

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

Stream Survey Report

**Briggs Creek
2011**

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SUMMARY

Briggs Creek is a designated trout stream with its headwater located in a wetland complex in Benton County, Minnesota. It flows 12.2 miles to the confluence with Briggs Lake in Sherburne County. The stream has a watershed of 5,844 acres, with dominant land uses of forest and agriculture. Stream temperatures are unfavorable for trout and no trout have been found since 1980, when yearling brown trout stocking was discontinued. Little to no suitable spawning substrate is available. Twenty species were sampled in the current survey, including eight species classified as tolerant and one as intolerant. The most common species captured were central mudminnow, brook stickleback, and white sucker. White sucker was the dominant species by weight.

STUDY AREA

Briggs Creek is a designated trout stream with its headwater located in a wetland complex in Benton County, Minnesota. It flows 12.2 miles to the confluence with Briggs Lake in Sherburne County (Figure 1). The creek has a overall gradient of 2.2 feet per mile and an overall sinuosity of 1.5. The watershed is 5,845 acres (Figure 2) with estimated land use of 34.3% forest, 31.8% cultivated crops, 14.1% pasture/hay, 9.5% wetland, 4.9% grassland/shrub, 4.4% residential, and 1.0% open water (Table 1).

Previous surveys were conducted in 1949, 1968, 1977, 1980, and 1985. A temperature profile was recorded in 1994. Brown trout yearlings were stocked almost annually from 1949 to 1980. No evidence of natural reproduction was found and stocking was discontinued due to lack of public access. No trout have been sampled since 1980.

METHODS

Water temperatures were recorded hourly using a Hobo Pendant data logger (model UA-001-08) at two sites from April to October (Figure 3).

Fish were sampled at three sites with a Smith Root BP-15D backpack electrofisher using pulsed DC current. All fish were identified, counted, and bulk weighed by species. Game fish were measured to the nearest mm and released. Index of Biotic Integrity (IBI) scores were calculated by the Minnesota Pollution Control Agency for each site.

Land use analysis and map production were done using ArcMap 9.3 and the 2001 International land use/land cover data.

RESULTS

Land use in the watershed is dominated by forest (34.3%) and cropland (31.8%; Table 1, Figure 2). The 1985 survey reported land use dominated by forest and pasture, with little cropland (MNDNR 1985). The stream substrate was primarily sand and silt. The riparian zone was dominated by alders, willows, sedges, and other wetland plant species.

Water temperatures were higher at the lower site (Figure 4) than at the upper site (Figure 5). At the lower site the maximum hourly temperature recorded was 81°F, with seven readings above 80°F. A total of 160 readings above 75°F were recorded with a maximum of 38 consecutive hours above 75°F. At the upper site, the maximum temperature was 78°F, with only 29 readings above 75°F. A maximum of 12 consecutive hours above 75°F were recorded.

A total of 20 species were captured via backpack electrofishing at three sites (Tables 2 and 3). Site 1 was located nearest to Briggs Lake and had the highest number of species (16). Game fish included: green sunfish, hybrid sunfish, largemouth bass, northern pike, walleye, and yellow perch. These were primarily found at site 1, nearest to Briggs Lake. Nongame species were dominated in number by central mudminnow, brook stickleback, and white sucker (Table 3). White sucker was the dominant species by weight.

IBI scores were low overall, but only EF 2 scored below the threshold for impairment (Table 4). EF 3 was just above the threshold level. Only EF 1 was above the upper confidence interval, indicating that it is not impaired. Both EF 2 and EF 3 could be considered impaired, based on the fish metrics used in scoring the IBI.

DISCUSSION

Trout stream designation affords some additional protection to Briggs Creek, but the increase in row crop agriculture in the watershed may be having a negative impact on water quality and sedimentation. IBI scores were low enough (Table 4) to consider most of the stream impaired or nearly so. Efforts should be made to identify agricultural or grazing areas close to

the stream which would benefit from buffering. The amount of riparian wetland and low elevations along the stream likely limit future development in the riparian zone or nearby.

Temperature data suggests that the lower portion of the stream should be classified as warmwater, whereas the upper reaches could be considered coolwater. Temperatures exceeding 80°F at the lower site preclude the persistence of cold water species. Temperatures above 75°F at the upper site are marginal for cold water species. The lack of any coldwater fish species in the present survey suggests that the stream is unable to support a coldwater assemblage in its present state.

