Topeka Shiner (*Notropis topeka*) Management Plan for the State of South Dakota

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List of Abbreviations

This document was written according to the style suggested by the American Fisheries Society. Acronyms that are used throughout this document are defined below.

BHSU.....Black Hills State University
BMP ..... best management practice
CAFO.....confined animal feeding operation
CRP .....Conservation Reserve Program
CSP .....Conservation Security Program
CWA .....Clean Water Act
DSU..... Dakota State University
EPA .....Environmental Protection Agency
EQIP.....Environmental Quality Incentives Program
EROS.....Earth Resources Observation Systems
ESA .....Endangered Species Act
EWP .....Emergency Watershed Program
FEMA..... Federal Emergency Management Agency
FHA.....Federal Highway Administration
FSA ..... Farm Services Agency
GIS .....Geographic Information Systems
GRP .....Grasslands Reserve Program
HCP.....Habitat Conservation Plan
IBI.....index of biotic integrity
NPDES .....National Pollution Discharge Elimination System
NRCS .....Natural Resource Conservation Service
NRI.....National Resource Inventory
NWI..... National Wetlands Inventory
RC&D..... Resource Conservation and Development
SDCA.....South Dakota Cattlemen's Association
SDCGA .....South Dakota Corn Grower's Association
SD Dept. of Ag. ..... South Dakota Department of Agriculture
SD DENR.....South Dakota Department of Environment and Natural Resources
SD DOT..... South Dakota Department of Transportation
SD GF&P .....South Dakota Game, Fish & Parks
SDSU..... South Dakota State University
TMDL.....Total Maximum Daily Load
UN-Omaha .....University of Nebraska - Omaha
USCOE..... United States Army Corps of Engineers
USFWS ..... United States Fish and Wildlife Service
USGS.....United States Geological Survey
WHIP.....Wildlife Habitat Improvement Program
WRP .....Wetland Reserve Program

Introduction

The U.S. Fish and Wildlife Service (USFWS) listed the Topeka shiner (*Notropis topeka*) as endangered under the Endangered Species Act (ESA) in January 1999 (USFWS 2001). Prior to listing, limited survey data suggested the shiner only occupied 10% of its historic range (USFWS 1998). Recent studies in South Dakota have documented the Topeka shiner in 80% of historically known streams, along with many streams where Topeka shiners were not previously reported. These recent findings suggest Topeka shiners are more abundant in South Dakota than other states within its range.

This state management plan is a cooperative effort between various local, state, and federal entities within South Dakota. While South Dakota Game, Fish and Parks (SD GF&P) took the lead in drafting this plan, entities, such as the USFWS, Natural Resource Conservation Service (NRCS), U.S. Army Corps of Engineers (USCOE), South Dakota Department of Environment and Natural Resources (SD DENR), South Dakota Department of Transportation (SD DOT), South Dakota Department of Agriculture (SD Dept. of Ag.), conservation districts, state universities, and private organizations (SD Cattlemen's Assoc., SD Farm Bureau), provided input at various levels. Local groups and private landowners will have opportunities for participation through outreach activities.

The goals of this state management plan are to:

- Maintain habitat integrity in Topeka shiner streams.
- Establish a point-based management goal for the State of South Dakota in contribution towards national recovery efforts.

Specific objectives needed to meet these plan goals include:

- Management actions that address stream hydrology, geomorphology, and water quality.
- Establishment of a monitoring and assessment protocol to evaluate South Dakota's point-based recovery goal.
- Development of public outreach and education strategies to inform all entities involved about Topeka shiner management in South Dakota.

> A short-term intended purpose of this plan is to exclude the need to designate critical habitat in South Dakota by identifying and enacting those conservation strategies listed in this plan.

The State of South Dakota considers a flexible, adaptive, and proactive management approach to be an appropriate and effective means of achieving continued conservation of the Topeka shiner in South Dakota while contributing to national recovery efforts. Flexible management of the Topeka shiner will best be directed through a Habitat Conservation Plan (HCP), which may alleviate certain consultation procedures currently required under Section 7 of the ESA. This state management plan will provide a crucial component in establishing an HCP. Specific functions of this plan are: 1) to provide a planning framework from which specific operational plans or tools can be developed and implemented; 2) to provide a basis upon which legal agreements, such as an HCP, can be

developed; 3) specific to South Dakota Game, Fish & Parks to fulfill endangered species commitments made in the Cooperative Agreement for the Conservation of Endangered and Threatened Animals; and 4) to make use of the state expertise related to fish communities, their related habitats, and existing programs designed to promote and restore healthy ecosystems. This plan takes a watershed-level approach to identify needs and strategies for the long-term conservation of Topeka shiner habitat. A watershed-level approach will allow for a greater number of options in implementing conservation strategies to address major concerns that may impact Topeka shiner populations.

Description

The Topeka shiner is a small minnow (family Cyprinidae) first discovered by C.H. Gilbert in Shunganunga Creek near Topeka, Kansas (Minckley and Cross 1959). This shiner averages 1.5 to 2 inches in length with a maximum length of 3 inches. Distinguishing characteristics include a chevron-shaped black spot at the base of its caudal fin, a dusky stripe along the lateral line, a dark, olivaceous colored body, and a distinct dark stripe preceding the dorsal fin. Dark pigment gives the body a crosshatch pattern above the lateral line while the body is white below the lateral line. Breeding males have an orange-tinted head and fins (Pflieger 1997, USFWS 1998).

Life History

Topeka shiners spawn from late-May to mid-August, depending on water temperature. Spawning occurs over gravel nests of green sunfish (*Lepomis cyanellus*) and orangespotted sunfish (*L. humilis*). Topeka shiner males occupy a small territory around the periphery of the nest. Hatch (2001) reported breeding males and females occurring over silt-covered rubble and concrete rip-rap as well. Topeka shiners are sexually mature by their second summer and few individuals live to three years of age (Pflieger 1997). The diet of the shiner is quite diverse, ranging from plant material to zooplankton. However, small aquatic insects, especially midges (family Chironomidae), make up a large portion of the Topeka shiner's diet (Dahle 2001, Kerns and Bonneau 2002).

Habitat

Topeka shiners generally occupy small, prairie streams with groundwater inputs, high water quality, and sand or gravel substrates (Pflieger 1997). Some Topeka shiner locations in South Dakota reported by Wall et al. (2001) and Cunningham (2002) were degraded streams with silt substrates, off-channel backwater areas, borrow pits, and sloughs connected to occupied streams. Recruitment potential in these habitat types is unknown. Other studies (Clark 2000, Dahle 2001, Hatch 2001) have reported this species in backwater areas as well. Topeka shiners have also been collected in varying abundance from streams with incised channels, high bank erosion, and intensive grazing pressure along the riparian zone (Jeff Shearer, SD GF&P, personal observation). Regardless of the habitat selected, groundwater flow is especially important to Topeka shiners during dry conditions. Based on a GIS model developed by Wall et al. (2001), the potential of Topeka shiner presence increased as the potential for groundwater delivery to streams increased. Groundwater inputs into streams help lower water temperatures and maintain water levels in isolated pools. These isolated pools provide

important habitat during periods of intermittency and act as a dispersal source when more perennial flows return to the stream (Kerns and Bonneau 2002).

Range

Historically, the Topeka shiner was widespread throughout the central prairie region of the Missouri, Mississippi, and Arkansas River drainages. The species' range included eastern South Dakota, southwestern Minnesota, Iowa, Nebraska, Kansas, and Missouri (Bailey and Allum 1962, Gilbert 1980). Currently, highly disjunct populations of Topeka shiners occupy 10% of the species' historic habitat (USFWS 1998). However, recent studies in South Dakota indicate the Topeka shiner still occupies a high percentage of known historic locations (Cunningham and Hickey 1997, Cunningham 1999, Blausey 2001, Wall et al. 2001, Cunningham 2002). With the exception of the Elm River all other historic locations fall within the boundaries of the shiner's current range in South Dakota.

Reasons for Range-wide Decline

Declines in Topeka shiner populations can not be isolated to a single factor; moreover, any combination of changes at the systemic and local levels may have contributed to a reduction in the species' range and abundance. Alterations at the systemic level, such as conversion of the prairie landscape and wetland drainage and more localized impacts, such as point source discharges, most likely acted in combination to reduce individual populations and negatively affect the Topeka shiner rangewide.

Habitat alterations may have the most pronounced impact on Topeka shiner populations. Land use changes (e.g., urbanization, development, and intensive agriculture) that alter stream hydrology and geomorphology lead to changes in sediment load and water regime. Watershed activities, such as tributary impoundment, water withdrawals, and stream channelization, often result in channel erosion, siltation, and altered water levels, potentially impacting Topeka shiner habitat (Tabor 1993, Pflieger 1997). Reduction in groundwater inputs due to wetland loss and water withdrawal may further reduce stream reaches inhabited by Topeka shiners (Wall et al. 2001). Drought may also reduce the number of stream reaches inhabited by Topeka shiners. However, the effect of drought on stream hydrology is not the same as the effects of human alterations. Topeka shiners, as well as other native prairie fish, have adapted to natural stream flow fluctuations. Human-induced changes to stream hydrology rarely mimic natural flow disturbances in timing, frequency and magnitude. Other impacts include stocking of predatory game fish (e.g., largemouth bass *Micropterus salmoides*) in impounded streams (Layher 1993, Schrank et al. 2001, Winston 2000, 2002) and introduction of non-native species (e.g., blackstripe topminnow *Fundulus notatus*, western mosquitofish *Gambusia affinis*; Pflieger 1997).

Legal Status

The Topeka shiner was proposed as a federally endangered species in the Federal Register on October 24, 1997 by the USFWS (USFWS 1997). On January 14, 1999, the Topeka shiner became officially listed as endangered under the ESA (USFWS 1998). The Topeka shiner is state-endangered in Missouri and Nebraska. Kansas and Iowa list the species as state-threatened, and Minnesota listed the Topeka shiner as a species of

concern. The shiner is not state-threatened or endangered in South Dakota. The abundance and distribution of the Topeka shiner in South Dakota precludes the need for state listing. A recent downgrade in the Topeka shiner's state rank from S2 (imperiled) to S3 (vulnerable) reflects new knowledge regarding distribution and abundance in South Dakota. The global rank of the Topeka shiner is G3 (vulnerable; SD GF&P 2003). The South Dakota Natural Heritage Program monitors and recognizes the Topeka shiner as a sensitive species. Entities that are required to address federal- and state-listed species use the South Dakota Natural Heritage database extensively during environmental review of federally funded projects.

Topeka Shiner Research in South Dakota

Research concerning the Topeka shiner in South Dakota has focused primarily on species' distribution and associated habitat. Woolman (1896 cited in Bailey and Allum 1962) reported Topeka shiners in South Dakota in 1892. However, no surveys have extensively documented Topeka shiner distribution prior to 1997. Cunningham and Hickey (1997) and Cunningham (1999) documented Topeka shiner distribution and provided a qualitative assessment of habitat in various tributaries of the James, Vermillion, and Big Sioux basins. Cunningham (2002) documented additional Topeka shiner locations and conducted a population estimate in three streams. Blausey (2001) quantitatively measured water quality and physical habitat attributes at the reach scale and compared these measurements with fish community data collected at 61 tributary sites. Regression models from this study indicate that Topeka shiners were associated with areas of low livestock use, overhanging vegetation, low siltation, and run/glide habitats composed of fine gravel and cobble substrates. Wall et al. (2001) developed a GIS model that classified the probable occurrence of Topeka shiner presence based on habitat and land use features. The GIS model was 89% accurate in predicting Topeka shiner presence and absence at high and low probability sites (i.e., the model correctly predicted whether shiners would be present or absent 89% of the time). Stream size, flow regime (i.e., intermittent to perennial), groundwater potential, gradient, and stream size discrepancy (i.e., position within the watershed or stream network) significantly influenced Topeka shiner presence (Wall et al. 2001).

Development of microsatellite markers through genetics research conducted at Black Hills State University (BHSU) is being used to estimate genetic diversity and determine genetic population structure for Topeka shiners in South Dakota (Sarver 2001). A survey for microsatellite variability for Topeka shiner populations in primary recovery units, development of a non-invasive method for collecting tissue samples for DNA extraction, and development of major histocompatability complex markers are the foci of current research. Genetics research will allow resource managers to determine the best source of broodstock for fish propagation, thus providing critical information in other states where reintroduction efforts might be needed. Furthermore, genetics information will identify specific populations in need of special management considerations.

The SD DOT has funded two studies to examine the impacts highway construction projects may have on Topeka shiner populations. Wall and Berry (2002) measured a variety of dimensions on pipe culverts for 232 culverts at 81 sites on stream segments

with a high potential for Topeka shiner presence (see Wall et al. 2001). These measurements were used to determine potential problems to fish movements, such as blockage, gradient, water velocity, embeddedness, and degree of perch (i.e., drop between culvert lip and water surface). This study found that 9% of sites posed an immediate risk to fish passage, 27% of sites were of moderate risk, and 64% of sites had low priority for mitigation (Wall and Berry 2002). Cunningham (2002) compiled a set of bridge and highway best management practices (BMPs) that would minimize on-site erosion and impact to the stream. These BMPs should meet permit regulatory requirements for construction projects in Topeka shiner streams.

The SD DOT has also been working with USFWS and other agencies to further refine these BMPs for bridges and box culvert replacements and culvert extension construction. The Topeka shiner-spawning period restriction prohibits instream work from May 15th to July 31st. This work restriction period causes major conflicts as it is also the prime construction season for SD DOT activities. Ongoing pilot projects and discussions are aimed to alleviate construction conflicts while satisfying regulatory requirements. A box culvert extension pilot project in eastern South Dakota is currently testing BMPs for winter construction in Topeka shiner streams. Further refinement of BMPs while establishing greater flexibility for instream work is the intent of this pilot project. Furthermore, the SD DOT is providing training to department administration and field staff, consultants, and contractors of the importance of implementing and monitoring erosion and sediment controls on all waterbodies in the state while emphasizing the need for special measures to be taken on Topeka shiner streams. The BMPs for Topeka shiner streams are included as Appendix A.

Goal Statement

All entities involved in developing and implementing this plan have an interest in protection and restoration of the Topeka shiner and its habitat. These interests may be inherent in the agency's mission or bound by obligations under state or federal law. For example, South Dakota Codified Law 34A-8-6 reads: "The Department of Game, Fish and Parks and the Department of Agriculture shall perform those acts necessary for the conservation, management, protection, restoration and propagation of endangered, threatened and nongame species of wildlife."

The overall goal of this plan is to establish guidelines to maintain habitat integrity in Topeka shiner streams in South Dakota. The State of South Dakota feels the best way to maintain the current abundance and distribution of Topeka shiners is to maintain the existing stream habitat. The intent of these guidelines is to work towards future delisting of the species pursuant to the ESA. The purposes of the ESA are to "provide a means whereby the ecosystems upon which the endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section." Given the relative abundance and intact distribution of Topeka shiners in South Dakota, the State of South Dakota feels a point-based system sets a more realistic management

goal than that proposed in the draft Federal Topeka Shiner Recovery Plan. This state plan proposes the following point-based management goal for each basin within eastern South Dakota: James River Basin, 900 points; Vermillion River Basin, 600 points; Big Sioux River Basin, 1300 points. These point values were based on approximately 70% of all known stream occurrences of the Topeka shiner between 1997 and 2002 in eastern South Dakota. Point values do not allow for a reduction in Topeka shiner populations or stream quality, but are designed to account for the natural variability of stream fish populations (see Population Monitoring and Assessment for justification and further details). These stream numbers exceed those occurrences reported in the final rule to list the Topeka shiner as endangered (USFWS 1998) and to establish recovery criteria of the draft Federal Topeka Shiner Recovery Plan (USFWS 2001).

Relationship to Federal Recovery Plan

The draft Federal Topeka Shiner Recovery Plan (Federal Plan) developed by the Topeka Shiner Recovery Team lists recovery criteria that must be met in order to downlist or delist the Topeka shiner. A draft of the Federal Plan was under internal review during the time this state management plan was developed. The Federal Plan divides the shiner's range into primary and secondary recovery units. The James, Vermillion, and Big Sioux River basins along with the Rock River watershed in Minnesota comprise Primary Recovery Unit 3 (PRU 3). In order to downlist or delist the Topeka shiner, populations must meet the recovery criteria of "stable or increasing over a period of 10 years" in PRU 3. The State of South Dakota feels the point-based management criteria (discussed in the Goal Statement) provides a more tangible value to work towards rather than the recovery criteria proposed in the Federal Plan. Point-based management criteria establish a baseline population and provide a measurable value that can be monitored and assessed. Point-based management criteria also take into account the natural variability (e.g. drought / flood cycles) that influence Topeka shiner populations. Even in undisturbed watersheds, stream fish populations can not consistently maintain a "stable or increasing" status due to the natural variability of prairie streams (see Factor E and Population Monitoring and Assessment). Furthermore, the Federal Plan does not provide a baseline population; measurable value to determine if populations are increasing, stable, or decreasing; or methodology for assessing population status.

Past activities in South Dakota and actions set forth in this state management plan are consistent with those activities recommended in the Federal Plan. The Federal Plan recommends implementing the following actions in order to downlist or delist the Topeka shiner: 1) conduct studies on the biology and life history requirements of the Topeka shiner, 2) monitor populations and habitat of the Topeka shiner, 3) reestablish Topeka shiner in suitable stream or off-channel habitats within its historic range, 4) design and implement a public awareness and education program, and 5) implement and maintain an adaptive management program and ensure appropriate research and management activities are carried out in order to attain recovery of the Topeka shiner (USFWS 2001). Past and on-going research regarding the biology and life history of the Topeka shiner in South Dakota is previously discussed (see Topeka Shiner Research in South Dakota). Future research will focus on further documenting shiner occurrences in unsurveyed

watersheds, population genetics, and determining proper BMPs for projects that may impact the Topeka shiner and its habitat. Population and habitat monitoring is discussed under the Population Monitoring and Assessment section. The Topeka shiner's current distribution in South Dakota does not necessitate reintroduction at historic locations. Those historic locations without a recent documented occurrence of the Topeka shiner are located in close proximity to currently known Topeka shiner locations; therefore, the potential for natural recolonization exists. The Public Outreach and Education section will discuss current and future outreach activities. The Management Actions section will address adaptive management activities.

Distribution of Topeka Shiners in South Dakota

The Topeka shiner occupies tributaries of the James, Vermillion, and Big Sioux rivers in South Dakota. Meek (1892 cited in Bailey and Allum 1962) was the first to report Topeka shiners in South Dakota in the Big Sioux River near Sioux City (Union County). Bailey and Allum (1962) and Nickum and Sinning (1971) also reported Topeka shiners in the mainstem Big Sioux River, presumably during periods of extended drought when tributaries were dry. The Topeka shiner was reported in 7 watersheds in the James, 5 watersheds in the Vermillion, and 4 watersheds in the Big Sioux River basins before 1997, and observed in 13 watersheds in the James, 8 watersheds in the Vermillion, and 17 watersheds in the Big Sioux River basins since 1997. In recent years (1997-2002) new occurrences of Topeka shiners have been reported in 9 watersheds in the James, 5 watersheds in the Vermillion, and 17 watersheds in the Big Sioux River basins. Topeka shiners have not been documented in 3 watersheds in the James, 1 watershed in the Vermillion, and 3 watersheds in the Big Sioux River basins since 1990 (Table 1). These numbers do not indicate a range expansion since all historic sites were not sampled recently, and vice versa. Furthermore, sampling intensity has varied between study periods.

Threats vs. Effects Analysis for Topeka Shiner Populations in South Dakota

This plan addresses the five factors utilized by the USFWS in listing, delisting, or downlisting actions:

A. Present or threatened destruction, modification, or curtailment of habitat or range.
B. Overutilization for commercial, recreational, scientific, or educational purposes.
C. Disease or predation.
D. Inadequacy of existing regulatory mechanisms.
E. Other natural or manmade factors.

By meeting the definition of a threat for at least one of these factors, a species meets the definition of threatened or endangered as described in Section 4(a)(1) of the ESA. Each factor is evaluated based on its potential as a threat or effect to Topeka shiner populations in South Dakota. For the purposes of this report a threat is an impact that, if uncorrected, will likely result in further decline or extirpation of the species from a significant portion of its range. An effect is an impact that may reduce localized populations, but will not

result in the overall decline or extirpation of Topeka shiner populations from South Dakota.

A. The present or threatened destruction, modification, or curtailment of habitat or range

Information on the historic range of the Topeka shiner in South Dakota is somewhat lacking. The historic distribution of the Topeka shiner and most other nongame fish in South Dakota was determined through a compilation of various surveys and reports from past fisheries investigations. Range estimations are complicated by the qualitative, and sometimes incomplete, nature of historic data. However, these records are the only source lending insight into the historic distribution of Topeka shiners.

Evermann and Cox (1896) conducted the first fisheries survey of the upper Missouri River basin reporting Topeka shiners in 4 streams in the James River basin. Churchill and Over (1933) provided a description of the Topeka shiner and stated that "these minnows are found occasionally in the small creeks of the eastern and southern part of the state." Churchill and Over (1933) go on to state that Topeka shiners are not "sufficiently numerous to be of particular importance" as a baitfish, suggesting that the abundance of this species has always comprised a small percentage of the overall fish community. Bailey and Allum (1962) reported the Topeka shiner at 5 locations in the Big Sioux and Vermillion River basins. Bailey and Allum (1962) stated that the Topeka shiner "…was formerly common in the Big Sioux, Vermillion, and James river drainages of South Dakota, but is now rare;" however, no sources were cited documenting the shiner's once common occurrence. Beckman and Elrod (1971) reported Topeka shiners in the embayments of the Cheyenne, Moreau, and Grand rivers in Lake Oahe. This finding is questionable as these sample locations were in a large reservoir, not a small prairie stream. Furthermore, Beckman and Elrod (1971) documented no occurrences of the sand shiner *Notropis stramineus*, a ubiquitous species similar in appearance to the Topeka shiner. This finding is not recognized as a viable Topeka shiner occurrence in the South Dakota Natural Heritage database and will not be included as part of the shiner's historic range for this report. The only evidence suggesting a reduction in the species' range is the failure of recent surveys (Cunningham and Hickey 1997, Blausey 2001) to record Topeka shiners in the Elm River. The Elm River is the northernmost documented occurrence of the Topeka shiner (Elsen 1977). All other historic locations are within the boundaries of the species' current distribution in South Dakota. No data currently exist to demonstrate an increase or decrease in the Topeka shiner's range in South Dakota.

Land use practices that alter the hydrologic and geomorphic processes of streams can have detrimental effects to aquatic habitat. Habitat impacts, such as wetland loss, sedimentation, channelization, and resource extraction, are often cited as reasons for declines of Topeka shiner populations throughout its range. The relevancy of each impact as it relates to Topeka shiner populations in South Dakota is discussed.

Wetland Drainage

The ecological functions of wetlands are diverse, but their influence on stream hydrology and groundwater inputs is especially critical to Topeka shiners.

Wetlands buffer stream flows by reducing flood peaks and maintaining base flows during periods of drought. Groundwater discharge into streams also provides a thermal refuge for fish during periods of intermittency. Higher peak flows increase streambed scouring, channel incision, and bank erosion, and hence channel degradation. Wetland loss alters stream hydrology, thus potentially creating an environment unsuitable for Topeka shiner inhabitance through elevated flow velocities, loss of groundwater inputs, and decrease of habitat heterogeneity. Blausey (2001) and Kuitunen et al. (2000) suggest that Topeka shiners prefer streams with low velocities (0 m/s - 0.3 m/s). Wall et al. (2001) identified groundwater potential and flow regime as positive indicators of Topeka shiner presence. The probability of Topeka shiner presence increased as potential for groundwater delivery to streams increased and flow regime moved from temporary to perennial. South Dakota is one of the few prairie states to still retain the majority, approximately 65%, of its wetland resources (Johnson and Higgins 1997) with wetland densities still commonly exceeding 100 wetlands per square mile in eastern South Dakota (Higgins et al. 2002). Prevention of wetland loss would aid efforts to maintain stream hydrology as close to unaltered conditions as possible.

Sedimentation

Sedimentation from natural sources has always occurred in stream systems; however, alterations to the landscape can change a stream's sediment load. A primary reason for increased sedimentation to aquatic systems in the Midwest is loss of native prairie (Menzel et al. 1984, Karr et al. 1985, Cross and Moss 1987). Streams with increased sediment loads often become shallower and wider, leading to a loss of habitat, warmer waters, and more frequent flooding. Loss of spawning substrate by siltation may reduce Topeka shiner recruitment. Siltation of gravel substrate may greatly reduce invertebrate productivity, especially in riffles (Berkman and Rabeni 1987), and potentially limit the shiner's food source. Hatch and Besaw (2001) classified Topeka shiners as opportunistic omnivores; however, insect (especially midges) larvae comprised a large portion of the shiner's diet. The loss of pool habitat through siltation would reduce critical areas required by the shiner to sustain periods of intermittency (Wall et al. 2001). While sedimentation continues to impair stream reaches in South Dakota (SD DENR 2002b), these problems are being address through various Total Maximum Daily Load (TMDL) projects (SD DENR 2002a).

