Appendix A: Detailed descriptions of thermal habitat use designation reviews

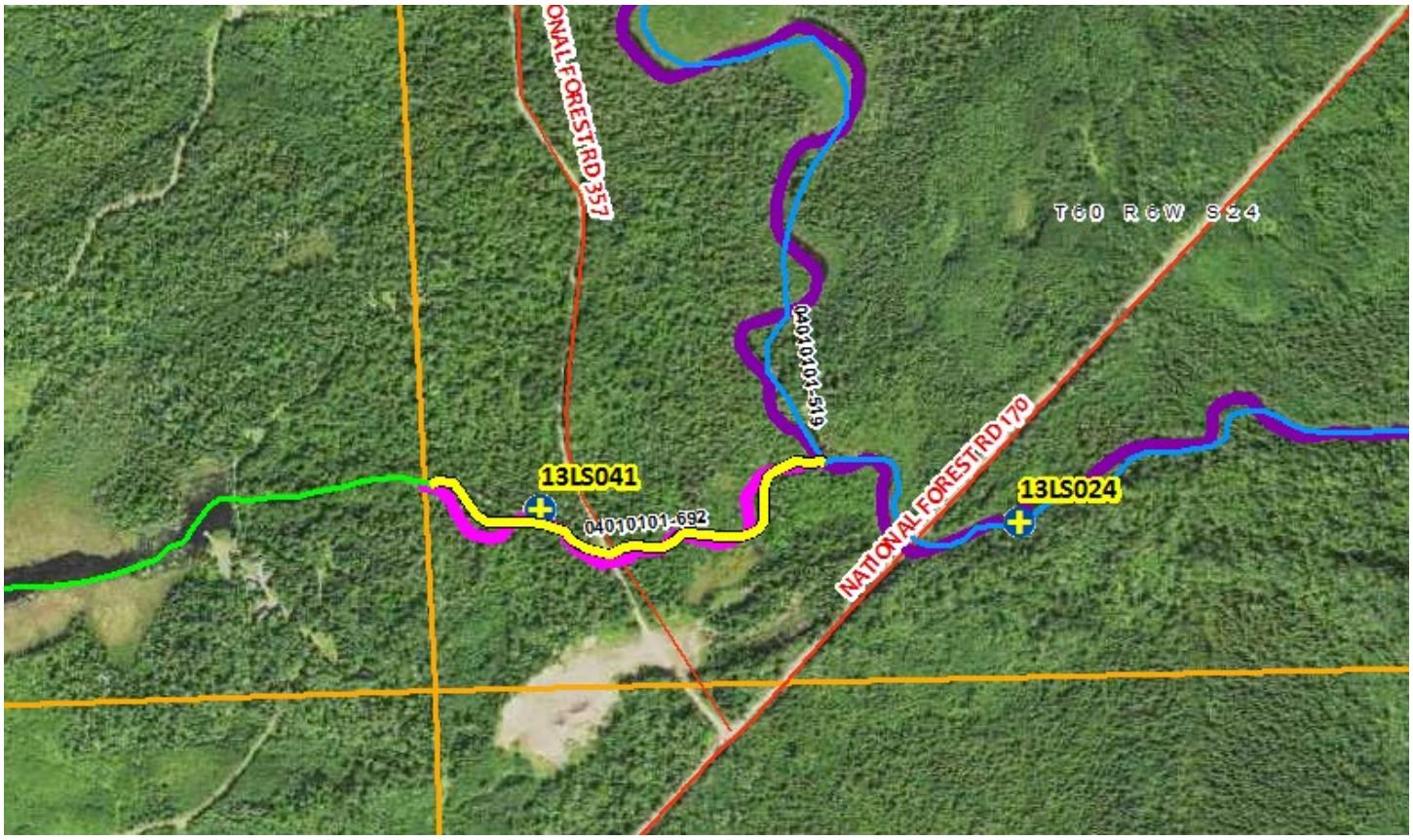
Wilson Creek (04010101-692) MPCA Use Designation Review

Stream name: Wilson Creek
AUID(s): 04010101-692
AUID description: T60 R6W S24, west line to Cross River
Field number(s): 13LS041
Sample dates: 2013
Watershed: Lake Superior North (04010101)
County: Lake

DNR designation: Trout protection tributary
DNR management class: I-D (Marginal trout water)

Current AUID designation: 2Ag (cold water)
Reason for review: Fish, macroinvertebrate, and temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.

Additional Information: The upstream terminus of this reach is essentially Wilson Lake, though it is officially described in Minn. R. 7050 by a legal description. The reach in question is the outlet of Wilson Lake, flowing for 0.34 miles before emptying into the Cross River.



Review of existing data

MPCA monitoring data

MPCA biological data

MPCA has conducted biomonitoring surveys at one location on this reach, 13LS041, which is immediately upstream of Forest Road 357. Fish and macroinvertebrates were sample at this station in 2013. The observed fish assemblage lacked trout and sculpin, and included several warm water taxa (e.g., tadpole madtom, yellow perch). A single cool water fish species (longnose dace) was sampled. *Leuctra,* representing cold water stoneflies (Plecoptera) was the only cold water macroinvertebrate taxa observed at this site. Only 2 specimens were sampled, comprising 0.6% of the sample, suggesting that the thermal regime of this stream may be too warm to support a cold water macroinvertebrate assemblage.

Fish Data: 13LS041, 8/13/2013					
Common Name	CN Code	Min	Max	Weight	Number
blacknose dace	BND	62	95	161	29
longnose dace	LND	71	113	153	18
yellow perch	YEP	87	105	60	7
creek chub	CRC	92	113	56	6
tadpole madtom	TPM	71	98	45	5
central mudminnow	CNM	66	86	22	4
common shiner	CSH	116	134	36	2
white sucker	WTS	123	123	20	1

MPCA Temperature data

A continuously-recording stream temperature logger was deployed in this reach by MPCA during the summer of 2013. Summary data for the logger deployment can be found in the table at right. "No Growth", "Growth", "Stress", and "Lethal" temperature ranges are specific to brook trout; the date range for the summary statistics is June 1 to August 31.

Water temperature logger summary data (2013)

Field Number	Growth Days	Stress Days	Lethal Days	Summer Avg Temp (◦C)	June Avg Temp (◦C)	July Avg Temp (◦C)	Aug. Avg Temp (◦C)	% Days Recording
13LS041	49.3	46.9	3.8	19.6	16.4	20.9	21.5	100

DNR information

The DNR has not surveyed this reach and it was probably placed on the list of Designated Trout Streams as a "protected tributary" to the Cross River. This stream has not demonstrated any cold water potential though DNR has no previous information on it. The fact that the stream comes directly out of a lake leads DNR to infer that the water is likely too warm to support trout.

MPCA Summary

MPCA biological monitoring did not sample any cold water fish species and only a single cool water fish species (longnose dace) was sampled. The macroinvertebrate sample included 1 cold water taxa (*Leuctra*) and comprised 0.6% of the sample. Temperature logger data had an average July water temperature of 20.9°C and temperatures were in the growth range only 49.3% of the summer. This stream is the outlet for Wilson Lake and would not be expected to support a cold water habitat. The DNR does not manage this stream as a trout water and it was designated as a trout protection water for the Cross River.

Spider Creek (04010201-617, 04010201-862, 04010201-863, 04010201-864, 04010201-865, 04010201-866, 04010201-867, 04010201-869) MPCA Use Designation Review

Stream name: Spider Creek (Spider Muskrat Creek)
AUID(s): 04010201-617, 04010201-862, 04010201-863, 04010201-864, 04010201-865, 04010201-866, 04010201-867, 04010201-869
Tributaries: 04010201-870, 04010201-871, 04010201-872, 04010201-873, 04010201-874, 04010201-875
AUID description: Headwaters to Whiteface River
MPCA biological station(s): 67LS017, 19LS006, 15LS065, 67LS018, 98LS049
Watershed: St. Louis (04010201)
County: St. Louis

DNR designation: Not a designated trout water
DNR management class: unknown

Current AUID designation: 2Ag (cold water)
Reason for review: DNR delisting
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.

Map of Spider Creek (04010201-617, 04010201-862, 04010201-863, 04010201-864, 04010201-865, 04010201-866, 04010201-867, 04010201-869)

Review of existing data

MPCA monitoring data

MPCA biological data

Fish data: 67LS017, 8/6/2015 (Barr Eng.)					
Common Name	CN Code	Min	Max	Weight	Number
johnny darter	JND	45	70	39	18
white sucker	WTS	70	200	698	17
blacknose dace	BND	40	85	38	12
creek chub	CRC	125	180	297	7
central mudminnow	CNM	55	75	21	6
mottled sculpin	MTS	80	85	18	2
northern pike	NOP	140	190	67	2
brook trout	BKT	220	220	107	1
pearl dace	PRD	80	80	5	1

Fish data: 19LS006, 6/17/2019					
Common Name	CN Code	Min	Max	Weight	Number
blacknose dace	BND	32	99	342	65
pearl dace	PRD	49	88	46	23
central mudminnow	CNM	34	66	38	18
creek chub	CRC	51	210	206	11
johnny darter	JND	38	61	18	9
common shiner	CSH	50	143	76	8
northern redbelly dace	NRD	32	41	5	8
white sucker	WTS	64	215	289	8
mottled sculpin	MTS	70	84	19	3
muskellunge	MUE	48	50	1	2

Fish data: 15LS065, 8/6/2015					
Common Name	CN Code	Min	Max	Weight	Number
pearl dace	PRD	60	95	940	181
johnny darter	JND	30	65	103	69
creek chub	CRC	30	165	489	63
blacknose dace	BND	40	75	140	58
white sucker	WTS	30	170	244	27
common shiner	CSH	50	70	32	12
blacknose shiner	BNS	30	45	3	7
central mudminnow	CNM	70	90	30	6
brassy minnow	BRM	55	65	12	5
brook stickleback	BST	55	56	3	2
mottled sculpin	MTS	70	85	13	2

Fish data: 98LS049, 8/19/1998					
Common Name	CN Code	Min	Max	Weight	Number
longnose dace	LND	42	101	272.5	57
mottled sculpin	MTS	32	95	117.5	22

Fish data: 98LS049, 8/19/1998					
Common Name	CN Code	Min	Max	Weight	Number
johnny darter	JND	39	65	32.5	12
bluegill	BLG	55	65	44	10
central mudminnow	CNM	50	82	11.5	3
trout-perch	TRP	80	97	20.5	3
white sucker	WTS	79	210	120	3
burbot	BUB	174	187	72	2
northern pike	NOP	179	179	32	1

Fish data: 98LS049, 6/11/2009					
Common Name	CNC ode	Min	Max	Weight	Number
longnose dace	LND	65	117	122	23
mottled sculpin	MTS	53	105	87.5	15
johnny darter	JND	43	72	22	11
burbot	BUB	140	215	209.5	8
creek chub	CRC	98	199	268.5	5
central mudminnow	CNM	49	95	14.5	4
common shiner	CSH	71	175	66.5	3
black bullhead	BLB	92	92	11	1
brassy minnow	BRM	46	46	0.5	1

Fish data: 98LS049, 7/2/2009					
Common Name	CN Code	Min	Max	Weight	Number
white sucker	WTS	23	206	103	30
longnose dace	LND	28	106	89	15
mottled sculpin	MTS	23	94	39	14
johnny darter	JND	54	63	20	10
central mudminnow	CNM	60	80	32	6
creek chub	CRC	59	71	9	3
northern redbelly dace	NRD	35	40	0.5	2
blacknose shiner	BNS	68	68	2	1

Inverts
67LS017, 9/18/2015 (Barr Eng.): No cold water macroinvertebrate taxa
19LS006, 8/28/2019: No cold water macroinvertebrate taxa
98LS049, 9/10/1998: Brachycentrus, Lype, and Ephemerella; 6 individuals, 1.8% of sample
98LS049, 8/11/2009: No cold water macroinvertebrate taxa

MPCA Temperature data

Water temperature logger summary data measured at 98LS049

Year	Growth Days	Stress Days	Lethal Days	Summer Avg Temp (◦C)	June Avg Temp (◦C)	July Avg Temp (◦C)	Aug. Avg Temp (◦C)	% Days Recording
2009	72.8%	25.9%	1.3%	18.1	17.6	18.2	20.2	100%

DNR information

Spider Creek was stocked with trout from 1955 to 1962. Fish electrofishing assessments in 1947, 1967 and 2005 found no trout species present. Continuous temperature monitoring was completed at two locations in 2003, 2004 and 2005. Stressful temperatures were present on average 19% to 27% of the time period from June 1 – Sept. 15. In addition, periodic lethal readings were recorded at both sites. These temperatures are not conducive to supporting trout populations.

DNR Temperature data

DNR water temperature logger summary data measured at Hwy 5 (near 98LS049)

Year	Growth Days	Stress Days	Lethal Days	Summer Avg Temp (◦C)	June Avg Temp (◦C)	July Avg Temp (◦C)	Aug. Avg Temp (◦C)	% Days Recording
2003	58%	42%	0%	18.7	17.6	18.2	20.2	95%
2004	76%	24%	1%	16.8	13.3	20.2	16.9	100%
2005	52%	42%	6%	19.8	17.4	21.9	20.1	100%

DNR water temperature logger summary data measured in T52 R19W S24 (near 15LS065)

Year	Growth Days	Stress Days	Lethal Days	Summer Avg Temp (◦C)	June Avg Temp (◦C)	July Avg Temp (◦C)	Aug. Avg Temp (◦C)	% Days Recording
2003	73%	27%	0%	18.1	16.3	18.8	18.9	95%
2004	87%	13%	0%	16.4	15.9	17.8	15.3	100%
2005	64%	35%	1%	18.8	18.3	20.2	17.9	100%

MPCA Summary

The DNR removed Spider Creek from the trout waters list in 2008 (State of Minnesota 2008) for two main reasons: (1) three years (2003-2005) of temperature logger data indicate that it is not suitable to support a cold water fish assemblage and (2) since its designation in the 1960's there has been no evidence of trout reproduction or any return from trout stocking efforts. Data collected by the MPCA in 2009 support DNR's sampling result of no trout sampled in any visits from 1947 to 2009 in the lower portions of this stream (04010201-617, 04010201-862, 04010201-863, 04010201-864, and 04010201-865). A single cold water fish species (mottled sculpin) and five cool-water fish species (brassy minnow, brook stickleback, northern redbelly dace, longnose dace, and burbot) were sampled. One macroinvertebrate sample include three cold water taxa (*Brachycentrus, Lype, and Ephemerella*) in low numbers (1.8% of sample) and a second sample contained no cold water taxa. Water temperature logger data was collected from two stations in 2003, 2004, 2005, and 2009 had an average July water temperature of 17.8.-21.9°C and temperatures were in the growth range for brook trout 52-87% of the summer. These data indicate that water temperatures in these stream reaches are marginally cold, but during some periods and years it is unsuitable for cold water biota. The biological data in the lower portion of Spider Creek were also marginal and are indicative of a cool or warm water habitat. The Class 2Ag designation for the upper portions of Spider Creek (04010201-866, 04010201-867, and 04010201-869) will be retained based on the presence of brook trout in the 2015 Barr Engineering electrofishing sample. No water temperature data were available for the upper reaches of the Spider Creek and no cold water macroinvertebrate taxa were collected. Additional study is needed to determine if the upper reaches of Spider Creek are an existing cold water habitat and if so what is the extent of that habitat.

Unnamed creek (Peters Creek) (04010201-823, 04010201-824) MPCA Use Designation Review

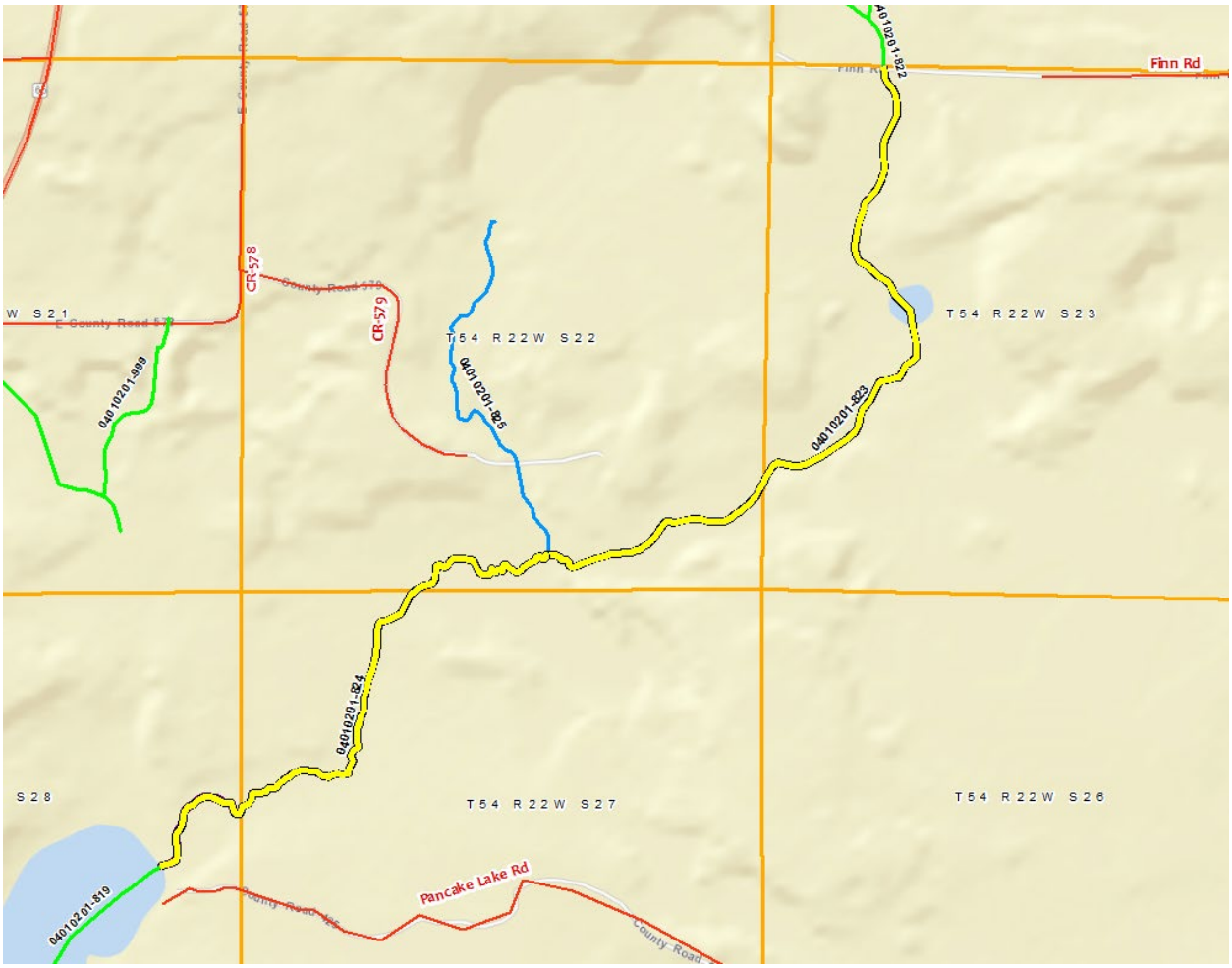
Stream name: Unnamed creek (Peters Creek) (04010201-823, 04010201-824)
AUID(s): 04010201-823, 04010201-824
AUID description: 04010201-823: T54 R22W S23, north line to Unnamed cr; 04010201-824: Unnamed cr to Pancake Lk
Tributaries: 04010201-825
MPCA biological station(s): none
MPCA sample dates: NA
County: Itasca
Watershed: St. Louis

DNR designation: Not a designated trout water
DNR management class: None/warm water

Current AUID designation: 2Ag (cold water)
Reason for review: DNR use designation review
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.

Locality Detail: Flowing for 2.8 miles from T54 R22W S23, north line to Pancake Lake; located within PLS system sections 14, 15, 16, 21, 22, 23, 26, 27, 28 TWP 64, RNG 22W.

Additional information: Unnamed Creek (Peters Creek) was first stocked in 1974, but it is not clear when the original trout water designation took place. The only records of fish stocking was in the fall of 1974 and 1977. 04010201-825 tributary was considered a feeder stream, but the 1977 survey report indicated there was insufficient flow from this tributary. This reach was removed from the trout waters list by the DNR in 2018 (State of Minnesota 2018).



Map of unnamed creek (Peters Creek) (04010201-823, 04010201-824)

Monitoring and Management History

MPCA Surveys

No MPCA monitoring data

DNR Surveys:

1977: Sampled on October 5, 1977 after trout were stocked (9/30/1977). Temperature data was limited and October sampling period make this information less useful. Seeps were observed with some watercress in the feeder stream (04010201-825). Sampled 11 trout at one station (feeder stream) and none at the other. All trout were sampled at the station just downstream of where they were stocked fiver days earlier. 80% of stocked trout exhibited symptoms of fin rot with emaciated dorsal, caudal, and pectoral fins. Peter's Creek was described as being heavily congested with alder and would not be capable of supporting a native population of trout. The feeder stream described as having characteristics of a trout stream, but low flows prelude management as a trout water. Report recommended removing the trout stream designation.

1980: Surveyed on November 5, 1980. No trout were sampled during the 1980 survey. Report stated that dense alder thickets, mucky substrate, limited flow, and gradient resulted in marginal trout habitat. The report concluded that Peter's Creek has limited potential for trout management and recommended against stocking.

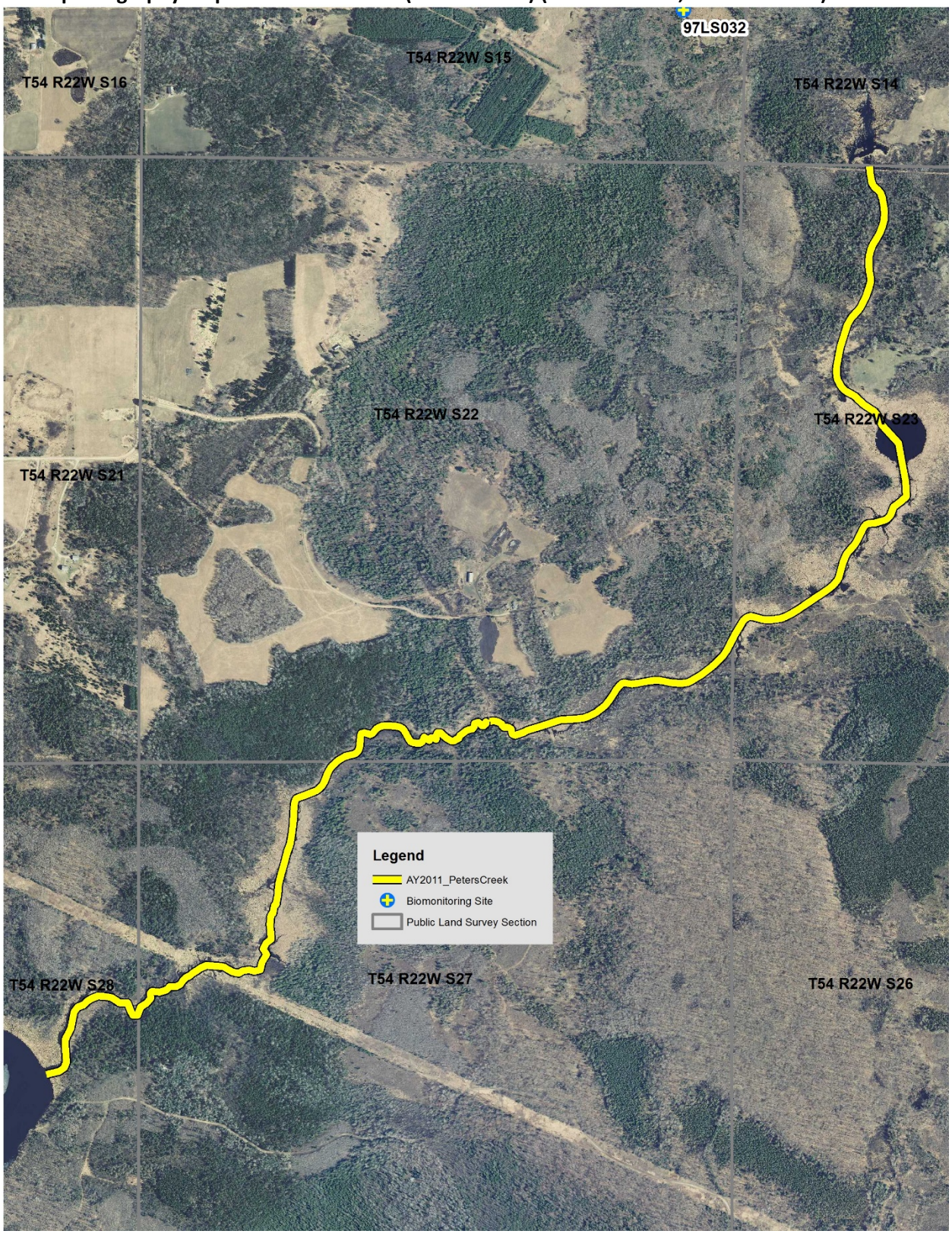
MPCA Summary

This stream was stocked by the DNR with brook trout in 1974 and 1977. A survey in 1977, 5 days after stocking, collected 11 trout. Most of the trout collected in this survey had signs of fin rot indicating that this stream is not suitable for trout management. A survey in the fall of 1980 did not collect any trout. Two DNR reports indicate that dense alder thickets, mucky substrate, limited flow, and low gradient result in marginal trout habitat in this stream. As a result, the DNR concluded that Peter's Creek has limited potential for trout management. This reach was removed from the trout waters list by the DNR in 2018 (State of Minnesota 2018).

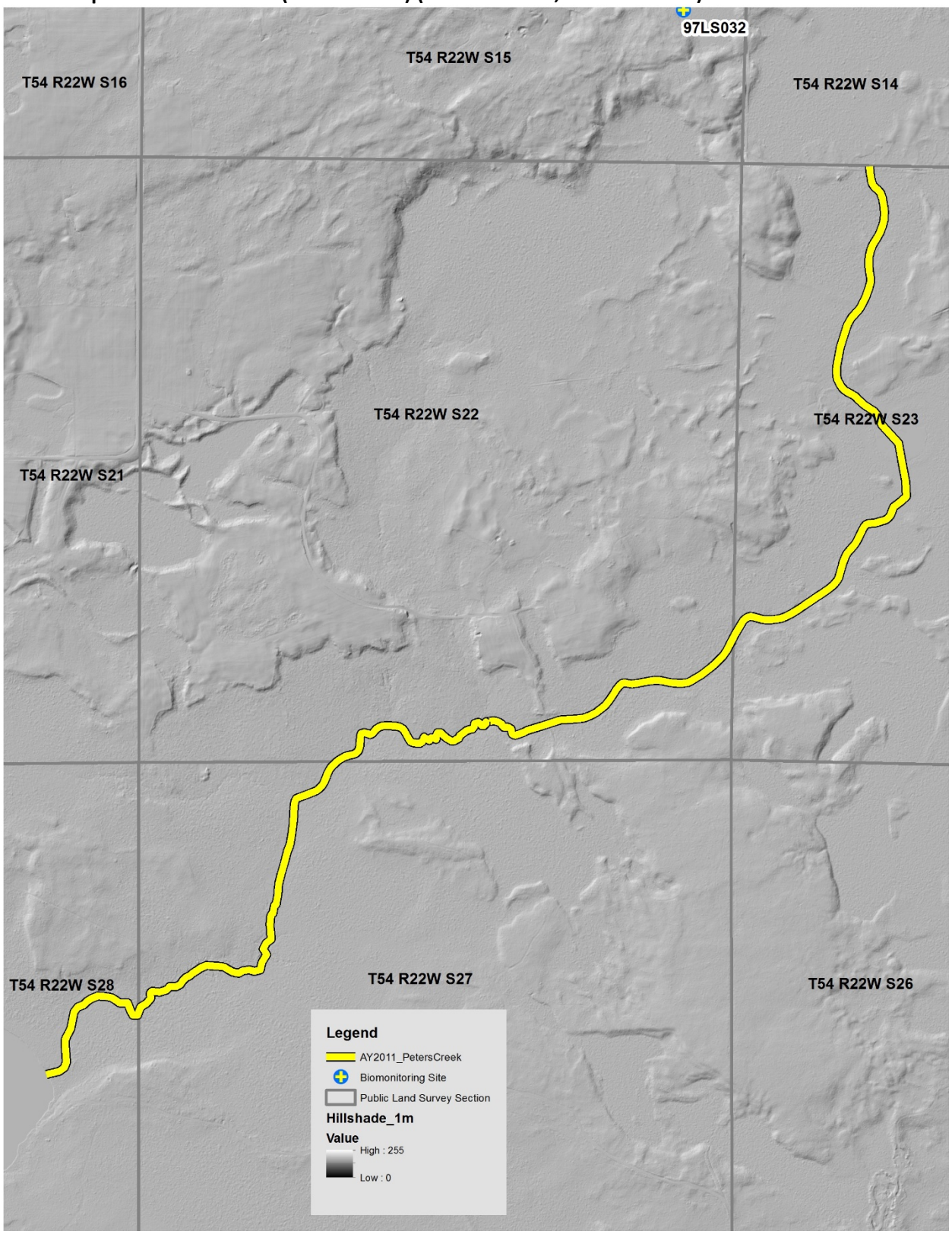
References

State of Minnesota (2018) State Register, 30 April 2018. Volume 42, Number 44. pp. 1298-1341.

Aerial photography map of unnamed creek (Peters Creek) (04010201-823, 04010201-824)



LIDAR map of unnamed creek (Peters Creek) (04010201-823, 04010201-824)



Unnamed Creek (Carey Creek) (04010202-617) MPCA Use Designation Review

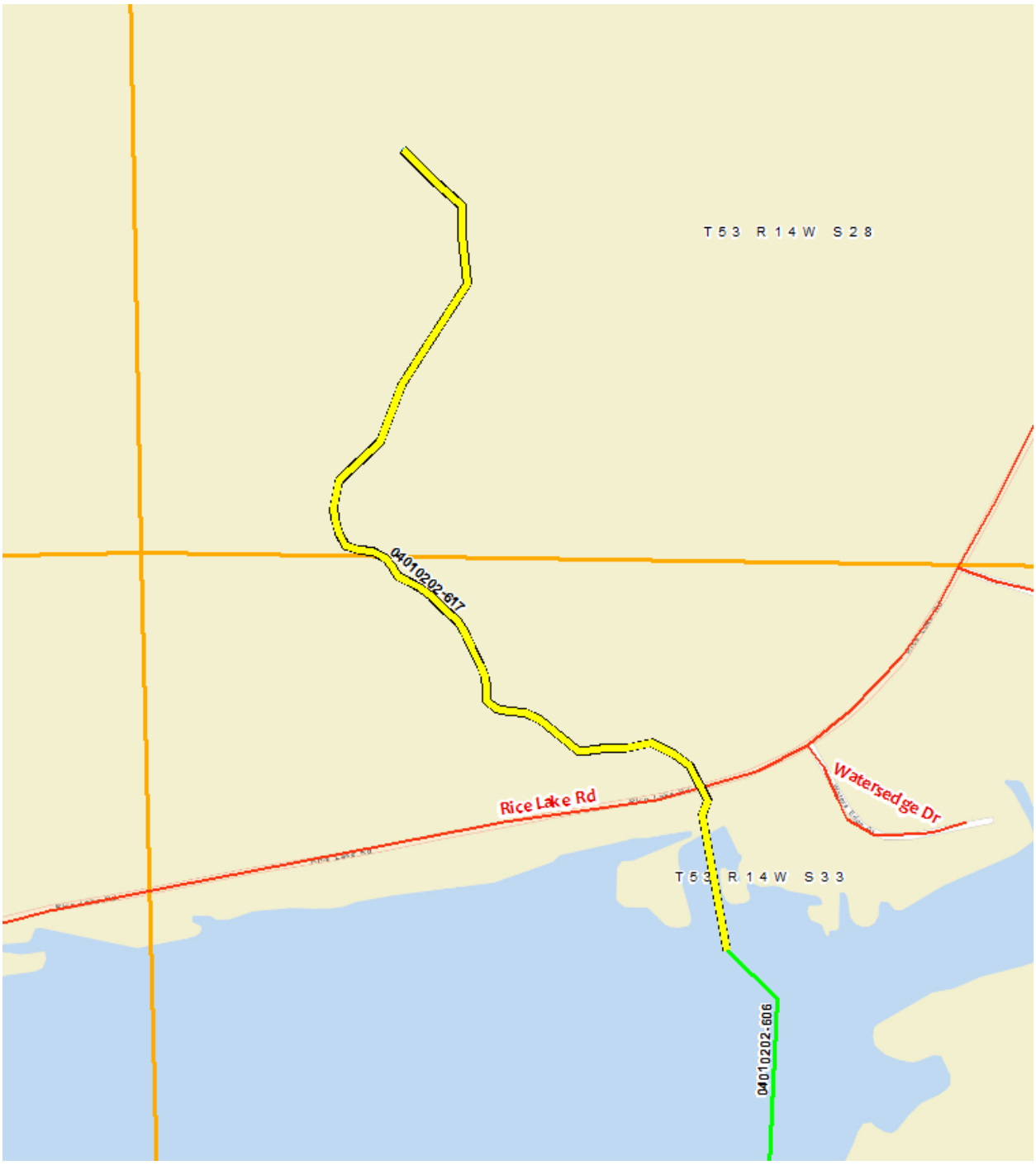
Stream name: Unnamed creek (Carey Creek)
AUID(s): 04010202-617
AUID description: Headwaters to Island Lake Reservoir
Tributaries: None
MPCA biological station(s): none
MPCA sample dates: NA
County: St. Louis
Watershed: Cloquet (04010202)

DNR designation: Not a designated trout water
DNR management class: None/warm water

Current AUID designation: 2Ag (cold water)
Reason for review: DNR trout water delisting
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.

Locality Detail: Flowing for 0.86 miles from it headwaters to Island Lake Reservoir; Located within PLS system sections 28 and 33, T53 R14W.

Additional Information: Catchable sized trout (largely brook trout but rainbow and brown trout were also stocked) were stocked into the pond upstream of highway 4 from 1955 through 1989. This reach was removed from the trout waters list by the DNR in 2018 (State of Minnesota 2018).



Map of Unnamed creek (Carey Creek) (04010202-617)

Monitoring and Management History

MPCA Surveys

No MPCA monitoring data

DNR information

Carey Creek was stocked with catchable-sized brook trout from 1955 through 1989. Brown and rainbow trout were also sampled during this period. A three year (2010-2012) temperature study was performed to determine thermal conditions and this stream's ability to support trout. Summer (June-September) water temperatures were above the threshold for stress for brook trout 50% or more of the summer season. A DNR fish survey in 2010 did not collect any trout.

MPCA Summary

Carey Creek was stocked with trout from 1955 through 1989. A three year (2010-2012) temperature study was performed by the DNR to determine thermal conditions and this stream's ability to support trout. Summer (June-September) water temperatures were above the threshold for stress for brook trout 50% or more of the summer season indicating that this stream is too warm for trout. A DNR fish survey in 2010 did not collect any trout. As a result, the DNR concluded that Carey Creek is not suitable for management of trout. This reach was removed from the designated trout waters list by the DNR in 2018 (State of Minnesota 2018).

References

State of Minnesota (2018) State Register, 30 April 2018. Volume 42, Number 44. pp. 1298-1341.

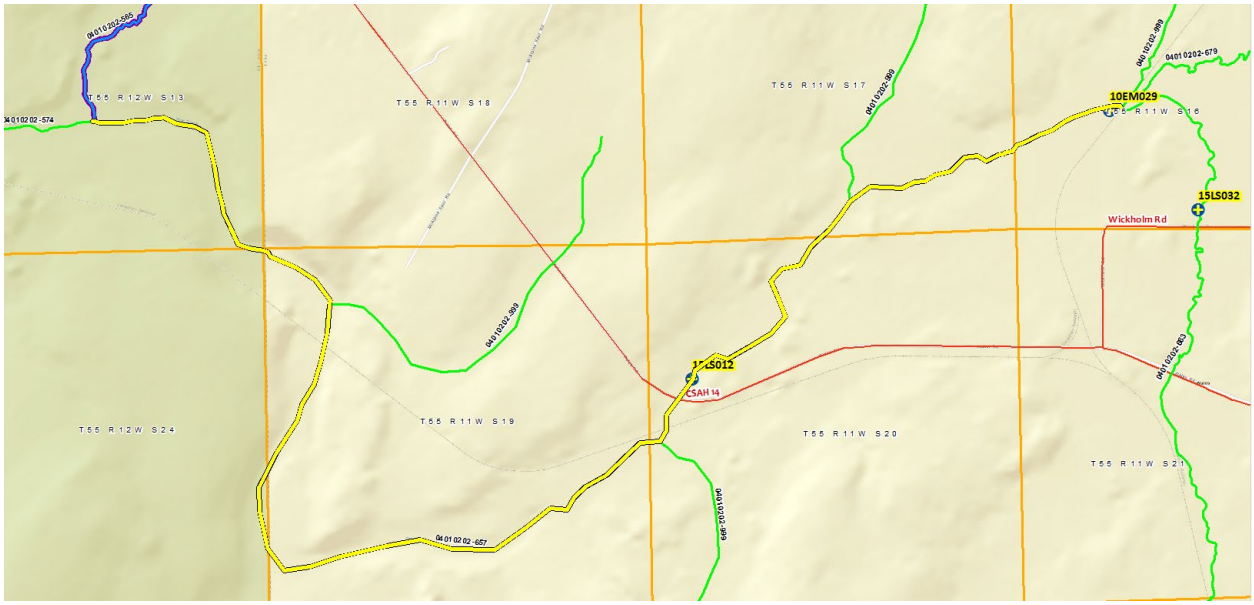
Pine Creek (04010202-657) MPCA Use Designation Review

Stream name: Pine Creek
AUID(s): 04010202-657
AUID description: Unnamed cr to Unnamed cr
Tributaries: none
MPCA biological station(s): 10EM029, 15LS012
County: Lake
Watershed: Cloquet River (04010202)

DNR designation: Not a designated trout water
DNR management class: None/warm water

Current AUID designation: 2Bg (warm water)
Reason for review: Fish assemblage
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.

Additional information: Reach length - 4.58 miles



Map of Pine Creek (04010202-657)

Monitoring and Management History

MPCA monitoring data

MPCA biological data

Fish and macroinvertebrates were monitored by the MPCA from two stations in 2010 and 2015. One fish survey sampled brook trout. Two cold water fish species (brook trout and mottled sculpin) and four cool water fish species (brook stickleback, longnose dace, burbot, and pearl dace) were sampled. Cold water species comprised 5.3-20.0% of the fish samples. Three cold water macroinvertebrate taxa (*Ephemerella, Aquarius,* and *Limnephilus*) were collected and comprised 0-0.6% of the samples.

Fish data: 10EM029,08/12/2010					
Common Name	CN Code	Min	Max	Weight	Number
creek chub	CRC	25	169	208	43
mottled sculpin	MTS	32	115	138	29
common shiner	CSH	25	55	11	27
johnny darter	JND	27	65	29	26
white sucker	WTS	32	154	201	18
brook stickleback	BST	31	42	2	5
brook trout	BKT	209	219	212	2
central mudminnow	CNM	75	97	13	2
blacknose dace	BND	35	35	0.5	1
burbot	BUB	241	241	67	1
longnose dace	LND	65	65	3	1

Fish data: 10EM029, 08/20/2015					
Common Name	CN Code	Min	Max	Weight	Number
johnny darter	JND	30	69	39	58
mottled sculpin	MTS	27	91	70	22
largemouth bass	LMB	55	84	44	11
creek chub	CRC	34	171	49	10
white sucker	WTS	33	51	6	9
common shiner	CSH	25	33	1	7
longnose dace	LND	46	52	2	2
central mudminnow	CNM	85	85	5	1

Fish data: 15LS012, 07/15/2015					
Common Name	CN Code	Min	Max	Weight	Number
white sucker	WTS	25	215	222	534
creek chub	CRC	25	59	23	60
mottled sculpin	MTS	25	103	74	36
blacknose dace	BND	25	90	16	15
johnny darter	JND	25	62	20	12
longnose dace	LND	60	105	44	6
largemouth bass	LMB	29	36	4	4

Fish data: 15LS012, 07/15/2015					
Common Name	CN Code	Min	Max	Weight	Number
common shiner	CSH	45	51	3	2
pearl dace	PRD	26	34	1	2
central mudminnow	CNM	97	97	11	1

Cold water macroinvertebrate summary

FieldNum	15LS012	10EM029	10EM029
WBName	Pine Creek	Pine Creek	Pine Creek
VisitNum	20152853	20101905	20152684
VisitDate	08/26/2015	08/25/2010	08/20/2015
Season	2015	2010	2015
WQTime	15:26	-	10:54
TempH2O (deg C)	15.6	-	13.6
Coldwater Taxa Richness	1	2	0
Coldwater Taxa Percent (%)	1.9	2.9	0
Coldwater Macroinvertebrate Taxa			
Ephemerella	2		
Aquarius		1	
Limnephilus		1	

MPCA water temperature data

No temperature loggers were deployed by the MPCA, but water temperature was measured during the biological visits. The water levels of the upstream lake is likely the cause of the high variability (6°C) in temperatures observed at station 10EM029.

10EM029: 08/12/2010, 1110 - 19.7°C; 08/20/2015, 1054 – 13.6°C
15LS012: 07/15/2015, 1842 – 19.7°C; 8/26/2015, 1526 - 15.6°C

DNR information

The DNR does not list this reach of Pine Creek as a trout water nor does it manage this water for trout. In 2010 the DNR conducted 3 fish surveys (one DNR station was near 15LS012) and sampled both adult and young-of-the-year brook trout at all stations. The DNR also deployed 4 temperature loggers although only one displayed a promising cold water regime. The DNR is going to consider a possible cold water designation from just downstream of cold water tributary (04010202-565) in PLS section T55 R12W S13 to a yet to be determined location. DNR will likely need to perform a longitudinal survey to identify the upper end of trout water designation.

MPCA Summary

This reach of Pine Creek was reviewed because fish samples had good percentages of cold water fish species, indicating the ability to support these assemblages. Two stations (10EM029 and 15LS012) were sampled for fish on this reach in 2015 and 10EM029 was also sampled in 2010. One of the 2010 visits included brook trout. In 2010, the DNR also conducted a fish survey and sampled three locations on this reach. Both adult and young-of-the-year brook trout were sampled at all three of these stations

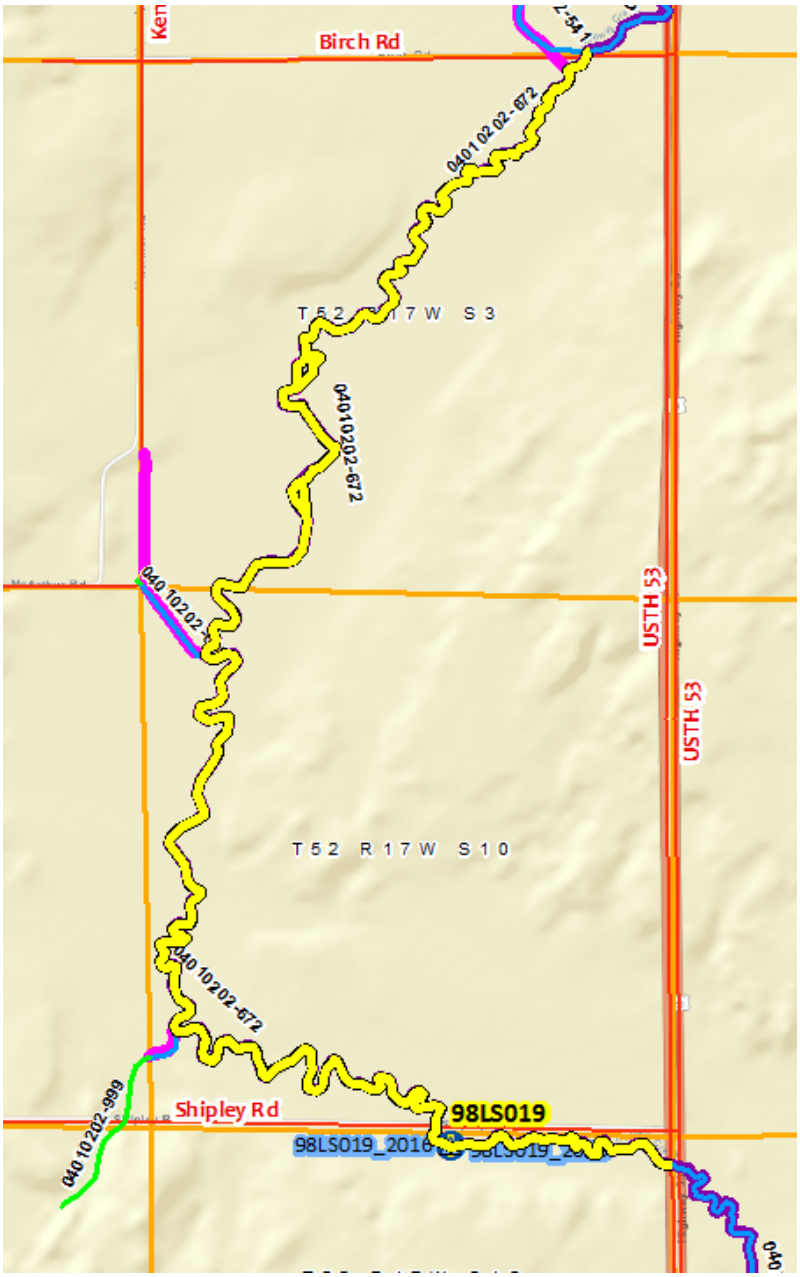
indicating natural reproduction of trout. The DNR also deployed four temperature loggers, but only one was indicative of a cold water thermal regime. However the measured thermal variability is plausibly the result of fluctuating water levels of the upstream lake. Despite inconclusive temperature logger data, the observed biological communities indicate that this reach supports a cold water habitat.

Hellwig Creek (04010202-672) MPCA Use Designation Review

Stream name: Hellwig Creek
AUID(s): 04010202-672
AUID description: Unnamed cr to T52 R17 S15, east line
Trout protection tributaries: 04010202-541, 04010202-638, and 04010202-639
MPCA biological station(s): 98LS019
County: St. Louis
Watershed: Cloquet River (04010202)

DNR designation: Trout Stream
DNR management class: 1C (Semi-Wild Trout)

Current MPCA use designation: Class 2Ag (cold water)
Why is the site being reviewed? Fish, macroinvertebrate, and water temperature data
Was this site previously reviewed? If so what were the results? No



Map of Hellwig Creek (04010202-672)

Review of Existing Data

MPCA Monitoring

MPCA Biological Data

Fish and macroinvertebrates were sampled from one station in 1998, 2015, and 2016. Two fish visits did not sample any cold or cool water fish species. One visit (8/12/1998) did sample 1 cold water fish species (mottled sculpin) and 2 cool water species (brook stickleback and finescale dace). No trout were sampled. Cold water fish species individuals comprised 0-3.7% (0-11.1% of taxa) of the fish samples. Macroinvertebrates we sampled twice (1998 and 2015) and neither included any cold water taxa.

Fish data: 98LS019, 8/12/1998					
Common Name	**CN Code**	**Min**	**Max**	**Weight**	**Number**
creek chub	CRC	38	89	133.5	49
johnny darter	JND	23	60	44	46
brook stickleback	BST	27	47	29	39
central mudminnow	CNM	31	90	106	39
white sucker	WTS	53	71	65	18
common shiner	CSH	55	90	56.5	14
mottled sculpin	MTS	24	72	21.5	8
blacknose dace	BND	46	62	4.5	3
finescale dace	FND	37	37	0.5	1

Fish data: 98LS019, 7/1/2015					
Common Name	**CN Code**	**Min**	**Max**	**Weight**	**Number**
central mudminnow	CNM	38	109	181	62
white sucker	WTS	129	325	2600	16
johnny darter	JND	43	65	17	8
creek chub	CRC	98	101	16	2

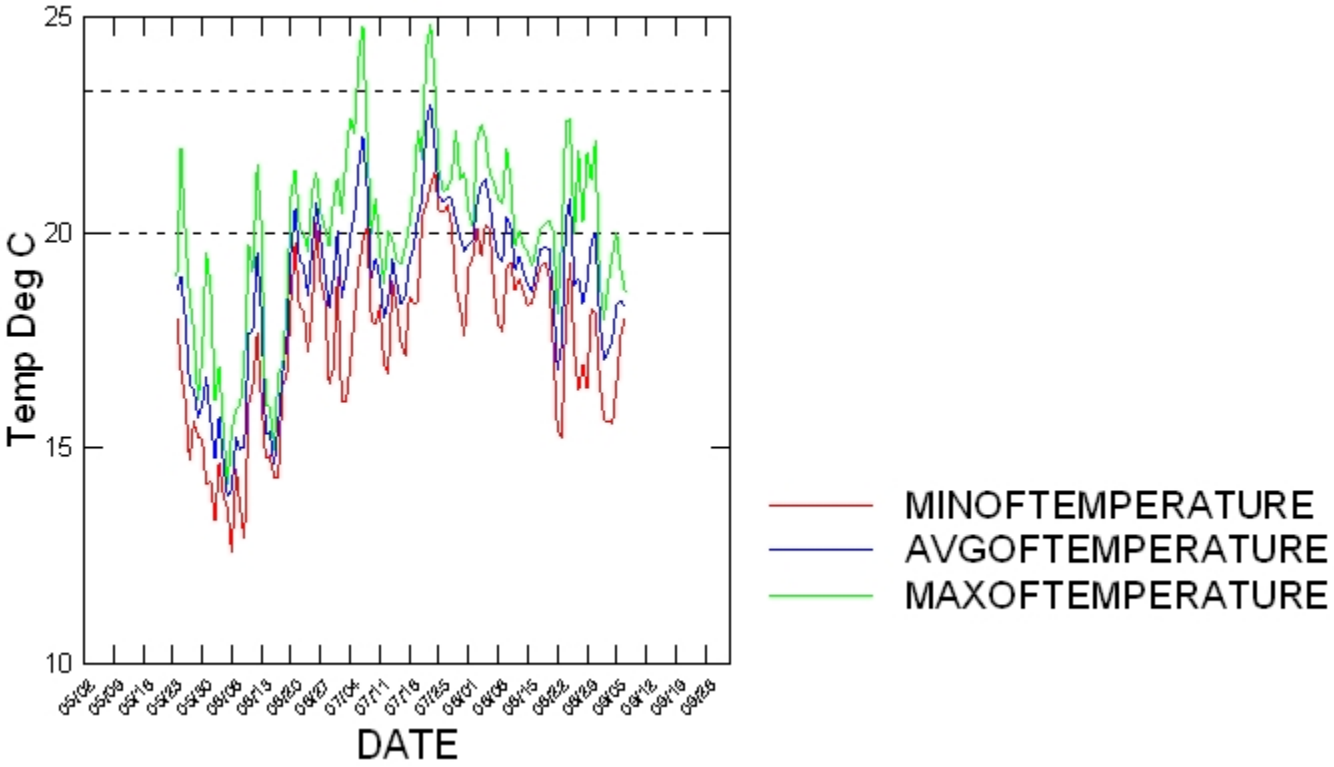
Fish data: 98LS019, 7/27/2016					
Common Name	**CN Code**	**Min**	**Max**	**Weight**	**Number**
central mudminnow	CNM	68	113	176	19
golden shiner	GOS	31	80	16	5
bluegill	BLG	54	54	3	1
northern pike	NOP	139	139	25	1

Water Temperature Data

A water temperature logger was deployed at 98LS019 in 2015. The results are below:

Temperature Logger Graph and Average Summary for 98LS019 in 2015

Summer Avg Temp (°C)	June Avg Temp (°C)	July Avg Temp (°C)	August Avg Temp (°C)	% Growth	% Stress	% Lethal	% Recording
19.0	17.3	20.1	19.4	67.4	32.6	0	100



DNR information:

In 2006 the DNR performed a trout population assessment of Hellwig Creek. Fish were sampled at river miles 0.1, 1.7, 3.6, 8.7, and 9.9. Brook (4) and brown (1) trout were collected at river mile 0.1 and brook trout (2) were collected at river mile 1.7. Temperature logger data was collected in Hellwig Creek by the DNR from 2002-2004. A temperature logger was deployed for 3 years near Hwy 53 (mile 3.1) between 2002 and 2004 which recorded temperatures with 25-43% of the summer in the stressful or lethal range for brook trout. It should be noted that this reach was originally designated as cold due to stocking efforts in the 1960's. The DNR is considering removing the cold water designation above the first Hwy 53 crossing and maintaining it below that crossing. Tributaries to Hellwig above this location would no longer be designated trout waters with the exception of the tributary in section 15 in which the DNR is pursuing for a separate trout water designation. DNR data from that tributary which suggests it could support a trout. Brook trout have not been collected above this tributary indicating that this tributary is a source of cold water for Hellwig Creek.

MPCA summary

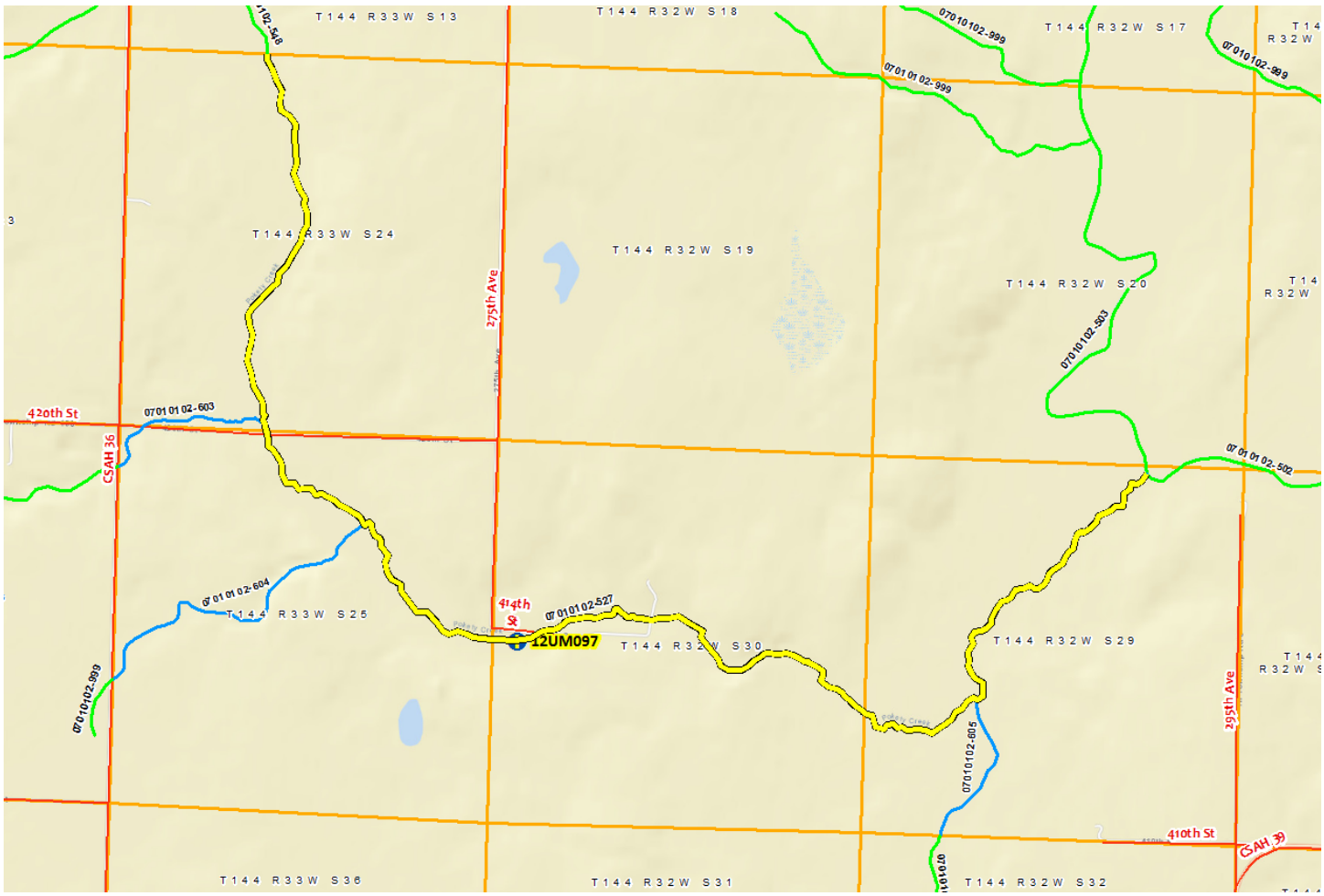
This reach was originally designated by the DNR as a trout water as cold due to stocking efforts in the 1960's. The DNR surveyed this reach in 2006 and did not sample any trout in 04010202-672. Brook and brown trout were sampled downstream of this WID. Fish and macroinvertebrates were sampled by the MPCA from one station in 1998, 2015, and 2016. Two fish visits did not sample any cold or cool water fish species. One visit did sample one cold water fish species (mottled sculpin) and 2 cool water species (brook stickleback and finescale dace). No trout were sampled. Cold water fish species individuals comprised 0-3.7% (0-11.1% of taxa) of the fish samples. Macroinvertebrates we sampled twice (1998 and 2015) and neither included any cold water taxa. Temperature logger data was collected from the biological station in 2015 had an average July water temperature of 20.1°C and temperatures were in the growth range for brook trout 67.4% of the summer. Temperature logger data collected by the DNR near Hwy 53 (mile 3.1) in this reach during 2002, 2003, and 2004. These data were similar to the MPCA temperature logger data with 57-75% of the summer in the stressful or lethal range for brook trout. The DNR is considering removing the trout water designation above the first Hwy 53 crossing and maintaining in the downstream reaches. This change to the DNR's designation matches the MPCA's proposal.

Pokety Creek (07010102-527) MPCA Use Designation Review

Stream name: Pokety Creek
AUID: 07010102-527
AUID description: T144 R33W S24, north line to Necktie River
Tributaries: 07010102-603, 07010102-604, and 07010102-605
MPCA biological station(s): 12UM097
Sample dates: 7/25/2012
County: Hubbard
Watershed: Leech Lake River

DNR's designation: Not a designated trout stream (removed in 2018 rule)
DNR management class: unknown

Current AUID designation: 2Ag (cold water)
Reason for review: Fish and temperature data; DNR trout water delisting
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.



Map of Pokety Creek (07010102-527)

Review of existing data

MPCA monitoring data

MPCA biological data

Fish and macroinvertebrates were sampled from one station (12UM097) in 2012. No cold water fish species and four cool water fish species (brook stickleback, northern redbelly dace, finescale dace, and pearl dace) were sampled. No cold water macroinvertebrate taxa were collected.

Fish data: 12UM097, 7/10/2012					
Common Name	CN Code	Min	Max	Weight	Number
brook stickleback	BST	25	60	16	17
northern redbelly dace	NRD	43	74	20	12
central mudminnow	CNM	59	65	15	4
finescale dace	FND	60	65	27	3
pearl dace	PRD	101	101	7	1

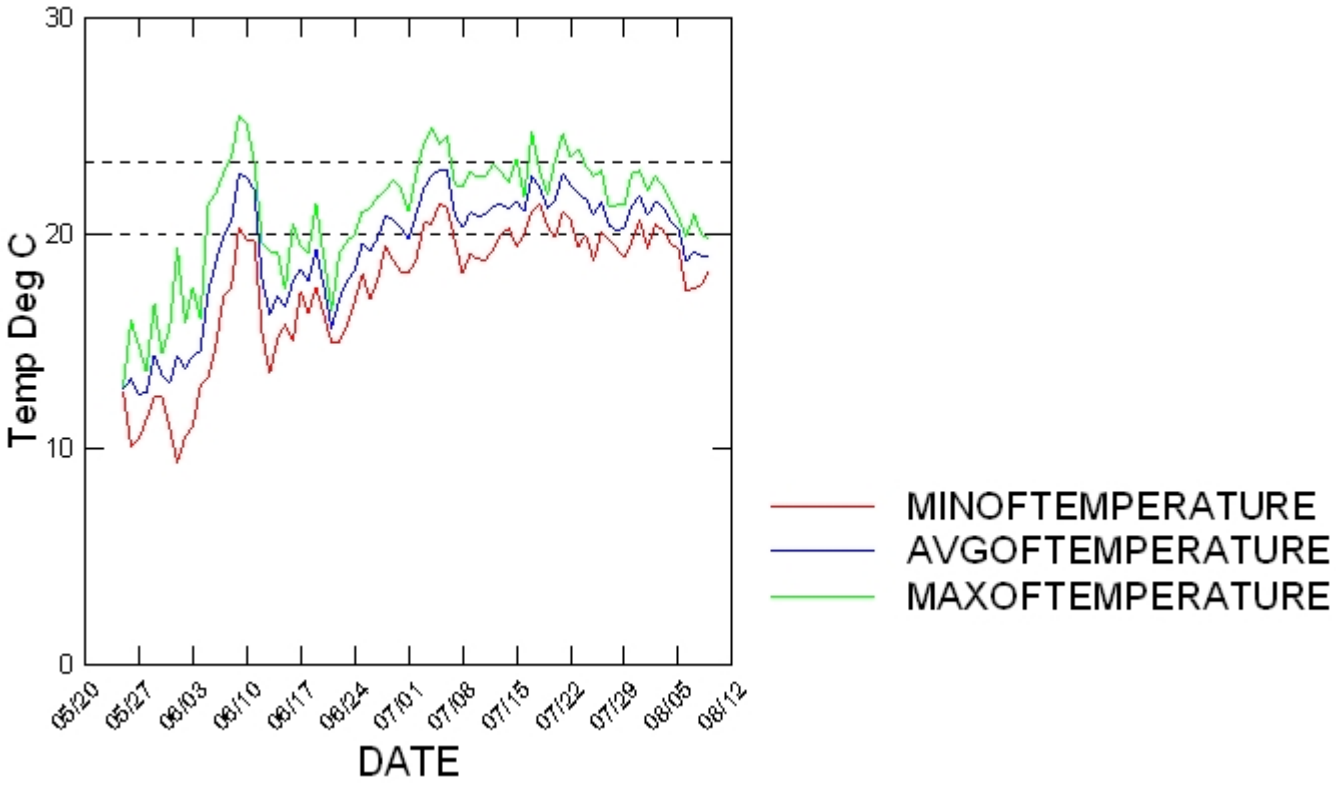
Fish Community Information:

FieldNum	WID	VisitDate	Cold	ColdPct	ColdTXPct	Cool	CoolPct	CoolTxPct
12UM097	07010102-527	7/10/2012	0	0.0	0.0	3	56.8	60.0

MPCA water temperature data

The MPCA deployed a water temperature logger at 12UM097 in 2012. The results are below.

Field Number	Year	% Growth Days	% Stress Days	% Lethal Days	Summer Avg Temp (◦C)	June Avg Temp (◦C)	July Avg Temp (◦C)	Aug. Avg Temp (◦C)	% Days Recording
12UM097	2012	43.9	55.7	0.4	20.0	18.5	21.4	19.9	75.0%



DNR information

The DNR stocked this stream brook trout fingerlings in 1958-63, 1965-68, and 1970-75. A winter reconnaissance in 1959 noted: "Possibly no winter survival of trout, unless in some spring holes in section 24 or 25. In wet season this stream may support trout on put and take stocking management." In the early 1990s, some limited electrofishing was performed and no trout were sampled. Water temperature was measured with data loggers in 2012 and 2013 from two locations. The DNR removed this stream from the trout waters list in 2018 (State of Minnesota 2018) because management of trout was deemed to not be feasible and it is not managed for trout.

DNR temperature logger data summary

June/July/August/September	420th St		100th St	
Metric	**2012**	**2013**	**2012**	**2013**
Growth (<20°C)	62.6%	76.6%	58.2%	71.0%
Stress (20-25°C)	29.7%	19.8%	41.5%	28.4%
Lethal (>25°C)	7.7%	3.6%	0.3%	0.5%

MPCA Summary

The DNR removed this stream from the trout waters list in 2018 (State of Minnesota 2018) because management of trout was deemed to not be feasible. Stocking reports indicated that brook trout fingerlings were stocked in years 1958-63, 1965-68, and 1970-1975. A 1959 MDNR winter reconnaissance report noted that trout would likely not survive the winter unless they resided near spring holes found in section 24 or 25. The report also noted that Pokety Creek was a possible candidate for put-and-take stocking management. DNR sampling was conducted during the early 1990s and no trout were sampled. Temperature data was collected by the DNR at two locations on Pokety Creek during 2012 and 2013. Thermal stress was recorded 19.8-41.5% of the summer (June through September). The lethal threshold was also reached 7.7% of the summer. Fish community data was collected by the MPCA at one station on Pokety Creek during 2012. No cold water fish species were sampled and four cool water fish species were sampled. Macroinvertebrates were also sampled in 2012 and no cold water taxa were collected. Water temperature data collected at 15 minute intervals during the summer of 2012 indicate that conditions are not suitable for supporting trout with an average July temperature of 21.4^{o}C and summer (June through August) temperatures in the growth range only 43.9% of the time.

References

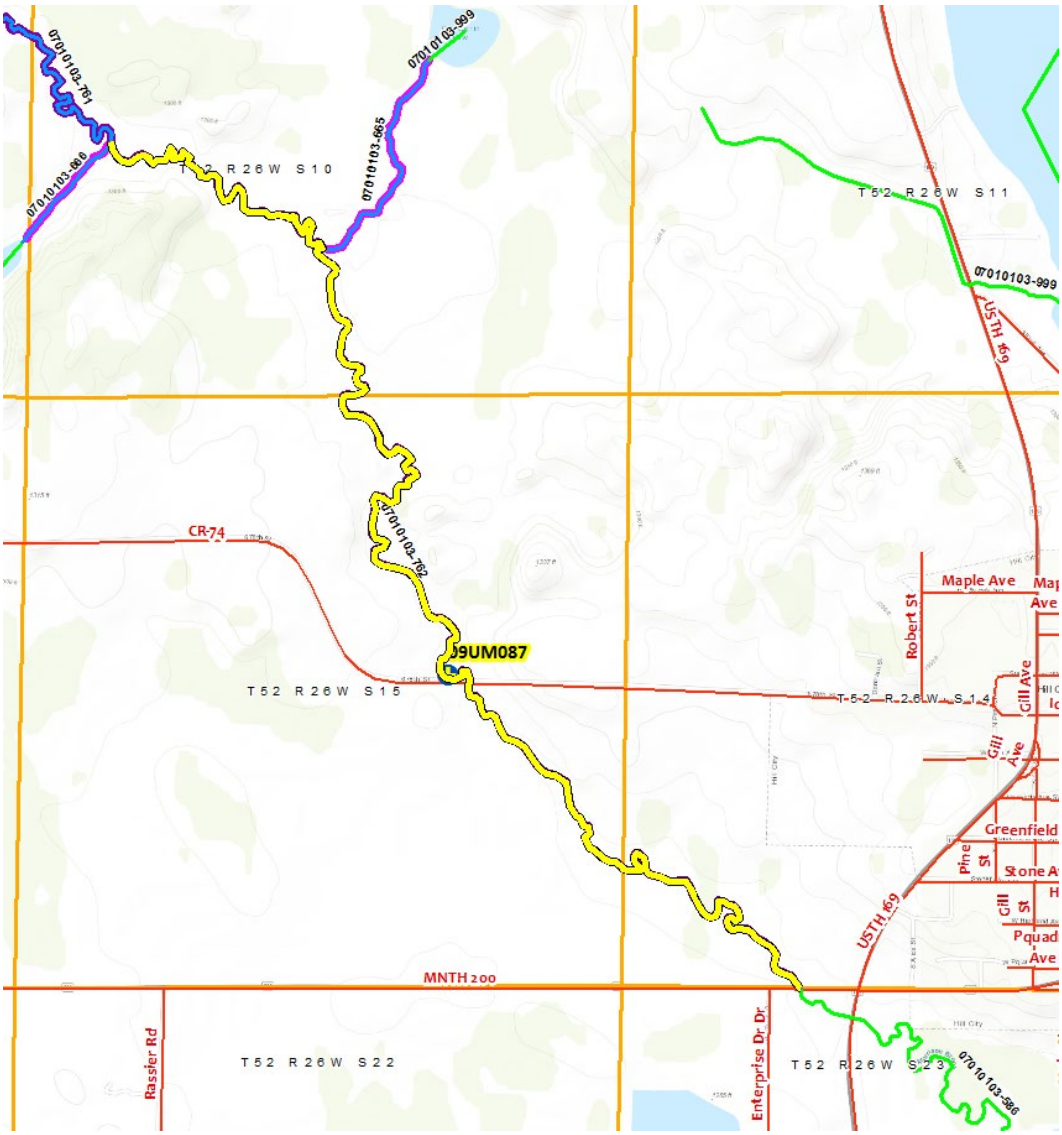
State of Minnesota (2018) State Register, 30 April 2018. Volume 42, Number 44. pp. 1298-1341.

Morrison Brook (07010103-762) MPCA Use Designation Review

Stream name: Morrison Brook
AUID(s): 07010103-762 (Parent: 07010103-584); data from 07010103-761 was also reviewed
Tributaries: 07010103-665
AUID description: Unnamed creek to T52 R26W S14, south line
MPCA biomonitoring site(s): 15UM045, 16UM170 and 09UM087
MPCA monitoring date(s): 09/21/09, 07/08/10, 06/10/15, 08/26/15, and 08/24/16 (09UM087), 06/15/15 & 08/26/15 (15UM045), and 08/25/16 & 09/13/15 (16UM170; *previously Morrison Brook_ DS*)
Watershed: Mississippi River-Grand Rapids
County: Aitkin & Itasca

DNR designation: Trout Stream
DNR management class: I-C (Semi-Wild Trout)

Current MPCA use designation: 2Ag (Cold water)
Why is the site being reviewed? Fish, Macroinvertebrate, and Temperature Data
Was this site previously reviewed? If so what were the results? No



Map of Morrison Brook (07010103-762)

Review of existing data

MPCA monitoring data

MPCA biological data

MPCA conducted biomonitoring surveys at three locations on this reach, 15UM054 (Downstream of CR 241 (County Line Rd.), 3.5 mi NE of Hill City), 16UM170 (adjacent to 690th Ln, 5 mi. NW of Hill City), and 09UM087 (Upstream of CR 74, 1 mi. W of Hill City). Stations 15UM054 and 16UM170 are located on 07010103-761 and 09UM087 is on 07010103-762. Fish and macroinvertebrates were collected from three stations (15UM054 & 09UM087) during the summer of 2015 and two stations (16UM170 & 09UM087) during the summer of 2016; earlier surveys (2009 – macroinvertebrates, 2010-fish) were conducted at 09UM087. In addition, temperature loggers were deployed at 4 locations along this stretch of Morrison Brook (Figures 1-5). During the summer of 2016 the MPCA re-surveyed 09UM087 and established a new biological station at 16UM170, which had previously been a temperature logger only station. Overall, fish and macroinvertebrate communities observed at the downstream most biomonitoring site 09UM087 lacked a cold water community. Mottled sculpin were observed at this station, however in lower numbers and no cold water macroinvertebrate taxa were observed. In contract, the upstream biomonitoring station (15UM045) containing 17% cold water macroinvertebrate taxa and 47% cold water fish.

Fish data summary

FieldNum	09UM087	09UM087	09UM087	16UM170	15UM045
WBName	Morrison Brook	Morrison Brook	Morrison Brook	Morrison Brook	Morrison Brook
VisitNum	20161063	20151979	20101195	20161062	20151980
VisitDate	24-Aug-16	10-Jun-15	08-Jul-10	25-Aug-16	10-Jun-15
WQTime	2:50:00 PM	4:36:00 PM	9:50:00 AM	10:21:00 AM	2:21:00 PM
Conductivity (uS/cm)	350	245	266	357	207.5
TempH2O (deg C)	17.4	19.7	16.8	15.2	17.8
Distance Fished (m)	150	150	150	150	150
Time Fished (sec)	3192	1509	1664	3076	1695
GearType	BPLR24	BPLR24	BPLR24	BPLR24	BPLR24
Fish Taxa List					
blacknose dace			3	3	6
blacknose shiner			1	1	
brook stickleback	5		1	55	2
brook trout					8
burbot				1	2
central mudminnow	18		5	11	11
common shiner		6	4		13
creek chub	20	5	24	16	1
fathead minnow				2	
golden shiner			1		
hybrid minnow			1		
Iowa darter					1
johnny darter	33	7	10	14	2
largemouth bass	2		2		
mottled sculpin	24	4	9	55	29
northern pike	1				
northern redbelly dace					1
pumpkinseed	1				
rock bass	3	1	2		
white sucker	47	7	21	17	2
yellow perch	9	9	5		

Macroinvertebrate data summary

FieldNum	09UM087	09UM087	16UM170	15UM045
WBName	Morrison Brook	Morrison Brook	Morrison Brook	Morrison Brook
VisitNum	20101334	20152712	20161227	20152793
Season	2009	2015	2016	2015
WQTime	DNS	10:45:00 AM	2:25:00 PM	9:28:00 AM
TempH2O (deg C)	DNS	14.9	13.7	10.2
Coldwater Taxa Richness	-	-	4	7
Coldwater Taxa Percent (%)	0	0	7	15.6
Coldwater Macroinvertebrate Taxa				
Isoperla	-	-	8	2
Amphinemura	-	-	-	2
Glossosoma nigrior	-	-	-	2
Glossosoma intermedium	-	-	-	1
Glossosoma	-	-	-	9
Ephemerella	-	-	-	18
Eukiefferiella	-	-	1	3
Limenphilus	-	-	1	-
Gammarus	-	-	1	-

MPCA temperature data

A continuously-recording stream temperature logger was deployed in this reach by the MPCA during the summers of 2010 (only at 09UM087), 2014 - 2016. The water temperatures at 09UM087 were in the "stressful" range for brook trout between 25-37% of the time. Summary data for the logger deployment can be found in the table below. "No Growth", "Growth," "Stress," and "Lethal" temperature ranges are specific to brook trout and the date range for these summary statistics is June 1 to August 31.

TempLogNum	4873	10530565	4874	5189	1299054	4872	5217	10659963	4317	4318	5162	10530571
FieldNum	MorrisonBrookUS	MorrisonBrookUS	15UM045	15UM045	15UM045	16UM170	16UM170	16UM170	09UM087	09UM087	09UM087	09UM087
Season	2014	2016	2014	2015	2016	2014	2015	2016	2010	2014	2015	2016
Interval (Min)	15	30	15	30	30	15	30	30	15	15	30	30
Percent (%) Recording	100%	100%	100%	99%	100%	100%	97%	100%	100%	100%	99%	100%
BKT_No Growth	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BKT_Growth	90%	90%	96%	100%	95%	93%	94%	95%	75%	74%	62%	73%
BKT_Stress	10%	10%	4%	0%	5%	7%	6%	5%	25%	25%	37%	27%
BKT_Lethal	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
SummerAvgTemp (deg C)	17.4	17.1	16.3	15.1	16.9	17.1	16.4	17.0	18.2	18.7	18.9	18.5
JuneAvgTemp (deg C)	17.2	15.7	17.3	15.3	15.6	17.1	15.7	15.6	16.0	17.6	17.4	17.0
JulyAvgTemp (deg C)	18.1	18.4	16.8	15.9	17.9	17.7	17.9	18.0	19.4	19.6	21.0	19.5
AugustAvgTemp (deg C)	16.8	17.3	14.8	14.1	17.1	16.5	15.5	17.3	19.1	18.9	18.2	18.9

Temp Logger	Location
MorrisonBrookUS	At Hill Road (CR 342), 5 mi. NW of Hill City
15UM045	At CR 241, 3 mi. NW of Hill City
16UM170	Trail to S. of 690th Ln, 5 mi. NW of Hill City
09UM087	Upstream of CR 74, 1 mi. W of Hill City

<u>DNR information</u>

At least eight DNR fisheries surveys from 1950 through 2015 were performed on Morrison Brook. Brook trout were stocked until 1992 and the stream now appears to sustain a naturally reproducing population of brook trout. Although DNR surveys did not always sample the same stations, sample reaches 0.81 to 9.5 miles from the stream mouth were sampled during different surveys. From DNR sampling, natural reproduction of trout in Morrison Brook is limited to

upstream of Section 9 (T52 R26W). The section which support trout and cold water macroinvertebrates includes part of 07010103-761, but not any portion of 07010103-762. This lower section appears to naturally be a warm water stream.

MPCA summary

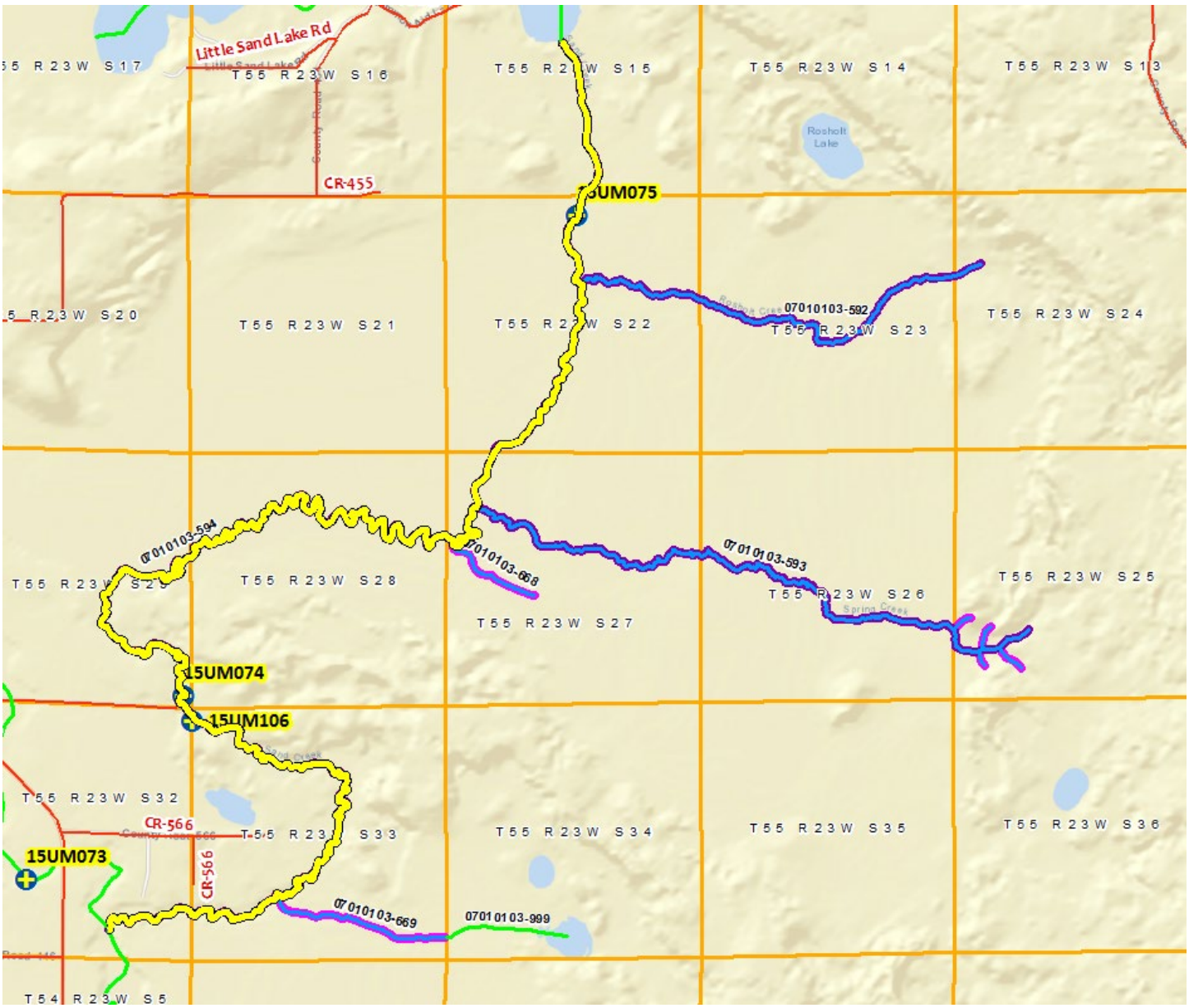
There is no evidence of trout reproduction or presence of trout in the lower section (07010103-762) of Morrison Brook. In 2010, 2015, and 2016, the MPCA sampled fish from one monitoring station located on this reach. One cold (mottled sculpin) was present. Macroinvertebrates were sampled in 2009 and 2015 and no cold water macroinvertebrate taxa were present in these samples. Water temperature data was collected using temperature loggers from the biological monitoring station during 2010, 2014, 2015, and 2016. Water temperature data indicated that conditions in this section of Morrison Brook are marginal for a cold water habitat. Stressful to lethal thermal conditions for trout accounted for 25-38% of the summer (June through August) and average July temperature was 19.4-21.0°C.

