Fisheries Management and Evaluation for 2023 Willamette River Spring Chinook

Oregon Department of Fish and Wildlife
Ocean Salmon and Columbia River Program
Columbia River Management

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Introduction

The population of Upper Willamette River (UWR) wild spring Chinook salmon was listed as a threatened species under the federal Endangered Species Act (ESA) in May 1999, reflecting significant long-term declines in abundance and productivity. In response, the Oregon Department of Fish and Wildlife (ODFW) developed and submitted a Fisheries Management and Evaluation Plan (FMEP) to the National Marine Fisheries Service (NMFS) in February 2001. The FMEP provides a comprehensive framework for managing commercial and recreational fisheries that may affect ESA-listed spring Chinook salmon in the Willamette Basin and the lower Columbia River.

The NMFS determined the FMEP met ESA requirements for protecting listed species while allowing for limited fisheries impacts. As a result, fisheries conducted in compliance with the FMEP are not subject to ESA prohibitions on harming or impacting listed fish. This authorization is contingent on strict adherence to the plan's conservation measures, monitoring requirements, and established impact limits.

The central objective of the FMEP is to allow harvest of known hatchery-origin spring Chinook salmon, and other legally harvestable fish species, while ensuring that fishing-related impacts do not jeopardize the survival and recovery of wild UWR spring Chinook salmon. The plan applies broadly to all freshwater commercial and recreational fisheries in the Willamette River and the lower Columbia River that could directly or indirectly affect these populations.

A cornerstone of the FMEP is the ability to distinguish between hatchery and wild Chinook salmon in the fishery. To achieve this, ODFW implemented permanent selective fishing regulations in 2002 that require anglers to release all unmarked (wild-origin) spring Chinook salmon. Only hatchery fish, identified by the absence of an adipose fin, may be retained. This selective harvest strategy is supported by a basin-wide mass-marking program initiated with the 1997 brood, in which hatchery spring Chinook salmon are adipose fin-clipped prior to release. This approach allows fisheries to focus harvest pressure on hatchery-origin fish while minimizing impacts on naturally produced populations.

To ensure that fisheries remain consistent with conservation goals, the FMEP established a quantitative limit on allowable fishery impacts. Specifically, it sets an annual average combined impact rate of no more than 15 percent on wild UWR spring Chinook salmon from all freshwater commercial and recreational fisheries. This limit was designed to be protective even under conservative assumptions about population productivity and environmental conditions. Importantly, the impact-rate framework is responsive to annual variations in run size. This flexibility supports both conservation and sustainable use across a wide range of future scenarios.

The FMEP includes a robust monitoring and evaluation component built around a series of performance indicators. These indicators are used to assess fishery impacts, evaluate compliance with management objectives, and measure progress toward conservation and recovery goals for wild spring Chinook salmon populations within the UWR. Key metrics include adult escapement estimates, spawning ground surveys, and statistical estimates of catch and harvest derived from angler creel surveys and commercial landing records. Data are collected from a variety of sources

and locations in the lower Columbia River, the Willamette River and primary tributaries identified in the plan as critical spawning and rearing areas.

Together, these monitoring efforts support an adaptive management framework that uses current data to evaluate fishery performance and inform management decisions over time. Information on escapement, spawning activity, and fishery encounters is reviewed regularly by the Oregon Department of Fish and Wildlife and the National Marine Fisheries Service to ensure that fisheries are operating as intended and consistent with conservation objectives. This ongoing evaluation provides accountability and helps verify that protective measures for wild UWR spring Chinook salmon are effective.

By integrating monitoring results with established management measures, the framework ensures that fisheries remain aligned with ESA requirements and NMFS conservation standards. At the same time, it supports stable and predictable recreational and commercial fishing opportunities in the lower Columbia River and the Willamette Basin by maintaining a balance between conservation priorities and sustainable harvest of hatchery-origin fish.

2023 Willamette Spring Chinook Performance Indicators

Columbia River Mouth

Returns of Willamette River spring Chinook salmon have been monitored since 1946 and show substantial year-to-year variability in total run size (Figure 1). From 1946 to 1970, returns were estimated at the mouth of the Willamette River. Beginning in 1971, estimates have instead been made at the mouth of the Columbia River, and this approach continues today. Total returns to the Columbia River are estimated by reconstructing the run from multiple data sources. These include commercial and recreational harvest estimates in the lower Columbia River, recreational harvest in the lower Willamette River, fish counts at Willamette Falls, escapement estimates to key tributaries such as the Clackamas River and estimates of predation by sea lions. The largest estimated return occurred in 2004, with approximately 143,700 fish, while the smallest return occurred in 2008, with an estimated 26,614 fish (Figure 1).

Prior to implementation of the Willamette FMEP, only a portion of hatchery-origin spring Chinook salmon were externally marked before release, which limited the ability to distinguish hatchery fish from wild fish in returning populations. Beginning with the 1997 brood year (released in 1999), all hatchery-origin spring Chinook salmon released in the Willamette Basin were marked with an adipose fin-clip. The first year in which all returning hatchery-origin jacks and adults were marked was 2004. Since that time, it has been possible to reliably estimate the number of wild and hatchery spring Chinook salmon returning to the mouth of the Columbia River (Figure 2, Appendix 1).

The estimated number of Willamette River spring Chinook salmon returning to the Columbia River in 2023 was 38,372 adult fish (Table 1). This estimate is lower than the previous 5- and 10-year averages of 41,561 and 48,498, respectively. Of the 2023 return, an estimated 12,278 adult spring Chinook salmon were unmarked, which is slightly higher than previous five- and ten-year

averages of 10,085 and 10,277 (Table 1). The estimated number of marked spring Chinook salmon was 26,094 adults. This estimate is 83% of the 5-year average of 31,475 adults and 68% of the 10-year average of 38,221 adults.

The total return consisted of 1,164 Age-3 fish, 23,240 Age-4 fish, 15,144 Age-5 fish, and 19 Age-6 fish. These age estimates were derived from scale analysis and CWT data from marked fish recovered in the lower Columbia River recreational fishery (Table 2).

ODFW developed a preseason forecast for 2023 that projected a total return of 71,045 adult spring Chinook salmon (age 4-6) to the Columbia River (Figure 3, Table 2). Post season analysis estimated the actual return at 38,373 adults, which was 54% of the forecast. The forecast also assumed that 25% of the returning fish would be unmarked (wild-origin) and 75% would be marked (hatchery-origin), based on the average proportions observed from 2018 through 2022. Reconstructed data showed that unmarked fish comprised 32% of the total return and marked fish accounted for 68% (Table 1).

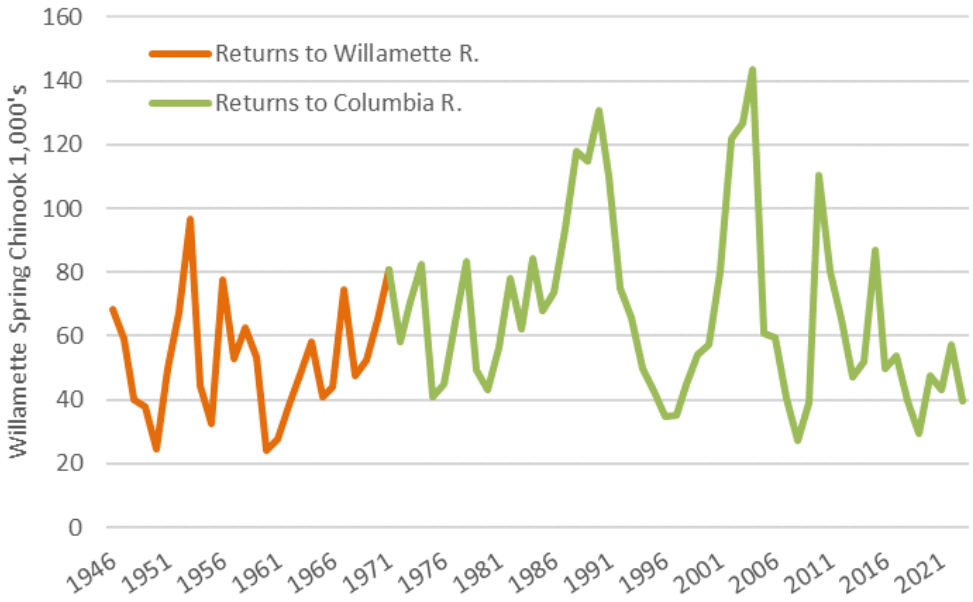

Figure 1. Willamette spring Chinook salmon return estimates, 1946-2023. From 1946 -1970 (red line) return numbers are to the mouth of the Willamette River and from 1971 – present (green line) returns are to the mouth of the Columbia River.

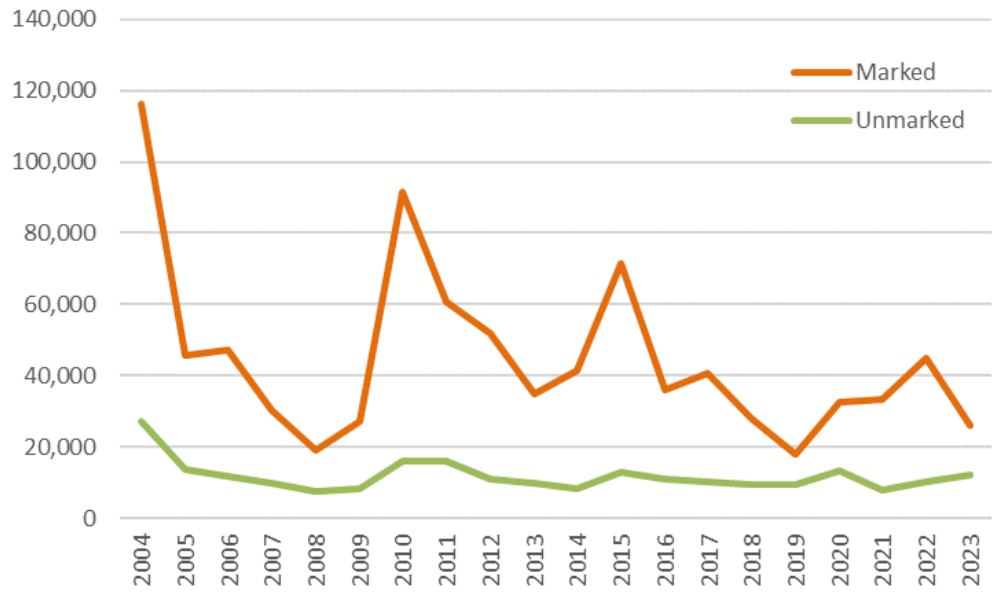

Figure 2. Estimates of adult Willamette River spring Chinook salmon to the Columbia River by origin, 2004 – 2023.

Table 1. Estimates of adult Willamette River spring Chinook salmon to the Columbia River with previous five- and ten-year averages, 2013-2023.