Stream Channelization

Channelization alters stream hydrology and geomorphology. Stream systems are dynamic, but channel type remains at equilibrium under natural conditions (Leopold et al. 1964, Leopold 1994). Channelization leads to upstream degradation and downstream aggradation, resulting in an unstable channel type and altered fish habitat (Rosgen 1996). Upstream head cutting, bank slumping, and channel incision, which disconnect a stream from its floodplain and backwaters, are all forms of channel degradation. Downstream aggradation results from increased sediment loads in the channel. Monotony in habitat (i.e.,

dominated by runs) often characterizes channelized streams. However, the presence of Topeka shiners in pools, backwaters, and side channels (Pflieger 1997, Blausey 2001, Hatch 2001) suggests the need for a diversity of habitat types. Regression models indicate shiner association with stable, well-vegetated banks that are low in height. Topeka shiners are also associated with low incision channels with gravel substrates (Blausey 2001). Three percent of eastern South Dakota streams have been modified (Johnson and Higgins 1997); however, future channelization for municipal, urban, or other land use projects would be subject to endangered species review during permitting process required by Section 404 of the Clean Water Act (CWA). High water years, such as those of the mid- to late-1990s, may present the need for greater flood control measures in eastern South Dakota (FEMA 1994). Caution should be exercised so that flood control measures do not present long-term ecological changes to stream systems.

Resource Extraction

Resource extraction, such as water withdrawals and gravel mining, for municipal, agricultural, and domestic uses have the potential to impact aquatic systems when conducted improperly. Irrigation and municipal water withdrawal can lower water tables and groundwater delivery to streams, causing streams to experience longer periods of intermittency. As previously stated, positive indicators of Topeka shiner presence include groundwater potential and flow regime (Wall et al. 2001). Topeka shiners show a tendency to inhabit clear, cool prairie streams (Pflieger 1997), thus groundwater percolation through the streambed plays a critical role in sustaining water temperature and dissolved oxygen levels during periods of low flow, especially drought. The preference of perennial flows by Topeka shiners indicates the importance of groundwater percolation and springs in maintaining base flow conditions. Observations of irrigation withdrawal alterations to stream flow have been reported (Wall et al. 2001). Stream miles impacted by irrigation dewatering are unknown, though believed to be small. Of greater impact may be the groundwater aquifer withdrawals from urban areas, specifically Sioux Falls, South Dakota. Although the Sioux Falls area represents a small portion of the overall Topeka shiner range in South Dakota, this urban area consists of approximately 124,000 people (16% of the state population; U.S. Census Bureau 2002). Instream gravel mining operations can pose a threat to streams through direct alteration of stream channels and downstream sedimentation problems. SD GF&P and SD DENR authorize permits for mining operations, most of which occur outside the stream channel.

The present destruction, modification, or curtailment of range or habitat is not a threat to Topeka shiners in South Dakota. The threatened destruction, modification, or curtailment of range or habitat is difficult to assess, but the State of South Dakota feels this impact is not a threat to Topeka shiner populations. Impacts to the Topeka shiner's habitat have not occurred in South Dakota to the extent that these impacts have affected habitat in other parts of the shiner's range. Agriculture remains the primary landuse throughout the Topeka shiner's range. The loss of native prairie and resulting sedimentation and eutrophication of streams resulting from intensive agricultural production is often cited as

a primary reason for declines in Topeka shiner populations (Minckley and Cross 1959, USFWS 1998, Mammoliti 2002). Until recently, agricultural receipts for livestock have been higher than agricultural receipts for crops in South Dakota (USDA 2000a). Thus, South Dakota's agricultural economy has operated on a grass-based system (i.e. more land is reserved for grazing as opposed to row crop production). A grass-based system has noticeable benefits (e.g. retention of wetland basins, unaltered stream reaches, untilled riparian zones) to Topeka shiner watersheds in South Dakota. Recent data suggest South Dakota's agricultural economy is moving towards a production-based system (USDA 2000b, Higgins et al. 2002, Kurt Forman, USFWS, *personal communication*). Potential impacts this shift towards production agriculture may have on Topeka shiner populations are difficult to predict and unknown. However, efforts to preserve a grass-based land use (i.e. grazing) along flood plains and riparian areas combined with good stewardship practices should mitigate for many threats land use changes may present to Topeka shiner populations in South Dakota.

Table A. Potential / Actual Threats, due to Factor A, Influencing Topeka Shiner Populations in South Dakota.

Factor			Magnitude Of Threat	Immediacy of Threat	Comments
A.1. present	destruction	habitat	no threat	no threat	trends do not support
A.2. present	modification	habitat	no threat	no threat	trends do not support
A.3. present	curtailment	habitat	low	non-imminent	due to groundwater withdrawals
A.4. threatened	destruction	habitat	unknown	unknown	
A.5. threatened	modification	habitat	unknown	unknown	landuse changes, impacts unknown
A.6. threatened	curtailment	habitat	unknown	unknown	

B. Overutilization for commercial, recreational, scientific, or educational purposes
This impact is of little threat to Topeka shiners in South Dakota. Most commercial bait dealers within the state collect baitfish (e.g., fathead minnow *Pimephales promelas*) from rearing ponds or isolated wetland basins, not streams. The incidental take of Topeka shiners during bait collection by individual anglers may occur on occasion. However, South Dakota's fishing rules and regulations prohibit the use or take of state or federally listed species as bait. South Dakota Codified Law 34A-8-9 also prohibits the possession of a threatened or endangered species. The collection of endangered fish species for educational or scientific purposes requires a scientific collector permit issued by SD GF&P and USFWS. Only under special circumstances does this permit allow take of Topeka shiners.

The impacts of overutilization for commercial, recreational, scientific, or educational purposes do not present a threat to Topeka shiner populations in South Dakota. Any incidents resulting in take of Topeka shiners from these purposes occurs on a limited or isolated basis and would only have minor effects to the entire Topeka shiner population within South Dakota.

Table B. Potential / Actual Threats, due to Factor B, Influencing Topeka Shiner Populations in South Dakota.

Factor		Magnitude of Threat	Immediacy of Threat	Comments
B.1. overutilization	commercial	no threat	no threat	
B.2. overutilization	recreational	no threat	no threat	
B.3. overutilization	scientific	no threat	no threat	
B.4. overutilization	educational	no threat	no threat	

C. Disease or predation

The impacts of disease on Topeka shiner populations are relatively unknown. Occurrences of scoliosis (deformity of the vertebrae) were reported in Missouri (USFWS 1998). No reports exist in South Dakota of Topeka shiner specific diseases or abnormalities. Most diseases incurred by Topeka shiners are likely stress-induced resulting from degraded habitat conditions (e.g., elevated water temperatures, organic pollution, low dissolved oxygen levels). Mitigation of impacts to Topeka shiner habitat will address any stress-induced diseases resulting from poor habitat conditions. The lack of data regarding diseases incurred by Topeka shiners prevents further evaluation of this impact.

Predation is not as significant an impact on Topeka shiners in South Dakota as in southern parts of the shiner's range. Predation by introduced game fish, such as largemouth bass *Micropterus salmoides*, white bass *Morone chrysops*, or crappie *Pomoxis* spp., is often associated with tributary impoundment (impoundments discussed in further detail under Factor E). Several studies (Layher 1993, Schrank et al. 2001, Winston 2000, 2002, Mammoliti 2002) have documented impacts of introduced game fish on Topeka shiner populations following stream impoundment in Kansas and Missouri. Hatch (2001) also noted the extirpation of Topeka shiners from several off-channel habitats following the introduction of largemouth bass in Minnesota. Blausey (2001) reported largemouth bass and black crappie *Pomoxis nigromaculatus* in relatively high abundance, but no Topeka shiners, near a historical site on the Elm River below Elm Lake. Introduced game fish were uncommon in the vast majority of tributaries sampled by Cunningham and Hickey (1997), Cunningham (1999), Blausey (2001), and Cunningham (2002). Berry and Kolander (1994) noted that first-winter mortality of stocked largemouth bass was high (85% - 100%). High mortality rates were attributed to depletion of energy reserves and cold stress during long winter periods (Berry and Kolander 1994). Most streams in eastern South Dakota remain unimpounded. Without impounded areas, the harsh physicochemical nature of prairie streams may make these systems unsuitable for introduced game fish (Shearer and Berry 2003).

The impacts of disease and predation do not threaten Topeka shiner populations in South Dakota. The lack of information on diseases in Topeka shiner populations makes assessment of the magnitude or immediacy of this factor difficult; however, no surveys or genetics research has reported a disease specific to this species. Predation by introduced game fish may occur on an isolated basis, especially where private individuals have intentionally introduced game fish. The extent of these introductions is unknown, though presumed to be small due to the rarity of game fish in recent stream surveys. SD GF&P

is the agency charged with managing the recreational fisheries in South Dakota's public waters; however, SD GF&P does not stock game fish into Topeka shiner streams or any other streams of similar size in eastern South Dakota. Therefore, the State of South Dakota considers the impact of game fish predation on the overall Topeka shiner population to be low, especially given the low occurrence of large-scale impoundments on Topeka shiner streams (discussed under Factor E).

Table C. Potential / Actual Threats, due to Factor C, Influencing Topeka Shiner Populations in South Dakota.

Factor	Magnitude of Threat	Immediacy of Threat	Comments
C.1. disease	unknown	unknown	no data to support
C.2. predation	low	non-imminent	likely occurs in isolated areas

D. Inadequacy of existing regulatory mechanisms

Special measures protect the Topeka shiner and its habitat in South Dakota. The South Dakota Natural Heritage Program monitors and tracks Topeka shiner locations and reviews all federally funded projects that may impact sensitive species, including the Topeka shiner. Scientific collector permits, administered by SD GF&P, only allow take of Topeka shiners under special circumstances. Bait regulations outlined in South Dakota's fishing rules and regulations prohibit the take of state or federally listed species. The SD DOT has developed BMPs (Appendix A) for use during highway construction projects in Topeka shiner watersheds. These BMPs should prevent fish blockage due to improper culvert placement and reduce sedimentation problems due to on-site erosion. The SD DENR regulates water quality (water quality standards, wastewater discharge, confined animal feeding operations) and water quantity (municipal water withdrawal, crop irrigation) impacts through various permits. The Topeka shiner receives special protection as a federally listed species under the ESA. Accordingly, the USFWS reviews all projects with a federal nexus that may impact the Topeka shiner or its habitat. The NRCS is developing guidelines for project development and implementation that may impact endangered species. Projects involving the dredging or filling of waterways (e.g., impoundments) require a CWA Section 404 permit issued by the USCOE. As long as Topeka shiners maintain their current distribution and abundance in South Dakota, existing regulatory mechanisms should be adequate.

This factor does not pose a threat to Topeka shiner populations in South Dakota. Those agencies involved directly with Topeka shiner management or projects / activities that may impact Topeka shiners and their associated habitat have enacted procedural and regulatory mechanisms to protect the species in compliance with state and federal laws. The design of these mechanisms is not necessarily to protect every individual Topeka shiner, but to prevent the long-term destruction or loss of stream habitat. Further regulatory mechanisms may not result in increased protection for the Topeka shiner or its habitat in South Dakota.

Table D. Potential / Actual Threats, due to Factor D, Influencing Topeka Shiner Populations in South Dakota.

Factor			Magnitude of Threat	Immediacy of Threat	Comments
D.1. inadequate	existing	regulations	no threat	no threat	

E. Other natural and manmade factors

No other natural (species competition, niche overlap, hybridization) or manmade (urbanization, impoundments) factors are known to pose an imminent threat to Topeka shiners in South Dakota. The only exotic fish throughout the Topeka shiner's range is the common carp *Cyprinus carpio*. Other exotic fish (e.g., bighead carp *Hypophthalmichthys nobilis*, grass carp *Ctenopharyngodon idella*, rudd *Scardinius erythrophthalmus*) in South Dakota do not currently occupy the same streams as Topeka shiners, but range expansion is difficult to predict. Cunningham (2002) reported two possible incidents of hybridization between Topeka shiners and sand shiners. Fish that share phenotypic characteristics with Topeka shiners and sand shiners have also been observed in Minnesota streams as well. However, sand shiners have a great deal of intraspecific variation within the species (Dr. Jay Hatch, University of Minnesota, *personal communication*). No reports of hybridization in the southern extent of the Topeka shiner's range exist. Potential Topeka shiner hybridization and influencing factors is an area warranting further research. Currently, data are lacking regarding potential hybridization between sand and Topeka shiners; therefore, the status of this impact can not be assessed.

Flooding and drought are not a threat to the overall viability of Topeka shiners in South Dakota. Streams in the Northern Glaciated Plains naturally experience cyclical weather patterns ranging from extended drought to prolonged flooding (Milewski 2001, Shearer and Berry 2003), as evidenced by long-term stream flow records (USGS 2000). Topeka shiners, and other native prairie fish, have adapted to these naturally variable systems. In fact, Minckley and Cross (1959) indicated that Topeka shiner spawning success was among the highest of any species during periods of intermittency. Kerns and Bonneau (2002) noted that Topeka shiners, especially juveniles, were the last fish to succumb in drying pools. While native fish populations may fluctuate with changes in annual stream flow, the species will remain persistent (Shearer and Berry 2003). However, adaptation of native fish to natural disturbance should not be interpreted as the ability to tolerate all levels of human-induced disturbance.

Past impacts of point source pollution (e.g., wastewater discharge, industrial effluent) on streams in eastern South Dakota have been documented (Dieterman and Berry 1998), and most likely had adverse effects to Topeka shiner populations. Since enactment of the Clean Water Act in 1977; however, the SD DENR and U.S. Environmental Protection Agency (USEPA) have closely monitored point source impacts. Currently, municipal wastewater treatment and confined animal feeding operations are much improved over past methods and wastewater discharge must not violate designated use criteria for the receiving stream. Conflicts may arise in the future given the close proximity of urban areas, such as Sioux Falls, to Topeka shiner streams (see Figure 1). Nonpoint source pollution from urban areas will soon be addressed as urban areas and the SD DOT are

required to initiate storm water management programs under the National Pollution Discharge Elimination System (NPDES) Phase II storm water regulations. The SD DENR Section 319 and TMDL programs also address nonpoint source pollution problems (SD DENR 2002a). Urban storm water runoff is now required to meet regulatory requirements and will be less of an issue. While point and nonpoint sources may still effect Topeka shiner populations in isolated areas, there is no evidence to suggest this impact currently poses a threat to shiner populations within South Dakota.

Impoundments can be either detrimental or beneficial to Topeka shiners depending on many variables, such as impoundment size, location within watershed, and watershed condition, etc. The presence of large-scale impoundments can pose a threat to Topeka shiner populations. These types of impoundments severely alter a stream's natural hydrology. Furthermore, recreational interests often result in the stocking of non-native piscivores (impacts discussed under *disease and predation*). Large-scale impoundments exist on eight Topeka shiner streams in eastern South Dakota. These impoundments include Elm Lake, Elm River; Ethan Lake, 12-Mile Creek; Staum Dam, Shue Creek; Lake Mitchell, Firesteel Creek; Lake Cavour, Redstone Creek; Wilmarth Lake, West Branch Firesteel Creek; Centerville Dam, Vermillion River; and Lake Vermillion, East Fork Vermillion River). The Centerville Dam (Vermillion River) does not impede fish movement due to a breach in the dam structure. These impoundments may have adverse effects on Topeka shiner populations within their respective streams. The State of South Dakota feels this threat is moderate in magnitude within South Dakota, especially given its relation to Factor A (modification of habitat) and Factor B (predation). However, given the low occurrence (8 dams on 38 streams) of large-scale impoundments within Topeka shiner watersheds, this threat should be considered non-imminent.

Small-scale impoundments, such as those created by the USFWS Partners for Fish and Wildlife Program, can be beneficial to prairie stream hydrology if strategically placed throughout their associated watersheds to help sustain and restore historic watershed functions. With 35% of wetland acreage lost (Dahl 1990) and 75% of native grassland converted (USDA 2000b) to predominately agricultural use in eastern South Dakota, runoff rates have greatly increased into receiving streams. Impoundments, created to function like natural wetlands (i.e., trap sediment, capture overland runoff, recharge groundwater, filter nutrients, etc.), have a positive effect on prairie stream hydrology and associated native species. Some small-scale impoundments may have adverse effects to individual shiner populations; however, early consultation during the planning stages of these projects can alleviate negative impacts to Topeka shiners.

Overall, other natural and manmade factors do not pose a threat to Topeka shiner populations in South Dakota. Impacts, such as point source pollution and large-scale impoundments, may have adversely affected Topeka shiner populations in the past, but given the shiner's current distribution and abundance it appears these impacts do not pose an imminent threat to the species. The State of South Dakota is not aware of any synergistic effects to Topeka shiner populations.

Table E. Potential / Actual Threats, due to Factor E, Influencing Topeka Shiner Populations in South Dakota.

Factor		Magnitude of Threat	Immediacy of Threat	Comments
E.1. other	flood / drought cycles	no threat	no threat	
E.2. other	hybridization	unknown	unknown	
E.3. other	point source impacts	low	non-imminent	likely effects from isolated incidences
E.4. other	urbanization	low	non-imminent	only occurring in small portion of total range within South Dakota
E.5. other	small-scale impoundments	no threat	no threat	
E.6. other	large-scale impoundments	moderate	non-imminent	relates to Factor B (predation) and Factor A (modification of habitat)
E.7. other	synergistic effects	unknown	unknown	potential adverse impacts, but not demonstrable

Management Actions

The overall goal of this management plan is to maintain habitat integrity in Topeka shiner streams, thus management objectives will focus on those primary issues that influence habitat integrity: hydrology, geomorphology, and water quality. Given the current abundance and distribution of Topeka shiners in South Dakota, meeting the objectives of this plan proves more feasible than those recovery efforts required to restore shiner populations in other states. Strategies and tasks presented under each objective should maintain and enhance habitat in Topeka shiner streams through local- and watershed-level BMPs, conservation programs, and regulatory incentives. A combination of local- (e.g., riparian zone restoration) and watershed-level BMPs (e.g., grassland easements) may provide the best means for improving site-specific stream habitat and watershed integrity as a whole (Roth et al. 1996, Wang et al. 2002). The objectives below address those habitat effects discussed under *Present or threatened destruction, modification, or curtailment of habitat or range*. Order of listing or numbering does not denote level of importance or priority. However, it is important to note that the three issues (hydrology, geomorphology, and water quality) discussed below are interconnected in the context of watershed integrity and impacts or improvements to one may result in changes (negative or positive) to the others.

The conservation of existing habitat will provide the best option in meeting the goal of this plan. Since the vast majority of streams in eastern South Dakota flow through private land, landowner involvement will be a crucial aspect in maintaining Topeka shiner populations. However, landowner participation in any programs listed in this plan is strictly voluntary. This plan does not establish any new or additional regulations or restrictions for private landowners with regards to endangered species, but provides interested landowners and land users with a variety of conservation program options. Options may include cost share programs (e.g., Conservation Reserve Program or

Environmental Quality Incentives Program) or endangered species programs (e.g., Safe Harbors Agreements or HCPs). Appendix B provides a description of relevant programs.

Many strategies discussed in this plan relate to practices and programs already implemented throughout eastern South Dakota. Topeka shiner watersheds with few protected acres or stream reaches with high erosion would best benefit from additional conservation enrollments. The South Dakota Gap Analysis Program at South Dakota State University has identified these areas for all Topeka shiner watersheds in South Dakota. Appendix C provides an example of Gap analysis for Topeka shiner watersheds.

Hydrology

Objective 1.1: Maintain and restore the natural hydrology of streams containing Topeka shiners.

Discussion:
Stream hydrology refers to the precipitation, evaporation, runoff, and infiltration of water that occurs within a watershed. Stream systems, in the strictest sense, can be recognized as self-adjusting conveyors of water and sediment. Alterations to stream hydrology disrupt the transport of water and sediment, ultimately impacting aquatic habitat. Those land use activities that alter water delivery to streams, retention time within the basin, and infiltration rates change the natural hydrology of stream systems. The resulting effects on Topeka shiners may range from sedimentation due to increased erosion or surface runoff, longer periods of intermittent flows, and loss of groundwater inputs. Those practices that restore and maintain the natural flow regime are critical for the persistence of native fish species (Poff et al. 1997).

Strategy 1.1A: Utilize wetlands (both created and restored) to enhance groundwater recharge and reduce overland runoff in historic areas of high wetland loss.

Task: Conduct research on optimal wetland design, placement, and function in relation to stream hydrology and Topeka shiner habitat parameters.

Programs / tools:

GIS Modeling
Field research
USFWS – NWI
USGS gauging stations

Task: Provide technical and financial assistance to landowners interested in creating or restoring wetland areas.

Agencies / organizations:

Conservation districts
NRCS
USFWS - Partners for Fish and Wildlife

SD GF&P
Ducks Unlimited

Programs / tools:

Grass waterways – CRP
USFWS – Wetland Easements
WRP
WHIP
DENR Section 319 Program

Task: Inform the public on the importance of wetlands to wildlife and watershed quality.

Programs / tools:

Demonstration sites
SDSU Extension
Classroom presentations
Terry Redlin Fresh Water Institute
DENR Information and Education Outreach

Strategy 1.1B: Identify and restore those Topeka shiner watersheds whose hydrographs have been most altered from historic conditions.

Task: Develop and use existing computer models to 1) assess land use alterations to stream hydrology, 2) assess which conservation measures would be most practical and effective for restoring stream hydrology.

Programs / tools:

GIS Land use Analysis – NRI, EROS Landsat imagery
Streamflow modeling
USGS gauging stations

Task: Provide landowner incentives to increase native vegetative cover and other conservation measures in areas identified by hydrologic models.

Programs / tools:

CRP
GRP
WHIP
Grassland Easements – USFWS
Dense nesting cover – GF&P
Native warm season grass establishment – GF&P
USFWS grassland easements
DENR Section 319 Program

Task: Maintain current levels of grassland resources by ensuring viability of agricultural herbivory.

Agencies / organizations:

Agricultural associations

NRCS
Grassland Managed Intensive Grazing
USFWS - Partners for Fish and Wildlife
SD Dept. of Ag.
SD DENR
USFWS

Programs / tools:

DENR Section 319 Program
Grassland Easements
Conservation Commission Grants

Task: Provide technical assistance to urban, residential, and development planners in designing storm water systems that minimize runoff "peaks" into streams following precipitation events.

Agencies / organizations:

SD DENR
SD DOT

Geomorphology

Objective 1.2: Reduce those impacts that adversely alter the geomorphology of Topeka shiner streams.

Discussion: Geomorphology refers to the physical features (e.g., channel dimensions, substrate, gradient) that characterize a stream. Geomorphology and riparian vegetation are the principle factors influencing aquatic habitat. Land use practices and manmade structures (e.g., large-scale impoundments) often have direct and / or indirect impacts to a stream's geomorphic features. The resulting channel degradation (i.e., erosion) or aggradation (i.e., sedimentation) changes the aquatic habitat to which native fish have adapted. Impacts to Topeka shiner streams may include loss of instream pool habitat, loss of spawning substrate, channel incision, and increased stream velocities.

Strategy 1.2A: Encourage erosion control measures along riparian zones and slopes adjacent to Topeka shiner streams. Encourage minimal disturbance of these areas during construction projects.

Task: Work with government agencies to develop BMPs that minimize erosion from construction / project activities.

Agencies / organizations:

SD DOT
USCOE
NRCS
SD DENR
SD GF&P
USFWS

Task: Provide financial and technical assistance to landowners interested in reestablishing native vegetation along riparian zones, especially along areas with high erosion potential.

Agencies / organizations:
USFWS - Partners for Fish and Wildlife
Conservation Districts
NRCS

Programs / tools:
CRP
Habitat fence construction
WHIP
GRP
EQIP
Grassland Easements
Conservation Commission Grants
Small watershed program
EWP
DENR Section 319 Program

Task: Minimize riparian disturbance in areas with high erosion potential.

Programs / tools:
Alternate watering sources for livestock – EQIP
Conservation Commission Grants
Habitat fence construction
Stream bank stabilization
Provide livestock shelter / wintering areas outside riparian areas – tree plantings
DENR Section 319 Program

Strategy 1.2B: Restore altered habitat in stream reaches critical to Topeka shiners.

Task: Identify those stream reaches in Topeka shiner watersheds that have been most altered by land use changes.

Programs / tools:
GIS Modeling
Field research – habitat assessments

Task: Provide technical and financial assistance to landowners interested in restoring habitat in degraded stream reaches.

Agencies / organizations:
SD GF&P
NRCS
SD DENR

USCOE
Conservation Districts
USFWS

Strategy 1.2C: Review stream mitigation projects and inform government agencies, the public, and landowners about the adverse impacts of stream channelization to watershed health.

Task: Review projects that may adversely alter habitat in Topeka shiner streams.

Agencies / organizations:
SD GF&P
SD DENR
USCOE
USFWS
SD DOT

Programs / tools:
Terry Redlin Fresh Water Institute

Task: Inform all entities involved with stream projects on the adverse impacts of channelization to stream habitat and associated fish and wildlife species.

Agencies / organizations:
SD GF&P
SD DENR
USCOE
SD DOT
Conservation Districts
NRCS
USFWS

Programs / tools:
Terry Redlin Fresh Water Institute

Water Quality

Objective 1.3: Minimize non-point source water quality impacts in streams containing Topeka shiners.

Discussion:
Point source impacts (e.g., wastewater discharge) to stream systems have been greatly reduced since enactment of the Clean Water Act in 1977; however, non-point source impacts (e.g., habitat loss) are often cited for the continued decline of aquatic resources (Karr and Chu 1999). One of the main impairments to South Dakota streams is sediment and nutrient runoff (SD DENR 2002b). Impacts to Topeka shiner streams may range from altered trophic structure due to excessive nutrient inputs to stress-induced mortality due to elevated water temperatures. Non-point source impacts to stream hydrology and geomorphology are previously discussed.