Sand Creek (07010103-594) MPCA Use Designation Review

Stream Name: Sand Creek
AUID(s): 07010103-594
AUID description: Lammon Aid Lake to Swan River
Tributaries: 07010103-668 and 07010103-669
MPCA biomonitoring site(s): 15UM075, 15UM074, 15UM106, and TL_SandCreek_DS
MPCA monitoring date(s): 06/23/15 & 08/12/15 (15UM075), 06/10/15 (15UM074) and 09/02/15 (15UM106)
Watershed: Mississippi River-Grand Rapids
County: Itasca

DNR designation: Designated trout stream
DNR management class: I-D (Marginal Trout)

Current AUID designation: 2Ag (cold water)
Reason for review: Fish, macroinvertebrate, and temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.



Map of Sand Creek (07010103-594)

MPCA Monitoring Data

MPCA biological data

The MPCA sampled fish from 3 stations in 2015 (15UM075, 15UM106, and 15UM074) and macroinvertebrates were sampled from 2 stations in 2015 (15UM075 and 15UM106). All 3 fish samples included one cold water fish species (mottled sculpin). Three cool water fish species (burbot, longnose dace, pearl dace) were irregularly collected from these stations. One of the macroinvertebrate samples included a single cold water taxon (*Isoperla*; 4 individuals).

Fish Visit Summary

FieldNum	15UM075	15UM106	15UM074
WBName	Sand Creek	Sand Creek	Sand Creek
VisitNum	20151543	20151647	20151802
VisitDate	23-Jun-15	02-Sep-15	10-Jun-15
WQTime	8:52:00 AM	6:16:00 PM	8:43:00 AM
Conductivity (uS/cm)	166.3	190.6	98.6
TempH2O (deg C)	17.1	25.6	15.8
Distance Fished (m)	322	150	150
Time Fished (sec)	3211	2177	2767
GearType	SS	BPLR24	BPLR24
Fish Taxa List			
blacknose dace		7	
burbot	3	9	10
central mudminnow	103	9	9
creek chub		41	1
johnny darter	58	9	2
largemouth bass	3	7	
longnose dace		10	2
mottled sculpin	1	1	4
northern pike	4	1	
rock bass	9		
tadpole madtom	3	7	
white sucker	3	8	
yellow perch	91	13	2

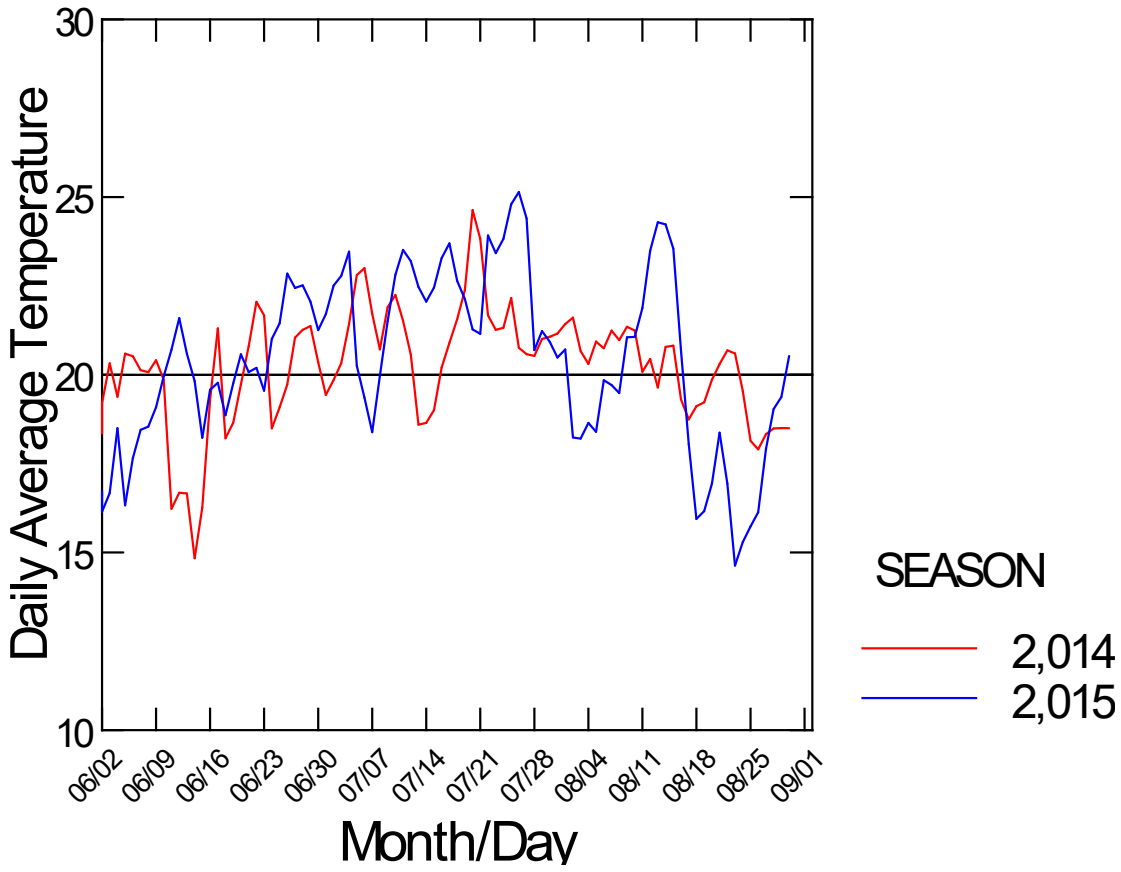
Macroinvertebrate Visit Summary

FieldNum	15UM075	15UM106
WBName	Sand Creek	Sand Creek
VisitNum	20152814	20152817
VisitDate	12-Aug-15	02-Sep-15
Season	2015	2015
WQTime	5:47:00 PM	6:16:00 PM
TempH2O (deg C)	24.1	25.6
Coldwater Taxa Richness	0	1
Coldwater Taxa Percent (%)	0	2
Coldwater Macroinvertebrate Taxa		
Isoperla	-	4

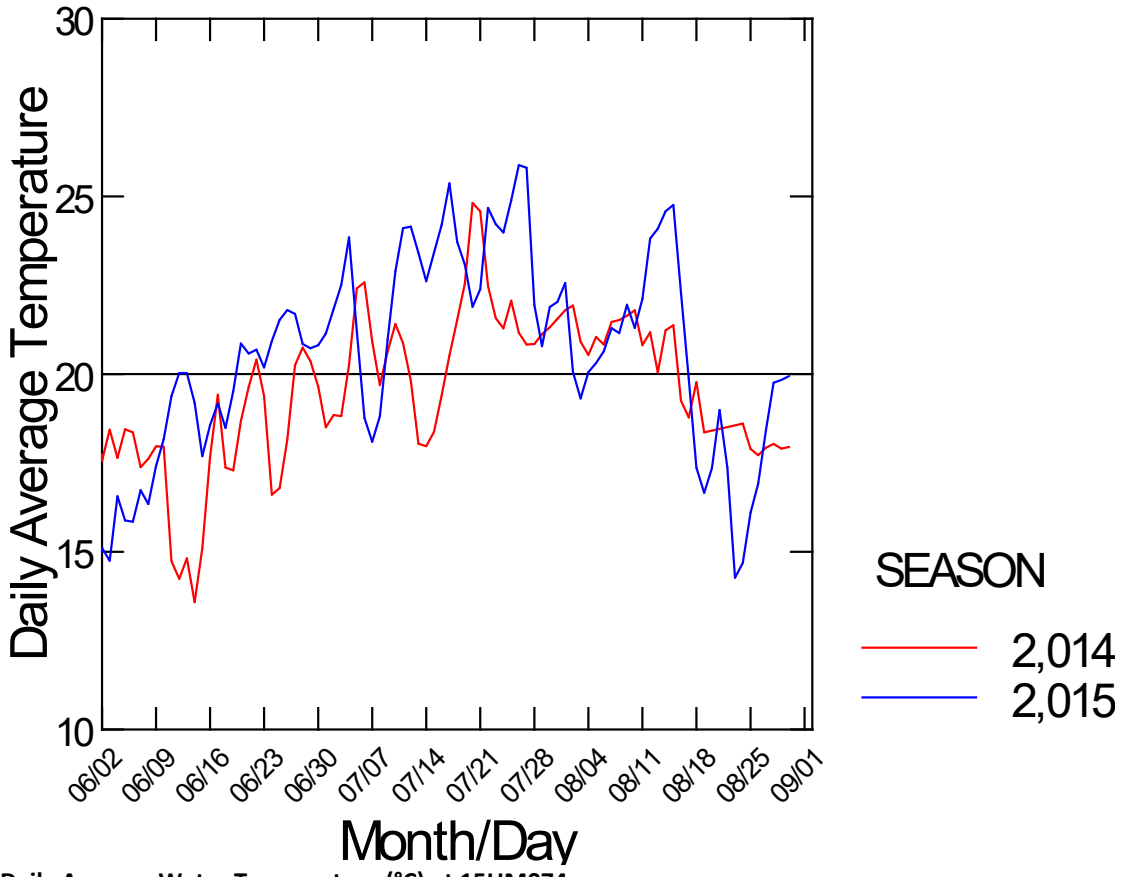
MPCA temperature data

A continuously-recording stream temperature logger was deployed at two location along Sand Creek during the summers of 2014 & 2015. Summary data for the logger deployment can be found in the table below. “No Growth”, “Growth,” “Stress,” and “Lethal” temperature ranges are specific to brook trout; the date range for these summary statistics is June 1 to August 31.

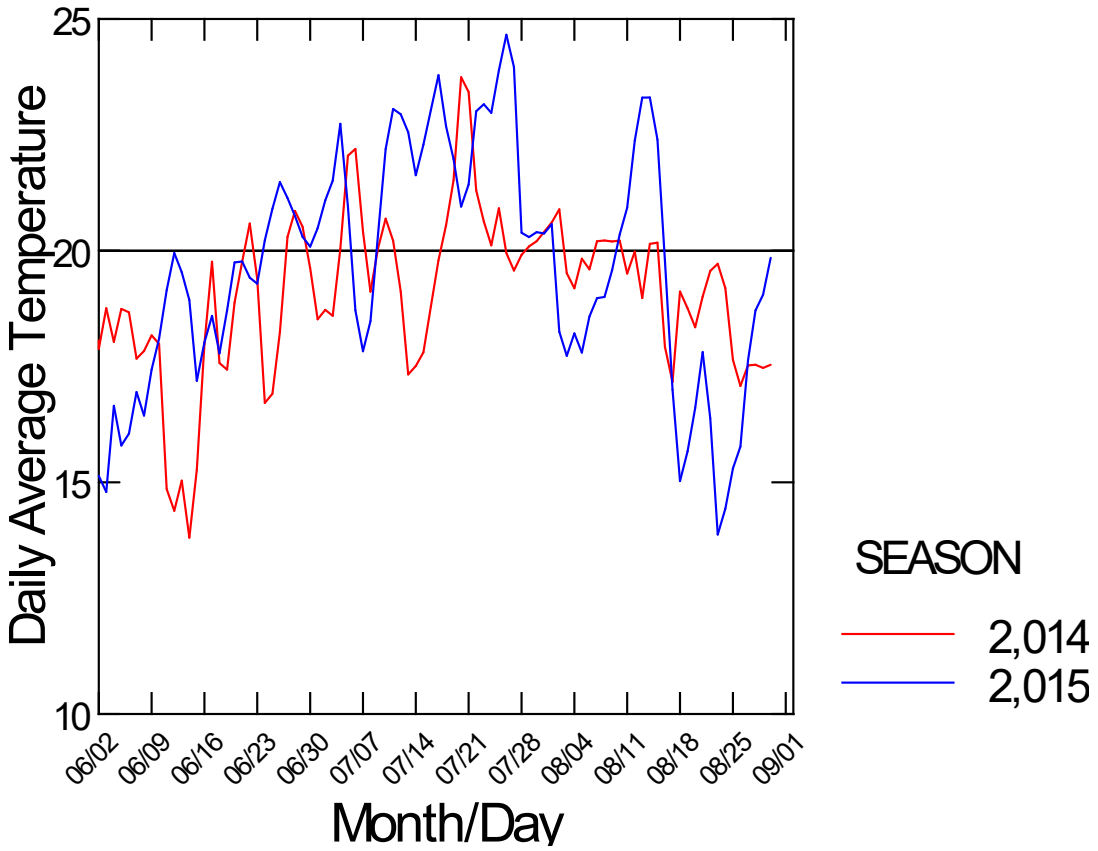
TempLogNum	5195	4879	5194	5239	5218	4878
FieldNum	15UM075	15UM075	15UM074	15UM074	SandCreekDS	SandCreekDS
Season	2015	2014	2015	2014	2015	2014
Interval (Min)	30	15	30	15	30	15
Percent (%) Recording	100%	100%	100%	94%	98%	100%
BKT_No Growth	0%	0%	0%	0%	0%	0%
BKT_Growth	48%	49%	45%	58%	54%	67%
BKT_Stress	43%	49%	46%	41%	43%	32%
BKT_Lethal	9%	2%	9%	2%	4%	1%
SummerAvgTemp (deg C)	20.3	20.2	20.4	19.5	19.6	19.1
JuneAvgTemp (deg C)	19.5	19.4	18.6	17.8	18.5	18.0
JulyAvgTemp (deg C)	22.3	21.2	22.7	20.8	21.7	20.1
AugustAvgTemp (deg C)	19.2	20.0	20.0	20.0	18.5	19.1



Daily Average Water Temperature (°C) at 15UM075



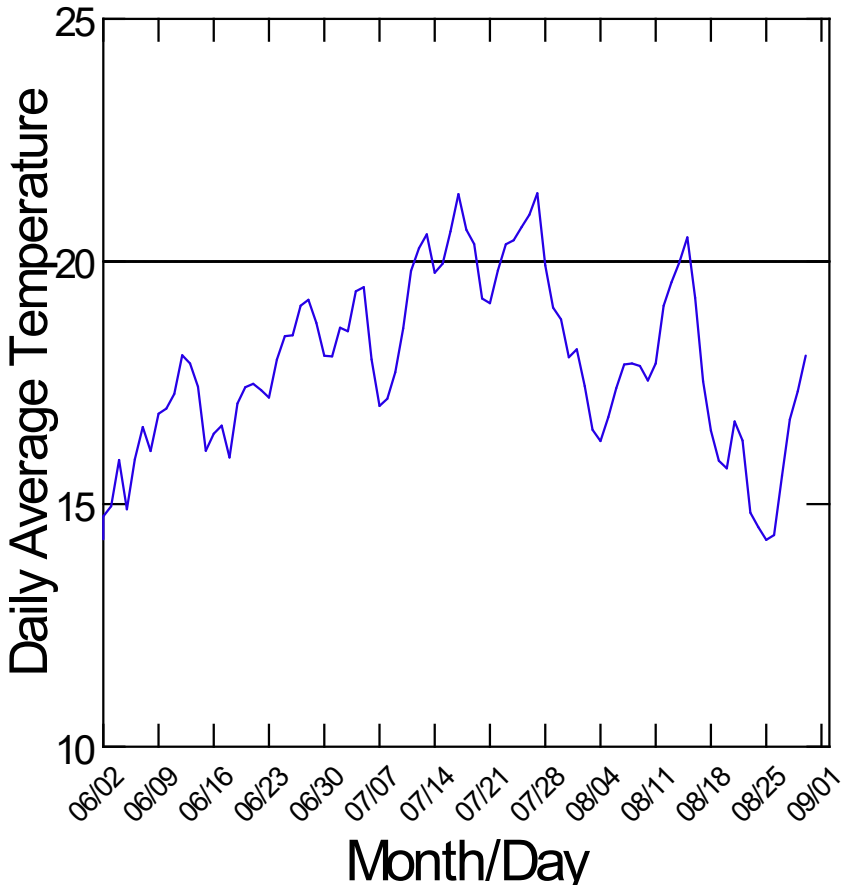
Daily Average Water Temperature (°C) at 15UM074

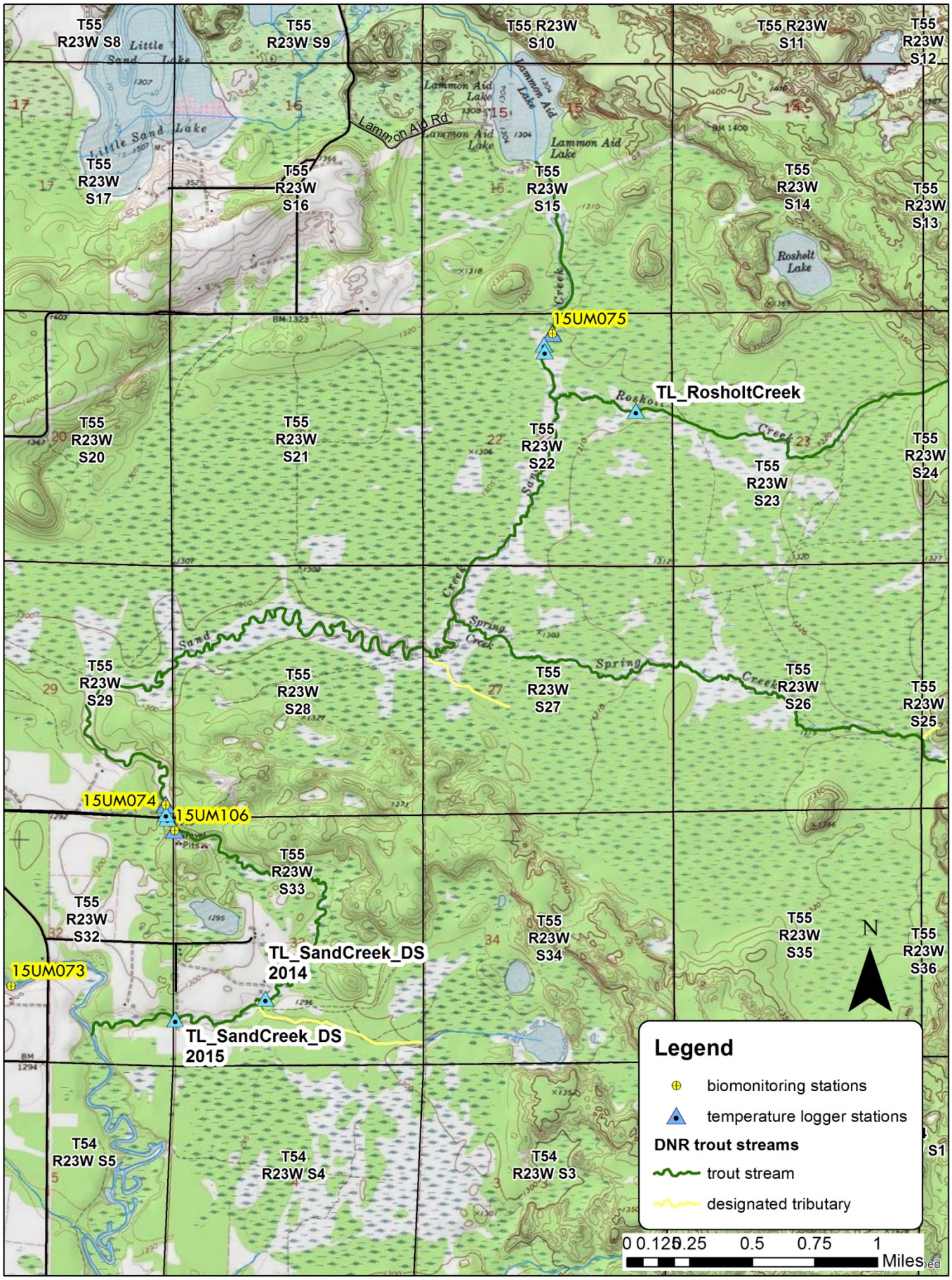


Daily Average Water Temperature (°C) at TL_SandCreek_DS, the temperature logger was moved further downstream in 2015 due to beaver dams at original location.

During the summer of 2015 the MPCA also deployed a temperature logger in Rosholt Creek, this station was not sampled for biology due to numerous beaver dams.

TempLogNum	5196
FieldNum	15UM077
Season	2015
Interval (Min)	30
Percent (%) Recording	100%
BKT_No Growth	0%
BKT_Growth	84%
BKT_Stress	16%
BKT_Lethal	0%
SummerAvgTemp (deg C)	17.8
JuneAvgTemp (deg C)	16.8
JulyAvgTemp (deg C)	19.5
AugustAvgTemp (deg C)	17.2





MPCA Biomonitoring and Temperature Logger Stations along Sand and Rosholt Creeks

DNR information

1990 Population Survey

The DNR survey sampled fish at 3 locations on Sand Creek and did not sample any cold water fish species. No trout were observed or collected. The survey noted limited fish cover and a largely sand substrate with some boulders which does not provide suitable trout spawning substrates. Other issues for trout fishery management include numerous beaver dams, erratic flows, high water temperatures during the summer. Due to this, this reach was classified as Class I-D (marginal trout) and management of a trout fishery would require regular stocking.

Overview of DNR Information

Trout stocking ceased in 1971. Conversations with DNR staff indicated that no natural reproduction or year-to-year carryover of trout has been observed in this stream reach. DNR electrofishing surveys were performed in 1981 and 1990 and no trout were sampled during either survey. A tributary of Sand Creek (Spring Creek, 07010103-593) does support a naturally reproducing population of brook trout. It is possible that they trout utilize Sand Creek during the winter months. Overall, DNR staff consider Sand Creek to be more indicative of a warm water stream.

MPCA Summary

No trout and a single cold water fish species (mottled sculpin) were observed at three biological monitoring stations monitored in 2015. A single cold water macroinvertebrate taxon (4 individuals) was sampled a one station. Temperature logger data indicated a summer (June-August) thermal regime that is not conducive to support a cold water community. Temperature loggers were deployed at 3 locations in 2014 and 2015 and measured water temperatures that were in the lethal or stressful range for trout 33-55% of the summer. This included lethal temperatures for 1-9% of the recording time at these stations. Average July temperatures ranged from 20.1 to 22.7°C. The DNR recognizes that conditions are not conducive to support a self-sustaining population of trout in this reach of the Sand Creek and that conditions are more indicative of a warm water habitat.

Unnamed Creek (Warba Creek) 07010103-595 MPCA Use Designation Review

Stream name: Unnamed Creek (Warba Creek)
AUID(s): 07010103-595
AUID description: T54 R23W S13 to T54 R23W S21
Tributaries: 07010103-684, 07010103-685, 07010103-686, 07010103-687, and 07010103-688
MPCA biological station(s):15UM082, 15UM083, and 99UM056
County: Itasca
Watershed: Mississippi River-Grand Rapids (07010103)

DNR designation: Trout water designation removed in 2018
DNR management class: unknown

Current MPCA use designation: 2Bg (Warm water)
Why is the site being reviewed? Fish and Temperature Data
Was this site previously reviewed? If so what were the results? No evidence of prior review.

Map of Unnamed Creek (Warba Creek) 07010103-595

Review of Existing Data

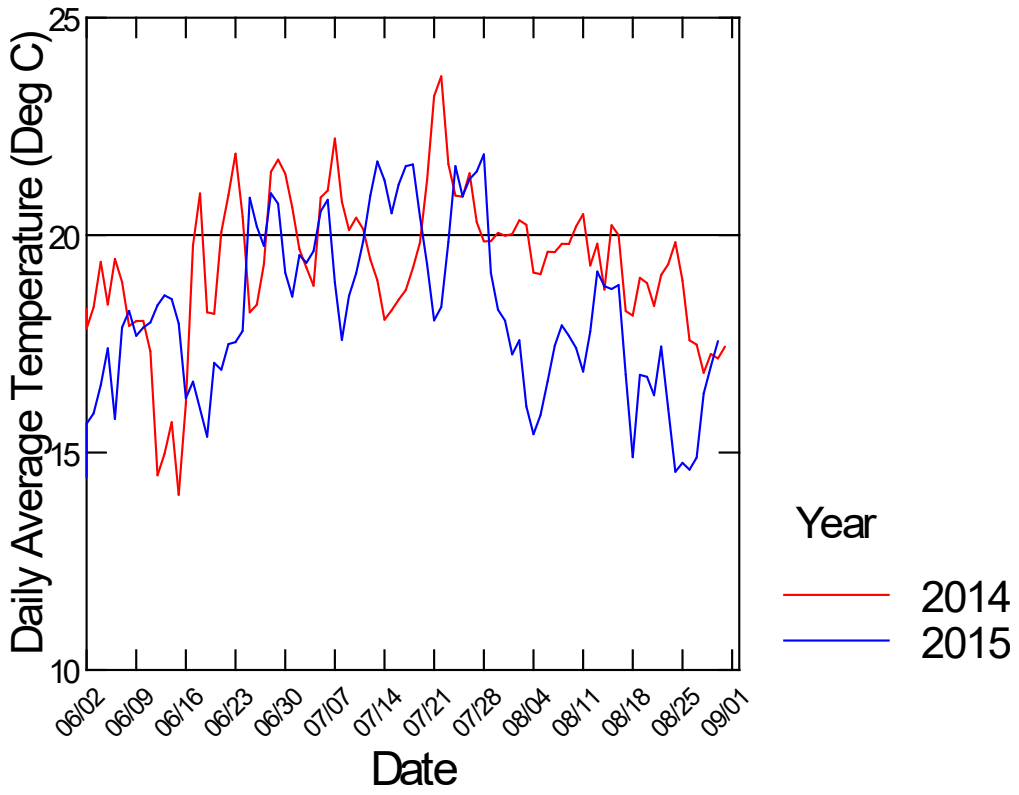
MPCA Monitoring

Water Temperature Data

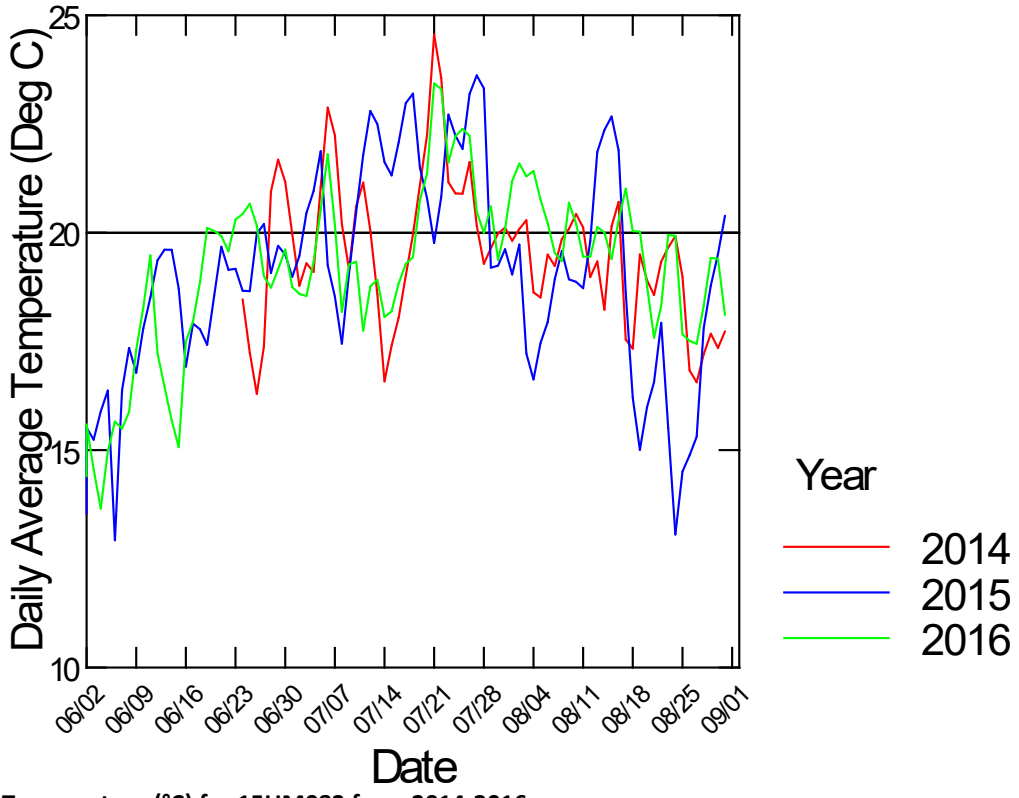
Water temperature loggers were deployed at two station (15UM082, 15UM083) in 2014, 2015, and 2016. The results are below.

Temperature Logger Graph and Average Summary for 15UM082 and 15UM083 for 2014-2016

MPCA Site ID	Year	Summer Avg. Temp (°C)	June Avg. Temp (°C)	July Avg. Temp (°C)	August Avg. Temp (°C)	% Lethal	% Stress	% Growth
15UM082	2014	19.6	19.1	20.3	18.9	1.2	41.2	57.6
15UM082	2015	19.0	17.9	21.1	18.1	3.4	36.1	60.6
15UM082	2016	19.1	17.7	20.0	19.6	1.4	36.1	62.5
15UM083	2014	19.3	18.6	20.3	19.0	0.6	38.4	61.0
15UM083	2015	18.2	17.7	20.0	16.8	0.0	24.1	75.9



Temperature (°C) for 15UM083 from 2014-2015.



Temperature (°C) for 15UM082 from 2014-2016

MPCA Biological Data

Fish sampling from 3 stations (15UM083, 99UM056, and 15UM082) during the summers of 1999, 2015, and 2016 did not included any cold water taxa. Four cool water fish species (northern redbelly dace, brook stickleback, burbot and brassy minnow) were sampled. Macroinvertebrate samples from 15UM083 and 15UM082 included 3 cold water taxa (*Aquarius, Lype diversa,* and *Somatochlora minor*) consisting of a total of 3 individuals (15UM083) and 7 individuals (15UM082); respectively.

Fish data

FieldNum	15UM083	99UM056	15UM082	15UM082
WBName	Unnamed creek (Warba Creek)	Unnamed creek (Warba Creek)	Unnamed creek (Warba Creek)	Unnamed creek (Warba Creek)
VisitNum	20151875	19990081	20151874	20161084
VisitDate	09-Jun-15	22-Jun-99	09-Jun-15	16-Jun-16
WQTime	3:01:00 PM	4:40:00 PM	6:30:00 PM	9:45:00 AM
Conductivity (uS/cm)	261	242.6	187.8	241
TempH2O (deg C)	19.3	22.9	19.8	15.5
Distance Fished (m)	150	149	150	150
Time Fished (sec)	1707	3980	1988	1375
GearType	BPLR24	BP	BPLR24	BPLR24
Fish Taxa List				
blacknose shiner	2			
bluegill				3
brassy minnow	2			1
brook stickleback	5	1		
burbot		7	1	2
central mudminnow	12	11		3
common shiner			8	29
creek chub		3		2
fathead minnow			2	
hornyhead chub				8
johnny darter	1		8	15
northern redbelly dace	1	1		
tadpole madtom				1
white sucker		4		391

Macroinvertebrate data summary

FieldNum	15UM083	99UM056	15UM082
WBName	Unnamed creek (Warba Creek)	Unnamed creek (Warba Creek)	Unnamed creek (Warba Creek)
VisitNum	20152765	19990216	20152900
VisitDate	12-Aug-15	31-Aug-99	12-Aug-15
Season	2015	1999	2015
WQTime	4:52:00 PM	-	2:33:00 PM
TempH2O (deg C)	-	-	22.4
Coldwater Taxa Richness	2	-	2
Coldwater Taxa Percent (9	5	0	4
Coldwater Macroinvertebrate Taxa			
Aquarius	-	-	2
Lype diversa	2	-	5
Somatochlora minor	1	-	-

DNR information

There is no evidence of natural reproduction of trout in this reach of the Warba Creek. Warba Creek was last stocked with brook trout in 1971. Survival and carryover of stocked fish was documented as poor, and led to a cessation of stocking and management activities. The DNR indicated that poor conditions for trout were not the result of anthropogenic impacts, but were due to a natural lack of suitable habitat. There are also indications that winter survival of fish is poor. A fish population assessment in 1980 documented an absence of trout and recommended removal of the trout water designation. In 2018, the DNR removed this stream reach from the trout waters list.

MPCA Summary

This reach was removed from the trout waters list by the DNR in 2018 (State of Minnesota 2018). Survival and carryover of stocked fish had been documented as poor and as a result, stocking and management activities by the DNR had been discontinued in 1971. In 1999, 2015, and 2016, the MPCA collected fish and macroinvertebrates community data from three monitoring stations located on this reach. Four fish samples were collected. No cold water fish species were present in these samples and low numbers of four cool water species were present. Three cold water macroinvertebrate taxa (8 individuals) were present in among 2 samples, accounting for 10 total individuals. Water temperature data was collected using temperature loggers from the monitoring stations during 2014-2016. The water temperature data indicate that conditions in Warba Creek are marginal for supporting a cold water community. Stressful to lethal thermal conditions for trout accounted for 24-42% of the summer (June through August). One of these logger deployments indicated water temperatures that may be suitable for trout (76% of the summer in the growth range) however, the average July temperature for this deployment and the others was at or above 20°C.

References

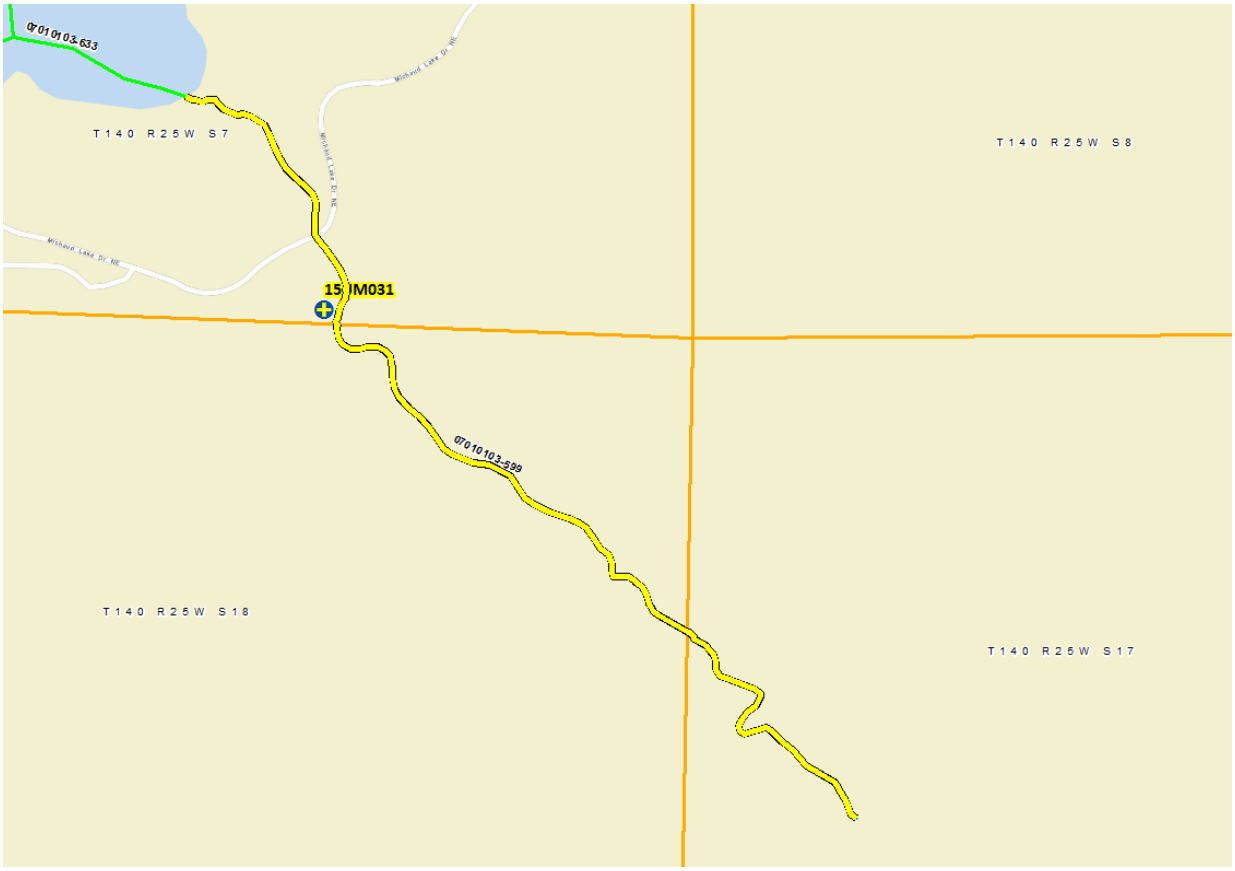
State of Minnesota (2018) State Register, 30 April 2018. Volume 42, Number 44. pp. 1298-1341.

Michaud Brook (07010103-599) MPCA Use Designation Review

Stream name: Michaud Brook
AUID(s): 07010103-599
AUID description: Headwaters to Michaud Lake
Tributaries: none
MPCA biomonitoring site(s): 15UM031
MPCA monitoring date(s): 06/10/2015, 7/23/2015, and 08/11/2015
Watershed: Mississippi River-Grand Rapids
County: Cass

DNR designation: Designation removed in 2018
DNR management class: N/A

Current MPCA use designation: 2Ag (Cold water)
Why is the site being reviewed? Fish, Macroinvertebrate, and Temperature Data
Was this site previously reviewed? If so what were the results? No



Map of Michaud Brook (07010103-599)

Review of existing data

MPCA monitoring data

MPCA biological data

A single biological station was sampled for fish and macroinvertebrates in 2015 and 2016. No cold water fish taxa were sampled and a single cool water (brook stickleback) taxon was sampled. A single cold water macroinvertebrate taxon (*Odontomesa*) consisting of one individual was collected in one of the macroinvertebrate samples. The second macroinvertebrate sample included no cold water taxa.

Fish data summary

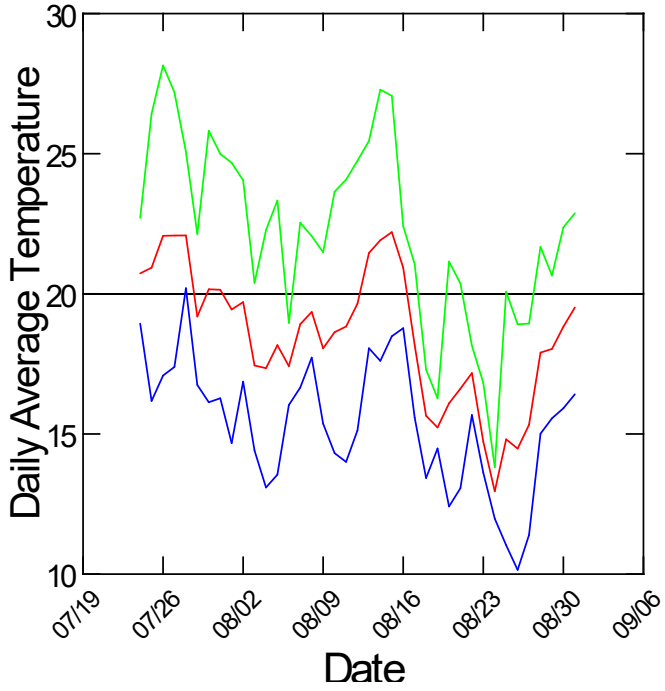
FieldNum	15UM031	15UM031	15UM031
WBName	Michaud Brook	Michaud Brook	Michaud Brook
VisitNum	20151747	20151978	20161190
VisitDate	23-Jul-15	10-Jun-15	20-Jul-16
WQTime	2:21:00 PM	11:11:00 AM	10:02:00 AM
Conductivity (uS/cm)	149	39.1	48
TempH2O (deg C)	25.9	19.4	21.6
Distance Fished (m)	150	150	150
Time Fished (sec)	1906	1830	3086
GearType	BPLR24	BPLR24	BPLR24
Fish Taxa List			
brook stickleback	42	13	1
brown bullhead			1
central mudminnow	29	6	5
common shiner	2		122
creek chub	60	2	20
largemouth bass	20		2
northern pike			1
white sucker			1
yellow perch	3	1	19

Macroinvertebrate data summary

FieldNum	15UM031	15UM031
WBName	Michaud Brook	Michaud Brook
VisitNum	20152788	20161266
VisitDate	11-Aug-15	22-Aug-16
Season	2015	2016
WQTime	DNS	12:15:00 PM
TempH2O (deg C)	DNS	19.89
Coldwater Taxa Richness	1	0
Coldwater Taxa Percent (%)	2.3	0
Coldwater Macroinvertebrate Taxa		
Odontomesa	1	-

MPCA Temperature data

A continuously-recording stream temperature logger was deployed at the MPCA's biomonitoring station (15UM031) during the summers of 2015 and 2016. Summary data for the logger deployment can be found in the table below. "No Growth", "Growth," "Stress," and "Lethal" temperature ranges are specific to brook trout; the typical date range for these summary statistics is June 1 to August 31. In 2015, the logger failed to record temperatures during June and July due to the logger being out of water, thus the summary for the 2015 season only includes the following time period July 23 through August 31st. The figure below provides a summary of water temperatures during the 2015 deployment; green line indicates maximum daily water temperatures, red line indicates daily average water temperatures, and the blue line indicates minimum daily water temperatures.



TempLogNum	5188	10273048
FieldNum	15UM031	15UM031
Season	2015	2016
Interval (Min)	30	30
Percent (%) Recording	42%	100%
BKT_No Growth	0%	0%
BKT_Growth	66%	56%
BKT_Stress	30%	43%
BKT_Lethal	4%	1%
SummerAvgTemp (deg C)	18.5	19.4
JuneAvgTemp (deg C)		17.8
JulyAvgTemp (deg C)	20.9	20.5
AugustAvgTemp (deg C)	17.9	19.9

DNR information

The DNR removed Michaud Brook from the trout waters list in 2018. The DNR indicates this stream lacks suitable habitat and water quality for reproduction and year round survival of trout. There is no evidence of natural reproduction of trout in this stream. No documentation could be located explaining why this stream was listed as a trout water or if was historically managed for trout.

MPCA Summary

This reach was removed from the trout waters list by the DNR in 2018 (State of Minnesota 2018). There is no documentation regarding why this reach was listed as a trout water or if it was ever managed for trout. In 2015 and 2016, the MPCA collected fish and macroinvertebrates community data from one monitoring station located on this reach. Three fish samples were collected. No cold water fish species were present in these samples and a single cool water species was present. A single cold water macroinvertebrate taxon (1 individual) was present in one of two samples collected from this stream reach. Water temperature data was collected using temperature loggers from the biological monitoring station during 2015-2016 (however the data was incomplete for 2015). The water temperature data from 2016 indicate that conditions in Michaud Brook are marginal for supporting a cold water

community. Stressful to lethal thermal conditions for trout accounted for 44% of the summer (June through August) and average July temperature was 20.5°C.

References

State of Minnesota (2018) State Register, 30 April 2018. Volume 42, Number 44. pp. 1298-1341.

Unnamed Creek (Libby Brook) (07010103-601, -602) MPCA Use Designation Review

Stream name: (Unnamed Creek) Libby Brook
AUID(s): 07010103-602, 07010103-601
AUID description: Unnamed Lake (01-0037-00) to Mississippi River
Tributaries: none
MPCA biomonitoring site(s): 15UM017
MPCA monitoring date(s): 06/10/15, 09/01/15, and 6/15/2016 (15UM017)
Watershed: Mississippi River-Grand Rapids
County: Aitkin

DNR designation: Not a designated trout stream (removed in 2018 rule)
DNR management class: N/A

Current MPCA use designation: 2Ag (Cold water)
Why is the site being reviewed? Fish, Macroinvertebrate, and Temperature Data
Was this site previously reviewed? If so what were the results? No

Map of Unnamed Creek (Libby Brook) (07010103-601, -602)

Review of existing data

MPCA monitoring data

MPCA Biological data

Fish were sampled from one station (15UM017) in 2015 and 2016. No cold water species were sampled and three cool water species (burbot, brassy minnow, and brook stickleback) were sampled in low numbers. Macroinvertebrates were sampled in 2015 and a single cold water species was collected (*Lype diversa: Psychomyiidae: Trichoptera*) and had low abundance. Overall, fish and macroinvertebrate communities observed at 15UM017 generally lacked cold water taxa.

Fish Visit Summary

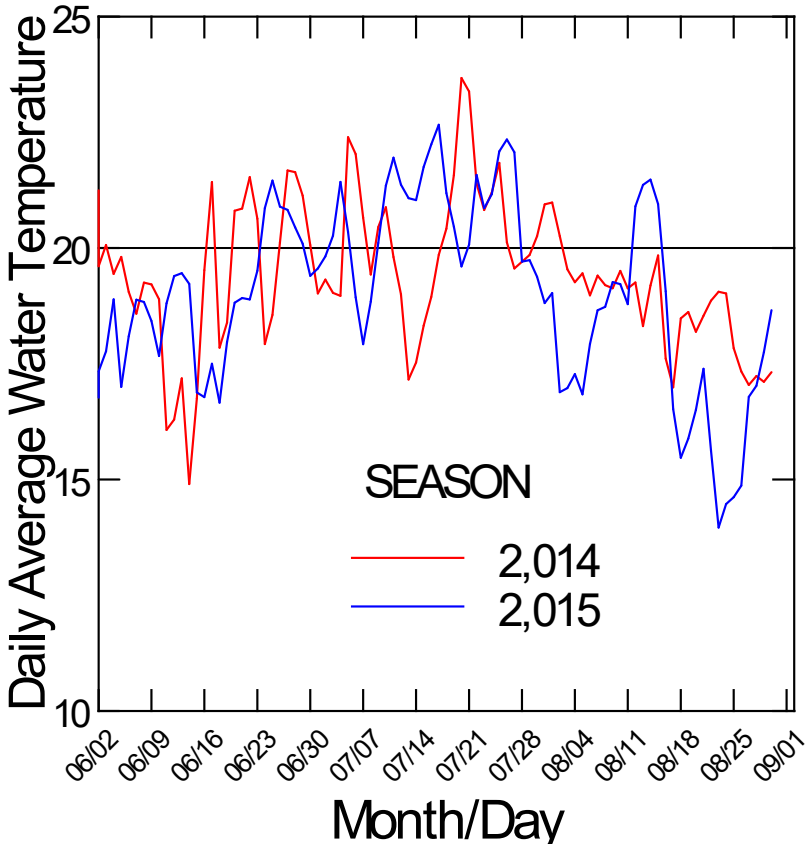
FieldNum	15UM017	15UM017
WBName	Libby Brook	Libby Brook
VisitNum	20151702	20161016
VisitDate	10-Jun-15	15-Jun-16
WQTime	00-Jan-00	6:59:00 PM
Conductivity (uS/cm)	199.1	195
TempH2O (deg C)	20.5	16.41
Distance Fished (m)	150	150
Time Fished (sec)	2164	2465
GearType	BPLR24	BPLR24
Fish Taxa List		
blacknose shiner	3	
brassy minnow		2
brook stickleback		2
burbot	1	1
central mudminnow		15
common shiner	10	1
creek chub	22	19
johnny darter	4	1
tadpole madtom	1	
white sucker	2	15
yellow perch		2

Macroinvertebrate Visit Summary

FieldNum	15UM017
WBName	Libby Brook
VisitNum	20152888
VisitDate	01-Sep-15
Season	2015
WQTime	4:42:00 PM
TempH2O (deg C)	22.1
Coldwater Taxa Richness	1.0
Coldwater Taxa Percent (%)	2.4
Coldwater Macroinvertebrate Taxa	
Lype diversa	30

MPCA temperature data

A continuously-recording stream temperature logger was deployed at one location in Libby Brook during the summers of 2014 through 2016. Generally, water temperatures are in the “stress” range for brook trout between 36-40% of the summer months. Summary data for the logger deployment can be found in the table below. “No Growth”, “Growth,” “Stress,” and “Lethal” temperature ranges are specific to brook trout; the date range for these summary statistics is June 1 to August 31. Stressful and lethal temperatures occurred 37-41% and the average July temperature was 20.2-20.7°C.



TempLogNum	4871	5186	10530582
FieldNum	15UM017	15UM017	15UM017
Season	2014	2015	2016
Interval (Min)	15	30	30
Percent (%) Recording	100%	100%	100%
BKT_No Growth	0%	0%	0%
BKT_Growth	61%	63%	59%
BKT_Stress	38%	36%	40%
BKT_Lethal	0%	1%	1%
SummerAvgTemp (deg C)	19.4	19.0	19.3
JuneAvgTemp (deg C)	19.3	18.6	17.9
JulyAvgTemp (deg C)	20.2	20.7	20.6
AugustAvgTemp (deg C)	18.8	17.7	19.5

Figure 1. Daily Average Water Temperatures (°C) at 15UM017 as measured using a continuous recording Hobo Water Temp Pro v2.

DNR information

The DNR removed Libby Brook from the trout waters list in 2018. Stocking of Libby Brook was halted in 1979. The DNR indicates this stream lacks suitable habitat due to relatively high water temperatures, low water levels, and beaver activity and is unable to support reproduction and year round survival of trout. There is no evidence of natural reproduction of trout in this stream. A 1991 survey by the DNR confirmed that Libby Brook is unsuitable for management of trout.

MPCA Summary

This reach was removed from the trout waters list by the DNR in 2018 (State of Minnesota 2018). In 2015 and 2016, the MPCA collected fish and macroinvertebrates community data from one monitoring station located on this reach. Two fish samples were collected. No cold water fish species were present in these samples and three cool water species were sampled. A single cold water macroinvertebrate taxon (*Lype diversa*) was present in the sample collected from this stream reach. Water temperature data was collected using temperature loggers from the biological monitoring station from 2014 through 2016. The water temperature data indicate that conditions in Libby Brook are marginal for supporting a cold water habitat. Stressful to lethal thermal conditions for trout accounted for 37-41% of the summer (June through August) and the average July temperature was 20.2-20.7°C.

References

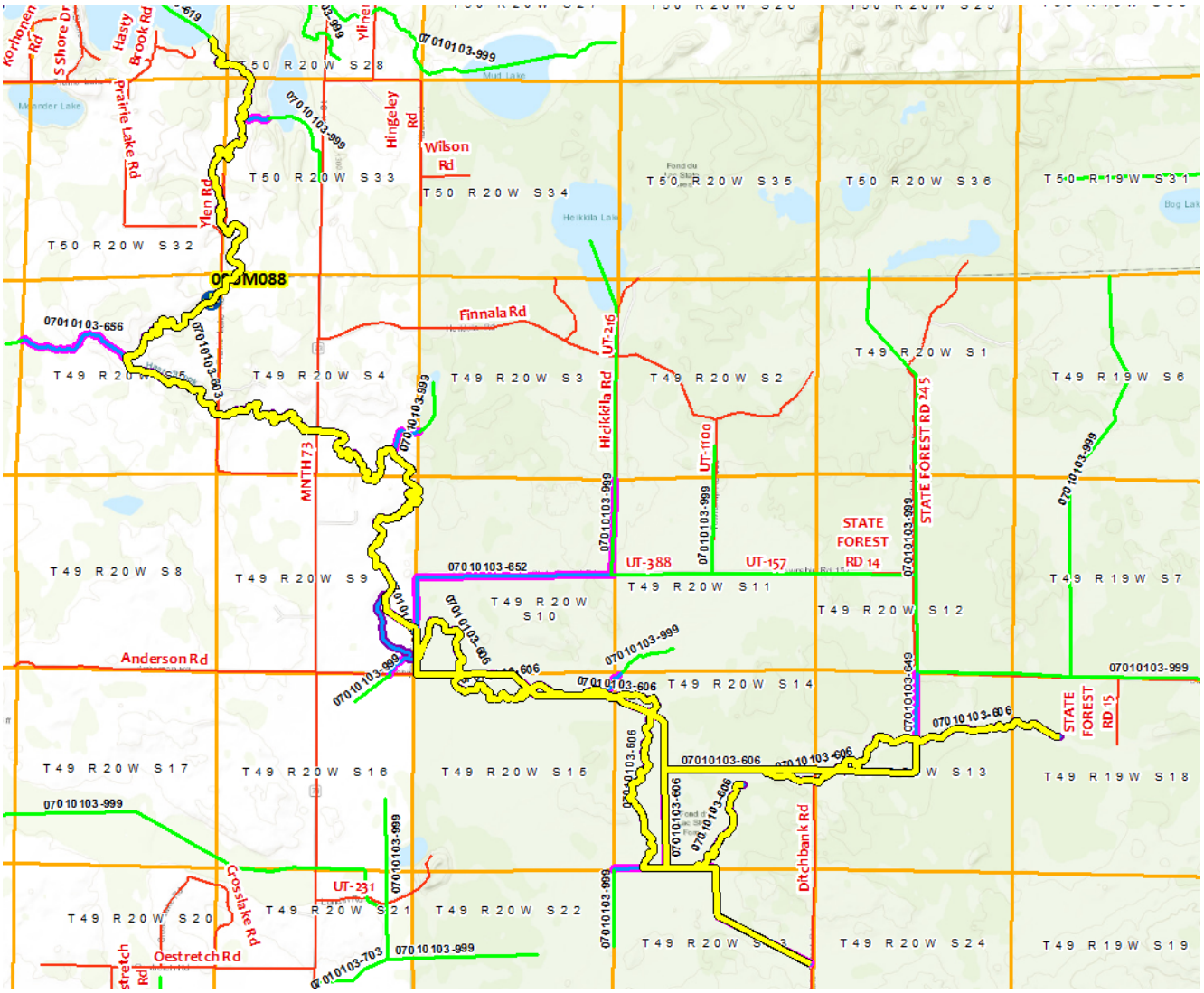
State of Minnesota (2018) State Register, 30 April 2018. Volume 42, Number 44. pp. 1298-1341.

Hasty Brook (07010103-603, -606) MPCA Use Designation Review

Stream name: Hasty Brook
AUID(s): 07010103-603
AUID description: Unnamed ditch to Prairie Lake
Tributaries: 07010103-653, 07010103-654, 07010103-655, 07010103-656, 07010103-657, 07010103-658
MPCA biomonitoring site(s): TL_HastyBrook_US, 09UM088, and TL_HastyBrook_DS
Watershed: Mississippi River-Grand Rapids
County: Carlton & St. Louis

DNR designation: Trout water
DNR management class: I-D (marginal trout)

Current MPCA use designation: 2Ag (Cold water)
Why is the site being reviewed? Fish, Macroinvertebrate, and Temperature Data
Was this site previously reviewed? If so what were the results? No



Map of Hasty Brook (07010103-603, -606)

Review of existing data

MPCA monitoring data

MPCA biological data

Fish and macroinvertebrates were sampled form one station (09UM088) in 2010 and 2015. No cold or cool water fish species were sampled. A single cold water obligate macroinvertebrate taxon (*Isoperla: Perlodidae: Plecoptera*) was observed in low abundance during the 2010 visit. No cold water macroinvertebrate taxa were collected in 2015. In general, fish and macroinvertebrate communities observed at 09UM088 generally lacked cold water taxa.

Fish data summary

FieldNum	09UM088	09UM088
WBName	Hasty Brook	Hasty Brook
VisitNum	20101196	20151764
VisitDate	08-Jul-10	16-Jul-15
WQTime	1:43:00 PM	9:03:00 AM
Conductivity (uS/cm)	200	-
TempH2O (deg C)	23.1	20.6
Distance Fished (m)	150	152
Time Fished (sec)	1775	3605
GearType	BPLR24	BPx2
Fish Taxa List		
blacknose dace	2	5
central mudminnow	8	19
common shiner	19	10
creek chub	3	
hornyhead chub	3	
johnny darter	17	39
logperch	2	21
northern pike	1	2
white sucker	8	10
yellow perch	12	47

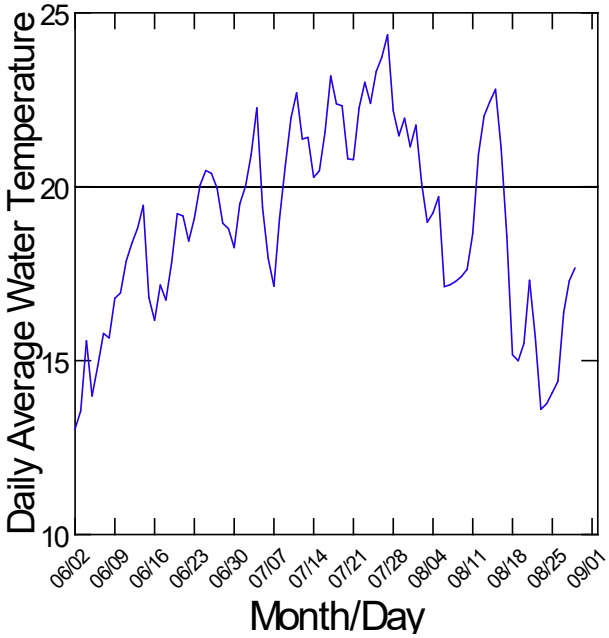
Macroinvertebrate data summary

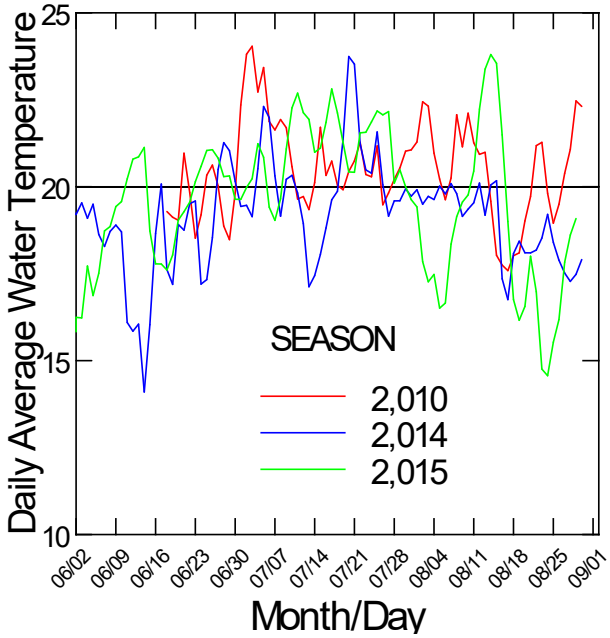
FieldNum	09UM088	09UM088
WBName	Hasty Brook	Hasty Brook
VisitNum	20101335	20152710
VisitDate	21-Sep-09	31-Aug-15
Season	2009	2015
WQTime	-	5:24:00 PM
TempH2O (deg C)	-	21.6
Coldwater Taxa Richness	1	0
Coldwater Taxa Percent (%)	2.2	0
Coldwater Macroinvertebrat Taxa		
Isoperla	2	-

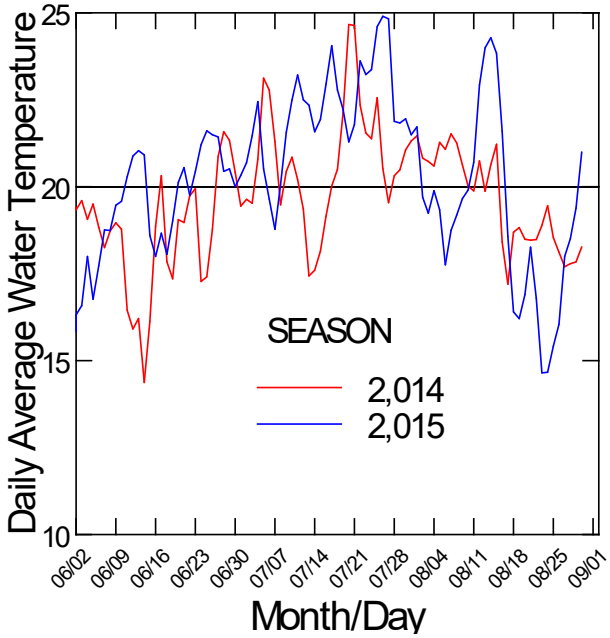
MPCA temperature data

A continuously-recording stream temperature logger was deployed at three locations along Hasty Brook during the summers of 2010 (09UM088), 2014, and 2015. Generally water temperatures are in the “stress” range for brook trout between 32-52% of the summer months. Summary data for these logger deployments can be found in the table below. “No Growth”, “Growth,” “Stress,” and “Lethal” temperature ranges are specific to brook trout; the date range for these summary statistics is June 1 to August 31.

TempLogNum	5216	4319	4320	5163	4870	5215
FieldNum	HastyBrookUS	09UM088	09UM088	09UM088	HastyBrookDS	HastyBrookDS
Season	2015	2010	2014	2015	2014	2015
Interval (Min)	30	15	15	30	15	30
Percent (%) Recording	99%	80%	100%	99%	100%	100%
BKT_No Growth	0%	0%	0%	0%	0%	0%
BKT_Growth	59%	44%	67%	55%	58%	47%
BKT_Stress	40%	52%	32%	44%	41%	48%
BKT_Lethal	1%	4%	1%	1%	1%	5%
SummerAvgTemp (deg C)	18.8	20.5	19.1	19.5	19.6	20.2
JuneAvgTemp (deg C)	17.1	19.5	18.4	18.9	18.6	19.2
JulyAvgTemp (deg C)	21.3	21.0	20.1	21.1	20.7	22.1
AugustAvgTemp (deg C)	18.0	20.4	18.9	18.6	19.6	19.2







Daily Average Water Temperatures (°C) at a) TL_HastyBrook_US (2014), b) 09UM088, and c) TL_HastyBrook_DS as measured using a continuous recording Hobo Water Temp Pro v2.

DNR information

The DNR has recommended removal of Hasty Brook from the trout waters list. This stream was stocked with brook trout for two years (1961 and 1963). Electrofishing surveys were carried out in 1991 and 1997 and no trout were observed in either survey. There is no indication of natural reproduction or carry over in Hasty Brook. The DNR indicates this stream lacks suitable habitat and water quality for reproduction and year round survival of trout due to relatively high water temperatures most years. This stream may have been listed to determine if it had potential to support a trout fishery, but a lack of carry over in the 1960s led to the determination that it was naturally a warm water habitat.

MPCA Summary

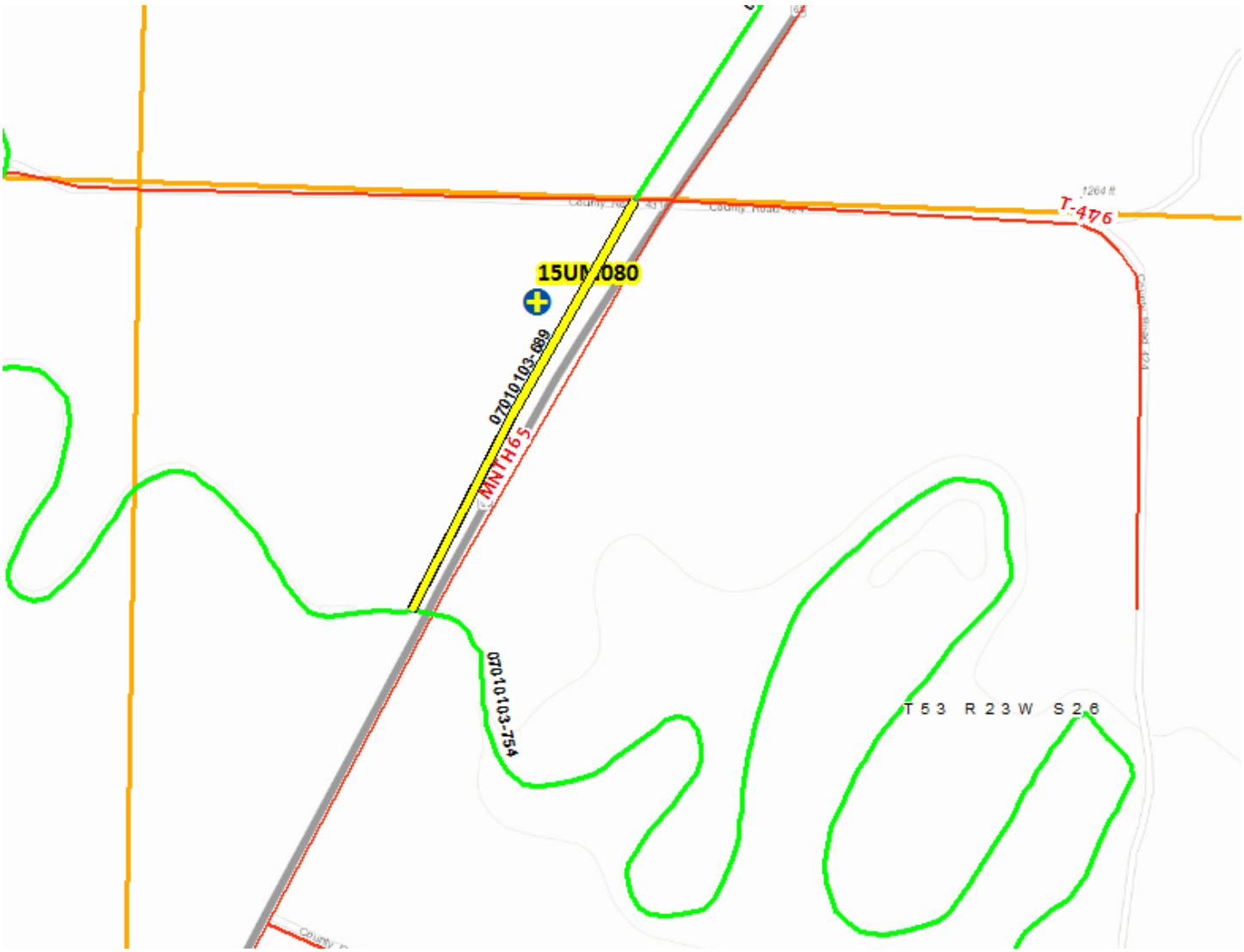
The DNR has recommended removal of Hasty Brook from the trout waters list. This stream was stocked with trout in 1961 and 1963 most likely to determine if it could support a trout fishery. DNR surveys in in 1991 and 1997 collected no trout and determined that water temperatures were too warm most years for trout survival. In 2020 and 2015, the MPCA collected fish and macroinvertebrates community data from one monitoring station located on this reach. No cold or cool water fish species were present in these samples and a single cold water macroinvertebrate taxon (2 individuals) was present in one of two samples collected from this stream reach. Water temperature data was collected in 2010, 2014 and 2015 from three locations using temperature loggers. Water temperature data indicate that conditions in Hasty Brook are marginal for supporting a cold water community. Stressful to lethal thermal conditions for trout accounted for 33-56% of the summer (June through August) and average July temperature was 20.1-21.3°C.

Bruce Creek (07010103-608, 07010103-609, and 07010103-689) MPCA Use Designation Review

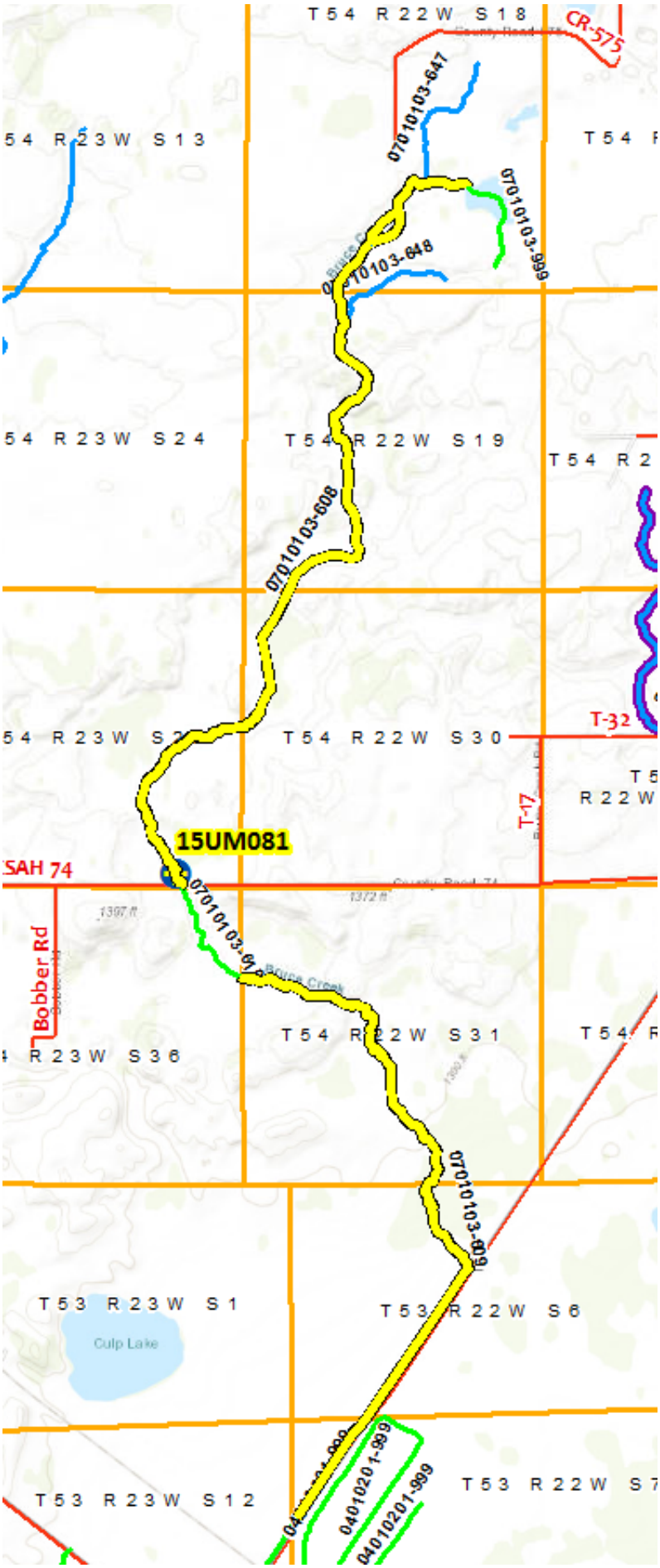
Stream name: Bruce Creek
AUID(s): 07010103-608, 07010103-609, and 07010103-689
AUID description: Headwaters to Swan River
Tributaries: 07010103-647, 07010103-648
MPCA biomonitoring site(s): 15UM081, TL_BruceCreek_XX, and 15UM080
MPCA monitoring date(s): 06/10/2015 (15UM081), 06/09/15, and 08/12/15 (15UM080)
Watershed: Mississippi River-Grand Rapids
County: Itasca

DNR designation: Not a designation trout stream (removed from list in 2018)
DNR management class: unknown

Current MPCA use designation: 2Ag (Cold water)
Why is the site being reviewed? Fish, Macroinvertebrate, and Temperature Data
Was this site previously reviewed? If so what were the results? No



Map of Bruce Creek (07010103-689)



Map of Bruce Creek (07010103-608, 07010103-609)

Review of existing data

MPCA monitoring data

MPCA biological data

Two biological stations were sampled for fish and macroinvertebrates in 2015. A single cold water fish species (mottled sculpin) was sampled at one station in low numbers and a six cool water taxa (northern redbelly dace, finescale dace, pearl dace, brook stickleback, brassy minnow, and burbot) were sampled. A single cold water macroinvertebrate taxon (*Lype diversa*) consisting of four individuals was collected. Overall, fish and macroinvertebrate communities observed at two biomonitoring stations generally lacked cold water taxa.

Fish Visit Summary

FieldNum	15UM081	15UM080
WBName	Bruce Creek	Bruce Creek
VisitNum	20151706	20151703
VisitDate	10-Jun-15	09-Jun-15
WQTime	6:27:00 PM	8:38:00 PM
Conductivity (uS/cm)	157	229
TempH2O (deg C)	20.6	17.2
Distance Fished (m)	150	150
Time Fished (sec)	1478	1725
GearType	BPLR24	BPLR24
Fish Taxa List		
brassy minnow		2
brook stickleback	8	
burbot		12
central mudminnow	7	1
creek chub		1
Fam: minnows	1	
finescale dace	1	1
mottled sculpin		7
northern redbelly dace	9	17
pearl dace	5	11
white sucker		11

Macroinvertebrate Visit Summary

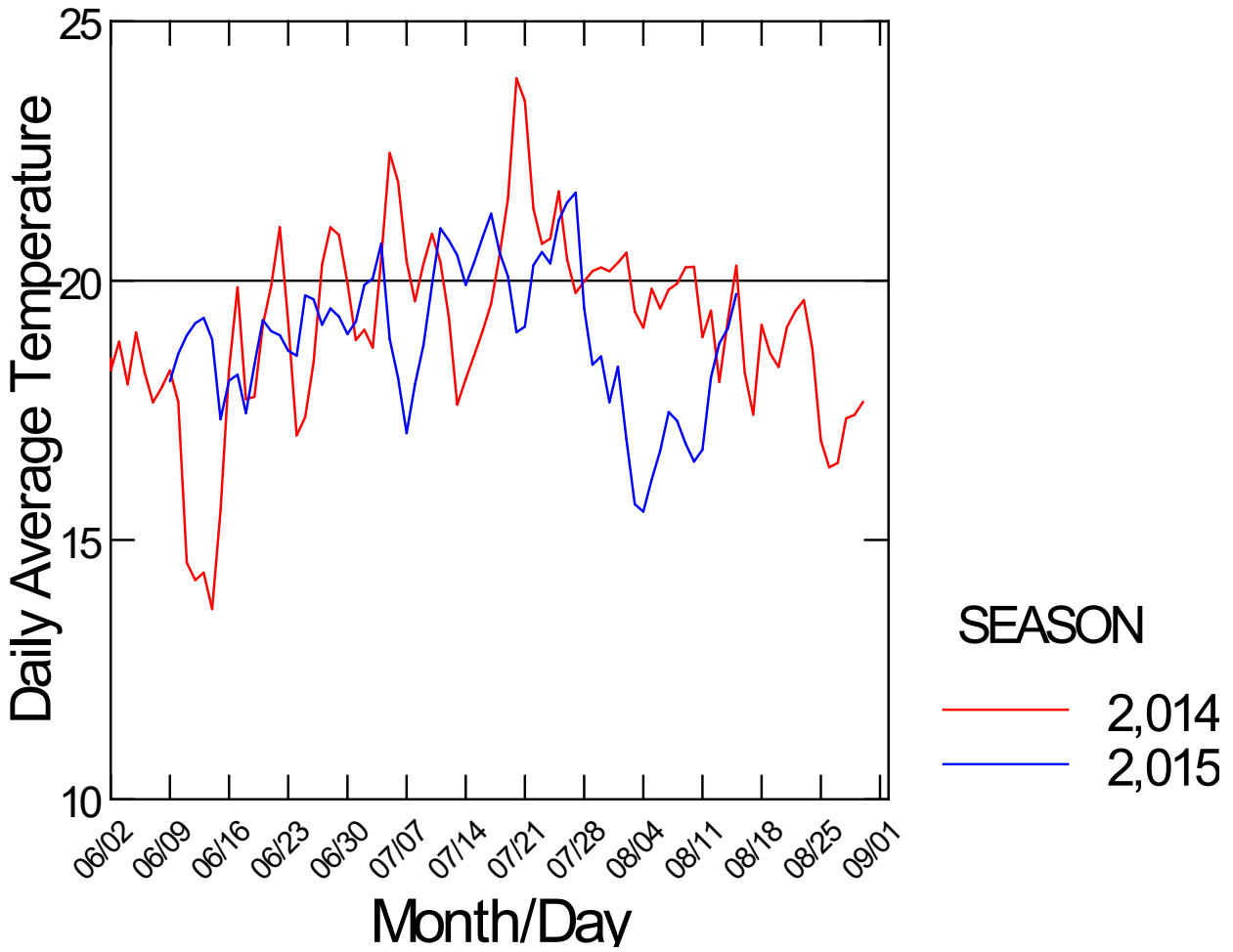
FieldNum	15UM080
WBName	Bruce Creek
VisitNum	20152802
VisitDate	12-Aug-15
Season	2015
WQTime	9:36:00 AM
TempH2O (deg C)	15.8
Coldwater Taxa Richness	1
Coldwater Taxa Percent (%)	2
Coldwater Macroinvertebrate Taxa	
Lype diversa	4

MPCA temperature data

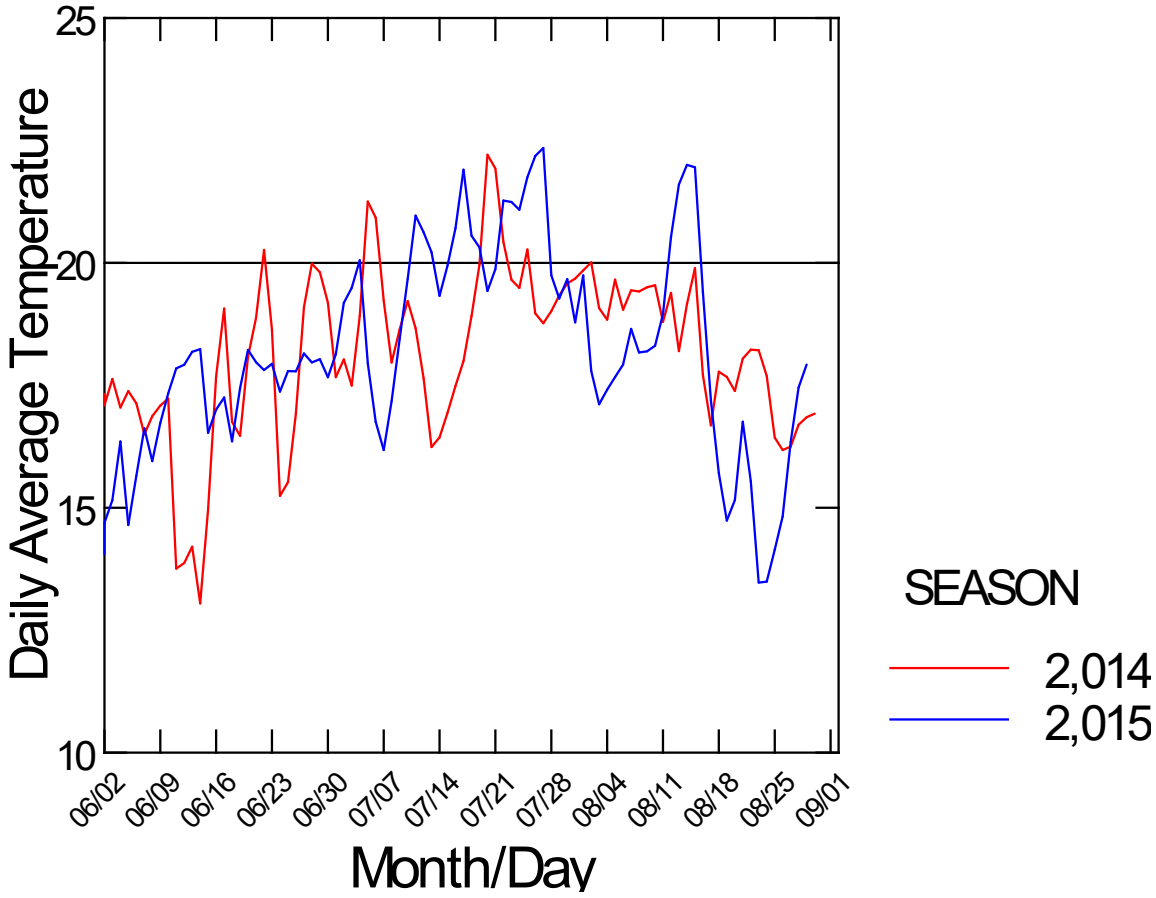
Continuously-recording stream temperature loggers were deployed at three locations along Bruce Creek during the summers of 2014 - 2016. Generally, water temperatures are in the “stress” range for brook trout between 20-34% of the summer months for the upstream stations (15UM081 & TL_BruceCreek_XX), while 15UM080 experienced 11-14% “stress” range temperatures. Summary data for the logger deployment can be found in the table below. “No Growth”,

“Growth,” “Stress,” and “Lethal” temperature ranges are specific to brook trout; the date range for these summary statistics is June 1 to August 31.

