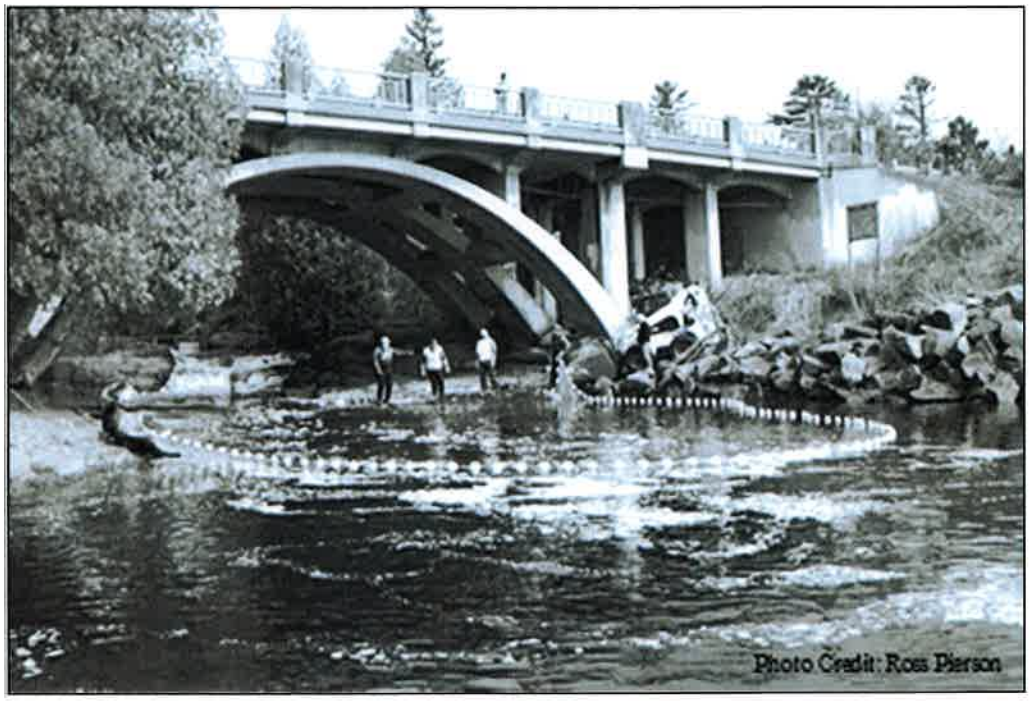
Minnesota
F29 Segment 32 (Year 2)

MINNESOTA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH AND WILDLIFE
SECTION OF FISHERIES

SUPPLEMENTAL REPORT



Results of Operating the French River Juvenile and Adult Fish Traps 2016

Jeramy Pinkerton
Nick Peterson

DEPARTMENT OF NATURAL RESOURCES

This report provides an annual update of juvenile and adult fish trap operations at the French River. These traps have provided valuable information for assessment and management of Rainbow Trout in Minnesota Waters of Lake Superior.

The French River adult fish trap was installed approximately 0.1 miles upstream of the confluence of the French River in 1970, and was reconfigured to its current design in 1982. The adult trap has been used to evaluate adult returns from stocking events in the French River, and to collect gametes for the Kamloops and steelhead stocking programs. The French River juvenile fish trap was constructed approximately 0.2 miles upstream of the mouth of the French River in 1994 (Dexter and Schliep 2007). The juvenile trap has been used to gather information about juvenile fish survival, growth, mortality, and movement patterns, to evaluate stocking programs, and to determine how these metrics influence adult returns to French River. Sampling procedures for the juvenile and adult trap are described in Ward and Blankenheim (2006) and Blankenheim (2007).

Study Area

The French River is an average size stream on the Minnesota shore of Lake Superior. It flows for 14.3 miles and enters Lake Superior approximately 14 miles northeast of Duluth, Minnesota (Figure 1). The presence of Rainbow Trout juveniles upstream of mile 0.2 is solely the result of stocking, and the lower 9.4 miles of the river have been used as nursery habitat for stocked juvenile steelhead prior to their emigration to Lake Superior. The French River is also currently managed to maintain native Brook Trout and introduced Brown Trout populations upstream of mile 0.2. More information about the French River fishery and its management can be found in the French River Historic Index Station Summary 2016 (Pinkerton 2017) and the French River Management Plan 2011.

Environmental Conditions

Environmental conditions and habitat (i.e., adequate water levels and cool water temperatures) are two primary factors that dictate whether steelhead will remain in tributaries for at least two years and reach an age/size that is needed to survive in Lake Superior. Ample precipitation in the fall and snowfall during the winter months helps to maintain overwintering habitat for fish by recharging water sources (e.g., wetlands) and insulating stream temperatures from excessive ice formation that can decrease overwinter survival.

Environmental conditions were ideal for juvenile trout entering the winter of 2015/2016. Spring arrived early in 2016 as ice started to clear in streams near Duluth in mid to late March. A significant run-off event occurred in mid-March that helped to clear much of the ice.

Stream conditions were relatively favorable for juvenile trout during the summer and fall of 2016. Air temperatures and precipitation totals were generally similar to the historic averages throughout the summer (http://cdo.ncdc.noaa.gov/qclcd/QCLCD). Abnormally dry conditions briefly appeared in late-May and early June. Although discharge dropped below average in late September and stayed there for the rest of the fall, the North Shore was free of drought conditions from mid-June through December.

Juvenile Trap Operations

The juvenile trap was open for 211 days between April 12 and November 16, 2016, which is longer than the historic average (Table 1). Approximately 86% of all juvenile trout emigrated in spring (April-June), 10% in summer (July-August, and 4% in fall (September-November). In general, the emigration pattern of juvenile trout in 2016 coincided with increases in stream water temperatures and decreasing stream discharge.

A total of 2,478 juvenile steelhead were captured in 2016, which was lower than the historic average (3,382), but within the interquartile range (IR=1,709 - 4,604) (Table 2, Figure 2). Eighty-seven percent of steelhead emigrated in spring, 10% in summer, and 3% in fall. Sixty-seven percent of all juvenile steelhead were caught in June (Figures 3). Of all juvenile steelhead that emigrated in 2016, less than 1% were age-0, 84% were age-1, 15% were age-2, and 1% were age-3 (Table 2; Figure 4).

A small proportion of the total catch of trout species at the French River juvenile trap is Brook Trout and Brown Trout. Thirty Brook Trout and 78 Brown Trout were captured in 2016 (Table 3). Approximately 47% of Brook Trout emigrated in the spring, 23% in summer, and 30% in fall. Approximately 50% of Brown Trout emigrated in the spring, 18% in summer, and 32% in fall (Figure 5). Eleven other non-gamefish species were also captured in 2016 (Table 4).

Adult Trap Operations

The French River adult trap was opened on April 5th in 2016, nine days earlier that the mean start date for trap operation (Table 5). The trap was closed on May 16th, which was ten days earlier than normal. Seining in the pool downstream of the adult trap was conducted twice a week for the first three weeks and once a week for the remainder of the run. Trapping and seining did not take place in the fall of 2016, as fall migratory runs are no longer monitored.

Kamloops

A total of 1488 Kamloops were captured at the French River in the spring of 2016. This was above the 24 year average and interquartile range (Mean=90; IR=457-1286; Table 6, Figure 6). Eight unknown sex two and three year old Kamloops were captured and are reported here, but were not included in further analyses.

