2023 Information for Reporting on MA BIOP Terms and Conditions #8 Provided to James Archibald from Bryce Glaser, Brian Gale, Todd Hillson, Jeremy Wilson, Kris Warner and Anja Huff.
January 31, 2024

This report provides information to address the requirements of the Terms and Conditions (T&C) 8a, 8b, 8c, 8d, 8f, 8g, and 8i (summarized below).

Excerpts from Terms and Conditions

8. NMFS shall annually provide one comprehensive annual report for all Mitchell Act funded programs to NMFS' SFD on or before January 31st for the previous fiscal year. The annual report will include:
    a. Numbers of fish released, release dates and locations, and tag/mark information for each program.
    b. Estimates of the natural spawning distribution, origin, survival and contribution to fisheries and escapements for fish released for each brood year, for each program.
    c. Estimates of pHOS and/or gene flow for all natural ESA-listed salmonid populations that are affected by straying from Mitchell Act funded hatchery programs.
    d. Provide tables for all Mitchell Act funded facilities combined, grouped by State Authority, that include the duration (in days) of each epizootic and magnitude (% of production lost).
    f. Compliance records with NPDES permitting requirements.
    g. The number of fish encountered and killed at each weir and broodstock collection location including the species, origin (hatchery or natural-origin), life-stage, and release condition (unharmed, injured, killed).
    i. Results of RM&E, including important findings, for:
        i. The Kalama River Research Program;
        ii. Results of RM&E – Toutle Fish Collection Facility Activities
        v. Evaluation of the benefits and risks of juvenile wild fish rescue programs;

Numbers of fish released (T&C 8a)

Table 1 shows the numbers of fish released by species at MA facilities during 2022 and the numbers marked and tagged.

Table 1.Numbers of salmon and steelhead marked, tagged, and released during Calendar Year 2022.

Project	Release Location	Species/Run	Release Start Date	Brood Year	Ad + CWT Marked	Ad Only Marked	CWT ONLY	Unmarked	Total Released
Beaver Creek Hatchery	Beaver Creek	Coho	4/19/2022	2020	44,408	120,591	268	5	165,272
Beaver Creek Hatchery	Beaver Creek	Winter Steelhead	4/19/2022	2021	0	134,676	0	1,636	136,312
Beaver Creek Hatchery	Beaver Creek	Summer Steelhead	4/19/2022	2021	0	29,545	0	148	29,693
Beaver Creek Hatchery	Grays River	Chum	3/23/2022	2021	0	0	0	166,562	166,562
Deep River Net Pens	Deep River Net Pens	Coho	4/29/2022	2020	40,984	112,124	247	645	154,000
Deep River Net Pens	Deep River Net Pens	Spring Chinook	2/18/2022	2020	18,700	343	658	12	19,713
Deep River Net Pens	Deep River Net Pens	Spring Chinook	5/25/2022	2021	218,617	384,440	2,076	3,867	609,000
Fallert Creek Hatchery	Kalama River	Spring Chinook	3/1/2022	2020	126,115	393,461	1,026	2,100	522,702
Fallert Creek Hatchery	Kalama River	Fall Chinook	5/23/2022	2021	92,473	2,530,816	3,453	2,911	2,629,653
Fallert Creek Hatchery	Kalama River	Winter Steelhead	5/15/2022	2021	0	0	0	47,491	47,491
Fallert Creek Hatchery	Kalama River	Summer Steelhead	3/1/2022	2021	0	3,200	0	0	3,200
Kalama Falls Hatchery	Kalama River	Coho	4/1/2022	2020	44,115	258,152	159	1,557	303,983
Kalama Falls Hatchery	Kalama River	Winter Steelhead	4/15/2022	2021	29,695	182	61,718	378	91,973
North Toutle River	Green River	Fall Chinook	6/26/2022	2021	99,818	966,582	755	7,794	1,074,949
North Toutle River	Green River	Coho	5/2/2022	2020	33,131	56,417	274	500	90,322
Ringold Springs Hatchery	Springs Creek	Fall Chinook	6/13/2022	2021	338,852	3,779,399	4,012	44,741	4,167,004
Ringold Springs Hatchery	Springs Creek	Coho	4/11/2022	2020	39,198	178,302	114	518	218,132
Ringold Springs Hatchery	Springs Creek	Summer Steelhead	3/25/2022	2021	0	144,343	0	813	145,156
Skamania Hatchery	Klickitat River	Summer Steelhead	4/25/2022	2021	0	90,883	0	0	90,883
Skamania Hatchery	Rock Creek	Winter Steelhead	4/15/2022	2021	0	20,018	0	0	20,018
Skamania Hatchery	Washougal River	Winter Steelhead	4/18/2022	2021	0	85,364	0	162	85,526
Skamania Hatchery	Washougal River	Winter Steelhead	4/18/2022	2021	0	85,364	0	162	85,526
Skamania Hatchery	Washougal River	Summer Steelhead	4/18/2022	2021	0	70,454	0	397	70,851
South Fork Toutle Ponds	South Fork Toutle	Summer Steelhead	4/15/2022	2021	0	20,369	0	82	20,451
Washougal Hatchery	Washougal River	Fall Chinook	6/22/2022	2021	101,038	1,124,872	406	4,518	1,230,834
Washougal Hatchery	Klickitat River	Coho	3/28/2022	2020	67,036	2,377,082	541	19,170	2,463,829
Washougal Hatchery	Washougal River	Coho	5/2/2022	2020	44,129	58,133	173	345	102,780