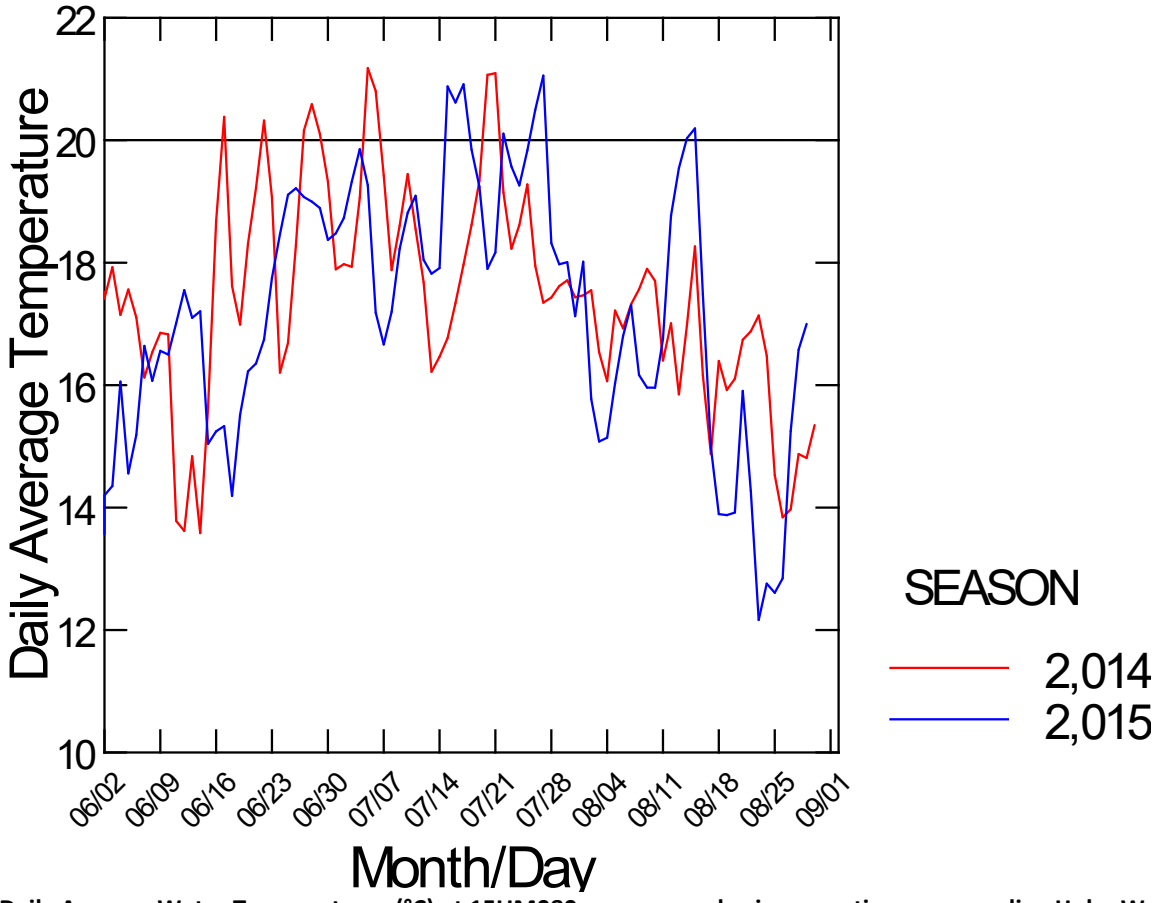
TempLogNum	4868	5198	9853069	4869	5214	10273043	4867	5197	9853072
FieldNum	15UM081	15UM081	15UM081	BruceCreekXX	BruceCreekXX	BruceCreekXX	15UM080	15UM080	15UM080
Season	2014	2015	2016	2014	2015	2016	2014	2015	2016
Interval (Min)	15	30	30	15	30	30	15	30	30
Percent (%) Recording	100%	74%	100%	100%	99%	100%	100%	99%	100%
BKT_No Growth	0%	0%	0%	0%	0%	0%	0%	0%	0%
BKT_Growth	65%	69%	76%	80%	75%	79%	89%	86%	86%
BKT_Stress	34%	31%	24%	20%	25%	21%	11%	14%	14%
BKT_Lethal	1%	0%	0%	0%	0%	0%	0%	0%	0%
SummerAvgTemp (deg C)	19.1	18.9	18.4	18.1	18.1	18.0	17.4	17.1	17.8
JuneAvgTemp (deg C)	18.0	18.8	17.4	17.0	16.8	16.4	17.4	16.3	16.1
JulyAvgTemp (deg C)	20.3	19.8	19.4	19.0	19.8	19.2	18.5	18.9	18.8
AugustAvgTemp (deg C)	18.9	17.4	18.5	18.3	17.6	18.5	16.4	15.9	18.4



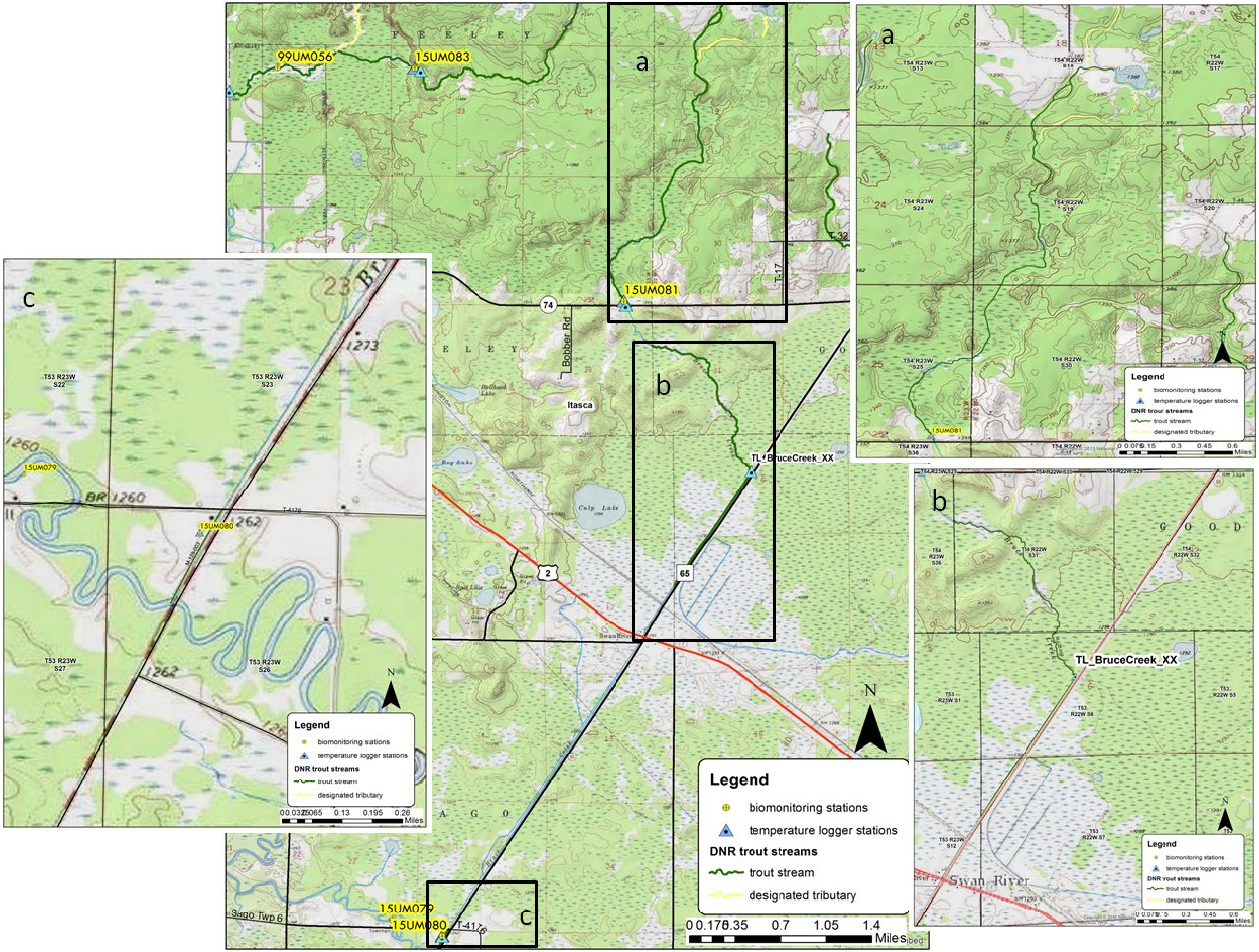
Daily Average Water Temperatures (°C) at 15UM081 as measured using a continuous recording Hobo Water Temp Pro v2. During the summer of 2015 (blue line) the temperature logger was out of water during different periods, thus the graph reflects data generated during the following date range: 06/10/15-08/16/15.



Daily Average Water Temperatures (°C) at TL_BruceCreek_XX as measured using a continuous recording Hobo Water Temp Pro v2.



Daily Average Water Temperatures (°C) at 15UM080 as measured using a continuous recording Hobo Water Temp Pro v2.


a
b
c
99UM056
15UM083
15UM081
TL_BruceCreek_XX
15UM079
15UM080
Bobber Rd
Itasca
Culp Lake
Sago Twp 6
T-4176
Swan River
Legend
biomonitoring stations
temperature logger stations
DNR trout streams
trout stream
designated tributary
0 0.175 0.35 0.7 1.05 1.4
Miles
N

DNR surveys and fishery management

Electrofishing and habitat surveys were conducted in 1977. No fish were encountered throughout the two reaches that were monitored (Sector A: 1.25 miles from the mouth; Sector B: 0.25 miles from the mouth). The lack of fish in 1977 was attributed to the low water years in the summers of 1975 and 1976 and summer or winter-kills. In 1977, the cold water macroinvertebrate taxon *Glossosoma* (Trichoptera: Glossosomatidae) was present at a both stations monitored.

Electrofishing and habitat survey conducted in 1981. During this survey two stations (0.25 miles and 6 miles from the mouth) were monitored. Sculpins (likely mottled) were captured in the lower section (0.25 mi. from the mouth) along with suckers, sticklebacks, dace, mudminnows, darters, and shiners. No cold water fish species were encountered at the reach 6 miles from the mouth.

A macroinvertebrate survey was conducted by the DNR in 1982. Two sections of Bruce Creek were sampled June 18th, 1982 with a Surber sampler. Section A was near the town of Swan River (likely downstream of Hwy 2) and Section B was at the CR 74 road crossing. The purpose of the survey and notes about the survey are lacking. Identifications were, for the most part, left at the order level. Notably, *Gammarus* (Amphipoda) was identified from section B.

An electrofishing and habitat survey was conducted in 1990. Three stations were monitored (0.8, 1.7, and 6 miles from the mouth). Burbot were captured at two stations (0.6 [2 individuals] and 6.0 [3 individuals] from the mouth). Other fish encountered were white sucker, central mudminnow, northern redbelly dace, finescale dace, brassy minnow, mimic shiner, common shiner, johnny darter, brook stickleback, and creek chub.

Brook trout yearlings were stocked in Bruce Creek from 1951 to 1997. Brook trout populations disappeared shortly after stocking was discontinued and no brook trout were captured in the three electrofishing efforts (1977, 1981, and 1990). Based on the 1977 DNR report: "Locals reported that fishing use to be very good for brook trout. This stream was considered to be one of the best trout streams in Itasca County." There is no evidence of natural reproduction of trout species in this stream indicating that the fishery was sustained through stocking.

Several DNR surveys suggest that trout spawning habitats are absent, much of the lower portions of the stream have been channelized or diverted (1968), and that beavers are a difficult to manage in this stream. The DNR removed this stream from the trout waters list in 2018 (State of Minnesota 2018) because channelization, numerous beaver dams and low gradient creates unsuitable trout habitat and no trout have been sampled since at least 1977.

MPCA Summary

The DNR removed this stream from the trout waters list in 2018 (State of Minnesota 2018) because management of trout was deemed to not be feasible. Stocking reports indicated that brook trout were stocked from 1951 to 1997. DNR surveys in 1977, 1981, and 1990 did not collect any trout. The cessation of trout management and delisting of Bruce Creek was the result channelization, numerous beaver dams, and low gradient creating unsuitable trout habitat. Two biological stations were sampled for fish and macroinvertebrates in 2015. A single cold water fish species (mottled sculpin) was sampled at one station in low numbers and a six cool water taxa (northern redbelly dace, finescale dace, pearl dace, brook stickleback, brassy minnow, and burbot) were sampled. A single cold water macroinvertebrate taxon (*Lype diversa*) was present in low numbers. Overall, fish and macroinvertebrate communities observed at two biomonitoring stations generally lacked cold water taxa. Continuously-recording stream temperature loggers were deployed at three locations along Bruce Creek during the summers of 2014, 2015 and 2016. Water temperatures were in the growth range for brook trout 65-89% of the summer and average July temperatures 18.5-20.3°C. Although some locations in Bruce Creek have temperatures that might support a cold water habitat, DNR and MPCA monitoring indicate that a cold water community is not present in this stream.

References

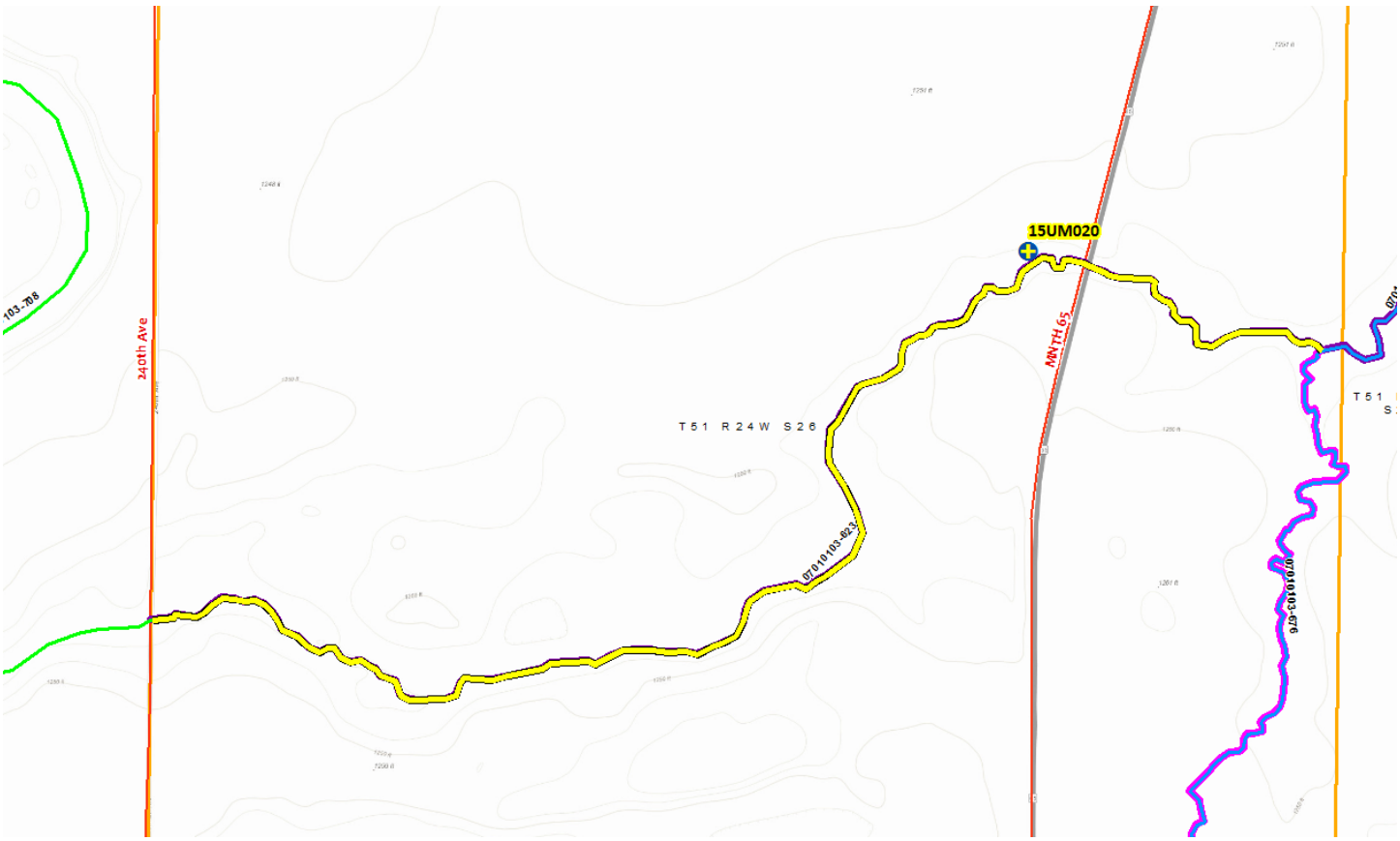
State of Minnesota (2018) State Register, 30 April 2018. Volume 42, Number 44. pp. 1298-1341.

Unnamed Creek (Two River Springs) (07010103-623) MPCA Use Designation Review

Stream name: Unnamed Creek (Two River Springs)
AUID(s): 07010103-623
AUID description: Unnamed Creek to T51 R24W S26, West line
Tributaries: none; upstream reach and tributaries lack monitoring data
MPCA biomonitoring site(s): 15UM020
MPCA monitoring date(s): 06/10/15 & 08/27/15 & 08/24/2016 (15UM020)
Watershed: Mississippi River-Grand Rapids
County: Aitkin

DNR designation: Trout Stream
DNR management class: III (warm water feeder)

Current MPCA use designation: 2Ag (Cold water)
Why is the site being reviewed? Fish, Macroinvertebrate, and Temperature Data
Was this site previously reviewed? If so what were the results? No



Map of Unnamed Creek (Two River Springs) (07010103-623)

Review of existing data

MPCA monitoring data

MPCA biological data

One biological station was sampled for fish (2015) and macroinvertebrates (2016). No cold or cool water fish species were sampled. Macroinvertebrates were not sampled in 2015 as the stream had dense emergent vegetation and although water was present in the channel much (if not all) was stagnant during the time of the attempted macroinvertebrate visit (September 2015). Macroinvertebrates were sampled in 2016, however no cold water taxa were present in the sample.

Fish data summary

FieldNum	15UM020	15UM020
WBName	Trib. to Mississippi River	Trib. to Mississippi River
VisitNum	20151557	20151985
VisitDate	27-Aug-15	10-Jun-15
WQTime	8:37:00 AM	1:05:00 PM
Conductivity (uS/cm)	280	268
TempH2O (deg C)	15.3	20.5
Distance Fished (m)	150	175
Time Fished (sec)	2222	2333
GearType	BPLR24	BPLR24
Fish Taxa List		
blacknose shiner	4	
central mudminnow	32	13
common shiner	3	
creek chub	91	1
Iowa darter	1	
johnny darter	7	
white sucker	1	

June 10th, 2015

August 27th, 2015

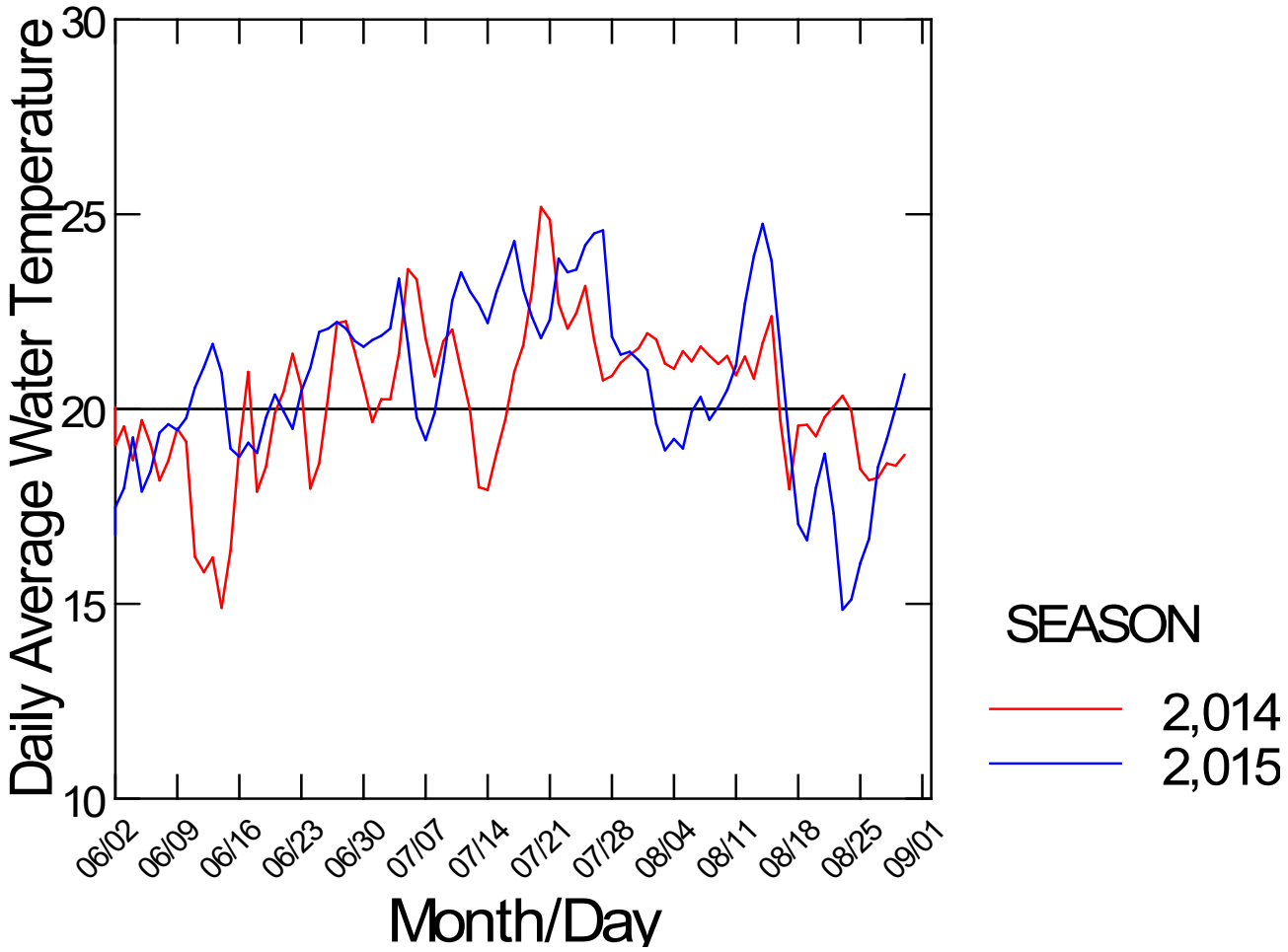
Middle of 15UM020 sampling reach looking upstream

MPCA temperature data

A continuously-recording stream temperature logger was deployed at one location along Two River Springs during the summers of 2014-2016. Water temperatures are in the "stress" range for brook trout 55-64% of the summer months. Summary data for the logger deployment can be found in the table below. "No Growth", "Growth," "Stress," and "Lethal" temperature ranges are specific to brook trout and the date range for these summary statistics is June 1 to August 31.

Temperature logger data summaries

TempLogNum	4881	5187	10273038
FieldNum	15UM020	15UM020	15UM020
Season	2014	2015	2016
Interval (Min)	15	30	30
Percent (%) Recording	100%	100%	100%
BKT_No Growth	0%	0%	0%
BKT_Growth	44%	41%	33%
BKT_Stress	55%	55%	64%
BKT_Lethal	1%	4%	3%
SummerAvgTemp (deg C)	20.3	20.6	20.8
JuneAvgTemp (deg C)	19.1	19.7	19.2
JulyAvgTemp (deg C)	21.4	22.5	21.8
AugustAvgTemp (deg C)	20.3	19.5	21.4



Daily Average Water Temperatures (°C) at 15UM020 as measured using a continuous recording Hobo Water Temp Pro v2.

DNR information

Brook trout management is ongoing in the upper reaches of this stream. A 1992 electrofishing survey conducted by the Minnesota DNR captured a young-of-the-year brook trout in the upper portions (3.2-3.7 miles from the mouth) of Two River Springs. Volunteer creel surveys from 1986 also indicate brook trout presence in the upper reaches of Two River Springs. Based on this information, the reach 3.2-3.7 miles from the mouth of the stream is a natural brook trout stream, but the downstream reach (including 07010103-623) is managed as a warm water feeder.

MPCA Summary

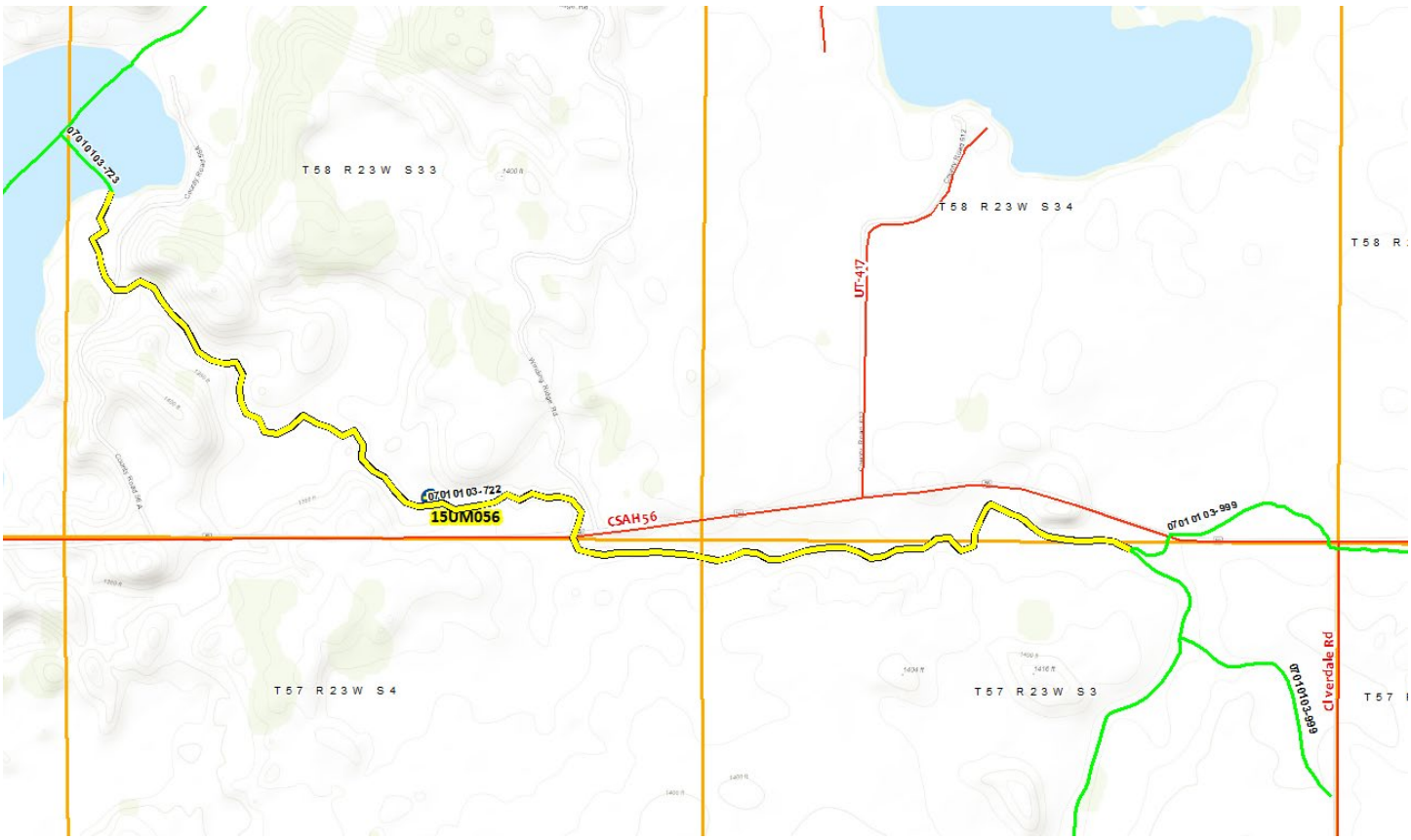
The reach of Two River Springs including 07010103-623 is managed as a warm water feeder by the DNR. There is no evidence indicating that this reach is naturally a cold water habitat or that trout reproduction occurs in this reach. . In 2015, the MPCA sampled fish and macroinvertebrates from one monitoring station located on this reach. No cold or cool water fish species were present and no cold water macroinvertebrate taxa were present in these samples. Water temperature data was collected using temperature loggers from the biological monitoring station during 2014 through 2016. Water temperature data indicated that conditions in Two River Springs are not indicative of a cold water habitat. Stressful to lethal thermal conditions for trout accounted for 56-67% of the summer (June through August) and average July temperature was 21.4-22.5°C.

Unnamed Creek (Tributary to Bray Lake) (07010103-722) MPCA Use Designation Review

Stream name: Unnamed Creek (Tributary to Bray Lake)
AUID(s):07010103-722
Tributaries: 07010103-999
AUID description: Unnamed Creek to Bray Lake
MPCA biomonitoring site(s): 15UM056
MPCA monitoring date(s): 06/10/15, 08/18/2015, and 06/14/2016 (15UM056)
Watershed: Mississippi River-Grand Rapids
County: Itasca

DNR designation: Not a designated trout water
DNR management class: III (warm water feeder)

Current MPCA use designation: 2Bg (Warm Water)
Why is the site being reviewed? Macroinvertebrate and water temperature data
Was this site previously reviewed? If so what were the results? No



Map of unnamed creek (Tributary to Bray Lake) (07010103-722)

Review of existing data

MPCA monitoring data

MPCA biological data

Fish were sampled twice in 2015 and once in 2016 from a single station (15UM056). No cold water fish species and one cool water fish species was sampled during the three electrofishing surveys. One macroinvertebrate sample was collected at 15UM056 in 2015. This sample had five cold water macroinvertebrate taxa and these individuals comprised 3.7% of the sample (10.4% of taxa).

Fish visit summary

FieldNum	15UM056	15UM056	15UM056
WBName	Trib. to Bray Lake	Trib. to Bray Lake	Trib. to Bray Lake
VisitNum	20151770	20151957	20161012
VisitDate	18-Aug-15	10-Jun-15	14-Jun-16
WQTime	5:24:00 PM	6:57:00 PM	4:48:00 PM
Conductivity (uS/cm)	419	69.6	114
TempH2O (deg C)	16.3	19.9	16.78
Distance Fished (m)	150	150	150
Time Fished (sec)	1978	2632	1746
GearType	BPLR24	BPLR24	BPLR24
Fish Taxa List			
central mudminnow	6	1	6
common shiner	3		3
creek chub	68	4	11
finescale dace	1		
golden shiner			1
johnny darter			1
largemouth bass	3		
white sucker	38		8

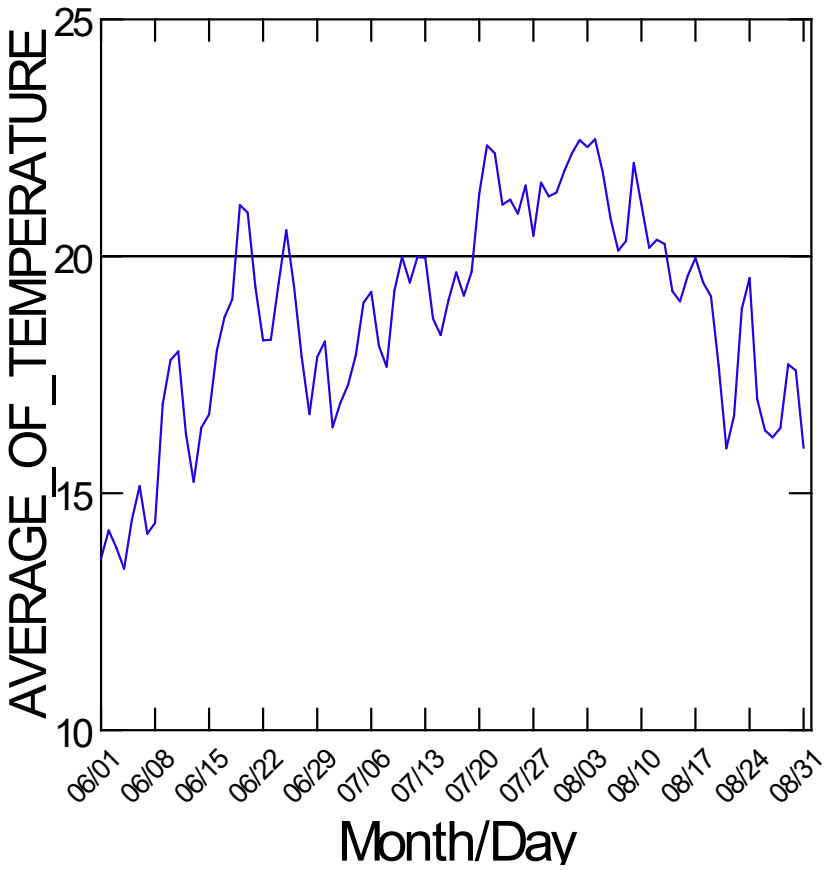
Macroinvertebrate visit summary

FieldNum	15UM056
WBName	Trib. to Bray Lake
VisitNum	20152891
VisitDate	18-Aug-15
Season	2015
WQTime	5:24:00 PM
TempH2O (deg C)	16.3
Coldwater Taxa Richness	5
Coldwater Taxa Percent (%)	9.3
Coldwater Marcroinvertebrate Taxa	
Doncricotopus bicaudatus	1
Glossosoma intermedium	4
Goera	1
Isoperla	2
Lype diversa	4

MPCA temperature data

A continuously-recording stream temperature logger was deployed at one location along Unnamed Creek during the summer of 2016. Water temperatures are in the “stress” range for brook trout 36% of the summer months. Summary data for the logger deployment can be found in the table below. “No Growth”, “Growth,” “Stress,” and “Lethal” temperature ranges are specific to brook trout and the date range for these summary statistics is June 1 to August 31.

TempLogNum	10530579
FieldNum	15UM056
Season	2016
Interval (Min)	30
Percent (%) Recording	100%
BKT_No Growth	0%
BKT_Growth	64%
BKT_Stress	36%
BKT_Lethal	0%
SummerAvgTemp (deg C)	18.7
JuneAvgTemp (deg C)	17.1
JulyAvgTemp (deg C)	19.8
AugustAvgTemp (deg C)	19.3



Daily Average Water Temperatures (°C) at 15UM056 as measured using a continuous recording Hobo Water Temp Pro v2.

DNR information

The DNR manages this water a warm water feeder (Class III). A 1979 DNR survey provides information of past stocking efforts, habitat assessment, macroinvertebrate collections, trout potential, and management plans for Bray Creek. Trout were stocked into this stream until 1965. During the 1979 surveys no trout were encountered despite sampling 3 different sections of Bray Creek (1.33, 1.70, and 4.25 miles from the mouth (Bray Lake)). White sucker, creek chub, and central mud minnows were captured from 2 of the 3 stations. Two cold water macroinvertebrate taxa were encountered from 2 stations during the 1979 survey (*Glossosoma* and *Limnephilus*). *Glossosoma intermedium* was captured during the MPCA's 2015 survey. The 1979 DNR survey suggests that Sector A (1.33 miles from the mouth) has some potential as a marginal brook trout water. This reach overlaps with MPCA's biomonitoring station (15UM056). In 1980, the DNR undesignated Bray Creek from the trout waters inventory because it was determined to be unsuitable to support of a trout population.

MPCA summary

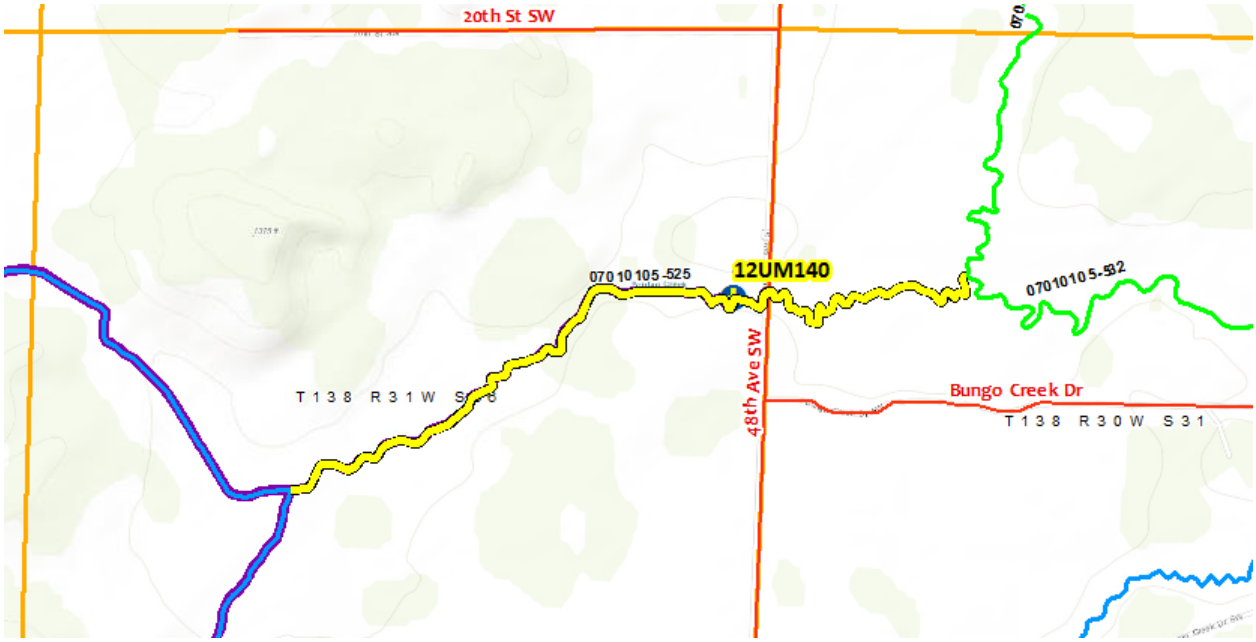
This reach was removed from the trout waters list by the DNR in 1980 because it was determined that it could not support a trout fishery. In 2016, the MPCA collected fish and macroinvertebrates community data from one monitoring station located on this reach. A single cool water fish species (finescale dace) was present. Five cold water macroinvertebrate taxa (*Doncricotopus bicaudatus, Glossosoma intermedium, Goera, Isoperla*, and *Lype diversa*) was present and comprised to 3.7% of the sample. Water temperature data was collected using temperature loggers from the biological monitoring station during 2016. The water temperature data from 2016 indicate that conditions in the tributary to Bray Lake could support a cold water community. Stressful to lethal thermal conditions for trout accounted for 36% of the summer (June through August) and average July temperature was 19.8°C. Although, no cold water fish were encountered during surveys, in-stream habitat suggests that non-trout cold and cool water fish (i.e. burbot, longnose dace, and pearl dace) could utilize this habitat.

Brittan Creek (07010105-525) MPCA Use Designation Review

Stream name: Brittan Creek
AUID(s): 07010105-525
AUID description: Dabill Creek to South Fork Pine River
Tributaries: none
MPCA biological station(s):12UM140
Sample dates: 6/12/2012, 7/1/2013 (fish); 8/2/2012, 9/24/2013 (inverts)
County: Cass
Watershed: Pine River

DNR's designation: Designated trout stream (in part); lower reach in T138 R30W S31 is not a designated trout stream
DNR management class: I-D (marginal trout)
DNR kittle number: M-106-013-005 (labeled Dabill Creek and kittle route is continuous from headwaters of Dabill Creek to South Fork Pine River)

Current AUID designation: 2Ag (cold water)
Reason for review: Fish and temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.



Map of Brittan Creek (07010105-525)

Review of existing data

MPCA monitoring data

MPCA biological data

The fish and macroinvertebrates were sampled at one biomonitoring station (12UM140) in 2012 and 2013. One cold water fish species (mottled sculpin) and five cool water fish species (brassy minnow, northern redbelly dace, finescale dace, pearl dace, and brook stickleback) were sampled. The June 2012 fish sample consisted of 13 species and was indicative of a low gradient stream. Five mottled sculpin (the only cold water fish species) were present in the June sample along with 52 pearl dace. Pearl dace are not considered a cold water species, but are often found in cold water streams. The July 2013 fish sample consisted of 11 species. Only one mottled sculpin was present in the sample and similar numbers of pearl dace were present. The 2012 macroinvertebrate sample was dominated by warm water taxa and indicative of a low gradient system. The 2013 macroinvertebrate sample was also dominated by warm water taxa, but did contain the midge *Doncricotopus bicaudatus.* This midge is often found in small cool/cold water streams of varying gradient.

Fish data summary

CommonName	6/12/2012 visit	7/1/2013 visit
black bullhead	1	
blacknose dace	23	4
blacknose shiner		1
brassy minnow	2	6
brook stickleback	20	6
central mudminnow	12	7
common shiner	12	15
creek chub	47	14
finescale dace	1	
johnny darter	5	
mottled sculpin	5	1
northern redbelly dace	7	7
pearl dace	52	46
white sucker	12	6

Macroinvertebrate data summary

FieldNum	12UM140	12UM140
WBName	Brittan Creek	Brittan Creek
VisitDate	02-Aug-12	24-Sep-13
Season	2012	2013
TempH2O (deg C)	21.5	14
Coldwater Taxa Richness	0	1
Coldwater Taxa Percent (%)	0	2.083333333

FieldNum	12UM140
Visit Date	24-Sep-13
WBName	Brittan Creek
DrainSqMi	15.92
Gradient	1.179993
Invert Class	4
Family	Chironomidae
Taxon	*Doncricotopus bicaudatus*
Sum Of Count	2

MPCA water temperature data

In 2012, water temperature was measured continuously using a temperature logger located within the sampling reach. The average temperature for July was very marginal for trout survival (22.2°C) with temperatures only in the growth range 50.1% of the summer (June through August).

Water temperatures data summary

Temp Log Number	2004
Thermal Regime Category	Area 1
% Recording	91.300
% Growth	50.110
% Stress	46.730
% Lethal	3.160
% No Growth	0.000
July Avg Temp (°C)	22.2
July Recording Days	31
August Avg Temp (°C)	19.0
August Recording Days	29
Summer Avg Temp (°C)	20.1
Total Summer Days	84

DNR information

No DNR sampling data from Brittan Creek (07010105-525) could be located. Historically Dabill Creek (07010105-526), upstream of Brittan Creek (07010105-525), was managed for brook trout in the headwaters region located upstream of CSAH 2. In 2003 the cold water designation was extended downstream through Brittan Creek (07010105-525). No documentation could be located to provide rationale for this change. During conversation DNR staff have indicated that Brittan Creek was never managed for trout and was thought to be very marginal for trout survival (lacked habitat and was warm).

Dabill Creek information (upstream of Brittan Creek [07010105-525])

The Brainerd Area DNR Office could not locate any stocking data for Dabill Creek; however, a 1989 survey indicates brook trout were stocked throughout the 1950s. During the years of regular stocking the stream received considerable angling pressure and natural reproduction was observed. Stocking was discontinued in the late 1950s or 1960s pending the development of angler access easements. The 1989 survey document also noted that during a 1975 survey (fish data not documented), large numbers of young-of-the-year brook trout were sampled at a station located in the headwaters of Dabill Creek (07010105-526). No trout were captured during the 1989 survey and only one mottled sculpin was captured. All other species present at the five monitoring stations were indicative of a low gradient stream. Notes from the 1989 survey indicate that beaver activity has created numerous impoundments along the stream and that habitat (for trout) was poor.

MPCA Summary

No DNR sampling data from Brittan Creek (07010105-525) could be located. Historically Dabill Creek (07010105-526), upstream of Brittan Creek (07010105-525), was managed for brook trout in the headwaters region located upstream of CSAH 2. In 2003 the trout water designation was extended downstream through Brittan Creek (07010105-525). No documentation could be located to provide rationale for this change. Available information indicates that Brittan Creek was never managed for trout and was thought to be very marginal for trout survival due to the lack of trout habitat and high

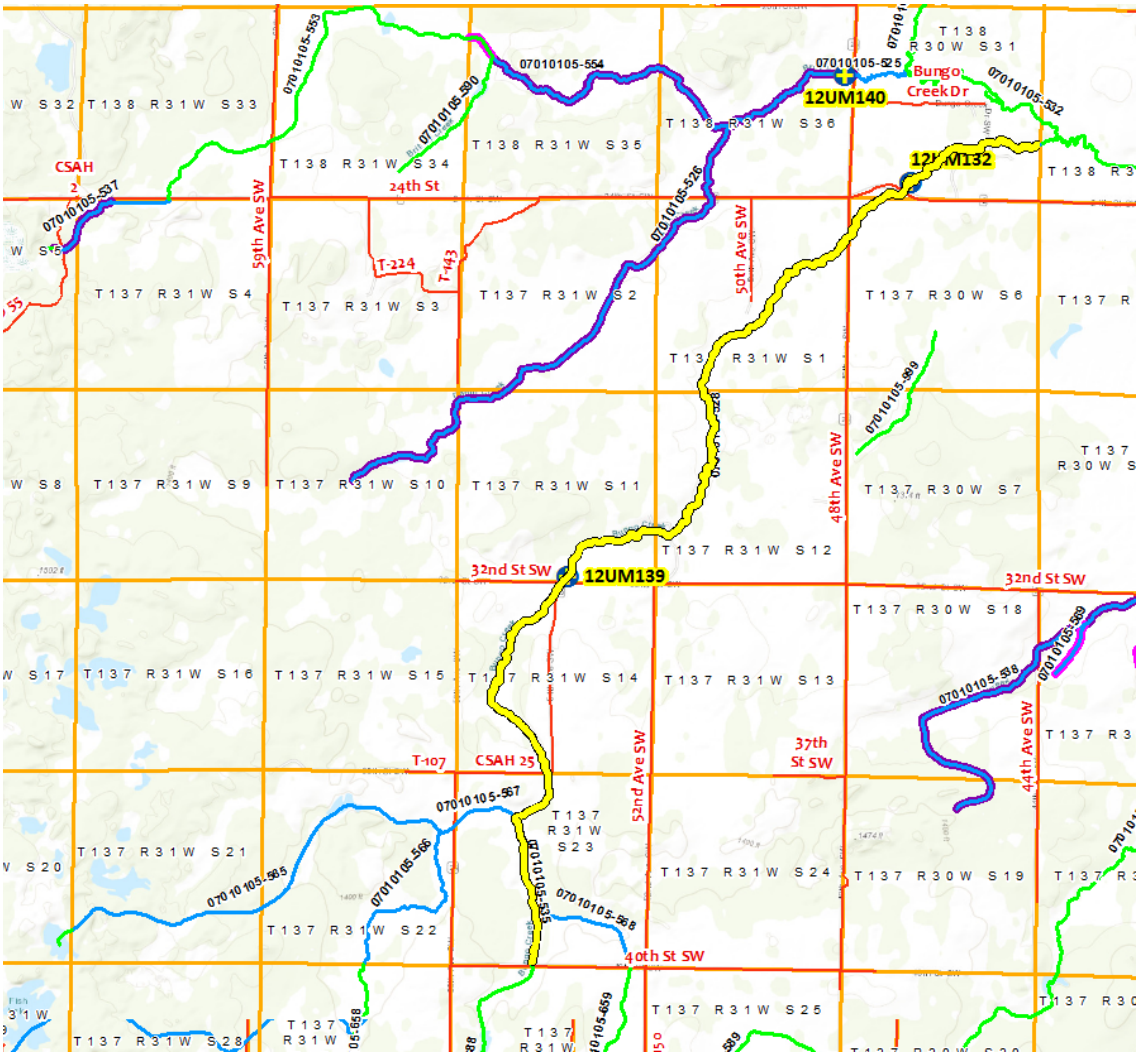
water temperatures. Fish and macroinvertebrates were sampled during 2012 and 2013 at one monitoring station located on Brittan Creek. All samples consisted of communities indicative of a warm water low gradient stream. No trout were collected and a single cold water fish species (mottled sculpin) was collected in low numbers. The macroinvertebrate samples only included a single cold water taxon (*Doncricotopus bicaudatus*) which comprised 0-2.1% of the individuals in the samples. In 2012, water temperature was measured continuously using a temperature logger located within the MPCA's biological sampling reach. The average temperature for July was very marginal for trout survival (22.2°C) with temperatures only in the growth range 50.1% of the summer (June through August). Temperatures were lethal to brook trout 3.2% of the summer.

Bungo Creek (07010105-528) MPCA Use Designation Review

Stream name: Bungo Creek
AUID(s): 07010105-528, (07010105-535)
AUID description: Unnamed creek to T138 R30W S31, east line
Tributaries: 07010105-565, 07010105-566, 07010105-567, and 07010105-568
MPCA biological station(s): 12UM132, 12UM139
Sample dates: 6/11/12, 7/11/12, 7/12/12, 7/1/13
County: Cass
Watershed: Pine River

DNR's designation: Not a designated trout stream (removed in 2018)
DNR management class: unknown

Current AUID designation: 2Ag (cold water)
Reason for review: Fish and temperature data; DNR trout water delisting
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.



Map of Bungo Creek (07010105-528, and -535)

Review of existing data

MPCA monitoring data

MPCA biological data

Two biological stations were sampled in 2012 and 2013 for fish and macroinvertebrates. One cold water species (mottled sculpin) was captured at one station (12UM132) in both years in very low numbers. Four cool water fish species (brassy minnow, brook stickleback, northern redbelly dace, and pearl dace) were sampled from Bungo Creek. No cold water macroinvertebrates were present in the four samples collected.

Fish: 12UM139, 7/12/2012

Common Name	Min	Max	Weight	#
blacknose dace	60	98	259	63
creek chub	30	163	511	51
pearl dace	65	100	56	12
johnny darter	49	59	9	7
brook stickleback	35	38	1	4
common shiner	60	64	7	3
brassy minnow	65	65	4	1
northern redbelly dace	57	57	1	1
white sucker	74	74	4	1

Metric	Salmonids	Cold	Cold+Cool	Cool
Taxa richness	0	0	4	4
% Taxa	0.0	0.0	44.4	44.4
% Individuals	0.0	0.0	12.6	12.6

Fish: 12UM139, 6/11/2012

Common Name	Min	Max	Weight	#
blacknose dace	45	91	263	81
creek chub	45	152	292	50
common shiner	43	140	147	21
brassy minnow	55	79	46	12
johnny darter	40	61	19	11
brook stickleback	43	49	15	6
pearl dace	34	40	17	5
central mudminnow	64	79	18	4
white sucker	67	79	24	4
northern redbelly dace	34	64	5	3
fathead minnow	61	61	2	1

Metric	Salmonids	Cold	Cold+Cool	Cool
Taxa richness	0	0	4	4
% Taxa	0.0	0.0	36.4	36.4
% Individuals	0.0	0.0	13.1	13.1

Fish: 12UM139, 7/9/2013

Common Name	Min	Max	Weight	#
blacknose dace	43	105	180	41
creek chub	97	149	341	22
pearl dace	68	105	95	17
brassy minnow	63	80	51	13
common shiner	71	98	48	9
northern redbelly dace	43	61	19	8
brook stickleback	46	53	4	3
central mudminnow	49	60	5	3
fathead minnow	64	64	3	1
johnny darter	52	52	1	1
white sucker	31	31	0.5	1

Metric	Salmonids	Cold	Cold+Cool	Cool
Taxa richness	0	0	4	4
% Taxa	0.0	0.0	36.4	36.4
% Individuals	0.0	0.0	21.0	21.0

Macroinvertebrates: 12UM139, 8/2/2012 and 8/8/2013 – no cold water taxa

Fish: 12UM132, 7/11/2012

Common Name	Min	Max	Weight	#
central mudminnow	50	94	82	22
creek chub	32	196	436	21
white sucker	36	117	206	20
johnny darter	44	60	14	10
blacknose dace	62	95	19	5
mottled sculpin	68	71	8	2
bluegill	77	77	6	1
brook stickleback	54	54	1	1
common shiner	126	126	25	1
northern redbelly dace	31	31	1	1

Metric	Salmonids	Cold	Cold+Cool	Cool
Taxa richness	0	1	3	2
% Taxa	0.0	10.0	30.0	20.0
% Individuals	0.0	2.4	4.8	2.4

Fish: 12UM132, 7/1/2013

Common Name	Min	Max	Weight	#
creek chub	60	140	570	62
blacknose dace	55	100	145	34
white sucker	77	170	245	28
central mudminnow	54	90	88	27
common shiner	64	125	111	22
johnny darter	44	72	23	19
pearl dace	65	82	41	12
brassy minnow	57	77	10	4
northern pike	74	86	9	3
brook stickleback	54	57	3	2
mottled sculpin	67	67	5	1
yellow bullhead	275	275	325	1
yellow perch	81	81	6	1

Metric	Salmonids	Cold	Cold+Cool	Cool
Taxa richness	0	1	4	3
% Taxa	0.0	7.7	30.8	23.1
% Individuals	0.0	0.5	8.8	8.3

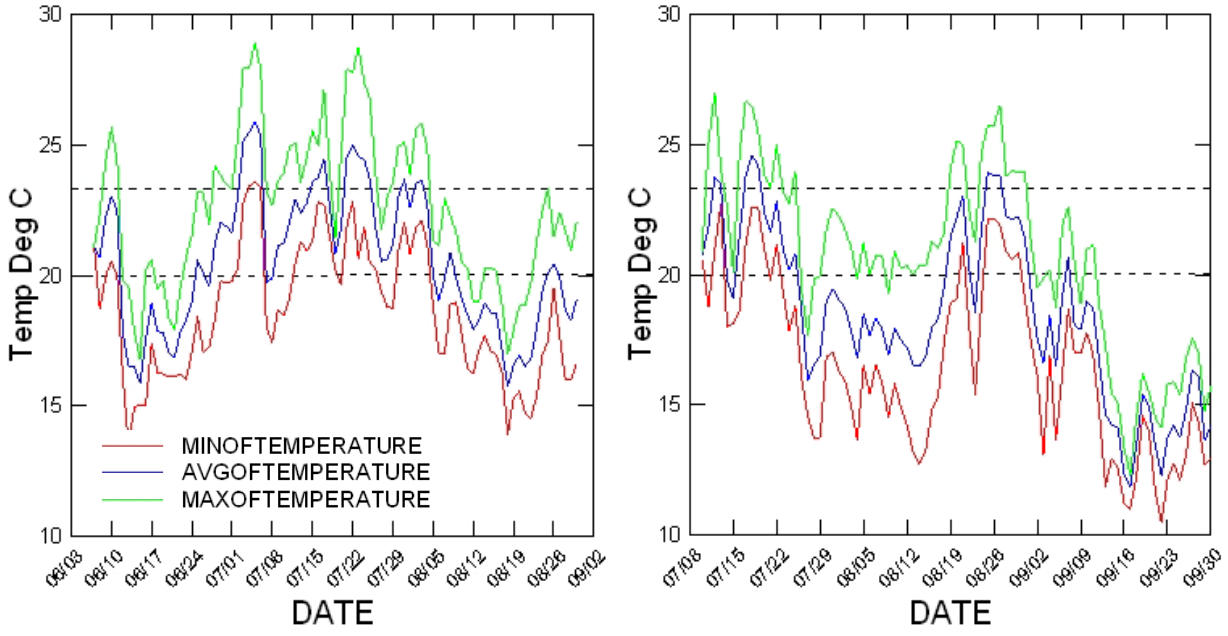
Macroinvertebrates: 12UM132, 8/2/2012 and 8/8/2013 – no cold water taxa

MPCA water temperature data

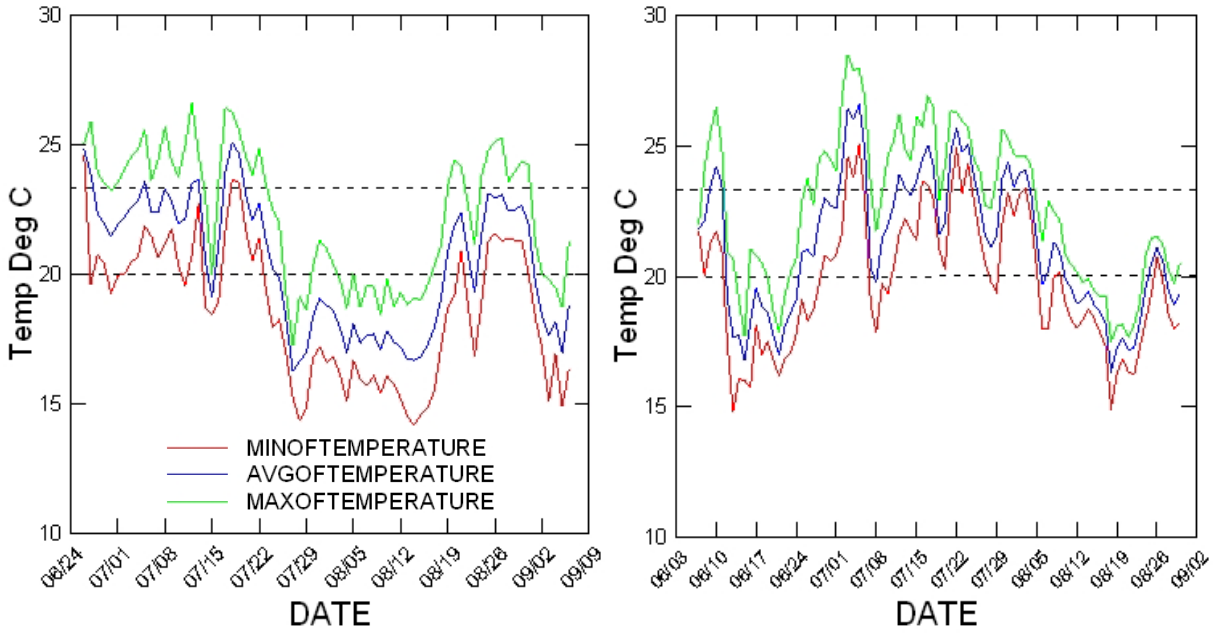
Water temperature data was collected at 15 minute intervals using data loggers from both sampling stations in 2012 and 2013. Average July water temperatures ranged from 20.8-23.5°C and were in the growth range for brook trout 38.4-49.2% of the summer (June through August). The lethal threshold for brook trout was reached 4.1-10.1% of the summer.

Temperature logger data summary

MPCA Site ID	Year	Summer Avg. Temp (°C)	June Avg. Temp (°C)	July Avg. Temp (°C)	August Avg. Temp (°C)	% Lethal	% Stress	% Growth
12UM139	2012	20.6	19.4	22.9	19.1	6.8	48.1	45.1
12UM139	2013	20.1	-	20.8	19.6	4.7	46.1	49.2
12UM132	2012	20.6	22.9	21.4	19.4	4.1	53.6	42.3
12UM132	2013	21.2	20.2	23.5	19.7	10.1	51.5	38.4



Plot of temperature data from 12UM139measured during 2012 and 2013



Plot of temperature data from 12UM132 measured during 2012 and 2013

DNR information

The DNR removed this stream from the trout waters list in 2018 (State of Minnesota 2018) because management of trout was deemed to not be feasible. Limited information regarding the past management of Bungo Creek was available, but the DNR believes that Bungo Creek likely supported a brook trout fishery before 1975. No documentation of brook trout natural reproduction within Bungo Creek or its tributaries could be found. Only one stocking record, documenting the release of 2000 brook trout yearlings in 1971, could be found. In 1975, the DNR sampled two sites on Bungo Creek and no trout were sampled at either site. Evidence of any additional DNR surveys or management activities conducted on Bungo Creek could not be found.

MPCA Summary

The DNR removed this stream from the trout waters list in 2018 (State of Minnesota 2018) because management of trout was deemed to not be feasible. Limited information regarding the past management of Bungo Creek was available, but the DNR believes that Bungo Creek likely supported a brook trout fishery before 1975. No documentation of brook trout natural reproduction within Bungo Creek or its tributaries could be found. Only one stocking record, documenting the release of 2000 brook trout yearlings in 1971, could be found. In 1975, the DNR sampled two sites on Bungo Creek and no trout were sampled at either site. Evidence of any additional DNR surveys or management activities conducted on Bungo Creek could not be found. The MPCA sampled the fish community data from two stations on Bungo Creek in 2012 and 2013. All samples consisted of predominantly warm water species. During both years of sampling, one cold water species (mottled sculpin) was sampled in low numbers at one station. No cold water macroinvertebrates were collected from either biological station. Water temperature data was collected at 15 minute intervals using data loggers from both sampling stations in 2012 and 2013. Average July water temperatures ranged from 20.8-23.5°C and were in the growth range for brook trout 38.4-49.2% of the summer (June through August). The lethal threshold for brook trout was reached 4.1-10.1% of the summer.

References

State of Minnesota (2018) State Register, 30 April 2018. Volume 42, Number 44. pp. 1298-1341.

Little Rock Creek (07010201-652, 07010201-653) MPCA Use Designation Review

Stream name: Little Rock Creek
AUID(s): 07010201-652 (07010201-653 also considered in this review)[1]
AUID description: 07010201-652: T39 R30W S22, south line to T38 R31W S23, west line; 07010201-653: T39 R31W S22, east line to T38 R31W S28, east line
Tributaries: 07010201-652: 07010201-600, 07010201-601, 07010201-602, 07010201-603, 07010201-604, and 07010201-605; 07010201-653: numerous
MPCA biomonitoring site(s): 99UM058
MPCA monitoring date(s): 7/15/1999, 6/30/2015, 6/29/2016
Watershed: Mississippi River-Sartell
County: Morrison

DNR designation: Trout stream
DNR management class: None/warm water

Current MPCA use designation: 2Ag (Cold water)
Why is the site being reviewed? Fish and temperature data
Was this site previously reviewed? If so what were the results? Segment 07010201-504 (Little Rock Creek headwaters to Mississippi River) was placed on the 2002 TMDL list due to a biological impairment as indicated by a poor warm water fish IBI score at site 99UM058. At that time it was understood that the warm water use designation (2B) was applicable. During the 2004 assessment cycle 07010201-504 was split into -547, -548, and -549 based on the recognition that the designated use of part of the headwaters of the AUID was not Class 2B (warm water), but was Class 2A (cold water) as listed in Minn. R. 7050.0470 and also a designated trout stream as listed in Minn. R. 6264.0050 subp.4. The impairment was associated with the AUID 07010201-548 (T39 R30W S27 south line to T38 R31W S28 east line) based on the location of the biological monitoring site. After consultation with biologists at the Minnesota Department of Natural Resources office in Little Falls it was determined that the upstream reaches (-547 and part of -548) of Little Rock Creek (i.e., upstream of the eastern boundary of Section 22 T39N-R31W) lacked the potential to support a cold water fishery. Thus, for management purposes the DNR considered these reaches to be a warm water stream. The application of a warm water IBI to determine the impairment status was in their opinion, a reasonable approach. During the 2006 assessment cycle 07010201-548 was removed from the TMDL list as a correction when a routine examination of designated uses of assessed waterbodies revealed that 07010201-548 was a designated Class 2A cold water stream and typically would not be assessed for biology.

During the 2008 assessment process the BPJ group recognized that the unique history of the assessment, listing and designated uses on this AUID necessitated a reevaluation of its removal from the impaired water list. Additionally, MPCA and Benton County were undertaking a study of the Little Rock Creek (including these reaches) and Little Rock Lake. The data indicated that impaired conditions existed not only for biota, but also dissolved oxygen, turbidity, fecal coliform, and excessive nutrients in the lake. Therefore, it was determined that 07010201-548 be placed back on the impaired waters list and assessed as impaired using a narrative interpretation of MN Rule Chapter 7050.0150 as a Class 2A waterbody.

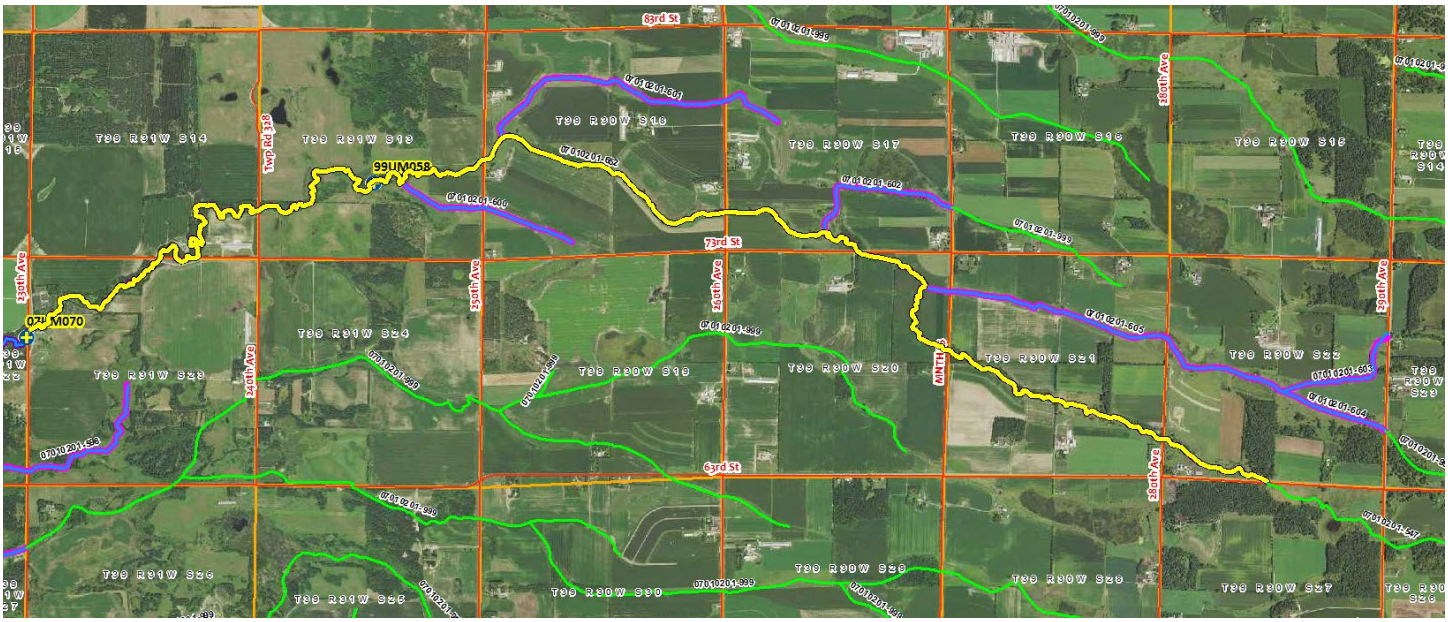
Purpose/Goal: The purpose of this review is to reclassify the use designation of the headwaters portion of Little Rock Creek from a cold water (2A) stream to a northern headwaters warm water (2B) stream. The portion of the stream under review is upstream of 230th Ave., including approximately the upstream most seven miles of AUID 07010201-548

[1] The WID history for the WIDs in this review include several splits that occurred during assessment and use designation review efforts. Little Rock Creek from its headwater to the Mississippi River was originally a single WID (07010201-504). This WID was split into 07010201-547, -548, and -549 to recognize DNR's trout stream designation from T39 R30W S22, south line to T38 R31W S28, east line (07010201-548 was the trout water section). As part of the present review, 07010201-548 was split into 07010201-652 and 07010201-653 to recognize differences in the thermal habitat between these two reaches.

and all of AUID 07020101-547. This portion of stream has historically never supported trout and based on fish and water temperature data and does not and could not support trout.

Additional information

- On January 9, 2017 the Little Rock Creek Final TMDL report was approved and released and can be found here: https://www.pca.state.mn.us/water/tmdl/little-rock-creek-dissolved-oxygen-nitrate-temperature-and-fish-bioassessment. This report noted: "The upstream portion is slow, marshy and warmer than downstream sections. From 230th Avenue in Morrison County and downstream, the creek picks up ground water from springs and the temperature drops."
- Since the decision to place AUID-548 back on the impaired waters list, additional fish community and water temperature data have been collected which are detailed below.



Map of Little Rock Creek (07010201-652)

Review of existing data

MPCA monitoring data

MPCA biological data

Fish were sampled by the MPCA in 1999, 2007, 2015, and 2016 from 99UM058. This station was visited twice in 2007 but during his period the stream was intermittent and the samples collected were not considered assessable. No cold water fish species were collected during any of the 5 visits. The fish community at station 99UM058 on Little Rock Creek (07010201-652) is characterized by a prevalence of highly tolerant warm water species and absence of cold water species. The fish community attributes suggest the fish community deviates substantially from what is expected in a cold water system. Macroinvertebrates were sampled from 99UM058 in 1999, 2015 and 2016 and no cold water taxa were present in any of these three samples.

Fish community data

7/15/1999	
Common Name	**#**
central mudminnow	260
creek chub	58
brook stickleback	33
blacknose dace	16
white sucker	9
johnny darter	9
fathead minnow	7

6/30/2015	
Common Name	**#**
central mudminnow	31
brook stickleback	21
johnny darter	14
creek chub	10
blacknose dace	8
fathead minnow	3
white sucker	1

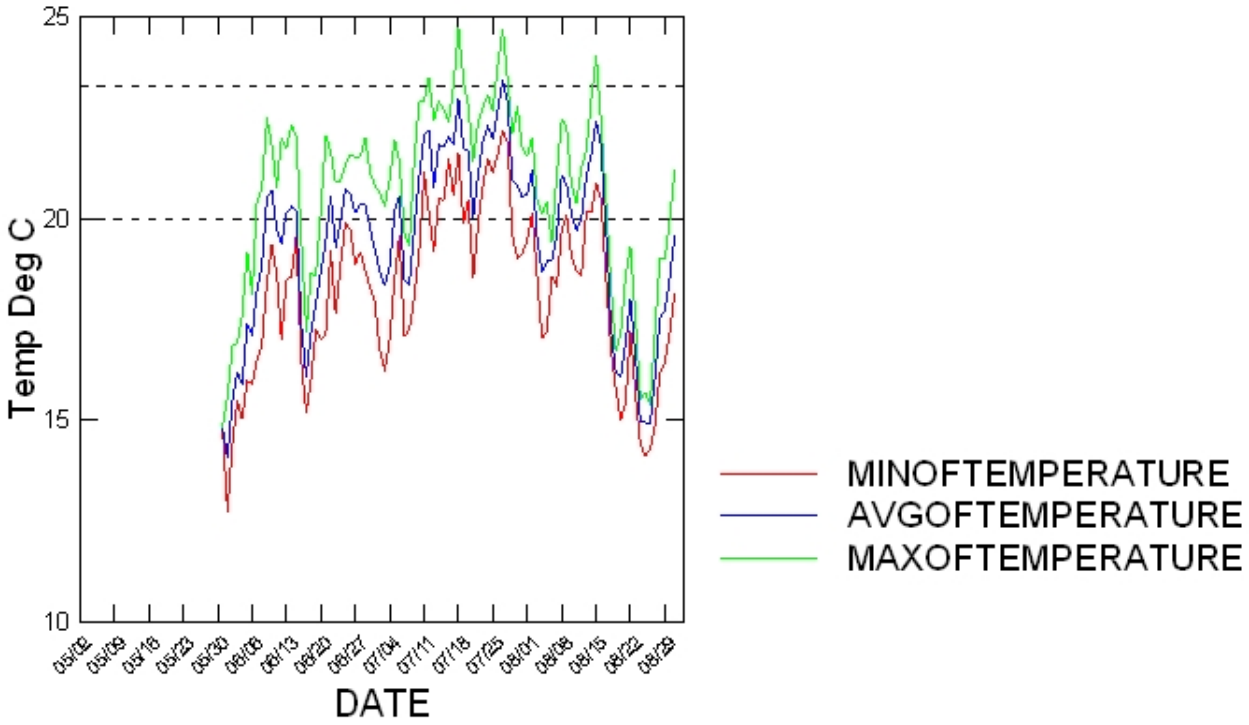
6/29/2016	
Common Name	**#**
johnny darter	107
creek chub	74
central mudminnow	63
brook stickleback	16
blacknose dace	15
fathead minnow	11
white sucker	9
bigmouth shiner	2

MPCA Temperature data

- Single water temperature readings were taken at the time of each individual MPCA fish sample:
  - 7/15/1999: 23.6°C
  - 6/30/2015: 19.4°C
  - 6/29/2016: 18.43°C
- MPCA temperature data was recorded every 30 minutes from June 1, 2015 through August 31, 2015. Average July temperature was 21.0 and temperatures were in the growth range 52.5% of the summer (June through August).
- Overall, the temperature data collected indicates temperatures insufficient to support a cold water fish assemblage. Water temperatures were often in the "stress" range for brook trout (20.0°C) with several days approaching the "lethal" temperature range (25.0°C).

Temperature logger data summary

MPCA Site ID	Year	Summer Avg. Temp (°C)	June Avg. Temp (°C)	July Avg. Temp (°C)	August Avg. Temp (°C)	% Lethal	% Stress	% Growth
99UM058	2015	19.5	18.8	21.0	18.7	0.0	47.5	52.5



Plot of temperature logger data from 99UM058 during 2015

DNR information

The DNR measured temperature data at 230th Ave, approximately 2.3 downstream miles from 99UM058 (i.e., within 07010201-653) during the summers of 2012, 2014, and 2016. From June 1 through August 31 each year, the average daily temperatures were 19.30°C, 18.08°C, and 18.62°C, respectively.

The DNR manages much of Little Rock Creek as a trout water. However, the reach above 230th Avenue is not managed for cold water fish and is considered a warm water habitat by the DNR. This is based on annual DNR electrofishing surveys and annual temperature logger data which indicate that the reach downstream of 230th Avenue is capable of supporting trout. However, upstream of 230th Avenue, temperature and biological data indicate that this stream is too warm and has not historically supported trout.

MPCA Summary

Portions of Little Rock Creek support or have supported natural reproduction of brown trout. However, evidence indicates that a section of the reach designated as a trout water (07010201-652) is naturally warm water. The upstream portion of the DNR's trout water designation (above 230th Avenue) is lower gradient with finer substrates (i.e., sand and silt) compared to the downstream portion of the creek. There are also springs which add ground water and cool water temperatures below 230th Avenue. Observations of the upstream reach indicate that this portion is intermittent, frequently having no flow or only pools of stagnant water. MPCA and DNR biological and water temperature data, including historic data, indicates that the upstream portions of Little Rock Creek (upstream of 230th Avenue) could not support trout. MPCA monitoring of fish and macroinvertebrates in 1999, 2015 and 2016 did not collect any cold water species. Water temperature data was collected using a temperature logger from the biological monitoring station during 2015 and indicated that conditions in this reach of Little Rock Creek are too warm to support a cold water community. Stressful to lethal thermal conditions for brook trout accounted for 47.5% of the summer (June through August) and average July temperature was 21.0°C.

