

Stream Status

Overall Strategy: Routine Watershed Management

Water Quality Rating: B-

Stream Class: Surface Water (SW)

Stream Type: Slightly entrenched, meandering, gravel dominated, riffle/pool channel.

Subwatershed Land Cover: 21% developed, 17% forests and woodlands, 13% grassland/shrubland/sparse vegetation, 1% lakes and open water wetlands, 38% planted or cultivated, 11% wetlands.



BASIC FACTS

Section	16
Township	30
Range	20
Stream Length	2.5 miles
Subwatershed Area	1336 acres
Baseflow	2.22 cfs
Bankfull Flow	7.29 cfs
Entrenchment Ratio	1.50
Width:Depth Ratio	12.00
Sinuosity	1.20
Slope	0.05
Rosgen Class	B4
DNR Trout Stream	No

Fish Species: N/A

CMSCWD References:
 Lower St. Croix River Spring Creek Stewardship Plan ('03)
 CMWD Silver Creek Corridor Management Plan ('04)
 Fisheries Stream Management Plan for Silver Creek in Washington County ('05)
 Fisheries Stream Survey for Silver Creek in Washington County ('05)

Macroinvertebrate Data (2002-2003)*

Metric	Score	Mean of Spring Creeks
Chironomidae Species Richness	28	21
Invertebrate Taxa Richness	28	31.75
HBI	4.4	4.4
% EPT	38.7	36.9
% Dominance	26.0	35.5
Most Common Families	Midges, Elimidae Beetles and Netspinner Caddisflies	

Water Chemistry (2000-2002)*

Parameter	Site Mean	Site σ	MPCA NCHF Benchmark MIS/St. Croix River		Mean of Spring Creeks
TP [$\mu\text{g/L}$]	29.19	6.73	90	55	42.47
NO ₂ +NO ₃ [mg/L]	0.52	0.34	0.1	0.203	2.15
TSS [mg/L]	8.38	12.07	8.8	7.50	15.96
Temperature [C]	11.80	6.01	13.0	10.30	9.95

*Refer to 2010 Watershed Management Plan Section V, Stream Management Plans for definitions of macroinvertebrate metrics and water chemistry parameters.

Overall Assessment: Silver Creek Flowage

Silver Creek Flowage is located just north of Stillwater, west of State Highway 95 and the St. Croix River. Silver Creek begins as a small meandering stream, at Silver Lake, flows through Carol Lake and continues approximately 2.5 miles downstream to the St. Croix River near the Historic Boom Site Landing. Before descending into the St. Croix Valley, Silver Creek passes through a small, shallow flowage-like lake formed by a beaver dam.

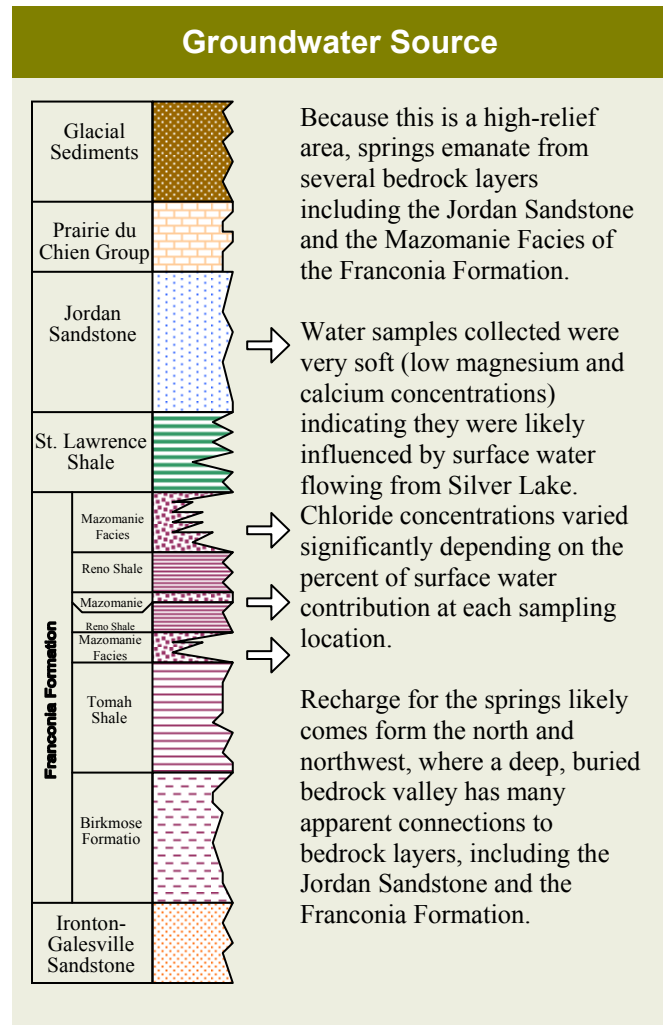
At one time there was a control structure at this site. Below the old beaver dam, Silver Creek becomes a high gradient stream, often flowing over bedrock outcroppings. Approximately ¼ mile before discharging to the St. Croix River, Silver Creek cascades over a 50-foot waterfall known as Fairy Falls.

