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Supplemental Biological Assessment -Topeka Shiner and Designated Critical Habitat

Lewis and Clark Regional Water Supply Project, Rock and Nobles Counties, Minnesota

U.S. Department of the Interior
Bureau of Reclamation
Dakotas Area Office

Lewis and Clark Regional Water System

Banner Associates

TRC Environmental Corporation

May 2011

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Supplemental Biological Assessment, Topeka Shiner and Designated Critical Habitat Lewis and Clark Regional Water Supply Project, Rock and Nobles Counties, Minnesota

United States Department of the Interior
Bureau of Reclamation
Great Plains Region
Dakotas Area Office
Bismarck, North Dakota

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United States Department of the Interior

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BY:------------------

Mr. Tony Sullins
Field Supervisor, Ecological Services
U.S. Fish and Wildlife Service
4101 E 80th Street
Bloomington, MN 55425-1665

Subject: Transmission of Supplemental Biological Assessment, Topeka Shiner and Designated Critical Habitat – Lewis and Clark Regional Water Supply Project Rock and Nobles Counties, Minnesota

Dear Mr. Sullins:

In the enclosed supplemental biological assessment (SBA), Bureau of Reclamation has determined that construction of the Lewis and Clark Regional Water Supply Project in Rock and Nobles Counties, Minnesota, is likely to adversely affect the Topeka shiner. Based on the enclosed SBA, Reclamation requests to enter into formal consultation with the U.S. Fish and Wildlife Service.

In accordance with Section 7 of the Endangered Species Act (ESA) of 1973 (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.), Reclamation has prepared the SBA for the Lewis and Clark Regional Water Supply Project, Rock and Nobles Counties, Minnesota. The Lewis & Clark Regional Water System (Lewis & Clark), a nonprofit corporation composed of numerous municipalities and rural water systems, is constructing a water supply pipeline and associated well field, pump stations, treatment plant, and storage reservoirs throughout southeastern South Dakota, southwestern Minnesota, and northwestern Iowa. Much of the work in South Dakota is completed. Reclamation is the lead federal agency for funding portions of Lewis & Clark construction and is responsible for project regulatory oversight and for ensuring compliance with environmental and other related laws. The project was authorized by Congress in 2000. Public Law 106-246 authorized expenditures in the form of a federal grant for project planning and construction.

Reclamation completed a Finding of No Significant Impact (FONSI) with a biological assessment and an environmental assessment for the Lewis & Clark project in March 2003. The Section 7 consultation was completed with the Service's South Dakota Field Office in coordination with the Service's Twin Cities Minnesota and Rock Island Illinois Field Offices. At the time of the issuance of the FONSI in March 2003, no designated critical habitat for any federally listed threatened and endangered species occurred in the project area. However, in 2004, critical habitat was designated for the federally listed Topeka shiner in Nebraska, Iowa, and Minnesota. Lands in the States of Missouri, Kansas, and South Dakota were excluded from critical habitat designation because those states have management plans that provide comprehensive conservation measures and programs necessary to achieve recovery of the Topeka shiner.

In subsequent meetings with Rich Davis of your staff it was determined that a SBA would be required to address potential impacts to Topeka shiners and their designated critical habitat that had not been addressed in the previous biological assessment for the project in Minnesota. To date, none of the proposed pipeline segments involving Topeka shiner critical habitat have been constructed in Minnesota.

We value the excellent working relationship we have with the Service and look forward to your continued participation with the Lewis and Clark Regional Water Supply Project. If you have any questions concerning this SBA, please contact Nell McPhillips or me at 701-250-1275 or 701-250-1243, respectively. We know the Section 7 regulations have an established timeframe for formal consultation. We have had a previous draft of the SBA sent to and reviewed by Mr. Rich Davis of your staff. We hope this will help expedite your biological opinion. If there is anything we can do to facilitate this consultation please let us know.

Sincerely,

Loretta Chandler
Chief, Environmental Management

Enclosure

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BA	Biological assessment
cfs	Cubic feet per second
Banner	Banner Associates, Inc.
EA	Environmental assessment
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
HDD	Horizontally directional drilling
IERT	Interagency Environmental Review Team
Lewis & Clark	Lewis and Clark Regional Water System, Inc.
MN-2	Minnesota Segment 2
MN-3	Minnesota Segment 3
MN-4	Minnesota Segment 4
MNDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
NHIS	Natural Heritage Information System
P.L.	Public Law
Pollution Prevention Plan	Storm Water Pollution Prevention Plan
ppm	Parts per million
Reclamation	U.S. Bureau of Reclamation
SBA	Supplemental biological assessment
SDGFP	South Dakota Game, Fish, and Parks
Service	U.S. Fish and Wildlife Service
T&E	Threatened and endangered
TEPC	Threatened, endangered, candidate, proposed
TRC	TRC Environmental Corporation
TRC Mariah	TRC Mariah Associates Inc.
U.S.C.	United States Code
USGS	U.S. Geological Survey

Introduction

Lewis and Clark Regional Water System, Inc. (Lewis & Clark), a nonprofit corporation composed of numerous municipalities and rural water systems, is constructing a water supply pipeline and associated well field, pump stations, treatment plant, and storage reservoirs throughout southeastern South Dakota, southwestern Minnesota, and northwestern Iowa (Figure 1). The Bureau of Reclamation (Reclamation) is the lead federal agency for funding portions of Lewis & Clark construction and is responsible for project regulatory oversight and for ensuring compliance with environmental and other related laws. The project was authorized by Congress in 2000. Public Law (P.L.) 106-246 authorized expenditures in the form of a federal grant for Project planning and construction. Approximately 78% of project planning and construction costs would be funded by a federal grant under P.L. 106-246. The remaining costs necessary to complete construction would be provided by local and state project sponsors. Lewis & Clark retains title to all project facilities during and after construction, and is responsible for all operation, maintenance, repair, and rehabilitation costs of the project.

Reclamation completed a Finding of No Significant Impact (FONSI) with a biological assessment (BA) (TRC Mariah Associates Inc. [TRC Mariah] 2002) and an environmental assessment (EA) for the Lewis & Clark Project in March 2003 (Reclamation 2003). An Interagency Environmental Review Team (IERT) was formed to assist Reclamation and Lewis & Clark in implementing the environmental commitments in the FONSI. Construction began in 2004. To date, the raw water pipeline and portions of the treated water pipeline and well field have been completed. Most of the project work to date has occurred in South Dakota. Based on construction contracts completed and awarded, the project is approximately halfway completed. Additional information on the system may be found at Lewis & Clark's website at http://www.lcrws.org.

The Topeka shiner (*Notropis topeka*), was listed as an endangered species on December 15, 1998, and this species was analyzed in the project EA and addressed in the FONSI. At the time of the issuance of the FONSI in March 2003, no designated critical habitat for any federally

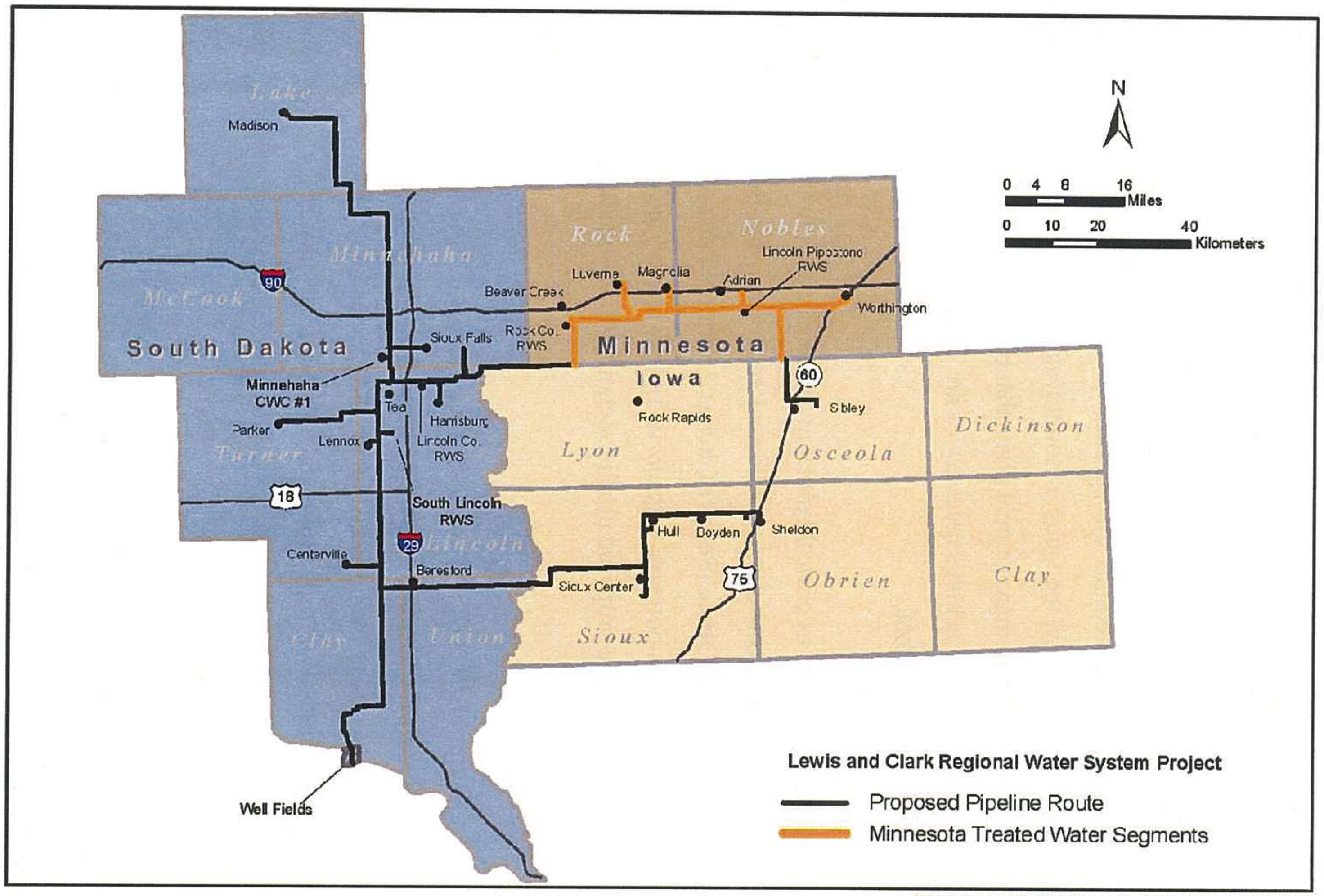

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Figure 1 - Location of the Lewis and Clark Regional Water System Project, 2011.

listed threatened and endangered (T&E) species occurred in the project area. In 2004, critical habitat was designated for the federally listed Topeka shiner in Nebraska, Iowa, and Minnesota. At the time this species was proposed for listing in 1997, only five locations were known in South Dakota. The South Dakota Game, Fish, and Parks (SDGFP) initiated surveys in 1997 to determine current occupation of known historical sites and to investigate other possible drainages suitable for Topeka shiner. These surveys indicated that this species was more widespread in South Dakota than previously thought. Additionally, the lands in South Dakota were excluded from critical habitat designation because they had management plans that provide comprehensive conservation measures and programs necessary to achieve recovery of the Topeka shiner. Therefore, no critical habitat was designated in South Dakota.

Several stream segments designated as critical habitat in Minnesota are crossed by the Lewis & Clark project. Therefore, based on consultation between Reclamation and the U.S. Fish and Wildlife Service Twin Cities Field Office (Service), it was determined that a supplemental BA (SBA) would be required to address potential impacts to Topeka shiners and their designated critical habitat. To date, none of the proposed pipeline segments have been constructed in Minnesota.

The *Endangered Species Act of 1973* (ESA) defines critical habitat as "the specific areas within the geographical area occupied by the species, at the time it is listed, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and specific areas outside the geographical area occupied by the species at the time it is listed that are determined by the Secretary of the Interior to be essential for the conservation of the species."

Critical habitat includes those physical and biological features essential to the conservation of listed species that may require special management considerations or protection (Service 1998). These physical and biological features include:

- Space for individuals and population growth and for normal behavior;
- Food, water, air, light, or other nutritional or physiological requirements;
- Cover or shelter;

- Sites for breeding, reproduction, rearing of offspring; and
- Habitats protected from disturbance or representative of the historic geographical and ecological distributions of a species.

The purpose of this SBA is to discuss the potential effects of the project on Topeka shiner and its designated critical habitat on project-affected areas in Minnesota. This analysis documents potential effects and mitigation measures that will demonstrate compliance with provisions of the ESA, 16 United States Code [U.S.C.] 1531 et seq., as amended. This document supplements the initial BA (2002) and is tiered to the EA and associated FONSI (Reclamation 2003).

The defining stream elevation for determining the lateral extent of critical habitat instream channels and off-channel or oxbow pools is the elevation equal to the bankfull discharge stream elevation (Service 2004). In this document, "suitable" Topeka shiner habitat is defined as habitat, although not designated by the Service (2004), which provides many of the primary constituent elements that characterize an environment suitable for occupancy by Topeka shiners.

Project Description

Overview

The Lewis & Clark Project in Minnesota would include the construction, operation, maintenance, and replacement of a buried water transmission pipeline, water storage reservoirs, service connections facilities, and pumping units. The water for the project would come from alluvial aquifers adjacent to the Missouri River via radial collector, vertical, and/or angled wells along the banks of the Missouri River near Vermillion, South Dakota (refer to Figure 1). Water extracted from the well field would be treated by a new water treatment facility currently under construction northwest of Vermillion, South Dakota. When completed, the Lewis & Clark Project would provide potable water to over 300,000 people through its members--15 cities and five rural water systems in southeast South Dakota, southwest Minnesota, and northwest Iowa, encompassing a service area of approximately 5,000 square miles via an approximately 340-mile long pipeline network. Banner Associates, Inc. (Banner) headquartered in Brookings, South

Dakota, is the principal engineering company for the project. To date, approximately half of the Lewis & Clark Project pipeline segments and project support facilities such as meter buildings, pump stations, and water storage reservoirs have been constructed, mostly in South Dakota. The new water treatment plant is expected to be completed by late March 2012. Water delivery is anticipated for most of the South Dakota member cities and one completed pipeline segment in Iowa in late 2012.

The Lewis & Clark Project has used several methods to cross rivers and streams. Each crossing has been adapted to minimize environmental impacts to the stream, including Topeka shiner habitat, and to accommodate the size of the pipeline and the size of the stream. Installation of Lewis & Clark's pipeline segments to date in South Dakota has utilized the open cut method, with dikes and diversion pipe(s). These crossing methods have been used by Lewis & Clark contractors for the installation of pipeline segments that crossed the Vermillion River, as well as smaller prairie streams. Figures 2, 3 and 4 illustrate the single dike with diversion method used for the installation of pipe across drainages in South Dakota. When possible dikes and cofferdams will be placed in manner and location that avoids or minimizes, to the greatest extent possible, impacts to Topeka shiner off channel pool habitat.