A total of 20 species were captured in Briggs Creek (Table 3). Of these, eight are classified as tolerant and one as intolerant. In the 1985 survey, 18 species were captured with two species classified as intolerant (Iowa darter, blackchin shiner). Species found in 1985, but not in 2011 included: blackchin shiner, spottail shiner, black crappie, and yellow bullhead. The Minnesota Pollution Control Agency (MPCA) sampled one site in 2009 upstream from EF1 (MPCA data provided to Montrose Fisheries). Twenty species were captured, including: bigmouth shiner, brassy minnow, finescale dace, northern redbelly dace, and pearl dace, which were not found in 2011. Iowa darter was the only intolerant species captured in 2009. Some of these differences could be due to identification error, but differences in sample sites and variation in temperature and flow among seasons likely play a role also.

Management Implications

No plans exist to manage Briggs Creek for trout. Temperatures were too high in the lower section for brown trout survival and were marginal in the upper site. The lack of suitable spawning substrate would continue to prevent natural reproduction and stocking for a put-and-take fishery is not possible without public access. The small size and lack of habitat in the stream limit the potential for other gamefish growth and are unfavorable for a desirable fishery.

REFERENCES

Briggs Creek Survey. 1949, 1968, 1977, 1980, 1985. Minnesota Department of Natural Resources, Division of Fish and Wildlife, Section of Fisheries, St. Paul, MN.

Table 1. Briggs Creek watershed estimated land use (percent).

Land Use	2011*
Residential	4.4
Forest	34.3
Grassland/Shrub	4.9
Pasture/Hay	14.1
Cultivated Crops	31.8
Wetland	9.5
Open Water	1.0

* Based on 2001 National Land Cover Data

Table 2. Electrofishing stations and catch information, Briggs Creek, September, 2011.

Station	Length (ft)	Effort (sec)	# Species
EF 1	550	2,255	16
EF 2	610	1,950	10
EF 3	385	1,700	10
Total	1,545	5,905	20

Table 3. Backpack electrofishing results from Briggs Creek, September, 2011.

Species	EF 1	EF2	EF 3	Total	CPUE (#/hr)	Bulk Weight (g)	Length Range (mm)
Black bullhead ²	1			1	0.7	5	78
Blackside darter	2			2	1.4	10	73-87
Bluntnose minnow ²	1		1	2	1.4	4	60-71
Brook stickleback ²		7	79	86	58.9	54	32-63
Central mudminnow ²	33	58	99	190	130.1	870	37-105
Common shiner		5	36	41	28.1	250	59-135
Creek chub ²		4		4	2.7	300	51-220
Fathead minnow ²			2	2	1.4	1	58
Green sunfish ²	1			1	0.7	20	82
Hybrid sunfish	2			2	1.4	95	100-120
Iowa darter ¹	5			5	3.4	9	37-60
Johnny darter	7	1		8	5.5	13	45-66
Largemouth bass	4		1	5	3.4	20	51-93
Logperch	17			17	11.6	130	56-108
Mimic shiner			3	3	2.1	6	72-81
Northern pike	4	1	2	7	4.8	545	200-275
Pumpkinseed	6	3		9	6.2	120	70-75
Spotfin shiner	1	2		3	2.1	6	71-72
Walleye	1			1	0.7	33	157
White sucker ²	11	20	27	58	39.7	3,280	92-230
Yellow perch	42	9	6	57	39.0	810	60-165
Total	138	110	256	504	345.2	6,581	

¹ = intolerant species; ² = tolerant species

Table 4. IBI Scores for electrofishing sites, Briggs Creek, September, 2011.

Site	IBI Score	Threshold	Upper CI	Lower CI
EF 1	58.8	40	50	30
EF 2	38.5	40	50	30
EF 3	41.1	40	50	30

