DEPARTMENT OF NATURAL RESOURCES

Minnesota
F-29-RP-33
Study 3
Federal Project Number: F17AF00190

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

SUPPLEMENTAL REPORT

French River Juvenile and Adult Fish Trap Report 2017

Mark Gottwald
Nick Peterson

This report provides an annual update of juvenile and adult fish trap operations at the French River. These traps provide 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, Figure1). 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).

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.

French River Stocking Update

Approximately 26,174 Kamloops Rainbow Trout yearlings (age-1, 2016 year-class) were stocked on April 24 (13,520) and April 25, 2017 (12,654) in the French River at McQuade Road. The average size of Kamloops stocked was 5.085 inches, which was a targeted pre-smolt size (less than 5.91 inches; Negus 2003) to allow them the opportunity to imprint on French River water. All Kamloops were given an adipose and right pelvic fin clip before they were stocked to distinguish them from steelhead that were stocked as fry without fin clips. These fish were offspring of adult Kamloops that returned to French River in spring 2016, and were raised in outdoor ponds at the Spire Valley Coldwater Hatchery near Remer, Minnesota.

Approximately 181,783 Steelhead Rainbow Trout fry were stocked in the French River on June 30 (98,671) and July 11, 2017 (83,112). Locations and percent of total stocked at each were Pioneer Rd. (10%), Private Drive (20%), Lakewood Rd. (30%), Cant Rd. (30%), and McQuade Rd. (10%). All fry were offspring of feral (wild) adult Steelhead that returned to French River in spring 2017. Eggs were fertilized and raised to the eyed-egg stage at the French River Coldwater Hatchery. They were then transported in coolers on ice to the Spire Valley Coldwater Hatchery where they were hatched and grown to swim-up fry (hatched from the egg and used up its attached food source-called a yolk sac) size.

Environmental Conditions

Environmental conditions and habitat (i.e., adequate water levels and water temperatures) are 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 good for juvenile trout entering the winter of 2016/2017. Spring arrived in 2017 as ice started to clear in streams near Duluth in late March and early April. Stream conditions were relatively favorable for juvenile trout during the summer of 2017. Late summer and fall of 2017 had much wetter conditions and higher flows in the river. Air temperatures and precipitation totals were generally similar to the historic averages throughout the summer. Abnormally dry conditions briefly appeared in late-May into mid-June. Flows were higher in August, September, and in October flows returned to normal rates and stayed there for the rest of the year. The North Shore was free of drought conditions from mid-June through December.

Juvenile Trap

The juvenile trap was open for 204 days between April 8 and November 3, 2017 (Table 1). A total of 6,363 juvenile salmonids were captured throughout 2017, of which 66% (4,184) were Kamloops Rainbow Trout, 32% (2,043) were Steelhead Rainbow Trout, 2% (105) were Brown Trout, and less than 1% (31) were Brook Trout. Eighty-four percent (5,350) of all

salmonids were captured in spring (April-June), 12% (774) were captured in summer (July-August), and 4% (239) were captured in fall (September-November).

A total of 2,043 juvenile steelhead were captured in 2017, which was lower than the historic average (3,326) but within the interquartile range (1,752 to 4,599, Table 1, Figure 2). Seventy-three percent (1,492) emigrated in spring, 18% (370) in summer, and 9% (181) in fall. Less than 1% (1) were age-0, 78% (1,601) were age-1, 21% (433) were age-2, and less than 1% were age-3 (7) and age-4 (1) (Table 1; Figure 3).

Only 16% (2,043) of all age-1 Kamloops stocked upstream in April were captured leaving the French River in 2017. The fate of the other 84% of Kamloops stocked that did not leave the French River in 2017 will be realized after the 2018 trap season. Trap catches in 2018 will determine if the Kamloops that were not captured in 2017 had remained in the river and survived the winter, or did not survive to emigrate at age-2. More age-1 Kamloops left the French River at age-1 than steelhead (Figure 4). However, age-1 Kamloops were 29% larger (on average) than age-1 steelhead when they left the French River; mean total length at capture was 6.4 inches (162 mm) for age-1 Kamloops and 4.8 inches (121 mm) for age-1 steelhead. Kamloops maintained a larger average size than age-1 steelhead throughout the entire trap season, but the average growth rate over time was not different between the two strains (Figure 5).

A total of 31 Brook Trout were captured in 2017, of which 65% (20) were captured in spring, 19% (6) in summer, and 16% (5) in fall. Approximately 26% (8) were age-0, 45% (14) were age-1, 23% (7) were age-2, and 6% were age-3 (2). One-hundred five Brown Trout were captured in 2017, of which 40% (42) were captured in spring, 44% (46) in summer, and 16% (17) in fall. Approximately 7% (7) were age-0, 84% (88) were age-1, and 9% (10) were age-2. Ten other non-gamefish species were also captured in 2017 (Table 2).

Adult Trap

The French River adult trap was opened on March 27th in 2017, eighteen days earlier than the mean start date for trap operation (Table 3). The trap was closed on May 8th, which was eighteen days earlier than normal. Seining in the pool downstream of the adult trap was conducted eight times with the trap checked more frequently throughout (Table 4). Trapping and seining did not take place in the fall of 2017, as fall migratory runs are no longer monitored.

Timing of Adult Returns

The spring thaw was early in 2017 with fish first sampled on March 27th. Seventy-seven percent of all Kamloops and 62% of all steelhead were captured by April 15th. Ninety-eight percent of all Kamloops and 97% of all steelhead were captured by May 1, 2017 (Table 4, Figure 6).

Kamloops

A total of 1564 Kamloops were captured at the French River in the spring of 2017. This was above the 25 year average and interquartile range (Mean=935; IR=463-1351; Table 5, Figure 7).

