**Minnesota Department of Natural Resources**
**Division of Fish and Wildlife**
**Section of Fisheries**

# Stream Survey Report

# Seven Mile Creek 2014

**Funding:** Federally funded under aid from the Sport Fish Restoration Act, F-29-R(P), Fisheries Management

**Field work by:** Sky Wigen, Chris Foster, and Gene Jeseritz

**Report completed by:** Sky Wigen, Hutchinson Area Fisheries Office

**MINNESOTA DEPARTMENT OF NATURAL RESOURCES**

**RIVER OR STREAM SURVEY**

**Initial Survey**
**Resurvey**
**Pop. Assessment**
**Special Assessment X**

**Date(s) of Field Work:** 5 September 2014 and 6 October 2014.

**Leader** Sky Wigen
**Assistant(s)** Chris Foster, Gene Jeseritz

## NAME, LOCATION AND FLOW CHARACTERISTICS

**1. Stream Name:** Seven Mile Creek

**2. Alternate Name(s):** None

**3. Tributary Number:** M-55-71.5

**4. Counties:** Nicollet

**5. Watershed Name and Number:** Lower Minnesota #29

**6. Sequence of Waterways to Basin:** Seven Mile Creek to Minnesota River to Mississippi River.

**7. Map(s) Used:** Prim Maps

**8. Average Width - Upper Stations:** 8.5′ **Lower Stations:** 10′

**9. Mouth Location:** **T.** 109 N **R.** 27 W **S.** 12

**10. Flow at Mouth of watershed (SMC_WQ3):** 0.67 cfs **Date:** 9/5/14

**11. Location of SMC_WQ3: River mile 0.4, below second bridge in park (E: 417873 x N: 4901492).**

## WATERSHED DESCRIPTION AND USE

**12. Description of Watershed (soil types, cover types, topography, land use and ownership.**

**a) Watershed description:** The watershed is in mostly row crop agriculture on rather flat slopes, except for the creek valley below Highway 99, which is a hardwood forest on steep slopes.

**b) Land adjacent to stream:** The corridor consists of mostly hardwood trees once the stream enters its natural channel below Highway 99. Above Highway 99 the stream is an open ditch flowing through agricultural fields.

## GENERAL INFORMATION ON THE STREAM

**13. Reason for Survey:** To assess the fish community in conjunction with restoration measures being implemented as part of the Seven Mile Creek Watershed Program. Four standardized stations (SMC_BS1 - SMC_BS4) were sampled (Fig. 1). A Seven Mile Creek Watershed Program Monitoring Plan was written in December, 2011 and much of this report follows those protocols.

**14. Previous Investigations and Surveys:** Initial survey in 1985; population assessments in 1986, 1987, 1991, 1993, 1996, 2002, and 2011-2014; brown trout abundance estimates in 2002, 2003, 2005, and 2008.

**15. Special Problems or Conditions:** Problems include flooding, hydrological 'flashiness', seasonal low base flows attributed to a lack of groundwater recharge, agricultural run-off, channel and stream bank deterioration, and lack of deep pool habitat for adult brown trout.

## GENERAL INFORMATION ON THE STREAM (continued)

**16. Dams and other obstructions (including beaver dams): See 1985 survey.**

**17. Use of Water: Fishing** X **Recreation** X **Com. Navigation**
**Power** _____ **Irrigation** _____ **Livestock Watering** X
**Other (specify)**

**18. Access (location and ownership):** Road crossings and within the park.

**19. Recreational Boating:**
**1) Navigable reach:** None.
**2) Type of Boating:** n/a.

**20. Tributaries and springs:** Springs near SMC_BS4 allow brown trout to occupy a small section (approximately 1,000 feet) of Seven Mile Creek.

