier type:  
 Date installation:  
 Date removed:

Description of stream flow: Stream was completely dry during entire process.

Comments: None

## **Erosion and Sediment Control**

BMPs implemented: Low flow silt fence, erosion control wattles, type 2 erosion control blanket, straw mulching, Class B riprap, permanent seeding.

Comments: BMPs appear to have been effective and functional.

## **Fish Removal**

Topeka shiners present: Stream was dry during entire construction period. No seining was required.

Topeka shiner mortality: 0

Comments:

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**

## SDDOT Project Reporting Form

PCN: 03A7	DOT Region: Mitchell
Project Number: NH 0281(97)85	DOT Area: Mitchell
Structure Number: 02-180-013	Project Biologist: Craig Olawsky
Latitude: 43.91933	Project Engineer: Tim Marshall
Longitude: -98.45149	Primary Contractor: VanderPol Dragline
County: Aurora	Start Date: 12/18/2014
Stream Name: Firesteel Creek	Completion Date: 04/17/2015
Watershed: James	Existing Structure: Bridge
Structure Ownership: State	New Structure: Same – Scour Protection Only

### Stream Habitat

Description of stream habitat: Typical prairie stream habitat.

Impacts to Stream Habitat:

Disturbed Area (acres):	0.60
Structure Length (ft):	No change from previous
Permanent Impacted Length (ft):	193.00
Structure Width (ft):	No change from previous
Length Previous Structure (ft):	34.00
Width of Previous Structure (ft):	151.50
Countersink Depth (inches):	Not applicable

Comments: Scour protection (Class B riprap) placed on berm embankments under and around the bridge.

### Diversion Channel

Diversion channel type: A diversion channel was not used. See comments.  
 Temporary water barrier type:  
 Date installation:  
 Date removed:

Description of stream flow: Low stream flow at time of construction.

Comments: Steel sheet pile & floating silt curtain were used around the bridge abutments where riprap was placed; allowing the main stream channel to remain open.

## **Erosion and Sediment Control**

BMPs implemented: High flow silt fence, floating silt curtain, erosion control wattle, erosion control blanket, turf reinforcement mat, vegetated buffer strips, straw mulching, permanent seeding, Class B riprap.

Comments: BMPs appear to have been effective and functional.

## **Fish Removal**

Topeka shiners present: Construction zone was isolated with floating silt curtain to allow continued normal stream flow; no seining was required.

Topeka shiner mortality: Presumed to be zero.

Comments:

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**

## SDDOT Project Reporting Form

PCN: 03A7	DOT Region: Mitchell
Project Number: NH 0281(97)85	DOT Area: Mitchell
Structure Number: 37-239-014	Project Biologist: Craig Olawsky
Latitude: 44.17943	Project Engineer: Tim Marshall
Longitude: -98.45360	Primary Contractor: VanderPol Dragline
County: Jerauld	Start Date: 09/17/2015
Stream Name: Sand Creek	Completion Date: 10/19/2015
Watershed: James	Existing Structure: Bridge
Structure Ownership: State	New Structure: Same – Scour Protection Only

### Stream Habitat

Description of stream habitat: Typical prairie stream habitat.

Impacts to Stream Habitat:

Disturbed Area (acres):	0.60
Structure Length (ft):	No change from previous
Permanent Impacted Length (ft):	129.00
Structure Width (ft):	No change from previous
Length Previous Structure (ft):	34.00
Width of Previous Structure (ft):	117.00
Countersink Depth (inches):	Not applicable

Comments: Scour protection (Class B riprap) placed on berm embankments under and around the bridge.

### Diversion Channel

Diversion channel type: A diversion channel was not used. See comments.  
 Temporary water barrier type:  
 Date installation:  
 Date removed:

Description of stream flow: Low stream flow at time of construction.

Comments: Steel sheet pile & floating silt curtain were used around the bridge abutments where riprap was placed; allowing the main stream channel to remain open.

