U.S. Fish & Wildlife Service

Arcata Fisheries Data Series Report DS 2023-69

Summary of Abundance and Biological Data Collected During Juvenile Salmonid Monitoring in the Mainstem Klamath River Below Iron Gate Dam, California, 2022

Tyler J. Wallin, William D. Pinnix, and Nicholas A. Som

U.S. Fish and Wildlife Service
Arcata Fish and Wildlife Office
1655 Heindon Road
Arcata, California 95521
(707) 822-7201

February 2023

Funding for this study was provided by the Bureau of Reclamation's Klamath Area Office, with additional support provided by the U. S. Fish and Wildlife Service's Klamath River Fish Habitat Assessment Study administered by the Arcata Fish and Wildlife Office.

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Key words: Klamath River, Salmon, Chinook, Coho, Steelhead, Frame Net, Rotary Screw Trap, Juvenile, Outmigrant, Mark-Recapture, Trap Efficiency, Stream Salmonid Simulator

The correct citation for this report is:

Wallin, T. J., W. D. Pinnix, and N. A. Som. 2023. Summary of Abundance and Biological Data Collected During Juvenile Salmonid Monitoring on the Mainstem Klamath River Below Iron Gate Dam, California, 2022. U.S. Fish and Wildlife Service. Arcata Fish and Wildlife Office, Arcata Fisheries Data Series Report Number DS 2023-69.

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U.S. Fish and Wildlife Service
Arcata Fish and Wildlife Office
1655 Heindon Road, Arcata, California
tyler_wallin@fws.gov
bill_pinnix@fws.gov
nicholas_som@fws.gov

Abstract.—This report summarizes results from monitoring the outmigration of juvenile salmonids downstream of Iron Gate Dam on the mainstem Klamath River, California in 2022. rapping occurred at four locations: below the confluence with Bogus Creek (river km 308), just upstream of the Interstate 5 bridge (river km 294), upstream of the confluence with the Scott River near Kinsman Creek (river km 238), and above the confluence with the Trinity River near Weitchpec, California (river km 65). Both frame nets and rotary screw traps were deployed in early March and operated until early July. Traps were operated four nights each week from Monday to Friday. All juvenile salmonids in the catch were counted and each day a subset was measured for length, weight, and external symptoms of disease. Non-salmonid fishes in the catch were also enumerated and subsampled to measure length. Mark-recapture studies were conducted periodically at the I-5, Kinsman and Weitchpec trap sites during the season to estimate trap efficiency. Efficiency estimates and catch data were used to estimate weekly and seasonal outmigration abundance of age-0 juvenile Chinook Salmon migrating downstream past the I-5, Kinsman, and Weitchpec trap sites using a Bayesian time-stratified population estimation method. Due to an early release (April 15) of 2.8 million unmarked hatchery-origin juvenile Chinook Salmon, abundance estimates in 2022 represent combined hatchery- and natural-origin stocks. For the periods that traps were operated, season-wide abundance estimates of combined hatchery- and natural-origin age-0 Chinook Salmon were 5,936,109 (CI=4,199,753-8,179,567) at the I-5 trap site, 967,444 (CI=743,242-1,236,325) at the Kinsman trap site, and 1,384,187 (CI=811,879-2,222,750) at the Weitchpec site. Abundance estimates were not calculated for the Bogus trap site in 2022.

Introduction

The Klamath River basin historically supported large runs of Chinook Salmon (*Oncorhynchus tshawytscha*), Coho Salmon (*O. kisutch*), steelhead (*O. mykiss*), and other anadromous fishes (KRBFTF 1991; NAS 2004; USDOI and NMFS 2012). These species contribute to economically and culturally important subsistence, sport, and commercial fisheries. However, abundance of anadromous fish species has declined dramatically due to a variety of factors, including overfishing, logging, mining, road building, livestock grazing, water diversion, wetland conversion, and dam construction (KRBFTF 1991; NAS 2004; USDOI and NMFS 2012).

This report summarizes data collected during the 2022 juvenile salmonid outmigration study conducted on the Klamath River downstream of Iron Gate Dam. The U.S. Fish and Wildlife Service (USFWS), in collaboration with the Karuk Tribe and U.S. Geological Survey (USGS), began trapping juvenile salmonids annually on the Klamath River between Iron Gate Dam and the Scott River confluence in 2000 to collect outmigration timing data and weekly catch of young-of-the-year (age-0) Chinook Salmon to calibrate the production model SALMOD (Bartholow et al. 2002). Beginning in 2006, the objectives of this ongoing monitoring project shifted to generate weekly-stratified estimates of production (Gough et al. 2015) and prevalence of infection with the parasite *Ceratonova shasta* (Nichols and True 2007; Nichols et al. 2009; True et al. 2010, 2011, 2013, 2016; Bolick et al. 2012, 2013). Additionally, these data have been used to develop and calibrate an improved salmon production model, the Stream Salmonid Simulator, or S3 Model (Perry et al. 2018, 2019) that is being used as a decision-support tool to aid in water management (Plumb et al. 2019). Data generated by this project are also useful for assessing the status and trends of salmonid populations in the Klamath River.

Study Area

Juvenile salmon monitoring was conducted at four sites on the mainstem Klamath River (Figure 1) located between Iron Gate Dam [river kilometer (rkm) 310.0] and the Trinity River confluence (rkm 64.3). The upstream-most site (Bogus site; rkm 307.8) was 1.6 km downstream of the Bogus Creek confluence accessed via Blue Heron RV Park property. The second site (I-5 site; rkm 293.5) was 0.2 km downstream of the Carson Creek confluence and 0.9 km upstream of where Interstate 5 crosses the Klamath River. The third downstream site (Kinsman site; rkm 237.5) was 0.5 km upstream of the Kinsman Creek confluence. The farthest downstream site (Weitchpec site; rkm 65) was 0.7 km upstream of the Trinity River confluence below the Yurok Tribal office in Weitchpec, California.

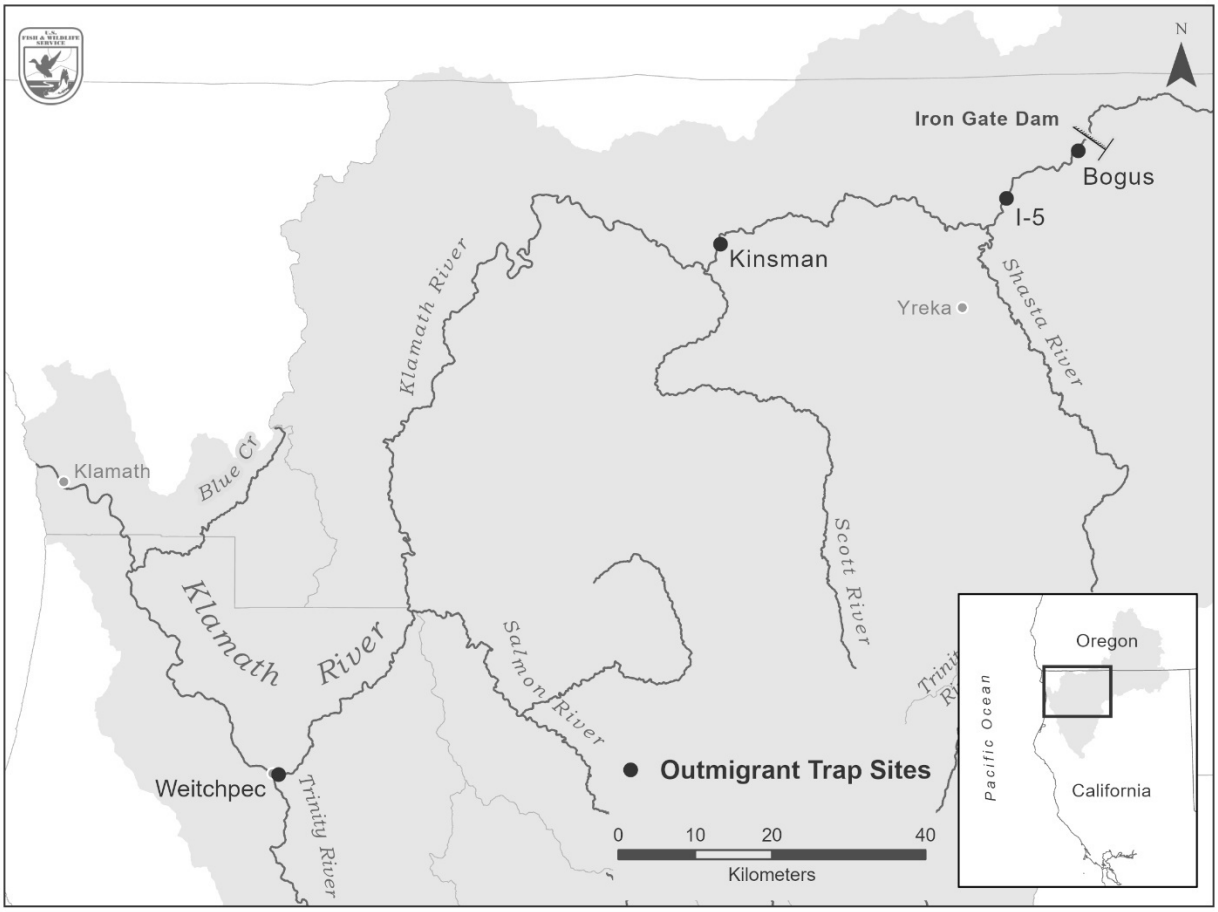

Figure 1. The middle Klamath River basin with juvenile salmon outmigration trap sites identified.

Methods

River Conditions

River discharge and water temperature were monitored throughout the trapping season. The USGS gaging station below Iron Gate Dam (#11516530) was used to represent discharge at the Bogus and I-5 trap sites since accretions from tributaries between the gaging station and these sites are minimal. Discharge at the Kinsman trap site was estimated by subtracting the discharge of the Scott River near Fort Jones (USGS gaging station #11519500) from the discharge of the Klamath River near Seiad Valley (USGS gaging station #11520500). Discharge at the Weitchpec Site was estimated using the USGS gaging station near Orleans, California (#11523000). Water temperature was monitored near each trap site using digital data loggers. For a more detailed description of the methods used to collect and process water temperature data, see Daley et al. (2022).

Trap Design and Operation

Rotary screw traps (RSTs) and/or frame nets were deployed at each of the trap sites. Frame nets were placed closer to the bank in shallower, slower moving water as compared to RST placement, and are in general more efficient at capturing younger and smaller age-0 salmonids migrating along river margins (Gough et al. 2015). Rotary screw traps were set further from the bank in faster, deeper water to capture older and larger age-0 and age-1 salmonids than typically caught in frame nets (Gough et al. 2015). Frame nets were placed near the bank at a location such that water velocity was ideally between 1.0 and 1.2 m/s at the center of the net and water depth between 0.3 and 1.0 m, while RSTs were placed further from the bank such that the cone would spin between five and seven revolutions/min.

In 2022, one frame net (3 m by 1.5 m opening) was operated at the Bogus trap site, two 2.4-m (8-ft) diameter RSTs and one frame net were operated at the I-5 trap site, one 1.5-m (5-ft) diameter RST was operated at the Kinsman trap site and one 2.4-m (8-ft) diameter RST and one frame net were operated at the Weitchpec site. The Bogus frame net, I-5 RSTs, and Kinsman RST were deployed on March 1. The Weitchpec RST and one frame net were deployed March 1 and March 8 respectively. The Bogus frame net was operated until June 3, when water temperature at these sites exceeded the threshold established in the project's scientific collection permit. The Kinsman RST, I-5 RSTs and frame net were operated until June 24 when the water temperature at this site also exceeded the allowable threshold. The RST and upstream frame net at the Weitchpec site were operated until July 6. Due to decreased flows and channel morphology, the downstream frame net became unsafe for staff to operate and was removed on June 17.

All traps were typically operated over four consecutive nights each week (Monday–Thursday nights) throughout the sampling period and checked a minimum of once per day, with the frequency of trap checks governed by catch abundance, water temperatures, and debris loading. The following information was recorded for each trap on each day: date, site, trap type, crew members, air and water temperatures, trap check time, trap reset time, trap depth, and center velocity. Rotation rates at the times of checks and resets of RSTs were also measured as a count of complete cone revolutions in a minimum of 180 seconds. Air temperature was taken in the shade close to the river's edge. Water temperature was taken near the surface in the shade in moving water. Trap depth of RSTs was defined as the submerged depth of the cone, while trap depth of frame nets was the measured as the water depth at the midpoint of the frame entrance. Center velocity was measured as the water velocity at 60% of the trap depth. If a trap was relocated, RST rotations, trap depth, and center velocity were re-measured.

All captured fish were identified and enumerated. A maximum daily biological sample ('biosample') of 30 fish for each salmonid species and 10 fish from each non-salmonid species for each trap type at each monitoring site were measured and examined, including up to 10 lamprey ammocoetes from each genus and 10 eyed lamprey from each species. The following data were recorded for all salmonids in the biosample: age (0 or 1+), fork length (FL), weight, presence/absence of a hatchery mark, presence of any external abnormalities, and abdomen condition (normal or distended). Gill color (red, pale/pink, or white/gray/tan) and condition (normal or eroded/fungal) were recorded for salmonids ≥45 mm FL. The following data were recorded for non-salmonids in the biosample: species, development stage [lampreys only (ammocoete, eyed juvenile, or adult)], FL (or total length for species with pointed or round caudal fins), and presence of any external abnormalities.

Chinook Salmon Production Estimates

Weekly and season totals of natural-origin age-0 Chinook Salmon outmigrating past the I-5, Kinsman, and Weitchpec trap sites were estimated using a Bayesian time-stratified population estimation method (Bonner et al. 2009; Payton and Som 2021). This method requires the following weekly data: total age-0 Chinook Salmon with adipose fins, total adipose fin-clipped age-0 Chinook Salmon (and associated hatchery clip rate), trapping effort (weighted sample fraction, described below), marks released, and marks recaptured. The numbers of age-0 Chinook Salmon with and without adipose fins were summarized from the weekly trapping data and fin-clip rates were reported by Iron Gate Hatchery (IGH).