Historically, seventy-two percent of Kamloops returns at the French River are age-4 and age-5. In 2017 fewer returns consisted of age-4 and age-5 Kamloops. The Kamloops in 2017 ranged from age-2 to age-7, with a large portion of the return consisting of age-3 (31%), age-4 (49%), and age-5 (11%) fish. (Table 5, Figure 8). Females and males comprised 57% and 43% of Kamloops returns in 2017, respectively. Just over 3% of returning Kamloops were recaptures which was lower than the long-term mean of 4% and within the interquartile range (IR= 2.9%-5.4%; Table 5). 49% of the recaptures had the previous spring's tag. The overall mean total length was 582 mm (22.9 in.) and mean weight was 2.1 kg (4.7 lbs.).

Steelhead

There were 145 steelhead captured at the French River in 2017, which is above the interquartile range (Mean=89, IR=56.5-111; Table 7, Figure 10). Three of these fish were captured and tagged at the Knife River adult trap, one in 2016, and two in early 2017. Additionally, one former Knife River brood stock steelhead was collected. Steelhead collected in 2017 ranged from age-3 through age-11 (Table 7, Figure 8). One unknown sex steelhead is reported here, but is not included in further analysis. Forty-three percent of all mature individuals were age-4. Ten percent (N=15) of the steelhead collected in 2017 had tags from previous years, which is an above average return of repeat spawners (Table 7). Among the tags found, ten were applied in 2016, one was applied in 2015, and one was applied in 2012. The average length of steelhead was 596 mm (23.5 in.) and the average weight was 2.3 kg (4.5 lbs.) The maximum size collected was 722 mm (28.4 in., Table 6).

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).

Negus, M.T. 2003. Determination of smoltification status in juvenile migratory rainbow trout and Chinook salmon in Minnesota. North American Journal of Fisheries Management 23:913-927.

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

DEPARTMENT OF NATURAL RESOURCES

Minnesota
F-29-RP-33
Study 3
Federal Project Number: F17AF00190

FRENCH RIVER ADULT/JUVENILE TRAP REPORT

2017

Prepared by:

Mark Gottwald
Nick Peterson

Field crew leaders:

Nick Peterson, Rebecca Reiche

Project Leader: _____ Date: 4/16/18

Regional Fisheries Supervisor: _____ Date: 4/24/18

Table 1. Descriptive statistics (number [*N*] and percentage [%]) for juvenile steelhead data collected at the French River juvenile trap by age and year. Frylings were stocked instead of fry in 2009 and 2011-2013.

Year	2007[2]		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		Mean 1994 - 2017	
Date trap was opened	4/15		4/16		4/17		3/28		4/18		3/25		5/7		4/28		4/15		4/12		4/8		4/13	
Date trap was closed	11/2		11/6		11/6		10/29		11/3		10/29		11/7		10/31		11/16		11/16		11/3		11/5	
Number of days trap was open	193		204		203		215		178		165		184		185		215		210		204		201	
Emigrants by Age	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**
Age-0	408	9%	382	12%	173	4%	0	0%	0	0%	176	15%	50	7%	4	0%	217	14%	9	0%	1	0%	270	8%
Age-1	2,795	61%	2064	66%	3140	79%	1,844	57%	0	0%	976	84%	623	84%	1,204	67%	659	42%	2,077	84%	1,601	78%	2,327	70%
Age-2	1,347	29%	659	21%	609	15%	1,338	42%	333	95%	0	0%	71	10%	558	31%	664	43%	374	15%	433	21%	704	21%
Age-3	65	1%	14	0%	29	1%	34	1%	18	5%	11	1%	0	0%	29	2%	11	1%	18	1%	7	0%	26	1%
Age-4	0	0%	0	0%	1	0%	0	0%	1	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0%	0	0%
Total	**4,615**		**3,119**		**3,952**		**3,216**		**352**		**1,163**		**744**		**1,795**		**1,551**		**2,478**		**2,043**		**3,326**	
Emigrants by Year-Class	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N***	**%**	***N*[1]**	**(%)[1]**
Age-0	408	13%	382	8%	173	7%	0	--	0	0%	176	13%	50	3%	4	--	217	--	9	--	1	--	328	9%
Age-1	2,064	66%	3,140	64%	1,844	78%	0	--	976	91%	623	46%	1,204	62%	659	--	2,077	--	1,601		**		2,566	70%
Age-2	609	20%	1,338	27%	333	14%	0	--	71	7%	558	41%	664	34%	374	--	433		**		**		721	20%
Age-3	34	1%	18	0%	11	0%	0	--	29	3%	11	1%	18	1%	7		**		**		**		27	1%
Age-4	1	0%	0	0%	0	0%	0	--	0	0%	0	0%	1	0%	**		**		**		**		0	0%
Total	**3,116**		**4,878**		**2,361**		**0**		**1,076**		**1,368**		**1,937**		**1,044****		**2,727****		**1,610****		**1****		**3,643**	
Percent Emmigrants per Year-Class	**2007**		**2008**		**2009**		**2010**		**2011**		**2012**		**2013**		**2014**		**2015**		**2016**		**2017**		**Average**	
Number of fry stocked	121,740		109,324		53,214		0		55,013		55,032		55,596		39,856		99,908		193,308		181,783		103,190	
Number of fry stocked/ha	16,291		14,630		7,121		0		7,362		7,364		7,440		5,334		13,321		25,878		24,335		13,808	
Age-0	0.3%		0.3%		0.3%		--		0.0%		0.3%		0.1%		0.0%		0.2%		0.0%		0.0%		0.3%	
Age-1	1.7%		2.9%		3.5%		--		1.8%		1.1%		2.2%		1.7%		2.1%		0.8%		**		2.7%	
Age-2	0.5%		1.2%		0.6%		--		0.1%		1.0%		1.2%		0.9%		0.4%		**		**		0.7%	
Age-3	0.0%		0.0%		0.0%		--		0.1%		0.0%		0.0%		0.0%		**		**		**		0.0%	
Age-4	0.0%		0.0%		0.0%		--		0.0%		0.0%		0.0%		**		**		**		**		0.0%	
Cumulative Survival Index	**2.6%**		**4.5%**		**4.4%**		**--**		**2.0%**		**2.5%**		**3.5%**		**2.6%**		**2.7%**		**0.8%**		**0.0%**		**3.8%**	

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

[2] Some individuals were subsampled in 2007

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

Table 2. Other fish species collected in the French River juvenile trap in 2017.