Estimates of survival and contribution to fisheries and escapements (T&C 8b)

Estimates of survival and contribution to fisheries for natural origin Chinook and coho are not available for most populations, as these fish are not coded-wire tagged. Survival rates and contribution to fisheries for hatchery fish can be found in the "Report on the coded-wire tag program for Chinook and coho salmon produced by WDFW Columbia River basin hatcheries" (Harlan 2018). Updated information is not summarized at this time. Rawding et al (2010) published a report in 2010 with estimates of spawner distribution in the lower Columbia River. Table 2 shows natural origin estimates of fall Chinook in Washington tributaries.

Table 2. Natural Origin Estimates for Lower Columbia Fall Chinook Populations [1]

NOAA Population	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Grays/Chinook*	83	62	35	91	185	219	80	295	515	344	203	168	58
Elochoman/Skamokawa	136	63	62	80	147	230	90	77	27	38	57	86	109
Mill, Abernathy, Germany	156	94	21	128	34	80	87	17	6	12	24	25	26
Coweeman	413	622	463	1,568	794	1,359	411	721	216	287	724	607	403
Lower Cowlitz	2,550	2,745	1,553	3,477	2,923	4,186	2,878	2,924	3,002	4,514	4,670	4,043	8475
Green/SFK Toutle/NFK Toutle	227	198	235	914	403	374	367	312	138	125	346	552	488
Kalama	593	428	288	812	764	2,889	2,539	1,732	1,643	1,474	3,219	1,971	2691
Lewis	1,485	1,572	1,308	3,994	3,277	3,292	2,128	1,771	1,724	1,504	4,234	2,659	3526
Washougal	589	473	256	1,197	997	1,332	883	655	903	1,575	3,772	1,452	1467
Total	6,233	6,258	4,221	12,261	9,524	13,962	9,463	8,504	8,173	9,873	17,249	11,563	17,243

[1] Preliminary estimates for 2019-22. All estimates subject to updates.

* Grays population only.

Table 3 shows estimates of natural origin coho spawners in Washington tributaries. Natural origin estimates are based on unclipped (adipose fin clipped) coho.

Table 3. Natural Origin Estimates for Columbia River Coho Populations [1].

NOAA Population	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Coweeman	4,214	3,730	3,070	3,755	7,069	1,167	3,237	2,718	2,849	3,408	4,766	4,774	4,311
East Fork Lewis	1,739	1,908	2,661	2,647	4,043	519	822	1,388	1,858	2,727	2,738	4,981	4,070
Elochoman/Skamokawa	702	656	562	810	3,080	310	788	1,060	1,130	1,747	2,172	1,645	756
Grays/Chinook	409	81	732	763	3,115	244	629	255	253	572	1,210	1,210	814
Kalama	8	14	29	44	88	17	98	76	92	163	270	183	268
Lower Cowlitz	7,154	5,335	4,670	6,512	25,072	2,495	4,709	2,687	2,953	3,515	4,813	6,448	4,293
Lower Gorge	605	54	476	639	1,324	346	836	540	609	1,087	1,216	1,519	1,363
Mill/Abernathy/Germany/Coal	1,110	588	567	742	2,578	669	1,142	865	973	1,496	1,554	1,411	1,703
North Fork Lewis	2,434	1,515	1,566	1,344	4,891	995	3,376	4,245	2,940	4,627	7,555	4,696	4,862
North Fork Toutle	1,683	1,003	1,440	2,954	5,334	706	1,631	937	953	2,180	2,194	2,778	2,584
Salmon Creek	2,567	1,778	1,404	1,938	5,041	970	2,233	1,779	1,938	2,732	2,798	3,077	2,938
South Fork Toutle	1,749	1,297	1,934	3,320	10,139	1,243	2,769	1,195	1,162	2,481	2,774	3,190	2,036
Tilton	898	1,963	1,268	2,653	8,920	1,361	2,629	5,197	1,321	1,558	2,400	6,437	7,275
Upper Cowlitz and Cispus	2,772	7,614	1,603	10	6,849	376	911	5,200	170	3,562	8,914	9,611	11,532
Washougal	646	630	495	535	575	115	246	207	228	625	766	1,323	1,026
Totals	29,864	30,502	24,452	30,363	90,559	11,803	26,806	29,422	20,865	34,194	48,477	53,283	49,831

[1] Natural Origin estimates are estimates of unclipped coho. All estimates subject to updates.