## **Erosion and Sediment Control**

BMPs implemented: High flow silt fence, floating silt curtain, erosion control wattle, erosion control blanket, turf reinforcement mat, vegetated buffer strips, straw mulching, permanent seeding, Class B riprap.

Comments: BMPs appear to have been effective and functional.

## **Fish Removal**

Topeka shiners present: Construction zone was isolated with floating silt curtain to allow continued normal stream flow; no seining was required.

Topeka shiner mortality: Presumed to be zero.

Comments:

**Impacts to Other Endangered Species:** None

**Conservation Recommendations:**

**Appendix II. Individual stream crossing reporting forms for projects that were constructed in 2015 and also impacted the American burying beetle.**

**SDDOT Project Reporting Form**

PCN:	00JN	DOT Region:	Mitchell
Project Number:	BRO 8027(11)	DOT Area:	Mitchell
Structure Number:	27-342-262	Project Biologist:	Craig Olawsky
Latitude:		Project Engineer:	Rick Brandner
Legal Descrip.:	Sec. 23, T96N, R68W	Primary Contractor:	Midwest Contracting
County:	Gregory	Start Date:	08/03/2015
Stream Name:	North Scalp Creek	Completion Date:	10/07/2015
Watershed:	Missouri	Existing Structure:	Bridge
Structure Ownership:	State	New Structure:	4 – RCP Low Water Crossing

**Stream Habitat**

Description of stream habitat: Slow moving stream in heavily wooded area.

Impacts to Stream Habitat:

Disturbed Area (acres):	1.10
Structure Length (ft):	74.00
Permanent Impacted Length (ft):	100.45                      26.45' is riprap
Structure Width (ft):	27.00                                      (4 - 4' x 3.83')
Length Previous Structure (ft):	16.60
Width of Previous Structure (ft):	32.60
Countersink Depth (inches):	0

Comments: Structure was not countersunk due to heavy sedimentation history of this stream. Determination was made that heavy silt loads would fill up most of the structure, and cause water to back up on adjacent property if it was countersunk.

## **Diversion Channel**

Diversion channel type:	Fabric lined excavated channel
Temporary water barrier type:	Steel sheet pile
Date installation:	8/16/2015
Date removed:	9/21/2015

Description of stream flow: Minimal late summer/early autumn flow

Comments: None

## **Erosion and Sediment Control**

BMPs implemented: Low flow silt fence, straw mulching, erosion control wattle, gabions, Class C riprap, permanent seeding.

Comments: BMPs appear to have been effective and functional.

## **Fish Removal**

Topeka shiners present:	Gregory County is not located within Topeka shiner range.
Topeka shiner mortality:	Not applicable

Comments: None

**Impacts to Other Endangered Species:** Gregory County falls within the known range of the American burying beetle. Earth disturbing activities were kept to a minimum. Work limits were pulled in to the greatest extent possible during the preconstruction meeting.

**Conservation Recommendations:** Earth disturbing activities were kept to a minimum. Work limits were pulled in to the greatest extent possible during the preconstruction meeting.



**Appendix III. Monitoring Plan for structures which ‘may adversely affect’ Topeka shiners**

South Dakota Fish Passage Monitoring Protocol for Projects Regulated by the  
2008 Programmatic Biological Opinion: Stream Crossing Projects Administered/Funded  
by the South Dakota Department of Transportation and the Federal Highway  
Administration

Office of Project Development-Environmental  
South Dakota Department of Transportation  
2012

Submitted to:

United States Fish and Wildlife Service  
Mountain-Prairie Region 6  
South Dakota Ecological Services Office  
Pierre, SD