Figure 2 - Single Dike with Diversion Crossing Method, Vermillion River Crossing.

Figure 3 - Installation of Pipe Using the Single Dike Method, Vermillion River.

Figure 4 - Vermillion River Crossing After Pipeline Crossing.

Lewis & Clark contractors would use similar drainage crossing methods on some pipeline segments in Minnesota to cross rivers and streams that entail pipeline installation in rock and in wet soil conditions. Additional crossing methods proposed by Lewis & Clark contractors for those segments located in Minnesota may include cofferdams, dike(s) with a diversion pipe, open trenches in dry streams and wetlands, and conventional boring and/or horizontal directional drilling (HDD).

Further details on the Lewis & Clark Project can be found in the FONSI and EA (Reclamation 2003) and original BA (TRC Mariah 2002). Detailed project design documents are available for review from Banner Associates.

This SBA documents Reclamation's conclusions and the rationale to support those conclusions regarding the potential effects of the Lewis & Clark Project on Topeka shiners and their designated critical and suitable habitats in southern Minnesota.

Minnesota Pipeline Segments Construction

Introduction

The total length of Lewis & Clark pipeline routes located in Minnesota is approximately 63.5 miles (Figure 5 and Table 1). Minnesota pipeline segments currently are identified as Minnesota Segment 2 (MN-2), Minnesota Segment 3 (MN-3), Minnesota Segment 4 (MN-4), and several service lines--the Luverne Service Line, the Magnolia Service Line, the Lincoln-Pipestone Service Line, and the Sibley, IA Service Line (refer to Figure 5). Installation of the Minnesota segments is proposed for construction beginning in fall 2011, with MN-2 and the Luverne Service Line pending, awaiting acquisition of all permits and federal funding but anticipated to be completed in 2012. Construction of the remaining Minnesota segments and service lines is pending federal funding and these segments could be constructed over an estimated 2-10 year time frame.

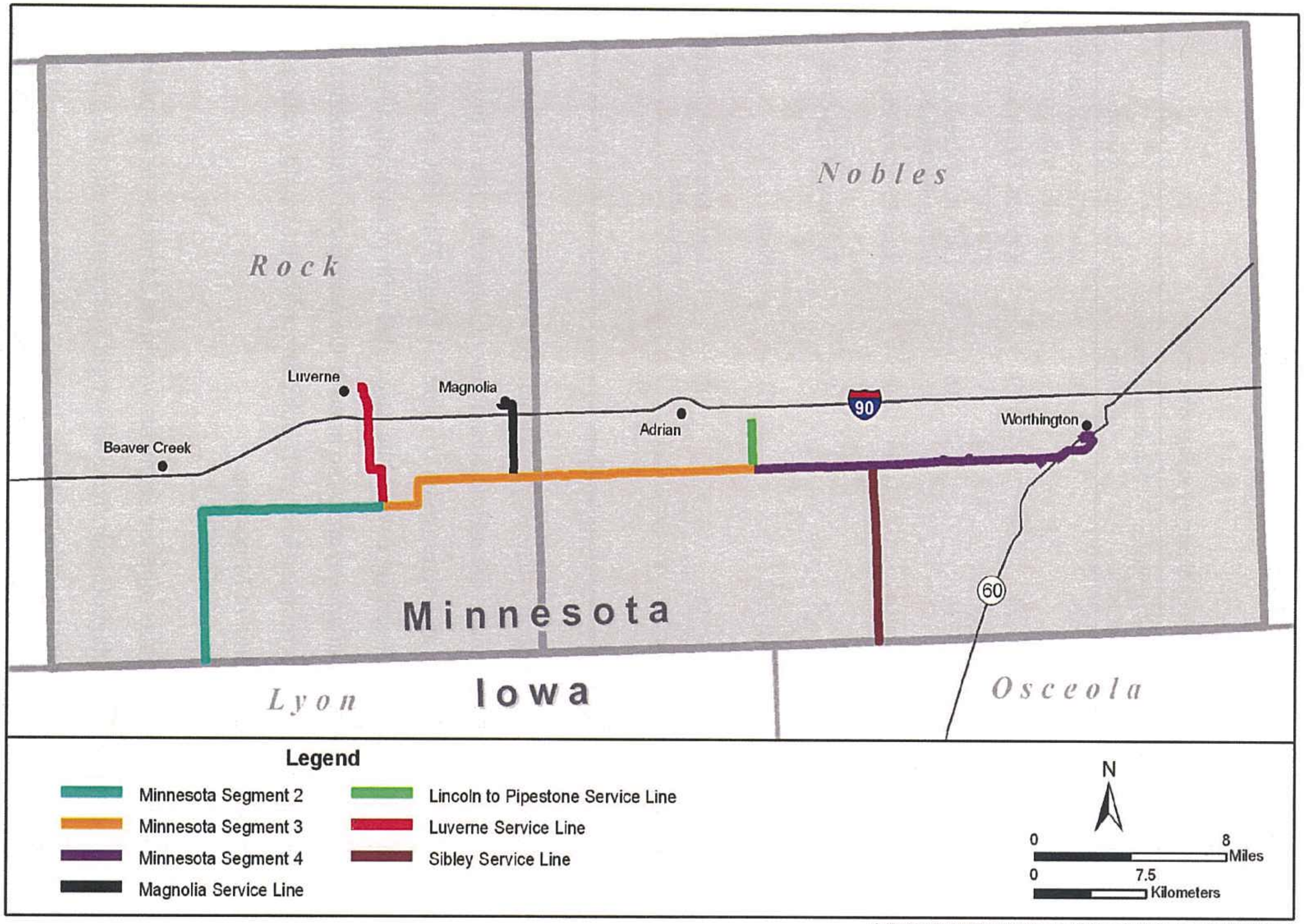

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Figure 5 - Location of Lewis & Clark Minnesota Pipeline Segments, Rock and Noble Counties, Minnesota.

Table 1 - Lewis and Clark Regional Water Supply, Minnesota Pipeline Segment and Affected Drainage Crossings.

1 As illustrated on 1:24,000-scale U.S. Geological Survey topographic maps.

	Length (Miles)	Pipeline Diameter (inches)	Number of Drainage Crossings[1]	Affected Drainages
MN-2	13.6	24	20	Mud Creek and Rock River and select tributaries
MN-3	16.6	24	19	Kanaranzi Creek and select tributaries
MN-4	15.2	18	16	Little Rock Creek, tributary to Judicial Ditch No. 6
Luverne Service Line	5.8	14	9	Rock River and Elk Creek
Magnolia Service Line	3.4	6	4	Tributary of Elk Creek
Lincoln-Pipestone Service Line	2.0	12	0	None
Sibley Service Line	6.9	16	10	Little Rock River and select tributaries
Total	63.5		78	

The total amount of short-term temporary disturbance associated with the Minnesota pipeline segments is estimated at 1,099 acres, and the estimated amount of long-term, life of project (i.e., permanent) disturbance is estimated at 7 acres (refer to Table 2.1 [page 7] in TRC Mariah [2002]). All 7 acres of permanent disturbance would be associated with pump stations and reservoirs, which would be located in upland areas, so none of the permanent disturbance would occur in drainages. Therefore, no permanent loss of Topeka shiner habitat would occur as a result of the installation of the pipeline in Minnesota.

The largest pipe used for the Minnesota pipeline segments would be 24 inches in diameter (e.g., MN-2 and MN-3 segments). The Magnolia Service Line would be the smallest, using a 6-inch pipe (refer to Table 1). Most easement widths would be 100 feet (60 feet permanent, 40 feet temporary); however, some easements may be narrower for special situations.

The Minnesota pipeline segments cross the main channels and tributaries of Rock and Little Rock rivers and Mud, Elk, and Kanaranzi creeks (Appendix A). The Minnesota pipeline segments and service lines would cross a total of 78 drainages (refer to Table 1).

General Crossing Methods

Drainages would either be:

- Open cut (i.e., trenched) with or without diversion structures. The open cut method with diversion structures would include an instream water diversion structure such as a dike(s) with diversion pipe or cofferdam structure. A cofferdam also may be used at the crossing and then be open cut. When possible dikes and cofferdams will be placed in manner and location that avoids or minimizes, to the greatest extent possible, impacts to Topeka shiner off channel pool habitat. The open cut method without diversion structures would not use any instream water diversion structures; or
- The crossing may be conventionally bored or HDD.

Crossing Method Determination

The open cut method without diversion structures would be utilized for:

- All dry small intermittent channel crossings and tiled drainage crossings;
- All dry manmade drainage ditch crossings;
- stream crossings located in suitable Topeka shiner habitat, but not designated as critical habitat, with recent documentation of Topeka shiner occurrences where the channel is dry or frozen solid and with no flowing water or pooled water without fish present at the time of the crossing; or
- Stream crossings located in critical habitat where the stream is dry or frozen solid with no water flowing under the ice at the time of the crossing.

The open cut method with diversion structures would be utilized for:

- Stream crossings located in suitable Topeka shiner habitat that has no recent documentation (e.g., last 5 years) of Topeka shiner occurrences 1.0 mile upstream or downstream of the crossing;

- Stream crossings located where the adjacent streamside habitat is degraded (e.g., agricultural plantings or overgrazed pasture and trampled banks); or
- Stream channel crossings located in critical habitat with no recent (e.g., last 5 years) documentation of Topeka shiner occurrences 1.0 mile upstream or downstream of the crossing.

The conventional boring or HDD methods would be utilized, if possible, for:

- Stream crossings in designated critical habitat with recent (e.g., last 5 years) documentation of Topeka shiner occurrences 1.0 mile upstream or downstream of the crossing; or
- Stream crossings of suitable habitat but not in designated critical habitat with recent (e.g., last 5 years) documentation of Topeka shiner occurrences 1.0 mile upstream or downstream of the crossing.

If conventional boring or HDD fails (e.g., if an obstruction is encountered during the bore or the large channel cannot be bored due to bedrock) then attempts would be made to use alternative methods to get through the obstruction. A contingency plan would be prepared by the contractor to describe what alternative methods would be used prior to the commencement of construction if an obstacle is encountered during boring. The contingency plan would be reviewed and would be cleared with the Service prior to construction. If no reasonable or economic alternatives are available to continue the boring, then temporary instream structures such as cofferdams or, in smaller streams, dike(s) and a diversion pipe would be placed in the stream for the duration of the crossing, and the site would be open cut. When possible dikes and cofferdams will be placed in manner and location that avoids or minimizes, to the greatest extent possible, impacts to Topeka shiner off channel pool habitat.

Stream crossings that involve side channel pools and oxbows that have sufficient water to support Topeka shiners (e.g., the pools and oxbows are fed by springs or groundwater sources) would be evaluated to see if these areas could be avoided. If these areas cannot be avoided and are in critical habitat, the crossing would be conventionally bored or HDD.

A description of each crossing method is presented below. The specific drainage crossing method used would be determined based on the following information:

- Knowledge of occurrence of Topeka shiner based on field surveys (based on MNDNR, Natural Heritage Information Systems [NHIS] data);
- Presence or absence of Service-designated critical habitat (Service 2004);
- condition of habitat based on presence/absence of primary constituents elements (Service 2004) as determined during preconstruction annual IERT meetings or a coordination meeting with the Service;
- Status of streamflow at the time of construction (i.e., dry or flowing); and
- Width of the channel.

All drainage crossing constructions would occur after August 15 and before ice-out in the spring in all suitable Topeka shiner habitats. The most recent MNDNR NHIS data available would be reviewed by TRC, Banner, and Reclamation to determine which crossings are occupied Topeka shiner habitats based on Topeka shiner records within 1.0 mile upstream or downstream of each crossing. Crossing of critical habitat with no Topeka shiner records and degraded habitat (i.e., absence of constituent elements) would be open cut. All dry small intermittent channels and tiled drainages would also be open cut.

Suitable habitat would be reviewed prior to construction by Reclamation, TRC, and Banner, who would propose construction methods based on the following contingency plan. The IERT and the Service would be contacted and informed about chosen construction methods for each crossing. Reclamation, TRC, and Banner would consider any further recommendations in consultation with the Service.

Pipeline Installation Methods

The installation of all pipeline segments would be designed so the top of the pipe is a minimum of 6 feet below the bottom of the channel bed. Construction activities and staging areas would be located to avoid side channels and remnant stream channels that may have a groundwater hydrologic connection. Clay plugs would be used as needed, especially in floodplains of occupied and designated critical Topeka shiner habitat, to control and minimize groundwater migration and potential impacts of dewatering side channels outside the construction easement. A Storm Water Pollution Prevention Plan (Pollution Prevention Plan) would be developed for the project in accordance with Minnesota Pollution Control Agency (MPCA) and implemented by the contractor as required by the contract specifications. Construction in occupied Topeka shiner habitat would not begin until the entire crossing could be completed without delay. All project-wide mitigation/environmental protection measures, including erosion control features presented in the FONSI, would be incorporated into the drainage crossing design phase and construction phase of the project to minimize impacts to Topeka shiners and their designated critical habitat. All disturbed areas will be seeded with native, non-invasive plant species.