**21. Stream Physical Characteristics:** Several physical stream measurements were taken during this survey. Miles from mouth was estimated using Arcmap10 "Stream routes with Kittle numbers" layer. The stream layer was not an exact match to the actual stream location.

| **a)Station no.** | SMC_BS1 | SMC_BS2 | SMC_BS3 | SMC_BS4 | SMC_WQ3 |
|---|---|---|---|---|---|
| **b)Date** | 9/5/14 | 9/5/14 | 9/5/14 | 9/5/14 | 9/5/14 |
| **c)Loc.(mi from Mouth)** | 5.8 | 5.2 | 0.6 | 1.0 | 0.4 |
| **d)Length of station** | 350 | 350 | 350 | 525 | 0 |
| **e)% station in** | | | | | |
| **Pools** | 100 | 50 | 0 | 5 | --- |
| **Riffle & Rapids** | 0 | 0 | 20 | 65 | --- |
| **Runs** | 0 | 50 | 80 | 30 | --- |
| **Other (list)** | | | | | |
| **f)Avg. width** | 10′ | 7′ | 10′ | 10′ | 14′ |
| **g)Avg. depth** | 18″ | 0″ | 8″ | 8″ | 2.5″ |
| **h)Flow (cfs)** | 0.0 (pooled above Hwy 99 culvert) | 0.0 (stagnant, pooled downstream) | Same as SMC_WQ3 | Same as SMC_WQ3 | 0.67 |
| **i)High water mark** | Not checked | Not checked | Not checked | Not checked | --- |
| **j)Present stage** | Low | Low | Low | Low | --- |
| **k)Banks:** | Heavy veg. Reed canary | Reed canary & brush | Heavy grass, brush,& Forbes | Hardwoods, brush, & Reed canary | --- |
| **Avg. height** | Not measured | Not measured | Not measured | Not measured | --- |
| **Height range** | Not measured | Not measured | Not measured | Not measured | --- |
| **Erosion** | Light-moderate | Moderate-severe | Moderate | Moderate | --- |
| **%grazed** | 0 | 0 | 0 | 0 | --- |
| **%ditched** | 100 | 20, near Hwy 13. | 100 | 0 | --- |
| **l)Shade** | Light | Heavy | Moderate | Heavy | --- |
| **m)Overall Bottom type** | | | | | |
| **Rubble** | | | 20 | 30 | --- |
| **Boulder** | | 5 | 10 | 30 | --- |
| **Sand** | | 5 | 5 | 5 | --- |
| **Gravel** | 20 | 10 | 60 | 30 | --- |
| **Silt** | 80 | 80 | 5 | 5 | --- |
| **n)Wood debris** | none | moderate | none | light | --- |

**22. Characteristics of Water:** No grab samples were taken during this survey.

| **a)Station No.** | SMC_BS1 | SMC_BS2 | SMC_BS3 | SMC_BS4 | SMC_WQ3 |
|---|---|---|---|---|---|
| **b)Date** | 9/5/14 | 9/5/14 | 9/5/14 | 9/5/14 | 9/5/14 |
| **c)Loc.(mi. from mouth)** | 5.8 | 5.2 | 0.6 | 1.0 | 0.4 |
| **d)Length of station** | 350 | 350 | 350 | 525 | 0 |
| **e)Time** | 1440 | 1340 | 0940 | 1230 | 0940 |
| **f)Air temp F** | 65 | 64 | 58 | 58 | 58 |
| **g)Water temp C** | 20.3 | 17.9 | 12.9 | 12.9 | 12.9 |
| **h)Color** | Green | Brown | Clear | Clear | Clear |
| **i)Cause of color** | Algae | Silt | Clear | Clear | Clear |
| **j)Secchi disc (ft.)** | Not done | Not done | Not done | Not done | Not done |
| **Field Determinations** | | | | | |
| **Dissolved oxygen (mg/l)** | 9.1 | 7.7 | 10.5 | 10.5 | 10.5 |
| **T Tube – Turbidity (cm)** | 11 | 9.8 | 60+ | 60+ | 60+ |
| **Conductivity (umhos)** | 894 | 699 | 873 | 873 | 873 |

**23. Temperature Profile:** No temperature loggers were deployed during this survey.

**24. Biological Characteristics:**

**a) Distribution of aquatic plants:** Aquatic plants were not quantitatively examined in this survey.

| **a)Station No.** | SMC_BS1 | SMC_BS2 | SMC_BS3 | SMC_BS4 |
|---|---|---|---|---|
| **b)Date** | 9/4/14 | 9/4/14 | 9/4/14 | 9/4/14 |
| **f)Filamentous Algae** | Abundant | Rare | Rare | Moderate |