	HATCHERY/MARKED		WILD/UNMARKED		
YEAR	**Est. Number**	**Percent**	**Est. Number**	**Percent**	**Total**
2013	34,988	78.0%	9,892	22.0%	44,880
2014	41,492	83.4%	8,273	16.6%	49,765
2015	71,525	84.6%	13,007	15.4%	84,532
2016	36,242	76.7%	10,983	23.3%	47,225
2017	40,586	79.9%	10,188	20.1%	50,774
2018	27,859	74.4%	9,582	25.6%	37,441
2019	18,131	65.8%	9,437	34.2%	27,568
2020	32,786	71.1%	13,309	28.9%	46,095
2021	33,496	81.1%	7,812	18.9%	41,308
2022	45,105	81.4%	10,278	18.6%	55,392
2023	26,094	68.0%	12,278	32.0%	38,372
5-YR. AVE.	31,475	75.7%	10,085	24.3%	41,561
10-YR. AVE	38,221	78.8%	10,277	21.2%	48,498

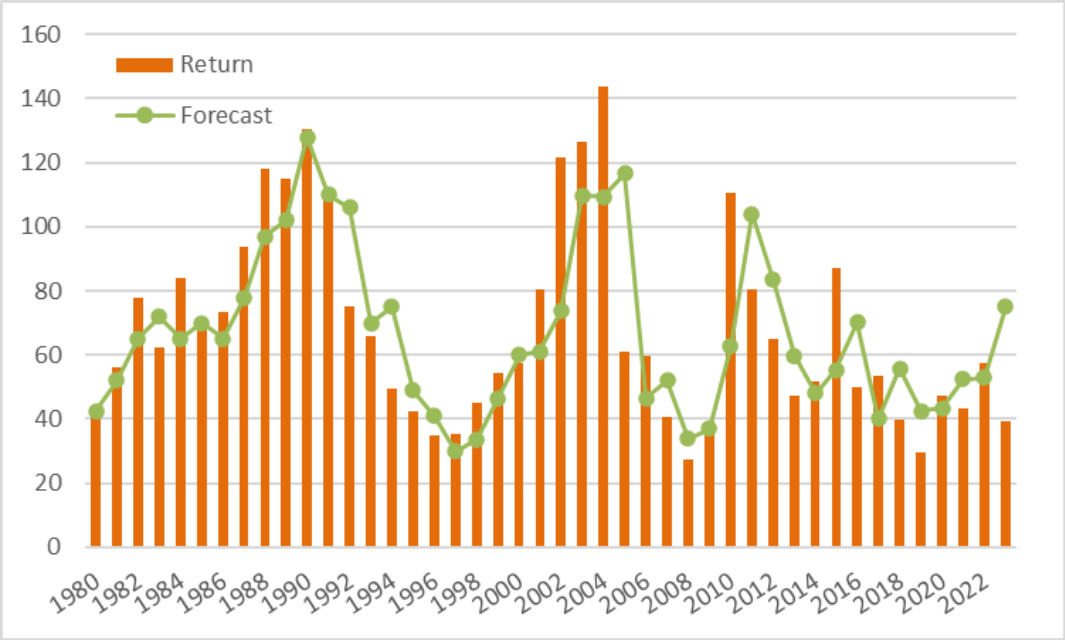

Figure 3. Predicted and observed Willamette River spring Chinook salmon returns to the Columbia River mouth, 1980-2023.

Table 2. Forecast and reconstructed run estimates for Willamette River spring Chinook salmon to the Columbia River mouth, 2023.

	AGE 3	AGE 4	AGE 5	AGE 6	TOTAL$_{ADULTS}$	TOTAL$_{JACKS+ADULTS}$
2023 FORECAST	1,974	52,010	18,926	109	71,045	73,019
95% CI	973-3,052	25,310-80,370	6,226-34,180	0 - 381		
2022 RECONSTRUCTED RETURN	1,164	23,240	15,114	19	38,373	39,537

Willamette Falls

Willamette Falls is a natural waterfall located at river kilometer 42 on the Willamette River. It serves as an important geographic and biological reference point, marking the boundary between the upper and lower Willamette River in the NOAA Fisheries Evolutionarily Significant Unit (ESU) designation for the spring Chinook salmon population. The falls function as a seasonal barrier to fish migration requiring most fish to use a fishway operated by ODFW to pass upstream. Fish using this passage route are counted at a viewing window, where a digital video monitoring system records their movement. These time-lapse recordings are later reviewed by trained staff to identify species and enumerate daily passage numbers.

These fish counts play a critical role in monitoring population trends for migratory fish entering the upper Willamette River basin. Fishery managers use these data to assess trends in population abundance, evaluate the timing and strength of annual runs, and inform in-season and post-season management decisions. In particular, the counts help determine whether escapement

objectives established under the Upper Willamette Spring Chinook Salmon FMEP are being met. These objectives are designed to ensure sufficient numbers of fish escape fisheries to support sustainable populations, while also allowing for mark-selective recreational fisheries upstream of the falls and meeting hatchery broodstock requirements.

Counts of spring Chinook salmon passing Willamette Falls have been recorded continuously since 1946, providing a long-term dataset that shows substantial year-to-year variability in escapement (Figure 4). These counts serve as a key index of the number of fish migrating upstream into the upper Willamette River basin and are central to population monitoring efforts. Over time, escapement has fluctuated widely in response to changing ocean conditions, freshwater habitat quality, and fishery management practices. The highest recorded count occurred in 2004, when 95,967 spring Chinook salmon were observed, while the lowest occurred in 2008, with 14,151 fish, highlighting the broad range of run sizes observed across years.

Beginning in 2004, all returning hatchery-origin spring Chinook salmon (both jacks and adults) were marked with an adipose fin clip, making it possible to distinguish hatchery fish from wild fish at Willamette Falls. This significantly improved monitoring by allowing biologists to produce separate estimates of hatchery-origin (marked) and natural-origin (unmarked) fish passing the falls (Figure 5, Appendix 2). Since then, the number of marked adult spring Chinook salmon passing upstream has ranged from 8,845 to 75,876 fish, while unmarked adult escapement has ranged from 4,511 to 20,091 fish. These data provide important insight into the relative contributions of hatchery and wild fish to the total run and are used to assess population status, evaluate fishery impacts, and measure progress toward conservation objectives.

In 2023, a total of 23,422 adult spring Chinook salmon escaped to Willamette Falls (Table 3). This represents 82% of the five-year average of 28,603 and 74% of the previous ten-year average of 31,653 (Table 3). Of these fish, 7,034 were unmarked, which is 113% of the previous five-year average of 6,202 and 1.07% of the ten-year average of 6,592. The total number of marked fish recorded was 16,388, which was 73% of the 5-year average of 22,401 adults and 65% of the 10-year average of 25,062 adults.

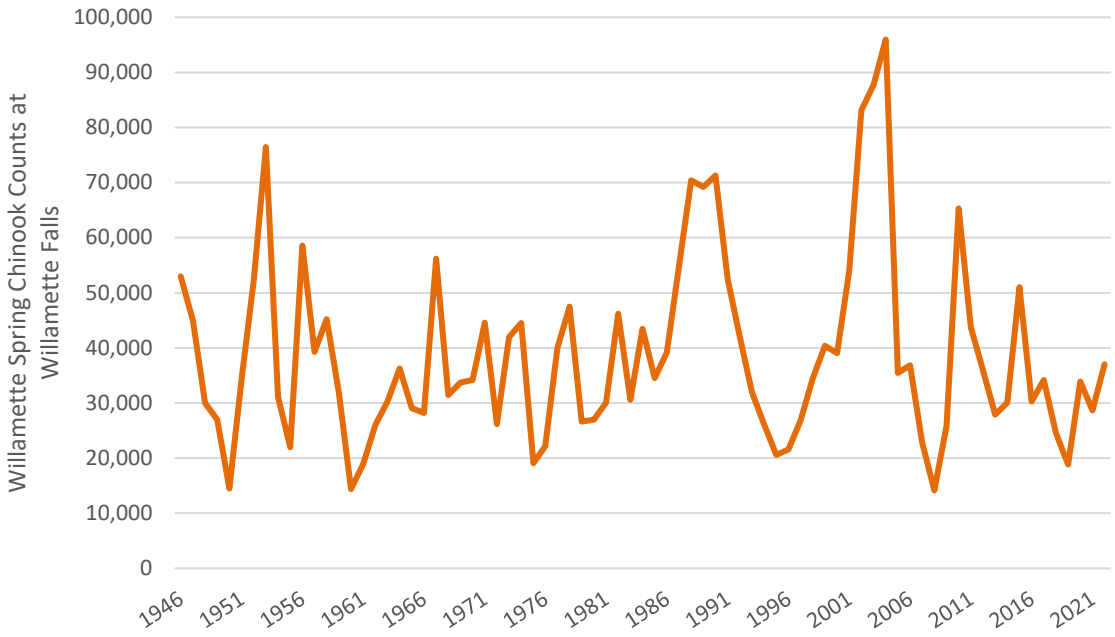

Figure 4. Willamette spring Chinook salmon escapement to Willamette Falls, 1946-2023.

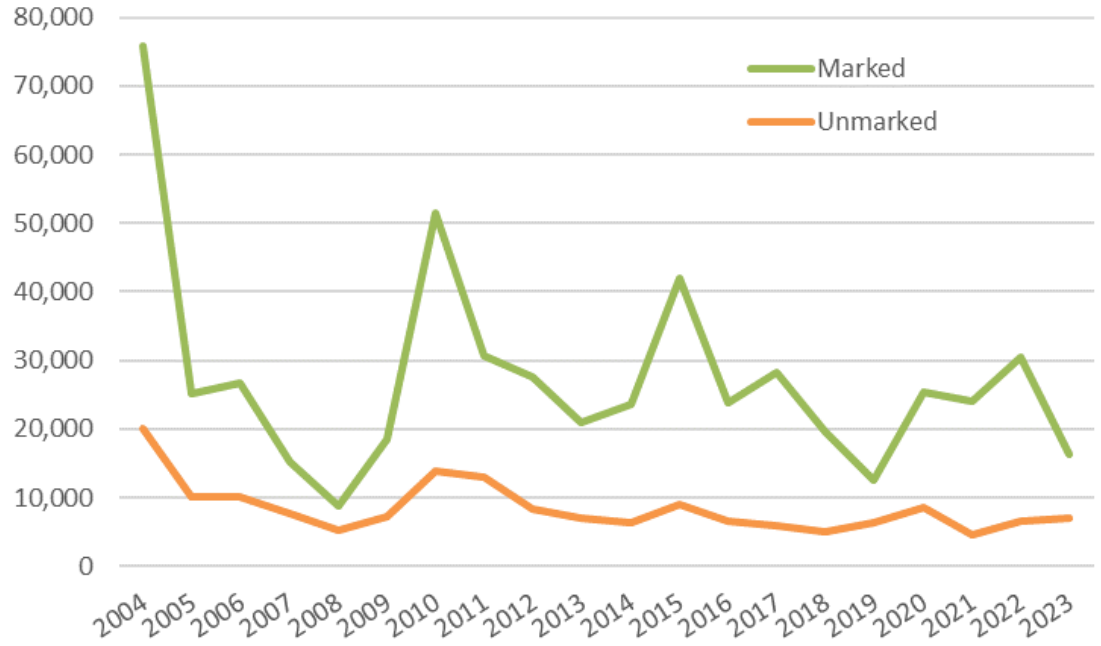

Figure 5. Estimates of adult spring Chinook salmon to Willamette Falls, by origin, Willamette River, Oregon, 2004 – 2023.

Table 3. Estimates of adult spring Chinook salmon to Willamette Falls with previous five- and ten-year averages, Willamette River, Oregon, 2013-2023.