Stony Creek (07010202-725) MPCA Use Designation Review

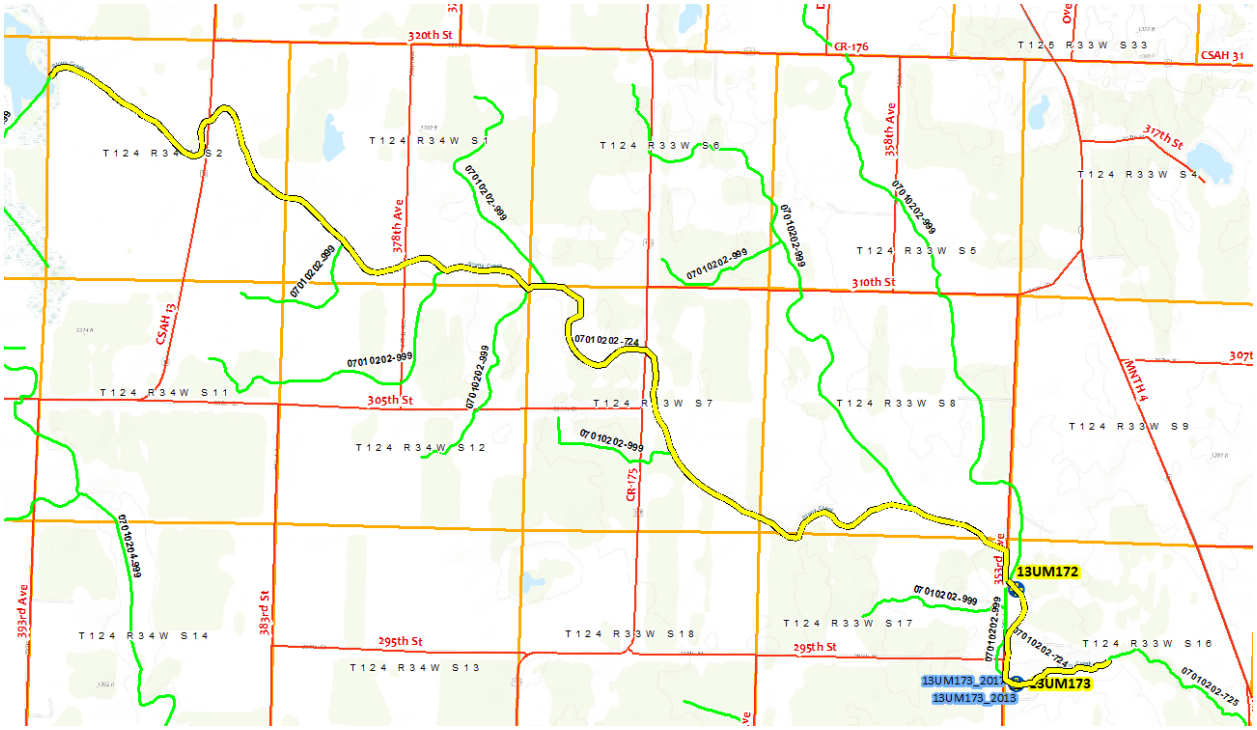
Stream name: Stony Creek
AUID(s): 07010202-724, 07010202-725, and 07010202-726 (parent: 07010202-541); 07010202-655[1]
AUID description: 07010202-724 - Headwaters (Unnamed lk 73-0261-00) to -94.836, 45.55
07010202-725 - -94.836, 45.55 to T124 R33W S22, east line
07010202-726 - T124 R33W S23, west line to Sauk R
07010202-655 - Unnamed cr to Stony Cr
Tributaries: N/A
MPCA biological station(s): 17UM052, 13UM173, 08UM024, 17UM050, 17UM051, 08UM022
County: Stearns
Watershed: Sauk

DNR's designation: Not a designated trout stream
DNR management class: None/Warm water; I-D (marginal trout water)

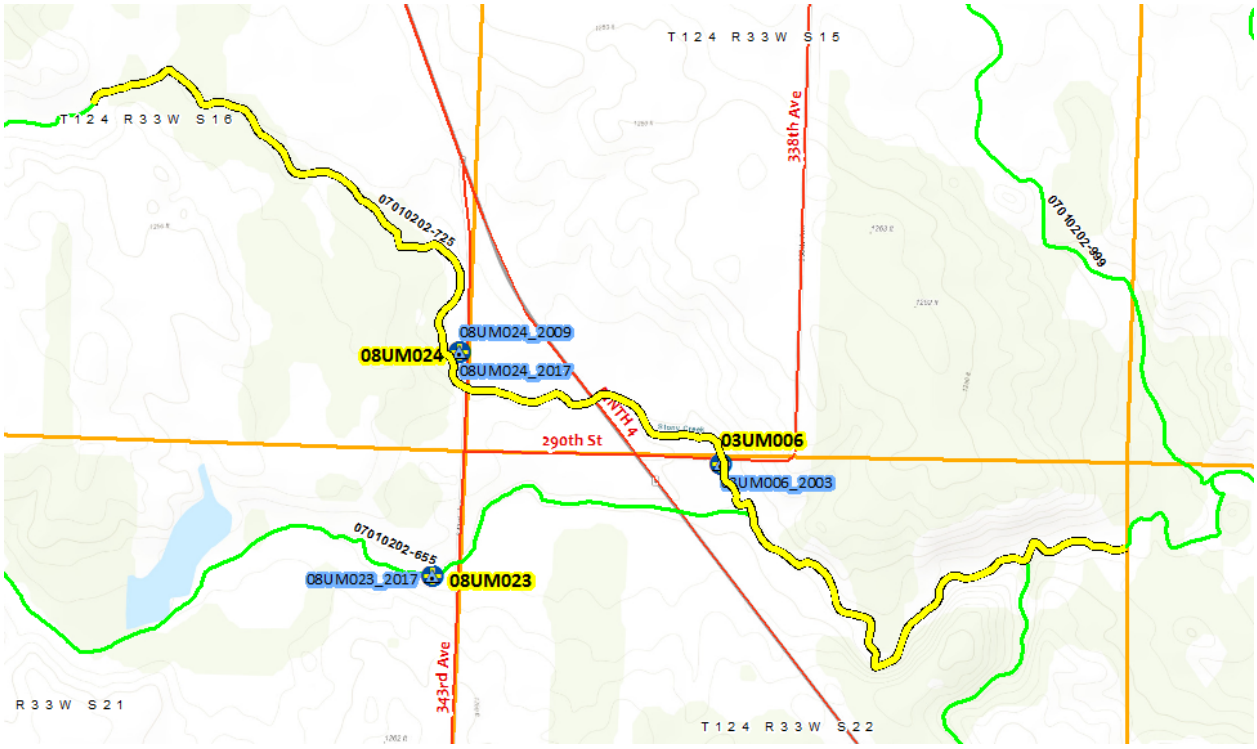
Current AUID designation: 2Bg (warm water)
Reason for review: Fish and temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.

Additional Information: When the MPCA initiated a review of the use designation for this stream, it was a single WID (07010202-541) which stretched from the headwaters to the Sauk River. As a result of reviewing MPCA and DNR information, it was recommended that part of Stony Creek be designated as a cold water habitat (between stream miles 2.4 and 4.7 or from 94.836, 45.55 to T124 R33W S22, east line). This stream section aligns with the reach that the DNR was considering for management as a I-D or marginal trout water. As a result of this recommendation, the parent WID was split into three child WIDs: 07010202-724, 07010202-725, and 07010202-726. 07010202-725 is the WID being recommended for cold water habitat (Class 2Ag) designation whereas the other WIDs would retain their current warm water (Class 2Bg) designations. As part of this review, data from a tributary to Stony Creek (07010202-655) was also reviewed. It is recommended that this tributary retain its current water mater designation.

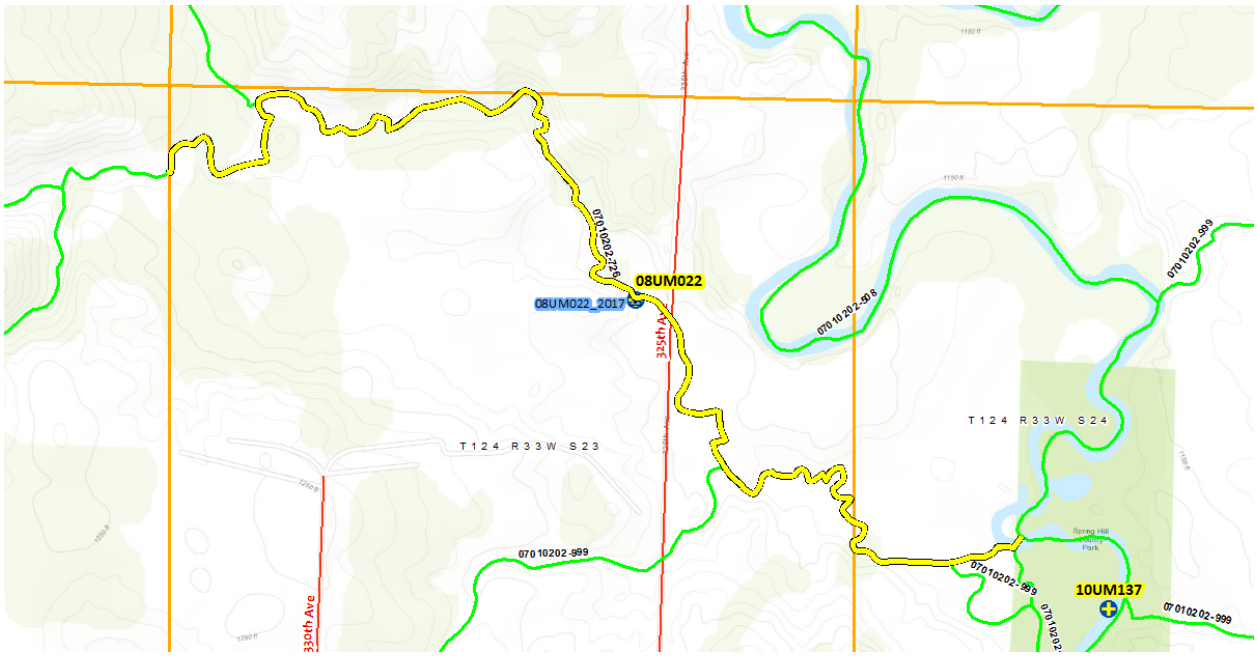
[1] Tributary to Stony Creek; data from this WID was also reviewed



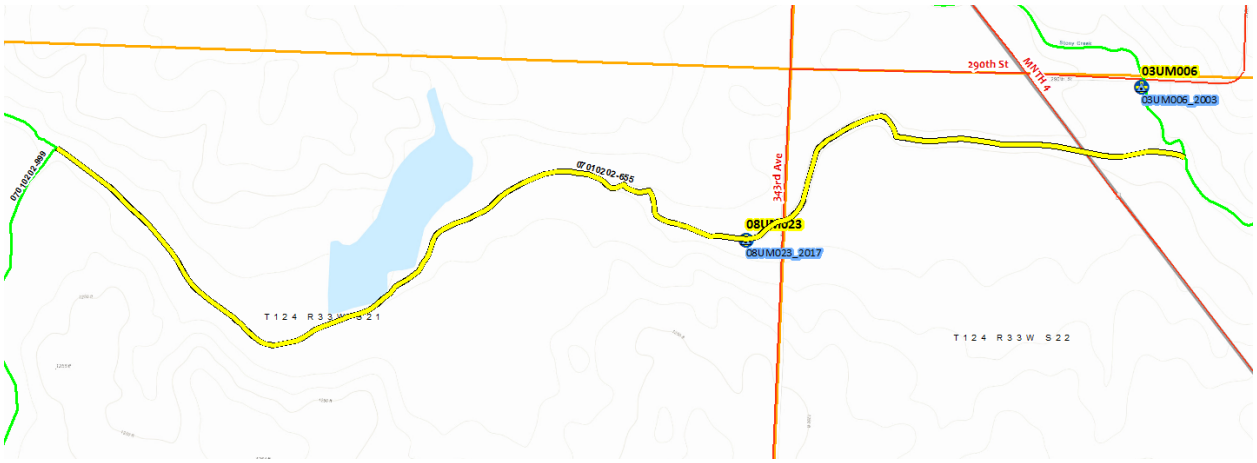
Map of Stony Creek (07010202-724)



Map of Stony Creek (07010202-725)



Map of Stony Creek (07010202-726)



Map of tributary to Stony Creek (07010202-655)

Review of existing data

MPCA monitoring data

MPCA biological data

07010202-724 (recommended to retain warm water designation)

Fish data: 13UM172, 6/20/2013					
Common Name	CN Code	Min	Max	Weight	Number
fathead minnow	FHM	36	77	62	29
brook stickleback	BST	39	70	30	11
central mudminnow	CNM	71	124	87	8
creek chub	CRC	59	69	22	8
black bullhead	BLB	187	187	101	1
blacknose dace	BND	54	54	1	1
johnny darter	JND	54	54	2	1

13UM172: No macroinvertebrate data

Fish data: 13UM173, 06/20/2013					
Common Name	CN Code	Min	Max	Weight	Number
fathead minnow	FHM	44	63	26	18
central mudminnow	CNM	72	92	82	13
creek chub	CRC	62	132	94	10
johnny darter	JND	44	52	7	7
brook stickleback	BST	28	75	9	7
white sucker	WTS	144	193	123	2

13UM173: No macroinvertebrate data

07010202-725 (recommend cold water reach)

Fish data: 08UM024, 06/26/2008					
Common Name	CN Code	Min	Max	Weight	Number
fathead minnow	FHM	34	55	193	131
creek chub	CRC	38	163	1816	116
brook stickleback	BST	25	52	35	49
central mudminnow	CNM	30	105	205	46
blacknose dace	BND	54	117	306	39
johnny darter	JND	40	59	27	15
brook trout	BKT	282	300	660	2

Fish data: 08UM024, 08/14/2008					
Common Name	CN Code	Min	Max	Weight	Number
creek chub	CRC	27	171	1104	64
fathead minnow	FHM	57	68	79	29

Fish data: 08UM024, 08/14/2008					
Common Name	CN Code	Min	Max	Weight	Number
blacknose dace	BND	30	97	177	21
central mudminnow	CNM	37	91	20	7
brook stickleback	BST	37	47	6	4
johnny darter	JND	54	62	4	2

Fish data: 08UM024, 7/18/2018					
Common Name	CN Code	Min	Max	Weight	Number
fathead minnow	FHM	31	66	396	159
brook stickleback	BST	26	57	113	68
white sucker	WTS	40	165	86	28
creek chub	CRC	65	121	95	10
northern redbelly dace	NRD	52	60	15	9
blacknose dace	BND	85	100	50	4
central mudminnow	CNM	40	61	4	2

Macroinvertebrates, 08UM024
8/12/2008: no cold water taxa
8/21/2018: no cold water taxa

07010202-726 (recommended to retain warm water designation)

Fish data: 08UM022, 07/29/2008					
Common Name	CN Code	Min	Max	Weight	Number
creek chub	CRC	30	172	1040	134
white sucker	WTS	34	250	2256	121
common shiner	CSH	49	158	797	107
central stoneroller	CSR	58	131	492	94
bigmouth shiner	BMS	54	81	178	70
blacknose dace	BND	28	100	175	46
hornyhead chub	HHC	59	131	285	28
johnny darter	JND	18	63	15	10
fathead minnow	FHM	48	61	26	9
longnose dace	LND	28	63	13	6
bluntnose minnow	BNM	65	86	22	3
central mudminnow	CNM	96	98	23	2
brassy minnow	BRM	69	77	13	2

Fish data: 08UM022, 7/18/2018					
Common Name	CN Code	Min	Max	Weight	Number
creek chub	CRC	32	161	903	83

Fish data: 08UM022, 7/18/2018					
Common Name	CN Code	Min	Max	Weight	Number
fathead minnow	FHM	32	66	198	80
common shiner	CSH	57	118	477	49
brook stickleback	BST	42	53	60	38
blacknose dace	BND	57	96	215	37
white sucker	WTS	32	176	153	28
bigmouth shiner	BMS	52	84	90	27
johnny darter	JND	47	55	34	9
central mudminnow	CNM	54	68	32	7
brassy minnow	BRM	42	50	2	2
blackside darter	BSD	48	48	1	1
bluntnose minnow	BNM	67	67	2	1

Macroinvertebrates, 08UM022
8/11/2008: no cold water taxa
8/21/2018: no cold water taxa

07010202-655 (tributary to Stony Creek)

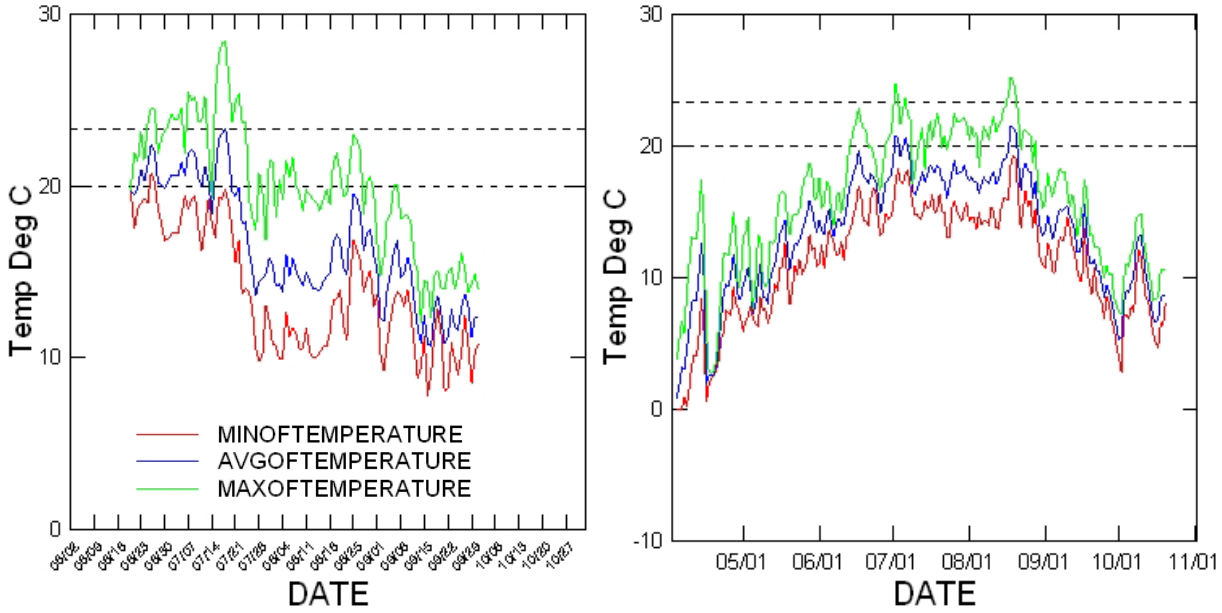
Fish data: 08UM023, 6/26/2008					
Common Name	CN Code	Min	Max	Weight	Number
creek chub	CRC	75	174	423.5	28
fathead minnow	FHM	43	65	57	28
blacknose dace	BND	68	96	176	23
brook stickleback	BST	25	34	1	4
central mudminnow	CNM	59	83	18	4
white sucker	WTS	123	158	112.5	4
brassy minnow	BRM	62	62	2	1
central stoneroller	CSR	108	108	15.5	1

No macroinvertebrate data

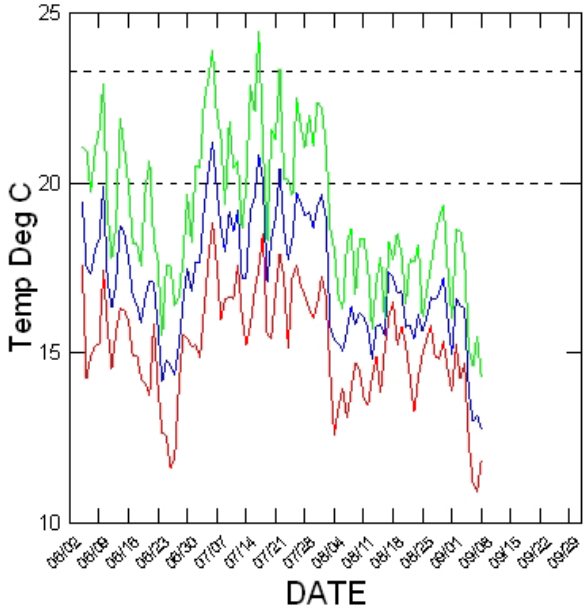
MPCA water temperature data
Temperature loggers were deployed at six stations between 2003 and 2018. These data are summarized below. Percent lethal (>25°C), stress (>20°C and <25°C), and growth (<20°C) are for brook trout and are measured during the period from June 1st through August 31st.

Summary of temperature logger data

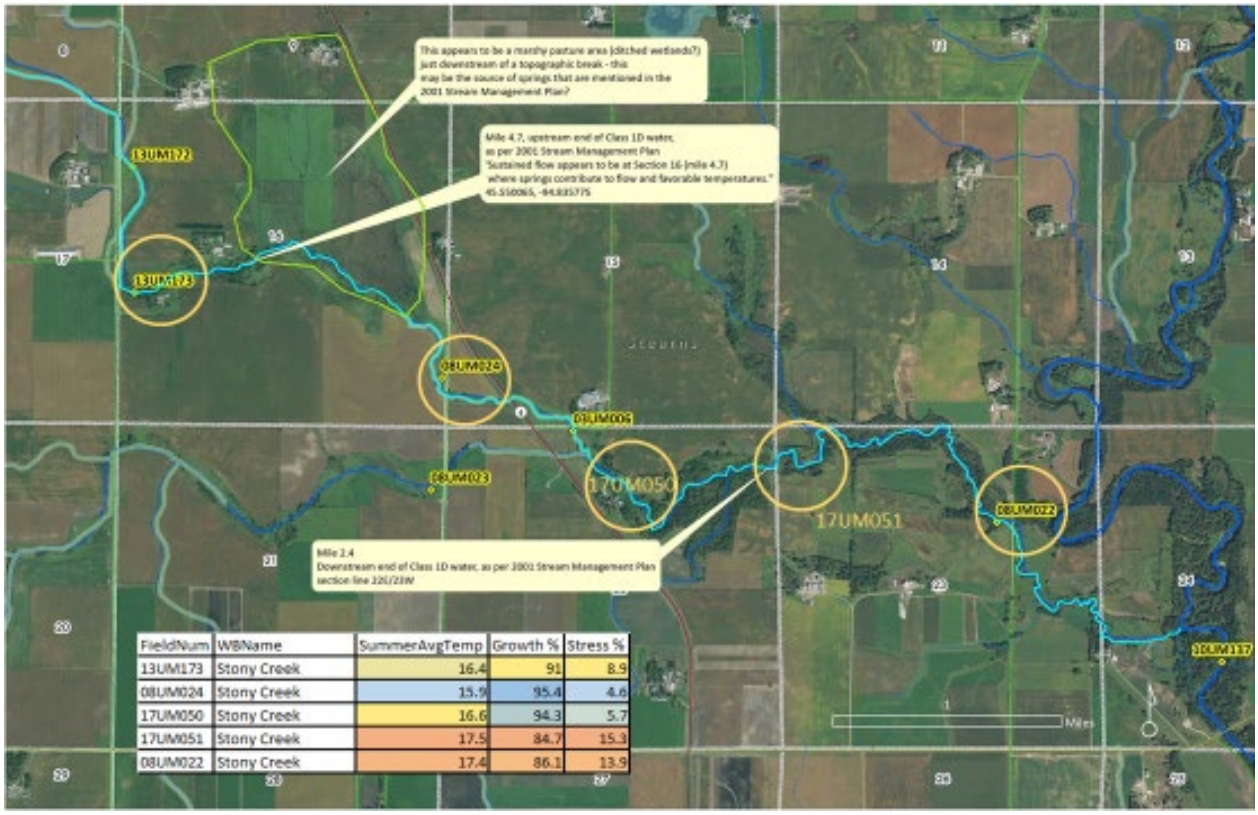
WID	MPCA Site ID	Year	Summer Avg. Temp (°C)	June Avg. Temp (°C)	July Avg. Temp (°C)	August Avg. Temp (°C)	% Lethal	% Stress	% Growth	% Recording
07010202-724	13UM173	2013	18.0	20.6	19.4	15.7	2.2	29.5	68.3	78.3
07010202-725	03UM006	2003	17.3	16.1	18.2	17.7	0.1	18.9	81.0	100.0
07010202-725	17UM050	2018	18.3	17.8	19.5	17.5	0.2	23.6	76.2	100.0
07010202-726	17UM051	2018	19.0	18.3	20.0	18.6	0.8	32.0	67.2	99.5
07010202-726	08UM022	2017	17.4	16.9	18.9	16.3	0.0	13.9	86.1	94.9
07010202-655	08UM023	2017	18.9	18.6	20.5	17.6	0.8	27.7	71.5	95.0



Plots of water temperature from 13UM173 during 2013 (left) and 03UM006 during 2003 (right).



Plot of water temperature from 08UM022 during 2017.



FieldNum	WBName	SummerAvgTemp	Growth %	Stress %
13UM173	Stony Creek	16.4	91	8.9
08UM024	Stony Creek	15.9	95.4	4.6
17UM050	Stony Creek	16.6	94.3	5.7
17UM051	Stony Creek	17.5	84.7	15.3
08UM022	Stony Creek	17.4	86.1	13.9

Temperature logger deployment locations.

DNR information

Stony Creek is not currently listed as a designated trout water by the DNR, but this stream was a DNR designated trout stream from 1950 until 1977. The entire stream from headwaters to its confluence with the Sauk River was a designated trout water (T. 124N., R. 33W., S. 8, 15-17,21-24). Stocking records are incomplete, but Stony Creek was first stocked with trout in 1948. Little information is available regarding the trout population status in Stony Creek between 1948 and 1977, other than anecdotal evidence from landowners that brook trout were common in the creek. A 1976 memo recommended that the stream be removed from the designated list. DNR removed the trout stream designation in 1977 due to degradation, low populations of trout, little fishing pressure, and requests for water appropriation.

In 2001, DNR anticipated some positive land use changes in the watershed, and became interested in managing Stony Creek for trout again. Temperature loggers were deployed and indicated thermal and habitat conditions that were favorable for trout in a limited portion of the stream. Stream miles 2.4 to 4.7 were proposed to be managed as “Class I-D” (marginal) trout water, with the upstream and downstream segments managed as warm water habitat. The upstream end of the I-D water was at the location where springs entered the stream, providing cold perennial flow. Trial stocking of brook trout occurred in 2002-2004. In August 2002, brook trout fingerlings were stocked in Stony Creek. Brook trout yearlings were also stocked in April 2004. A DNR fish survey in 2003, collected five yearling trout displaying excellent growth. A DNR fish survey in 2004 collected 21 trout (all from the April stocking). A DNR fish survey in 2005 collected 25 adults from the 2004 stocking. A DNR electrofishing survey in October of 2006 captured 2 adults (from 2004 stocking) and five juvenile brook trout. This was the first

evidence of natural reproduction. No trout were captured from Stony Creek during DNR electrofishing surveys in 2015. The trout from all electrofishing surveys (DNR and MPCA) were found in the proposed Class I-D water between mile 2.4 and 4.7. Current evidence of natural reproduction of brook trout is limited to an area between T 124N R33W Middle of Sec 16 (coordinates 45.550065, -94.835775) and 343rd Ave.

MPCA Summary

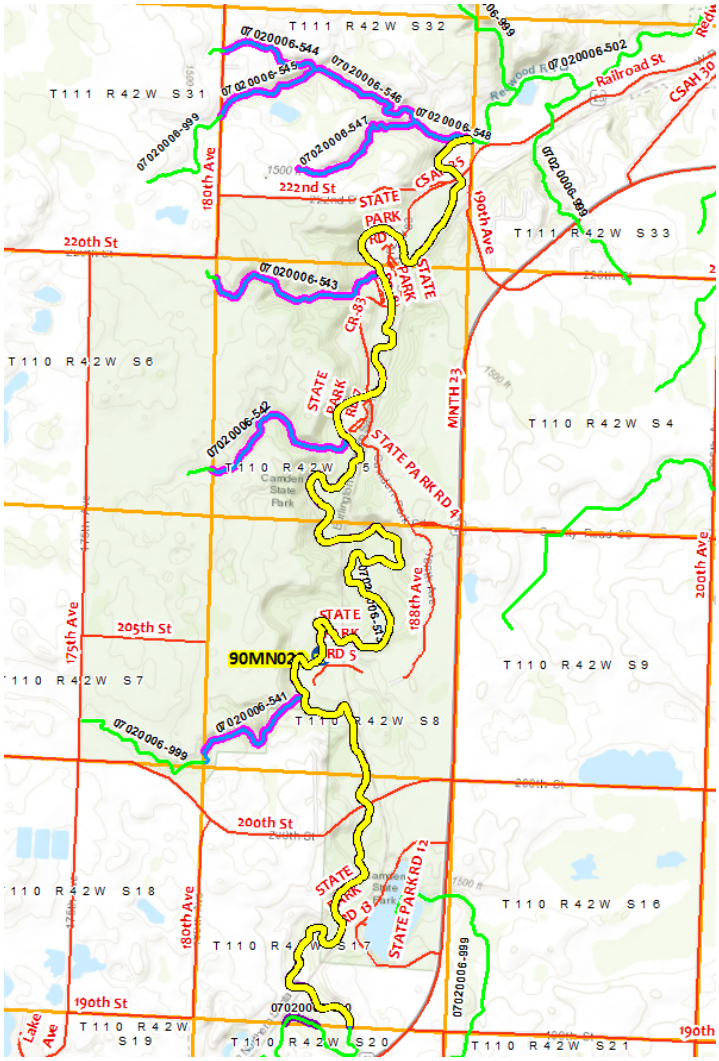
Stony Creek is not currently listed as a designated trout water by the DNR, but this stream was a DNR designated trout stream from 1950 until 1977. Little information is available regarding the trout population status in Stony Creek between 1948 and 1977, other than anecdotal evidence from landowners that brook trout were common in the creek. DNR removed the trout stream designation in 1977 due to degradation, low populations of trout, little fishing pressure, and requests for water appropriation. Improvement to land use management and temperature measurements in the early 2000s indicated that Stony Creek may be able to support trout. Brook trout fingerlings were stocked in 2002 and yearlings were stocked in 2004. A DNR fish survey in 2003, collected five yearling trout displaying excellent growth. A DNR fish survey in 2004 collected 21 trout (all from the April stocking) and a DNR fish survey in 2005 collected 25 adults from the 2004 stocking. In 2006, 5 young-of-the-year and 2 adult trout were captured, indicating natural reproduction of brook trout in Stony Creek. MPCA fish surveys in 2008 also collected brook trout although the 2018 MPCA survey did not collect any trout. The MPCA deployed water temperature loggers from this reach of Stony Creek in 2003 and 2018 at two different locations. Average July water temperatures ranged from 18.2-19.5°C and summer (June through August) temperatures were in the growth range for brook trout 76.2-81.0% of the time.

Redwood River (07020006-513) MPCA Use Designation Review

Stream name: Redwood River
AUID(s): 07020006-513
AUID description: T110 R42W S17, south line to T111 R42W S32, east line
Tributaries: 07020006-541, 07020006-542, 07020006-543, 07020006-544, 07020006-545, 07020006-546, 07020006-547, and 07020006-548
MPCA biological station(s): 90MN029
County: Lyon
Watershed: Redwood River (07020006)

DNR designation: Designated trout stream
DNR management class: I-D (marginal trout water)

Current AUID designation: 2Ag (cold water)
Reason for review: Fish and temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.



Map of Redwood River (07020006-513)

Review of existing data

MPCA monitoring data

MPCA biological data

Two assessable fish samples were collected from Redwood River at one station. No cold water fish species were sampled and one cool water fish species (brassy minnow) was present in one sample. Three non-assessable (inconsistent methods) fish samples were also available. One cold water fish species (brown trout) was collected in the 1990s and the cool water species, brassy minnow, was present in two of the three samples. A single cold water macroinvertebrate taxon (*Eukiefferiella*) was present in one of the two samples collected from 90MN029. Only one *Eukiefferiella* individual was present in this sampled and comprised 0.3% of the sample.

90MN029, 7/18/1990 [data not reportable due to inconsistent methods]

Common Name	#
central stoneroller	338
common shiner	292
white sucker	127
blacknose dace	106
fantail darter	97
common carp	91
creek chub	87
bluntnose minnow	75
johnny darter	68
hornyhead chub	57
bigmouth shiner	53
golden redhorse	45
fathead minnow	40
green sunfish	9
northern hogsucker	8
brown trout	3
black bullhead	2
orangespotted sunfish	1

Metric	Salmonids	Cold	Cold+Cool	Cool
Taxa richness	1	1	1	0
% Taxa	5.6	5.6	5.6	0.0
% Individuals	0.2	0.2	0.2	0.0

90MN029, 7/16/1992 [data not reportable due to inconsistent methods]

Common Name	#
central stoneroller	409
common shiner	223
white sucker	83
blacknose dace	80
creek chub	63
fantail darter	56
hornyhead chub	43
golden redhorse	29
fathead minnow	28
bluntnose minnow	16
johnny darter	16
brassy minnow	14
orangespotted sunfish	12
bluegill	7

Metric	Salmonids	Cold	Cold+Cool	Cool
Taxa richness	1	1	2	1
% Taxa	4.8	4.8	9.5	4.8
% Individuals	0.6	0.6	1.9	1.3

brown trout	7
bigmouth shiner	6
green sunfish	6
common carp	3
northern hogsucker	3
black bullhead	2
tadpole madtom	1

90MN029, 9/1/2010 [data not reportable due to inconsistent methods]

Common Name	#
common shiner	102
central stoneroller	78
blacknose dace	54
hornyhead chub	36
brassy minnow	34
northern hogsucker	24
fantail darter	19
bigmouth shiner	16
creek chub	15
johnny darter	10
bluntnose minnow	7
common carp	6
golden redhorse	6
fathead minnow	3
Iowa darter	2
white sucker	2
yellow perch	2

Metric	Salmonids	Cold	Cold+Cool	Cool
Taxa richness	0	0	1	1
% Taxa	0.0	0.0	5.9	5.9
% Individuals	0.0	0.0	8.2	8.2

90MN029, 9/1/2010

Common Name	#
common shiner	198
central stoneroller	168
blacknose dace	90
hornyhead chub	55
brassy minnow	52
fantail darter	50
northern hogsucker	31
creek chub	22
bigmouth shiner	21
johnny darter	19
bluntnose minnow	11
common carp	9
golden redhorse	7
white sucker	6
fathead minnow	4
Iowa darter	3
yellow perch	3

Metric	Salmonids	Cold	Cold+Cool	Cool
Taxa richness	0	0	1	1
% Taxa	0.0	0.0	5.6	5.6
% Individuals	0.0	0.0	6.9	6.9

tadpole madtom	1

90MN029, 7/11/2017

Common Name	#
fantail darter	201
common shiner	172
blacknose dace	151
Iowa darter	62
white sucker	61
bluegill	58
bigmouth shiner	51
fathead minnow	51
golden redhorse	38
hornyhead chub	37
creek chub	31
bluntnose minnow	28
central stoneroller	25
northern hogsucker	20
johnny darter	11
tadpole madtom	5
walleye	4
yellow perch	4
black bullhead	3
common carp	3
green sunfish	3
largemouth bass	3
slenderhead darter	3
northern pike	1

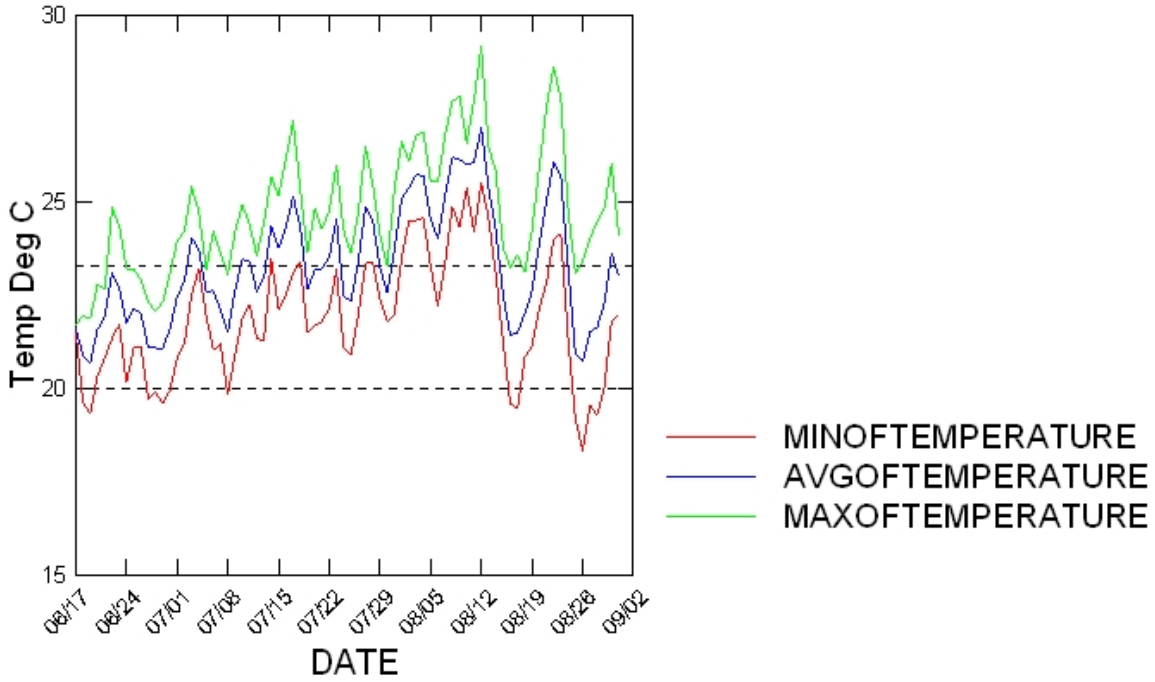
Metric	Salmonids	Cold	Cold+Cool	Cool
Taxa richness	0	0	0	0
% Taxa	0.0	0.0	0.0	0.0
% Individuals	0.0	0.0	0.0	0.0

Macroinvertebrate data:
90MN029, 9/21/2009: *Eukiefferiella*; 0.3% of individuals
90MN029, 8/2/2017: no cold water taxa collected

MPCA water temperature data
A water temperature data logger was deployed at one station in 2010. These data are summarized below. Percent lethal (>25°C), stress (>20°C and <25°C), and growth (<20°C) are for brook trout and are measured during the period from June 1st through August 31st.

Water temperature logger data summary

FieldNum	Year	% Recording	% Growth	% Stress	% Lethal	June Avg	July Avg	Aug Avg	Summer Avg
90MN029	2010	81.5	3.7	76.8	19.5	21.7	23.3	24.0	23.0
90MN029	2017	100	28.4	59.7	11.9	20.3	24.2	20.5	21.7



Plot of water temperature from 90MN029 during 2010.

DNR information

The Redwood River (07020006-513) is currently classified by the DNR as a designated trout stream. Current DNR management consists of annual stocking of harvestable size trout for a put-and-take fishery, which is an important resource for Camden State Park and the surrounding area. Stocking has at least occurred since 2002. With a DNR designation of I-D (Marginal Trout), there is little expectation for trout carryover between years and natural reproduction. Carryover of trout is limited with only a few anecdotal reports of anglers catching trout larger than the size stocked. There is no evidence of natural reproduction of trout in this stream.

MPCA Summary

This reach of the Redwood River is currently classified by the DNR as a designated trout stream. Current DNR management consists of annual stocking of harvestable size trout for a put-and-take fishery. The DNR manages this water as a marginal trout water which has is little expectation for trout carryover between years and natural reproduction. As such, there is no evidence of natural reproduction and only anecdotal information suggesting some carryover of trout. Low numbers of brown trout were present in some non-reportable (inconsistent methods) MPCA fish samples from the early 1990s. Most MPCA fish samples did not include any cold water fish species and only a single cool water fish species (brassy minnow) was present. A single cold water macroinvertebrate individual (*Eukiefferiella*) was collected from 2 samples. Both fish and macroinvertebrate communities are indicative of a warm or cool water community in this stream reach. Water temperatures measured by continuous data loggers (2010 and 2017) in this stream reach are too high to support cold water aquatic life with water temperatures in the growth range for brook trout only 3.6-28.4% of the summer and lethal temperatures measured 11.9-19.5% of the summer. Average July water temperatures were also high and ranged from 23.3 to 24.3°C. Degradation within the watershed has occurred, but no evidence of a historical cold water community

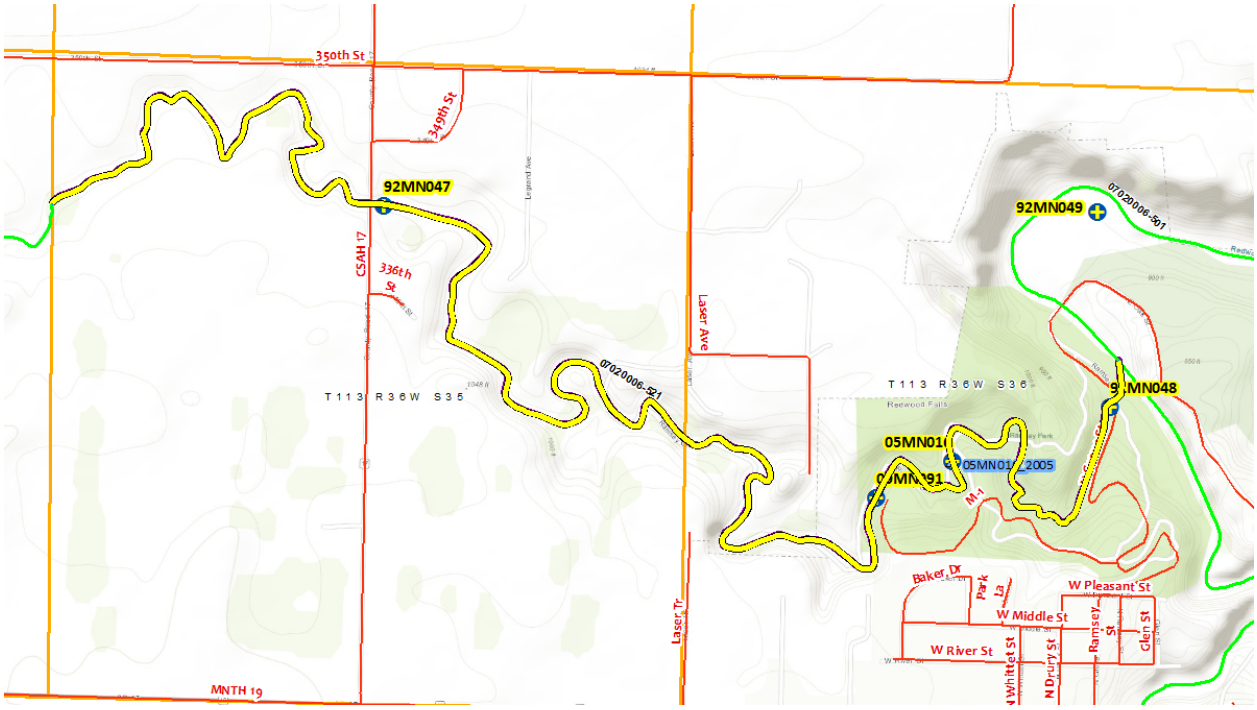
has been found. Furthermore, the water temperatures are very high for a cold water habitat indicating that the stream is not a degraded cold water habitat.

Ramsey Creek (07020006-521) MPCA Use Designation Review

Stream name: Ramsey Creek
AUID(s): 07020006-521
AUID description: T113 R36W S35, west line to Redwood River
Tributaries: none
MPCA biological station(s): 92MN047, 05MN016, 91MN048
County: Redwood
Watershed: Redwood River (07020006)

DNR's designation: Designated trout stream
DNR management class: I-D (marginal trout water)

Current AUID designation: 2Ag (cold water)
Reason for review: Fish and temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.



Map of Ramsey Creek (07020006-521)

Review of existing data

MPCA monitoring data

MPCA biological data

Fish were sampled from two stations on Ramsey Creek in 2005 and 2017. Brown trout were the only cold water species present and this species was sampled in low numbers in all three fish visits. A single cool water fish species (brassy minnow) was present in two of the three samples. Several non-reportable (inconsistent methods) fish samples were also collected from this stream. The fish communities were similar in these to the reportable visits with the exception that a downstream station (91MN048) had many additional species and no cold water fish species. This downstream fish community was impacted by its proximity to the Redwood River mainstem. Macroinvertebrates were sampled twice from two stations 92MN047 and 09MN091in 2017 and 2009, respectively. No cold water macroinvertebrate taxa were present in either sample.

Fish: 92MN047, 7/15/2005

Common Name	#
blacknose dace	222
creek chub	102
fathead minnow	18
brown trout	6
white sucker	6
bigmouth shiner	5
brassy minnow	2

Metric	Salmonids	Cold	Cold+Cool	Cool
Taxa richness	0	1	2	1
% Taxa	0.0	14.3	28.6	14.3
% Individuals	0.0	1.7	2.2	0.6

Fish: 92MN047, 6/26/2017

Common Name	#
blacknose dace	174
white sucker	126
creek chub	107
bigmouth shiner	50
fathead minnow	17
brown trout	6
brassy minnow	2

Metric	Salmonids	Cold	Cold+Cool	Cool
Taxa richness	0	1	2	1
% Taxa	0.0	14.3	28.6	14.3
% Individuals	0.0	1.2	1.7	0.4

Macroinvertebrates: 92MN047, 8/8/2017: No cold water taxa

Macroinvertebrates: 09MN091, 9/22/2009: No cold water taxa

Fish: 05MN016, 9/21/2005

Common Name	#
creek chub	319
blacknose dace	297
white sucker	34
bigmouth shiner	8
fathead minnow	3
sand shiner	3
brown trout	1

Metric	Salmonids	Cold	Cold+Cool	Cool
Taxa richness	0	1	1	0
% Taxa	0.0	14.3	14.3	0.0
% Individuals	0.0	0.2	0.2	0.0

MPCA water temperature data

Temperature loggers were deployed for a summer at two of the biological stations. These data are summarized below. Percent lethal (>25°C), stress (>20°C and <25°C), and growth (<20°C) are for brook trout and are measured during the period from June 1st through August 31st.

Water temperature logger data summary

FieldNum	Year	% Recording	% Growth	% Stress	% Lethal	June Avg	July Avg	Aug Avg	Summer Avg
05MN016	2005	100	39.1	45.0	15.9	18.2	23.1	21.8	21.1
92MN047	2017	100	47.4	45.0	7.6	18.6	23.5	19.8	20.6

DNR information

Current DNR management consists of annual stocking of harvestable size for a put-and-take fishery. Stocking has occurred at least since 2002. As a DNR designation of I-D (Marginal Trout), there is very little expectation for carryover and reproduction. Fish sampling visits going back to 1992 by the MPCA and DNR have collected brown trout in the stream (the only cold water species found) on several occasions. These fish are likely the result of stocking by the DNR, with the DNR noting that carryover is limited and that there is no evidence of natural reproduction.

Final Recommendations:

This stream was also previously reviewed during Coldwater IBI development for inclusion in the development dataset. The previous review recommended that data from this stream should not be included in the dataset due to high summer water temps, no cold water refuge, and very little carryover. Although this stream is managed successfully as an annual put and take fishery by the DNR, and is an important resource as such in the area, the thermal regime and lack of trout carryover would suggest this stream should be designated warmwater (2b) by the MPCA to better reflect the fish and macroinvertebrate community present in the stream. This review recommends that the designation of Ramsey Creek (-521) should be changed from cold water (2a) to warm water (2b) in order to appropriately assess the biological condition of the stream.

MPCA Summary

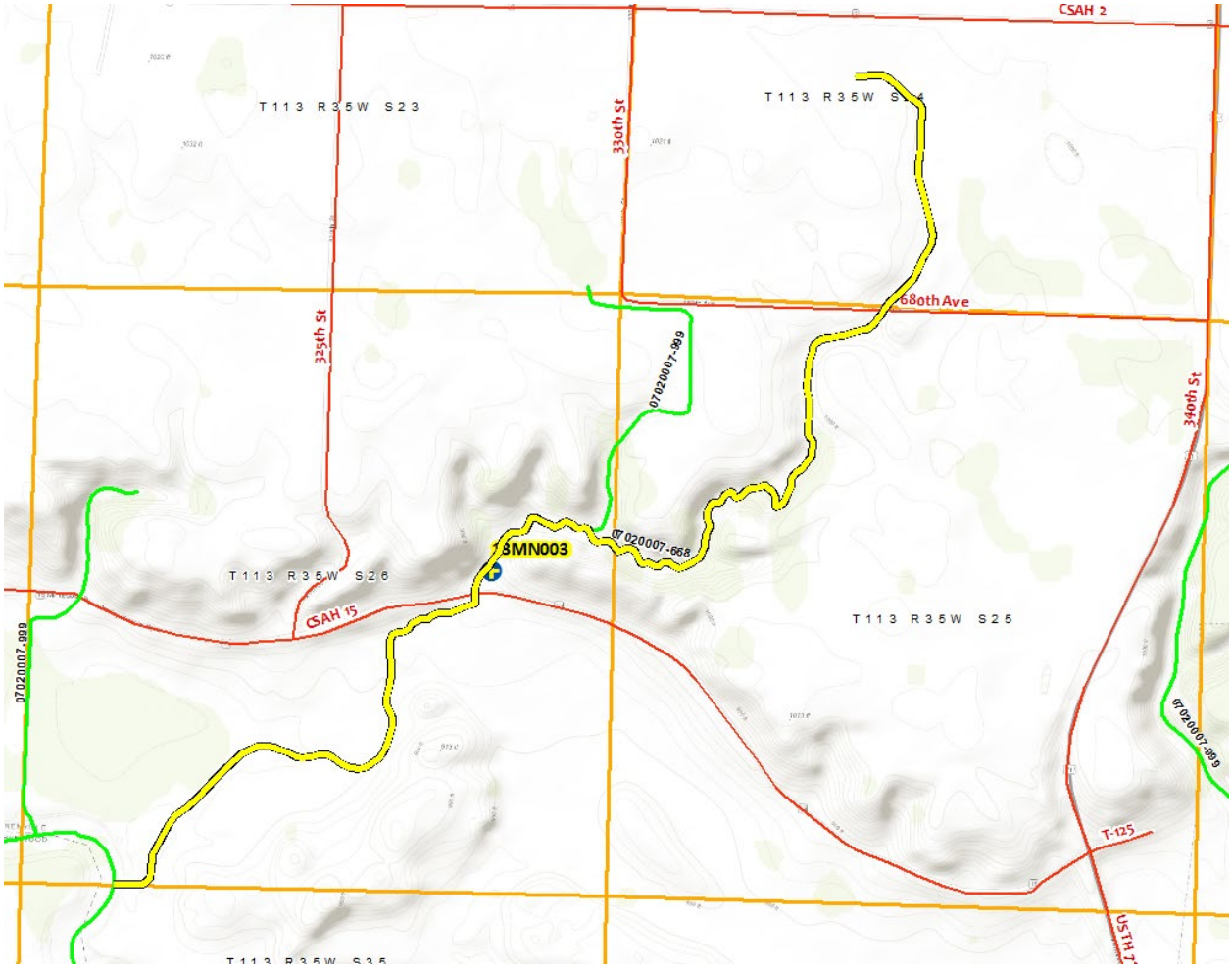
This reach is managed as a put-and-take trout water and brown trout are stocked annually. There is no evidence of natural reproduction and only limited indication of some carry over. Low numbers of brown trout were present in some MPCA fish samples and were fish stocked by the DNR. A no cold water macroinvertebrate species have been collected from this reach. Both fish and macroinvertebrate communities are indicative of a warm or cool water community in this stream reach. Water temperatures in this stream reach are too high to support cold water aquatic life with water temperatures in the growth range for brook trout only 39.1-47.4% of the summer. Temperature logger data also shows water temps are above the lethal threshold for brook trout 7.6-15.0% of the time and July average water temperatures over 23°C. Stream degradation is present for this system, but there is no indication that the stream was naturally a cold water habitat. Although this stream is managed as an annual put and take fishery by the DNR, and is an important resource as such in the area, the thermal regime and lack of trout carryover demonstrates this stream should be designated a warm water habitat by the MPCA to better reflect the fish and macroinvertebrate community present in the stream.

Trib. To MN River (07020007-668) MPCA Use Designation Review

Stream name: Trib. To MN River
AUID(s): 07020007-668
AUID description: Headwaters to Minnesota River
Tributaries: NA
MPCA biological station(s): 13MN003
County: Renville
Watershed: Minnesota River - Mankato

DNR designation: Not a designated trout water
DNR management class: Warm water Class IV: Rough/Forage Fish

Current AUID designation: 2Bg (warm water)
Reason for review: Macroinvertebrates and temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.



Map of Trib. To MN River (07020007-668)

Review of existing data

MPCA monitoring data

MPCA biological data

The macroinvertebrate samples contained the following cold water taxa: *Gammarus, Hesperophylax, Diplectrona, Parachaetochladius,* and *Prodiamesa*. Individuals of these five taxa comprised 20.3% of the sample. *Diplectrona* is a rare caddisfly in Minnesota, and typically only found in northeastern Minnesota and adjacent watersheds of the St. Croix, and Upper Mississippi basins.

No cold or cool water fish species were sampled in this stream and the fish community was generally species poor with low abundance. Flow conditions at the time of the August sample were low, most likely strictly groundwater. At the of the June fish sample, it was noted that this is a small headwater stream that would not be expected to support a cold water community.

Fish: 13MN003, 6/18/2013

Common Name	#	Metric	Salmonids	Cold	Cold+Cool	Cool
creek chub	1	Taxa richness	0	0	0	0
		% Taxa	0.0	0.0	0.0	0.0
		% Individuals	0.0	0.0	0.0	0.0

Fish: 13MN003, 8/13/2013

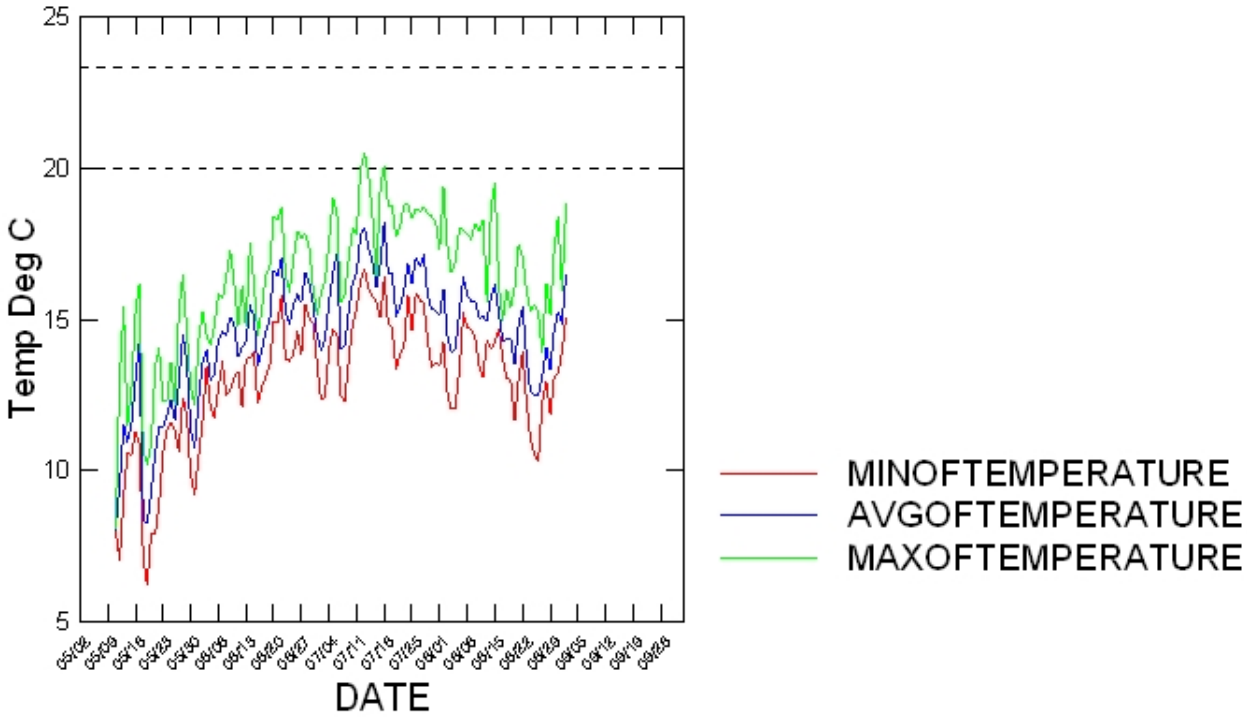
Common Name	#	Metric	Salmonids	Cold	Cold+Cool	Cool
creek chub	24	Taxa richness	0	0	0	0
fathead minnow	1	% Taxa	0.0	0.0	0.0	0.0
white sucker	1	% Individuals	0.0	0.0	0.0	0.0

MPCA water temperature data

A water temperature data logger was deployed at the biological station in 2015. These data are summarized below. Percent lethal (>25°C), stress (>20°C and <25°C), and growth (<20°C) are for brook trout and are measured during the period from June 1st through August 31st.

Water temperature logger data summary

FieldNum	Year	% Recording	% Growth	% Stress	% Lethal	June Avg	July Avg	Aug Avg	Summer Avg
13MN003	2015	100.0	99.9	0.1	0.0	14.8	16.1	14.6	15.2



Water temperature measurements collected during biological visits

FieldNum	Waterbody Name	Visit Date	Time	Temperature (°C)
13MN003	Trib. to Minnesota River	8/13/2013	5:37:00 PM	15.3
13MN003	Trib. to Minnesota River	6/18/2013	3:24:00 PM	17.9
13MN003	Trib. to Minnesota River	8/19/2013	7:28:00 PM	18.0

DNR information

A single reconnaissance investigation was made to Crow Creek in 2002 by the DNR to determine the stream characteristics and fish community. Four fish species were sampled in low abundance including blacknose dace, creek chub, fathead minnow, and green sunfish. It was determined that Crow Creek may be used seasonally by different life stages of fish depending on discharge level, but is not independently an important fisheries resource. Only infrequent specialized sampling and no active management (stocking) was recommended.

MPCA Summary

Macroinvertebrate sampling by the MPCA collected *Diplectrona*, a rather rare, sensitive and obligate cold water invertebrate species. Four other cold water invertebrate taxa were also collected (*Gammarus, Hesperophylax, Parachaetochladius,* and *Prodiamesa*). In total, the cold water macroinvertebrate taxa individuals comprised 20.3% of the sample. MPCA fish sampling identified a species poor fish community with no cold or cool water species present. A reconnaissance survey by the DNR observed as similar fish community. The poor fish community could be the result of poor connectivity with the Minnesota River and because this stream is a small headwater stream without habitat to support a more diverse community. Furthermore, temperatures in this stream are very cold which also likely limits the fish species which can colonize this stream. A water temperature data logger

was deployed at the biological station in 2015. Water temperatures were in the growth range for brook trout 99.9% of the summer with an average July temperature of 16.1°C.

Bluff Creek (07020012-710) MPCA Use Designation Review

Stream name: Bluff Creek
AUID(s): 07020012-710
AUID description: Headwaters to Rice Lk
Tributaries: NA
MPCA biological station(s): 00MN008, 00MN009
County: Carver
Watershed: Lower Minnesota River

DNR designation: None
DNR management class: unknown

Current AUID designation: 2Bg (warm water)
Reason for review: Macroinvertebrate and temperature data
Was this site previously reviewed? If so what were the results? This WID has not been previously reviewed

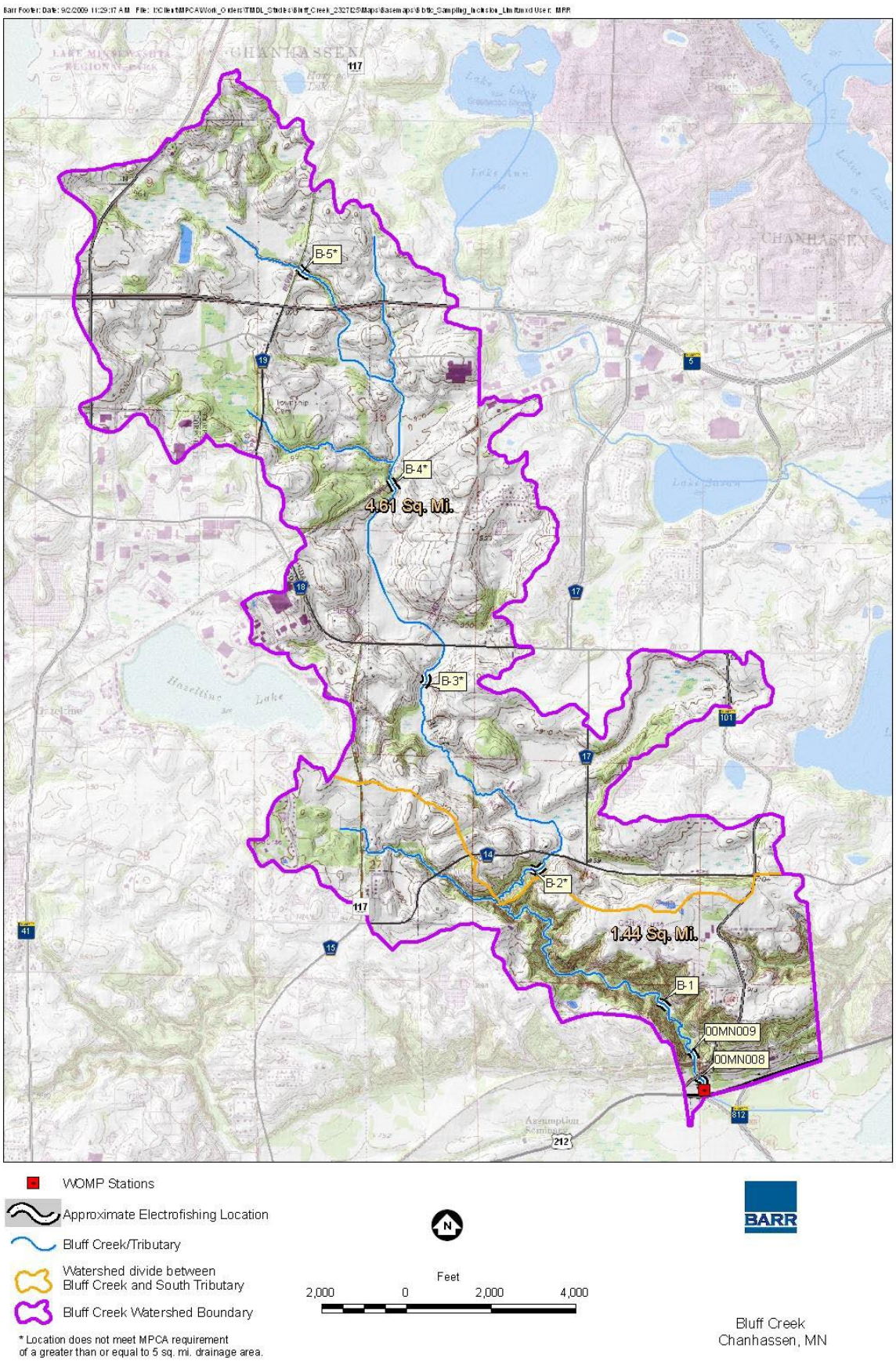
Additional Information: The sampling locations that provided data for this analysis are shown in the map below (Figure 1). There are two locations with biological survey data collected by MPCA on this reach of Bluff Creek. 00MN009 is located just above the old railroad crossing/bike path, below which is a significant fish barrier. 00MN008 is located just downstream stream of the rail crossing, and is not impacted by the fish barrier. Metropolitan Council Environmental Services (MCES) has 13+ years of macroinvertebrate data and annual water quality data, including temperature logger information, at a station that is located just downstream of MPCA station 00MN008. Fish, macroinvertebrate, temperature and water quality data, have also been collected by Riley Purgatory Bluff Creek Watershed District (RPBCWD), at five locations (B1-B5) all of which are upstream of the MPCA stations. Much of the data collected by RPBCWD that is relevant to this analysis is documented in the Bluff Creek TMDL-Stressor Identification Report (https://www.pca.state.mn.us/sites/default/files/wq-iw7-28n.pdf). The following tables and figures contain the information relevant to this cold water review.

Temperature Data:
Table 1- MPCA grab data
Figure 2- MCES temperature summary plot
Figure 3- RPBCWD temperature summary plot
Invertebrate Data:
Table 2 – MPCA and MCES invertebrate cold water summary data
Table 3 – MPCA raw invertebrate data for station 00MN008
Table 4 – MPCA raw invertebrate data for station 00MN009
Table 5- MCES raw invertebrate data for station BL 3.5
(MCES invertebrate data from 2001, 2002, and 2003 were available, but not included in this analysis as the taxonomic resolution was not consistent with MPCA protocols)
Fish Data:
Table 6 – MPCA and MCES fish coldwater summary data
Table 7- MPCA raw fish data for station 00MN008
Table 8- MPCA raw fish data for station 00MN009

RPBCWD invertebrate data was not sampled and processed in a manner consistent with MPCA protocols, so will not be used in this analysis. Nonetheless, the data show the presence and abundance of several cold water taxa, which is consistent with data collected by the MPCA and MCES. RPBCWD fish and macroinvertebrate data is summarized in the

Bluff Creek TMDL – Stressor ID document, and the results are consistent with the data collected at the upstream MCPA station (00MN009)

Figure 1 – Sampling locations



Review of existing data

Biological Data

Macroinvertebrates were sampled by the MPCA from 2 stations in 2014. 10 additional supporting macroinvertebrate samples were collected between 2000 and 2016 at MCES location BL 3.5, just below MPCA station 00MN008. Several years of data were also collected by RPBCWD at several locations throughout the watershed (stations B1-B5). The macroinvertebrate samples included 6 cold water taxa (*Hesperophylax, Eukiefferiella, Erioptera, Gammarus, Odontomesa,* and *Glossosoma*) and MPCA samples included 13-25% of cold water individuals. Six fish samples were sampled from 2 stations during 2000, 2014, and 2015. A single cool water fish species (brook stickleback) was collected in this reach of Bluff Creek. The upstream station (00MN009) is impacted by a barrier and only brook stickleback and fathead minnows were collected. Both species are tolerant of cool temperatures and the lack of cold water species (e.g., trout and sculpin) can be attributed to the downstream barrier. The effect of this barrier means that the fish are not a good indicator of the cold water status of this habitat.

Table 2: Invertebrate Community Summary Information

Waterbody Name	Field Number	Data Source	Visit Date	CW Taxa	CW Pct	CW Taxa Pct	CBI
Bluff Creek	BL 3.5	MCES	17-Oct-04	3	61.2	10.3	17.7
Bluff Creek	BL 3.5	MCES	12-Oct-05	1	20.2	6.25	18.1
Bluff Creek	BL 3.5	MCES	13-Sep-06	0	0	0	20.2
Bluff Creek	BL 3.5	MCES	1-Oct-07	6	43.9	31.6	17.8
Bluff Creek	BL 3.5	MCES	22-Sep-08	2	49.3	11.1	17.7
Bluff Creek	BL 3.5	MCES	5-Oct-09	2	62.9	14.3	17.5
Bluff Creek	BL 3.5	MCES	21-Sep-11	4	44.1	19	17.7
Bluff Creek	BL 3.5	MCES	21-Sep-12	2	47.1	8	18.4
Bluff Creek	BL 3.5	MCES	18-Sep-13	2	45.6	9.1	18
Bluff Creek	00MN008	MPCA	3-Sep-14	3	11.6	25	18.5
Bluff Creek	00MN009	MPCA	3-Sep-14	2	21.3	13.3	18.5
Bluff Creek	BL 3.5	MCES	21-Sep-16	1	15.7	8.3	18.7

Table 3: Macroinvertebrate Survey Data - Station 00MN008

FieldNum	VisitDate	DataSource	Taxon	Count
00MN008	03-Sep-14	MPCA	Oligochaeta	1
00MN008	03-Sep-14	MPCA	Physella	1
00MN008	03-Sep-14	MPCA	Gammarus	34
00MN008	03-Sep-14	MPCA	Baetis brunneicolor	15
00MN008	03-Sep-14	MPCA	Capniidae	1
00MN008	03-Sep-14	MPCA	Helichus	1
00MN008	03-Sep-14	MPCA	Stenelmis	1
00MN008	03-Sep-14	MPCA	Erioptera	1
00MN008	03-Sep-14	MPCA	Simulium	259
00MN008	03-Sep-14	MPCA	Eukiefferiella	2
00MN008	03-Sep-14	MPCA	Phaenopsectra	1
00MN008	03-Sep-14	MPCA	Polypedilum	3

Table 4: Macroinvertebrate Survey Data - Station 00MN009

FieldNum	VisitDate	DataSource	Taxon	Count
00MN009	03-Sep-14	MPCA	Oligochaeta	1
00MN009	03-Sep-14	MPCA	Gammarus	62

00MN009	03-Sep-14	MPCA	Heptagenia	1
00MN009	03-Sep-14	MPCA	Baetis brunneicolor	15
00MN009	03-Sep-14	MPCA	Belostoma flumineum	
00MN009	03-Sep-14	MPCA	Helichus	5
00MN009	03-Sep-14	MPCA	Hydropsyche betteni	1
00MN009	03-Sep-14	MPCA	Tipula	1
00MN009	03-Sep-14	MPCA	Antocha	1
00MN009	03-Sep-14	MPCA	Simulium	201
00MN009	03-Sep-14	MPCA	Atrichopogon	1
00MN009	03-Sep-14	MPCA	Cricotopus	1
00MN009	03-Sep-14	MPCA	Eukiefferiella	5
00MN009	03-Sep-14	MPCA	Parametriocnemus	1
00MN009	03-Sep-14	MPCA	Polypedilum	18

Table 5: Macroinvertebrate Survey Data – MCES Station BL 3.5

FieldNum	VisitDate	DataSource	Taxon	Count
BL 3.5	17-Oct-04	MCES	Tanypodinae	7
BL 3.5	17-Oct-04	MCES	Brillia	1
BL 3.5	17-Oct-04	MCES	Corynoneura	147
BL 3.5	17-Oct-04	MCES	Cricotopus	1
BL 3.5	17-Oct-04	MCES	Eukiefferiella	30
BL 3.5	17-Oct-04	MCES	Parametriocnemus	10
BL 3.5	17-Oct-04	MCES	Paraphaenocladius	2
BL 3.5	17-Oct-04	MCES	Limnophora	2
BL 3.5	17-Oct-04	MCES	Maccaffertium	1
BL 3.5	17-Oct-04	MCES	Tvetenia	5
BL 3.5	17-Oct-04	MCES	Psychoda	1
BL 3.5	17-Oct-04	MCES	Paracladopelma	1
BL 3.5	17-Oct-04	MCES	Nemouridae	2
BL 3.5	17-Oct-04	MCES	Dicranota	3
BL 3.5	17-Oct-04	MCES	Gammarus	401
BL 3.5	17-Oct-04	MCES	Isotomidae	4
BL 3.5	17-Oct-04	MCES	Clinocera	1
BL 3.5	17-Oct-04	MCES	Stagnicola	1
BL 3.5	17-Oct-04	MCES	Allocapnia	18
BL 3.5	17-Oct-04	MCES	Hydropsyche	1
BL 3.5	17-Oct-04	MCES	Baetis	53
BL 3.5	17-Oct-04	MCES	Tipula	4
BL 3.5	17-Oct-04	MCES	Sigara	1
BL 3.5	17-Oct-04	MCES	Cheumatopsyche	1
BL 3.5	17-Oct-04	MCES	Optioservus	1
BL 3.5	17-Oct-04	MCES	Uvarus	1
BL 3.5	17-Oct-04	MCES	Laccophilus	1
BL 3.5	12-Oct-05	MCES	Tipula	2
BL 3.5	12-Oct-05	MCES	Neoplea	1
BL 3.5	12-Oct-05	MCES	Tvetenia	1
BL 3.5	12-Oct-05	MCES	Thienemanniella	1
BL 3.5	12-Oct-05	MCES	Conchapelopia	1
BL 3.5	12-Oct-05	MCES	Simulium	12
BL 3.5	12-Oct-05	MCES	Dicranota	2
BL 3.5	12-Oct-05	MCES	Dicrotendipes	1
BL 3.5	12-Oct-05	MCES	Oligochaeta	1
BL 3.5	12-Oct-05	MCES	Helichus	2
BL 3.5	12-Oct-05	MCES	Allocapnia	124
BL 3.5	12-Oct-05	MCES	Baetis	26

FieldNum	VisitDate	DataSource	Taxon	Count
BL 3.5	12-Oct-05	MCES	Stenacron	2
BL 3.5	12-Oct-05	MCES	Hyalella	5
BL 3.5	12-Oct-05	MCES	Gammarus	46
BL 3.5	12-Oct-05	MCES	Optioservus	1
BL 3.5	13-Sep-06	MCES	Helichus	1
BL 3.5	13-Sep-06	MCES	Stenelmis	22
BL 3.5	13-Sep-06	MCES	Dubiraphia	2
BL 3.5	13-Sep-06	MCES	Hydropsychidae	1
BL 3.5	13-Sep-06	MCES	Cheumatopsyche	8
BL 3.5	13-Sep-06	MCES	Simulium	2
BL 3.5	13-Sep-06	MCES	Tanypodinae	1
BL 3.5	13-Sep-06	MCES	Anthopotamus	1
BL 3.5	13-Sep-06	MCES	Atherix	3
BL 3.5	13-Sep-06	MCES	Laccobius	1
BL 3.5	13-Sep-06	MCES	Procloeon	1
BL 3.5	13-Sep-06	MCES	Stenacron	26
BL 3.5	13-Sep-06	MCES	Polypedilum	1
BL 3.5	13-Sep-06	MCES	Heterocloeon	2
BL 3.5	13-Sep-06	MCES	Baetis	42
BL 3.5	13-Sep-06	MCES	Rhagovelia	2
BL 3.5	13-Sep-06	MCES	Hyalella	2
BL 3.5	13-Sep-06	MCES	Paraleptophlebia	2
BL 3.5	13-Sep-06	MCES	Tricorythodes	1
BL 3.5	13-Sep-06	MCES	Caenis	1
BL 3.5	13-Sep-06	MCES	Hetaerina	3
BL 3.5	13-Sep-06	MCES	Corixidae	10
BL 3.5	13-Sep-06	MCES	Palmacorixa	3
BL 3.5	13-Sep-06	MCES	Belostoma	1
BL 3.5	13-Sep-06	MCES	Pisidium	1
BL 3.5	01-Oct-07	MCES	Glossosoma	20
BL 3.5	01-Oct-07	MCES	Cheumatopsyche	1
BL 3.5	01-Oct-07	MCES	Simulium	35
BL 3.5	01-Oct-07	MCES	Limnephilus	1
BL 3.5	01-Oct-07	MCES	Hesperophylax	1
BL 3.5	01-Oct-07	MCES	Ceratopsyche	26
BL 3.5	01-Oct-07	MCES	Optioservus	9
BL 3.5	01-Oct-07	MCES	Helichus	8
BL 3.5	01-Oct-07	MCES	Allocapnia	4
BL 3.5	01-Oct-07	MCES	Baetis	178
BL 3.5	01-Oct-07	MCES	Gammarus	195
BL 3.5	01-Oct-07	MCES	Oligochaeta	6
BL 3.5	01-Oct-07	MCES	Physella	11
BL 3.5	01-Oct-07	MCES	Cricotopus	1
BL 3.5	01-Oct-07	MCES	Eukiefferiella	2
BL 3.5	01-Oct-07	MCES	Tvetenia	3
BL 3.5	01-Oct-07	MCES	Rheotanytarsus	1
BL 3.5	01-Oct-07	MCES	Aquarius	3
BL 3.5	01-Oct-07	MCES	Lepidostoma	1
BL 3.5	22-Sep-08	MCES	Ceratopsyche	11
BL 3.5	22-Sep-08	MCES	Polypedilum	1
BL 3.5	22-Sep-08	MCES	Tvetenia	1
BL 3.5	22-Sep-08	MCES	Thienemanniella	1

FieldNum	VisitDate	DataSource	Taxon	Count
BL 3.5	22-Sep-08	MCES	Parakiefferiella	1
BL 3.5	22-Sep-08	MCES	Eukiefferiella	33
BL 3.5	22-Sep-08	MCES	Cricotopus	3
BL 3.5	22-Sep-08	MCES	Simulium	49
BL 3.5	22-Sep-08	MCES	Limnephilidae	1
BL 3.5	22-Sep-08	MCES	Optioservus	4
BL 3.5	22-Sep-08	MCES	Helichus	12
BL 3.5	22-Sep-08	MCES	Liodessus	1
BL 3.5	22-Sep-08	MCES	Capniidae	1
BL 3.5	22-Sep-08	MCES	Baetis	83
BL 3.5	22-Sep-08	MCES	Gammarus	146
BL 3.5	22-Sep-08	MCES	Physa	2
BL 3.5	22-Sep-08	MCES	Oligochaeta	12
BL 3.5	22-Sep-08	MCES	Dicranota	1
BL 3.5	05-Oct-09	MCES	Dicranota	2
BL 3.5	05-Oct-09	MCES	Cheumatopsyche	2
BL 3.5	05-Oct-09	MCES	Chironomus	1
BL 3.5	05-Oct-09	MCES	Simulium	20
BL 3.5	05-Oct-09	MCES	Tipula	1
BL 3.5	05-Oct-09	MCES	Hesperophylax designatus	2
BL 3.5	05-Oct-09	MCES	Physa	1
BL 3.5	05-Oct-09	MCES	Agabus	1
BL 3.5	05-Oct-09	MCES	Capniidae	5
BL 3.5	05-Oct-09	MCES	Baetis	102
BL 3.5	05-Oct-09	MCES	Oligochaeta	1
BL 3.5	05-Oct-09	MCES	Gammarus	240
BL 3.5	05-Oct-09	MCES	Helichus	5
BL 3.5	05-Oct-09	MCES	Tvetenia	2
BL 3.5	21-Sep-11	MCES	Orthocladius	4
BL 3.5	21-Sep-11	MCES	Tvetenia	3
BL 3.5	21-Sep-11	MCES	Chironomini	1
BL 3.5	21-Sep-11	MCES	Phaenopsectra	1
BL 3.5	21-Sep-11	MCES	Corynoneura	7
BL 3.5	21-Sep-11	MCES	Cladotanytarsus	1
BL 3.5	21-Sep-11	MCES	Eukiefferiella	67
BL 3.5	21-Sep-11	MCES	Hemerodromia	2
BL 3.5	21-Sep-11	MCES	Polypedilum	2
BL 3.5	21-Sep-11	MCES	Baetis	66
BL 3.5	21-Sep-11	MCES	Thienemanniella	9
BL 3.5	21-Sep-11	MCES	Brillia	2
BL 3.5	21-Sep-11	MCES	Gammarus	68
BL 3.5	21-Sep-11	MCES	Aquarius	2
BL 3.5	21-Sep-11	MCES	Helichus	2
BL 3.5	21-Sep-11	MCES	Cheumatopsyche	3
BL 3.5	21-Sep-11	MCES	Hydropsyche	1
BL 3.5	21-Sep-11	MCES	Tipula	4
BL 3.5	21-Sep-11	MCES	Simulium	29
BL 3.5	21-Sep-11	MCES	Odontomesa	1
BL 3.5	21-Sep-11	MCES	Oligochaeta	38
BL 3.5	21-Sep-12	MCES	Gerris	1
BL 3.5	21-Sep-12	MCES	Dicranota	1
BL 3.5	21-Sep-12	MCES	Tipula	1

FieldNum	VisitDate	DataSource	Taxon	Count
BL 3.5	21-Sep-12	MCES	Simulium	1
BL 3.5	21-Sep-12	MCES	Baetis	18
BL 3.5	21-Sep-12	MCES	Capniidae	3
BL 3.5	21-Sep-12	MCES	Hydropsychidae	1
BL 3.5	21-Sep-12	MCES	Limnephilidae	1
BL 3.5	21-Sep-12	MCES	Ptilostomis	1
BL 3.5	21-Sep-12	MCES	Gyraulus	1
BL 3.5	21-Sep-12	MCES	Thienemannimyia	8
BL 3.5	21-Sep-12	MCES	Physa	105
BL 3.5	21-Sep-12	MCES	Polypedilum	1
BL 3.5	21-Sep-12	MCES	Gammarus	141
BL 3.5	21-Sep-12	MCES	Thienemanniella	2
BL 3.5	21-Sep-12	MCES	Helichus	2
BL 3.5	21-Sep-12	MCES	Tropisternus	2
BL 3.5	21-Sep-12	MCES	Oligochaeta	2
BL 3.5	21-Sep-12	MCES	Brillia	3
BL 3.5	21-Sep-12	MCES	Corynoneura	5
BL 3.5	21-Sep-12	MCES	Cricotopus	9
BL 3.5	21-Sep-12	MCES	Eukiefferiella	15
BL 3.5	21-Sep-12	MCES	Orthocladius	1
BL 3.5	21-Sep-12	MCES	Parakiefferiella	2
BL 3.5	21-Sep-12	MCES	Optioservus	4
BL 3.5	18-Sep-13	MCES	Salda	1
BL 3.5	18-Sep-13	MCES	Parametriocnemus	1
BL 3.5	18-Sep-13	MCES	Physa	10
BL 3.5	18-Sep-13	MCES	Polypedilum	6
BL 3.5	18-Sep-13	MCES	Sigara	5
BL 3.5	18-Sep-13	MCES	Simulium	53
BL 3.5	18-Sep-13	MCES	Tanytarsus	2
BL 3.5	18-Sep-13	MCES	Thienemanniella	1
BL 3.5	18-Sep-13	MCES	Tipula	2
BL 3.5	18-Sep-13	MCES	Microtendipes	1
BL 3.5	18-Sep-13	MCES	Thienemannimyia	2
BL 3.5	18-Sep-13	MCES	Cheumatopsyche	1
BL 3.5	18-Sep-13	MCES	Optioservus	1
BL 3.5	18-Sep-13	MCES	Oligochaeta	9
BL 3.5	18-Sep-13	MCES	Belostoma flumineum	1
BL 3.5	18-Sep-13	MCES	Corynoneura	4
BL 3.5	18-Sep-13	MCES	Cricotopus	1
BL 3.5	18-Sep-13	MCES	Eukiefferiella	9
BL 3.5	18-Sep-13	MCES	Gammarus	122
BL 3.5	18-Sep-13	MCES	Gerris	1
BL 3.5	18-Sep-13	MCES	Hydrochara	
BL 3.5	18-Sep-13	MCES	Baetis	55
BL 3.5	21-Sep-16	MCES	Rheotanytarsus	1
BL 3.5	21-Sep-16	MCES	Simulium	138
BL 3.5	21-Sep-16	MCES	Polypedilum	4
BL 3.5	21-Sep-16	MCES	Orthocladius	1
BL 3.5	21-Sep-16	MCES	Corynoneura	1
BL 3.5	21-Sep-16	MCES	Brillia	1
BL 3.5	21-Sep-16	MCES	Tipula	1
BL 3.5	21-Sep-16	MCES	Belostoma flumineum	1
BL 3.5	21-Sep-16	MCES	Baetis	86

FieldNum	VisitDate	DataSource	Taxon	Count
BL 3.5	21-Sep-16	MCES	Hyalella	40
BL 3.5	21-Sep-16	MCES	Physella	1
BL 3.5	21-Sep-16	MCES	Gammarus	51

Fish Data

Table 6: Fish Community Summary Information

FieldNum	Channel	VisitDate	DataSource	Cold	ColdPct	ColdCool	ColdCoolPct	Salmonid	SalmonidPct
00MN008	OC	22-Jul-00	Schmidt	0	0.00	1	25.20	0	0.00
00MN008	OC	08-Jul-14	MPCA	0	0.00	0	0.00	0	0.00
00MN008	OC	17-Jun-15	MPCA	0	0.00	1	17.86	0	0.00
00MN008	OC	03-Aug-15	MPCA	0	0.00	1	4.41	0	0.00
00MN009	NA	22-Jul-00	Schmidt	0	0.00	1	92.31	0	0.00
00MN009	NA	07-Jul-14	MPCA	0	0.00	1	53.33	0	0.00

Table 7: Fish Survey Data - Station 00MN008

FieldNum	VisitDate	DataSource	CommonName	LengthMin	LengthMax	Weight	Number
00MN008	22-Jul-00	Schmidt	bluntnose minnow	66	66	2.5	1
00MN008	22-Jul-00	Schmidt	fathead minnow	36	66	50.5	34
00MN008	22-Jul-00	Schmidt	brook stickleback	36	60	47.5	32
00MN008	22-Jul-00	Schmidt	Iowa darter	36	45	47	60
00MN008	08-Jul-14	MPCA	blacknose dace	52	93	9	2
00MN008	08-Jul-14	MPCA	fathead minnow	51	62	3	2
00MN008	08-Jul-14	MPCA	black bullhead	89	120	9	2
00MN008	08-Jul-14	MPCA	green sunfish	59	82	37	6
00MN008	08-Jul-14	MPCA	Iowa darter	54	54	0.5	1
00MN008	08-Jul-14	MPCA	yellow perch	81	81	5	1
00MN008	17-Jun-15	MPCA	hybrid sunfish	45	45	1	1
00MN008	17-Jun-15	MPCA	central mudminnow	59	70	15	5
00MN008	17-Jun-15	MPCA	creek chub	72	90	15	2
00MN008	17-Jun-15	MPCA	blacknose dace	62	72	5	2
00MN008	17-Jun-15	MPCA	hornyhead chub	82	82	6	1
00MN008	17-Jun-15	MPCA	fathead minnow	42	70	167	78
00MN008	17-Jun-15	MPCA	brook stickleback	38	54	34	25
00MN008	17-Jun-15	MPCA	green sunfish	52	84	89	20
00MN008	17-Jun-15	MPCA	Iowa darter	54	60	6	5
00MN008	17-Jun-15	MPCA	logperch	95	95	8	1
00MN008	03-Aug-15	MPCA	central mudminnow	44	80	33	8
00MN008	03-Aug-15	MPCA	common carp	84	84	8	1
00MN008	03-Aug-15	MPCA	creek chub	145	145	37	1
00MN008	03-Aug-15	MPCA	fathead minnow	43	71	91	49
00MN008	03-Aug-15	MPCA	spotfin shiner	57	80	49	20
00MN008	03-Aug-15	MPCA	black bullhead	75	127	840	61
00MN008	03-Aug-15	MPCA	brook stickleback	37	55	17	12
00MN008	03-Aug-15	MPCA	green sunfish	35	153	365	89
00MN008	03-Aug-15	MPCA	pumpkinseed	40	40	0.5	1
00MN008	03-Aug-15	MPCA	largemouth bass	57	72	12	3
00MN008	03-Aug-15	MPCA	Iowa darter	40	57	20	21
00MN008	03-Aug-15	MPCA	yellow perch	72	76	17	3
00MN008	03-Aug-15	MPCA	logperch	80	99	23	3

Table 8: Fish Survey Data - Station 00MN009

FieldNum	VisitDate	DataSource	CommonName	LengthMin	LengthMax	Weight	Number
00MN009	22-Jul-00	Schmidt	fathead minnow	25	45	11	5
00MN009	22-Jul-00	Schmidt	brook stickleback	28	72	63.5	60
00MN009	07-Jul-14	MPCA	fathead minnow	25	29	1	21
00MN009	07-Jul-14	MPCA	brook stickleback	25	56	2	24

Water Temperature Data

All water temperature measured by the MPCA were below 20°C. A temperature logger deployed from 2004-2012 by the MCES also determined that average monthly temperatures did not exceed 20°C.