Open Cut Method

The typical procedures for the open cut method of crossing minor stream channels in unsuitable habitat, dry, or tiled drainages would first include the installation of a silt fence or other means of silt and erosion control downstream of the crossing (Figure 6). Pipeline installation using the

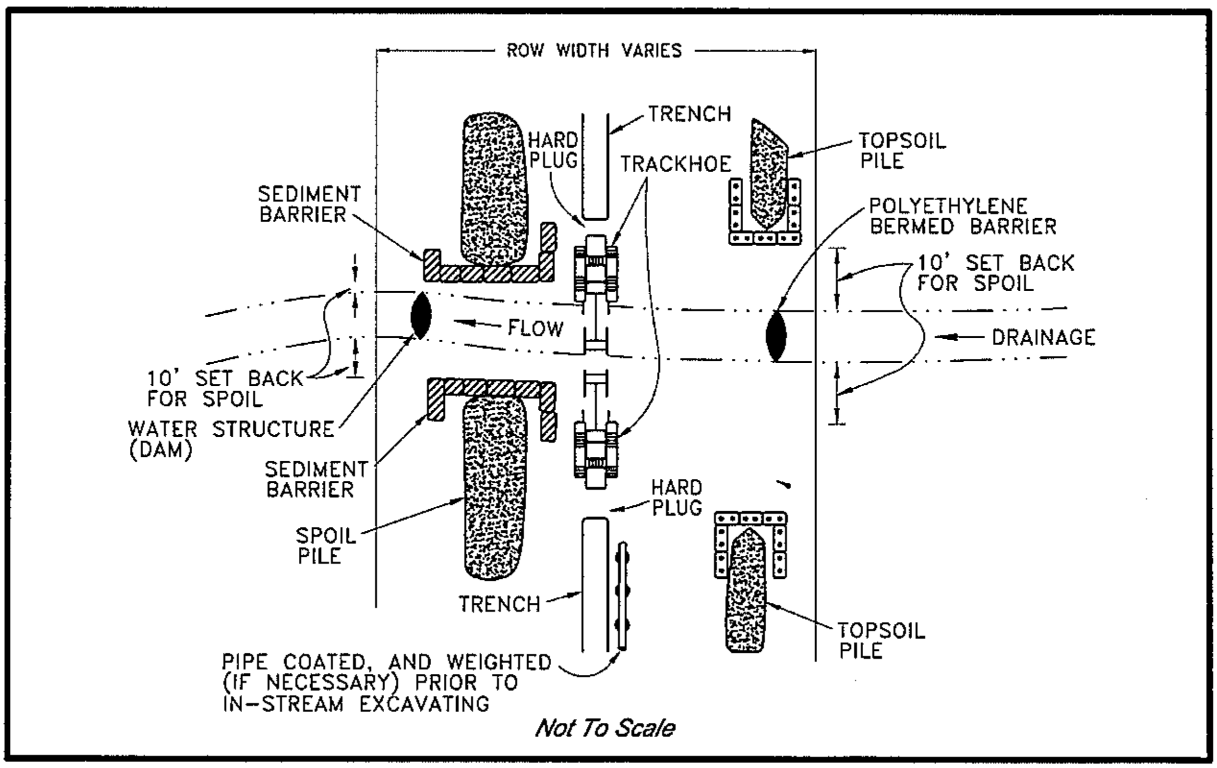


Figure 6 - Typical Drawing of Open Cut Method in Dry, Intermittent, or Tiled Drainage Crossings.

open cut without diversions method across minor stream channels typically can be completed in less than a day. The contractor would unwater (surface water) or dewater (groundwater) the area as needed, then open cut the channel and place the excavated material immediately adjacent to the open cut.

The contractor then would install buoyancy restraint fabric around the pipe, backfill the cut with the original material, and restore the banks and bed of the channel. The pipe would be installed to a minimum of 6 feet below the bottom of the reconstructed channel bed. Clay plugs would be placed in the trench under each stream bank. Disturbed areas would be seeded with native, non-invasive plant species as soon as practical in accordance with the Pollution Prevention Plan.

Single or Double Dike Method with Diversions

The single and double dike methods (Figures 7 and 8) would be used to cross flowing streams of suitable Topeka shiner habitat. If Topeka shiners are suspected to be present, contractors would follow procedures provided in Section - *Block Seining and Removal of Topeka Shiners from Construction Areas* (page 20) to remove shiners from the construction easement crossing prior to conducting any sediment control or construction activities. The choice to use a single or double dike method would be determined based on site-specific physical and hydrologic conditions. This technique is short in duration and construction would proceed on an accelerated schedule as conditions allow. When possible dikes and cofferdams will be placed in manner and location that avoids or minimizes, to the greatest extent possible, impacts to Topeka shiner off channel pool habitat.

Prior to the initiation of construction activities, an appropriate number of silt fences would be installed to reduce potential storm water runoff. A diversion pipe large, enough to transport the natural stream flow and maintain the hydrologic connection, would be placed on the channel bed parallel to flow within the construction easement width. An upstream dike would be constructed over the diversion pipe to divert flows and maintain the hydrologic connection into the diversion pipe and around (i.e., above) the construction area (refer to Figure 8). A dike would be constructed over the diversion pipe to support and to provide an adequate construction width to install the pipeline across the drainage (refer to Figure 8). The dike material

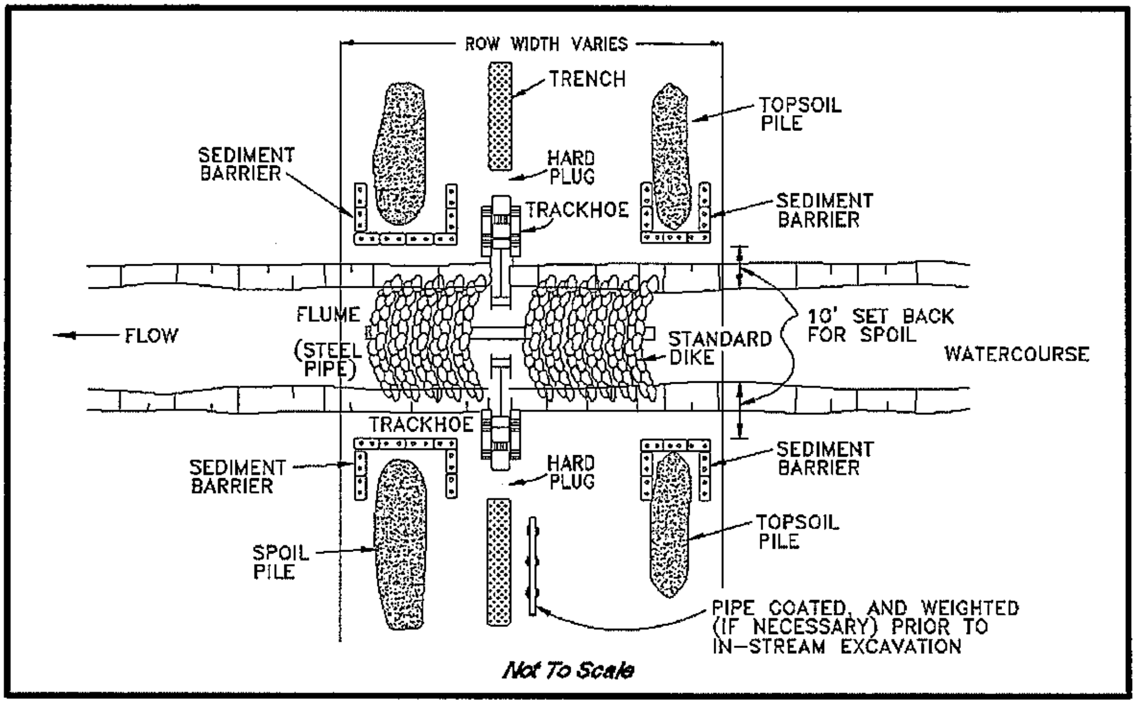


Figure 7 - Typical Single Dike with Diversion Pipe Drainage Crossing Method.

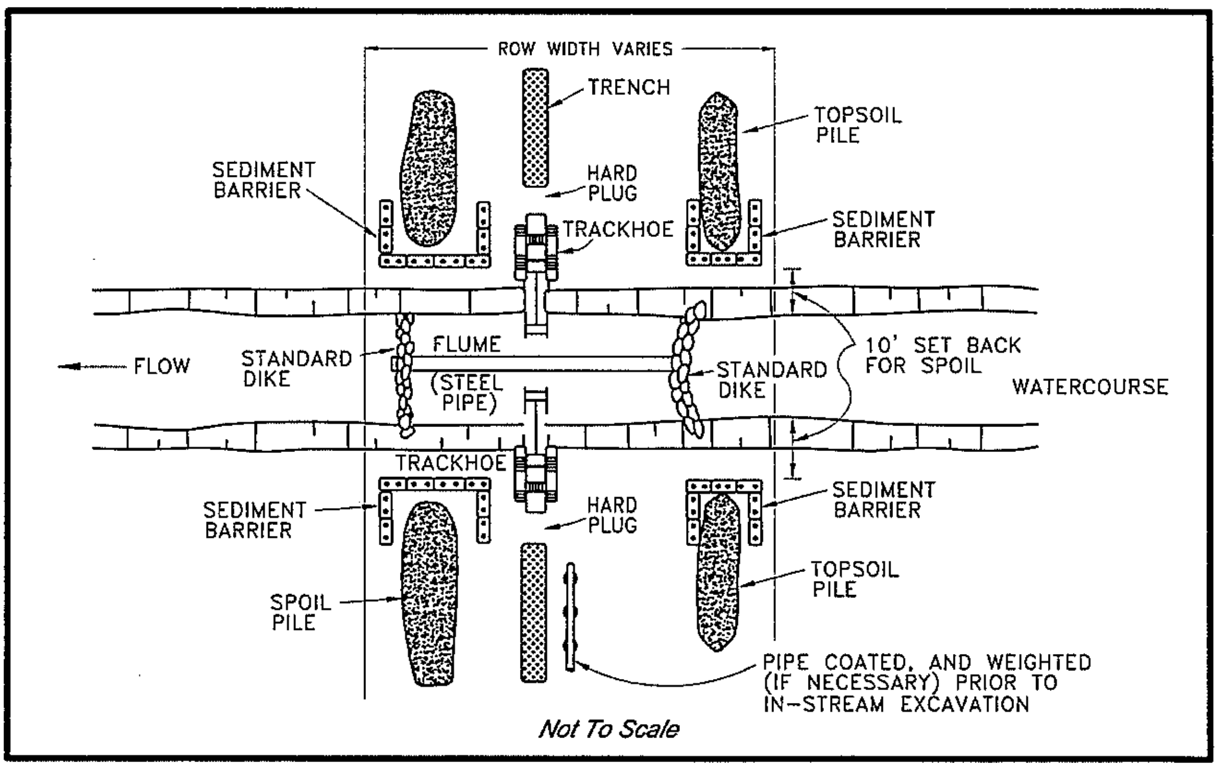


Figure 8 - Typical Double Dike with Diversion Pipe Drainage Crossing Method.

would be covered or protected with plastic sheet, Jersey barrier, or sheet piling.

The double dike method would use a second dike constructed downstream after streamflow is diverted through the diversion pipe. The second dike would be constructed to keep water from flowing upstream and into the construction area. When possible dikes will be placed in manner and location that avoids or minimizes, to the greatest extent possible, impacts to Topeka shiner off channel pool habitat. The dike material would be covered or protected with plastic sheet, Jersey barrier, or sheet piling. In suitable Topeka shiner habitat, if unwatering (i.e., removal of ponded or flowing surface water) between the dikes is required, pumps would be encapsulated with a commercial well screen of 1/4 inch or finer, with a 3-inch intake and a 1/8-inch screen covering the intake hose to minimize the potential for passage and impingement of Topeka shiners. A fisheries biologist would be on-site when pumping to ensure the safe transfer of any fish back into the stream. This biologist would have a permit from the Service to handle Topeka shiners. The instream features would be designed and installed in a manner that would not impair the passage of Topeka shiner and other fish during the construction phase of the project.

A trench would be constructed using a backhoe under the diversion pipe to a depth sufficient to install the water pipeline under the drainage. Dewatering (i.e., removing water by pumping) of the trench would occur during excavation, pipe installation, and backfill operations as required. During the dewatering process, all pumps would be encapsulated with a commercial well screen of 1/4 inch or finer, with a 3-inch intake and a 1/8-inch screen covering the intake hose to minimize the passage and impingement of Topeka shiners. A fisheries biologist would be on-site when pumping to ensure the safe transfer of any fish back into the stream. This biologist would have a permit from the Service to handle Topeka shiners.

Buoyancy restraint for the pipe would be accomplished by draping geotextile filter fabric over the pipe and backfilling with granular material to cover the pipe after it is installed under the diversion pipe so that a minimum of 6 feet of fill exists over the top of the pipe. Clay plugs would be placed in the trench under the stream banks. The streambed and banks would be restored to predisturbance conditions, including restoration of substrate integrity and distribution and the dike and diversion pipe would be removed. Stream banks would be restored, and disturbed areas would be seeded with native, non-invasive species as soon as practical (refer to Figure 4). It is estimated that all stream crossings using the single or double dike diversion pipe method could be completed in less than 1 day, thereby minimizing instream flow alterations. Care would be taken during the construction of the single or double dike structures, installation of cofferdams, trenching, and backfilling processes to minimize bank material from falling or sloughing into the work space and to prevent excess debris from falling into the water during construction. When possible dikes and cofferdams will be placed in manner and location that avoids or minimizes, to the greatest extent possible, impacts to Topeka shiner off channel pool habitat.

Conventional Boring or HDD

Larger drainages such as Rock River and Kanaranzi Creek known to contain occupied critical Topeka shiner habitat would be conventionally bored or HDD to minimize disturbance. The decision to bore or open cut these larger drainage crossings located in designated critical habitat also would be dependent on the depth of bedrock and other geologic factors gathered during the preconstruction soil bore tests. If the preconstruction soil boring tests indicate the presence of shallow bedrock or potential obstructions, the crossing would be completed using the cofferdam method discussed below or a modified dike and diversion pipe discussed above.

For conventional horizontal boring, the bore pits would be located in upland areas outside of off-channel pool habitat and any slack water areas. Prior to the initiation of construction activities, an appropriate number of silt fences would be installed to reduce potential storm water runoff. Pits would be excavated on either side of the channel to a sufficient depth so the pipeline could be installed a minimum of 6 feet below the river channel bottom. Dewatering for or unwatering of the pits would occur during excavation, pipe installation, and backfill operations. The excavated material would be located near the excavation area and within the area protected by the silt fences. The conventional boring equipment would consist of a hydraulic ram and flight auger. The boring equipment is capable of some horizontal and vertical alignment changes. If no obstructions are encountered, the boring would be completed and the pipe would be installed under the channel. The excavation areas would be backfilled, and the disturbed area would be seeded with native, non-invasive plant species at the first practical opportunity. All boring activities would occur within the project construction easement; therefore, no additional disturbance outside the 100 foot easement area would be required.

The entry and exit location for HDD would be located in upland areas outside of off-channel pool habitat and any slack water areas. Prior to the initiation of construction activities, an appropriate number of silt fences would be installed to reduce potential storm water runoff. The boring would be accomplished through the use of HDD equipment. The HDD equipment is capable of horizontal and vertical alignment changes. If no obstructions are encountered, the HDD would be completed and the pipe would be installed under the channel. The areas where the pipeline and the drilled pipe are connected would be excavated and then backfilled and the disturbed area would be seeded with native, non-invasive plant species at the first practical opportunity. All HDD activities would occur within the project construction easement; therefore, no additional disturbance outside the 100-foot easement area would be required.

If an obstruction is encountered during conventional boring or HDD or the large channel cannot be bored due to bedrock, then attempts would be made to use alternative methods to get through the obstruction. A contingency plan would be prepared by the contractor to describe what alternative methods would be used prior to the commencement of construction if an obstacle is encountered during boring. The contingency plan would be approved and would be cleared with the Service prior to construction. If no reasonable or economic alternatives are available to continue the boring, then temporary instream structures such as cofferdams or, in smaller streams, dike(s) and a diversion pipe would be placed in the stream for the duration of the crossing, and the site would be open cut. Prior to construction, silt fences would be installed along stream banks and around construction and staging areas as needed. Disturbance of bank areas and removal of streamside vegetation would be limited to the extent possible.

