

Stream Status

Priority Ranking: Routine Watershed Management

Water Quality Rating: A

Stream Class: Groundwater Large Watershed Nonurban (GWL)

Stream Type: Low sinuosity, gravel and sand dominated, gently graded channel with very low width to depth ratio. This stream is relatively stable and will likely remain so as long as stream banks are not disturbed.

Subwatershed Land Cover: 25% developed, 26% forests and woodlands, 7% grassland/shrubland/sparse vegetation, 38% planted or cultivated, 3% wetlands.



BASIC FACTS

Section	18
Township	32
Range	19
Stream Length	0.58 miles
Subwatershed Area	624 acres
Baseflow	0.34 cfs
Bankfull Flow	4.08 cfs
Entrenchment Ratio	2.20
Width:Depth Ratio	11.00
Sinuosity	1.16
Slope	0.06
Rosgen Class	E4b
DNR Trout Stream	No

Macroinvertebrate Data (2002-2003)*

Metric	Score	Mean of Spring Creeks
Chironomidae Species Richness	19	21
Invertebrate Taxa Richness	36	31.75
HBI	3.92	4.4
% EPT	41.97	36.9
% Dominance	45.77	35.5
Most Common Families	Midges, Small Minnow Mayfly, Nemourid Broadback	

Water Chemistry (2000-2002)*

Parameter	Site Mean	Site σ	MPCA NCHF Benchmark MIS/St. Croix River		Mean of Spring Creeks
TP [$\mu\text{g/L}$]	40.93	8.02	90	55	42.47
NO ₂ +NO ₃ [mg/L]	1.99	0.38	0.1	0.203	2.15
TSS [mg/L]	12.50	10.15	8.8	7.5	15.96
Temperature [C]	10.58	3.86	13.0	10.3	9.95

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

Fish Species:
Brook Trout

CMSCWD References:
Lower St. Croix River Spring Creek Stewardship Plan ('03)

Overall Assessment: Zavoral's Creek

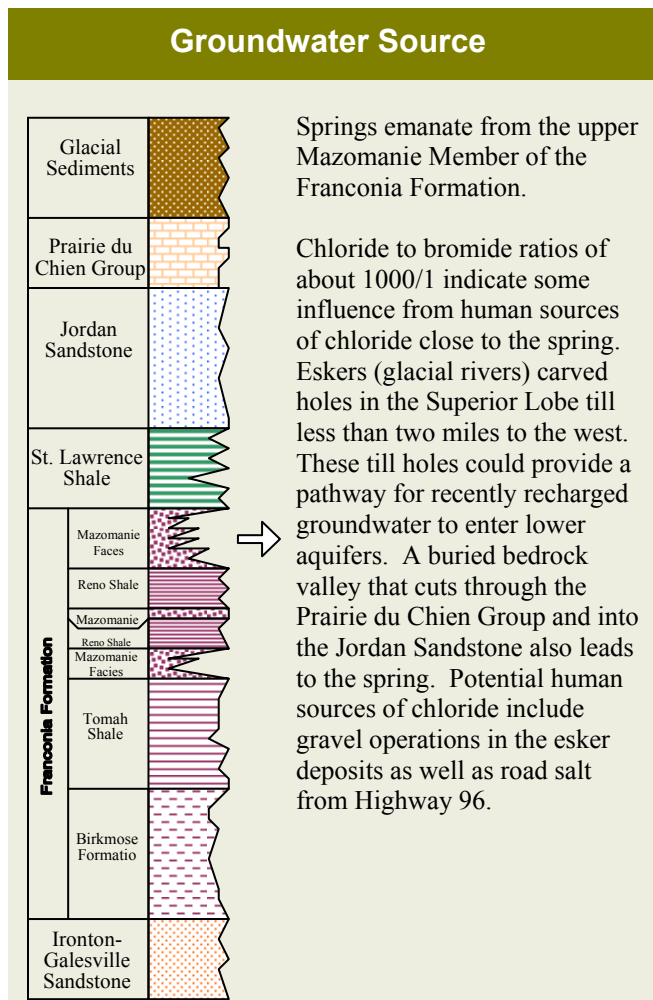
Zavoral's Creek starts as a ditch draining a portion of a large agricultural field. This drainage system crosses Highway 95 just north of Highway 97. In the lower portion of Zavoral's Creek, below Highway 95, it flows through a deep, rocky, canyon-like reach with several waterfalls. It is within this lower reach that the perennial flows occur. Near its confluence with the St. Croix River, Zavoral's Creek disappears (infiltrates into the ground) into a mixed hardwood seepage swamp approximately 200 to 300 feet before reaching the St. Croix River. Within this area, the single channel becomes a braided channel as it seeps across and through the seepage swamp. For this reason, there is no visible channel when viewed from the St. Croix River.

Zavoral's Creek is one of the better quality creeks evaluated as part of this study. The hydrology is complex in that the creek appears to lose and then gain flows within a relatively short distance. Flows just downstream of the railroad tracks are probably at least double what they are at the monitoring station (upstream of the railroad tracks). Moving downstream from the railroad tracks, flows largely disappear before the creek reaches the St. Croix River.

Although no formal fisheries survey has been completed for this creek, based on numerous sightings during field surveys, a healthy, naturally reproducing population of brook trout appears to be present. This creek is also unique in that it contains some short reaches of excellent habitat, with deep pools, cut banks, woody debris and a good distribution of riffles, runs and pools.

Plant communities include an excellent quality (A-rank) maple-basswood forest, bedrock bluff prairie, mixed hardwood seepage swamp and an exceptionally beautiful area of moist to wet cliff and talus slope with bryophyte communities. South-facing areas of this ravine contain undisturbed dry cliff grading into bedrock bluff prairie. There are no known DNR MCBS Records for the lower reaches of Zavoral's Creek.

Based on macroinvertebrate data from the 2003 *Lower St. Croix River Spring Creek Stewardship Plan*, Zavoral's Creek has a very good water quality rating of 'A.' Hilsenhoff's biotic index (HBI) is good, and the data show a decent percent EPT (percent of pollutant intolerant mayflies, stoneflies and caddisflies in the sample). Macroinvertebrate data looks good despite the extent and proximity of agricultural use within the watershed. In addition, the Blanding's turtle (*Emydoidea blandingii*) is a state-listed threatened species that may be encountered throughout the watershed.



Key Management Recommendations

- The driveway crossing the stream (located approximately 300 feet upstream of the St. Croix River) has a partially collapsed culvert. If this culvert is replaced, it should be placed to ensure that fish movement through the culvert is maintained.
- Activity within the gravel pit, located near the intersection of Hwy 95 and Hwy 97, should be closely monitored to ensure that sediment does not wash into Zavoral's Creek. Additionally, any dewatering of gravel pit ponds should be evaluated to assess potential impacts to groundwater flows.

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

THIS PAGE LEFT INTENTIONALLY BLANK