

Smith River Volunteer Adult Salmonid Surveys

Summer 2019

With a 31-year Data Comparison



Training volunteers to identify and survey for fish safely.

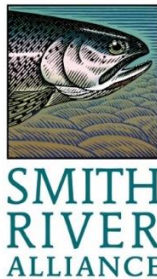
Photo: *Lucas Parish*

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A Smith River Alliance Report by:

Marisa Parish Hanson

marisa@smithriveralliance.org



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Coastal Cutthroat trout (*Oncorhynchus clarki clarki*), Upper South Fork Smith River Vimal Golding

Summary

Summer snorkel surveys aimed at searching for adult salmonids have been conducted across the Smith River basin for thirty-one years. The California Department of Fish and Wildlife performed the first surveys in 1982. The U.S. Forest Service and Humboldt State University, conducted surveys annually from 1989 to 1999. The Smith River Alliance continued the effort by organizing surveys from 2000 to present with the help of hundreds of volunteers.

This long-term collaborative effort has resulted in a thirty-one year survey record for the South Fork, twenty-seven years on the Middle Fork, and ten years on the North Fork in the Smith River Basin. Currently surveys record observations of all adult salmonids including coastal cutthroat trout (*Oncorhynchus clarki clarki*), summer steelhead trout (*O. mykiss*), steelhead half-pounders, spring Chinook salmon (*O. tshawytscha*), and rainbow trout (*O. mykiss*). Observations of Klamath small-scale suckers (*Catostomus rimiculus*) are also documented. Observations of amphibians and reptiles have been recorded since 2011.

The annual total stream miles surveyed has varied over time. Therefore, fish abundance is reported as density per mile to allow for comparison across all 31 survey years. We report on the observations of the 2019 volunteer survey effort and how these data compare to the 31-year data set. Overall, we have found the density of coastal cutthroat trout (CCT) are consistently higher in the South Fork than in the Middle or North Forks. While, the density of total CCT has cyclically varied throughout the long-term data set, the overall trend shows an increase in density in both the South Fork and Middle Fork.

Adult spring Chinook salmon and summer steelhead trout (>16") are far less common than CCT in the Smith River. Observed densities for both species in 2019 were less than the average of the long-term data set. The density of half-pounder steelhead trout (<12-15") and rainbow trout were higher than average on the South Fork, though lower than average on the Middle Fork. Conversely, Klamath small-scale densities were higher than average on the Middle Fork and lower than average on the South Fork. Other species observed include coastal giant salamanders, foothill-yellow legged frogs, aquatic garter snakes, rough skinned newts, crayfish, and lamprey ammocetes.

Introduction

Successful recognition of fluctuations and trends in a species population requires long-term monitoring. These data can also be used to assess and track a population's response to management, restoration, and environmental change over time. This information can then help guide management and restoration decisions to help protect species productivity and resilience. However, long-term monitoring over a large geographical area requires significant resources. Through collaborative effort and continued volunteer support, a 31-year data set of adult salmonids in the Smith River basin has been collected from 1989 to 2019.

This report describes the results of the survey conducted on the South Fork, Middle Fork and North Fork Smith River on August 3, 2019. Additionally, it summarizes the cumulative 31-year data set and explain how the 2019 species densities compare to the average densities over the longer time horizon.

Background

The Smith River has exceptional water quality and clarity providing an ideal setting to learn to identify, observe and count adult salmonids. The annual volunteer fish census is conducted during the summer with the objective of consistently and accurately counting adult salmonids in the Smith River. These data contribute to a long-term data set that first began in 1982, and has been collected annually since 1989, providing annual population density trends and distribution of adult salmonids. Due to dedicated assistance from citizen volunteers, these surveys also provide increased public awareness of the natural diversity and condition of the Smith River watershed. Surveys were first performed in 1982 by California Department of Fish and Wildlife (CDFW) for summer steelhead in all three Forks of the Smith River. In 1989 and 1990, the U.S. Forest Service (USFS) performed surveys along the majority of the South Fork and Humboldt State University performed surveys along the Middle Fork.

In 1991, CDFW performed the surveys. From 1992 to 1999, the USFS conducted surveys annually until 1999. Since 2000, the Smith River Alliance has led the organization, training, and reporting for these surveys. Survey effort on the South Fork Smith River has remained the highest priority, as this is where there is the longest continuous data set. With sufficient volunteers, additional surveys are conducted on the Middle Fork and North Fork of the Smith River. This report highlights the results from surveys conducted on August 3, 2019 and how these counts compare to those from past years survey efforts.

Study Area

The 725 square mile Smith River basin is recognized as a salmon stronghold, a wild and scenic river, as well as a National Recreation Area. From 2016 through 2018 the California Department of Fish and Wildlife designated a total of approximately 140 miles of South Fork Smith River and

multiple tributaries from the confluence with Craig's Creek upstream to the Island Lake Trail as Wild and Heritage Trout Waters (CDFW 2019).

The quantity of stream miles surveys on any given year is dependent on available volunteer surveyors. The available area to be surveyed includes sections of the South Fork, Middle Fork, and North Fork of the Smith River with a maximum total of 50 miles possible (Figure 1). With volunteers, a single survey stream section (reach) ranges from 1.08 – 3.35 miles.

The volunteer sample frame includes at most, 12 reaches on the South Fork can be surveyed from the mouth of Buck Creek to the confluence with the Middle Fork, a total of 21.61 miles. The Middle Fork is surveyed from the upper extent of anadromy at the Middle Fork Falls down to the South Fork confluence, a total of 27.29 miles across 14 reaches. A single reach of the North Fork can be surveyed from two units upstream from the confluence with Stony Creek to the confluence with the Middle Fork, 1.15 miles. Historic surveys conducted by USFS and CDFW covered a broader area extending into tributaries and upstream to Harrington Creek on the South Fork. Since 2000, the event coordinator has worked to survey the maximum stream miles possible each year depending on the number of volunteer surveyors attending the event.

Survey Methods

During the summer, when flows are low and water clarity is high, groups of 3-5 individuals conduct a snorkel survey along a continuous river reach while floating downstream through all pool habitats. All adult salmonids including coastal cutthroat trout (*Oncorhynchus clarki clarki*), summer steelhead trout (*O. mykiss*), steelhead half-pounders, spring Chinook salmon (*O. tshawytscha*), and rainbow trout (*O. mykiss*), as well as Klamath small-scale suckers (*Catostomus rimiculus*) observed during the survey are counted. Observations of any other adult salmonids observed such as sockeye salmon (*O. nerka*) and chum salmon (*O. keta*) are also recorded though these species are rare in the Smith River basin (Walkley and Garwood 2017).

All new participating volunteers attend a pre-survey training to practice proper survey methods, fish identification, and measurement techniques with qualified trainers having previous direct experience. The August 2, 2019 training, taught volunteers to employ skills to reduce the probability of double-counting fish as well as how to safely navigate hazards present in the river. Each survey crew was assigned a lead in charge of data recording and reporting while ensuring accurate and safe navigation throughout the assigned survey reach. Each group also included a surveyor comfortable with diving to ensure areas of cover such as boulders, logs, and ledges were thoroughly investigated for hiding fish. Survey members are taught to watch for fleeing fish while another surveyor dives. Groups are taught to communicate by vocalizing and pointing to ensure fish are not doubled counted. All surveys are conducted between 9:30 am and 5:00 pm during the optimal lighting conditions.