	Month								
Species	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**Total**
Blacknose Dace			1	13	14	3			**31**
Brook Stickleback				1					**1**
Central Mudminnow		1							**1**
Creek Chub		11	6	11	7	1	1		**37**
Fathead Minnow		1	7	1					**9**
Longnose Dace			2		1				**3**
Northern Redbelly Dace			2						**2**
Pearl Dace					3				**3**
White Sucker						1			**1**
Finescale Dace					1				**1**
Total	**0**	**13**	**18**	**26**	**26**	**5**	**1**	**0**	**89**

Table 3. 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			
2017	3/27	5/8	43	2017			
Mean (1993-2017)	4/13	5/26	43	Mean (1993-2009)	9/5	11/10	66

Table 4. Total catch by date for all fish species collected during the French River adult trap operations in 2017.

Date	All Species	Kamloops Rainbow Trout	Steelhead Rainbow Trout
3/27/2017	396	367	29
4/7/2017	308	282	26
4/12/2017	468	444	24
4/13/2017	95	86	9
4/14/2017	26	24	2
4/16/2017	93	83	10
4/17/2017	130	109	21
4/20/2017	49	41	8
4/23/2017	5	5	
4/24/2017	85	77	8
4/25/2017	1	1	
5/1/2017	21	17	4
5/4/2017	9	8	1
5/5/2017	2	2	
5/8/2017	21	18	3
Total	1709	**1564**	**145**

Table 5. Annual returns, number of repeat spawners, and year-class strength indices of Kamloops Rainbow Trout collected at the French River.

Year of Sampling																														
Year	**2003**		**2004**		**2005**		**2006**		**2007**		**2008**		**2009**		**2010**		**2011**		**2012**		**2013**		**2014**		**2015**		**2016**		**2017**		**Mean 1993-2017**	
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	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	3	65	**0**	**41**
Age-3	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	267	215	**52**	**63**
Age-4	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	465	295	**285**	**158**
Age-5	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	87	78	**145**	**84**
Age-6	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	37	14	**55**	**23**
Age-7	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	28	10	**14**	**9**
Age-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	0	0	**3**	**1**
Age-9	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	0	0	**1**	**0**
Sex total	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	887	677	**554**	**381**
Grand total	1351		1364		1942		589		655		316		408		402		850		1242		1264		437		886		1480		1564		**935**	

1x repeat	30	80	76	46	24	14	22	12	19	55	61	19	40	114	42	**35**
2x repeat	2	5	12	11	1	1	2	3	0	6	9	1	5	7	5	**3**
3x repeat	1	0	0	1	1	0	0	1	0	0	1	1	0	1	0	**0**
4x repeat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
% repeat	**2.4%**	**6.2%**	**4.5%**	**9.8%**	**4.0%**	**4.7%**	**5.9%**	**4.0%**	**2.2%**	**4.9%**	**5.6%**	**4.8%**	**5.1%**	**8.2%**	**3.0%**	**4.2%**
Fall tag	2	0	57	36	4	2	4	0	0	0	0	0	0	0	0	**4**
K.R. tag	1	0	7	5	0	3	1	0	1	0	0	2	0	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**	**2017**
Stocked	45,906	30,050	39,712	36,374	55,111	45,446	65,018	54,239
Returned	1223	884	344	268	161	9	37	–
% return[1]	2.66%	2.94%	0.87%	0.74%	0.29%	0.02%	0.06%	–

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

Table 6. Length-frequency distribution of all fish measured by species at the French River in adult trap operations 2017.

Length Group (10mm)	Kamloop Rainbow Trout	Steelhead Rainbow Trout
340	4	
350	6	1
360	5	
370	4	2
380	4	
390	2	1
400	7	1
410	14	1
420	6	
430	10	
440	4	
450	3	
460	3	
470	6	1
480	3	2
490	14	
500	25	
510	41	3
520	61	1
530	65	4
540	76	8
550	90	6
560	106	10
570	138	13
580	128	4
590	109	7
600	110	11
610	128	12
620	91	14
630	75	11
640	64	5
650	48	6
660	47	5
670	27	6
680	17	2
690	8	2
700	9	2
710	3	3
720	1	1
730	2	
Grand Total	**1564**	**145**

Table 7. 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	2003		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		**Mean (93-17)**	
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**
2	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	**0**	**0**
3	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	7	**1**	**4**
4	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	41	21	**8**	**7**
5	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	40	7	**19**	**12**
6	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	11	9	**17**	**9**
7	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	4	1	**9**	**6**
8	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	1	0	**3**	**2**
9	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	0	0	**1**	**0**
10	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	**0**	**0**
11	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	0	0	1	0	**0**	**0**
Sex total	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	99	45	**56**	**41**
Total	101		186		144		74		102		66		73		94		85		106		141		24		117		159		145		**98**	

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	**Mean (03-17)**
1x repeat	0	14	37	13	3	10	2	9	7	8	16	1	16	4	8	**10**
2x repeat	0	0	1	1	0	0	1	0	0	2	3	1	2	3	0	**1**
3x repeat	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4x repeat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
% Repeat	0.0%	7.5%	27.1%	18.9%	2.9%	15.2%	4.1%	9.6%	8.2%	9.4%	13.5%	8.3%	15.4%	4.4%	5.5%	**11.1%**

