



Klamath River Outmigrant Monitoring Update — April 5, 2024

Synopsis: The outmigration of juvenile salmonids is monitored annually on the mainstem Klamath River by the USFWS Arcata Fish and Wildlife Office (AFWO), the Karuk Tribe of California, and the Yurok Tribe of California. The objectives of this collaborative project are to:

1. Estimate the weekly abundance of juvenile Chinook Salmon and collect pertinent biological data such as fork length and presence of clinical signs of disease at three selected locations on the mainstem Klamath River.
2. Examine subsamples of Chinook Salmon, Coho Salmon, and steelhead for external disease indicators and collect, preserve, and deliver weekly-stratified, random samples of young-of-the-year (YOY) Chinook Salmon to the Service's California–Nevada Fish Health Center (CA–NV FHC) for conducting qPCR assays to estimate *Ceratonova shasta* infection rate in the outmigrant population.
3. Collect relative abundance and biological data on Coho Salmon and steelhead at the four locations on the mainstem Klamath River.

Information generated by this study are used for a variety of purposes, including stock-recruitment analyses, to inform flow management decisions, to further refine a fish disease model, and to validate and calibrate the S3 (Stream Salmonid Simulator) Chinook Salmon production model, among others.

Monitoring is conducted at three sites on the mainstem Klamath River between Iron Gate Dam (IGD; rkm 309.65) and the Trinity River confluence (rkm 64.3). The upstream-most site is the 'I-5 Trap Site' (rkm 293.55), which is positioned on the left bank downstream of the Carson Creek confluence and upstream of the I-5 bridge river crossing. The 'Kinsman Trap Site' (rkm 237.55-238.56) consists of two traps separated by ~1km. The upstream trap is located on the left bank of the main channel downstream of the confluence of Horse Creek. The downstream trap is located on the left bank is positioned in a side channel on the left bank just upstream of the Kinsman Creek confluence. The 'Weitchpec Trap Site' (rkm 65) is the farthest downstream and is 0.7 km upstream of the Trinity River confluence behind the Yurok Tribal office in Weitchpec, California. Monitoring at 'Bogus Trap Site' (rkm 307.75), used in previous years, will not be conducted in 2024 due to dam removal operations.

Sampling at the I-5 Trap Site is conducted using two in-line 8-ft diameter rotary screw traps (RST) and one 3.1-m by 1.6-m frame net. The Kinsman Trap Site consists of one 8-ft diameter RST upstream and one 5-ft diameter RST in the downstream side channel. The Weitchpec trap site uses one 8-ft diameter RST on the left bank and periodically one to two 3.1-m by 1.6-m frame nets on the right bank. Traps are typically operated four nights per week (Monday through Thursday) and checked once daily while in operation. Trapping began the week of March 4th [Calendar Week (CW) 10] at I-5, and Kinsman sites in 2024. *Winter storms, high flows, and general unsafe conditions have prevented the installation of the Weitchpec site at this time.*

This project update provides an in-season summary of the weekly total catch (Table 1) and mean catch-per-day (Table 2) of Chinook Salmon, Coho Salmon, and steelhead at each trap site. In addition, weekly estimates of mean fork length of YOY Chinook and Coho salmon from each of the

four trap sites are provided (Table 3). Expansions to generate weekly-stratified abundance estimates are calculated after the end of the sampling season and are not presented here. Trap efficiency, a measure of the proportion of fish moving past a trap site that are caught, varies weekly. *Therefore, raw catch numbers are not representative of actual abundance and we advise against using weekly raw catch numbers to make inferences on temporal abundance.*

Included in this project update is a weekly-stratified summary of clinical signs of disease observed in the catch for the trap and seine sites (Table 4). Note that these data are based on the visual presence of external symptoms of disease, which may not always be revealed by infected fish. The percentage of live YOY Chinook Salmon in the trap and seine catches that exhibit distended bellies, gill fungus, and pale gills are presented separately for each site on a weekly basis. Distended bellies may be a clinical sign of infection by the myxosporean parasites, *Ceratonova shasta* and *Parvicapsula minibicornis*. Gills of juvenile salmonids ≥ 45 mm FL are evaluated for color (red, pale/pink, white, or tan) and condition (normal, eroded, or fungal). Pale gills may be due to anemia associated with *P. minibicornis* infection. Gill fungus is likely *Saprolegnia* growing upon a columnaris (*Flavobacterium columnare*) infection.