The Silver Creek watershed is unique in that it contains good to high quality examples of the natural communities known to occur along the St. Croix Valley. Several portions of the corridor are shown on the Department of Natural Resources (DNR) Minnesota County Biological Survey (MCBS) Map of Rare Features for Washington County. DNR MCBS documented natural communities include maple-basswood forest, mesic oak forest, rich fen and dry prairie (sand gravel subtype).

Other natural communities present include floodplain forest, river beach, black ash seepage swamp, dry cliff, moist cliff, oak savanna, oak woodland, wet meadow, shrub swamp and emergent marsh. Rare species known to occur in the Silver Creek corridor include *Seiurus motacilla* (Louisiana waterthrush), *Dryopteris goldiana* (Goldie's fern), *Besseyia bullii* (kitten-tails), and *Aureolaria pedicularia* (fernleaf false foxglove). The Blanding's turtle (*Emydoidea blandingii*) is a state-listed threatened species that may be encountered throughout the watershed. Water quality monitoring of this stream began in 1998 and will continue indefinitely.

Based on macroinvertebrate data from the 2003 *Lower St. Croix River Spring Creek Stewardship Plan*, Silver Creek Flowage has a water quality rating of 'B-.' Hilsenhoff's biotic index (HBI) is good, but the presence of common families shows a likely issue with suspended solids. Data also indicate a decent percent EPT (percent of pollutant intolerant mayflies, stoneflies and caddisflies in the sample) and richness.

The DNR's 2005 *Fisheries Stream Management Plan for Silver Creek* includes an Operational Plan to *Facilitate and cooperate in implementing the Silver Creek Corridor Management Plan as compiled by Carnelian Marine Watershed District*. The DNR Plan's long term goal is to establish a small population of heritage brook trout into the lower reach of the Silver Creek once geomorphology, flow and water quality are *adequately improved*.



Key Management Recommendations from Spring Creek Stewardship Plan

- Small patches of bedrock-bluff prairie occur along the upper slope of the south-facing bluff of the Fairy Falls Ravine. This bedrock-bluff prairie is severely eroded with substantial invasion by woody species including prickly ash, buckthorn and eastern red cedar. This sensitive area should be restricted from foot traffic and other disturbances.
- Stormwater generated from Fairy Falls Road, Orwell Avenue and private driveway drains to Fairy Falls. Rain gardens, infiltration swales, diversion, and culvert retrofitting are all examples of techniques that can be used to control stormwater impacts to Silver Creek.
- The thermal protection afforded by streambank vegetation should be maintained continuously along Silver Creek. Stream-side forests should be closely monitored for buckthorn and if necessary, control measures implemented.
- Stormwater volume entering Silver Creek should be maintained at predevelopment conditions from new and existing development. Infiltration practices should be implemented to achieve predevelopment volumes.
- The valley along Silver Creek below Fairy Falls is poorly suited to foot paths due to talus slopes, steep, erodible streambanks, and frequent seeps and springs.
- Reestablish Meandering Stream Channel and Restore Riparian Plant Communities.
- Maintain Pool and Restore Wetland Plant Communities for Fairy Pond.
- Refer to Lower St. Croix River Spring Creek Stewardship Plan ('03) for additional detail on recommendations.