	MARKED/HATCHERY		UNMARKED/WILD		
YEAR	**Count**	**Percent**	**Count**	**Percent**	**Total**
2013	20,923	75.0%	6,974	25.0%	27,897
2014	23,666	78.7%	6,405	21.3%	30,071
2015	41,979	82.2%	9,065	17.8%	51,044
2016	23,769	78.4%	6,548	21.6%	30,317
2017	28,272	82.7%	5,914	17.3%	34,186
2018	19,536	79.6%	5,007	20.4%	24,543
2019	12,455	66.0%	6,428	34.0%	18,883
2020	25,323	74.7%	8,564	25.3%	33,887
2021	24,135	84.3%	4,511	15.7%	28,646
2022	30,588	82.5%	6,499	17.5%	37,057
2023	16,388	70.0%	7,034	30.0%	23,422
5-YR. AVE.	22,401	78.3%	6,202	21.7%	28,603
10-YR. AVE	25,062	79.2%	6,592	20.8%	31,653

Clackamas River

The Clackamas River is a major tributary of the Willamette River with its confluence at river kilometer 40, approximately two kilometers below Willamette Falls. Although its confluence is below Willamette Falls, the Clackamas River spring Chinook salmon population is classified by the National Marine Fisheries Service as part of the Upper Willamette River (UWR) Evolutionary Significant Unit (ESU). This designation reflects shared genetic, ecological, and life-history characteristics with populations upstream of the falls.

Within the UWR ESU, the Clackamas River is considered one of the key historical production areas for spring Chinook salmon. Today, the Clackamas population continues to support a significant level of natural production. In most years, estimates of naturally spawning adults exceed both the critical and interim viability thresholds established by the Oregon Department of Fish and Wildlife (ODFW 2001), indicating that this population remains relatively robust. A factor contributing to this resilience is the extent of accessible habitat. Much of the Clackamas River basin remains open to natural spawning and rearing, providing a range of habitat conditions that support different life stages. However, the basin is not without constraints. A three-dam hydroelectric complex located between river miles 23 and 31 has altered natural flow regimes, migration timing, and habitat connectivity in the mainstem. These dams affect both upstream adult passage and downstream juvenile migration, as well as the quality and availability of rearing habitat.

Fish passage and monitoring efforts are managed by Portland Gas and Electric staff at North Fork Dam, the uppermost facility in the complex. This site serves as a critical control point for distinguishing between hatchery and wild fish. Hatchery-origin Chinook salmon are removed at the dam and either used for hatchery broodstock or returned to the river mouth to allow for

additional harvest opportunities, while unmarked fish are allowed to pass upstream to spawn naturally. This selective passage strategy is intended to protect the genetic integrity and productivity of the wild population while still allowing hatchery programs to support harvest opportunities downstream.

Beginning in 1999, all hatchery fish released in the Clackamas River were marked with an adipose fin clip. The first year all returning hatchery origin jack and adults were marked was 2004, after which time estimates of returning wild and hatchery spring Chinook salmon to the Clackamas River was possible (Figure 6, Appendix 3). Both the marked and unmarked population have displayed wide variation in adult returns during this period, with the marked population decidedly so. The marked population has ranged from 192 to 21,220 while the unmarked population has ranged from 617 to 5,596 returning adults.

The estimated return of adult spring Chinook salmon to the Clackamas River in 2023 was 6,880 fish (Table 4). This estimate is 177% of the previous five-year average of 3,886 and 141% of the previous ten-year average of 4,865 adults. Of these fish, 4,856 were unmarked, which was 162% of the previous five-year average of 2,995 and 177% of the 10-year average of 2,745. The estimate for marked adults was 2,024 returns, which was 227% of the 5-year average of 891 and 95% of the 10-year average of 2,120 adults.

Age composition of returning marked spring Chinook salmon was estimated using CWT recoveries and scales analysis from fish collected at the Clackamas Hatchery and the recreational fishery. Results indicate that the population was dominated by age-4 (63.1%) and age-5 (31.4%) fish, with a small proportion of age-3 (5.5%) fish, and no age-6 fish observed (Table 5).

Counts of spring Chinook salmon at the North Fork Dam on the Clackamas River have been conducted annually since 1980 (Figure 7). Over this period, returns fluctuated widely, ranging from a low of 857 fish in 1999 to a high of 10,207 fish in 2003. In 2023, a total of 5,422 adult spring Chinook salmon were counted at the North Fork Dam (Table 6, Figure 7). This total represents 170% of the previous five-year average of 3,196 and 160% of previous ten-year average of 3,396. Of these fish, 4,794 were unmarked, which is 161% of the five-year average of 2,985 and 175% of the ten-year average of 2,732. Marked fish encountered at the North Fork Dam were primarily strays from Clackamas Hatchery and were either transferred to the hatchery for use as broodstock or released at the river mouth to allow for additional harvest opportunities. Only unmarked fish were allowed to pass upstream of the dam to spawn naturally.

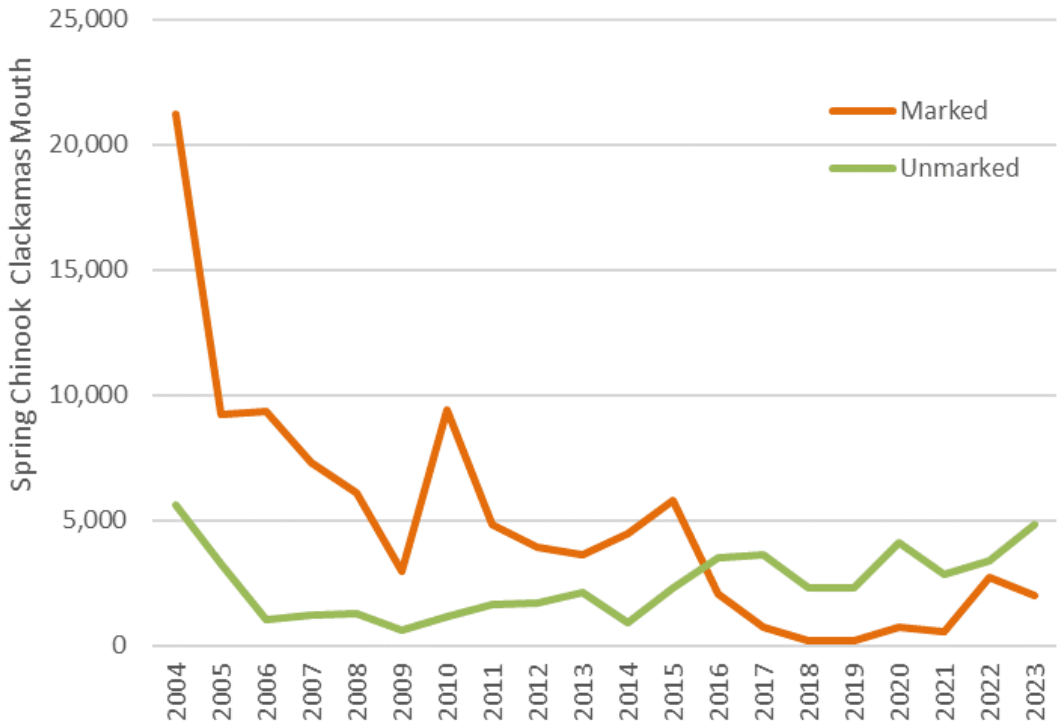

Figure 6. Estimates of adult spring Chinook salmon returns to the Clackamas River, by origin, Clackamas River, Oregon, 2004-2023.

Table 4. Run reconstruction for adult spring Chinook salmon, by origin, with previous five- and ten-year averages, Clackamas River, Oregon, 2013 – 2023.

	WILD/UNMARKED				HATCHERY/MARKED					TOTALS	
YEAR	Dam Count	Nat. Spawn	Rel. Mort.	Total	Dam Count	Nat. Spawn	Harvest	Hatchery Returns	Total	Total Run	Percent Wild
2013	2,126	7	16	2,149	1,388	4	368	1,870	3,630	5,779	37%
2014	888	14	5	907	1,210	19	307	2,937	4,473	5,380	17%
2015	2,310	5	6	2,321	1,944	4	412	3,448	5,808	8,129	29%
2016	3,481	6	3	3,490	846	1	42	1,186	2,075	5,565	63%
2017	3,586	6	17	3,609	201	0	86	470	757	4,366	83%
2018	2,313	15	1	2,329	77	1	7	114	199	2,528	92%
2019	2,278	18	1	2,297	52		0	138	190	2,487	92%
2020	4,092	2	0	4,094	145	0	0	620	765	4,859	84%
2021	2,857	0	1	2,858	212	0	4	350	566	3,424	83%
2022	3,387	8	2	3,397	566	1	13	2,153	2,733	6,130	55%
2023	4,794	61	1	4,856	628	7	8	1,381	2,024	6,880	71%
5 YR AVE				2,995					891	3,886	77%
10 YR AVE				2,745					2,120	4,865	56%

Table 5. Age distribution of marked adult and jack spring Chinook salmon returning to the Clackamas River, Oregon, 2023.

	NUMBER	PERCENT
AGE 3	400	5.5%
AGE 4	4,573	63.1%
AGE 5	2,276	31.4%
AGE 6	0	0.0
TOTAL	7,249	

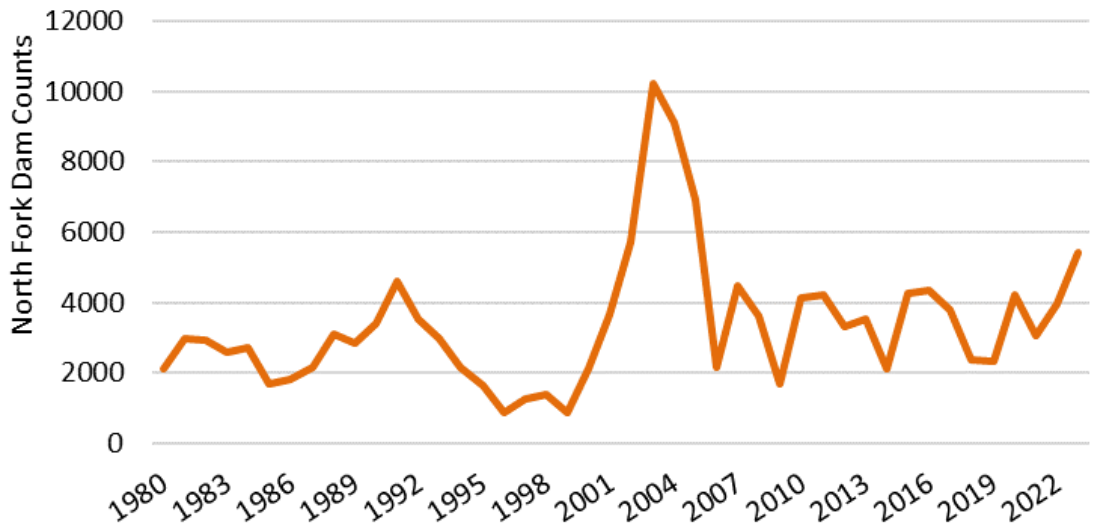

Figure 7. Willamette spring Chinook salmon escapement to North Fork Dam, Clackamas River, Oregon, 1980-2023.

Table 6. Adult spring Chinook salmon returns to the North Fork Dam with previous five- and ten-year averages, Clackamas River, Oregon, 2013-2023

	HATCHERY/MARKED		WILD/UNMARKED		
YEAR	**Dam Count**	**Percent**	**Dam Count**	**Percent**	**Total**
2013	1,388	39%	2,126	61%	3,514
2014	1,210	58%	888	42%	2,098
2015	1,944	46%	2,310	54%	4,254
2016	846	20%	3,481	80%	4,327
2017	201	5%	3,586	95%	3,787
2018	77	3%	2,313	97%	2,390
2019	52	2%	2,278	98%	2,330
2020	145	3%	4,092	97%	4,237
2021	212	7%	2,857	93%	3,069
2022	566	14%	3,387	86%	3,953
2023	628	12%	4,794	88%	5,422
5-YR AVE	210	7%	2,985	93%	3,196
10-YR AVE	664	20%	2,732	80%	3,396

North Santiam River

The North Santiam River joins the South Santiam River near Jefferson, Oregon, forming the Santiam River, which flows into the Willamette River at river kilometer 174, about 19 kilometers north of Albany, Oregon. The North Santiam River was identified in the FMEP as a basin that historically supported production of Upper Willamette River (UWR) spring Chinook salmon. It remains an important basin for natural production today; however current populations likely do not meet critical or interim viability thresholds for abundance (ODFW 2001).

