2022 Information for Reporting on MA BIOP Terms and Conditions #8 Provided to James Archibald from Bryce Glaser, Sam Gibbons, and Todd Hillson January 31, 2023

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 2021 numbers marked and tagged.

Table 1.Numbers of salmon and steelhead marked and tagged during Calendar Year 2021.

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	4/15/2021	2019	45,293	40,473	273	66,768	152,807
	Beaver Creek	Winter Steelhead	4/15/2021	2020	0	0	0	132,433	132,433
	Beaver Creek	Summer Steelhead	4/15/2021	2020	0	0	0	30,562	30,562
	Grays River	Chum	3/31/2021	2020	0	0	0	187,063	187,063
Deep River Net Pens	Deep River Net Pens	Coho	5/4/2021	2019	42,693	131,195	519	1,593	176,000
Fallert Creek Hatchery	Kalama River	Spring Chinook	3/1/2021	2019	123,914	372,956	987	2,002	499,859
	Kalama River	Fall Chinook	5/18/2021	2020	97,530	2,909,139	391	5,472	3,012,532
	Kalama River	Winter Steelhead	5/15/2021	2020	0	52,047	0	0	52,047
	Kalama River	Summer Steelhead	4/27/2021	2020	0	75,145	0	49	75,194
Kalama Falls Hatchery	Kalama River	Fall Chinook	6/1/2021	2020	108,501	4,021,976	404	27,157	4,158,038
	Kalama River	Coho	4/1/2021	2019	46,115	241,540	0	0	287,655
	Kalama River	Winter Steelhead	4/15/2021	2020	91,074	366	735	2	92,177
North Fork Toutle River	Green River	Fall Chinook	6/24/2021	2020	99,408	541,041	0	5,075	645,524
	Green River	Coho	5/3/2021	2019	36,454	56,178	142	1,293	94,067
Ringold Springs Hatchery	Springs Creek	Fall Chinook	6/14/2021	2020	425,091	3,878,068	5,236	16,585	4,324,980
	Springs Creek	Coho	4/12/2021	2019	51,139	202,322	144	600	254,205
	Springs Creek	Summer Steelhead	4/2/2021	2020	0	172,786	0	659	173,445
Skamania Hatchery	Klickitat River	Summer Steelhead	4/26/2021	2020	0	92,268	0	0	92,268
	Rock Creek	Winter Steelhead	4/15/2021	2020	0	20,071	0	0	20,071
	Washougal River	Winter Steelhead	4/15/2021	2020	0	86,251	0	0	86,251
	Salmon Creek	Winter Steelhead	5/3/2021	2020	0	40,381	0	97	40,381
	Washougal River	Summer Steelhead	4/15/2021	2020	0	70,939	0	0	70,939
South Fork Toutle Ponds	South Fork Toutle	Summer Steelhead	4/17/2021	2020	0	19,960	0	40	20,000
Washougal Hatchery	Washougal River	Fall Chinook	6/3/2021	2020	101,030	2,010,242	1,042	6,454	2,118,768
	Klickitat River	Coho	3/29/2021	2019	70,345	2,381,474	460	15,581	2,467,860
	Washougal River	Coho	5/1/2021	2019	44,094	65,382	128	190	109,794

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. WDFW has a report regarding Chinook spatial data that will be included in the 2013-2017 VSP report (Wilson et al 2020). 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
Grays/Chinook*	83	62	35	91	185	219	80	295	515	344	203	168
Elochoman/Skamokawa	136	63	62	80	147	230	90	77	27	38	57	86
Mill, Abernathy, Germany	156	94	21	128	34	80	87	17	6	12	24	25
Coweeman	413	622	463	1,568	794	1,359	411	721	216	287	724	607
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
Green/SFK Toutle/NFK Toutle	227	198	235	914	403	374	367	312	138	125	346	552
Kalama	593	428	288	812	764	2,889	2,539	1,732	1,643	1,474	3,219	1,971
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
Washougal	589	473	256	1,197	997	1,332	883	655	903	1,575	3,772	1,452
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

[1] Preliminary estimates for 2021. 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
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
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
Elochoman/Skamokawa	702	656	562	810	3,080	310	788	1,060	1,130	1,747	2,172	1,645
Grays/Chinook	409	81	732	763	3,115	244	629	255	253	572	1,210	1,210
Kalama	8	14	29	44	88	17	98	76	92	163	270	183
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
Lower Gorge	605	54	476	639	1,324	346	836	540	609	1,087	1,216	1,519
Mill/Abernathy/Germany/Coal	1,110	588	567	742	2,578	669	1,142	865	973	1,496	1,554	1,411
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
North Fork Toutle	1,683	1,003	1,440	2,954	5,334	706	1,631	937	953	2,180	2,194	2,778
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
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
Tilton	898	1,963	1,268	2,653	8,920	1,361	2,629	5,197	1,321	1,558	2,400	6,437
Upper Cowlitz and Cispus	2,772	7,614	1,603	10	6,849	376	911	5,200	170	3,562	8,914	9,611
Washougal	646	630	495	535	575	115	246	207	228	625	766	1,323
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

[1] Natural Origin estimates are estimates of unclipped coho. Preliminary estimates for 2021. 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

* 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.