Strategy 1.3A: Reduce nutrient inputs into Topeka shiner streams from urban and agricultural sources.

Task: Provide technical assistance to urban, residential, and development planners to improve water quality from storm water discharge systems.

Agencies / organizations:

SD DENR

Task: Continue routine inspections of sewage treatment facilities to ensure compliance with water quality standards.

Agencies / organizations:

SD DENR
State and county health departments

Task: Continue technical assistance for permitting and designing confined animal feeding operations.

Agencies / organizations:

SD DENR
EPA
SD Dept. of Ag.
USDA
Animal Waste Team

Task: Provide incentives for landowners to establish riparian buffers or filter strips along agricultural fields with high runoff potential.

Agencies / organizations:

USFWS - Partners for Fish and Wildlife

Programs / tools:

EWP
CRP
WHIP
EQIP
Small watershed program
CSP
DENR Section 319 Program

Task: Continue to provide technical assistance to farmers and ranchers interested in developing and implementing BMPs on their land.

Agencies / organizations:

SD Dept. of Ag.
SD DENR
USFWS - Partners for Fish and Wildlife
SD GF&P
Conservation Districts
NRCS

Programs / tools:
DENR Section 319 Program

Population Monitoring and Assessment

Population monitoring is an important component in the management of any fish species; however, the physical nature of certain stream systems presents challenges to monitoring efforts. The stochastic nature of prairie streams, such as those in the Northern Glaciated Plains (Omernik 1987), leads to systems predominantly influenced by abiotic (e.g., climate, geology, etc.) controls that foster persistent fish communities with variable populations (Poff and Ward 1989, Milewski 2001, Shearer and Berry 2003). For example, fish populations in eastern South Dakota streams naturally fluctuate on an intra- and inter-annual basis (Walsh 1992, Braaten and Berry 1997). Population changes for fish species, such as the Topeka shiner, that are rare, have a patchy distribution, and have variable recruitment (Minckley and Cross 1959, Wall et al. 2001) are especially difficult to assess. For these reasons, multi-metric indices that monitor change at the community level combined with physical habitat and land use assessments would be a better approach to evaluating the viability of Topeka shiners and their habitat as opposed to statistical evaluations of population surveys.

Multi-metric indices, such as the index of biotic integrity (IBI), measure structural and functional attributes of the fish (or other faunal) community while integrating information from the individual to the ecosystem level. These indices are sensitive to a broad range of environmental disturbances, robust to incorporate natural variation, and adaptable for regional application (Karr and Chu 1999). Habitat assessments, such as those used by Wang et al. (1998) and Goldstein et al. (2002), evaluate geomorphic and hydrologic changes resulting from systemic- (e.g., land use) and local-level (e.g., riparian conditions) alterations. A change in a stream's geomorphic and hydrologic features, such as substrate, channel width, and flow velocities, ultimately means altered fish habitat. Land use changes alter aquatic habitat, which is the principle determinant of a stream's biological potential (Goldstein et al. 2002). Therefore, a direct assessment of the fish community, physical habitat, and land use changes should provide a thorough analysis of biological integrity for a given stream.

This monitoring protocol will evaluate South Dakota's recovery goal at two levels: the species (i.e., Topeka shiner), and overall fish community. We recognize the need to specifically evaluate Topeka shiner populations within watersheds. Given the natural variability of individual populations we feel it is important to consider the overall fish community as well. For example, the absence of Topeka shiners from a site should not count against a basin's recovery goal point total when physical habitat and the overall fish community improve.

Baseline Data

The recent surveys by Cunningham and Hickey (1997), Cunningham (1999, 2002), Blausey (2001), Wall et al. (2001), and the East Dakota Water Development District (SD GF&P 2002) represent the most comprehensive information available on Topeka shiner

distribution in South Dakota. Baseline streams will be those with a Topeka shiner occurrence reported between 1997 and 2002 in the South Dakota Natural Heritage database. This includes 13 streams in the James, 8 streams in the Vermillion, and 17 streams in the Big Sioux River basins (Table 1). Topeka shiners in disconnected oxbow channels, riverine wetlands, and dugouts are considered individuals of the same population inhabiting the adjacent stream. The first several years of monitoring fish community composition and stream habitat will provide initial Topeka shiner population, biotic integrity, and habitat conditions.

Wetland resources, grassland resources, and drainage activity are three land coverage components critical to the assessment of Topeka shiner watersheds. This information will provide a direct assessment of those issues addressed in the management actions that influence stream habitat. Techniques will be developed to assess these three components, establish baseline conditions, and monitor any changes in future years. National Wetland Inventory (NWI), Farm Service Agency slides, USGS topographical maps, NRCS wetland inventory maps, National Resource Inventory (NRI), Earth Resources Observation Systems (EROS) Landsat imagery, and other Geographic Information System (GIS) databases will be used to assess land use changes.

Monitoring Site Selection

Three sampling sites per watershed will be established (114 total sites) with each site sampled once every three years. Three sites per watershed should be a fair compromise between obtaining a representative sample of the watershed and considering time restraints. Smaller watersheds (e.g., unnamed tributary to 12-Mile Creek) may require fewer sites, large watersheds (e.g., Firesteel Creek) may require more sites. Monitoring sites will be located at known Topeka shiner locations or stream reaches with a high probability of Topeka shiner presence (see Wall et al. 2001). Site access and landowner cooperation will determine final site location.

Monitoring Protocol

Those methods used by Blausey (2001) and Milewski (2001) will be used to sample fish communities and physical habitat. These methods will provide a measure of fish community composition and relative abundance, channel features, and surrounding land use. A modification to these methods will be the use of multiple seine hauls, thus allowing confidence intervals and depletion estimates to be calculated. The monitoring protocol will allow a crew of two people to sample one site per day. Sampling will take place between mid-June and late-September when stream flows are most stable.

A modified IBI will analyze fish community data. The modified IBI will be similar to those indices used by Milewski et al. (2001) and Shearer and Berry (2002). The IBI assigns an index score to a site or stream and classifies the stream into categories (e.g., good, fair, poor). Biotic integrity changes when the IBI score changes categories (e.g., fair to poor) between sampling visits. Watersheds with continually low or declining IBI scores should be the focus of conservation efforts. The draft Federal Plan recommended the development of a monitoring protocol similar to the IBI to assist and management of

the Topeka shiner (USFWS 2001). The monitoring protocol proposed for South Dakota streams is consistent with those recommendations.

Topeka shiner populations will be evaluated on a presence / absence basis. The natural variability of streams in South Dakota and associated fluctuations in fish populations may hamper statistical analyses. The Missouri Dept. of Conservation (1999), through the use of population modeling software (Gibbs 1995), determined that at least 12 sample sites per watershed were needed to detect a 15-year trend in Topeka shiner populations with 90% accuracy. Given the same statistical power, error rate, and coefficient of variation, 456 sites sampled annually would be required to detect a 15-year trend in South Dakota's Topeka shiner watersheds. Thus monitoring efforts designed to detect a statistically relevant trend would not be feasible.

Physical habitat measurements will be used to assess changes in channel geomorphology, such as width / depth ratio, substrate composition, and stream classification (Rosgen 1996). A watershed-, basin-, county-, and / or state-level analysis of landuse will provide a systemic-level assessment, lending insight into possible reasons for the decline or improvement in fish communities and physical habitat.

Monitoring Funding and Implementation

The Division of Wildlife within SD GF&P will be the primary funding agency for monitoring and assessment of Topeka shiner populations. Funding from the Division of Wildlife is contingent upon revenue generated from the sale of hunting and fishing licenses in combination with federal funds and following approval by the SD GF&P Commission. SD GF&P currently does not have the available staff to carry out annual monitoring of Topeka shiner populations; therefore, monitoring efforts will be contracted to an outside entity or conducted by seasonal employees. Monitoring efforts should begin during the summer of 2004 or 2005. SD GF&P will seek cooperation from other state agencies in funding for Topeka shiner monitoring as well.

Management Goal Evaluation

Each basin will receive baseline point totals as follows:

	James River basin	**Vermillion River basin**	**Big Sioux River basin**
Baseline Conditions*	1300	800	1700
Management Goal	900	600	1300

* baseline conditions based on those Topeka shiner streams documented between 1997 – 2002 at 100 points / stream.

The management goal for each basin does not propose a decline in stream condition. Baseline and management goal point totals differ because of natural variation in annual stream flows. Baseline Topeka shiner populations (1997-2002) were measured following a period (1993-1999) when stream flows were above the historic mean for each basin in eastern South Dakota (USGS 2000). These elevated stream flows allow fish to extend their range and create additional habitat that may not be available during drought years.

As habitat fluctuates with changes in annual stream flows fish species' abundance and distribution may vary from year to year (Poff and Ward 1989, Shearer and Berry 2003). Therefore, a management goal based on data collected during high flow conditions may establish unattainable standards during low flow or drought years. The degree to which Topeka shiner populations fluctuate between wet and dry years is unknown. Thus, management goal criteria may require adjustment following annual monitoring between high and low flow years.

South Dakota's management goal will be evaluated every three years. The following six scenarios will evaluate each stream's contribution towards the basin management goal:

Scenario	Rank	Point Value*
Topeka shiners present / IBI scores increase	1	+ 100
Topeka shiners absent / IBI scores increase	2	+ 50
Topeka shiners present / IBI scores stable	3	+ 50
Topeka shiners absent / IBI scores stable	4	0
Topeka shiners present / IBI scores decrease	5	- 50
Topeka shiners absent / IBI scores decrease	6	- 100

* point value assessed based on three-year change.

Example: Medary Creek initial point value for 2003, 100 points
Medary Creek 2006 scenario – shiner present / IBI increases, contribution to basin management goal 150 points.

A stream's overall point value will be the average of sampling site values. The scoring system weights point values based on biotic integrity, thus the presence or absence of Topeka shiners does not influence each basin's management goal as much as watershed health.

Public Outreach / Education

Public outreach and education will play a critical role in informing the citizens of South Dakota about the Topeka shiner. Cooperating agencies, landowners, and the general public need to be informed about the state management plan as well as the Topeka shiner in general. Outreach efforts will focus on the past and present status of the Topeka shiner, why the species was federally listed, why a state Topeka shiner management plan is important, and what South Dakota has done in managing the shiner and in working towards delisting.

Outreach Objective: Develop an awareness program that informs the public on the status of the Topeka shiner, the importance of maintaining watershed health, the management efforts in South Dakota, and the importance and function of the Topeka shiner state management plan.

Task: Continue coordination with federal, state, and local entities through the

Topeka shiner advisory group to identify potential problems and management options for the shiner.

Task: Provide biannual press releases to various agricultural (e.g., SD Cattlemen's Assoc., SD Farm Bureau) and conservation (e.g., conservation districts) groups on current state and federal activities involving the Topeka shiner. Appendix D is the first press release concerning the state management plan.

Task: Utilize media sources to inform the public about Topeka shiner recovery efforts in South Dakota. Several articles have already appeared in newspapers throughout eastern South Dakota and a feature on South Dakota Public Radio.

Task: Establish at least one demonstration site in each basin that provides a good example of land management BMPs and associated stream health. Demonstration sites can be established cooperatively with other watershed and conservation commission projects.

Task: Develop and maintain a state Topeka shiner website that presents information and documents concerning the Topeka shiner in South Dakota. Website is currently maintained at:
http://www.state.sd.us/gfp/DivisionWildlife/Diversity/index.htm
http://www.sddot.com/pe/projdev/environment_topshiner.asp

Task: Publish an annual article in the South Dakota Conservation Digest regarding the Topeka shiner and / or watershed related topics. Appendix E is a copy of the 2002 Conservation Digest article.

Task: Prepare and deliver a presentation on the Topeka shiner and state management plan at professional society meetings and workshops. Four presentations are currently scheduled for Winter / Spring 2003.

Task: Develop a handout and poster on the Topeka shiner for public display at area nature centers (e.g., Sioux Falls Outdoor Campus) and quantities for general distribution.

Evaluation

Activities in South Dakota that contribute to national recovery efforts of the Topeka shiner will be summarized in an annual progress report. Annual progress reports will include a list of projects completed, status of current projects, other relevant activities, and a summary of monitoring and assessment data. These reports will be submitted to the local and regional USFWS office. Further evaluation may include an annual meeting between those entities involved in developing this state management plan.

Literature Cited

Bailey, R.M., and M.O. Allum. 1962. Fishes of South Dakota. Museum of Zoology, University of Michigan, Ann Arbor. 133 pp.

Beckman, L.G., and J.H. Elrod. 1971. Apparent abundance and distribution of young-of-year fishes in Lake Oahe, 1965-69. Reservoir Fisheries and Limnology, Special Publication No. 8, American Fisheries Society. pp. 333-347.

Berkman, H.E., and C.F. Rabeni. 1987. Effect of siltation on stream fish communities. Environmental Biology of Fishes 18: 285-294.

Berry, C.R. Jr., and T.D. Kolander. 1994. Cold stress and first-year survival of largemouth bass. Proceedings of the South Dakota Academy of Science 73: 31-42.

Berry, C.R. Jr., S.S. Wall, and C.J. Kopplin. 2002. Identifying gaps between endangered fish habitat and conservation land. Canadian Journal of Fisheries and Aquatic Sciences. *In review*.

Blausey, C.M. 2001. The status and distribution of the Topeka shiner *Notropis topeka* in eastern South Dakota. M.S. Thesis. South Dakota State University, Brookings.

Braaten, P.J., and C.R. Berry, Jr. 1997. Fish associations with four habitat types in a South Dakota prairie stream. Journal of Freshwater Ecology 12: 477-489.

Churchill, E.P., and W.H. Over. 1933. Fishes of South Dakota. S.D. Dept. of Game and Fish, Pierre. 87 pp.

Clark, S.J. 2000. Relationship of Topeka shiner distribution to geographic features of the Des Moines Lobe in Iowa. M.S. Thesis, Iowa State University, Ames.

Cross, F.B., and R.E. Moss. 1987. Historic changes in fish communities and aquatic habitats in plains streams of Kansas. Pages 155-65 *in* W.J. Matthews and D.C. Heins, eds. Community and evolutionary ecology of North American stream fishes. University of Oklahoma Press, Norman, Oklahoma.

Cunningham, G.R., and S.M. Hickey. 1997. Topeka shiner (*Notropis topeka*) survey at selected sites within the James and Big Sioux river drainages in South Dakota. Eco-Centrics, Omaha, NE. 39 pp.

Cunningham, G.R. 1999. A survey for the Topeka shiner (*Notropis topeka*) within the Big Sioux, Vermillion, and James river basins in South Dakota. Eco-Centrics, Omaha, NE. 73 pp.

Cunningham, G.R. 2002. Road and bridge construction best management practices for

stream sites inhabited by *Notropis topeka* (Topeka shiner). Report to the South Dakota Department of Transportation, Pierre.

Cunningham, G.R. 2002. Topeka shiner surveys and population estimates in eastern South Dakota survey year 1999. Eco-Centrics, Omaha, NE.

Dahl, T.E. 1990. Wetlands losses in the United States, 1780's to 1980's. Washington D.C.: United States Fish and Wildlife Service.

Dahle, S.P. 2001. Studies of Topeka shiner (*Notropis topeka*) life history and distribution in Minnesota. M.S. Thesis, University of Minnesota, St. Paul.

Dieterman, D.J., and C.R. Berry, Jr. 1998. Fish community and water quality changes in the Big Sioux River. Prairie Naturalist 30: 199-224.

Elsen, D.S. 1977. Distribution of fishes in the James River in North Dakota and South Dakota prior to the Garrison and Oahe Diversion Projects. M.S. Thesis. University of North Dakota, Grand Forks.

Evermann, B.W., and U.O. Cox. 1896. A report upon the fishes of the Missouri River basin. Report to the U.S. Commission on Fish and Fisheries 20(1894): 325-429.

FEMA (Federal Emergency Management Agency). 1994. Multi-objective flood mitigation plan: Vermillion River Basin South Dakota. Federal Emergency Management Agency, Denver, Colorado.

Gibbs, J.P. 1995. MONITOR users manual (version 6.2): software for estimating the power of population monitoring programs to detect trends in plant and animal abundance. Department of Biology, Yale University, New Haven, Connecticut.

Gilbert, C.R. 1980. Notropis topeka (Gilbert); Topeka shiner. Page 317 *in* Lee, D.S., C.R. Gilbert, C.H. Hocutt, R.E. Jenkins, D.E. McAllister, J.R. Stauffer, Jr. (editors). Atlas of North American freshwater fishes North Carolina State Museum of Natural History.

Goldstein, R.M., L. Wang, T.P. Simon, and P.M. Stewart. 2002. Development of a stream habitat index for the Northern Lakes and Forest ecoregion. North American Journal of Fisheries Management 22: 452-464.

Grossman, G.D., J.F. Dowd, and M. Crawford. 1990. Assemblage stability in stream fishes: a review. Environmental Management 14: 661-671.

Hatch, J.T. 2001. What we know about Minnesota's first endangered fish species: the Topeka shiner. Journal of the Minnesota Academy of Sciences 65: 39-46.

Hatch, J.T., and S. Besaw. 2001. Diverse food use in Minnesota populations of the Topeka shiner (*Notropis topeka*). Journal of Freshwater Ecology 16:229-233.

Higgins, K.F., D.E. Naugle, and K.J. Forman. 2002. A case study of changing land use practices in the Northern Great Plains, U.S.A.: an uncertain future for waterbird conservation. Waterbirds (Special Publication) 25: 42-50.

Johnson, R.R., and K.F. Higgins. 1997. Wetland resources of eastern South Dakota. Brookings: South Dakota State University.

Karr, J.R., and E.W. Chu. 1999. Restoring Life in Running Waters: Better Biological Monitoring. Island Press, Washington D.C. 206 pp.

Karr, J.R., L.A. Toth, and D.R. Dudley. 1985. Fish communities of Midwestern rivers: a history of degradation. BioScience 35: 90-95.

Kerns, H.A., and J.L. Bonneau. 2002. Aspects of the life history and feeding habits of the Topeka shiner (Notropis topeka) in Kansas. Transactions of the Kansas Academy of Science 105: 125-142.

Kuitunen A., L.P. Aadland, S.L. Johnson, J. Harvey, and K.L. Terry. 2000. Microhabitat relationships of the Topeka shiner. Unpublished report. Minnesota Department of Natural Resources, Division of Fisheries and Wildlife, Ecological Services Section, Stream Habitat Program, Fergus Falls, MN.

Layher, W.G. 1993. Changes in fish community structure resulting from a flood control dam in a Flint Hills stream, Kansas, with emphasis on the Topeka shiner. University of Arkansas at Pine Bluff. Cooperative Fisheries Research Project AFC-93-1. 30 pp.

Leopold, L.B., M.G. Wolman, and J.P. Miller. 1964. Fluvial processes in geomorphology. W.H. Freeman and Company, San Francisco, California. 522 pp.

Leopold, L.B. 1994. A view of the river. Harvard University Press, Cambridge, Massachusetts.

Mammoliti, C.S. 2002. The effects of small watershed impoundments on native stream fishes: a focus on the Topeka shiner and hornyhead chub. Transactions of the Kansas Academy of Science 105: 219-231.

Menzel, B.W., J.B. Barnum, and L.M. Antosch. 1984. Ecological alterations of Iowa prairie-agricultural streams. Iowa State Journal of Research 59: 5-30.

Milewski, C.L. 2001. Local and systemic controls on fish and fish habitat in South Dakota rivers and streams: implications for management. Ph.D Dissertation. South Dakota State University, Brookings.

Milewski, C.L., C.R. Berry Jr., and D. Dieterman. 2001. Use of the index of biotic integrity in eastern South Dakota rivers. Prairie Naturalist 33: 135-152.

Minckley, W.L., and F.B. Cross. 1959. Distribution, habitat, and abundance of the Topeka shiner, *Notropis topeka* (Gilbert), in Kansas. American Midland Naturalist 61: 210-217.

Missouri Dept. of Conservation. 1999. An action plan for the Topeka shiner (*Notropis topeka*) in Missouri. Missouri Dept. of Conservation, Jefferson City, Missouri.

Nickum, J.G., and J.A. Sinning. 1971. Fishes of the Big Sioux River. Proceedings of the South Dakota Academy of Sciences 50: 143-154.

Omernik, J.M. 1987. Ecoregions of the conterminous United States. Annuals of the Association of American Geographers 77: 118-125.

Pflieger, W.L. 1997. The fishes of Missouri, revised edition. Missouri Department of Conservation, Jefferson City, Missouri. 343 pp.

Poff, N.L., and J.V. Ward. 1989. Implications of streamflow variability and predictability for lotic community structure: a regional analysis of streamflow patterns. Canadian Journal of Fisheries and Aquatic Sciences 46: 1805-1817.

Poff, N.L., J.D. Allan, M.B. Bain, J.R. Karr, K.L. Prestegaard, B.D. Richter, R.E. Sparks, and J.C. Stromberg. 1997. The natural flow regime. Bioscience 47: 769-784.

Rosgen, D. 1996. Applied river morphology. Wildland Hydrology, Pagosa Springs, Colorado.

Roth, N.E., J.D. Allan, and D.L. Erickson. 1996. Landscape influences on stream biotic integrity assessed at multiple spatial scales. Landscape Ecology 11: 141-156.

Sarver, S.K. 2001. Development of DNA fingerprinting markers in Topeka shiner. Final Report to South Dakota Game, Fish & Parks, Pierre, South Dakota.

Schrank, S.J., C.S. Guy, M..R. While, and B.L. Brock. 2001. Influence of instream and landscape-level factors on the distribution of Topeka shiners (*Notropis topeka*) in Kansas streams. Copeia 2001(2): 413-421.

Shearer, J.S., and C.R. Berry, Jr. 2002. Index of biotic integrity utility for the fishery of the James River of the Dakotas. Journal of Freshwater Ecology 17: 575-588.

Shearer, J.S., and C.R. Berry, Jr. 2003. Fish community persistence in eastern North and South Dakota rivers. Great Plains Research 13: 139-159.

SD DENR (South Dakota Dept. of Environment and Natural Resources). 2002a. South Dakota Total Maximum Daily Load Waterbody List 2002, SD DENR, Pierre, SD.

SD DENR (South Dakota Dept. of Environment and Natural Resources). 2002b. The 2002 South Dakota Report to Congress: 305(b) Water Quality Assessment, SD DENR, Pierre, SD.

South Dakota Game, Fish and Parks. 2002. South Dakota Natural Heritage database elemental occurrence records. South Dakota Game, Fish and Parks, Division of Wildlife, Pierre, South Dakota.

South Dakota Game, Fish and Parks. 2003. South Dakota Natural Heritage database elemental occurrence records. South Dakota Game, Fish and Parks, Division of Wildlife, Pierre, South Dakota.

Tabor, V.M. 1993. Status report on Topeka shiner (*Notropis topeka*). Kansas Field Office. U.S. Fish and Wildlife Service Region 6. Manhattan, Kansas. 22 pp.

U.S. Census Bureau. 2002. http://www.census.gov/census2000/states/sd.html. Retrieved March 27, 2003.

USDA (U.S. Dept. of Agriculture). 2000a. 100 years of South Dakota agriculture 1900-1999. South Dakota Agricultural Statistics Service, Sioux Falls, South Dakota.

USDA (U.S. Dept. of Agriculture). 2000b. Summary report 1997 National Resources Inventory (revised December 2000). U.S. Department of Agriculture, Natural Resources Conservation Service, Iowa State University, Ames.

USFWS (U.S. Fish and Wildlife Service). 1997. Endangered and threatened wildlife and plants; proposed rule to list the Topeka shiner as endangered. Federal Register 62 (206: 55381-55388).

USFWS (U.S. Fish and Wildlife Service). 1998. Endangered and threatened wildlife and plants; final rule to list the Topeka shiner as endangered. Federal Register 63 (240: 69008-69021).

USFWS (U.S. Fish and Wildlife Service). 2001. Topeka shiner recovery plan (draft). Manhattan, Kansas. 42 pp.

USGS (U.S. Geological Survey). 2000. Water Resources Data, South Dakota, Water Year 1999. USGS, Water Resources Division, Rapid City, South Dakota.

Wall, S.S., C.M. Blausey, J.A. Jenks, and C.R. Berry, Jr. 2001. Topeka shiner (*Notropis topeka*) population status and habitat conditions in South Dakota. South Dakota Cooperative Fish and Wildlife Research Unit, Completion Report, Research Work Order 73, Brookings.

Wall, S.S., and Berry, C.R., Jr. 2002. Inventory and mitigation of culverts crossing streams inhabited by Topeka shiners (*Notropis topeka*) in South Dakota – Draft. South Dakota Department of Transportation, Pierre, South Dakota.

Walsh, R.J. 1992. Differences in fish abundance among habitat types in a warmwater stream; the James River, South Dakota. Master's Thesis. South Dakota State University, Brookings.

Wang, L., J. Lyons, and P. Kanehl. 1998. Development and evaluation of a habitat rating system for low-gradient Wisconsin streams. North American Journal of Fisheries Management 18: 775-785.

Wang, L., J. Lyons, and P. Kanehl. 2002. Effects of watershed best management practices on habitat and fish in Wisconsin streams. Journal of the American Water Resources Association 38: 663-680.

Winston, M.R., C.M. Taylor, and J. Pigg. 1991. Upstream extirpation of four minnow species due to damming of a prairie stream. Transactions of the American Fisheries Society 120: 98-105.