Table 4 shows wild winter steelhead escapements by TRT population, and Table 5 shows wild summer steelhead escapements.

Table 4. Wild Winter Steelhead Escapement Estimates by TRT population.

Brood Year	Grays/ Chinook	Elochoman/ Skamokawa*	Mill/Abernathy/ Germany	Coweeman	SF Toutle	NF Toutle/ Green	Kalama	EF Lewis**	Washougal***
2010	422	534	398	528	274	508	961	336	232
2011	318	442	270	408	210	416	622	308	204
2012	488	378	184	256	378	473	1,061	272	306
2013	834	784	402	622	972	553	811	488	678
2014	386	502	310	496	708	587	948	414	388
2015	950	1,244	666	940	1,340	1,540	1,206	678	648
2016	1,020	754	436	886	1,532	1,142	1,203	984	636
2017	792	540	224	294	344	367	686	746	602
2018	426	432	184	474	624	652	594	538	438
2019	636	586	196	354	284	215	153	322	130
2020	272	370	232	352	148	322	491	728	258
2021	358	378	148	592	744	352	299	604	424
2022	476	606	234	234	270	555	811	234	370
2023	752	342	244	526	330	384	609	328	372

* Elochoman/Skamokawa - In 2009 severe flooding limited surveys/visibility = minimum estimate

**EF Lewis River - no surveys in 2000 - only mainstem flight counts in 2001

***Washougal River = 2001 &2004 estimates are based on mainstem counts only; no tributary surveys were conducted.

Note: Kalama 2023 brood year estimate of 609 is considered preliminary only.

Table 5. Wild Summer Steelhead Escapement Estimates by TRT population.

Return Year	Spawn Year	Kalama	EF Lewis	Washougal	Wind
2010	2011	582	1,036	No Est	1,465
2011	2012	667	1,084	842	796
2012	2013	745	1,059	1,464	740
2013	2014	402	617	544	281
2014	2015	795	843	783	577
2015	2016	877	422	755	1,013
2016	2017	648	824	727	1,059
2017	2018	329	739	624	204
2018	2019	392	373	876	516
2019	2020	321	367	457	303
2020	2021	240	331	392	437
2021	2022	145	NA [1/]	145	208
2022	2023	447	866	479	814
2023	2024	376	[2/]	[2/]	[3/]

[1/] No estimate reported due to extreme lack of precision in estimate. Low return year and lowest number of tagged fish on record.

[2/] No snorkel was completed this year due to safety and L&I incident

3/ final 2024 brood year estimate will be completed in summer of 2024

2024 Brood Year estimate is considered preliminary

Table 6 shows Columbia River chum population estimates.

Table 6. Columbia River Chum abundance in select Washington tributaries, 2010-2021.

Location	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Crazy Johnson Creek	865	2,304	3,475	1,925	1,541	4,193	5,987	3,681	899	72	2,863	6,279	3,318
WF Grays River	1,814	5,996	2,817	1,857	1,145	6,297	19,023	1,930	2,902	3,406	3,055	7,293	3,656
Mainstem Grays River	3,701	2,509	1,717	1,352	2,107	1,091	6,129	1,051	3,010	3,990	7,528	3,842	6,055
Grays R. broodstock take	288	294	220	250	246	128	128	118	250	222	195	192	194
I-205 area	2,148	4,912	2,586	1,466	1,472	4,757	5,245	1,647	2,518	1,421	2,324	3,883	4,178
Multnomah area	458	647	120	222	334	1,142	1,162	93	394	470	557	636	971
St Cloud area	126	343	1	84	85	344	242	103	123	89	90	460	160
Horsetail area	54	119	92	59	75	420	656	56	320	213	135	474	377
Ives area	214	162	230	175	409	1,306	1,914	347	1,724	3,031	981	2,216	3,620
Duncan Creek	48	85	4	27	24	153	208	7	129	76	78	488	255
Hardy Creek	175	157	75	56	108	350	354	14	193	64	104	166	17
Hamilton Creek	404	542	352	255	260	249	332	162	548	1,367	1,118	1,219	965
Hamilton Spring Channel	190	325	137	392	678	1,397	1,265	742	1,583	341	413	1,474	991
Grays return	6,668	11,103	8,229	5,384	5,039	11,709	31,267	6,780	7,061	7,690	13,641	17,606	13,223
I-205 to Bonneville return	3,817	7,292	3,597	2,736	3,445	10,118	11,378	3,171	7,532	7,072	5,800	11,016	11,534
Sum	**10,485**	**18,395**	**11,826**	**8,120**	**8,484**	**21,827**	**42,645**	**9,951**	**14,593**	**14,762**	**19,441**	**28,622**	**24,757**

PHOS Survey Results (T&C 8c)

Table 7 shows pHOS results for lower Columbia fall Chinook populations that are monitored by WDFW. It should be noted that the management strategies for some of these areas have changed over the time frame identified here. For example, hatchery fish were intentionally released upstream to seed areas during some years, thus increasing pHOS levels.