Historically, seventy-five percent of Kamloops returns at the French River are age-4 and age-5. Kamloops in 2016 ranged from age-2 to age-6, with only 54% of the return consisting of age-4 (21%) and age-5 (33%) fish. A higher percentage of age-2 Kamloops (11%) returned than average (4%). An additional 19% of the spawning run was age-6 fish (Table 6, Figure 7). Females and males comprised 56% and 44% of Kamloops returns in 2016, respectively. Just over 8% of returning Kamloops were recaptures with a previous spring's tag, which was higher than the long-term mean of 4.0% and above the interquartile range (IR= 2.5%-5.5%; Table 6). The overall mean total length was 588 mm (23.1 in.) and mean weight was 2.3 kg (5.0 lbs.). More Kamloops exceeding 600 mm (23.6 in.) were captured in 2016 than in any of the previous three years (Table 7, Figure 8).

Steelhead

One hundred sixty-six steelhead were captured at the French River in 2016, which is above the interquartile range (Mean=94, IR=50-123; Table 8, Figure 9). Two of these fish were captured and tagged at the Knife River adult trap earlier in 2016. Additionally, one former Knife River brood stock steelhead was collected. Steelhead collected in 2016 ranged from age-2 through age-10 (Table 8, Figure 7). Seven unknown sex steelhead are reported here, but are not included in further analysis. Forty-seven percent of all mature individuals were age-5. Repeat spawning continues to be uncommon for steelhead at the French River. Four percent (N=7) of

the steelhead collected in 2016 had tags from previous years, which is a below average return of repeat spawners (Table 6). Among the tags found, four were applied in 2015, two were applied in 2013, and one was applied in 2012. The average length of steelhead was 596 mm (23.5 in.) and the average weight was 2.2 kg (4.9 lbs.) The maximum size collected was 737 mm (29 in., Table 7).

Unknown Rainbow Trout

Fourteen Rainbow Trout of unknown strain were collected in 2016. It could not be determined if these fish were Kamloops or steelhead based on clips. They were not included in any data analysis.

Timing of Adult Returns

The spring thaw was early in 2016 with fish first sampled on April 6th. Seventy-four percent of all Kamloops and 62% of all steelhead were captured by April 15th. Ninety-six percent of all Kamloops and 94% of all steelhead were captured by May 1, 2016 (Table 9, Figure 10).

Literature Cited

Blankenheim, J. E. 2007. A comprehensive summary of salmonid returns to the French River, 1993-2007. Minnesota Department of Natural Resources, St. Paul, MN.

Dexter, D. J. and D.V. Schliep. 2007. Design of a compound inclined screen trap for anadromous salmonid smolts. North American Journal of Fisheries Management 27: (885-890).

Pinkerton, J. 2017. French River Historic Index Station Summary 2016. Minnesota Department of Natural Resources (*in review*).

Report prepared by:

Jeramy Pinkerton
Nick Peterson

Field crew leaders:

Jeramy Pinkerton
Nick Peterson
Beck Reiche

Project Leader: _____ 4/6/17

Regional Fisheries Supervisor: _____ 5/25/17

FRENCH RIVER ADULT/JUVENILE
TRAP REPORT 2016

Table 1. Operation dates of the French River juvenile trap and total hours open (Hours open), at the French River juvenile trap. The trap was closed for three days in July due to operator error and for five days in September for maintenance.

Year	Operation Dates	Hours open
1994	5/5 - 10/28	4,234
1995	4/13 - 11/2	4,881
1996	4/22 - 11/7	4,785
1997	4/18 - 11/4	4,809
1998	3/30 - 11/5	5,289
1999	4/5 - 11/15	5,385
2000	3/27 - 11/8	5,433
2001	4/18 - 11/16	5,097
2002	4/15 - 10/31	4,785
2003	4/25 - 11/7	4,714
2004	4/13 - 11/5	4,953
2005	4/11 - 11/4	4,977
2006	4/8 - 11/1	4,977
2007	4/15 - 11/02	4,656
2008	4/16 - 11/06	4,901
2009	4/17 - 11/06	4,869
2010	3/28 - 10/29	5,160
2011	4/18 - 11/03	4,272
2012	3/25 - 10/29	3,984
2013	5/7 - 11/07	4,440
2014	4/28 - 10/31	4,488
2015	4/15 - 11/16	5,184
2016	4/12 - 11/16	5,064
Mean	**4/14 - 11/4**	**4,841**

Table 2. Descriptive statistics (number [n] and percentage [%]) for juvenile steelhead data collected at the French River juvenile trap by year. Frylings were stocked instead of fry in 2009 and 2011-2013.

Year	2006		2007[2]		2008		2009		2010		2011		2012		2013		2014		2015		2016		Mean 1994 - 2016	
Date trap was opened	4/8		4/15		4/16		4/17		3/28		4/18		3/25		5/7		4/28		4/15		4/12		4/14	
Date trap was closed	11/1		11/2		11/6		11/6		10/29		11/3		10/29		11/7		10/31		11/16		11/16		10/20	
Number of days trap was open	207		194[3]		204		203		215		178[4]		166[5]		185		187		215		211[6]		200	
Emigrants by Age	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**
Age-0	537	12%	408	9%	382	12%	173	4%	0	0%	0	0%	176	15%	50	7%	4	0%	217	14%	9	0%	281	8%
Age-1	2,132	46%	2,795	61%	2,064	66%	3,140	79%	1,844	57%	0	0%	976	84%	623	84%	1,204	67%	659	42%	2,077	84%	2,358	70%
Age-2	1,887	41%	1,347	29%	659	21%	609	15%	1,338	42%	333	95%	0	0%	71	10%	558	31%	664	43%	374	15%	715	21%
Age-3	37	1%	65	1%	14	0%	29	1%	34	1%	18	5%	11	1%	0	0%	29	2%	11	1%	18	1%	27	1%
Age-4	0	0%	0	0%	0	0%	1	0%	0	0%	1	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**4,593**		**4,615**		**3,119**		**3,952**		**3,216**		**352**		**1,163**		**744**		**1,795**		**1,551**		**2,478**		**3,382**	
Emigrants by Year-Class	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N*[1]**	**(%)[1]**
Age-0	537	13%	408	13%	382	8%	173	7%	--	--	0	0%	176	13%	50	3%	4	--	217	--	9	--	328	9%
Age-1	2,795	70%	2,064	66%	3,140	64%	1,844	78%	--	--	976	91%	623	46%	1,204	62%	659	--	2,077		**		2,566	70%
Age-2	659	16%	609	20%	1,338	27%	333	14%	--	--	71	7%	558	41%	664	34%	374	--	**		**		721	20%
Age-3	29	1%	34	1%	18	0%	11	0%	--	--	29	3%	11	1%	18	1%	**		**		**		27	1%
Total	**4,020**		**3,115**		**4,878**		**2,361**		**---**		**1,076**		**1,368**		**1,936**		**1,037****		**2,294****		**9****		**3,643**	
Percent Emmigrants per Year-Class																								
Number of fry stocked	122,776		121,740		109,324		53,214		0		55,013		55,032		55,596		39,856		99,908		193,308		100,162[1]	
Number of fry stocked/ha	16,430		16,291		14,630		7,121		0		7,362		7,364		7,440		5,334		13,321		25,878		13,404[1]	
Age-0	0.4%		0.3%		0.3%		0.3%		-----		0.0%		0.3%		0.1%		0.0%		0.2%		0.0%		0.3%[1]	
Age-1	2.3%		1.7%		2.9%		3.5%		-----		1.8%		1.1%		2.2%		1.7%		2.1%		**		2.7%[1]	
Age-2	0.5%		0.5%		1.2%		0.6%		-----		0.1%		1.0%		1.2%		0.9%		**		**		0.7%[1]	
Age-3	0.0%		0.0%		0.0%		0.0%		-----		0.1%		0.0%		0.0%		**		**		**		0.0%[1]	
Cumulative Survival Index	**3.3%**		**2.6%**		**4.5%**		**4.4%**		**----**		**2.0%**		**2.5%**		**3.5%**		**2.6%**		**2.3%**		**0.0%**		**3.8%[1]**	