### **Background and Purpose:**

Construction of bridges and culverts by South Dakota Department of Transportation (SDDOT) and the Federal Highway Administration (FHWA) have and will continue to affect the streams and rivers of South Dakota. In 2008, SDDOT, FHWA, and the US Fish and Wildlife Service (FWS) developed and implemented a Programmatic Biological Opinion (Opinion) that evaluates potential impacts of stream-crossing projects on all federally listed Threatened and Endangered species in South Dakota. The Opinion specifically addresses adverse impacts to the Topeka Shiner (*Notropis topeka*) and the American Burying Beetle (*Nicrophorus americanus*), identifying nondiscretionary 'Reasonable and Prudent Measures' (RPMs) and their implementing Terms and Conditions (TCs) that, if followed, ensure the Incidental Take Statement issued with the Opinion remains valid and that any take resulting from stream-crossing projects is exempt under section 7(o)(2) of the Endangered Species Act. The RPMs and TCs relative to the Topeka Shiner are intended to minimize take primarily by preventing decreases in Topeka Shiner population and their occupied range in South Dakota.

Monitoring and reporting is required in the Opinion to ensure the RPMs and TCs for the Topeka shiner are appropriate and effective, and the level of take exempt by the Opinion is not exceeded. Development of a monitoring program is required under RPM 4 of the Opinion. The purpose of this monitoring program is to verify that SDDOT structures, as designed, constructed, and maintained are not influencing stream geomorphology or prohibiting fish movement.

The monitoring, to include field work and observations, will be done by SDDOT Environmental staff scientists and biologists, consultants, or temporary employees. Consultants and temporary employees will be trained by qualified SDDOT Environmental staff to ensure consistency in the assessments.

### **Fish Passage and Stream Crossing Design:**

During project scoping, the Project Identification Coordinators (PICs) in cooperation with the Environmental Staff will identify structures where fish passage is required based on the Opinion. These structures are located in the eastern part of South Dakota where Topeka Shiners occur. Anomalous structures may also be included if it is determined that the structures may affect Topeka shiners. Anomalous structures may include features such as rock check dams to aid in fish passage or fish ladders when unusual methodology is determined necessary for fish passage. The USFWS will be notified if there are structures outside the main scope of this protocol.

TCs within the Opinion require that stream crossings be designed in a manner that facilitates development of normal channel features within the crossing. The SDDOT hydraulic design procedures have been established to meet or exceed the TCs of the BO. These procedures and definitions are documented in the South Dakota Drainage Manual hyperlinked at: <http://sddot.com/business/design/forms/drainage/Default.aspx>. Chapter 10 and sections 10.3.4.6 titled "Fish Passage" and Appendix 10.A titled "Fish Passage Guidelines" include additional design parameters used for fish passage.

The hydraulic design procedures for fish passage reference FHWA's Aquatic Organism Passage Design Guidelines for Roadway Culverts, Hydraulic Engineering Circular No. 26 (HEC 26). SDDOT design procedures and the USACE 404 nationwide permit further

require culverts be sunk below the stream flow line to allow development of natural channel features within the culvert and to prevent outlet perching that may lead to restricted fish movement.

Specifically, the natural channel forming process is to be maintained by sizing stream crossings according to bankfull ( $Q_2$ ) channel size, streambed slope, and channel complexity. The floor elevation of culverts is to be set below flow line of the stream as appropriate to facilitate the development of normal channel features within the culvert. At a minimum the culvert floor elevation will be set 1 foot below the stream flow line but not less than the adjustment profile line. Depth of counter sinking will be determined through design analysis tools and programs as discussed in the hydraulics design procedures. The culvert width will be at least 1.2 times the  $Q_2$  channel width unless special circumstances dictate otherwise and shall be estimated using project survey data and peak flow estimation models or other models as appropriate. Finally, any installed diversion channels must be at grade with the stream bed with no fish passage obstructions.