Cofferdam

A cofferdam is a temporary structure that can be installed in open water up to 10 feet deep, which utilizes free-standing steel supports and an impervious fabric membrane or steel structure to create an instream construction environment without the need for excavation or fill (Figure 9).

The hydraulic loading on the fiber membrane or steel structure assists in sealing and stabilizing the entire structure.

A cofferdam generally would be used for crossing drainages wider than 20 ft. This crossing method could be used for the crossing of Rock River if boring cannot be conducted. Cofferdams would be constructed in approximately 60% of the river without the use of diversion pipes. This would allow construction in the river to occur while still allowing the river to flow around the cofferdam. Once the cofferdam is constructed, pumps would be used to unwater the area behind the barrier, and the pipeline would be installed and encased in concrete from one side of the streambank. Unwatering of the trench and construction areas contained by cofferdams would not be discharged directly into the stream. Unwatering hoses would be situated to discharge over vegetated areas (land application) to spread out flow. All pumps would be encapsulated with a commercial well screen of 1/4 inch or finer, with a 3-inch intake and a 1/8-inch screen covering the intake hose to minimize the passage and impingement of Topeka shiners. A fisheries biologist would be on-site when pumping to ensure the safe transfer of any fish back into

Figure 9 - Photograph of a Cofferdam Drainage Crossing Method.

the stream. This biologist would have a permit from the Service to handle Topeka shiners. After the pipeline is installed in the first portion of the crossing area, the disturbed stream channel would be backfilled and restored, the cofferdam would be removed, and the process would be repeated on the other streambank utilizing the same cofferdam. Once the crossing is completed, the banks would be restored to their natural configuration, including restoration of substrate integrity and distribution, and the disturbed area would be seeded with native, non-invasive plant species at the first opportunity.

Block Seining and Removal of Topeka Shiners from Construction Areas

All crossings in occupied Topeka shiner critical habitat that would use the cofferdam or the dike with diversion pipe methods would be seined to remove shiners prior to the construction of the instream diversion structures. Block seines would be installed both upstream and downstream of the crossing, and the construction easement would be seined by a trained fisheries biologist using approved methods to remove shiners from the construction area. The biologist(s) would have a permit from the Service to handle Topeka shiners.

If pumping is required to remove excess water from within the construction easement, cofferdam, or double-dike diversion pipe area, all pumps would be equipped with commercial well screens of 1/4 inch or finer, with a 3-inch intake and a 1/8-inch screen covering the intake hose to prevent the passage and impingement of Topeka shiners. The double dike with diversion pipe would then be constructed, and the pipeline would be installed under the diversion pipe. When possible dikes and cofferdams will be placed in manner and location that avoids or minimizes, to the greatest extent possible, impacts to Topeka shiner off channel pool habitat.

Once the pipeline has been installed and the cofferdam or dike(s) and diversion pipe have been removed, all exposed slopes and banks would be stabilized. All temporary and excess fill material would be removed to an upland area, and all disturbed areas would be seeded with native, non-invasive plant species. Erosion control structures would be removed once vegetation has become re-established. Trench boxes would be used when installing the pipeline at locations where wetlands or intermittent stream run parallel to the pipeline to minimize the amount of disturbance. No new roads would be required to install the pipeline across the drainages.

Post-construction and Pipeline Maintenance

Prior to being put into service, the pipeline would be tested and disinfected following procedures provided in the FONSI (Reclamation 2003). Chlorinated water would be neutralized prior to being discharged into drainages, so no impacts to water quality are anticipated (Reclamation 2003). Flushing assemblies are designed to neutralize chlorinated water and have rip-rap aprons sufficient to dissipate energy and to control erosion prior to water entering streams. The flushing assembly would be used at start-up to clean the line and then during operation of the pipeline on an infrequent basis following water line breaks or to remove sediment buildup in the water line if indicated by water quality testing. The time required to flush out each pipeline segment would depend on the length of the pipeline between flushing and blow-off assemblies. Flushing would occur outside the Topeka shiner spawning season and flushing and blow-off assemblies and their associated rip rap aprons would be placed in a manner and location that avoids and or minimizes, to the greatest extent possible impacts to Topeka shiner off channel pool habitat.

Blow-off hydrants would be located at low spots in the pipelines and would be used to flush out accumulated sediments and to drain the pipelines for repairs, maintenance, and inspection. Blow-off hydrants would be placed in a manner and location that avoids or minimizes, to the greatest extent possible, impacts to Topeka shiner off channel pool habitat. The blow-off hydrants are designed with a hose attachment so water can be directed away from the pipeline and any cultivated land and into a nearby grassed drainage ditch to dissipate flows or into a nonerodible surface drainage channel (i.e., drain tiled drainage) or storm drain, if available. Once the pipeline is in operation, the operator may flush the line using the blow-off assemblies as needed. Project specifications state that water should be flushed until the water runs clear. After operation of the system begins, the chloramines from treated water would be neutralized prior to discharge into drainages and wetlands.

Project-wide Mitigation Measures for Topeka Shiner

Pages xix-xxix in the project FONSI provide Project-required Environmental Commitments (Reclamation 2003). Section 4.0 (pages 17-23) of TRC (2002) describes the measures that would be used to avoid, minimize, or mitigate potential impacts to T&E species (including Topeka shiners). All of the project-wide mitigation/environmental protection measures identified in Reclamation (2003) and TRC Mariah (2002) will continue to be implemented on project-affected lands to avoid or mitigate potential project impacts. In addition, Lewis & Clark or its contractors would obtain all Section 404 permits from the U.S. Army Corps of Engineers and other Minnesota state and county stream crossing permits prior to construction to further avoid, minimize, or mitigate potential impacts to T&E species (including Topeka shiners).

In June 2008, the Service's Twin Cities Field Office developed a list of recommendations as guidance to design project actions that would avoid or minimize adverse effects to Topeka shiner. Many of these 2008 recommendations reiterate the project-wide mitigation/environmental protection measures identified in Reclamation (2003) and TRC Mariah (2002); however, they also provide recommendations specific to the State of Minnesota. Because these recommendations were developed by the Service after the issuance of the 2003 FONSI, a list of additional mitigation measures are included in this SBA and would be implemented to the extent possible.

- Do not unwater stream reaches or off-channel habitats or temporarily divert streams for construction.
- Do not conduct instream work before August 15 to avoid disrupting Topeka shiner spawning.
- Implement applicable requirements and best management practices for storm water and erosion control contained in MPCA-issued storm water pollution prevention permits.
- Minimize removal of riparian vegetation, removing it only as required and sequentially for the project and replacing it as soon as feasible upon project completion.

- Mulch areas of disturbed soils and reseed promptly with native noninvasive species.
- Implement appropriate erosion and sediment prevention measures to the maximum extent practicable and inspect structures regularly so that they are effective and in good repair, especially following precipitation events during construction and following the completion of construction.
- Leave existing features, such as road bridge abutments, retaining walls, and rip-rap in place to the extent feasible.
- Design and install instream structures in a manner that would not impair the passage of Topeka shiners or other fish during and after construction.
- Do not operate motorized vehicles instream. Excavations and/or culvert replacement should be conducted from streambanks outside of standing water or flowing water.
- Backfill placed instream would consist of rock or granular material free of fines, silts, and mud.
- Keep machinery parts clean of soil and rock material and free of grease, oil, etc., before instream use.
- Prevent materials and debris from falling into water during construction.
- Provide information to contractors and subcontractors with regard to permit provisions that are necessary to avoid or minimize adverse effects to Topeka shiners.

Lewis & Clark or its contractors would adhere to the 2008 Service's Twin Cities Field Office project design recommendations by developing project specifications to meet these requirements.

The project would comply with decisions reached during informal consultations between Reclamation and the Service as provided in the FONSI and final EA (Reclamation 2003) and the BA (TRC Mariah 2002). Mitigation measures provided in Reclamation (2003) and TRC Mariah (2002) to avoid or minimize potential adverse effects to Topeka shiners and their designated critical habitat would be implemented during the construction, operations, and maintenance phases of the project.

Action Area

Affected Area

A description of the project area, study area, and impact areas used to assess impacts of the Lewis & Clark project Proposed Action is provided on page 15 of the FONSI (Reclamation 2003). Federal- and state-listed threatened, endangered, protected, and candidate (TEPC) species or their habitat potentially occurring in the project area were identified in both the EA (TRC Mariah 2002) and the BA (Reclamation 2003) for the project. Reclamation submitted database requests to the MNDNR NHIS in February 2010 for the occurrence or potential occurrence of federal- and state-listed TEPC species for biological surveys conducted on MN-2 and the Luverne Service Line (TRC 2010a). Specific location information for Topeka shiner observations was obtained through a License Agreement between TRC and MNDNR NHIS in January 2011. For analysis purposes, as directed by the Service (December 1, 2010, meeting between the Service- Twin Cities Minnesota Field Office, Reclamation, Lewis & Clark, and TRC), TRC obtained data from MNDNR NHIS for Topeka shiner observations 1.0 mile upstream and downstream from the Lewis & Clark construction easements. The most current alignment of pipeline construction easements were obtained from Banner's proposed construction drawings and from project maps for each pipeline segment located in Minnesota (refer to Figure 5 and Appendix A).

Specific Areas Affected by the Project

The specific areas that may be affected by the project are the drainage crossings that are designated as critical habitat, occupied habitat, or suitable Topeka shiner habitat during pipeline construction and operations and maintenance. Major drainages crossed are Rock River, Elk Creek, Kanaranzi Creek, and Little Rock River (refer to Appendix A). The location of critical habitat for Topeka shiner was obtained from the Service (2004, 2005) and is provided in

Appendix A. The location of Topeka shiner observations with a 1.0-mile buffer on each side of the Lewis & Clark Minnesota pipeline construction routes also is provided in Appendix A.

A field assessment that included a photographic inventory of all drainages crossed by the Lewis & Clark construction easement was conducted by TRC in fall 2010 (TRC 2010b). A preliminary assessment of the quality of habitat at each crossing was based on the Service (2004, 2005, 2007, 2009) descriptions of suitable habitat and other Topeka shiner life history and distribution studies (Dahle 2001; Ceas and Anderson 2004; Ceas and Monstad 2006, 2005; Ceas and Plain 2007; Ceas and Larson 2008, 2009, 2010). Each pipeline segment construction easement was driven, and digital photographs were taken at all construction easement drainage crossings as indicated on a 1:24,000-scale U.S. Geological Survey (USGS) map. Additional photographs of the streambed, floodplain (where applicable), and upstream or downstream of the construction easement also were taken. The results of the field inventory are provided in TRC (2010b). Copies of this report were provided to the Service and a MNDR Biologist at a consultation meeting held in Luverne, Minnesota, on December 1, 2010. The photograph inventory report documented the 2010 habitat quality of designated critical habitat, identified crossing areas of suitable habitat, areas of degraded habitat, and areas of unsuitable Topeka shiner habitat. The results of the inventory are used in this report to evaluate the potential spatial impacts to Topeka shiner or its designated critical habitat and as an aid in project design.

Ongoing Activities In Vicinity of Project

Intensive cropland agriculture in the vicinity of the Lewis & Clark construction easements is the major contributor to current reduction of stream suitability for Topeka shiners, including designated critical habitat. Factors that reduce stream suitability as a result of agricultural activities include sedimentation, increased nutrient loading from fertilizer runoff, channelization of stream channels, and decrease in stream habitats due to tiling. The use of agricultural tiling, which uses surface ditches and subsurface permeable pipes to remove standing or excess water from poorly drained lands, has increased in South Dakota and Minnesota (Service 2009). Overgrazing of riparian areas, impoundments, urbanization, confinement animal feeding operations, and placement of culverts associated with road and bridgework also impact Topeka shiner, its habitat, and its macroinvertebrate food sources throughout most of its range (Kuitunen 2001; Service 2009). All of these activities are ongoing on lands crossed by the Lewis & Clark Minnesota pipeline routes in Rock and Nobles counties.

Species and Critical Habitat Considered

The BA Section 5.0 (pages 25-45) (TRC Mariah 2002) presents a discussion of the status, habitat, potential effects, and mitigation for all federally listed T&E species that may occur in the project vicinity. Species addressed in TRC Mariah (2002) included pallid sturgeon, Topeka shiner, scaleshell mussel, American burying beetle, bald eagle, least tern, piping plover, western prairie orchid, and prairie bush clover. This SBA only addresses the Topeka shiner and designated critical habitat potentially affected in Minnesota.

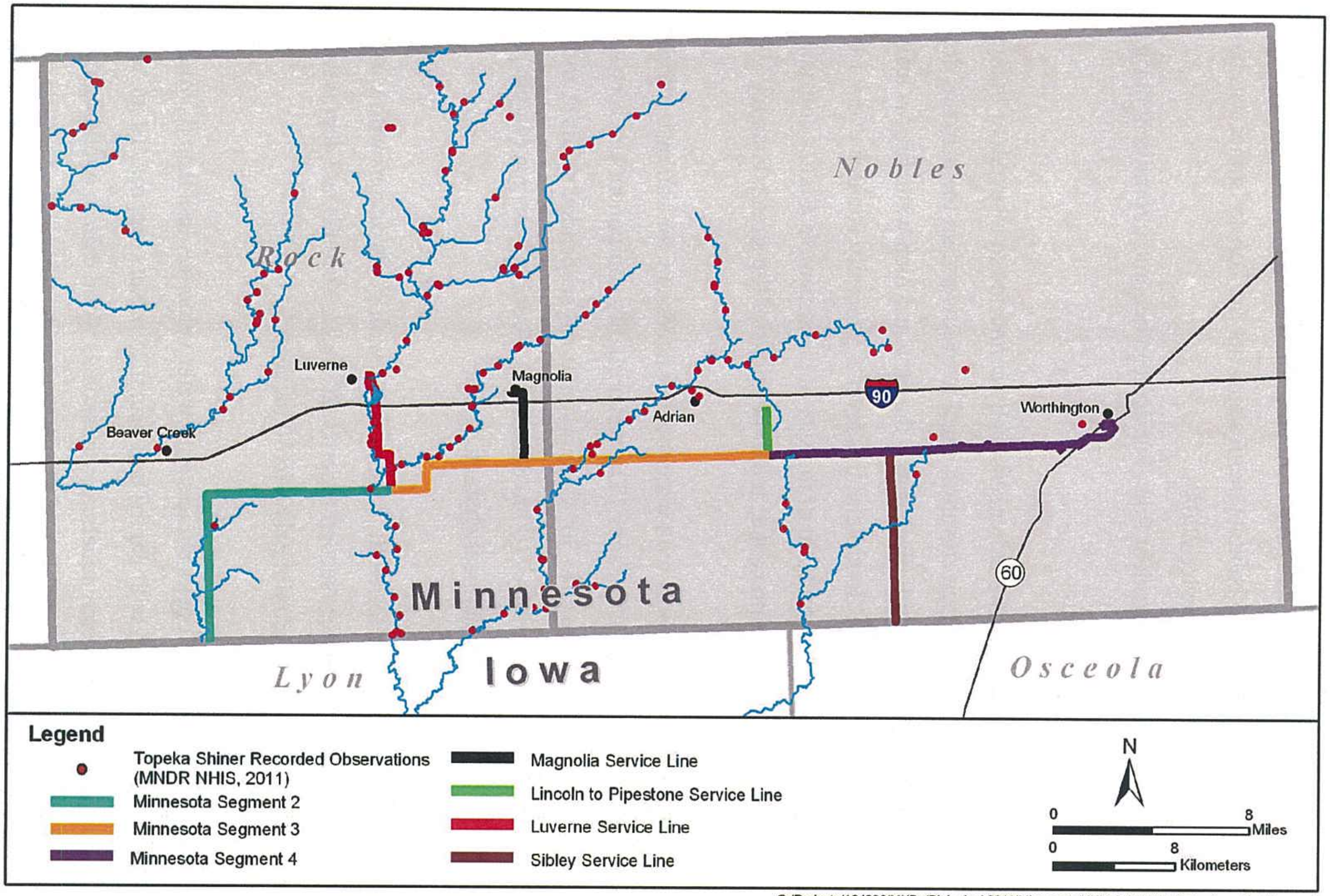
As previously stated, at the time of the issuance of the FONSI (Reclamation 2003), the Service had not designated critical habitat, and no adverse effects to critical habitats were identified or discussed. However, on July 27, 2004, critical habitat was designated for the Topeka shiner in Nebraska, Iowa, and Minnesota. At the time this species was proposed for listing in 1997, only five occupied locations were known in South Dakota, therefore the SDGFP initiated surveys in 1997 to determine current occupation of known historical sites and to investigate other possible drainages suitable for Topeka shiner. The surveys indicated that the species was more widespread in South Dakota than previously thought; therefore, no critical habitat was designated in South Dakota.

