

Fall 2018 through Spring 2019



Wisconsin Department of Natural Resources
Bureau of Fisheries Management

Root River Steelhead Facility Fall 2018 and Spring 2019

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Abstract – A total of 1,125 Chinook salmon, 2,487 coho salmon, 762 steelhead and 80 brown trout were examined during fall 2018 and spring 2019 at the Root River Steelhead Facility (RRSF). A total of 510 coho were spawned, and approximately 555,000 eggs were collected for our hatcheries.

The spring 2019 return of steelhead was a total of 742 fish. Although the 2019 return was lower than the previous year, it fell within 1% of the 10-year average return. A total of 445 steelhead were spawned, which produced approximately 632,758 chambers creek eggs and 559,925 ganaraska eggs.

The number of fish captured at RRSF is a subset of the seasonal migration in the Root River. RRSF does not stop every fish in the river, as they are able to move upstream past the facility before it is operational in early spring and fall, and some fish are able to bypass the facility during the sampling season when the river is at high flows. High flows on the Root River for much of the early spring in 2019 resulted in delayed start up of the facility, which partially explains the lower steelhead return.

Due to Viral Hemorrhagic Septicemia (VHS) protocols, no skamania strain steelhead brood fish have been collected from RRSF since fall 2006. Historically, adult skamania were transported in the fall from RRSF to Kettle Moraine Springs State Fish Hatchery, where they were held until they were ready to spawn the following January/February. VHS rules now prohibit the transfer of live fish from RRSF to a hatchery, and therefore, the skamania program was suspended, with none stocked between 2008 and 2017. Skamania were stocked in 2018 and 2019, which were raised from eggs collected by Indiana DNR. Without skamania brood stock collection, RRSF is operated later in the fall, allowing Chinooks to migrate upriver past the facility early in the season. This accounts for lower numbers of fish processed at RRSF in recent fall seasons.

In 2018, the U.S. Fish and Wildlife Service's mass marking program began marking all rainbow trout stocked into Lake Michigan with an adipose clip and coded-wire tag. All rainbow trout will continue to be marked with coded-wire tags and adipose clips for a period of five years, which will provide opportunities for analysis of movement and straying rates of stocked fish, growth rates, and estimates of natural reproduction.

In fall 2018 at RRSF the standard weight of a 30 inch Chinook salmon was 9.8 pounds, which was slightly higher than the fall of 2016 and 2017. The standard weight for a 22 inch coho salmon was 3.8 pounds, which was about the same as the previous fall. The standard weight for a 22 inch steelhead was 3.8 pounds, which was also about the same as the previous fall. The standard weight for a 20-inch brown trout was 3.9 pounds.

The following tables and figures report the results of data collected at the RRSF during fall 2018 and spring 2019. These data contribute to a long-term index of Chinook, coho and steelhead populations in the Root River, and are collected to fulfill three objectives: 1) track the abundance of salmonid returns, 2) measure growth and condition of each species and/or strain, and 3) estimate return rate of each species. For complete description of methods and calculations, see Thompson and Eggold (2007).

REFERENCES

Thompson, J. and B. Eggold. 2007. Root River Steelhead Facility, Fall 2006 and Spring 2007. Publication number PUB-FH-836 2007. Wisconsin Department of Natural Resources, Milwaukee, Wisconsin. 22 pages.

Table 1. Summary of Chinook salmon, coho salmon, steelhead and brown trout captured at the Root River Steelhead Facility during 2009 to 2019.

Harvest year	Harvested	Passed upstream	Misc. samples	Total
CHINOOK SALMON				
Fall 2009	0	1,695	21	1,716
Fall 2010	7	1,067	434	1,508
Fall 2011	117	1,798	206	2,121
Fall 2012	201	1,462	167	1,830
Fall 2013	486	1,070	392	1,948
Fall 2014	533	1,646	44	2,223
Fall 2015	384	880	45	1,309
Fall 2016	518	1,375	152	2,045
Fall 2017	696	1,542	524	2,762
Fall 2018	794	326	5	1,125
COHO SALMON				
Fall 2009	185	1,131	22	1,338
Fall 2010	256	1,355	71	1,682
Fall 2011	240	1,258	130	1,628
Fall 2012	153	659	37	849
Fall 2013	216	1,281	169	1,666
Fall 2014	60	1,295	33	1,388
Fall 2015	60	1,351	25	1,436
Fall 2016	60	1,324	133	1,517
Fall 2017	66	2,290	180	2,536
Fall 2018	61	2,397	29	2,487
STEELHEAD				
Spring 2009	122	902	0	1,024
Fall 2009	0	99	0	99
Spring 2010	67	363	1	431
Fall 2010	0	65	0	65
Spring 2011	120	642	4	766
Fall 2011	0	18	0	18
Spring 2012	116	113	3	232
Fall 2012	0	16	2	18
Spring 2013	120	179	2	301
Fall 2013	0	7	0	7
Spring 2014	120	852	7	979
Fall 2014	0	11	0	11
Spring 2015	60	711	3	774
Fall 2015	0	9	0	9
Spring 2016	60	1,293	0	1,353
Fall 2016	0	43	0	43
Spring 2017	120	774	1	895
Fall 2017	0	9	0	9
Spring 2018	62	990	0	1,052
Fall 2018	0	20	0	20
Spring 2019	91	651	0	742
BROWN TROUT				
Fall 2008	0	243	2	245
Spring 2009	0	1	0	1
Fall 2009	0	95	2	97
Fall 2010	0	78	1	79
Fall 2011	0	57	4	61
Fall 2012	0	112	22	134
Fall 2013	0	166	1	167
Spring 2014	0	1	0	1
Fall 2014	13	174	5	192
Fall 2015	0	52	34	86
Fall 2016	0	11	5	16
Fall 2017	0	12	3	15
Fall 2018	0	80	0	80

Table 2. Number of Chinook salmon harvested, passed upstream and sampled at the Root River Steelhead Facility during fall 2018.

Date	Number Harvested	Number Passed Upstream	Number of Miscellaneous Samples	Total Number of Fish
27 Sep 2018	45	2	0	47
01 Oct 2018	59	2	0	61
04 Oct 2018	19	0	0	19
10 Oct 2018	16	0	1	17
13 Oct 2018	0	7	0	7
15 Oct 2018	71	0	0	71
18 Oct 2018	116	23	0	139
22 Oct 2018	82	64	0	146
25 Oct 2018	104	52	1	157
29 Oct 2018	107	109	0	216
01 Nov 2018	99	67	2	168
05 Nov 2018	67	0	0	67
08 Nov 2018	9	0	1	10
Totals	794	326	5	1,125

Table 3. Average weight, average length, standard weight (predicted weight at a given length based on a length-weight regression) and trophy weight (95th percentile) for the major salmonid species returning to the Root River Steelhead Facility during fall 2008 to spring 2019. The lengths used for calculation of standard weight are: 30 inches for Chinook, 22 inches for coho, 22 inches for steelhead, and 20 inches for brown trout. Note: Fall 2016 and Fall 2017 were omitted for brown trout due to low returns.