	Complete year-classes													
Year-class	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	**Mean (90-08)**
Stocked	42,571	60,669	100,281	201,156	109,427	48,311	64,932	117,596	250,100	135,202	122,776	121,740	109,324	**114,160**
Returned	56	84	143	133	100	44	42	139	131	42	68	120	105	**93**
% return[1]	0.13%	0.14%	0.14%	0.07%	0.09%	0.09%	0.06%	0.12%	0.05%	0.03%	0.06%	0.10%	0.10%	**0.09%**
1x repeat	7	7	7	6	4	0	3	5	5	1	5	15	11	**6**
2x repeat	0	0	2	0	2	0	0	1	0	0	1	4	3	**1**
3x repeat	0	1	0	0	0	0	0	0	0	0	0	0	1	**0**

	Incomplete year-classes								
Year-class	2009	2010	2011	2012	2013	2014	2015	2016	2017
Stocked	53,214	0	55,013	55,032	55,596	39,856	99,908	193,308	181,783
Returned	99	50	94	65	73	9	1	6	--
% return[1]	0.19%	--	0.17%	0.12%	0.13%	0.02%	0.00%	--	--
1x repeat	4	0	1	0	0	0	--	--	--
2x repeat	1	0	0	0	0	0	--	--	--
3x repeat	0	0	0	0	0	0	--	--	--

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

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

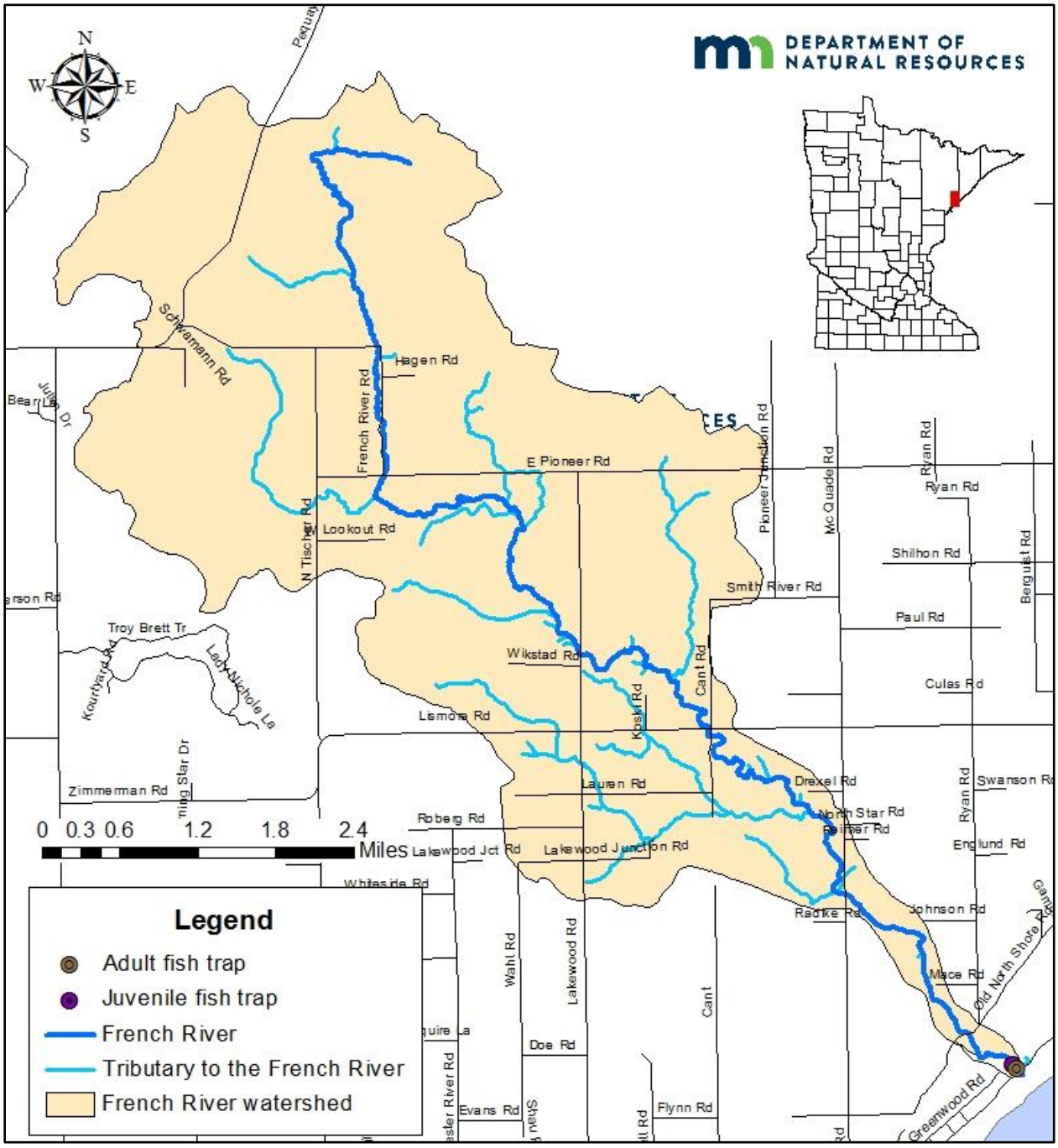

Figure 2. Number of juvenile steelhead emigrants captured in the French River juvenile trap by year. Mean is the historic average from 1994-2017 (± 1 standard error).