[1] Values shown for only the year classes that have completely emigrated

[2] Some individuals were subsampled in 2005 and 2007

[3] The trap was closed for 8 days for dredging of the reservoir

[4] The trap was closed for 21 days in July due to the government shutdown

[5] The trap was closed for 6 days from June 20th-25th due to a major flood, and then for 47 days from August 8th - September 23rd for gravel removal from the reservoir

[6] The trap was closed for three days in July due to operator error and for five days in September for maintenance.

** Data not yet complete for the given year-class

Table 3. Descriptive statistics (number [n] and percentage [%]) for juvenile Brook and Brown Trout data collected at the French River juvenile trap by year.

Year	2012		2013		2014		2015		2016		Mean 1994-2016	
Date trap was opened	3/25		5/7		4/28		4/15		4/12		4/14	
Date trap was closed	10/29		11/7		10/31		11/16		11/16		11/5	
Number days trap open	166 [2]		185		187		215		211 [3]		200	
Brook Trout												
Emigrants by age	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**
Age-0	52	68%	4	25%	4	33%	9	39%	6	20%	**21**	**36%**
Age-1	18	23%	9	56%	8	67%	3	13%	17	57%	**30**	**50%**
Age-2	5	6%	3	19%	0	0%	10	43%	7	23%	**7**	**12%**
Age-3	2	3%	0	0%	0	0%	1	4%	0	0%	**1**	**2%**
Total	**77**		**16**		**12**		**23**		**30**		**60**	
Emigrants by year-class	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N*** [1]	**(%)** [1]
Age-0	52	84%	4	18%	4	**	9	**	6	**	**24**	**38%**
Age-1	9	15%	8	36%	3	**	17	**	**	**	**32**	**50%**
Age-2	0	0%	10	45%	7	**	**	**	**	**	**7**	**11%**
Age-3	1	2%	0	0%	**	**	**	**	**	**	**1**	**2%**
Total	**62**		**22**		**14****		**28****		**6****		**62**	
Brown Trout												
Emigrants by age	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**
Age-0	1	3%	0	0%	0	0%	36	95%	19	24%	**4**	**17%**
Age-1	32	86%	1	17%	0	0%	2	5%	50	64%	**13**	**57%**
Age-2	2	5%	4	67%	5	83%	0	0%	9	12%	**5**	**22%**
Age-3	1	3%	1	17%	1	17%	0	0%	0	0%	**1**	**3%**
Age-4	1	3%	0	0%	0	0%	0	0%	0	0%	**0**	**1%**
Total	**37**		**6**		**6**		**38**		**78**		**24**	
Emigrants by year-class	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N*** [1]	**(%)** [1]
Age-0	1	14%	0	**	0	**	36	**	19	**	**2**	**10%**
Age-1	1	14%	0	**	2	**	50	**	**	**	**13**	**61%**
Age-2	5	71%	0	**	9	**	**	**	**	**	**5**	**24%**
Age-3	0	0%	0	**	**	**	**	**	**	**	**1**	**4%**
Age-4	0	0%	**	**	**	**	**	**	**	**	**0**	**2%**
Total	**7**		**0****		**7****		**86****		**19****		**20**	

[1] Determined from the time period when all complete year classes have been sampled

[2] The trap was closed for 6 days in June due to a major flood, and then for 47 days from August 8th - September 23rd for gravel removal from the reservoir

[3]The trap was closed for three days in July due to operator error and for five days in September for maintenanc

** Numbers are incomplete for particular year class

Table 4. Other non-game fish species collected in the French River juvenile trap in 2016.

Species	Number Caught
Blacknose Dace	362
Brook Stickelback	6
Central Mudminnow	5
Creek Chub	135
Fathead Minnow	56
Longnose Dace	114
Northern Redbelly Dace	4
Pearl Dace	5
Total	**687**

Table 5. Opening date, closing date, and days of operation of the French River adult trap by season and year.

Spring				Fall			
Year	Opening date	Closing date	Days of operation	Year	Opening date	Closing date	Days of operation
1993	4/12	5/17	37	1993	8/18	11/10	85
1994	4/18	5/23	36	1994	9/13	11/21	70
1995	4/17	5/26	40	1995	9/7	11/21	76
1996	4/26	6/14	50	1996	9/6	11/13	69
1997	4/16	6/2	48	1997	9/16	11/6	52
1998	4/5	5/26	52	1998	9/14	11/3	51
1999	4/12	5/17	36	1999	9/6	11/9	65
2000	3/27	5/22	57	2000	9/1	11/15	76
2001	4/16	5/23	38	2001	9/10	11/15	67
2002	4/16	5/20	35	2002	9/9	11/12	65
2003	4/23	5/28	36	2003	9/11	11/4	55
2004	4/13	5/19	37	2004	8/31	11/8	70
2005	4/11	5/27	47	2005	9/7	11/17	72
2006	4/6	5/19	44	2006	9/1	10/30	60
2007	4/15	5/25	41	2007	9/6	11/3	59
2008	4/17	5/24	35	2008	8/28	11/10	75
2009	4/21	5/29	39	2009	9/8	11/6	60
2010	3/28	5/18	52	2010	Closed		
2011	4/18	5/27	40	2011			
2012	3/26	5/16	52	2012			
2013	5/6	6/7	33	2013			
2014	5/5	7/3	60	2014			
2015	4/13	6/12	60	2015			
2016	4/5	5/16	33	2016			
Mean (1993-2016)	4/14	5/26	43	Mean (1993-2009)	9/5	11/10	66

Table 6. Annual returns, number of repeat spawners, and year-class strength indices of Kamloops Rainbow Trout collected at the French River.

Year of Sampling																																
Year	**2002**		**2003**		**2004**		**2005**		**2006**		**2007**		**2008**		**2009**		**2010**		**2011**		**2012**		**2013**		**2014**		**2015**		**2016**		**Mean 1993-2016**	
Age	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**
Age-2	0	14	0	126	0	3	0	11	0	0	0	52	0	2	2	15	0	47	0	4	0	17	0	50	0	3	0	47	3	157	**0**	**40**
Age-3	9	16	33	72	57	77	14	0	12	11	121	93	39	41	6	15	15	47	148	104	59	77	46	173	12	26	4	22	75	146	**43**	**57**
Age-4	219	96	364	273	326	172	711	463	58	59	180	72	142	53	190	102	108	54	261	108	624	258	478	258	175	114	193	108	193	122	**277**	**153**
Age-5	57	37	195	127	345	205	208	119	190	155	65	29	24	6	45	8	71	27	117	66	119	52	148	40	39	40	287	122	331	164	**148**	**85**
Age-6	5	0	41	10	125	21	194	138	53	16	26	10	5	1	13	10	23	4	18	8	20	14	44	13	15	13	48	49	227	62	**55**	**23**
Age-7	2	0	20	55	14	3	49	27	29	3	0	5	2	1	1	1	3	3	11	5	2	0	5	9	0	0	5	1	0	0	**13**	**9**
Age-8	0	8	22	0	9	0	6	2	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**	**1**
Age-9	0	0	13	0	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**0**
Sex total	292	171	688	663	880	484	1182	760	345	244	394	261	212	104	257	151	220	182	555	295	824	418	721	543	241	196	537	349	829	651	**540**	**368**
Grand total	463		1351		1364		1942		589		655		316		408		402		850		1242		1264		437		886		1480		**909**	