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

Return Year	Spawn Year	Kalama	EF Lewis	Washougal	Wind
2010	2011	534	1,036	No Est	1,497
2011	2012	646	1,084	842	815
2012	2013	738	1,059	1,464	760
2013	2014	400	617	544	281
2014	2015	814	843	783	577
2015	2016	868	422	755	1,013
2016	2017	647	824	727	1,059
2017	2018	321	739	624	241
2018	2019	377	373	876	425
2019	2020	311	367	457	303
2020	2021	233	331	392	445
2021	2022	95	NA 1/	145	446
2022	2023	TBD	866	479	TBD

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

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
Crazy Johnson Creek	865	2,304	3,475	1,925	1,541	4,193	5,987	3,681	899	72	2,863	6,279
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
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
Grays R. broodstock take	288	294	220	250	246	128	128	118	250	222	195	192
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
Multnomah area	458	647	120	222	334	1,142	1,162	93	394	470	557	636
St Cloud area	126	343	1	84	85	344	242	103	123	89	90	460
Horsetail area	54	119	92	59	75	420	656	56	320	213	135	474
Ives area	214	162	230	175	409	1,306	1,914	347	1,724	3,031	981	2,216
Duncan Creek	48	85	4	27	24	153	208	7	129	76	78	488
Hardy Creek	175	157	75	56	108	350	354	14	193	64	104	166
Hamilton Creek	404	542	352	255	260	249	332	162	548	1,367	1,118	1,219
Hamilton Spring Channel	190	325	137	392	678	1,397	1,265	742	1,583	341	413	1,474
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
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
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**

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
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%
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%
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%
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%
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%
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%
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%
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%
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%
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%

[1] Preliminary estimates for 2021. All estimates subject to updates. PHOS results include corrections for un-clipped hatchery fish.

* Grays population only.

Table 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
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%
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%
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%
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%
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%
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%
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%
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%
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%
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%
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%
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%
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%
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%
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%
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%

[1] All estimates subject to updates. 2021 estimates are preliminary.

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 2023.

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. Preliminarily, these data show promise for developing estimates of pHOS throughout the lower Columbia DPS. WDFW has recently requested continued discussions with NMFS staff to facilitate final review of data collection and analytical methods for this approach. WDFW anticipates submitting a technical report summarizing analytical methods and results to date in the spring of 2023.

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, 2022. Produced by Ann Leroux, WDFW.

For the monitoring period October 2021 through September 2022. WDFW MA facilities are compliant 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.

During this monitoring period, MA facilities had no exceedances to report to Ecology as required under the NPDES permit. List of exceedances for the period October 2021 through September 2022:

Facility	**Monitoring Period**
Grays River	No exceedances
Beaver Creek	No exceedances
Kalama Falls	No exceedances
Fallert Creek	No exceedances
North Toutle	No exceedance
Skamania	No exceedance
Washougal	No exceedance
Ringold Springs	No exceedance

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

Table 9 shows handle and mortalities associated with hatchery operations in 2021. 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. In-season communications occurred with NMFS staff to address this change.

Table 9. Natural-Origin adults and jacks handled at hatchery facilities in 2021 and associated mortality.

			Number Authorized		Calendar Year 2021 Number [1/]		
Watershed	Hatchery	NOR Species	Handled	Mortalities	Handled	Mortalities	Comments
Columbia River	Ringold Springs	Steelhead	1	0	0	0	
North Fork Toutle River	Toutle Hatchery	Fall Chinook	2,000	<60	690	41	
		Coho	10,000	<100	1486	7	
		Chum	0	0	0	0	
	2021 BY Summer	Steelhead	10	1	5	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	0	0	
		Early coho			0	0	
		Late coho	20	1	210	4	
		Chum	20	1	51	0	
		Winter Steelhead	NA	NA	1	0	
Kalama River	Fallert Creek	Fall Chinook			0	0	
*Allowed handle/mortality		Spring Chinook			0	0	
combined for		Coho			0	0	
Fallert Creek and		Chum			0	0	
Kalama Falls		Steelhead			0	0	
	Kalama Falls	Fall Chinook	6,000	<60	629	3	
		Spring Chinook	500	<5	94	3	
		Early coho			46	0	
		Late coho	3,000	<90	668	0	
		Chum	25	1	0	0	
		Summer/Winter Steelhead	3,400	<34			
	2021 BY Summer	Summer Steelhead			123	6	
	2022 BY Summer	Summer Steelhead			91	2	
	2021 BY Winter	Winter Steelhead			143	0	
	2022 BY Winter	Winter Steelhead			677	1	
Washougal River	Washougal	Fall Chinook	3,000	<30	64	4	
		Coho	1,000	<10	119	0	
		Chum	25	<1	0	0	
	Skamania	Fall Chinook			0	0	
	Skamania	Coho			0	0	
Washougal River	Skamania	Summer/Winter Steelhead	400	<5			
2022 BY		Summer Steelhead			6	0	
2021 BY		Winter Steelhead			13	0	
	Washougal						
2022 BY		Summer Steelhead			18	0	

1/ Direct take (handle/mortality) is not included in this table. Handled/mortality numbers in 2021 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 2021. The authorized numbers are from Table 122 in the MA BIOP.