Table 7. PHOS Estimates for Lower Columbia Fall Chinook Populations [1]

NOAA Population	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Grays/Chinook*	51.4%	85.1%	78.1%	94.5%	80.9%	71.1%	77.4%	47.7%	29.7%	41.8%	65.2%	49.6%	75.0%
Elochoman/Skamokawa	89.2%	94.2%	69.9%	82.2%	78.0%	76.3%	75.1%	32.3%	64.9%	75.9%	65.8%	68.5%	44.7%
Mill, Abernathy, Germany	93.5%	92.1%	85.7%	80.7%	93.7%	91.9%	78.0%	82.1%	60.0%	95.4%	71.6%	73.2%	77.0%
Coweeman	29.3%	11.9%	11.8%	32.5%	4.3%	2.3%	6.4%	14.3%	11.5%	21.7%	7.8%	9.2%	8.4%
Lower Cowlitz	31.7%	25.5%	43.0%	19.5%	32.8%	30.0%	25.9%	19.4%	15.5%	11.0%	8.0%	15.0%	7.0%
Green/SFK Toutle/NFK Toutle	88.1%	86.8%	74.1%	47.9%	48.6%	36.8%	53.9%	47.1%	43.5%	74.2%	50.8%	32.4%	24.0%
Kalama	88.8%	94.4%	96.1%	90.4%	91.9%	54.9%	39.8%	43.0%	35.3%	46.4%	32.0%	52.7%	27.7%
Lewis	36.4%	29.3%	32.3%	30.7%	43.8%	54.9%	55.3%	48.6%	36.5%	25.9%	27.6%	43.8%	42.0%
Washougal	89.3%	85.4%	73.8%	66.9%	34.7%	54.4%	60.0%	40.8%	11.4%	13.3%	25.2%	25.7%	12.0%
Average	66.4%	67.2%	62.8%	60.6%	56.5%	52.5%	52.4%	41.7%	34.3%	45.1%	39.3%	41.1%	35.3%

[1] Preliminary estimates for 2019-22. All estimates subject to updates. PHOS results include corrections for un-clipped hatchery fish.

* Grays population only.

Table 8 shows pHOS results for lower Columbia coho populations that are monitored by WDFW.

Table 8. PHOS Estimates for Columbia River Coho Populations [1].

NOAA Population	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Coweeman	8.8%	4.4%	3.5%	11.9%	16.6%	21.4%	14.6%	8.6%	16.2%	28.7%	14.9%	21.8%	9.1%
East Fork Lewis	25.0%	5.8%	6.3%	8.7%	18.3%	23.2%	50.4%	36.3%	11.9%	8.1%	9.5%	6.6%	7.5%
Elochoman/Skamokawa	72.7%	56.4%	33.5%	41.0%	34.6%	45.7%	39.7%	20.7%	35.4%	34.6%	18.5%	46.0%	18.3%
Grays/Chinook	82.9%	95.3%	45.2%	63.1%	35.9%	65.1%	60.6%	78.4%	79.8%	70.7%	44.9%	54.9%	45.1%
Kalama	98.4%	96.1%	89.3%	88.4%	90.8%	89.8%	71.3%	70.5%	69.3%	68.4%	67.5%	79.0%	60.6%
Lower Cowlitz	13.5%	11.1%	12.9%	15.9%	4.7%	7.5%	8.0%	18.0%	8.5%	6.5%	7.1%	13.1%	18.9%
Lower Gorge	25.0%	10.4%	15.5%	20.8%	29.6%	12.6%	7.1%	16.5%	20.0%	22.5%	7.7%	4.0%	20.4%
Mill/Abernathy/Germany/Coal	12.2%	19.0%	2.3%	7.3%	12.1%	6.8%	12.9%	8.2%	15.2%	27.3%	10.9%	14.4%	24.3%
North Fork Lewis	24.5%	22.6%	14.7%	84.9%	65.2%	79.2%	65.1%	54.9%	70.1%	51.2%	44.6%	63.4%	62.8%
North Fork Toutle	55.5%	30.7%	20.6%	17.9%	32.4%	54.8%	60.6%	31.9%	30.8%	21.9%	17.3%	14.7%	13.8%
Salmon Creek	8.0%	5.4%	5.3%	2.2%	1.5%	2.3%	4.1%	9.1%	9.7%	9.7%	10.0%	3.7%	2.1%
South Fork Toutle	20.4%	13.8%	11.0%	13.8%	19.2%	48.6%	21.7%	10.6%	9.3%	10.2%	5.4%	10.5%	10.9%
Tilton	69.9%	69.0%	74.2%	58.8%	35.5%	53.4%	62.2%	50.2%	70.5%	78.5%	81.9%	59.3%	56.3%
Upper Cowlitz and Cispus	87.5%	60.8%	58.2%	99.8%	76.7%	71.5%	90.7%	55.3%	97.2%	63.4%	58.1%	66.1%	51.6%
Washougal	39.8%	9.1%	11.1%	31.9%	71.2%	69.7%	75.0%	75.3%	74.7%	56.9%	57.6%	14.8%	38.7%
Average	43.7%	34.7%	27.4%	37.9%	36.4%	43.9%	43.0%	36.8%	41.6%	36.8%	30.0%	31.5%	29.4%