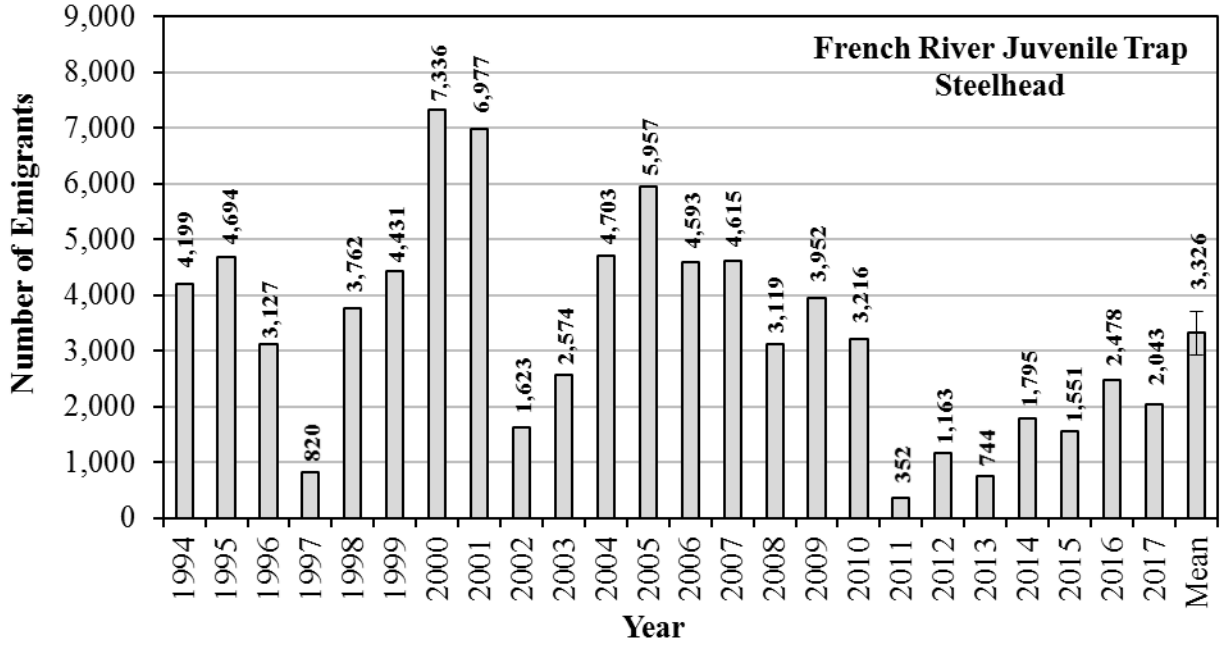

Figure 3. Percent of all juvenile steelhead collected in the French River juvenile trap that were age-0 through age-4 by year.

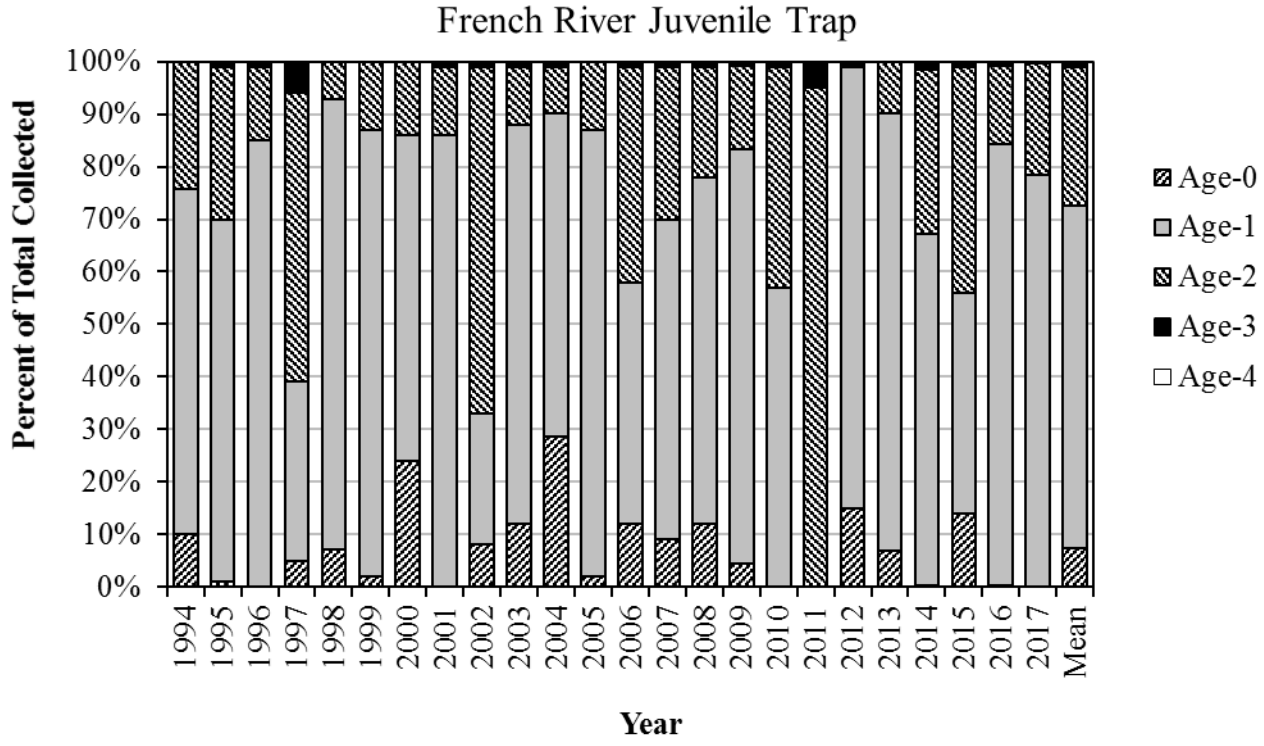

Figure 4. Number of age-1 (2016 year-class) Kamloops and steelhead captured in the French River juvenile trap by month and week in 2017.