Since the construction of Detroit and Big Cliff dams in the 1950s, more than 70% of the river's historic spawning habitat has been lost due to blocked access to upstream reaches. The habitat that remains downstream of the dams is further degraded by altered flow regimes and elevated water temperatures due to dam operations. These changes reduce the quality and availability of suitable spawning and rearing conditions for native fish populations.

Beginning in 1999, all hatchery fish released in the North Santiam River were marked with an adipose fin clip. The first year all returning hatchery origin jack and adults were marked was 2004, after which time estimates of returning wild and hatchery spring Chinook salmon was possible. Since that time, both the marked and unmarked populations have shown high variability in annual adult returns (Figure 8, Appendix 4). Unmarked adult estimates ranged 113 in 2008 to 1,681 in 2014 while the marked population has ranged from 1,295 in 2008 to 16,068 in 2004.

The estimated return of spring Chinook salmon to the North Santiam River in 2023 was 6,327 adults (Table 7). This estimate is 116% of the previous five-year average of 5,472 adults and 103% of the previous ten-year average of 6,116 adults. Of these fish, 1,266 were unmarked, which is 136% of the 5-year average of 934 returns and 120% of the 10-year average of 1,058. The

estimated number of marked adults returning was 5,061 which is 112% of the 5-year average of 4,538 and consistent with the 10-year average of 5,058 adults.

A total of 5,930 adult spring Chinook salmon were reported passing the upper and lower Bennett Dams in 2023 (Table 8). These counts are 118% of the previous five-year average of 5,025 fish and 109% of the previous ten-year average of 5,426 fish. A total of 1,248 unmarked adult spring Chinook salmon were counted at the dams, which is 136% of the previous five-year average of 918 and 120% of ten-year average of 1,037. There were 4,682 marked adults counted which is 114% of the 5-year average of 4,107 and 107% of the 10-year average of 4,389 adults. Dam counts are not available for the lower and upper Bennett Dams from 2006 – 2009 and were estimated using methods described in Oregon 2020.

Redd counts of spring Chinook salmon in the North Santiam River were not conducted by the Oregon Department of Fish and Wildlife in 2023. Counts from the previous ten years are presented in Table 9. The number of naturally spawning fish used in the North Santiam run reconstruction (Table 7) is an average for the previous 5-years.

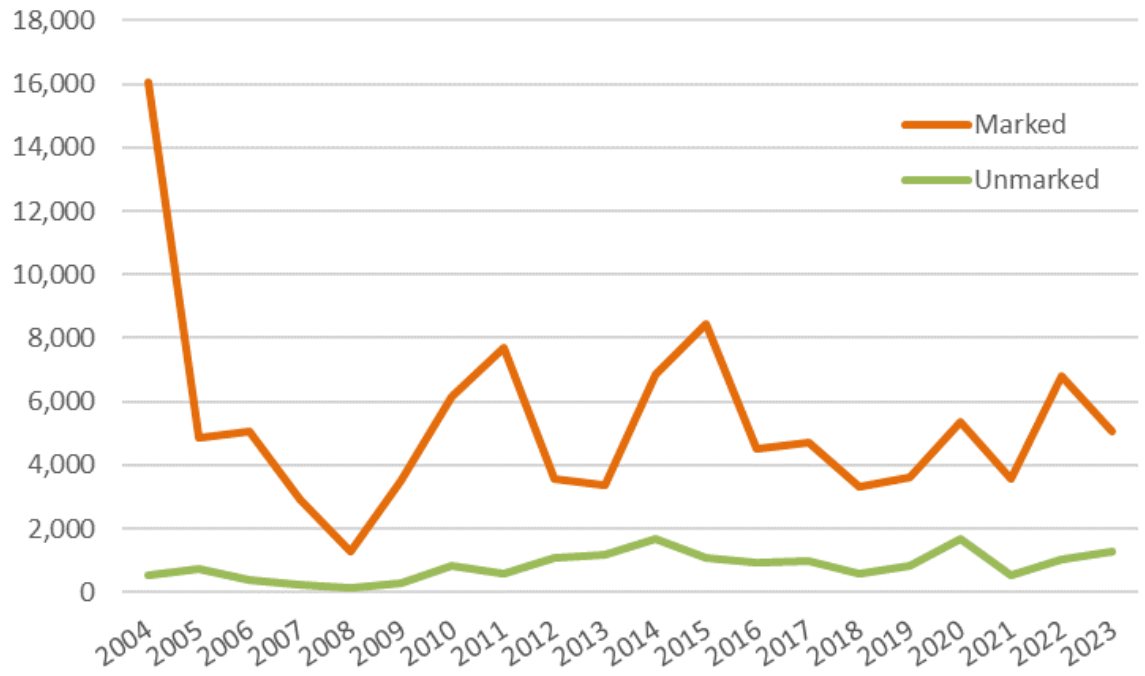

Figure 8. Estimate of adult spring Chinook salmon escapement, by origin, to the North Santiam River, Oregon, 2004-2023.

Table 7. Run reconstruction for adult spring Chinook salmon, by origin, with previous five- and ten-year averages, North Santiam River, Oregon, 2013 – 2023.

	WILD/UNMARKED				HATCHERY/MARKED				TOTALS	
YEAR	Dam Count	Nat. Spawn	Rel. Mort.	Total	Dam Count	Nat. Spawn	Harvest	Total	Total Run	Percent Wild
2013	1,167	6	12	1,186	3,100	2	293	3,395	4,580	25.9%
2014	1,630	9	41	1,680	5,421	11	1,403	6,835	8,515	19.7%
2015	1,074	5	27	1,106	6,687	10	1,741	8,438	9,544	11.6%
2016	921	5	14	940	3,941	6	565	4,512	5,451	17.2%
2017	987	2	13	1,002	4,204	5	499	4,708	5,710	17.5%
2018	573	4	6	582	3,022	29	266	3,317	3,899	14.9%
2019	829	11	13	853	3,149	31	449	3,629	4,482	19.0%
2020[1]	1,638	6	15	1,659	4,941	15	412	5,368	7,028	23.6%
2021[1]	529	6	9	544	3,100	16	477	3,593	4,137	13.1%
2022[1]	1,019	6	8	1,033	6,324	19	437	6,780	7,813	13.2%
2023[1]	1,248	7	11	1,266	4,682	22	357	5,061	6,327	20.0%
5 YR AVE				934				4,538	5,472	17.1%
10 YR AVE				1,058				5,058	6,116	17.3%

[1] Number of natural spawners were estimated using previous 5-year average.

Table 8. Combined adult spring Chinook salmon counts at the lower and upper Bennett Dams with previous five- and ten-year averages, North Santiam River, Oregon, 2013-2023.

	HATCHERY/MARKED		WILD/UNMARKED		
YEAR	Dam Count	Percent	Dam Count[1]	Percent	Total
2013	3,100	72.7%	1,167	27.3%	4,267
2014	5,421	76.9%	1,630	23.1%	7,051
2015	6,687	86.2%	1,074	13.8%	7,761
2016	3,941	81.1%	921	18.9%	4,862
2017	4,204	81.0%	987	19.0%	5,191
2018	3,022	84.1%	573	15.9%	3,595
2019	3,149	79.2%	829	20.8%	3,978
2020	4,941	75.1%	1,638	24.9%	6,579
2021	3,100	85.4%	529	14.6%	3,629
2022	6,324	86.1%	1,019	13.9%	7,343
2023	4,682	79.0%	1,248	21.0%	5,930
5-YR AVE	4,107	81.7%	918	18.3%	5,025
10-YR AVE	4,389	80.9%	1,037	19.1%	5,426

Table 9. Redd counts of spring Chinook salmon in the North Santiam River, 2013-2023.

YEAR	NORTH SANTIAM: STAYTON TO MINTO	LITTLE NORTH FORK OF THE SANTIAM	TOTAL
2013	362	--	362
2014	478	--	478
2015	239	--	239
2016	411	--	411
2017	230	--	230
2018	198	--	198
2019	351	--	351
2020[1]	---	--	---
2021[2]	---	--	---
2022[2]	---	--	---
2023[2]	---	---	---
5-YR AVE			275
10-YR AVE			324

[1]Counts were not conducted in 2020 due to wildfires.
[2]Counts not conducted 2021-2023.

McKenzie River

The McKenzie River is a major tributary of the Willamette River with its confluence at river kilometer 282 near the city of Eugene. Historically the McKenzie River was one of the the basins identified by the FMEP that produced wild upper Willamette spring chinook salmon. Today, the McKenzie River is considered to be the most important of these basins accounting for half the production potential for the UWR ESU and a wild population that exceeds critical viability thresholds for abundance and productivity most years (ODFW 2001). Limiting this population of spring Chinook salmon is the loss of available habitat to two thirds of its original capacity and dam operations that reduced habitat quality in those areas due to thermal and flow effects (NMFS 2000).

Beginning with the 1997 brood year (1999 release year) all hatchery origin spring Chinook salmon released in the Willamette basin were marked, which includes the McKenzie River. The first year all returning hatchery origin jack and adults were marked was 2004, after which time estimates of returning wild and hatchery spring Chinook salmon to the McKenzie River were possible. Since 2004, both the marked and unmarked populations have demonstrated similar variability in annual adult returns (Figure 9, Appendix 5). Unmarked adult estimates ranged from 1,117 in 2014 to 5,082 in 2004 while the marked population has ranged from 1,222 in 2023 to 14,324 in 2004.

The 2023 estimated return to the McKenzie River was 3,750 adult spring Chinook salmon (Table 10). This estimate is 48% of the previous 5-year average of 7,810 fish and 49% of the previous 10-year average of 7,579 fish. An estimated 2,528 returning adults were unmarked which is approximately 118% of the previous five- year averages of 2,148 and 138% of the previous 10-year average of 1,835. The estimated return of marked adults was 1,222 which is 22% of the 5-year average of 5,662 adult returns and 21% of the 10-year average of 5,744 adults returning to the McKenzie River.

Since 2020, returns to McKenzie Hatchery have declined substantially, largely due to very limited attractant water at the facility. As a result, broodstock collection has increasingly relied on fish captured at Leaburg Dam and Leaburg Hatchery to supplement the lower numbers returning to McKenzie Hatchery. The decline in hatchery returns has coincided with an increase in the number of marked (hatchery-origin) fish spawning naturally downstream of Leaburg Dam (Table 10). Spawning surveys conducted by ODFW show higher redd densities (redds/mile) in this reach, along with a relatively high proportion of marked carcasses, indicating greater hatchery fish contribution to the natural spawning population in these areas.

Counts of spring Chinook salmon at Leaburg Dam on the McKenzie River have been recorded continuously since 1990 (Figure 10), providing a valuable long-term dataset that highlights substantial year-to-year variability in returns. Over this period, annual counts have ranged widely, from a low of 1,176 to a high of 9,913. These counts play an integral role in developing run reconstructions for the McKenzie River by accounting for the number of fish escaping above the McKenzie and Leaburg Hatcheries to spawn naturally.