Traps were not operated a full seven days each week, and due to operational logistics and disruptions (e.g., flawed sets due to debris), daily catches were not completed every day as originally planned. To account for variable and less than full effort, the number of days the site was operated within each j^{th} week was divided by seven, termed sampling fraction:

$$s_j = \frac{d_j}{7}$$

Mark-recapture trap efficiency tests for age-0 Chinook Salmon were conducted at I-5, Kinsman, and Weitchpec trap sites. Hatchery-produced age-0 Chinook Salmon provided by IGH were used for this process. Test fish were marked with Bismarck Brown stain (Rawson 1984) and released approximately 0.5–0.8 km upstream of the trap site to be tested. At least three meso-habitat units, including at least one riffle, were located between the release site and the trap site to allow the fish enough time and space to distribute across the river channel similarly to a natural population passing the trap site. Due to the length of the sampling week, two or three recapture days were available after the release of marked fish. These capture efficiency trials were essential data for estimating abundance via the Bayesian time-stratified model. Mark-recapture efficiency tests could not be conducted for Coho Salmon or steelhead due to the limited catch of these species, so production estimates were not generated for these species.

Results and Discussion

River Conditions

The 2022 monitoring season was characterized by generally low and stable flows from March through June (Figure 2) with a relatively low-level flow pulse released from Iron Gate Dam from April 15-22. At the beginning of the sampling season, discharge below Iron Gate Dam was approximately 27 m^3/s, discharge at the Kinsman trap site was approximately 38 m^3/s, and discharge at the Weitchpec site was approximately 119 m^3/s (Figure 2). Flows out of Iron Gate Dam increased in April peaking at approximately 126 m^3/s, peaking at approximately 124 m^3/s at the Kinsman trap site, and peaking at approximately 360 m^3/s at the Weitchpec site (Figure 2). Discharge at Weitchpec was more variable than the upstream sites, reflecting inputs from tributaries downstream of the other sampling sites.

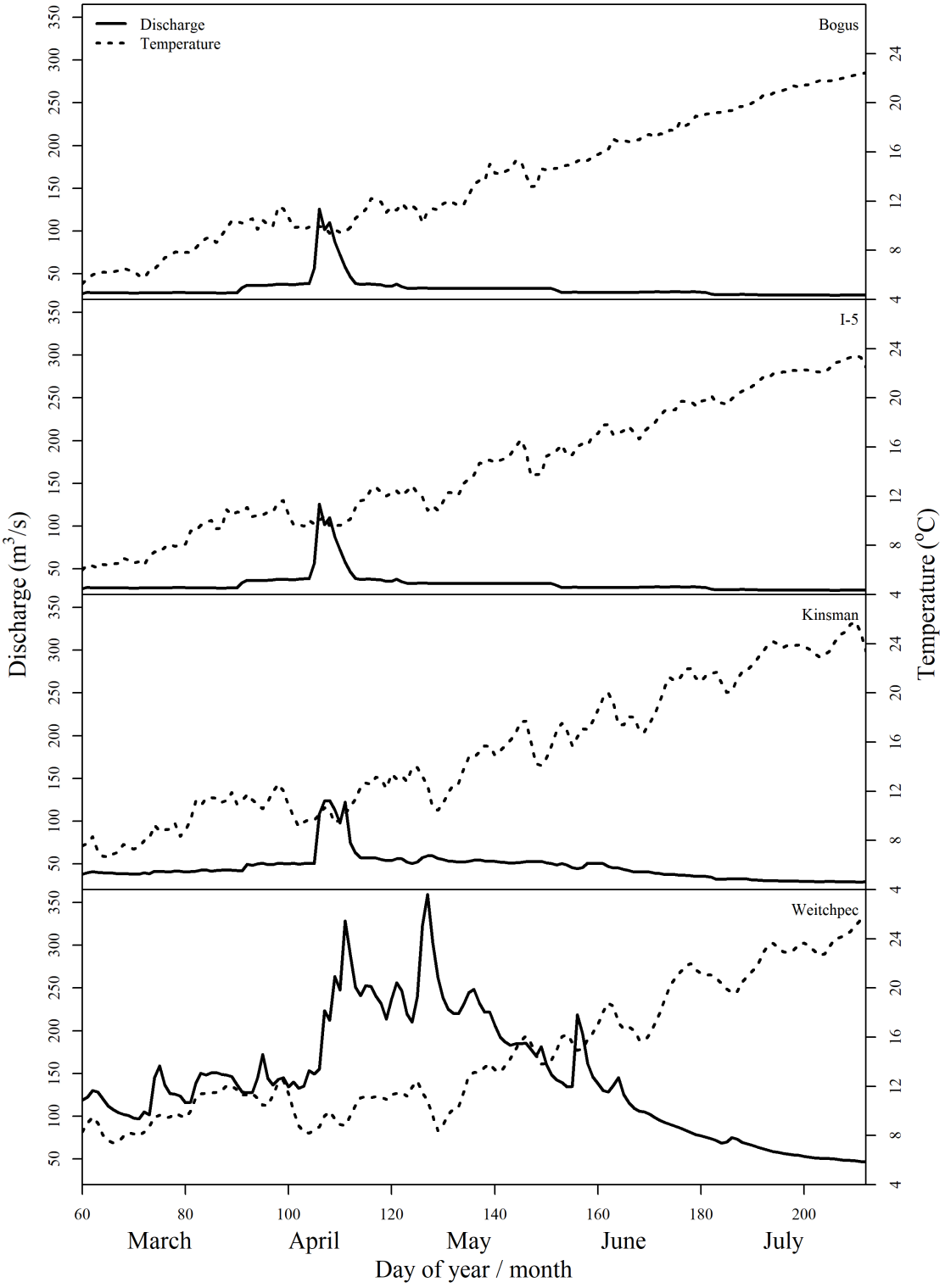

Figure 2. Klamath River mean daily discharge (m^3/s) and mean daily temperature (°C) at the four trap sites for February through the end of July 2022.

Salmonid Abundance and Biological Data

Chinook Salmon

Natural-origin age-0 Chinook Salmon were captured at each of the three trap sites in all weeks that sampling occurred (Appendix A). Peak weekly catch of age-0 Chinook Salmon occurred during calendar week 15 (early April) at the Bogus trap site, and during calendar week 18 (late April) at the I-5 site. Peak weekly catch of age-0 Chinook Salmon occurred during calendar week 14 (late March) at Kinsman trap site (Appendix A). No age-1 Chinook Salmon were captured at the Bogus site, 29 age-1 Chinook Salmon were captured at the I-5 site, eight (8) age-1 Chinook Salmon were captured at the Kinsman trap site, and 43 age-1 Chinook Salmon were captured at the Weitchpec site (Appendix A). In 2022 we were unable to assign origin to the majority of the juvenile Chinook Salmon captured because California Department of Fish and Wildlife (CDFW) released 2.8 million hatchery fish *without marks* earlier (April 12, 2022) in the season than normal. In mid-late May, CDFW released 0.9 million that were 100% marked. All catch data for Chinook Salmon provided in Appendix A are raw catch and are not adjusted for effort or trap efficiency and do not encompass the entire outmigration period.

Estimates of the population of combined natural- and hatchery-origin age-0 juvenile Chinook Salmon outmigrating past each of the trap sites during the spring 2022 season were 5,936,109 (CI=4,199,753-8,179,567) at the I-5 trap site, 967,444 (CI=743,242-1,236,325) at the Kinsman trap site, and 1,384,187 (CI=811,879-2,222,750) at the Weitchpec site (Table 1, Figure 3). The estimate at all sites appears to have encompassed the entirety of the Spring/early-Summer emigration period.

The 2022 sampling season was notable for the relatively high proportion of live juvenile Chinook Salmon exhibiting distended abdomens and pale gills (clinical signs of disease) at upriver trap sites (Table 2) and catch of dead fish (Appendix A) at all sampling sites. The proportion of the catch with either clinical signs of disease or dead fish should not be assumed to be representative of the actual population level of disease incidence or mortality. Abdomen and gill condition are useful real-time indicators of fish health and disease prevalence. However, prevalence of infection is better determined through genetic analysis and histological examination (e.g., True et al. 2016). To determine prevalence of infection more accurately for the juvenile Chinook Salmon population passing the Kinsman and Weitchpec trap sites, weekly-stratified random samples were collected, preserved, and delivered to the California–Nevada Fish Health Center (CA–NV FHC) to process using qPCR assays. The CA–NV FHC investigates infection rates of *C. shasta*, *Parvicapsula minibicornis*, and other pathogens in juvenile salmonids annually in the Klamath River below Iron Gate Dam and will publish a separate report compiling the prevalence of infection results for 2022.

Age-0 Chinook Salmon mean weekly fork lengths gradually increased throughout the sampling periods at the Bogus frame net while weekly mean fork lengths steadily increased throughout the sampling period at all trap sites (Figure 4-9, Appendix B, Appendix C, Appendix E). Length–weight relationships for all Chinook Salmon pooled across trap sites are presented in Figure 10.

Table 1. Mainstem Klamath River weekly age-0 juvenile Chinook Salmon outmigrant abundance estimates and mark-recapture information, 2022.

Trap Site	Week	Week Starting	Raw Catch	Marks Released	Marks Recovered	Sampling Fraction	Mean population estimate	0.025 bound	0.975 bound
I-5	10	2/27/2022	350	--	--	0.5714	149,576	56,130	277,867
	11	3/6/2022	788	5,899	37	0.5714	232,700	165,468	318,995
	12	3/13/2022	461	5,823	17	0.5714	270,602	174,273	398,754
	13	3/20/2022	624	--	--	0.5714	345,483	118,842	659,178
	14	3/27/2022	891	5,900	13	0.5714	569,892	366,663	863,625
	15	4/3/2022	414	--	--	0.5714	348,631	118,424	765,209
	16	4/10/2022	1,204	--	--	0.5714	574,298	233,958	1,135,766
	17	4/17/2022	2,530	5,886	34	0.5714	814,026	567,099	1,126,194
	18	4/24/2022	5,322	--	--	0.5714	1,250,815	331,424	2,832,231
	19	5/1/2022	1,025	--	--	0.5714	449,792	155,677	903,561
	20	5/8/2022	147	--	--	0.5714	129,238	43,367	331,321
	21	5/15/2022	212	--	--	0.5714	122,728	43,116	275,684
	22	5/22/2022	395	--	--	0.5714	149,379	43,115	303,170
	23	5/29/2022	164	--	--	0.4286	99,850	28,838	205,336
	24	6/5/2022	149	--	--	0.5714	64,479	23,281	130,589
	25	6/12/2022	37	3,305	5	0.5714	30,273	14,128	59,021
	26	6/19/2022	13	--	--	0.4286	14,335	2,761	43,494
Total							5,936,109	4,199,753	8,179,567
Kinsman	10	2/27/2022	162	--	--	0.5714	76,132	31,227	141,033
	11	3/6/2022	140	--	--	0.5714	85,691	34,567	154,308
	12	3/13/2022	104	5,954	9	0.5714	105,345	63,643	166,901
	13	3/20/2022	200	5,884	11	0.5714	137,303	87,165	204,304
	14	3/27/2022	344	5,915	31	0.5714	116,512	81,047	157,399
	15	4/3/2022	333	--	--	0.5714	97,177	44,966	177,000
	16	4/10/2022	178	--	--	0.5714	70,283	25,931	134,856
	17	4/17/2022	-	--	--	0.0000	51,170	18,516	94,019
	18	4/24/2022	207	5,920	59	0.5714	37,419	28,180	48,051
	19	5/1/2022	119	--	--	0.5714	26,637	13,198	44,856
	20	5/8/2022	129	3,039	54	0.5714	15,384	11,049	20,940
	21	5/15/2022	43	--	--	0.5714	19,259	10,127	31,833
	22	5/22/2022	91	5,812	41	0.5714	22,259	15,558	30,269
	23	5/29/2022	25	--	--	0.4286	20,494	9,236	36,092
	24	6/5/2022	18	4,926	3	0.5714	20,876	10,071	38,410
	25	6/12/2022	16	--	--	0.5714	15,940	5,068	34,919
	26	6/19/2022	6	--	--	0.1429	14,724	2,981	36,441
Total							967,444	743,242	1,236,325
Weitchpec	10	2/27/2022	265	--	--	0.5714	69,331	6,221	221,333
	11	3/6/2022	267	--	--	0.5714	63,276	4,608	208,478
	12	3/13/2022	18	--	--	0.2857	33,983	4,845	110,707
	13	3/20/2022	182	--	--	0.4286	39,130	2,962	119,521
	14	3/27/2022	105	2,967	30	0.5714	19,354	12,306	28,251
	15	4/3/2022	69	5,971	60	0.4286	16,178	11,235	22,007
	16	4/10/2022	65	5,938	128	0.2857	10,794	7,883	14,063
	17	4/17/2022	-	--	--	0.0000	11,288	866	36,463
	18	4/24/2022	24	5,911	22	0.5714	11,301	5,815	18,209
	19	5/1/2022	16	5,895	19	0.4286	11,611	5,672	19,634
	20	5/8/2022	20	--	--	0.4286	12,490	1,990	34,713
	21	5/15/2022	13	2,946	3	0.5714	14,304	4,972	31,193
	22	5/22/2022	10	4,641	11	0.5714	9,440	3,144	19,108
	23	5/29/2022	7	--	--	0.285714	21,970	1,649	64,051
	24	6/5/2022	210	4926	18	0.428571	130,523	79,769	199,820
	25	6/12/2022	631	3305	5	0.571429	464,998	210,230	870,428
	26	6/19/2022	995	2996	1	0.571429	199,457	24,766	582,517
	27	6/26/2022	86	--	--	0.428571	73,423	6,662	249,897
	28	7/3/2022	1	--	--	0.142857	34,284	878	188,025
Total							1,384,187	811,879	2,222,750