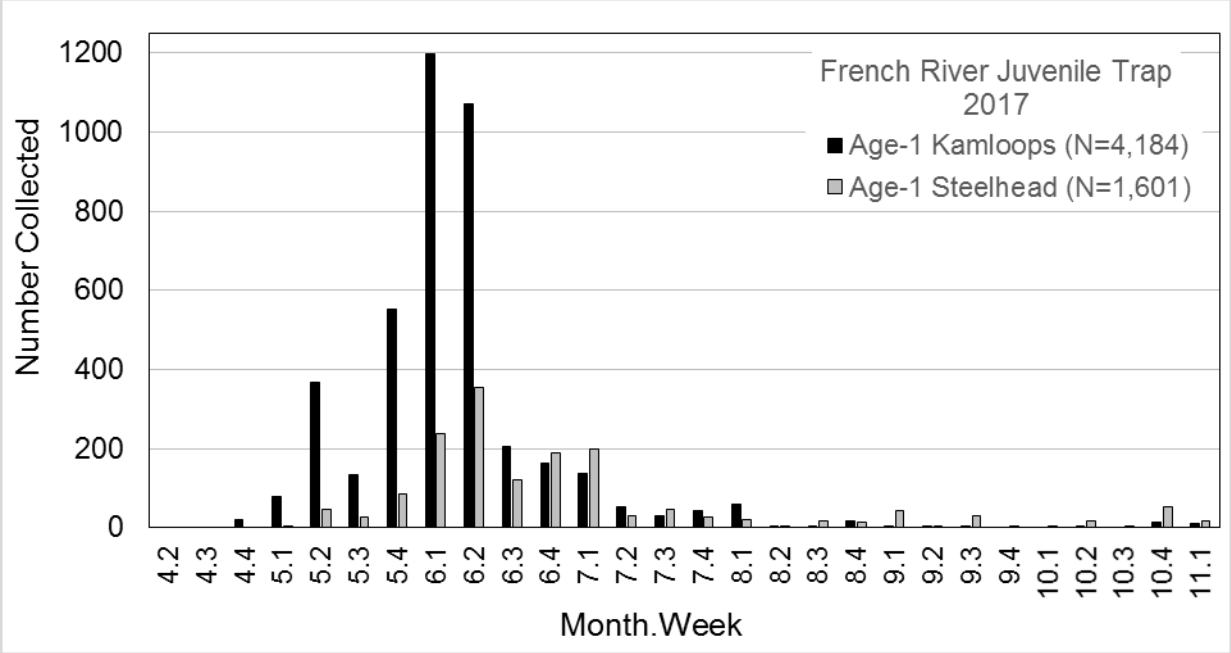

Figure 5. Mean total length (inches) of age-1 (2016 year-class) Kamloops and steelhead captured at the French River juvenile trap by month and week in 2017. The linear trendline for both Kamloops and steelhead is also shown.

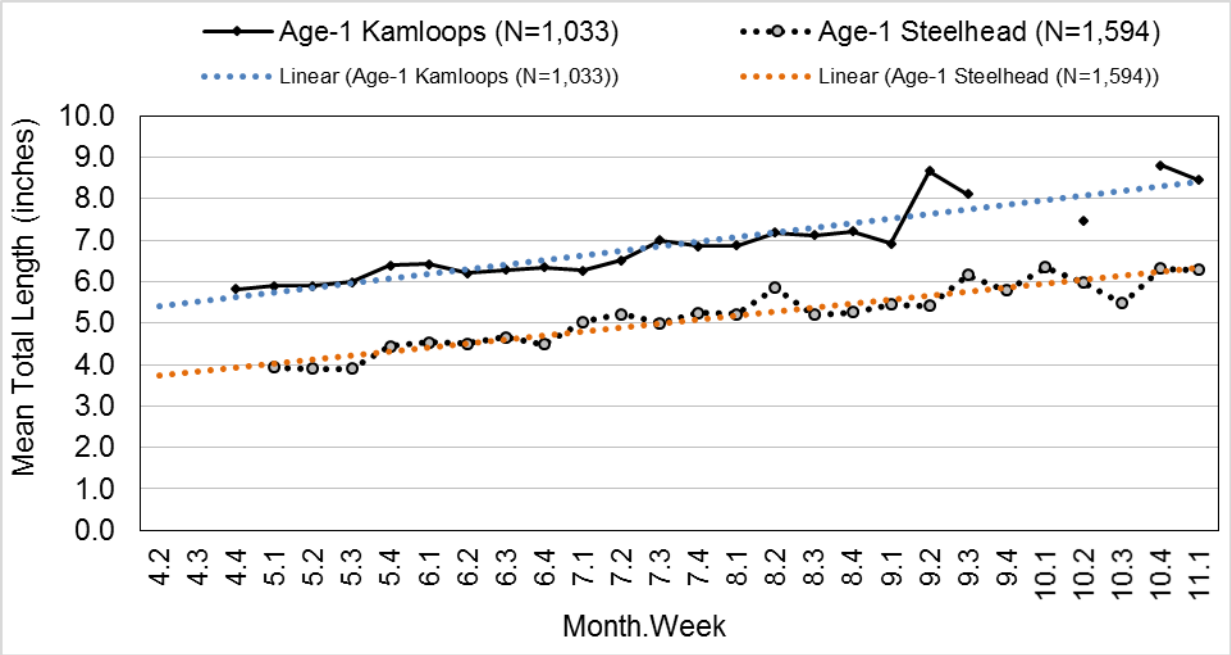

Figure 6. Number of Kamloops Rainbow Trout and steelhead Rainbow Trout collected by date during French River adult trap operations in 2017.