The Lewis & Clark construction easements do not cross designated critical habitat in Iowa. Critical habitat has not been designated for any of the other federally listed species discussed in the original EA or BA. Therefore, this section of the SBA will provide an update of current status and use and a discussion of potential direct and indirect effects, analysis of effects, and proposed mitigation measures to offset effects to Topeka shiner and its designated critical habitat crossed by Lewis & Clark pipeline segments in Minnesota. The location of designated critical habitat in the vicinity of the Lewis & Clark project is provided in Appendix A.

Topeka Shiner Current Status and Habitat Use

The Topeka shiner occurs throughout the Big Sioux and Rock River watersheds in the five southwestern Minnesota counties of Rock, Nobles, Pipestone, Murray, and Lincoln (Ceas and Larson 2008; Service 2009). When the Topeka shiner was listed in 1998, it was known to occur in 15 locales in eight streams in the Rock and Big Sioux River watersheds in Minnesota. Since 1998, additional data have been collected, and the species is now known to occur at 75 sites in at least 17 named streams and off-channel floodplain pools adjacent to these streams in these same five southwestern Minnesota counties (Service 2009). Numerous occurrences of Topeka shiner have been recorded in Rock and Nobles counties, Minnesota (MNDNR NHIS] 2011) (refer to Figure 10).

An annual monitoring program to determine population distribution and presence/absence of Topeka shiner in Minnesota began in 2004 (Ceas and Anderson 2004). In February 2005, a Topeka shiner Recovery Team was formed to facilitate coordination and information sharing on status, population trends, analysis of ongoing and future threats, and information on conservation actions (Service 2009). After 5 years of monitoring, researchers concluded that the species has widespread distribution across its known historic range and stream segments, with an abundance of suitable habitat that produced higher numbers of this species. Recent studies indicate that Topeka shiners prefer pool or oxbow habitat outside the main channel course where contact with groundwater provides subsurface flow, ensuring water during times of intermittent surface flows. Studies also showed an absence of Topeka shiner observations in stream segments with continuous flowing "raceways" habitat such as excavated drainages (Service 2009).



G:/Projects/164686/MXDs/Biological 2011/Minnesota/NHIS-RARE/MNProjectLocationMap.mxd

Figure 10 - Known Occurrences of Topeka Shiners in Rock and Nobles Counties, Minnesota.

Topeka Shiner Critical Habitat

The Service has designated critical habitat in segments of Rock River, Elk Creek, Mud Creek, Kanaranzi Creek, Little Rock Creek, and select tributaries in Minnesota (Service 2004) (refer to Appendix A). Designation of critical habitat stream segments for Topeka shiner was based on nine primary constitute elements (Service 2004):

1. Streams most often with permanent flow, but that can become intermittent during dry periods;

2. Side-channel pools and oxbows either seasonally connected to a stream or maintained by groundwater inputs, at a surface elevation equal to or lower than the bankfull discharge stream elevation. The bank full discharge is the flow at which water begins leaving the channel and flowing into the floodplain; this level is generally attained every 1 to 2 years. Bankfull discharge, while a function of the size of the stream, is a fairly constant feature related to the formation, maintenance, and dimensions of the stream channel;

3. Streams and side-channel pools with water quality necessary for unimpaired behavior, growth, and viability of all life stages. The water quality component can vary seasonally and can include temperature (1 to 30° Centigrade), total suspended solids (1 to 2000 parts per million [ppm]), conductivity (100 to 800 mhos), dissolved oxygen (4 ppm or greater), pH (7.0 to 9.0), and other chemical characteristics;

4. Living and spawning areas for adult Topeka shiner with pools or runs with water velocities less than 0.5 meters/second (approx. 20 inches/second) and depths ranging from 0.1 to 2.0 meters (approximately 4 to 80 inches);

5. Living areas for juvenile Topeka shiners with water velocities less than 0.5 meters/second (approx. 20 inches/second) with depths less than 0.25 meters (approx. 10 inches) and moderate amounts of instream aquatic cover, such as wood debris, overhanging terrestrial vegetation, and aquatic plants;

6. Sand, gravel, cobble, and silt substrates with amounts of fine sediment and substrate embeddedness that allows for nest building and maintenance of nests and eggs by native *Lepomis* sunfishes (green sunfish, orange spotted sunfish, long-ear sunfish) and Topeka shiner as necessary for reproduction, unimpaired behavior, growth, and viability of all life stages;

7. An adequate terrestrial, semiaquatic, and aquatic invertebrate food base that allows for unimpaired growth, reproduction, and survival of all life stages;

8. A hydrologic regime capable of forming, maintaining, or restoring the flow periodicity, channel morphology, fish community composition, off-channel habitats, and habitat components described in the other primary constituent elements; and

9. Few or no nonnative predatory or nonnative competitive species present.

Each of the construction easements segments in Minnesota (with the exception of the Lincoln-Pipestone Service Line) crosses drainages either designated as critical habitat and/or occupied habitat or drainages that could provide suitable habitat for Topeka shiner (refer to Appendix A and Table 1). Several of the drainages, indicated as intermittent streams on USGS 1:24,000-scale maps, and tributaries to these critical habitat streams have been drain tiled with subsurface permeable pipes to remove standing or excess water from poorly drained lands to increase tillable land (TRC 2010b). At tiled crossings, no stream channels occur; therefore, there is no suitable habitat for Topeka shiner. However, follow-up site-specific field investigations are recommended to determine the quality of suitable and designated critical Topeka shiner habitat crossed by each construction easement rather than relying solely on streams indicated on USGS topographic maps.

Topeka Shiner Occurrence In Action Area

Installation of the Lewis & Clark pipeline in Minnesota would cross 78 drainages (TRC 2010b) (Appendix B). Of these 78 crossings, 18 (23%) crossings are in designated critical habitat, 9 (12%) are in suitable habitat, and 15 (19%) are of questionable quality (Table 2). The remaining 36 (46%) crossings currently are tiled or cultivated and provide no suitable habitat. Based on MNDNR data obtained on February 22, 2011, Topeka shiners have been documented within 1.0 stream mile of 18 (23%) of the 78 crossings within the last 5 years. The Luverne Service Line had the most proposed crossings with occurrences documented within 1.0 mile (8), followed by MN-2 and MN-3 (four each) and MN-4 (two). No occurrences were documented within 1.0 stream mile of crossings proposed for the Magnolia and Sibley service lines, and the Lincoln-Pipestone Service Line has no proposed stream crossings (refer to Table 4.1). Crossings with known occurrences of Topeka shiners 1.0 mile upstream or downstream of the construction easement drainage crossings are provided in Appendix A.

Of the 18 crossings with documented occurrences within 1.0 mi, 11 (61%) are within designated critical habitat (refer to Appendix A), two (11%) are within habitat classified as suitable by TRC (2010b) but not classified as critical, and five (28%) are in habitat deemed unsuitable for Topeka shiners in TRC (2010b) (refer to Table 2). Three of the crossings in unsuitable habitat that are within 1.0 mile of known occurrences are cultivated, one is tiled, and one lacks a channel and may be tiled.

Table 2 - Summary of Drainage Crossings by Pipeline Segment, Number of Crossings in Designated Critical Topeka Shiner Habitat, and Preliminary Assessment of Suitable Habitat Crossed by Each Pipeline Segment.[1]

	Number of Drainage Crossings						
Pipeline Segment	Total	Occurrences of Topeka Shiner Within 1.0 mi[2]	Designated as Critical Topeka Shiner Habitat[3]	Suitable Habitat, But Not Designated as Critical Habitat[3, 4]	Unsuitable Habitat and Not Designated as Critical Habitat[4]	Questionable Habitat and Not Designated as Critical Habitat[5]	Affected Drainage
MN-2	20	4	8 (4)	1 (0)	7 (0)	4 (0)	Mud Creek and Rock River and select tributaries
MN-3	19	4	3 (2)	3 (0)	9 (2)	3 (0)	Kanaranzi Creek and select tributaries
MN-4	16	2	2 (1)	3 (1)	7 (0)	4 (0)	Little Rock Creek, tributary to Judicial Ditch No. 6
Luverne Service Line	9	8	4 (4)	1 (1)	4 (3)	0 (0)	Rock River and Elk Creek
Magnolia Service Line	4	0	0 (0)	1 (0)	3 (0)	0 (0)	Tributary of Elk Creek
Lincoln-Pipestone Service Line	0	n/a	n/a	n/a	n/a	n/a	n/a
Sibley Service Line	10	0	1 (0)	0 (0)	5 (0)	4 (0)	Little Rock River
Total	78	18	18 (11)	9 (2)	36 (5)	15 (0)	

1 Based on November 2010 field inventory and preliminary habitat quality assessment based on USFWS (2004) and TRC (2001a, 2010b).

2 Drainage crossings with known occurrences of Topeka shiner within 1.0 stream mile in the past 5 years. Data included here were provided by the Division of Ecological Resources, Minnesota Department of Natural Resources (MNDR) and were current as of February 22, 2011. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present. Copyright 2011 State of Minnesota Department of Natural Resources.

3 Numbers in parentheses are the indicated drainages that have known occurrences of Topeka shiner within 1.0 stream mile in the past 5 years, based the MNDR data referenced in footnote 2 of this table.

4 Data based on TRC (2010b). Column excludes crossings with questionable potential for Topeka shiner habitat based on a field assessment assigned during a November 2010 on-site visit by TRC personnel.

5 Questionable habitat determined to provide marginal habitat requirement but should be revisited to determine suitability.

Effects Analysis

Installation of the Lewis & Clark pipeline in Minnesota would result in the crossing of 78 drainages (TRC 2010b). Of these 78 crossings, 17 (22%) are in designated critical habitat, 10 (13%) are in suitable habitat, and 16 (21%) are in questionable quality habitat. The remaining 35 (45%) crossings are currently drain tiled and/or provide no suitable habitat. Additional effects to Topeka shiner and/or its designated critical habitat could occur during operation and maintenance activities over the life of the project.

Based on crossing method determination criteria presented in Section 2.2.2.1 and physical and biological characteristics of the 78 drainage crossings as noted during the 2010 on-site investigations (refer to TRC 2010b), 13 (17%) crossings are proposed for boring or HDD, with an additional five (6%) proposed for boring or HDD if suitable habitat cannot be avoided during construction (see Appendix B, Tables B.1-B.6). Twenty-four (31%) of the crossings are proposed for open cuts with diversion structures, and 34 (44%) are proposed for open cuts without diversion structures. The remaining two crossings are proposed as open cuts, with the requirement for diversion structures undetermined at this time. It should be noted that these proposed methods are preliminary, and if conditions at the crossing (e.g., presence or absence of Topeka shiners, depth and/or connectivity of surface water) differ substantially from those described in TRC (2010b) at the time of the crossing; the crossing method should be reassessed based on the criteria provided in Section - *Crossing Method Determination* (page 11). Any alternative crossing methods would be presented to the Service and approved prior to implementation.

Construction Phase

Overview of Potential Impacts to Topeka Shiner and Designated Critical Habitat

Impacts to Topeka Shiners

The BA (TRC Mariah 2002) Section 5.2.2.2, page 37, provides a list of potential impacts that could occur to Topeka shiners if best management practices are not implemented. Likely effects to Topeka shiner from construction of the Lewis & Clark Minnesota segments would be the same; however, the level of intensity of an impact would depend on crossing method and whether or not the drainage(s) crossed are occupied habitat (i.e., Topeka shiner observations within 1.0 mile upstream or downstream of construction easement have been recorded). Impacts to Topeka shiners and/or their designated critical habitat could occur primarily during the installation of pipeline across streams and rivers occupied by Topeka shiner. Construction of the pipeline and project facilities in upland areas would have minor or no impacts to Topeka shiners provided that all sediment control and all project-wide mitigation/environmental protection measures described in the FONSI are implemented.

Impacts to Designated Critical Habitat

Potential impacts to designated critical habitat during the construction phase could include sedimentation into streams, increased nutrient loading (as a result of sedimentation), alteration of instream and off-channel habitats, alteration of streambed substrates from predisturbance conditions, alteration of groundwater flow regimes patterns in the floodplain and abandoned channels, temporary alteration of streamflow and instream hydrologic regimes, alteration of streambank vegetation, degradation of spawning habitat, and temporary degradation and water quality such as increased temperature and decreases in dissolved oxygen. These direct impacts could occur within the construction easement, as well as to critical habitat downstream of the construction easement drainage crossings, if best management/mitigation practices are not implemented correctly.

