Stream Status

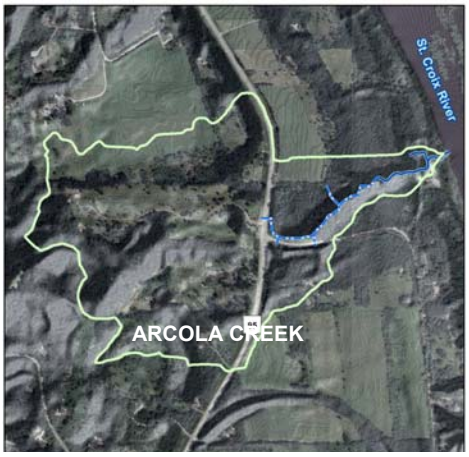
Overall Strategy: Routine Watershed Management

Water Quality Rating: A-

Stream Class: Groundwater Small Watershed Nonurban (GWS)

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

Subwatershed Land Cover: 14% developed, 43% forests and woodlands, 26% grassland/shrubland/sparse vegetation, 17% planted or cultivated.



Macroinvertebrate Data (2002-2003)*

Metric	Score	Mean of Spring Creeks
Chironomidae Species Richness		21
Invertebrate Taxa Richness	30	31.75
HBI	4.3	4.4
% EPT	34.9	36.9
% Dominance	24.4	35.5
Most Common Families	Scuds, Small Minnow Mayfly, Tortoiseshell Casemakers	

Water Chemistry (2000-2002)*

Parameter	Site Mean	Site σ	MPCA NCHF Benchmark MIS/St. Croix River		Mean of Spring Creeks
TP [µg/L]	39.21	31.74	90	55	42.47
NO_2+NO_3 [mg/L]	0.82	1.42	0.1	0.203	2.15
TSS [mg/L]	23.00	43.36	8.8	7.50	15.96
Temperature [C]	10.06	1.12	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.

BASIC FACTS

Section	31
Township	31
Range	19
Stream Length	0.18 miles
Subwatershed Area	145 acres
Baseflow	1.83 cfs
Bankfull Flow	3.09 cfs
Entrenchment Ratio	1.10
Width:Depth Ratio	7.00
Sinuosity	1.20
Slope	0.04
Rosgen Class	G4
DNR Trout Stream	No

Fish Species:
Brook Trout

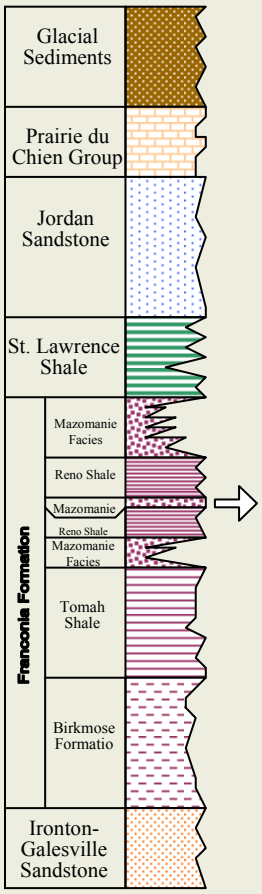
CMSCWD References:
Lower St. Croix River Spring Creek Stewardship Plan ('03)

Overall Assessment: Arcola Creek

The upper portion of the 160-acre watershed of Arcola Creek encompasses a mostly undeveloped area of old field, conifer plantations, woodland and forest. Large-lot residential home sites are present along Highway 95. Below Highway 95, the watershed is dominated by forested ravines along the St. Croix River. The perennial reach of Arcola Creek begins at the base of a rocky escarpment where groundwater discharges out of fissure in the rock. Arcola Creek then flows for about 500 feet to an old Mill Pond that once powered a saw mill. At this mill pond, a tributary discharging from a large spring to the north joins Arcola Creek. Downstream of the mill pond, Arcola Creek increases in gradient as it flows another 150 feet to join the St. Croix River.

Arcola Mills is located along the St. Croix River on a site that is as unique ecologically as it is historically. The same springs that powered the saw mills at the turn of the century today support the unusual groundwater–dependent plant communities that make Arcola Mills unique. Arcola Creek is a highly diverse stream ecosystem with a naturally reproducing population of brook trout. The lower portion of Arcola Creek flows through an excellent quality maple basswood forest shown on the *Natural Communities and Rare Species* map for Washington County. The lower portions of Arcola Creek also encompass small areas of mixed hardwood seepage swamp.

Groundwater Source



The springs emanate from the middle Mazomanie Facies of the Franconia Formation.

The spring water appears to be a mixture of groundwater recharged in upland and lake areas. The magnesium concentrations are relatively high and the calcium/magnesium ratio is relatively low, indicating probable recharge from a lake. The chloride concentration is low, indicating relatively little human impact on the groundwater. The chloride/bromide ratio is in the range typical of upland recharge. This mix of water suggests that recharge is occurring in the very hummocky terrain between the springs, Square Lake, and Big Marine Lake. Much of the terrain is upland, but several of the landlocked basins may hold quantities of water long enough to enrich the water in magnesium, giving it the characteristics of lake water.

Based on macroinvertebrate data from the 2003 *Lower St. Croix River Spring Creek Stewardship Plan*, Arcola Creek has a good water quality rating of 'A-.' Hilsenhoff's biotic index (HBI) is very good with decent percent EPT (percent of pollutant intolerant mayflies, stoneflies and caddisflies in the sample) and taxa richness. In fact, the study also identified two new species of macroinvertebrate taxa, thought to be extinct in Minnesota. The presence of a naturally reproducing population of brook trout is also an indicator of good water quality.

The Blanding's turtle (*Emydoidea blandingii*) is a state-listed threatened species that may be encountered throughout the watershed.

Key Management Recommendations

- Work with Mn/DOT to address stormwater runoff from roadway and inslopes at Highway 95 and Arcola Trail. Runoff currently washes off the road way surface and erodes the inslope. This area should be monitored and, if necessary, stabilized and replanted.
- Install an infiltration pond downstream of Highway 95 on the Arcola Mills property. The purpose of this pond is to reduce peak flow rates and stormwater runoff volume into Arcola Creek. This pond will help to stabilize the badly eroded head cut and lower sediment delivery rates to downstream areas.
- Once stormwater flow rates are stabilized, Arcola Mills Foundation should work with the Watershed to stabilize and restore stream banks within the perennial sections of Arcola Creek.
- The lower section of Arcola Creek should be restored with special emphasis given to sediment removal, improving instream connectivity, and bank stabilization.

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

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