Winston, M.R. 2000. Largemouth bass expansion as a cause of Topeka shiner decline. Unpublished report. Missouri Department of Conservation, 110 S. College Ave., Columbia, MO. 22 pp.

Winston, M.R. 2002. Spatial and temporal species associations with the Topeka shiner (*Notropis topeka*) in Missouri. Journal of Freshwater Ecology 17: 249-261.

Table 1. Identified Topeka shiner sites within the James, Vermillion, and Big Sioux River watershed basins. This table only provides county locations of Topeka shiner sites and should not be used for regulatory interpretation.

Historic Locations (pre-1997)

Stream	Basin	County	Year(s) observed
Shue Creek	James	Beadle	1989
Elm River	James	Brown	1975
Enemy Creek*	James	Davison	1896
Firesteel Creek*	James	Davison	1896, 1975
Prairie Creek	James	Yankton	1896
Rock Creek*	James	Miner	1896
Redstone Creek	James	Sanborn	1989
Vermillion River*	Vermillion	Clay, Turner	1934, 1991, 1992
West Fork Vermillion River*	Vermillion	McCook, Turner	1991, 1992
East Fork Vermillion River	Vermillion	McCook, Turner	1991, 1992
Swan Lake	Vermillion	Turner	1943
Turkey Ridge Creek*	Vermillion	Turner	1991, 1992
Big Sioux River	Big Sioux	Brookings, Lincoln, Union, Moody	1892, 1958, 1970
Lake Tetonkaha Inlet	Big Sioux	Brookings	1949
Willow Creek	Big Sioux	Minnehaha	1939
Flandreau Creek*	Big Sioux	Moody	1970

Current Locations (1997 – 2002)

Stream	Basin	County	Year(s) Observed
West Branch Firesteel Creek	James	Aurora	1998
Pearl Creek	James	Beadle	1997 - 1999
Middle Pearl Creek	James	Beadle	1997, 1999
Shue Creek	James	Beadle	1999
Unnamed Trib. to 12-Mile Creek	James	Davison	2002
12-Mile Creek	James	Davison, Hanson	1998, 1999, 2002
Enemy Creek*	James	Davison	1998, 1999
Firesteel Creek*	James	Davison	1997, 1999
Dry Creek	James	Hutchinson	2000
North Branch Dry Creek	James	Hutchinson	2000
South Branch Lonetree Creek	James	Hutchinson	2000
Wolf Creek	James	Hutchinson	1997
Rock Creek*	James	Miner	2000
Vermillion River*	Vermillion	Clay, Turner	1999
Blind Creek	Vermillion	Lincoln	1999
Long Creek	Vermillion	Lincoln	1999
Saddle Creek	Vermillion	Lincoln	1999
West Fork Vermillion River*	Vermillion	McCook, Turner	1998, 1999
Camp Creek	Vermillion	Turner	2000
Outlet of Silver Lake	Vermillion	Turner	2000
Turkey Ridge Creek*	Vermillion	Turner	1999, 2001, 2002
Medary Creek	Big Sioux	Brookings	1997 – 2000
North Deer Creek	Big Sioux	Brookings	2000
Tributary to Deer Creek	Big Sioux	Brookings	2000
South Fork North Deer Creek	Big Sioux	Brookings	1998
6-Mile Creek	Big Sioux	Brookings	1997, 1999, 2000
Peg Munky Run	Big Sioux	Deuel	2002
Hidewood Creek	Big Sioux	Deuel	1999

Table 1 continued.

Current Locations (1997 – 2002)

Stream	Basin	County	Year(s) Observed
Stray Horse Creek	Big Sioux	Hamlin	2002
4-Mile Creek	Big Sioux	Minnehaha	1999, 2002
Beaver Creek	Big Sioux	Minnehaha	1999
Slip-up Creek	Big Sioux	Minnehaha	1999
Split Rock Creek	Big Sioux	Minnehaha	1998, 1999
Springwater Creek	Big Sioux	Minnehaha	1999
West Pipestone Creek	Big Sioux	Minnehaha	1999, 2001
Pipestone Creek	Big Sioux	Moody	1998 - 2002
Spring Creek	Big Sioux	Moody	2000
Brookfield Creek	Big Sioux	Moody	1999

Sources: Evermann and Cox 1896, Bailey and Allum 1962, Wall et al. 2001, South Dakota Natural Heritage Program 2002

* Indicates those historic stream locations where Topeka shiners have been documented recently (Topeka shiners recently documented in Flandreau Creek in Minnesota, Hatch 2001). Note that all historic locations were not sampled recently and some current Topeka shiner streams were not historically sampled.

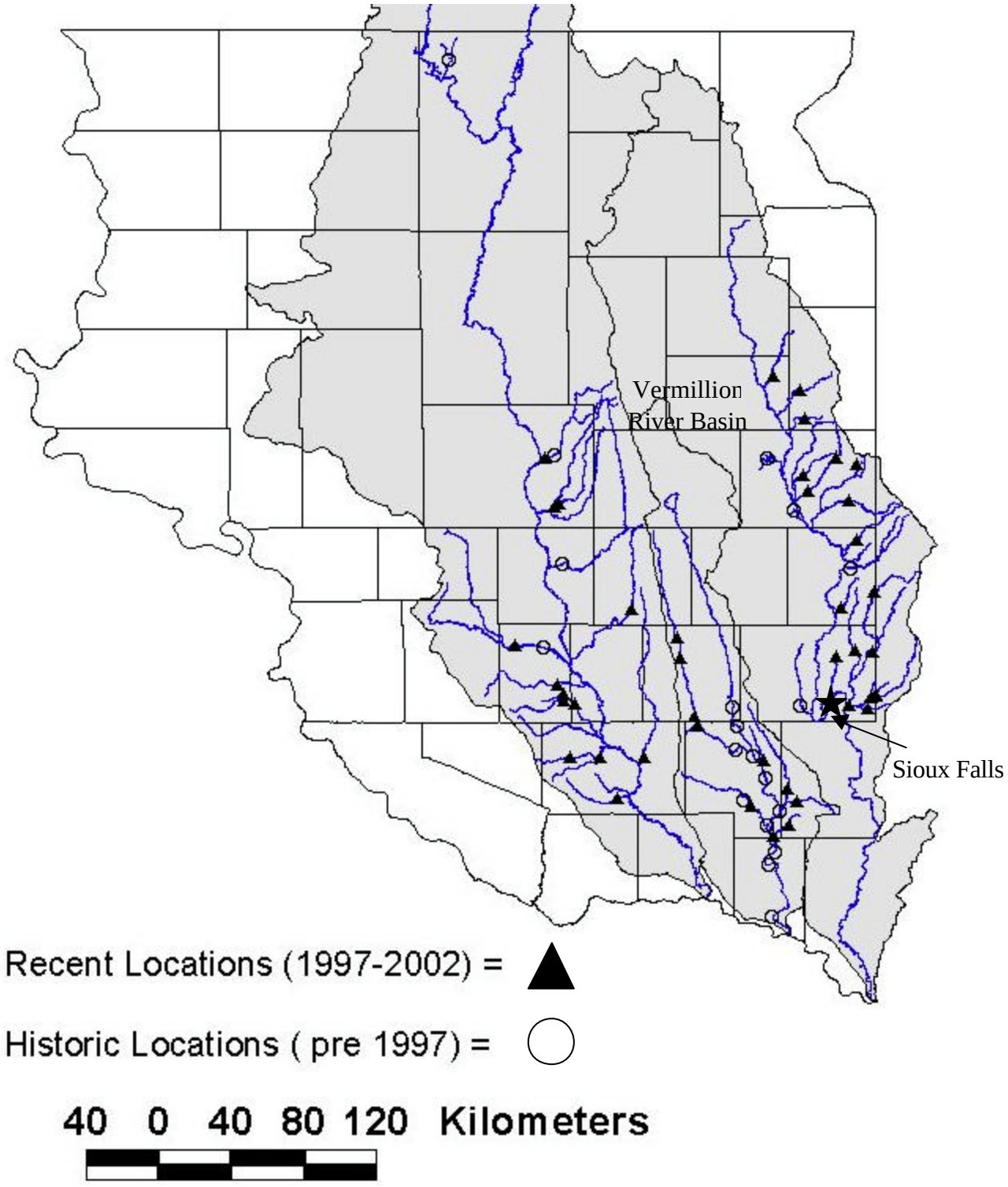


Figure 1. Map of documented Topeka shiner locations within eastern South Dakota. Locations based on those occurrences reported in the South Dakota Natural Heritage Database. Figure should not be used for regulatory interpretation.

Appendix A. Best management practice guidelines used by the Department of Transportation for highway construction activities that involve Topeka shiner streams.

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
CONSTRUCTION PRACTICES IN STREAMS
INHABITED BY THE TOPEKA SHINER

APRIL 2, 2003

I. DESCRIPTION

This project crosses a stream inhabited by the Topeka Shiner, a federally endangered species. In order to maintain the habitat necessary to support the Topeka Shiner, several conditions shall be met by the Contractor during construction. The conditions are outlined in the following paragraphs.

II. MATERIALS (None Required)

III. CONSTRUCTION REQUIREMENTS

A. GENERAL CONSTRUCTION

Construction activities within the stream are prohibited from May 15 to July 31, unless the stream is completely separated from construction areas by a Temporary Water Barrier or cofferdam. If work is to be done behind a Temporary Water Barrier or cofferdam between May 15 and July 31, the barrier must be in-place and initially de-watered prior to May 15. Temporary Water Barriers and cofferdams shall also be in-place and initially de-watered prior to ice up if winter work is planned. Construction activities at all times along the stream banks, and in areas that drain into the stream will not be permitted unless comprehensive and effective erosion and sediment controls, that will prevent sediments from entering into the stream, are in-place and functioning properly. Erosion and sediment controls shall be left in place and maintained in good working condition until these areas are stabilized and re-vegetated.

The Contractor shall minimize disturbance of the work area by limiting the working pad surface area, and limiting removal of riparian vegetation to the greatest extent possible. Exposed surfaces shall not be left exposed for greater than one day if work is not occurring daily at that location. Exposed work areas shall be protected at the end of each workday with erosion control mats, plastic sheeting or other approved methods. All areas disturbed by construction activities shall be stabilized and restored with native vegetation when work in those areas is complete. Disturbed construction areas left for more than a day without continuous work that are not permanently seeded and mulched shall be covered with temporary mulch.

The Contractor shall perform monitoring of erosion and sediment controls on a continuous basis, with thorough inspections during rainfall events, and immediately make needed repairs or adjustments.

All temporary storage facilities for petroleum products, other fuels, and chemicals must be located and protected to prevent accidental spills from entering streams within the project area. Cement sweepings, washings, treatment chemicals, or grouting and bonding materials are prohibited from entering into the stream directly or from any locations where they can be washed into the stream by storm water runoff, as these materials are toxic to aquatic life.

No mechanized equipment will be allowed in the stream. If equipment cannot access the work area from shore, work platforms supported by piling driven into the channel bottom shall be constructed. Work berms shall not be constructed in the stream and erosion control measures shall be added to work berms adjacent to the stream.

Unrestricted fish passage must be provided at all times. Construction of temporary dams or diversions using earthen material is not allowed within the stream. Excavated material from the streambed shall not be released back into the stream. Every effort must be made to limit the extent of streambed disturbance and to isolate and capture sediment released during all phases of construction. In-stream dredging and disturbance of the streambed, not provided for in the plans, will not be allowed. This includes no removal of stream bottom substrate for construction materials. If modifications to the streambed cannot be avoided, the physical habitat features (pool-riffle-run sequences) must be restored to pre-construction conditions. Photo documentation of the stream before, during, and after construction must be provided. Water from wet materials excavated and removed from within a Temporary Water Barrier or cofferdam shall have sediment removed prior to the effluent reentering the stream. Sediment removal methods may include a detention pond, complete filtration at an upland site or trickling through vegetation.

The Contractor shall submit a detailed Construction Plan, a minimum of 14 days prior to starting work, to the Engineer for approval. The plan shall include an Erosion and Sediment Control Plan with a complete description of products, materials and methods of installation and removal. The plan shall also include products, materials and methods of construction for Temporary Water Barriers and cofferdams including de-watering, handling, storage, and disposal of excavated material and pumped effluent. The Construction Plan shall include all necessary information to provide assurance that the special environmental conditions are adequately addressed. The plan will be forwarded to the Environmental and Bridge Offices for review and approval with a copy forwarded to the US Fish & Wildlife Service. Work shall not proceed without approval of the construction plan by the Environmental and Bridge Offices.

Oversight for final water enclosures, de-watering, fish seining and any fish transfer or movement shall be conducted by a Biologist under contract to SDDOT.

A pre-construction meeting shall be held with the Contractor, all Sub-Contractors, Project Engineer and personnel from the Environmental Office to ensure all permit conditions and plans are clearly understood.

The Contractor shall be familiar with provisions of the 404 Permit. The Contractor shall notify the Engineer if in-stream construction methods or material will be used that are not covered in the 404 Permit, so an amendment to the 404 Permit can be processed if necessary. The contractor shall provide an estimated date at the pre-construction meeting when the Biologist will be needed on site to monitor final water enclosures, de-watering, fish seining or any fish transfer. The contractor shall notify the Biologist two days before he is needed on site. The telephone number and name of the Biologist will be supplied to the Contractor at the pre-construction meeting.

The project will be inspected and evaluated daily by the Engineer to ensure that all construction requirements and environmental conditions are being met and that the stream and habitat are being protected. The Engineer has the authority to recommend that different or

additional controls be implemented to more effectively protect the stream. Construction methods that result in fish mortality shall cease and may resume only after the Engineer, in consultation with the Biologist, approves an acceptable plan. The Engineer shall be notified immediately if field conditions change, or if the project must be modified, so that coordination of permits and approvals can be expedited.

B. TEMPORARY WATER BARRIERS

Temporary water barriers can consist of sheet piling, water filled bladders, portable cofferdams, sand bag dikes, or similar acceptable methods that completely and effectively isolate the stream from the work area. Temporary Water Barriers shall be clean and free of contaminants and sediments that can effect water quality. They shall also be installed by methods that minimize the introduction of sediments and contaminants into the water. Barriers that are constructed in the water shall be enclosed at the upstream side first and every effort shall be made to move any trapped fish out the downstream side before the downstream side is enclosed. If Temporary Water Barriers are overtopped after initial de-watering, every effort shall be made to move or remove trapped fish from within the enclosure before completely de-watering again. Movement of fish must be supervised by the biologist.

Any excavation or removal of muck and debris from behind a Temporary Water Barrier enclosure shall be done by such methods that sediment and debris do not enter into the stream. The use of temporary platforms may be required to catch any materials that may fall into the stream during removal.

C. COFFERDAMS

Where cofferdams are required for deep foundations, the same provisions given for Temporary Water Barriers shall apply for cofferdams with the following exceptions:

The contractor shall provide a walkway along the inside perimeter of cofferdams, within one foot of the water surface, to provide access for seining operations. The last sheet piling to be installed shall be at the downstream end. A net or seine shall be used, vertically, inside the sheet pile cofferdam beginning at the upstream end to gradually force fish out the open downstream end. The cofferdam may then be completely enclosed by driving the last sheet pile.

Design of cofferdams shall be as specified in Section 423 of the Standard Specifications.

D. DE-WATERING

De-watering and construction activities within water enclosures shall not be done until the Biologist has confirmed that all the fish have been moved from within the enclosure. The intent is to ensure that no fish remain trapped within the enclosure after it is closed and de-watered.

Initial de-watering or de-watering after overtopping has occurred shall be done by an approved pumping method and shall not occur unless the Biologist is present or has cleared the enclosure for de-watering. Initial de-watering or de-watering after overtopping has occurred shall be done with pumping methods that will not transport fish through pumps or trap fish against intakes.

Effluent from the de-watering operation shall be pumped to an upland site and the sediment removed prior to the effluent reentering the Stream. Sediment removal methods may include a detention pond, complete filtration at an upland site or trickling through vegetation.

E. TEMPORARY WORKS (FALSEWORK AND WORK PLATFORMS)

Falsework or work platforms shall conform to section 423 of the Standard Specifications and any applicable requirements of this provision.

Temporary piling shall be cutoff at or driven flush with the streambed, or extracted when no longer needed.

The Contractor shall consider how falsework or work platforms will be installed and removed when preparing the Construction Plan and include any special construction methods or sequencing that may be required to protect the Topeka Shiner.

Design of temporary works shall be as specified in Section 423 of the Standard Specifications.

F. REMOVAL OF STRUCTURES & OBSTRUCTIONS

Removal of structures and obstructions shall conform to section 110 of the Standard Specifications and any applicable requirements of this provision.

Construction, demolition and/or removal operations conducted over or in the vicinity of the stream, shall be controlled to prevent materials from falling in the waterway. Any materials that do fall into the waterway or into areas below the ordinary high water elevation (2-year flow) must be removed promptly by hand or with equipment located above the stream bank. A platform suspended below the bridge shall be constructed to prevent material from entering the Stream during demolition of the superstructure. A platform or similar device shall be constructed around the piers located in the Stream to prevent material from entering the water during demolition of those piers. A Temporary Water Barrier shall be constructed around areas of removal that are below the waterline.

G. BOX CULVERTS

Construction of box culverts shall comply with all applicable requirements of this provision.

Temporary diversion channels for box culverts shall be constructed according to standard plate number 734.10. Temporary diversion channels shall be complete and in place prior to May 15 for work between May 15 and July 31 and shall also be in-place prior to ice up if winter work is planned. The contractor shall construct the temporary diversion channel to allow unrestricted fish passage even if the channel is dry at the start of construction.

The contractor shall include details of products, materials and methods of construction for temporary diversion channels with his Construction Plan.

H. BOX CULVERT EXTENSIONS

Construction of box culvert extensions shall comply with all applicable requirements of this provision.

The contractor shall divert the stream and use phased construction to maintain unrestricted fish passage during construction activities. The contractor shall use phased construction and construct the stream flow diversion even if the channel is dry at the start of construction.

The temporary stream diversion for box culvert extensions shall be constructed according to the plan details. Temporary stream diversions shall be complete and in place prior to May 15 for work between May 15 and July 31 and shall also be in-place prior to ice up if winter work is planned.

The contractors detailed Construction Plan shall include stream diversion layout for each phase, box extension construction joints, bar splicing details, diversion sequence, and any other special construction methods or sequencing that may be required to protect the Topeka Shiner.

IV. METHOD OF MEASUREMENT

A. Temporary Water Barriers: Temporary water barriers will be measured to the nearest foot.

B. Cofferdams: Measurement for cofferdams will be as per Section 423.4 of the Standard Specifications.

C. Dewatering: Measurement for dewatering will not be made.

D. Temporary Works: Measurement for temporary works will be as per Section 423.4 of the Standard Specifications.

E. Removal of Structures and Obstructions: Measurement for removal of structures and obstructions shall be as per Section 110.4 of the Standard Specifications.

F. Temporary Diversion Channel for Box Culverts: Measurement for temporary diversion channel for box culverts shall be in accordance with Standard Plate number 734.10.

G. Temporary Stream Diversion for Box Culvert Extensions: Measurement for temporary stream diversions for box culvert extensions will be on a per each basis.

H. Erosion Control for Box Culvert Extension: Measurement for erosion and sediment control for box culvert extensions will not be made.

V. BASIS OF PAYMENT

A. Temporary Water Barriers: Temporary water barriers will be paid for at the contract unit price per foot. Payment for this bid item shall be made only once at each plan shown location, regardless of the number of times the barrier is changed or moved. Payment will be full compensation for labor, equipment, materials, and all incidentals necessary for constructing the temporary water barrier.

B. Cofferdams: Payment for cofferdams shall be as specified in Section 423.5 of the Standard Specifications.

C. Dewatering: Payment for Dewatering will not be made. All costs associated with dewatering shall be incidental to the other bid items.

D. Temporary Works: Payment for temporary works shall be as specified in Section 423.5 of the Standard Specifications.

E. Removal of Structures and Obstructions: Payment for removal of structures and obstructions shall be as specified in Section 110.5 of the Standard Specifications.

F. Temporary Diversion Channel for Box Culverts: Payment for temporary diversion channels for box culverts shall be in accordance with Standard Plate number 734.10.

G. Temporary Stream Diversion for Box Culvert Extensions: Temporary stream diversion for box culvert extensions will be paid for at the contract unit price per each. Payment for this bid item will be made only once, regardless of the number of times the diversion is changed or moved at this site. Payment will be full compensation for labor, equipment, materials, and all incidentals necessary for constructing the temporary diversion channel.

H. Erosion Control for Box Culvert Extension: Erosion control for box culvert extension will be paid for at the contract lump sum price. The contract lump sum price shall be full compensation for all labor, equipment, materials, and incidentals necessary to install and maintain erosion and sediment control measures for box culvert extensions.

* * * * *

Appendix B. Conservation programs for landowners. Program descriptions were adopted from agency websites, website links are provided below.

Conservation Reserve Program (CRP) - FSA / NRCS
The Conservation Reserve Program (CRP) provides technical and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. The voluntary program provides assistance to farmers and ranchers in complying with Federal, State, and tribal environmental laws, and encourages environmental enhancement.

The Conservation Reserve Program reduces soil erosion, protects the Nation's ability to produce food and fiber, reduces sedimentation in streams and lakes, improves water quality, establishes wildlife habitat, and enhances forest and wetland resources. It encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filterstrips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. Cost sharing is provided to establish the vegetative cover practices.

Wetland Reserve Program (WRP) - NRCS
The Wetlands Reserve Program is a voluntary easement program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. The USDA Natural Resources Conservation Service (NRCS) provides technical and financial support to help landowners with their wetland restoration efforts. The NRCS goal is to achieve the greatest wetland functions and values, along with optimum wildlife habitat, on every acre enrolled in the program. This program offers landowners an opportunity to establish long-term conservation and wildlife practices and protection.

Environmental Quality Incentives Program (EQIP) - NRCS
The Environmental Quality Incentives Program (EQIP) was reauthorized in the Farm Security and Rural Investment Act of 2002 (Farm Bill) to provide a voluntary conservation program for farmers and ranchers that promotes agricultural production and environmental quality as compatible national goals. EQIP offers financial and technical help to assist eligible participants install or implement structural and management practices on eligible agricultural land.

EQIP offers contracts with a minimum term that ends one year after the implementation of the last scheduled practices and a maximum term of ten years. These contracts provide incentive payments and cost-shares to implement conservation practices. Persons who are engaged in livestock or agricultural production on eligible land may participate in the EQIP program. EQIP may cost-share up to 75 percent of the costs of certain conservation practices. Incentive payments may be provided for up to three years to encourage producers to carry out management practices they may not otherwise use without the incentive. However, limited resource producers and beginning farmers and ranchers may be eligible for cost-shares up to 90 percent.

Wildlife Habitat Incentive Program (WHIP) - NRCS
The Wildlife Habitat Incentives Program (WHIP) is a voluntary program for people who want to develop and improve wildlife habitat primarily on private land. Through WHIP USDA's Natural Resources Conservation Service provides both technical assistance and up to 75 percent cost-share assistance to establish and improve fish and wildlife habitat. WHIP agreements between NRCS and the participant generally last from 5 to 10 years from the date the agreement is signed. WHIP has proven to be a highly effective and widely accepted program across the country. By targeting wildlife habitat projects on all lands and aquatic areas, WHIP provides assistance to conservation minded landowners that are unable to meet the specific eligibility requirements of other USDA conservation programs.

Small Watershed Program - NRCS
The Small Watershed Program, including River Basin operations, works through local government sponsors and helps participants solve natural resource and related economic problems on a watershed basis. Projects include watershed protection, flood prevention, erosion and sediment control, water supply, water quality, fish and wildlife habitat enhancement, wetlands creation and restoration, and public recreation in watersheds of 250,000 or fewer acres. Both technical and financial assistance are available.

Conservation Security Program (CSP) - NRCS
The Conservation Security Program (CSP) is a voluntary program that provides financial and technical assistance for the conservation, protection, and improvement of soil, water, air, energy, plant and animal life, and other conservation purposes on Tribal and private lands. The program provides payment for producers who practice good stewardship on their agricultural lands and incentives for those who want to do more. CSP assistance was authorized in the Farm Security and Rural Investment Act of 2002 (Farm Bill) and the program may be available in fiscal year 2003.

Grassland Reserve Program (GRP) - NRCS
The Grassland Reserve Program is a new voluntary program in which landowners receive financial incentives to restore and protect grasslands. Eligible land includes restored, improved, or natural grassland, rangeland, pastureland and prairie. Practice cost share will be up to 75% on restored grasslands, 90% on virgin grasslands (prairies).

Emergency Watershed Program (EWP) - NRCS
The Emergency Watershed Protection (EWP) program helps protect lives and property threatened by natural disasters such as floods or wildfires. EWP provides funding to project sponsors for such work as clearing debris from clogged waterways, restoring vegetation, and stabilizing riverbanks. The measures that are taken must be environmentally and economically sound and generally benefit more than one property owner. NRCS provides up to 75 percent of the funds needed to restore the natural function of a watershed. The community or local sponsor of the work pays the remaining 25 percent, which can be provided by cash or in-kind services.

Partners for Fish and Wildlife - USFWS
The Partners for Fish and Wildlife program is a cooperative effort between the Fish and Wildlife Service, private landowner, and other interested entities to restore and improve degraded or marginal habitat. The Partners program improves fish and wildlife habitat on private land, contributes to the land's health and rural quality of life, restores habitat through voluntary partnerships with private landowners, emphasizes landowner choice and control, and offers advice and funding for habitat projects on private lands.