To determine infection rates more accurately for the outmigrant juvenile Chinook Salmon population passing the Kinsman Trap Site, I-5 Trap Site, and Weitchpec Trap Site, weekly-stratified random samples are collected, preserved, and delivered to the California–Nevada Fish Health Center (CA–NV FHC) to process using qPCR assays. This season’s fish health sampling began the week of March 20. The CA–NV FHC investigates infection rates of *C. shasta* and other pathogens in juvenile salmonids in the Klamath River annually. The CA–NV FHC releases regular updates (available on the [USFWS online library](#)) and a final report for each season.

Daily mean discharge below IGD (Figure 1) and at the Kinsman Trap Site (Figure 2), from late February to July, are provided to help portray pertinent flow conditions. Discharge at the I-5 trap site are represented by USGS Gauging Station 11516530 (Klamath River below IGD, California). Discharge at USGS 11520500 (Klamath River near Seiad Valley, California) minus discharge at USGS 11519500 (Scott River near Fort Jones, California) is used as a surrogate flow for the Kinsman Trap Site.

If you have any questions regarding this summary, please contact Adam Wojtczak (adam_wojtczak@fws.gov) or Taylor Daley (taylor_daley@fws.gov).

Table 1. In-season summary of the total catch by week of adipose fin-clipped (AD Clip) and non-adipose fin-clipped (No Clip) Chinook Salmon and steelhead and left maxillary-clipped (LM Clip) and non-maxillary clipped (No Clip) Coho Salmon by trap at the I-5 and Kinsman trap sites on the mainstem Klamath River, 2024. Note that RST = rotary screw trap, UPS = upstream, DNS = downstream, and YOY = young-of-the-year.

Preliminary Data - Subject to Revision

Trap	Calendar week	Sample dates	Q (cfs) ^a		Water temp. (°F) ^b		Trapping days	Chinook (<i>O. tshawytscha</i>)			Coho (<i>O. kisutch</i>)			Steelhead (<i>O. mykiss</i>)			
			Min	Max	Min	Max		YOY			Age 1 +			Age 1 +			
								No clip	AD clip	Age 1+	YOY	No clip	LM clip	YOY	No clip	AD clip	
I-5 UPS RST	10	3/6-3/8	1,350	1,650	43.3	44.2	2	58	0	0	0	3	0	0	0	0	0
	11	3/12-3/15	1,050	1,700	43.9	45.7	3	14	0	0	3	3	0	1	6	1	
	12	3/19-3/22	965	1,700	48.5	50.5	3	5	0	0	5	1	0	1	11	0	
	13	3/26-3/29	989	1,270	47.8	50.7	2	1	0	0	1	0	0	0	8	0	
	14	4/2-4/5	1,300	1,500	48.1	53	4	2	0	0	3	0	0	7	22	0	
I-5 DNS RST	10	3/6-3/8	1,050	1,650	43.3	44.2	3	39	0	0	0	1	0	0	3	0	
	11	3/12-3/15	1,350	1,700	43.9	45.7	4	7	0	0	1	3	0	3	3	0	
	12	3/19-3/22	965	1,700	48.5	50.5	3	2	0	0	0	1	0	1	7	0	
	13	3/26-3/29	989	1,270	47.8	50.7	4	3	0	0	1	0	0	0	6	0	
	14	4/2-4/5	1,300	1,500	48.1	53	4	2	0	0	2	2	0	7	7	0	
Kinsman RST	10	3/6-3/8	3,000	3,225	42.7	44.2	3	15	0	0	5	8	0	1	0	0	
	11	3/12-3/15	2,675	3,162	44.0	48.5	4	15	0	0	2	36	0	3	18	0	
	12	3/19-3/21	2,770	2,870	48.1	50.2	3	41	0	0	8	27	0	5	22	0	
	13	3/26-3/29	2,620	3,040	47.5	50.3	3	37	0	0	28	39	0	0	13	0	
	14	4/2-4/5	2,685	2,790	48.3	53.0	4	14	0	0	8	9	0	4	8	0	
Kinsman UPS RST	11	3/14-3/15	2,811	3,162	44.5	45.3	2	79	0	0	3	8	0	0	2	0	
	12	3/19-3/22	2,770	3,542	49.1	50.5	3	64	0	2	14	20	0	3	3	0	
	13	3/26-3/29	2,620	3,040	46.7	50.3	4	81	0	2	51	29	0	0	13	0	
	14	4/2-4/5	2,685	2,790	48.3	53.0	3	59	0	6	44	27	0	1	24	0	