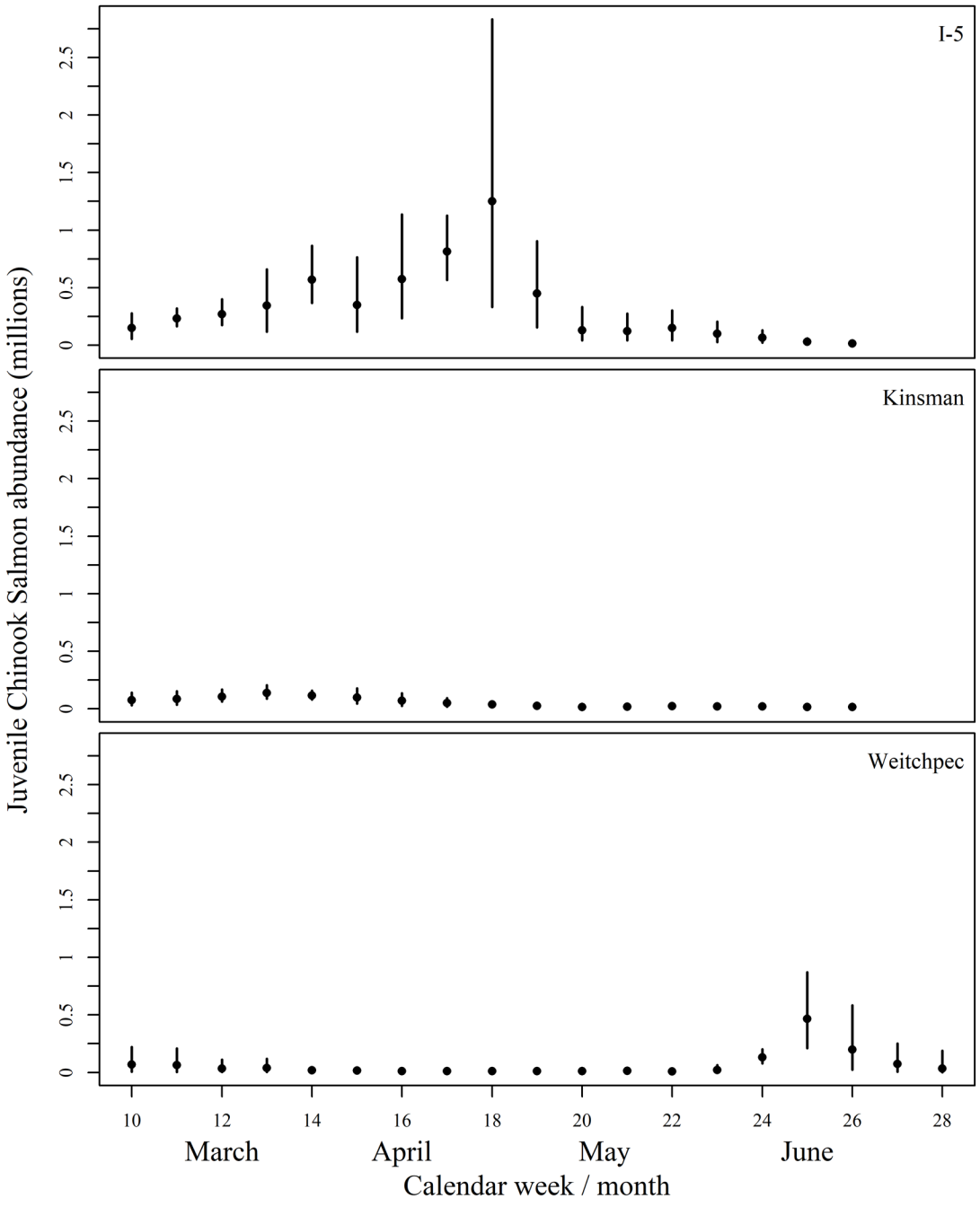

Figure 3. Weekly mean with lower (2.5% credible interval) and upper (97.5% credible interval) bound estimates for natural-origin, age-0 juvenile Chinook Salmon outmigrant abundance at three trap sites, 2022.

Table 2. Mainstem Klamath River weekly natural-origin age-0 Chinook Salmon external symptoms of disease, 2022. Salmonid gills were classified as healthy if they were red in color and free of fungus and erosion. Gills were classified as unhealthy if they were pale/white/tan in color, fungal, or eroded. A distended abdomen is an indication of potential infection with the parasite *Ceratonova shasta*. These data were also collected for juvenile Coho Salmon and steelhead but are not reported here.

			Abdomen condition			Gills				
							Color		Condition	
Trap site	Calendar week	Sampling dates	Number Examined	Distended		Number Examined	Pale or worse		Eroded or fungal	
				Number Unhealthy	Percent Unhealthy		Number Unhealthy	Percent Unhealthy	Number Unhealthy	Percent Unhealthy
Bogus	10	Mar 2-4	40	-	0.0%	0	-	--[a]	-	--[a]
	11	Mar 8-11	51	-	0.0%	0	-	--[a]	-	--[a]
	12	Mar 14-18	-	-	--[a]	0	-	--[a]	-	--[a]
	13	Mar 22-25	70	-	0.0%	1	0	--[a]	0	--[a]
	14	Mar 29 - Apr 1	87	-	0.0%	2	0	--[a]	0	--[a]
	15	Apr 5 -8	90	-	0.0%	7	0	--[a]	0	--[a]
	16	Apr 12-15	30	-	0.0%	5	0	--[a]	0	--[a]
	17	Apr 19-22	-	-	--[a]	0	-	--[a]	-	--[a]
	18	Apr 26-28	89	8	9.0%	23	1	--[a]	0	--[a]
	19	May 3-6	89	1	1.1%	30	0	0.0%	2	6.7%
	20	May 10-13	127	6	4.7%	55	1	1.8%	1	1.8%
	21	May 17-20	40	16	40.0%	36	1	2.8%	1	2.8%
	22	May 24-27	58	5	8.6%	45	0	0.0%	0	0.0%
	23	Jun 1 - 3	8	1	--[a]	5	0	--[a]	0	--[a]
	Total		779	37	4.7%	209	3	1.4%	4	1.9%
I-5	10	Mar 1-4	98	-	0.0%	0	-	--[a]	-	--[a]
	11	Mar 8-11	161	-	0.0%	0	-	--[a]	-	--[a]
	12	Mar 15-18	114	-	0.0%	2	0	--[a]	0	--[a]
	13	Mar 22-25	128	-	0.0%	2	0	--[a]	0	--[a]
	14	Mar 29 - Apr 1	158	-	0.0%	7	0	--[a]	0	--[a]
	15	Apr 5 -8	93	-	0.0%	36	0	0.0%	0	0.0%
	16	Apr 12-15	151	1	0.7%	111	1	0.9%	0	0.0%
	17	Apr 19-22	87	-	0.0%	68	0	0.0%	0	0.0%
	18	Apr 26-29	177	1	0.6%	110	0	0.0%	0	0.0%
	19	May 3-6	160	-	0.0%	110	0	0.0%	0	0.0%
	20	May 10-13	96	6	6.3%	85	7	8.2%	8	9.4%
	21	May 17-20	82	4	4.9%	67	2	3.0%	3	4.5%
	22	May 24-27	68	8	11.8%	60	4	6.7%	2	3.3%
	23	Jun 1 - 3	58	5	8.6%	54	5	9.3%	5	9.3%
	24	Jun 7-10	79	9	11.4%	74	12	16.2%	4	5.4%
	25	Jun 14-17	31	-	0.0%	30	0	0.0%	0	0.0%
	26	Jun 22-24	-	-	--[a]	0	-	--[a]	-	--[a]
	Total		1,741	34	2.0%	816	31	3.8%	22	2.7%

[a] sample size too low for a reportable calculation

Table 2 continued. Mainstem Klamath River weekly natural-origin age-0 Chinook Salmon health information, 2022. Salmonid gills were classified as healthy if they were red in color and free of fungus and erosion. Gills were classified as unhealthy if they were pale/white/tan in color, fungal, or eroded. A distended abdomen is an indication of potential infection with the parasite *Ceratonova shasta*. These data are also collected for juvenile Coho Salmon and steelhead but are not reported here.

			Abdomen condition			Gills				
							Color		Condition	
Trap site	Calendar week	Sampling dates	Number Examined	Distended		Number Examined	Pale or worse		Eroded or fungal	
				Number Unhealthy	Percent Unhealthy		Number Unhealthy	Percent Unhealthy	Number Unhealthy	Percent Unhealthy
Kinsman	10	Mar 1-4	85	0	0.0%	3	0	--[a]	0	--[a]
	11	Mar 8-11	85	0	0.0%	12	0	--[a]	0	--[a]
	12	Mar 15-18	67	0	0.0%	13	0	--[a]	0	--[a]
	13	Mar 22-25	90	0	0.0%	41	0	0.0%	0	0.0%
	14	Mar 29 - Apr 1	90	0	0.0%	66	0	0.0%	0	0.0%
	15	Apr 5 -8	90	0	0.0%	78	0	0.0%	0	0.0%
	16	Apr 12-15	90	1	1.1%	88	0	0.0%	0	0.0%
	17	Apr 19-22	-	-	--[a]	0	-	--[a]	-	--[a]
	18	Apr 26-29	85	0	0.0%	82	0	0.0%	0	0.0%
	19	May 3-6	74	3	4.1%	69	0	0.0%	0	0.0%
	20	May 10-13	59	0	0.0%	59	1	1.7%	0	0.0%
	21	May 17-20	32	5	15.6%	31	1	3.2%	0	0.0%
	22	May 24-27	33	4	12.1%	33	0	0.0%	0	0.0%
	23	Jun 1 - 3	20	2	--[a]	19	2	--[a]	1	--[a]
	24	Jun 7-10	14	3	--[a]	14	3	--[a]	0	--[a]
	25	Jun 14-17	12	0	--[a]	12	2	--[a]	1	--[a]
	26	Jun 22-24	6	0	--[a]	6	2	--[a]	2	--[a]
	Total		932	18	1.9%	626	11	1.8%	4	0.6%
Weitchpec	10	Mar 1-4	120	0	0.0%	0	-	--[a]	-	--[a]
	11	Mar 8-11	195	0	0.0%	0	-	--[a]	-	--[a]
	12	Mar 15-18	7	0	--[a]	0	-	--[a]	-	--[a]
	13	Mar 22-25	176	0	0.0%	0	-	--[a]	-	--[a]
	14	Mar 29 - Apr 1	105	0	0.0%	9	0	--[a]	0	--[a]
	15	Apr 5 -8	59	0	0.0%	26	0	--[a]	0	--[a]
	16	Apr 12-15	40	0	0.0%	32	0	0.0%	0	0.0%
	17	Apr 19-22	-	-	--[a]	0	-	--[a]	-	--[a]
	18	Apr 26-29	13	0	--[a]	2	0	--[a]	0	--[a]
	19	May 3-6	16	0	--[a]	7	0	--[a]	0	--[a]
	20	May 10-13	20	0	--[a]	20	0	--[a]	0	--[a]
	21	May 17-20	20	0	--[a]	20	0	--[a]	0	--[a]
	22	May 24-27	40	2	5.0%	40	0	0.0%	0	0.0%
	23	Jun 1 - 3	46	0	0.0%	46	0	0.0%	0	0.0%
	24	Jun 8-10	84	0	0.0%	84	0	0.0%	0	0.0%
	25	Jun 14-17	120	0	0.0%	120	0	0.0%	0	0.0%
	26	Jun 21-24	118	0	0.0%	118	0	0.0%	0	0.0%
	27	Jun 28-30	79	0	0.0%	79	0	0.0%	0	0.0%
	28	Jul 6	6	0	--[a]	6	0	--[a]	0	--[a]
	Total		1,264	2	0.2%	609	0	0.0%	0	0.0%

[a] sample size too low for a reportable calculation

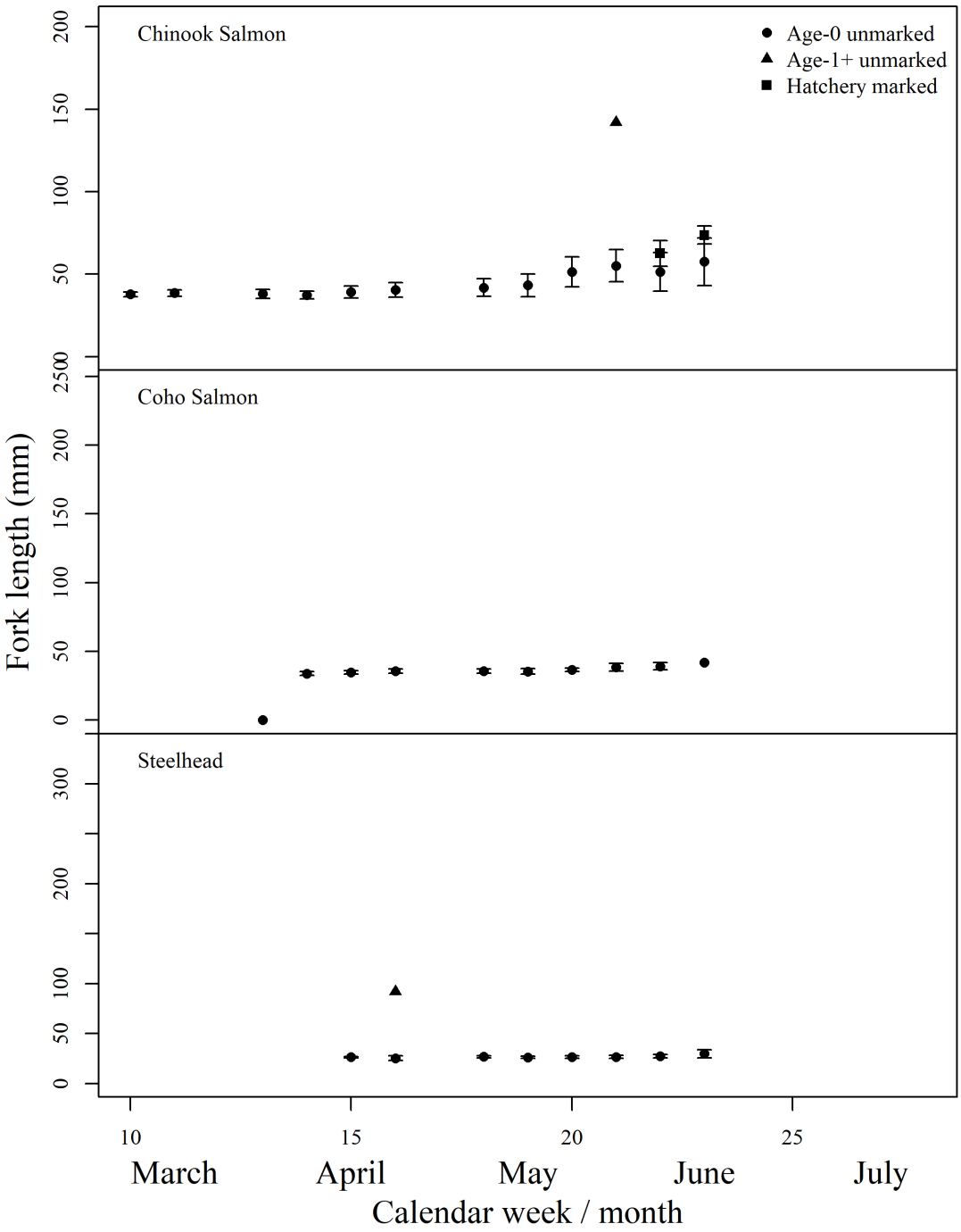

Figure 4. Weekly mean fork lengths (± one standard deviation) of unmarked age-0, unmarked age-1+, and hatchery-marked Chinook Salmon, Coho Salmon, and steelhead captured at the Klamath River Bogus frame net, 2022. Please note the difference in scale of the *y*-axes.