Table 1: MPCA field grab temperatures

FieldNum	WBName	DataSource	VisitDate	WQTime	TempH2O
08MN008	Bluff Creek	MPCA	9/03/2013	5:37:00 PM	15.9
08MN008	Bluff Creek	MPCA	7/22/2000	1:00:00 PM	13.7
08MN008	Bluff Creek	MPCA	7/8/2014	6:16:00 PM	19.6
08MN008	Bluff Creek	MPCA	6/17/2015	1:45:00 PM	13.1
08MN008	Bluff Creek	MPCA	8/3/2015	11:05:00 AM	15.9
08MN009	Bluff Creek	MPCA	9/3/2014	11:16:00 AM	15.5
08MN009	Bluff Creek	MPCA	7/7/2014	5:10:00 PM	13.2

Figure 2: MCES temperature logger data summary

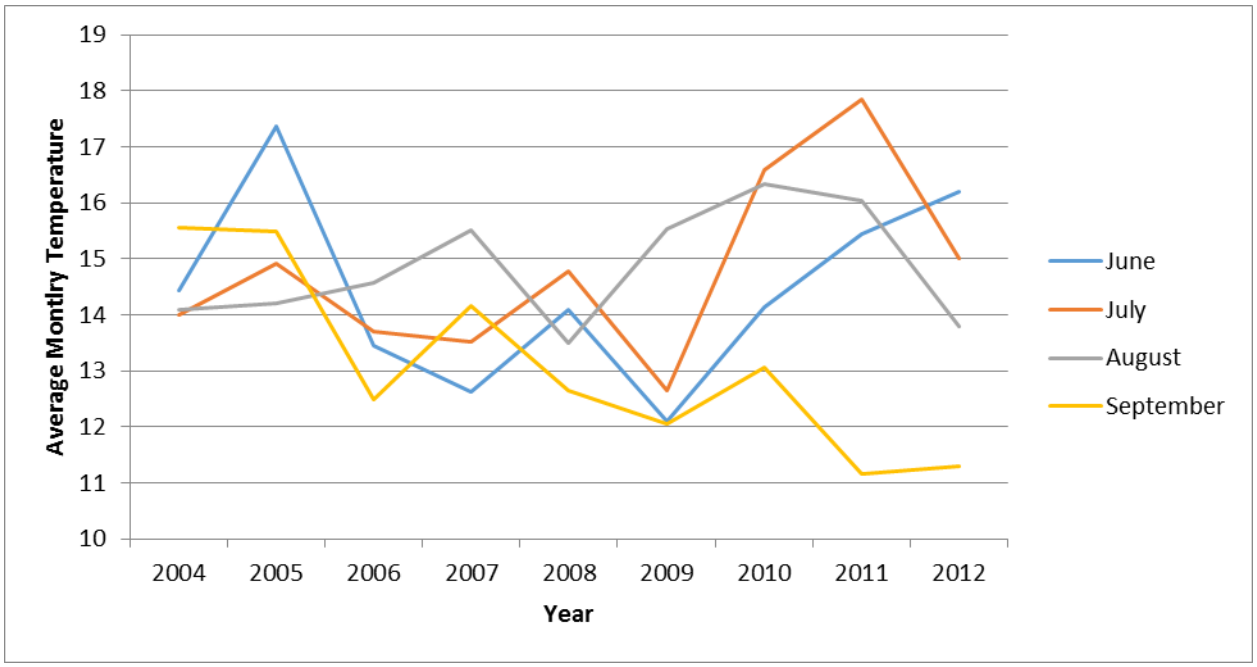


Figure 3: RPBCWD Temperature Data Summary

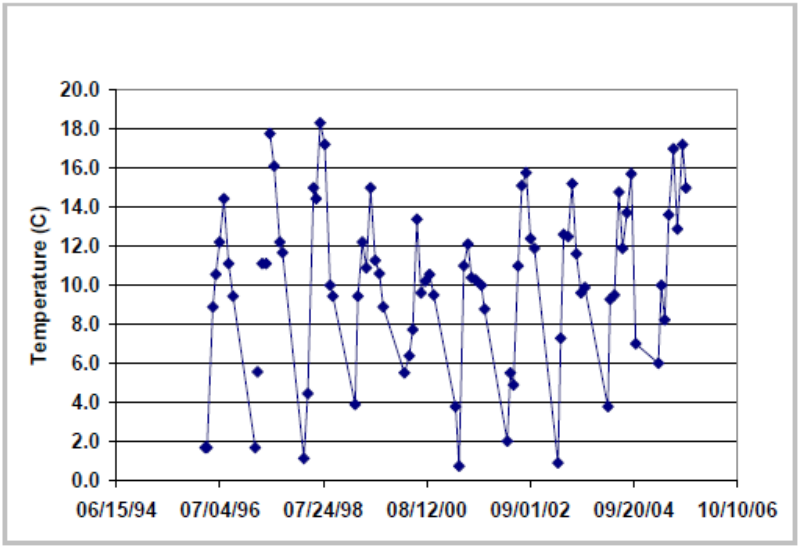


Figure 23 1996-2005 Bluff Creek Temperature Data: B-1

Summary of MPCA Review Decision

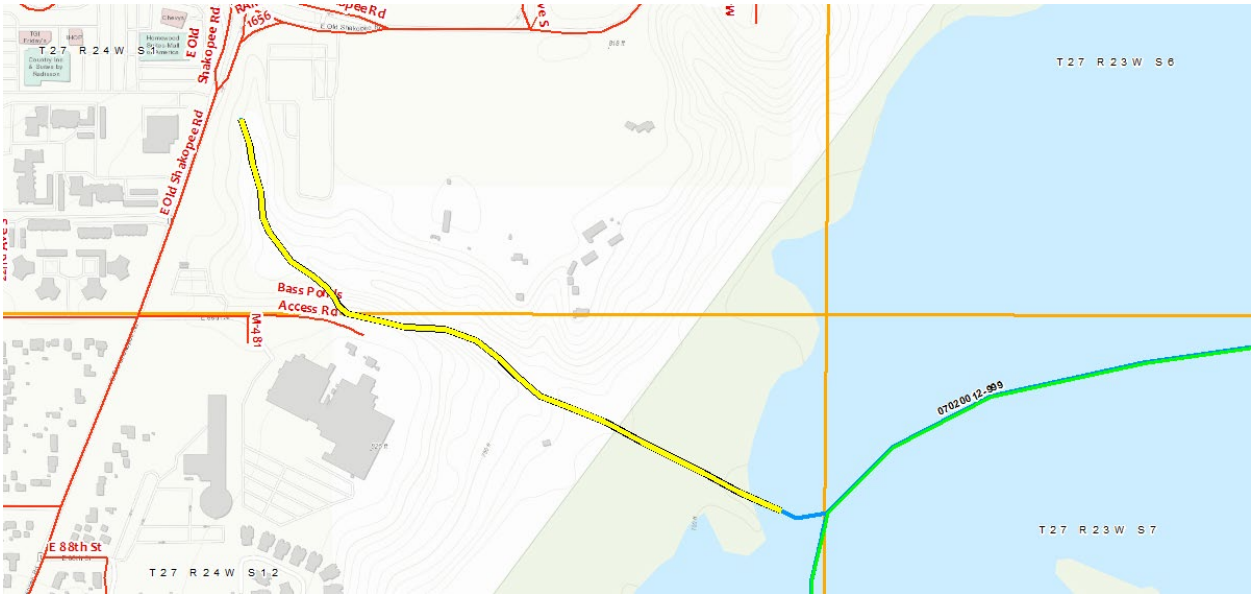
Temperature data collected by the MPCA, Metropolitan Council Environmental Services (MCES), and Riley Purgatory Bluff Creek Watershed District (RPBCWD) demonstrate that water temperatures in Bluff Creek are driven by groundwater inputs and are consistently low throughout year. In nine years (2004-2012) of temperature logger data collected by the MCES, the mean July water temperature was below 18°C. The macroinvertebrate community included six cold water taxa (*Hesperophylax, Eukiefferiella, Erioptera, Gammarus, Odontomesa,* and *Glossosoma*) and high proportion of cold water individuals (13-25% of individuals in the samples). The presence of a fish barrier at the downstream end of the Bluff Creek, impedes migration of cold water taxa, and is the primary reason that fish are not considered as an indicator of cold water habitat. However, the primary fish present in the reach above the barrier were brook stickleback and fathead minnows. Both of these taxa are tolerant of cold water temperatures and are common in streams that have low temperatures but lack a natural source of cold water obligate taxa (e.g., trout and sculpin). As such, these taxa are supportive of a cold water designation despite their ability to tolerate poor stream conditions.

Unnamed Stream[1] (07020012-866) MPCA Use Designation Review

Stream name: Unnamed Stream
AUID(s): 07020012-866
AUID description: Headwaters to Long Meadow Lk
Tributaries: none
MPCA biological station(s): none
County: Hennepin
Watershed: Lower Minnesota River (07020012)

DNR designation: Designated trout stream
DNR management class: I-D (marginal trout water)

Current AUID designation: 2Ag (cold water)
Reason for review: Fish and temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.



Map of Unnamed Stream (07020012-866)

Review of existing data

MPCA monitoring data

No MPCA monitoring data are available.

DNR information

Based on measurement of water temperatures in this streams that indicated favorable temperatures for trout, the DNR stocked this stream with brook trout fingerlings in 2007. As a result of this stocking, a naturally reproducing population of brook trout was reestablished. The DNR is considered designating this stream as a trout stream.

[1] This stream is also called "Ike's Creek."

Other information

This creek (called Ike's Creek) was part of study of thermal regime and chironomid distribution (see Nyquist et al. 2020). This study notes that this stream originates at a limnocrene spring and is fed by springs. Winter water temperature measurements also demonstrated that this stream is thermally buffered by groundwater. This study also notes that brook trout were found in this stream in the 1930s and early 1940s, but were extirpated at some point in the1940s.

Nyquist, C., Vondracek, B. & Ferrington, L. The influence of an in-stream thermal gradient on chironomid emergence during winter. Hydrobiologia 847, 3153–3167 (2020).

MPCA Summary

Historical information indicates that this stream supported a brook trout population until the early 1940s, but at some point in the 1940s, this population was extirpated. In the 2000s, the DNR collected water temperature data that indicated conditions that could support brook trout. As a result, brook trout fingerlings were stocked in this creek in 2007. This stocking established a naturally reproducing population of brook trout. Based on cold water temperatures and the presence of a brook trout population, this stream supports a cold water habitat.

Kenny Brook (07030001-562) MPCA Use Designation Review

Stream name: Kenny Brook
AUID(s): 07030001-562
AUID description: T41 R17W S20, north line to Crooked Cr
Tributaries: NA
MPCA biological station(s): 16SC120
County: Pine
Watershed: Upper St. Croix

DNR designation: Trout protection tributary
DNR management class: Class I-D (marginal trout)

Current AUID designation: 2Ag (cold water)
Reason for review: Fish and temperature data
Was this site previously reviewed? If so what were the results? This WID has not been previously reviewed

Map of Kenny Brook (07030001-562)

Review of existing data

MPCA monitoring data

MPCA biological data

Fish Community Information: Fish were sampled from two station in Kenney Brook in 1980 and 2016. In 2016, no salmonids or cold water fish were sampled. Four cool water fish species (northern red belly dace, pearl dace, burbot, and brook stickleback) were present in this sample and comprised 19.3% of the sample. The 1980 fish sample was not reportable due to the use of inconsistent methods , but can provide some qualitative information. The 1980 sample included a single cold water fish species (slimy sculpin) and 4 cool water fish species (redside dace [species identification not confirmed], longnose dace, burbot and brook stickleback). The 1980 fish sample was collected from a different station which was only 0.2 mi from Crooked Creek and the fish community may be influenced by close proximity to this cold water stream. Both fish samples were taxa rich and dominated by warm water fish species. Macroinvertebrates were also sampled in 2016. Two cold water macroinvertebrate taxa were present in the sample, but only a single individual of each taxon was present (0.6% of total sample). Attempts were made to sample fish and macroinvertebrates in 2017 from 16SC120, but the stream was impacted by a beaver dam and samples were not collected.

Fish data: 16SC120, 6/22/2016

Common Name	#
central mudminnow	7
creek chub	19
blacknose dace	3
fathead minnow	1
Gen: Phoxinus	1
northern redbelly dace	2
common shiner	1
pearl dace	1
burbot	4
brook stickleback	4
largemouth bass	10
johnny darter	1
white sucker	3

Metric	Salmonids	Cold	Cold+Cool	Cool
Taxa richness	0	0	4	4
% Taxa	0.0	0.0	30.8	30.8
% Individuals	0.0	0.0	19.3	19.3

Fish data: 80SC001, 8/12/1980

Common Name	#
central mudminnow	6
redside dace	5
creek chub	214
blacknose dace	7
longnose dace	1
spottail shiner	1
fathead minnow	1
common shiner	1
black bullhead	1
burbot	9
brook stickleback	1
slimy sculpin	4
pumpkinseed	1

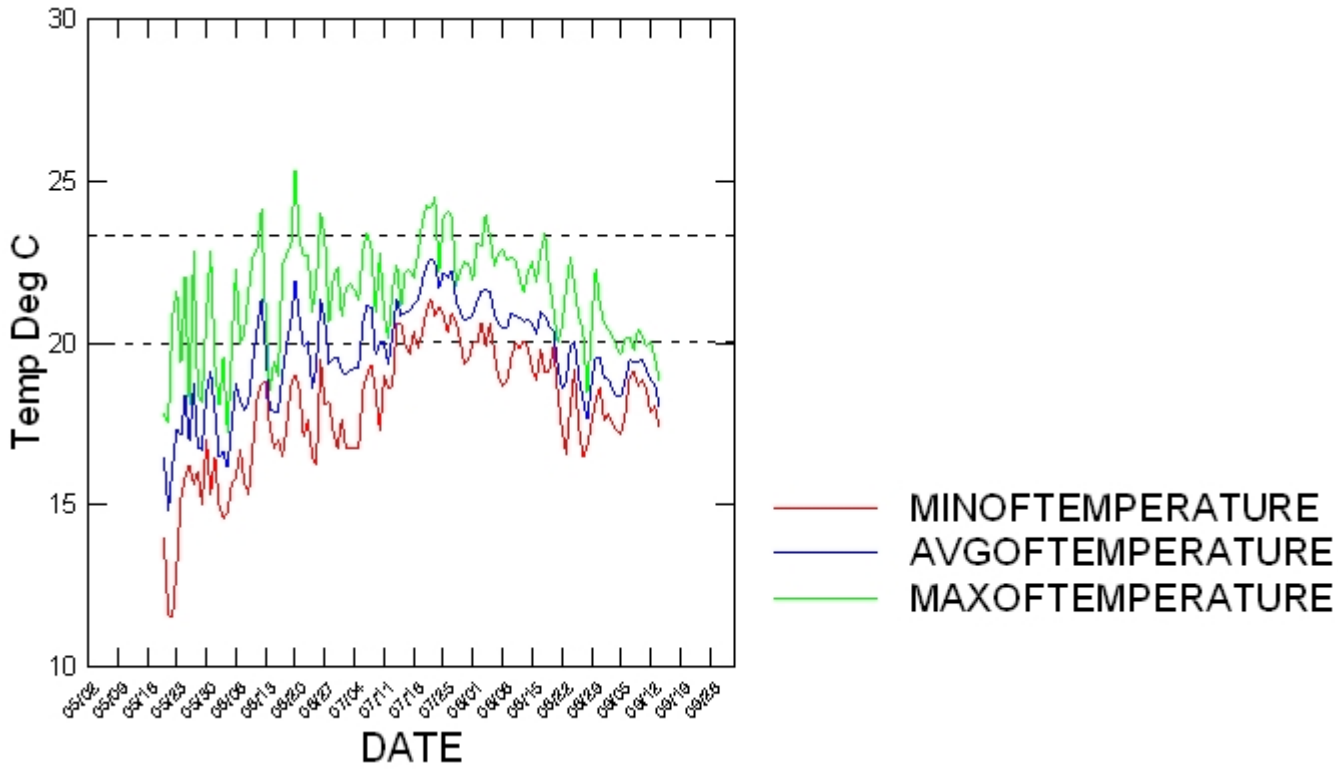
Metric	Salmonids	Cold	Cold+Cool	Cool
Taxa richness	0	1	5	4
% Taxa	0.0	5.6	27.8	22.2
% Individuals	0.0	1.2	5.7	4.6

largemouth bass	4
johnny darter	18
blackside darter	12
smallmouth bass	2
white sucker	60

Macroinvertebrates: 16SC120, 8/15/2016: *Eukiefferiella, Trissopelopia ogemawi*; 0.6% of individuals

Water temperature logger data summary

FieldNum	Year	% Recording	% Growth	% Stress	% Lethal	June Avg	July Avg	Aug Avg	Summer Avg
16SC120	2016	100	45.3	54.6	1.1	19.1	20.9	20.1	20.1



Plot of water temperature from 16SC120 during 2016.

DNR information

The DNR manages Kenney Brook as a marginal trout water (Class I-D: stream lacks suitable habitat and water quality for reproduction and year round survival of trout). A 1918 survey collected trout from this stream, but there is no evidence of natural trout reproduction in this stream despite close proximity to a downstream trout water (Crooked Creek). A DNR survey in 1981 determined that Kenney Brook is not capable of supporting a trout fishery.

MPCA Summary

Data collected by the MPCA indicate that Kenny Brook supports warm water fish and macroinvertebrate assemblages. One cold water (slimy sculpin) and five cool water (northern red belly dace, redside dace pearl dace, burbot, and brook stickleback) fish species were collected, but the fish community is dominated by warm water fish species. The DNR sampled trout in a 1918 survey, but did not sample trout during a 1981 survey. In 1981 survey, the DNR concluded that Kenny Book is incapable of supporting trout. Temperature logger data from 2016 had a July average water temperature of 20.9°C and temperatures were in the growth range for brook trout 45.3% of the summer.

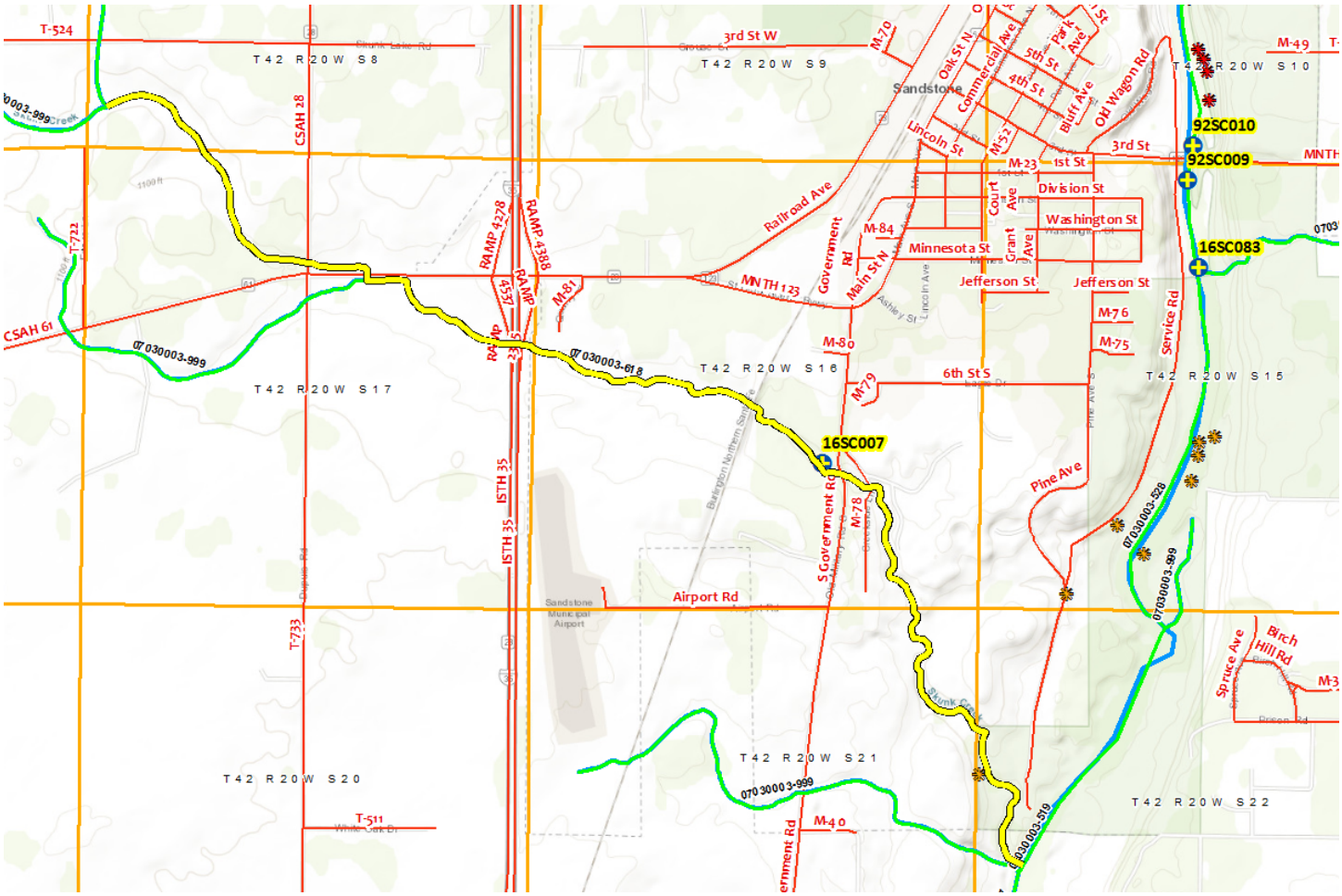
Skunk Creek (07030003-618) MPCA Use Designation Review

Stream name: Skunk Creek
AUID(s): 07030003-618
AUID description: Unnamed creek to Kettle R
Tributaries: NA
MPCA biological station(s): 16SC007 and 3 DNR stations
County: Pine
Watershed: Kettle River

DNR designation: Not a designated trout water
DNR management class: Class I-B (cold water feeder)

Current AUID designation: 2Bg (warm water)
Reason for review: Macroinvertebrate and temperature data
Was this site previously reviewed? If so what were the results? This site was not previously reviewed by the MPCA, but the DNR conducted a stream survey in 2007/2008 and recognizes this streams cold water potential.

Additional information: The extent of the cold water section has not been fully determined. The draft designation (07030003-618) more or less corresponds to the DNR's determination of the perennial extent of this stream. Future data collection may require adjustments to the extent of the cold water reach.



Map of Skunk Creek (07030003-618)

Review of existing data

MPCA monitoring data

MPCA biological data

Fish Community Information: Fish community data collected by the MPCA is comprised of species tolerant of cold water temperatures, but not considered cold water obligate taxa. These species are frequently found in streams that have cold temperatures, but lack suitable habitat for salmonid and/or other "cold water" species, or lack connectivity with streams that harbor these species.

Fish data: 16SC007, 7/26/2016; 0% cold water species

Common Name	CN Code	Min	Max	Weight	Number
brook stickleback	BST	34	55	23	20
fathead minnow	FHM	45	71	9	4
central mudminnow	CNM	80	85	22	3

Fish data: 16SC007, 8/31/2016; 0% cold water species

Common Name	CN Code	Min	Max	Weight	Number
brook stickleback	BST	40	61	29	14
fathead minnow	FHM	45	83	49	10
central mudminnow	CNM	34	89	56	9
pearl dace	PRD	130	130	32	1

Fish data: 16SC007, 9/12/2017; 0% cold water species

Common Name	CN Code	Min	Max	Weight	Number
brook stickleback	BST	48	69	17	5
central mudminnow	CNM	74	86	24	4

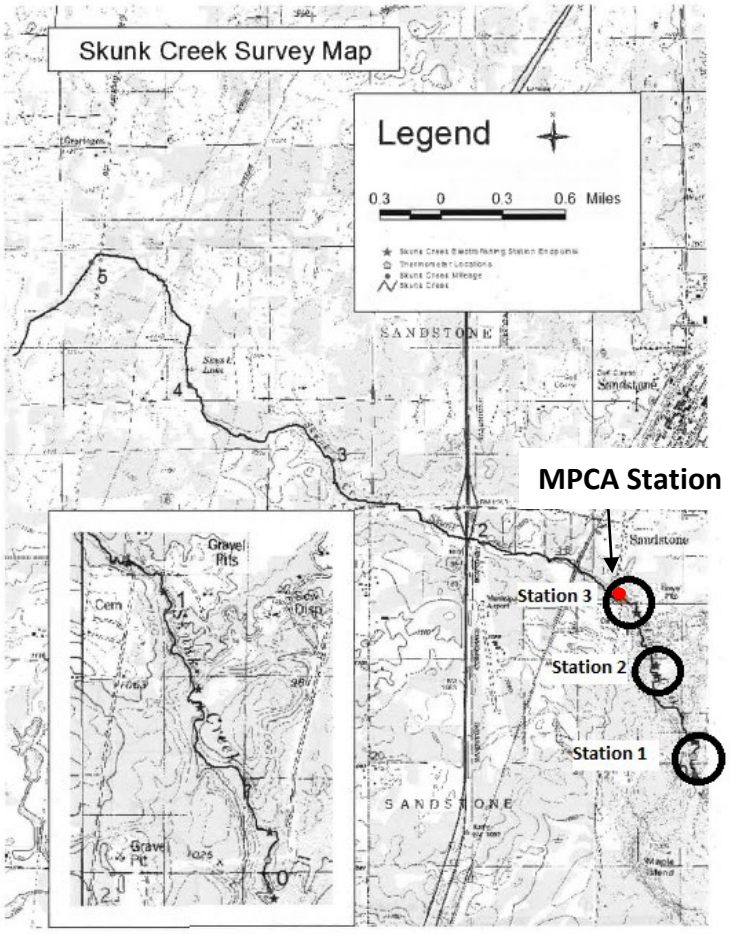
Invertebrate Community Information: Macroinvertebrate community data collected by the MPCA has a robust assemblage of cold water taxa and included 8 taxa (*Diamesa, Pagastia, Ephemerella, Odontomesa, Eukiefferiella, Glossosoma, Lype diversa,* and *Limnephilus*). The two samples, collected on 8/17/2016 and 9/12/2017, had four and six cold water taxa present, respectively. The 2016 visit was comprised of 2.8% cold water individuals, while the 2017 visit was comprised of 11.8% cold water individuals. Overall the 2017 samples looks better, which could be explained by differences in flow regime; the 2016 sample was collecting following the second highest flow event recorded in the past 60 years, at the nearest stream gauge (Kettle River @ Sandstone).

Macroinvertebrates: 16SC007, 8/17/2016; *Diamesa, Pagastia, Lype diversa,* and *Glossosoma*; 2.8% of individuals

Macroinvertebrates: 16SC007, 9/12/2017; *Ephemerella, Odontomesa, Eukiefferiella, Glossosoma, Lype diversa,* and *Limnephilus*; 11.8% of individuals

DNR information

The DNR surveys water tempeatures and fish communites in Skunk Creek in 2007 (temperature) and 2008 (temperature and biology). The DNR surveyed 3 stations for fish in 2008 and sampled no cold water species and four cool water species (burbot, brook stickleback, northern redbelly dace, and pearl dace). Water tempeature logger data indicated Skunk Creek had cold water tempertures with temperatures in the growth range for brook trout 100% of the summer (June through August). During the summer, water temperatures averaged 16°C with maximum water temperatures below 19°C. The upper reaches of Skunk Creek were dry during the DNR reconnaisance indicating that the lower reaches were largely fed by ground water during the summer. The 2008 report noted: "With cold water temperatures, good water quality, good food availability, no predatory fish, good summer flows, good pools and available cover, strong consideration should be made to stocking brook trout in the this stream."



Mapping showing three DNR stations (small, black stars that are circled), and MPCA station (red circle).

MPCA Station - 16SC007

Figure 9. Survey map of Skunk Creek, 2008.

Water temperatures data collected by DNR:

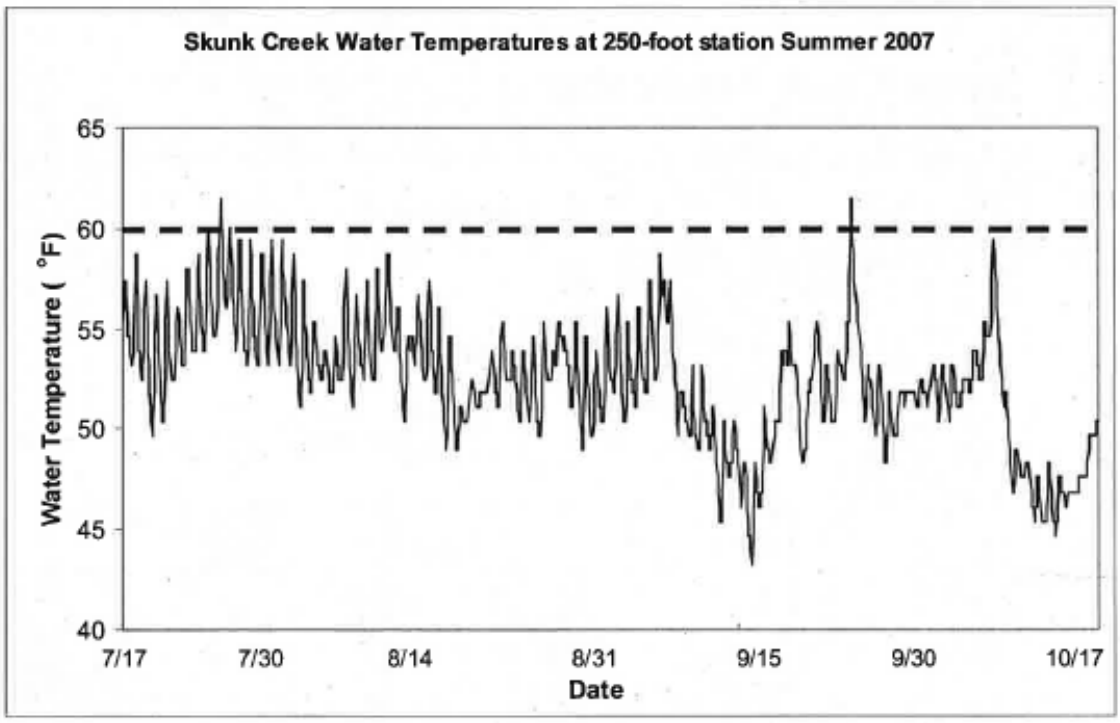


Figure 10. Graph of water temperatures at 250-foot station of Skunk Creek, 2007.

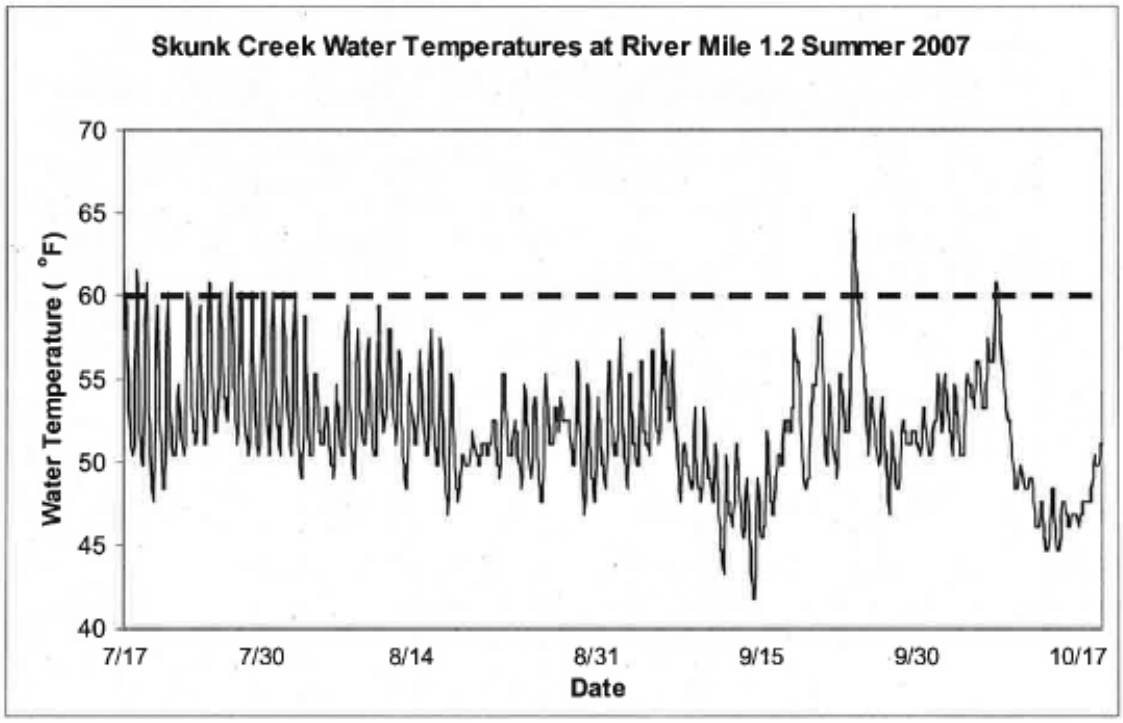


Figure 11. Graph of water temperatures at river mile 1.2 of Skunk Creek, 2007.

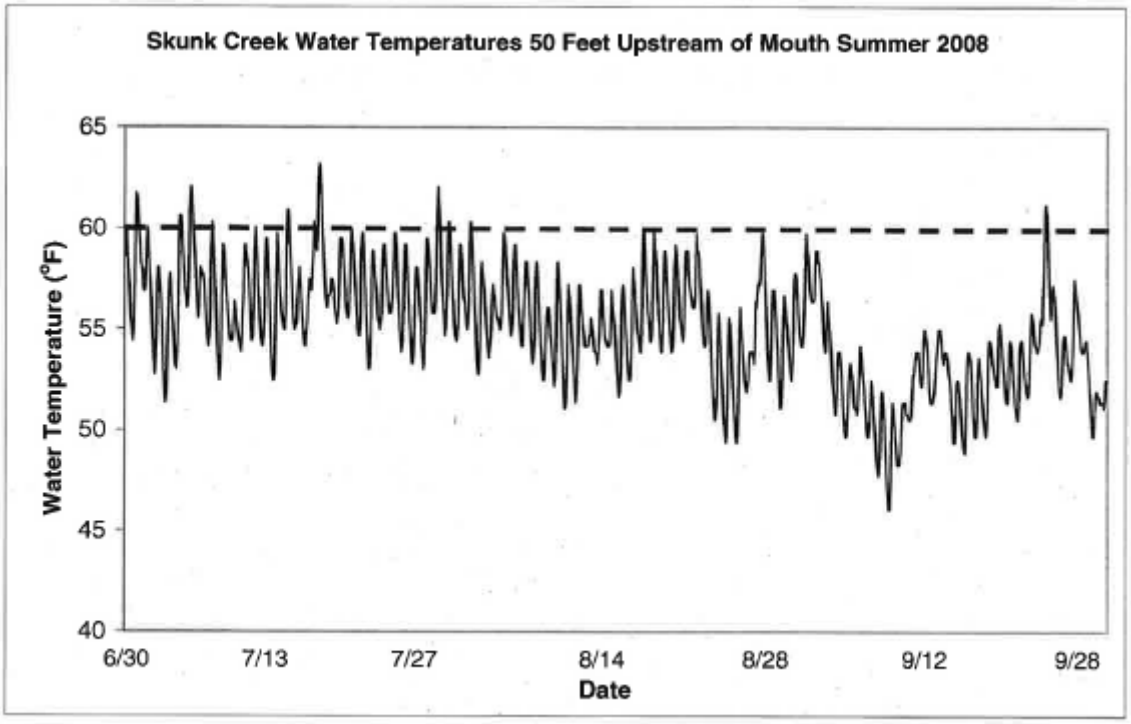


Figure 10. Graph of water temperatures at 50-foot station of Skunk Creek, 2008.

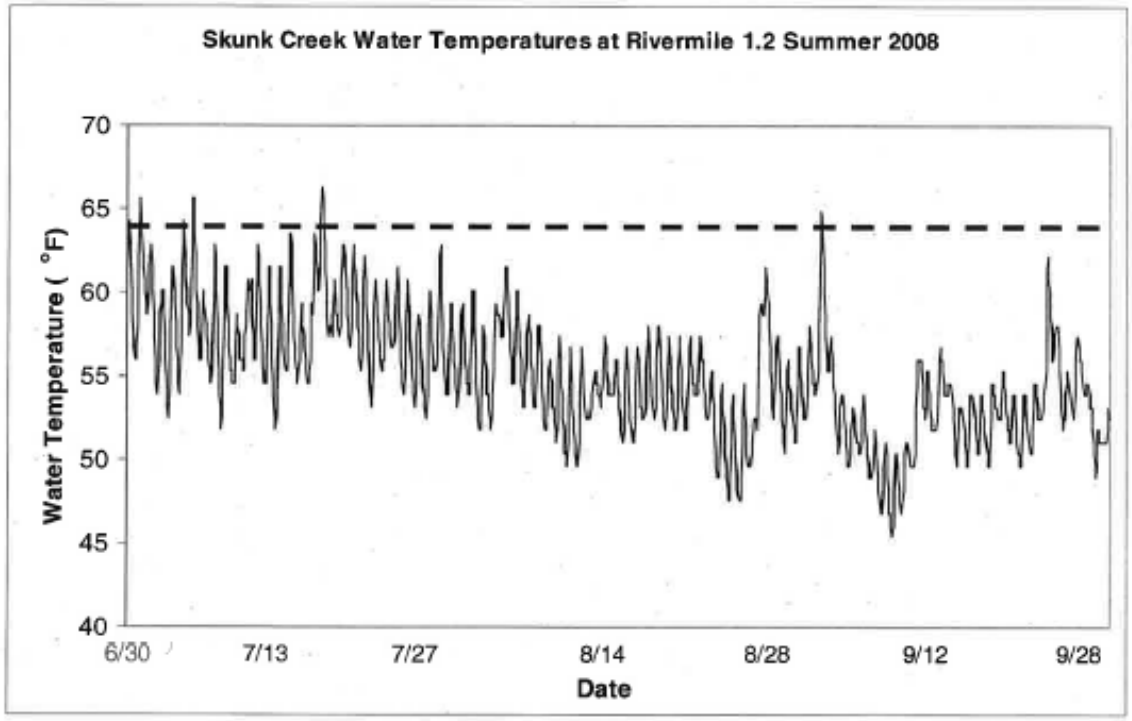


Figure 11. Graph of water temperatures at river mile 1.2 of Skunk Creek, 2008.

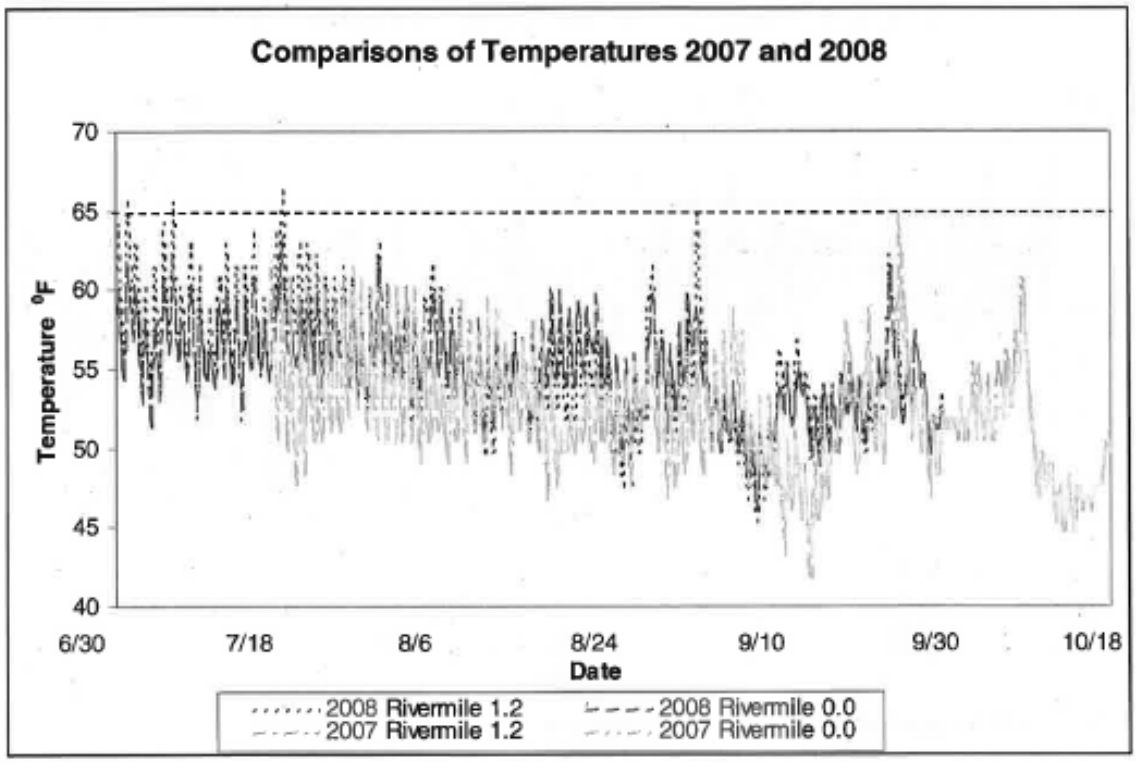


Figure 12. Comparison of water temperatures at both stations in 2007 and 2008.

DNR Fish Data – locations can be found on above map.

Table 4. Fish catch on Skunk Creek, 2008.

Station no.	1			2			3		
Date	8/4/2008			8/4/2008			8/4/2008		
Length of station, feet	1,100			450			770		
Gear	Backpack Shocker			Backpack Shocker			Backpack Shocker		
Amt of sampling effort (seconds)	1,200			1,170			1,030		
Species Present	Total Number	Length Range (in)	Total Weight (g)	Total Number	Length Range (in)	Total Weight (g)	Total Number	Length Range (in)	Total Weight (g)
Burbot	1	8.3	50	---	---	---	---	---	---
Brook Stickleback	5	1.9-2.8	10	5	1.3-2.5	10	66	1.6-2.4	60
Northern Redbelly Dace	4	1.6-2.3	10	---	---	---	18	1.8-2.3	15
Fathead Minnow	19	1.5-2.6	20	13	1.9-2.4	10	24	1.8-2.3	30
Central Mudminnnow	3	2.6-3.0	15	1	1.8	5	14	1.6-3.8	35
White Sucker	3	3.6-5.8	25	---	---	---	---	---	---
Pearl Dace	6	2.9-3.9	40	6	3.6-4.9	50	3	3.9-4.4	40
Creek Chub	7	3.5-5.0	90	1	5.1	10	---	---	---
Black Bullhead	---	---	---	1	6	45	---	---	---

MPCA Summary

Water temperate data collected by the DNR demonstrated that summer water temperatures in Skunk Creek average near 16°C with maximum water temperatures below 19°C. As a result temperatures are within the growth range for brook trout 100% of the summer and may be suitable to support trout. No cold water fish were sampled by the MPCA or DNR, but the community largely consists of species that are tolerant of low water temperatures even if they are not cold water obligates. The macroinvertebrate community included eight cold water species (*Ephemerella*, *Limnephilus*, *Lype diversa*, *Glossosoma*, *Diamesa*, *Eukiefferiella*, *Odontomesa*, and *Pagastia*) which comprised 2.8-11.8% of individuals in the samples. Although this stream is not a designated trout water, it is considered by the DNR to be a cold water feeder stream and stocking brook trout may be considered in the future. Based on the presence of a cold water macroinvertebrate community and water temperatures adequately low to support trout reproduction, Skunk Creek is capable of supporting a cold water habitat.

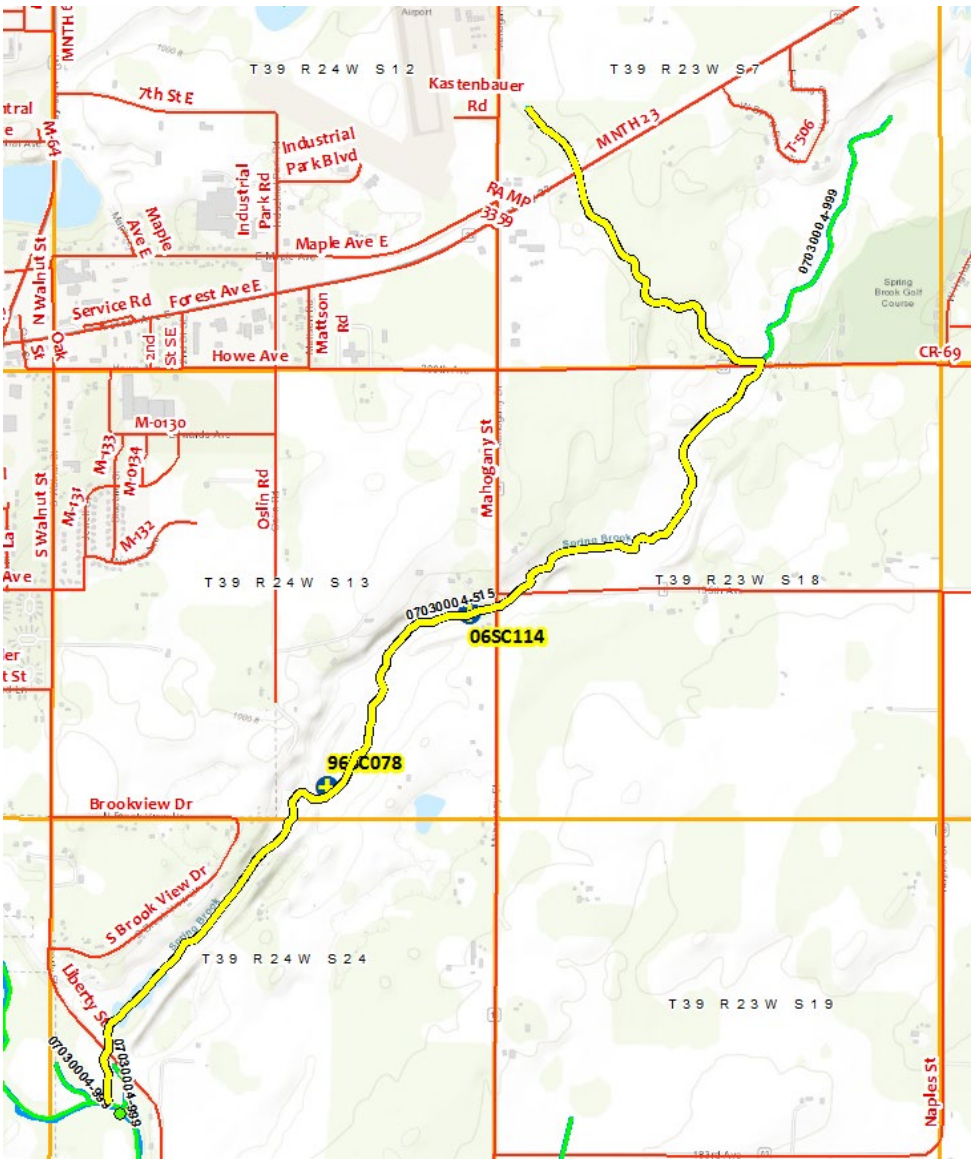
Snake River (07030004-515) MPCA Use Designation Review

Stream name: Snake River (St. Croix)
AUID(s): 07030004-515
AUID description: Headwaters to Snake Rive
Tributaries: NA
MPCA biological station(s): 06SC114, 96SC078
County: Kanabec
Watershed: Snake River (St. Croix) (07030004)

DNR designation: Not a designated trout stream (was a designated trout stream until late 60s/early 70s)
DNR management class: unknown

Current AUID designation: 2Bg (warm water)
Reason for review: Macroinvertebrate and temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.

Additional Information: Due to the impact of wetlands and beaver activity, parts of this WID may not support cold water habitat. Additional data may require refinement of the extent of the cold water reach.



Map of Snake River (07030004-515)

Review of existing data
MPCA monitoring data

MPCA Survey Data (96SC078 - 1996):
Temperature Data:

- Fish Visit: 22.5°C on 8/7/1996 @ 4:40 pm

Biological Data:

- Fish (1996): No cold water species, 2 cool water species (low abundance)

Fish data: 96SC078, 8/7/1996					
Common Name	CN Code	Min	Max	Weight	Number
white sucker	WTS	44	144	470	56
fathead minnow	FHM	49	74	46.5	13
creek chub	CRC	68	122	89	11
common shiner	CSH	54	102	23.5	5
Iowa darter	IOD	51	52	2	2
central mudminnow	CNM	69	77	9	2
brook stickleback	BST	47	54	3	2
burbot	BUB	172	172	30	1
black bullhead	BLB	92	92	11	1

- Macroinvertebrates (1996): Community includes only one cool/cold water taxa (*Gammarus*) that was picked in the large/rare search. Baetidae is also present (1) but this individual was not identified to species. **CBI = 20.0°C**.
- This site/visit is not the reason for the coldwater review as it is a random site that is located at the downstream end of a large wetland complex that Spring Brook runs through. According to aerial photos it is occasionally impounded by beaver dams (Figure 1). As such, it is unlikely that this location is representative of the cold water nature of this stream.

MPCA Survey Data (06SC114 - 2006):
Temperature Data:

- Fish Visit: 17.3°C on 7/18/2006 @ 4:30 pm

Biological Data:

- Fish (2006): No cold water species, 2 cool water species, low numbers of fish in general

Fish data: 06SC114, 7/18/2006					
Common Name	CN Code	Min	Max	Weight	Number
burbot	BUB	87	200	293	10
brook stickleback	BST	32	64	10	8
fathead minnow	FHM	54	65	15	4
white sucker	WTS	47	95	16.5	2
central mudminnow	CNM	62	73	8	2

- Macroinvertebrates (2006): *Not-assessable: Outside baseflow, low*. Community includes 3 cold water taxa (*Gammarus, Lype,* and *Heterotrissocladius*) accounting for 2% of individuals and 8% of taxa in sample. Limnephilidae is also present but not identified to species. **CBI = 18.9°C**

Figure 1. Relative location of biological monitoring stations on Spring Brook.

MPCA Survey Data (06SC114 - 2009):

- Macroinvertebrates (2009): Community includes 4 cold water taxa (*Gammarus, Amphinemura, Glossosoma,* and *Heterotrissocladius*) accounting for 21% of individuals and 15% of taxa in sample. Limnephilidae is also present but not identified to species. **CBI = 18.9°C**

MPCA Survey Data (06SC114 - 2016):

Temperature Data:

- Fish Visit: 11.3°C on 9/14/2016 @ 12:37 pm
- Invert Visit: 14.2°C on 8/9/2016 @ 11:45 am

Biological Data:

- Fish (2016): No cold water species, 2 cool water species (low abundance), low numbers of fish in general

Fish data: 06SC114, 9/14/2016					
Common Name	CN Code	Min	Max	Weight	Number
white sucker	WTS	57	128	148	12
johnny darter	JND	60	71	16	4
creek chub	CRC	36	49	1	3
pearl dace	PRD	119	123	33	2
brook stickleback	BST	65	76	5	2
northern pike	NOP	312	312	224	1

- Macroinvertebrates (2016): Community includes 5 cold water taxa (*Gammarus, Lype diversa, Amphinemura, Diplectrona modesta,* and *Limnephilus*) accounting for 11% of individuals and 15% of taxa in sample. *Baetis* was identified to species as *brunneicolor* which has a thermal tolerance value estimated at 17.0°C. **CBI = 18.8°C**

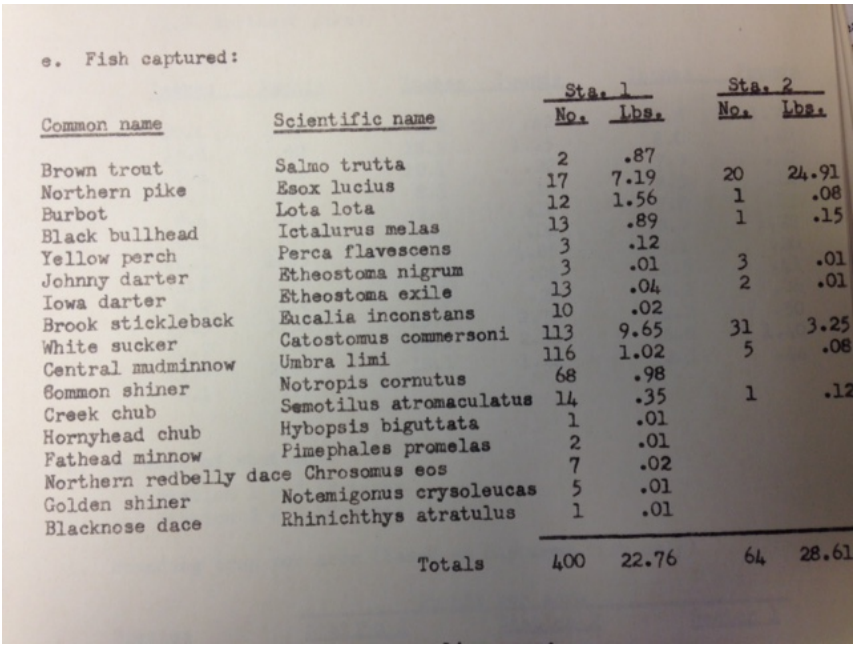
DNR information review

The entire stream was a designated trout stream up until at least the late 1960's. The stream was surveyed in 1964 and 1967 leading to the recommendations that the trout waters designation be removed.

1964 Stream Survey – captured both brown and brook trout (stocked fish) in the stream.

1967 Stream Survey – the purpose of survey was to investigate the cold water resources in Region I and evaluate management practices. Based on a comparison of flow measurements between locations without any tributaries coming in, and seeing a significant increase in flow, "unlocated springs in the stream bed must supply a significant part of the flow."

Fish sampling (May 9-10 1967) in Sector 1 (from mouth of creek to bridge just upstream of MPCA site **06SC114**) captured 2 brown trout near the mouth of the stream, 10.5 and 9.6 inches in length. The 9.6 inch fish was a fin-clipped stocked fish from a stocking of 300 yearlings on April 24, 1967, 100 of which were released at bridge US of **06SC114**. The 10.5 inch fish was likely from a 1966 stocking (evidence of carryover).

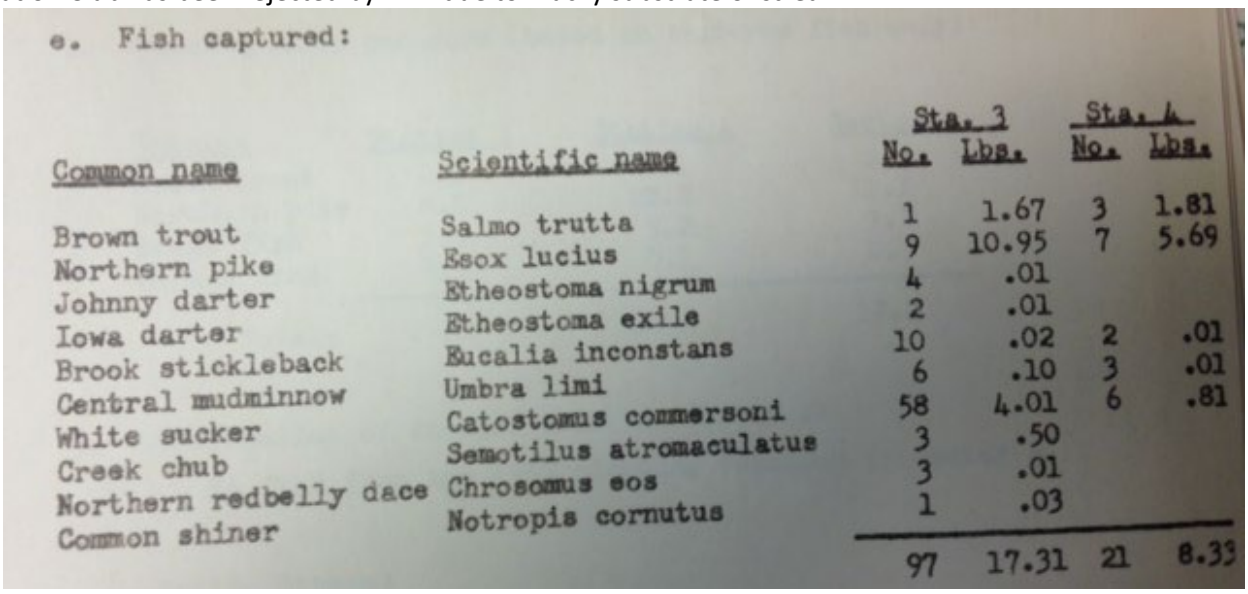


e. Fish captured:

Common name	Scientific name	Sta. 1 No.	Sta. 1 Lbs.	Sta. 2 No.	Sta. 2 Lbs.
Brown trout	Salmo trutta	2	.87		
Northern pike	Esox lucius	17	7.19	20	24.91
Burbot	Lota lota	12	1.56	1	.08
Black bullhead	Ictalurus melas	13	.89	1	.15
Yellow perch	Perca flavescens	3	.12		
Johnny darter	Etheostoma nigrum	3	.01	3	.01
Iowa darter	Etheostoma exile	13	.04	2	.01
Brook stickleback	Eucalia inconstans	10	.02		
White sucker	Catostomus commersoni	113	9.65	31	3.25
Central mudminnow	Umbra limi	116	1.02	5	.08
Common shiner	Notropis cornutus	68	.98		
Creek chub	Semotilus atromaculatus	14	.35	1	.12
Hornyhead chub	Hybopsis biguttata	1	.01		
Fathead minnow	Pimephales promelas	2	.01		
Northern redbelly dace	Chrosomus eos	7	.02		
Golden shiner	Notemigonus crysoleucas	5	.01		
Blacknose dace	Rhinichthys atratulus	1	.01		
	Totals	400	22.76	64	28.61

Fish sampling (May 11-12 1967) in Sector 2 (from Bridge just US of 06SC114 to its source) captured 4 brown trout: 15.5", 11.2", 10.3", and 10.4"; believed to be from 1965, 1966, and 1967 stockings (evidence of carryover).

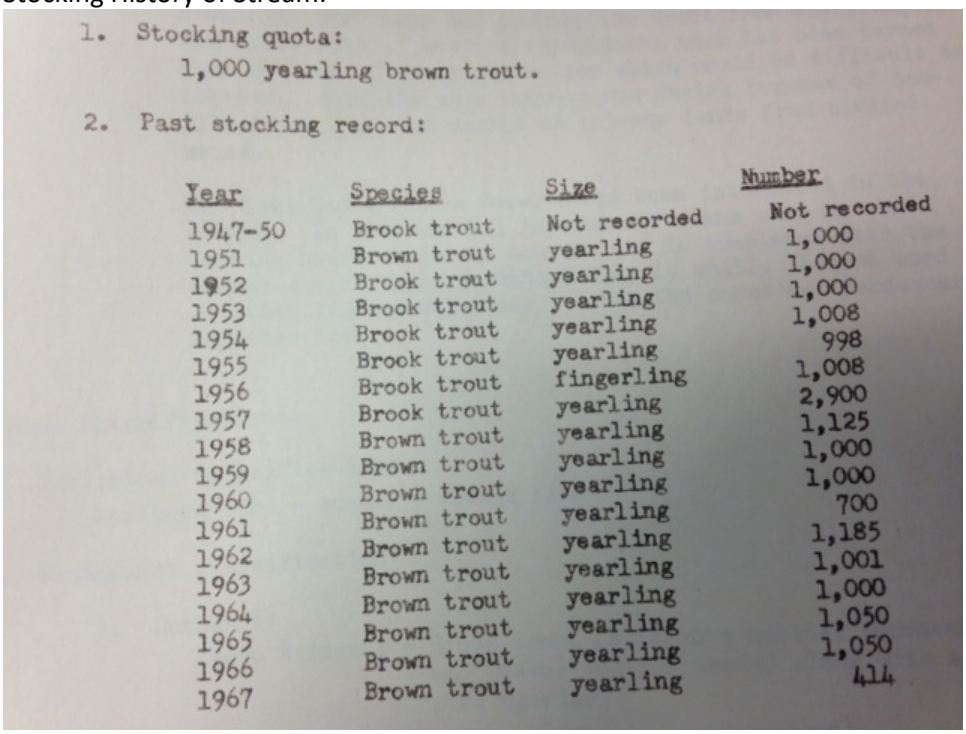
"The 1967 survey considers Spring Brook to have a sufficient amount of water and suitable temperatures to support trout." (1964 survey did not have similar conclusions). Still this stream "does not support trout" due to beaver activity and soft substrates of this stream. Local reports of brook trout being caught in stream "quite a long time ago." Habitat improvement at the request of Kanabec Conservation Club has been rejected by DNR due to mucky substrate of stream.



e. Fish captured:

Common name	Scientific name	Sta. 3 No.	Sta. 3 Lbs.	Sta. 4 No.	Sta. 4 Lbs.
Brown trout	Salmo trutta	1	1.67	3	1.81
Northern pike	Esox lucius	9	10.95	7	5.69
Johnny darter	Etheostoma nigrum	4	.01		
Iowa darter	Etheostoma exile	2	.01		
Brook stickleback	Eucalia inconstans	10	.02	2	.01
Central mudminnow	Umbra limi	6	.10	3	.01
White sucker	Catostomus commersoni	58	4.01	6	.81
Creek chub	Semotilus atromaculatus	3	.50		
Northern redbelly dace	Chrosomus eos	3	.01		
Common shiner	Notropis cornutus	1	.03		
		97	17.31	21	8.33

Stocking History of Stream:



1. Stocking quota:
   1,000 yearling brown trout.

2. Past stocking record:

Year	Species	Size	Number
1947-50	Brook trout	Not recorded	Not recorded
1951	Brown trout	yearling	1,000
1952	Brook trout	yearling	1,000
1953	Brook trout	yearling	1,000
1954	Brook trout	yearling	1,008
1955	Brook trout	yearling	998
1956	Brook trout	fingerling	1,008
1957	Brook trout	yearling	2,900
1958	Brown trout	yearling	1,125
1959	Brown trout	yearling	1,000
1960	Brown trout	yearling	1,000
1961	Brown trout	yearling	700
1962	Brown trout	yearling	1,185
1963	Brown trout	yearling	1,001
1964	Brown trout	yearling	1,000
1965	Brown trout	yearling	1,050
1966	Brown trout	yearling	1,050
1967	Brown trout	yearling	414

Poor returns on stocking attributed to predation by northern pike, beaver impoundments, and land use practices. “The upper 2 ½ miles of stream is cool enough to support trout permanently, but other conditions are poor for trout.”

Two management possibilities proposed for stream: either manage it for brook trout/northern pike or northern pike/waterfowl, each requiring significant habitat work. “In its present condition, no trout stocking should be considered and it should be removed from the Designated Trout List”. Removal from trout waters list was based on poor trout habitat and not temperatures.

MPCA summary

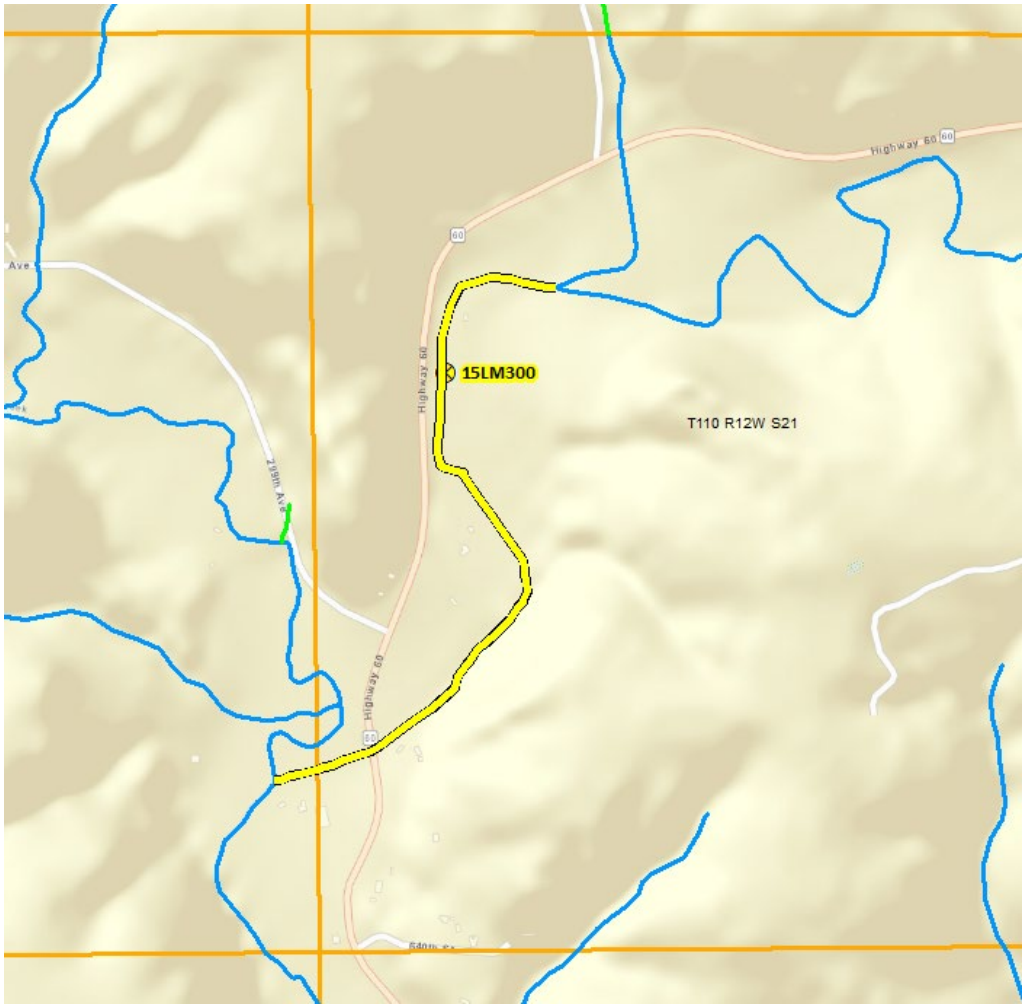
No temperature logger data are available, but water temperature grab samples were generally cold (06SC114: 11.3-17.3°C; 96SC078: 22.5°C). Water temperatures may to be higher in 96SC078 because this stream section appears to be impounded. This reach was previously managed for trout by the DNR, but this stream was removed from the trout waters list due to poor trout habitat. No cold water fish were sampled by the MPCA. The macroinvertebrate community included several cold water species (*Gammarus, Amphinemura, Glossosoma, Diplectrona modesta, Limnephilus*, *Lype diversa,* and *Heterotrissocladius*) which was comprised 2-21% of individuals (06SC114) in the sample. A single cold water macroinvertebrate taxon (*Gammarus*) was sampled from 96SC078. Review of temperature and macroinvertebrate data indicate that this stream supports a cold water macroinvertebrate community in its upper sections (i.e., upstream of large wetland complex). A combination of factors, largely natural, preclude the establishment and maintenance of a cold water fish community, including beaver activity, lack of coarse substrates, predation by northern pike, and surrounding land use practices. The continued presence of cold water macroinvertebrates suggest that the thermal regime of the stream is sufficient to support cold water aquatic life.

Unnamed Creek (Trib. To Spring Creek) (07040004-763) MPCA Use Designation Review

Stream name: Unnamed Creek (Trib. To Spring Creek)
AUID(s): 07040004-763
Reach description: Unnamed creek to Spring Creek
Tributaries: none
MPCA biomonitoring site(s): 15LM300
MPCA sample dates: 7/22/2015, 7/14/2015, 8/6/2015
Watershed: Zumbro River
County: Wabasha

DNR kittle number: M-034-020-002 (extent is greater than 07040004-763)
DNR designation: Trout protection tributary
DNR management class: unknown

Current AUID designation: 2Ag (cold water)
Reason for review: Fish and temperature data
Was this site previously reviewed? If so what were the results? No



Map of Unnamed Creek (Trib. To Spring Creek) (07040004-763)

Review of existing data

MPCA monitoring data

MPCA biological data

Fish and invertebrates were sampled from one station (15LM300) in 2015. Fish were sampled on 7/14/2015 and 7/22/2015. Brown trout were collected at both visits. Due to the small size of these fish, they appear to be young-of-the-year fish which may be indicative of natural reproduction in this stream reach. No other cold water species were present. The presence of brown trout in a stream adjacent to a cold water habitat alone is not indicative of a cold water habitat as the community is dominated by warm water fish species. However, the presence of YOY coupled with low waters temperatures does indicate that this reach supports a cold water fish community. Macroinvertebrates were sampled once on 8/6/2015. Several cold water taxa were collected including *Gammarus, Glossosoma intermedium,* and *Pagastia*). These taxa comprised 17% of the sample. Overall, the macroinvertebrate community is indicative of a cold water habitat.

Fish results from 15LM300 for 7/14/2015 visit

Common Name	CN Code	Min	Max	Weight	Number	DELTs
white sucker	WTS	66	195	1702	108	0
brook stickleback	BST	25	65	75	47	0
creek chub	CRC	40	137	497	39	0
brown trout	BNT	82	105	215	23	0
johnny darter	JND	34	54	23	19	0
central stoneroller	CSR	89	99	32	4	0
blacknose dace	BND	80	87	14	2	0
fathead minnow	FHM	76	76	7	1	0

Fish results from 15LM300 for 7/22/2015 visit

Common Name	CN Code	Min	Max	Weight	Number	DELTs
white sucker	WTS	61	210	1319	85	0
brook stickleback	BST	25	68	78	63	0
johnny darter	JND	36	60	45	45	0
creek chub	CRC	42	178	252	16	0
brown trout	BNT	93	97	145	14	0
central stoneroller	CSR	76	97	11	2	0

MPCA Temperature data

No temperature loggers were deployed in this stream. However, grab samples collected during biological visits indicated cold temperatures ranging from 13.3-13.9°C (7/14/2015, 9:22 AM: 13.4°C; 7/22/2015, 11:47 AM: 13.9°C; 8/6/2015, 12:03 PM: 13.3°C).

DNR information

The DNR has never sampled this headwaters tributary for fish nor do they have any temperature data for this system. This stream was designated cold water by default rule in the 1990s because the stream it flows to, Spring Creek, is designated cold water and a small section of this stream flows through the section.

MPCA Summary

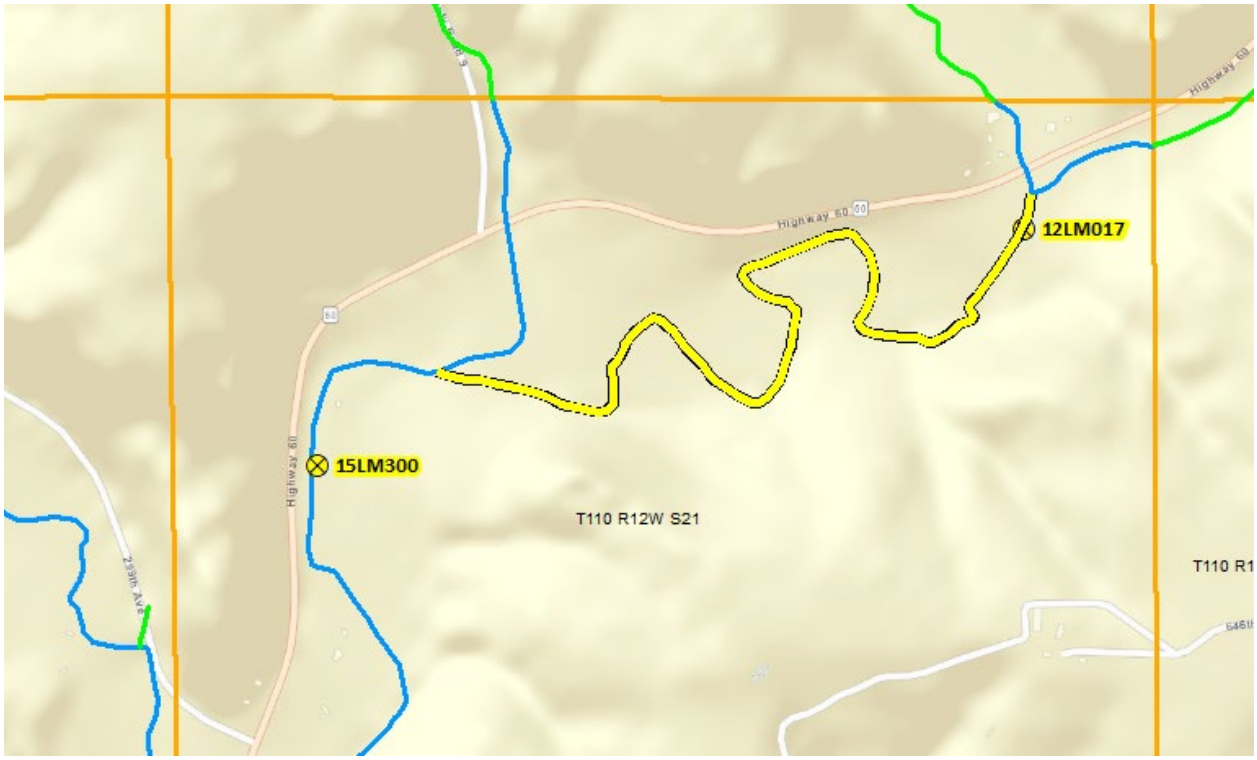
Biological monitoring by the MPCA indicated that this stream supports a cold water habitat. Brown trout were collected in 2015 during two visits, including young-of-the-year fish. The young-of-the-year fish indicate natural reproduction of trout in this stream. A macroinvertebrate sample was also collected which included several cold water taxa (*Gammarus, Glossosoma intermedium,* and *Pagastia*) with individuals of these taxa comprising 17% of the sample. No temperature loggers were deployed, but three grab samples from July and August ranged from 13.3-13.9°C.