In 2023, the number of adult spring Chinook salmon escaping to Leaburg Dam was 2,267 fish (Table 11). This total is 73% of the previous five-year average of 3,118 and 86% of the ten-year average of 2,638. Of the 2023 total, an estimated 1,852 unmarked spring Chinook salmon escaped to Leaburg Dam which is consistent with the previous 5-year average of 1,876 adults and 113% of the previous 10-year average of 1,638 adults. The number of unmarked spring Chinook salmon escaping above Leaburg Dam is below the escapement goal of 3,000-5,000 fish specified in the McKenzie River Basin Fish Management Plan for Spring Chinook (ODFW 1998), but well above the viable salmonid population threshold of 600 UWR spring Chinook salmon outlined in the FMEP (ODFW 2001). The number of marked fish counted was 415, which is 33% of the 5-year average of 1,243 fish and 42% of the 10-year average of 999 returns. The number of marked fish observed at Leaburg Dam does not directly reflect the overall size of the hatchery population. Because these fish are released downstream of the dam, only a portion of the population migrates back and is encountered at this location. As a result, these counts should be interpreted as a general reference or indicator rather than an exact measure of total hatchery abundance.

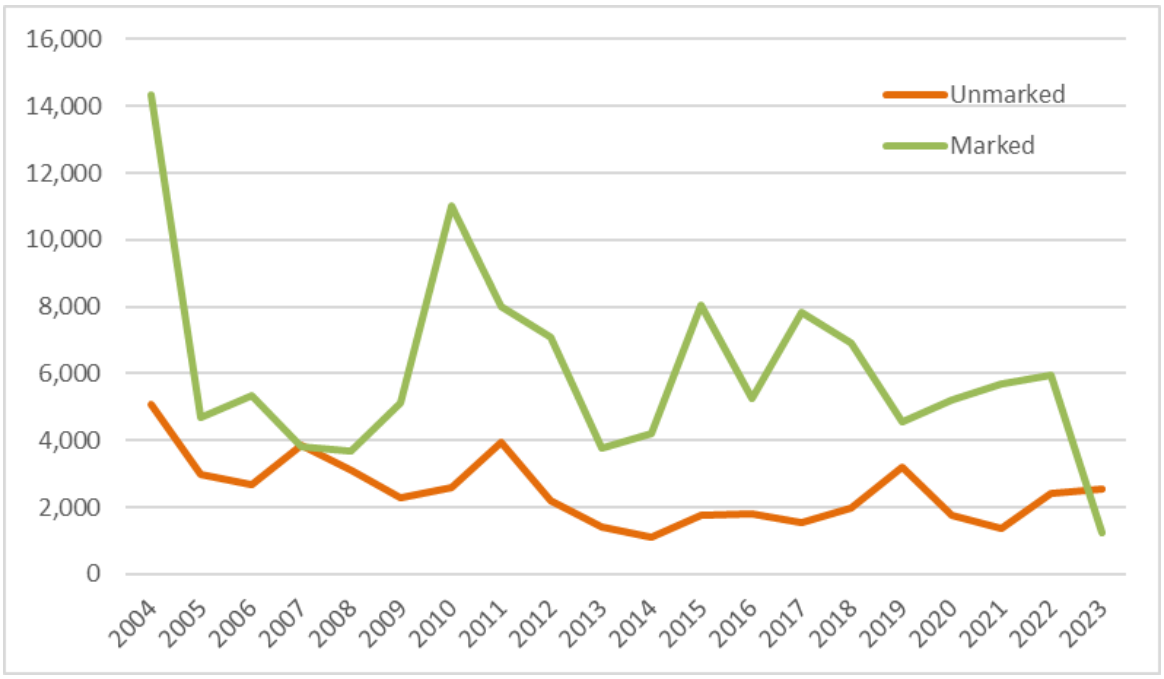

Figure 9. Estimate of adult spring Chinook salmon returns, by origin, to the McKenzie River, Oregon, 2004-2023.

Table 10. Run reconstruction for adult spring Chinook salmon, by origin, with previous five- and ten-year averages, McKenzie River, Oregon, 2013 – 2023.

	WILD/UNMARKED				HATCHERY/MARKED					**TOTALS**	
YEAR	**Dam Count**	**Nat. Spawn**	**Rel. Mort.**	**Total**	**Dam Count**	**Nat. Spawn**	**Harvest**	**Hatchery Returns**	**Total**	**Total Run**	**Percent Wild**
2013	1,236	158	28	1,422	293	502	604	2,367	3,766	5,188	26%
2014	1,003	94	20	1,117	487	374	626	2,718	4,205	5,322	39%
2015	1,589	143	17	1,749	1,092	233	645	6,070	8,040	9,788	33%
2016	1,698	67	25	1,790	1,360	408	604	2,899	5,271	7,061	50%
2017	1,479	33	19	1,530	546	80	783	6,442	7,851	9,381	46%
2018	1,838	115	34	1,987	469	345	960	5,135	6,909	8,896	31%
2019	2,986	114	89	3,189	2,276	243	1,033	986	4,538	7,727	19%
2020[1]	1,528	196	54	1,778	1,166	1,439	1,291	1,309	5,205	6,983	33%
2021	1,184	122	79	1,384	1,074	1,094	2,654	884	5,706	7,090	24%
2022	1,843	441	117	2,400	1,228	1,322	2,372	1,033	5,955	8,355	27%
2023	1,852	607	69	2,528	415	273	272	262	1,222	3,750	21%
5 YR AVE				2,148					5,662	7,810	18%
10 YR AVE				1,835					5,744	7,579	25%

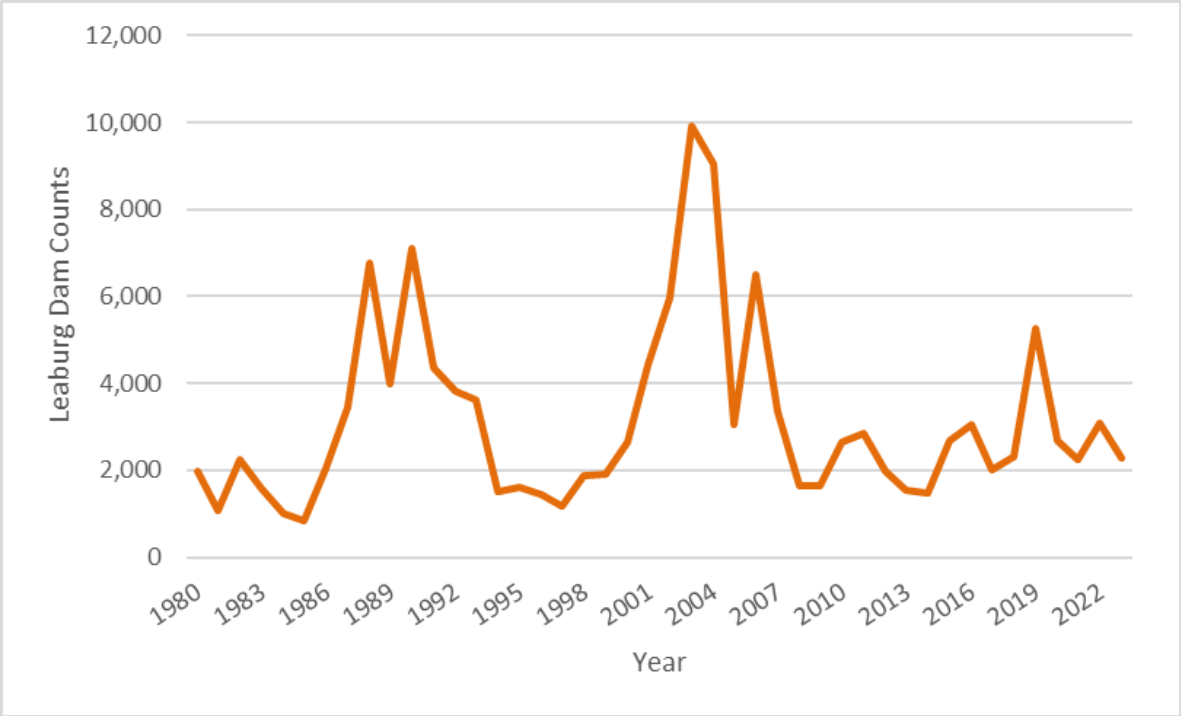

Figure 10. Spring Chinook salmon returns to Leaburg Dam, McKenzie River, Oregon, 1980-2023.

Table 11. Adult spring Chinook salmon counts at Leaburg Dam with previous five- and ten-year averages, McKenzie River, Oregon, 2013-2023.

	WILD/UNMARKED		HATCHERY/MARKED		
YEAR	**Number**	**Percent**	**Number**	**Percent**	**Total**
2013	1,236	81%	293	19%	1,529
2014	1,003	67%	487	33%	1,490
2015	1,589	59%	1,092	41%	2,681
2016	1,698	56%	1,360	44%	3,058
2017	1,479	73%	546	27%	2,025
2018	1,838	80%	469	20%	2,307
2019	2,986	57%	2,276	43%	5,262
2020	1,528	57%	1,166	43%	2,694
2021	1,184	52%	1,074	48%	2,258
2022	1,843	60%	1,228	40%	3,071
2023	1,852	82%	415	18%	2,267
5 YR. AVE.	1,876	60%	1,243	40%	3,118
10 YR. AVE	1,638	62%	999	38%	2,625

2023 Fisheries Indicators

Introduction

The Willamette FMEP, implemented in 2001, calls for mark-selective fisheries for hatchery spring Chinook salmon. Beginning in 2001, only adipose fin-clipped spring Chinook salmon were allowed to be retained in freshwater recreational fisheries and in 2002 freshwater commercial fisheries followed suit. All unmarked fish must be released unharmed in these fisheries. The goal of Willamette Basin fishery management for spring Chinook salmon is to limit fishery impacts on wild fish to levels that ensure the survival and rebuilding of wild populations while providing fishery access to abundant hatchery fish. An average annual impact rate of less than 15% in combined freshwater fisheries in the Willamette Basin and lower Columbia was established to achieve this goal. The expectation for fisheries is described in detail in ODFW/WDFW February 2023 Joint Staff Report.

The majority of catch in these fisheries occurs well before the peak of migration over Willamette Falls and up the Clackamas River. This late migration precludes early updating of the run size for use in in-season management. As a result, these fisheries are managed based on preseason expectations (Figure 3, Table 2). The 2023 preseason forecast for Willamette River spring Chinook salmon was for a total of 73,019 fish to the Columbia River mouth, 25% (18,399) of the run was expected to be of wild origin and 75% (54,620) hatchery origin (Table 2). To allocate how many fish are available for commercial and recreational harvest below Willamette Falls on a given year, the UWR FMEP developed a sliding scale allocation schedule which uses the predicted hatchery population and allocates shares (Appendix 6). For 2023, using the allocation schedule for the predicted return of 54,620 hatchery origin Willamette spring Chinook salmon to the mouth of the Columbia River, a total of 24,000 hatchery spring Chinook salmon was required to pass Willamette Falls and another 3,600 to the Clackamas River for a total of 27,600 fish. A projected surplus of 27,020 hatchery fish were available for harvest. The surplus was to be allocated 76% to recreational fisheries downstream of Willamette Falls including the lower Columbia River. The remaining 24%was allocated to commercial fisheries in the lower Columbia River.

Standardized mortality rates for captured and released fish were established to estimate the impact the fishery has on the wild UWR spring Chinook salmon population. For released salmon in Columbia River recreational fisheries the mortality rate is assumed to be 10%. Estimated commercial fishery release mortality rates for spring Chinook salmon are 40% in large-mesh gill nets and 14.7% in tangle nets (ODFW/WDFW 2008). In the Willamette Basin, the estimated mortality rate for released fish in the Willamette Basin recreational fisheries is 12.2% (Lindsay et al. 2003).