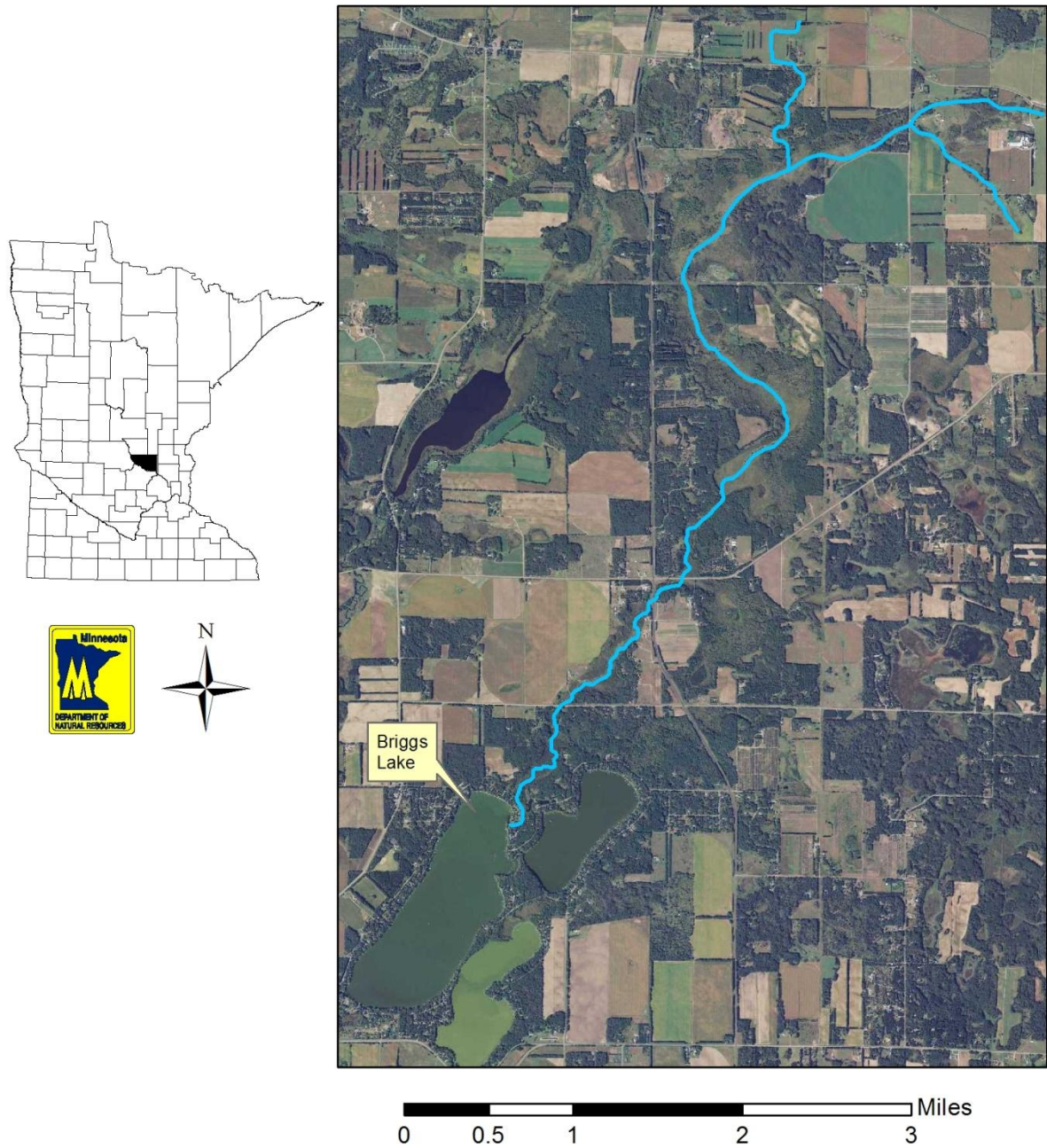


Figure 1. Location of Briggs Creek, Sherburne County, MN.