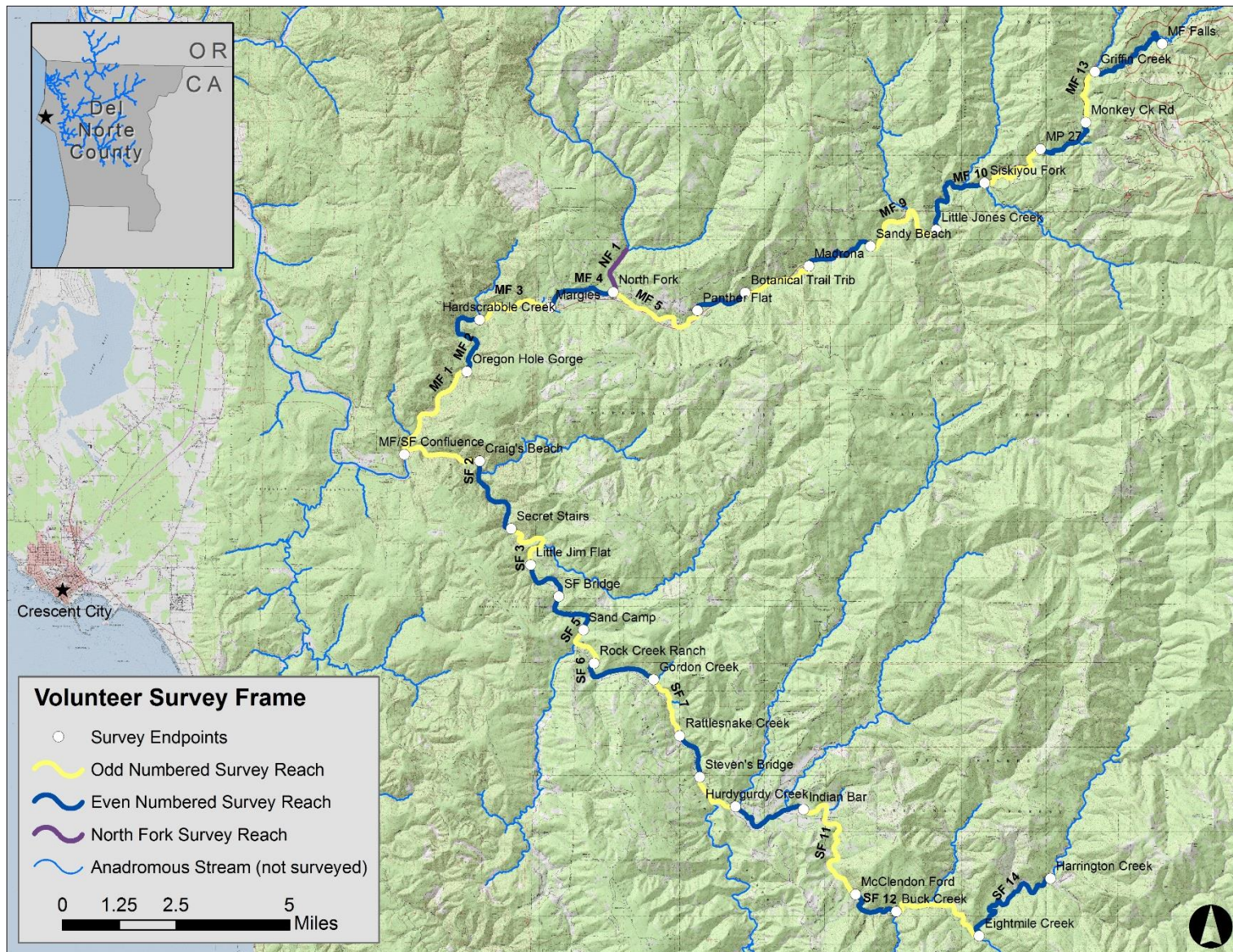


Figure 1. Stream reaches available to be surveyed during volunteer adult salmonid summer snorkel surveys in the Smith River basin, Del Norte County, CA.

Only fish lacking juvenile parr marks are counted during a survey. Coastal cutthroat trout are counted by dividing them into two groups, small (< 12") and large (> 12") individuals. Summer steelhead trout are divided into adults ($\geq 16"$) and half-pounders (12" – 15"). Also counted are spring Chinook salmon > 16", rainbow trout > 10", and Klamath small-scale suckers > 6". Last, incidental observations of local aquatic mammals, amphibians and aquatic reptiles are also recorded at the reach-level but are not a focus of this survey.

Results

2019 Results

A total of 22 reaches were surveyed on August 3, 2019 with the help of 80 volunteers, 74 of which conducted the surveys. The USGS gauge near Smith River (11532500) recorded a preliminary daily mean flow of 322 cubic feet per second (cfs) (USGS 2019); slightly lower than the average daily flow of 354 cfs during past fish counts. The water temperature of the South Fork at Rock Creek Ranch was 62° F (16.75° C) at 1500 on August 3. Surveys covered 39.05 miles of stream, approximately eight miles more than the average surveyed in the 31-year data set (Figure 2). The South Fork was surveyed from Buck Creek to the confluence with the Middle Fork covering 21.61 miles (Table 1). The Middle Fork was surveyed from Mile Post 27 to Hardscrabble Creek covering 17.44 miles (Table 2). No volunteer surveys were conducted on the North Fork, however CDFW Wild and Heritage Trout crew surveyed sections near Major Moore during the last week of July. A total of 1505 coastal cutthroat trout, seven summer steelhead trout, 10 steelhead half-pounders, one spring Chinook salmon, 181 rainbow trout, and 42 Klamath small-scale suckers were observed across all surveys (Table 2).

Cumulative Long-term Results

Similar to previous years, this year's total count of coastal cutthroat trout (CCT) per mile was higher on average throughout the South Fork than the Middle Fork (Figure 3). While volunteers did not survey the North Fork this year, CCT densities on the North Fork have been greater than or similar to densities in the South Fork and Middle Fork in some years (i.e., 1995, 1997, 2006) (Figure 3). The volunteer efforts survey fewer stream miles on the North Fork compared to these years with recorded high densities, which may contribute to the lower documented densities. The total density of cutthroat was near the average of the entire data set with densities at 1.24 and 1.28 times greater on the South Fork and Middle Fork, respectively, than the average of all previous years. Throughout the data set the density of CCT has increased in both the South Fork and Middle Fork (Figure 4, Figure 5). As has been observed across the majority of the data set, we observed a higher density of small CCT per mile than large cutthroat per mile this year (Figure 4, Figure 5, Figure 6).