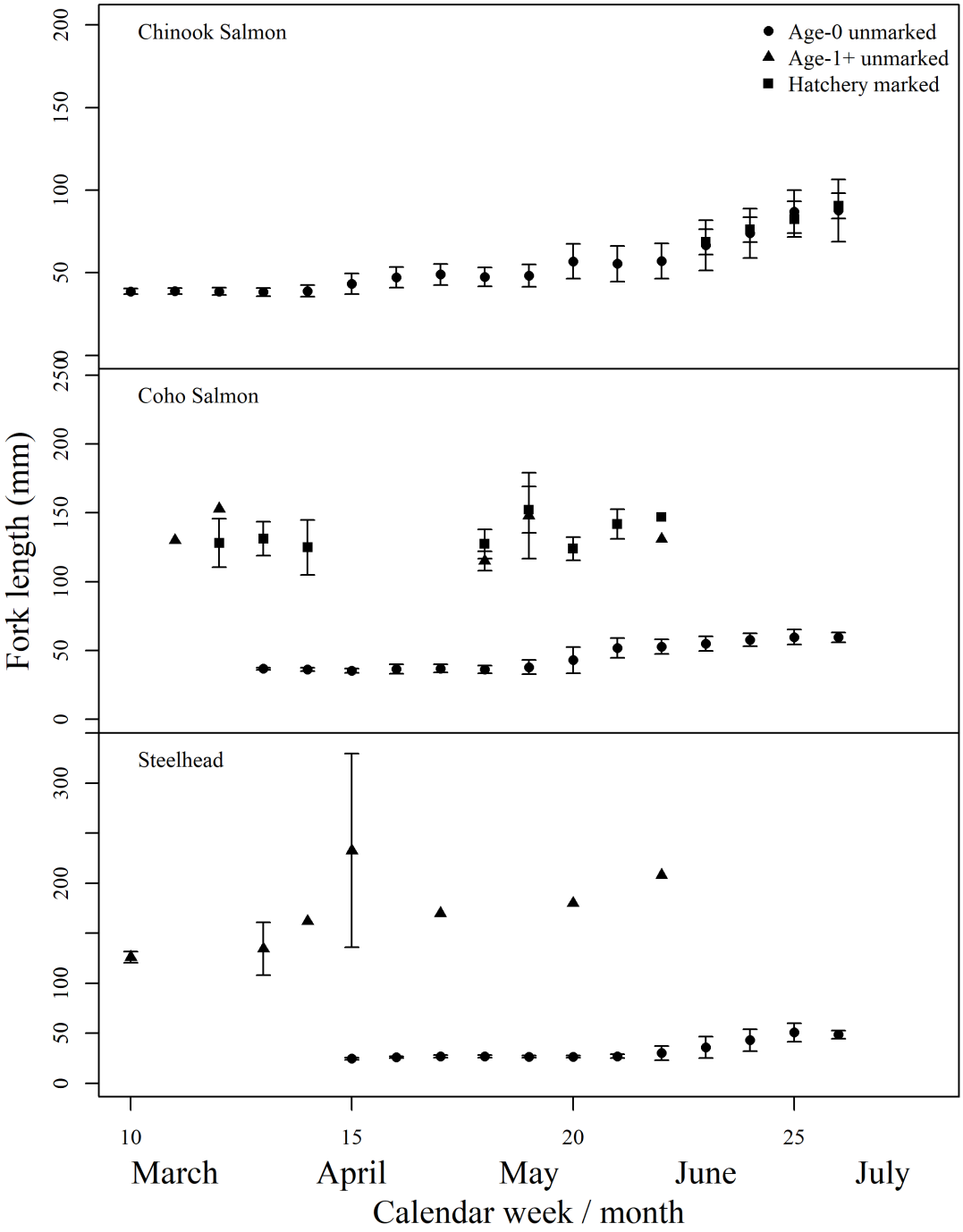

Figure 5. Weekly mean fork lengths (± one standard deviation) of unmarked age-0, unmarked age-1+, and hatchery-marked Chinook Salmon, Coho Salmon, and steelhead captured at the Klamath River I-5 RSTs, 2022. Please note the difference in scale of the *y*-axes.

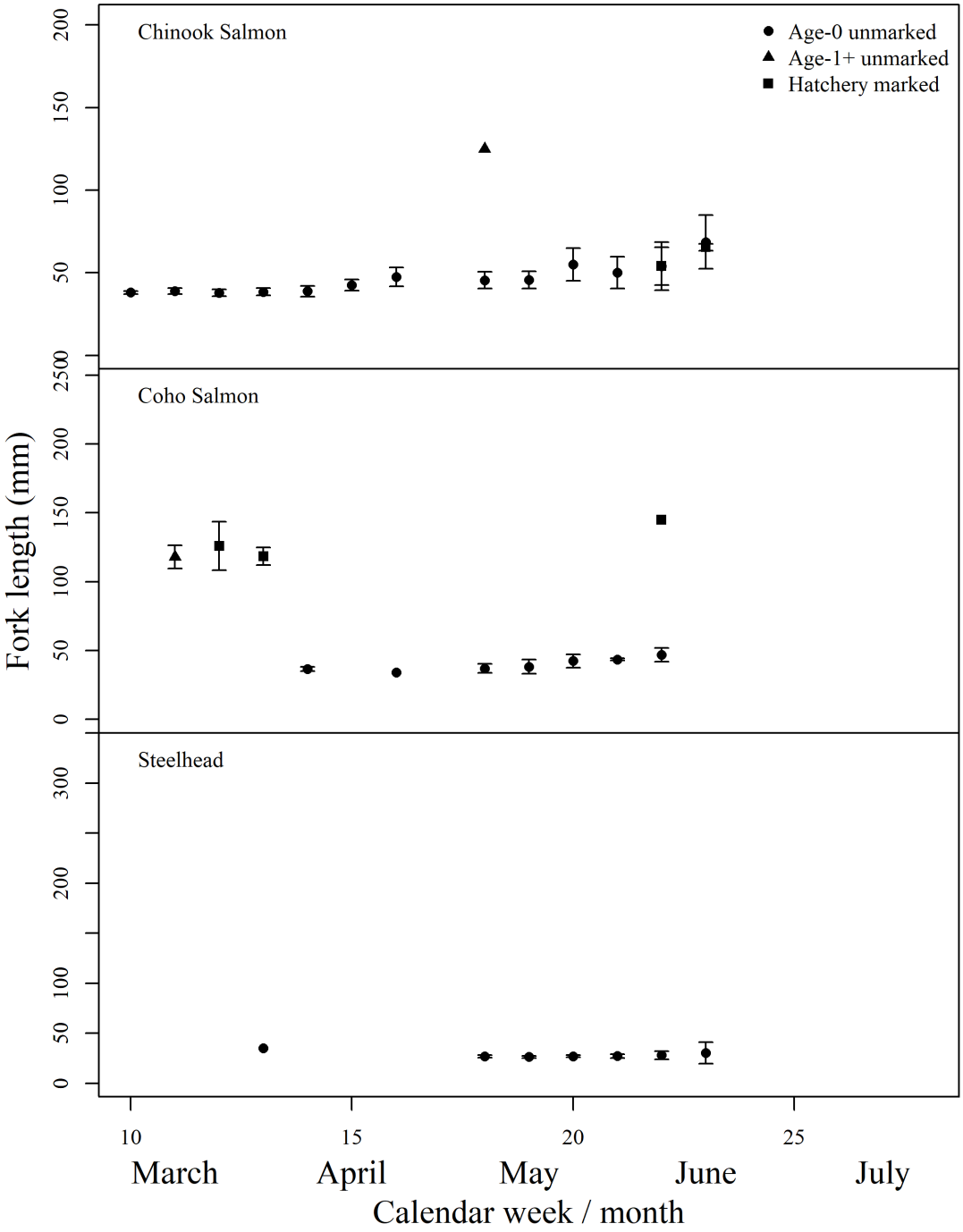

Figure 6. Weekly mean fork lengths (± one standard deviation) of unmarked age-0, unmarked age-1+, and hatchery-marked Chinook Salmon, Coho Salmon, and steelhead captured at the Klamath River I-5 frame net, 2022. Please note the difference in scale of the *y*-axes.

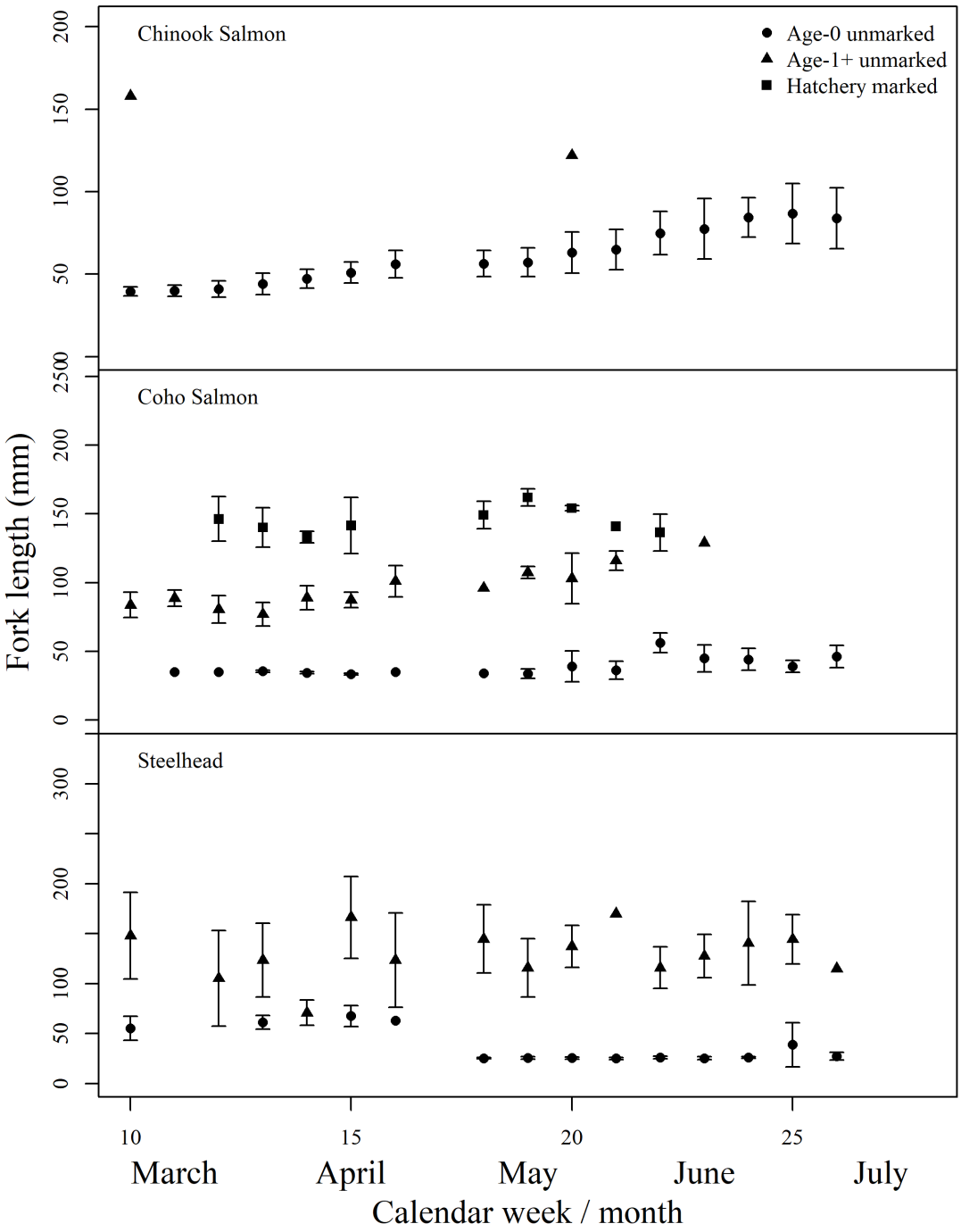

Figure 7. Weekly mean fork lengths (± one standard deviation) of unmarked age-0, unmarked age-1+, and hatchery-marked Chinook Salmon, Coho Salmon, and steelhead captured at the Klamath River Kinsman RST, 2022. Please note the difference in scale of the *y*-axes.