Season	Number used in analysis	Average weight (pounds)	Average length (inches)	Standard weight	Trophy weight
CHINOOK SALMON					
2008 – 09	684	10.1 ± 3.6	30.8 ± 4.5	8.8	15.0
2009 – 10	553	11.4 ± 4.9	31.2 ± 5.2	9.1	18.7
2010 – 11	674	9.5 ± 3.6	29.9 ± 4.4	8.8	15.0
2011 – 12	564	10.9 ± 5.0	30.3 ± 5.0	9.6	18.5
2012 – 13	694	10.6 ± 3.4	31.5 ± 3.9	8.6	16.0
2013 – 14	1,085	12.5 ± 6.2	31.6 ± 5.8	9.6	21.5
2014 – 15	945	11.8 ± 3.0	32.2 ± 3.2	9.0	16.4
2015 - 16	920	11.7 ± 3.7	31.6 ± 4.2	9.0	16.9
2016 - 17	870	10.1 ± 5.3	29.5 ± 5.4	9.5	19.1
2017 - 18	868	11.1 ± 5.3	30.3 ± 5.0	9.5	19.1
2018 – 19	852	13.8 ± 6.0	32.6 ± 5.6	9.8	22.5
COHO SALMON					
2008 – 09	1,529	5.1 ± 1.6	24.4 ± 2.9	3.5	7.6
2009 – 10	1,217	5.2 ± 2.5	24.2 ± 4.6	3.5	9.0
2010 – 11	1,249	5.4 ± 2.2	24.9 ± 4.0	3.4	8.6
2011 – 12	786	7.4 ± 2.3	26.9 ± 3.7	3.6	10.3
2012 – 13	715	4.0 ± 1.7	22.4 ± 3.8	3.5	6.4
2013 – 14	786	8.2 ± 2.4	28.1 ± 3.4	3.6	11.3
2014 – 15	1,353	6.2 ± 1.8	25.9 ± 3.3	3.5	8.6
2015 - 16	1,161	4.5 ± 1.5	23.3 ± 2.9	3.5	7.0
2016 - 17	1,042	5.2 ± 2.8	23.8 ± 5.0	3.6	9.4
2017 - 18	1,249	8.3 ± 2.4	27.7 ± 3.2	3.9	11.6
2018 - 19	1,742	7.8 ± 2.4	26.9 ± 3.3	3.8	11.2
STEELHEAD					
2008 – 09	622	5.4 ± 1.5	24.8 ± 2.4	3.9	8.3
2009 – 10	528	6.3 ± 1.9	26.5 ± 3.1	3.8	9.2
2010 – 11	827	4.8 ± 2.3	23.5 ± 4.1	3.7	8.8
2011 – 12	247	5.7 ± 1.8	25.4 ± 2.8	3.7	8.9
2012 – 13	315	4.5 ± 2.1	23.2 ± 4.3	3.6	7.7
2013 – 14	605	5.6 ± 2.5	24.6 ± 4.3	3.6	9.6
2014 – 15	779	4.1 ± 1.9	22.6 ± 3.9	3.3	7.6
2015 - 16	1,047	4.9 ± 1.9	24.0 ± 2.2	3.8	7.3
2016 - 17	933	6.6 ± 2.2	25.9 ± 3.5	3.8	9.8
2017 - 18	1,044	6.9 ± 2.1	26.3 ± 2.9	3.9	10.8
2018 - 19	747	6.7 ± 2.5	25.7 ± 3.4	3.8	11.1
BROWN TROUT					
2006 – 07	80	6.4 ± 2.7	23.7 ± 3.6	3.5	11.0
2007 – 08	60	6.3 ± 1.8	23.7 ± 1.6	3.9	8.5
2008 – 09	243	5.4 ± 1.6	22.8 ± 2.3	3.4	7.8
2009 – 10	95	7.4 ± 3.5	25.1 ± 3.7	3.5	14.9
2010 – 11	78	6.5 ± 2.9	24.0 ± 3.3	3.4	14.7
2011 – 12	57	5.6 ± 2.5	22.0 ± 4.5	4.0	11.1
2012 – 13	112	5.5 ± 1.6	23.1 ± 2.5	3.8	8.1
2013 – 14	167	5.8 ± 1.4	22.8 ± 1.7	4.1	8.3
2014 – 15	184	5.7 ± 2.0	22.7 ± 2.7	4.0	10.2
2015 - 16	84	5.9 ± 2.1	22.6 ± 2.5	4.0	10.8
2018 - 19	80	6.3 ± 1.7	23.4 ± 1.9	3.9	8.2

Table 4. Number of coho salmon harvested, passed upstream and sampled at the Root River Steelhead Facility during fall 2018.

Date	Number Harvested	Number Passed Upstream	Number of Miscellaneous Samples	Total Number of Fish
27 Sep 2018	0	266	0	266
01 Oct 2018	0	219	0	219
04 Oct 2018	0	159	0	159
10 Oct 2018	0	0	0	0
13 Oct 2018	0	492	6	498
15 Oct 2018	0	8	0	8
18 Oct 2018	0	5	0	5
22 Oct 2018	0	3	0	3
25 Oct 2018	0	4	1	5
29 Oct 2018	61	152	4	217
01 Nov 2018	0	21	0	21
05 Nov 2018	0	1,049	18	1,067
08 Nov 2018	0	19	0	19
Totals	61	2,397	29	2,487

Table 5. Estimated age composition of coho salmon (sexes combined) examined at the Root River Steelhead Facility during fall, 1996 through 2018. During 1996 to 1998, age was based on age-length key developed from known-age fin-clipped coho salmon. After 1998, ages were assigned by length-frequency of measured fish.

Year of Return	Percent age composition		Number used in analysis	Total return
	1+	2+		
1996	32 %	68 %	4,170	4,406
1997	5 %	95 %	6,978	7,894
1998	12 %	88 %	2,439	4,000
1999	44 %	56 %	341	1,150
2000	7 %	93 %	472	3,408
2001	16 %	84 %	320	1,327
2002	16 %	84 %	334	2,514
2003	17 %	83 %	93	198
2004	17 %	83 %	363	1,259
2005	20 %	80 %	680	841
2006	48 %	52 %	593	1,400
2007	25 %	75 %	514	1,169
2008	8 %	92 %	1,529	2,581
2009	24 %	76 %	1,217	1,338
2010	12 %	88 %	1,249	1,682
2011	6 %	94 %	761	1,628
2012	21 %	79 %	715	849
2013	5 %	95 %	786	1,666
2014	6 %	94 %	1,353	1,388
2015	9 %	91 %	1,161	1,436
2016	29 %	71 %	1,042	1,517
2017	5%	95%	1,249	2,536
2018	5%	95%	1,746	2,487

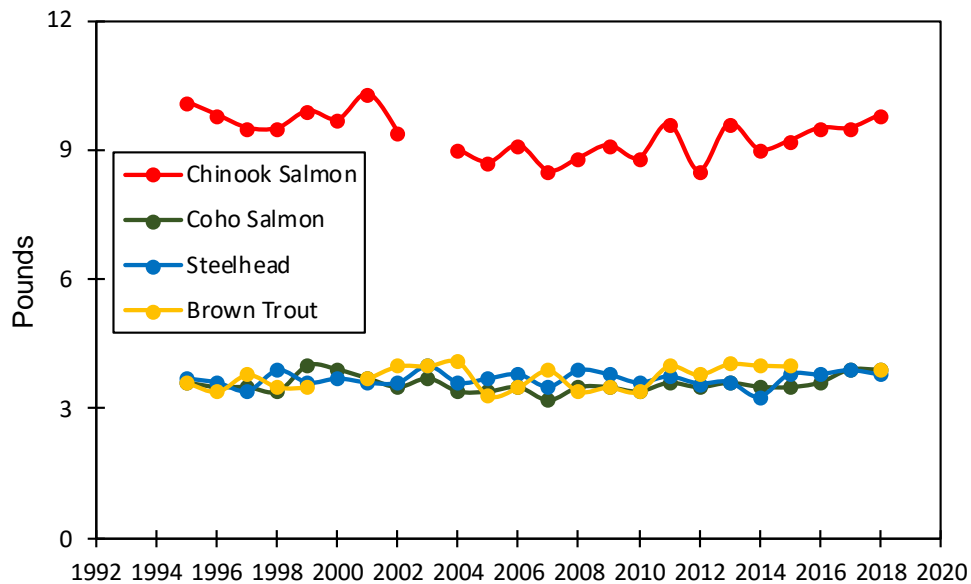


Figure 1. Standard weight for the major salmonid species returning to the Root River Steelhead Facility during 1995 to 2019. Note: Fall 2016 and Fall 2017 were omitted for brown trout due to low returns.

Table 6. Number of steelhead harvested, passed upstream and sampled at the Root River Steelhead Facility during fall 2018 and spring 2019.

Date	Number Harvested	Number Passed Upstream	Number of Miscellaneous Samples	Total Number of Fish
09 Sep 2018	0	2	0	2
01 Oct 2018	0	2	0	2
04 Oct 2018	0	1	0	1
10 Oct 2018	0	1	0	1
13 Oct 2018	0	3	0	3
18 Oct 2018	0	1	0	1
22 Oct 2018	0	0	0	0
25 Oct 2018	0	0	0	0
29 Oct 2018	0	0	0	0
01 Nov 2018	0	7	0	7
05 Nov 2018	0	3	0	3
08 Nov 2018	0	0	0	0
28 March 2019	4	12	0	16
01 April 2019	6	223	0	229
08 April 2019	64	184	0	248
15 April 2019	11	198	0	209
22 April 2019	6	34	0	40
Totals	91	671	0	762

Table 7. Return rate of steelhead to the Root River Weir during 2002 through 2019. Number at age were estimated by expanding the proportion at each age in the aged sample against the return of known-strain steelhead. Fall data include only skamania; spring data combine chambers creek and ganaraska returns.