A total of seven summer steelhead trout were observed across all three Forks. This density is below the average of past years surveys (Figure 7). A total of 10 half-pounders and 181 Rainbow trout were detected this year, a higher than average density on the South Fork and lower than average density on

the Middle Fork for these two life history diversities (Figure 8, Figure 9). Only one spring Chinook salmon was observed across all surveys and was seen in the upper South Fork gorge near McClendon Ford (Table 1). The spring Chinook salmon densities were lower than average on both forks (Figure 10). A total of 42 Klamath small-scale suckers were observed, with densities higher than average on the Middle Fork and lower than average on the South Fork (Figure 11).

In 2014 there were high numbers of dead coastal giant salamanders (*Dicamptodon tenebrosus*) observed though the survey area. Fewer dead individuals have been observed annually since and only one was observed on the South Fork this year. One live coastal giant salamander was observed on the South Fork and eight were observed in the Middle Fork, one of which was dead. Eight aquatic garter snakes (*Thamnophis atratus*) were recorded on the South Fork and thirteen on the Middle Fork. Five rough skinned newts (*Taricha granulosa*) were observed on the Middle Fork. Two lamprey ammocetes were detected in the South Fork. Last, adult and juvenile Foothill yellow-legged frogs (*Rana boylei*) were observed on the South Fork and Middle Fork. All of these species are cryptic animals and are difficult to detect with our survey protocol, so observations are incidental.

Table 1. Complete counts of fish observed across the South Fork (SF) Smith River during the volunteer fish count on August 3, 2019.

Reach	Top	Bottom	Length (miles)	Cutthroat <12"	Cutthroat >12"	Spring Chinook	Summer Steelhead	Half Pounder	Rainbow Trout	Sucker	Crew Lead	Crew #
SF 1	Craig's Beach	Middle Fork	1.88	23	17	0	0	1	2	0	E. Cooper	3
SF 2	Secret Stairs	Craig's Beach	2.04	17	12	0	0	1	0	0	M. London	3
SF 3	Little Jim Flat	Secret Stairs	1.74	24	11	0	1	0	5	0	C. Stiverson	4
SF 4A	SF Bridge	Little Jim Flat	1.25	23	44	0	1	0	14	2	A. Singh	4
SF 4B	Sand Camp	SF Bridge	1.41	6	28	0	0	0	10	0	A. Singh	4
SF 5	Rock Creek Ranch	Sand Camp	1.08	54	37	0	0	0	3	0	J. Deibner- Hanson	5
SF 6	Gordon Creek	Rock Creek Ranch	1.78	44	35	0	0	0	3	0	B. Coenen	4
SF 7	Rattlesnake Creek	Gordon Creek	1.49	110	34	0	0	0	9	0	A. Piscitelli	4
SF 8	Steven's Bridge	Rattlesnake Creek	1.12	40	38	0	1	0	3	0	C. Cobsy	4
SF 9	Hurdygurdy Creek	Steven's Bridge	1.21	20	20	0	0	1	11	0	V. Golding	3
SF 10	Indian Bar	Hurdygurdy Creek	1.94	58	54	0	0	2	4	1	M. Reneski	4
SF 11	McClendon Ford	Indian Bar	3.35	43	68	1	2	3	61	1	N. Van Vleet	3
SF 12	Buck Creek	McClendon Ford	1.32	118	18	0	1	0	6	0	E. Sinkhorn	3
South Fork Totals			21.61	580	416	1	6	8	131	4		

Table 2. Complete counts of fish observed across the Middle Fork (MF) Smith. Total counts include combined observations across the South Fork and Middle Fork during the volunteer fish count on August 3, 2019.

Reach	Top	Bottom	Length (miles)	Cutthroat <12"	Cutthroat >12"	Spring Chinook	Summer Steelhead	Half Pounder	Rainbow Trout	Sucker	Crew Lead	Crew#
MF 3	Margie's	Hardscrabble	1.92	24	13	0	0	1	4	11	C. Martel	4
MF 4	North Fork	Margie's	1.62	33	17	0	0	0	0	6	M. Halloran	4
MF 5	Panther Flat	North Fork	2.47	86	28	0	0	2	23	0	C. McIntee	4
MF 6	Botanical Trailhead Rd	Panther Flat	1.32	28	5	0	0	0	6	1	J. Hollis	3
MF 7	Madrona	Botanical Trailhead Rd	1.67	68	27	0	0	0	2	15	M. Hicks	3
MF 8	Sandy Beach	Madrona	1.75	43	6	0	0	0	1	4	K. Jewell	3
MF 9	Little Jones Creek	Sandy Beach	2.44	33	22	0	0	1	9	1	J. Abrams	3
MF 10	Siskiyou Fk	Little Jones Creek	2.28	16	35	0	1	2	5	0	J. Walkey	3
MF 11	MP 27	Siskiyou Fk	1.96	10	15	0	0	0	0	0	T. Cadwell	3
Middle Fork Totals			17.44	341	168	0	1	6	50	38		
Total counts				921	584	1	7	14	181	42		