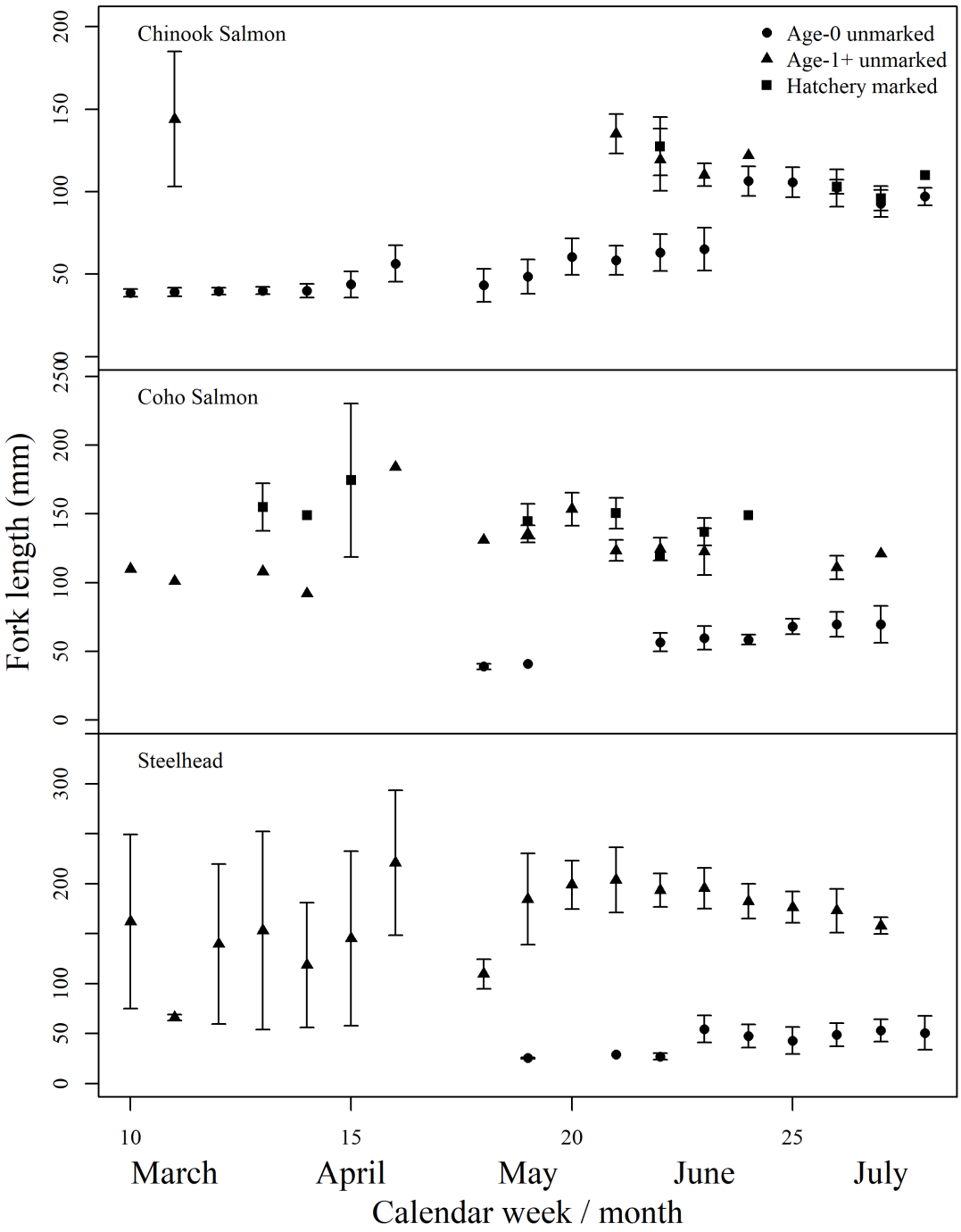

Figure 8. Weekly mean fork lengths (± one standard deviation) of unmarked age-0, unmarked age-1+, and hatchery-marked Chinook Salmon, Coho Salmon, and steelhead captured at the Klamath River Weitchpec RST, 2022. Please note the difference in scale of the *y*-axes.

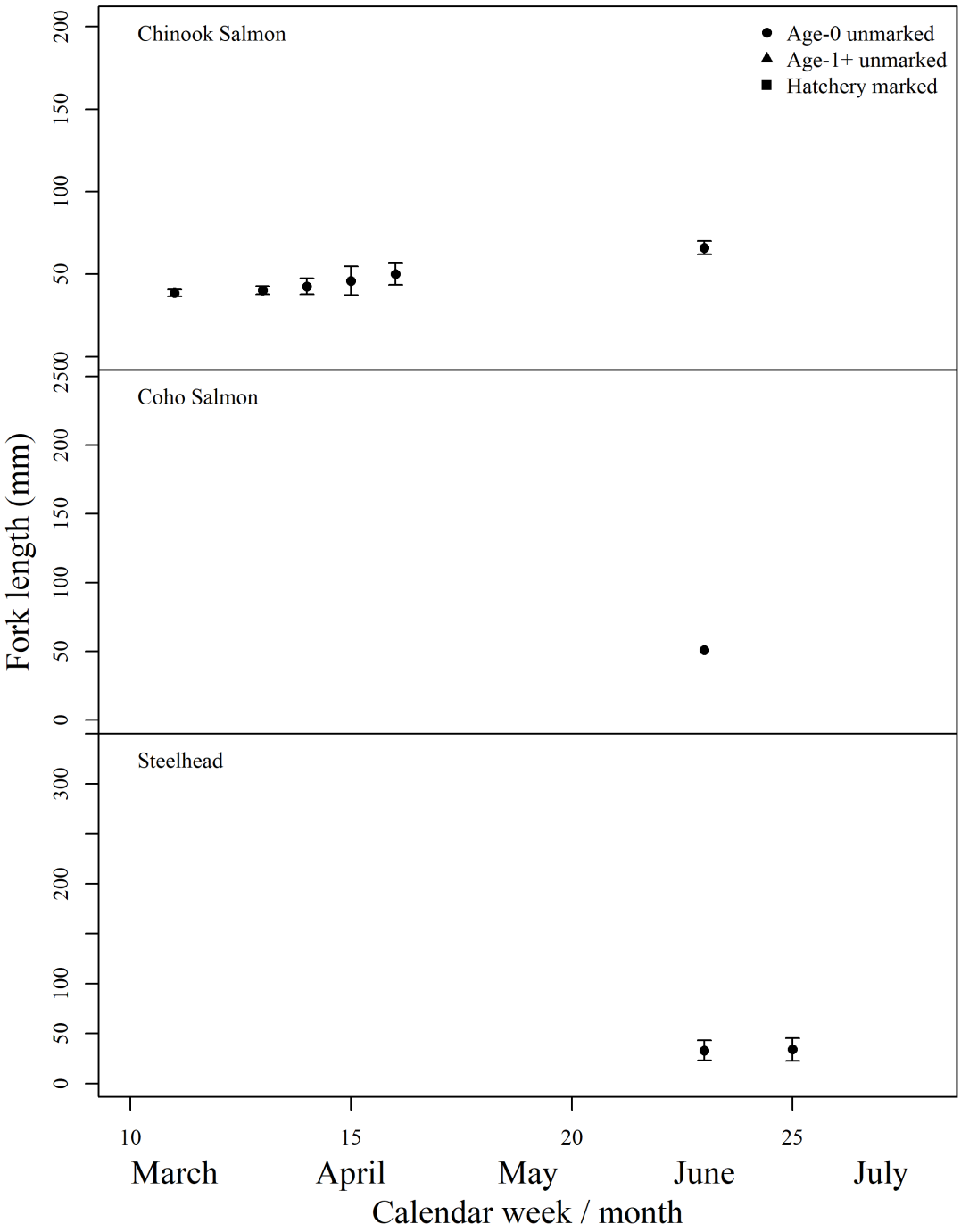

Figure 9. Weekly mean fork lengths (± one standard deviation) of unmarked age-0, unmarked age-1+, and hatchery-marked Chinook Salmon, Coho Salmon, and steelhead captured at the Klamath River Weitchpec frame nets, 2022. Please note the difference in scale of the *y*-axes. No Coho Salmon were captured.

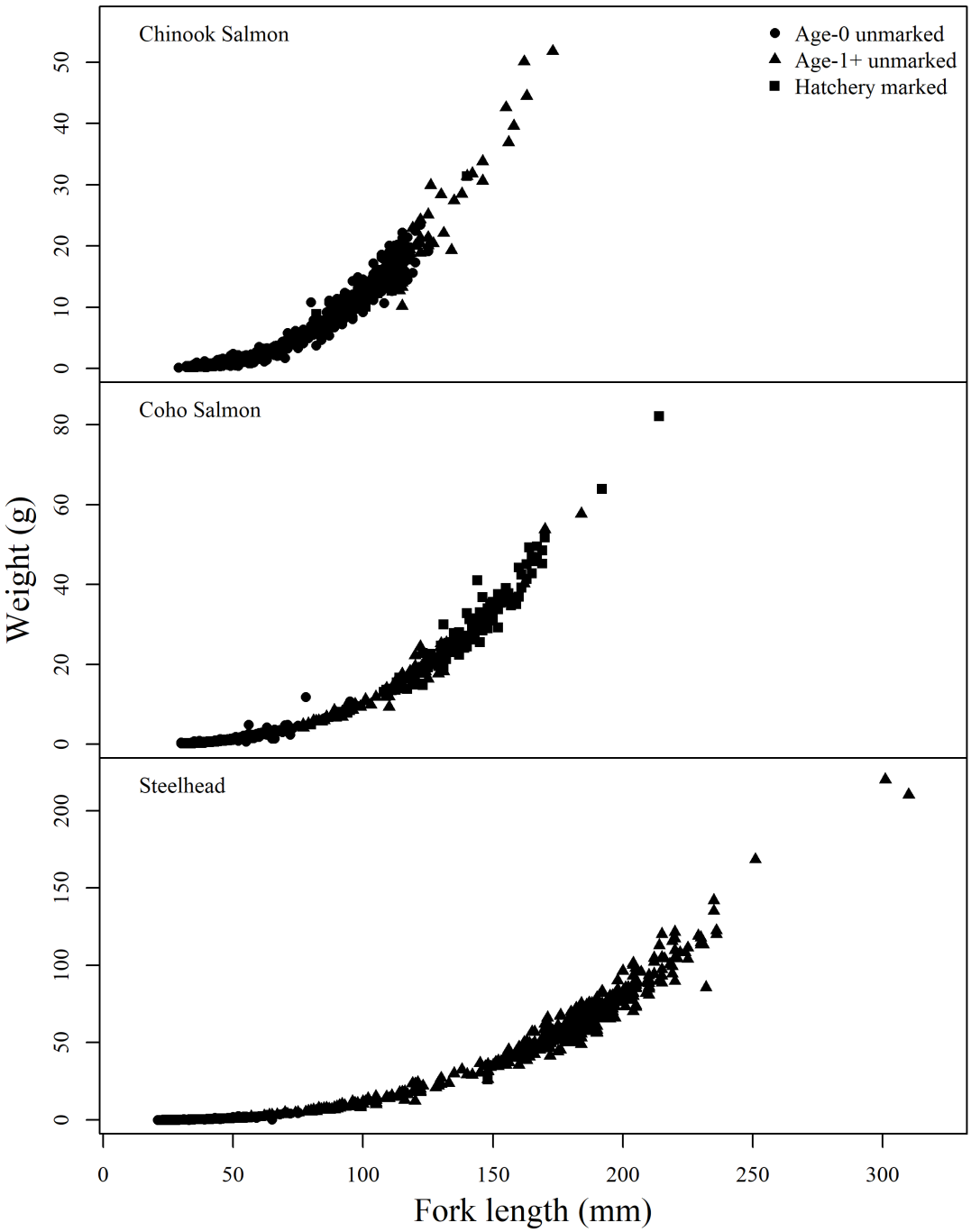

Figure 10. Weight plotted against fork length for individual juvenile Chinook Salmon, Coho Salmon, and steelhead, all trap sites combined, 2022. Please note the difference in scale of the *y*-axes.

Coho Salmon

Natural-origin age-0 Coho Salmon were first captured during calendar week 13 (late-March) at the Bogus and I-5 trap sites, were present the entire sampling season at the Kinsman site and were first caught at the Weitchpec site in calendar week 19 (late-April; Appendix A). Peak natural-origin age-0 Coho Salmon catches occurred during calendar week 18 (late April) at the Bogus trap site, and I-5 sites, calendar week 19 (early May) at the Kinsman trap site, with no clear peak observed at the Weitchpec site (Appendix A). Iron Gate Hatchery releases age-1 Coho Salmon, 100% marked with a left maxillary clip, annually between mid-March and early April. In 2022, this release occurred on March 15 (calendar week 12). No age-1 Coho Salmon were captured at the Bogus trap site (Appendix A). Sixteen (16) natural-origin and 542 hatchery-origin age-1 Coho Salmon were captured at the I-5 trap site (Appendix A). Forty-six (46) natural-origin and 74 hatchery-origin age-1 Coho Salmon were captured at the Kinsman trap site (Appendix A). Fifty-two (52) natural-origin and 32 hatchery-origin age-1 Coho Salmon were captured at the Weitchpec trap site. All catch data for Coho Salmon provided in Appendix A are raw catches that have not been adjusted for effort or trap efficiency and do not encompass the entire outmigration period. Natural-origin age-0 Coho Salmon mean weekly fork lengths were generally stable throughout sampling periods at all three trap sites (Figures 4-9, Appendix B-G). Length–weight relationships for Coho Salmon are presented in Figure 10.

Steelhead

Natural-origin age-0 steelhead were first observed during week 15 (early April) at the Bogus, I-5, and Weitchpec trap sites, (Appendix A). Natural-origin age-0 steelhead were captured throughout the sampling period at the Kinsman site with no clear peak in abundance in the catch (Appendix A). Natural-origin age-1+ steelhead were observed throughout most of the trapping season at most sites, with the lowest catch at the Bogus site and the highest catch at the Weitchpec site (Appendix A). Peak natural-origin age-1+ steelhead catch occurred during calendar week 23-24 (early-June) at the Weitchpec trap site (Appendix A), while catch at the other sites did not show a clear peak. All catch data for steelhead provided in Appendix A are raw catch and have not been adjusted for effort or trap efficiency and do not encompass the entire outmigration period. No clear patterns or trends were apparent in steelhead mean weekly fork lengths at any of the three trap sites (Figures 4-9, Appendix B-G). Length–weight relationships for steelhead are presented in Figure 10.

Other Species

Sampling efforts were designed to target juvenile salmonids, but a variety of other fishes were also captured in the traps. In total, 16 non-target species were captured and identified. The most common non-target fishes captured at Bogus trap site were non-native Crappie, (*Pomoxis* spp.) (Table 3). The most common non-target fishes captured at the I-5 and Kinsman trap sites was non-native Bullhead (*Ameiurus* spp.) (Table 3). The most common non-target fishes captured and identified at the Weitchpec site were native Speckled Dace (*Rhinichthys osculus*) (Table 3).

Table 3. Catch totals of non-target fish species in the mainstem Klamath River at the three trap sites (all traps within each site combined), 2022.