Grassland and Wetland Easements - USFWS
Perpetual easements purchased from willing landowners for grassland or wetland habitat. Grassland easements allow the landowner to continue grazing the land and hay after a certain data, but prohibit the conversion of grassland into row crop production. Wetland easements restrict the dredging, burning, or filling of wetlands. Easements purchased on previously drained or filled wetlands may be restored through USFWS funding and technical assistance.

Safe Harbor Agreements - USFWS
Safe Harbor Agreements are voluntary arrangements between the USFWS and cooperating non-Federal landowners. The agreements benefit endangered and threatened species while giving the landowners assurances from additional restrictions. Following development of an agreement, the USFWS will issue an “enhancement of survival” permit, to authorize any necessary future incidental take to provide participating landowners with assurances that no additional restrictions will be imposed as a result of their conservation actions.

Habitat Conservation Plan (HCP) - USFWS
Habitat Conservation Plans (HCPs) are an agreement between the USFWS and non-Federal entities designed to protect a species while allowing development. An HCP allows the U.S. Fish and Wildlife Service to permit the take of endangered or threatened species incidental to otherwise lawful activities, when the taking is mitigated by conservation measures. This process should reduce conflicts between listed species and private development and provide a framework that would encourage "creative partnerships" between the private sector and local, state and federal agencies in the interest of endangered and threatened species and habitat conservation.

Conservation Commission Grants - SD Dept. of Ag
Grants from the Coordinated Soil & Water Conservation Grant Fund are available for projects that show a natural resource conservation benefit to the state. Any organized conservation district within the state may make an application to the State Conservation Commission. These grants are competitive in nature and there is limited funding for these grants. The following examples are projects that have received funding in the past: windbreak tree planting establishment and renovations including windbreaks for wildlife habitat, field erosion control, farmstead and livestock protection, water development to provide for livestock water needs away from the riparian area to promote healthy regeneration of those areas for erosion control benefits, waterway construction and seeding, rangeland / pastureland improvement projects, water quality improvement

projects including some of the above practices as well as overall assessment of the condition of the watershed and to identify sources of water quality impairments, and no-till cropping system incentives.

Dense Nesting Cover - GF&P
Dense nesting cover, or DNC, is a mixture of cool season grasses (those that green up early in the spring) and legumes, like alfalfa and yellow sweet clover. DNC is the cornerstone habitat type for many species of wildlife. Species, like pheasant, use it for nesting, rearing their broods, roosting and loafing. DNC is high quality nesting cover designed to maximize nesting activity and reproductive success. A lot of the Conservation Reserve Program lands in South Dakota are established with a DNC mixture.

Wetland Restoration - GF&P
Wetlands are the most dynamic ecosystem in South Dakota. Wetlands are important for flood control, water purification and wildlife habitat. GF&P is keenly interested in protecting and restoring wetlands. Through this practice, landowners that have wetlands that have been drained can receive a cost-share and technical assistance to have them restored.

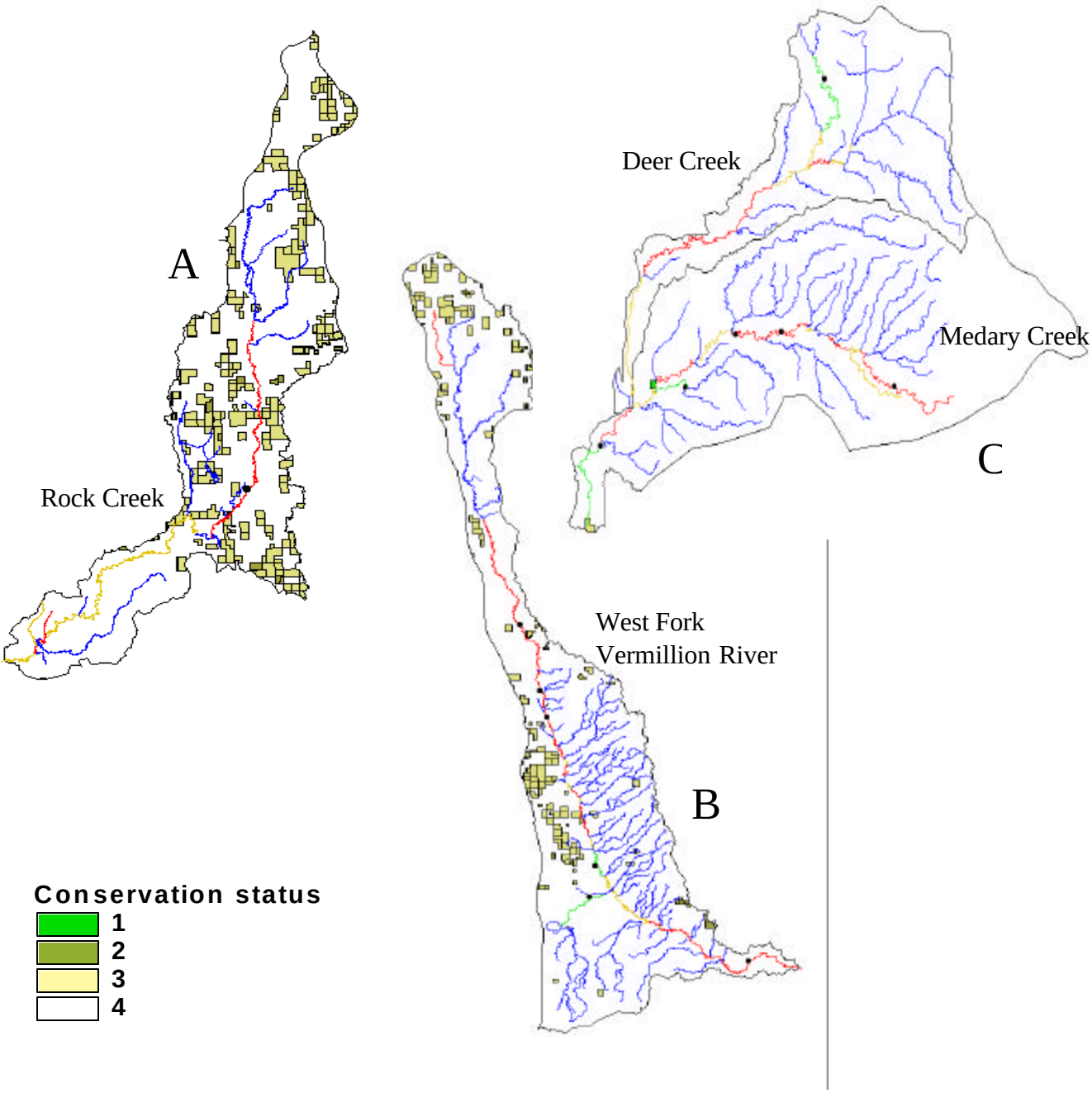
Habitat Fence Construction - GF&P
Important habitats often require protection from livestock. In special cases GF&P will help landowners protect these habitats by helping to pay for the cost of constructing a fence.

Native Warm Season Grass Establishment - GF&P
Once, a large portion of eastern South Dakota consisted of a grassland community that was very tall and did most of its growing in the middle of summer. It's hard to find better winter roosting habitat for resident wildlife than native warm season grasses. The stems are rigid and tend to stand up to a lot of weight from snow. NWSG plantings are also important to some species for nesting, brood rearing, loafing and even as a source of food.

Sources:
http://www.nrcs.usda.gov/
http://partners.fws.gov/
http://endangered.fws.gov/
http://www.state.sd.us/doa/forestry/state_conservation_programs.htm
http://www.state.sd.us/denr/DFTA/WatershedProtection/wpprg.htm
http://www.state.sd.us/gfp/privatelands/

Appendix C. Example of Gap analysis application to three Topeka shiner watersheds in eastern South Dakota. Figure and text from Berry et al. (2002). Figure not intended for regulatory interpretation.

Figure description:
Three sub-basin maps showing three types of gaps between land parcels in four conservation classes and stream segments in four classes of habitat priority for the Topeka shiner (red = high, green = moderate to high, orange = low to moderate and blue = low priority habitat). A = some headwaters and high-priority segments touch protected parcels; B = gaps between protected land and high priority habitat and headwaters; C = little to no protected land. Black dots = Topeka shiner locations. Sub-basins are not to scale.



Status Code Description:
We assigned one of four status codes for the intensity of land protection in each conservation parcel. Status One denoted permanent protection from land cover conversion, such as that found in most national parks. Status Two denoted permanent protection but with uses that might degrade existing natural communities somewhat (e.g. wildlife food plots in a state park). Status Three denoted permanent protection but with extractive uses that were low intensity (e.g. logging) or localized (e.g. mining). The Status three group was larger than others because of the many permanent conservation easements in wetlands, grasslands, and riparian areas that the US government has on private land. We probably underestimated this group because the most recent data are for years before 1995. Status Four was usually assigned to private lands that had no legal mandates to prevent conversion of natural habitat types or only short-term conservation easements (e.g. 10-yr grassland reserve easements). Much private land is well managed, but the intent of the Gap analysis program is long-term habitat conservation.

Appendix D. Press release from GFP News regarding state management plan.

TOPEKA SHINER STATE MANAGEMENT PLAN BEING DEVELOPED

PIERRE - South Dakota's Dept. of Game, Fish and Parks (GFP) is collaborating with other local, state, and federal entities in South Dakota to develop a state management plan for the Topeka shiner, a federally endangered minnow.

"The primary purpose of this state plan is to have a working document that identifies land and stream stewardship opportunities through interagency coordination," said GFP Aquatic Ecologist Jeff Shearer. "In addition, the state plan will determine landowner interest in a variety of partnership programs through public outreach activities. The development and implementation of this plan may also avoid the need for the U.S. Fish and Wildlife Service to list critical habitat for the Topeka shiner in South Dakota."

Topeka shiner management plans have been implemented elsewhere, such as Missouri and Fort Riley, Kansas; however, South Dakota's situation is unique.

"Currently, the shiner's distribution and population status are very similar to historic levels in South Dakota," Shearer noted. "For this reason, South Dakota has the opportunity to establish more flexible guidelines in managing the Topeka shiner, an option not available in other states where drastic population declines have occurred."

"The Topeka shiner state management plan will provide South Dakota with a prime opportunity to address specific state needs while still supporting national recovery efforts," said Game, Fish and Parks Secretary John Cooper.

The planning process will continue through the spring of 2003. A draft of the management plan should be available for public comment by late Feb. 2003.

To receive information regarding planning meetings, contact Jeff Shearer (605)

773-2743 or visit the GFP website at www.state.sd.us/gfp/Diversity/index.htm.

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Appendix E. Topeka shiner article published in South Dakota Conservation Digest.

Upon first glance the Topeka shiner looks like just another minnow one would find in a typical prairie stream. But when the U.S. Fish and Wildlife Service (USFWS) listed the Topeka shiner (*Notropis topeka*) as a federally endangered species in January 1999, this otherwise ordinary minnow started receiving much greater attention. Outside South Dakota, various human impacts to the landscape caused drastic declines to the shiner's range and population. Within South Dakota, however, the Topeka shiner tells a different tale.

The Topeka shiner is a small minnow (family: Cyprinidae) native to the prairie streams of the Great Plains. Named after the town near which it was first discovered (Topeka, KS), this shiner can reach three inches in length and live up to three years. While easily confused with the sand shiner, a common minnow found throughout much of South Dakota, the Topeka shiner can be identified by a dark stripe in front of its dorsal fin and a distinct wedge-shaped spot at the base of its tail. Males are more easily distinguished during the spawning season by their colorful, orange fins, as they occupy a small territory over gravelly substrate often around the periphery of sunfish nests. Food items range from zooplankton to plant material, though small aquatic insects are an important source.

Topeka shiners prefer small, quiet prairie streams with cool temperatures and good water quality. This shiner occupies a variety of habitats, such as runs, pools, and backwater areas. Preferred stream types tend to have clean gravel or sand substrates with vegetated banks of grasses and forbs. Groundwater flow into streams is especially important to Topeka shiners and other stream fish during late summer months to maintain cool, perennial flows. Though the Topeka shiner is a schooling fish, it is often associated with red shiners, bigmouth shiners, sand shiners, orangespotted sunfish, and black bullhead.

Eastern South Dakota lays on the northwestern edge of the Topeka shiner's range. Other states within the specie range include southwestern Minnesota, Iowa, Nebraska, Missouri, and Kansas, where studies suggest the shiner now occupies only 10% of its historic range. The picture is much brighter in South Dakota. The Topeka shiner occupies tributaries of the James, Vermillion, and Big Sioux rivers in eastern South Dakota. Recent studies by South Dakota State University, East Dakota Water Development District, and the South Dakota Department of Game, Fish and Parks have documented Topeka shiners in 80% of tributaries where the shiner was historically documented along with many new sites.

So how could a fish that has declined throughout most of its range be doing so well in South Dakota? Though a difficult question to answer, a closer examination of watershed-level activities may lend some insight. Human activities, whether intensive agriculture, construction and development, or point source pollution (e.g. wastewater discharges), often result in multiple impacts to aquatic systems. As is the case with many imperiled fish in the Midwest, declines in Topeka shiner abundance have been linked to habitat degradation, tributary impoundment, water withdrawals, sedimentation, and other water quality problems. Indeed, South Dakota streams face many of these problems, but perhaps to a lesser degree than streams have suffered elsewhere. Many streams in southwestern Minnesota and Iowa are channelized with row crop fields leading to the

edge of the stream's bank. Most streams in South Dakota are not channelized, and while row crop agriculture is a major industry, most land adjacent to streams is reserved for grazing. Tributary impoundments and stockdams are extensive throughout many Kansas watersheds. Although stockdams are prevalent throughout central and western South Dakota, the vast majority of eastern streams remain free flowing. While these are just some of the differences between South Dakota and the rest of the shiner's range, the demise of a species is often a result of a complex interaction of many variables.

Why should the plight of this small minnow concern us? After all, the shiner is not a game fish and most people have never seen one. But it's the message the Topeka shiner, and other "indicator" species, relay that's of importance. Eventually, all organisms (including people) are affected when a system becomes degraded, indicator species just respond sooner. The shiner can tell a story of a watershed's past health and warn us of future problems. Luckily, the story portrayed in South Dakota is one of optimism. Early indications suggest that shiner populations are at least stable. The current status of the shiner in South Dakota is, in part, a testimony of good stewardship practices by landowners. Sustainable management of the land has, in turn, sustained the natural diversity of streams.

Some landowners are concerned about having endangered species on their land, often citing fear of government restrictions. However, landowners should not feel apprehensive about having Topeka shiners on their land, but rewarded in knowing they've preserved a part of the watershed's integrity. The USFWS reviews federally funded projects and works with all parties involved to avoid impacts to species protected by the Endangered Species Act. Activities involving a federal permit, license, or funding require consideration of endangered species. Since the vast majority of day-to-day activities on private lands do not involve these federal ties, the presence of Topeka shiners, or any other federally listed species, should not unduly concern landowners.

Conservation and management activities for the Topeka shiner are taking place at both the federal and state level. The USFWS is drafting a Topeka shiner recovery plan, which will list potential threats, recovery goals, and conservation programs for the shiner. The USFWS is also designating critical habitat for the Topeka shiner. Critical habitat is an area deemed essential for the conservation and recovery for a particular species. Activities at the state level in South Dakota are more region specific for our own management goals.

South Dakota Game, Fish and Parks is currently working with other entities, including local, state, and federal interests, in the state to develop a Topeka shiner state management plan. The plan will allow for management of the Topeka shiner at the state level while still supporting national recovery efforts. The plan would identify habitat enhancement opportunities and landowner interest in partnership programs through local, state, and federal cooperation. Additionally, a completed plan should allow South Dakota to be excluded from critical habitat designation. Overall, South Dakota's goal is to maintain current populations and habitat, a much easier task than that faced by other states within the Topeka shiner's range.

On a national scale, the Topeka shiner has a long road to recovery that will require extensive efforts by many interest groups. Despite this long road, there are bright spots along the way. Good stewardship and conservation practices have allowed South Dakota to set an example for other states. By following South Dakota's lead, other states

will not only witness a recovery in their Topeka shiner populations, but improvements to their watersheds as a whole.

Appendix F. Management plan briefing developed by SD GF&P.

Topeka Shiner State Management Plan

What is it?
The state management plan is a document that will establish conservation guidelines for the Topeka shiner in South Dakota. The plan will discuss the current status of Topeka shiners, relevant research on the Topeka shiner, list possible impacts to the shiner and its habitat in SD, and address conservation strategies and tools (e.g. CRP, WRP) to mitigate potential impacts.

Several tasks of the state management plan will include:
- identify state-specific activities that support national recovery needs;
- coordinate with local, state, and federal agencies to identify opportunities for habitat enhancement;
- avoid the need to list critical habitat for the Topeka shiner in South Dakota; and
- determine private landowner interest in various partnership programs that are compatible with Topeka shiner needs.

Why do we need a state management plan?
Topeka shiner populations are more abundant and widespread in South Dakota than in other parts of the shiner's range. Recent surveys have documented the Topeka shiner in 80% of historically occupied streams as well as many new locations. Despite relatively abundant populations, Topeka shiners in South Dakota are regulated by the same guidelines in the Endangered Species Act as Topeka shiners in other states. It is the State's intention to avoid the need to list critical habitat in South Dakota and establish more flexible guidelines for management of the species through a completed management plan. These guidelines would alleviate some of the conflicts that occur during various projects involving Topeka shiner streams.

Who is involved with the state management plan?
Part of SD Game, Fish & Parks' mission is to conserve, manage, and protect South Dakota's wildlife resources; therefore, it is GF&P's responsibility to take the lead in developing and implementing the state management plan. Local, state, and federal entities are involved in providing input and comments, as the state plan will affect a variety of interests.

Stage of development
Initial plan developments started in June 2002 where a multi-agency meeting was held to discuss planning efforts and involvement. Plan goals, objectives, and components will be discussed at the next meeting (Fall 2002). A final draft plan should be finished by August 2003. Public involvement activities are being developed, including a future website at: http://www.state.sd.us/gfp/Diversity/index.htm

Appendix G. Press release from GFP News regarding the 30-day comment period on draft Topeka Shiner Management Plan for the State of South Dakota.

TOPEKA SHINER STATE MANAGEMENT PLAN AVAILABLE FOR COMMENT

PIERRE – The South Dakota Topeka Shiner Management Plan is now available for public comment. Game, Fish and Parks officials invite interested individuals to review the document and offer comments and suggestions to improve upon it.

"The main purpose for this state management plan is to outline opportunities for inter-agency cooperation to maintain and improve Topeka shiner habitat and watershed health as a whole," said Aquatic Ecologist Jeff Shearer. "Given the relatively intact distribution of Topeka shiners in South Dakota, the best way to support national recovery efforts is by maintaining existing habitat in eastern South Dakota streams."

People who wish to comment on the draft plan must have written comments submitted by March 21. The draft plan is available online at www.state.sd.us/gfp/DivisionWildlife/Diversity/ index.htm, by contacting Jeff Shearer at (605) 773-2743 or by e-mail at jeff.shearer@state.sd.us. Submit comments to: Jeff Shearer, S.D. Game Fish and Parks, 523 E. Capitol Ave., Pierre, S.D. 57501.

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Appendix H. Summary of comments submitted on the draft copy of the management plan during comment period (February 21, 2003 – March 21, 2003). Comments are copied verbatim as submitted.

Agencies / organizations / individuals that submitted comments:
South Dakota Game, Fish & Parks
South Dakota Dept. of Environment and Natural Resources
South Dakota Department of Transportation
South Dakota Department of Agriculture
Natural Resource Conservation Service – Brookings Field Office
U.S. Fish & Wildlife Service – Brookings Wildlife Habitat Office
U.S. Fish & Wildlife Service – Pierre Ecological Services Office
Lower James RC&D
South Dakota Farm Bureau
South Dakota Grasslands Coalition
South Dakota Cattlemen's Association
South Dakota Stockgrower's Association
South Dakota Corn Grower's Association
South Dakota Izaak Walton League
Harold Kerns – Missouri Dept. of Conservation
Carmen Blausey
Robert Hemmer
Gordon Williamson
Wendy Lieberg-Lockwood
Kelly Lieberg
Arens Engineering

Comments relating specifically to the Topeka shiner management plan:
The following list addresses those comments relating specifically to the management plan. Comments are followed by a reply. The reply states whether or not the comment will be incorporated into the plan and the reason for doing or not doing so. Comments are not listed in any specific order.

- Various suggestions regarding formatting, style, and organization of the plan were submitted embedded within a copy of the draft plan. These changes were made to the best extent possible but are not listed below.

Comment 1: Regarding the first impact; the present or threatened destruction, modification, or curtailment of habitat or range, SDCGA believes land-use practices that alter the hydrologic and geomorphic process provide benefits to a safe environment. SDCGA cautions the Department to occupational, industry and municipal activities that occur with such land use practices regarding wetlands, sedimentation, stream channelization, and resource extraction.
Reply: These activities will be considered as well.

Comment 2: Specific to South Dakota farmers, the state's abundant rainfall gives producers a big advantage over growers in drier farm states. However, during "wet years" which results in an over abundance of precipitation and saturation of property, farmers need a sound field drainage system to remove excess water and ensure that conditions remain suitable for crop growth. Such drainage systems for wet or saturated lands provide benefits to South Dakota farmers and residents of the state.

Reply: The discussion of drainage in this plan is only intended to address the negative impacts drainage systems can have on stream hydrology.

Comment 3: SDCGA agrees that the impacts of sedimentation on stream systems are wide ranging and South Dakota producers reap the rewards of sound management practices. Specifically, the draft plan state, "The loss of native prairie is often cited as a primary reason for increased sedimentation to aquatic systems in the Midwest." However, South Dakota's sizeable shiner populations should be evident of producers' existing land management practices that have minimized sedimentation of stream systems in the state.
Reply: Sound management practices have benefits to both producers and streams. However, certain alterations to the landscape have the potential to alter a stream's sediment load if proper management practices are not implemented.

Comment 4: SDCGA agrees that channelization alters stream hydrology and geomorphology. In doing so, channelization provides civic municipalities with greater control to prevent property losses resulting from periodic flooding in flood plain zones. With most communities and towns settled on strategic waterways, stream channelization is a necessary flood control measure.
Reply: Stream channelization is addressed in this plan to point out the adverse effects such activities may have on a stream system. Other flood control measures exist that can benefit both the stream and communities.

Comment 5: Regarding resource extraction, the draft plan states, "Resource extraction such as water withdrawals and gravel mining, for municipal, agricultural, and domestic uses have the potential to impact aquatic systems when conducted improperly. Irrigation can lower water tables and groundwater delivery to streams…" SDCGA believes agricultural irrigation is not an issue in South Dakota since the state generally receives adequate rainfall and the cost benefit of irrigation on already rich farming soil fields yields only marginal return to producers. Instead, focus of this section should be directed specifically at urban municipal governments.
Reply: The threats analysis on resource extraction indicates that water withdrawals (whether for agricultural or municipal purposes) are not a threat to Topeka shiner populations in South Dakota.

Comment 6: Specifically, the City of Sioux Falls generates nearly all of it's water intake from water wells and pumping stations strategically located around the Big Sioux River and surrounding underground area aquifers to supply the water needs for a population of over 120,000 residents. SDCGA believes more emphasis is needed for resource extraction from municipal governments instead of agricultural producers for resource extraction to be a valid point of consideration in the state's management plan.
Reply: This will be added.

Comment 7: Regarding the third impact: Disease and predation, SDCGA believes the state's draft plan is inconstant and incomplete. The draft plan states, "Little is known about the impacts of disease on Topeka shiner populations." If this wordage is correct, SDCGA believes a logical first step should be in-depth scientific studies on the impact of disease on shiner populations conducted by the U.S. Fish & Wildlife Service. Such basic information would provide information beyond stress-induced habitat conditions.
Reply: Suggested research will be added; however, this does not make the plan's assessment of disease incomplete.

Comment 8: The draft plan state, "Predation may not be as significant an impact on Topeka shiners in South Dakota as in other parts of the shiner's range." Such wordage does not guarantee however, that predation is not a threat. In the Department's own words, "Predation by introduced game fish most likely occurs, especially in areas where game fish have been intentionally introduced." This confirms that predation will occur and diminish shiner populations in the state. Furthermore, the draft plan state, "…the extent of these introductions is unknown" and indicates that the department does not entirely know the impact that predation will have on shiner populations in South Dakota.
Reply: The plan's assessment of predation and reasoning for predation not being a threat to Topeka shiner populations will be clarified.

Comment 9: SDCGA believes that more information needs to be collected on disease and predation before the Department can say for certain that disease and predation do not constitute a threat to the Topeka shiner populations in South Dakota.
Reply: No evidence exists to suggest disease or predation are threats to Topeka shiner populations in South Dakota. Topeka shiner populations have persisted throughout their historic range in South Dakota; therefore, we see no past or present evidence of threats from disease or predation.

Comment 10: Regarding the fifth impact: Other natural and manmade factors, the draft plan states, "No other natural (species competition, niche overlap, hybridization) or manmade (urbanization, impoundments) factors are known to threaten Topeka shiners in South Dakota," SDCGA believes such factors do exist that have the potential to threaten shiner populations in the state.
Reply: We respectfully disagree. There is no evidence that suggests other natural or manmade factors are currently threatening Topeka shiner populations in South Dakota. However, this does not mean that unforeseen future impacts will not develop.