Year Class	Number Stocked	Return Time	Number at Age							Total	Return Rate
			Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7		
2002	35,448	fall	0	2	85	117	0	0	0	204	0.58%
	54,273	spring	0	12	106	129	27	4	2	280	0.52%
	89,721	total	0	14	191	246	27	4	2	484	0.54%
2003	35,145	fall	0	0	268	4	0	2	0	274	0.78%
	58,920	spring	0	101	270	97	18	5	3	494	0.84%
	94,065	total	0	101	538	101	18	7	3	768	0.82%
2004	35,930	fall	0	3	29	0	1	0	0	33	0.09%
	55,033	spring	0	30	73	18	16	5	0	142	0.26%
	90,963	total	0	33	102	18	17	5	0	175	0.19%
2005	34,452	fall	0	3	0	14	2	1	0	20	0.06%
	54,346	spring	0	60	90	133	32	1	2	318	0.59%
	88,798	total	0	63	90	147	34	2	2	338	0.38%
2006	35,210	fall	0	0	63	27	1	1	0	92	0.26%
	57,934	spring	0	67	486	191	67	4	0	815	1.41%
	93,144	total	0	67	549	218	68	5	0	907	0.97%
2007	34,556	fall	0	2	0	0	1	0	0	3	0.01%
	47,628	spring	2	13	36	49	15	1	0	116	0.24%
	82,184	total	2	15	36	49	16	1	0	119	0.14%
2008	0	fall	-	-	-	-	-	-	-	-	-
	84,275	spring	0	14	252	47	2	0	0	315	0.37%
	84,275	total	0	14	252	47	2	0	0	315	0.37%
2009	0	fall	-	-	-	-	-	-	-	-	-
	57,165	spring	0	145	115	97	47	1	2	407	0.71%
	57,165	total	0	145	115	97	47	1	2	407	0.71%
2010	0	fall	-	-	-	-	-	-	-	-	-
	55,119	spring	0	3	47	99	15	2	0	166	0.30%
	55,119	total	0	3	47	99	15	2	0	166	0.30%
2011	0	fall	-	-	-	-	-	-	-	-	-
	54,029	spring	0	74	316	81	23	3	0	497	0.92%
	54,029	total	0	74	316	81	23	3	0	497	0.92%
2012	0	fall	-	-	-	-	-	-	-	-	-
	54,111	spring	0	182	336	318	74	60	0	970	1.79%
	54,111	total	0	182	336	318	74	60	0	970	1.79%
2013	0	fall	-	-	-	-	-	-	-	-	-
	56,723	spring	0	198	835	559	139	41		1,772	3.12%
	56,723	total	0	198	835	559	139	41		1,772	3.12%
2014	0	fall	-	-	-	-	-	-	-	-	-
	62,848	spring	0	21	87	64	12			184	0.29%
	62,848	total	0	21	87	64	12			184	0.29%
2015	0	fall	-	-	-	-	-	-	-	-	-
	55,352	spring	0	78	495	219				792	1.43%
	55,352	total	0	78	495	219				792	1.43%
2016	0	fall	-	-	-	-	-	-	-	-	-
	55,133	spring	0	36	214					250	0.45%
	55,133	total	0	36	214					250	0.45%
2017	0	fall	-	-	-	-	-	-	-	-	-
	90,572	spring	0	28						28	0.03%
	90,572	total	0	28						28	0.03%

*Note – Skamania strain broodstock are no longer collected at the Root River Weir, and none were stocked from 2008 - 2017. Years in which Skamania were not targeted are marked as “-“. Skamania were stocked in 2018, which is reflected in the total number stocked for the 2017 year class.

Table 8. Estimated age composition of steelhead (sexes combined) examined at the Root River Steelhead Facility during 1999 – 2019. Age is based on age-length key developed from known-age fin clipped steelhead. Total number represents the number of steelhead used in the analysis.

Year of return	Percent age composition							Total Number
	1+	2+	3+	4+	5+	6+	7+	
Fall – 1999	-	-	32.3	54.7	5.2	7.8	-	51
Spring – 2000		8.0	21.3	53.6	14.2	3.0	-	714
Fall – 2000	-	2.7	25.3	46.7	6.7	8.0	10.7	75
Spring – 2001		3.5	83.2	8.9	1.4	2.8	0.2	482
Fall – 2001	2.4	1.4	72.8	1.5	13.3	26.3	7.0	212
Spring – 2002		4.2	23.2	68.3	1.5	0.8	2.0	575
Fall – 2002	-	-	26.8	53.9	1.7	2.7	14.8	278
Spring – 2003	-	13.1	52.9	14.1	19.2	0.8	-	491
Fall – 2003	-	14.1	57.6	15.3	11.1	0.8	1.1	262
Spring – 2004	-	1.5	39.2	54.0	1.8	2.3	1.0	385
Fall – 2004	-	0.8	41.6	52.8	0.8	4.0	-	125
Spring – 2005	-	14.7	15.3	54.5	14.5	0.6	0.4	490
Fall – 2005	-	-	79.8	7.3	0.1	6.4	5.5	109
Spring – 2006	-	4.2	38.4	18.4	38.1	0.6	0.3	354
Fall – 2006	-	0.6	55.6	24.2	15.6	1.9	1.3	475
Spring – 2007	-	17.4	21.1	28.0	7.8	22.0	3.7	218
Fall – 2007	-	4.8	43.5	6.5	-	40.4	4.8	62
Spring – 2008	-	34.6	46.2	9.3	6.6	2.2	1.1	182
Spring – 2009	0.3	1.9	73.5	20.1	2.4	0.8	0.3	370
Fall – 2009	-	2.8	76.4	16.7	1.4	2.8	-	72
Spring – 2010	-	5.0	12.8	68.0	11.4	1.8	1.1	281
Fall – 2010	-	14.3	-	78.6	7.1	-	-	14
Spring – 2011	0.2	28.2	48.9	9.4	13.1	0.2	-	497
Fall – 2011	-	33.3	66.7	-	-	-	-	6
Spring – 2012	-	1.7	61.6	25.0	8.1	2.3	1.2	172
Fall – 2012	-	100	-	-	-	-	-	1
Spring – 2013	-	33.5	21.2	43.9	0.9	0.5	-	212
Spring – 2014	-	28.3	49.1	15.3	7.3	-	-	399
Spring – 2015	-	31.4	53.2	12.8	2.4	0.2	-	617
Spring - 2016	-	1.7	69.5	26.5	1.9	0.2	0.2	909
Spring – 2017	-	9.7	10.9	69.7	9.3	0.4	-	775
Spring – 2018	-	4.5	62.4	8.0	17.5	7.6	-	794
Spring - 2019	-	5.4	41.6	42.6	2.4	8.0	-	500

Table 9. Average length (inches) and weight (pounds) at age (± 1 SD) of fall-run skamania-strain steelhead at the Root River Steelhead Facility during 1996 to 2012. No Skamania were captured in Fall 2013, 2014, 2015, 2016, 2017, or 2018. Data from 2000 - 2004 were taken from fish transported and held at Kettle Moraine Springs Hatchery, so some weight loss likely occurred.