1x repeat	11	30	80	76	46	24	14	22	12	19	55	61	19	40	114	**34**
2x repeat	3	2	5	12	11	1	1	2	3	0	6	9	1	5	7	**3**
3x repeat	0	1	0	0	1	1	0	0	1	0	0	1	1	0	1	**0**
4x repeat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Fall tag	0	2	0	57	36	4	2	4	0	0	0	0	0	0	0	**5**
K.R. tag	3	1	0	7	5	0	3	1	0	1	0	0	2	0	0	**3**

Complete Year-classes

Year-class	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**90-09 mean**
Stocked	52,850	61,871	49,906	49,772	45,796	36,474	33,337	36,589	61,032	**50,038**
Returned	1818	236	344	504	551	417	676	1,403	1052	**917**
% return[1]	3.44%	0.38%	0.69%	1.01%	1.20%	1.14%	2.03%	3.64%	1.72%	**1.86%**

Incomplete Year-classes

Year-class	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Stocked	45,906	30,050	39,712	36,374	55,111	45,446	–
Returned	1223	884	344	268	160	–	–
% return[1]	2.66%	2.94%	0.87%	0.74%	0.29%	–	–

[1]: percent return of stocked yearlings returned to the French River trap as adults

Table 7. Length-frequency distribution of all fish measured by species at the French River in adult trap operations 2016.

Length Group (10 mm)	Kamloops Rainbow Trout	Steelhead Rainbow Trout	Unknown Rainbow Trout	Coho Salmon	Northern Pike
310		1			
320					
330					
340					
350		1			
360	1				
370					
380	2	1			
390	3				
400	9	4			
410	15	1			
420	21	5			
430	30	2			
440	30	5			
450	30	3			
460	21	1		1	
470	13	3			
480	5	4		1	
490	8	3			
500	9	1	1		
510	27	1			
520	40	1			
530	28	1			
540	37	3	1		
550	42	6	2		
560	39	2			
570	65	3	1		
580	56	7			1
590	92	6	1		
600	146	6	1		
610	145	14	1		
620	130	12	1		
630	120	8			
640	110	8	1		
650	74	5	2		
660	58	7			
670	41	7	1		
680	19	7	1		
690	7	6			
700	12	10			
710	2	2			
720		5			
730		4			
Total	**1487**	**166**	**14**	**2**	**1**

Table 8. Annual returns, number of repeat spawners, and year-class strength indices of mature unclipped steelhead Rainbow Trout collected at the French River adult trap.

	Year of Sampling																													
Year	2002		2003		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		Mean (93-16)	
Age	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
2	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	1	**0**	**0**
3	0	7	0	9	0	1	1	0	1	13	2	9	0	0	0	1	1	2	0	0	0	3	0	6	0	2	0	1	0	9	**1**	**4**
4	6	5	10	12	8	6	7	4	3	4	24	21	7	7	4	3	0	1	8	8	7	8	6	9	6	3	1	4	3	15	**6**	**7**
5	14	3	20	21	27	10	34	19	12	4	10	9	26	14	29	15	6	6	14	9	27	30	32	27	5	1	12	5	39	29	**18**	**12**
6	6	2	14	8	50	25	32	23	14	5	9	3	5	4	4	10	35	9	12	8	19	8	33	9	3	4	26	16	9	4	**17**	**9**
7	1	2	3	3	21	20	13	4	8	7	7	4	1	0	3	1	10	18	12	9	2	1	11	7	0	0	18	12	28	9	**9**	**6**
8	0	1	0	0	12	3	2	3	1	1	3	0	1	1	2	0	2	3	3	2	1	0	1	0	0	0	13	4	7	2	**3**	**2**
9	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	1	1	2	**1**	**0**
10	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**0**	**0**
Sex total	27	20	48	53	120	66	91	53	39	35	55	47	40	26	42	31	54	40	49	36	56	50	83	58	14	10	72	45	87	72	**55**	**42**
Total	47		101		186		144		74		102		66		73		94		85		106		141		24		117		159		**97**	

Complete year-classes																			
Year-class	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Mean (90-07)
Stocked	233,720	277,585	179,981	129,685	56,928	98,637	42,571	60,669	100,281	201,156	109,427	48,311	64,932	117,596	250,100	135,202	122,776	121,740	**130,628**
Returned	34	88	124	132	85	74	56	84	143	133	100	44	42	139	131	42	68	120	**91**
% return[1]	0.01%	0.03%	0.07%	0.10%	0.15%	0.08%	0.13%	0.14%	0.14%	0.07%	0.09%	0.09%	0.06%	0.12%	0.05%	0.03%	0.06%	0.10%	**0.08%**
1x repeat	3	5	6	9	5	1	7	7	7	6	4	0	3	5	5	1	5	15	**5**
2x repeat	0	0	1	1	0	0	0	0	2	0	2	0	0	1	0	0	1	4	**1**
3x repeat	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**0**

Incomplete year-classes									
Year-class	2008	2009	2010	2011	2012	2013	2014	2015	2016
Stocked	109,324	53,214	0	55,013	55,032	55,596	39,856	99,908	193,308
Returned	105	98	45	74	19	11	1	--	--
% return[1]	0.10%	0.18%	--	0.13%	0.03%	0.02%	0.00%	--	--
1x repeat	11	4	0	1	0	0	0	--	--
2x repeat	3	1	0	0	0	0	0	--	--
3x repeat	1	0	0	0	0	0	0	--	--

[1]percent return of stocked fry or fingerlings to the French River trap as adults

Table 9. Total catch by date for all fish species collected during the French River adult trap operations in 2016.

	Species					
Date	**All Species**	**Kamloops Rainbow Trout**	**Steelhead Rainbow Trout**	**Unknown Strain Rainbow Trout**	**Coho Salmon**	**Northern Pike**
4/6/2016	724	670	48	6	0	0
4/11/2016	265	231	33	1	0	0
4/13/2016	200	183	17	0	0	0
4/14/2016	22	16	5	1	0	0
4/15/2016	3	3	0	0	0	0
4/16/2016	7	6	0	1	0	0
4/17/2016	33	31	2	0	0	0
4/18/2016	167	143	22	2	0	0
4/19/2016	7	7	0	0	0	0
4/20/2016	116	95	21	0	0	0
4/21/2016	3	2	1	0	0	0
4/22/2016	11	9	2	0	0	0
4/23/2016	6	4	2	0	0	0
4/24/2016	1	1	0	0	0	0
4/27/2016	20	17	2	0	0	1
4/28/2016	2	1	0	1	0	0
4/29/2016	6	4	1	1	0	0
5/2/2016	47	39	8	0	0	0
5/5/2016	2	2	0	0	0	0
5/9/2016	14	11	1	0	2	0
5/16/2016	15	13	1	1	0	0
Total	1671	**1488**	**166**	**14**	**2**	**1**