The bankfull channel can generally be defined as the  $Q_2$  stream channel or the elevation at which stream flow spills into the floodplain, whichever is less. In most cases, culverts will be sized much greater than the bankfull channel based solely on hydraulic criteria. In some rare cases, culverts may constrict the bankfull channel, especially if the culvert is designed for a very low flood recurrence frequency or the culvert is being placed in a watershed with a very large drainage area (i.e., > 100 sq mi). In some special cases, an exemption to the minimum culvert width may be allowed if strong evidence is available to suggest that fish passage will not be adversely impacted due to the width of the culvert. The USFWS will be notified if there are structures outside the main scope of this protocol and these projects will be processed through individual formal consultation. While exemptions do not fall under the terms and conditions of the BO, these structures will be monitored under this monitoring plan.

### **Site Inspections:**

Monitoring in the late summer or fall will take place to adequately assess channel and streambed conditions resulting from past seasonal flows. Low flows of late summer and fall provide the best opportunity to access the site, evaluate channel and streambed conditions, take photos, and assess how the structure is functioning with regards to fish passage during low flows. Monitoring will be completed after the first high flow season following project completion and in the third and fifth year after construction<sup>1</sup>. For example, a structure built in the summer of 2012 will be assessed in the fall of 2013, 2015 and finally 2017. In order to limit stream degradation and harm to fish during these assessments, stream disturbance will be limited to the greatest extent practicable.

The SDDOT will make a reasonable effort to perform surveys for each structure appended to the 2008 B.O. in accordance with this monitoring protocol however; the FWS recognizes there may be conditions and limitations that may preclude completion of surveys at each site. It is also noted that structures built between 2009 and 2011 have not been reviewed to date (pending an approved monitoring protocol). These structures will be given initial priority and the first assessment observations of these structures will be compared to the original design drawings and NBI photos (if available).

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<sup>1</sup> Opinion, p.46 RPMs/TCs B-1, Monitoring will be conducted on an annual or biennial basis

The inspection and findings documentation will be recorded on the 'SDDOT Fish Passage Assessment' form (See Attachment A).

The 'SDDOT Fish Passage Assessment' form includes the following:

**General Project Information:** This information will include specific project information, year constructed, county, structure location, stream name, date of assessment, and name of person completing the assessment.

- **Structure Type:** The structure type and size will be documented.
- **Structure Shape Comment:** The structure shape will be recorded using descriptions defined in the data sheet. The intent of recording structure shapes is to document whether the stream transition to and from the structure maintains and promotes fish passage. Terms used to describe the applicable outlet configuration are as follows:

#### **Inlet Type**

**Projecting:** The barrel simply extends beyond the embankment. No additional support is used.

**Wing wall:** A wing wall is a retaining wall placed adjacent to a culvert to retain fill and to a lesser extent direct water.

**Head wall:** Used along with wing walls to retain the fill, resist scour and improve the hydraulic capacity of the culvert

**Apron:** Aprons are usually made of concrete or riprap and installed to prevent or reduce scour. If an apron exists, a brief description will be provided in the observation section, including any low flow concentration structures.

**Other:** Could be Energy dissipaters, Bridge, etc...

#### **Outlet Type**

**At Stream Grade:** No perched condition at the outlet exists

**Cascade over Riprap:** Culvert flows onto either a rough riprap surface causing turbulence or a riprap / bedrock surface where flow depth decreases as it exits the culvert. If this condition exists, observation will be made to document whether or not this condition may prevent fish passage.

**Free fall into Pool:** Culvert outlet is perched directly over a pool, requires migrating fish to jump into culvert from outlet pool. If this condition exists, observation will be made to document whether or not this condition may prevent fish passage.

**Free fall onto riprap:** Culvert outlet is perched and exiting water plunges onto riprap or bedrock with no pool. If this condition exists, observation will be made to document whether or not this condition may prevent fish passage.

**Outlet apron:** Aprons are usually made of concrete or riprap and installed to prevent or reduce scour. If an apron exists, provide a brief description in the observation section, including any low flow concentration structures.