Potential Effects to Topeka Shiners and/or Critical Habitat Based on Drainage Crossing Methods

Open Cut Without Diversion Structures

Potential Effects to Topeka Shiners There would be no effect to Topeka shiners with the open cut method at crossings that are dry, tiled, or are manmade ditches or streams that are frozen solid with no flowing water or pooled habitat without fish at the time of crossing because there would be no habitat (i.e., water) for Topeka shiners to survive. No effect to Topeka shiners is expected at crossings with flowing water that have been determined as degraded habitats or unsuitable because the necessary primary constituent elements (Service 2004) for this species are unlikely to occur at these locations. No effect is anticipated to Topeka shiners when using the open cut method at crossings of suitable habitat determined to be unoccupied by Topeka shiners at the time of construction because Topeka shiners are unlikely to occur in those areas determined to be unoccupied. This would include areas that are dry or streams that are frozen solid with no flowing water or pooled habitat without fish at the time of crossing or areas that have been surveyed prior to construction.

Potential Effects to Critical Habitat There would be no effect to Topeka shiner critical habitat with the open cut method at crossings that are dry or if the streams are frozen solid with no flowing water at the time of crossing provided that all mitigation measures, sediment control features, and best management practices are implemented. Stream crossings would be restored to predisturbance configuration, including restoration of substrate integrity and distribution and slopes would be reseeded with native, non-invasive plant species as soon as practical with native species, so no effects to designated critical habitat are anticipated when critical habitat is open cut with no water flow.

Open Cut with Double or Single Dike Methods with Diversions or Cofferdam Crossing Method

Potential Effects to Topeka Shiners Construction would be timed to occur outside the Topeka shiner spawning time stipulation (August 15 to spring ice-off) to minimize any potential impacts to spawning activity. When possible dikes and cofferdams will be placed in manner and location that avoids or minimizes, to the greatest extent possible, impacts to Topeka shiner off channel pool habitat. Therefore, no disruption of Topeka shiner spawning is anticipated using the single or double dike open cut method with diversion or the cofferdam crossing method. No direct effects to Topeka shiner would occur to spawning behavior using the open cut with diversion methods.

Likely direct effects to Topeka shiners during the construction phase if the open cut method with diversion structures or the cofferdam crossing method is used may include mortality, resulting in a "take" of individual or populations. Mortality may occur if individuals occur at the crossing location and the pipe, trench box, or other construction equipment collides with the species. However, such mortality could be limited because of the efficient swimming performance of Topeka shiners (Adams et. al. 2000). Other direct effects to Topeka shiner or to young and eggs resulting in mortality may occur if areas of the stream channels are filled in either by accident or due to a failure in sediment control features at the crossing. Crossings of known occupied Topeka shiner habitat would be identified early in the design process, and these crossings would be seined by a Service-permitted fisheries biologist to remove shiners prior to the construction of the instream diversion structures (refer to Section - *Block Seining and Removal of Topeka Shiners from Construction Areas*; page 20). A take may occur if individuals are not captured during the seining process and the stream is unwatered after the installation of the diversion structures. Harassment and potentially mortality of Topeka shiners may also occur during the seining and removal of individuals if fish need to be moved out of the construction easements. During unwater actions there is a possibility of potential impingement on a pump screen, or if a fish accidentally passes through a pump take could occur. Therefore, construction across occupied Topeka shiner habitat using the open cut with diversion structures could result in "likely to adversely affect" if mortality of individual(s) or populations results in a "take" of the species.

Potential effects to Topeka shiner associated with the cofferdam method are expected to decrease the possibility of a "take" because water would be flowing through the crossing sites and fish could move out of the construction easement if suitable habitat occurs adjacent to the crossing area.

If pumping is required to remove excess water from within the cofferdam or double-dike diversion pipe area, additional mortality may occur if Topeka shiners that are not removed by seining are sucked up in pumps during the unwatering process. All pumps would be equipped with commercial well screens of 1/4 inch or finer, with a 3-inch intake and a 1/8-inch screen covering the intake hose to prevent the passage and impingement of Topeka shiners through the pump. Insignificant effects to Topeka shiners are anticipated during unwatering, provided seining and screen protocols are implemented correctly to reduce the potential for passage and impingement of Topeka shiners.

Installation of diversion structures could result in the temporary alteration of stream flows, which could result in temporary alteration of water quality parameters (i.e., changes in dissolved oxygen and water temperature) (Service 2009). Provided that all diversion pipe used in either the single or double dike method are of sufficient size to transmit water flow downstream of the crossing, it is unlikely to affect stream flow and indirectly affect Topeka shiners or macroinvertebrate food bases. Potential effects to Topeka shiner associated with the cofferdam method are expected to decrease the possibility of a "take" because water would be flowing through the crossing sites and alteration of stream flows would be negligible.

Direct effects to Topeka shiner also include the possible direct take of an individual or group of individuals with an influx of sediment that results in a degradation of living or spawning habitat. Therefore, the potential intensity of impacts to Topeka shiners and their habitat could depend on the drainage crossing method and the locations of known Topeka shiner populations either upstream or downstream of the construction easements. For example, if known populations of Topeka shiners occur upstream of the construction easement and an accidental large sediment input into the stream occurs, the impact to that population could be less than if a large population of Topeka shiners occurs downstream of the construction easement and an accidental sedimentation effect occurs.

Potential Effects to Critical Habitat Adverse modification to Topeka shiner critical habitat would occur if the project resulted in a permanent degradation of the Topeka shiner primary constituent elements (Service 2004). The potential to modify critical habitat is related to the sedimentation that may occur with open cuts across flowing streams and with the use of diversion structures. Sedimentation may result in a degradation of designated critical and suitable Topeka shiner habitat within the construction easements, as well as downstream of the crossing. Likely effects to designated critical habitat using the single or double dike or cofferdam crossing methods would be similar if the erosion control structures are not properly selected or installed or are not adequate to prevent soil or debris from entering the stream. With increased sedimentation, flow-dependant physical habitat features such as mean depth and velocities can be altered in these prairie streams, resulting in changes in the distribution of fishes and aquatic macroinvertebrates (Kuitunen 2001). Sedimentation from construction can indirectly negatively impact spawning habitat and water quality downstream of the construction easement. Potentially affected water quality parameters include nutrient enrichment and turbidity, which decrease dissolved oxygen and increase water temperatures (Service 2009). Recent studies have found that bank erosion is a severe problem and a major contributor to the high sediment loads of rivers within a watershed. Bank erosion is especially severe in areas where the riparian vegetation has been removed, where cattle are allowed to graze channel banks, and/or where row crops are planted too close to stream channels (Kuitunen 2001). Many of these human-caused changes continue throughout the Big Sioux and Rock rivers watershed. Therefore, degradation of habitat at a site-specific location could result in cumulative indirect effects to Topeka shiner and modifications of critical habitat in the watershed. Construction across critical habitat may affect and is likely to adversely modify critical habitat.

Potential indirect effects as a result of construction across drainages either in designated or suitable habitat could include changes to channel morphology, changes or imbalances in sediment transport and pool-riffle complex, and other primary constituents downstream and/or upstream of construction easements if crossings are not restored properly to predisturbance conditions (Brooks et al. 1992). Restoration of channels to predisturbance conditions including restoration of substrate integrity and distribution would minimize the effects to the overall function of the stream. Any effects to unoccupied critical habitat, suitable habitat, or occupied habitat would be temporary because the stream channels would be restored to predisturbance condition, so the hydrologic balance of the pool-riffle sequence would be expected to return to predisturbance conditions. All project-wide mitigation/environmental protection measures provided in the FONSI (Reclamation 2003) implemented during the installation of pipe in South Dakota also would be implemented during pipeline construction in Minnesota.

Conventional Boring or HDD Crossing Method

Potential Effects to Topeka Shiners No direct effects (i.e., potential "take") to Topeka shiner are anticipated during the conventional boring or HDD crossing method because habitat occupied by Topeka shiner would be avoided when the pipe is installed under the channel. Bore pits or pipe entry locations would be located in upland areas outside critical habitat, off-channel habitats and any slack water areas, and/or other areas that are not suitable to support Topeka shiners or their spawning areas. Implementation of all project-wide mitigation/environmental protection measures provided in the FONSI (Reclamation 2003) implemented during the installation of pipe in South Dakota will also be implemented during pipeline construction in Minnesota. Therefore, no direct or indirect effects to Topeka shiner are anticipated and neither conventional boring nor HDD are likely to adversely affect Topeka shiners.

Potential Effects to Critical Habitat Potential effects to Topeka shiner designated critical habitat are anticipated to be insignificant and discountable if crossings are bored or HDD is implemented and no obstructions are encountered. The primary impact from boring or HDD would be the potential dewatering of floodplain aquifers, resulting in loss of off-channels or abandoned channel habitat. Clay plugs would be installed on the pipeline entering and leaving the crossings as required to minimize and offset the migration of floodplain aquifers as part of standard drainage crossing procedures, so insignificant and discountable effects are anticipated to floodplain aquifers and loss of off-channel habitat areas fed by groundwater. Pit or pipe entry locations and work areas would be located outside any critical habitat (defined as the elevation of the adjacent stream floodplain equal to the bankfull discharge elevation [Service 2004]), so no off-channels or oxbows would be disturbed. In addition, sediment/erosion control structures would be installed to prevent sediment, backfill material, or other construction-related material to enter into the stream channel, side channels, or oxbows; therefore, both conventional boring and HDD are anticipated to have insignificant and discountable effects on Topeka shiners and/or their critical habitat. However, if an obstruction is encountered during conventional boring or HDD and an emergency open cut or unwatering is required, potential impacts resulting in degradation of habitat or possible "take" could occur as discussed in Section - *Open Cut with Double or Single Dike Methods with Diversions or the Cofferdam Crossing Method* (page 38).

Operations and Maintenance Phase

The potential effects to Topeka shiners or their critical habitat during the operations and maintenance phase of the project is insignificant and discountable. Typical activities during the operations, maintenance and replacement phases of the project include the operation of meter stations, pump stations, and reservoir storage facilities and maintenance and replacement of pipeline and facility components. All operation facilities would be located in upland areas; therefore, no effects to Topeka shiner and/or their designated critical habitat during the operations and maintenance phase are anticipated, provided that all sediment control and all project-wide mitigation/environmental protection measures provided in the FONSI (Reclamation 2003) are implemented.

Potential effects to Topeka shiners and/or their designated critical habitat could occur during operations and maintenance activities over the life of the project if a major leak or break in the pipe were to occur at one of the crossings and the pipe needed either to be repaired or removed and replaced. Effects associated with pipeline repair or replacement would be the same or may increase if the entire pipe segment needed to be excavated and the repair area was located in occupied Topeka shiner habitat. If replacement was necessary, Lewis & Clark would replace pipe in Topeka shiner habitat as detailed previously in this document and would consult with the Service prior to doing so.

Flushing and blow-out assemblies are proposed for all pipeline segments to facilitate the operations and maintenance phase of the project. Potential effects associated with these assemblies include temporary localized changes in water temperatures and/or water quality, possible sedimentation, and temporary increases in stream flow. Water would be dechloraminated prior to being discharged into drainages, so no impacts to water quality are anticipated (Reclamation 2003). Flushing assemblies would be designed with rip-rap aprons sufficient to dissipate energy and to control erosion prior to water entering Topeka shiner occupied or critical habitat. Furthermore, flushing assemblies and their associated rip rap aprons should be placed in a manner and location that avoids or minimizes, to the greatest extent possible, impacts to Topeka shiner off channel pool habitat. Therefore, anticipated impacts are considered insignificant and discountable. The blow-off hydrants are designed with a hose attachment so water can be directed away from the pipeline and any cultivated land and into a nearby grassed drainage ditch to dissipate flows or into a nonerodible surface drainage channel (i.e., tiled drainage) or storm drain, if available. Blow-off hydrants would be placed in a manner and location that avoids or minimizes, to the greatest extent possible, impacts to Topeka shiner off channel pool habitat.

Any flushing maintenance activity would be timed to occur outside the Topeka shiner spawning time stipulation (August 15 to spring ice-off), when possible, to minimize potential impacts to spawning activity; therefore, no disruption of Topeka shiner spawning is anticipated. If an emergency flushing activity is required and a large volume of water is released, it may result in the take of an individual Topeka shiner or their eggs/offspring if water quality parameters or temperatures are suddenly altered and mortality of individuals occurs. The flushing assemblies are designed with valves to control discharge flows and aprons are designed to dissipate high energy flows, thereby decreasing the potential for sedimentation and increased turbidity. In case of such an emergency, Lewis & Clark would contact the Service immediately.

One flushing assembly is proposed for the MN-2 pipeline segment in a tributary of Rock River. The estimated time to flush the 13.6-mile long 24-inch MN-2 pipeline segment is about 10 hours, resulting in an approximate 6.5 cubic feet per second (cfs) flow (personal communication, January 20, 2011, with Dennis Odens, Engineer, Banner). The flow of Rock River at Luverne, Minnesota, upstream of the MN-2 flushing assembly on January 20, 2011 was 10.8 cfs (MNDNR 2011). Flushing of the other pipeline segments would have similar discharges.

Conclusion and Determination of Effects

Construction Phase

Installation of the Lewis & Clark pipeline in Minnesota would result in the crossing of 78 drainages (TRC 2010b) (refer to Appendices A and B). Of these 78 crossings, 18 (23%) are in designated critical habitat, 9 (12%) are in suitable habitat, and 15 (19%) are in questionable quality habitat. The remaining 36 (46%) crossings are tiled and provide no suitable Topeka shiner habitat. Based on MNDNR data obtained on February 22, 2011, Topeka shiners have been documented within 1.0 stream mile of 18 (23%) of the 78 crossings within the last 5 years. The Luverne Service Line had the most proposed crossings with occurrences documented within 1.0 mile (8), followed by MN-2 and MN-3 (four each) and MN-4 (two). No occurrences were documented within 1.0 stream mile of crossings proposed for the Magnolia and Sibley service lines, and the Lincoln-Pipestone Service Line has no proposed stream crossings.

The total amount of short-term disturbance associated with the Minnesota pipeline segments is estimated at 1,099 acres, and the estimated amount of permanent disturbance is estimated at 7 acres (refer to Table 2.1 [page 7] in TRC Mariah [2002]). The 7 acres of permanent disturbance would be associated with pump stations, reservoirs, and service connections which would occur outside Topeka shiner habitat. Open cut, conventional boring, or HDD activities would occur within project construction easements; therefore, no additional disturbance outside the 100 foot construction easement would occur. Trench boxes would be used when installing the pipeline at locations where wetlands or intermittent streams run parallel to the pipeline to reduce the amount of disturbance.

The determination of effects to Topeka shiners and their designated critical habitat would depend on drainage crossing methods, the extent of critical and occupied habitat occurring in the easement, and the location of Topeka shiner populations relative to the construction easement.

Based on 2011 data, the greatest impact to Topeka shiners could occur during the installation of the Luverne Service Line and MN-2 and MN-3 segments, respectively, based on the number of crossings with recorded Topeka shiner occurrences.

