Topeka shiner (*Notropis topeka*) monitoring in Eastern South Dakota streams (2010-2012) #T2-9-R-1

NOTE: Table 3 has been removed from this document to protect the security of specific locations.

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EXECUTIVE SUMMARY

The Topeka shiner (*Notropis topeka*) was listed as endangered in 1999 due to a 90% reduction in its range, which encompasses portions of six Midwestern states including South Dakota. However, more recent studies have shown that the Topeka shiner is more widespread within South Dakota than other portions of its range. Because of the prevalence of the Topeka shiner in South Dakota, the Department of Game, Fish and Parks developed a state management plan (Shearer 2003) with the goal of maintaining the habitat integrity of Topeka shiner streams in South Dakota while contributing towards national recovery efforts. Monitoring and assessment is a critical step in the implementation and evaluation of this goal.

The purpose of this study was to implement a long-term Topeka shiner monitoring program to determine progress toward the State Plan management goals. The monitoring plan was designed to assess the hydrologic and geomorphic parameters that may influence stream physical habitat, and ultimately fish community composition, and also to collect Topeka shiner and fish community data in tributaries potentially inhabited by Topeka shiners in the Big Sioux, Vermillion and James River Basins.

Specific objectives were to:

1) Classify each stream reach according to the Rosgen classification system (Rosgen 1996).
2) Produce a longitudinal profile of each stream reach illustrating pool/riffle sequences.
3) Produce a substrate composition profile for each stream reach.
4) Summarize aquatic habitat (riparian, bank and instream habitat) for each stream reach.
5) Calculate fish metrics for monitoring fish community structure.

A total of 33 sites were evaluated from 2010 to2012. Eleven streams were assessed with three sites per stream. Streams sampled included: Sixmile Creek, Peg Munky Run, Stray Horse Creek, West Pipestone Creek, and Medary Creek in the Big Sioux River Basin; the West Fork Vermillion River, Turkey Ridge Creek, and Long Creek from the Vermillion River Basin; and Middle Pearl Creek, Enemy Creek, and Twelvemile Creek from the James River Basin. Cross section, thalweg, substrate, habitat and fish community data were collected to calculate metrics to assess stream condition and the status of Topeka shiners.

Topeka shiners were found in all streams surveyed and at 58% (18 of 31) of sites sampled. Two sites were dry and could not be sampled. The number of Topeka shiners caught at sample sites ranged from 0 to 144. Three new sites were selected because permission could not be obtained to sample existing sites. Replacement sites were within close proximity to original sites and were located on Sixmile Creek, Medary Creek, and Peg Munky Run. Topeka shiners were collected at all of these sites. Two sites each from Long Creek and the West Fork Vermillion have limited data because the drought created intermittent pools. Additionally, fish were sampled from two sites on these steams. Poor environmental conditions ranging from flooding in 2010 to drought in 2012 made sampling difficult. Thus, the information presented in this report should be interpreted conservatively as sampling efforts may have lowered detection probabilities. During periods of intermittency fish often seek refuge in places of persistent water and flow. Topeka shiner may have been present, but not detected due to adverse conditions at sampling locations during the current period.

Since 2004, we have observed a shift in stream classification within several of the Topeka shiner monitoring sites, as well as a shift towards larger particle sizes. We found streams to fall within typical stream classifications as either "C" or "E" types for eastern South Dakota, however we observed shifts towards "G" type streams currently. Shifts towards "G" type streams and the associated probability of Topeka shiner presence is unknown.

Minimal changes in thalweg were observed between the 2004-2006 and 2010-2012 sampling periods. Sites on Stray Horse Creek and Medary Creek continued to have high gradient, heterogeneity and larger dominant particle sizes. Additionally, a single site on West Pipestone Creek continued to be homogeneous, flat-bottomed and dominated by silt substrates.

There were no differences between the time periods in bank cover, instream cover or index of biological integrity (IBI) between the different drainages. There were no changes in habitat metrics or IBI scores from the early to late sampling periods within the Big Sioux or James River Basins. However, there was a significant drop in bank cover within Long Creek from the Vermillion River Drainage between sampling periods. This drop did not correspond to a decline in IBI fish scores. Interestingly, there was no correlation between IBI scores and habitat metrics, suggesting the variables chosen to quantify stream habitat did not correspond to changes in the biotic community.

The purpose of this study was to provide a second round of sampling to be used in conjunction and for comparison with baseline data collected by Wall and Thomson (2007), in monitoring Topeka shiners and their habitat in eastern South Dakota. Streams clearly displayed a range of community and habitat conditions from relatively good (e.g., Stray Horse Creek, Medary Creek), to relatively poor (e.g., West Pipestone Creek). The metrics provided by this study were designed for detecting quantifiable differences in habitat and fish quality by comparing values at a site amongst years, however, we found some problems with the current methodology while doing the sampling this summer. Monitoring identical sites was not always feasible because we could not obtain landowner permission at several locations. Additionally, some methodology was found to be subjective and therefore, we recommend re-evaluating the current protocol to make adjustments that will limit bias and provide a more practical and repeatable monitoring program. With a revised approach, monitoring changes can be analyzed by individual site, stream, and/or basin over time.