Briggs Creek Watershed Land Use

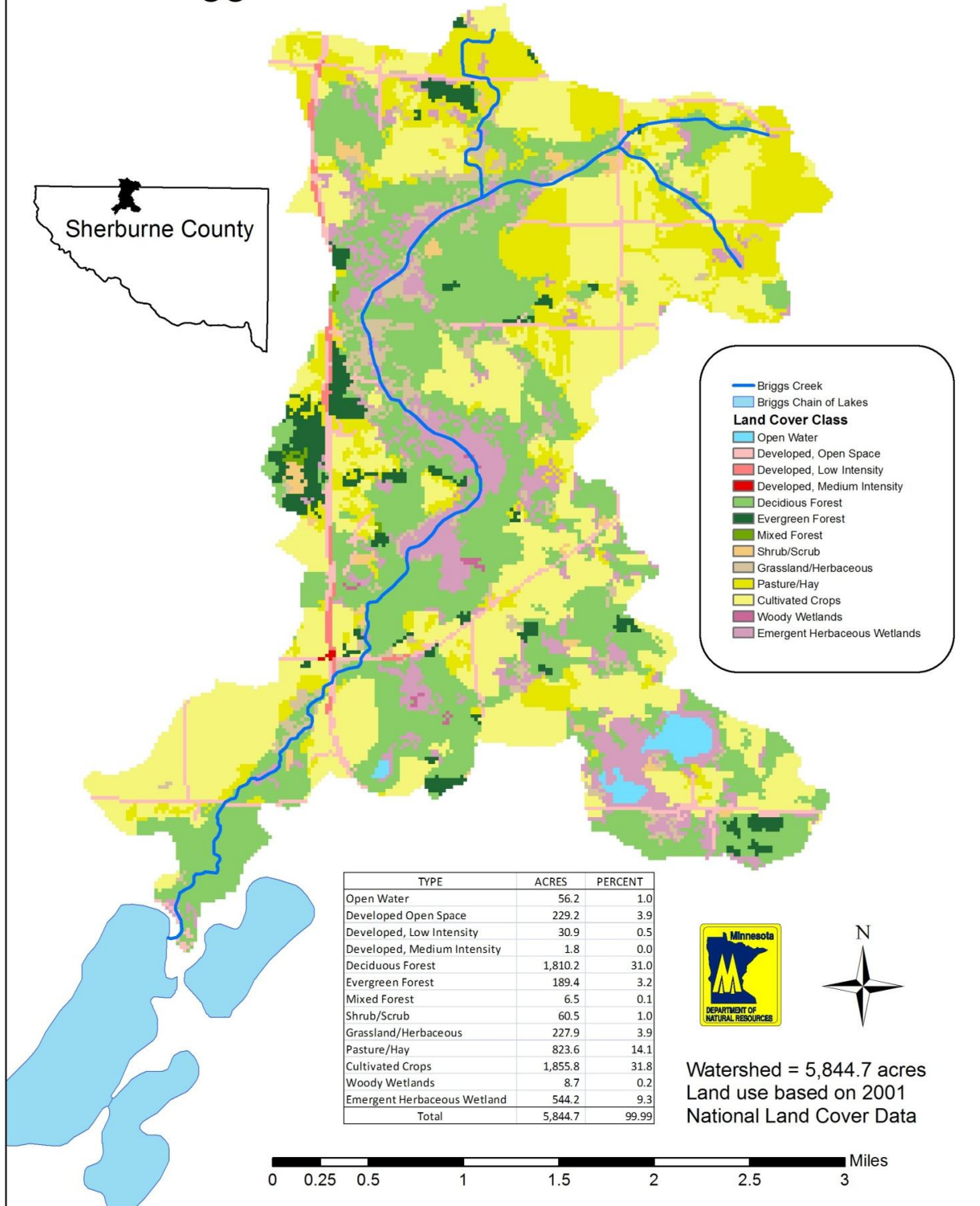


Figure 2. Watershed land use, Briggs Creek, MN.