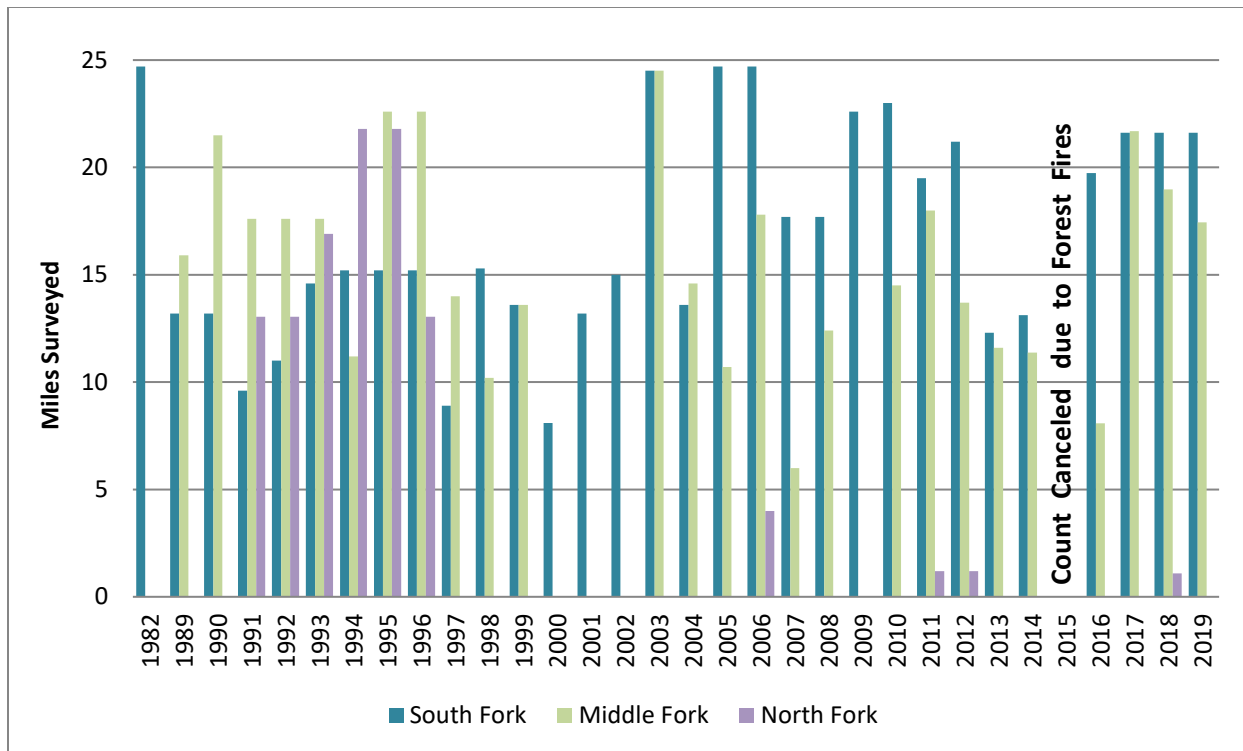


Figure 2. Number of stream miles surveyed each year fish counts have been conducted from 1982 to 2019 on the South Fork, Middle Fork, and North Fork Smith River. Surveys were not conducted on all forks every survey year, refer to Appendix A, B, and C for survey effort.

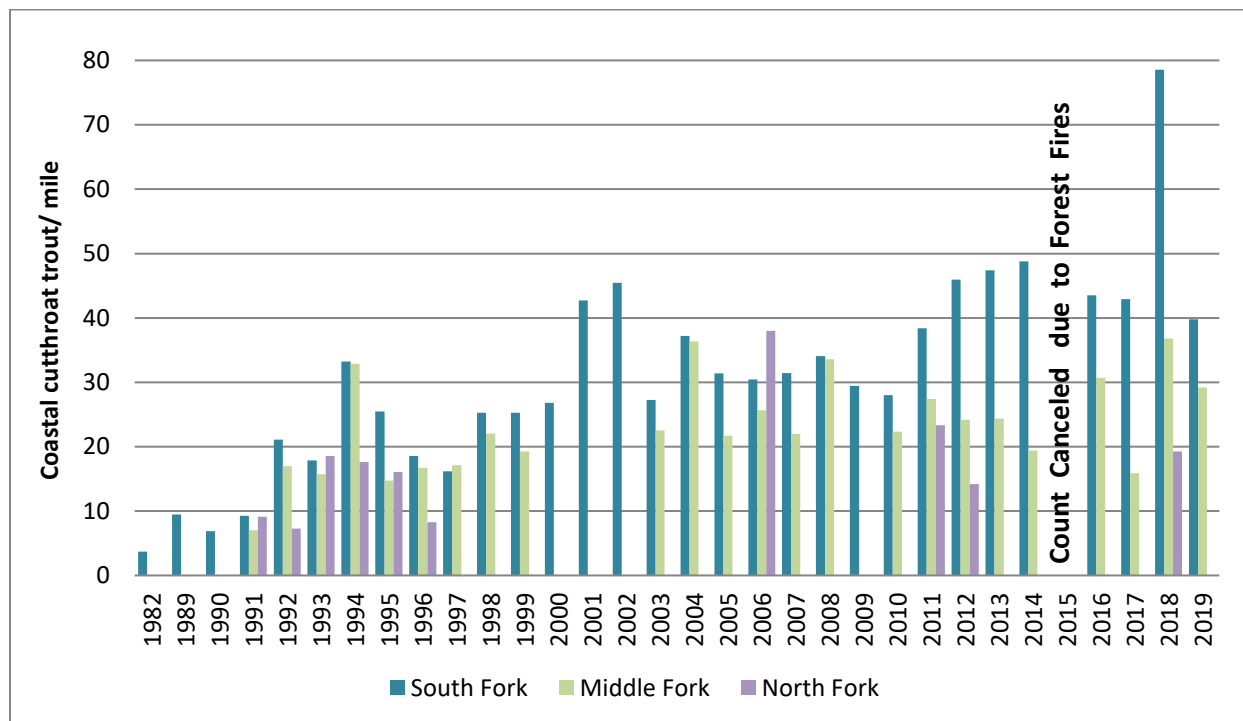


Figure 3. Density of total Coastal Cutthroat Trout counted per mile based on miles of river surveyed in the South Fork, Middle Fork, and North Fork Smith River from 1982 to 2019. Surveys were not conducted on all forks every survey year, refer to Appendix A, B, and C for survey effort.

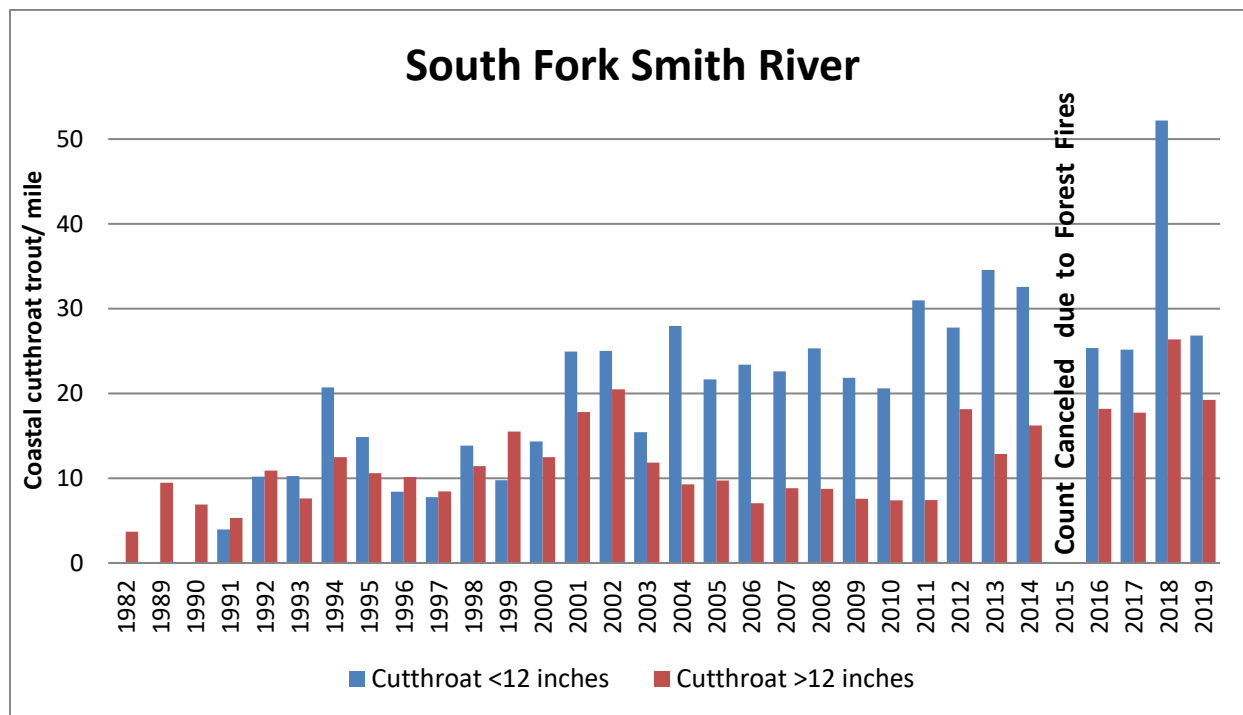


Figure 4. Density of small (<12") and large (>12") Coastal Cutthroat Trout based on counts per mile of river surveyed on the South Fork Smith River from 1982 to 2019.