Season	Strain	Age 2+	Age 3+	Age 4+	Age 5+	Age 6+	Age 7+
Fall 1996	Skamania	22.1 (± 0) 4.0 (± 0) N = 1	27.2 (± 1.4) 6.7 (± 0.7) N = 7	28.8 (± 0) 8.0 (± 0) N = 1	32.1 (± 1.7) 10.1 (± 1.8) N = 2		
Fall 1997	Skamania	28.5 (± 1.0) 7.1 (± 0.9) N = 6	27.1 (± 1.1) 6.0 (± 1.0) len N = 19 wt N = 18	31.1 (± 1.8) 9.1 (± 1.9) N = 91	32.1 (± 1.3) 9.6 (± 1.1) N = 12	34.5 (± 1.7) 12.3 (± 3.3) N = 7	36.0 (± 0) 12.9 (± 0) N = 1
Fall 1998	Skamania		25.8 (± 1.4) 5.1 (± 0.8) N = 22	30.0 (± 2.1) 8.0 (± 1.6) N = 44	31.9 (± 2.0) 9.5 (± 1.5) N = 19		
Fall 1999	Skamania		28.3 (± 1.6) 7.3 (± 0.8) N = 14	29.0 (± 1.2) 8.0 (± 1.1) N = 25	31.6 (± 2.1) 10.6 (± 0.4) N = 2	32.2 (± 0.6) 10.0 (± 1.1) N = 4	
Fall 2000	Skamania	26.4 (± 0) 7.0 (± 1.4) N = 2	27.8 (± 1.2) 7.5 (± 1.0) N = 19	30.2 (± 2.0) 8.5 (± 2.0) len N = 37 wt N = 38	28.9 (± 0.5) 8.6 (± 1.0) N = 8	31.2 (± 1.0) 10.6 (± 1.8) N = 6	32.3 (± 2.3) 10.1 (± 1.8) N = 8
Fall 2001	Skamania		27.0 (± 1.3) 6.8 (± 1.1) len N = 135 wt N = 53	25.5 (± 0.6) 6.6 (± 0.2) len N = 3 wt N = 2	31.5 (± 1.4) 9.3 (± 1.5) len N = 5 wt N = 3	30.5 (± 1.1) 10.1 (± 1.9) len N = 15 wt N = 10	32.6 (± 1.6) 10.9 (± 1.3) len N = 7 wt N = 5
Fall 2002	Skamania		26.6 (± 1.4) 6.2 (± 1.4) len N = 69 wt N = 11	28.7 (± 1.6) 8.0 (± 1.3) len N = 132 wt N = 41	30.0 (± 0.9) 7.3 len N = 4 wt N = 1	30.3 (± 0.7) 7.8 (± 1.1) len N = 6 wt N = 2	32.2 (± 0.9) 10.4 (± 1.1) len N = 31 wt N = 8
Fall 2003	Skamania	25.4 (± 1.6) 6.3 (± 1.7) N = 10	26.1 (± 1.9) 6.4 (± 1.2) N = 66	29.5 (± 1.4) 8.6 (± 1.0) N = 16	32.1 (± 2.4) 10.9 (± 1.8) N = 17	30.7 7.5 N = 1	
Fall 2004	Skamania	24.0 (± 0) 4.4 (± 0) N = 1	26.3 (± 2.1) 6.2 (± 1.3) N = 52	29.2 (± 1.7) 7.9 (± 1.5) N = 66	31.8 (± 0) 10.1 (± 0) N = 1	32.5 (± 2.6) 10.0 (± 1.6) N = 5	
Fall 2005	Skamania		27.0 (± 1.2) 6.0 (± 0.8) N = 85	28.6 (± 1.1) 7.3 (± 1.0) N = 12	29.1 (± 0) 7.1 (± 0) N = 1	30.1 ($\pm .9$) 8.1 (± 1.1) N = 7	32.2 (± 0.7) 9.1 (± 1.1) N = 6
Fall 2006	Skamania	27.3 ($\pm .6$) 6.0 (± 1.5) N = 4	27.3 (± 1.2) 7.0 (± 1.0) N = 262	30.2 (± 1.7) 9.4 (± 1.8) N = 114	29.7 (± 1.4) 8.7 (± 1.6) N = 81		32.0 (± 1.0) 11.6 (± 1.3) N = 6
Fall 2007	Skamania		27.5 (± 0.9) 6.2 (± 1.2) N = 28	27.0 (± 1.5) 7.2 (± 2.2) N = 5		31.7 (± 1.2) 9.2 (± 1.4) N = 27	30.2 (± 0.3) 9.0 (± 0.8) N = 3
Fall 2008	Skamania		26.8 (± 1.9) 6.1 (± 1.5) N = 2		27.1 (± 0) 8.6 (± 0) N = 1		30.9 (± 0) 8.3 (± 0) N = 1
Fall 2009	Skamania		27.8 (± 1.4) 6.8 (± 1.1) N = 65	30.3 (± 1.6) 8.5 (± 1.7) N = 10		33.0 (± 0) 13.1 (± 0) N = 1	
Fall 2010	Skamania			28.8 (± 2.1) 7.2 (± 1.3) N = 20	28.7 (± 0) 8.2 (± 0) N = 1		
Fall 2011	Skamania				30.0 (± 0) 9.6 (± 0) N = 1		
Fall 2012	Skamania					28.9 (± 0) 7.6 (± 0) N = 1	32.3 (± 0) 10.1 (± 0) N = 1

Table 10. Average length (inches) and weight (pounds) at age (± 1 SD) of spring-run chambers creek-strain steelhead at the Root River Steelhead Facility during 2002 to 2019.