**b) Distribution and abundance of aquatic invertebrates:** Aquatic invertebrates were sampled for the first time by Minnesota Department of Natural Resources (MDNR) Section of Fisheries staff in 2014. Samples were collected within station SMC_BS4 on 10/6/14, sorted from debris, and sent to Gary Montz, Aquatic Invertebrate Biologist for identification.

| Taxa | Riffle | Woody Debris | Vegetation |
|---|---|---|---|
| **EPHEMEROPTERA** | | | |
| Baetidae | | | |
| Baetis sp. | 24 | | 4 |
| Caenidae | | | |
| Caenis sp. | 1 | 1 | |
| Leptophlebiidae | | | |
| Paraleptophlebia sp. | 1 | | |
| **TRICHOPTERA** | | | |
| Hydropsychidae | | | |
| Ceratopsyche sp. | 1 | | |
| Cheumatopsyche sp. | 13 | | |
| Hydropsyche ?betteni | 6 | | |
| Hydroptilidae | | | |
| Hydroptila sp. | 2 | | |
| **COLEOPTERA** | | | |
| Dryopidae | | | |
| Helichus sp. | 1 | 5 | 3 |
| Dytiscidae | | | 1 |
| Gyrinidae | | | |
| Dineutus sp. | | | 2 |
| Hydrophilidae | | | 1 |
| Tropisternus sp. | | 1 | |
| **ODONATA** | | | |
| Aeshnidae | | | |
| Aeshna sp. | | 3 | |
| Boyeria sp. | | 1 | |
| **HETEROPTERA** | | | |
| Belostomatidae | | | |
| Belostoma sp. | | 6 | 2 |
| Corixidae | | | |
| Sigara sp. | | | 6 |
| Nepidae | | | |
| Ranatra sp. | | 1 | 1 |
| **DIPTERA** | | | |
| Chironomidae | 111 | 17 | 6 |
| Muscidae | | | |
| ?Limnophora sp. | 8 | | 9 |
| Tipulidae | | | |
| Prionocera sp. | | 1 | |
| Tipula sp. | 1 | | 3 |
| **Non-insect taxa**<br>**CRUSTACEA** | | | |
| Amphipoda | | | |
| Gammarus ?pseudolimnaeus | 59 | 33 | 9 |
| **OLIGOCHAETA** | | | |
| Hirudinea | 1 | | |
| **MOLLUSCA** | | | |
| Gastropoda | | | |
| Fossaria sp. | | 3 | |
| Physella sp. | 5 | 5 | 226 |
| ?Planorbula sp. | | | 1 |
| Stagnicola sp. | | | 4 |
| | | | |
| **Totals** | 234 | 77 | 278 |

**25. Fishery Characteristics:**

| Station number: | SMC_BS1 | SMC_BS2 | SMC_BS3 | SMC_BS4 |
|---|---|---|---|---|
| **b) Date** | 9/5/14 | 9/5/14 | 9/5/14 | 9/5/14 |
| **c) Start location – downstream end (UTM)** | E: 414187 N: 4904792 | E: 414078 N: 4903934 | E: 417624 N: 4901646 | E: 417275 N: 4901935 |
| **d) Length of Station** | 350 ft | 350 ft | 350 ft | 525 ft |
| **e) Gear** | Haltech-Backpack Pulsed DC 150 volts 60 pps | Haltech-Backpack Pulsed DC 150 volts 60 pps | Haltech-Backpack Pulsed DC 150 volts 60 pps | Haltech-Backpack Pulsed DC 150 volts 60 pps |
| **f) Amt. of sampling effort** | 327 sec | 546 sec | 626 sec | 1132 sec |
| **ff) Number of netters** | 1 | 1 | 1 | 1 |

