

DRAFT

Stream Management Plan

Region	County	Area	Stream Name	Alternate Name	Trib. No.	Length (mi.)	Stream Type	Species Managed
2	St. Louis	Duluth	Us-Kab-Wan-Ka River	Rush River	S-2-16-6	21.5	Coldwater	brown trout, brook trout

Long-range Goal:

1. Provide and maintain a brown trout population density of 25 fish per acre in the lower 9.1 miles of river, given average daily temperatures do not reach lethal limits to brown trout.
2. Provide conditions suitable for wild brook trout population growth with a catch-per-unit effort goal of three fish per 1000 feet electrofished, given stressful or lethal temperatures to brook trout do not exceed 20% of the total recorded hours.
3. Improve the water temperature profiles such that hours of stressful or lethal temperatures to brown and brook trout do not exceed 3% and 20% of the total recorded hours, and no daily average temperatures reach the brown trout lethal range.

Operational Plan:

1. Stock 100 brown trout fingerlings/acre (2,030 total) annually in the lower 9.1 miles of the river beginning in 2008.
2. Evaluate the efficacy of stocking efforts by surveying the Us-Kab-Wan-Ka River annually beginning in 2009 and continuing through 2011.
3. Work with the Arrowhead Fly Fishers to control beaver and remove dams to improve temperature conditions for trout.
4. Evaluate the effectiveness of beaver control efforts by continuously monitoring stream summer temperatures from 2009 through 2011. Temperature monitors will also be placed at stations 6.9, 8.7, and 13.4 in 2008 per standard assessment protocol (Figure 1).
5. Assist Arrowhead Fly Fishers with tree planting in the riparian corridor to provide shade and future recruitment of large woody debris.
6. Minimize impacts to aquatic resources by providing recommendations during permit review.

Mid-range Objectives:

1. Determine if stocking is resulting in brown trout populations meeting the long-range goal.
2. Determine if brown trout are naturally reproducing.
3. Monitor the presence of beaver dams through voluntary reconnaissance surveys conducted by the Arrowhead Fly Fishers (AFF) and helicopter surveys by the DNR Fisheries division.
4. Remove beaver dams through voluntary efforts by the AFF in the main stem and tributaries.
5. Improve stream temperatures by increasing riparian shade as well as increase future inputs of large woody debris habitat.

Area Supervisor's Signature	Date	Regional Manager's Signature	Date

Stream	Tributary	Date
Us-Kab-Wan-Ka	S-2-16-6	2007

Potential Plan:

Create quality instream habitat suitable to trout, given water temperatures reach the aforementioned long-range goal.

Narrative:

The Us-Kab-Wan-Ka River originates from Rush Lake and wetland seepage and flows for 21.5 miles before entering the Cloquet River northwest of Duluth, Minnesota. The stream lies in an area of stratified glacial drift known as the Toimi drumlin field, with soil types of gravel/clay and a gradient of 11 feet/mile. Land usage within the watershed is 50% brushland, 28% marshland, and 22% forestland. Cover types adjacent to the stream are 89% shrubs, 9% forests, and 2% grasses. Land ownership adjacent to the river is 90% county tax forfeit and 10% private.

Past Surveys and Investigations:

Population Assessments – 1965, 1984, 2006

Temperature Assessments – 2002, 2004, 2005, 2006

Fall Beaver Dam Assessments - 2006 and 2007

Special Surveys – The Minnesota Department of Conservation (now the DNR) conducted a survey between 1942 and 1945 to determine the presence and future potential of trout streams in the St. Louis River basin. Results of the study (including the Cloquet River) were presented in the 1947 Fisheries Research Unit Investigational Report #69: *A biological survey and fishery management plan for the streams of the St. Louis River basin* (Moyle and Kenyon 1947). Electrofishing surveys conducted between 1965 and 2006 collected twelve fish species in Us-Kab-Wan-Ka River (Figure 1, Table 1).

Past Management:

The Us-Kab-Wan-Ka River has received little management other than standard bag and size limits for trout. Trout stocking reportedly occurred from 1914 through the late 1940's, although no records of specific species, numbers, or sizes of stocked fish exist. The Cloquet River was stocked with yearling brown trout in 1975, 1977-1981, and 2002-2007. Historic anecdotal reports suggest anglers did catch brown trout in the past, but have never been sampled in fisheries surveys.