Comment 11: SDCGA believes that shiner hybridization needs further research before concluding such action is not a threat. The Department's draft states, "Potential Topeka shiner hybridization and influencing factors is an area warranting further research" and as such, SDCGA believes further research should proceed regarding this possible threat.
Reply: We agree that potential hybridization between Topeka shiners and sand shiners warrants further research. However, only two occurrences of possible Topeka / sand shiner hybrids have ever been reported. Only observational data exist suggesting these individual fish were hybrids, there have been no genetics or morphometrics research to verify these findings.

Comment 12: SDCGA also has concerns for not including cyclical weather patterns for consideration as indicated by, "The natural effects of drought or floods should not be considered threats to Topeka shiner populations." SDCGA believes that adverse weather conditions have the potential to increase or decrease shiner population numbers. Such population changes could result in a skewed data at during the course of a population sampling in identified stream segments. As such, SDCGA suggests populations samplings should include a "factor" for dry years of drought that would impair shiner populations in the state.
Reply: The natural effects of drought or floods is in reference to the cyclical weather patterns, this section will be reworded for clarification. Fish populations do increase or decrease naturally with annual precipitation changes. Population monitoring protocols do take into account this natural variability so conclusions are not made based on skewed data.

Comment 13: SDCGA has concerns with the impacts of point source pollution such as wastewater discharge and other industrial effluents. Communities and industries that discharge the legally acceptable waste limits into river and stream segments impound a water body. Such impoundments impact those stream segments downstream from such sources. Other urbanization factors for consideration should include new developments and the potential for run-off resulting in rain downpours that infiltrate storm sewers and subsequent outflow into rivers. Consequently, SDCGA believes urban areas have the potential to impact areas downstream and severely diminish shiner populations. SDCGA asks the Department to reconsider the impacts of point source pollution as threats to the Topeka shiner in South Dakota.
Reply: Urban areas are still subject to the state water quality standards regulated by the SD DENR. These standards are designed to prevent significant impairment to state waters. We feel point source pollution is not a threat to Topeka shiner populations as long as these standards are upheld.

Comment 14: Regarding the Department's "Management Actions": The overall goal of this management plan is to maintain or improve habitat integrity in Topeka shiner streams. Thus, management objectives will focus on those primary issues that influence habitat integrity: hydrology, geomorphology, and water quality. SDCGA believes South Dakota's sizeable Topeka shiner populations can be attributed to existing land practices being utilized by producers who livelihood is tied to the productivity of their land. Additional funding sources and opportunities to combat sedimentation, erosion or surface runoff will not only benefit shiner populations in the state, but also the productivity of farmers with increased incentives offered through various governmental programs.
Reply: Agreed.

Comment 15: As such, SDCGA has concerns with some of the identified tasks for Objective 1.1: Maintain and restore the natural hydrology of streams containing Topeka shiners. SDCGA recommends including tiling as a beneficial option aimed at removing excess water and reducing overland runoff. Sound field drainage systems provide environmental benefits by removing excess water from fields and helping to reduce runoff. SDCGA recommends educating the public on the importance of tiling and other Best Management Practices such as stream stabilization, terraces, grass waterways and buffers.
Reply: Tiling may be beneficial to removing excess water and reducing overland runoff, but we respectfully disagree on the environmental benefits of tiling to the natural hydrology of stream systems.

Comment 16: SDCGA also expresses concern with tasks identified for Strategy 1.1B. Mainly the task to provide technical assistance to urban, residential, and development planners in designing storm water systems that minimize runoff "peaks" into streams following precipitation events." This is a concern since the Department did not list point source pollution as an impact to shiner populations in South Dakota nor the general threat of urbanization.
Reply: This strategy is designed to address the impacts runoff from impervious surfaces following storm events have on stream hydrology, not point source pollution.

Comment 17: Along the same thought, SDCGA is concern with Objective 1.3: Minimize non-point source water quality impacts in streams containing Topeka shiners. The Department lists non-point source water as an objective and even establishes a strategy to combat the objective with five tasks. However, the Department does not consider non-point sources as an identifiable threat to the Topeka shiner in South Dakota. If no such threat is listed, why has the Department developed strategies and tasks associated with non-point sources?
Reply: Tasks listed for this objective are being implemented throughout South Dakota. Listing of these tasks are to identify those actions needed to ensure non-point source pollution does not become a threat to Topeka shiner populations in the future.

Comment 18: Regarding the section on Population Monitoring and Assessment, SDCGA believes population monitoring is an important component in the management of any state plan. As such, the Department will face challenges to monitoring populations of the shiner.
Reply: Agreed.

Comment 19: Since the Department has chosen not to include weather patterns and conditions such as floods and droughts as threat to the shiner, SDCGA believes population samplings should include a "factor" for dry years of drought that would impair shiner populations in the state.
Reply: Conditions, such as drought, are taken into consideration when monitoring stream fish populations.

Comment 20: SDCGA also believes that for a proper monitoring protocol to be used, the current fifteen (15) year trend should be extended to include a thirty (30) year trend.
Reply: The monitoring protocol in this plan does not establish a 15-year trend. Monitoring the shiner on a 30-year basis is too long of a time frame for a species that has a maximum life span of 3 years.

Comment 21: Regarding the section on Public Outreach / Education, SDCGA believes producer groups and municipalities working with the Department will provide a critical role in informing citizens of South Dakota about the Topeka shiner. SDCGA is pleased to work with governmental agencies or departments to help educate and inform our producer members. SDCGA invites the Department to maintain its existing working relationship currently being displayed in the shiner issue.
Reply: Agreed.

Comment 22: The second sentence reads, "…landowner involvement will be an important aspect in maintaining Topeka shiner populations." I would change the word "important" to either critical or crucial. I don't believe we (whether in Missouri or South Dakota) can overemphasize the dependence we have on private landowners in the recovery of this species.
Reply: Agreed.

Comment 23: I was surprised to see your sampling protocol for Topeka shiner monitoring include their peak spawning period. With the critically low numbers of Topeka shiners in Missouri, we established our sampling protocol outside the spawning time for this species.
Reply: Stream sampling between June and September is the only feasible period in eastern South Dakota. Ice cover and spring floods prevent sampling earlier, stream intermittency and cold weather prevent sampling later.

Comment 24: The draft would have benefited from a review of the committee before release to the public.
Reply: Agreed, however, the short period of time between completion of the draft and submission a final draft prevented a longer review process.

Comment 25: This document seems to be indicating three conflicting paths for managing the Topeka shiner. The plan correctly states that the Topeka shiner population in South Dakota is in good shape. Maintenance of status quo should serve them well. The management actions include activities like research and funding programs to "improve" habitat which goes beyond maintaining status quo. Then a point system is proposed with baselines for current conditions followed by "recovery" goals for a point reductions in each drainage. We can't resolve the conflicted language.
Reply: Wording in the plan will be clarified. Recovery goals do not propose a reduction in the status quo. The management goal acknowledges that the established baseline conditions set after "wet" years can not be maintained during "dry" years. Maintaining the status quo of the Topeka shiner is the best option; however, Topeka shiner numbers are not stable. Thus management goal and baseline point totals differ.

Comment 26: Will the way future impoundment projects are discussed create some problems for constructing ponds through the fish and wildlife and NRCS small dams projects? We suggest you revisit the language. You may simply need to specify the reference is to large impoundments as it is seems to be in opposition statements made in the next paragraph.
Reply: Agreed, this point was clarified to refer to large impoundments.

Comment 27: We suggest that both watershed projects and conservation districts should be included as technical assistance providers. The Grassland Managed Intensive Grazing, Buffer Sales and Animal Waste Teams should be mentioned.
Reply: These will be added.

Comment 28: There is no mention of 319 (watershed) projects in the document as a source of funding for Best Management Practices. This should be added.
Reply: These will be added.

Comment 29: Outreach activities are rather weak. They are mostly target agency and organizations. More use should be made of the media to reach a greater segment of the population.
Reply: Media outlets have been used, these will be added to the plan.

Comment 30: We recommend that the demonstration sites be established cooperatively with watershed, conservation commission, etc. projects to maximize use of resources and eliminate duplication of effort.
Reply: Agreed.

Comment 31: If the incidents of altered stream flow have been observed why can't you determine the extent of dewatering.
Reply: One incident of stream dewatering was reported by Wall et al (2001). The total extent of stream miles impacted by dewatering would require a much more indepth study. Clarification will be made in the plan.

Comment 32: The extent of gravel mining is not unknown. These activities are permitted.
Reply: This will be added, however, some concern has been raised regarding activities without a permit.

Comment 33: Page 17, 1.1A Task 2 after WHIP add EPA 319 Projects. Task 3 after Classroom presentations add Terry Redlin Fresh Water Institute. 1.1B Task 2 after native warm season grass GFP add

EPA 319 Projects. Page 18, 1.2A Task 2 after NRCS add EPA 319 Projects. Page 19, 1.2C Task 1 after USFWS add Terry Redlin Fresh Water Institute. Task 2 after USFWS add Terry Redlin Fresh Water Institute. Page 20, 1.3A Task 3 to my knowledge EPA does not provide technical assistance. Dept. of Ag should read USDA and SDDA. Task 4 after CSP add EPA 319 Projects. Task 5 after NRCS add EPA 319 Projects.
Reply: These will be added.

Comment 34: Perhaps you could list those BMPs such as an Animal Nutrient Management System or riparian restoration etc. that do not require an on-site inspection for installation. Some conservation districts currently require all BMPs to undergo an on site inspection by the USFWS if OWs are present in the area while others do not.
Reply: These will be added.

Comment 35: Conservation Districts are county entities in grass roots management planning with producers. They are typically underfunded and short staffed. I would ask that they are not asked to extend any of their precious resources on a recovery program for a fish (topeka shiner), that is not threatened in this state. p 19&20.
Reply: Conservation districts are simply listed as one possible tool for certain tasks. This listing does not commit them to any new activities outside the day-to-day tasks conservation districts already carry out.

Comment 36: There is a huge demand for EQUIP funds by producers in South Dakota. These funds should not be redirected to a recovery program for the topeka shiner, whose "distribution and population status are very similar to historic levels…."
Reply: Listing of any conservation program in this plan does not redirect funding for recovery of the Topeka shiner. Programs are listed to point out various voluntary options that are available to interested entities.

Comment 37: Need to add in a section to state the overall goal of the document. Such as expanding on the first sentence from Page 16, Management actions section.
Reply: This change will be added to the introduction.

Comment 38: Life History, 1st paragraph. First sentence uses dates from late-May to mid-August. Should be end of July.
Reply: The Topeka shiner spawning period varies with water temperature. Shiners have been observed spawning during August. The late-May to end of July period refers to the spawning period restriction time for construction activities on shiner streams.

Comment 39: Life History, 1st paragraph. Clarify why believed few individuals live to three years or cite a reference.
Reply: Reference will be added.

Comment 40: Habitat, 1st paragraph, 2nd sentence. "Some Topeka shiner locations…streams with silt substrate…" Clarify in Life History section if there are expected recruitment possibilities in this habitat.
Reply: No information regarding expected recruitment, will be clarified.

Comment 41: Habitat continued, 1st paragraph, 2nd sentence. If it is based on the model wouldn't it be "potential presence"?
Reply: Statement based on data collected during field surveys, not model predictions.

Comment 42: Habitat continued, 1st paragraph, last sentence. Clarify that this assumes that there is a return of flows prior to dry down in an intermittent system or due to drought and that during this time the isolated pools maintain required habitat components. All within the short life span.
Reply: This will be clarified.

Comment 43: Topeka Shiner Research in South Dakota, 1st paragraph, 2nd sentence. State "…no surveys had taken place to specifically document Topeka shiner distribution prior to 1997." However, the Range

section, 1st paragraph, 3rd sentence refers to the historic range. These statements conflict and need clarification if earlier studies did not look at the basin / watersheds level to allow delineating historic ranges and thus separate from qualitative data later collected.
Reply: This will be clarified under Factor A of the Threats Analysis section.

Comment 44: Topeka Shiner Research in South Dakota, 1st paragraph, 2nd to last sentence. "This model was 89% accurate in predicting Topeka shiner presence." This statement is based on what? Does it mean that when the model predicted shiners would be present that upon field checking a certain percentage of them that shiners were only found 89% of the time? Or that when the model was applied to known sites only 89% of the sites showed up on the model?
Reply: This will be clarified.

Comment 45: Topeka Shiner Research in South Dakota, 2nd paragraph, last sentence. Refers to "This information will allow resource managers to determine the best source of broodstock for fish propagation…". This statement may be correct in regards to what is being researched. However, in context of the management plan that has the goals focusing around maintaining and improving habitat that statement is a bit misleading. The rest of the management plan does not incorporate the use of broodstock and propogation into it and this should be clarified at this point that it is not being researched as part of the implementation identified in this plan.
Reply: This will be clarified. There is not a need for propagation and stocking of Topeka shiners in South Dakota, however, this may be a required practice in other states. Genetics research was mainly justified to better understand the genetic distinctiveness of South Dakota populations. Identification of potential brood stock is a secondary benefit of this research.

Comment 46: Topeka Shiner Research in South Dakota, 3rd paragraph, 4th sentence. Study percentages stated 9% and 64%. What is the status of the other 27%?
Reply: This will be clarified.

Comment 47: Distribution of Topeka Shiners in South Dakota, last two sentences. The first of these sentences shows the breakdown of watersheds by basin. The recent year sentence also needs the basin breakdown for comparison and consistency. Clarify the "…have not been documented in 9 watersheds since 1990 (Table 1)." Table 1 shows only 8.
Reply: This will be clarified and changed.

Comment 48: Legal Status. States that "The species is not state-listed in Nebraska or South Dakota." It is stated why it is not in South Dakota but why isn't it in Nebraska?
Reply: The Topeka shiner was recently listed in Nebraska. This change will be made.

Comment 49: Goal Statement, 1st paragraph, 1st sentence. Use of term "vested interest" not recommended. By definition this means with goals for personal advancement or advantage at the expense of others. Not a message that should be sent on an issue that can already be viewed by some as subjective and political.
Reply: This change will be made.

Comment 50: Goal Statement, 1st paragraph. First paragraph may work better in the legal status section and then the Goal Statement section would start right off with the currently second paragraph that clearly contains goal information.
Reply: The group consensus was that the Goal Statement should start off with statement about agency obligations for wildlife and resource protection.

Comment 51: Goal Statement, 2nd paragraph, 1st two sentences. "The overall goal…streams in South Dakota *to maintain current population levels*", and "The intent of these….delisting of the *species pursuant to* the ESA."
Reply: This plan is designed to focus on stream habitat as opposed to species populations. By preserving current habitat, we feel current population levels will be maintained. Changes will be made to the second sentence.

Comment 52: Goal Statement, 2nd paragraph. When mentioning the recovery goal point system provide a reference to the Recovery Goal Evaluation section.
Reply: This change will be made.

Comment 53: Plan Development and Implementation, 1st paragraph. Nice paragraph but it belongs earlier in the plan in the Introduction section. Also be sure that all acronyms (SDSU, DSU, BHSU) have been spelled out at one point. In a document that utilizes several acronyms it is often recommended that an appendix listing them be utilized.
Reply: These changes will be made, a list of acronyms will be added towards the beginning of the plan.

Comment 54: Plan Development and Implementation, last paragraph. Areas that may best benefit need to indicate that the value of an adjacent buffer may balance out negative impacts identified further up the landscape. There is a reference to reaches with no protection with no definition of what those would be. Also, provide an appendix map showing what the Gap Analysis Program application identifies and how it looks.
Reply: These changes will be made.

Comment 55: Threats to Topeka Shiner Populations in South Dakota, 1st paragraph. Edits, "This plan address *all* five *factors* utilized…." Add sentence relating that a species may be determined to be a threatened or endangered species due to one or more of the five factors described in Section 4(a)(1) of the ESA. Also, after the first paragraph, provide a list to show what all five factors are.
Reply: These changes will be made.

Comment 56: List of five factors. List them by A, B, etc to be consistent with the way they are listed in the 50 CFR Part 17 Final Rule to List the Topeka Shiner as Endangered.
Reply: This change will be made.

Comment 57: Resource Extraction. 3rd sentence: Delete "As stated above" unless the above text clearly states the connections between the uses mentioned and groundwater/flow regime interactions. 4th sentence: Replace "evolved" with something such as "show tendencies or preferences". Evolved implies evolution and is generally should not used in this context for general public documents.
Reply: "As stated above" will be changed to "as previously stated." The term "evolved" will be replaced.

Comment 58: Disease or Predation, last paragraph. Move the last paragraph to be the first paragraph.
Reply: The last paragraph is intended to summarize the discussion regarding Disease and Predation.

Comment 59: Inadequacy of Existing Regulatory Mechanisms, 1st paragraph. 1st sentence, "…Topeka shiner location and reviews all federally funded projects…" How is this done? Is there an established protocol? 3rd from last sentence: "The NRCS has developed guidelines for project development and implementation…" should be changed to read "The NRCS is developing guidelines for project development and implementation…"
Reply: Each project is reviewed on a case by case basis. At a minimum, known locations of federal candidate and listed species are shared with the requesting entity. Additional information on state listed and state sensitive species and potential project impacts to rare species is often requested of the SD Natural Heritage Database. The second change will be made.

Comment 60: Other Natural and Manmade Factors, 2nd paragraph, last sentence. Future impoundment projects in Topeka shiner watersheds are highly unlikely…" Need to clarify large-scale due to Fish and Wildlife Service Partners for Fish and Wildlife Program activities. Large-scale projects however are also a very politically active issue in the upper Big Sioux watershed as being looked at by the Pelican Lake Water District and Upper Big Sioux Watershed Board. This same issue is stated in the last paragraph the last two sentences.
Reply: This will be clarified.

Comment 61: Management Actions, 1st paragraph. 1st sentence: Good sentence and it should also be utilized in the Introduction section. 4th sentence: Define the italics part as being the primary factor from the Threats to Topeka Shiner Populations in South Dakota.
Reply: These changes will be made.

Comment 62: Objective general comments: Make header larger, center, and bold to stand out. Clearly define them with a single word (hydrology, geomorphology, and water quality) as defined in Management Actions paragraph. Possibly include the rest of the text from the Objective statement as a "Purpose" statement for the objective.
Reply: These changes will be made.

Comment 63: Discussion. Define hydrology in the first sentence as is done for geomorphology in the discussion associated with the next section.
Reply: Hydrology will be defined.

Comment 64: Task and Tools sections general comments. Be consistent in utilizing all or no acronyms and make sure they are easily defined (i.e. in an appendix for acronyms). Do not mix NRCS programs (CRP, WRP, etc.) into lists that also contain agencies. Possibly use as a subhead list if needed under the appropriate implementing agency.
Reply: This will be clarified. Agencies and programs will be separated under different headings: Agencies/organizations and Programs/tools.

Comment 65: Objective 1.3 The 1st sentences states "non-point source" while the Management Actions introduction paragraph just lists it as water quality in general. Should be defined the same in both sections.
Reply: This will be clarified.

Comment 66: 1st paragraph, last sentence. "…groundwater sources, and change from rural to the urban landuse." Should read "…groundwater sources, and changes in landuse." Significant changes in farm or grassland management can have definite impacts and should be included in this category.
Reply: These changes will be made.

Comment 67: Monitoring Protocol. How and by whom will the sites be selected? 2nd paragraph, 4th sentence: Should state that the watersheds to be focused on would be known or historic location ones.
Reply: It has not been determined who will carry out monitoring activities.

Comment 68: Monitoring Site Selection. Section should be located before the protocol.
Reply: This change will be made.

Comment 69: Recovery Goal Evaluation: The baseline scores (1300, 800, 1700) indicate that not only the shiners were but the IBI scores increased for all locations. The 1300, 800, and 1700 correlate to the number of known watersheds since 1997 if all are given 100 points. If these baseline values are used, then the statement is being made that currently biotic integrity is increasing in all known shiner watersheds. Is it then assumed that stated recovery goals come from new locations? If so, then the goal of this management plan is actually being measured by increasing additional populations and habitat and not the protection of the existing populations and habitats. Thus the plan needs to be revised throughout to reflect that change.
Reply: This section will be clarified. Scores for assessing the recovery goal are set to monitor and evaluate year-to-year change. An example will be included to clarify this. Plan goal is still to maintain existing habitat, not to increase populations.

Comment 70: Table 1. Format to fit on one page. Expand out the "Stream" column to be sure only one line is needed per entry and then the document should easily fit.
Reply: Table will be reformatted, but still may not fit on one page.

Comment 71: Appendix general comments. Make "Appendix A" header larger and bold to stand out. Include page numbers in the Table of Contents or possibly number the pages (A-1, A-2, etc.) to indicate location in the Appendix and overall document.

Reply: Appendices and rest of the plan are formatted in accordance to those suggestions by the American Fisheries Society. Page numbers will be added to the Table of Contents.

Comment 72: Appendix A, WRP "The Wetland Reserve Program is a voluntary *easement* program."
Reply: This change will be made.

Comment 73: Appendix A, CSP "…the program *may* be available in fiscal year 2003 *pending funding*."
Reply: This change will be made.

Comment 74: Need to add the Grassland Reserve Program to the list since it is previously cited on page 18, Strategy 1.2A, Task, Tools.
Reply: This change will be made.

Comment 75: Overall this management plan seems to be a good general tool to assist in overall management goals of a watershed but it does not define specific actions or agencies that will implement them. The current Goal Statement says, "The intent of these guidelines is to work towards future delisting of the species from the ESA." However, this document is very broad and the Appendix B that would include the type of information listed is not included in the draft document.
Reply: Plan implementation will be discussed at a later date. Information to be included in Appendix B had not yet been submitted for inclusion in this draft document. This information has since been added.

Comment 76: Reasons for Decline: Farm Bureau recognizes the reasons in the section as potential reasons for decline in South Dakota. The second paragraph states the reduction in groundwater inputs due to wetland loss and irrigation withdrawal may further reduce stream reaches inhabited by Topeka shiners. It should also state that less-than-normal annual rainfall has the same effect.
Reply: This will be added. However, it is important to note that drought years are natural events, reduction in groundwater inputs due to wetland loss, irrigation withdrawal, and municipal water uses are manmade factors.

Comment 77: A paragraph should be added stating that South Dakota has no proof of a declining population on a statewide basis.
Reply: This is correct, currently no data exist to document a decline (or increase) in population levels. This will be clarified under "The present or threatened destruction, modification, or curtailment of habitat or range" rather than adding a new paragraph. "Reasons for Decline" is intended to state possible factors effecting Topeka shiners throughout their entire range, not necessarily those specific to South Dakota.

Comment 78: Goal Statement: Farm Bureau support the intent to work toward delisting of the species because of the lack of, or inaccurate, data used during the listing of the Topeka shiner. If delisting cannot be accomplished, down listing the Topeka shiner from endangered to threatened, and development of a workable 4d rule, is second best.
Reply: Agreed. However, delisting or downlisting of the Topeka shiner across its entire range is an action that is broader than this state plan. Actions throughout the entire range will require cooperation from all states within the shiner's range. SDGF&P currently is contracting genetics work that may help in delisting the Topeka shiner within South Dakota, although delisting and downlisting decisions are ultimately made by the USFWS.

Comment 79: We support the concept of a flexible management plan for the species because of the present excellent habitat and distribution of the species. Whether or not a 4d rule is put in place, we need a mechanism to substantiate data for delisting in the future.
Reply: Agreed. The intent of the Monitoring and Assessment portion of the plan is not only to assess recovery goal status, but also to collect the needed information to support delisting.

Comment 80: We support the concept of the point based recovery goal. Farm Bureau recommend applying a 30-year weather cycle to the point based system. In the dry years of the cycle the system should be able to average points or apply a weight factor to the scoring because of changes due to natural conditions.

Reply: Changes due to cycling wet / dry years will be factored into the point system.

Comment 81: Farm Bureau agrees with the statement "The present or threatened destruction of range or habitat is not a threat to Topeka shiners in South Dakota." There must be a balance reached in the reduction of sediment and clean water. We must use sound science in conservation practices that protect the environment and are economically feasible for the producer.
Reply: Agreed.

Comment 82: Management Actions: The terms maintain or improve habitat, maintain and enhance habitat, maintain or restore are used many times in this section. Maintaining current habitat is a useful term in management of the Topeka shiner. The use of restore, improve, or enhance may be beyond the scope of accomplishment due to economic and natural conditions. We should not overlook the species adaptation ability. If the species is adapting to the present conditions, restoring, enhancing, and improving habitat could have a negative effect on the species.
Reply: This will be clarified. Enhancement or restoration may only be necessary if the state is not meeting its recovery goal. Habitat improvements or enhancements that restore streams to their natural conditions should not, however, have negative impacts on the species.

Comment 83: Farm Bureau is concerned with where the money will come from to carry out the tasks. These management actions appear to be voluntary at present. Past history indicates they could become mandatory in the future. Our concern is another potential unfunded requirement placed on producers.
Reply: It is important to note that many tasks listed in the management actions are already being carried out by individual entities as part of their regular program activities (i.e. technical assistance provided for permitting and designing of confined animal feeding operations); therefore, these tasks already have funding mechanisms in place. Other tasks that are voluntary (i.e. establishing native grassland cover) are based on voluntary programs (e.g. CRP) that are not administered through this plan. Therefore, listing of any tasks can not add any additional mandatory requirements to producers.

