

Stream Status

Implementation Strategy: Focus

Stream Health Goal: A- (2003)

Stream Health Grade: C (2014)

Stream Class: Groundwater Large Watershed Nonurban (GWL)

Stream Type: Slightly entrenched, sand dominated, meandering channel, incised in gentle terrain.

Subwatershed Land Cover: 13% developed, 40% forests and woodlands, 9% grassland/shrubland/sparse vegetation, 36% planted or cultivated, 3% wetlands.



Macroinvertebrate Data*

Metric	Score 2014	District Mean 2014	Score 2003	District Mean 2003
Chironomidae Species Richness (total number)	-	-	21	21
Invertebrate Taxa Richness	22	19	26	31.75
HBI	4.25	4.43	4.5	4.4
% EPT	5.33	20.01	24.7	36.9
% Dominance	75.64	50.14	31.6	35.5
Three Most Common Families	Scuds, Bkflies, Riffle beetles	Scuds, Baetid mayflies, Bkflies	Scuds, Bkflies, Baetid mayflies	NA
Species of Note	Baetids	Midges, caddisflies	NA	NA

Water Chemistry*

Parameter	July 2013-2014	MPCA NCHF Benchmark Miss/St. Croix River		District Mean 2013-2014	District Mean 2003
TP [µg/L]	74.31	90	55	54.63	42.47
TN [µg/L]	5.87	NA	NA	2.67	NA
TSS [mg/L]	11.69	8.8	7.5	9.02	15.96
NO2+NO3 [mg/L]	NA	0.1	0.203	NA	2.15
NO ₃ [mg/L]	5.80	NA	NA	2.48	NA
NH ₄ [mg/L]	0.007	NA	NA	0.006	NA
Mean Temp [C]	NA	13	10.3	9.6	9.95
Temp S&W [C]	15-3	NA	NA	14.3-4.8	NA

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

BASIC FACTS

Section	19
Township	31
Range	19
Stream Length	0.9 miles
Subwatershed Area	1408 acres
Baseflow	0.86 cfs
Bankfull Flow	2.25 cfs
Entrenchment Ratio	1.42
Width:Depth Ratio	9.30
Sinuosity	1.10
Slope	0.02
Rosgen Class	G4
DNR Trout Stream	Yes

Fish Species:

Brook Trout

CMSCWD References:

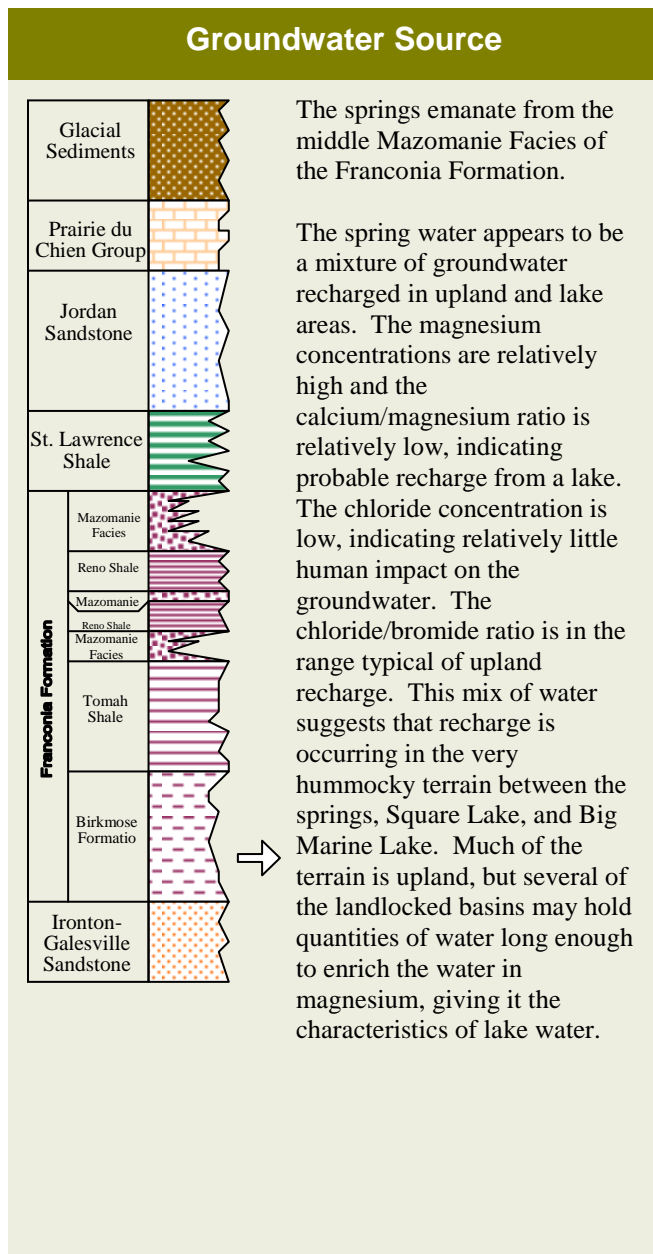
- Lower St. Croix River Select Small tributary Streams: An Aquatic Biotic Assessment, Ten Years Later (2014)
- Lower St. Croix River Spring Creek Stewardship Plan (2003)