General Recommendations from the Silver Creek Corridor Management Plan

- Work with Stillwater Township to implement stormwater management standards that provide for no net increase in stormwater rate or volume to Silver Creek.
- Work with Stillwater Township to protect the water quality of Silver Creek and the Headwater Lakes. Discharge of nutrients, sediments and other pollutants should not degrade the quality of these waters.
- Work with Stillwater Township to implement the Silver Creek Corridor Plan, and to concentrate natural resource preservation efforts within a three-tier stream corridor.
- Develop a policy for beaver control. Beavers are present within all of the headwaters lakes and in portions of Silver Creek. Because beavers are beneficial in providing habitat for fish and wildlife, stabilizing erosive streams sections and attenuating in-stream flows, they should only be removed as a last resort.
- Develop a Wetland Management Plan that protects the unique wetland resources of the Silver Creek Corridor.
- Provide education for lakeshore residents on practices to prevent erosion, filter sediment and nutrients, and maintain wildlife habitat through landowner workshops and on-site demonstrations.
- Educate landowners on invasive species and their removal.

Specific Recommendations from the Silver Creek Corridor Management Plan

Stream Reach*	Recommended Action(s) & Implementation Status	Status
7	<ul style="list-style-type: none"> Establish grade control to limit further down cutting within the stream channel. By narrowing the stream channel (under base flow conditions), it is anticipated that the more concentrated flows during winter months will reduce ice build up in the stream channel. Re-slope vertical banks where severe bank erosion is occurring and stabilize banks. Selectively thin trees and shrubs in corridor to remove invasive species and encourage growth of native species. 	Actions implemented, currently working with landowner on monitoring and maintenance.
2 & 3	<ul style="list-style-type: none"> Protect the Rich Fen by establishing buffer around the edges of the fen and incorporating adjacent upland forest areas. Manage this site through selective removal of shrubs and controlled burns targeted to control cool season grasses. 	Actions implemented, for willing landowners currently working with landowners on monitoring and maintenance.
1	<ul style="list-style-type: none"> Restore stream meander to prevent stream bottom and bank erosion. Reduce stream velocities by lengthening the stream channel, or by creating greater channel roughness. Expand riparian corridor and fence to provide better separation from grazing areas. 	Action 3 implemented along with additional agricultural BMP's.
8 & 9	<ul style="list-style-type: none"> Complete a subwatershed storm water plan for the direct drainage area to Silver Creek from Fairy Falls to the St. Croix River. Stormwater rate and volume to Silver Creek upstream of Reach #8 should be maintained at existing levels, or where possible, reduced. 3. Limit thermal impacts to Silver Creek. 	District has completed a detailed hydrologic model of the Silver Creek drainage. Actions 2 & 3 are implemented by District review and permit program
8 & 9	<ul style="list-style-type: none"> Enhance stream fisheries habitat where sufficient pools and other cover are lacking. Address recreational use issues within the lower reaches of Silver Creek. 	NPS has addressed Action 2 for Reach 8.
4	<ul style="list-style-type: none"> Manage the dry prairie-woodland plant communities along the south facing slope above Fairy Pond. Work with Stillwater Township to protect critical portions of this parcel. 	Actions implemented, for willing landowners currently working with landowners on monitoring and maintenance.
2	<ul style="list-style-type: none"> Restore stream meanders lost due to past ditching activities. 	Implementation waiting for willing landowner.
2	<ul style="list-style-type: none"> Evaluate tributaries for stormwater impacts to determine if they contribute significant stormwater to the creek. 	
7	<ul style="list-style-type: none"> Restore oak woodland and black ash seepage swamp inclusions along the riparian corridor. 	Implemented selective thinning and invasive species removal.
5 & 6	<ul style="list-style-type: none"> Restore native plant communities along the riparian corridor. 	Actions implemented, for willing landowners currently working with landowners on monitoring and maintenance.
6	<ul style="list-style-type: none"> Design new culvert crossings for fish and wildlife passage should the structures under 94th Street and Fairy Falls Road be replaced. 	Stillwater Twp replaced 94th St. culvert with larger culvert.

* Stream reach recommendations listed in order of priority. Refer to CMWD Silver Creek Corridor Management Plan ('04) for map of reach locations and additional information.

** See 2010 Watershed Management Plan Section V, *Stream Management Plans* for additional information on District stream management activities.