- **Observations:**

1. *The structure is installed generally in accordance with plans (width, depth, location, size, countersunk, etc...).* This question will be answered during the first assessment only.
2. *Overall structure width is wider than the average stream width upstream and downstream.* This measurement will be compared to background information from the hydraulic data and cross sections developed and used during design. If the background information does not exist, the stream width will be determined during the 1<sup>st</sup> assessment by taking an average of 3 measurements upstream and 3 measurements downstream.
3. *Natural streambed material exists throughout structure (i.e. structure remains counter sunk approximately 1 foot).*
4. *Stream channel is free of scour activity that may impede fish passage.*
5. *A natural low flow channel exists through the structure or if not the streambed surface within the structure simulate the streambed beyond the structure inlet and outlet similar to design conditions.*
6. *Stream is free of channelizing along the surface of the structure.* Presence of a Thalweg allows the stream to flow in a narrower defined low flow channel within the stream which is suitable for fish passage and not along the surface of the structure. If a Thalweg is not present, a wider shallower stream may impede fish movement due to limited depths, elevated water temperatures, and/or other conditions that are not ideal for fish passage.
7. *Up & downstream channel appears stable (no apparent erosion).*
8. *Vegetation is/has re-established on the stream banks within the construction area.*

- **Stream Cross-Sections:** To evaluate whether the SDDOT structures are performing as intended, stream cross-sections will be taken perpendicular to the stream at the following locations:

3 cross sections will be taken at the following locations to determine if a Thalweg exists within the structure (see Figure 1): 1) within 10 feet of the structure inlet, 2) within 10 feet of the structure outlet, and 3) inside the structure (if accessible). Visual observations will be used instead of the 3<sup>rd</sup> cross section if this location is not be accessible (i.e. structure is too small to access with survey equipment, soil conditions are not stable, water volumes are excessive).

If a Thalweg does not exist within the structure (the area is flat or there is only a slight depression with no true defined low flow channel), a 4<sup>th</sup> cross section will be taken downstream of the structure at a distance of approximately 7 times the width of the stream (refer to Figure 2) to determine whether the structure appears to be changing the stream profile.

If a Thalweg does not exist within the structure or downstream of the structure, a 5<sup>th</sup> cross section will be taken upstream of the structure at approximately 7 times the width of the stream (refer to Figure 3) to determine whether the structure appears to be changing the stream profile.

Analysis of cross sections taken will be used as follows and findings will be documented in the report as shown below:

1. If a Thalweg exists within the structure (cross sections 1, 2, and 3), no additional cross-sections will be taken and the assessment will document the structure is performing as intended. Else...
  2. If a Thalweg does not exist within the structure (cross sections 1, 2, and 3) and does not exist downstream (cross section 4), no additional cross-sections will be taken. The assessment will document "no further conclusion can be made at this time as fish restriction (if occurring) is below the structure". Else...
  3. If a Thalweg does not exist upstream, exists downstream but does not exist within the structure the report will document "the structure is no more of a barrier than the stream upstream and no further conclusion can be made at this time".
  4. If a Thalweg exists upstream and downstream of the structure but does not exist within the structure a detailed survey and correction plan will be required.
- **Stream Velocity:** A natural earthen and/or granular stream bank edge is a good indicator the stream is acting independent of the structure. If the edge of the stream is in contact with the structure during  $Q_2$  or lower conditions, material within the structure may have shifted or water velocities, turbulence, and friction along the structure walls may have an effect on fish movement.