Overall Assessment: Willow Brook

The 1150 acre watershed of Willow Brook is relatively undeveloped west of Highway 95, where it is dominated by forest, woodland, conifer plantation and old fields. The watershed east of Highway 95 is dominated by residential development, with Willow Brook flowing through the back yard of many residential homes. Willow Brook starts within a groundwater-dependent wetland complex west of Highway 95. East of Highway 95, Willow Brook flows through the Croixside Residential Development. Within this reach, Willow Brook is a moderate to high gradient stream. Just upstream of the St. Croix River, a series of small fish ponds has been formed behind concrete weirs.

The headwaters of Willow Brook encompass an excellent quality shrub fen/rich fen wetland complex. This wetland complex provides the majority of base flow to Willow Brook and is therefore important to the long term protection of this stream. Willow Brook contains populations of naturally reproducing brook trout (*Salvelinus fontinalis*). The Blanding's turtle (*Emydoidea blandingii*) is a state-listed threatened species that may be encountered throughout the watershed.

Based on macroinvertebrate data from the 2014 Watershed Management Plan Update, Willow Brook has a water quality rating of 'C.' Hilsenhoff's biotic index (HBI) and richness are decent. However, data show a very low percent EPT (percent of pollutant intolerant mayflies, stoneflies and caddisflies in the sample) with a very high dominance of a single taxa (scuds) compared to 2003.



Key Management Recommendations

- Streamside buffers should be protected or, where lacking, established continuously from Highway 95 to the mouth of the St. Croix River. Streamside buffers should be planted with native trees, shrubs and groundcover species and should extend over Willow Brook to provide thermal protection.
- Stormwater runoff, especially from roads and rooftops, should be retained on-site through the use of infiltration practices. Due to the high permeability of soils in this area, pretreatment of runoff may be necessary to protect groundwater quality.
- Protect existing buffers and create new ones where lacking, around the margins of the headwaters wetland and associated seepage areas west of Highway 95.
- Control buckthorn within Rich Fen located west of Highway 95. Buckthorn should be hand cut and treated with a basal application of an approved herbicide.
- Fallen trees, log jams and other natural materials should not be cleaned out of the stream channel, but rather left in place to provide instream habitat for aquatic organisms.
- Re-establishment of the stream channel around the ponds (to maintain stream velocity and reduce sediment deposition) should be considered. It is possible that the ponds could still be retained if groundwater sources and or streamflow is adequate.
- Landowners adjacent to the headwaters wetland should limit ATV use around the margins of the wetland, where damage to vegetation and erosion may result.

* See Appendix D for additional information on District stream management activities.

Planned Implementation Activity

- As a result of the Focused Implementation Strategy, a detailed implementation plan for the lower reach of Willow Brook will be developed in Summer 2015.

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