		Trap Site			
Common name	**Scientific name**	**Bogus**	**I-5**	**Kinsman**	**Weitchpec**
Ammocete (Entosphenus)	*Entosphenus* spp.	45	36	120	-
Bullhead	*Ameiurus* spp.	11	148	123	34
Crappie	*Pomoxis* spp.	99	61	0	2
Fathead minnow	*Pimphales promelas*	0	0	2	1
Golden shiner	*Notemigonus crysoleucas*	5	12	1	3
Green sturgeon	*Acipenser medirostris*	0	0	0	19
Klamath River Lamprey	*Entosphenus similis*	16	44	76	-
Marbled sculpin	*Cottus klamathensis*	15	97	3	34
Pacific Lamprey	*Entosphenus tridentatus*	4	54	38	-
Prickly sculpin	*Cottus asper*	0	1	1	-
Speckled Dace	*Rhinichthys osculus*	1	53	76	277
Sucker spp.	*Catostomus* spp.	1	40	59	118
Sunfish	*Lepomis* spp.	9	53	1	2
Tadpole/Frog		1	44	34	2
Threespine stickleback	*Gasterosteus aculeatus*	0	0	0	14
Unidentified Lamprey Spp		0	0	0	3,963
Western Brook Lamprey	*Lampetra 'richardsoni'*	1	1	1	-
Yellow perch	*Perca flavescens*	49	54	1	-
Other unidentified/misc		0	1	0	-

Acknowledgements

We are grateful to work on the lands of the Yurok, Karuk, Hoopa Valley, Shasta, and Modoc peoples and acknowledge their stewardship of these resources since time immemorial. Additionally, we thank the Karuk Tribe and Yurok Tribe for sharing their deep knowledge of the Klamath River ecosystem while contributing work to all aspects of fish monitoring in this study. We also recognize that data were collected by AFWO personnel: Samantha Adams, Aaron Bachelier, Nicholas Glaser, Aliah Guerrero, David Kissling, and Adam Wojtczak; Karuk Tribe Fisheries Program staff: Kenneth Brink, Clayton Tuttle, and Aaron Tuttle; and Yurok Tribal Fisheries Program Staff: Rocky Erickson, Jamie Holt, Leanna Knutson, Gilbert Myers Jr, Keenan O'Rourke, and Oshun O'Rourke. We thank the California Department of Fish and Wildlife for providing fish for mark recapture trials from their Iron Gate Hatchery as well as storage facilities at their Yreka Office.

We recognize that the Arcata Fish and Wildlife Office exists on the ancestral lands of the Wiyot people.

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Appendices

Appendix A. Mainstem Klamath River weekly juvenile salmonid outmigrant trap catch summary, 2022.

Trap	Calendar week	Sample dates	Q (m^3/s) [a] Min	Q (m^3/s) [a] Max	Water temp. (°C) [b] Min	Water temp. (°C) [b] Max	Trapping days	Chinook (*O. tshawytscha*) Age-0 No clip	Chinook Age-0 AD clip	Chinook Age 1+	Chinook Mortality Dead in Livebox [c]	Chinook Mortality Expired During Handling	Coho (*O. kisutch*) Age-0	Coho Age 1 + No clip	Coho Age 1 + LM clip	Coho Mortality Dead in Livebox [c]	Coho Mortality Expired During Handling	Steelhead (*O. mykiss*) Age-0	Steelhead Age 1 + No clip	Steelhead Age 1 + AD clip	Steelhead Mortality Dead in Livebox [c]	Steelhead Mortality Expired During Handling
Bogus Frame Net	10	3/2-3/4	27.7	28.6	6.5556	6.78	3	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	11	3/8-3/11	27.5	27.8	7	7.39	4	120	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
	12	3/14-3/18	27.6	27.9	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	13	3/22-3/25	27.6	27.9	9.2778	10.56	4	108	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
	14	3/29-4/1	27.6	33.7	10.056	10.50	4	483	0	0	6	2	44	0	0	0	0	0	0	0	0	0	0
	15	4/5-4/8	36.5	38.2	10.389	10.89	4	944	0	0	0	1	236	0	0	0	0	27	0	0	0	0	0
	16	4/12-4/15	37.9	56.4	10.5	10.50	1	61	0	0	1	0	49	0	0	0	0	6	1	0	1	0	0
	17	4/19-4/22	46.7	87.5	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	4/26-4/28	37.1	37.9	12.056	12.17	3	572	0	0	23	0	1712	0	0	5	0	213	0	0	1	0	0
	19	5/3-5/6	33.1	33.4	11.167	12.11	4	347	0	0	6	0	445	0	0	1	0	549	0	0	0	0	0
	20	5/10-5/13	33.1	33.1	11.056	12.06	4	102	0	0	9	0	5	0	0	0	0	270	0	0	0	0	0
	21	5/17-5/20	33.1	33.1	13.389	15.56	4	65	0	0	2	0	21	0	0	0	0	370	1	0	2	0	0
	22	5/24-5/27	33.1	33.1	13.056	15.17	4	51	25	0	8	0	39	0	0	0	0	148	0	0	9	0	0
	23	6/1-6/3	28.3	30.6	15.056	15.17	3	14	1	0	7	0	2	0	0	0	0	42	0	0	17	0	0
I-5 Upstream RST	10	3/1-3/4	26.9	28.6	5.5	6.56	4	226	0	12	1	0	0	0	0	0	0	0	0	1	0	0	0
	11	3/8-3/11	27.5	27.8	5.8889	6.67	4	452	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0
	12	3/15-3/18	27.6	27.8	6.5556	7.17	4	291	0	0	1	0	0	1	378	1	1	0	0	0	0	0	0
	13	3/22-3/25	27.6	27.9	7.3333	8.28	4	319	0	5	1	0	6	0	2	0	0	0	4	0	0	0	0
	14	3/29-4/1	27.6	33.7	8.9444	9.78	4	416	0	0	7	1	19	0	1	0	0	0	0	0	0	0	0
	15	4/5-4/8	36.5	38.2	9.2778	10.17	4	212	0	0	15	0	12	0	0	0	1	1	2	0	0	0	0
	16	4/12-4/15	37.9	56.4	8.5556	9.50	4	831	0	1	20	0	8	0	1	0	0	5	0	0	0	0	0
	17	4/19-4/22	46.7	87.5	9.3889	9.67	4	1857	0	0	58	2	113	1	2	4	0	59	1	0	0	0	0
	18	4/26-4/29	35.4	37.9	11.278	11.56	4	2336	0	0	128	0	79	3	1	2	0	280	1	0	1	0	0
	19	5/3-5/6	33.1	33.4	10.667	11.50	4	572	0	0	53	0	23	2	4	1	0	465	2	0	1	0	0
	20	5/10-5/13	33.1	33.1	10.778	11.17	4	95	0	0	6	0	5	1	2	1	0	199	1	0	0	0	0
	21	5/17-5/20	33.1	33.1	12.389	13.06	4	154	1	0	18	0	18	0	3	3	0	398	1	0	1	0	0
	22	5/24-5/27	33.1	33.1	12.778	14.17	4	345	34	0	66	1	36	1	2	5	1	280	1	0	5	0	0
	23	6/1-6/3	28.3	30.6	13.5	14.28	3	135	14	0	21	1	39	0	0	3	0	74	0	0	0	0	0
	24	6/7-6/10	28.3	28.3	14.278	15.78	4	133	15	0	48	0	45	0	0	7	0	53	0	0	3	0	0
	25	6/14-6/17	28.3	28.6	15.278	16.00	4	43	10	0	18	0	20	0	0	2	0	8	0	0	1	0	0
	26	6/22-6/24	28.6	28.9	16.211	16.56	3	33	18	0	34	0	14	0	0	4	0	11	0	0	4	0	0
I-5 Downstream RST	10	3/1-3/4	27.5	28.6	5.5	6.56	3	104	0	8	1	0	0	0	0	0	0	0	3	0	0	0	0
	11	3/8-3/11	26.9	27.8	5.8889	6.67	4	207	0	1	2	0	0	1	0	0	0	0	0	0	0	0	0
	12	3/15-3/18	27.6	27.8	6.5556	7.17	3	134	0	0	2	1	0	0	123	0	0	0	0	0	0	0	0
	13	3/22-3/25	27.6	27.9	7.3333	8.28	4	220	0	0	3	0	2	0	9	0	0	0	3	0	0	0	0
	14	3/29-4/1	27.6	33.7	8.9444	9.78	4	290	0	0	6	1	15	0	2	0	0	0	1	0	0	0	0
	15	4/5-4/8	36.5	38.2	9.2778	10.17	4	206	0	0	5	0	7	0	0	0	0	2	1	0	0	0	0
	16	4/12-4/15	37.9	56.4	8.5556	9.39	4	380	0	0	2	0	7	0	1	0	0	2	0	0	0	0	0
	17	4/19-4/22	46.7	87.5	9.3889	9.67	4	752	0	0	19	0	42	0	0	2	0	25	0	0	1	0	0
	18	4/26-4/29	35.4	37.9	11.278	11.56	4	850	0	1	13	1	49	2	0	1	0	131	0	0	1	0	0
	19	5/3-5/6	33.1	33.4	10.667	11.50	4	273	0	0	8	0	11	1	0	1	0	236	0	0	0	0	0
	20	5/10-5/13	33.1	33.1	10.778	11.17	4	43	0	0	3	0	1	0	0	0	0	127	0	0	2	0	0
	21	5/17-5/20	33.1	33.1	12.389	13.06	4	78	0	0	14	0	6	1	0	1	0	187	1	0	1	0	0
	22	5/24-5/27	33.1	33.1	12.778	14.17	4	160	5	0	33	0	21	0	1	3	0	153	0	0	6	0	0
	23	6/1-6/3	28.3	30.6	13.5	14.28	2	53	1	0	12	0	13	0	0	0	0	32	0	0	0	0	0
	24	6/7-6/10	28.3	28.3	14.278	15.78	4	66	3	0	15	0	12	0	0	1	0	30	0	0	4	0	0
	25	6/14-6/17	28.3	28.6	15.278	16.00	3	23	12	0	6	0	8	0	0	1	0	12	0	0	0	0	0
	26	6/22-6/24	28.6	28.9	16.5	16.56	3	7	8	0	6	0	3	0	0	2	0	11	0	0	1	0	0

[a] Mean discharge from day of sampling (discharge below IGD used for Bogus and I-5 sites; flow at Kinsman Site is Klamath River flow at Seiad minus Scott River flow; discharge at Weitchpec Site is discharge near Orleans)

[b] Temperature recorded at time of trap check

[c] Fish dead in livebox is not representative of mortality in the population as trap efficiency for capture of dead fish has been shown to not be equal to that for live fish

Appendix A continued. Mainstem Klamath River weekly juvenile salmonid outmigrant trap catch summary, 2022.

Trap	Calendar week	Sample dates	Q (m^3/s) [a] Min	Q (m^3/s) [a] Max	Water temp. (°C) [b] Min	Water temp. (°C) [b] Max	Trapping days	Chinook (*O. tshawytscha*) Age-0 No clip	Chinook Age-0 AD clip	Chinook Age 1+	Chinook Mortality Dead in Livebox [c]	Chinook Mortality Expired During Handling	Coho (*O. kisutch*) Age-0	Coho Age 1 + No clip	Coho Age 1 + LM clip	Coho Mortality Dead in Livebox [c]	Coho Mortality Expired During Handling	Steelhead (*O. mykiss*) Age-0	Steelhead Age 1 + No clip	Steelhead Age 1 + AD clip	Steelhead Mortality Dead in Livebox [c]	Steelhead Mortality Expired During Handling
I-5 Frame Net	10	3/2-3/4	27.7	28.6	5.6667	6.56	3	23	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	11	3/8-3/11	27.5	27.8	5.8889	6.67	4	103	0	0	0	0	0	2	0	0	0	0	0	0	0	0
	12	3/15-3/18	27.6	27.8	6.5556	7.17	4	32	0	0	2	0	0	0	7	0	0	0	0	0	0	0
	13	3/22-3/25	27.6	27.9	7.3333	8.28	4	50	0	0	2	0	1	0	2	0	0	1	0	0	0	0
	14	3/29-4/1	27.6	33.7	8.9444	9.78	4	78	0	0	4	0	11	0	0	0	0	0	0	0	0	0
	15	4/5-4/8	36.5	38.2	9.2778	10.17	2	17	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	16	4/12-4/15	37.9	56.4	9.3889	9.39	1	16	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	17	4/19-4/22	46.7	87.5	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	4/26-4/29	35.4	37.9	11.278	11.56	4	1133	0	0	30	0	378	0	0	2	0	228	0	0	3	0
	19	5/3-5/6	33.1	33.4	10.667	11.50	4	248	0	0	6	1	81	0	0	0	0	260	0	0	2	0
	20	5/10-5/13	33.1	33.1	10.778	11.17	4	22	0	0	4	0	3	0	0	1	0	130	0	0	0	0
	21	5/17-5/20	33.1	33.1	12.389	13.06	4	15	0	0	2	0	3	0	0	0	0	200	0	0	1	0
	22	5/24-5/27	33.1	33.1	12.778	14.17	3	28	3	0	7	0	9	0	1	1	0	121	0	0	0	0
	23	6/1-6/3	28.3	30.6	13.5	14.28	3	19	0	0	13	0	1	0	0	0	0	11	0	0	0	0
Kinsman RST	10	3/1-3/4	38.3	40.9	7.2222	8.44	4	162	0	1	1	0	3	8	0	0	0	5	3	0	1	0
	11	3/8-3/11	38.1	38.8	6.2778	8.06	4	144	0	0	4	0	2	5	0	0	0	1	0	0	1	0
	12	3/15-3/18	40.8	41.4	7.0556	8.78	4	109	0	0	0	0	1	5	6	0	0	0	5	0	0	0
	13	3/22-3/25	41.1	43.4	8.3889	11.56	4	191	0	0	2	0	5	2	45	0	0	4	7	0	1	0
	14	3/29-4/1	42.0	43.3	9.5	10.78	4	349	0	0	5	0	37	4	2	0	0	0	11	0	0	0
	15	4/5-4/8	49.2	50.8	9.5556	13.06	4	325	0	0	23	0	4	7	2	3	0	2	3	0	1	0
	16	4/12-4/15	49.7	51.2	8.5556	9.89	4	179	0	2	1	0	2	2	1	0	0	2	2	0	1	0
	17	4/19-4/22	75.3	113.5	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	4/26-4/29	54.2	57.1	11.167	14.67	4	148	0	2	0	0	4	1	5	0	0	4	8	0	2	0
	19	5/3-5/6	50.5	57.5	13.833	15.61	4	123	0	1	5	0	46	6	4	0	0	27	14	0	2	0
	20	5/10-5/13	52.1	55.4	10.056	12.89	4	77	0	1	2	0	14	3	5	1	0	20	7	0	0	0
	21	5/17-5/20	53.1	54.7	14.278	16.06	4	51	0	2	9	0	44	2	1	2	0	9	2	0	1	0
	22	5/24-5/27	51.5	53.2	16.5	16.56	4	65	0	0	15	0	20	1	2	2	0	11	7	0	3	0
	23	6/1-6/3	44.6	48.6	16.333	17.67	2	31	0	0	6	0	36	0	1	0	0	35	6	0	1	0
	24	6/7-6/10	44.1	47.0	17.111	18.28	4	21	0	0	6	0	22	0	0	0	0	8	4	0	0	0
	25	6/14-6/17	40.8	43.5	15.611	16.72	4	18	0	0	2	0	7	0	0	0	0	16	7	0	3	0
	26	6/22-6/24	37.7	38.3	18.556	21.06	3	7	0	0	1	0	23	0	0	1	0	8	3	0	4	0

[a] Mean discharge from day of sampling (discharge below IGD used for Bogus and I-5 sites; flow at Kinsman Site is Klamath River flow at Seiad minus Scott River flow; discharge at Weitchpec Site is discharge near Orleans)

[b] Temperature recorded at time of trap check

[c] Fish dead in livebox is not representative of mortality in the population as trap efficiency for capture of dead fish has been shown to not be equal to that for live fish

Appendix A continued. Mainstem Klamath River weekly juvenile salmonid outmigrant trap catch summary, 2022.