Season	Strain	Age 2+	Age 3+	Age 4+	Age 5+	Age 6+	Age 7+
Spring 2002	Chambers Cr.		25.5 (+ 1.8)	28.9 (+ 1.8)	30.3 (+ 2.4)	29.9 (+ 2.3)	32.3 (+ 1.3)
			5.4 (+ 1.1)	8.0 (+ 1.6)	9.8 (+ 1.4)	8.7 (+ 1.6)	11.2 (+ 1.8)
			N = 17	N = 206	N = 2	N = 2	N = 8
Spring 2003	Chambers Cr.	16.9 (\pm 1.4)	24.8 (\pm 1.3)	28.2 (\pm 1.5)	28.8 (\pm 2.2)	28.6 (\pm 0.7)	
		1.8 (\pm 0.4)	5.1 (\pm 1.0)	7.4 (\pm 1.3)	7.7 (\pm 1.5)	7.1 (\pm 0.4)	
		N = 20	N = 72	N = 27	N = 19	N = 2	
Spring 2004	Chambers Cr.	16.5 (\pm 1.8)	24.8 (\pm 1.4)	28.6 (\pm 1.8)		31.1 (\pm 1.6)	32.6 (\pm 0.7)
		1.6 (\pm 0.4)	5.4 (\pm 0.9)	7.9 (\pm 1.5)		9.7 (\pm 1.4)	11.0 (\pm 0.7)
		N = 3	N = 48	N = 112		N = 5	N = 4
Spring 2005	Chambers Cr.	17.7 (\pm 1.2)	24.3 (\pm 1.1)	27.6 (\pm 1.9)	29.2 (\pm 2.2)	28.9 (\pm 1.7)	
		1.9 (\pm 0.3)	4.9 (\pm 0.8)	7.1 (\pm 1.6)	8.1 (\pm 1.9)	7.8 (\pm 0.7)	
		N = 6	N = 38	N = 81	N = 21	N = 3	
Spring 2006	Chambers Cr.	17.9 (\pm 0.7)	23.5 (\pm 1.4)	27.1 (\pm 1.5)	25.5 (\pm 1.2)		32.4 (\pm 0)
		2.1 (\pm 0.3)	4.8 (\pm 0.9)	6.6 (\pm 1.0)	5.6 (\pm 0.9)		9.5 (\pm 0)
		N = 5	N = 22	N = 49	N = 115		N = 1
Spring 2007	Chambers Cr.	18.0 (\pm 1.0)	25.8 (\pm 1.3)	26.8 (\pm 1.1)	27.8 (\pm 1.2)	29.6 (\pm 1.0)	29.7 (\pm 0.8)
		2.0 (\pm 0.4)	5.6 (\pm 1.0)	6.5 (\pm 0.9)	7.1 (\pm 0.5)	8.2 (\pm 1.0)	8.5 (\pm 1.8)
		N = 29	N = 14	N = 34	N = 7	N = 55	N = 2
Spring 2008	Chambers Cr.	18.0 (\pm 1.0)	23.9 (\pm 1.5)	28.5 (\pm 1.9)	25.2 (\pm 2.2)		30.8 (\pm 0.5)
		2.1 (\pm 0.9)	4.4 (\pm 0.7)	7.2 (\pm 1.3)	5.3 (\pm 1.3)		7.7 (\pm 1.1)
		N = 21	N = 61	N = 13	N = 4		N = 2
Spring 2009	Chambers Cr.	22.9 (\pm 1.0)	24.8 (\pm 1.5)	27.3 (\pm 1.9)	28.4 (\pm 1.3)	29.9 (\pm 0.9)	33.7 (\pm 0)
		4.3 (\pm 0.8)	5.1 (\pm 0.9)	6.9 (\pm 1.4)	7.8 (\pm 0.9)	8.0 (\pm 1.1)	12.5 (\pm 0)
		N = 6	N = 115	N = 62	N = 5	N = 2	N = 1
Spring 2010	Chambers Cr.	18.0 (\pm 0.7)	24.5 (\pm 1.9)	27.9 (\pm 2.0)	28.6 (\pm 2.0)	29.0 (\pm 2.0)	34.0 (\pm 1.4)
		2.0 (\pm 0.1)	4.6 (\pm 0.3)	6.8 (\pm 1.3)	7.3 (\pm 1.7)	7.7 (\pm 0.7)	12.1 (\pm 1.5)
		N = 5	N = 8	N = 102	N = 22	N = 3	N = 2
Spring 2011	Chambers Cr.	18.4 (\pm 1.8)	25.0 (\pm 1.8)	28.3 (\pm 1.5)	29.0 (\pm 1.5)		
		2.1 (\pm 0.9)	5.4 (\pm 1.3)	7.0 (\pm 0.8)	8.0 (\pm 1.4)		
		N = 47	N = 82	N = 12	N = 31		
Spring 2012	Chambers Cr.	16.9 (\pm 0)	25.0 (\pm 1.4)	28.2 (\pm 1.5)	27.3 (\pm 1.6)	30.2 (\pm 1.1)	30.9 (\pm 0.2)
		1.6 (\pm 0)	5.2 (\pm 0.8)	7.6 (\pm 1.5)	6.4 (\pm 1.2)	8.2 (\pm 0.7)	8.7 (\pm 0.2)
		N = 1	N = 48	N = 17	N = 2	N = 4	N = 2
Spring 2013	Chambers Cr.	17.8 (\pm 0.8)	23.8 (\pm 1.2)	27.5 (\pm 1.7)			
		1.9 (\pm 0.3)	4.4 (\pm 0.6)	6.4 (\pm 1.1)			
		N = 30	N = 15	N = 41			
Spring 2014	Chambers Cr.	18.0 (\pm 1.6)	25.9 (\pm 1.6)	27.8 (\pm 1.7)	29.2 (\pm 1.3)		
		2.0 (\pm 0.9)	5.9 (\pm 0.9)	7.3 (\pm 1.1)	8.5 (\pm 1.5)		
		N = 72	N = 120	N = 29	N = 14		
Spring 2015	Chambers Cr.	16.6 (\pm 1.8)	22.8 (\pm 1.4)	27.7 (\pm 1.8)	27.6 (\pm 1.7)	32.4 (\pm 0)	
		1.5 (\pm 0.6)	3.7 (\pm 0.7)	6.6 (\pm 1.4)	6.7 (\pm 1.6)	9.2 (\pm 0)	
		N = 77	N = 149	N = 48	N = 8	N = 1	
Spring 2016	Chambers Cr.	18.0 (\pm 0.5)	23.4 (\pm 1.4)	25.8 (\pm 1.2)	28.3 (\pm 1.4)	28.0 (\pm 0)	28.4 (\pm 0.1)
		2.1 (\pm 0.2)	4.4 (\pm 0.8)	5.6 (\pm 0.9)	8.2 (\pm 1.4)	6.5 (\pm 0)	7.3 (\pm 0.3)
		N = 6	N = 260	N = 101	N = 6	N = 1	N = 2
Spring 2017	Chambers Cr.	18.1 (\pm 1.1)	25.4 (\pm 1.8)	27.7 (\pm 1.9)	28.1 (\pm 1.7)	30.7 (\pm 1.5)	
		2.2 (\pm 0.6)	6.0 (\pm 1.1)	7.6 (\pm 1.5)	7.7 (\pm 1.6)	11.2 (\pm 1.6)	
		N = 53	N = 52	N = 247	N = 42	N = 3	
Spring 2018	Chambers Cr.	18.9 (\pm 1.7)	25.8 (\pm 1.4)	28.1 (\pm 1.5)	28.8 (\pm 2.0)	29.7 (\pm 1.2)	
		2.7 (\pm 0.9)	6.2 (\pm 1.0)	8.4 (\pm 1.6)	8.9 (\pm 1.9)	8.8 (\pm 1.3)	
		N = 19	N = 282	N = 43	N = 59	N = 32	
Spring 2019	Chambers Cr.	17.2 (\pm 1.3)	24.3 (\pm 1.5)	28.3 (\pm 2.1)	29.1 (\pm 1.2)	30.6 (\pm 1.6)	
		1.8 (\pm 0.5)	5.3 (\pm 1.0)	8.1 (\pm 1.8)	8.9 (\pm 1.0)	10.3 (\pm 2.0)	
		N = 8	N = 90	N = 127	N = 5	N = 21	

Table 11. Average length (inches) and weight (pounds) at age (± 1 SD) of spring-run ganaraska-strain steelhead at the Root River Steelhead Facility during 2002 to 2019.