Identifying Willamette River spring Chinook salmon in the lower Columbia River fisheries is one of the challenges in determining a final impact rate. Stock separations are made by field staff monitoring the commercial and recreational harvest using the visual stock identification (VSI) method and verified by coded-wire-tag (CWT) analyses (WDF, 1990). The CWT corrected VSI stock ratio was applied to the final wild release mortality estimates in the lower Columbia River to determine the impact rates for Willamette River spring Chinook salmon in the lower Columbia River recreational fishery.

Lower Columbia Commercial Fishery

No mainstem Columbia River commercial gillnetting season occurred for spring Chinook salmon in 2023. Existing Commission guidance limits the commercial impacts to upriver spring Chinook salmon to 20% of the non-treaty total and prioritizes use of these impacts in Select Area commercial fisheries.

Select Area Fishery

Commercial fisheries for net-pen reared spring Chinook salmon occurred in 2023 in Youngs Bay, Blind Slough/Knappa Slough and Tongue Point/South Channel (collectively known as the Select Area fishery). The Select Area fisheries are not mark-selective. These off-channel net pen and fishing sites are dominated by returns of local hatchery origin spring Chinook salmon released in these areas to provide commercial fishing opportunities without having large impacts on wild stocks. A total of 20,089 Chinook were caught in 2023 winter/spring/summer Select Area commercial fisheries, including an estimated 596 adult Willamette spring Chinook salmon. Catch rates for the lower Columbia River recreational fishery were used as a surrogate to estimate the percent of the Willamette River spring Chinook salmon that were captured in the Select Area Fisheries that were wild origin. Using this information, an estimated 15.6% of the adult Willamette spring Chinook salmon catch in the Select Area fishery was comprised of wild/unmarked fish which resulted in an estimated mortality of 93 fish in 2023 (Table 12).

Lower Columbia Recreational Fishery

The 2023 lower Columbia River recreational spring Chinook salmon fishery was open under mark-selective, adipose fin-clipped-only regulations. The fishery was managed under a pre-season forecast of 198,600 fish to the mouth of the Columbia River which included 71,000 adult spring Chinook salmon destined for the Willamette River. The sport fishery was open seven days per week during the months of January and February under permanent regulations with a two fish bag limit from Buoy 10 to the I-5 Bridge. The season was extended from March 1–April 11 for the lower Columbia River between Buoy 10 and Beacon Rock, plus the Oregon and Washington banks between Beacon Rock and Bonneville Dam. The two-fish daily bag limit was modified to one adult spring Chinook salmon effective March 1. A second extension was adopted for additional fishing days for the period from May 19-31 from Tongue Point upstream to Bonneville Dam. The final catch in the 2023 recreational fishery below Bonneville Dam through June 15 was 6,929 adult spring Chinook salmon (5,810 kept and 1,119 released) from 60,477 angler trips (ODFW/WDFW 2024).

Catch estimates are derived from creel surveys on the Columbia River below Bonneville Dam. Of the 2023 catch in the lower Columbia River an estimated 703 adipose fin-clipped adult Willamette spring Chinook salmon were retained and 130 were released. Applying the standard post release mortality rate for the lower Columbia River of 10%, the estimated mortality for unmarked Willamette spring Chinook salmon was 13 adult fish (Table 12).

Lower Willamette Recreational Fishery

The 2023 lower Willamette River (below Willamette Falls) opened for retention of spring Chinook salmon seven days per week the entire year. This was the twentieth consecutive year of full implementation of a mark-selective spring Chinook salmon fishery. Partial-season mark-selective fisheries occurred in 2000 and 2001.

ODFW Research and District staff conducted a study of post-release mortality of Chinook salmon in the lower Willamette recreational fishery during 1998-2000 (Lindsay et al. 2003). Estimates of hooking mortality by anatomical hook locations were made from catch and release of recreational caught fish immediately below Willamette Falls and compared to uncaught fish in a control situation from a trap in the Willamette Fall's fishway. Concurrently, ODFW recreational fish samplers in the lower Willamette recreational fishery noted anatomical hooking locations from landed Chinook. Applying the estimates of hooking mortality rates made at Willamette Falls to the distribution of hook locations in the recreational fishery provided an estimated 12.2% catch-and-release hooking mortality in the lower Willamette River recreational fishery. The 12.2% rate has been used to estimate the fishery impact on released fish in the lower Willamette River, upper Willamette, and Willamette tributary recreational fisheries since 2002.

Catch estimates are derived from angler creel surveys with all unmarked fish released by anglers assumed to be wild fish. The effect of unmarked hatchery fish being included in this group has not yet been analyzed. An estimated 68,319 angler trips were made to catch 7,976 adult spring Chinook salmon in 2023. A total of 6,107 (77%) were kept adipose fin clipped adults and 1,869 (23%) were released unmarked adults. Applying the standard post release mortality rate for the Willamette River of 12.2%, the mortality of Willamette wild adult spring Chinook salmon was estimated at 228 adult fish (Table 12).

Clackamas Recreational Fishery

The lower Clackamas River fishery was open to salmon angling seven days per week the entire year, catch limits were a combined daily limit of 3 hatchery salmon or hatchery steelhead per day. Catch estimates were derived from angler creel surveys with all unmarked fish released by anglers assumed to be wild origin. There were an estimated 15 spring Chinook salmon caught in the 2023 lower Clackamas River recreational fishery from 1,212 anglers. A total of 8 (53%) spring Chinook salmon were kept adipose fin-clipped adults and 7 (47%) were released unmarked adults. Applying the standard post release mortality rate for the Willamette River and its tributaries of 12.2%, the mortality of adult Clackamas wild spring Chinook salmon was estimated at 1 fish (Table 12).

Upper Willamette Mainstem Recreational Fishery

The 2023 upper Willamette mainstem recreational fishery (from Willamette Falls upstream to the mouth of the McKenzie River) was restricted to retention of adipose fin-clipped Chinook the entire year. This fishery was open seven days per week with regulations consistent with the lower Willamette River. Participation in the recreational fishery in the upper Willamette is typically much less than what is witnessed in the lower Willamette.

The recreational fisheries above Willamette Falls have not been sampled for harvest since 2004 which makes estimating the impacts to wild fish above Willamette Falls problematic. To estimate wild impacts, encounter rates of hatchery fish in these fisheries have been used as a surrogate for wild fish. Harvest data derived from angler harvest cards were used to calculate hatchery impact rates which were then applied to the estimated number of unmarked fish returning to each basin. The resultant product was then multiplied by the standard mortality rate for the Willamette River (12.2%) to estimate wild impacts. Because this method calculates the number of wild fish released based on encounter rates, the estimate should not be influenced by unmarked hatchery fish being counted in the catch, as is the case with estimates generated by creel surveys. Key assumptions for this method are that the encounter rates for hatchery and wild fish in the fishery are equivalent and angler harvest cards provide an accurate accounting of the number of fish harvested, both of which are untested at this time.

The estimated 2023 catch of adult spring Chinook salmon in the mainstem Willamette River above Willamette Falls was 280 fish (Table 12). Of the total, 231 (83%) were estimated to be kept adipose fin-clipped adults and 49 (17%) were released unmarked adults. Applying the standard post release mortality rate for the Willamette River of 12.2%, the estimated mortality of wild spring Chinook salmon from the 2023 sport fishery in the upper Willamette was 6 adults (Table 12).

Upper Willamette Tributary Recreational Fishery

All tributary recreational fisheries in the Willamette Basin have been restricted to retention of adipose fin-clipped spring Chinook salmon since 2002. In 2023, the North Santiam fishery was open from Jan. 1 – August 31 and October 15 – December 31 for hatchery, adipose fin-clipped Chinook salmon while the McKenzie River was open from Jan. 1 – July 14 for hatchery, adipose fin-clipped Chinook. Angler surveys are not conducted in these areas so estimates of impacts on Willamette wild spring Chinook salmon in the North Santiam and McKenzie rivers were made using methods described for the upper Willamette mainstem recreational fishery.

The estimated 2023 catch of spring Chinook salmon in the North Santiam River was 447 adult fish (Table 12). Of the total 357 (80%) were kept adipose fin-clipped and 90 (20%) were released unclipped fish. Applying the standard post release mortality rate of 12.2%, the estimated mortality of wild spring Chinook salmon in the North Santiam was 11 fish (Table 12).

The estimated 2023 catch of spring Chinook salmon in the McKenzie River was 778 adult fish (Table 12). Of the total 272 (35%) were kept adipose fin-clipped and 566 (65%) were released unmarked fish. The estimated mortality of wild spring Chinook salmon in the McKenzie River was 69 adult fish (Table 12).

Table 12. 2023 adult Willamette spring Chinook freshwater catches and impacts on wild fish returns.

Fishery	Catch		Wild Fish Mortalities [1]	Percent Impact on Wild Return [2]
	Kept	Released		
Select Area Commercial	596	0	93	0.76%
Lower Columbia Recreational	703	130	13	0.11%
Lower Willamette Recreational	6,107	1,869	228	1.86%
	7,406	1,999	334	2.72%
Clackamas Recreational	8	7	1	0.01%
Upper Willamette Recreational	231	49	6	0.05%
North Santiam Recreational	357	90	11	0.09%
McKenzie Recreational	272	566	69	0.56%
	868	712	87	0.71%
Totals by Population				
Clackamas				2.73%
North Santiam				2.86%
McKenzie				3.33%

[1] *Estimated release mortality rates are 10% in the lower Columbia recreational fisheries and 12.2% in the Willamette and tributary recreational fisheries. Release mortalities for commercial fisheries vary by gear type used (14.7% and 40%).*

[2] *Aggregate wild return estimated at 12,278 adults at the mouth of the Columbia River (31.9 %) of the total 2023 Willamette spring Chinook adult run of 38,378 . Wild return to the Clackamas River estimated at 4,814 adults (70.3 %) of the 6,849 Clackamas adult return.*

2023 Total Wild Impacts

The goal of Willamette Basin fishery management for spring Chinook salmon is to limit fishery impacts on wild fish to an average annual impact rate of less than 15% in the Willamette Basin and lower Columbia Rivers. For 2023, the impact from the combined Columbia and Willamette freshwater fishery was 3.6% (Table 13). The lower Willamette recreational fishery had the highest wild impact rate in 2023 with 1.9%, which represents 53% of the total. The average impacts over the last ten years indicates that the lower Columbia River commercial and lower Willamette recreational fishery account for most of the wild impacts on the Willamette River spring Chinook salmon population with a combined total impact rate of 76% of the total. The total impact rates for the three primary tributaries remained low in 2023 with the Clackamas, North Santiam, and McKenzie Rivers of 2.7%, 2.9% and 3.3%, respectively (Table 13). Most of the impacts to these populations are occurring outside the tributaries as the in-river impact rates are low (0.0%, 0.1%, 0.6% for the Clackamas, North Santiam, and McKenzie Rivers, respectively). The Clackamas River has seen very little fishing pressure with the collapse of the hatchery spring Chinook salmon run which has resulted in low or no impact on the wild population. Of the three tributaries the McKenzie has the most angling pressure which is evidenced by the higher impact rates.

The estimated number of wild adult Willamette spring Chinook salmon returning to the mouth of the Columbia River is used to calculate the wild impact rates for the Willamette and lower Columbia fisheries. This rate is calculated by combining escapement to Willamette Falls and the Clackamas River and adding estimated mortality from the lower Willamette and Columbia Rivers (Table 14). For 2023 the estimated number of wild adult Willamette spring Chinook salmon to the mouth of the Columbia River was 12,279.