Comment 84: We need to strive for balanced conservation practices. We must have flexibility in reduction of sediment by means of conservation practices. Large storm events can cause soil to move from one place to another. Removing the storm sediment from field deposition or dugouts needs to take place with a minimum of red tape or delay. Placement of terraces, filter strips, and closed drainage systems need to be used in the flexible conservation plan to obtain the needed balance.
Reply: This plan can not, however, substitute for any federal regulations during the Section 7 consultation process for projects that may involve endangered species. Agreements, such as a Habitat Conservation Plan, should aid in reducing the delays caused by federal regulatory requirements.

Comment 85: This section appears to be written from a biologist's point of view. We cannot save every shiner on every stream in South Dakota no matter what we do or do not do. Many of the tasks in this draft are carried out on private lands. The concern is will GF&P become another agency the producer must check with before they do anything on the land?
Reply: Agreed, we can not save every shiner every time regardless of the circumstances. The habitat approach taken by this plan should avoid the need to focus on individuals of a population. The logic being as long as the stream as a whole is taken care of, the shiner will persist. Since the Topeka shiner is not state-listed, SD GF&P does not need to be consulted by a producer on activities that may impact the shiner or its habitat. SD GF&P's role has been an advisory role from the perspectives of knowledge of fisheries management and stream hydrology.

Comment 86: South Dakota Farm Bureau believes that producers gain little or nothing in the draft management plan over the listing of critical habitat for Topeka shiners by USFWS. Our concern is that the voluntary tasks of the draft management plan could become mandatory tasks in the future. We do not need one more level of bureaucracy to deal with.
Reply: A Topeka shiner plan was drafted for South Dakota with the intention of avoiding the need to list critical habitat. The decision by the USFWS to no longer exclude critical habitat on the basis of Section 3(5)(a) of the ESA undermines those planning efforts. SDGF&P will continue to seek exclusion of critical

habitat. Tasks listed in this state management plan carry no legal or regulatory authority, but are part of a voluntary, alternative approach to the strict enforcement of the ESA.

Comment 87: We urge state agencies to request delisting of the species because of new data available. If delisting is refused by USFWS, we request that state agencies ask for down listing the species from endangered to threatened.
Reply: As stated previously, delisting or down listing will require cooperation by all states and the USFWS within the Topeka shiner's range. These actions are beyond the scope of any one agency within South Dakota; however, a comparable effort by all states within the Topeka shiner's range could facilitate downlisting or delisting.

Comment 88: The plan raises no significant concerns from our review. We are pleased to see an emphasis on stream geomorphology / hydrology, we like the monitoring planned, and the goal to establish demonstration sites in each basin.
Reply: None.

Comment 89: Baseline and Monitoring of Wetland Resources within Topeka shiner range: As pointed out in the Management Plan, streams with ground water inputs and high in water quality are important to the Topeka shiner. Also pointed out is that alteration at the systemic level, such as wetland drainage, is a reason for Topeka shiner decline. With this information in hand, it is imperative to have good baseline data regarding number and acreage amounts of wetlands in the present Topeka shiner range. I suggest you develop a method to quantify the number and amount of wetlands within the current range. Tools to be used for this baseline data gathering could include NWI, NRCS wetland determination and inventory maps, FSA slides, USGS topographical quadrangles, etc. Once the technique is created to determine wetland number and amount, the same technique can be used in respective years for monitoring. To paraphrase your goal, the overall goal is to maintain and improve habitat integrity in Topeka shiner streams. Unless good baseline information is known for Topeka shiner watersheds, determination of maintenance or improvement is occurring will be impossible.
Reply: Agreed, this will be added to the monitoring protocol.

Comment 90: Baseline and Monitoring of Grassland Resources within Topeka shiner range: Again, good baseline information of current grassland in the present range is needed. The plan states, landuse practices that alter the hydrologic and geomorphic processes of streams can have detrimental effects. Also stated in the plan is that the loss of native prairie is often cited as a primary reason for increased sedimentation to aquatic systems in the Midwest. To accurately quantify maintenance of grassland in the current Topeka shiner range, a baseline of grassland quantity and annual monitoring are needed. Potential tools to establish a baseline could include GIS landuse cover type, maps, NRCS National Resource Inventory data, etc. Again, unless accurate current information is determined about Topeka shiner habitat and their corresponding watersheds, the goal of maintaining habitat will not be quantifiable.
Reply: Agreed, this will be added to the monitoring protocol.

Comment 91: Monitoring of Drainage Activity: A reason stated for the decline of the Topeka shiner is habitat alteration. Landuse changes such as intensified agriculture have led to habitat alteration. Corresponding with intensified agriculture is intensified drainage be it either wetland drainage or pattern tiling of upland sites. Within the last several years, the landscape within the current range of the Topeka shiner has experienced an exorbitant amount of subsurface perforated drainage tile installation. It is well documented in peer reviewed journals that drainage tile alters natural rates of water discharge into receiving streams. The plan notes both good water quality and ground water influence are important to the Topeka shiner. A system of documenting both wetland drainage and upland pattern tiling within the current range of the Topeka shiner needs to be developed and implemented if the goal of habitat maintenance is to occur. DENR, SD Dept. of Agriculture, NRCS or other agencies could be involved in the development of a system and documentation of all drainage activity within the current Topeka shiner range.
Reply: Agreed, this type of monitoring should be developed and will be explored in the future.

Comment 92: In 1999, meetings to consider listing the Topeka shiner as threatened or endangered were held. The USF&WS reported that in South Dakota the shiner occupied only 20% of its native range in our state, causing great concern for the species. In September of 2002, the USF&WS reported that the shiner occupies 80% of its original habitat. Inaccurate figures were given then or are being used at this present date due to an 80% shiner occupation in the same basin acreage. This constitutes a 60% increase in 3+ years of an "endangered" species listing with no recovery plan in place. SDCA questions the need of any such plan due to the good stewardship of the landowners that have provided the habitat for the shiner since this land was settled in the late 1800s.
Reply: Any data that refer to a 20% range occupancy of the Topeka shiner in South Dakota in 1999 are inaccurate. Data collected between 1997 and 2000 by SDSU and surveys contracted by SDGFP demonstrate that the Topeka shiner occupies about 80% of historic locations along with many new locations not previously documented (some of these new locations were never before sampled, some were). Data are not available to show an increase or decrease in the Topeka shiner's range in South Dakota. Trends in range expansion or reduction can only be demonstrated following annual or periodic sampling at fixed locations. This type of sampling has not been previously conducted on eastern South Dakota streams.

Comment 93: We need to prove our state's environmental health to the rest of the nation thus justifying the de-listing of the shiner. Let's not allow other state's inequities cripple our state. Our goals need to redirect the USF&WS to worry about where the shiner is not rather than according to their own numbers, worry about a population located in a state environment capable of a 60% increase in a three year time period.
Reply: One way of delisting the Topeka shiner is for each state to meet its recovery goals. South Dakota has a much easier task of meeting our recovery goals than other states where the Topeka shiner has experienced large population declines. Data regarding increasing in Topeka shiner populations previously addressed. Listing and delisting actions are generally based on an analyses throughout the species' range, not based on one state's population numbers.

Comment 94: SDCA does not support the use of Farm Bill to finance any endangered species programs. As anyone involved in production agriculture can attest, one should not count on income from a government program until the check has cleared the bank. The federal programs (Conservation Reserve Program or Environmental Quality Incentive Programs) that the SDGF&P proposes to fund the "protection" of a population that has documentation of high numbers, still have not been appropriated and are in limbo in Washington, D.C. Let landowners use these possible resources for endeavors other than a quixotic chase. If you want to increase habitat acreages, pay for it. Current proposed cost-share for establishing habitat and associated practices in the EQIP program calls for 40 to 75 percent cost-share to establish practices associated with grassland habitat and related livestock use. If more Topeka shiner habitat includes grasslands, then offer incentives and practices at a higher rate. For example look at the increase in tree planting when programs were offered at 90% cost-share. It is not economically attractive to offer a planned grazing system to a producer along a Topeka shiner stream with 50% cost-share for the fencing and 50% for alternative water sources. Sound grassland management, and more of it, will result in more habitat for the Topeka shiner.
Reply: This plan does not propose the use of any Farm Bill program to finance an endangered species program. Farm Bill programs listed in this plan are simply suggestions as possible tools for meeting listed tasks. SDGFP does not administer the Conservation Reserve Program or Environmental Quality Incentive Program and therefore can not propose the funding of endangered species management with such programs. The goal of this management plan is to maintain the habitat Topeka shiner streams currently have; sound grassland management will play an important part in meeting this goal.

Comment 95: Perhaps funding could come from the USF&WS's ample budget, which is used to buy unpopulated Pacific islands and atolls from private corporations. That money could be redirected to support an endangered species recovery program in an area where the species needs a foothold, instead of asking one of the country's least populated states to finance a plan that supports a great deal of the whole country's minnow population. Our GF&P must address this situation. Safe harbor agreements and habitat conservation plans are better used where there is a legitimate concern and/or documented decline of an endangered species (e.g. Nebraska, Kansas, Missouri, Iowa, Minnesota and other places that have had shiners). Why spend money for conservation on a state with healthy populations?

Reply: Endangered Species Act programs, such as Habitat Conservation Plans and Safe Harbor Agreements, can have realized benefits to the landowner as well. These programs can alleviate the formal consultation process and other ESA restrictions when properly implemented. These benefits alone may be desirable in a state with an intact Topeka shiner distribution, but which still must comply with ESA guidelines that cover the shiner across its entire range.

Comment 96: Threats to the Topeka Shiner Populations in South Dakota: These should be real threats in South Dakota. Why use threats utilized by the USF&WS in areas were the fish is declined to extinction? Why not identify South Dakota's threats to the shiner? Could it be that there are not any currently to deal with?
Reply: The plan clearly states that those threats utilized by the USFWS in listing and delisting actions are not threats to Topeka shiner populations in South Dakota. If South Dakota wishes to become involved in petitioning to delist the Topeka shiner, these same threats must be addressed.

Comment 97: The SDCA would view a shift in balance of our state's land resources from the status quo to be detrimental not only to the shiner but also to our state's economic viability. A documented dependence on our current agricultural land use by the shiner is illustrated by the high sampling occurrence listed by the agencies tasked to initially assess the shiner's numbers in South Dakota.
Threats to our state's current land use model are:

1. unrealistic regulations that act as a parasite on our industry as we compete globally with foreign commodities.
2. non-scarcity of foreign resources due to slash and burn management practices.
3. a strong U.S. dollar due to a stable democracy.
4. less stringent food safety concerns due to the lack of resources and technology in underdeveloped countries. Foreign countries are able to carry on without these environmental and safety responsibilities, thus becoming more economically efficient as they enter the global market. This enables them to undercut our prices. If our USF&WS does not work to address or acknowledge these concerns, our country may gain ecological stability, but lose economic stability. Our goal should be a balance of both.

Reply: Addressing these threats is beyond the scope of this management plan.

Comment 98: The present or threatened destruction, modification or curtailment of habitat or range: Cattlemen and other agri-businesses have worked hard to atone for past management practices that were production-oriented, not sustainable production/conservation oriented. Cattlemen have identified the need to enact grazing management of current grasslands in order to match grazing times to grass species' production cycles. Heterosis enables more beef off of the same acres. This shift of management efficiency was started in the thirties with the dust bowl and continues today. Genetically Modified Commodities require less cultivation and chemical use. A variety of other practices, such as more carefully calculated grazing rotation schedules, also increase resource conservation.
The threats listed by the GF&P plan (Wetland drainage, Sedimentation, Stream Channelization and Resource Extraction) are not realistic threats for the level that the GF&P claims these occur across the range. We still have a robust, healthy shiner community in spite of the "threats." The SDCA puts forth that these actions are so rare now that they become moot, thus begging for more current, pertinent and realistic threat concerns in order to be pro-active in a plan, not reactive. List future possibilities that would affect what is working today to keep the shiners at such high numbers.
Reply: The draft plan clearly states that wetland drainage, sedimentation, stream channelization, and resource extraction are not threats to Topeka shiner populations in South Dakota.

Comment 99: Wetland drainage is no longer as grave a concern as it was prior to the swamp buster bill.
Reply: Wetland loss is no longer as extensive as in the past, this will be clarified in the plan.

Comment 100: Stream channelization occurs on a much greater level for urban purposes than agricultural use. Identify this and address it (ex. Sioux Falls' Phase III flood plan, which involves channelization of waters around Sioux Falls). Currently, urban areas impact the shiner with this threat 99.6% more than agricultural use ever does. Compare NRCS records and Army Corps of Engineers data to verify this.

Reply: A distinction between stream channelization for municipal and agricultural purposes will be made in the plan.

Comment 101: Sedimentation has occurred ever since the tall grass prairie was gifted with, on average, 12" of topsoil. Lewis and Clark noted the sedimentation on their travels. This land, although having no European influence on it, still had heavy sedimentation. The shiner evolved under these conditions.
Reply: Sedimentation has always occurred naturally in streams. Streams, such as the White River and historic Missouri River, have always had high sediment loads. However, other streams, such as the Big Sioux River and many headwater prairie streams, flowed clear most of the year. Sedimentation occurs naturally, but landuse changes can substantially alter (increase or decrease) a stream's sediment load.

Comment 102: Resource Extraction is minimal compared to other states due to our state's grass-based economy, which is not dependent on the huge quantities of water that other states utilize for crop irrigation and huge urban populations. SDCA encourages the GF&P to consult with the DENR to obtain current laws and usage records concerning the states waters.
Reply: The draft plan states resource extraction is not a threat in South Dakota.

Comment 103: The other states, according to Vernon Tabor, a biologist with the USF&WS in Manhattan, KS, have had very extensive non-native predator fish stocking programs in the past. Our state has never had enough conservation group/political group pressure put on it to stock these game fish, which prey on the shiner. We also have not had the state finances to have an extensive statewide stocking system as other states have had and currently have. The large mouth bass single-handedly may have been the worst management decision ever implemented as far as the shiner is concerned.
Reply: The effects of predatory game fish are discussed under Disease and Predation. For various reasons, game fish are not stocked into eastern South Dakota tributaries, and thus do not pose a threat to Topeka shiner populations in South Dakota.

Comment 104: Recreation has no threat to the shiner? Ask the biologists from the USF&WS about that statement.
Reply: There are no apparent recreational threats involving the Topeka shiner in South Dakota.

Comment 105: Along streams that originate out of state (Split Rock Water Body), be sure to hold those states accountable for headwater stocking of fish.
Reply: Game fish (e.g. largemouth bass) were rare and often absent from recent surveys of South Dakota streams whose headwaters originate out-of-state. These introduced game fish can not survive in these stream environments and therefore do not pose a threat to Topeka shiners in South Dakota.

Comment 106: Genetic identification of the initially identified shiner and its currently perceived species needs to be verified to ensure that the same species then is the same today.
Reply: Genetics research has been conducted on the Topeka shiner. There is no evidence to suggest a change in the genetic identify of the species.

Comment 107: Drought and floods have to be considered in the plan for the study of their effect on populations of shiners. A timeframe needs to be established for taking those events into consideration and allowing for recovery time. If this is not assessed, a false cause of takings could be identified and an unnecessary adjustment or action could occur, affecting the whole of the biotic community.
Reply: The natural variability of droughts and floods on Topeka shiner populations will be assessed as annual monitoring is conducted. These natural events will be considered to prevent any misevaluation of a watershed's status.

Comment 108: On page 15, paragraph 5, sentence 4, include "Confined Animal Feeding Operations" in that sentence right before or after "municipal wastewater treatment".
Reply: This change will be made.

Comment 109: The opening statement does not mention anything about maintaining the current integrity of the existing habitat that sustains the world's most vibrant, numerous populations of the Topeka shiner.

We should be proud of our current levels and be the example to other parts of the region in regard to what to do for proper shiner management.
Reply: This change will be made.

Comment 110: Once again, the SDCA cautions against using Farm Bill dollars to fund endangered species maintenance and development due to the fickleness of appropriations and the original intent and spirit of the Farm Bill to fund farm programs. This concept is very important to the continued success of South Dakota lands' health.
Reply: Use of Farm Bill dollars previously addressed.

Comment 111: The most important strategy we, as a group, can provide, has been stated by the evidence of Kurt Forman of the USF&WS and by the testimonies of myself and other cattlemen. This has also been supported by the DENR in my conversations with Jerry Miller of that office, our state's Department of Agriculture, and many others involved in this matter.

The SDCA puts forth the following objective in lieu of the current Objective 1.1. Due to the emphasis our state's government, industries and landowners have put on adding value to our current herbivory/commodity production balance we have thus far created in our state the biggest Topeka shiner population in the world. We feel the plan should address the biggest catalyst of shiner habitat, herbivory, and do what is needed to protect that industry on local, state and national levels, assuring shiners for years to come.
Objective 1.1 Recognize and expand the interdependence of herbivory and commodity agriculture production in order to maintain the healthy population status of the Topeka shiner.
Task: Ensure the viability of agricultural herbivory in order to maintain current levels of grassland resources.
Tools: SDGF&P
USF&WS
DENR
EPA 319money
NRCS
Agriculture associations
Task: Educate agencies and the public about the roles that herbivory and commodity agriculture play in maintaining and sustaining the populations of the Topeka shiner found in our state and the country.
Tools: SDGF&P
USF&WS
DENR
EPA
NRCS
Reply: The current strategies will be reworded to incorporate these ideas.

Comment 112: Under Strategy 1.1: Any student of grass production knows that retaining as much water as possible is important to rangeland/cropland success. If we can decrease horizontal movement of water and the involved soil of major storm events by implementing terracing and tiling to slow the movements of these events, we will increase water stores upland of water bodies.
Reply: The idea of strategy 1.1 is to restore stream hydrology in areas where groundwater influences have been severely altered, not necessarily increase water stores in upland areas.

Comment 113: Second Task: Non-land owner and land owner education on the importance of proper conservation best management practices, including but not limited to, tiling, terracing, buffer strips, waterways, stream bank stabilization and other management tools. Use soil/water retention indices to monitor results and provide monetary funding in the form of incentives for decreased runoff and increased soil conservation.
Tools: NRCS
FSA
Producer organizations
Private conservation groups

USF&WS
SDGF&P
Reply: The current strategies will be reworded to incorporate these ideas.

Comment 114: Under Strategy 1.2A: To best complete this task and successfully complete this endeavor (third task) include EPA 319 funding. EQIP would be better used for other conservation measures due to uncertain funding and intended usage.
Reply: 319 Program will be added.

Comment 115: Under Objective 1.3: Non-point source impacts have been addressed by the EPA, SD DENR, county agencies and producer groups for years. Our state DENR has gone on record stating that we have some of the cleanest waters since they began monitoring. If the shiner can survive to this point, and local, state, and federal agencies continue to manage this resource, the water, and subsequently the shiner, should increase in quality and number.
Reply: This objective is intended to support those activities that are currently addressing non-point source impacts (TMDL projects) as well as address those non-point source impacts that continue to impair state water designated use criteria. These impacts are listed by waterbody in the SD DENR 305(b) report to Congress that is submitted once every two years.

Comment 116: In the discussion of Objective 1.3: Karr and Chu identify the threats to a decreasing population, but fail to provide input on the factors contributing to the increasing or stable population South Dakota enjoys.
Reply: Karr and Chu (1999) only discuss watershed impacts in general terms, their discussion does not focus on South Dakota or the Topeka shiner. This citation is used to support the conclusion that non-point source impacts are still a threat to various waters throughout the Midwest.

Comment 117: Population Monitoring and Assessment: This is a very key component to the survival of the minnow. We as cattlemen are concerned with the fact that the monitoring of an endangered species will occur every three years when the streams that they haunt are so dynamic in form. A sampling site may be completely gone due to drought or successive flooding during the three-year interval. Money to fund this ongoing protection and subsequent study, of an endangered species, must come from the budget of the USF&WS.
Reply: Monitoring will be conducted on an annual basis. The state recovery goal will be evaluated once every three years. Monitoring strategies are able to incorporate the variability due to drought and floods in an annual assessment.

Comment 118: Multi-metric indices and index of biotic integrity (IBI) are open to interpretation of successive stages an ecosystems goes through.
Reply: Multi-metrics indices and the IBI have been repeatedly tested and verified in many aquatic systems throughout the U.S. These indices are designed to be robust to account for any natural changes to a stream system. Many state agencies throughout the U.S. utilize these indices for annual assessment of surface water conditions.

Comment 119: Regarding paragraph three of the Population Monitoring and Assessment: What happens if the predator fish that benefits from the increased shiner population is present when no shiners are? Why would we not want shiners and conducive habitat together? How will we measure the takings from native predator fish and be able to accurately credit the loss to the fish and not the landowners above the water.
Reply: This paragraph will be clarified. We would want Topeka shiners and conducive habitat together; however, absence of Topeka shiners from a site does not necessarily indicate degradation, especially when habitat conditions have not changed. It is important to consider the biological community, habitat, and surrounding landuse before determining a site has been degraded. Predation by native fish is a natural occurrence. Monitoring strategies are designed to distinguish between natural and anthropogenic occurrences.

Comment 120: Baseline Data: This is also very important to start with. The SDCA feels that if 20% sampling was found originally and used to list the shiner, now the 80% more found should show a great

national increase and be used to assess the species de-listing. Mapping, monitoring, modeling, soil profiling, erosion monitoring and any information used to determine the fate of people in a State in the United States of America should be ground proven data only.
Reply: Data relating to a 20% and 80% range occurrence was previously addressed.

Comment 121: Monitoring Protocol: This must take into consideration where we are in the 30-year weather patterns. We are currently coming down on the descending curve and must be careful to adjust the population on this when starting.
Reply: Annual stream flow changes due to drought or flooding will be taken into account.

Comment 122: Concern was stated about land-use data being unavailable. If data is needed to defend the justification of continued listing of the shiner, the SDGF&P and the USF&WS must be charged with its funding.
Reply: These data were not intended to justify listing of the species, this data will be used, in part, to assess South Dakota's recovery goal status. The data are available; however, the scale of different data sets is not consistent and may hinder analysis.

Comment 123: The evidence that has been compiled on this issues compels us to believe that the current management practices have been highly effective in the preservation and promotion of the Topeka shiner minnow. It has shown what those of us in the agricultural business have long believed, that the best choices for agriculture are often the best choices for the environment. The Topeka shiner minnow is a living example of that. We at SDCA believe that there are much more pressing uses of the time and resources of the state of South Dakota than further study and implementation of a management plan for a species that, by all appearances, needs no management plan. Therefore, we think the emphasis of this plan should be on the delisting of this species, rather than the management of it.
Reply: The overall goal of this plan is to maintain current habitat conditions. The intent of these guidelines is to work towards delisting of the Topeka shiner. If the Topeka shiner is to be delisted through the recovery process, each state must demonstrate that they are meeting their respective recovery goals. This plan lists those actions necessary for South Dakota to meet its state recovery goal, and thus work towards delisting of the Topeka shiner.

Comment 124: The plan needs to be more specific on what the overall goals are. The goals should be listed or bulleted in the introduction or executive summary and then appear again prior to the objectives.
Reply: Goals will be specified in the introduction.

Comment 125: On page 8 it appears that the goals are to maintain and improve habitat, delisting, and point-based management. When reading through the management actions, starting on page 16 it appears that the goals are maintaining and improving habitat, monitoring and assessment and public outreach/education. From a planning perspective shouldn't these be objectives or actions that would be used to meet the goals?
Reply: Correct, this will be clarified.

Comment 126: Instead of saying we are going to maintain and improve habitat the goal should be to:
Goal 1: Maintain 70% of baseline populations for the next 10 years
Objective 1: Maintain and restore the hydrology of 3 streams in each critical segment containing Topeka shiners.
Reply: South Dakota's recovery goal is to maintain roughly 70% of baseline populations based on 1997-2002 data. However, focusing on habitat rather than the species allows the plan to address watershed-level concerns.

Comment 127: In our last meeting it was our understanding that the overall goal was still to petition to de-list or down list. And that the plan should be designed to allow management activities to take place by maintaining a certain population level. Is this the intent of the current draft plan? Will this plan allow us to manage the Topeka Shiner on a watershed basis or species level? This needs to be clearly outlined in the plan.

Reply: The plan will allow South Dakota to manage the Topeka shiner on a watershed basis, this will be clarified. The plan will work towards delisting by setting a recovery goal in South Dakota. As long as this recovery goal is met, South Dakota is meeting its contribution towards the national recovery effort. Delisting or downlisting of the Topeka shiner; however, will require cooperation from the USFWS and state agencies throughout the shiner's range, not just those entities in South Dakota.

Comment 128: The plan should have a specific timeline for implementation.
Reply: Agreed, this will have to be discussed at a later time and incorporated into the plan. This is a strategic plan; however, and specific operational activities are not intended to be covered in this document.

Comment 129: The background information should be put in the appendix.
Reply: The background information will be combined and reformatted.

Comment 130: If the issue concerning listing of critical habitat is no longer an option, do we still need to complete the plan by August 2003? If not, this will give us more time to develop a plan that can be substituted for section 7 of the ESA and meet SD recovery goals.
Reply: The USFWS has indicated that the plan must demonstrate "functional equivalency" to substitute for section 7 of the ESA, and that this is a difficult task to accomplish. The plan will be completed as originally planned and SDGF&P will still pursue the possibility of excluding critical habitat in South Dakota.