**(g) Species present:**

| Station: | SMB_BS1 | | SMB_BS2 | | SMB_BS3 | | SMB_BS4 | |
|---|---|---|---|---|---|---|---|---|
| | Num | Wt(g) | Num | Wt(g) | Num | Wt(g) | Num | Wt(g) |
| Bigmouth Shiner | | | | | 4 | 3 | | |
| Blacknose Dace | | | | | 32 | 125 | 2 | 16 |
| Bluntnose Minnow | | | | | 68 | 69 | 2 | 1 |
| Brassy Minnow | | | | | 55 | 55 | | |
| Brown Trout | | | | | 15 | 353 | 35 | 762 |
| Brook Stickleback | 11 | 8 | 32 | 30 | 1 | 1 | | |
| Creek Chub | | | | | 7 | 48 | | |
| Common Shiner | | | | | 3 | 3 | | |
| Central Mudminnow | | | | | 1 | 8 | | |
| Central Stoneroller | | | | | 15 | 170 | | |
| Fathead Minnow | 10 | 5 | | | 2 | 3 | | |
| Green Sunfish | | | | | | | 2 | 19 |
| Hornyhead Chub | | | | | 1 | 1 | | |
| Iowa Darter | | | | | 4 | 3 | 2 | 3 |
| Johnny Darter | | | | | 6 | 5 | 4 | 10 |
| Northern Pike | | | | | | | 1 | 80 |
| White Sucker | | | | | 29 | 92 | | |
| Total | 21 | 13 | 32 | 30 | 243 | 939 | 48 | 891 |

**Remarks:** A total of 17 species were found. Species included; Bigmouth Shiner, Blacknose Dace, Bluntnose Minnow, Brassy Minnow, Brown Trout, Brook Stickleback, Creek Chub, Common Shiner, Central Mudminnow, Central Stoneroller, Fathead Minnow,

Green Sunfish, Hornyhead Chub, Iowa Darter, Johnny Darter, Northern Pike, and White Sucker. No anomalies (deformations, tumors, discoloration, open sores, diseases, or parasites) were seen on any fish.

**26. Fish Sizes:** Lengths of game fish grouped into one inch categories.

| Species | Brown Trout | Northern Pike |
|---|---|---|
| < 2.0 | | |
| 2.0 - 2.9 | | |
| 3.0 - 3.9 | 1 | |
| 4.0 - 4.9 | 35 | |
| 5.0 - 5.9 | 13 | |
| 6.0 - 6.9 | 1 | |
| 7.0 - 7.9 | | |
| 8.0 - 8.9 | | |
| 9.0 - 9.9 | | 1 |
| 10.0 - 10.9 | | |
| 11.0 - 11.9 | | |
| 12.0 - 12.9 | | |
| 13.0 - 13.9 | | |
| 14.0 - 14.9 | | |
| 15.0 - 15.9 | | |
| 16.0 - 16.9 | | |
| 17.0 - 17.9 | | |
| 18.0 - 18.9 | | |
| 19.0 - 19.9 | | |
| 20.0 - 20.9 | | |
| 21.0 - 21.9 | | |
| 22.0 - 22.9 | | |
| 23.0 - 23.9 | | |
| 24.0 - 24.9 | | |
| 25.0 - 25.9 | | |
| Total | 50 | 1 |

**27. Age and Growth of Gamefish:** Game fish were not aged. Given the inability to accurately and/or consistently assign ages of Brown Trout from scales collected during the 2011 survey no scales were collected in recent surveys. A single small Northern Pike was the only other game fish sampled.

**28. Comparisons with past investigations and surveys:** This was the fourth consecutive year that all four stations were surveyed together in one assessment. Station SMC_BS4 was the same as what the Minnesota Pollution Control Agency (PCA) sampled in 2010, 2011, and 2013. The PCA calculated an Index of Biotic Integrity (IBI) score for their work on Seven Mile Creek in 2010, 2011, and 2013 resulting in scores of 11.0, 23.9, and 57, respectively. The 2011, 2012, 2013, and 2014 MDNR, Section of Fisheries surveys yielded IBI scores of 22.2, 47.8, 60, and 59.2 respectively. Any IBI score below a threshold of 45 can be considered impaired (Bryan Spindler, personal communication). Technically, the site sampled in 2012, 2013, and 2014 indicated a status of non-impairment; however, impairment decisions are based on a weight of evidence approach. Since other recent fish surveys were well below the threshold the stream is still likely considered impaired for fish.