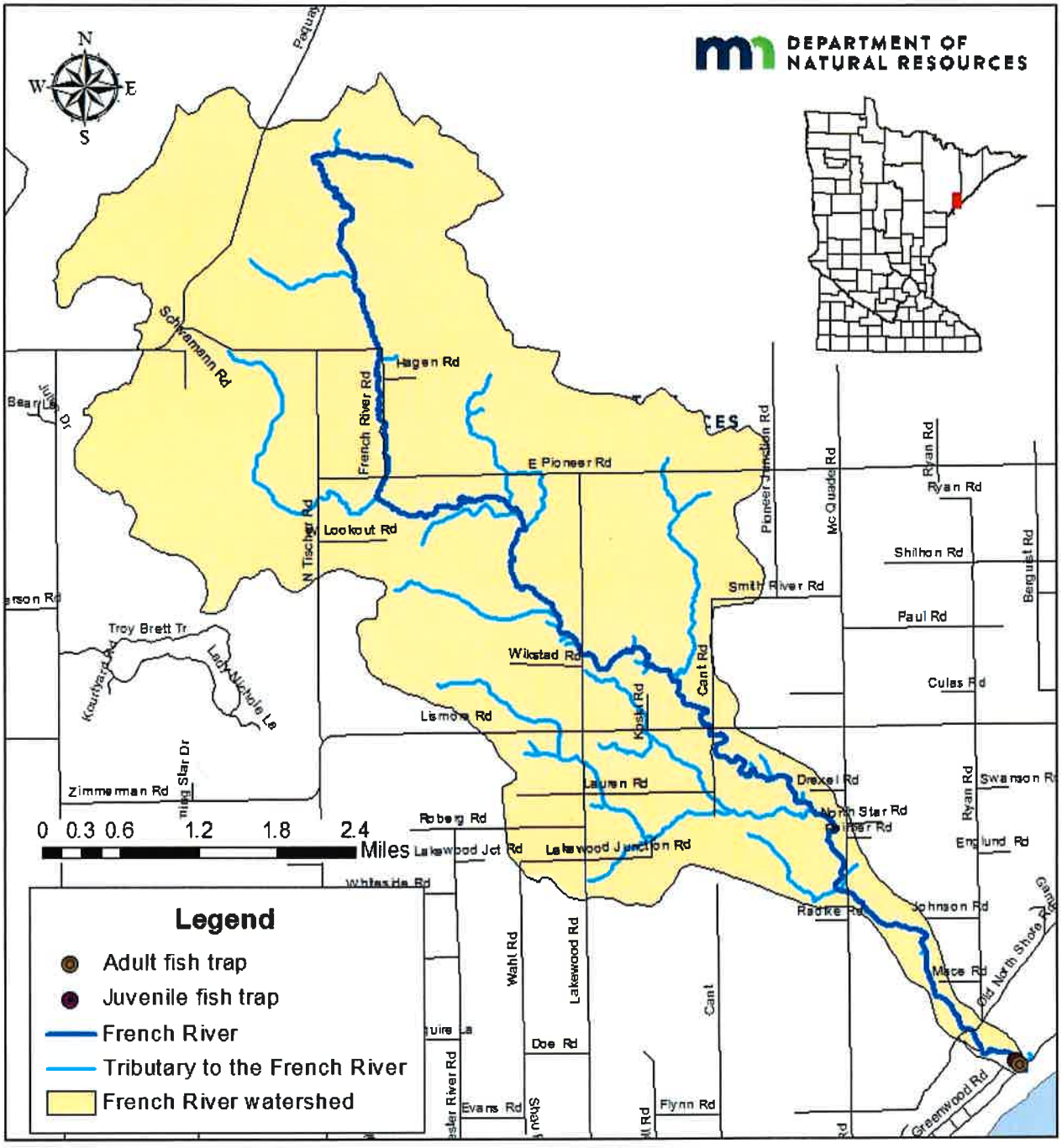


Figure 1. Map of the French River and the locations of the adult and juvenile fish traps.

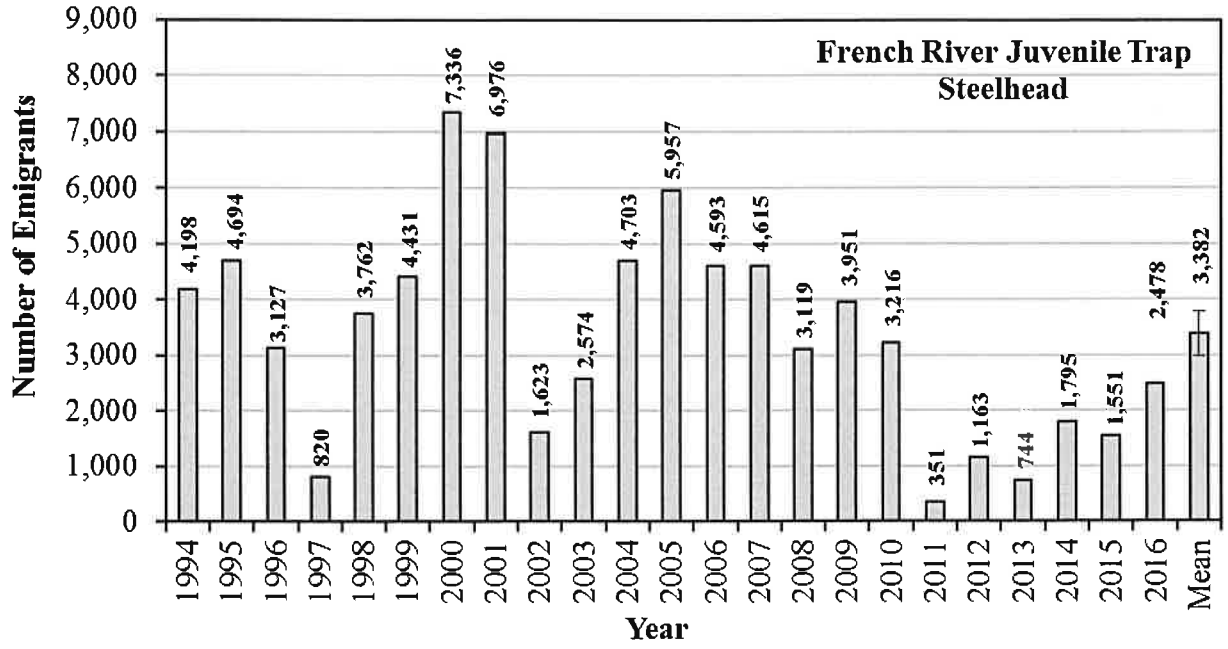


Figure 2. Number of juvenile steelhead emigrants captured in the French River juvenile trap by year. The historic average from 1994-2016 (Mean ± 1 standard error) is also provided.