Comment 131: I applaud your efforts at looking beyond the mere presence/absence of Topeka shiners as an assessment of the status of these prairie streams. The concern I have is the fact that the bottom line in dealing with an endangered species is that the habitat may appear to be great, if the species isn't present, you haven't fulfilled the obligation of protecting/maintaining/enhancing the species of concern.
Reply: Agreed. However, species presence / absence is also dictated by natural controls (e.g. drought), which are beyond any actions an agency can mitigate.

Comment 132: Page 27, Literature Cited – The Missouri Department of Conservation citation should list Jefferson City, Missouri instead of Columbia, Missouri.
Reply: This will be changed.

Comment 133: The William L. Pflieger citation for the Fishes of Missouri should list this as the Revised Edition and list Jefferson City, Missouri and not Columbia, Missouri.
Reply: This change will be made.

Comment 134: Table of Contents, Appendices. List the appendices separately with title and page number for ease in referencing.
Reply: This change will be made.

Comment 135: Under this plan unrealistic measures are identified to "protect" a species of fauna that is in great abundance in the waterways of eastern South Dakota.
Reply: Measures listed in this plan have been and are being implemented through South Dakota. This plan does not add any new measures to watershed protection outside those measures already implemented by local, state, and federal entities.

Comment 136: Our office has reviewed the draft Management Plan and has submitted comments to Mr. Jeff Shearer of your staff. We hope to review a new draft of the Management Plan if significant changes are made to the existing version. The current draft contains substantial information and obviously involved considerable effort within the time available. We believe that changes may be necessary to further focus the Management Plan's specific objectives and ultimately improve its utility. A focus on a more complete analysis of threats to the species in South Dakota with associated measurable management objectives to address each threat may create a more definitive and achievable conservation strategy. Some assurances of the State's ability to implement the Management Plan and to ensure its effectiveness will be necessary.
Reply: Further analysis of threats will be completed to the extent practically for inclusion in this management plan. Threat analysis beyond those presented in this plan can be completed at a later date.

Comments not relating specifically to the Topeka shiner management plan:
The following list addresses those comments not specific to the Topeka shiner state management plan. This does not mean these comments do not relate to the Topeka shiner or management of endangered species in South Dakota. These comments are not followed by a reply.

Comment 137: The South Dakota Stockgrowers Association agrees with Peter Gober, USFWS, that "The Topeka Shiner should not be a listed species." The situation being that the Topeka Shiner has already been added to the Endangered Species List, the South Dakota Stockgrowers Association concurs with the comments submitted by the South Dakota Cattlemen's Association concerning the Topeka Shiner Critical Habitat Management Plan.

Comment 138: We especially urge government agencies to rely on landowners, specifically ag producers, to manage private and publicly-held land. Private management will provide optimum benefits for both agricultural use and wildlife conservation.

Comment 139: Due to an untimely response to a request for information made to the FWS, I would like to express my concerns to the critical habitat designation assigned to Turkey Ridge Creek and those ramifications as they relate to the ongoing viability of Swan Lake located in Turner County, SD.

I ask that you consider the following paragraph in lieu of the associated link in your determination to the planning and management of the Topeka Shiner in South Dakota. I am contending that the present and future "human development" as it relates to all facets of recreation and property would be and has been "highly impacted" by the protection measures already taken and proposed concerning the Topeka Shiner. These comments will be filed with the Swan Lake Association. Thank you.

> " In accordance with sections 3(5)(C) of the Act, not all areas that can be occupied by a species will be designated critical habitat. Within the geographic area occupied by the species we designate only areas currently known to be essential. Essential areas should already have the features and habitat characteristics that are necessary to conserve the species. We will not speculate about what areas might be found to be essential if better information becomes available, or what areas may become essential over time. If the information available at the time of designation does not show that an area provides essential life cycle needs of the species, then the area should not be included in the critical habitat designation. We will not designate areas within the geographic area occupied by the species unless at least one of the primary constituent elements, as defined at 50 CFR 424.12(b), is present. Moreover, areas occupied by certain known populations of the Topeka shiner have not been proposed as critical habitat. For example, we did not propose critical habitat for some small scattered populations or habitat in areas highly impacted by human development. http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2002_register&docid=02-20939-filed"

Comment 140: The reasons supporting the critical habitat designation are reasons the species declined in other states, not South Dakota. This is not valid reasoning, since the practices in South Dakota have heretofore allowed for a strong population of Topeka shiners, while practices that other states have become dependent on have reduced their numbers. These states are not grass-based financially and must make sacrifices for the shiner like we have proven in South Dakota that we have and will continue to do so. Upon that justification, we must insist to the USF&WS that the shiner be de-listed based upon South Dakota's track record of successfully carrying on normal practices while supporting the nation's last remaining bastion of Topeka shiners.

Comment 141: P. 38 states "Currently, the shiner's distribution and population status are very similar to historic levels in South Dakota". I feel there should be no critical habitat designation in South Dakota based on a successful history of habitat management to date in South Dakota.

Comment 142: There is a great deal of confusion amongst the different agencies and even within agencies on what conservation practices may impair shiner habitat or which ones might improve habitat. People in the field need more expedient permit approval. There currently is not enough manpower in the COE or USFWS to handle the statewide workload. Sometimes BMP projects are delayed for months waiting for approval.

Comment 143: I want to express my opinion in regard to stream management in SD. What I have seen in the past 55 years is tremendous damage to streams from cattle producers. I could show you hundreds of winter feedlots situated on the "high ground" directly above natural drainages. I could show you hundreds of summer pastures that surround what were once nice streams but are now trampled into "seasonal wetlands", choked with cattails, bulrushes and other grasses. These "wetlands" were once well defined streams but as you know, cattle gravitate to the stream bed in the heat of summer and destroy the banks and bottoms. Until there is some protection of the waterways from direct and indirect effects of cattle, our streams are doomed. Of course water flows downhill, and as these streams cease to flow, or flow with strong levels of livestock pollutants, into our drinking water basins, the water supply for human survival is increasingly threatened.

Comment 144: I wish to make the following comments for your record. Turkey Ridge Creek is a known and valuable habitat for the Topeka Shiner in South Dakota. Turkey Ridge Creek flows adjacent to Swan Lake but does not naturally flow into the Lake. In the early 1900's, Swan Lake Association made provisions for a man made inlet structure which allowed for Turkey Ridge Creek stream flow into Swan Lake. Swan Lake has a relatively small natural drainage basin. As such, additional stream flow is normally required to maintain an adequate water depth in Swan Lake. For 90 years, Turkey Ridge Creek stream flow was used for maintaining the Swan Lake depth. During that time, the Topeka Shiner maintained a continual presence in Turkey Ridge Creek.

The Turkey Ridge Creek stream flow water quality was not always of the best water quality, thus at time had an detrimental effect on the Swan Lake water quality. In the mid 1990's, the existing Turkey Ridge Creek stream inlet structure to Swan Lake had been closed. Since 1990's, Swan Lake Association has been working with State and Federal agencies to develop an acceptable Swan Lake stream flow plan from Turkey Ridge Creek. The prime components of the plan included taking the stream flow during period of acceptable Turkey Ridge Creek water quality while maintaining adequate Turkey Ridge stream flow for the Topeka Shiner downstream of Swan Lake.

After the completion of the Topeka Shiner Management Plan for South Dakota, Swan Lake Association is interested in working with the State and Federal agencies to finalize the Swan Lake stream flow from Turkey Ridge Creek management plan and the construction of the new Turkey Ridge Creek inlet structure. The Swan Lake water depth has suffered since the closure of the existing Turkey Ridge Creek stream inlet structure to Swan Lake.

Comment 145: I am writing in response to your invitation for comments on the Topeka Shiner Management Plan for South Dakota. As a lifelong resident and longtime taxpayer of Moody County, my primary concern is with the added costs that are incurred with regard to the construction of bridges.

Normally one or two bridges are replaced each year within Moody County, and this is an activity which has been taking place for many years without the restrictions that have been put in place recently. If the Topeka Shiner has survived and even flourished under these conditions, it seems that it should be unnecessary to put bridge construction on hold for 2 ½ months each year during a time (May-June-July) when construction is most efficient. My other point is that the part of a stream or river that is impacted is usually quite small in comparison to the total length of the stream or river.

It seems to me that the amount of silt and other pollutants introduced into the water during bridge construction is small compared to what enter during heavy spring and summer rains. I have no objections to the goals of the management plan other than that I would like to have bridge construction allowed all year long.

Comment 146: I am commenting on the SD Topeka Shiner Management Plan. Please include exceptions in the plan for sources of recreation that are being detrimentally effected by the Topeka Shiner on the endangered species list. We own a cabin and land on Swan Lake, near Viborg, for the purposes of recreation and the lake is so dry now. We have spoken to many other property owners at Swan Lake and

something needs to be done soon. We invested our money, time, etc to Swan Lake and it now doesn't have water coming in. Please bring this to the attention of everyone involved in this process. SD has few lakes and we need to preserve what we have.

Appendix I. South Dakota Game, Fish and Parks letter requesting review of State Plan.

DEPARTMENT OF GAME, FISH AND PARKS
Foss Building
523 East Capitol
Pierre, South Dakota 57501-3182

December 11, 2003

Mr. Chuck Davis
U.S. Fish and Wildlife Service
Denver Federal Center
PO Box 25486
Denver, CO 80225-0486

Dear Chuck:

Please find enclosed a copy of the Topeka Shiner (*Notropis topeka*) Management Plan for the State of South Dakota (State Plan). South Dakota Game, Fish and Parks (SDGFP) outlined in an August 5, 2003 letter to the U.S. Fish and Wildlife Service (USFWS) our request to exclude South Dakota from the final designation of critical habitat based upon the conservation goals and objectives set forth in the State Plan. This cooperative plan was prompted by an offer from the USFWS to exempt lands from critical habitat designation upon approval of a species management plan. Our planning effort included representatives from local, state and federal agencies with the most potential to have long-term impacts on this species in South Dakota. We were also able to engage several highly influential organizations with strong ties to landowners and agriculture, a link that will be critical to the continued success of our cooperative, multi-agency Topeka shiner management approach.

As indicated in a December 9, 2003 conference call between SDGFP and USFWS personnel, we are submitting this letter requesting the prompt review of the enclosed State Plan relative to the evaluation criteria under the USFWS's Policy for Evaluation of Conservation Efforts (PECE). The focus of this letter is to highlight how the State Plan mitigates for potential threats, provides assurances that conservation efforts have been and will continue to be implemented, and highlights the effectiveness of past conservation efforts. It is imperative that the Service provide specific feedback to us if the Plan does not comply with the PECE criteria so that we can make adjustments as needed to ensure South Dakota is exempted from critical habitat designation when the final designation is published in 2004.

The State Plan provides an objective analysis of threats versus effects for the five factors utilized by the USFWS in listing, delisting, or downlisting actions. Large-scale impoundments (discussed under *other natural and manmade factors*) were the only threat considered to be moderate in magnitude within South Dakota. However, the immediacy was considered non-imminent due to the low occurrence of large-scale impoundments on Topeka shiner streams. Since the Topeka shiner became listed, no large-scale impoundments have been constructed on

Wildlife Division: 605/773-3381 Parks and Recreation Division: 605/773-3391 FAX: 605/773-6245 TTY: 605/773-3381

Topeka shiner streams. Working through the section 7 consultation process of the ESA, this threat has been effectively neutralized in the five years this species has been listed. Our agency cooperates extensively with the USFWS through the Section 6 program and other SDGFP programs to provide information, such as survey data, to facilitate the Section 7 consultation process. Our agency is also an active reviewer of all Corps of Engineers (Corps) permits issued under section 404 of the CWA.

This cooperation between the Section 6 and Section 7 programs of the ESA has worked in South Dakota to prevent construction of any impoundments on Topeka shiner streams since the species was listed. This clearly demonstrates that this threat, impoundments on Topeka shiner streams, has been curtailed effectively by the processes in place. Per the PECE Policy, these long established and fully functional processes have addressed the threat of impoundment construction on Topeka shiner streams in South Dakota. Furthermore, agencies that traditionally funded or authorized impoundments, such as the Natural Resource Conservation Service (NRCS), the USFWS, SDGFP, and the Corps have demonstrated a willingness to either not fund or not authorize impoundment construction on Topeka shiner streams.

All other threats were considered low in magnitude or not a threat to Topeka shiner populations in South Dakota. The low magnitude threats involved discharges into Topeka shiner streams relating to water quality issues in South Dakota.

State and federal laws provide assurances that many conservation efforts referenced in the State Plan will be implemented. The Natural Heritage Program within SDGFP recognizes the Topeka shiner as a species of concern. Subsequently, SDGFP provides an environmental review for projects that may impact the Topeka shiner. The South Dakota Department of Environment and Natural Resources (SDDENR) addresses low-impact threats, such as point source discharges, under the National Pollution Discharge Elimination System authorized by Section 402 of the Clean Water Act. Non-point source impacts are mitigated by the SDDENR through Clean Water Act Section 319 projects.

Both of those State programs have developed processes for the USFWS to review these actions for Section 7 ESA compliance. These existing and functional processes have satisfactorily met Section 7 compliance, which further demonstrates that these safeguards are eliminating this minor threat. Finally, the State also provides section 401 water quality certification for all projects proposed to be authorized by the Corps under the section 404 program. To date, the State has determined all such issued Corps permits on Topeka shiner streams meet water quality certification. That final oversight authority on Corps 404 permits is in statute. We believe these State programs have ensured water quality constraints have not to date nor will they rise to the level that would compromise Topeka shiner streams.

The South Dakota Department of Transportation in conjunction with the USFWS has developed best management practices (BMPs) for highway construction work that involves Topeka shiner streams. Similarly, the NRCS has developed BMPs and guidelines for project development and implementation that may impact Topeka shiner streams. The Corps has worked extensively with the USFWS on Section 404 activities involving Topeka shiner streams. All projects involving a

federal nexus require Section 7 consultation with the USFWS. In addition to those conservation efforts aimed at alleviating threats are the many habitat-based programs, such as the Conservation Reserve Program, offered by SDGFP, USFWS, and NRCS that provide net benefits Topeka shiners through improved watershed health.

Our review of the actual threats identified in the listing package for the Topeka shiner and elaborated upon in the State Plan indicate that the threats for this species have been and will continue to be effectively neutralized in South Dakota. Accordingly, we believe that sufficient measures are in place with an extensive track record that negate known threats for the Topeka shiner and the State Plan meets the intent of the PECE Policy. Therefore, South Dakota should be excluded from the need to list critical habitat. In addition, the State Plan outlines the many activities that are being undertaken by us and others that benefit Topeka shiners. For example, we have worked cooperatively with the NRCS, to ensure funding mechanism such as the Environmental Quality Incentives Program (EQIP) and the Wildlife Habitat Incentive Program (WHIP) place a higher priority on measures and projects that benefit Topeka shiner streams. These actions are in addition to the many ongoing conservation programs being undertaken by NRCS.

The current range and distribution of Topeka shiners in South Dakota is the best evidence we can provide towards that our activities and the mandated and cooperative activities of our conservation partners are effective Topeka shiner conservation efforts. With the addition of the Elm River following 2003 surveys, recent data indicates the Topeka shiner now occupies all of its historic range within South Dakota. As illustrated in the State Plan, South Dakota does not have the habitat threats that have greatly diminished Topeka shiner populations in other states.

The actions described above, when combined with ongoing actions undertaken to ameliorate the threats to the Topeka shiner, have resulted in high quality habitat and robust Topeka shiner populations in South Dakota. We believe that the ongoing programs and activities undertaken by a diverse group of individuals, organizations, and agencies have contributed to the presence of South Dakota's high quality aquatic habitats. There is considerable concern that critical habitat designation will have a chilling effect on the willingness of private landowners to participate in many of voluntary programs that benefit Topeka shiners in South Dakota. This negative impact has great potential to damage existing relationships with landowners and to discourage future partnerships that are so critical to endangered species recovery and management. The State Plan, if successful in eliminating the need for critical habitat designation, would eliminate this unintended and detrimental consequence. Furthermore, our multi-agency, multi-partner effort provides a much stronger recovery and management framework than a planning effort that depends on the commitment of a single agency.

Through the above outlined actions, which eliminate threats to Topeka shiners, further beneficial activities, maintain viable populations and institute a comprehensive monitoring program, we believe the State Plan and subsequent efforts satisfy the PECE Policy.

In addition to providing a strategic framework for Topeka shiner conservation, the State Plan also forms a basis for a Habitat Conservation Plan (HCP). An HCP will complement the State's adaptive management approach to meet goals and objectives as well as facilitate implementation of the point-based monitoring system. SDGFP is currently involved in development of an HCP for other listed species. Those experiences will provide a background for a potential Topeka shiner HCP.

As stated earlier, we ask that the USFWS provide a prompt analysis of the State Plan relative to its compliance with PECE criteria. Your feedback is critical to our continuing refinement of the State Plan and efforts towards Topeka shiner conservation. Thank you for your time in this matter.

Sincerely,

John L. Cooper
Department Secretary

cc: Ralph Morgenweck, USFWS Region 6 Regional Director
John Blankenship, USFWS Region 6 Deputy Regional Director
Pete Gober, USFWS, Pierre, South Dakota
Governor M. Michael Rounds

Appendix J. U.S. Fish and Wildlife Service reply letter to South Dakota Governor M. Michael Rounds.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mountain-Prairie Region

IN REPLY REFER TO:

FWS/R6
ES

MAILING ADDRESS:
Post Office Box 25486
Denver Federal Center
Denver, Colorado 80225-0486

STREET LOCATION:
134 Union Blvd.
Lakewood, Colorado 80228-1807

MAR 0 8 2004

Honorable M. Michael Rounds
Governor of South Dakota
State Capitol
500 East Capitol Avenue
Pierre, South Dakota 57501-5070

Dear Governor Rounds:

Thank you for your letter of October 9, 2003, as well as letters dated August 5, 2003, and December 11, 2003, from the South Dakota Department of Game Fish and Parks Department (Department) related to Topeka shiner issues in your State. I apologize for the lateness of this formal response. The letters discussed a number of important subjects that have either been in flux due to recent litigation or raised important policy questions that required input from our Washington Office.

The primary issues outlined in the State's correspondence involved a 5-year status review, the Draft Recovery Plan, Critical Habitat designation of streams in South Dakota, and a review of South Dakota's Topeka Shiner Management Plan (Plan).

5-Year Review

The Endangered Species Act, under section 4(c)(2), requires the Service to review at least once every 5 years the information available respective to a species status. As you note in your October 9 letter, there is extensive new information on the Topeka shiner, including an increase in the number of known locations. This is largely due to the cooperation of State and Federal agencies and private landowners in conducting surveys.

The Service agrees with your recommendation to undertake a 5-year review for Topeka shiners and we will begin that process this year.

Draft Recovery Plan

The Service, States, and others have been working on a Recovery Plan for the Topeka shiner. We agree with your analysis that significant new information exists which may affect the Topeka shiner's listing status. We anticipate that completion of a Draft Recovery Plan will be delayed to incorporate this new information so that the draft Recovery Plan reflects the conclusions of the 5-year review.

Critical Habitat

Streams and stream segments in South Dakota were proposed as critical habitat on August 21, 2002. The Department developed a Topeka Shiner Management Plan to demonstrate that adequate management is occurring in South Dakota and, therefore, critical habitat designation in the State is unnecessary. We will soon publish an amended critical habitat proposal and a notice of availability for the draft economic analysis and draft environmental assessment in the Federal Register. We will make a final decision on the critical habitat designation by July 17, 2004. Your previous letters, conservation efforts, and comments will be part of the information used to make the final decisions on whether to designate critical habitat in South Dakota.

A fundamental consideration we must evaluate is whether excluding certain areas of critical habitat may cause the Topeka shiner to be in danger of extinction. .Our review of the information for Topeka shiners in South Dakota indicates that significantly more populations are known to exist in 2004 than were known to exist when the species was listed 5 years ago. These discoveries provide evidence of the species' persistence in South Dakota.

Another consideration that will impact our final decision of designating critical habitat in South Dakota is whether the benefits of exclusion outweigh the benefits of including specific areas. This evaluation will be based on the best biological information available and an economic analysis. We recognize the many efforts that South Dakota currently undertakes or proposes in the State Plan provide conservation benefits to the Topeka shiner. Some of these State commitments involve partnerships that may be more difficult or impossible if critical habitat is designated. This is particularly germane given that the majority of Topeka shiner habitat is on private land or adjacent to private land, where many of the most effective recognized conservation efforts are built upon voluntary participation and minimization of regulatory burdens.

Management Plan for the State of South Dakota

Your December 11, 2003, letter and the State Plan outline the rationale for exempting South Dakota from critical habitat, as well as the multitude of ongoing beneficial activities that influence the status of the Topeka shiner in South Dakota. Principal to your rationale for exemption are the conservation efforts underway to address the threats to this species that were identified when the species was listed.

We have reviewed the State Plan and note that many of the conservation benefits arise from partnership efforts currently being implemented. We agree that the partnerships highlighted in your State Plan are among the best methods to further recovery of listed species. Those established, ongoing efforts, recognized by the many partners in the State Plan, give confidence that the State goal of maintaining habitat integrity by focusing on the hydrology, geomorphology, and water quality of Topeka shiner habitat can be achieved. Finally, the monitoring and reporting aspects of the State Plan will allow evaluation of the conservation efforts being undertaken in South Dakota and document status changes to the species, which is a critical part of the species' recovery process.

To further our evaluation of the State Plan, we developed a table of the Plan's action items (enclosed) that includes the status of such actions along with other conservation measures the State has undertaken. Many of these actions already are being implemented and have proven effective, while others, such as the monitoring and assessment portion of the plan, will allow ongoing evaluation and opportunities for refinement as needed.

We believe the various components of the State Plan, including an evaluation of the threats to the species in South Dakota, use of partnerships involving multiple entities to conserve this species, and monitoring, will benefit long-term conservation of the species.

Policy for Evaluation of Conservation Efforts (PECE)

We initially requested that your plan should comply with our PECE, which is used for listing decisions that are based on commitments in existing conservation plans. The PECE recognizes that formalized conservation efforts can offset or neutralize known threats to a species or its habitat and thereby affect listing decisions. The State Plan outlines a Topeka shiner population monitoring and assessment effort that will continue to document the status of this species in South Dakota. However, we will evaluate the potential exclusion of Topeka shiner critical habitat under section 4(b)(2) of the Act, which provides that the Secretary may exclude any area from designation if the benefits of such exclusion outweigh the benefits of designation. We will use, in part, the economic analysis we have prepared in our analysis of benefits.

Other Considerations for the State Plan

Secretary Cooper's December 11, 2003, letter provides additional information regarding threats analyses and measures being undertaken to reduce or eliminate threats to Topeka shiners. We recommend that letter and this response be appended to the State Plan as additional information.

Appendix B of the State Plan outlines Conservation Programs available to landowners. The Service also has an active wetland and grassland easement program that is available to landowners in eastern South Dakota. These programs would fit well with the other conservation programs outlined in Appendix B. Detailed information on these programs is best attained from one of the five Wetland Management Districts located in eastern South Dakota.

In summary, we agree that an updated status assessment for the Topeka shiner is warranted, and the results of that review will need to be included in the Draft Recovery Plan. The State Plan will provide significant conservation benefits to the Topeka shiner and we will give serious consideration to the State's request for exclusion from critical habitat designation. I also commend the Department for undertaking development of the State Plan. If I can be of further assistance please do not hesitate to contact me.

Sincerely,

Richard A. Coleman

ACTING Regional Director

Enclosure

ACTION ITEM	STATUS
Establish the South Dakota Topeka shiner working group.	Complete and Ongoing
Develop and implement the State Plan.	Complete (2003) and Ongoing
Conduct surveys to determine extent of Topeka shiner range in South Dakota.	Complete and Ongoing
Design long term monitoring and assessment plan.	Complete
Develop an education and outreach program to provide information on the Topeka shiner and watershed health.	Ongoing
Develop and maintain a Topeka shiner website for information on this species.	Complete and Ongoing
Complete genetic analyses of different Topeka shiner populations in South Dakota.	Complete
Incorporation of Topeka shiner recovery and conservation efforts in State strategic planning documents on different levels.	Ongoing
Secure matching funds from the Service and others to conduct surveys and ecological studies and for various habitat restoration and enhancement activities.	Complete and ongoing
Conduct research in relationship to stream hydrology and Topeka shiner habitat.	Ongoing
Provide technical and financial assistance to landowners interested in creating or restoring wetland areas.	Complete and Ongoing
Provide landowner incentives to increase native vegetative cover.	Complete and Ongoing
Work with government agencies to develop best management practices that minimize erosion.	Complete and Ongoing
Provide financial and technical assistance to landowners to reestablish native vegetation along riparian zones.	Complete and Ongoing
Provide technical and financial assistance to landowners and other agencies interested in restoring habitat in degraded stream reaches.	Complete and Ongoing
Review projects that may adversely alter Topeka shiner streams.	Complete and Ongoing
Continue working with the Service to provide information and assistance on section 7 consultation issues.	Ongoing
Continue working with section 6 funds to further identify and Topeka shiner areas and strategy for long term conservation.	Ongoing
Provide technical assistance to urban, residential and development planners to improve water quality from water discharge systems.	Complete and Ongoing
Work with Natural Resource Conservation Service to have Topeka shiner streams get higher priority for EQIP and WHIP funding.	Complete and Ongoing
Provide incentives for landowners to establish riparian buffers or filter strips along agricultural fields with high runoff potential.	Complete and Ongoing
Continue technical assistance for permitting and designing confined animal feeding operations.	Ongoing
Continue routine inspections of sewage treatment facilities to ensure compliance with water quality standards.	Ongoing