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

^b temperature recorded at time of trap check

^c trap not set this week because trapping operations were limited due to a flow event and/or hatchery release

Table 2. In-season summary of the average catch-per-day by week of non-adipose fin-clipped (No Clip) and adipose fin-clipped (AD Clip) Chinook Salmon and steelhead and non-maxillary clipped (No Clip) and left maxillary-clipped (LM Clip) Coho Salmon by trap at the I-5 and Kinsman trap sites on the mainstem Klamath River, 2024. Note that RST = rotary screw trap, UPS = upstream, DNS = downstream, and YOY = young-of-the-year.

Preliminary Data - Subject to Revision

Trap	Calendar week	Sample dates	Q (cfs) ^a		Water temp. (°F) ^b		Trapping days	Chinook (<i>O. tshawytscha</i>)			Coho (<i>O. kisutch</i>)			Steelhead (<i>O. mykiss</i>)			
			Min	Max	Min	Max		YOY			Age 1+			Age 1+			
								No clip	AD clip	Age 1+	YOY	No clip	LM clip	YOY	No clip	AD clip	
I-5 UPS RST	10	3/6-3/8	1,350	1,650	43.3	44.2	2	29.00	0.00	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00
	11	3/12-3/15	1,050	1,700	43.9	45.7	3	4.67	0.00	0.00	1.00	1.00	0.00	0.33	2.00	0.33	
	12	3/19-3/22	965	1,700	48.5	50.5	3	1.67	0.00	0.00	1.67	0.33	0.00	0.33	3.67	0.00	
	13	3/26-3/29	989	1,270	47.8	50.7	2	0.50	0.00	0.00	0.50	0.00	0.00	0.00	4.00	0.00	
14	4/2-4/5	1,300	1,500	48.1	53.0	4	0.50	0.00	0.00	0.75	0.00	0.00	1.75	5.50	0.00		
I-5 DNS RST	10	3/6-3/8	1,350	1,650	43.3	44.2	3	13.00	0.00	0.00	0.00	0.33	0.00	0.00	1.00	0.00	
	11	3/12-3/15	1,050	1,700	43.9	45.7	4	1.75	0.00	0.00	0.25	0.75	0.00	0.75	0.75	0.00	
	12	3/19-3/22	965	1,700	48.5	50.5	3	0.67	0.00	0.00	0.00	0.33	0.00	0.33	2.33	0.00	
	13	3/26-3/29	989	1,270	47.8	50.7	4	0.75	0.00	0.00	0.25	0.00	0.00	0.00	1.50	0.00	
14	4/2-4/5	1,300	1,500	48.1	53.0	4	0.50	0.00	0.00	0.50	0.50	0.00	1.75	1.75	0.00		
Kinsman RST	10	3/6-3/8	3000	3225	42.7	44.2	3	5.00	0.00	0.00	1.67	2.67	0.00	0.33	0.00	0.00	
	11	3/12-3/15	1410	3162	44.0	48.5	4	3.75	0.00	0.00	0.50	9.00	0.00	0.75	4.50	0.00	
	12	3/19-3/21	2770	2870	48.1	50.2	3	13.67	0.00	0.00	2.67	9.00	0.00	1.67	7.33	0.00	
	13	3/26-3/29	2620	3040	47.5	50.3	3	12.33	0.00	0.00	9.33	13.00	0.00	0.00	4.33	0.00	
14	4/2-4/5	2685	2790	48.3	53.0	4	3.50	0.00	0.00	2.00	2.25	0.00	1.00	2.00	0.00		
Kinsman UPS RST	11	3/14-3/15	2,811	3,162	44.5	45.3	2	39.50	0.00	0.00	1.50	4.00	0.00	0.00	1.00	0.00	
	12	3/19-3/22	2,770	3,542	49.1	50.5	3	21.33	0.00	0.67	4.67	6.67	0.00	1.00	1.00	0.00	
	13	3/26-3/29	2,620	3,040	46.7	50.3	4	20.25	0.00	0.50	12.75	7.25	0.00	0.00	3.25	0.00	
	14	4/2-4/5	2,685	2,790	48.3	53.0	3	19.67	0.00	2.00	14.67	9.00	0.00	0.33	8.00	0.00	