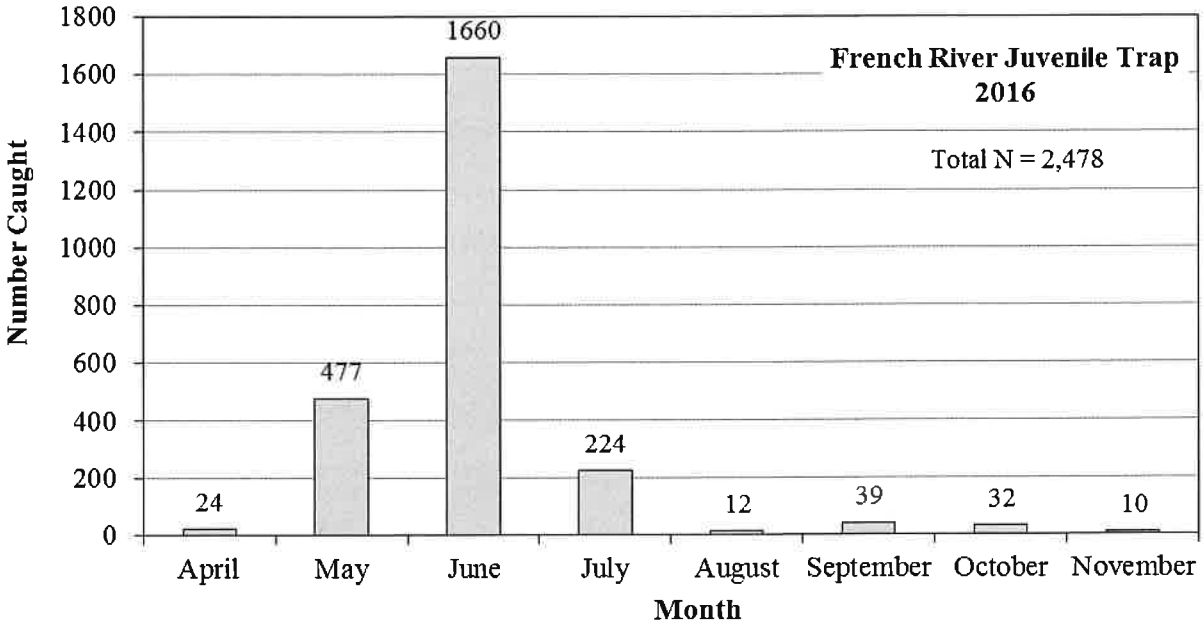


Figure 3. Number of juvenile steelhead collected in the French River juvenile trap by month in 2016.

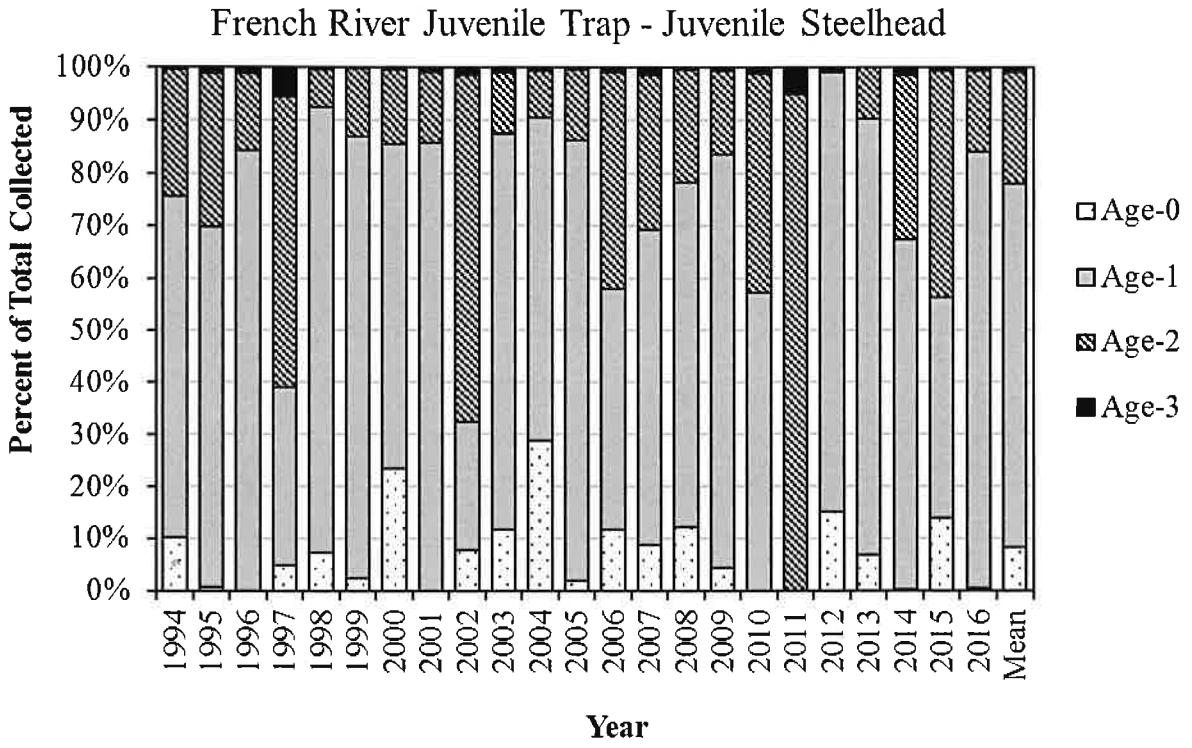


Figure 4. The percentage of the total number of juvenile steelhead collected in the French River juvenile trap that were age-0, age-1, age-2, and age-3 by year.

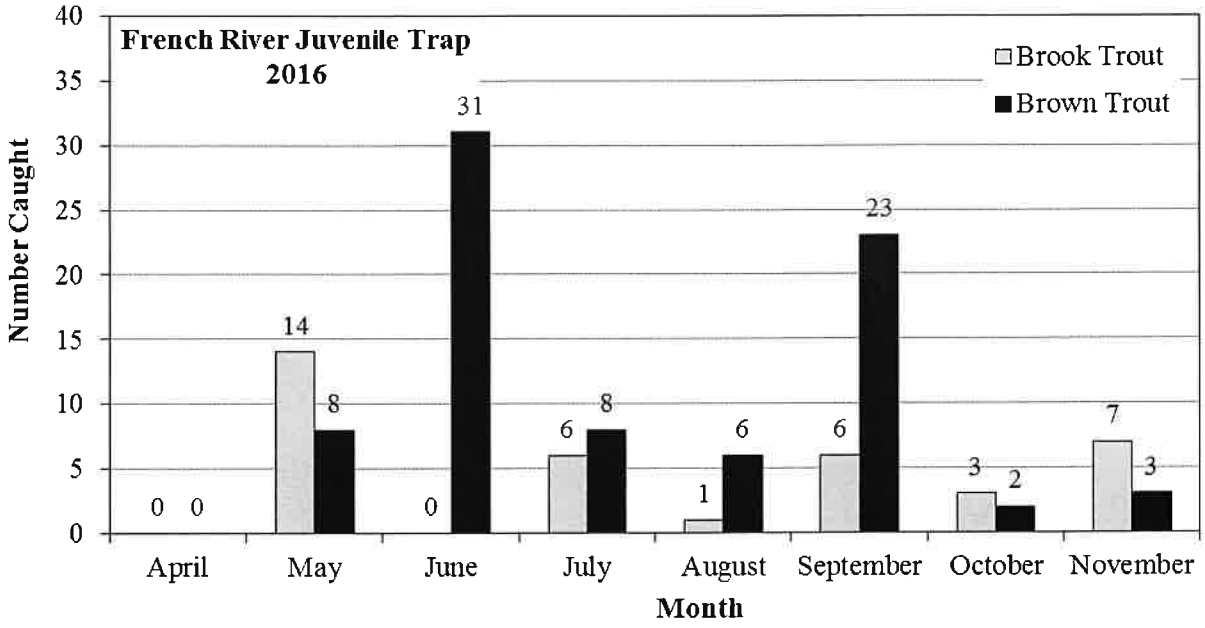


Figure 5. The number of Brown Trout and Brook Trout caught in the French River juvenile trap by month in 2016.