A determination of effects to designated critical Topeka shiner habitat and Topeka shiners based on crossing method is provided in Tables 3 and 4, respectively.

Operations and Maintenance Phase

The pipeline would be installed a minimum of 6 feet below the surface, and no permanent aboveground facilities would be located in wetlands or in streams; therefore, it is anticipated that, with reclamation, no permanent loss of wetlands or stream habitat would occur. Project-wide environmental commitments and mitigation measures identified in Reclamation (2003) and in Section - *Project-wide Mitigation Measures for Topeka Shiner* (page 22) would be implemented to further protect wetlands and stream habitat during the operations and maintenance phase of the project. A determination of effects to designated critical Topeka shiner habitat and Topeka shiners during the operations and maintenance phase of the project is provided in Table 5.

Table 3 - Determination of Effects to Topeka Shiners Based on Drainage Crossing Method, Lewis & Clark Pipeline Project.

Drainage Crossing Method	Potential Effects	Effects Analysis	Mitigation Measures
Open cut without diversion structures (unsuitable habitat, tiled or dry channels)	No direct effect; however, potential sedimentation may occur downstream when streamflow occurs; change in channel morphology and sediment transport equilibrium if crossing is not restored to predisturbance conditions including restoration of substrate integrity and distribution.	May affect not likely to adversely affect	Implement project-wide mitigation/environmental measures identified in FONSI (Reclamation 2003)
Open cut method with diversion structures (e.g., dikes, pipes, or cofferdams)	Mortality of individuals or populations of Topeka shiner from collision with equipment, degraded water quality, dewatering, or entrainment on pump screen; sedimentation and temporary increase in turbidity; mortality during seining	Is likely to adversely affect	Implement project-wide mitigation/environmental measures identified in FONSI (Reclamation 2003) and Service 2008 recommendations for crossing occupied Topeka shiner waters; use only Service-permitted fisheries biologist to seine or transport Topeka shiners
Conventional boring or HDD	Groundwater migration resulting in a loss of off-channel subsurface groundwater infiltration; same impacts if an obstruction is encountered and instream water diversions are required	May affect, but not likely to adversely affect	Implement project-wide mitigation/environmental measures identified in FONSI (Reclamation 2003) and Service 2008 recommendations for crossing occupied Topeka shiner waters

Table 4 - Determination of Effects to Designated Critical Topeka Shiner Habitat Based on Drainage Crossing Method, Lewis & Clark Pipeline Project.

Drainage Crossing Method	Potential Effects	Effects Analysis	Mitigation measures
Open cut without diversion structures (unsuitable habitat, tiled or dry channels)	No direct effect; however, sedimentation may occur downstream when streamflow occurs; change in channel morphology and sediment transport equilibrium if crossing is not restored to predisturbance conditions including restoration of substrate integrity and distribution	May affect not likely to adversely affect	Implement project-wide mitigation/environmental measures identified in FONSI (Reclamation 2003)
Open cut method with diversion structures (e.g., dikes, pipes, or cofferdams)	Alteration of streambed material; sedimentation; temporary alteration of streamflow and sediment transport processes; degradation of spawning habitat; temporary degradation of water quality; alteration of macroinvertebrate composition	Is likely to adversely affect	Implement project-wide mitigation/environmental measures identified in FONSI (Reclamation 2003) and Service 2008 recommendations for crossing occupied Topeka shiner waters
Conventional boring of HDD	Groundwater migration; same impacts if an obstruction is encountered and instream water diversions are required	May affect, not likely to adversely affect	Implement project-wide mitigation/environmental measures identified in FONSI (Reclamation 2003), use clay plugs to minimize ground water migration

Table 5 - Determination of Effects to Topeka Shiners and Critical Habitat During Operation and Maintenance, Lewis & Clark Pipeline Project.

Task	Potential Effects	Effects Analysis	Mitigation Measures
Pipeline testing and disinfection at flushing assemblies	Potential disruption during spawning; alteration of stream discharge; sedimentation. Impacts considered insignificant and discountable but dependent on emergency state	May affect, but not likely to adversely to affect	Design flushing assemblies to dissipate flows prior to entering stream; conduct flushing outside spawning season; implement project-wide mitigation/environmental measures identified in FONSI (Reclamation 2003)
Blow-off assemblies	Sedimentation	May affect, but not likely to adversely affect	Implement project-wide mitigation/environmental measures identified in FONSI (Reclamation 2003); direct blow-off water to noncritical habitat and grassed ditches
Maintenance of pumping stations, reservoirs, and meter buildings	None	No effect	None
Pipe repair or replacement	Same impacts as construction phase; impact intensity based on location (i.e., if at stream crossing or upland, occupied, or critical habitat), Service will be consulted	Likely to adversely affect	Implement project-wide mitigation/environmental measures identified in FONSI (Reclamation 2003) and Service 2008 recommendations for crossing occupied Topeka shiner waters

Contacts/Contributors/Preparers

Table 6 lists persons contacted during the preparation of this SBA, and Table 7 lists preparers of this SBA.

Table 6 - Persons Contacted During the Preparation of this Supplemental Biological Assessment.

Agency or Organization	Individual	Title	Contribution
Banner Associates, Inc.	Tim Conner	Project Engineer Lead	Project description
	Dennis Odens	Professional Engineer	Project design and project description
	Sig Zvejnieks	Professional Engineer	Stream crossing information
Lewis and Clark Regional Water Supply	Troy Larson	Executive Director	Project description
	Dan Zulkosky	Construction Administer	Project description
Bureau of Reclamation	Ted Hall	Civil Engineer	Biological assessment review
	Nell McPhillips	Natural Resource Specialist	Biological assessment review
	Tara Piper	Natural Resource Specialist	Biological assessment review
	Loretta Chandler	Chief, Environmental Management	Document Review
Rock County, Minnesota Rural Water	Dan Cook	Director	Project information
Minnesota Department of Natural Resources	Kevin Mixon	Regional Ecologist	Species information
	Heidi Cyr	Natural Heritage Review Specialist	Topeka shiner data and license agreement
	Lisa Joyal	Natural Heritage Review Coordinator	Topeka shiner data
U.S. Fish and Wildlife Service	Richard Davis	Biologist	Topeka shiner information, mitigation measures and consultation

Table 7 **Persons that Contributed to the Preparation of this Supplemental Biological Assessment.**

Company	Name	Responsibility
TRC Environmental Corporation	Jan Hart	Project Management, Supplemental Biological Assessment Preparation
	Scott Kamber	Peer Review, Quality Control
	Diane Thomas	Data Gathering/Analysis
	Randall Blake	Geographic Information System
	Betty Wills	Geographic Information System
	Genial DeCastro	Document Production/Quality Control
	Rena Merritt	Document Production
	Jessica Robinson	Technical Editor

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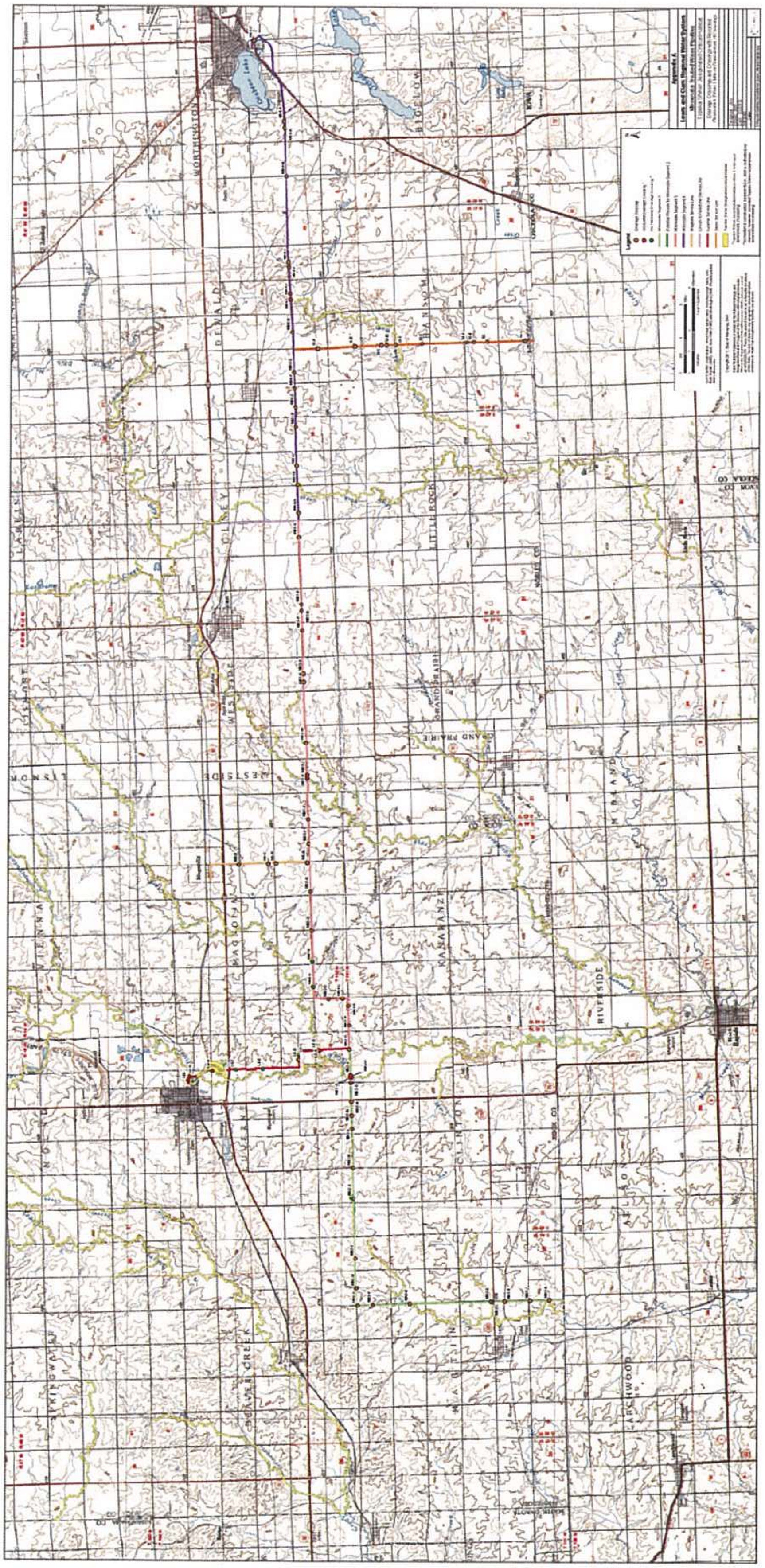
APPENDIX A:

DESIGNATED CRITICAL TOPEKA SHINER HABITAT IN THE VICINITY OF THE LEWIS & CLARK PROJECT, ROCK AND NOBLES COUNTIES, MINNESOTA



APPENDIX B:

A SUMMARY OF TOPEKA SHINER HABITAT BY DRAINAGE CROSSING AND PROPOSED CROSSING METHOD FOR EACH LEWIS & CLARK MINNESOTA SEGMENT

Table B.1 Summary of Topeka Shiner Habitat and Drainage Crossing Methods of Lewis & Clark's MN-2 Construction Easement.[1]

Crossing ID	Known Occurrence Upstream?[1]	Known Occurrence Downstream?[1]	Designated Critical Habitat?[2]	Suitable Topeka Shiner Habitat?[3]	Average Channel Width (ft)[3]	Proposed Method of Crossing[4]	Comments[3]
A	No	No	Yes	Yes	3	Bore or HDD	Tributary to Mud Creek; designated Topeka shiner critical habitat; side channels, oxbows, and/or abandoned channels are present
T	No	No	No	No	n/a	Open cut without diversion structures	Cultivated; no channel observed (designated as an intermittent stream on 1:24,000-scale U.S. Geological Survey [USGS] map)
B	No	No	No	No	n/a	Open cut without diversion structures	Drainage vegetated throughout and mowed; may be tiled; in abandoned railroad right-of-way
C	No	No	Yes	Yes	3	Bore or HDD if habitat is unavoidable	Tributary to Mud Creek; vegetated streambed; designated Topeka shiner critical habitat; side channels, oxbows, and/or abandoned channels are present
D	No	No	Yes	Yes	4	Bore or HDD	Mud Creek, dredged at road crossing; designated Topeka shiner critical habitat; side channels, oxbows, and/or abandoned channels are present
E	No	No	Yes	Yes	6	Bore or HDD	Mud Creek, dredged at road crossing; designated Topeka shiner critical habitat; side channels, oxbows, and/or abandoned channels are present
F	No	No	No	No	n/a	Open cut without diversion structures	Cultivated; no channel observed (designated as an intermittent stream on 1:24,000-scale USGS map)
G	No	No	No	?	2	Open cut with diversion structures	Drainage in road ditch; drainage is to Mud Creek
H	No	No	No	Yes	3	Open cut with diversion structures	Mud Creek; flows through a yard and farm
I	No	No	No	No	1	Open cut	Drainage vegetated
J	No	No	No	No	n/a	Open cut without diversion structures	Drainage vegetated and mowed; may be tiled
K	No	No	No	No	n/a	Open cut without diversion structures	Cultivated; no channel observed (designated as an intermittent stream on 1:24,000-scale USGS map)
L	No	No	No	?	3	Open cut with diversion structures	Tributary to Rock River
M	No	No	No	No	n/a	Open cut without diversion structures	Drainage vegetated and mowed; may be tiled

Table B.1 (Continued)

Crossing ID	Known Occurrence Upstream?[1]	Known Occurrence Downstream?[1]	Designated Critical Habitat?[2]	Suitable Topeka Shiner Habitat?[3]	Average Channel Width (ft)[3]	Proposed Method of Crossing[4]	Comments[3]
N	No	No	No	?	3	Open cut with diversion structures	Tributary ditch to Rock River; cultivated land adjacent
O	Yes	No	Yes	Yes	5	Bore/HDD	Tributary ditch to Rock River; in road right-of-way; designated Topeka shiner critical habitat
P	Yes	No	Yes	Yes	50	Bore/HDD	Wetland in Rock River; designated Topeka shiner critical habitat
Q	Yes	No	Yes	Yes	50-100	Bore/HDD	Rock River; 50 ft in May 2010, 100 ft in September 2010; designated Topeka shiner critical habitat
R	Yes	No	Yes	Yes	n/a	Bore/HDD	Floodplain of Rock River; designated Topeka shiner critical habitat
S	No	No	No	?	2	Open cut with diversion structures	Road ditch flows to Rock River

1 Indicates known occurrences of Topeka shiner within 1.0 stream mile in the past 5 years. Data included here were provided by the Division of Ecological Resources, Minnesota Department of Natural Resources and were current as of February 22, 2011. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present. Copyright 2011 State of Minnesota Department of Natural Resources.