[1] All estimates subject to updates.

Gene Flow and pHOS Monitoring Methods for Steelhead

WDFW submitted a report to NMFS on steelhead monitoring (Buehrens et al 2017) that described on-going hatchery reform efforts by WDFW for segregated hatchery steelhead programs in the lower Columbia Distinct Population Segment (DPS). The gene flow introgression study described in the report is still in progress. Genotyping has been completed but final analysis and reporting has taken substantially longer than anticipated due to a lack of resources and unanticipated disruptions caused by the global Covid-19 pandemic. Final reporting is now anticipated to be complete in 2024-2025.

Additionally, implementing actions identified in the MA BiOp, WDFW has eliminated and/or changed the broodstock source for early-timed segregated programs that historically used Chamber's Creek stock in basins with ESA listed steelhead populations. WDFW continues to work on development of a new early-timed segregated stock utilizing a locally derived (within DPS) stock on the Kalama River; this program is referred to as the Kalama Early Winter Steelhead (KEWS) program. The KEWS program is intended to replace programs that had been using the Chamber's Creek stock. In the interim, a segregated program generated from Eagle Creek (Clackamas)/Big Creek stock is being propagated on the Washougal (at Skamania Hatchery) for use in the Washougal and Rock Creek. Additionally, integrated summer and winter steelhead programs continue on the Kalama River alongside KEWS. These changes to broodstock sources, which affect both the spawn timing of returning hatchery fish and their genetic relatedness to designated wild populations, may affect the applicability of introgression study results to these programs as well as the efficacy of previously proposed geneflow/pHOS monitoring. WDFW is planning to review results of the introgression study to determine their applicability for monitoring gene flow for interim segregated programs (i.e., Eagle Creek stock) and the eventual transition to KEWS programs in the Washougal River and Rock Creek. Potential use for monitoring the KEWS program may be limited due to genetic similarity of the KEWS program to other within DPS natural-origin winter steelhead populations. WDFW will provide results and recommendations for methodologies to NMFS when the introgression study information is complete.

In addition to the introgression study and evaluation of options to monitor gene flow, WDFW has also implemented methods to collect data on steelhead pHOS via snorkel survey counts of adipose fin-clipped and unclipped summer steelhead, and spawning survey counts of live and dead (carcass) clipped and unclipped steelhead. New analytical methods using these data were developed in 2023. A draft report with detailed methods and results is currently in the late stages of internal reviews and will be published under agency cover on the WDFW website when finalized; this is anticipated by mid-2024. Based on the results from these analyses, a new gene flow introgression study was implemented in the summer of 2024 on the Washougal River to corroborate results. This study was focused on winter steelhead following the same general study design as described in Buehrens et al. (2017). The results of this study will be reported in 2024-2025.

Duration of epizootic episodes (T&C 8d)

Fish health reports are included in the two semi-annual reports. Any additional information will be provided in the next semi-annual report.

Compliance records with NPDES permitting requirements (T&C 8f)

NPDES Compliance records for WDFW Mitchell Act (MA) Facilities: Grays, Beaver Creek, Kalama Falls, Fallert Creek, North Toutle, Skamania, Washougal, and Ringold
Records as of October 31, 2023
Produced by Ann Leroux, WDFW

For the monitoring period October 2022 through September 2023. WDFW MA facilities had one exceedance and three non-compliance with the NPDES Permit (Upland Fin-fish Hatching and Rearing General Permit) effective date October 1, 2021 expiration date September 30, 2026.
MA facilities completed all requirements under the NPDES: quarterly monitoring reporting, annual chemical reporting, and any/all actions required by WA Dept of Ecology.
MA facilities exceeded permit limits on a few occasions, and were reported to Ecology as required under the NPDES permit. List of exceedances and non-compliance for the period October 2022 through September 2023:

Facility	Monitoring Period
Grays River	No exceedances
Beaver Creek	No exceedances
Kalama Falls	No exceedances
Fallert Creek	One exceedance and two non- compliances
North Toutle	No exceedance
Skamania	No exceedance
Washougal	No exceedance
Ringold Springs	No exceedance and one non- compliance

There was one exceedance reported to Ecology October 2022 to 2023.