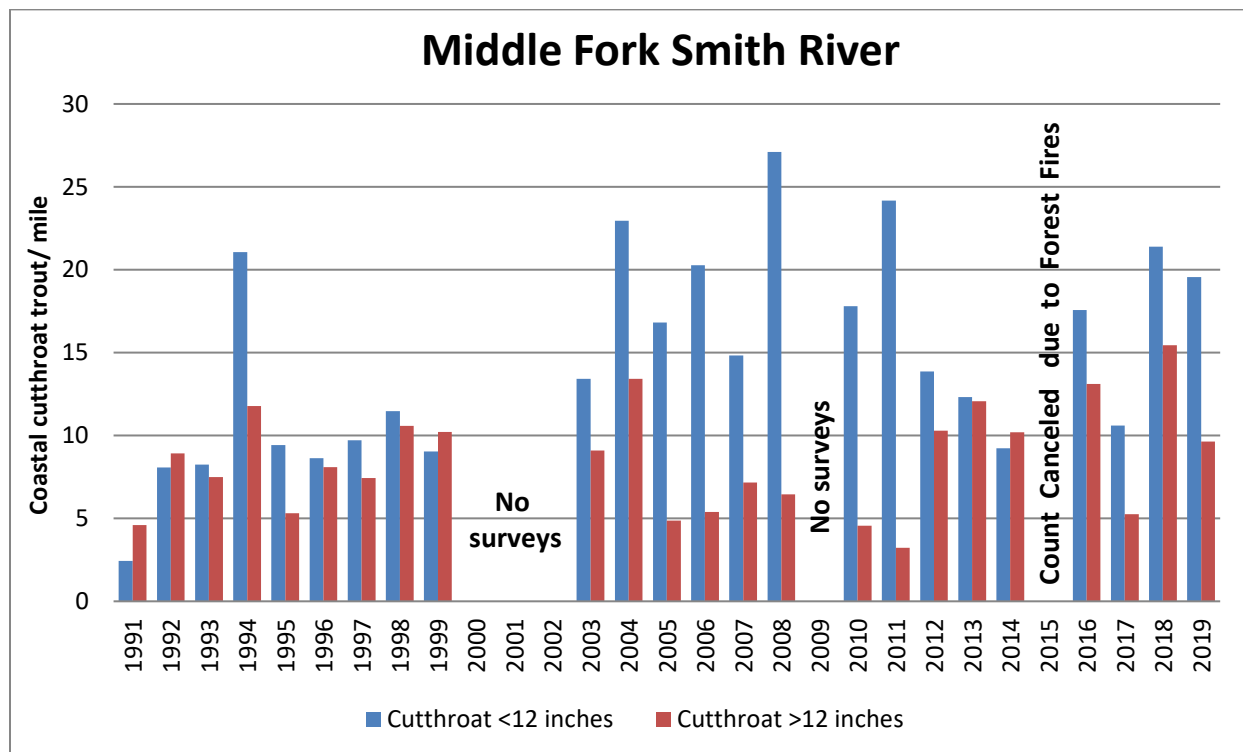


Figure 5. Density of small (<12") and large (>12") Coastal Cutthroat Trout based on counts per mile of river surveyed on the Middle Fork Smith River from 1991 to 2019.

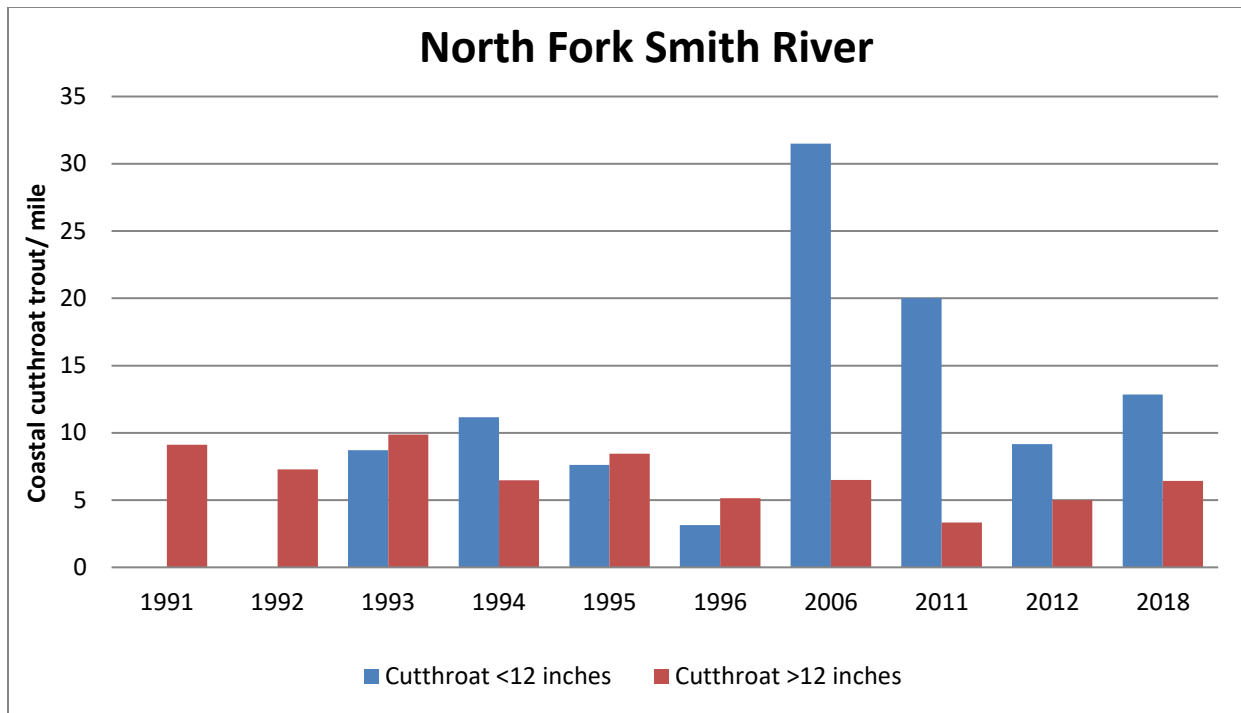


Figure 6. Density of small (<12") and large (>12") Coastal Cutthroat Trout based on counts per mile of river surveyed on the North Fork Smith River from 1992 to 2018 during ten years of surveys.