Trap	Calendar week	Sample dates	Q (m^3/s) [a] Min	Q (m^3/s) [a] Max	Water temp. (°C) [b] Min	Water temp. (°C) [b] Max	Trapping days	Chinook (*O. tshawytscha*) Age-0 No clip	Chinook Age-0 AD clip	Chinook Age 1+	Chinook Mortality Dead in Livebox [c]	Chinook Mortality Expired During Handling	Coho Age-0	Coho Age 1 + No clip	Coho Age 1 + LM clip	Coho Mortality Dead in Livebox [c]	Coho Mortality Expired During Handling	Steelhead Age-0	Steelhead Age 1 + No clip	Steelhead Age 1 + AD clip	Steelhead Mortality Dead in Livebox [c]	Steelhead Mortality Expired During Handling
Weitchpec	10	3/1-3/4	118.9	130.3	-	-	4	265	0	2	41	0	0	1	0	0	0	0	5	0	0	0
RST	11	3/8-3/11	98.0	104.5	7.9	8.10	4	203	0	2	3	0	0	1	0	0	0	0	2	0	1	0
	12	3/15-3/18	126.6	158.9	9	9.11	1	18	0	0	0	0	0	0	0	0	0	0	6	0	0	0
	13	3/22-3/24	116.4	150.4	9.3889	10.28	3	138	0	0	63	0	0	1	16	0	0	0	15	0	1	0
	14	3/29-4/1	128.6	148.1	10.1	11.10	4	84	0	0	39	0	0	1	0	0	0	0	20	0	0	0
	15	4/5-4/8	136.8	172.4	9	10.90	4	82	0	0	41	0	0	0	2	0	0	2	39	0	4	0
	16	4/12-4/15	132.8	153.5	9.7	9.80	2	67	0	0	42	0	0	1	0	0	0	0	11	0	0	0
	17	4/19-4/22	247.5	328.5	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	4/26-4/29	212.1	251.2	10	11.00	4	27	0	0	1	0	4	1	0	0	0	0	3	0	0	0
	19	5/3-5/6	208.4	322.8	9.9	10.30	3	17	0	0	1	0	1	2	3	0	0	2	12	0	0	0
	20	5/10-5/13	218.3	237.6	9.5	9.80	3	24	0	0	4	0	0	2	0	0	0	0	5	0	0	0
	21	5/17-5/20	204.7	231.1	11.5	12.50	4	48	0	7	35	0	0	8	6	1	0	8	11	0	1	0
	22	5/24-5/27	177.8	184.6	13.5	14.50	4	151	0	31	33	0	3	13	1	0	0	5	37	0	0	0
	23	6/1-6/3	136.2	143.8	14.5	15.00	3	91	5	0	20	0	4	15	2	0	0	4	106	0	2	0
	24	6/8-6/10	132.2	147.0	15	16.50	3	418	0	1	185	0	2	0	1	0	0	3	104	0	1	0
	25	6/14-6/17	108.7	127.7	15	16.30	4	960	0	0	335	29	7	0	0	2	0	7	87	0	1	0
	26	6/21-6/24	90.6	97.7	17	19.50	4	1005	6	0	21	0	2	5	1	0	0	12	51	9	3	0
	27	6/28-6/30	77.6	80.7	20.333	20.50	3	90	7	0	11	0	9	1	0	0	0	10	5	0	0	0
	28	7/6-7/6	75.6	75.6	19.111	19.11	1	6	1	0	6	0	0	0	0	0	0	3	0	0	1	0
Weitchpec	11	3/8-3/11	98.0	104.5	7.9	8.10	4	94	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upstream	12	3/15-3/18	126.6	158.9	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Frame Net	13	3/22-3/24	116.4	150.4	9.3889	10.28	3	107	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	14	3/30-4/1	128.6	146.4	10.111	10.28	3	50	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	15	4/7-4/8	136.8	143.0	10.3	10.90	2	30	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	16	4/12-4/15	132.8	153.5	9.7	9.80	2	41	0	0	2	0	0	0	0	0	0	0	0	0	0	0
	17	4/19-4/22	247.5	328.5	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	4/26-4/29	212.1	251.2	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	19	5/3-5/6	208.4	322.8	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20	5/10-5/13	218.3	237.6	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	21	5/17-5/20	204.7	231.1	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	22	5/24-5/27	177.8	184.6	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	23	6/2-6/3	136.2	141.0	15	15.00	2	3	0	0	1	0	1	0	0	0	0	5	0	0	0	0
	24	6/7-6/10	132.2	162.0	15	16.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	25	6/16-6/16	112.1	112.1	16.3	16.30	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0

[a] Mean discharge from day of sampling (discharge below IGD used for Bogus and I-5 sites; flow at Kinsman Site is Klamath River flow at Seiad minus Scott River flow; discharge at Weitchpec Site is discharge near Orleans)

[b] Temperature recorded at time of trap check

[c] Fish dead in livebox is not representative of mortality in the population as trap efficiency for capture of dead fish has been shown to not be equal to that for live fish

Appendix B. Klamath River at Bogus site (frame net) weekly unmarked and hatchery-marked Chinook and Coho salmon fork lengths (mm), 2022.

		Unmarked Chinook Salmon										Unmarked Coho Salmon										Marked Coho Salmon				
Calendar	Sample	Age-0					Age-1+					Age-0					Age-1+					Age-1+				
week	dates	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd
10	Mar 01-03	40	37.8	35	40	1.5	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--
11	Mar 08-10	51	38.6	35	42	2.0	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--
13	Mar 22-24	70	38.0	32	50	2.7	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--
14	Mar 29-31	89	37.3	32	46	2.4	0	--	--	--	--	44	33.8	30	37	1.3	0	--	--	--	--	0	--	--	--	--
15	Apr 05-07	90	39.1	33	53	3.6	0	--	--	--	--	90	34.8	32	38	1.3	0	--	--	--	--	0	--	--	--	--
16	Apr 12-14	30	40.4	34	50	4.5	0	--	--	--	--	30	35.5	32	38	1.6	0	--	--	--	--	0	--	--	--	--
18	Apr 26-28	89	41.8	35	56	5.3	0	--	--	--	--	90	35.6	32	41	1.6	0	--	--	--	--	0	--	--	--	--
19	May 03-05	90	43.2	35	63	6.9	0	--	--	--	--	90	35.4	32	46	2.0	0	--	--	--	--	0	--	--	--	--
20	May 10-12	82	51.4	35	72	9.1	0	--	--	--	--	5	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--
21	May 17-19	40	55.1	35	78	9.7	1	--[a]	--[a]	--[a]	--[a]	18	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--
22	May 24-26	43	51.4	36	85	11.8	0	--	--	--	--	27	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--
23	May 31-Jun 02	10	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	1	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--

[a] sample size too low for a reportable calculation

Appendix C. Klamath River at I-5 site (RST) weekly unmarked and hatchery-marked Chinook and Coho salmon fork lengths (mm), 2022.

		Unmarked Chinook Salmon										Unmarked Coho Salmon										Marked Coho Salmon				
Calendar	Sample	Age-0					Age-1+					Age-0					Age-1+					Age-1+				
week	dates	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd
10	Mar 01-03	91	38.71	33	42	1.73	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--
11	Mar 08-10	89	38.87	34	43	1.85	0	--	--	--	--	0	--	--	--	--	1	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--
12	Mar 15-17	90	38.71	35	48	2.25	0	--	--	--	--	0	--	--	--	--	1	--[a]	--[a]	--[a]	--[a]	60	128	80	167	18
13	Mar 22-24	89	38.35	29	49	2.49	0	--	--	--	--	5	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	9	--[a]	--[a]	--[a]	--[a]
14	Mar 29-31	90	38.94	32	54	3.47	0	--	--	--	--	27	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	3	--[a]	--[a]	--[a]	--[a]
15	Apr 05-07	90	43.29	30	56	6.2	0	--	--	--	--	14	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--
16	Apr 12-14	141	47.22	34	66	6.21	0	--	--	--	--	9	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--
17	Apr 19-21	90	48.94	35	71	6.3	0	--	--	--	--	87	37.0	33	51	3.0	0	--	--	--	--	0	--	--	--	--
18	Apr 26-28	90	47.57	36	66	5.74	0	--	--	--	--	86	36.2	32	47	2.8	2	--[a]	--[a]	--[a]	--[a]	2	--[a]	--[a]	--[a]	--[a]
19	May 03-05	90	48.23	36	79	6.73	0	--	--	--	--	30	37.9	32	53	5.1	2	--[a]	--[a]	--[a]	--[a]	3	--[a]	--[a]	--[a]	--[a]
20	May 10-12	86	56.95	35	85	10.58	0	--	--	--	--	4	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	2	--[a]	--[a]	--[a]	--[a]
21	May 17-19	89	55.44	39	83	10.76	0	--	--	--	--	14	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	4	--[a]	--[a]	--[a]	--[a]
22	May 24-26	90	57.14	38	95	10.66	0	--	--	--	--	42	52.9	41	65	5.4	1	--[a]	--[a]	--[a]	--[a]	1	--[a]	--[a]	--[a]	--[a]
23	May 31-Jun 02	57	66.63	39	101	15.27	0	--	--	--	--	34	54.9	46	68	5.3	0	--	--	--	--	0	--	--	--	--
24	Jun 8-9	89	73.96	37	99	14.95	0	--	--	--	--	47	57.8	46	72	4.7	0	--	--	--	--	0	--	--	--	--
25	Jun 14-16	24	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	15	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--
26	Jun 21-23	19	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	6	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--

[a] sample size too low for a reportable calculation

Appendix D. Klamath River at I-5 site (frame net) weekly unmarked and hatchery-marked Chinook and Coho salmon fork lengths (mm), 2022.

		Unmarked Chinook Salmon										Unmarked Coho Salmon										Marked Coho Salmon				
Calendar	Sample	Age-0					Age-1+					Age-0					Age-1+					Age-1+				
week	dates	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd
10	Mar 01-03	7	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--
11	Mar 08-10	71	38.9	35	44	1.8	0	--	--	--	--	0	--	--	--	--	2	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--
12	Mar 15-17	29	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	4	--[a]	--[a]	--[a]	--[a]
13	Mar 22-24	41	38.39	35	46	2.21	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	2	--[a]	--[a]	--[a]	--[a]
14	Mar 29-31	75	38.9	32	50	3.2	0	--	--	--	--	11	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--
15	Apr 05-07	7	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--
16	Apr 12-14	14	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	1	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--
18	Apr 26-28	88	45.49	32	61	5.13	1	--[a]	--[a]	--[a]	--[a]	90	37.0	30	51	3.4	0	--	--	--	--	0	--	--	--	--
19	May 03-05	88	45.7	36	60	5.1	0	--	--	--	--	69	38.3	30	53	5.2	0	--	--	--	--	0	--	--	--	--
20	May 10-12	18	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	3	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--
21	May 17-19	12	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	2	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--
22	May 24-26	7	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	5	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	1	--[a]	--[a]	--[a]	--[a]
23	May 31-Jun 02	12	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--

[a] sample size too low for a reportable calculation

Appendix E. Klamath River at Kinsman site (RST) weekly unmarked and hatchery-marked Chinook and Coho salmon fork lengths (mm), 2022.