Facility	Date	Paramete	Sample Type	Result	Unit	Comment
Fallert Creek	May-23	TSS	Drawdown	108	mg/L	The Draw Down was conducted from a rock bottom earthen pond. Reason for violation was due to pulling dam boards too quickly wich caused the water to scour the sediment that settled on the pond floor. To remedy this the dam boards will be pulled at a slower pace to reduce pond floor scouring.

There were three non-compliance reported to Ecology.

Facility	Date	Paramete	Sample Type	Result	Unit	Comment
Fallert Creek	Apr-23	TSS	Avg Net Composite	Failure to sample		
Fallert Creek	Apr-23	TSS	Max Net Composite	Failure to sample		
Ringold	Jun-23	Temp		Missing data		June 1-13 logger error.

NPDES MONITORING FOR WDFW FACILITIES.

Sampling at facilities covered under the current NPDES General Permit include the following parameters:

FLOW	Measured in millions of gallons per day (MGD) discharge.
SS EFF	Average net settleable solids in the hatchery effluent, measured in ml/L.
TSS COMP	Average net total suspended solids, composite sample (6 x/day) of the hatchery effluent, measured in mg/L.
TSS MAX	Maximum daily net total suspended solids, composite sample (6 x/day) of the hatchery effluent, measured in mg/L.
FLOW PA	Average gallons per day into the pollution abatement (PA) pond.
SS PA	Maximum settleable solids in the PA pond discharge, measured in ml/L.
TSS PA	Maximum total suspended solids in the PA pond discharge, effluent grab measured in mg/L.
TSS DD	Maximum total suspended solids during a drawdown for fish releases. One sample per pond drawdown, measured in mg/L.
SS DD	Settleable solids discharged during drawdown for fish release. One sample per pond drawdown, measured in ml/L.
TEMP	Continuous (24/7) monitoring reporting daily maximum in Celsius.

Numbers of fish encountered at hatchery facilities and weirs (T&C 8g)

Table 9 shows handle and mortalities associated with hatchery operations in 2022. The authorized numbers are from Table 121 in the MA BIOP. The Grays River hatchery facility has been closed (in accordance with BiOp requirements) and the hatchery coho and chum programs have been transferred to Beaver Creek hatchery on the Elochoman River. Take authorizations for the Grays and Elochoman programs need to be updated to reflect these changes.

Table 9. Natural-Origin adults and jacks handled at hatchery facilities in 2022 and associated s.

			Number Authorized		Calendar Year 2022 Number [1/]		
Watershed	Hatchery	NOR Species	Handled	Mortalities	Handled	Mortalities	Comments
Columbia River	Ringold Springs	Steelhead	1	0	1	0	
North Fork Toutle River	Toutle Hatchery	Fall Chinook	2,000	<60	634	82	
		Coho	10,000	<100	1228	16	
		Chum	0	0	0	0	
	2021 BY Summer	Steelhead	10	1	2	0	
Grays River	Grays River	Fall Chinook	25	1	---	---	Facility Closed
		Coho	150	<3	---	---	
		Chum	50	1	---	---	
Elochoman River	Beaver Creek	Fall Chinook	20	1	4	0	
		Early coho					
		Late coho	20	1	222	42	
		Chum	20	1	199	0	
		Winter Steelhead	NA	NA	8	0	
Kalama River *Allowed handle/mortality combined for Fallert Creek and Kalama Falls	Fallert Creek	Fall Chinook					
		Spring Chinook					
		Coho					
		Chum					
		Steelhead					
	Kalama Falls	Fall Chinook	6,000	<60	533	0	
		Spring Chinook	500	<5	185	0	
		Early coho			43	0	
		Late coho	3,000	<90	470	0	
		Chum	25	1	0	0	
		Summer/Winter Steelhead	3,400	<34			
	2022 BY Summer	Summer Steelhead			3	2	
	2023 BY Summer	Summer Steelhead			317	5	
	2022 BY Winter	Winter Steelhead			717	3	
	2023 BY Winter	Winter Steelhead			63	0	

Table 9. (continued) Natural-Origin adults and jacks handled at hatchery facilities in 2022 and associated mortality.

					Calendar Year 2022		
		NOR	Number Authorized		Number [1/]		
Watershed	Hatchery	Species	Handled	Mortalities	Handled	Mortalities	Comments
Washougal River	Washougal	Fall Chinook	3,000	<30	29	1	
		Coho	1,000	<10	112	0	
		Chum	25	<1	185	0	
	Skamania	Fall Chinook			3	0	
	Skamania	Coho			1	0	
Washougal River	Skamania	Summer/Winter Steelhead	400	<5			
2023 BY		Summer Steelhead			22	1	
2022 BY		Winter Steelhead			20	0	
	Washougal						
2023 BY		Summer Steelhead			78	0	

1/ Direct take (handle/mortality) is not included in this table. Handled/mortality numbers in 2022 are only for fish returning to the hatchery and does not include fish transported from the weir.