Season	Strain	Age 2+	Age 3+	Age 4+	Age 5+	Age 6+	Age 7+
Spring 2002	Ganaraska	16.0 (+ 1.6)	23.2 (+ 1.5)	27.3 (+ 1.7)	28.1 (+ 2.4)	28.9 (+ 0.5)	
		1.5 (+ 0.4)	4.2 (+ 0.7)	7.1 (+ 1.4)	8.0 (+ 2.5)	8.1 (+ 0.2)	
		N = 17	N = 86	N = 103	N = 5	N = 2	
Spring 2003	Ganaraska	17.0 (\pm 1.3)	22.8 (\pm 1.7)	27.2 (\pm 2.0)	25.4 (\pm 2.2)		
		1.9 (\pm 0.8)	4.3 (\pm 1.0)	6.5 (\pm 1.3)	5.8 (\pm 1.7)		
		N = 39	N = 116	N = 23	N = 48		
Spring 2004	Ganaraska	15.6 (\pm 3.3)	23.7 (\pm 1.7)	27.2 (\pm 2.1)	28.4 (\pm 1.5)	30.2 (\pm 0.8)	
		1.6 (\pm 1.0)	4.8 (\pm 1.0)	7.1 (\pm 1.5)	8.1 (\pm 1.1)	8.8 (\pm 0.6)	
		N = 3	N = 103	N = 96	N = 7	N = 4	
Spring 2005	Ganaraska	17.3 (\pm 1.8)	22.7 (\pm 2.2)	26.4 (\pm 1.7)	27.7 (\pm 2.0)		32.6 (\pm 2.0)
		2.0 (\pm 0.6)	4.1 (\pm 1.2)	6.2 (\pm 1.2)	7.1 (\pm 1.6)		10.3 (\pm 0.6)
		N = 66	N = 37	N = 186	N = 50		N = 2
Spring 2006	Ganaraska	16.5 (\pm 1.5)	23.8 (\pm 1.9)	24.8 (\pm 1.2)	26.7 (\pm 1.8)	28.9 (\pm 0.5)	
		1.6 (\pm 0.5)	4.7 (\pm 0.9)	5.0 (\pm 1.3)	6.0 (\pm 1.3)	7.1 (\pm 1.3)	
		N = 8	N = 116	N = 3	N = 20	N = 2	
Spring 2007	Ganaraska	18.2 (\pm 3.6)	23.6 (\pm 1.7)	26.2 (\pm 1.9)	28.3 (\pm 3.0)	27.8 (\pm 0.5)	30.1 (\pm 1.6)
		2.2 (\pm 1.3)	4.6 (\pm 0.9)	6.3 (\pm 1.4)	7.6 (\pm 2.6)	6.6 (\pm 0.5)	8.3 (\pm 1.7)
		N = 8	N = 34	N = 28	N = 3	N = 2	N = 6
Spring 2008	Ganaraska	17.3 (\pm 1.0)	23.0 (\pm 1.1)	24.9 (\pm 1.0)	27.2 (\pm 1.5)	26.6 (\pm 1.0)	
		1.8 (\pm 0.3)	4.1 (\pm 0.6)	5.6 (\pm 0.6)	6.3 (\pm 1.0)	5.5 (\pm 2.5)	
		N = 45	N = 22	N = 3	N = 8	N = 2	
Spring 2009	Ganaraska	17.1 (\pm 0)	23.2 (\pm 1.4)	25.8 (\pm 1.7)	27.7 (\pm 1.0)	29.5 (\pm 0)	
		1.8 (\pm 0)	4.5 (\pm 0.8)	5.8 (\pm 1.0)	7.8 (\pm 1.3)	7.5 (\pm 0)	
		N = 1	N = 155	N = 15	N = 3	N = 1	
Spring 2010	Ganaraska	17.0 (\pm 1.1)	23.8 (\pm 1.8)	26.2 (\pm 1.9)	26.6 (\pm 1.8)	29.3 (\pm 0.6)	33.0 (\pm 0)
		1.8 (\pm 0.3)	4.5 (\pm 1.0)	6.1 (\pm 1.2)	6.1 (\pm 1.4)	9.9 (\pm 1.7)	10.2 (\pm 0)
		N = 11	N = 18	N = 91	N = 11	N = 3	N = 1
Spring 2011	Ganaraska	17.7 (\pm 1.1)	23.3 (\pm 1.5)	26.8 (\pm 1.6)	27.2 (\pm 1.5)	30.4 (\pm 0)	
		2.0 (\pm 0.4)	4.5 (\pm 0.8)	6.6 (\pm 1.5)	7.0 (\pm 1.4)	8.9 (\pm 0)	
		N = 95	N = 161	N = 26	N = 34	N = 1	
Spring 2012	Ganaraska	17.2 (\pm 2.0)	24.4 (\pm 1.9)	26.5 (\pm 1.5)	25.0 (\pm 1.8)		
		2.3 (\pm 1.4)	4.8 (\pm 1.1)	6.3 (\pm 1.4)	5.2 (\pm 0.8)		
		N = 4	N = 62	N = 26	N = 11		
Spring 2013	Ganaraska	17.4 (\pm 1.9)	23.2 (\pm 0.9)	26.1 (\pm 1.6)	27.7 (\pm 1.0)	27.4 (\pm 0)	
		1.9 (\pm 0.8)	4.1 (\pm 0.5)	5.9 (\pm 1.0)	6.75 (\pm 1.3)	7.4 (\pm 0)	
		N = 42	N = 30	N = 52	N = 2	N = 1	
Spring 2014	Ganaraska	17.4 (\pm 0.9)	24.6 (\pm 2.0)	27.9 (\pm 2.1)	27.8 (\pm 2.3)		
		1.9 (\pm 0.3)	5.4 (\pm 1.2)	7.9 (\pm 1.5)	7.9 (\pm 1.9)		
		N = 41	N = 76	N = 32	N = 15		
Spring 2015	Ganaraska	16.5 (\pm 2.0)	22.3 (\pm 1.2)	26.4 (\pm 1.6)	27.8 (\pm 1.0)		
		1.5 (\pm 0.6)	3.6 (\pm 0.7)	5.9 (\pm 1.1)	6.9 (\pm 1.0)		
		N = 117	N = 179	N = 31	N = 7		
Spring 2016	Ganaraska	17.8 (\pm 0.8)	22.9 (\pm 1.2)	25.5 (\pm 1.6)	27.1 (\pm 1.0)	29.5 (\pm 0)	
		1.9 (\pm 0.3)	4.3 (\pm 0.7)	5.8 (\pm 1.0)	6.8 (\pm 1.1)	8.8 (\pm 0)	
		N = 9	N = 372	N = 140	N = 11	N = 1	
Spring 2017	Ganaraska	17.7 (\pm 1.1)	23.2 (\pm 1.5)	26.8 (\pm 1.6)	27.6 (\pm 1.4)		
		1.9 (\pm 0.4)	4.7 (\pm 0.9)	7.1 (\pm 1.3)	7.6 (\pm 1.5)		
		N = 22	N = 33	N = 293	N = 30		
Spring 2018	Ganaraska	17.7 (\pm 0.7)	25.2 (\pm 1.7)	27.8 (\pm 1.3)	28.1 (\pm 1.8)	29.5 (\pm 0.9)	
		1.8 (\pm 0.4)	6.1 (\pm 1.1)	8.2 (\pm 1.2)	8.6 (\pm 1.7)	9.9 (\pm 1.4)	
		N = 16	N = 208	N = 20	N = 78	N = 28	
Spring 2019	Ganaraska	17.9 (\pm 1.2)	23.7 (\pm 1.6)	28.0 (\pm 1.9)	28.4 (\pm 1.5)	28.8 (\pm 1.4)	
		2.0 (\pm 0.5)	5.1 (\pm 1.1)	8.6 (\pm 1.7)	8.4 (\pm 1.3)	8.8 (\pm 1.6)	
		N = 10	N = 118	N = 86	N = 7	N = 19	

Table 12. Population estimates for Chinook, coho and steelhead returning to the Root River during spring 2004 through fall 2017. Population estimates were not calculated in fall 2011, 2012, 2014, 2015, and 2018 and spring 2012, 2015, 2018, and 2019 due to a lack of recaptured fish. Fall steelhead are mostly skamania, but also include other strains.

Year	Species	# marked fish	# recaptured fish	# marked fish in recapture sample	Population size (\pm) 1 SD
Spring 2004	Chambers Creek	350	20	7	1,000 \pm 305
	Ganaraska	421	32	5	2,694 \pm 1,107
Fall 2004	Chinook	378	4	1	1,512 \pm 1,309
	Coho	1,148	11	10	1,263 \pm 120
	Fall steelhead	77	4	3	103 \pm 30
	Brown	28	9	0	280 \pm 188
Spring 2005	Chambers Creek	224	7	6	261 \pm 40
	Ganaraska	388	9	7	499 \pm 89
Fall 2005	Chinook	3,608	50	25	7,216 \pm 1,020
	Coho	657	3	3	657 \pm 0
	Fall steelhead	25	6	0	175 \pm 115
	Brown	141	6	0	987 \pm 646
Spring 2006	Chambers Creek	321	18	6	963 \pm 321
	Ganaraska	321	8	3	856 \pm 391
Fall 2006	Chinook	9,836	119	29	40,362 \pm 6,518
	Coho	1,133	3	2	1,511 \pm 378
	Fall steelhead	125	14	1	938 \pm 504
	Brown	124	15	0	1,984 \pm 1,358
Spring 2007	Chambers Creek	139	13	1	973 \pm 520
	Ganaraska	65	6	0	455 \pm 298
	Spring Skamania	17	2	0	51 \pm 29
Fall 2007	Chinook	3,501	28	13	7,540 \pm 1,530
	Coho	592	3	0	2,368 \pm 1,450
	Fall steelhead	98	1	1	98 \pm 0
	Brown	242	3	0	968 \pm 593
Spring 2008	Chambers Creek	48	6	0	336 \pm 219
	Ganaraska	34	6	0	238 \pm 155
	Spring Skamania	6	2	0	18 \pm 10
Fall 2008	Chinook	987	28	18	1,535 \pm 216
	Coho	2,071	7	2	5,523 \pm 2,183
	Brown	243	1	1	243 \pm 0
Spring 2009	Chambers Creek	278	7	1	1,112 \pm 556
	Ganaraska	260	6	2	607 \pm 229
Fall 2009	Fall steelhead	99	2	0	297 \pm 171
	Brown	95	10	1	523 \pm 273
Fall 2010	Chinook	1,067	25	15	1,778 \pm 290
	Coho	1,355	22	10	2,981 \pm 696
	Fall steelhead	65	8	1	293 \pm 149
	Brown	78	10	0	858 \pm 578
Spring 2011	Chambers Creek	114	3	1	228 \pm 93
	Ganaraska	264	14	5	739 \pm 265
Spring 2013	Chambers Creek	32	9	1	155 \pm 80
	Ganaraska	68	7	0	544 \pm 360
Fall 2013	Chinook	1,070	3	2	1,427 \pm 357
	Coho	1,281	2	2	1,281 \pm 0
Spring 2014	Chambers Creek	348	13	9	503 \pm 93
	Ganaraska	172	1	0	344 \pm 172
Spring 2016	Chambers Creek	470	22	4	2,585 \pm 1,169
	Ganaraska	671	18	4	3,019 \pm 1,331
Fall 2016	Chinook	1,375	36	6	8,250 \pm 3,074
	Coho	1,324	4	0	6,620 \pm 4,187
Spring 2017	Chambers Creek	328	22	1	3,772 \pm 2,081
	Ganaraska	322	49	5	3,156 \pm 1,337
Fall 2017	Chinook	1,542	22	3	8,867 \pm 3,604
	Coho	2,290	6	3	4,008 \pm 1,173