^a mean daily discharge range during sampling dates (discharge below IGD used for Bogus and I-5 sites; discharge at Kinsman Site is Klamath River discharge at Seiad minus Scott River discharge; discharge at Weitchpec Site is discharge near Orleans)

^b temperature recorded at time of trap check

^c trap not set this week because trapping operations were limited due to a flow event and/or hatchery release

Table 3. In-season summary of fork lengths, compared with the last ten years of naturally produced Chinook and Coho salmon by trap type at the I-5 and Kinsman sites on the mainstem Klamath River, 2024. RST = rotary screw trap and YOY = young-of-the-year.

Preliminary data - Subject to revision

Site	Calendar Week	2024 Sampling Dates	YOY Chinook (natural) - fork length data					YOY Coho - fork length data										
			2024				Previous 10 years	2024				Previous 10 years						
			n	Mean (mm)	Min. (mm)	Max. (mm)	% > 55 mm	n	Years of data	Mean (mm)	n	Mean (mm)	Min. (mm)	Max. (mm)	% > 55 mm	n	Years of data	Mean (mm)
I-5 RST's	10	Mar 06-08	65	41.7	29.0	52.0	0	666	9	37.7	0	^b	^b	^b	^b	0	2	-
	11	Mar 12-14	17	^b	^b	^b	^b	623	10	37.9	3	^b	^b	^b	^b	1	3	11.7
	12	Mar 19-21	5	^b	^b	^b	^b	722	9	37.4	4	^b	^b	^b	^b	0	2	-
	13	Apr 02-04	3	^b	^b	^b	^b	604	8	37.9	3	^b	^b	^b	^b	15	5	28.0
Kinsman RST's	10	Mar 06-08	16	^b	^b	^b	^b	504	8	37.7	4	^b	^b	^b	^b	2	2	16.5
	11	Mar 12-14	43	40.7	35.0	53.0	0	531	8	34.0	1	^b	^b	^b	^b	14	2	34.2
	12	Mar 19-21	105	40.0	36.0	49.0	0	585	8	41.1	21	^b	^b	^b	^b	32	3	34.1
	13	Apr 02-04	48	43.2	35.0	59.0	6%	733	8	42.2	34	39.0	34	83	6%	117	6	40.1

^b sample size too low for a reportable calculation

Table 4. In-season summary of clinical signs of disease in young-of-the-year Chinook Salmon by site at the I-5, and Kinsman sites on the mainstem Klamath River, 2024. *Note: Although only Chinook Salmon are reported in this table, we also monitor clinical signs of diseases in Coho Salmon and other species.*

Preliminary Data - Subject to Revision

Site	Calendar week	Sampling dates	Weekly mean flow (cfs) ^a	Water temp. (°F) ^b		Belly condition			Gills				
				Min	Max	Sample size	Distended		Sample size	Color		Condition	
							# positive	%		# positive	%	# positive	%
I-5	10	3/6-3/8	1,386	43.3	44.2	97	0	0.0%	9	0	- ^c	0	- ^c
	11	3/12-3/15	1,379	43.9	45.7	21	0	- ^d	4	0	- ^d	0	- ^c
	12	3/19-3/22	1,388	48.5	50.5	7	0	- ^d	1	0	- ^d	0	- ^c
	13	3/26-3/29	1,228	47.8	50.7	2	0	- ^d	0	0	- ^d	0	- ^c
	14	4/2-4/5	1,350	48.1	53.0	4	0	- ^d	1	0	- ^d	0	- ^c
Kinsman	10	3/6-3/8	2,861	42.7	44.2	15	0	- ^c	0	0	- ^c	0	- ^c
	11	3/12-3/15	2,928	44.0	48.5	94	0	0.0%	4	0	- ^d	0	- ^c
	12	3/19-3/21	3,102	48.1	50.2	105	0	0.0%	5	0	- ^d	0	- ^c
	13	3/26-3/29	2,980	47.5	50.3	116	0	0.0%	13	0	- ^d	0	- ^c
	14	4/2-4/5	2,335	48.3	53.0	79	0	0.0%	23	0	- ^d	0	- ^c