Adult brook trout up to 230 mm were sampled in small numbers in the 1984 and 2006 assessments as far upstream as mile 5.0.

Warm water gamefish including northern pike and smallmouth bass were sampled up to mile 10.2. Northern pike and smallmouth bass sampled were scarce, small in size, and likely the result of adult migration from the Cloquet River or Bergen Lake into Us-Kab-Wan-Ka to spawn.

Water temperatures from 2002-2006 indicate that the thermal regime of the Us-Kab-Wan-Ka River was approaching and/or exceeding the upper temperature tolerance threshold for brook trout. The mean percentage of time water temperatures were within and above the range of thermal stress for brook trout was between 26% and 42% (Table

Stream Name	Tributary No.	Date
Us-Kab-Wan-Ka River	S-2-16-6	2007

2). Therefore, brook trout are likely experiencing reduced growth and increased mortality during thermally stressful periods. Mean water temperatures were more conducive to supporting brown trout populations, with stressful temperatures occurring less than 15% of the time (Table 3).

Stream and Watershed Alterations:

In 1912, the Duluth, Winnipeg & Pacific Railway was completed and connected Duluth with several other railway interchanges. This railway is still in use and runs adjacent to and over the Us-Kab-Wan-Ka River. Other than logging, little human alteration of the watershed has taken place because the river lies within the Cloquet Valley State Forest.

Beaver activity in the Us-Kab-Wan-Ka river watershed is of special concern. Beaver dams block fish migration, increase water temperatures, and deteriorate habitat preferable to trout. A total of 33 dams were located during a 2006 aerial survey.

Limiting Factors:

Warm water temperatures and low flow limit trout abundance in the Us-Kab-Wan-Ka River, in part due to beaver dams. Dams reduce flows by creating standing water that is susceptible to evaporation.

Social Considerations:

The entire 21.5-mile reach of Us-Kab-Wan-Ka is a designated trout stream and all but approximately 4,000 feet is on public land. Given its proximity to Duluth and potential to maintain brook and brown trout populations, the Us-Kab-Wan-Ka river should be considered a very valuable resource.

Although not yet collected in the Us-Kab-Wan-Ka river, the exotic species *Bythotrephes cederstroemi*, commonly known as the spiny water flea has been found downstream in the Cloquet River.

Survey Needs and Evaluation Plan:

1. Beginning in 2009, conduct annual population assessments to monitor the survival and distribution of stocked fingerling brown trout, and to document potential natural production. Assessments would end in 2011 and the management plan evaluated to determine whether long-range goals were reached.
2. Deploy continuous recording thermometers from 2009-2011 to assess water temperature changes resulting from beaver dam removal.
3. Work annually with AFF volunteers monitoring beaver activity to determine efficacy of beaver control strategies.

Land Acquisition Needs:

Maintain public ownership of land within the watershed.

Stream Name	Tributary No.	Date
Us-Kab-Wan-Ka River	S-2-16-6	2007

Habitat Development Needs:

1. Remove beaver dams through a voluntary effort by the AFF, with dams in the main stem the first priority and tributaries the second priority.
2. Plant coniferous tree species unfavorable to beaver in the riparian area to provide shade and reduce water temperature.

Habitat Protection Needs:

1. Minimize impacts to aquatic resources by providing recommendations during permit review.
2. Work with St. Louis County and MN DNR forestry departments on timber sales affecting riparian areas by utilizing Forest Resource Council site level guidelines.

Stocking:

Annual stocking of 2,030 brown trout fingerlings will begin in 2008 to provide an in-stream fishery, as well as to provide seed trout for angling opportunities in the Cloquet River.

Regulations:

Maintain status as designated trout stream.

Table 1. Species sampled in the Us-Kab-Wan-Ka River, 1947-2006.