		Unmarked Chinook Salmon										Unmarked Coho Salmon										Marked Coho Salmon				
Calendar	Sample	Age-0					Age-1+					Age-0					Age-1+					Age-1+				
week	dates	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd
10	Mar 01-03	85	39.49	34	51	2.71	1	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	8	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--
11	Mar 08-10	85	39.94	35	50	3.44	0	--	--	--	--	2	--[a]	--[a]	--[a]	--[a]	4	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--
12	Mar 15-17	67	41.03	34	59	4.97	0	--	--	--	--	1	--[a]	--[a]	--[a]	--[a]	5	--[a]	--[a]	--[a]	--[a]	3	--[a]	--[a]	--[a]	--[a]
13	Mar 22-24	90	44.01	34	64	6.5	0	--	--	--	--	2	--[a]	--[a]	--[a]	--[a]	2	--[a]	--[a]	--[a]	--[a]	44	140.1	122	219	14.5
14	Mar 29-31	90	47.24	34	61	5.67	0	--	--	--	--	29	--[a]	--[a]	--[a]	--[a]	4	--[a]	--[a]	--[a]	--[a]	2	--[a]	--[a]	--[a]	--[a]
15	Apr 05-07	90	50.97	35	67	6.31	0	--	--	--	--	3	--[a]	--[a]	--[a]	--[a]	5	--[a]	--[a]	--[a]	--[a]	2	--[a]	--[a]	--[a]	--[a]
16	Apr 12-14	90	56.11	44	82	8.31	0	--	--	--	--	1	--[a]	--[a]	--[a]	--[a]	2	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--
18	Apr 26-28	85	56.34	36	77	7.92	0	--	--	--	--	4	--[a]	--[a]	--[a]	--[a]	1	--[a]	--[a]	--[a]	--[a]	5	--[a]	--[a]	--[a]	--[a]
19	May 03-05	74	57.18	38	79	8.7	0	--	--	--	--	16	--[a]	--[a]	--[a]	--[a]	4	--[a]	--[a]	--[a]	--[a]	4	--[a]	--[a]	--[a]	--[a]
20	May 10-12	60	63.15	35	99	12.43	1	--[a]	--[a]	--[a]	--[a]	11	--[a]	--[a]	--[a]	--[a]	2	--[a]	--[a]	--[a]	--[a]	5	--[a]	--[a]	--[a]	--[a]
21	May 17-19	38	64.84	41	98	12.18	0	--	--	--	--	21	--[a]	--[a]	--[a]	--[a]	2	--[a]	--[a]	--[a]	--[a]	1	--[a]	--[a]	--[a]	--[a]
22	May 24-26	41	74.9	53	101	13.11	0	--	--	--	--	11	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	2	--[a]	--[a]	--[a]	--[a]
23	May 31-Jun 02	26	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	25	--[a]	--[a]	--[a]	--[a]	1	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--
24	Jun 07-09	15	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	17	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--
25	Jun 14-16	12	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	3	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--
26	Jun 21-23	6	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	11	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--

[a] sample size too low for a reportable calculation

Appendix F. Klamath River at Weitchpec site (RST) weekly unmarked and hatchery-marked Chinook and Coho salmon fork lengths (mm), 2022.

		Unmarked Chinook Salmon										Unmarked Coho Salmon										Marked Coho Salmon				
Calendar	Sample	Age-0					Age-1+					Age-0					Age-1+					Age-1+				
week	dates	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd
10	Mar 01-04	120	38.6	32	45	2.3	0	--	--	--	--	0	--	--	--	--	1	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--
11	Mar 08-11	118	39.2	31	49	2.5	2	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	1	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--
12	Mar 15-18	18	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--
13	Mar 26-25	86	40.0	36	47	2.1	0	--	--	--	--	0	--	--	--	--	1	--[a]	--[a]	--[a]	--[a]	14	--[a]	--[a]	--[a]	--[a]
14	Mar 29-Apr 01	55	39.9	33	61	4.1	0	--	--	--	--	0	--	--	--	--	1	--[a]	--[a]	--[a]	--[a]	1	--[a]	--[a]	--[a]	--[a]
15	Apr 05-08	46	43.7	35	62	7.8	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	2	--[a]	--[a]	--[a]	--[a]
16	Apr 12-15	43	56.4	36	82	11.0	0	--	--	--	--	0	--	--	--	--	1	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--
18	Apr 26-29	25	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	4	--[a]	--[a]	--[a]	--[a]	1	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--
19	May 03-06	17	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	1	--[a]	--[a]	--[a]	--[a]	2	--[a]	--[a]	--[a]	--[a]	3	--[a]	--[a]	--[a]	--[a]
20	May 10-13	24	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--	2	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--
21	May 17-20	48	58.4	46	90	8.8	7	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	8	--[a]	--[a]	--[a]	--[a]	6	--[a]	--[a]	--[a]	--[a]
22	May 24-27	42	63.1	39	92	11.2	29	--[a]	--[a]	--[a]	--[a]	3	--[a]	--[a]	--[a]	--[a]	13	--[a]	--[a]	--[a]	--[a]	1	--[a]	--[a]	--[a]	--[a]
23	Jun 01-03	8	--[a]	--[a]	--[a]	--[a]	47	110.2	96	127	6.9	4	--[a]	--[a]	--[a]	--[a]	15	--[a]	--[a]	--[a]	--[a]	2	--[a]	--[a]	--[a]	--[a]
24	Jun 07-10	84	106.4	70	119	9.0	1	--[a]	--[a]	--[a]	--[a]	2	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	1	--[a]	--[a]	--[a]	--[a]
25	Jun 14-17	121	105.7	57	125	9.2	0	--	--	--	--	5	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--
26	Jun 21-24	114	102.2	55	122	11.4	0	--	--	--	--	5	--[a]	--[a]	--[a]	--[a]	3	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--
27	Jun 28-Jul 01	72	92.8	70	110	8.2	0	--	--	--	--	9	--[a]	--[a]	--[a]	--[a]	1	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--
28	Jul 05-08	6	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--

[a] sample size too low for a reportable calculation

Appendix G. Klamath River at Weitchpec site (frame nets) weekly unmarked and hatchery-marked Chinook and Coho salmon fork lengths (mm), 2022.

		Unmarked Chinook Salmon										Unmarked Coho Salmon										Marked Coho Salmon				
Calendar	Sample	Age-0					Age-1+					Age-0					Age-1+					Age-1+				
week	dates	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd	n	mean	min	max	sd
11	Mar 08-11	60	38.6	30	42	2.2	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--
13	Mar 22-25	90	40.29	36	51	2.5	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--
14	Mar 29-Apr 01	50	42.6	36	63	4.8	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--
15	Apr 05-08	28	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--
16	Apr 12-15	41	50.2	39	62	6.5	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--	0	--	--	--	--
23	May 31-Jun 03	3	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	1	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--	0	--	--	--	--

[a] sample size too low for a reportable calculation

Appendix H. Klamath River at Bogus site (frame net) weekly unmarked steelhead fork lengths (mm), 2022.

		Unmarked steelhead									
Calendar	Sample	Age-0					Age-1+				
week	dates	n	mean	min	max	sd	n	mean	min	max	sd
15	Apr 05-07	19	_[a]	_[a]	_[a]	_[a]	0	--	--	--	--
16	Apr 12-14	5	_[a]	_[a]	_[a]	_[a]	1	_[a]	_[a]	_[a]	_[a]
18	Apr 26-28	90	26.8	24	33	1.1	0	--	--	--	--
19	May 03-05	90	26.2	24	28	1.0	0	--	--	--	--
20	May 10-12	90	26.49	22	30	1.31	0	--	--	--	--
21	May 17-19	90	26.68	24	33	1.46	0	--	--	--	--
22	May 24-26	70	27.34	24	34	1.77	0	--	--	--	--
23	May 31-Jun 02	28	_[a]	_[a]	_[a]	_[a]	0	--	--	--	--

[a] sample size too low for a reportable calculation

Appendix I. Klamath River at I-5 site (RST) weekly unmarked steelhead fork lengths (mm), 2022.

		Unmarked steelhead									
Calendar	Sample	Age-0					Age-1+				
week	dates	n	mean	min	max	sd	n	mean	min	max	sd
10	Mar 01-03	0	--	--	--	--	2	_[a]	_[a]	_[a]	_[a]
13	Mar 22-24	0	--	--	--	--	5	_[a]	_[a]	_[a]	_[a]
14	Mar 29-31	0	--	--	--	--	1	_[a]	_[a]	_[a]	_[a]
15	Apr 05-07	3	_[a]	_[a]	_[a]	_[a]	3	_[a]	_[a]	_[a]	_[a]
16	Apr 12-14	5	_[a]	_[a]	_[a]	_[a]	0	--	--	--	--
17	Apr 19-21	55	26.9	24	31	1.2	1	_[a]	_[a]	_[a]	_[a]
18	Apr 26-28	90	26.8	24	32	1.2	0	--	--	--	--
19	May 03-05	90	26.6	24	29	1.0	0	--	--	--	--
20	May 10-12	88	26.7	25	30	1.3	1	_[a]	_[a]	_[a]	_[a]
21	May 17-19	90	27.04	24	40	1.97	0	--	--	--	--
22	May 24-26	89	30.2	24	65	7.22	1	_[a]	_[a]	_[a]	_[a]
23	May 31-Jun 02	60	35.98	22	64	10.7	0	--	--	--	--
24	Jun 8-9	58	43.1	24	75	11	0	--	--	--	--
25	Jun 14-16	6	_[a]	_[a]	_[a]	_[a]	0	--	--	--	--
26	Jun 21-23	7	_[a]	_[a]	_[a]	_[a]	0	--	--	--	--

[a] sample size too low for a reportable calculation

Appendix J. Klamath River at I-5 site (frame net) weekly unmarked steelhead fork lengths (mm), 2022.

		Unmarked steelhead									
Calendar	Sample	Age-0					Age-1+				
week	dates	n	mean	min	max	sd	n	mean	min	max	sd
13	Mar 22-24	1	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--
18	Apr 26-28	90	26.9	23	31	1.4	0	--	--	--	--
19	May 03-05	89	26.4	24	29	1.1	0	--	--	--	--
20	May 10-12	82	27.1	24	30	1.2	0	--	--	--	--
21	May 17-19	90	27.2	24	39	1.8	0	--	--	--	--
22	May 24-26	69	28.0	25	52	4.0	0	--	--	--	--
23	May 31-Jun 02	8	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--

[a] sample size too low for a reportable calculation

Appendix K. Klamath River at Kinsman site (RST) weekly unmarked steelhead fork lengths (mm), 2022.

		Unmarked steelhead									
Calendar	Sample	Age-0					Age-1+				
week	dates	n	mean	min	max	sd	n	mean	min	max	sd
10	Mar 01-03	4	--[a]	--[a]	--[a]	--[a]	3	--[a]	--[a]	--[a]	--[a]
11	Mar 08-10	0	--	--	--	--	0	--	--	--	--
12	Mar 15-17	0	--	--	--	--	4	--[a]	--[a]	--[a]	--[a]
13	Mar 22-24	4	--[a]	--[a]	--[a]	--[a]	6	--[a]	--[a]	--[a]	--[a]
14	Mar 29-31	0	--	--	--	--	7	--[a]	--[a]	--[a]	--[a]
15	Apr 05-07	2	--[a]	--[a]	--[a]	--[a]	3	--[a]	--[a]	--[a]	--[a]
16	Apr 12-14	1	--[a]	--[a]	--[a]	--[a]	2	--[a]	--[a]	--[a]	--[a]
18	Apr 26-28	3	--[a]	--[a]	--[a]	--[a]	6	--[a]	--[a]	--[a]	--[a]
19	May 03-05	9	--[a]	--[a]	--[a]	--[a]	12	--[a]	--[a]	--[a]	--[a]
20	May 10-12	11	--[a]	--[a]	--[a]	--[a]	7	--[a]	--[a]	--[a]	--[a]
21	May 17-19	5	--[a]	--[a]	--[a]	--[a]	1	--[a]	--[a]	--[a]	--[a]
22	May 24-26	5	--[a]	--[a]	--[a]	--[a]	6	--[a]	--[a]	--[a]	--[a]
23	May 31-Jun 02	22	--[a]	--[a]	--[a]	--[a]	5	--[a]	--[a]	--[a]	--[a]
24	Jun 07-09	5	--[a]	--[a]	--[a]	--[a]	2	--[a]	--[a]	--[a]	--[a]
25	Jun 14-16	8	--[a]	--[a]	--[a]	--[a]	5	--[a]	--[a]	--[a]	--[a]
26	Jun 21-23	6	--[a]	--[a]	--[a]	--[a]	1	--[a]	--[a]	--[a]	--[a]

[a] sample size too low for a reportable calculation

Appendix L. Klamath River at Weitchpec site (RST) weekly unmarked steelhead fork lengths (mm), 2022.

		Unmarked steelhead									
Calendar	Sample	Age-0					Age-1+				
week	dates	n	mean	min	max	sd	n	mean	min	max	sd
10	Mar 01-04	0	--	--	--	--	5	--[a]	--[a]	--[a]	--[a]
11	Mar 08-11	0	--	--	--	--	2	--[a]	--[a]	--[a]	--[a]
12	Mar 15-18	0	--	--	--	--	6	--[a]	--[a]	--[a]	--[a]
13	Mar 26-25	0	--	--	--	--	12	--[a]	--[a]	--[a]	--[a]
14	Mar 29-Apr 01	0	--	--	--	--	16	--[a]	--[a]	--[a]	--[a]
15	Apr 05-08	0	--	--	--	--	38	145.18	70	350	87.2
16	Apr 12-15	0	--	--	--	--	10	--[a]	--[a]	--[a]	--[a]
18	Apr 26-29	0	--	--	--	--	3	--[a]	--[a]	--[a]	--[a]
19	May 03-06	2	--[a]	--[a]	--[a]	--[a]	12	--[a]	--[a]	--[a]	--[a]
20	May 10-13	0	--	--	--	--	5	--[a]	--[a]	--[a]	--[a]
21	May 17-20	1	--[a]	--[a]	--[a]	--[a]	18	--[a]	--[a]	--[a]	--[a]
22	May 24-27	5	--[a]	--[a]	--[a]	--[a]	37	193.46	145	230	16.5
23	Jun 01-03	2	--[a]	--[a]	--[a]	--[a]	64	195.38	100	235	20.3
24	Jun 07-10	3	--[a]	--[a]	--[a]	--[a]	75	182.35	115	251	17.4
25	Jun 14-17	7	--[a]	--[a]	--[a]	--[a]	71	176.38	120	215	15.7
26	Jun 21-24	16	--[a]	--[a]	--[a]	--[a]	56	173.05	70	205	21.9
27	Jun 28-Jul 01	10	--[a]	--[a]	--[a]	--[a]	5	--[a]	--[a]	--[a]	--[a]
28	Jul 05-08	3	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--

[a] sample size too low for a reportable calculation

Appendix M. Klamath River at Weitchpec site (frame nets) weekly unmarked steelhead fork lengths (mm), 2022.

		Unmarked steelhead									
Calendar	Sample	Age-0					Age-1+				
week	dates	n	mean	min	max	sd	n	mean	min	max	sd
23	May 31-Jun 03	5	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--
25	Jun 14-17	2	--[a]	--[a]	--[a]	--[a]	0	--	--	--	--

[a] sample size too low for a reportable calculation