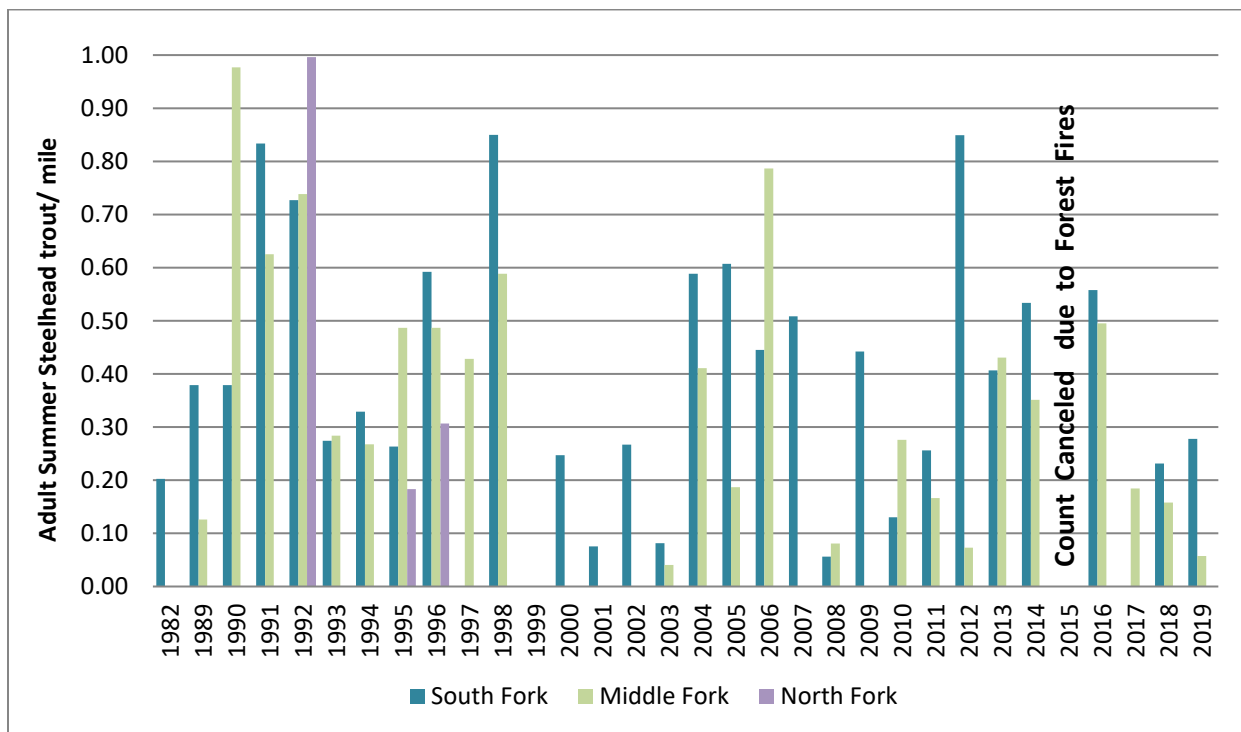


Figure 7. Density of adult Summer Steelhead trout (>16") based on total counts per mile surveyed along the South Fork, Middle Fork and North Fork of the Smith River during surveys conducted from 1982 to 2019. Surveys were not conducted on all forks every survey year, refer to Appendixes A, B, and C.

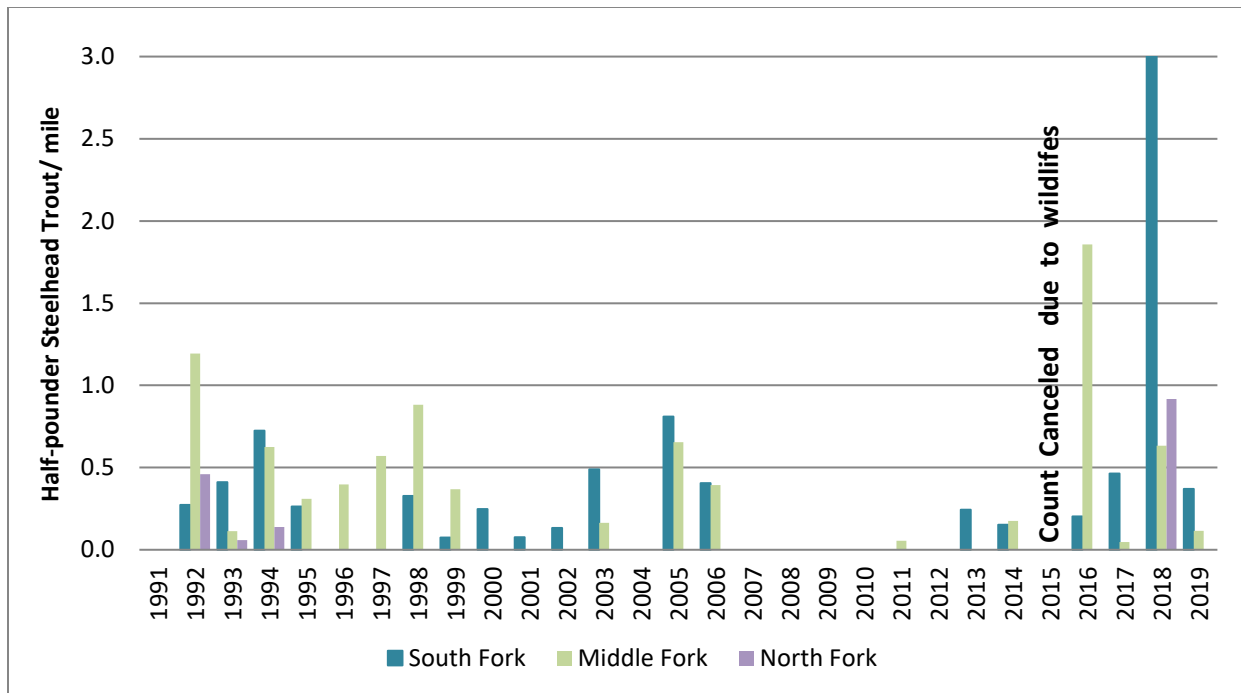


Figure 8. Density of Half-pounder Steelhead trout (12" - 16") based on total counts per mile surveyed along the South Fork, Middle Fork, and North Fork of the Smith River during surveys conducted from 1982 to 2019. Surveys were not conducted on all forks every survey year, refer to Appendixes A, B, and C.