Species	1947*	1965	1984	2006
	SA	PA	PA	PA
Blacknose dace		X	X	X
Bluegill		X		X
Brook trout			X	X
Central mudminnow		X		X
Common shiner		X		X
Creek chub		X		X
Johnny darter				X
Longnose dace		X		
Mottled sculpin		X	X	X
Northern Pike		X		X
Smallmouth Bass				X
White sucker		X		X

Survey type: FS=Full Survey, PA=Population Assessment, SA=Special Assessment

* no trout were seined during the survey, and other species were not recorded

Table 2. Summary of Us-Kab-Wan-Ka River water temperature data (°F) obtained at miles 0.2, 1.7, 3.1, 6.9, 8.7 and 13.4 between June 1 and September 30 (2,928 hours). Hourly water temperature readings (H) are summarized as the percentage (%) of time water temperatures occurred in the range of growth, range of thermal stress, and exceeded the lethal threshold for brook trout (Brown 1974)¹.

Station: Mouth (mile 0.2 from mouth)

Year	2002		2003		2005		Mean	
Dates deployed	6/11 - 9/30		6/2 - 9/30		6/1 - 9/30		'02, '03, '05	
Hours deployed	2,688		2,885		2,928		2,834	
Brook Trout Ranges:	H	%	H	%	H	%	H	%
Range below which growth occurs ($\leq 45.9^\circ$ F or 7.9° C)	0	0	13	1	0	0	4	0
Range of growth (46-67.9° F or 8-20° C)	1,519	57	1,904	66	1,814	62	1,746	62
Range of thermal stress (68-76.9° F or 20-24.9° C)	1,079	40	912	32	957	33	983	35
Lethal threshold ($\geq 77^\circ$ F or 25° C)	90	3	56	2	157	5	101	4

Station: Below Bergan Lake Inflow (mile 1.7 from mouth)

Year	2002		2003		2004		Mean	
Dates deployed	6/11 - 9/30		6/ - 9/30		6/1 - 9/30		'02 to '04	
Hours deployed	2,688		2,928		2,928		2,848	
Brook Trout Ranges:	H	%	H	%	H	%	H	%
Range below which growth occurs ($\leq 45.9^\circ$ F or 7.9° C)	0	0	18	1	0	0	6	0
Range of growth (46-67.9° F or 8-20° C)	1,591	59	2,172	74	2,506	86	2,090	73
Range of thermal stress (68-76.9° F or 20-24.9° C)	1,025	38	732	25	410	14	722	25
Lethal threshold ($\geq 77^\circ$ F or 25° C)	72	3	6	0	12	0	30	1

Station: Above Bergan Lake Inflow (mile 3.1 from mouth)

Year	2002		2003		2004		Mean	
Dates deployed	6/11 - 9/30		6/1 - 9/30		6/1 - 9/30		'02 to '04	
Hours deployed	2,688		2,914		2,928		2,843	
Brook Trout Ranges:	H	%	H	%	H	%	H	%
Range below which growth occurs ($\leq 45.9^\circ$ F or 7.9° C)	17	1	33	1	0	0	17	1
Range of growth (46-67.9° F or 8-20° C)	1,777	66	2,460	84	2,638	90	2,292	81
Range of thermal stress (68-76.9° F or 20-24.9° C)	828	31	421	14	290	10	513	18
Lethal threshold ($\geq 77^\circ$ F or 25° C)	66	3	0	0	0	0	22	1

Station: Along Shaw Rd. (mile 6.9 from mouth)

Year	2005		2006		Mean	
Dates deployed	6/1 - 9/30		6/1 - 9/30		'05 to '06	
Hours deployed	2,928		2,928		2,928	
Brook Trout Ranges:	H	%	H	%	H	%
Range below which growth occurs ($\leq 45.9^\circ$ F or 7.9° C)	3	0	25	1	14	0
Range of growth (46-67.9° F or 8-20° C)	2,086	71	1,874	64	1,980	68
Range of thermal stress (68-76.9° F or 20-24.9° C)	735	25	960	33	848	29
Lethal threshold ($\geq 77^\circ$ F or 25° C)	104	4	69	2	87	3

Station: End of Munger Shaw Rd. (mile 8.7 from mouth)