Unnamed Creek (Trib. To Spring Creek) (07040004-764) MPCA Use Designation Review

Stream name: Unnamed Creek (Trib. To Spring Creek)
AUID(s): 07040004-764
Reach description: Unnamed creek to unnamed creek
Tributaries: 07040004-762, 07040004-765, and 07040004-766
MPCA biological station(s): 12LM017
MPCA sample dates: 7/11/2012, 8/1/2012
Watershed: Zumbro River
County: Wabasha

DNR kittle number: M-034-020-002 (extent is greater than 07040004-764)
DNR designation: Trout protection tributary
DNR management class: unknown

Current AUID designation: 2Ag (cold water)
Reason for review: Fish and temperature data
Was this site previously reviewed? If so what were the results? No



Map of Unnamed Creek (Trib. To Spring Creek) (07040004-764)

Review of existing data

MPCA monitoring data

MPCA biological data

Fish and invertebrates were sampled from one station (12LM017) in 2012. The site was also visited on 8/17/2015, but fish were not sampled due to low water levels indicating that this stream is intermittent. Fish were sampled once on 7/11/2012. No cold water taxa were present in the sample. Macroinvertebrates were sampled once on 8/1/2012. One cold water macroinvertebrate taxon (*Gammarus*) was collected from 12LM017, but this taxa only consisted of 3 individuals (1% of sample). Overall, the macroinvertebrate community is indicative of a warm water habitat.

Fish results from 12LM017 for 7/11/2012 visit

Common Name	CN Code	Min	Max	Weight	Number	DELTs
creek chub	CRC	41	142	509	100	0
white sucker	WTS	42	151	168	53	0
blacknose dace	BND	65	86	57	13	0
central stoneroller	CSR	50	55	12	4	0
johnny darter	JND	68	68	2	1	0

MPCA Temperature data

No temperature logger was deployed in this stream. However, grab samples collected during biological visits were warm ranging from 24.3-28.5°C (7/11/2012, 3:35 PM: 28.5°C; 8/1/2012; 2:06 PM: 24.3°C)

DNR information

The DNR has never sampled this headwaters tributary for fish nor do they have any temperature data for this system. This stream was designated cold water by default rule because the stream it flows in to, Spring Creek, is designated cold water and a small section of this stream flows through the section.

MPCA Summary

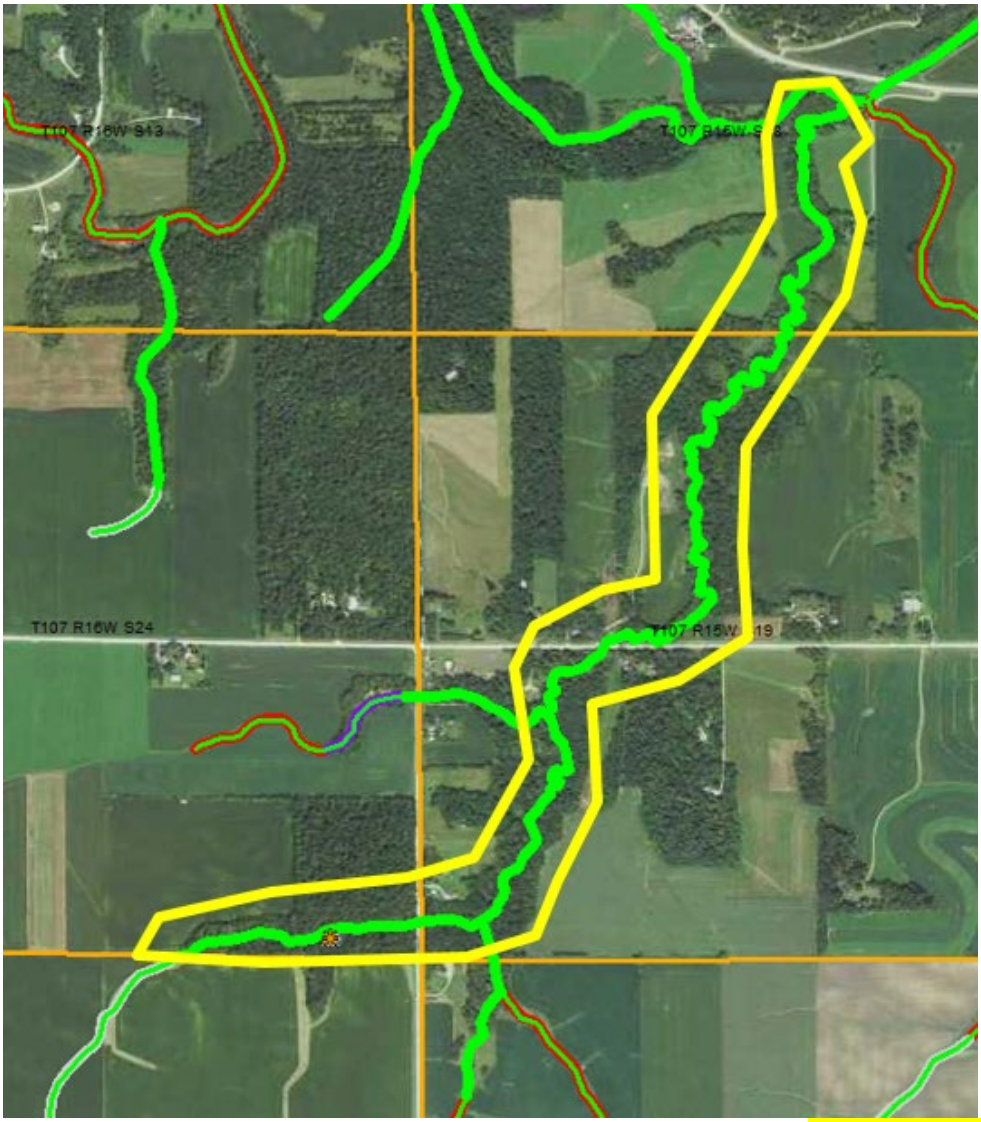
Based on MPCA surveys, the AUID 07040004-764 does not support a cold water habitat. Both fish and macroinvertebrate communities are indicative of a warm water community. Available water temperature measurements in this stream reach indicate that it is too warm to support cold water aquatic life. In addition, a biological sampling visit in 2015 could not be performed due to inadequate flow. Although there is anthropogenic disturbance in this watershed, there is no evidence that these activities have resulted in the loss of a cold water habitat (e.g., increased temperature, reduced flows). A sampling station approximately 1.2 miles downstream of 12LM017 on a different AUID (07040004-763) has much colder water temperatures and does support cold water aquatic life. These stations have similar contributing watersheds which indicates that there is a source of cold water between these stations and that the land use has not cause the loss of the cold water habitat in the downstream community. As a result, the evidence indicates that cold water habitat is not an existing or attainable use on 07040004-764.

Tompkins Creek (07040004-950, 07040004-951, 07040004-A00) MPCA Use Designation Review

Stream name: Tompkins Creek and unnamed spring (Tompkins Creek)
AUID(s): 07040004-950, 07040004-951, 07040004-A00
AUID description: south line of T107 R16W S24 to the Middle Fork of the Zumbro River
Tributaries: NA
MPCA biological station(s): none
County: Dodge, Olmsted
Watershed: Zumbro

DNR Kittle Number: M-034-056-004-012 (extends beyond T107 R16W S24)
DNR designation: Designated trout water and none (part of stream is not a designated trout water)
DNR management class: unknown

Current AUID designation: 2Bg (warm water)
Reason for review: DNR use designation (fish assemblage)
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.



Map of Tompkins Creek (07040004-950, 07040004-951, 07040004-A00) (revise when GIS layer is updated).

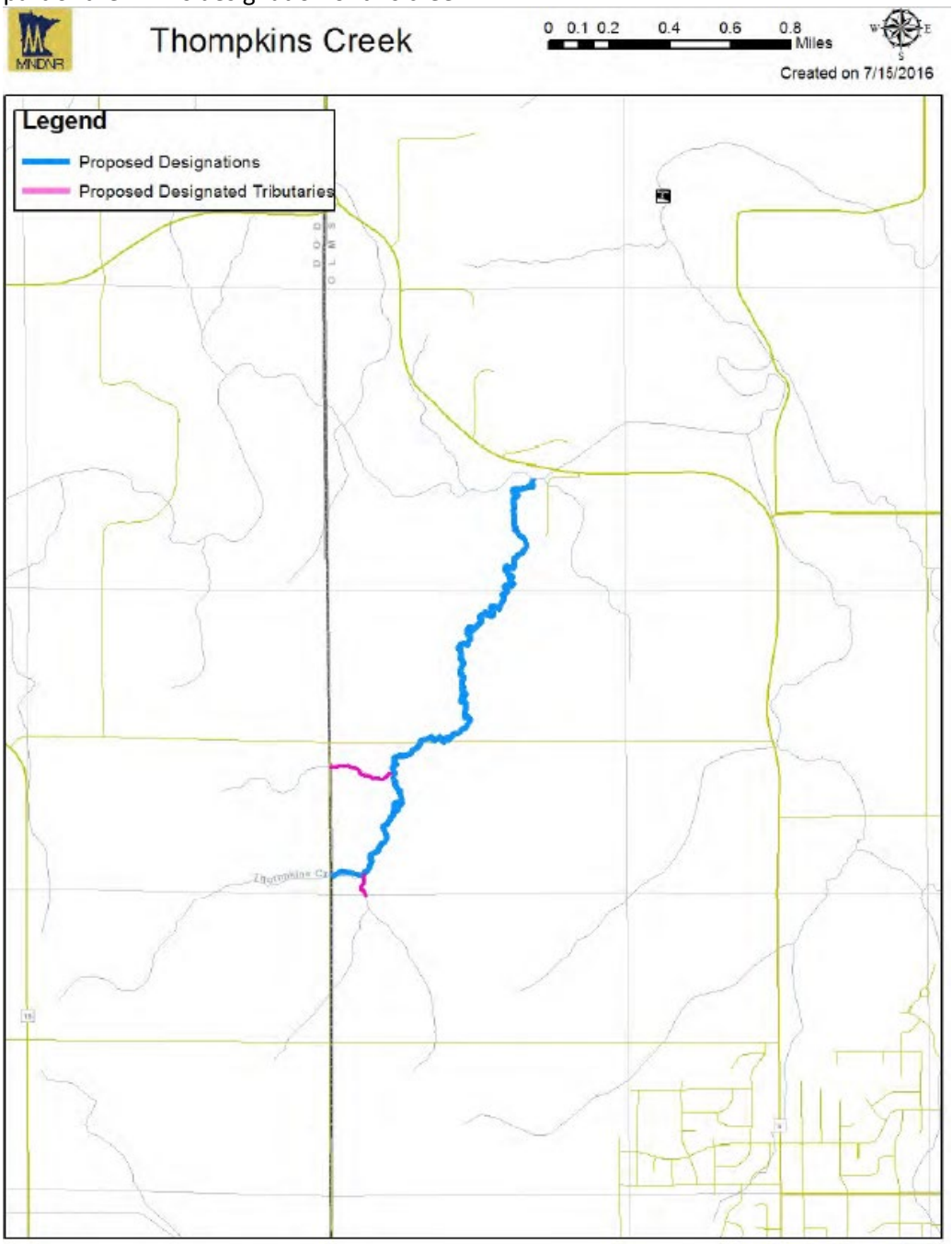
Review of existing data

MPCA monitoring data

No MPCA monitoring data are available

DNR information

The majority of these reaches 07040004-950, 07040004-951, and 07040004-A00 were designated as trout waters in Minn. R. 6264.0050 by the DNR through a rule making which was completed in 2018 (State of Minnesota 2018). The portion of Tompkins Creek in PLS system section T107 R16W S24 was not included as part of the DNR's designation of this creek.



DNR map of trout water addition added in 2018 rule.

Yearling brown, brook, and rainbow trout were stocked in this stream in the 1950s and anglers reported fair to good fishing at that time. Brook trout fingerlings were stocked in Tompkins Creek in 1999 and 2000. Surveys in 2003, 2010, and 2016 have documented a self-sustaining population of brook trout in Tompkins Creek. Overall, the small size of the stream and limited physical habitat, primarily a lack of deeper pools, limits the fish population, particularly for larger adults. A lack of forage species in the upper reaches may also be a limiting factor for growth of adult brook trout.

Summary of DNR survey data

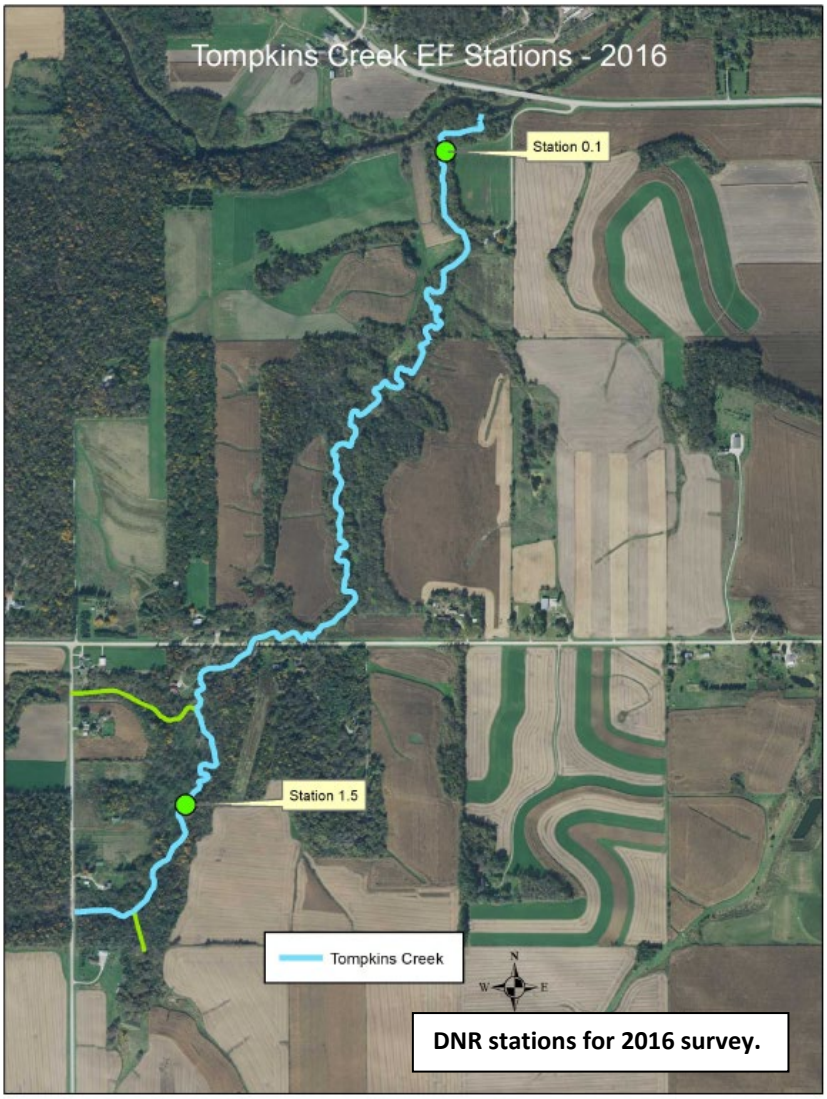
The DNR surveyed this stream in 2016, 2010 and 2003 following stockings to reintroduce brook trout into this stream.

<u>2016 Survey</u>

The DNR surveyed two stations (Stations 0.1 and 1.5) for fish on September 15, 2016.

Station 0.1 summary from DNR report: Four adult brook trout and numerous non-game species were sampled in station 0.1 for a minimum estimate of 70 adult brook trout per mile. No brook trout recruits (young-of-year) were sampled. MSHA score = 48.

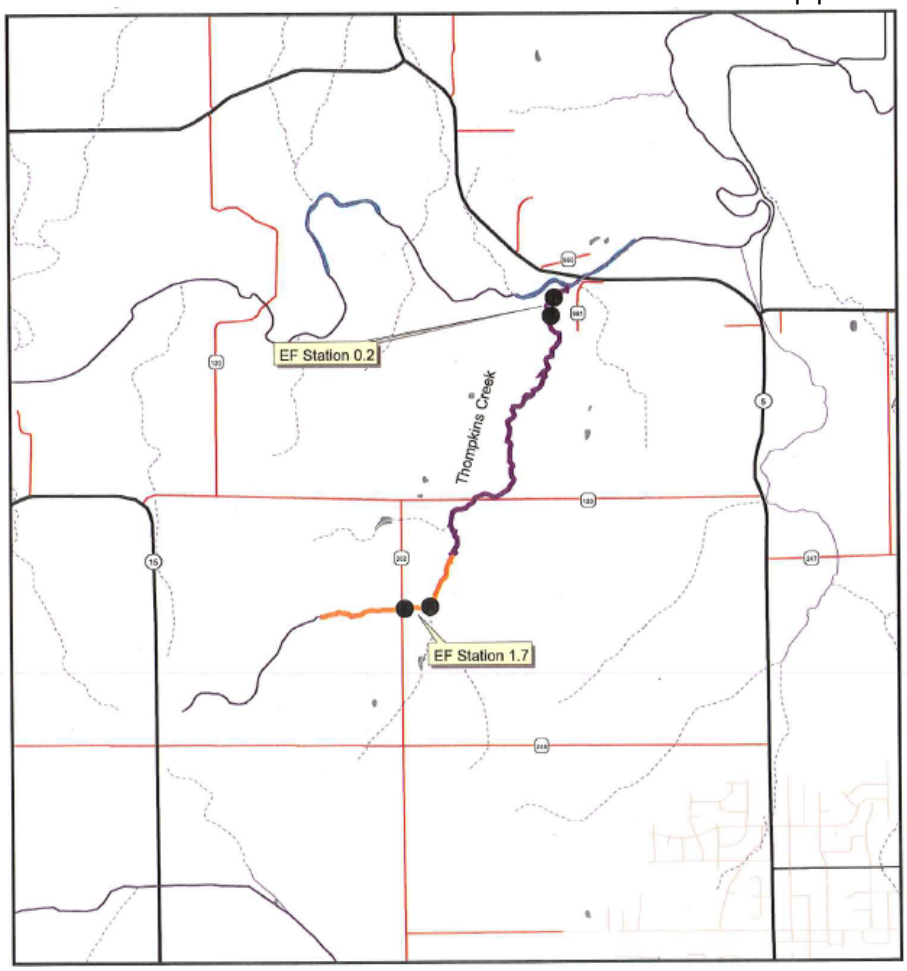
Station 1.5 summary from DNR report: Station 1.5 had a fair population of brook trout with an estimate of 512 adults and 8 recruits per mile. No larger fish (≥ 10 inches) were sampled. No other fish species were sampled. MSHA score = 66.



DNR stations for 2016 survey.

2010 Survey

The DNR surveyed a single station (Station 1.7) on June 22, 2010. A total of 27 brook trout ranging in size from 6 to 12 inches were collected. Multiple year classes were collected indicating reproduction. The report notes that there was limited habitat available for trout due to lack of deep pools.



DNR stations for 2010 and 2003 surveys.

2003 Survey

The DNR surveyed two stations (Station 0.2 and 1.7) on July 15, 2003. Seven brook trout were collected from Station 1.7 and no trout were collected from Station 0.2. Although numbers of trout were low, this survey documented natural reproduction in the headwaters of this stream.

Additional summary information from historical DNR surveys

The following is information summarized from the DNR's 2014 Use Designation Request packet for Tompkins Creek.

1959: An incomplete survey was conducted in 1959. Only the lower 1.4 miles were surveyed with the rest of the reach considered to be incapable of supporting trout. Based on local anglers, trout were present (fair to good fishing).

1989: The first full survey of this stream occurred in 1989. No trout were collected and the stream was considered a warm water stream. Drought conditions in 1988 may have impacted flows and temperature. No stocking was recommended due to low flows and poor habitat.

1995: A survey in 1995 collected no trout, but noted that temperatures were suitable for trout in sections of this reach. An introductory stocking of trout was recommended based on these results.

MPCA Summary

Based on DNR surveys, Tompkins Creek currently supports a naturally reproducing population of brook trout. The stream was managed for trout in the 1950s, but surveys in 1989 and 1995 did not collect any trout. However, temperature data in 1995 indicated that the thermal regime may be suitable to support to trout. A reintroduction stocking was recommended and brook trout fingerlings were stocked in 1999 and 2000. Three subsequent surveys have collected brook trout with multiple year classes indicating natural reproduction. Each survey has collected a larger number of trout, but the sampling locations have differed between surveys. The size of the trout population and the size of adult trout in this creek has been somewhat hampered by poor trout habitat (i.e., few deep pools) and limited forage fish in the upper reaches. However, the thermal regime is cool enough to support trout and should be capable of supporting other cold water organisms (e.g., sculpin, invertebrates). Based on the DNR's survey information indicating a naturally reproducing population of brook trout, this reach should be designated as cold water habitat (Class 2A). Although not listed as a trout water, the MPCA will also propose to include the section of this stream in Public Land Survey system section T107 R16W S24 due to its close proximity to a DNR station with brook trout and the presence of an unconfirmed spring in this reach of Tompkins Creek.

References

State of Minnesota (2018) State Register, 30 April 2018. Volume 42, Number 44. pp. 1298-1341.

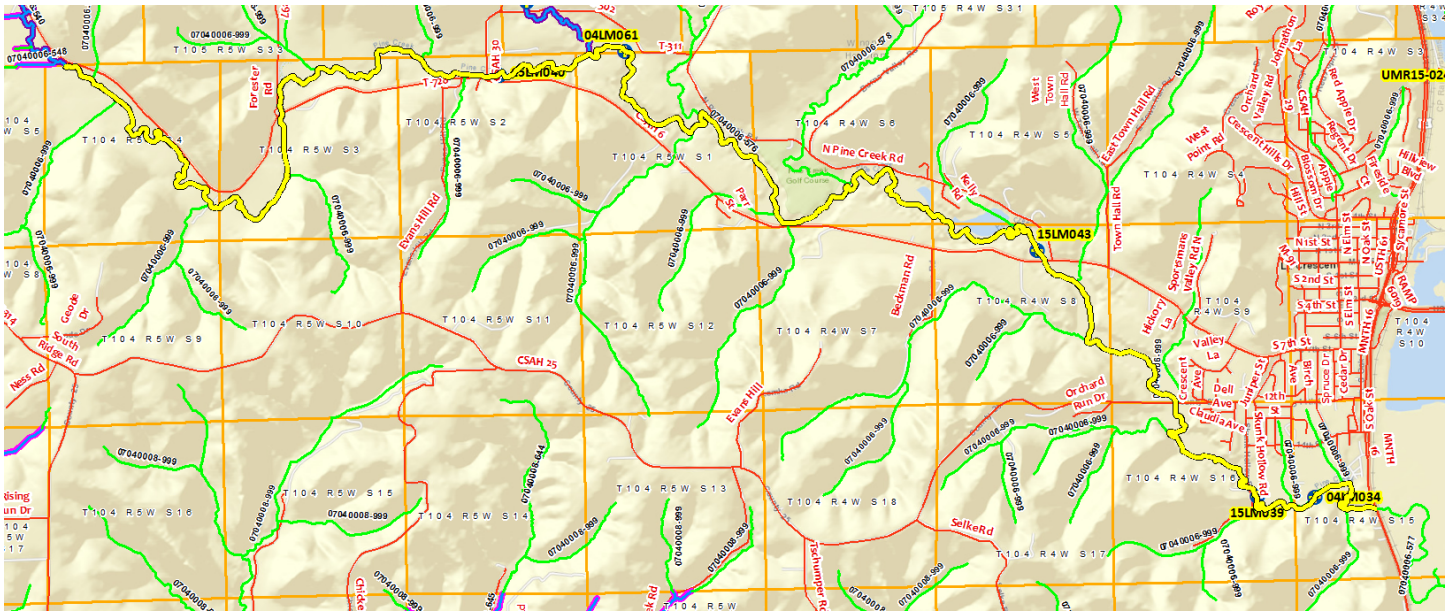
Pine Creek (Trib. To Spring Creek) (07040006-576) MPCA Use Designation Review

Stream name: Pine Creek
AUID(s): 07040006-576
AUID description: T104 R5W S4, north line to Hwy 16
Tributaries: none
MPCA biomonitoring site(s): 15LM040, 15LM043, 15LM039, 04LM034, 04LM061
MPCA sample dates: 06/10/15
Watershed: Mississippi River – La Crescent
County: Houston

DNR kittle: M-011 (part)
DNR designation: Not a designated trout water
DNR management class: Class I-D (marginal trout water)

Current AUID designation: 2Bg (warm water)
Reason for review: Fish and temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.

Additional Information: The current cold water designation on Pine Creek ends at the Winona/Houston County line. Three sample locations were sampled in 2015 for fish and inverts, two were sampled again in 2016. An additional two stations were sampled in 2004. Upstream of the county line Pine Creek is designated as a coldwater stream, a designation supported by samples conducted at 15LM041.



Map of Pine Creek (Trib. To Spring Creek) (07040006-576)

Review of existing data

MPCA monitoring data

MPCA biological data

Fish and macroinvertebrates were sampled from 5 stations in 2004, 2015, and 2016. Brown trout were collected from 4 of the 5 stations. Some brown trout individuals sampled appeared to be young-of-the-year which indicate natural reproduction in this reach. Three cool water species (longnose dace, brook stickleback, and burbot) were collected from this WID. Five cold water macroinvertebrate taxa were collected from this WID (*Brachycentrus occidentalis, Baetis tricaudatus, Gammarus, Heterotrissocladius,* and *Eukiefferiella*). These taxa comprised 4.4, 7.5, 8.2, 15.7, 16.1, 19.4, and 27.0% of the sample.

2004 Fish Community Information:

04LM034, 6/30/2004

Common Name	CN Code	Min Length (mm)	Max Length (mm)	Weight (g)	Number
brook stickleback	BST	25	42	5	12
white sucker	WTS	120	427	2700	11
mud darter	MDD	46	56	12	7
green sunfish	GSF	59	66	17	4
fathead minnow	FHM	25	31	1	3
Iowa darter	IOD	33	35	1	3
northern pike	NOP	131	153	36	2
central mudminnow	CNM	89	89	8.5	1
shorthead redhorse	SHR	139	139	27	1

04LM061, 6/30/2004

Common Name	CN Code	Min	Max	Weight	Number
white sucker	WTS	29	417	3800	54
blacknose dace	BND	38	98	134	34
creek chub	CRC	60	130	72	10
longnose dace	LND	66	72	20	5
fathead minnow	FHM	53	57	5	2
brook stickleback	BST	52	52	1	1

04LM061, 8/24/2004

Common Name	CN Code	Min	Max	Weight	Number
white sucker	WTS	43	280	775.5	31
blacknose dace	BND	28	98	172.5	29
fathead minnow	FHM	46	64	22	9
longnose dace	LND	34	110	29	6
brown trout	BNT	201	317	682.5	3
creek chub	CRC	76	117	40	3
Iowa darter	IOD	43	57	11.5	3
brook stickleback	BST	48	48	0.5	1

2015 Fish Community Information:

15LM040, 8/27/2015

Common Name	CN Code	Min Length(mm)	Max Length(mm)	Weight (g)	Number
brown trout	BNT	73	304	622	16

Common Name	CN Code	Min Length(mm)	Max Length(mm)	Weight (g)	Number
longnose dace	LND	64	86	68	13
white sucker	WTS	75	270	367	10
yellow bullhead	YEB	74	112	94	7
rainbow trout	RBT	142	142	38	1

15LM043, 7/22/2015

Common Name	CN Code	Min Length (mm)	Max Length (mm)	Weight (g)	Number
white sucker	WTS	42	374	3808	39
brown trout	BNT	222	477	3300	9
largemouth bass	LMB	55	80	35	7
weed shiner	WDS	37	60	7	4
central mudminnow	CNM	40	74	13	2
creek chub	CRC	72	80	12	2
fathead minnow	FHM	34	40	0.5	2
yellow perch	YEP	65	70	8	2
brook stickleback	BST	50	50	1	1
burbot	BUB	307	307	191	1
green sunfish	GSF	62	62	2	1
spottail shiner	SPO	42	42	1	1

15LM039, 7/21/2015

Common Name	CN Code	Min Length (mm)	Max Length (mm)	Weight (g)	Number
weed shiner	WDS	34	46	26	84
largemouth bass	LMB	52	72	84	21
brown trout	BNT	216	370	1500	7
white sucker	WTS	119	424	2182	7
Iowa darter	IOD	34	61	7	6
spottail shiner	SPO	38	44	2	4
fathead minnow	FHM	31	38	0.5	2
green sunfish	GSF	103	127	90	2
creek chub	CRC	81	81	12	1
golden shiner	GOS	48	48	0.5	1
northern pike	NOP	333	333	215	1
yellow perch	YEP	199	199	118	1

2016 Fish Community Information:

15LM040, 6/22/2016

Common Name	CN Code	Min	Max	Weight	Number	DELTs
green sunfish	GSF	45	115	613	161	0
white sucker	WTS	25	444	6496	76	0
blacknose dace	BND	51	97	303	55	0
brown trout	BNT	65	380	5292	39	0
creek chub	CRC	69	210	602	39	1
longnose dace	LND	60	85	97	29	0

Common Name	CN Code	Min	Max	Weight	Number	DELTs
fathead minnow	FHM	56	67	22	4	0
brook stickleback	BST	26	30	1	2	0
weed shiner	WDS	55	55	4	2	0
bluntnose minnow	BNM	52	52	1	1	0

15LM043, 6/21/2016

Common Name	CN Code	Min	Max	Weight	Number	DELTs
green sunfish	GSF	43	93	252	74	0
weed shiner	WDS	50	57	75	50	0
white sucker	WTS	29	390	5962	40	0
brown trout	BNT	212	421	4800	16	0
brook stickleback	BST	30	55	15	6	0
Iowa darter	IOD	35	51	9	5	0
central mudminnow	CNM	84	100	15	2	0
black bullhead	BLB	184	184	84	1	0
bluntnose minnow	BNM	50	50	1	1	0
emerald shiner	EMS	72	72	2	1	0
fathead minnow	FHM	36	36	0.5	1	0

MPCA Temperature data

Water Temperatures (One time temperature readings taken during biological sampling):
04LM034, 6/30/2004, 1238: 18.9°C
04LM061, 6/30/2004, 1612: 21.75°C
04LM061, 8/24/2004, 1835: 17.0°C
15LM040, 8/27/2015, 944: 14.6°C
15LM043, 7/22/2015, 820: 16.3°C
15LM043, 8/5/2015, 1931: 21.6°C
15LM039, 7/21/2015, 1640: 20.9°C
15LM039, 8/5/2015, 1824: 20.6°C
15LM040, 6/22/16, 924: 17.4°C.
15LM040, 9/1/2016, 1200: 18.0°C
15LM043, 6/21/16, 1407: 20.2°C
15LM043, 9/1/2016, 1057: 15.8°C

Temperature logger data summaries

Field Number	Year	% Growth	% Stress	% Lethal%	Summer Avg Temp (°C)	% Recording	June Avg Temp (°C)	July Avg Temp (°C)	Aug. Avg Temp (°C)
15LM039	2015	70.7	-	-	18.6	100	17.9	19.3	18.7
15LM040	2015	70.4	-	-	18.0	100	17.3	19.0	17.7
15LM043	2015	70.2	-	-	18.0	100	17.3	18.7	18.1
15LM040	2016	56.5	41.3	2.0	19.7	100	19.0	20.6	19.6
15LM043	2016	63.4	36.6	0.0	19.3	100	18.7	20.1	19.1

DNR information

Limited information is available from the DNR on this reach of Pine Creek. A fish survey done of the entire Pine Creek by the DNR in 1991 indicated the section of stream downstream of the Winona/Houston county line did have trout, but the temperature ranges were too high to be considered a healthy trout stream. Above the county line the survey indicated healthy temperatures for trout and a large population of brown trout, most of which had been stocked. The 1991 survey indicated a poorly reproducing community, but the stocked fish were surviving well. The DNR considers the entire reach

of the stream to be cold water, but is not designated a trout stream. The DNR has no evidence of natural reproduction of trout in this stream reach and it is currently managed as a marginal trout water due to higher water temperatures (measured in 1991) which can result in stress to trout. The DNR is currently collecting additional temperature data and plans to designate the section of Pine Creek in T105N, R5W, S 33 and 34 and T104N, R5W, S 2, 3, and 4 as a trout water.

MPCA Summary

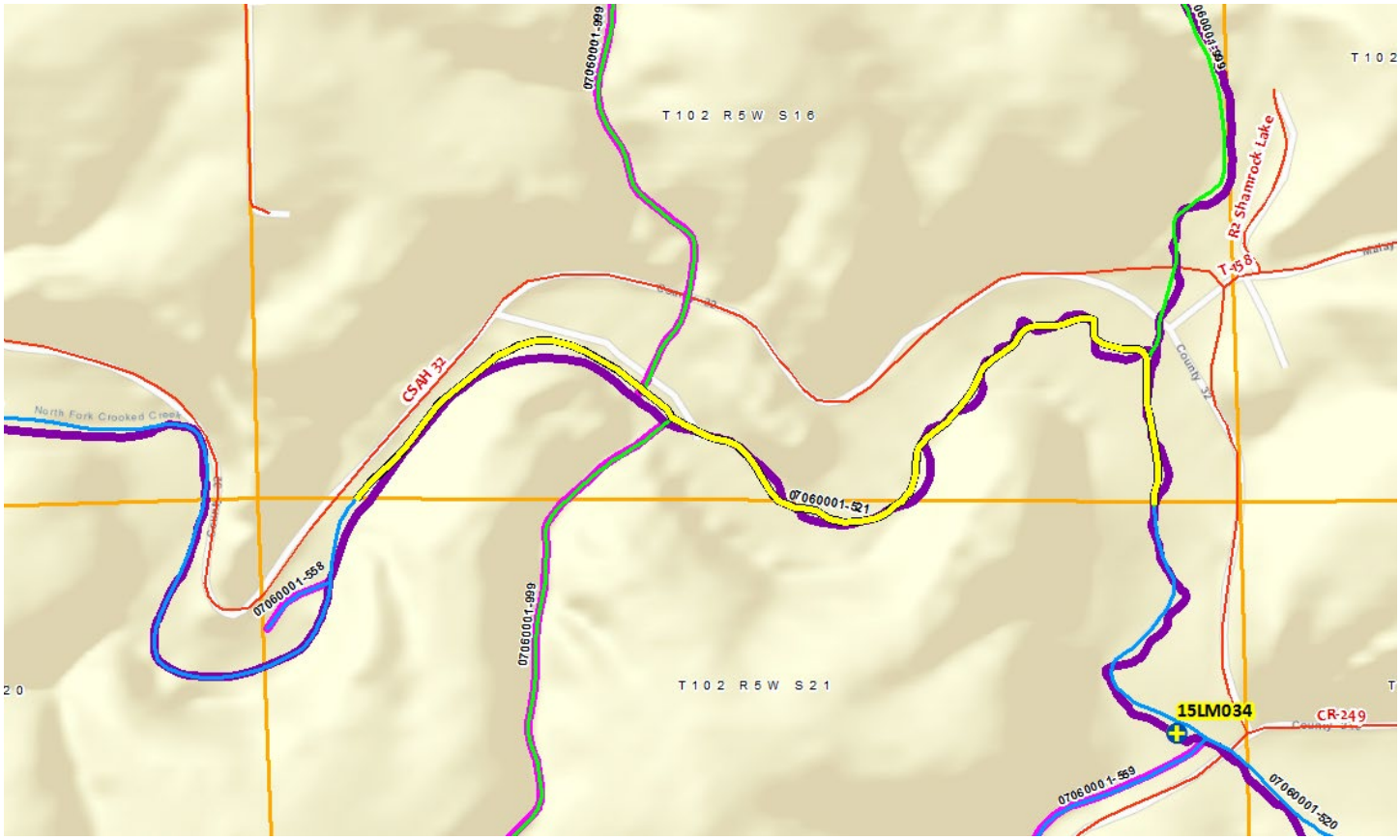
This stream section is not a designated trout water, but the DNR considers it a marginal trout water due to higher water temperatures measured in 1991. Brown trout were collected by the MPCA during most surveys. These trout included young-of-the-year trout indicating natural reproductions in this reach. The macroinvertebrate community included five cold water taxa (*Baetis tricaudatus, Brachycentrus occidentalis, Eukiefferiella, Gammarus,* and *Heterotrissocladius*) and in more than half of the samples, cold water taxa individuals comprised more than 15% of the sample. Temperature logger data from 2015 and 2016 had July average water temperatures ranging from 18.7-20.6°C and temperatures were in the growth range for brook trout 56.5-70.7% of the summer. There are also several springs along this stream reach and the upstream reach (07040006-507) and a tributary (Rose Valley Creek - 07040006-511) are cold water streams. Although previous data indicated marginal conditions in this stream section, more recent biological and temperature data indicate that trout populations have expanded into this stream section.

Crooked Creek, North Fork (07060001-521) MPCA Use Designation Review

Stream name: Crooked Creek, North Fork
AUID(s): 07060001-521
AUID description: T102 R5W S16, south line loop
Tributaries: none
MPCA biomonitoring site(s): none
MPCA sample dates: NA
Watershed: Mississippi River - Reno Watershed (07060001)
County: Houston

DNR designation: Designated trout water
DNR management class: Unknown

Current AUID designation: 2Bg (warm water)
Reason for review: DNR trout water designation
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.



Review of existing data

MPCA monitoring data

No MPCA monitoring data

DNR information

This reach of the N.F. of Crooked Creek was previously designated as a trout water, but it was accidently removed through a rule change when Shamrock Reservoir was opened to allow winter ice fishing for non-trout species. The DNR reinstated the trout water designation for this portion of the N.F. of Crooked Creek in Section 16.

MPCA Summary

This stream reach was previously designated a trout water by the DNR, but it was accidently removed when language in Minn. R. 6264.0050 was altered to allow winter ice fishing for non-trout species in Shamrock Reservoir. This reach was redesignated as a trout water by the DNR in 2018 (State of Minnesota (2018). This reach is currently designated Class 2Bg by default in the beneficial use table for the Mississippi River - Reno Watershed (07060001) incorporated by reference in Minn. R. 7050.0470. There is no assessable MPCA biological data from this reach to perform a full cold water use review. However, because this reach was erroneously designated and it is an extension of existing Class 2Ag reaches (07060001-522, 07060001-520), it is reasonable to assign this reach a General Use cold water habitat (Class 2Ag).

Winnebago Creek (07060001-693) MPCA Use Designation Review

Stream name: Winnebago Creek
AUID(s): 07060001-693 (Parent: 07060001-510)
AUID description: T101 R4W S27, west line to south line
MPCA biomonitoring site(s): 15LM028
Sample dates: 07/21/15, 8/4/2015
Watershed: Mississippi River -- Reno
County: Houston

DNR designation: Not a designated trout water
DNR management class: None/warm water

Current AUID designation: 2Bg (warm water)
Reason for review: Fish and temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.

Additional information: Records indicate this AUID is stocked upstream with trout. The upstream AUID (-508) is a designated cold water stream and the designation ends near the upstream end of the sample reach and has one sample location, 15LM030. The site is located so closely to the end of the cold water designation it makes sense to extend the cold water AUID and designation to include the site.

Map of Winnebago Creek (07060001-693)

Review of monitoring data

MPCA monitoring data

MPCA biological data

Fish and macroinvertebrates were each sampled from one station on 07060001-693 in 2015. Two cold water fish species (brown trout and rainbow trout) were sampled and one cool water fish species (longnose dace) was sampled. Trout individuals comprised 10.7% of the fish sampled. Some brown trout individuals were young-of-the-year indicating natural reproduction in this stream. The macroinvertebrate sample included 3 cold water taxa (*Gammarus, Baetis tricaudatus,* and *Brachycentrus occidentalis*) which comprised 13.4% of the sample.

MPCA fish community Information:

Field Number	Taxa Count	# Cold water Species	% Cold water Species	Salmonid Number	% Salmonid
15LM028	9	2	10.7	2	10.7

Common Name	CN Code	Min Length (mm)	Max Length (mm)	Weight (g)	Number
white sucker	WTS	30	452	2136	293
brown trout	BNT	86	500	7696	39
longnose dace	LND	37	80	62	16
fantail darter	FTD	47	60	17	10
northern pike	NOP	284	414	1200	7
yellow perch	YEP	57	62	11	4
weed shiner	WDS	58	59	7	3
rainbow trout	RBT	345	345	400	1
yellow bullhead	YEB	143	143	35	1

MPCA Temperature data

Water Temperatures:

Field Number	% Growth Days	Summer Avg Temp (◦C)	% Days Recording	June Avg Temp (◦C)	July Avg Temp (◦C)	Aug. Avg Temp (◦C)
15LM028	92.4%	17.0	100%	16.8	17.4	16.9

DNR information

The DNR has not surveyed this reach and is currently managed as a warm water stream.

MPCA Summary

This stream is not a designated trout water, but the upstream AUID (07060001-508) is a designated cold water stream and is stocked with trout. MPCA biological monitoring sampled both brown and rainbow trout which comprised 10.7% of the sample. Some brown trout individuals were young-of-the-year indicating natural reproduction in this stream. The macroinvertebrate sample included 3 cold water taxa (*Gammarus, Baetis tricaudatus,* and *Brachycentrus occidentalis*) which comprised 13.4% of the sample. Temperature logger data had an average July water temperature of 17.4°C and temperatures were in the growth range 92.4% of the summer.

Shamrock Creek (07060001-696, -698) MPCA Use Designation Review

Stream Name: Shamrock Creek
AUID(s): 07060001-696, 07060001-698
AUID description: 07060001-696: Headwaters to Shamrock Impoundment
07060001-698: Shamrock Impoundment to Crooked Cr
Tributaries: One tributary - not considered as part of this review
MPCA biomonitoring site(s): none
MPCA sample dates: NA
Watershed: Mississippi River - Reno Watershed (07060001)
County: Houston

DNR kittle: M-004-021
DNR designation: Trout water
DNR management class: unknown

Current AUID designation: 2Bg (warm water)
Reason for review: DNR trout water designation
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.

Add map

Review of existing data

MPCA monitoring data

No MPCA monitoring data is available.

DNR information

This reach of the N.F. of Crooked Creek was previously designated as a trout water, but it was accidently removed through a rule change when Shamrock Reservoir was opened to allow winter ice fishing for non-trout species. The DNR surveyed Shamrock Creek in 1991, 2000, and 2016 and sampled both brown and brook trout in all three surveys. The DNR reinstated the trout water designation for this portion of the N.F. of Crooked Creek in Section 16. The DNR intends to manage this stream to maintain populations of brown and brook trout as a source for the trout population in Crooked Creek.

Fish species sampled in DNR fisheries surveys and assessments, Shamrock Creek, Houston County.

Common Name	Species	1991	2000	2016
Brook Trout	*Salvelinus fontinalis*	X	X	X
Brown Trout	*Salmo trutta*	X	X	X
Creek Chub	*Semotilus atromaculatus*	X		
Largemouth Bass	*Micropterus salmoides*			X
Bluegill	*Lepomis macrochirus*	X		
Johnny Darter	*Etheostoma nigrum*	X		
Brook stickleback	*Culaea inconstans*	X		

MPCA Summary 07060001-696

This stream reach was previously designated a trout water by the DNR, but it was accidently removed when language in Minn. R. 6264.0050 was altered to allow winter ice fishing for non-trout species in Shamrock Reservoir. The DNR surveyed Shamrock Creek in 1991, 2000, and 2016 in the downstream reach (07060001-698) and sampled both brown and brook trout in all three surveys. This reach was redesignated as a trout water by the DNR in 2018 (State of Minnesota (2018). This reach is currently designated Class 2Bg by default in the beneficial use table for the Mississippi River - Reno Watershed (07060001) incorporated by reference in Minn. R. 7050.0470. There is no assessable MPCA biological data from this reach to perform a full cold water use review. However, because this reach was erroneously designated and DNR surveys indicate the presence of brown and brook trout populations, it is reasonable to assign this reach a General Use cold water habitat (Class 2Ag).

MPCA Summary 07060001-698

This stream reach was previously designated a trout water by the DNR, but it was accidently removed when language in Minn. R. 6264.0050 was altered to allow winter ice fishing for non-trout species in Shamrock Reservoir. The DNR surveyed Shamrock Creek in 1991, 2000, and 2016 and sampled both brown and brook trout in all three surveys. This reach was redesignated as a trout water by the DNR in 2018 (State of Minnesota (2018). Water temperature monitoring by the DNR in 1992 indicates that temperatures may be a limiting factor for trout in this reach, but the presence of young fish indicate that the stream may support natural reproduction or serve as a nursey for trout. This reach is currently designated Class 2Bg by default in the beneficial use table for the Mississippi River - Reno Watershed (07060001) incorporated by reference in Minn. R. 7050.0470. There is no assessable MPCA biological data from this reach to perform a full cold water use review. However, because this reach was erroneously designated and DNR surveys indicate the presence of brown and brook trout populations, it is reasonable to assign this reach a General Use cold water habitat (Class 2Ag).

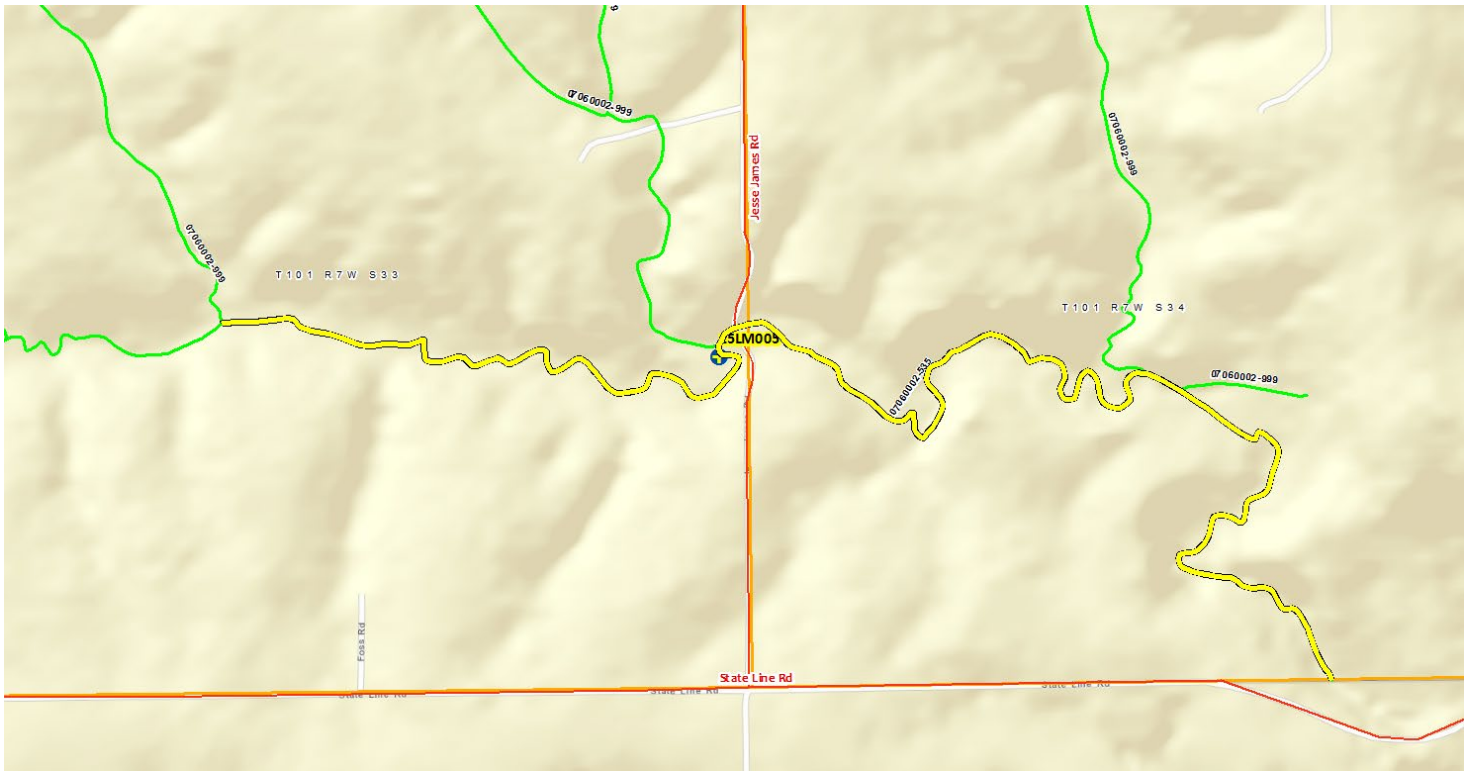
Unnamed Creek (07060002-535) MPCA Use Designation Review

Stream name: Unnamed Creek
AUID(s): 07060002-535
AUID description: Unnamed Cr to MN/IA border
Field number(s): 15LM005
Sample dates: 7/23/15, 8/4/2015, 8/11/2016
Watershed: Upper Iowa River
County: Houston

DNR designation: Not a designated trout water
DNR management class: None/warm water

Current AUID designation: 2Bg (warm water)
Reason for review: Fish and temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.

Additional Information: The unnamed creek is a tributary to North Bear Creek in Iowa. According to the Iowa DNR that stream is designated as a trout stream just south of the state border, stocked with brook and rainbow trout and wild brown trout. Part of the unnamed creek is also designated as a trout stream in Iowa just before joining North Bear Creek. After this confluence North Bear Creek becomes a designated trout stream.



Map of Unnamed Creek (07060002-535)

Review of existing data

MPCA monitoring data

MPCA biological data

Fish and macroinvertebrate were sampled by the MPCA in 2015 and the macroinvertebrates were sampled again in 2016. Two cold water species were found during the fish sample : brook trout (*Salvelinus fontinalis*) and mottled sculpin (*Cottus bairdii*) and one cool water species (brook stickleback). Cold water species comprised 45.7% of the fish sample. The macroinvertebrate sample included four cold water taxa (*Eukiefferiella, Brachycentrus occidentalis, Baetis tricaudatus,* and *Limnephilus*) comprising 2.9-8.0% of the samples.

Fish sample data

Fish data: 15LM005, 7/23/2015						
Common Name	**CN Code**	**Min**	**Max**	**Weight**	**Number**	**DELTs**
mottled sculpin	MTS	36	133	641	73	0
white sucker	WTS	87	283	3494	39	0
brook stickleback	BST	28	62	52	27	0
creek chub	CRC	53	212	790	18	0
fathead minnow	FHM	71	75	15	4	1
brook trout	BKT	200	200	85	1	0

Summary of fish sample data

Field Number	Taxa Count	# Cold water species	% Cold water species	Salmonid #	% Salmonid
15LM005	6	2	45.7	1	0.6

MPCA Temperature data

The one-time temperature readings measured during the biological sampled were 14.2, 15.7, and 16.7°C. A temperature logger was deployed in2015. Average July water temperature in 2015 was 16.0°C and the water temperature was in the growth range for trout 97.2% of the summer.

Water temperature logger summary data (2015)

Field Number	Growth Days	Summer Avg Temp (◦C)	% Days Recording	June Avg Temp (◦C)	July Avg Temp (◦C)	Aug. Avg Temp (◦C)
15LM005	97.2	15.8	100	15.5	16.0	15.8

DNR information

The DNR has not surveyed this reach and is currently managed as a warm water stream.

MPCA Summary

MPCA biological monitoring sampled both brook trout and mottled sculpin which comprised 45.7% of the sample. The macroinvertebrate sample included 3 cold water taxa (*Eukiefferiella, Brachycentrus occidentalis, Baetis tricaudatus,* and *Limnephilus*) which comprised 2.9-8.0% of the sample. Temperature logger data had an average July water temperature of 16.0°C and temperatures were in the growth range 97.2% of the summer. This unnamed creek is a tributary to North Bear Creek in Iowa which is designated as a trout stream. Iowa stocks North Bear Creek with catchable brook and rainbow trout and this stream supports a population of naturally reproducing brown trout. In addition, just south of the Minnesota/Iowa border, part of the unnamed creek in Iowa is designated as a trout stream.

Toad River (09020103-526, -665) MPCA Use Designation Review

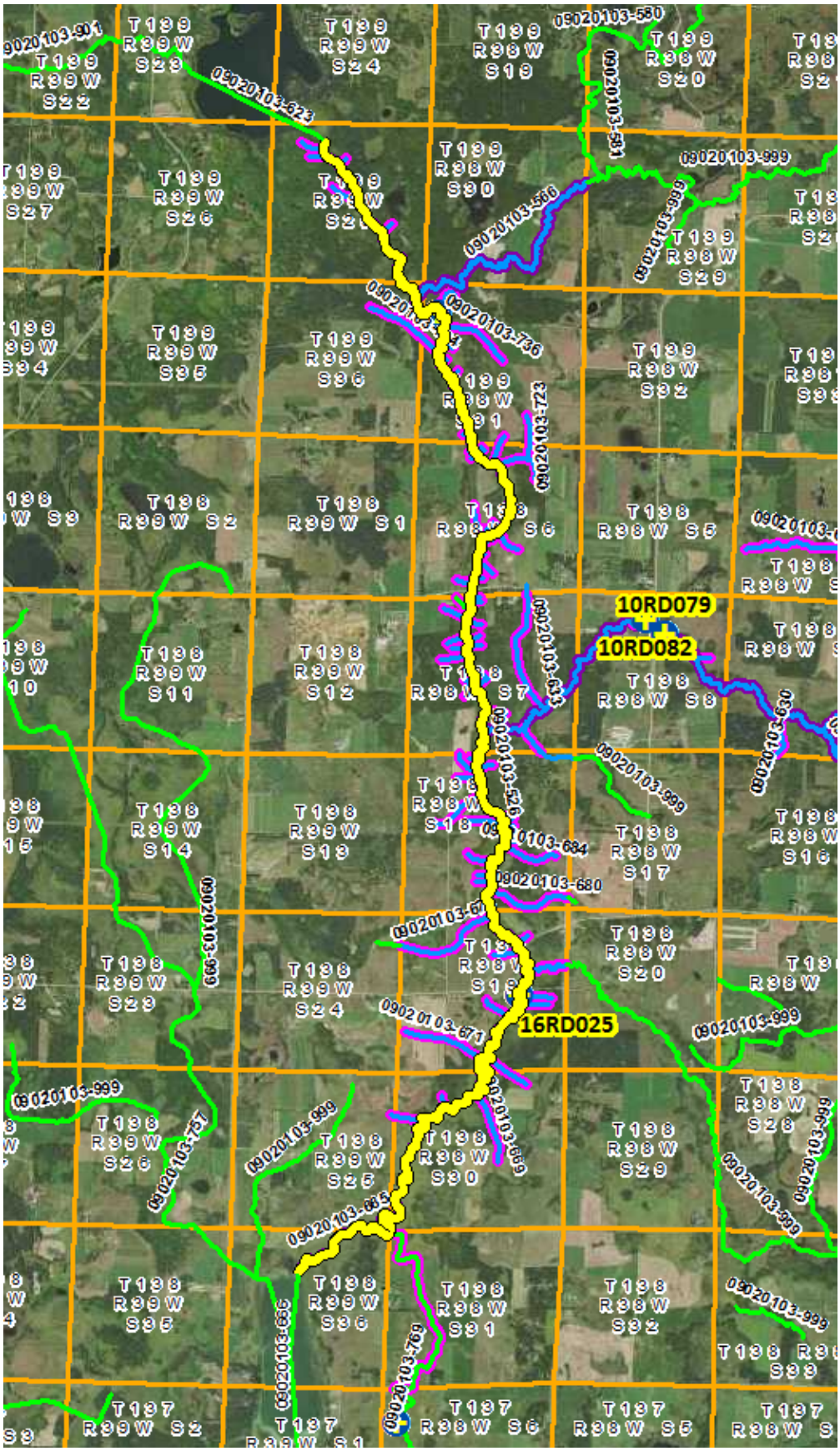
Stream name: Toad River, Unnamed creek (Toad River Tributary)[1]
AUID(s): 09020103-526, 09020103-665
AUID description: 09020103-526 - Little Toad Lake to T138 R38W S30, SW corner; 09020103-665 - Toad R to Dead Lk
MPCA biomonitoring site(s): 16RD025, 16RD026
Tributaries: 09020103-667, 09020103-668, 09020103-669, 09020103-670, 09020103-671, 09020103-672, 09020103-673, 09020103-674, 09020103-675, 09020103-676, 09020103-677, 09020103-678, 09020103-679, 09020103-680, 09020103-681, 09020103-682, 09020103-683, 09020103-684, 09020103-685, 09020103-686, 09020103-687, 09020103-688, 09020103-689, 09020103-690, 09020103-691, 09020103-692, 09020103-693, 09020103-694, 09020103-695, 09020103-696, 09020103-697, 09020103-698, 09020103-699, 09020103-700, 09020103-701, 09020103-702, 09020103-703, 09020103-704, 09020103-705, 09020103-706, 09020103-707, 09020103-708, 09020103-709, 09020103-710, 09020103-711, 09020103-712, 09020103-713, 09020103-714, 09020103-715, 09020103-716, 09020103-717, 09020103-718, 09020103-719, 09020103-720, 09020103-721, 09020103-722, 09020103-723, 09020103-724, 09020103-725, 09020103-726, 09020103-727, 09020103-728, 09020103-729, 09020103-730, 09020103-731, 09020103-732, 09020103-733, 09020103-734, 09020103-735, 09020103-736, 09020103-737, 09020103-738, 09020103-739, 09020103-740, 09020103-741, 09020103-742, 09020103-743
County: Becker
Watershed: Otter Tail River (09020103)

DNR's designation: Designated trout water
DNR management class: I-C (Semi-Wild Trout) and I-D (Marginal Trout)

Current AUID designation: 2Ag (cold water)
Reason for review: Fish, macroinvertebrate, and temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.

Additional Information: This reach of the Toad River is currently designated as a trout stream; however, the fish and macroinvertebrate communities observed at the biomonitoring stations were not indicative of a cold water habitat. As a result, the MPCA implemented a review of the cold water habitat designation of the Toad River from Little Toad Lake to the SW corner of PLS section T138 R38W S30.

[1] The DNR calls this reach "Toad River" as well as the trout protection tributary in PLS section T138 R38W S31 (part of 09020103-769). Based on historical maps it appears that 09020103-665 was a tributary to Toad River, but the construction of a ditch flowing out of the south end of Dead Lake has reversed the flow of this tributary such that most of the flow from Toad River now goes through 09020103-665. The original Toad River channel (part of 09020103-769) is still present, but it may only have substantial flow during high water levels.


10RD079
10RD082
16RD025

Review of existing data

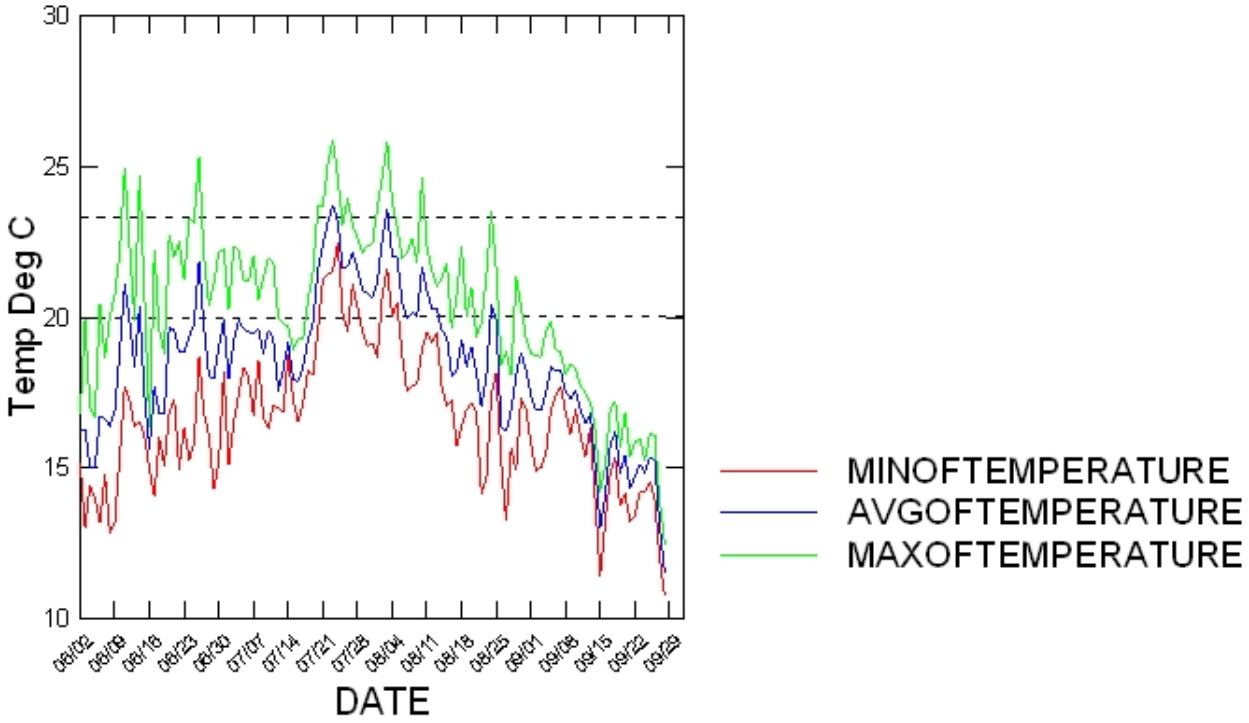
MPCA monitoring data

Water Temperature

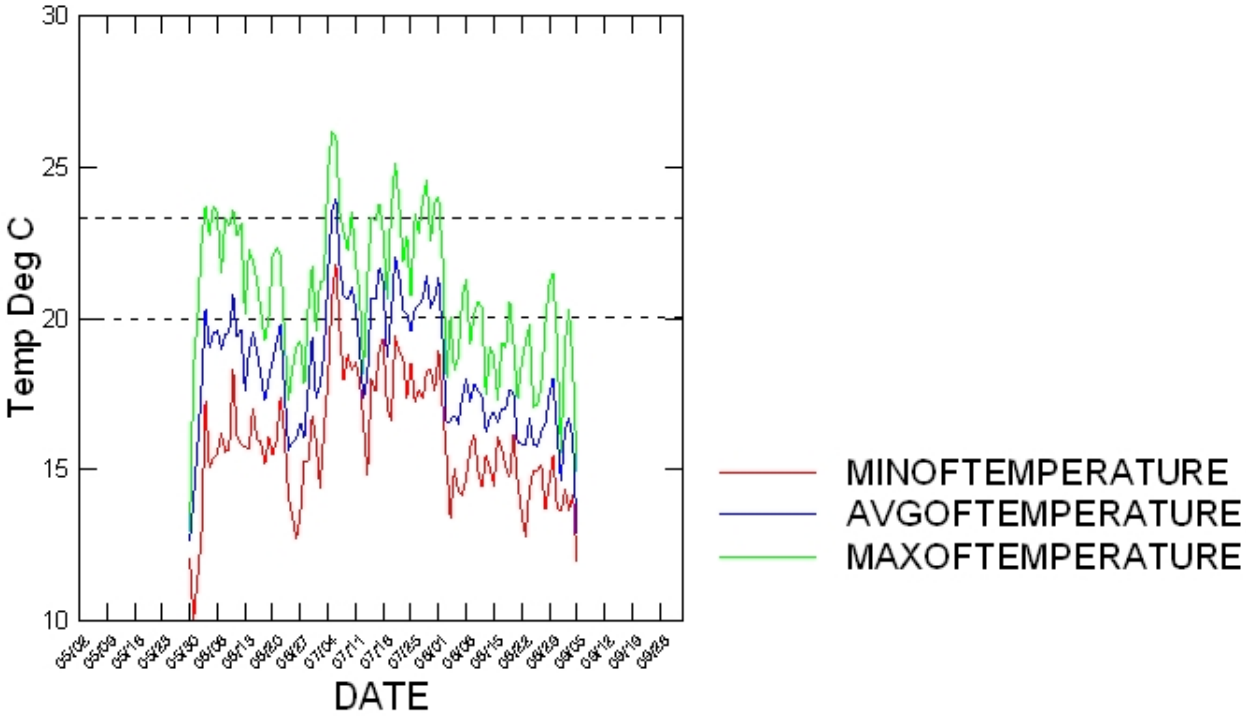
A continuously-recording stream temperature logger was deployed at two locations along the Toad River during the summer of 2016 and 16RD025 in 2017. A temperature logger was not deployed at 16RD026 in 2017 because access was not granted by the property owner. Summary data for the logger deployment can be found in the table below.

MPCA temperature logger summaries. "Growth," "Stress," and "Lethal" temperature ranges are specific to brook trout; the date range for these summary statistics is June 1st to August 31st.

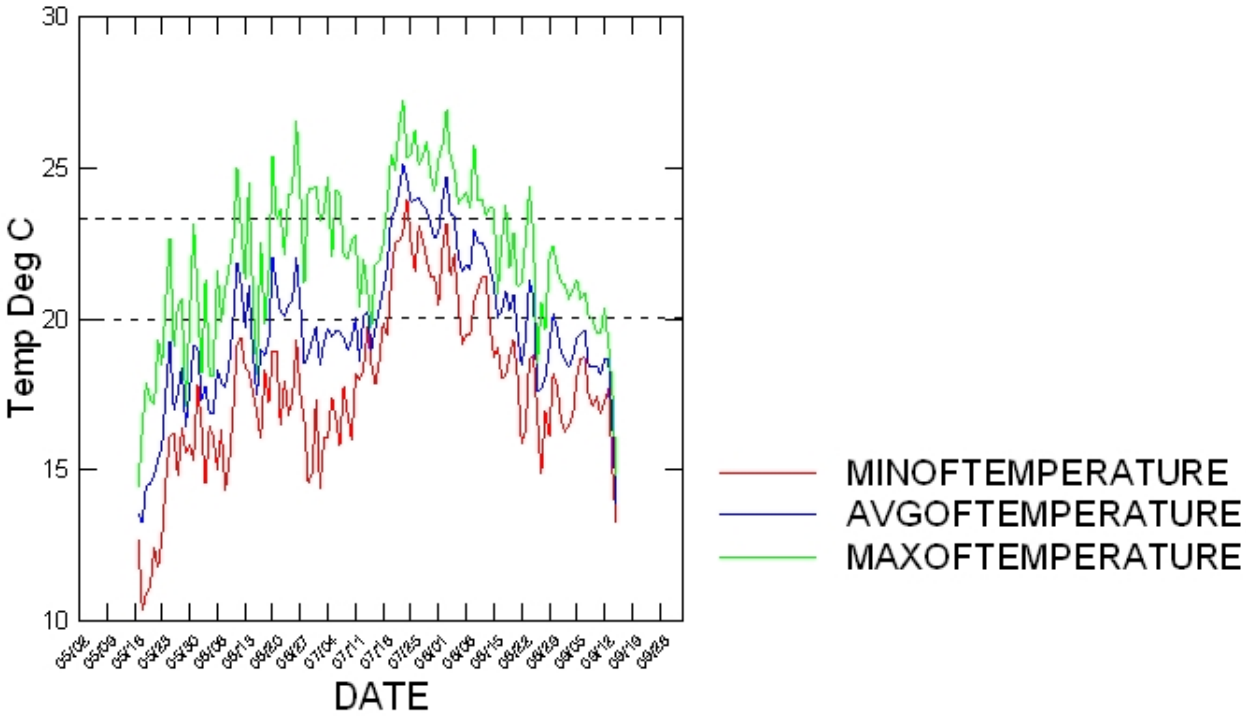
Water Temperature Metric	16RD025	16RD025	16RD026
Year	2016	2017	2016
Interval (min)	15	15	15
Percent (%) Recording	99.2	100	100
Growth	60.6	69.4	43.1
Stress	38.5	29.8	52.7
Lethal	0.8	0.7	4.1
Summer Average Temperature (°C)	19.2	18.6	20.5
June Average Temperature (°C)	18.1	18.4	19.3
July Average Temperature (°C)	20.1	20.4	21.3
August Average Temperature (°C)	19.3	17.1	20.9



Temperature logger data from 16RD025 in 2016.



Temperature logger data from 16RD025 in 2017.



Temperature logger data from 16RD026.

Other water quality measurements:

- 41 DO measurements (2008-2018) – all but one (6.92 mg/L) above 7 mg/L; only one measurement before 9 am (7.05 mg/L)]
- 32 TSS measurements – 90th percentile 19.5; raw data analysis but may not meet CW TSS standard but would likely meet Central TSS standard.

MPCA Biological Community Information

Both fish and macroinvertebrates were sampled from 2 biological stations (16RD025 and 16RD026) on the Toad River in 2016. No cold water fish taxa collected from either station by the MPCA although some cool water taxa were present

(see tables above). Three cold water invertebrate taxa (*Gammarus*, *Isoperla*, and *Somatochlora minor*) were collected from 16RD025 with a total of 7 individuals. No cold water invertebrate taxa were collected from 16RD026 in 2016.

MPCA fish sample data.

16RD026

CommonName	Min	Max	Weight	Number
johnny darter	47	73	86	59
creek chub	54	201	276	49
blacknose dace	51	113	104	25
black crappie	87	112	107	9
common shiner	50	98	44	7
white sucker	27	123	50	6
pumpkinseed	61	85	35	6
northern pike	86	230	182	4
central mudminnow	52	80	15	3
bluegill	47	235	362	2
black bullhead	180	186	155	2
yellow bullhead	102	102	16	1
mimic shiner	53	53	2	1
logperch	84	84	4	1
golden shiner	63	63	6	1
brassy minnow	65	65	5	1
blackside darter	62	62	2	1

16RD025

CommonName	Min length	Max length	Weight	Number
johnny darter	40	60	40	33
white sucker	25	445	1800	30
pearl dace	46	98	85	28
brook stickleback	25	44	8	15
bluntnose minnow	38	54	15	11
blackside darter	55	87	28	8
common shiner	45	120	40	4
central mudminnow	64	79	23	4
bigmouth shiner	43	78	12	4
brassy minnow	48	60	11	3
yellow perch	107	120	40	2
northern redbelly dace	43	49	5	2
bluegill	62	71	12	2
creek chub	52	52	1	1
black crappie	95	95	12	1
black bullhead	170	170	75	1

DNR surveys

Most surveys note that there are extensive beaver dams in this stream reach. Warm water may also enter the stream from lakes draining into this stream. Brown trout were stocked from 1947 to 1983 but was discontinued due to lack of funds for trout and maintenance, lack of evaluation and lack of adequate public access.

2001-2003 special assessment: A study from 2001-2003 deployed temperature loggers at two stations. The conclusions of this study was that it may be possible to manage this stream for more thermally tolerant brown trout.

2000 management plan: The upper reaches of this section of the Toad River (River Miles 8.6-11) are classified by the DNR as warm water (II-C)/marginal trout water (I-D). The remainder of this section (River Miles 11-19.5) is classified as a marginal trout water (I-D). Report notes that the watershed is largely natural with spring at the base of valley walls. In general, there is a good buffer between the Toad River and agricultural fields. However, there are some areas where cattle have access to the stream which is resulting in erosion. Also noted is that there are several limitations to maintaining a trout fishery including low flows during the late summer and winter, beaver activity which will require continual maintenance, and a temperature regime that may not be conducive to trout survival.

1999 stream survey: Fisheries survey did not sample any cold water fish. Notes that late summer or winter flows may not be sufficient to maintain trout. In addition to maintain a trout fishery, beaver control will be necessary to maintain free flowing conditions. The report also notes that temperatures may not be conductive for trout species. The report concludes that trout stocking has some potential to produce a periodic fishery, but it is unlikely that a self-sustaining population can be established. However, it notes that additional monitoring is needed to determine the fishery potential for Toad River.

1980 stream survey: One brown trout was sampled but this fish came from a stocking the previous spring. Survey report notes that fish sampling was limited due to presence of beaver dams throughout the stream reach. Water quality noted as fair to good except during high water levels when water from Big and Little Toad lakes can increase water temperatures.

Fish Stocking

Year	Species	Size	Number
1947-1954	Brown Trout	fingerling	2,000 - 7,000 annually
1955	Brown Trout	yearling	820
1956-1983	Brown Trout	yearling	approx. 200 annually

Overview of DNR information and management

DNR staff noted that stream classification for the Toad River varies between I-C and I-D. DNR survey work in the 1980's classified this stream as I-C, but more recent work in the early 2000's classified much of the stream as I-D. The stream segment between County Road 122 and Highway 87 shows some promise as being classified at I-C. Brown trout were stocked in Toad River until 1983. There was no evidence of natural reprodction. The DNR intends to retain the trout water desingation for the Toad River. Although recent stocking has not occurred, brown trout management could be successful if beaver control efforts were undertaken and easements were obtained.

MPCA summary

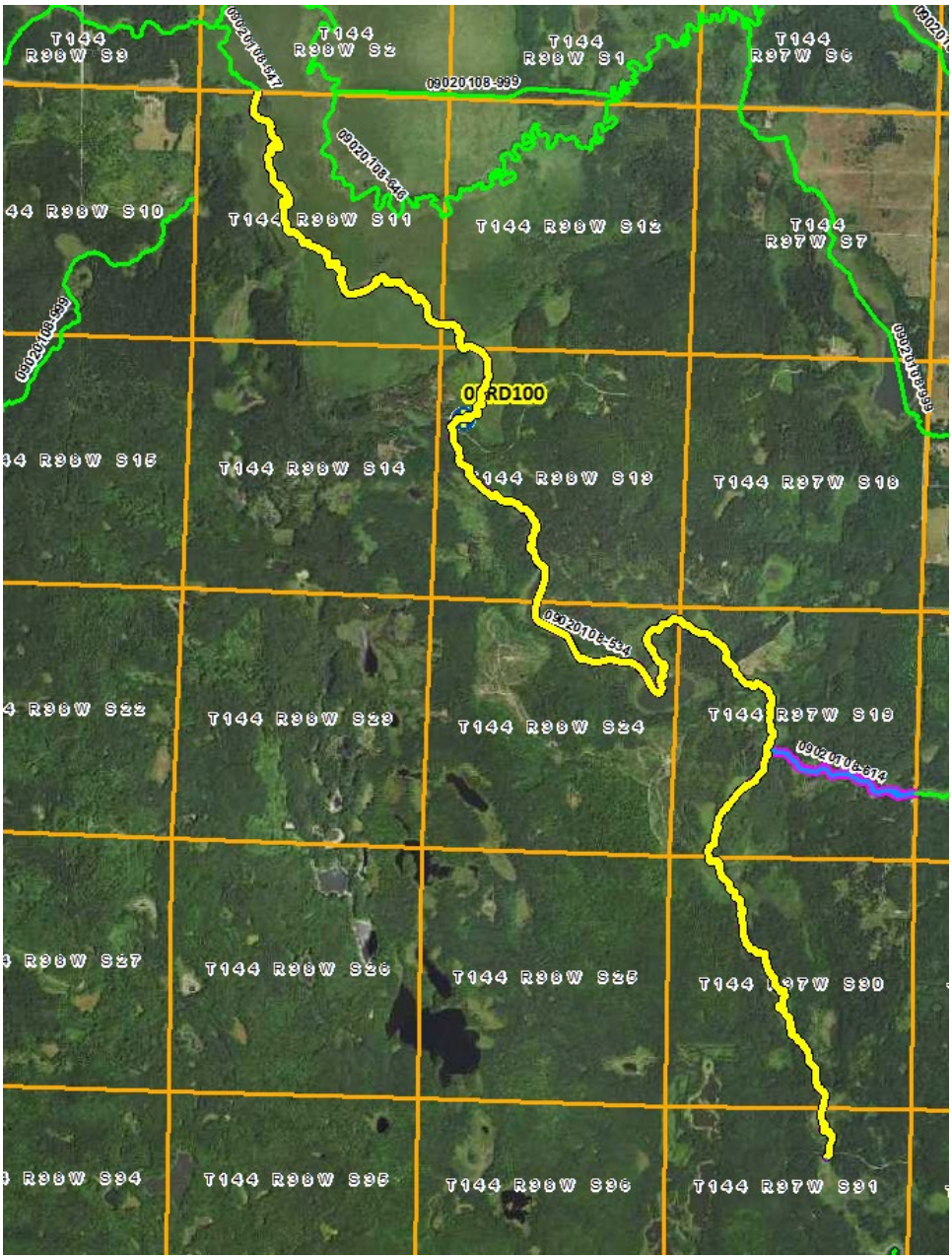
No cold water fish species were observed at either MPCA biological monitoring station. No cold water macroinvertebrate taxa were observed in the sample from station 16RD026 and 3 taxa (7 individuals) were sampled at 16RD025. Temperature logger data indicated a summer (June-August) thermal regime that is marginal to not conducive to support a cold water community. Conditions during this period were in the lethal or stressful range for trout 30.6-56.8% of the summer. This included lethal temperatures for 4% of the recording time at 16RD026. The DNR recognizes that conditions may not be conducive to support a self-sustaining population of trout in this reach of the Toad River.

Buckboard Creek (09020108-534) MPCA Use Designation Review

Stream name: Buckboard Creek
AUID(s): 09020108-534
AUID description: Headwaters to T144 R38W S11, north line
Tributaries: 09020108-614
MPCA biological station(s): 05RD100
County: Clearwater
Watershed: Wild Rice River

DNR designation: Trout stream
DNR management class: Cold water (I-A: wild trout) and Warm water (V)

Current MPCA use designation: 2Ag (Cold water)
Why is the site being reviewed? Fish and Temperature Data
Was this site previously reviewed? If so what were the results? No



Map of Buckboard Creek (09020108-534)

Review of Existing Data

MPCA Survey Data

Temperature Data

Temperature Data from Biological and Chemical Monitoring Visits

Date	Time	Station	Water Temp (°C)
8/24/2005	12:35	05RD100	19.0
6/10/2014	8:35`	05RD100	14.5
8/5/2014	14:22	05RD100	22.7

Temperature Logger Data from 05RD100 during 2014

Summer Avg Temp (°C)	June Avg Temp (°C)	July Avg Temp (°C)	August Avg Temp (°C)	Growth	Stress	Lethal
19.3	18.4	20.2	19.1	60.3%	37.3%	2.3%

Biological Data

05RD100: No cold water fish taxa collected during 2005 and 2015 visits. During these visits 3 cool water taxa were collected (brassy minnow, northern redbelly dace, and brook stickleback). Macroinvertebrates were also sampled in 2005 and 2014 and neither sample included any cold water taxa.