Table 10 shows handle and mortalities associated with weirs in 2022. The authorized numbers are from Table 122 in the MA BIOP.

Table 10. Natural-Origin adults and jacks handled at weirs in 2022 and associated mortality.

		Calendar Year 2022				
	Species	Number Authorized		Number		
Watershed	Encountered	Handled	Mortalities	Handled	Mortalities	Comments
NF Toutle	Fall Chinook	700	<21	---	---	All numbers are reported on the hatchery
	Coho	2,300	<70	---	---	table
	Chum	250	<8	---	---	
	Summer Steelhead	50	<2	---	---	
Grays River	Fall Chinook	750	<23	4	0	
	Coho	800	<24	0	0	
	Chum	8,500	<225	0	0	
Elochoman River	Fall Chinook	750	<23	90	1	
	Coho	800	<24	621	6	
	Chum	1,000	<30	466	13	take included in HGMP for broodstock program
Kalama River	Fall Chinook	3,200	<96	2502	10	
	Coho	150	<5	244	0	
	Chum	250	<8	1	0	
2023 BY	Summer Steelhead	200	<6	291	1	
Washougal River	Fall Chinook	1,200	<36	243	4	
	Coho	80	<3	13	0	
	Chum	250	<8	0	0	
2023 BY	Summer Steelhead	100	<3	71	0	
Coweeman River	Fall Chinook	1,600	<48	371	5	
	Coho	800	<24	53	0	
	Chum	100	<3	0	0	
	Winter Steelhead	300	<9	0	0	
Cedar Creek Weir	Fall Chinook			327	9	
	Coho			406	19	
	Chum			0	0	
	Summer Steelhead			0	0	
Cedar Creek Ladder	Fall Chinook			10	0	
(Maiden fish not	Coho			6	0	
seen at weir below)	Chum			0	0	
	Summer Steelhead			2	0	
Cedar Creek Total	Fall Chinook	400	<12	337	9	

	Coho	1,000	<30	412	19	
	Chum	250	<8	0	0	
2023 BY	Summer Steelhead	50	<2	0	0	

Table 11 shows handle and mortalities associated with hatchery operations and weirs combined in 2022. The authorized numbers are based on adding the authorized numbers from Table 121 and Table 122 in the MA BIOP.

Table 11. Natural-Origin adults and jacks handled at hatcheries and weirs combined in 2022 and associated mortality.

				Calendar Year 2022		
		Number Authorized		Number		
Watershed	Species Encountered	Handled	Mortalities	Handled	Mortalities	Comments
Ringold Springs	Steelhead	1	0	1	0	
NF Toutle	Fall Chinook	2,700	<81	634	82	
	Coho	12,300	<170	1,228	16	
	Chum	250	<8	0	0	
	Summer Steelhead	50	<2	2	0	
	Winter Steelhead	10	1	0	0	
Grays River	Fall Chinook	775	<24	4	0	Facility Closed
	Coho	950	<27	0	0	
	Chum	8,550	<226	0	0	
Elochoman River	Fall Chinook	770	<24	94	1	
	Coho	820	<25	843	48	
	Chum	1,020	<31	665	13	
Kalama River	Fall Chinook	9,200	<156	3,035	10	
	Spring Chinook	500	<5	185	-	
	Coho	3,150	<95	757	0	
	Chum	275	<9	1	0	
2021 BY	Summer Steelhead	200	<6	3	2	
2021 BY	Winter Steelhead			717	3	
2022 BY	Summer Steelhead			608	6	
2022 BY	Winter Steelhead			63	0	
	Summer and Winter Steelhead	3,400	<34	1,391	11	
Washougal River	Fall Chinook	4,200	<66	275	5	
	Coho	1,080	<13	126	0	
	Chum	275	<9	0	0	
2021 BY	Winter Steelhead			20	0	
2022 BY	Summer Steelhead	100	<3	171	1	

	Summer and Winter Steelhead	400	<5	191	1	

Table 11. (continued) Natural-Origin adults and jacks handled at hatcheries and weirs combined in 2022 and associated mortality.

		Number Authorized		Calendar Year 2022 Number		
Watershed	Species Encountered	Handled	Mortalities	Handled	Mortalities	Comments
Coweeman River	Fall Chinook	1,600	<48	371	5	
	Coho	800	<24	53	0	
	Chum	100	<3	0	0	
	Winter Steelhead	300	<9	0	0	
Cedar Creek	Fall Chinook	400	<12	337	9	
	Coho	1,000	<30	412	19	
	Chum	250	<8	0	0	
2022 BY	Summer Steelhead	50	<2	0	0	

Results of RM&E – Kalama Research Program (T&C 8ii)

Kalama Research Evaluations

TASK DESCRIPTION: The Kalama Research Team monitors and evaluates viable salmonid population (VSP) criteria of summer and winter steelhead populations and conducts research to better understand how fisheries management practices (e.g. hatchery introduction and wild spawner redistribution) have affected the population structure and ecology of natural-origin summer-run and winter-run steelhead in the Kalama River.