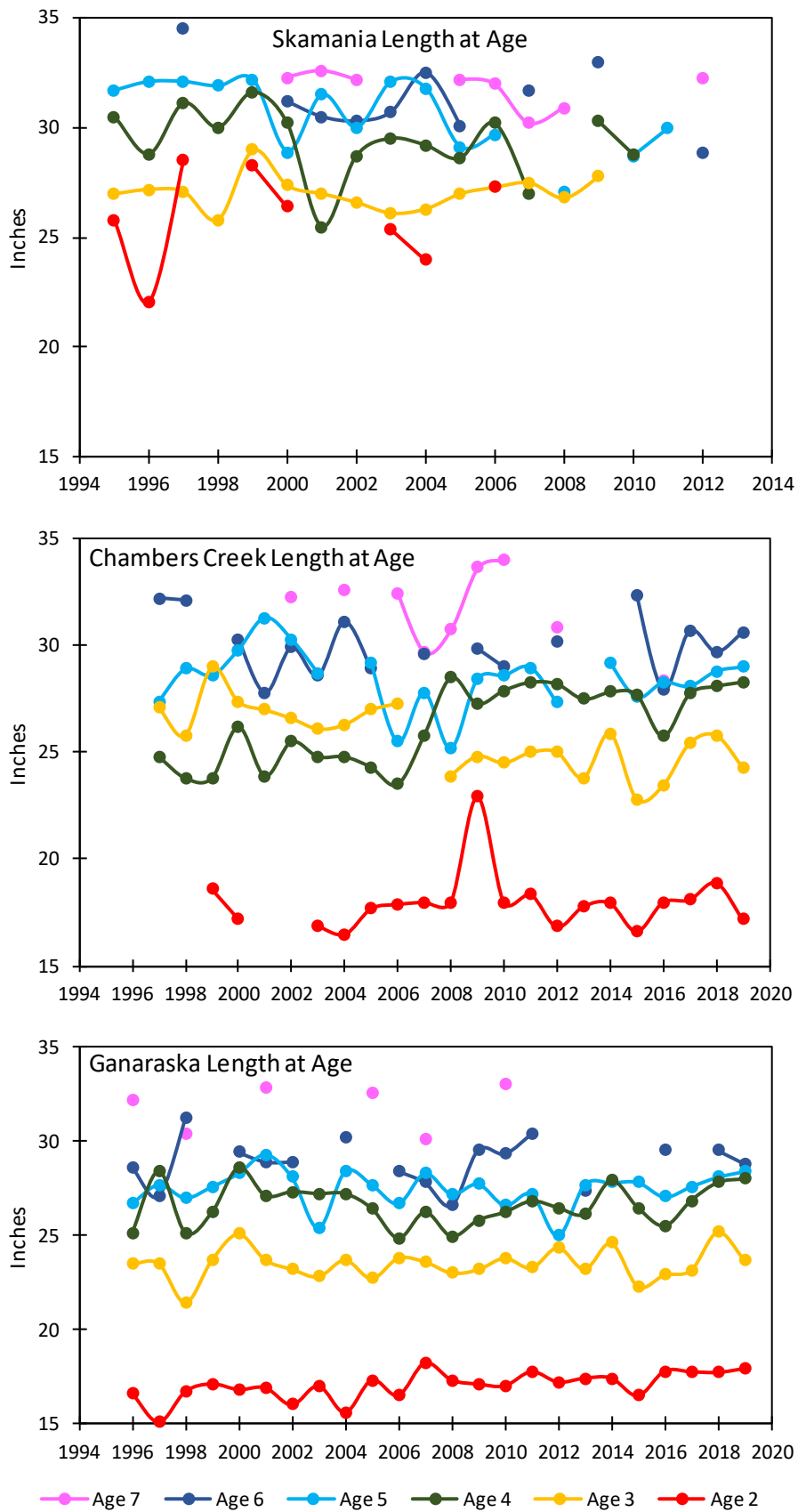


Figure 2. Steelhead mean length-at-age at the Root River Steelhead Facility during 1996 to 2019. Skamania data from 2001 - 2004 were taken from fish transported and held at Kettle Moraine Springs Hatchery.

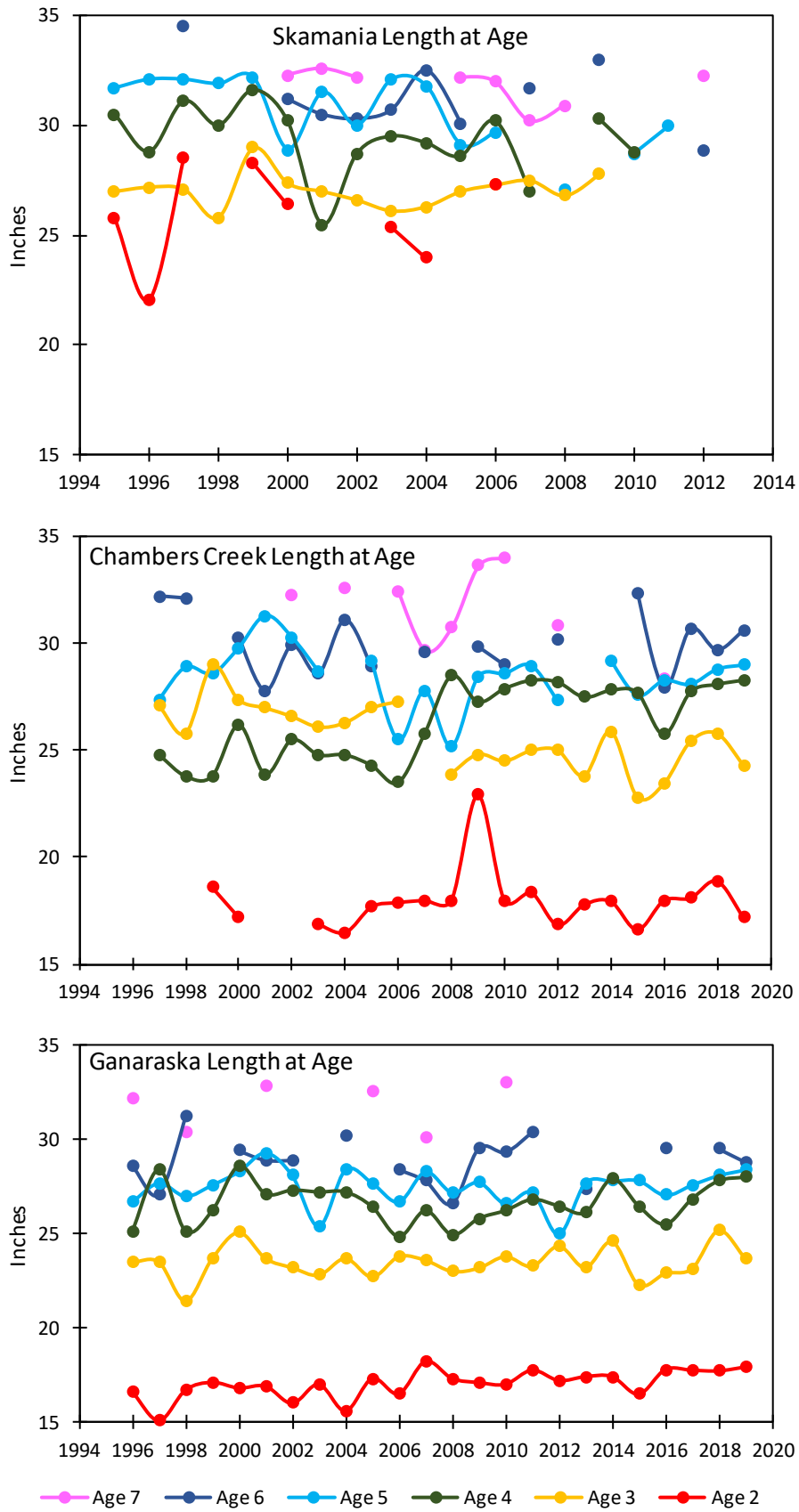


Figure 3. Steelhead mean weight-at-age at the Root River Steelhead Facility during 1996 to 2019. Skamania data from 2001- 2003 were taken from fish transported and held at Kettle Moraine Springs Hatchery.