Table 10. Natural-Origin adults and jacks handled at weirs in 2021 and associated mortality.

		Calendar Year 2021				
		Number Authorized		Number		
Watershed	Species 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	20	0	
	Chum	8,500	<225	0	0	
Elochoman River	Fall Chinook	750	<23	75	0	
	Coho	800	<24	1,103	3	
	Chum	1,000	<30	188	1	take included in HGMP for broodstock program
Kalama River	Fall Chinook	3,200	<96	1886	5	
	Coho	150	<5	175	0	
	Chum	250	<8	0	0	
2022 BY	Summer Steelhead	200	<6	89	1	
Washougal River	Fall Chinook	1,200	<36	173	0	
	Coho	80	<3	40	0	
	Chum	250	<8	0	0	
2022 BY	Summer Steelhead	100	<3	17	0	One pink salmon passed upstream
Coweeman River	Fall Chinook	1,600	<48	459	15	
	Coho	800	<24	457	4	
	Chum	100	<3	0	0	
	Winter Steelhead	300	<9	1	0	
Cedar Creek Weir	Fall Chinook			264	0	
	Coho			454	0	
	Chum			0	0	
	Summer Steelhead			0	0	
Cedar Creek Ladder	Fall Chinook			7	0	
(Maiden fish not	Coho			116	0	
seen at weir below)	Chum			0	0	
	Summer Steelhead			0	0	
Cedar Creek Total	Fall Chinook	400	<12	271	0	
	Coho	1,000	<30	570	0	
	Chum	250	<8	0	0	

	Summer Steelhead	50	<2	0	0	

Table 11 shows handle and mortalities associated with hatchery operations and weirs combined in 2021. 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 2021 and associated mortality.

		Number Authorized		Calendar Year 2021 Number		
Watershed	**Species Encountered**	**Handled**	**Mortalities**	**Handled**	**Mortalities**	**Comments**
Ringold Springs	Steelhead	1	0	0	0	
NF Toutle	Fall Chinook	2,700	<81	690	41	
	Coho	12,300	<170	1,486	7	
	Chum	250	<8	0	0	
	Summer Steelhead	50	<2	5	0	
	Winter Steelhead	10	1	0	0	
Grays River	Fall Chinook	775	<24	4	0	
	Coho	950	<27	20	0	
	Chum	8,550	<226	0	0	
Elochoman River	Fall Chinook	770	<24	75	0	
	Coho	820	<25	1,313	7	
	Chum	1,020	<31	239	1	
Kalama River	Fall Chinook	9,200	<156	2,515	8	
	Spring Chinook	500	<5	94	3	
	Coho	3,150	<95	889	0	
	Chum	275	<9	0	0	
2021 BY	Summer Steelhead	200	<6	123	6	
2021 BY	Winter Steelhead			143	-	
2022 BY	Summer Steelhead			180	3	
2022 BY	Winter Steelhead			677	1	
	Summer and Winter Steelhead	3,400	<34			
Washougal River	Fall Chinook	4,200	<66	237	4	
	Coho	1,080	<13	159	0	
	Chum	275	<9	0	0	
2021 BY	Winter Steelhead			13	0	
2022 BY	Summer Steelhead	100	<3	41	0	
	Summer and Winter Steelhead	400	<5			
Coweeman River	Fall Chinook	1,600	<48	459	15	
	Coho	800	<24	457	4	
	Chum	100	<3	0	0	
	Winter Steelhead	300	<9	1	0	
Cedar Creek	Fall Chinook	400	<12	271	0	
	Coho	1,000	<30	570	0	
	Chum	250	<8	0	0	

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 2022:

Floy tagged and returned to stream: 43
Genetic tissue sample from fish returned to stream: 99

NOR Winters Spawn Year 2021:

Floy tagged and returned to stream: 0
Genetic tissue sample from fish returned to stream: 102

Table 12 shows the number of steelhead smolts handled and associated handling mortalities at the Kalama smolt trap in 2021.

Table 12. Kalama Smolt Trapping, 2021

	Handled		Mortalities	
	Permitted	**Actual**	**Permitted**	**Actual**
Spring Chinook [1]	1,330	212	67	0
Coho	1,300	167	65	0
Steelhead (summer) [2]	8,000	NA	Up to 550	NA
Steelhead (winter) [2]	8,000	NA	Up to 550	NA
Steelhead [2]	16,000	11,977	Up to 1,100	23

[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 24 hours per day 7 days per week 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 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 2020. 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, 2021*.

	Number Handled	Number Mortalities
Wild Winter steelhead	84	0
Wild Coho	57	0
Wild Fall Chinook	1	0
Wild Summer steelhead	2	0

*Steelhead returns from Nov 2020-June 2021.
Coho returns during fall of 2021

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.

References

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