^a discharge below IGD used for Bogus and I-5 sites; discharge at Kinsman Site is Klamath River discharge near Seiad Valley minus discharge in the Scott River near Fort Jones; discharge at Weitchpec Site is discharge near Orleans

^b temperature recorded at time of trap check/seine

^c sample size too low for a reportable calculation

^d trap not set this week because trapping operations were limited due to a flow event and/or hatchery release

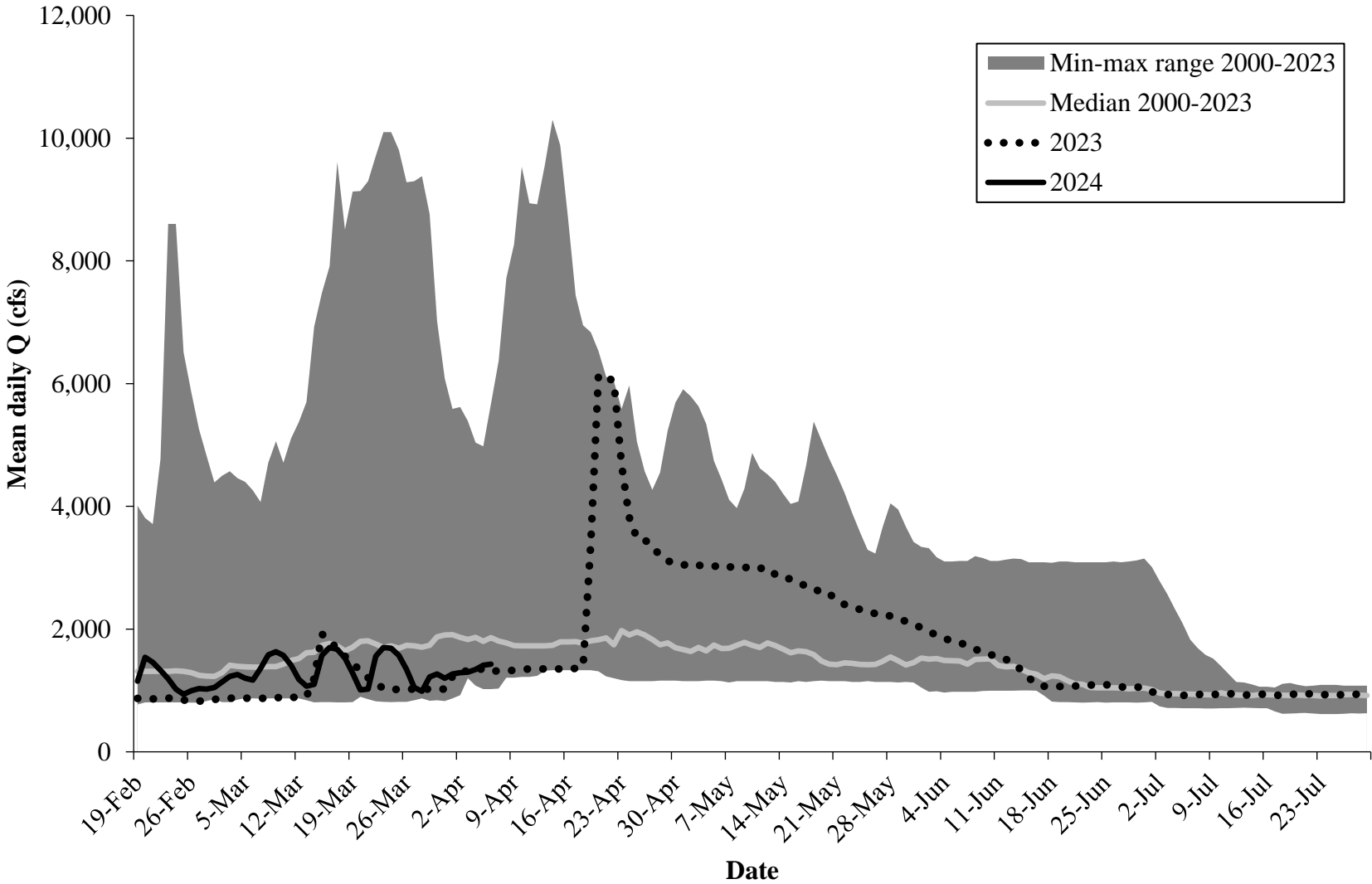


Figure 1. Daily mean discharge below Iron Gate Dam, Klamath River (USGS Gaging Station 11516530) from late February through July 2000–2024.