APPENDIX A. ROOT RIVER STOCKING NUMBERS

Table A-1. Number of fingerling Chinook salmon stocked in the Root River during 1994 - 2019. Chinook salmon were marked with an oral dose of Oxytetracycline (OTC) during 2001 and 2006 - 2010. Totals for 1999, 2006, and 2013 represent reductions in statewide stocking quotas, and the totals for 2007 - 2016 represents a reallocation to decrease Chinook stocking by 33,000 in the Root River in order to increase coho by 33,000.

Year stocked	Total number	Strain	Fin clip
1994	75,533	Lake Michigan	LP
	60,000	Lake Michigan	None
1995	99,000	Lake Michigan	RP
	69,250	Lake Michigan	None
1996	158,000	Lake Michigan	None
1997	142,500	Lake Michigan	None
1998	161,500	Lake Michigan	None
1999	143,100	Lake Michigan	None
2000	142,900	Lake Michigan	None
2001	143,973	Lake Michigan	None (OTC)
2002	140,280	Lake Michigan	None
2003	143,935	Lake Michigan	None
2004	143,900	Lake Michigan	None
2005	144,035	Lake Michigan	None
2006	113,945	Lake Michigan	None (OTC)
2007	80,972	Lake Michigan	None (OTC)
2008	69,000	Lake Michigan	None (OTC)
2009	80,950	Lake Michigan	None (OTC)
2010	44,156	Lake Michigan	A-CWT (OTC)
	41,588	Lake Michigan	A-CWT (non-OTC)
2011	20,154	Lake Michigan	A-CWT
2012	112,616	Lake Michigan	A-CWT
2013	75,046	Lake Michigan	A-CWT
2014	76,933	Lake Michigan	A-CWT
2015	52,120	Lake Michigan	A-CWT (regular stocking)
	25,640	Lake Michigan	A-CWT (net pen stocking)
2016	50,918	Lake Michigan	A-CWT (regular stocking)
	25,352	Lake Michigan	A-CWT (net pen stocking)
2017	7,467	Lake Michigan	A (regular stocking)
	43,561	Lake Michigan	A-CWT (regular stocking)
	31,300	Lake Michigan	A-CWT (net pen stocking)
2018	51,383	Lake Michigan	A-CWT (regular stocking)
	32,748	Lake Michigan	A-CWT (net pen stocking)
2019	42,626	Lake Michigan	A (regular stocking)
	42,079	Lake Michigan	A (net pen stocking)

Table A-2. Number of coho salmon stocked in the Root River during 1998 – 2019. Targets were 40,600 spring yearlings and 10,000 fall fingerlings. In 2007 target was changed to 73,600 spring yearlings and 10,000 fall fingerlings.

Year stocked	Total number	Strain	Fin clip	Age
1998	33,666	Lake Michigan	None	Spring yearling 1+
	10,000	Lake Michigan	None	Fall fingerling 0+
1999	45,945	Lake Michigan	None	Spring yearling 1+
	13,824	Lake Michigan	None	Fall fingerling 0+
2000	41,375	Lake Michigan	None	Spring yearling 1+
	10,030	Lake Michigan	None	Fall fingerling 0+
2001	27,970	Lake Michigan	None	Spring yearling 1+
	11,080	Lake Michigan	A-CWT	Spring yearling 1+
	10,260	Lake Michigan	None	Fall fingerling 0+
2002	29,954	Lake Michigan	None	Spring yearling 1+
	10,648	Lake Michigan	A-CWT	Spring yearling 1+
	12,285	Lake Michigan	None	Fall fingerling 0+
2003	31,514	Lake Michigan	None	Spring yearling 1+
	10,845	Lake Michigan	A-CWT	Spring yearling 1+
2004	40,623	Lake Michigan	None	Spring yearling 1+
	14,500	Lake Ontario	None	Fall fingerling 0+
2005	9,755	Lake Ontario	A-CWT	Spring yearling 1+
	30,855	Lake Ontario	None	Spring yearling 1+
	12,739	Lake Michigan	None	Fall fingerling 0+
2006	36,510	Lake Michigan	None	Spring yearling 1+
	7,560	Lake Michigan	A-CWT	Spring yearling 1+
	10,000	Lake Michigan	None	Fall fingerling 0+
2007	61,888	Lake Michigan	None	Spring yearling 1+
	10,000	Lake Michigan	A-CWT	Spring yearling 1+
	29,188	Lake Michigan	None	Fall fingerling 0+
2008	56,697	Lake Michigan	None	Spring yearling 1+
	10,813	Lake Michigan	A-CWT	Spring yearling 1+
	11,369	Lake Michigan	None	Fall fingerling 0+
2009	63,194	Lake Michigan	None	Spring yearling 1+
	10,463	Lake Michigan	A-CWT	Spring yearling 1+
2010	62,705	Lake Michigan	None	Spring yearling 1+
	10,930	Lake Michigan	A-CWT	Spring yearling 1+
2011	68,934	Lake Michigan	None	Spring yearling 1+
	10,675	Lake Michigan	A-CWT	Spring yearling 1+
2012	75,153	Lake Michigan	None	Spring yearling 1+
	10,968	Lake Michigan	A-CWT	Spring yearling 1+
2013	83,608	Lake Michigan	None	Spring yearling 1+
2014	79,080	Lake Michigan	None	Spring yearling 1+
2015	83,015	Lake Michigan	None	Spring yearling 1+
	10,008	Lake Michigan	None	Fall fingerling 0+
2016	60,021	Lake Michigan	None	Spring yearling 1+
	10,010	Lake Michigan	None	Fall fingerling 0+
2017	76,432	Lake Michigan	None	Spring yearling 1+
	13,001	Lake Michigan	None	Fall fingerling 0+
2018	76,241	Lake Michigan	None	Spring yearling 1+
2019	76,609	Lake Michigan	None	Spring yearling 1+

Table A-3. Number of steelhead stocked in the Root River during 2002 – 2019. Stocking targets were 35,000 per strain, reduced to 27,000 Chambers Creek and Ganaraska after 1998.

Year stocked	Total number	Strain	Fin clip
2002	33,634	Skamania	RM
	27,064	Chambers Creek	LM
	27,125	Ganaraska	ARV
2003	35,448	Skamania	RMRV
	27,123	Chambers Creek	LMLV
	27,150	Ganaraska	BV
2004	35,145	Skamania	RM
	31,039	Chambers Creek	LM
	27,881	Ganaraska	ALV
2005	35,930	Skamania	ARM
	27,058	Chambers Creek	ALM
	27,975	Ganaraska	ARV
2006	34,452	Skamania	RMRV
	27,398	Chambers Creek	LMLV
	26,948	Ganaraska	BV
2007	35,210	Skamania	RM
	22,890	Chambers Creek	LM
	35,044	Ganaraska	ALV
2008	34,556	Skamania	ARM
	24,839	Chambers Creek	ALM
	22,789	Ganaraska	ARV
2009	34,571	Chambers Creek	LMLV
	49,704	Ganaraska	BV
2010	27,913	Chambers Creek	LM
	29,252	Ganaraska	ALV
2011	28,104	Chambers Creek	ALM
	27,015	Ganaraska	ARV
2012	26,998	Chambers Creek	LMLV
	27,031	Ganaraska	BV
2013	26,995	Chambers Creek	LM
	27,116	Ganaraska	ALV
2014	27,188	Chambers Creek	ALM
	29,535	Ganaraska	ARV
2015	31,389	Chambers Creek	LMLV
	31,459	Ganaraska	BV
2016	27,134	Chambers Creek	LM
	28,218	Ganaraska	ALV
2017	28,085	Chambers Creek	ALM
	27,048	Ganaraska	ARV
2018	30,293	Chambers Creek	ALM+CWT
	26,252	Ganaraska	ARV+CWT
	34,027	Skamania	ARM+CWT
2019	32,034	Chambers Creek	ALM+CWT
	33,884	Ganaraska	ALV+CWT
	34,511	Skamania	ARM+CWT