Year	2005		2006		Mean	
Dates deployed	6/1 - 9/30		6/1 - 9/30		'05 to '06	
Hours deployed	2,928		2,928		2,928	
Brook Trout Ranges:	H	%	H	%	H	%
Range below which growth occurs ($\leq 45.9^\circ$ F or 7.9° C)	7	0	0	0	4	0
Range of growth (46-67.9° F or 8-20° C)	1,793	61	1,602	55	1,698	58
Range of thermal stress (68-76.9° F or 20-24.9° C)	855	29	1,129	39	992	34
Lethal threshold ($\geq 77^\circ$ F or 25° C)	245	8	171	6	208	7

Station: Three Lakes Rd. (Cty. Rt. 49) (mile 13.4 from mouth)

Year	2005		2006		Mean	
Dates deployed	6/1 - 9/30		6/1 - 9/30			
Hours deployed	out of water		2,928			
Brook Trout Ranges:	H	%	H	%	H	%
Range below which growth occurs ($\leq 45.9^\circ$ F or 7.9° C)			39	1		
Range of growth (46-67.9° F or 8-20° C)			1,676	57		
Range of thermal stress (68-76.9° F or 20-24.9° C)			1,109	38		
Lethal threshold ($\geq 77^\circ$ F or 25° C)			104	4		

¹Brown, H. W. 1974. Handbook of the effects of temperature on some North American fishes. American Electric Power Service Corporation, Canton, Ohio. 524 p and App (12).

Table 3. Summary of Us-Kab-Wan-Ka River water temperature data (°F) obtained at miles 0.2, 1.7, 3.1, 6.9, 8.7 and 13.4 between June 1 and September 30 (2,928 hours). Hourly water temperature readings (H) are summarized as the percentage (%) of time water temperatures occurred in the range of growth, range of thermal stress, and exceeded the lethal threshold for brown trout.

Station: Mouth (mile 0.2 from mouth)

Year	2002		2003		2005		Mean	
Dates deployed	6/11 - 9/30		6/2 - 9/30		6/1 - 9/30		'02, '03, '05	
Hours deployed	2,688		2,885		2,928		2,834	
Brown Trout Ranges:	H	%	H	%	H	%	H	%
Range below which growth occurs ($\leq 40.9^\circ\text{F}$ or 4.9°C) ²	0	0	0	0	0	0	0	0
Range of growth ($41-73.4^\circ\text{F}$ or $5-23^\circ\text{C}$) ^{2,1}	2,429	90	2,676	93	2,584	88	2,563	90
Range of thermal stress ($73.5-79.4^\circ\text{F}$ or $23.1-26.3^\circ\text{C}$) ^{1,3}	246	9	209	7	300	10	262	9
Lethal threshold ($\geq 79.5^\circ\text{F}$ or 26.4°C) ³	13	1	0	0	44	2	19	1

Station: Below Bergan Lake Inflow (mile 1.7 from mouth)

Year	2002		2003		2004		Mean	
Dates deployed	6/11 - 9/30		6/ - 9/30		6/1 - 9/30		'02 to '04	
Hours deployed	2,688		2,928		2,928		2,848	
Brown Trout Ranges:	H	%	H	%	H	%	H	%
Range below which growth occurs ($\leq 40.9^\circ\text{F}$ or 4.9°C) ²	0	0	0	0	0	0	0	0
Range of growth ($41-73.4^\circ\text{F}$ or $5-23^\circ\text{C}$) ^{2,1}	2,488	93	2,840	97	2,889	99	2,739	96
Range of thermal stress ($73.5-79.4^\circ\text{F}$ or $23.1-26.3^\circ\text{C}$) ^{1,3}	198	7	88	3	39	1	108	4
Lethal threshold ($\geq 79.5^\circ\text{F}$ or 26.4°C) ³	2	0	0	0	0	0	1	0

Station: Above Bergan Lake Inflow (mile 3.1 from mouth)