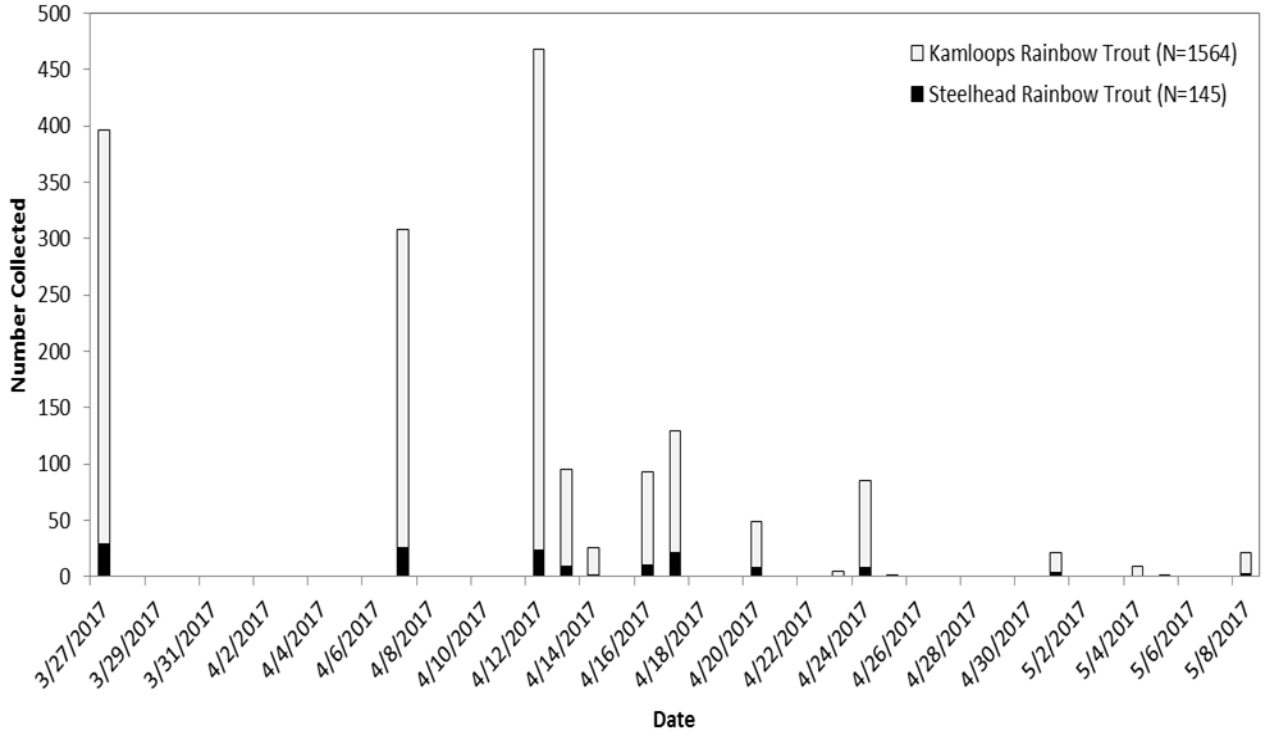

Figure 7. Number of adult Kamloops Rainbow Trout captured at the French River from 1993 to 2017.

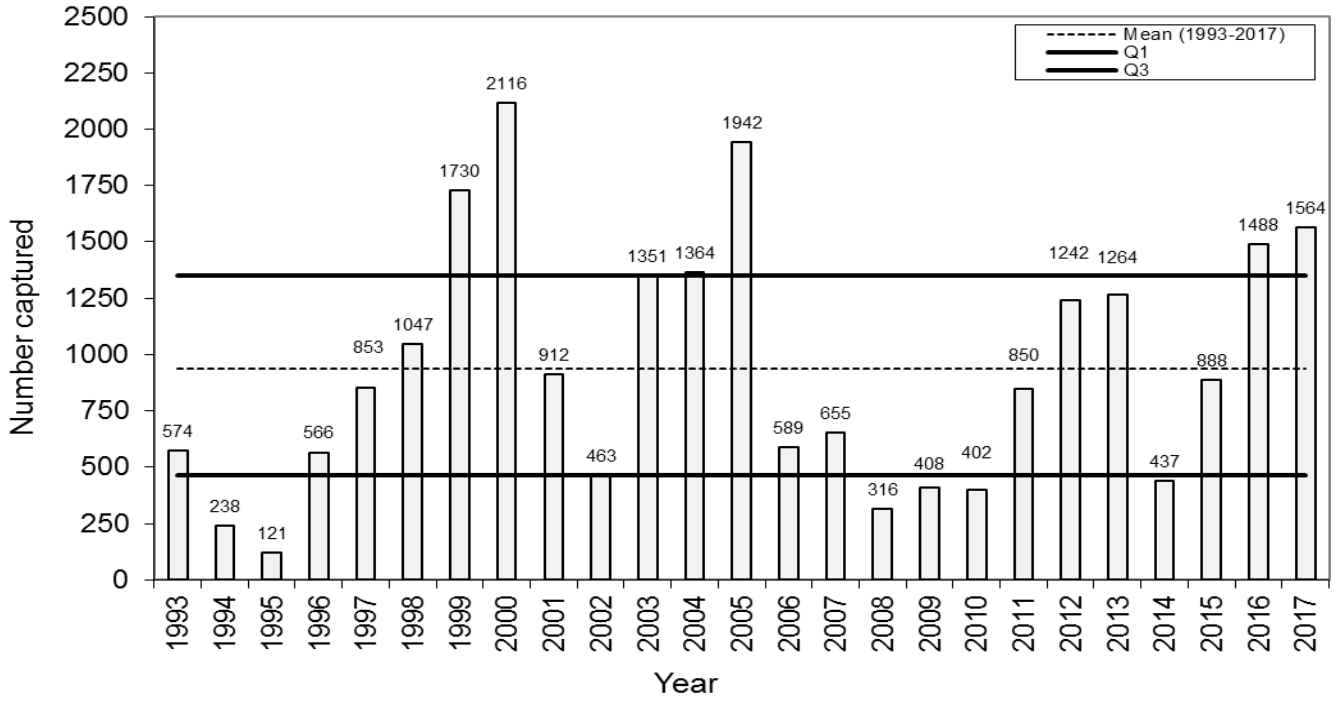

Figure 8. Age-frequency distributions of Kamloops and steelhead Rainbow Trout collected at the French River adult trap in 2017.