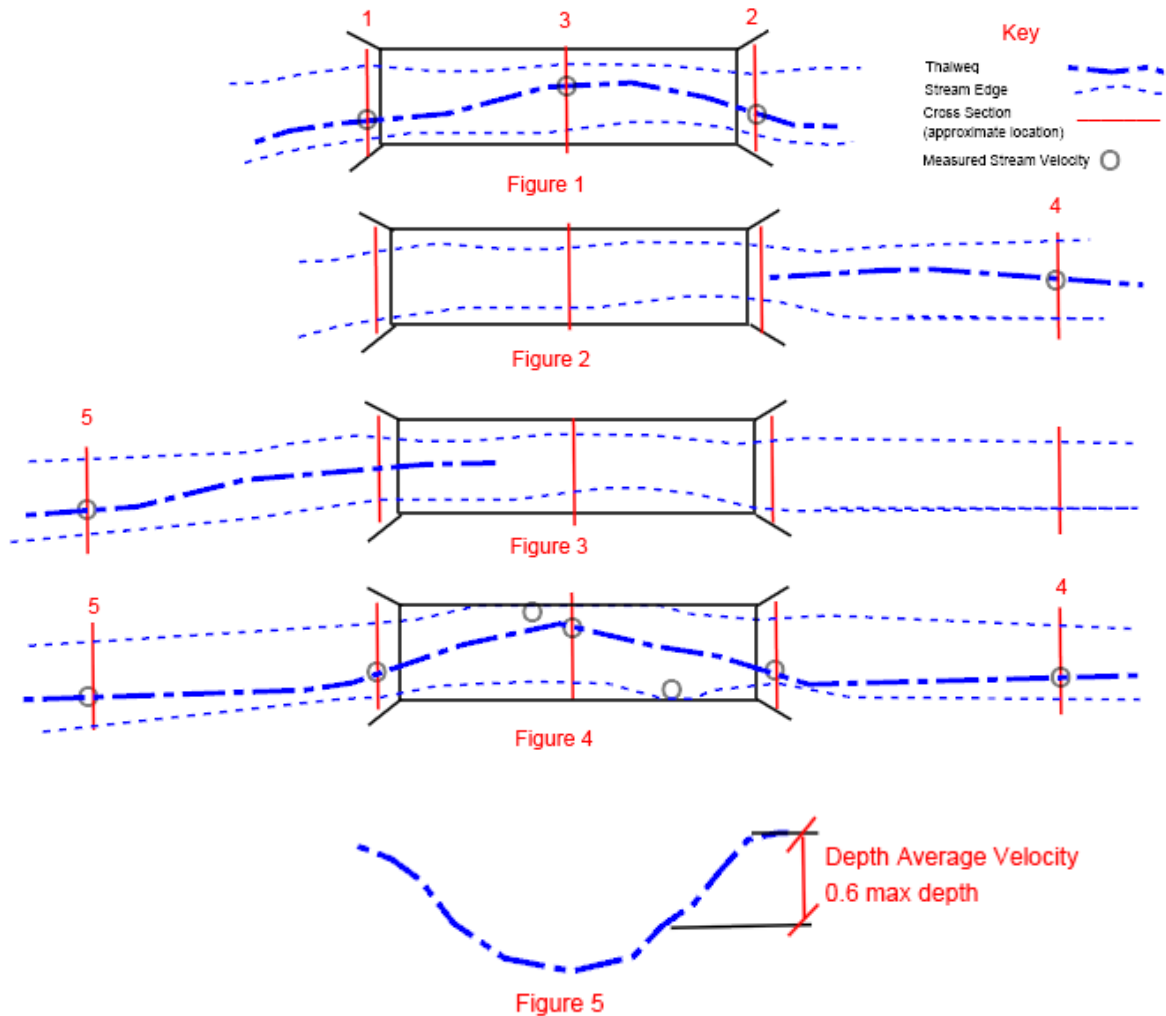
If the stream is in contact with one or both sides of the structure during the time of the assessment, the stream bed depth and reveal along the edges shall be evaluated to determine how the velocities compares to the natural stream edge outside the structure. The depth average velocity measured at a depth of 0.6 times the depth of the stream at the thalweg (see Figure 5) will be recorded and compared to the depth average velocity a distance approximately 7 times the width of the stream upstream and downstream of the structure within the Thalweg (see Figures 4) if a Thalweg exists.

Analysis of stream velocities taken will be used as follows and documented in the report findings.