Year	2002		2003		2004		Mean	
Dates deployed	6/11 - 9/30		6/1 - 9/30		6/1 - 9/30		'02 to '04	
Hours deployed	2,688		2,914		2,928		2,843	
Brown Trout Ranges:	H	%	H	%	H	%	H	%
Range below which growth occurs ($\leq 40.9^\circ\text{F}$ or 4.9°C) ²	0	0	0	0	0	0	0	0
Range of growth ($41-73.4^\circ\text{F}$ or $5-23^\circ\text{C}$) ^{2,1}	2,511	93	2,889	99	2,914	100	2,771	97
Range of thermal stress ($73.5-79.4^\circ\text{F}$ or $23.1-26.3^\circ\text{C}$) ^{1,3}	174	7	25	1	14	1	71	2
Lethal threshold ($\geq 79.5^\circ\text{F}$ or 26.4°C) ³	3	0	0	0	0	0	1	0

Station: Along Shaw Rd. (mile 6.9 from mouth)

Year	2005		2006		Mean	
Dates deployed	6/1 - 9/30		6/1 - 9/30		'05 to '06	
Hours deployed	2,928		2,928		2,928	
Brown Trout Ranges:	H	%	H	%	H	%
Range below which growth occurs ($\leq 40.9^\circ\text{F}$ or 4.9°C) ²	0	0	0	0	0	0
Range of growth ($41-73.4^\circ\text{F}$ or $5-23^\circ\text{C}$) ^{2,1}	2,700	92	2,693	92	2,697	92
Range of thermal stress ($73.5-79.4^\circ\text{F}$ or $23.1-26.3^\circ\text{C}$) ^{1,3}	204	7	210	7	207	7
Lethal threshold ($\geq 79.5^\circ\text{F}$ or 26.4°C) ³	24	1	25	1	25	1

Station: End of Munger Shaw Rd. (mile 8.7 from mouth)

Year	2005		2006		Mean	
Dates deployed	6/1 - 9/30		6/1 - 9/30		'05 to '06	
Hours deployed	2,928		2,928		2,928	
Brown Trout Ranges:	H	%	H	%	H	%
Range below which growth occurs ($\leq 40.9^\circ\text{F}$ or 4.9°C) ²	0	0	0	0	0	0
Range of growth ($41-73.4^\circ\text{F}$ or $5-23^\circ\text{C}$) ^{2,1}	2,462	84	2,543	87	2,503	85
Range of thermal stress ($73.5-79.4^\circ\text{F}$ or $23.1-26.3^\circ\text{C}$) ^{1,3}	354	12	284	10	319	11
Lethal threshold ($\geq 79.5^\circ\text{F}$ or 26.4°C) ³	112	4	101	3	107	4

Station: Three Lakes Rd. (Cty. Rt. 49) (mile 13.4 from mouth)

Year	2005		2006		Mean	
Dates deployed	6/1 - 9/30		6/1 - 9/30			
Hours deployed	out of water		2,928			
Brown Trout Ranges:	H	%	H	%	H	%
Range below which growth occurs ($\leq 40.9^\circ\text{F}$ or 4.9°C) ²			0	0		
Range of growth ($41-73.4^\circ\text{F}$ or $5-23^\circ\text{C}$) ^{2,1}			2,650	91		
Range of thermal stress ($73.5-79.4^\circ\text{F}$ or $23.1-26.3^\circ\text{C}$) ^{1,3}			250	9		
Lethal threshold ($\geq 79.5^\circ\text{F}$ or 26.4°C) ³			28	1		

¹Allen, K. R. 1985. Comparison of the growth rate of brown trout *Salmo trutta* in a New Zealand stream with experimental fish in Britain. The Journal of Animal Ecology 54:487-495.

²Brown, H. W. 1974. Handbook of the effects of temperature on some North American fishes. American Electric Power Service Corporation, Canton, Ohio. 524 p and App (12).

³Jobling, M. 1981. Temperature tolerance and the final preferendum - Rapid methods for the assessment of optimum growth temperatures. Journal of Fish Biology 19:439-455.

Uskabwanka River Thermometer and Electrofishing Locations

13.4

EF 13.4

8.7

EF 8.7

6.9

EF 6.9

EF 3.1

3.1

1.7

Lost Lake Rd

EF 1.7

0.2

4000 10000 20000 40000 80000 120000 Feet

Legend

- ⊙ 2006 Electrofishing Stations
- ☆ Thermometer Locations

Figure 1