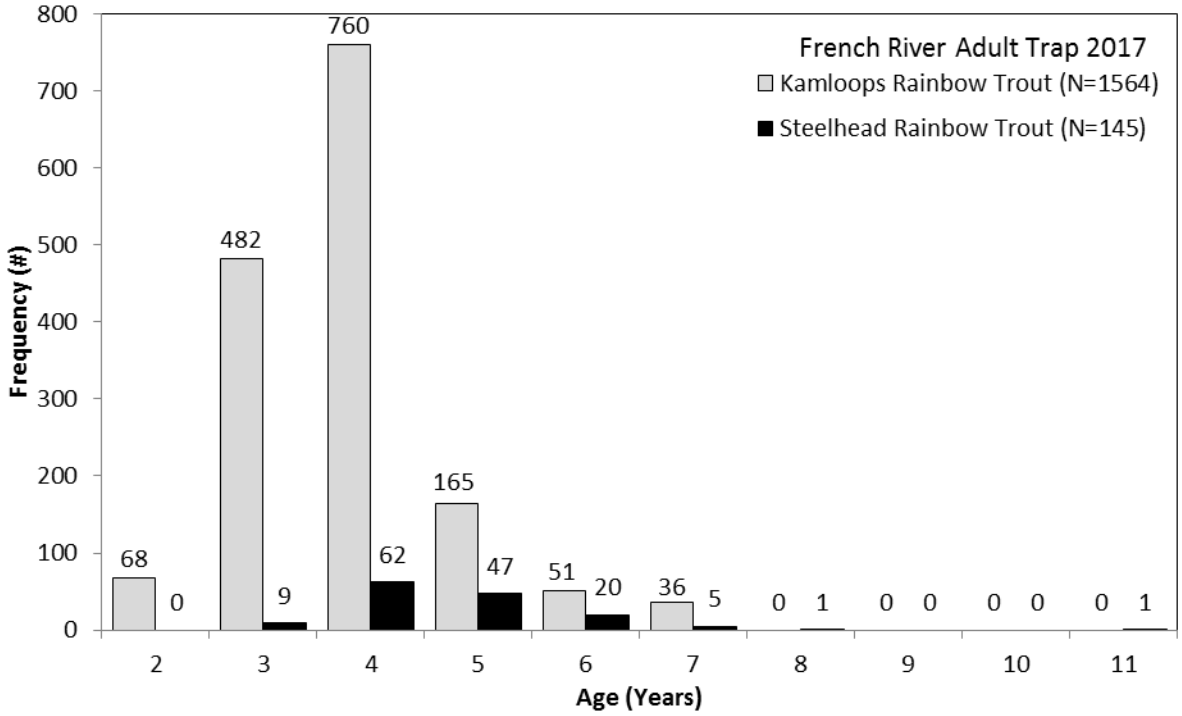

Figure 9. Length-frequency distributions of Kamloops Rainbow Trout captured in the spring at the French River in 2014, 2015, 2016, and 2017.

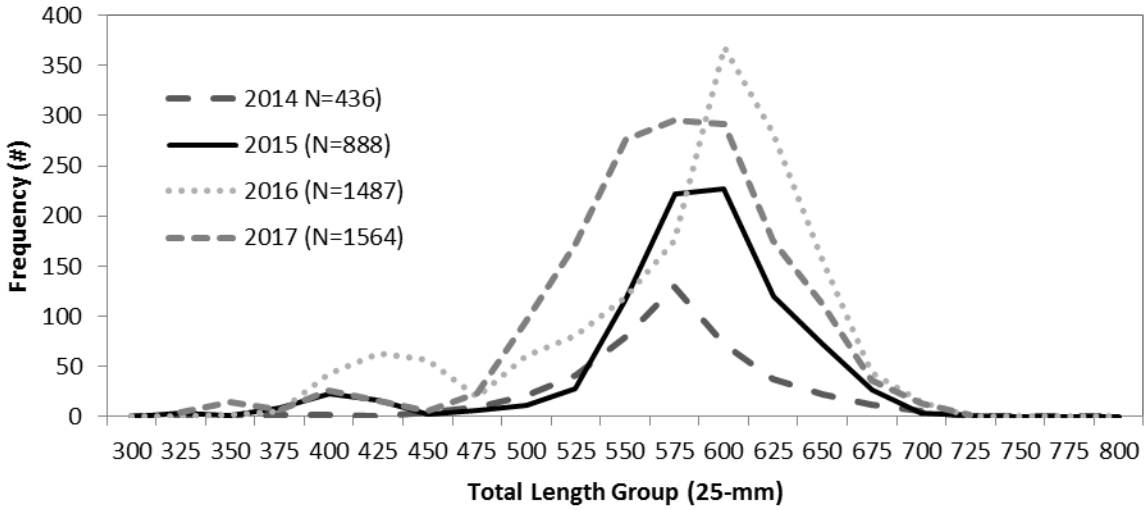

Figure 10. Number of steelhead Rainbow Trout collected at the French River from 1993 to 2017. The historic average (Mean) with 25th (Q1) and 75th (Q3) percentiles are also provided.