1. If the stream is dry or water velocities are beyond the equipment's specified accuracy limits (i.e.  $<0.5$  ft/s for March McBirney) at the locations where velocities are to be taken, the condition will be noted and no velocities will be taken. Else...
2. If the depth average velocities within the structure are at or below those recorded upstream and downstream, the assessment will document the structure is not considered to be impeding fish passage. Else...
3. If the depth average velocities within the structure are higher than those recorded upstream and downstream the structure and exceed the sustained swimming capabilities of Topeka shiner (0.9 ft./s -1.31ft./s. with burst swimming observed in water velocities of 1.31ft./s-2.46 ft./s (Adams 2000)<sup>2</sup>), the structure may be influencing the stream. A more detailed survey may be required. Further assessment and the need for a correction plan will be discussed with the FWS.

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<sup>2</sup> S. Reid Adams, Jan Jeffrey Hoover and K. Jack Kilgore 2000. Swimming Performance of the Topeka Shiner (*Notropis topeka*) an Endangered Midwestern Minnow. *American Midland Naturalist* Vol. 144, No. 1 pp. 178-186 Published by the University of Notre Dame



- Comments:** Unique observations that have or may impact stream morphology or fish passage in the future such as widening of the channel, forming/changing pool locations/sizes, bank erosion, new deposits, isolated unusual channelization within the streambed, etc... will be noted. Changes to channel widths on structures designed narrower than the stream channel that were processed by Formal Consultation will be discussed.
- Photographs:** A minimum of 2 photographs will be taken in the direction of the structure inlet and 2 in the direction of the structure outlet within a distance of 7 times the width of the structure. Photograph locations will be documented and recorded (i.e. GPS latitude and longitude coordinates) such that photographs taken during subsequent inspections will be from the same location and direction. The intent of these photographs is to document whether 1) the stream channel width, location, and/or depth is changing over time and 2) whether changes in the channel may obstruct fish passage at the site. It is most important to select locations that capture the intended need for the photograph therefore locations shall be selected both upstream and downstream that are representative of: undisturbed channel beyond the construction area, disturbed channel, and the structure.

### **Assessment, Notifications, Corrective Actions:**

Upon completion of the site inspection and assessment, each report will be filed with the project records and in an electronic Fish Passage file folder.

If it is determined a structure is not passable to fish, a report will be submitted to the FWS and FHWA within two weeks and a corrective action plan will be developed in coordination with FWS and FHWA. Where fish passage has been obstructed by debris or some other condition not related to the design or construction, the SDDOT Environmental Staff will coordinate with Operations to have the obstruction removed within three months of the inspection. Depending upon seasonal conditions, this timeframe may need to be extended. If necessary, extensions will be coordinated with FWS. Obstructions identified and corrected by the Area Offices, through normal roadway maintenance inspections, will be reported to the Environmental Office for further review and corrective actions if needed. Documentation of corrective actions will be made available to FWS within two weeks of completion. Any corrective actions taken will be documented in the annual report and a corrective action database will be maintained by the Environmental Office.

### **Annual Reporting:**

Per RPM#6 in the Opinion, a hard copy of the annual report will be provided to the FWS by March 1 of each year that reviews activities conducted under the Opinion. In an effort to disseminate monitoring findings in a timely manner, monitoring reports will be completed, included, and disseminated with the Annual Report. These reports will also be available by request as well as online to the FWS, FHWA and any other interested entities at the SDDOT website:

<http://www.sddot.com/transportation/highways/environmental/endangered/Default.aspx>

Within 1 month of distribution of the annual report (or other agreed time agreed to by all parties), the FWS, FHWA and SDDOT will meet to review report findings. If no corrective actions have been required within the first 5 years of monitoring, the need for further monitoring by site will be determined at this meeting. If systemic issues are identified, a corrective action plan will be developed and the group will determine whether any specific sites will be monitored beyond 5 years. During the annual meeting the group will also evaluate effectiveness of the data being collected on the 'SDDOT Fish Passage Assessment Work Sheet'. Revisions will be discussed and implemented as needed to meet the terms and conditions of the BO.