The higher scores in 2012, 2013 and 2014, relative to previous surveys may have been due to the decrease in tolerant species in the sample, which was likely attributed to the extremely low water flow during most of those years. In 2010, a total of 21 different species were sampled by the PCA, while 14 species were sampled in 2011 and 10 species in 2013. The DNR sampled 12 species in 2011, 8 species in 2012, 12 species in 2013, and 17 species in 2014. The low water flows due to drought conditions in recent years, have significantly depleted habitat available to fish, but have also decreased the percent of tolerant species in the sample and yielded improved IBI scores.

Aquatic macro-invertebrates are a good indicator of impairment, but have only been sampled three times by the PCA and once by MDNR. First by the PCA in September of 2009 with an IBI score 23.1, in August of 2011 with a score of 49.9, and again in August of 2013 with a score of 32. The MDNR sample was collected in October of 2014 with a score of 23.5. The impairment threshold for aquatic macro-invertebrates is 43. Thus, aquatic macro-invertebrates IBI appears to be highly variable (likely due to flow conditions), with one score above the impairment threshold and three below.

**29. History of fishing conditions:** No angling, trout or otherwise, was observed during the 2014 assessment. Limited pool habitat was available during this survey and brown trout were likely congregated in the few remaining pools due to the low flow.

**30. Records of past management:** Trout habitat improvements (3 J-hooks, 2 cross-vanes, 2 channel constrictors, bank resloping, and root wad placements) were completed in 2002. Native vegetation was planted to stabilize eroding banks in 2003. Trout habitat improvements (5 Lunker structures and several rock weirs) were completed in 2007. A habitat improvement project has been proposed in recent years that includes repairs to existing structures as well as new habitat features.

**Fish stocking:**

| Year | Species | Size | Number or pounds |
|---|---|---|---|
| 2004 | Brown Trout | Fingerling | 10,500 fgl |
| 2005 | Brown Trout | Fingerling | 7,500 fgl |
| 2006 | Brown Trout | Fingerling | 7,500 fgl |
| 2007 | Brown Trout | Fingerling | 7,500 fgl |
| 2008 | Brown Trout | Fingerling | 7,500 fgl |
| 2009 | Brown Trout | Fingerling | 7,500 fgl |
| 2010 | Brown Trout | Fingerling | 7,500 fgl |
| 2011 | Brown Trout | Fingerling | 7,500 fgl |
| 2012 | Brown Trout | Fingerling | 7,500 fgl |
| 2013 | Brown Trout | Fingerling | 7,500 fgl |
| 2014 | Brown Trout | Fingerling | 7,500 fgl |

**31. Special Regulations:** Portions of Seven Mile Creek are defined as "Designated Trout Stream" in Minnesota Rules Chapter 6264.0050 as they lie within Township 109 North; Range 27 West; and Sections 2-4 and 10-12.

**32. Discussion of Fishery:**

**a) General characteristics:** A total of 17 species representing 8 families were sampled. The three most abundant species sampled were Bluntnose Minnow, Brassy Minnow, and Brown Trout. Non-game fish (Brook Stickleback and Fathead Minnow) dominated the upper stations, while Brown Trout and a variety of minnow species became common in the lower stations. Diversity was much higher in the lower stations (17 spp.) compared to the upper station (2 spp.). Many of the lower station species were intolerant of the conditions found in the upper reaches. The water temperature for the upper stations (20.3 - 17.9 C) was much higher than that of the lower stations (12.9 C). It remains unlikely that Brown Trout would be able to survive in the upper reaches throughout the summer, especially considering the lack of any flow at site SMC_BS2 of Seven Mile Creek during 2012 and 2013. No adult Brown Trout (12 inches or longer) were sampled in any of the standardized stations. During 2011, after the standardized sampling was completed the only deep pool in the lower section of the Park was sampled. A total of 10 adult Brown Trout ranging in length from 12-19 inches were sampled in the pool. This may have been the extent of the adult trout population in Seven Mile Creek. Brown Trout were observed by MDNR staff in this pool throughout the summer during 2012. The upper stations offer no recreational fishing opportunity due to highly degraded, low flow conditions, and the complete absence of game fish.