Fish data: 05RD100, 8/24/2005					
Common Name	CN Code	Min	Max	Weight	Number
northern redbelly dace	NRD	22	60	46.5	125
blacknose dace	BND	25	84	64	69
fathead minnow	FHM	25	30	19.5	52
common shiner	CSH	37	113	22	25
brassy minnow	BRM	33	43	11.5	14
brook stickleback	BST	25	47	5	12
creek chub	CRC	26	153	85	11
white sucker	WTS	35	59	9.5	8
blackchin shiner	BCS	25	60	11	6
central mudminnow	CNM	73	90	30	5
johnny darter	JND	27	61	4.5	3

Fish data: 05RD100, 6/10/2014					
Common Name	CN Code	Min	Max	Weight	Number
blacknose dace	BND	30	90	499	128
central mudminnow	CNM	52	109	147	54
creek chub	CRC	41	183	940	45
johnny darter	JND	38	70	52	45
common shiner	CSH	43	152	163	23
northern redbelly dace	NRD	29	62	12	11
brook stickleback	BST	45	50	7	6
white sucker	WTS	62	220	168	3
fathead minnow	FHM	32	33	2	2
yellow perch	YEP	80	81	13	2
blackchin shiner	BCS	35	35	1	1
golden shiner	GOS	90	90	6	1
tadpole madtom	TPM	116	116	25	1

DNR management and surveys

DNR Management History

- The Minnesota DNR had managed Buckboard Creek for Brook trout in the 70s.
- Due to poor winter survival, the DNR management plan was switched from Brook trout to Brown trout.
- The DNR completed surveys in 1980, 1981, and 1982. Very few Brown trout were found in the surveys.
- Beavers were noted as playing a major role in the poor habitat and water quality. Due to poor survival and low angler use, Buckboard Creek was removed from trout management.

1983 DNR Stream Survey

- "Species composition and numbers are basically the same as in 1982. Very few trout are carrying over through the winter months"
- "The 1980 management plan recommended converting from Brook Trout stocking to Brown Trout stocking with evaluation after each year. Each year approximately 750 Brown Trout were stocked with the following electro-fishing results, 1980- no trout, 1981- no trout, 1982- 2 Brown Trout, 1983- 4 Brown Trout and 1 Brook Trout. Due to low carryover of stocked trout and low angler use, justification for continued management is doubtful. The beaver has played a major role in the destruction of habitat and water quality"

MPCA summary

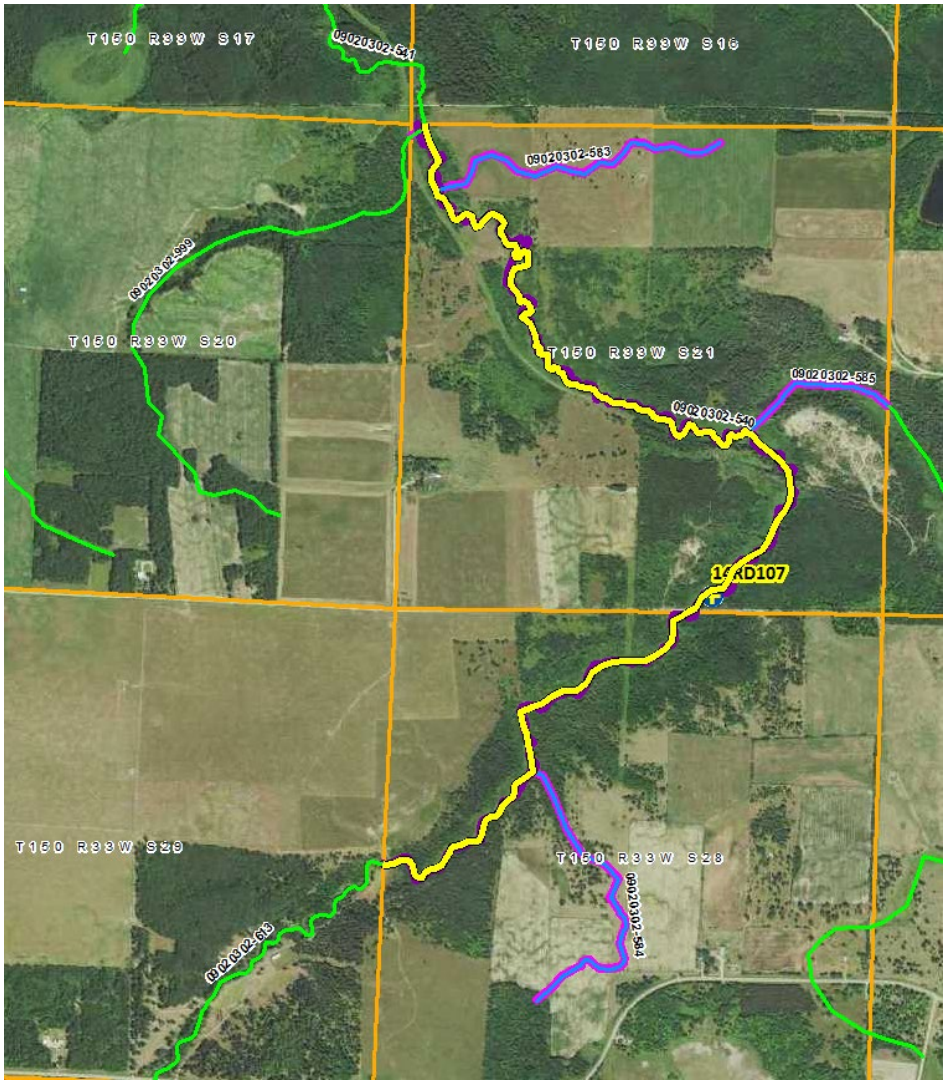
Buckboard Creek was managed by the DNR as a cold water stream from 1970 to 1983. Brook trout and brown trout have been collected during DNR stream surveys after stocking events, but no natural reproduction has been documented. In addition, the DNR indicates that control beaver activity impacts flow and water temperature and makes these reaches unsuitable to support trout. Trout management on Buckboard Creek was dropped by the DNR after the 1983 stream survey. Water temperature data collected at 15 min intervals during the summer of 2014 also indicate that conditions in this stream are not favorable for supporting a cold water community (average July water temperature = 20.2 °C). Fish and macroinvertebrate data collected by the MPCA further indicate this lower reach is warm/cool water habitat.

Mud River (09020302-540) MPCA Use Designation Review

Stream name: Mud River
AUID(s): 09020302-540
AUID description: T150 R33W S28, west line to T150 R33W S21, north line
Trout protection tributaries: 09020302-584, 09020302-585, 09020302-583
MPCA biological station(s): 14RD107
County: Beltrami
Watershed: Upper/Lower Red Lake (09020302)

DNR designation: Trout stream
DNR management class: Cold water (I-D: marginal trout)

Current MPCA use designation: 2Ag (Cold water)
Why is the site being reviewed? Fish and Temperature Data
Was this site previously reviewed? If so what were the results? No evidence of prior review.



Map of Mud River (09020302-540)

Review of existing data

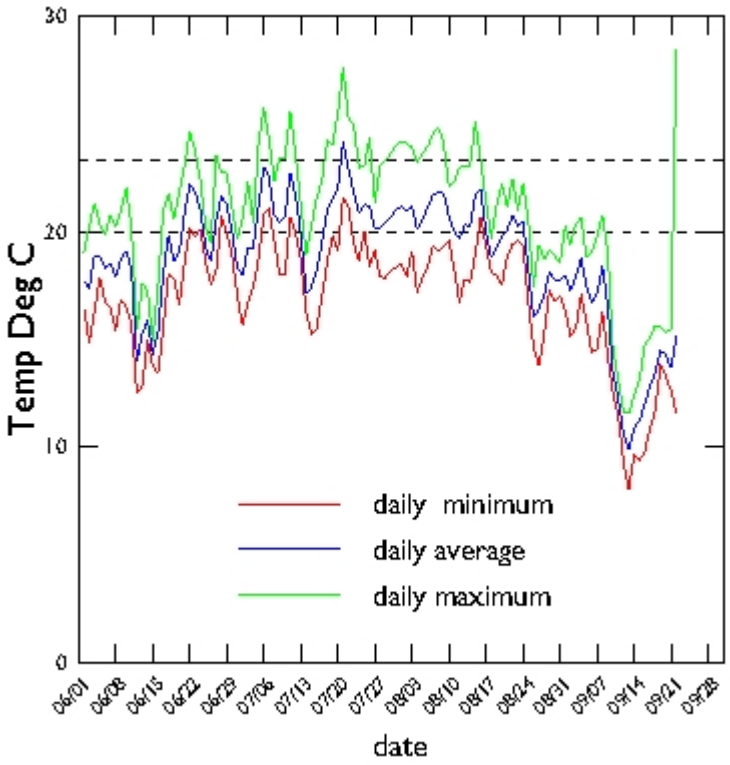
MPCA monitoring data

Water Temperature Data

A water temperature logger was deployed at 14RD107 in 2014. The results are below.

Temperature Logger Graph and Average Summary for 14RD107 in 2014

Summer Avg Temp (°C)	June Avg Temp (°C)	July Avg Temp (°C)	August Avg Temp (°C)	Growth	Stress	Lethal
19.7	18.7	20.6	19.9	54.0%	44.8%	1.1%



MPCA Biological Data

Fish sampling from 2 visits in 2014 did not include any cold water taxa; one visit sampled a single cool water species (northern redbelly dace). A macroinvertebrate sample from 2014 included 2 cold water taxa (*Ephemerella* and *Isoperla*) consisting of a total of 8 individuals.

Fish data: 14RD107, 6/30/2014					
Common Name	CN Code	Min	Max	Weight	Number
blacknose dace	BND	44	86	126	49
blacknose shiner	BNS	40	55	35	47
johnny darter	JND	35	65	31	25
common shiner	CSH	80	111	162	18
yellow perch	YEP	65	183	126	10
creek chub	CRC	61	116	96	9
brown bullhead	BRB	145	251	836	6

Fish data: 14RD107, 6/30/2014					
Common Name	CN Code	Min	Max	Weight	Number
golden shiner	GOS	60	74	17	4
central mudminnow	CNM	67	76	12	3
fathead minnow	FHM	52	56	12	3
northern pike	NOP	330	376	717	3
pumpkinseed	PMK	67	74	17	3
blackchin shiner	BCS	55	59	3	2
black bullhead	BLB	106	106	23	1
hybrid sunfish	HSF	85	85	9	1

Fish data: 14RD107, 9/22/2014					
Common Name	CN Code	Min	Max	Weight	Number
blacknose dace	BND	30	95	307	74
blacknose shiner	BNS	48	55	66	64
johnny darter	JND	38	73	101	50
creek chub	CRC	47	178	323	21
yellow perch	YEP	97	123	151	9
central mudminnow	CNM	53	107	36	7
northern pike	NOP	210	255	167	3
blackside darter	BSD	89	89	7	1
common shiner	CSH	134	134	44	1
golden shiner	GOS	77	77	3	1
Iowa darter	IOD	55	55	1	1
northern redbelly dace	NRD	57	57	1	1

DNR information

There is no evidence of natural reproduction of trout in this reach of the Mud River. The Mud River was last stocked with brown trout in 1977. Survival and carryover of stocked fish was documented as poor, and led to a cessation of stocking and management activities. The DNR indicated that poor conditions for trout were not the result of anthropogenic impacts. A population assessment in 1980 documented an absence of trout and recommended removal of the trout water designation.

MPCA Summary

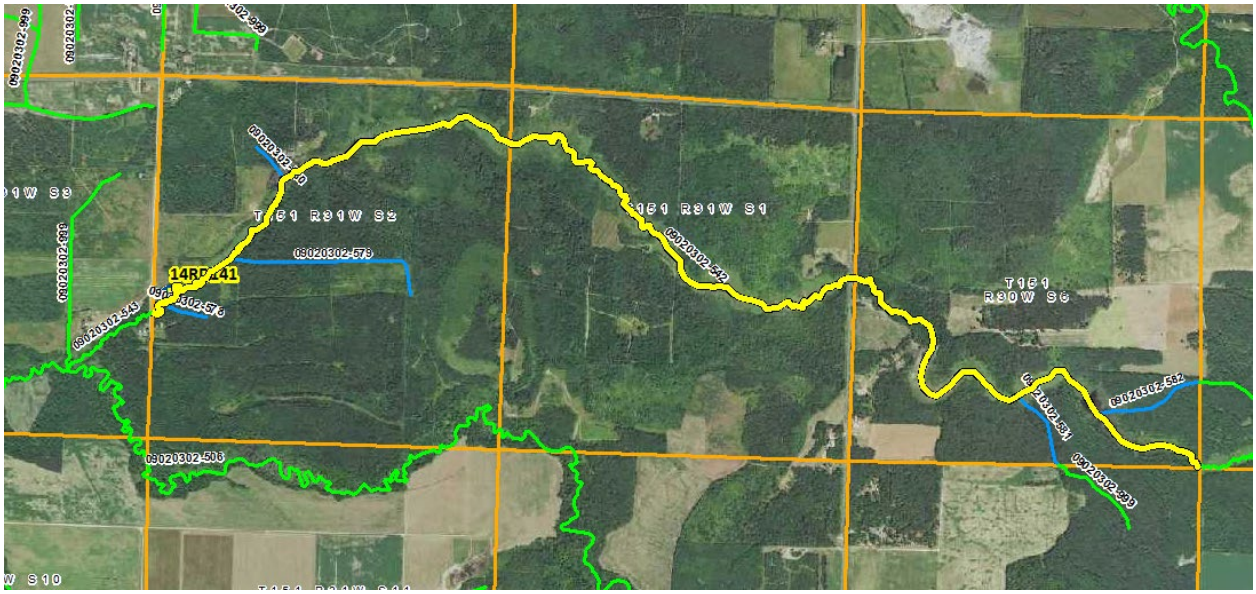
Survival and carryover of stocked fish has been documented as poor and as a result, stocking and management activities by the DNR have been discontinued. In 2014, the MPCA collected fish and macroinvertebrate community data from one monitoring station located on this reach. Two fish samples were collected. No cold water fish species were present in either sample and a single cool water species was present in one sample. Two cold water macroinvertebrate taxa (8 individuals) were present in a sample collected in 2014. Water temperature data was collected in 15 minute intervals from the monitoring station during 2014. The water temperature data indicate that conditions in the Mud River are marginal for supporting a cold water community. Stressful to lethal thermal conditions for trout were recorded for 46.0% of the summer (June through August).

Meadow Creek (09020302-542) MPCA Use Designation Review

Stream name: Meadow Creek
AUID(s): 09020302-542
AUID description: T151 R30W S6, east line to T151 R31W S2, west line
Tributaries: 09020302-578, 09020302-579, 09020302-580, 09020302-581, 09020302-582
MPCA biological station(s): 14RD141
County: Beltrami
Watershed: Upper/Lower Red Lake (09020302)

DNR designation: Not a designated trout stream
DNR management class: unknown

Current MPCA use designation: 2Ag (Cold water)
Why is the site being reviewed? Fish Data
Was this site previously reviewed? If so what were the results? No evidence of prior review.



Map of Meadow Creek (09020302-542)

Review of Existing Data

MPCA Monitoring

Water Temperature Data

No temperature logger data available – logger malfunctioned in 2014 and was too close to surface in 2015.

MPCA Biological Data

Fish were sampled in 2014 and no cold water taxa were collected. This sample included 4 cool water fish species (brassy minnow, northern redbelly dace, pearl dace, and brook stickleback). Macroinvertebrates were also sampled in 2014, but no cold water taxa were collected.

Fish data: 14RD141, 6/10/2014					
Common Name	CN Code	Min	Max	Weight	Number
pearl dace	PRD	47	91	175	73
creek chub	CRC	38	163	442	38
common shiner	CSH	30	78	63	32
northern redbelly dace	NRD	38	53	30	30
brassy minnow	BRM	50	80	43	22
blacknose dace	BND	35	90	119	18
central mudminnow	CNM	44	113	91	17
fathead minnow	FHM	44	61	28	17
johnny darter	JND	42	60	9	6
brook stickleback	BST	40	58	10	5
blackside darter	BSD	62	71	8	3
white sucker	WTS	69	69	4	1

DNR information

There is no evidence of natural reproduction of trout in this reach of Meadow Creek. Meadow Creek was last stocked with brook trout in 1975. The DNR indicated that poor conditions for trout were not the result of anthropogenic impacts, but rather are the result of poor habitat, warm temperatures, and beaver activity. DNR reports indicate that even with beaver control, Meadow Creek could not support a trout fishery due to low flow and low gradient.

MPCA summary

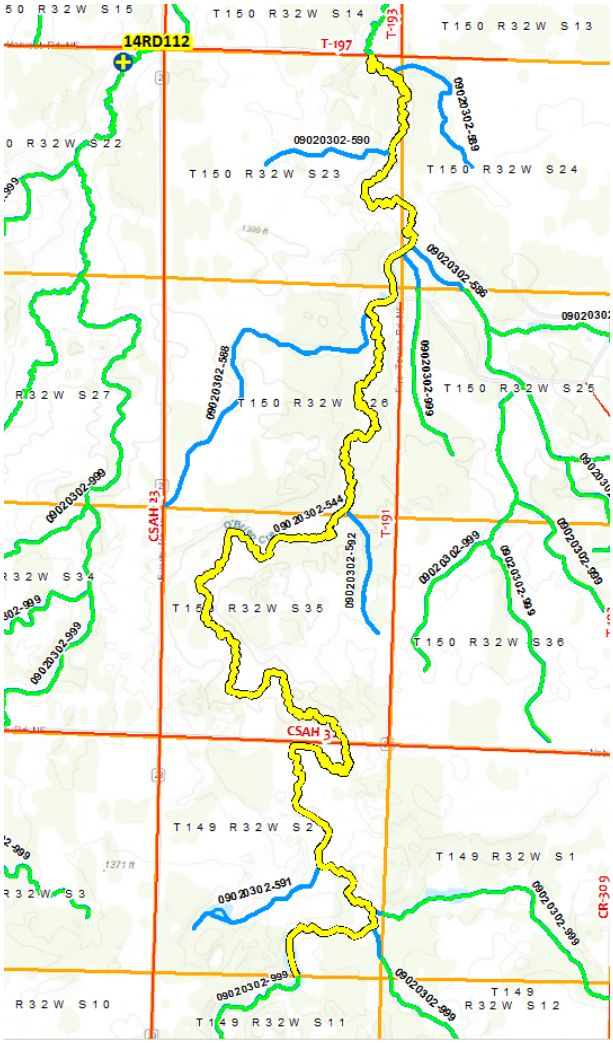
Stocking reports indicate that brook trout fingerlings were last stocked in 1975. After a 1977 population assessment documented no trout were present, a recommendation was made to remove Meadow Creek from the designated cold water stream listing due to poor habitat, warm temperatures, and beaver activity. The DNR removed Meadow Creek from the trout waters list in 2018 (State of Minnesota 2018). In 2014, the MPCA collected fish and macroinvertebrate community data from one monitoring station on this reach. No cold water fish or macroinvertebrate taxa were sampled.

O'Brien Creek (09020302-544) MPCA Use Designation Review

Stream name: O'Brien Creek
AUID(s): 09020302-544
AUID description: T149 R32W S2, south line to T150 R32W S23, north line
Tributaries: 09020302-586, 09020302-587, 09020302-588, 09020302-589, 09020302-590, 09020302-591, 09020302-592, 09020302-596, 09020302-597
MPCA biological station(s): none
County: Beltrami
Watershed: Upper/Lower Red Lake (09020302)

DNR designation: Not a designated trout stream
DNR management class: unknown

Current MPCA use designation: 2Ag (Cold water)
Why is the site being reviewed? DNR trout designation removal
Was this site previously reviewed? If so what were the results? No



Map of O'Brien Creek (09020302-544)

Review of Existing Data

MPCA information

No MPCA biological monitoring data is available from this reach.

DNR information

Most water temperature measurements made by the DNR in July (1970, 1981) were above 20 °C. A reconnaissance survey in 1970 noted that water temperatures were too warm to support brook trout and recommended shifting stocking to brown trout. Stocking of brown trout ceased in 1985. The final survey in 1981 indicated that beaver ponds were warming water temperatures resulting in marginal water temperatures. Due to poor conditions, the DNR recommend removal of the trout water designation and this reach of O'Brien Creek was removed from DNR's trout waters list in 2018.

MPCA summary

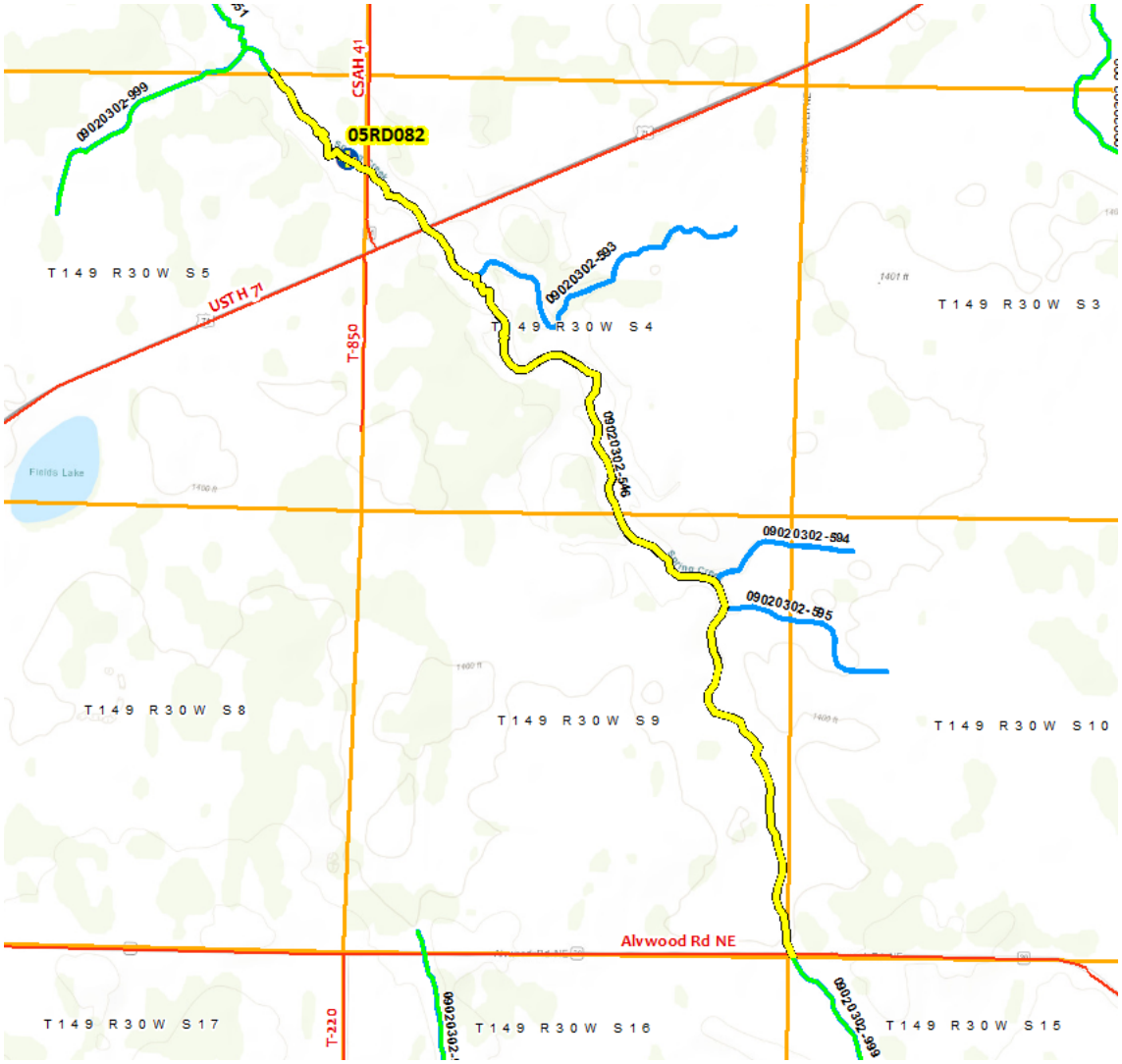
DNR surveys in the 1970s and 1980s indicated that water temperatures were marginal for trout due to the presence of beaver ponds on this reach. There is no indication of natural reproduction or good carryover of trout in this reach. Brown trout were last stocked in O'Brien Creek in 1985. The DNR removed O'Brien Creek from the trout waters list in 2018 (State of Minnesota 2018) because management of trout was deemed to not be feasible. No MPCA monitoring data on this stream reach is present.

Spring Creek (09020302-546) MPCA Use Designation Review

Stream name: Spring Creek
AUID(s): 09020302-546
AUID description: T149 R30W S10, south line to T149 R30W S5, north line
Tributaries: 09020302-593, 09020302-594, 09020302-595
MPCA biological station(s): 05RD082
County: Beltrami
Watershed: Upper/Lower Red Lake (09020302)

DNR designation: Not a designated trout stream (removed in 2018 rule)
DNR management class: unknown

Current MPCA use designation: 2Ag (Cold water)
Why is the site being reviewed? DNR trout designation removal
Was this site previously reviewed? If so what were the results? No



Map of Spring Creek (09020302-546)

Review of Existing Data

MPCA information

The MPCA has one biological monitoring station on this stream. Fish and macroinvertebrates were each sampled once from 05RD082 in 2005 for. No cold water fish species were sampled and four cool water fish species were sampled (brassy minnow, northern redbelly dace, finescale dace, and brook stickleback). No cold water macroinvertebrate taxa were sampled.

Fish data: 05RD082, 6/30/2005					
Common Name	CN Code	Min	Max	Weight	Number
northern redbelly dace	NRD	28	50	208.5	223
finescale dace	FND	53	100	331	72
brook stickleback	BST	25	64	73	50
central mudminnow	CNM	50	95	128	34
fathead minnow	FHM	40	62	64	29
brassy minnow	BRM	71	73	19	3
creek chub	CRC	110	110	17.5	1

DNR information

A 1970 reconnaissance survey noted that flows during normal dry weather periods in this stream are not sufficient. It also noted that due to low flows, the stream is unlikely to flow during extreme cold weather periods and that in shallow areas the stream would freeze to the bottom. The 1970 reconnaissance survey report recommended removal of trout water designation. Stocking of trout ceased in 1979. Due to poor habitat, low flows, beaver activity, and warm water temperatures, the DNR removed this reach of Spring Creek from DNR's trout waters list in 2018.

MPCA summary

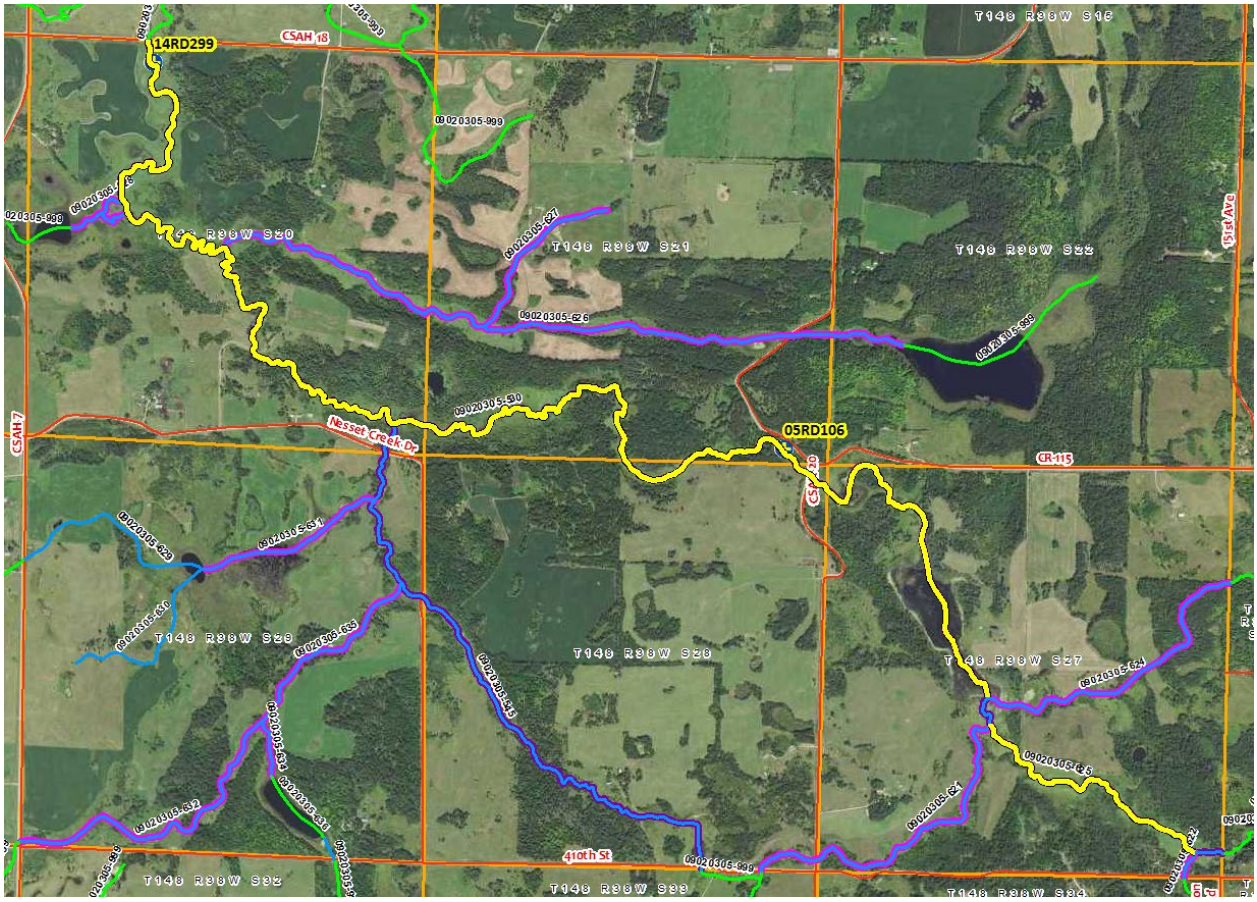
A reconnaissance survey by the DNR in 1970 indicated that flows were too low in Spring Creek to support trout. There is no indication of natural reproduction or good carryover of trout in this reach. Trout were last stocked in Spring Creek in 1979. The DNR removed Spring Creek from the trout waters list in 2018 (State of Minnesota 2018) because management of trout was deemed to not be feasible. Reasons for removal of the trout waters designation included poor habitat, low flows, beaver activity, and warm water temperatures. MPCA biological monitoring corroborates the DNR's decision due to the lack of cold water fish or macroinvertebrate taxa.

Lost River (09020305-530, 09020305-625) MPCA Use Designation Review

Stream name: Lost River
AUID(s): 09020305-530, 09020305-625
AUID description: Unnamed Cr to T148 R38W S20, north line
Tributaries: 09020305-621, 09020305-622, 09020305-624, 09020305-626, 09020305-627, 09020305-628
MPCA biological station(s): 05RD106, 14RD299
MPCA sample dates: 7/13/2005, 6/11/2014, 6/17/15
County: Clearwater
Watershed: Clearwater

DNR designation: Trout stream
DNR management class: Cold water (I-D: marginal trout)

Current MPCA use designation: 2Ag (Cold water)
Why is the site being reviewed? Fish Data
Was this site previously reviewed? If so what were the results? No evidence of prior review.



Map of Lost River (09020305-530, 09020305-625)

Review of monitoring data

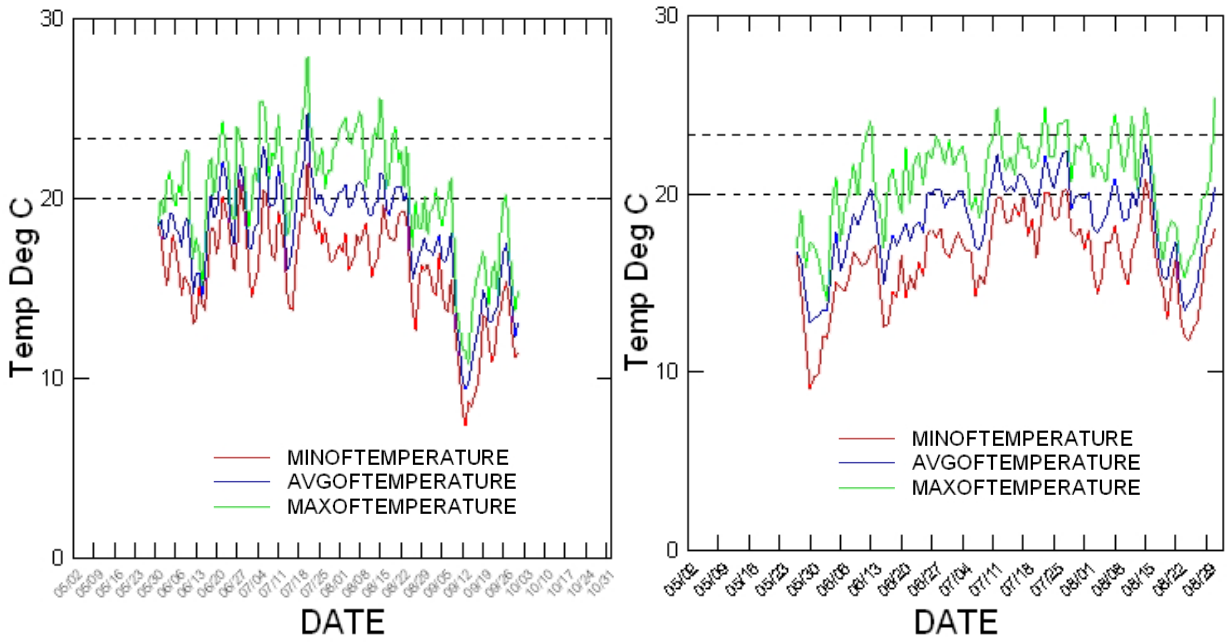
MPCA monitoring data

MPCA water temperature data

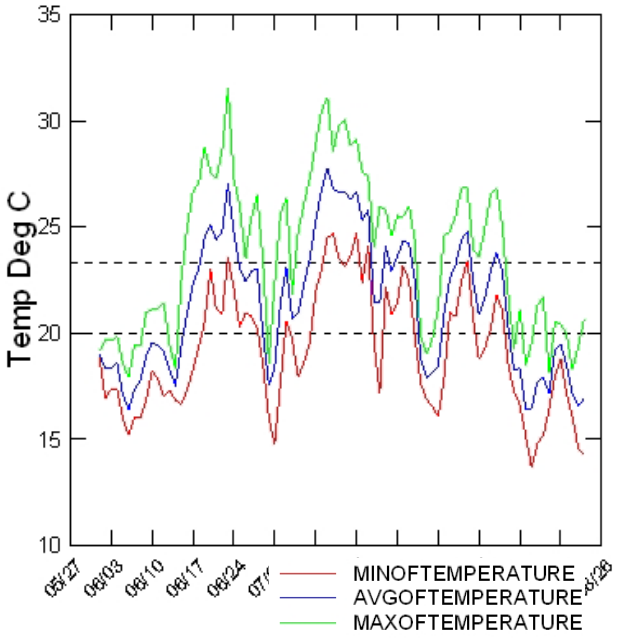
A water temperature data logger was deployed at three stations in 2005, 2014, and 2015. These data are summarized below. Percent lethal (>25°C), stress (>20°C and <25°C), and growth (<20°C) are for brook trout and are measured during the period from June 1st through August 31st.

Water temperature data logger summaries

Station	14RD299	14RD299	05RD106
Year	2014	2015	2005
% Growth	61.9	66.3	41.5
% Stress	37.1	33.6	40.0
% Lethal	1.0	0.0	18.5
Average June Temperature	18.6	17.7	20.8
Average July Temperature	19.9	20.1	23.1
Average August Temperature	19.4	18.1	19.9
Average Summer Temperature	19.3	18.6	21.4
% Recording	100	100	90.2



Temperature logger graphs from 14RD299 deployed during 2014 (left) and 2015 (right).



Temperature logger graph from 05RD106 deployed during 2005.

MPCA biological data

Two biological stations were sampled for fish in 2005, 20014 and 2015 and one station (05RD106) was sampled for macroinvertebrates in 2005. Macroinvertebrates were not sampled from 14RD299 due to low water level and a lack of flow. No cold water species and two cool water fish species (brook stickleback and northern redbelly dace) were sampled in from 14RD299 in low numbers. The same two cool water species were collected from 05RD106 although northern redbelly dace were abundant in this sample. No cold water macroinvertebrate taxa were collected.

Fish data: 14RD299, 6/11/14					
Common Name	**CN Code**	**Min**	**Max**	**Weight**	**Number**
creek chub	CRC	34	154	249	30
blacknose dace	BND	43	96	121	28
johnny darter	JND	33	54	19	24
common shiner	CSH	40	110	69	16
central mudminnow	CNM	50	92	41	9
brook stickleback	BST	47	47	1	1
white sucker	WTS	56	56	2	1
yellow bullhead	YEB	203	203	162	1

Fish data: 14RD299, 6/17/15					
Common Name	**CN Code**	**Min**	**Max**	**Weight**	**Number**
common shiner	CSH	71	125	1599	256
white sucker	WTS	68	143	2005	118
blacknose dace	BND	36	101	326	81
creek chub	CRC	53	147	825	66
johnny darter	JND	33	55	35	43

Fish data: 14RD299, 6/17/15					
Common Name	CN Code	Min	Max	Weight	Number
central mudminnow	CNM	54	79	92	30
brook stickleback	BST	27	65	18	11
fathead minnow	FHM	51	81	38	10
northern redbelly dace	NRD	35	67	7	3

Fish data: 05RD106, 7/13/05					
Common Name	CN Code	Min	Max	Weight	Number
northern redbelly dace	NRD	31	58	119	117
creek chub	CRC	25	167	445.5	67
blacknose shiner	BNS	35	50	31.5	37
central mudminnow	CNM	50	101	99	21
common shiner	CSH	45	136	177.5	20
white sucker	WTS	33	257	442	11
blacknose dace	BND	50	80	24	7
brook stickleback	BST	25	49	8.5	4
golden shiner	GOS	40	47	2	4
bluegill	BLG	103	111	45.5	2
fathead minnow	FHM	51	65	3.5	2
johnny darter	JND	30	51	2	2
Iowa darter	IOD	45	45	1.5	1
pumpkinseed	PMK	99	99	19	1

DNR information

The DNR manages the designated portion of the Lost River as a marginal trout water (I-D). Brook trout were stocked in this reach from 1947 to 1975, but no information could be located describing why stocking was ceased. No DNR surveys for this reach could be located.

MPCA review summary

The MDNR currently classifies this section of the Lost River as marginal trout water. Stocking reports indicate that brook trout fingerlings were stocked from 1947 to 1975. No official report or documentation regarding the cessation of stocking could be located. No DNR survey data for this reach was available. The MPCA collected fish community data from two monitoring stations located on this reach. One station was sampled in 2014 and 2015 and the other station was sampled in 2005. All fish samples consisted of predominantly warm water species. Water temperature data was collected in 15 minute intervals at both sampling stations. The water temperature data indicate that conditions in the Lost River are marginal for supporting a cold water community (average July water temperature 19.9-23.1°C). Thermal stress was recorded 33.6-40.0% of the summer (June through August) at both stations with the lethal threshold exceeded for 18.5% of the summer at one station.

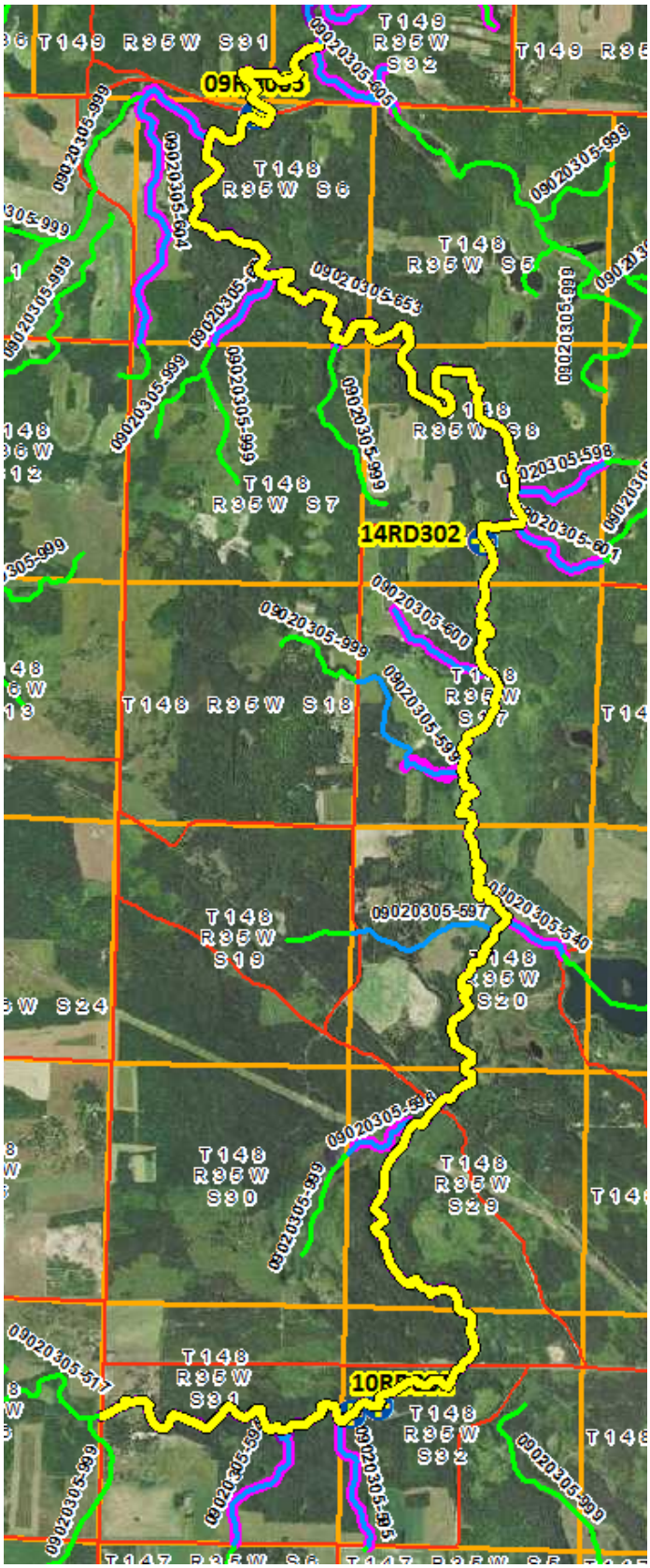
Clearwater River (09020305-653, 09020305-654[1]) Thermal Designation Review

Stream name: Clearwater River
AUID(s): 09020305-653, 09020305-654 (parent: 09020305-516)
AUID description:
09020305-653: T148 R35W S31, west line to Unnamed cr
09020305-654: Unnamed cr to Clearwater Lk
MPCA biomonitoring site(s):
09020305-653: 14RD302, 09RD065, 10EM085, 14RD273
09020305-654: 10RD081
Tributaries:
09020305-653: 09020305-540, 09020305-594, 09020305-595, 09020305-596, 09020305-597, 09020305-598, 09020305-599, 09020305-600, 09020305-601, 09020305-603, 09020305-604, 09020305-605, 09020305-606, 09020305-607;
09020305-654: 09020305-608, 09020305-609, 09020305-610, 09020305-611, 09020305-612, 09020305-613
County: Beltrami
Watershed: Clearwater

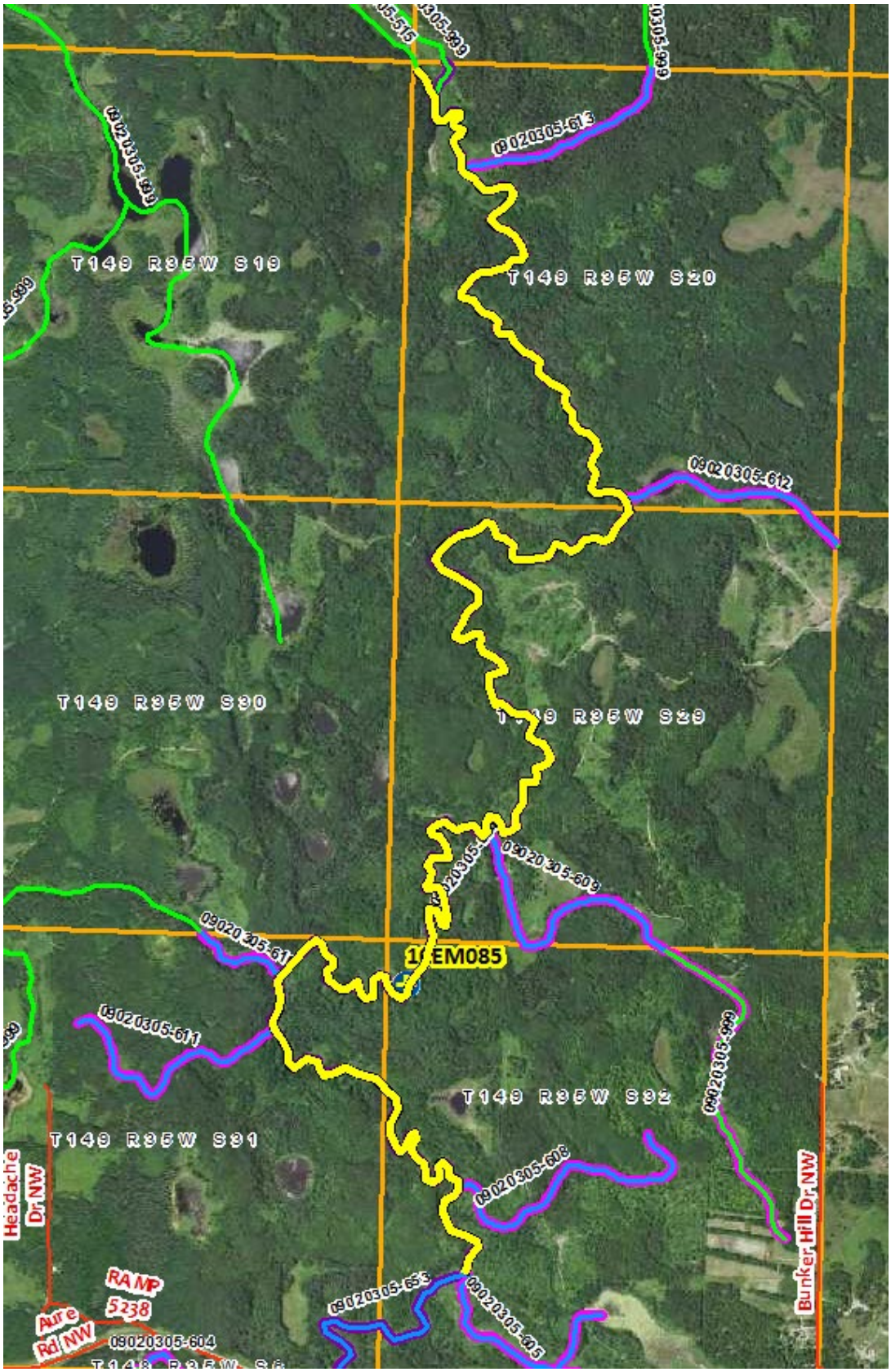
DNR's designation: Designated trout water
DNR management class: I-D (marginal trout)

Current AUID designation: 2Ag (cold water)
Reason for review: Fish data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.

[1] This review includes data from both WIDs, but the use designation discussion is largely focused on 09020305-654.



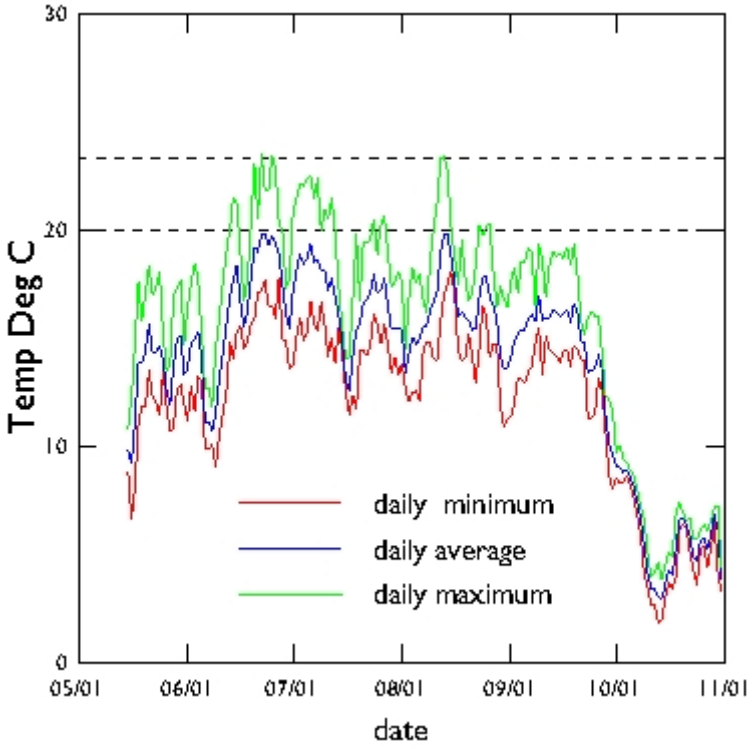
Map of Clearwater River (09020305-653)



Map of Clearwater River (09020305-654)

Review of monitoring data
MPCA monitoring data

09020305-653: 10RD081
Temperature data:



FieldNum	10RD081
% Growth	89.9
% Stress	10.1
% Lethal	0.0
Average June Temperature	16.1 °C
Average July Temperature	16.8 °C
Average August Temperature	16.2 °C
Average Summer Temperature	16.4 °C
% Recording	100.0

Temperature Logger Graph and Average Summary for station 10RD081

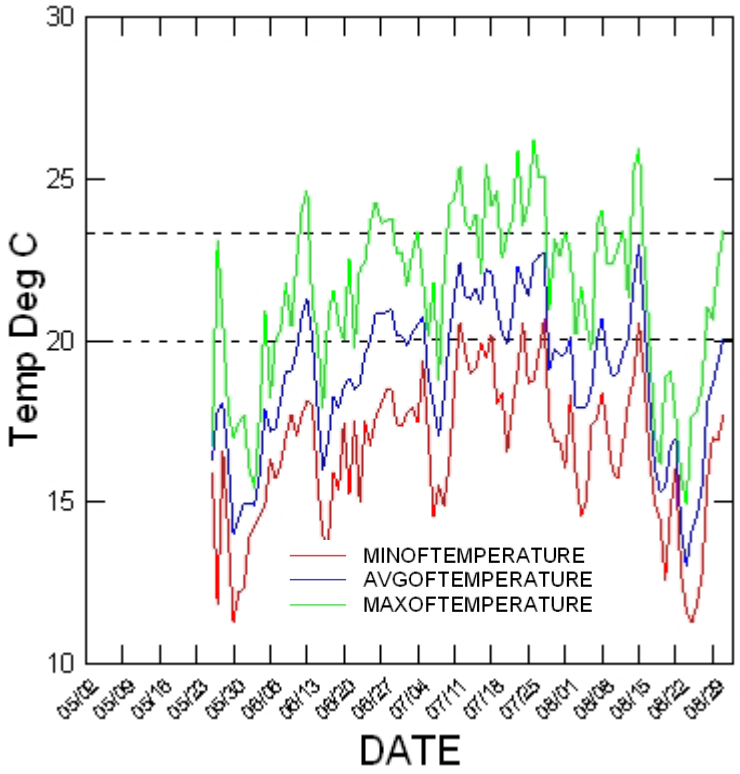
Biological data:
Three cold water fish species (brown trout, rainbow trout, and mottled sculpin) and 2 cool water taxa (longnose dace, brook stickleback) were sampled from 10RD081 in 2010. Five macroinvertebrate taxa (*Lype, Isoperla, Eukiefferiella, Ephemerella*, and *Brachycentrus*) were present in 2010 from 2 samples collected at 10RD081. These cold water taxa comprised 11.1-11.6% of the macroinvertebrate samples.

Fish data: 10RD081, 8/9/2010					
Common Name	CN Code	Min	Max	Weight	Number
blacknose dace	BND	34	104	777	171
creek chub	CRC	25	220	1237	121
white sucker	WTS	42	280	3071	56
common shiner	CSH	35	115	140	52
longnose dace	LND	38	106	217	43
johnny darter	JND	46	68	43	26
mottled sculpin	MTS	39	90	57	7
brown trout	BNT	165	422	1421	4
central mudminnow	CNM	97	99	37	4
rainbow trout	RBT	265	344	1087	4

Fish data: 10RD081, 8/9/2010					
Common Name	**CN Code**	**Min**	**Max**	**Weight**	**Number**
bigmouth shiner	BMS	65	65	0.5	1
brook stickleback	BST	40	40	1	1
fathead minnow	FHM	65	65	7	1
lamprey ammocoete	AMM	123	123	3	1

09020305-653: 14RD273

Temperature data:



FieldNum¤	14RD273¤
%·Growth¤	60.6¤
%·Stress¤	38.3¤
%·Lethal¤	1.0¤
Average·June·Temperature¤	18.5·°C¤
Average·July·Temperature¤	20.7·°C¤
Average·August·Temperature¤	18.1·°C¤
Average·Summer·Temperature¤	19.1·°C¤
%·Recording¤	100.0¤

Temperature Logger Graph and Average Summary for station 14RD273

Biological data:

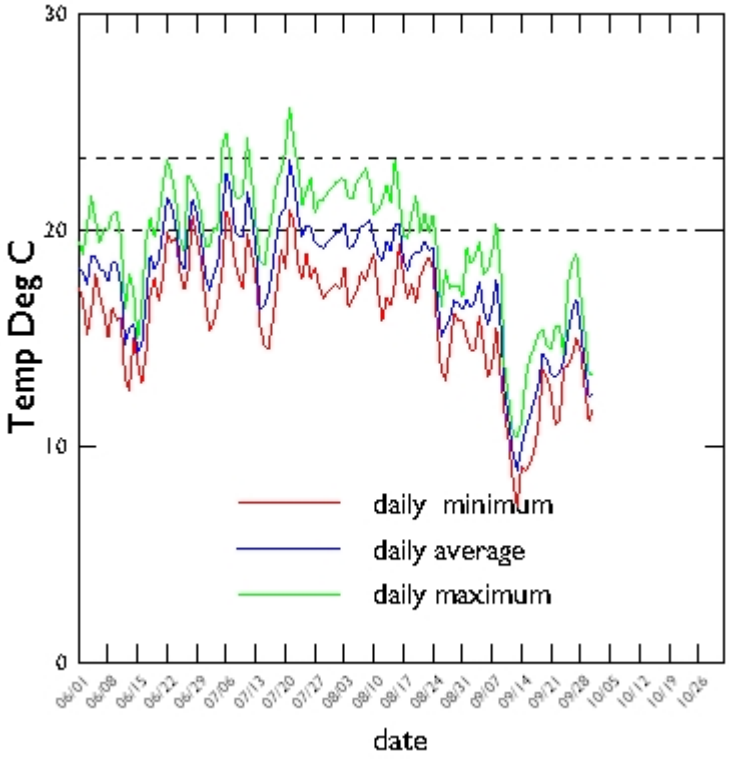
Three cold water fish species (rainbow trout, brown trout, and mottled sculpin) were collected in 14RD273. In additional, two cool water fish species were sampled (longnose dace and northern redbelly dace). Five cold water macroinvertebrate taxa (*Lype, Isoperla, Eukiefferiella, Ephemerella*, and *Brachycentrus*) were collected in two samples. These taxa comprised 11.1-11.3% of the samples.

Fish data: 14RD273, 7/9/2014					
Common Name	**CN Code**	**Min**	**Max**	**Weight**	**Number**
creek chub	CRC	47	187	456	90
blacknose dace	BND	46	96	237	64
longnose dace	LND	62	96	204	64
white sucker	WTS	25	375	6174	39

Fish data: 14RD273, 7/9/2014					
Common Name	CN Code	Min	Max	Weight	Number
johnny darter	JND	42	62	49	23
common shiner	CSH	40	113	49	20
northern redbelly dace	NRD	40	52	18	14
mottled sculpin	MTS	75	110	111	12
chestnut lamprey	CHL	75	430	45	11
central mudminnow	CNM	58	104	67	8
bluegill	BLG	88	129	119	4
brown trout	BNT	214	314	730	4
rainbow trout	RBT	275	299	498	2
shorthead redhorse	SHR	390	390	1550	2
bigmouth shiner	BMS	45	45	1	1
largemouth bass	LMB	41	41	1	1

09020305-653: 14RD302

Temperature data:



FieldNum	14RD302
% Growth	68.1
% Stress	31.6
% Lethal	0.3
Average June Temperature	18.3 °C
Average July Temperature	19.7 °C
Average August Temperature	18.7 °C
Average Summer Temperature	18.9 °C

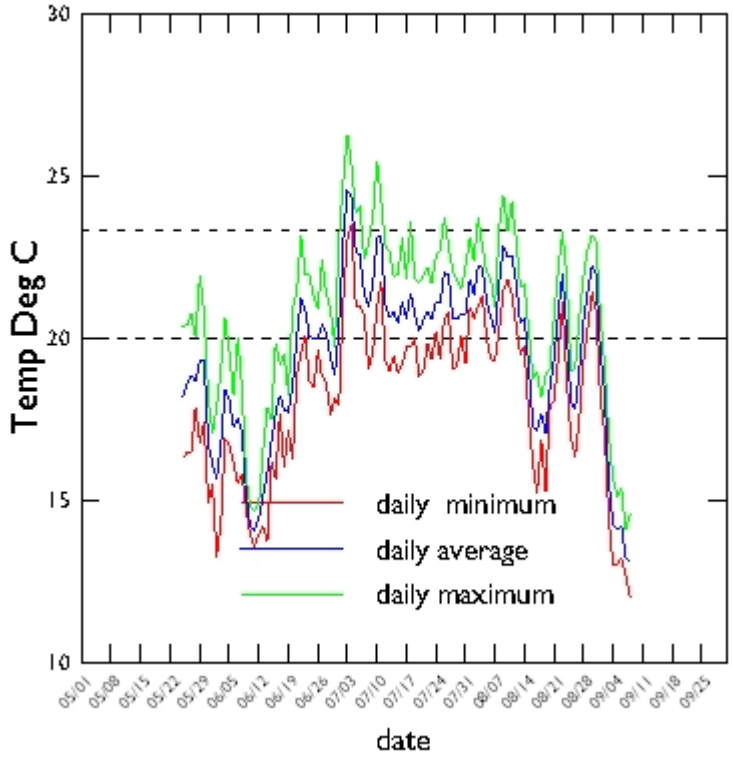
Temperature Logger Graph and Average Summary for station 14RD302

Biological data:

Three cold water fish species (brown trout, rainbow trout, and mottled sculpin) were present in low numbers from a sample from 14RD302 in 2014. No cool water fish species were sampled. One macroinvertebrate taxon (Isoperla) was present in 2014 from a sample collected at 14RD302. This cold water taxon comprised 1.9% of the macroinvertebrate sample.

Fish data: 14RD302, 8/27/2014					
Common Name	CN Code	Min	Max	Weight	Number
yellow perch	YEP	80	180	1001	88
common shiner	CSH	50	143	215	68
bluegill	BLG	68	133	1365	57
central mudminnow	CNM	44	126	240	24
blacknose shiner	BNS	48	54	20	23
johnny darter	JND	36	65	20	23
white sucker	WTS	98	315	2640	21
blackside darter	BSD	63	81	31	12
hornyhead chub	HHC	75	143	206	10
black bullhead	BLB	95	132	75	5
northern pike	NOP	158	400	4554	5
rock bass	RKB	74	195	322	5
green sunfish	GSF	105	112	58	3
lamprey ammocoete	AMM	110	138	4	3
largemouth bass	LMB	53	65	4	3
rainbow trout	RBT	295	306	865	3
mottled sculpin	MTS	40	68	5	2
brown trout	BNT	364	364	550	1
shorthead redhorse	SHR	120	120	8	1

09020305-653: 09RD065



FieldNum	09RD065
% Growth	66.3
% Stress	33.3
% Lethal	0.3
Average June Temperature	18.2 °C
Average July Temperature	19.9 °C
Average August Temperature	19.0 °C
Average Summer Temperature	19.0 °C

Temperature Logger Graph and Average Summary for station 09RD065

Biological data:
Two cold water fish species (brown trout, mottled sculpin) and 2 cool water taxa (longnose dace, pearl dace) were sampled from two visits at 09RD065 in 2014. Both samples featured a fairly diverse community of over 20 species – most being warm water species. Four macroinvertebrate taxa (*Brachycentrus, Dolophilodes, Ephemerella*, and *Isoperla*) were present in 2009 and 2014 from samples collected at 09RD065. These cold water taxa comprised 0.3-7.9% of the macroinvertebrate samples.

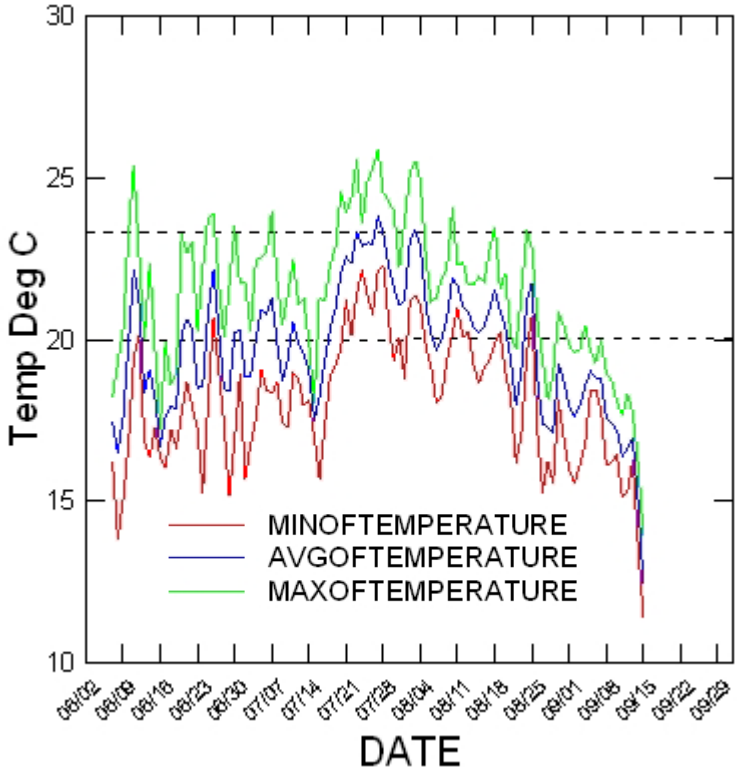
Fish data: 09RD065, 7/9/2014					
Common Name	CN Code	Min	Max	Weight	Number
yellow perch	YEP	76	196	818	76
bluegill	BLG	66	165	776	61
white sucker	WTS	25	346	3800	49
blackside darter	BSD	32	87	146	47
common shiner	CSH	42	163	370	44
longnose dace	LND	57	120	187	44
creek chub	CRC	75	181	1017	38
johnny darter	JND	45	57	32	25
blacknose dace	BND	40	94	76	16
central mudminnow	CNM	60	102	66	16
shorthead redhorse	SHR	164	451	6200	16
hornyhead chub	HHC	39	152	149	13
lamprey ammocoete	AMM	105	198	51	12
rock bass	RKB	55	245	653	8
logperch	LGP	65	86	14	7
mottled sculpin	MTS	70	100	57	7
largemouth bass	LMB	31	35	4	6
blacknose shiner	BNS	42	61	5	4
northern pike	NOP	87	493	696	4
bigmouth shiner	BMS	50	50	1	1
brown trout	BNT	232	232	121	1

Fish data: 09RD065, 9/22/2014						
Common Name	CN Code	Min	Max	Weight	Number	DELTs
common shiner	CSH	53	174	368	61	0
white sucker	WTS	58	272	6100	61	0
blackside darter	BSD	67	99	230	46	0
blacknose dace	BND	64	101	310	43	0
hornyhead chub	HHC	64	160	634	38	0
longnose dace	LND	69	103	172	32	0
johnny darter	JND	34	76	54	31	0
creek chub	CRC	91	208	1253	30	0
largemouth bass	LMB	64	83	138	30	0

Fish data: 09RD065, 9/22/2014						
Common Name	CN Code	Min	Max	Weight	Number	DELTs
yellow perch	YEP	89	111	227	21	0
lamprey ammocoete	AMM	62	124	25	10	0
bluegill	BLG	66	89	88	9	0
rock bass	RKB	28	72	53	8	0
mottled sculpin	MTS	86	114	60	5	0
central mudminnow	CNM	41	89	10	3	0
fathead minnow	FHM	66	68	14	3	0
black bullhead	BLB	96	99	25	2	0
blacknose shiner	BNS	49	52	1	2	0
Gen: redhorses	RHS			30	2	0
logperch	LGP	87	92	15	2	0
pearl dace	PRD	46	46	2	2	0
northern pike	NOP	230	230	90	1	0

09020305-654: 10EM085

Temperature data:



FieldNum	10EM085
% Growth	47.2
% Stress	51.5
% Lethal	1.3
Average June Temperature	19.2 °C
Average July Temperature	20.9 °C
Average August Temperature	20.2 °C
Average Summer Temperature	20.1 °C
% Recording	93.9

Biological data:

One cold water fish species (mottled sculpin) was sampled in low numbers during two visits (2011, 2015) to 10EM085. Four cool water fish species (longnose dace, northern redbelly dace, brook stickleback,

northern brook lamprey) were sampled from 10EM085. No cold water invertebrate species were collected.

Fish data: 10EM085, 7/28/2011					
Common Name	CN Code	Min	Max	Weight	Number
central mudminnow	CNM	38	115	450	75
blackside darter	BSD	65	96	226	49
yellow perch	YEP	55	253	1537	41
white sucker	WTS	145	375	8852	27
blacknose shiner	BNS	45	59	25	20
johnny darter	JND	27	66	41	19
common shiner	CSH	25	152	160	16
blacknose dace	BND	65	96	88	12
creek chub	CRC	28	194	365	12
largemouth bass	LMB	39	55	13	10
northern pike	NOP	105	187	218	10
lamprey ammocoete	AMM	110	152	47	9
bluegill	BLG	55	125	173	6
hornyhead chub	HHC	25	126	67	5
rock bass	RKB	25	238	784	5
shorthead redhorse	SHR	167	472	2099	5
brook stickleback	BST	30	62	6	4
mottled sculpin	MTS	35	118	34	4
fathead minnow	FHM	58	66	11	2
logperch	LGP	101	104	26	2
longnose dace	LND	31	32	1	2
northern redbelly dace	NRD	47	47	1	1

Fish data: 10EM085, 6/24/2015					
Common Name	CN Code	Min	Max	Weight	Number
northern redbelly dace	NRD	36	53	35	42
central mudminnow	CNM	52	111	98	29
yellow perch	YEP	74	222	540	18
northern brook lamprey	NBL	111	125	58	16
white sucker	WTS	92	321	2366	12
hornyhead chub	HHC	37	159	69	10
blackside darter	BSD	60	79	43	9
johnny darter	JND	43	70	11	9
bluegill	BLG	64	87	67	8
rock bass	RKB	72	263	1322	7
blacknose shiner	BNS	34	50	5	6
fathead minnow	FHM	40	42	3	5
creek chub	CRC	55	161	110	4

Fish data: 10EM085, 6/24/2015					
Common Name	CN Code	Min	Max	Weight	Number
mottled sculpin	MTS	70	76	14	3
black bullhead	BLB	110	126	52	2
blacknose dace	BND	192	192	12	1
brook stickleback	BST	41	41	1	1
Iowa darter	IOD	47	47	1	1

DNR information

The DNR classifies downstream reach of the Clearwater River (09020305-654) as I-D (Marginal trout). Occasionally, trout have been reported by anglers from this reach although this does not occur with much frequency. It is likely that trout stocked several miles upstream in the active management area near Pinewood, MN migrate downstream and occupy this reach, even though water temperatures are not conducive to survival. There is no evidence of natural reproduction in 09020305-654 and trout are not stocked in this portion of the Clearwater River.

MPCA summary

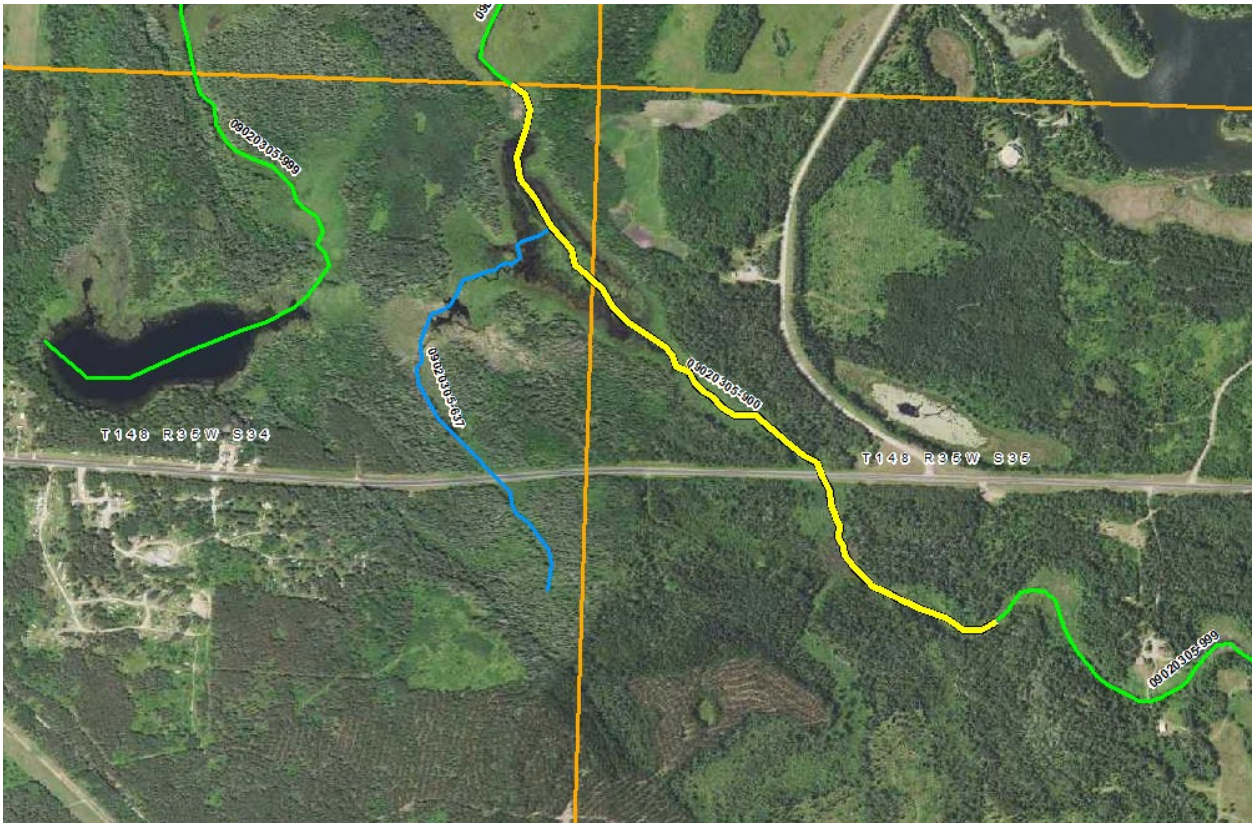
The DNR currently classifies the section of Clearwater River, from an unnamed creek (09020305-654) to Clearwater Lake, as a marginal trout water. According to the DNR, trout are occasionally captured by anglers from this reach and are likely migrants from the active management area located 10 miles upstream. The DNR does not actively manage this section of the Clearwater River for trout and has indicated that water temperatures are not conducive to trout survival. There is no evidence of natural reproduction of trout in this stream reach. In 2011 and 2015, the MPCA collected fish and macroinvertebrates community data from one monitoring station located on this reach. Both fish samples consisted of a diverse, predominantly warm water community with low numbers of a cold water species (mottled sculpin). No trout were collected by the MPCA. No cold water macroinvertebrate taxa were present in either the 2011 or 2015 samples. Water temperature data was collected in 15 minute intervals from the monitoring station during 2016. The water temperature data indicate that conditions in the Clearwater River are marginal for supporting a cold water community. Thermal stress was recorded 52.8% of the time during the summer and the average July temperature was 20.9°C.

Unnamed creek (Spring Lake Creek) (09020305-900) MPCA Use Designation Review

Stream name: Unnamed creek (Spring Lake Creek)
AUID(s): 09020305-900
AUID description: Headwaters to T148 R35W S34, north line
Tributaries: 09020305-637
MPCA biological station(s): None
County: Beltrami
Watershed: Clearwater

DNR designation: Not a designated trout stream (removed in 2018 rule)
DNR management class: unknown

Current MPCA use designation: 2Ag (Cold water)
Why is the site being reviewed? DNR trout designation removal
Was this site previously reviewed? If so what were the results? No



Map of Unnamed creek (Spring Lake Creek) (09020305-900)

Review of Existing Data

MPCA information

No MPCA monitoring data is available.

DNR information

The 1970 reconnaissance survey report recommended removal of the trout water designation. Stocking of trout ceased in 1977. The DNR removed this unnamed creek from the trout waters list in 2018 due to poor habitat, low flows, beaver activity, and warm water temperatures.

MPCA summary

A 1970 reconnaissance survey report recommended removal of trout water designation. Stocking of trout ceased in 1977. The DNR removed this unnamed creek from the trout waters list in 2018 (State of Minnesota 2018) because management of trout was deemed to not be feasible. Reasons for removal of the trout waters designation included poor habitat, low flows, beaver activity, and warm water temperatures. No MPCA monitoring data is available for this stream reach.

Hog Creek (09030001-676) MPCA Use Designation Review

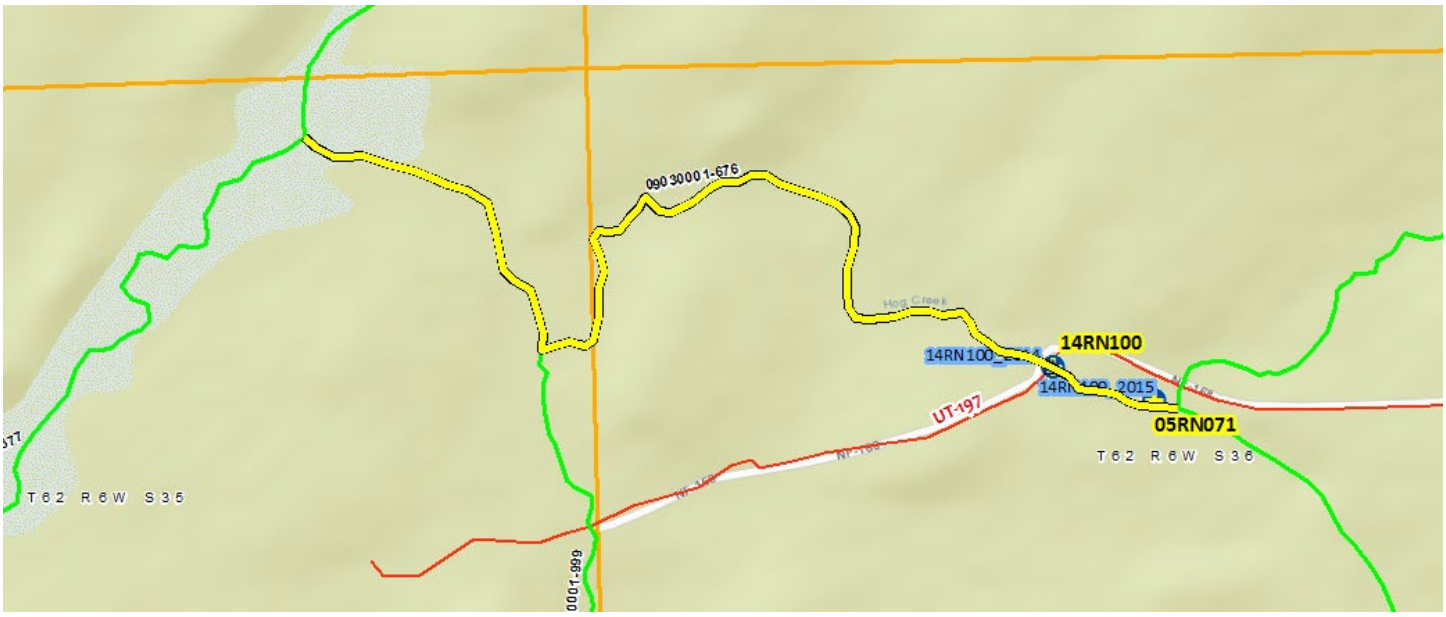
Stream name: Hog Creek
AUID(s): 09030001-676
AUID description: Unnamed Cr. to Unnamed Cr.
Tributaries: none
MPCA biomonitoring site(s): 05RN071 and 14RN100
MPCA monitoring date(s): 7/20/2005 (05RN071), 7/22/2014 (14RN100), and 8/18/2015 (14RN100)
Watershed: Rainy River-Headwaters
County: Lake

DNR Designation: Not a designated trout water
DNR management class: None/warm water

AUID use class: 2Bg (warm water)
Reason for review: Macroinvertebrate assemblage and water temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.

Additional Information

This reach of Hog Creek is not a designated trout stream. However, the macroinvertebrate community and temperature logger data indicate a strong potential for this reach to support a cold water biological community. Water temperatures appear adequate to support a cold water fish community; several cold water macroinvertebrate taxa are present in samples from both of the biological monitoring stations along this reach. In addition, continuous water temperature data from the summers of 2014 and 2015 are within the adequate growth range for brook trout.



Map of Hog Creek (09030001-676)

Monitoring and Management History

MPCA monitoring data

MPCA biological data

The USFS conducted four community-based fish surveys at mile 6.7 (47.8142, -91.0345) in 2010 and 2011, and collected both cool (longnose dace, northern redbelly dace) and cold (mottled sculpin) water species and was dominated by species typically found in cold water streams. Fish and macroinvertebrates were sampled by the MCPA from 2 stations in 2005, 2013, 2014 and 2015. No cold water fish species and three cool water species (longnose dace, northern redbelly dace, and burbot) were sampled. Seven cold water macroinvertebrate taxa (*Eukiefferiella, Boyeria grafiana, Baetis tricaudatus, Leuctra, Ephemerella, Diplectrona,* and *Dolophilodes*) were sampled comprising 1.9-5.5% of the sample.

FieldNum	05RN071	14RN100	14RN100
WBName	Hog Creek	Hog Creek	Hog Creek
VisitNum	20050203	20141270	20151769
WQTime	9:52:00 AM	5:03:00 PM	5:15:00 PM
TempH2O (deg C)	19.8	22.3	19.9
Distance Fished (m)	200	193	210
Time Fished (sec)	2063	3992	4645
GearType	BP	BPx2	BPx2
Fish Community Summary			
burbot			12
central mudminnow		1	
common shiner	65	2	9
creek chub	48	5	6
Iowa darter	1		
longnose dace	48	10	30
northern pike			4
northern redbelly dace	2		
white sucker	5		2

FieldNum	05RN071	14RN100	14RN100
WBName	Hog Creek	Hog Creek	Hog Creek
VisitNum	20050155	20132535	20152760
Season	2005	2014	2015
WQTime	-	9:10:00 AM	12:29:00 PM
TempH2O (deg C)	-	16.2	21.1
Coldwater Taxa Richness	2	4	3
Coldwater Taxa Percent (%)	4.2	7.1	4.6
Coldwater Macroinvertebrate Taxa			
Baetis tricaudatus		11	
Boyeria grafiana		1	1
Diplectrona	1		
Dolophilodes	7		
Ephemerella			2
Eukiefferiella		4	
Leuctra		2	4

MPCA water temperature data

A continuously-recording stream temperature logger was deployed in this reach by the MPCA during the summers of 2014 and 2015. Summary data for the logger deployment can be found below. “No Growth”, “Growth,” “Stress,” and

"Lethal" temperature ranges are specific to brook trout and the date range for these summary statistics is June 1 to August 31.