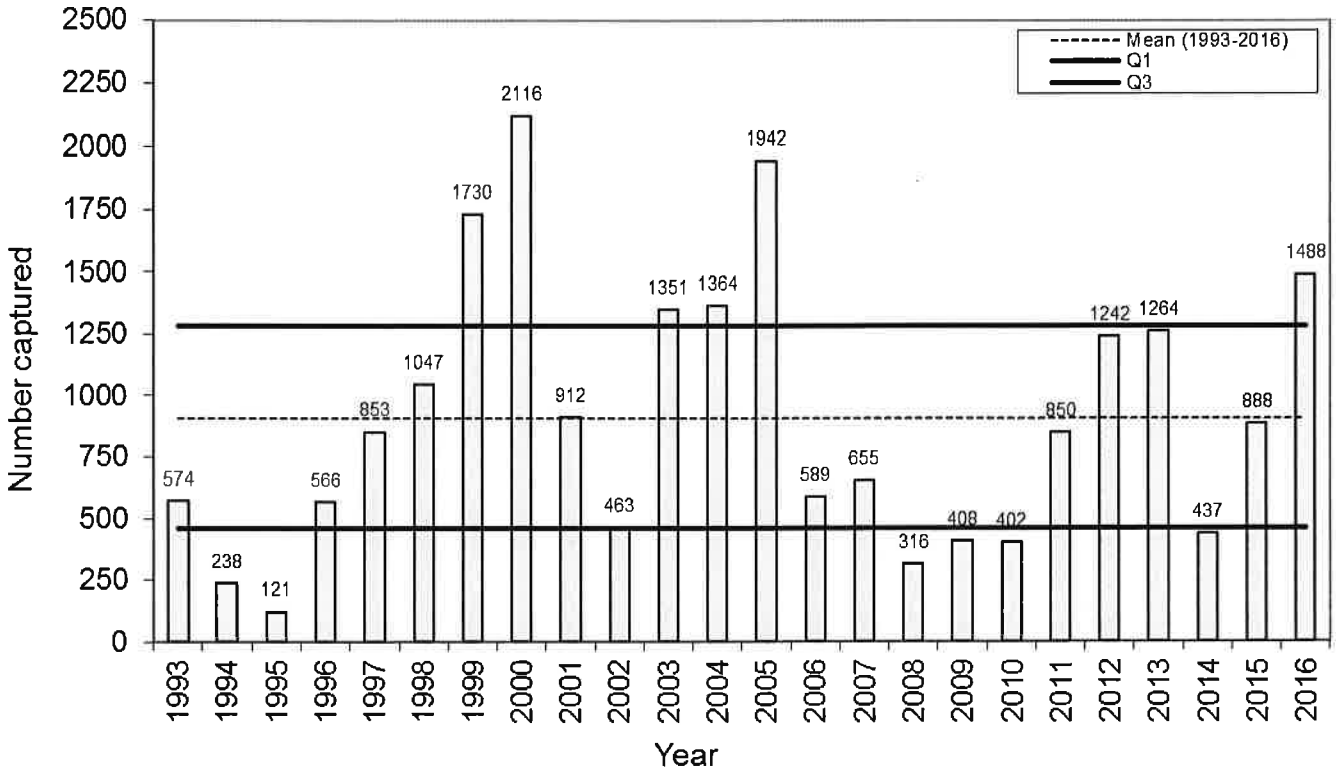


Figure 6. Number of adult Kamloops Rainbow Trout captured at the French River from 1993 to 2016.

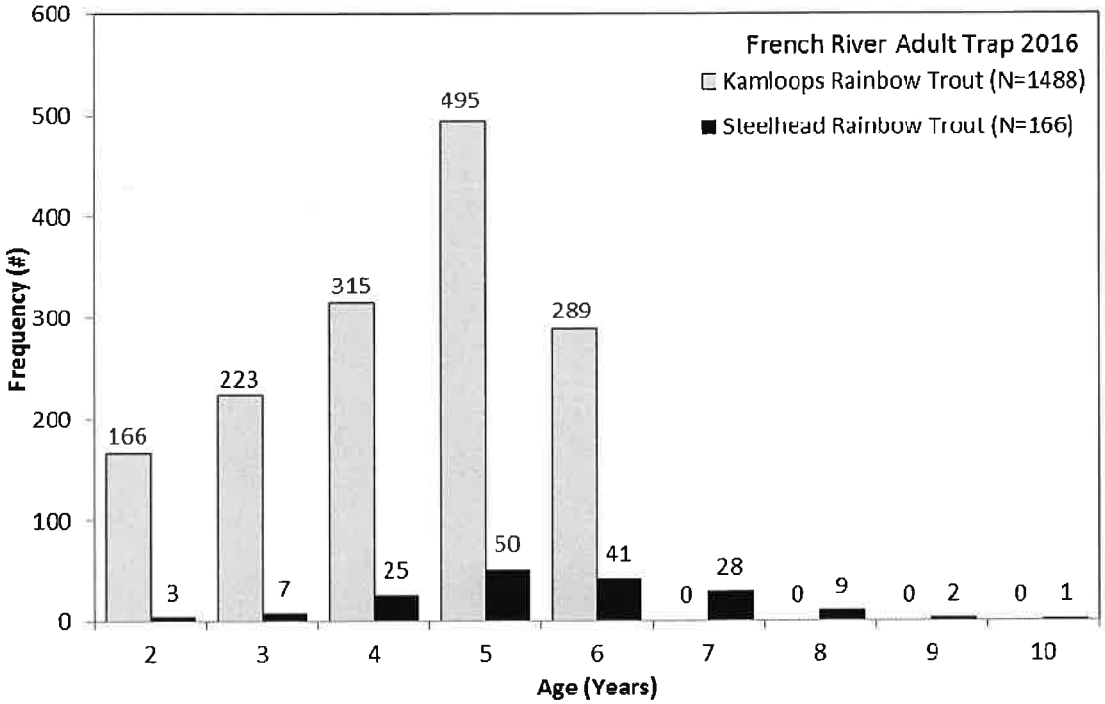


Figure 7. Age-frequency distributions of Kamloops and steelhead Rainbow Trout collected at the French River adult trap in 2016.

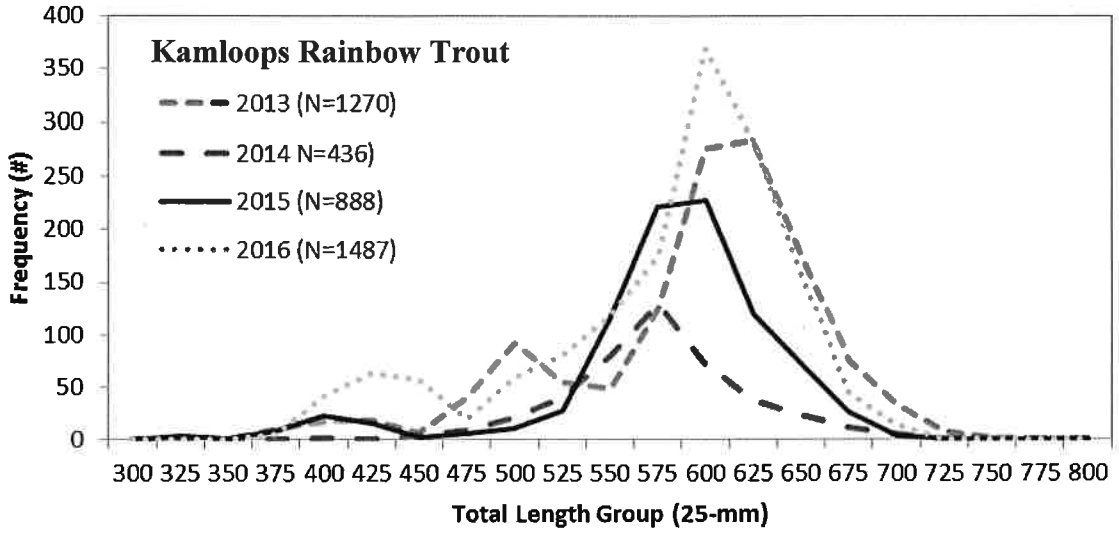


Figure 8. Length-frequency distributions of Kamloops Rainbow Trout captured in the spring at the French River in 2013, 2014, 2015, and 2016.