Estimates of wild fish handled in fisheries where catch is estimated by creel surveys (or observer programs) are derived by assuming that 100% of released fish are wild. Calculating the true number of wild fish handled by such fisheries is confounded by the presence of a small number of unmarked hatchery fish, which would be counted as wild. This would cause the handle and mortality of wild fish to be slightly overestimated and would also slightly overestimate the abundance of wild fish. Whether these two effects cancel each other out, result in additive errors, or cause directional bias has not been evaluated.

Table 13. Percent freshwater fishery impact on wild Willamette River spring Chinook salmon, 2013-2023.

FISHERY	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	AVERAGE
L. COL. COMMERCIAL [1]	3.1	1.4	1.3	0.8	0.9	0.9	1.3	1.6	0.4	0.8	**0.8**	**1.2**
L. COL. RECREATIONAL	0.3	0.5	0.3	0.2	0.1	0.3	0.1	0.1	0.2	0.2	**0.1**	**0.3**
L. WILLAMETTE	1.6	2.0	1.6	1.3	1.5	1.6	2.3	1.7	1.8	1.7	**1.9**	**1.8**
CLACKAMAS	0.2	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	**0.0**	**0.1**
U. WILLAMETTE	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	**0.1**	**0.1**
N. SANTIAM	0.1	0.5	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	**0.1**	**0.2**
MCKENZIE	0.3	0.2	0.1	0.2	0.2	0.3	0.8	0.2	0.4	0.9	**0.6**	**0.4**
TOTAL	**5.7**	**4.8**	**3.7**	**2.8**	**3.1**	**3.3**	**4.8**	**3.8**	**3.0**	**3.8**	**3.6**	**4.0**
TOTALS BY POPULATION												
CLACKAMAS	5.1	4.0	3.2	2.3	2.6	2.8	3.7	3.4	2.3	2.7	**2.7**	**3.3**
NORTH SANTIAM	5.1	4.5	3.4	2.5	2.7	2.9	4.0	3.6	2.5	2.8	**2.9**	**3.5**
MCKENZIE	5.3	4.2	3.3	2.6	2.8	3.1	4.6	3.7	2.8	3.6	**3.3**	**3.7**

[1] *Includes mainstem commercial and SAFE salmon fisheries through 2016. Beginning in 2017 includes SAF fisheries only.*

Table 14. Run reconstructions for unmarked Willamette River adult spring Chinook salmon, 2013-2023.

	Escapement		Mortality Below Falls					
Year	Willamette Falls	Clackamas River	Sea Lion	Pre-Spawn	Willamette R. Fishery	L. Columbia R. Fishery	Commercial	Total Columbia River Return
2013	6,974	2,258	138	31	157	27	306	9,892
2014	6,405	946	571	29	169	38	115	8,273
2015	9,065	2,467	920	115	226	39	175	13,007
2016	6,548	3,488	639	54	142	19	92	10,983
2017	5,914	3,603	375	46	150	9	90	10,188
2018	5,007	2,329	1,931	51	151	28	85	9,582
2019	6,429	2,297	249	19	210	12	123	9,340
2020	8,564	4,094	150	25	224	10	211	13,278
2021	4,511	2,874	217	29	137	14	39	7,812
2022	6,499	3,405	89	19	172	19	81	10,284
2023	7,034	4,814	76	21	228	13	93	12,279

2023 Angler Compliance with Regulations

Oregon State Police (OSP) Fish and Wildlife Division officers and their volunteers, with assistance from ODFW fish checkers and commercial fishery observers, enforce Willamette spring Chinook salmon angling regulations. A priority task is enforcement of the regulation requiring release of non-adipose-fin-clipped spring Chinook salmon in recreational fisheries. In 2023, the 2-rod validation was approved by the Oregon Fish Commission and was available for anglers to purchase. Compliance in both the sport and commercial fisheries was relatively high again in 2023.

Outlook for 2024 Willamette Spring Chinook Management

The 2024 Willamette spring Chinook salmon run size forecast is for a total run of 50,396 fish, including 9,766 (~19%) unmarked and 40,630 (~81%) marked fish. The forecast includes 1,607 age-3, 35,177 age-4, 13,527 age-5, and 86 age-6 fish. In December 2001, the Oregon Fish and Wildlife Commission established a long-term allocation plan between the lower Columbia commercial fishery and the recreational fishery below Willamette Falls (including the lower Columbia River) for sharing of the harvestable surplus of Willamette River hatchery spring Chinook salmon (Appendix 6). Harvestable surplus is calculated by subtracting the hatchery allocation goals from the total forecasted hatchery component of the run. For 2024, based on a forecast of 40,630hatchery origin returns of UWR spring Chinook salmon forecasted to the Columbia River the escapement goals to Willamette Falls and the Clackamas River are 22,000 and 3,300, respectively. This results in a harvestable surplus of 15,330. The sport harvest is allocated 85% of this surplus and the remaining 15% goes to commercial fisheries. (Appendix 6).

Mainstem and tributary spring Chinook salmon fisheries will continue to be mark-selective for adipose fin-clipped fish in 2024. All Willamette Basin recreational fisheries are restricted to adipose fin-clipped fish under permanent rule and regulations are printed as such in the *2024 Oregon Sport Fishing Regulations* pamphlet.

The cumulative freshwater fishery impact on Willamette wild spring Chinook salmon is expected to be below the maximum impact rate of 15% specified in the FMEP.

ODFW
June 2024

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Appendices

Appendix 1. Estimates of adult Willamette River spring Chinook salmon to the Columbia River, by origin, 2004-2023.

	HATCHERY/MARKED		WILD/UNMARKED		
YEAR	**Est. Number**	**Percent**	**Est. Number**	**Percent**	**Total**
2004	116,151	81.1%	27,091	18.9%	143,242
2005	45,529	76.6%	13,942	23.4%	59,471
2006	47,324	79.8%	11,988	20.2%	59,311
2007	30,187	75.6%	9,756	24.4%	39,943
2008	19,160	72.0%	7,453	28.0%	26,614
2009	27,062	76.4%	8,370	23.6%	35,432
2010	91,465	84.9%	16,210	15.1%	107,675
2011	60,662	79.2%	15,887	20.8%	76,549
2012	52,040	82.6%	10,997	17.4%	63,037
2013	34,988	78.0%	9,892	22.0%	44,880
2014	41,492	83.4%	8,273	16.6%	49,765
2015	71,525	84.6%	13,007	15.4%	84,532
2016	36,242	76.7%	10,983	23.3%	47,225
2017	40,586	79.9%	10,188	20.1%	50,774
2018	27,859	74.4%	9,582	25.6%	37,441
2019	18,131	65.8%	9,437	34.2%	27,568
2020	32,786	71.1%	13,309	28.9%	46,095
2021	33,496	81.1%	7,812	18.9%	41,308
2022	45,105	81.4%	10,287	18.6%	55,392
2023	26,094	68.0%	12,278	32.0%	38,372

Appendix 2. Estimates of adult spring Chinook salmon to Willamette Falls, by origin, 2004-2023.

	MARKED/HATCHERY		UNMARKED/WILD		
YEAR	**Count**	**Percent**	**Count**	**Percent**	**Total**
2004	75,876	79.1%	20,091	20.9%	95,967
2005	25,233	71.2%	10,220	28.8%	35,453
2006	26,655	72.3%	10,196	27.7%	36,851
2007	15,233	66.8%	7,585	33.2%	22,818
2008	8,845	62.5%	5,306	37.5%	14,151
2009	18,549	71.9%	7,246	28.1%	25,795
2010	51,447	78.8%	13,846	21.2%	65,293
2011	30,737	70.3%	13,011	29.7%	43,748
2012	27,499	76.6%	8,400	23.4%	35,899
2013	20,923	75.0%	6,974	25.0%	27,897
2014	23,666	78.7%	6,405	21.3%	30,071
2015	41,979	82.2%	9,065	17.8%	51,044
2016	23,769	78.4%	6,548	21.6%	30,317
2017	28,272	82.7%	5,914	17.3%	34,186
2018	19,536	79.6%	5,007	20.4%	24,543
2019	12,455	66.0%	6,428	34.0%	18,883
2020	25,323	74.7%	8,564	25.3%	33,887
2021	24,135	84.3%	4,511	15.7%	28,646
2022	30,558	82.5%	6,499	17.5%	37,057
2023	16,388	70.0%	7,034	30.0%	23,422

Appendix 3. Run reconstruction for adult spring Chinook salmon, by origin, Clackamas River, Oregon, 2004 – 2023.

	WILD/UNMARKED				HATCHERY/MARKED					TOTALS	
YEAR	Dam Count	Nat. Spawn	Rel. Mort	Total	Dam Count	Nat. Spawn	Harvest	Hatch. Returns	Total	Total Run	Percent Wild
2004	5,176	390	30	5,596	7,854	592	1,379	11,395	21,220	26,816	21%
2005	2,882	350	38	3,270	2,914	353	1,254	4,714	9,235	12,505	26%
2006	798	205	14	1,017	1,339	345	404	7,247	9,335	10,352	10%
2007	1,178	13	7	1,198	3,302	36	205	3,732	7,275	8,473	14%
2008	1,276	25	11	1,312	2,336	47	202	3,522	6,107	7,419	18%
2009	590	20	7	617	1,101	37	207	1,609	2,954	3,571	17%
2010	1,140	12	12	1,164	2,976	33	710	5,664	9,383	10,547	11%
2011	1,637	21	15	1,673	2,593	34	488	1,728	4,843	6,516	26%
2012	1,647	30	20	1,697	1,684	30	545	1,683	3,942	5,639	30%
2013	2,126	7	16	2,149	1,388	4	368	1,870	3,630	5,779	37%
2014	888	14	5	907	1,210	19	307	2,937	4,473	5,380	17%
2015	2,310	5	6	2,321	1,944	4	412	3,448	5,808	8,129	29%
2016	3,481	6	3	3,490	846	1	42	1,186	2,075	5,565	63%
2017	3,586	6	17	3,609	201	0	86	470	757	4,366	83%
2018	2,313	15	1	2,329	77	1	7	114	199	2,528	92%
2019	2,278	18	1	2,297	52	0	0	138	190	2,487	92%
2020	4,092	2	0	4,094	145	0	0	620	765	4,859	84%
2021	2,857	0	1	2,858	212	0	4	355	566	3,424	83%
2022	3,386	8	2	3,396	566	1	13	2,153	2,733	6,130	55%
2023	4,794	61	1	4,856	628	7	8	1,381	2,024	6,880	71%

Appendix 4. Run reconstruction for adult spring Chinook salmon, by origin, North Santiam River, Oregon, 2004 – 2023.