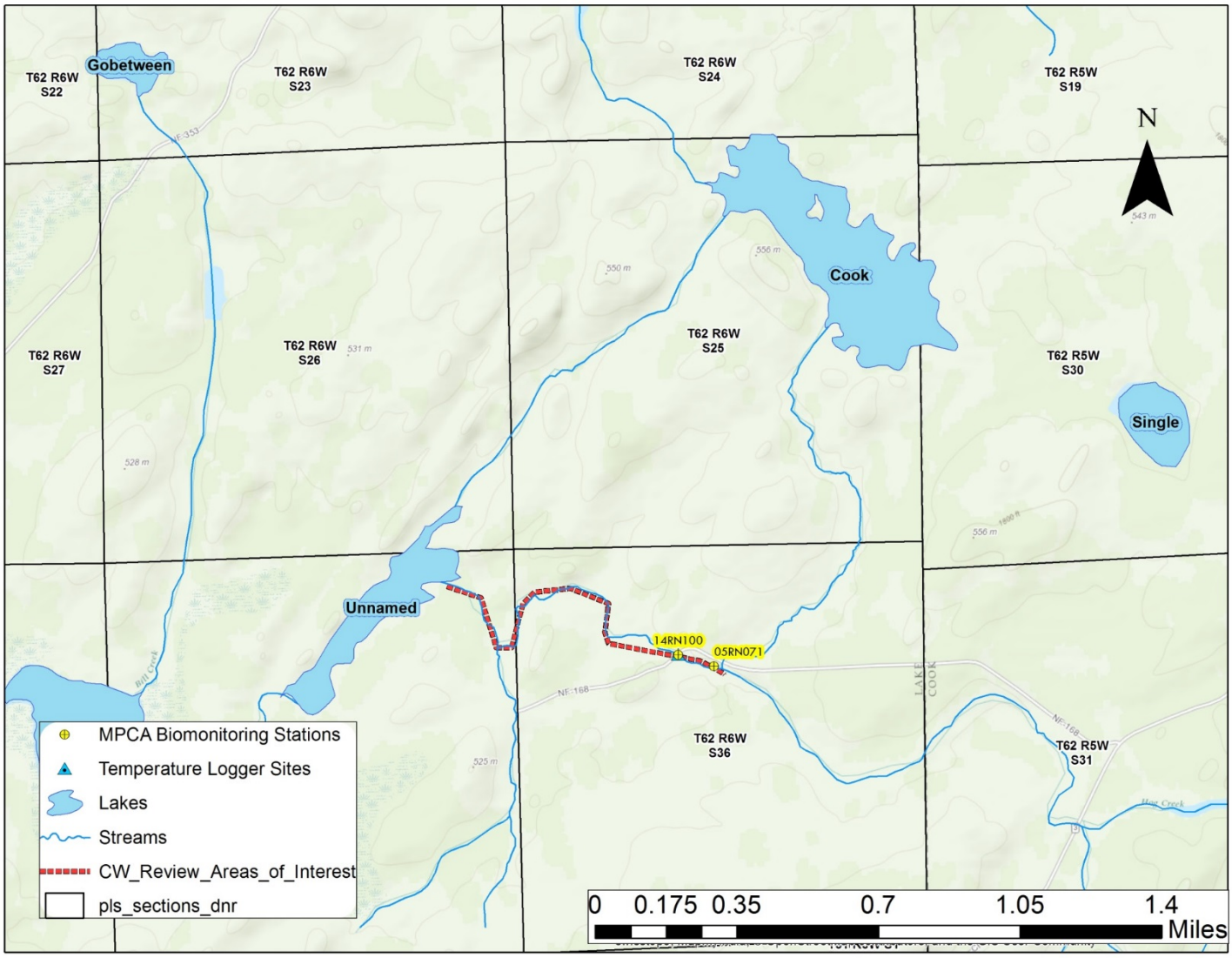
TempLogNum	4719	5130
FieldNum	14RN100	14RN100
WBName	Hog Creek	Hog Creek
Season	2014	2015
Interval (Min)	15	30
Percent (%) Recording	1	1
BKT_No Growth	0.0%	0.0%
BKT_Growth	89.6%	78.3%
BKT_Stress	10.4%	21.0%
BKT_LethaL	0.0%	0.7%
SummerAvgTemp (deg C)	17.0	17.7
JuneAvgTemp (deg C)	15.2	15.5
JulyAvgTemp (deg C)	17.8	19.8
AugustAvgTemp (deg C)	18.0	17.8

DNR information

The DNR classified this stream reach as a warm water stream in 1968 based on limited temperature data. No fish data were collected as part of the 1968 survey.

MPCA summary

The DNR currently classifies the entire reach of Hog Creek, from Hog Lake (16-0653-00) to Perent Lake (38-0220-00), as warm water. Limited information regarding the past management of Hog Creek was available. A survey by DNR was conducted in 1968 that included watershed information, physical characteristics, and aquatic plant diversity. The USFS conducted four community-based fish surveys at mile 6.7 (47.8142, -91.0345) in 2010 and 2011, and collected both cool (longnose dace, northern redbelly dace) and cold (mottled sculpin) water species and was dominated by species typically found in cold water streams. A more recent biological monitoring survey was conducted by the MPCA in 2014 and 2015 and sampled burbot, longnose dace, and northern redbelly dace. Macroinvertebrates were also sampled during this effort and contained several cold water obligates, including a state threatened species (*Boyeria grafiana*). Temperature data was collected from mile 6.7 and shows that the thermal regime is supportive of a brook trout fishery, with summer (June-August) water temperatures in the growth range for brook trout 78.3-89.6% of the time and July average temperatures were 17.8-19.8°C.

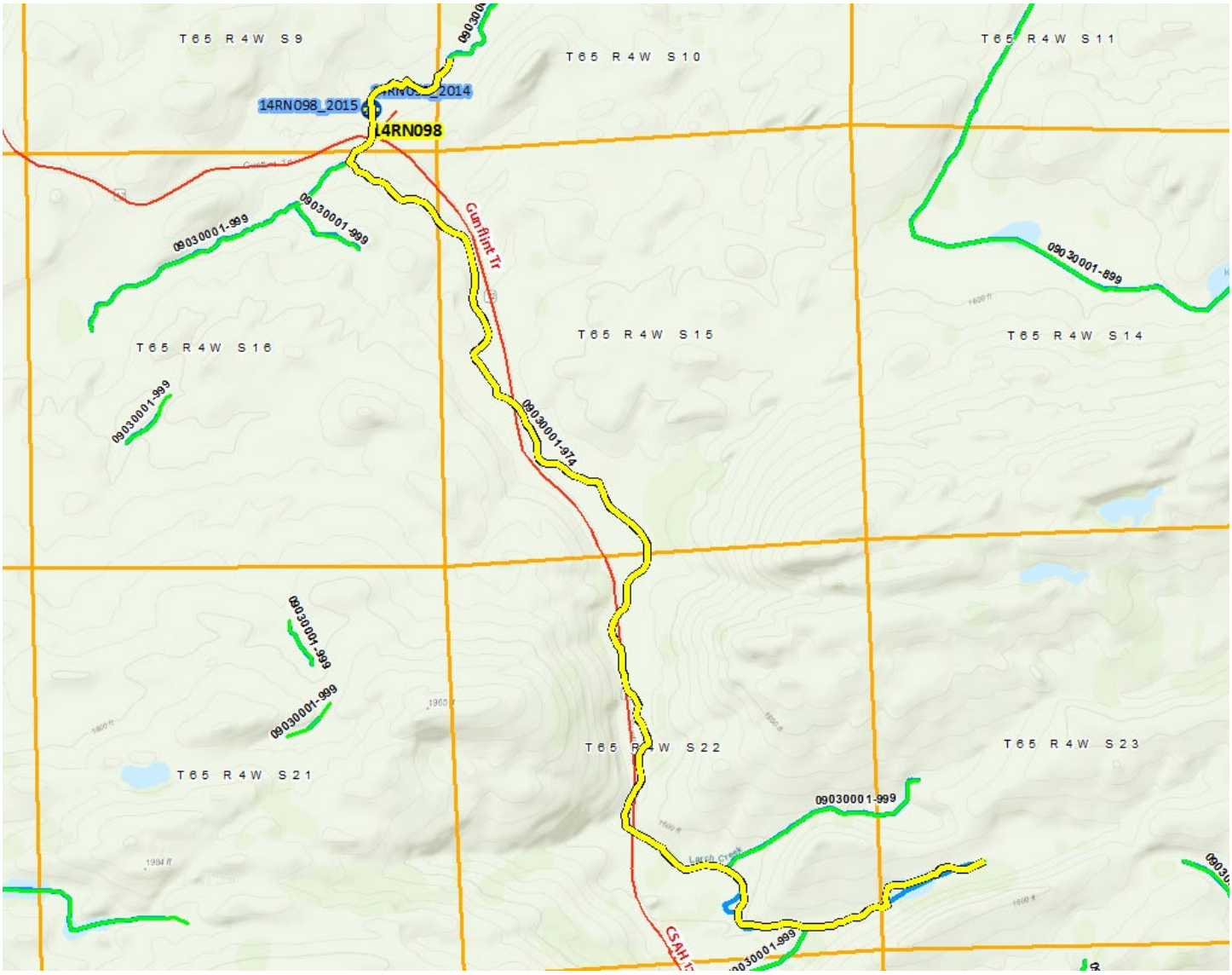

Gobetween
T62 R6W S22
T62 R6W S23
T62 R6W S24
T62 R5W S19
N
Cook
T62 R6W S27
T62 R6W S26
T62 R6W S25
T62 R5W S30
Single
Unnamed
14RN100
05RN071
T62 R6W S36
T62 R5W S31
MPCA Biomonitoring Stations
Temperature Logger Sites
Lakes
Streams
CW_Review_Areas_of_Interest
pls_sections_dnr
0 0.175 0.35 0.7 1.05 1.4
Miles

Larch Creek (09030001-974) MPCA Use Designation Review

Stream name: Larch Creek
AUID(s): 09030001-974
AUID description: Headwaters to BWCA Boundary
Tributaries: none
MPCA biomonitoring site(s): 14RN098
MPCA monitoring date(s): 2014 & 2015
Watershed: Rainy River-Headwaters
County: Cook

DNR designation: Not a designated trout water
DNR management class: None/warm water

AUID use class: 2Bg (warm water)
Reason for review: Macroinvertebrate assemblage and water temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.



Map of Larch Creek (09030001-974)

Monitoring and Management History

MPCA monitoring data

MPCA biological data

Fish and macroinvertebrates were sampled by the MPCA in 2014 and 2015 from one station. One cold water species (mottled sculpin) was sampled in 2015 and one cool water species (burbot) was sampled in 2014. Beaver activity was noted during the summer of 2015 and may be a plausible explanation for the absence of cold water taxa observed in 2014. Three cold water macroinvertebrate taxa (*Heterotrissocladius, Lype diversa,* and *Amphinemura*) were collected and with these individuals comprising 1.9-2.3% of the samples (2.1-5.3% of taxa).

Fish data: 14RN098, 7/23/2014					
Common Name	**CN Code**	**Min**	**Max**	**Weight**	**Number**
central mudminnow	CNM	46	54	2	2
burbot	BUB	198	198	52	1

Fish data: 14RN098, 8/12/2014					
Common Name	**CN Code**	**Min**	**Max**	**Weight**	**Number**
central mudminnow	CNM	68	83		9
mottled sculpin	MTS	85	85		1
northern pike	NOP	95	95		1
white sucker	WTS	200	200		1

FieldNum	14RN098	14RN098
WBName	Larch Creek	Larch Creek
VisitNum	20132533	20152759
Season	2014	2015
WQTime	4:01:00 PM	9:04:00 AM
TempH2O (deg C)	17.4	16.7
Coldwater Taxa Richness	3	1
Coldwater Taxa Percent (%)	5.3	2.1
Coldwater Macroinvertebrate Taxa		
Amphinemura	2	
Heterotrissocladius	2	6
Lype diversa	1	

MPCA water temperature data

A continuously-recording stream temperature logger was deployed in this reach by the MPCA during the summers of 2014 and 2015. Summary data for the logger deployment can be found in the table to the right. "No Growth", "Growth," "Stress," and "Lethal" temperature ranges are specific to brook trout and the date range for these summary statistics is June 1 to August 31.

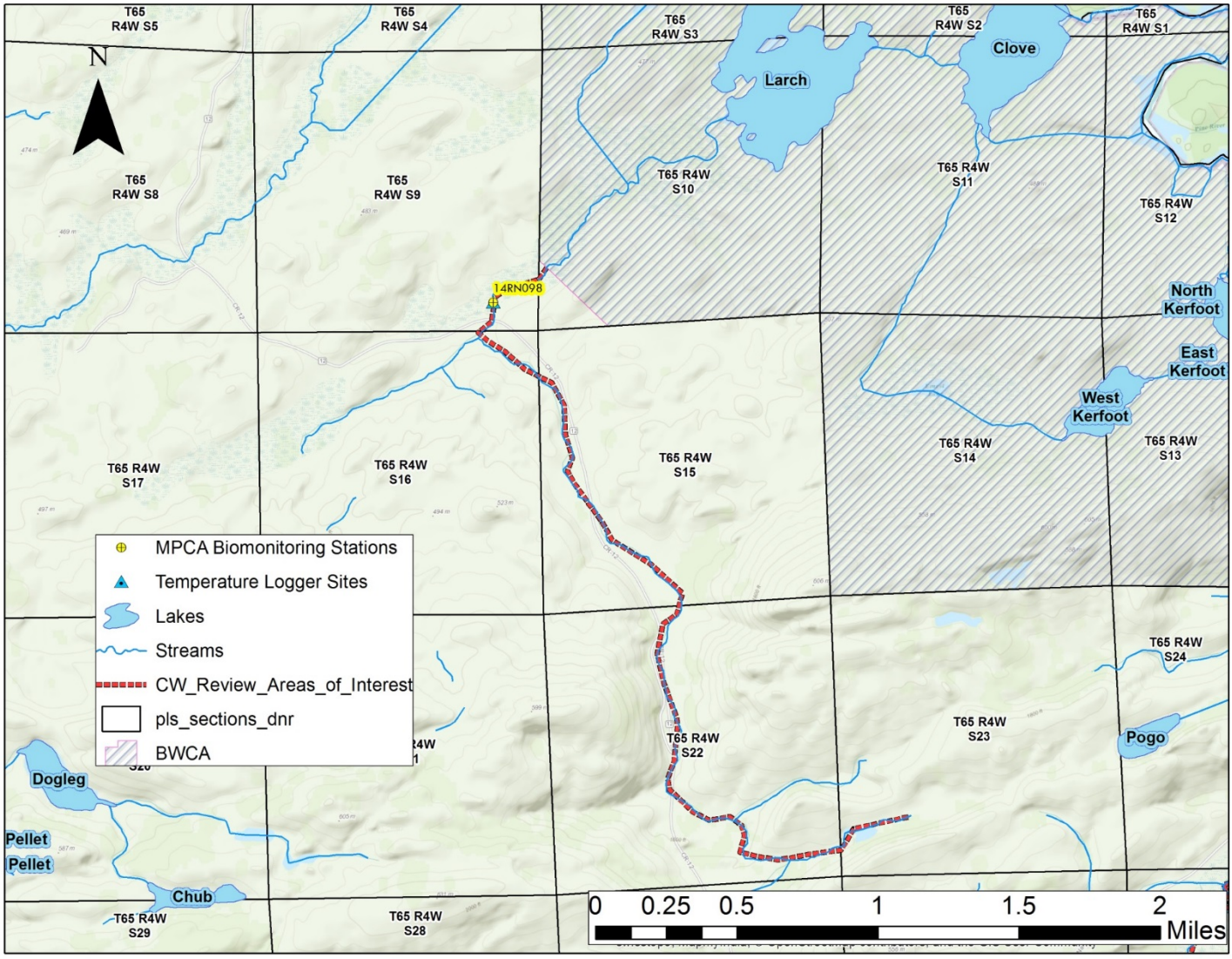
TempLogNum	4717	5128
FieldNum	14RN098	14RN098
WBName	Larch Creek	Larch Creek
Season	2014	2015
Interval (Min)	15	30
Percent (%) Recording	78.3%	35.9%
BKT_No Growth	0.0%	0.0%
BKT_Growth	97.7%	100.0%
BKT_Stress	2.3%	0.0%
BKT_Lethal	0.0%	0.0%
SummerAvgTemp (deg C)	16.3	15.4
JuneAvgTemp (deg C)	16.0	15.3
JulyAvgTemp (deg C)	16.8	16.7
AugustAvgTemp (deg C)	15.9	-

DNR information

The DNR classifies Larch Creek as a warm water stream and does not have any information on this stream.

MPCA Summary

No information regarding the past management of Larch Creek was available from the DNR. A more recent biological monitoring survey was conducted at mile 1.5 by the MPCA in 2014 and 2015. Two fish surveys were conducted during the summer of 2014 and sampled a community with some cold (mottled sculpin) and cool (burbot) water species. In addition, the MPCA macroinvertebrate survey from 2014 contained 3 cold water obligate taxa, and one from the summer of 2015. Beaver activity was noted during the summer of 2015 and may be a plausible explanation for the reduced number of cold water taxa observed in 2015. A continuous-recording stream temperature logger was deployed in this reach by the MPCA during the summer of 2014 and 2015. Although only 78.3% of the summer (June-August) was recorded in 2014, a high percentage (97.7%) of this time was within the growth range for brook trout and demonstrated that the thermal regime may be supportive of a brook trout fishery; thermal stress was recorded 2.3% of the time and lethal threshold reached 0.0%. Temperature data from 2015 was incomplete, with only the month of June and 3 days of July recorded, with 100% of the measurements within the growth range for brook trout. The summer average temperature for 2014 was 16.3°C and for 2015 it was 15.4°C.

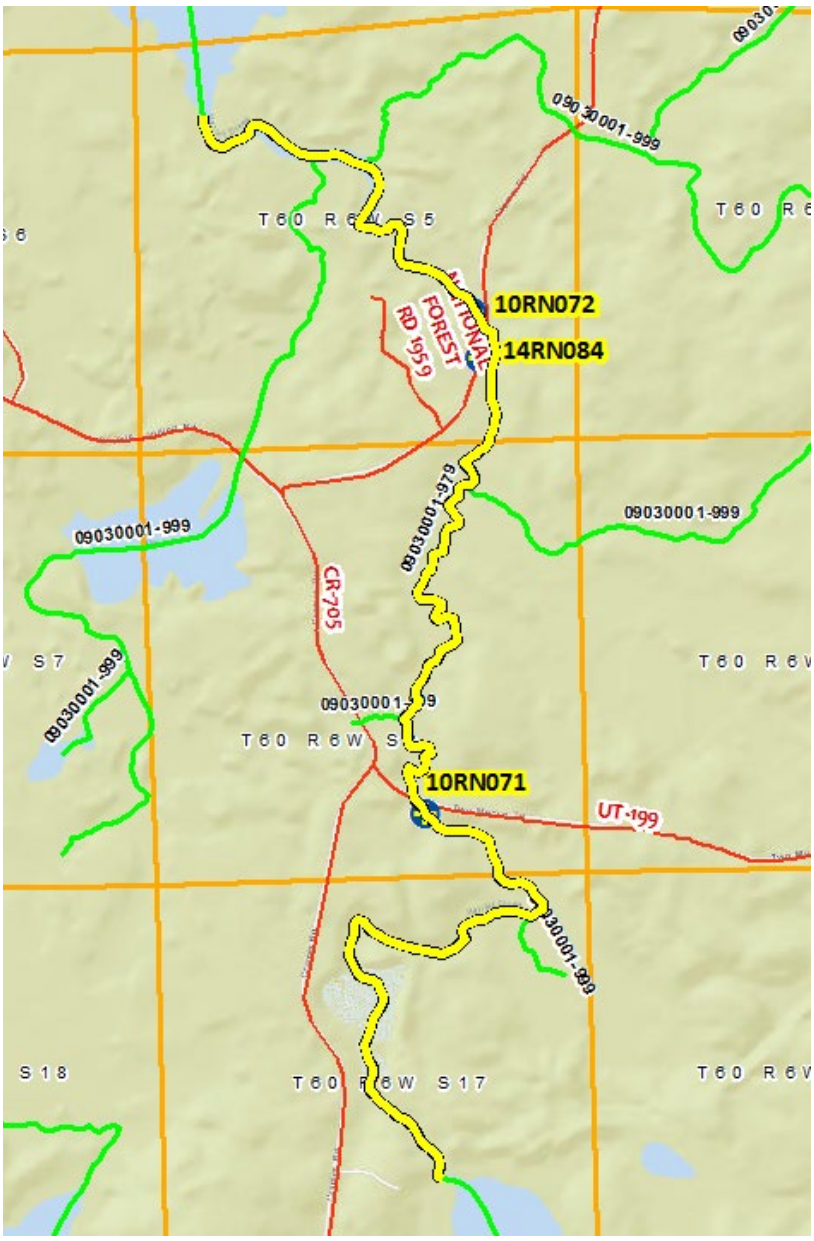

T65 R4W S5
T65 R4W S4
T65 R4W S3
T65 R4W S2
T65 R4W S1
N
Larch
Clove
T65 R4W S8
T65 R4W S9
T65 R4W S10
T65 R4W S11
T65 R4W S12
14RN098
North Kerfoot
East Kerfoot
West Kerfoot
T65 R4W S17
T65 R4W S16
T65 R4W S15
T65 R4W S14
T65 R4W S13
MPCA Biomonitoring Stations
Temperature Logger Sites
Lakes
Streams
CW_Review_Areas_of_Interest
pls_sections_dnr
BWCA
T65 R4W S24
T65 R4W S23
T65 R4W S22
Pogo
Dogleg
Pellet
Pellet
Chub
T65 R4W S29
T65 R4W S28
0 0.25 0.5 1 1.5 2
Miles

Harriet Creek (09030001-979) MPCA Use Designation Review

Stream name: Harriet Creek
AUID(s): 09030001-979
AUID description: Harriet Lake to Silver Island Lake
Tributaries: NA
MPCA biomonitoring site(s): 14RN098
MPCA monitoring date(s): 2014 & 2015
Watershed: Rainy River-Headwaters
County: Lake

DNR Designation: Not a designated trout water
DNR management class: None/warm water

AUID Use Class: 2Bg (warm water)
Reason for review: Macroinvertebrate assemblage and water temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.



Map of Harriet Creek (09030001-979)

Monitoring and Management History

MPCA monitoring data

MPCA biological data

Fish and macroinvertebrates were sampled in 2014 and 2015 from 14RN084. The fish community sampled included a single cold water species (mottled sculpin) in low numbers and 2 cool water species (longnose dace and pearl dace). Although the data were not reportable, the US Forest Service also collected fish samples from 2 additional sites (10RN071, 10RN072) on this stream in 2010 and 2011. The US Forest Service fish samples had a similar composition compared to the MPCA samples with that addition of 2 cool water species (burbot and brook stickleback). The macroinvertebrate samples included 6 cold water taxa (*Glossosoma nigrior, Eukiefferiella, Boyeria grafiana, Leuctra, Rhyacophila, Lype diversa*) with individuals comprising 3.5-3.6% of the sample (4.1-11.3% of taxa).

FieldNum	14RN084	14RN084
WBName	Harriet Creek	Harriet Creek
VisitNum	20141269	20151652
WQTime	3:32:00 PM	9:21:00 AM
TempH2O (deg C)	24.7	14.4
Distance Fished (m)	175	175
Time Fished (sec)	2440	4551
GearType	BPLR24	BPLR24
blacknose dace		2
common shiner		1
creek chub	11	3
Iowa darter	1	
logperch	2	
longnose dace	9	33
mottled sculpin	1	3
pearl dace	2	7
pumpkinseed	2	
white sucker	1	

FieldNum	14RN084	14RN084
WBName	Harriet Creek	Harriet Creek
VisitNum	20132530	20152758
Season	2014	2015
WQTime	10:55:00 AM	8:37:00 AM
TempH2O (deg C)	16.7	19.9
Coldwater Taxa Richness	6	2
Coldwater Taxa Percent (%)	11.3	4.1
Coldwater Macroinvertebrate Taxa		
Boyeria grafiana	2	
Eukiefferiella	2	
Glossosoma nigrior	1	9
Leuctra	3	2
Lype diversa	1	
Rhyacophila	2	

MPCA water temperature data

A continuously-recording stream temperature logger was deployed in this reach by the MPCA during the summer of 2015. Summary data for the logger deployment can be found in the table to the right. "No Growth", "Growth," "Stress," and "Lethal" temperature ranges are specific to brook trout; the date range for these summary statistics is June 1 to August 31.

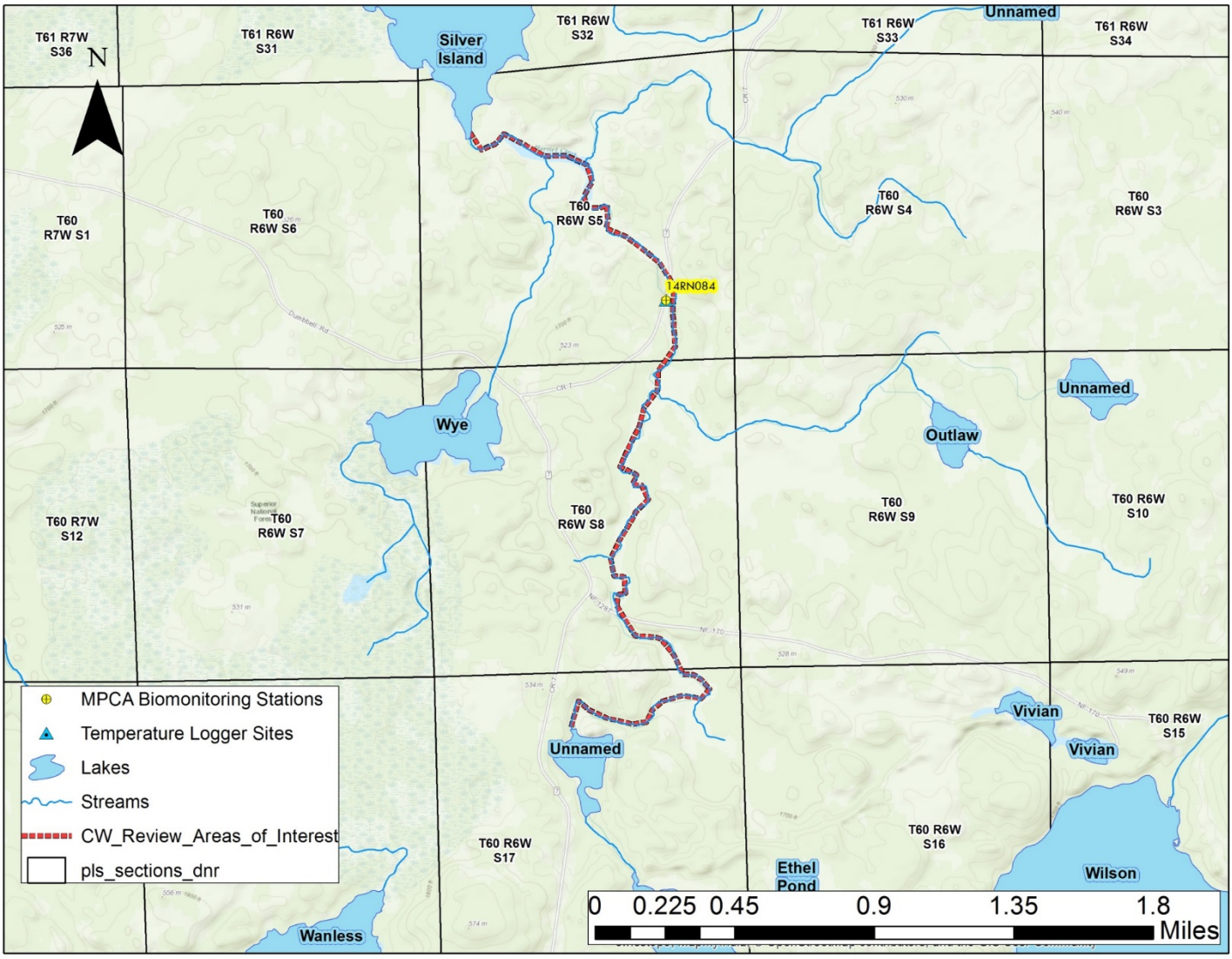
TempLogNum	5127
FieldNum	14RN084
WBName	Harriet Creek
Season	2015
Interval (Min)	30
Percent (%) Recording	1
BKT_No Growth	0.0%
BKT_Growth	70.9%
BKT_Stress	27.7%
BKT_Lethal	1.5%
SummerAvgTemp (deg C)	18.3
JuneAvgTemp (deg C)	16.4
JulyAvgTemp (deg C)	20.3
AugustAvgTemp (deg C)	18.1

DNR information

Fish community surveys were conducted by the DNR in 1968 (mile 1.30, 2.30, & 3.50) and 2002 (mile 2.25 & 2.30) and did not collect any cold water fish species.

MPCA Summary

The DNR currently classifies the section of Harriet Creek, from Harriet Lake to Silver Island Lake, as warm water stream. DNR fish surveys in 1968 and 2002 did not collect any cold water fish species. Additional information regarding past DNR management of Harriet Creek is limited. Both the MPCA fish and macroinvertebrate surveys, along with continuous temperature data, indicate a reasonable potential for this reach to support cold water biological communities. The MPCA macroinvertebrate survey from 2014 contains 6 cold water taxa, including a state threatened species (*Boyeria grafiana*). The 2015 macroinvertebrate contains 2 of these same taxa. Although not strongly indicative of a cold water community, fish samples were dominated by cool (longnose and pearl dace) and cold (mottled sculpin) water species. Fish community surveys by the US Forest Service fish from two additional stations in 2010 and 2011 were similar to the samples collected by the MPCA. Temperature data was collected from mile 1.30 and indicated that the thermal regime is potentially sufficient to support brook trout, with thermal stress recorded 27.7% of the time and lethal threshold reached 1.5% of the time during the summer (June through August) of 2015. The summer average temperature during 2015 was 18.1^{o}C.


T61 R7W S36
T61 R6W S31
Silver Island
T61 R6W S32
T61 R6W S33
Unnamed
T61 R6W S34
N
T60 R7W S1
T60 R6W S6
T60 R6W S5
14RN084
T60 R6W S4
T60 R6W S3
Wye
Unnamed
Outlaw
T60 R7W S12
T60 R6W S7
T60 R6W S8
T60 R6W S9
T60 R6W S10
MPCA Biomonitoring Stations
Temperature Logger Sites
Lakes
Streams
CW_Review_Areas_of_Interest
pls_sections_dnr
Unnamed
Vivian
Vivian
T60 R6W S15
T60 R6W S17
T60 R6W S16
Ethel Pond
Wilson
Wanless
0 0.225 0.45 0.9 1.35 1.8
Miles

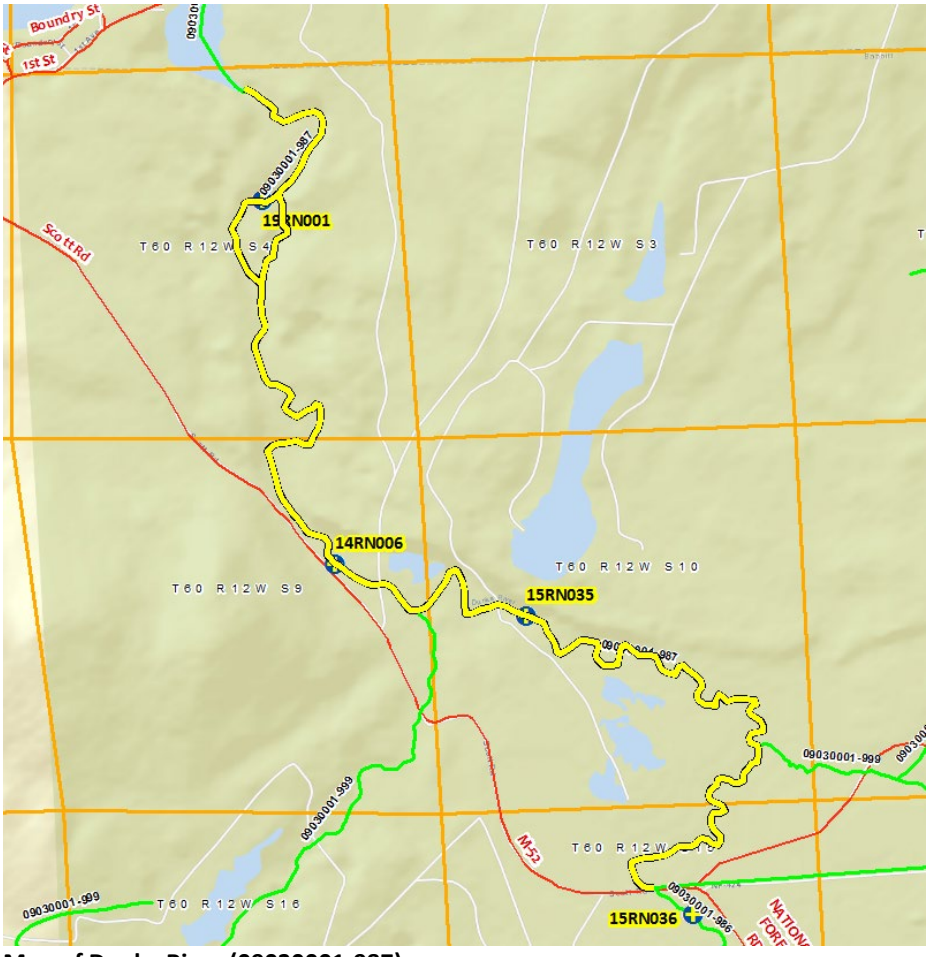
Dunka River (09030001-986 and -987) MPCA Use Designation Review

Stream name: Dunka River
AUID(s): 09030001-986 and 09030001-987 (parent: 09030001-513)
AUID description: 09030001-986 - Headwaters to Unnamed ditch;
09030001-987 - Unnamed ditch to Birch Lk
Tributaries: NA
MPCA biomonitoring site(s): 09030001-986 - 15RN037, 14RN065, and 15RN036;
09030001-987 - 15RN035, 14RN006, and 19RN001.
Watershed: Rainy River-Headwaters
County: St. Louis

DNR designation: Not a designated trout water
DNR management class: None/warm water

AUID use class: 2Bg (warm water)
Reason for review: Fish, macroinvertebrate, and water temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.

Additional information: When this review was initiated, this WID was 09030001-513. As a result of this review, it was recommend that only part of this WID be designated a cold water habitat which required a WID split. The two child WIDs are 09030001-986 and 09030001-987. 09030001-987 is recommended for cold water designation with 09030001-986 retaining the current warm water designation. This document contains data from both child WIDs and a tributary (09030001-603), but is largely focused on compiling evidence for the cold water designation of 09030001-987. The data from these two reaches are presented separately below.



Map of Dunka River (09030001-987)

09030001-987 Monitoring and Management History

MPCA monitoring data

MPCA biological data

Fish were sampled from three stations on 09030001-987 in 2014 (14RN006[2x]), 2015 (15RN035, 14RN006), and 2019 (19RN001). Two cold water fish species (brook trout and mottled sculpin) and 5 cool water species (longnose dace, brook stickleback, northern redbelly dace, finescale dace, and pearl dace) were sampled in this reach. Cold water species individuals comprised 3.0-10.3% of the samples and cold + cool water species comprised 12.4-41.6% of the samples. Some young-of-the-year brook trout were sampled indicating natural reproduction in this reach. Macroinvertebrates were sampled from two stations in on 09030001-987 in 2014 (14RN006) and 2015 (15RN035, 14RN006). Two cold water macroinvertebrate taxa (*Eukiefferiella, Ephemerella*) were sampled and individuals comprised 0.0-7.6% of the samples.

Fish: 15RN035, 6/24/2015

Common Name	#	Weight	Length Min	Length Max
longnose dace	42	358	61	132
blacknose dace	40	172	49	91
white sucker	12	720	71	266
common shiner	11	109	69	143
creek chub	10	110	50	126
johnny darter	6	9	46	64
brook stickleback	4	6	50	54
mottled sculpin	4	54	73	119
northern redbelly dace	3	5	50	59
pearl dace	1	1	60	60

Metric	Cold	Cold Cool	Cool	Salmonid
Taxa Number	1	5	4	0.0
Percent Individuals	3.0	41.6	37.6	0.0
Taxa Percent	10.0	50.0	40.0	0.0

Macroinvertebrates: 15RN035, 8/18/2015

Eukiefferiella; 2.6% individuals

Fish: 14RN006, 7/01/14

Common Name	#	Weight	Length Min	Length Max
creek chub	96	417	33	141
blacknose dace	54	148	45	83
common shiner	47	134	34	102
white sucker	41	1266	77	285
fathead minnow	24	59	36	70
northern redbelly dace	16	23	34	52
brook stickleback	10	20	47	55
johnny darter	10	16	42	54
central mudminnow	9	98	63	100
mottled sculpin	9	25	45	94
brook trout	2	450	249	289
longnose dace	2	15	57	74
blacknose shiner	1	6	57	57
finescale dace	1	4	67	67
hybrid *Phoxinus*	1	8	86	86

Metric	Cold	Cold Cool	Cool	Salmonid
Taxa Number	2	6	4	1
Percent Individuals	3.4	12.4	9.0	0.6
Taxa Percent	14.3	40.0	26.7	7.1

Fish: 14RN006, 8/19/14

Common Name	#	Weight	Length Min	Length Max
creek chub	180	1461	30	197
blacknose dace	99	281	35	87
brook stickleback	84	84	31	64
northern redbelly dace	84	142	29	77
common shiner	76	176	41	92

Metric	Cold	Cold Cool	Cool	Salmonid
Taxa Number	2	7	5	1
Percent Individuals	2.2	27.5	25.2	0.3
Taxa Percent	13.3	46.7	33.3	6.7

white sucker	69	3663	47	284
central mudminnow	68	332	36	106
johnny darter	47	57	37	64
longnose dace	23	64	39	119
fathead minnow	15	44	27	76
mottled sculpin	15	55	40	86
brook trout	2	103	178	179
blacknose shiner	1	2	48	48
finescale dace	1	3	56	56
pearl dace	1	2	44	44

Fish: 14RN006, 9/22/15

Common Name	#	Weight	Length Min	Length Max
common shiner	107	106	25	85
longnose dace	35	131	40	115
white sucker	20	662	45	215
creek chub	16	87	38	112
mottled sculpin	16	78	30	85
blacknose dace	14	32	30	78
johnny darter	14	19	37	60
brook trout	4	922	138	370
brook stickleback	1	1	38	38

Metric	Cold	Cold Cool	Cool	Salmonid
Taxa Number	2	4	2	1
Percent Individuals	8.8	24.7	15.9	1.8
Taxa Percent	22.2	44.4	22.2	11.1

Macroinvertebrates: 14RN006, 8/19/2014
Eukiefferiella and *Ephemerella*; 7.6% individuals

Macroinvertebrates: 14RN006, 8/18/2015
No cold water taxa; 0.0% individuals

Fish: 19RN001, 9/3/2019

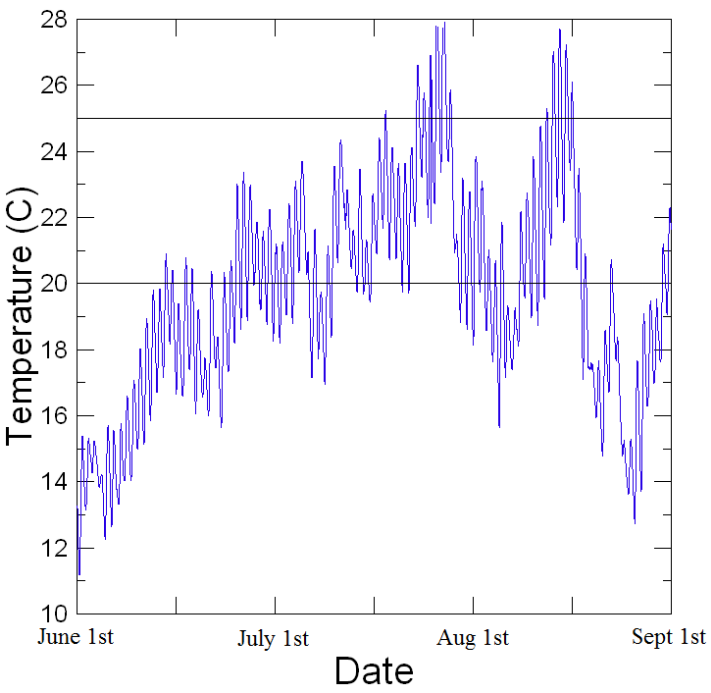
Common Name	#	Weight	Length Min	Length Max
creek chub	80		39	179
longnose dace	44		42	131
common shiner	37		34	139
brook trout	25		74	241
blacknose dace	22		36	99
white sucker	22		53	282
logperch	11		83	114
smallmouth bass	11		57	96
johnny darter	6		38	71
mottled sculpin	2		46	83
blacknose shiner	1		56	56

Metric	Cold	Cold Cool	Cool	Salmonid
Taxa Number	2	3	1	1
Percent Individuals	10.3	27.2	16.9	9.6
Taxa Percent	18.2	27.3	9.1	9.1

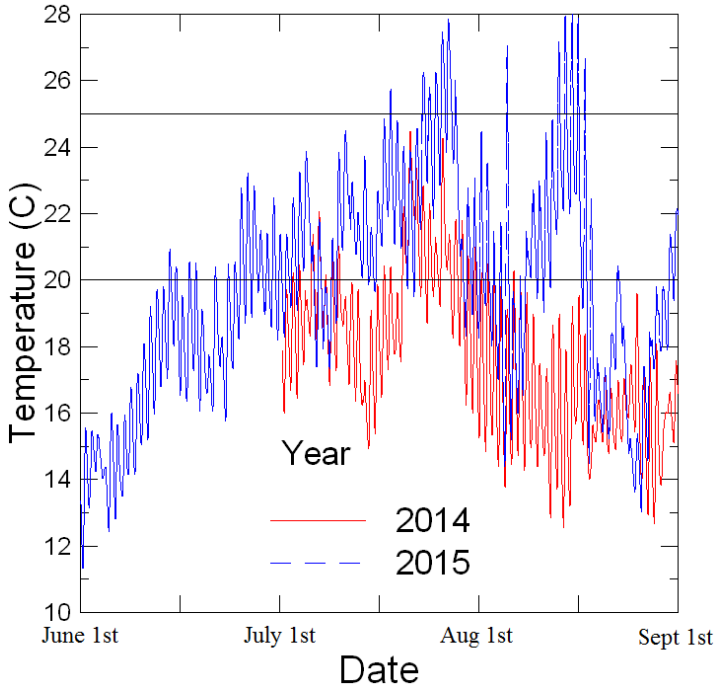
Macroinvertebrates: 19RN001: not sampled

MPCA water temperature data
Water temperature was measured with data loggers from one station in 2014 and two stations in 2015. These results are summarized below.

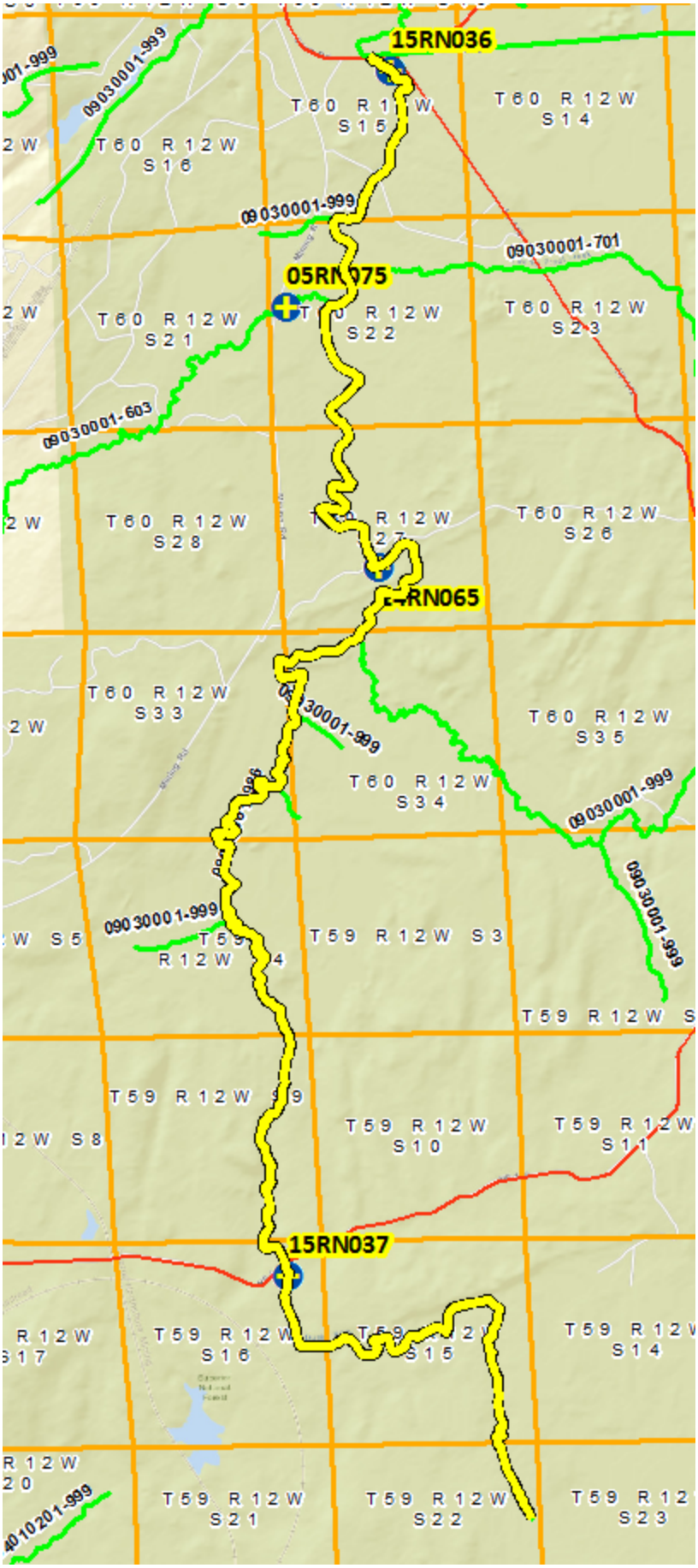
Field Number	Year	% Growth Days	% Stress Days	% Lethal Days	Summer Avg Temp (◦C)	June Avg Temp (◦C)	July Avg Temp (◦C)	Aug. Avg Temp (◦C)	% Days Recording
15RN035	2015	52.6%	42.0%	5.4%	19.7	17.5	22.0	19.6	100%
14RN006	2014	82.5%	17.5%	0%	17.7	-	19.3	16.2	67.4%
14RN006	2015	52.9%	42.0%	5.1%	19.7	17.5	22.0	19.5	100%



15RN035: 2015



14RN005: 2014, 2015



Map of Dunka River (09030001-986)

09030001-986 Monitoring and Management History

MPCA monitoring data

MPCA biological data

Fish: 15RN037, 9/21/2015

Common Name	#	Weight	Length Min	Length Max
common shiner	15	53	51	87
creek chub	7	17	41	77
blacknose dace	3	27	72	91
fathead minnow	2	2	57	60
pearl dace	2	18	95	102
brook stickleback	1	1	44	44
johnny darter	1	1	59	59
northern redbelly dace	1	1	46	46
white sucker	1	64	50	50

Metric	Cold	Cold Cool	Cool	Salmonid
Taxa Number	0	2	2	0
Percent Individuals	0	9.1	9.1	0
Taxa Percent	0	22.2	22.2	0

Macroinvertebrates: 15RN037, 8/26/2015

Ephemerella, Aquarius, and *Glossosoma*; 7.1% individuals

Fish: 14RN065, 8/7/2014

Common Name	#	Weight	Length Min	Length Max
northern redbelly dace	257	287	30	86
common shiner	214	199	29	103
creek chub	152	1219	34	175
white sucker	110	1242	25	287
brook stickleback	52	64	33	56
johnny darter	46	61	25	65
blacknose dace	43	186	54	95
finescale dace	31	80	29	80
fathead minnow	20	46	45	71
central mudminnow	12	45	47	95
brassy minnow	8	27	61	79
blacknose shiner	3	4	63	66
pearl dace	3	3	32	56
mottled sculpin	2	12	73	80
tadpole madtom	1	0.5	21	21

Metric	Cold	Cold Cool	Cool	Salmonid
Taxa Number	1	7	3	0.0
Percent Individuals	0.2	37.0	36.8	0.0
Taxa Percent	6.7	46.7	40.0	0.0

Macroinvertebrates: 14RN065, not sampled

Fish: 15RN036, 10/5/2015

Common Name	#	Weight	Length Min	Length Max
white sucker	94	6597	41	374
common shiner	22	40	31	77
creek chub	19	89	40	150
blacknose dace	8	29	34	86
brook stickleback	6	10	29	54
blacknose shiner	4	8	48	68
central mudminnow	3	15	62	74
finescale dace	2	9	62	68
brassy minnow	1	0.5	49	49
northern redbelly dace	1	1	47	47

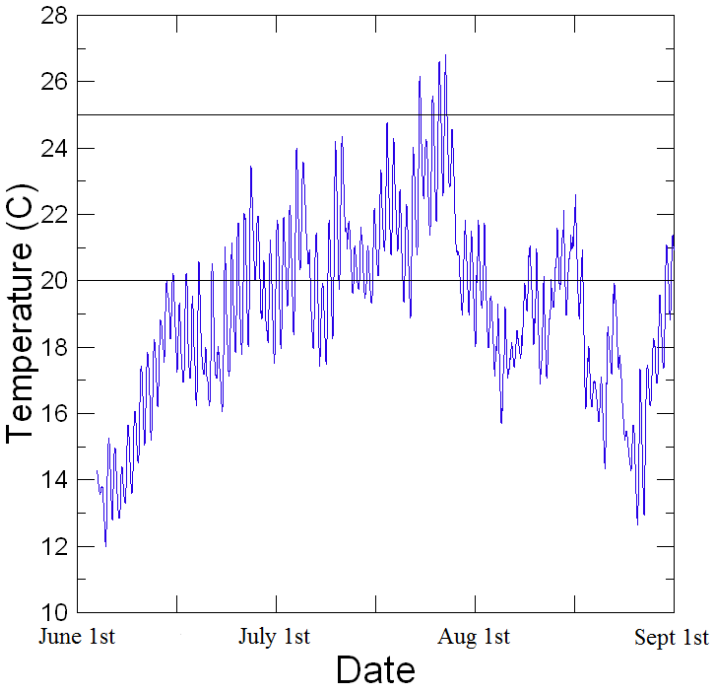
Metric	Cold	Cold Cool	Cool	Salmonid
Taxa Number	0.0	4	4	0.0
Percent Individuals	0.0	6.3	6.3	0.0
Taxa Percent	0.0	25.0	25.0	0.0

Macroinvertebrates: 15RN036, 8/18/2015
No cold water taxa; 0.0% individuals

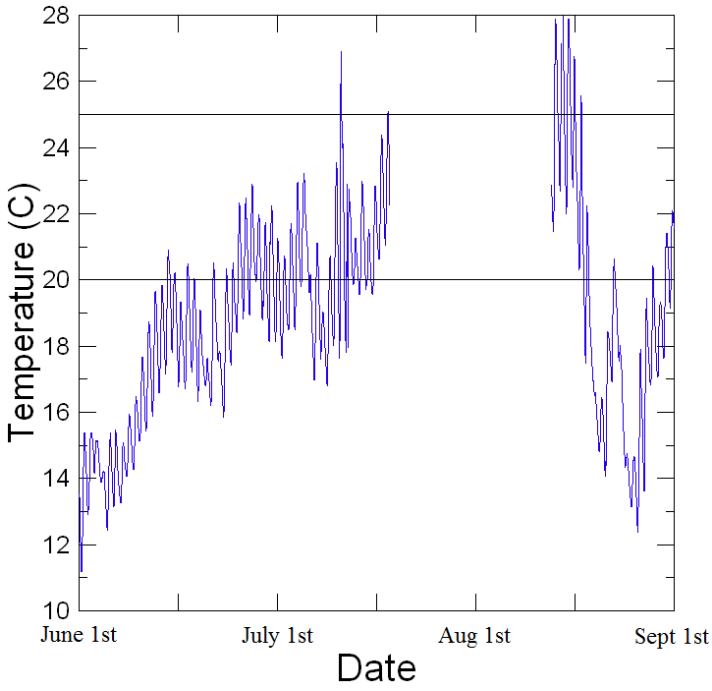
MPCA water temperature data

Water temperature was measured with data loggers from two stations in 2015. These results are summarized below.

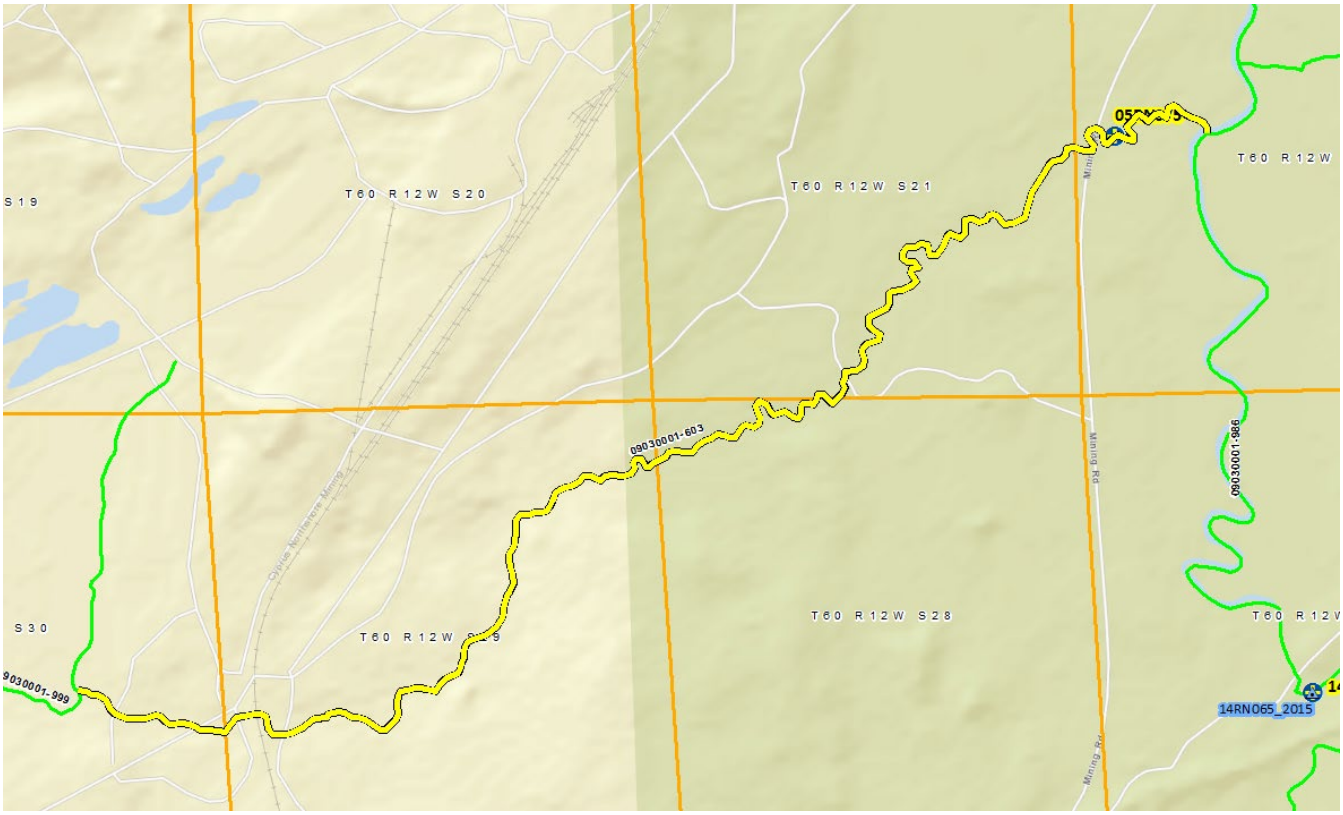
Field Number	Year	% Growth Days	% Stress Days	% Lethal Days	Summer Avg Temp (◦C)	June Avg Temp (◦C)	July Avg Temp (◦C)	Aug. Avg Temp (◦C)	% Days Recording
14RN065	2015	62.1%	36.4%	1.5%	19.1	17.5	21.4	18.2	96.7%
15RN036	2015	65.8%	30.8%	3.4%	18.8	17.4	20.5	19.2	72.8%



14RN065, 2015



15RN036, 2015



Map of unnamed creek (09030001-603)

09030001-603 Monitoring and Management History

MPCA monitoring data

MPCA biological data

Fish: 05RN075, 6/29/2005

Common Name	#	Weight	Length Min	Length Max
brook stickleback	99	71.5	25	53
northern redbelly dace	49	43.5	26	54
white sucker	45	573	54	215
fathead minnow	30	33	28	73
creek chub	27	130	42	133
common shiner	24	23	33	62
central mudminnow	22	85	42	92
blacknose shiner	19	30	45	61
blacknose dace	18	40	32	77
finescale dace	9	20	32	76
johnny darter	5	6	47	58
pearl dace	1	3.5	66	66

Metric	Cold	Cold Cool	Cool	Salmonid
Taxa Number	0.0	4	4	0.0
Percent Individuals	0.0	45.4	45.4	0.0
Taxa Percent	0.0	33.3	33.3	0.0

Fish: 05RN075, 8/17/2005

Common Name	#	Weight	Length Min	Length Max
brook stickleback	78	44	25	54
northern redbelly dace	70	83.5	25	68
blacknose dace	41	64	31	84
central mudminnow	41	160	43	91
fathead minnow	37	65.5	39	75
creek chub	36	103	36	105
pearl dace	20	42	41	70

Metric	Cold	Cold Cool	Cool	Salmonid
Taxa Number	0.0	5	5	0.0
Percent Individuals	0.0	48.6	48.6	0.0
Taxa Percent	0.0	35.7	35.7	0.0

common shiner	12	6.5	32	55
blacknose shiner	10	19.5	42	66
finescale dace	6	12.5	47	67
johnny darter	5	13.5	49	61
white sucker	3	10.5	70	72
brassy minnow	2	6	63	75
tadpole madtom	1	1	95	95

Macroinvertebrates: 05RN075, 8/9/2005 (data not assessable due to wetland characteristics)
No cold water taxa; 0.0% individuals

DNR information

The Dunka River is not designated as a trout stream. Community-based fish surveys were completed by the DNR in 1968 and 1975, which indicated that the lower reaches contained some cold water fish species (mottled sculpin), while the upper reaches were dominated by cool/warm water species. The DNR surveyed the Dunka River is in 2015. Much of the DNR's findings coincide with MPCA data as much of the sampling effort was coordinated between the agencies. The DNR did some sampling independently in some additional stream segments and did not find trout in any of these stream segments. The DNR's additional sampling included gillnetting immediately downstream of the Tomahawk Rd crossing and gillnetting with several sets several miles upstream of the same crossing. The DNR is not currently pursuing a trout designation for the Dunka River, but may consider such a designation in the future.

MPCA Summary

The DNR currently classifies the entire Dunka River, from the headwaters to Birch Lake, as warm water. Community-based fish surveys were completed by the DNR in 1968 and 1975, which indicated that the lower reaches contained some cold water fish species (mottled sculpin), while the upper reaches were dominated by cool/warm water species. More recent biological monitoring surveys conducted by the MPCA in 2014, 2015, and 2019, sampled brook trout at most stations. Some young-of-the-year brook trout were sampled, indicating that natural reproduction of trout is occurring in the lower reaches of the Dunka River. Mottled sculpin and several other cool water fish species (longnose dace, brook stickleback, northern redbelly dace, finescale dace, and pearl dace) were also present in this reach. The DNR has no records of stocking trout in the Dunka River but stocking did occur in nearby streams during the mid-1970s. This does not necessarily mean that the Dunka River was not stocked during this time period but only that they do not have any records. The MPCA also collected temperature data from mile 1.9 and 2.6 during the summers of 2014 and 2015. Temperature data from mile 1.9 indicates that the thermal regime is supportive of a brook trout fishery with water temperatures in the growth range for brook trout 82.5% of the summer (June through August) in 2014. The thermal regime at miles 1.9 and 2.6 during 2015 were more marginal for trout with temperature in the growth range for brook trout 52.6-52.9% of the summer.

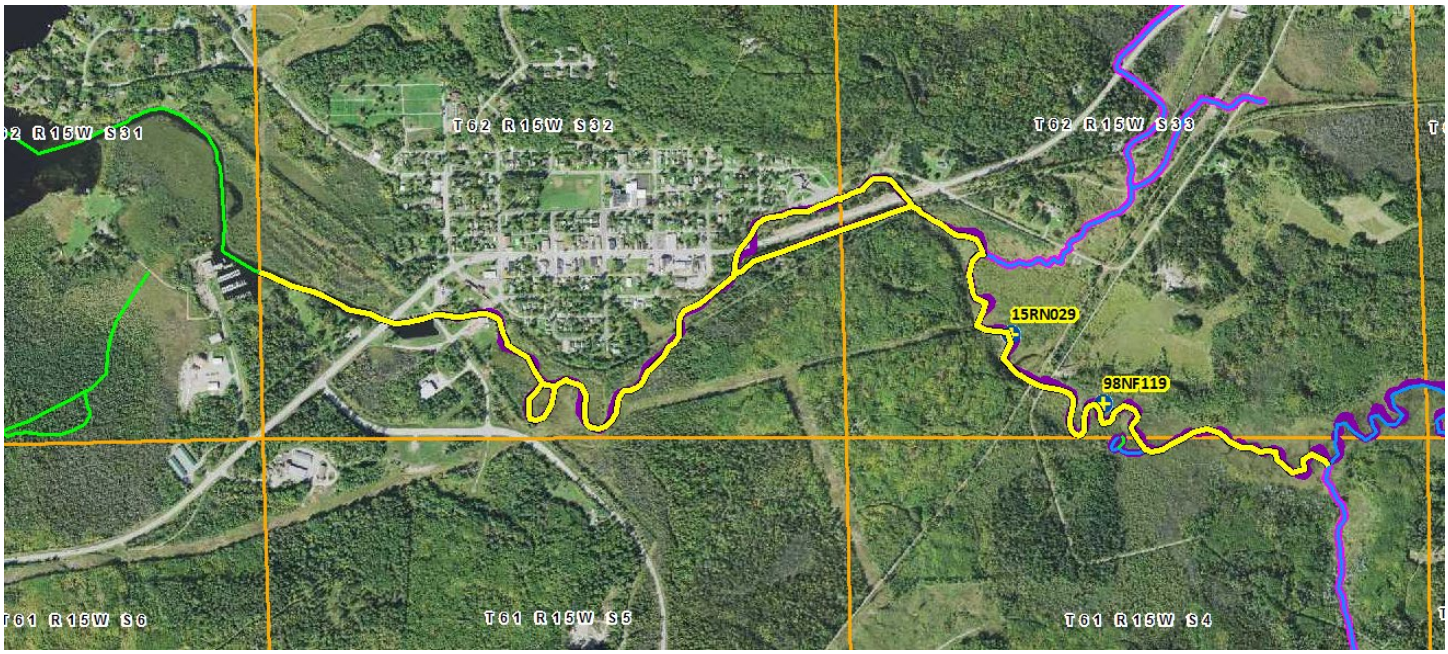
East Two River (09030002-647, -648) MPCA Use Designation Review

Stream name: East Two River
AUID: 09030002-647, 09030002-648 (parent: 09030002-504)
AUID description: 09030002-647: Headwaters (Eagles Nest Lk 2 69-0285-02) to Unnamed cr
09030002-648: Unnamed cr to T62 R15W S32, west line
Tributaries: 09030002-535, 09030002-538, 09030002-624, 09030002-625, 09030002-626, 09030002-628, and 09030002-627
MPCA biomonitoring site(s): 15RN029, 15RN028
County: St. Louis
Watershed: Vermilion River (09030002)

DNR designation: Designated trout water
DNR management class: I-C and warm water feeder

Current AUID designation: 2Ag (cold water)
Reason for review: Fish, macroinvertebrate, and temperature data
Was this site previously reviewed? If so what were the results? AUID was not previously reviewed.

Additional information: When the review of this reach was initiated, this WID was 09030002-504. As a result of reviewing these data, it was determined that a WID split was needed to recognize that part of this original WID does not and cannot support a cold water habitat. Data from both 09030002-647 and 09030002-648 are presented in this review, but the use review is largely focused on 09030002-648 because the current cold water use designation is recommended to be retained for 09030002-647.



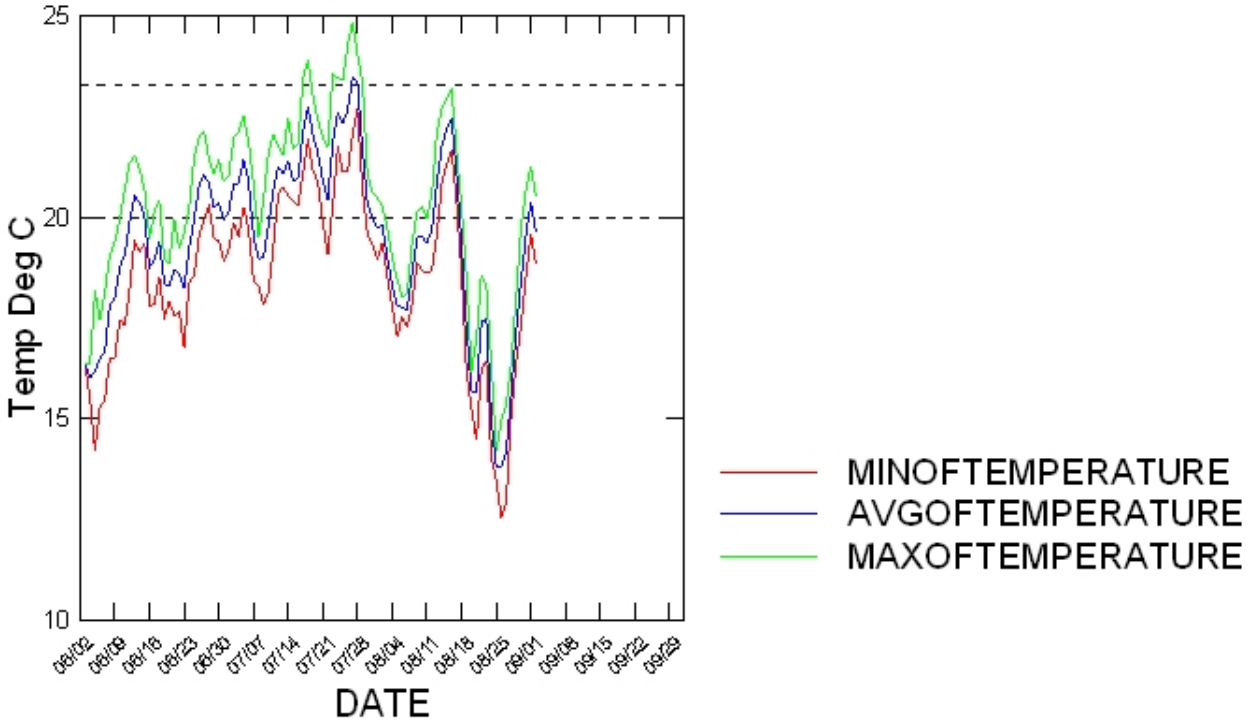
Map of East Two River (09030002-648)

Monitoring
MPCA surveys
09030002-648
The WID 09030002-648 included the monitoring station 15RN029 which was visited in 2015 and 2016. In 2015 it was determined to be impounded and it was not sampled for either fish or macroinvertebrates. In 2016 both fish and macroinvertebrates were sampled. Neither sampled assemblage included any cold water taxa. Four cool water fish species (northern redbelly dace, finescale dace, pearl dace, and brook stickleback) were sampled. Two temperature measurements were made during biological visits and a temperature logger was deployed in 2015. A temperature logger

was deployed in 2015. Based on temperature logger data, mean July water temperature was 21.2°C and temperatures were in the stressful range for trout for 44.3% of the summer.

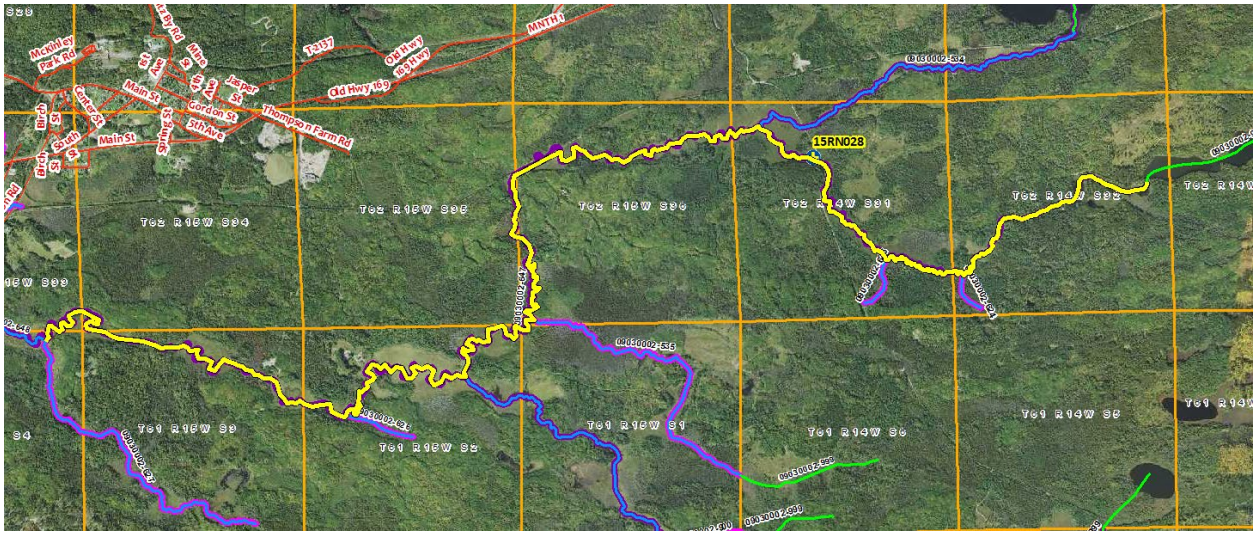
Station	Date	Time	Water Temperature (°C)
15RN029	9/14/2016	1655	14.8
15RN029	9/20/2016	0945	14.1

Field Number	Year	% Growth Days	% Stress Days	% Lethal Days	Summer Avg Temp (◦C)	June Avg Temp (◦C)	July Avg Temp (◦C)	Aug. Avg Temp (◦C)	% Days Recording
15RN029	2015	55.7	44.3	0.0	19.4	18.9	21.2	18.2	96.8%



Plot of summer water temperatures from 15RN029 during 2015.

Fish data: 15RN029, 9/20/2016					
Common Name	CN Code	Min	Max	Weight	Number
brook stickleback	BST	36	57	61	115
common shiner	CSH	37	91	56	60
central mudminnow	CNM	32	95	109	54
white sucker	WTS	60	260	399	28
blacknose dace	BND	33	48	10	11
pearl dace	PRD	38	42	6	5
finescale dace	FND	30	45	3	4
smallmouth bass	SMB	79	99	34	3
largemouth bass	LMB	70	109	26	2
northern redbelly dace	NRD	27	32	3	2
northern pike	NOP	485	485	815	1



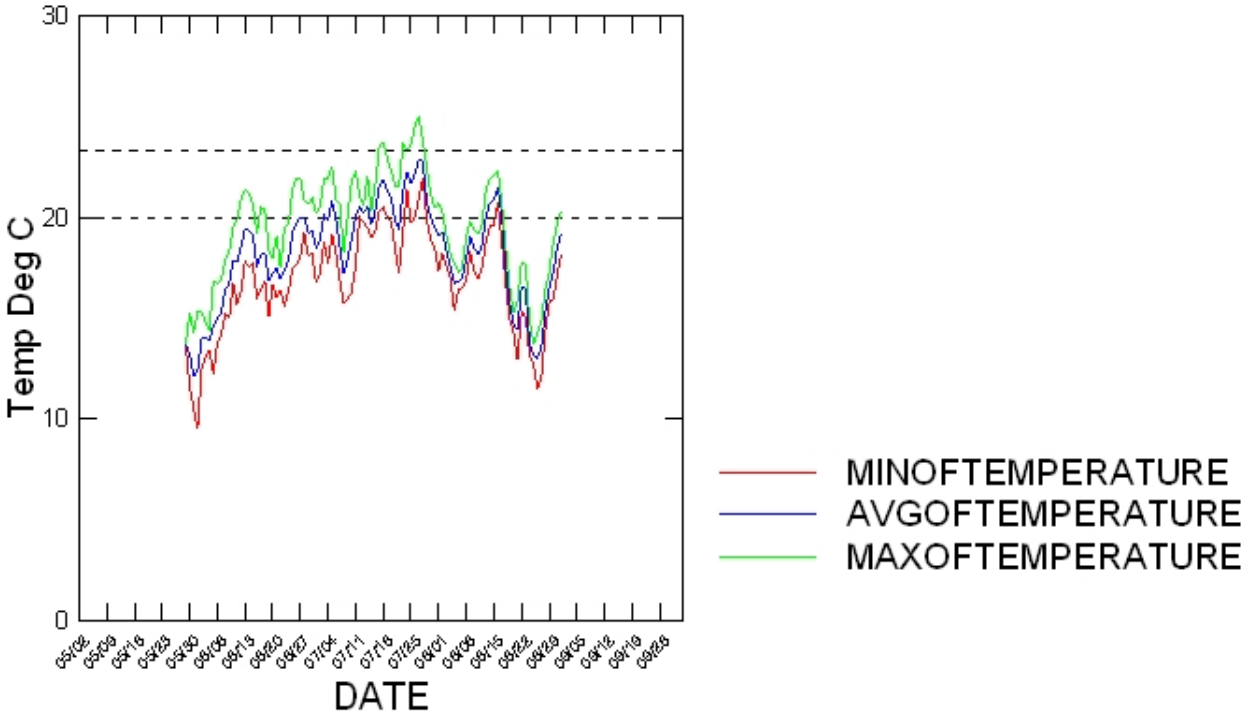
Map of East Two River (09030002-647)

09030002-647

The WID 09030002-647 included the monitoring station 15RN028. This station was visited in 2015 and sampled for fish and macroinvertebrates. The macroinvertebrates included a single cold water individual (*Heterotrissocladius*). The fish were sampled twice and a single cold water species was collected (mottled sculpin). In addition, 3 cool water taxa were collected (burbot, northern redbelly dace, and pearl dace). Three temperature measurements were made during biological visits and a temperature logger was deployed in 2015. Based on temperature logger data, the mean July water temperature was 20.3°C and waters temperatures were in the stressful range for trout for 29.3% of the summer.

Station	Date	Time	Water temperature (°C)
15RN028	8/18/2015	1956	17.6
15RN028	6/23/2015	1804	19.4
15RN028	7/8/2015	1038	17.1

Field Number	Year	% Growth Days	% Stress Days	% Lethal Days	Summer Avg Temp (◦C)	June Avg Temp (◦C)	July Avg Temp (◦C)	Aug. Avg Temp (◦C)	% Days Recording
15RN028	2015	70.7	29.3	0.0	18.3	17.3	20.3	18.3	100%



Plot of summer water temperatures from 15RN028 during 2015.

Fish data: 15RN028, 6/23/2015					
Common Name	**CN Code**	**Min**	**Max**	**Weight**	**Number**
common shiner	CSH	63	92	44	11
blacknose dace	BND	67	91	73	9
pearl dace	PRD	50	76	22	7
burbot	BUB	149	156	86	2
creek chub	CRC	89	93	18	2
mottled sculpin	MTS	49	98	18	2
northern redbelly dace	NRD	61	61	2	1

Fish data: 15RN028, 7/8/2015					
Common Name	**CN Code**	**Min**	**Max**	**Weight**	**Number**
common shiner	CSH	65	116	108	22
blacknose dace	BND	65	87	56	13
pearl dace	PRD	62	100	55	11
mottled sculpin	MTS	98	111	37	2
burbot	BUB	130	130	35	1
creek chub	CRC	117	117	24	1
largemouth bass	LMB	42	42	1	1
northern pike	NOP	305	305	151	1

DNR information

1992 Survey

Limited temperature data are available from this survey and conditions (cool and rainy) for this year were considered suboptimal for determining thermal profiles. No trout were collected in reaches which were included in 09030002-648 although slimy sculpin were present. The DNR survey notes that fish sampling for 2 of the 3 stations in 09030002-648

was difficult to effectively sample because these reaches were too deep. The 4 upstream stations included in 09030002-647, did collect brook trout (2-6 individuals) at 3 of the stations. Slimy sculpin were also collected at 2 of these stations. The report also notes that brook trout were observed spawning in this reach in 1980, but there is no confirmed natural reproduction in this stream.

Ecological classification considers the reach from Lake Vermilion to Highway 135 to be a warm water feeder. Upstream of Highway 135 to Eagles Nest 2 Lake is classified as I-C (Semi-Wild Trout). The survey notes that portions of the I-C reach are low gradient with long marshy sections which makes these reaches marginal trout waters or warm water feeders. Overall, the survey states that this stream (09030002-647 and 09030002-648) is a marginal trout stream with some higher-gradient reaches that could support populations of small, slow-growing trout.

Summary of data for 09030002-647 and 09030002-648

The MPCA and DNR studies of the East Two River both indicate that the ability to support cold water assemblages is largely limited to the upstream portions of the reach (09030002-647). MPCA conducted two fish surveys in 2015 at biological station 15RN028 in the upstream reach. Cold water taxa such as mottled sculpin were collected during both visits. The MPCA also deployed a temperature logger at this station in 2015, which indicated marginal cold water potential. The DNR conducted several fish surveys on East Two River in 1992, and the presence of trout was also limited to the upstream portions of this river. The downstream reach (09030002-648) was monitored by the MPCA in 2016 and no cold water fish or macroinvertebrate taxa were collected. The 1992 DNR survey results were similar although sculpin were collected from one station in this section of East Two River. Temperature logger data from 2015 also indicated that temperatures were not consistent with the maintenance of a cold water habitat. Discussions with the DNR resulted in a determination that for the MPCA's assessment purposes, it was appropriate to assess the biology in the downstream WID (09030002-648) as a warm water habitat and that the upstream WID (09030002-647) should be assessed as a cold water habitat.

MPCA summary

MPCA macroinvertebrate and fish surveys in 2016 did not sample any cold water species from this portion of East Two River. The MPCA's survey results are supported by a 1992 DNR survey which only collected sculpin from the same reach. A temperature logger deployed in 2015 at 15RN029, measured a mean July water temperature of 21.2°C and water temperatures in the stressful range for trout for 44.3% of the summer. Both DNR and MPCA data indicate that the upstream WID (09030002-647) at least supports a marginal cold water habitat and as such the Class 2A should be maintained for the upstream section of East Two River.