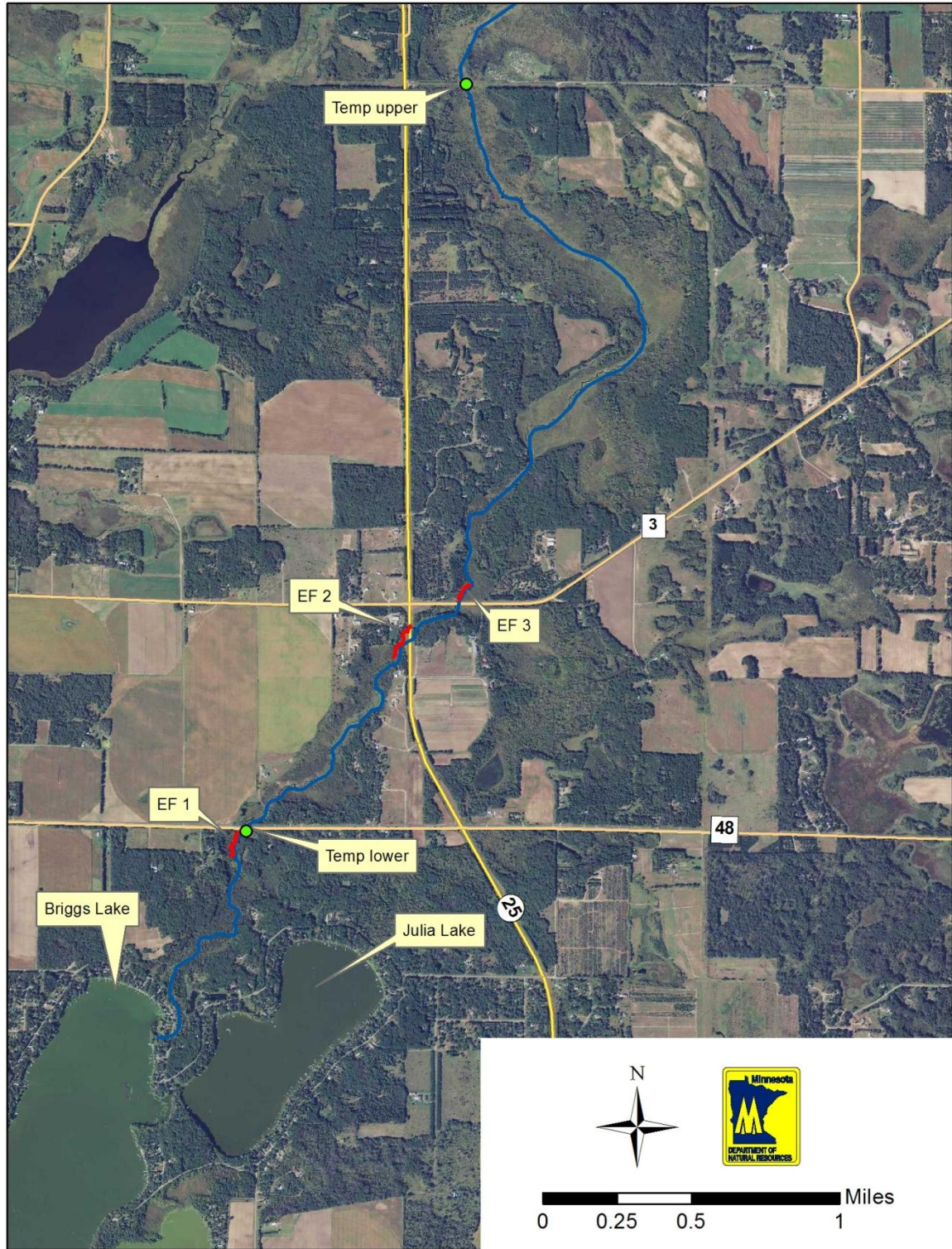


Figure 3. Location of electrofishing and temperature monitor sites, Briggs Creek, 2011.