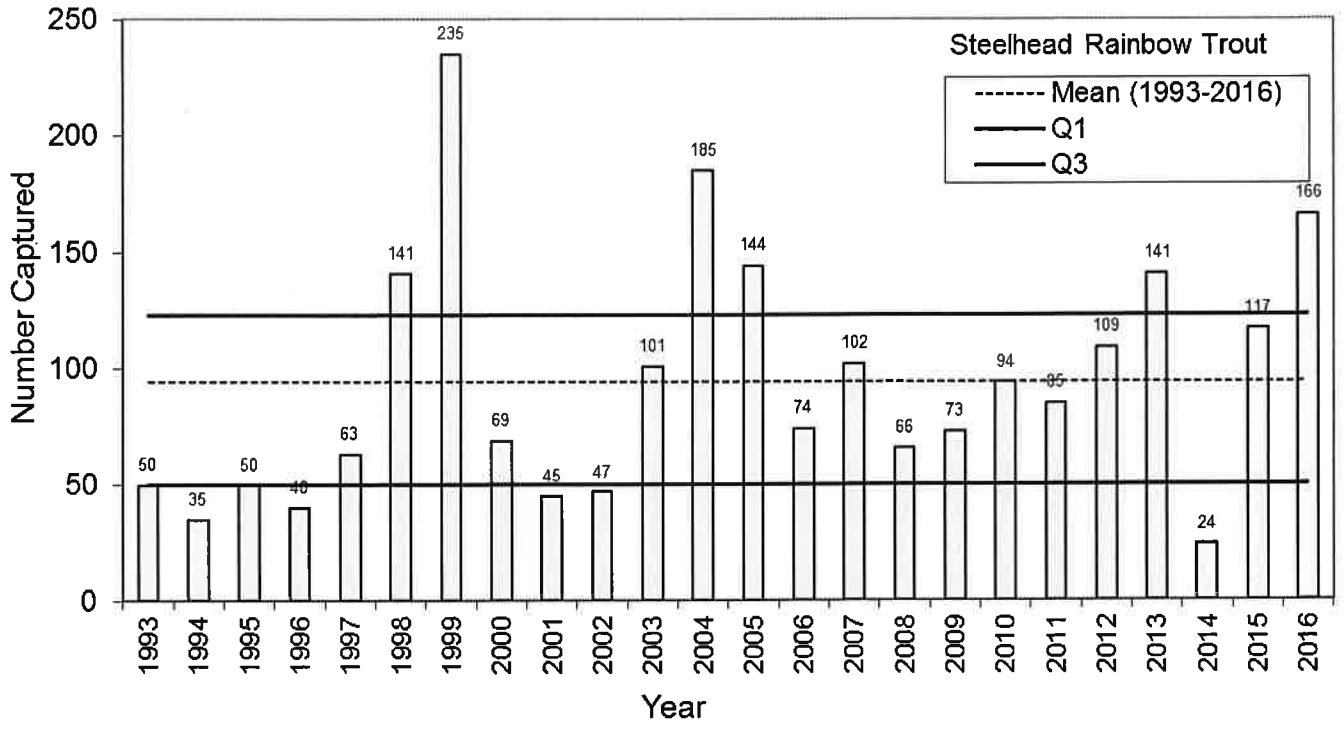


Figure 9. Number of steelhead Rainbow Trout collected at the French River from 1993 to 2016. The historic average (Mean) with 25th (Q1) and 75th (Q3) percentiles are also provided.

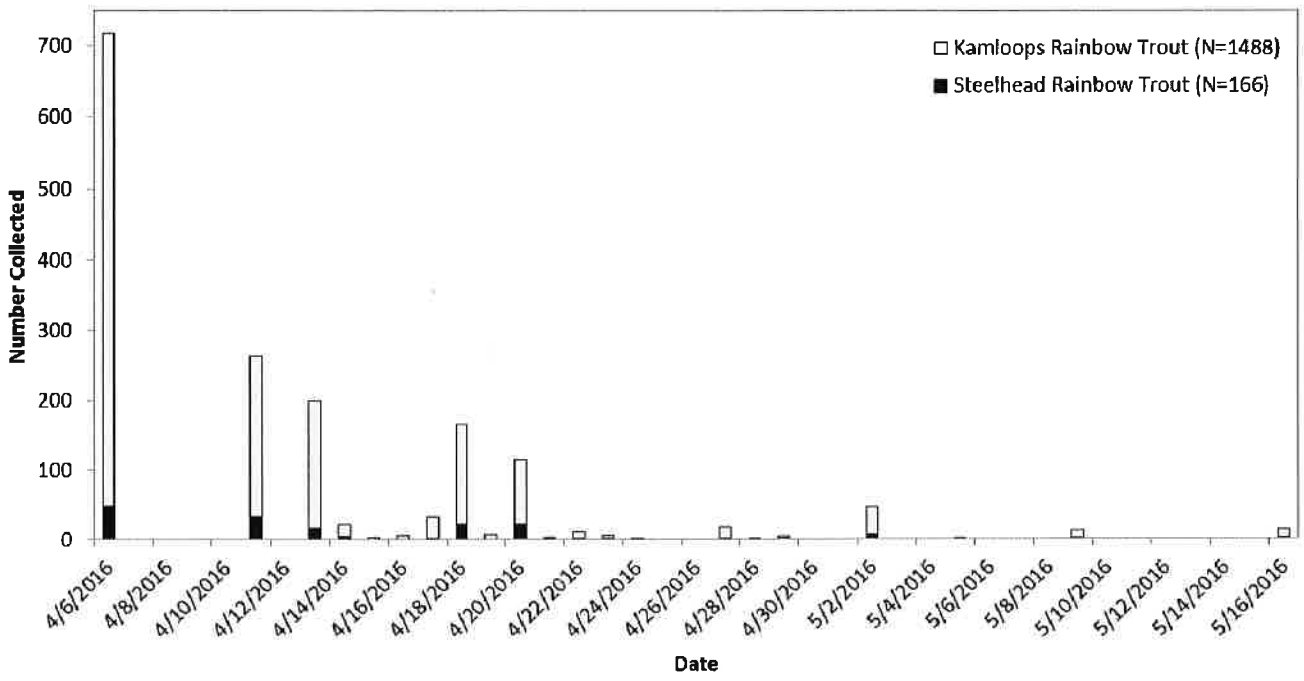


Figure 10. Number of Kamloops Rainbow Trout and steelhead Rainbow Trout collected by date during French River adult trap operations in 2015.