	WILD/UNMARKED				HATCHERY/MARKED				TOTALS	
YEAR	Dam Count	Nat. Spawn	Rel. Mort.	Total	Dam Count	Nat. Spawn	Harvest	Total	Total Run	Percent Wild
2004	489	17	48	553	13,042	53	2,973	16,068	16,621	3.3%
2005	667	46	8	721	4,215	175	448	4,838	5,559	13.0%
2006	372	30	6	408	4,283	113	662	5,058	5,466	7.5%
2007	210	35	4	248	2,419	131	356	2,906	3,155	7.9%
2008	110	3	0	113	1,263	13	12	1,288	1,401	8.1%
2009	245	59	5	309	2,812	210	503	3,525	3,834	8.1%
2010	744	87	13	844	5,065	308	807	6,180	7,024	12.0%
2011	515	54	6	575	6,846	191	655	7,692	8,267	7.0%
2012	1,014	24	21	1,059	2,923	55	609	3,587	4,646	22.8%
2013	1,167	6	12	1,186	3,100	2	293	3,395	4,580	25.9%
2014	1,630	9	41	1,680	5,421	11	1,403	6,835	8,515	19.7%
2015	1,074	5	27	1,106	6,687	10	1,741	8,438	9,544	11.6%
2016	921	5	14	940	3,941	6	565	4,512	5,451	17.2%
2017	987	2	13	1,002	4,204	5	499	4,708	5,710	17.5%
2018	573	4	6	582	3,022	29	266	3,317	3,899	14.9%
2019	829	11	13	853	3,149	31	449	3,629	4,482	19.0%
2020	1,638	6	15	1,659	4,941	15	412	5,368	7,028	23.6%
2021	529	6	9	544	3,100	16	477	3,593	4,137	13.1%
2022	1,019	6	8	1,033	6,324	19	437	6,780	7,813	13.2%
2023	1,248	7	11	1,266	4,682	22	357	5,061	6,327	20.0%

Appendix 5. Run reconstruction for adult spring Chinook salmon, by origin, McKenzie River, Oregon, 2004 – 2023.

	WILD/UNMARKED				HATCHERY/MARKED					TOTALS	
YEAR	**Dam Count**	**Nat. Spawn**	**Rel. Mort.**	**Total**	**Dam Count**	**Nat. Spawn**	**Harvest**	**Hatch Returns**	**Total**	**Total Run**	**Percent Wild**
2004	4,419	426	237	5,082	4,615	445	2,683	6,581	14,324	19,406	26%
2005	2,435	519	51	3,006	659	141	655	3,213	4,668	7,674	39%
2006	2,189	438	67	2,693	981	196	1,086	3,092	5,355	8,048	33%
2007	2,757	1,032	70	3,859	558	209	567	2,485	3,819	7,678	50%
2008	1,365	1,742	2	3,109	290	370	16	2,988	3,664	6,773	46%
2009	1,185	1,059	43	2,287	460	411	796	3,477	5,144	7,431	31%
2010	1,357	1,183	52	2,591	1,298	1,131	1,794	6,779	11,002	13,594	19%
2011	2,288	1,562	77	3,927	548	374	1,289	5,784	7,995	11,922	33%
2012	1,654	490	45	2,189	323	1,737	1,201	3,838	7,099	9,288	24%
2013	1,236	158	28	1,422	293	502	604	2,367	3,766	5,188	27%
2014	1,003	94	20	1,117	487	374	626	2,718	4,205	5,322	21%
2015	1,589	143	17	1,749	1,092	233	645	6,070	8,040	9,788	18%
2016	1,698	67	25	1,790	1,360	408	604	2,899	5,271	7,061	25%
2017	1,479	33	19	1,530	546	80	783	6,442	7,851	9,381	16%
2018	1,838	115	34	1,987	469	345	960	5,135	6,909	8,896	22%
2019	2,986	114	89	3,189	2,276	243	1,033	986	4,538	7,727	41%
2020	1,528	196	54	1,778	1,166	1,439	1,291	1,309	5,205	6,983	25%
2021	1,184	122	79	1,384	1,074	1,094	2,654	884	5,706	7,090	20%
2022	1,843	441	117	2,400	1,228	1,322	2,372	1,033	5,955	8,355	29%
2023	1,852	607	69	2,528	415	273	272	262	1,222	3,750	67%

Appendix 6. Willamette River spring Chinook salmon allocation schedule.

Predicted Willamette Hatchery Run Size	Hatchery Fish Escapement Targets			Number of Hatchery Fish Available	Harvest Shares Below the Falls			
	Willamette Falls Escapement Target	Clackamas Escapement Target	Combined Escapement Target		Recreational		Commercial	
					Share	Catch	Share	Catch
23,000	20,000	3,000	23,000	0	<1%	<230	<1%	<230
24,000	20,000	3,000	23,000	1,000	100%	1,000	<1%	<240
25,000	20,000	3,000	23,000	2,000	100%	2,000	<1%	<250
26,000	20,000	3,000	23,000	3,000	100%	3,000	<1%	<260
27,000	20,000	3,000	23,000	4,000	100%	4,000	<1%	<270
28,000	20,000	3,000	23,000	5,000	100%	5,000	<1%	<280
29,000	20,000	3,000	23,000	6,000	100%	6,000	<1%	<290
30,000	20,000	3,000	23,000	7,000	100%	7,000	<1%	<300
31,000	20,000	3,000	23,000	8,000	100%	8,000	<1%	<310
32,000	20,000	3,000	23,000	9,000	100%	9,000	<1%	<320
33,000	20,000	3,000	23,000	10,000	100%	10,000	<1%	<330
34,000	20,000	3,000	23,000	11,000	100%	11,000	<1%	<340
35,000	20,000	3,000	23,000	12,000	100%	12,000	<1%	<350
36,000	20,000	3,000	23,000	13,000	100%	13,000	<1%	<360
37,000	20,000	3,000	23,000	14,000	100%	14,000	<1%	<370
38,000	20,000	3,000	23,000	15,000	100%	15,000	<1%	<380
39,000	20,000	3,000	23,000	16,000	100%	16,000	<1%	<390
40,000	22,000	3,300	25,300	14,700	85%	12,495	15%	2,205
41,000	22,000	3,300	25,300	15,700	85%	13,345	15%	2,355
42,000	22,000	3,300	25,300	16,700	85%	14,195	15%	2,505
43,000	22,000	3,300	25,300	17,700	85%	15,045	15%	2,655
44,000	22,000	3,300	25,300	18,700	85%	15,895	15%	2,805
45,000	22,000	3,300	25,300	19,700	80%	15,760	20%	3,940
46,000	22,000	3,300	25,300	20,700	80%	16,560	20%	4,140
47,000	22,000	3,300	25,300	21,700	80%	17,360	20%	4,340
48,000	22,000	3,300	25,300	22,700	80%	18,160	20%	4,540
49,000	22,000	3,300	25,300	23,700	80%	18,960	20%	4,740
50,000	24,000	3,600	27,600	22,400	76%	17,024	24%	5,376
51,000	24,000	3,600	27,600	23,400	76%	17,784	24%	5,616
52,000	24,000	3,600	27,600	24,400	76%	18,544	24%	5,856
53,000	24,000	3,600	27,600	25,400	76%	19,304	24%	6,096
54,000	24,000	3,600	27,600	26,400	76%	20,064	24%	6,336
55,000	24,000	3,600	27,600	27,400	76%	20,824	24%	6,576
56,000	24,000	3,600	27,600	28,400	76%	21,584	24%	6,816
57,000	24,000	3,600	27,600	29,400	76%	22,344	24%	7,056
58,000	24,000	3,600	27,600	30,400	76%	23,104	24%	7,296
59,000	24,000	3,600	27,600	31,400	76%	23,864	24%	7,536
60,000	26,500	4,000	30,500	29,500	73%	21,535	27%	7,965
61,000	26,500	4,000	30,500	30,500	73%	22,265	27%	8,235
62,000	26,500	4,000	30,500	31,500	73%	22,995	27%	8,505
63,000	26,500	4,000	30,500	32,500	73%	23,725	27%	8,775
64,000	26,500	4,000	30,500	33,500	73%	24,455	27%	9,045
65,000	26,500	4,000	30,500	34,500	73%	25,185	27%	9,315
66,000	26,500	4,000	30,500	35,500	73%	25,915	27%	9,585
67,000	26,500	4,000	30,500	36,500	73%	26,645	27%	9,855
68,000	26,500	4,000	30,500	37,500	73%	27,375	27%	10,125
69,000	26,500	4,000	30,500	38,500	73%	28,105	27%	10,395

Appendix 6 (cont.)

Predicted Willamette Hatchery Run Size	Hatchery Fish Escapement Targets			Number of Hatchery Fish Available	Harvest Shares Below the Falls			
	Willamette Falls Escapement Target	Clackamas Escapement Target	Combined Escapement Target		Recreational		Commercial	
					Share	Catch	Share	Catch
70,000	29,000	4,400	33,400	36,600	73%	26,718	27%	9,882
71,000	29,000	4,400	33,400	37,600	73%	27,448	27%	10,152
72,000	29,000	4,400	33,400	38,600	73%	28,178	27%	10,422
73,000	29,000	4,400	33,400	39,600	73%	28,908	27%	10,692
74,000	29,000	4,400	33,400	40,600	73%	29,638	27%	10,962
75,000	29,000	4,400	33,400	41,600	73%	30,368	27%	11,232
76,000	29,000	4,400	33,400	42,600	70%	29,820	30%	12,780
77,000	29,000	4,400	33,400	43,600	70%	30,520	30%	13,080
78,000	29,000	4,400	33,400	44,600	70%	31,220	30%	13,380
79,000	29,000	4,400	33,400	45,600	70%	31,920	30%	13,680
80,000	32,000	4,900	36,900	43,100	70%	30,170	30%	12,930
81,000	32,000	4,900	36,900	44,100	70%	30,870	30%	13,230
82,000	32,000	4,900	36,900	45,100	70%	31,570	30%	13,530
83,000	32,000	4,900	36,900	46,100	70%	32,270	30%	13,830
84,000	32,000	4,900	36,900	47,100	70%	32,970	30%	14,130
85,000	32,000	4,900	36,900	48,100	70%	33,670	30%	14,430
86,000	32,000	4,900	36,900	49,100	70%	34,370	30%	14,730
87,000	32,000	4,900	36,900	50,100	70%	35,070	30%	15,030
88,000	32,000	4,900	36,900	51,100	70%	35,770	30%	15,330
89,000	32,000	4,900	36,900	52,100	70%	36,470	30%	15,630
90,000	35,000	5,400	40,400	49,600	70%	34,720	30%	14,880
91,000	35,000	5,400	40,400	50,600	70%	35,420	30%	15,180
92,000	35,000	5,400	40,400	51,600	70%	36,120	30%	15,480
93,000	35,000	5,400	40,400	52,600	70%	36,820	30%	15,780
94,000	35,000	5,400	40,400	53,600	70%	37,520	30%	16,080
95,000	35,000	5,400	40,400	54,600	70%	38,220	30%	16,380
96,000	35,000	5,400	40,400	55,600	70%	38,920	30%	16,680
97,000	35,000	5,400	40,400	56,600	70%	39,620	30%	16,980
98,000	35,000	5,400	40,400	57,600	70%	40,320	30%	17,280
99,000	35,000	5,400	40,400	58,600	70%	41,020	30%	17,580
100,000	39,000	6,000	45,000	55,000	70%	38,500	30%	16,500
101,000	39,000	6,000	45,000	56,000	70%	39,200	30%	16,800
102,000	39,000	6,000	45,000	57,000	70%	39,900	30%	17,100
103,000	39,000	6,000	45,000	58,000	70%	40,600	30%	17,400
104,000	39,000	6,000	45,000	59,000	70%	41,300	30%	17,700
105,000	39,000	6,000	45,000	60,000	70%	42,000	30%	18,000
106,000	39,000	6,000	45,000	61,000	70%	42,700	30%	18,300
107,000	39,000	6,000	45,000	62,000	70%	43,400	30%	18,600
108,000	39,000	6,000	45,000	63,000	70%	44,100	30%	18,900
109,000	39,000	6,000	45,000	64,000	70%	44,800	30%	19,200
110,000	39,000	6,000	45,000	65,000	70%	45,500	30%	19,500