2 Based on USFWS (2004).

3 Based on TRC (2010a); n/a = not applicable--no channel present or drainage is tiled; ? = questionable habitat, providing marginal habitat requirements, suitability not determined.

4 Based on criteria from Section 2.2.2. Areas where the presence of potential habitat is questionable have been proposed for open cut with diversion structures; however, open cut without diversion structures may be used if the channel is dry or is otherwise deemed unsuitable as Topeka shiner habitat at the time of construction. Crossings with proposed method of open cut that do not designate whether or not diversion structures will be used should be assessed at the time of construction based on the Section 2.2.2 criteria.

Table B.2 Summary of Topeka Shiner Habitat and Drainage Crossing Methods of Lewis & Clark's MN-3 Construction Easement.[1]

Crossing ID	Known Occurrence Upstream?[1]	Known Occurrence Downstream?[1]	Designated Critical Habitat?[2]	Suitable Topeka Shiner Habitat?[3]	Average Channel Width (ft)[3]	Proposed Method of Crossing[4]	Comments[3]
A	No	No	No	No	3	Open cut without diversion structures	Drainage is tiled in construction easement and north of easement, then open channel that parallels easement in the road ditch for 800 ft before crossing to south side of road; tributary to Rock River
B	No	No	No	No	n/a	Open cut without diversion structures	Tiled; excavated in road right-of-way, so limited open channel, some surface water observed
C	No	No	No	No	n/a	Open cut without diversion structures	Tiled; some surface water observed
D	No	No	No	No	n/a	Open cut without diversion structures	Tiled; no channel; cultivated cropland
E	No	Yes[5]	No	No	n/a	Open cut without diversion structures	Tiled; no channel
F	No	Yes[5]	No	No	n/a	Open cut without diversion structures	Cultivated land
G	No	No	No	No	n/a	Open cut without diversion structures	Tiled; no channel
H	No	No	No	No	n/a	Open cut without diversion structures	Cultivated land
I	No	No	No	?	2	Open cut with diversion structures	Drainage excavated in road right-of-way; channel bed vegetated throughout; tributary to Kanaranzi Creek
J	No	No	No	Yes	2	Open cut with diversion structures	Drainage excavated in road right-of-way; channel bed vegetated throughout; tributary to Kanaranzi Creek
K	Yes	Yes	Yes	Yes	35	Bore/HDD	Kanaranzi Creek
L	Yes	Yes	Yes	Yes	n/a	Bore/HDD	Kanaranzi Creek and floodplain east of creek; vegetated depressions; no surface water observed
M	No	No	Yes	Yes	8	Open cut with diversion structures	Tributary to Kanaranzi Creek
N	No	No	No	Yes	4	Open cut with diversion structures	Tributary to Kanaranzi Creek that parallels construction easement for about 900 ft; recommend move easement to south of road
O	No	No	No	Yes	3	Open cut with diversion structures	Tributary to Kanaranzi Creek

Table B.2 (Continued)

Crossing ID	Known Occurrence Upstream?[1]	Known Occurrence Downstream?[1]	Designated Critical Habitat?[2]	Suitable Topeka Shiner Habitat?[3]	Average Channel Width (ft)[3]	Proposed Method of Crossing[4]	Comments[3]
P	No	No	No	No	n/a	Open cut without diversion structures	Tiled tributary to Kanaranzi Creek
Q	No	No	No	?	2	Open cut with diversion structures	Tributary to Kanaranzi Creek
R	No	No	No	?	2	Open cut with diversion structures	Tributary to Kanaranzi Creek
S	No	No	No	No	n/a	Open cut without diversion structures	Cultivated; no evidence of a drainage

1 Indicates known occurrences of Topeka shiner within 1.0 stream mile in the past 5 years. Data included here were provided by the Division of Ecological Resources, Minnesota Department of Natural Resources and were current as of February 22, 2011. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present. Copyright 2011 State of Minnesota Department of Natural Resources.

2 Based on USFWS (2004).

3 Based on TRC (2010a); n/a = not applicable--no channel present or drainage is tiled; ? = questionable habitat, providing marginal habitat requirements, suitability not determined.

4 Based on criteria from Section 2.2.2. Areas where the presence of potential habitat is questionable have been proposed for open cut with diversion structures; however, open cut without diversion structures may be used if the channel is dry or is otherwise deemed unsuitable as Topeka shiner habitat at the time of construction. Crossings with proposed method of open cut that do not designate whether or not diversion structures will be used should be assessed at the time of construction based on the Section 2.2.2 criteria.

5 No suitable habitat in construction easements based on TRC (2010a). These crossings are either tiled or have been cultivated, and no stream channel occurs.

Table B.3 Summary of Topeka Shiner Habitat and Drainage Crossing Methods of Lewis & Clark's MN-4 Construction Easement.[1]

Crossing ID	Known Occurrence Upstream?[1]	Known Occurrence Downstream?[1]	Designated Critical Habitat?[2]	Suitable Topeka Shiner Habitat?[3]	Average Channel Width (ft)[3]	Proposed Method of Crossing[4]	Comments[3]
A	No	No	No	No	n/a	Open cut without diversion structures	Tiled drainage; no channel and cultivated
B	No	No	Yes	Yes	8	Open cut with diversion structures	Little Rock Creek; designated Topeka shiner critical habitat
C	No	No	No	Yes	4	Open cut with diversion structures	Tributary to Little Rock Creek
D	No	No	No	No	n/a	Open cut without diversion structures	Tiled drainage; no channel and cultivated
E	No	No	No	No	n/a	Open cut without diversion structures	Tiled drainage; no channel and cultivated
F	No	No	No	No	n/a	Open cut without diversion structures	Tiled drainage; no channel and cultivated
G	No	No	No	No	n/a	Open cut without diversion structures	Tiled drainage; no channel and cultivated
H	No	No	No	?	5	Open cut with diversion structures	Dredged at road crossing
I	Yes	No	Yes	Yes	4?	Bore/HDD	Flows to the Judicial Ditch No. 1; thick vegetation; difficult to see channel; channel dredged at culvert/road crossing; open channel in places; designated Topeka shiner critical habitat
J	Yes	No	No	Yes	8	Bore/HDD	Flows to the Judicial Ditch No. 1; incised channel in construction easement
K	No	No	No	Yes	4	Open cut with diversion structures	Tributary to Judicial Ditch No. 1
L	No	No	No	?	n/a	Open cut with diversion structures	Wetland, no channel observed
M	No	No	No	No	n/a	Open cut without diversion structures	Tiled drainage; no channel; cultivated
N	No	No	No	No	n/a	Open cut without diversion structures	Tiled drainage; no channel in construction right-of-way; cultivated; dredged at road crossing

Table B.3 (Continued)

Crossing ID	Known Occurrence Upstream?[1]	Known Occurrence Downstream?[1]	Designated Critical Habitat?[2]	Suitable Topeka Shiner Habitat?[3]	Average Channel Width (ft)[3]	Proposed Method of Crossing[4]	Comments[3]
O	No	No	No	?	2	Open cut with diversion structures	2-ft water of the U.S.; vegetated throughout; difficult to see side channels
P	No	No	No	?	3-5	Open cut with diversion structures	Judicial Ditch No. 6

1 Indicates known occurrences of Topeka shiner within 1.0 stream mile in the past 5 years. Data included here were provided by the Division of Ecological Resources, Minnesota Department of Natural Resources and were current as of February 22, 2011. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present. Copyright 2011 State of Minnesota Department of Natural Resources.

2 Based on USFWS (2004).

3 Based on TRC (2010a); n/a = not applicable--no channel present or drainage is tiled; ? = questionable habitat, providing marginal habitat requirements, suitability not determined.

4 Based on criteria from Section 2.2.2. Areas where the presence of potential habitat is questionable have been proposed for open cut with diversion structures; however, open cut without diversion structures may be used if the channel is dry or is otherwise deemed unsuitable as Topeka shiner habitat at the time of construction. Crossings with proposed method of open cut that do not designate whether or not diversion structures will be used should be assessed at the time of construction based on the Section 2.2.2 criteria.

Table B.4 Summary of Topeka Shiner Habitat and Drainage Crossing Methods of Lewis & Clark's Luverne Service Line Construction Easement.[1]

Crossing ID	Known Occurrence Upstream?[1]	Known Occurrence Downstream?[1]	Designated Critical Habitat?[2]	Suitable Topeka Shiner Habitat?[3]	Average Channel Width (ft)[3]	Proposed Method of Crossing[4]	Comments[3]
A	Yes	No	Yes	Yes	n/a	Bore/HDD	Wetland in Elk Creek floodplain; designated Topeka shiner critical habitat
B	Yes	No	Yes	Yes	15	Bore/HDD	Elk Creek; designated Topeka shiner critical habitat
C	No	Yes[5]	No	No	n/a	Open cut without diversion structures	No channel and cultivated; indicated as an intermittent stream on 1:24,000-scale U.S. Geological Survey (USGS) map
D	No	No	No	No	n/a	Open cut without diversion structures	No channel and cultivated; indicated as an intermittent stream on 1:24,000-scale USGS map
E	No	Yes[5]	No	No	n/a	Open cut without diversion structures	No channel and cultivated; indicated as an intermittent stream on 1:24,000-scale USGS map
F	No	Yes[5]	No	No	n/a	Open cut without diversion structures	No channel and may be tiled; indicated as an intermittent stream on 1:24,000-scale USGS map
G	Yes	No	Yes	Yes	20	Bore/HDD	Abandoned channel of Rock River or old dredged gravel pit location; designated Topeka shiner critical habitat
H	Yes	Yes	Yes	Yes	60	Bore/HDD	Rock River crossing in Luverne City park; designated Topeka shiner critical habitat
I	No	Yes	No	Yes	2	Bore/HDD	Tributary to Rock River in Luverne City park

1 Indicates known occurrences of Topeka shiner within 1.0 stream mile in the past 5 years. Data included here were provided by the Division of Ecological Resources, Minnesota Department of Natural Resources and were current as of February 22, 2011. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present. Copyright 2011 State of Minnesota Department of Natural Resources.

2 Based on USFWS (2004).

3 Based on TRC (2010a); n/a = not applicable--no channel present or drainage is tiled; ? = questionable habitat, providing marginal habitat requirements, suitability not determined.

4 Based on criteria from Section 2.2.2. Areas where the presence of potential habitat is questionable have been proposed for open cut with diversion structures; however, open cut without diversion structures may be used if the channel is dry or is otherwise deemed unsuitable as Topeka shiner habitat at the time of construction. Crossings with proposed method of open cut that do not designate whether or not diversion structures will be used should be assessed at the time of construction based on the Section 2.2.2 .criteria.

5 No suitable habitat in construction easements based on TRC (2010a). These crossings are either tiled or have been cultivated, and no stream channel occurs.

Table B.5 Summary of Topeka Shiner Habitat and Drainage Crossing Methods of Lewis & Clark's Magnolia Service Line Construction Easement.[1]

Crossing ID	Known Occurrence Upstream?[1]	Known Occurrence Downstream?[1]	Designated Critical Habitat?[2]	Suitable Topeka Shiner Habitat?[3]	Average Channel Width (ft)[3]	Proposed Method of Crossing[4]	Comments[3]
A	No	No	No	No	n/a	Open cut without diversion structures	No evidence of channel; cultivated
B	No	No	No	No	n/a	Open cut without diversion structures	No evidence of channel; cultivated
C	No	No	No	No	n/a	Open cut without diversion structures	Tiled drainage; no channel; drainage to Elk Creek
D	No	No	No	Yes	10	Open cut with diversion structures	Branch of Elk Creek

1 Indicates known occurrences of Topeka shiner within 1.0 stream mile in the past 5 years. Data included here were provided by the Division of Ecological Resources, Minnesota Department of Natural Resources and were current as of February 22, 2011. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present. Copyright 2011 State of Minnesota Department of Natural Resources.

2 Based on USFWS (2004).

3 Based on TRC (2010a); n/a = not applicable--no channel present or drainage is tiled; ? = questionable habitat, providing marginal habitat requirements, suitability not determined.

4 Based on criteria from Section 2.2.2. Areas where the presence of potential habitat is questionable have been proposed for open cut with diversion structures; however, open cut without diversion structures may be used if the channel is dry or is otherwise deemed unsuitable as Topeka shiner habitat at the time of construction. Crossings with proposed method of open cut that do not designate whether or not diversion structures will be used should be assessed at the time of construction based on the Section 2.2.2 criteria.

Table B.6 Summary of Topeka Shiner Habitat and Drainage Crossing Methods of Lewis & Clark's Sibley Service Line Construction Easement.[1]

Crossing ID	Known Occurrence Upstream?[1]	Known Occurrence Downstream?[1]	Designated Critical Habitat?[2]	Suitable Topeka Shiner Habitat?[3]	Average Channel Width (ft)[3]	Proposed Method of Crossing[4]	Comments[3]
A	No	No	No	No	n/a	Open cut without diversion structures	Tiled drainage; no channel; cultivated
B	No	No	No	No	n/a	Open cut without diversion structures	Tiled drainage; no channel; cultivated
C	No	No	No	?	4	Open cut with diversion structures	Vegetated throughout; difficult to see channel or side channels and depressions
D	No	No	No	?	n/a	Open cut with diversion structures	Lake
E	No	No	Yes	Yes	15-20	Bore or HDD if habitat is unavoidable	Little Rock River; incised banks; designated Topeka shiner critical habitat; side channels, oxbows, and/or abandoned channels are present
F	No	No	No	No	n/a	Open cut without diversion structures	Tiled drainage; no channel; cultivated
G	No	No	No	?	10	Open cut with diversion structures	Tributary to Little Rock River with trampled banks; channel dredged at road crossing
H	No	No	No	?	15	Open cut with diversion structures	Tributary to Little Rock River
I	No	No	No	No	n/a	Open cut without diversion structures	Tiled drainage; no channel; cultivated
J	No	No	No	No	1	Open cut	Incised stream; heavily vegetated

1 Indicates known occurrences of Topeka shiner within 1.0 stream mile in the past 5 years. Data included here were provided by the Division of Ecological Resources, Minnesota Department of Natural Resources and were current as of February 22, 2011. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present. Copyright 2011 State of Minnesota Department of Natural Resources.

2 Based on USFWS (2004).

3 Based on TRC (2010a); n/a = not applicable--no channel present or drainage is tiled; ? = questionable habitat, providing marginal habitat requirements, suitability not determined.

4 Based on criteria from Section 2.2.2. Areas where the presence of potential habitat is questionable have been proposed for open cut with diversion structures; however, open cut without diversion structures may be used if the channel is dry or is otherwise deemed unsuitable as Topeka shiner habitat at the time of construction. Crossings with proposed method of open cut that do not designate whether or not diversion structures will be used should be assessed at the time of construction based on the Section 2.2.2 criteria.