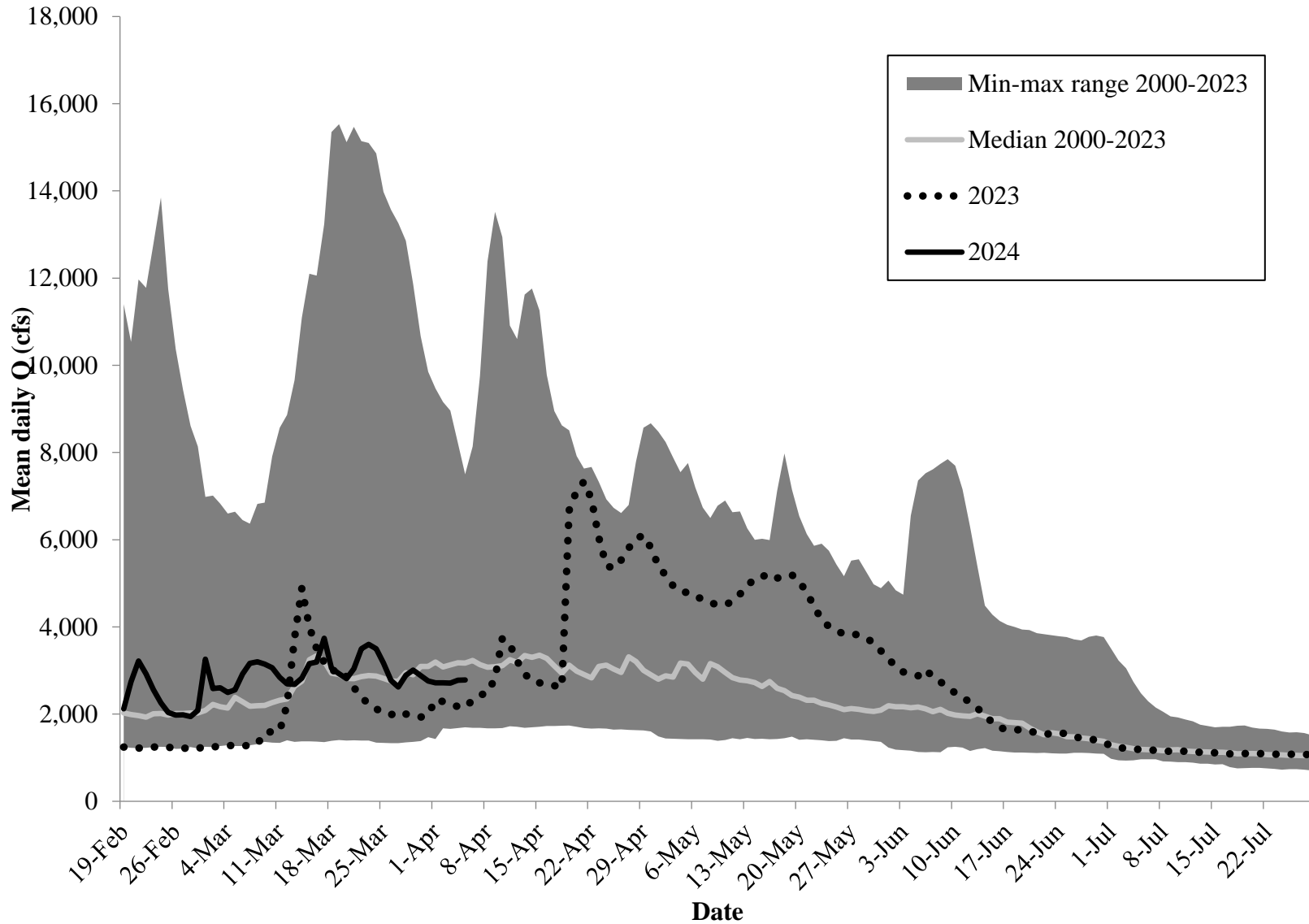


Figure 2. Klamath River daily mean discharge at the Kinsman Trap Site from late February through July 2000–2024. Discharge measurements are not available at this location. Therefore, Klamath River discharge near Seiad Valley, California (USGS Gaging Station 11520500) minus discharge from the Scott River near Fort Jones, California (USGS 11519500) is used as a surrogate.