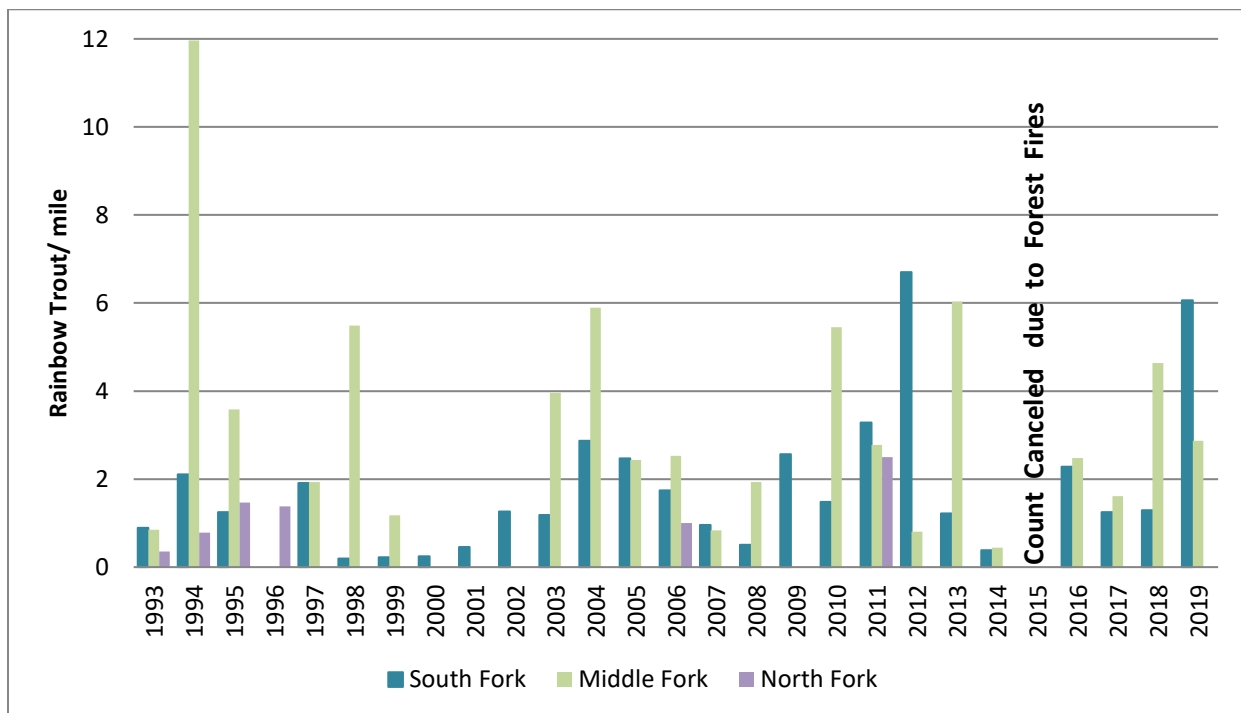


Figure 9. Density of adult Rainbow Trout (>10") based on total counts per mile surveyed along the South Fork, Middle Fork, and North Fork of the Smith River during surveys conducted from 1989 to 2019. Surveys were not conducted on all forks every survey year, refer to Appendixes A, B, and C.

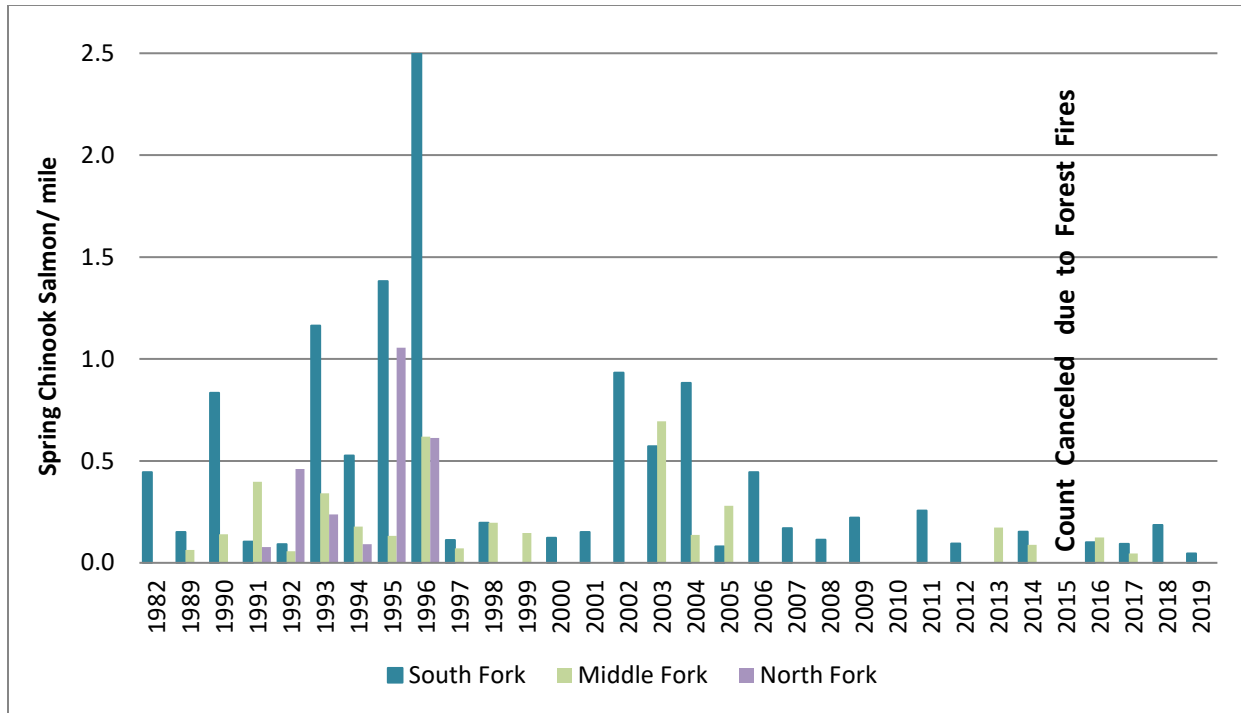


Figure 10. Density of adult Spring Chinook Salmon based on total counts per mile surveyed along the South Fork, Middle Fork and North Fork of the Smith River during surveys conducted from 1982 to 2019. Surveys were not conducted on all forks every survey year, refer to Appendixes A, B, and C.