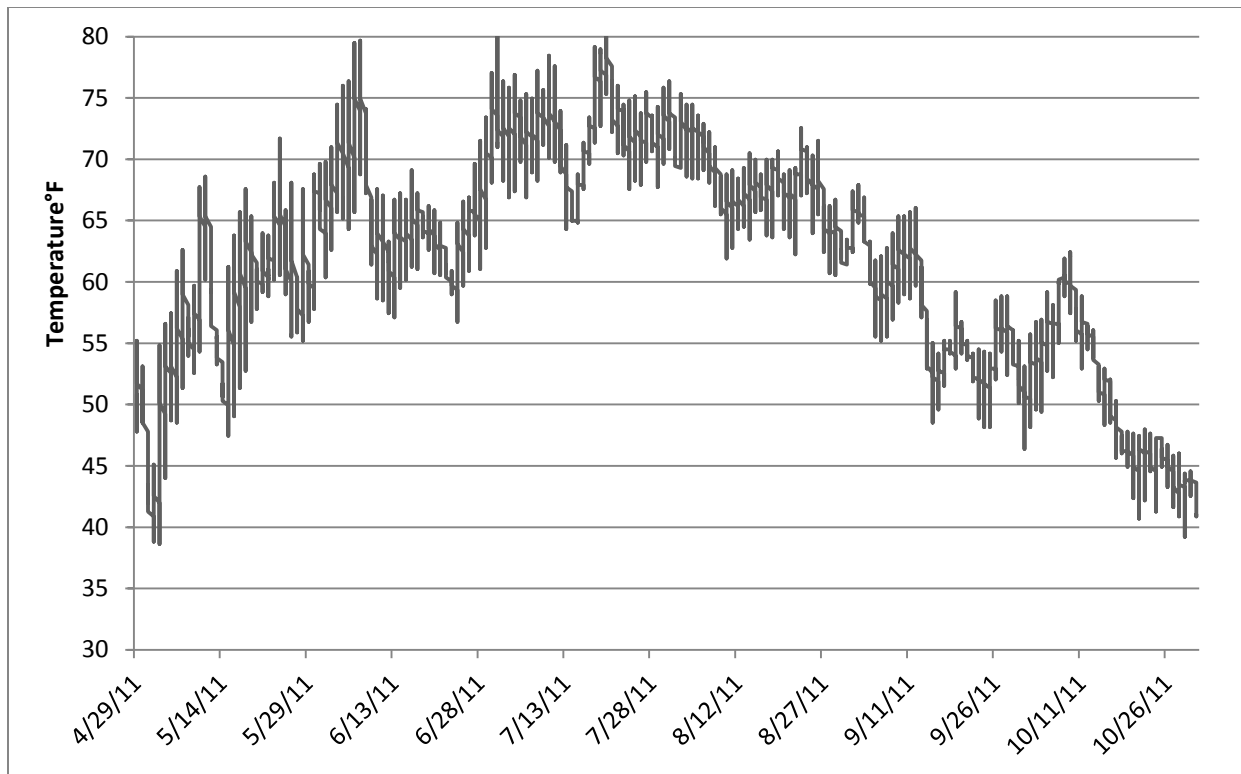


Figure 4. Hourly temperatures (°F) at lower temperature logger, Briggs Creek, MN, April-October, 2011.

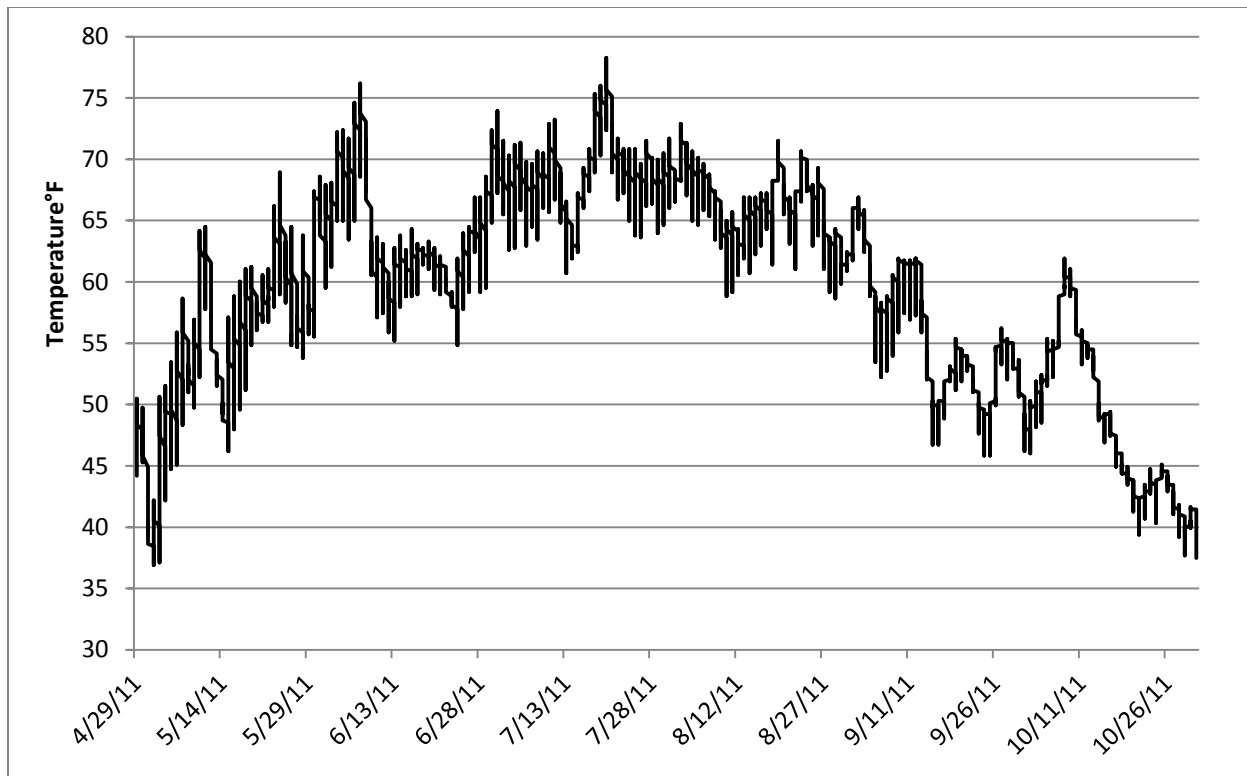


Figure 5. Hourly temperatures (°F) at upper temperature logger, Briggs Creek, MN, April-October, 2011.

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