Project objectives include:

- Adult Fish Passage: conduct year round sorting and passage of adult steelhead trapped in the Kalama Falls Hatchery fishway trap; identify stock origin and collect biological data from all adult steelhead including a subsample to determine age composition; collect DNA tissue samples from a proportion of wild and hatchery (integrated and segregated programs) steelhead; pass upstream all wild summer and winter-run steelhead; depending on run type, stock, physical condition, maturity status, and capture date, release hatchery steelhead not needed for broodstock either in the lower Kalama River or Kress Lake for additional harvest opportunity or surplus excess hatchery steelhead; as necessary for accomplishing sampling of steelhead, assist with handling of all salmon during adult fish processing (principally coho, spring Chinook and fall Chinook).
- Steelhead Population Monitoring: juvenile and adult steelhead abundance and composition are monitored using protocols designed to meet NOAA's Monitoring Guidance recommendations; estimate escapement and run sizes for returning hatchery and wild steelhead based on trap counts and mark-resight surveys; determine run timing and estimate age structure of each stock at adult and smolt life stages; estimate numbers of outmigrant wild Kalama steelhead smolts via operation of a rotary screw trap above Kalama Falls Hatchery (KFH); provide estimates of adult abundance and proportion hatchery spawners and estimates of smolt abundance to various management agencies and regional entities for consideration regarding population trends, status assessments, and recovery planning.

Adult fish passage monitoring for steelhead occurs at the Kalama Falls Hatchery trap. These operations occur concurrently with the hatchery operations for broodstock collection. The numbers of fish that were tagged or samples for genetic tissues is shown below. The take associated with these activities is included in the Kalama Falls Hatchery take tables.

NOR Summers Spawn Year 2023:

Floy tagged and returned to stream: 133
Genetic tissue sample from fish returned to stream: 265

NOR Winters Spawn Year 2022:

Floy tagged and returned to stream: 0
Genetic tissue sample from fish returned to stream: 359

Table 12 shows the number of natural-origin juveniles handled and associated handling mortalities at the Kalama River smolt trap in 2022.

Table 12. Kalama Smolt Trapping, 2022

	Handled		Mortalities	
	Permitted	**Actual**	**Permitted**	**Actual**
Spring Chinook [1]	1,330	76	67	0
Coho	1,300	135	65	1
Steelhead (summer) [2]	8,000	NA	Up to 550	NA
Steelhead (winter) [2]	8,000	NA	Up to 550	NA
Steelhead [2]	16,000	1,621	Up to 1,100	10

[1] All Chinook upstream of KFH are assumed to be spring Chinook.

[2] Juvenile steelhead are a combination of summer and winter steelhead. It is not possible to parse out at juvenile life stage without genetic analysis.

Results of RM&E – Toutle Fish Collection Facility Activities (T&C 8iii)

The Toutle Fish Collection Facility (TFCF) is operated from September through the end of May with occasional trapping into June. During this timeframe the TFCF is open and trapping up to 24 hours per day 7 days per week, conditions permitting, to recruit fish and is operated Monday, Wednesday, and Friday to remove, process and haul fish upstream. TFCF staff collect biological data from all salmonids (both natural and hatchery origin) that are captured. Species encountered are primarily steelhead and coho, however, Chinook salmon and cutthroat trout are occasionally captured. Biological data collected from individual fish includes fork length, sex, fin-clips, other marks, scale samples (for age analysis) and tissue samples (caudal fin hole punches from natural-origin steelhead and coho only) for genetic analysis. Natural origin steelhead are also tagged with T-bar anchor Floy Tags. Natural origin winter-run steelhead, coho, and cutthroat are transported by tanker truck above the Toutle Sediment Retention Structure to either Alder, Bear, or Pullen creeks. All hatchery origin fish are placed immediately downstream of TFCF with a right opercle hole punch for enumeration purposes. Table shows the results of operations conducted at the TFCF in 2022. Toutle FCF has ESA coverage under the MA BIOP, the COE BIOP for the SRS and WDFW's Section 10 permit.

Table 13. Toutle Fish Collection Facility, 2022*.

	Number Handled	Number Mortalities
Wild Winter steelhead	255	0
Wild Coho	506	0
Wild Fall Chinook	3	0
Wild Summer steelhead	2	0

*Steelhead returns from Nov 2021-June 2022.
Coho returns during fall of 2022

Evaluation of Juvenile Wild Fish Rescue Program (T&C 8iv)

As it pertains to the MA BIOP, this project has been completed. Please review past reports for a summary of this project.

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