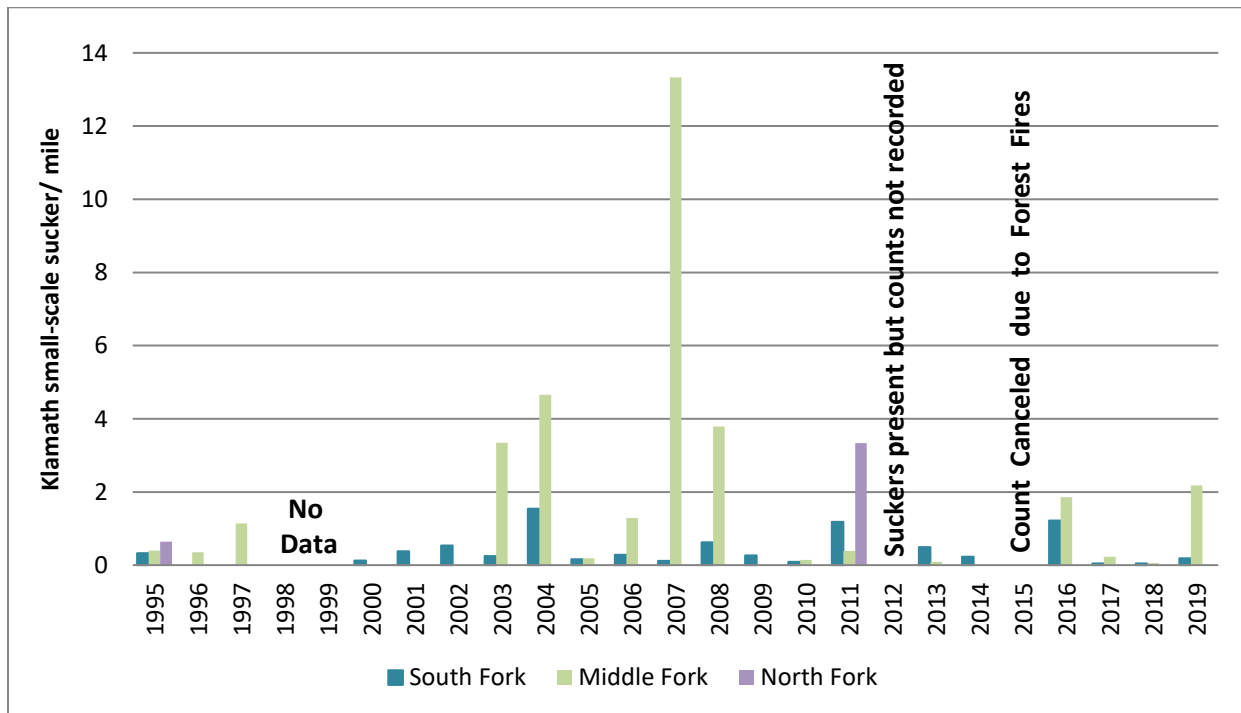


Figure 11. Density of Klamath small-scale suckers (> 6") based on total counts per mile surveyed along the South Fork, Middle Fork, and North Fork of the Smith River during surveys conducted from 1995 to 2019 when observations of suckers were recorded. Surveys were not conducted on all forks every survey year, refer to Appendixes A, B, and C.

Literature Cited

CDFW. 2019. Designated Wild and Heritage Trout Waters.

<https://www.wildlife.ca.gov/fishing/inland/trout-waters>.

USGS. 2019. USGS Surface - Water Daily Statistics for the Nation, 1153250 Smith R NR Crescent City.

https://waterdata.usgs.gov/nwis/dvstat?referred_module=sw&search_site_no=11532500&format=sites_selection_links

Walkley J. and J. Garwood. 2017. 2011 – 2016 Salmonid Redd Abundance and Juvenile Salmonid Spatial Structure in the Smith River Basin, California and Oregon. Final Report to the California Department of Fish and Wildlife, Fisheries Restoration Grants Program, Contract: P1210524. Smith River Alliance, Crescent City, CA. 88p.

Appendices

Appendix A. Summary of counts from all summer adult fish surveys in the South Fork Smith River. When a particular species was not identified and recorded during a survey year no data (ND) is available for that year.

Year	SF Miles	Cutthroat <12"	Cutthroat >12"	Spring Chinook salmon	Summer Steelhead trout	Steelhead half- pounder	Rainbow trout	Klamath smallscale sucker
1982	25	ND	91	11	5	ND	ND	ND
1989	13.2	ND	125	2	5	ND	ND	ND
1990	13.2	ND	91	11	5	ND	ND	ND
1991	9.6	38	51	1	8	0	ND	ND
1992	11	112	120	1	8	3	ND	ND
1993	14.6	150	111	17	4	6	13	ND
1994	15.2	315	190	8	5	11	32	ND
1995	15.2	226	161	21	4	4	19	5
1996	15.2	128	154	38	9	0	0	0
1997	8.9	69	75	1	0	0	17	0
1998	15.3	212	175	3	13	5	3	0
1999	13.6	133	211	0	0	1	3	0
2000	8.1	116	101	1	2	2	2	1
2001	13.2	329	235	2	1	1	6	5
2002	15	375	307	14	4	2	19	8
2003	24.5	378	290	14	2	12	29	6
2004	13.6	380	126	12	8	0	39	21
2005	24.7	535	240	2	15	20	61	4
2006	24.7	578	174	11	11	10	43	7
2007	17.7	400	156	3	9	0	17	2
2008	17.7	448	155	2	1	0	9	11
2009	22.6	494	171	5	10	0	58	6
2010	23	474	170	0	3	ND	34	2
2011	19.5	604	145	5	5	ND	64	23
2012	21.2	589	385	2	18	5	142	present
2013	12.3	425	158	0	5	3	15	6
2014	13.12	427	213	2	7	2	5	3
2016	19.73	500	359	2	11	4	45	24
2017	21.61	544	383	2	0	10	27	1
2018	21.61	1128	570	4	5	65	28	1
2019	21.61	580	416	1	6	8	131	4

Appendix B. Summary of counts from all summer adult fish surveys in the Middle Fork Smith River. If a particular species was not identified and recorded during a survey year no data (ND) is available for that year. Surveys were not conducted on the Middle Fork during the years not reported on in the table.

Year	MF Miles	Cutthroat <12"	Cutthroat >12"	Spring Chinook salmon	Summer Steelhead trout	Steelhead half-pounder	Rainbow trout	Klamath smallscale sucker
1989	15.9	ND	ND	1	2	ND	ND	ND
1990	21.5	ND	ND	3	21	ND	ND	present
1991	17.6	43	81	7	11	0	ND	ND
1992	17.6	142	157	1	13	21	ND	ND
1993	17.6	145	132	6	5	2	15	ND
1994	11.2	236	132	2	3	7	134	ND
1995	22.6	213	120	3	11	7	81	9
1996	22.6	195	183	14	11	9	0	8
1997	14	136	104	1	6	8	27	16
1998	10.2	117	108	2	6	9	56	0
1999	13.6	123	139	2	0	5	16	0
2003	24.5	329	223	17	1	4	97	82
2004	14.6	335	196	2	6	ND	86	68
2005	10.7	180	52	3	2	7	26	2
2006	17.8	361	96	0	14	7	45	23
2007	6	89	43	0	0	0	5	80
2008	12.4	336	80	0	1	0	24	47
2010	14.5	258	66	0	4	ND	79	2
2011	18	435	58	0	3	1	50	7
2012	13.7	190	141	0	1	0	11	ND
2013	11.6	143	140	2	5	0	70	1
2014	11.38	105	116	1	4	2	5	0
2016	8.08	142	106	1	4	15	20	15
2017	21.69	230	114	1	4	1	35	5
2018	18.98	406	293	0	3	12	88	1
2019	17.44	341	168	0	1	6	50	38

Appendix C. Summary of counts from all summer adult fish surveys in the North Fork Smith River. If a particular species was not identified and recorded during a survey year no data (ND) is available for that year.

Year	NF Miles	Cutthroat <12"	Cutthroat >12"	Spring Chinook salmon	Summer Steelhead trout	Steelhead half- pounder	Rainbow trout	Klamath smallscale sucker
1991	13.05	ND	119	1	0	ND	ND	ND
1992	13.05	ND	95	6	13	6	ND	ND
1993	16.9	147	167	4	0	1	6	ND
1994	21.8	243	141	2	0	3	17	ND
1995	21.8	166	184	23	4	0	32	14
1996	13.05	41	67	8	4	0	18	0
2006	4.0	126	26	0	0	0	4	0
2011	1.2	24	4	0	0	0	3	4
2012	1.2	11	6	0	0	0	0	present
2018	1.09	14	7	0	0	1	0	0