**b) Fish management problems:** Poor land use practices within the watershed have resulted in degradation of water quality and loss of in-stream habitat through erosion, siltation, pollution, and flooding. Seven Mile Creek has become a 'flashy' stream with minimal base flows primarily due to changes in the watershed that have removed the ability of wetlands to store water, such as drain tiling and surface water management. Following heavy precipitation events, periods of very high flow cause the stream to widen because it has limited connection to a natural floodplain. Due to the hard substrate found throughout much of the stream down cutting is minimal. These factors result in the widening of the stream because energy is focused on the banks of the stream. The widening stream has yielded a loss of the focused flow that is needed to scour pools, which also reduces in-stream cover habitat by washing large rocks downstream, even displacing habitat improvement structures. Unstable flows, lack of deep pools, and insufficient herbaceous and woody vegetation cover likely limit spawning habitat and cover for the stocked Brown Trout population. Springs in the lower section of Seven Mile Creek allow Brown Trout to occupy approximately 2,290 feet of the Creek that remains connected to the Minnesota River with at least some minimal flow throughout the year. Other segments of Seven Mile Creek between the upper parking lot at Seven Mile Creek County Park and the Hwy 99 bridge have maintained isolated pools even in late summer. For example, in recent surveys isolated pools were observed in the SMC_GM1 and SMC_GM2 study reaches. Generally these pools were created by spring fed flow that became trapped by outcroppings of non-porous stream bed. These are areas of Seven Mile Creek that could be the focus of future habitat improvements. This area of the state was in a drought in the falls of 2011, 2012, and 2013 so stream conditions reflected this. The highest flow measured in 2014, below the springs, was measured at 0.67 cfs. A 4.7 mile section of the creek virtually dried up above the area with the springs. The pool, where the adult Brown Trout were sampled, appeared to have the only remaining and functional "lunker" structure. Spring floods, particularly in 2010 (park manager, personal communication), altered several of the trout habitat improvement projects installed in 2002 and 2007. Flooding was so bad in the park in 2010, that parts of the creek channel had to be moved and reshaped (park manager, personal communication).

**33. Ecological Classification of Waterway:** 0-4.5 I-D marginal trout waters

**34. Summary and Recommendations**

**Summary:** Inadequate habitat for adult Brown Trout was reflected in the 2014 sampling results. The annual stocking of 7,500 fingerling Brown Trout only resulted in age-0 fish sampled in fall 2014. Anecdotal reports indicated that fishing pressure and catch rates for brown trout were generally low at Seven Mile Creek. Switching from put-grow-and-take to a put-and-take strategy including the stocking of yearlings, may provide a more immediate return for anglers. Stocking yearlings would also provide an immediate harvestable fishery that would be utilized during periods of sustained flow, mostly during spring. Larger stocked fish may also be harvested before dry summer conditions deplete flow, reduce habitat availability, and trap fishes in isolated spring fed pools. Stocking yearlings would also allow for evaluation of natural reproduction. The 2011 survey report indicated that "perhaps a more thorough investigation into what remains of the in-stream habitat improvements should be conducted before additional money is spent on that type of work." On-site visits in spring 2012 conducted by Stream Habitat specialists from the MDNR led to a determination that during periods of sustained flow (spring) that habitat improvement structures were functioning as designed, thus, have provided appropriate trout habitat and remained functional. Unfortunately, reduced base flow is difficult to correct and regulate. The stocking of harvestable fishes would create a true put-and-take fishery during periods of sustained flow. Long term maintenance of a reproducing adult population was severely limited by the recent drought conditions. Despite all of this, Seven Mile Creek offers a unique trout angling opportunity in this part of the state.

**35. CREDITS AND SIGNATURES**

**a. Funding:** Federally funded under aid from the Sport Fish Restoration Act, F-29-R (P), Fisheries Management.

**b. Field work by:**

**Name of crew leader:** Sky Wigen – Hutchinson Area Fisheries Specialist

**Name of aide(s):** Chris Foster and Gene Jeseritz

**c. Completed report by:**

**Name:** Sky Wigen

**Title:** Natural Resource Specialist – Fisheries

**Approved by:** _____ **Date: April 15, 2015**
**Area Fisheries Supervisor**

**Approved by:** _____ **Date:**
**Regional Fisheries Manager**

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**Figure 1.** Sampling stations for the 2014 Seven Mile Creek special assessment.


SMC_BS1
SMC_BS2
SMC_BS4
SMC_BS3
SMC_WQ3