2021 Information for Reporting on MA BIOP Terms and Conditions #8
Provided to James Archibald from Cindy LeFleur
January 31, 2021

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 2020 numbers marked and tagged.

MITCHELL ACT Marking and Tagging
Calendar Year 2020

Project	Release Location	Species/Run	Release Start Date	Brood Year	Ad + CWT Marked	Ad Only Marked	CWT Only	Unmarked	Total Released
Beaver Creek Hatchery	Elochoman River	Coho	4/20/2020	2018	47,206	152,873	-	321	200,400
Beaver Creek Hatchery	Elochoman River	Winter Steelhead	4/20/2020	2019	-	131,884	-	516	132,400
Beaver Creek Hatchery	Elochoman River	Summer Steelhead	4/20/2020	2019	-	29,411	-	59	29,470
Beaver Creek Hatchery	Grays River	Chum [1/]	3/20/2020	2019	-	-	-	195,482	195,482
Beaver Creek Hatchery	Skamokawa Creek	Chum [1/]	4/6/2020	2019	-	-	-	53,658	53,658
Deep River Net Pens	Deep River Net Pens	Spring Chinook	6/5/2020	2019	224,807	2,410	18,180	403	245,800
Deep River Net Pens	Deep River Net Pens	Coho	5/4/2020	2018	46,743	655,621	89	3,547	706,000
Fallert Creek Hatchery	Kalama River	Spring Chinook	3/3/2020	2018	120,155	357,502	579	1,725	479,961
Fallert Creek Hatchery	Kalama River	Fall Chinook	5/19/2020	2019	553,308	2,551,122	4,611	74,437	3,183,478
Fallert Creek Hatchery	Kalama River	Winter Steelhead	5/13/2020	2019	-	46,495	-	-	46,495
Fallert Creek Hatchery	Kalama River	Summer Steelhead	4/21/2020	2019	-	10,179	-	45,873	56,052
Kalama Falls Hatchery	Kalama River	Fall Chinook	5/26/2020	2019	100,704	3,415,893	354	172,087	3,689,038
Kalama Falls Hatchery	Kalama River	Coho	3/21/2020	2018	34,352	266,899	166	564	301,981
Kalama Falls Hatchery	Kalama River	Winter Steelhead	4/13/2020	2019	63,944	128	282	1	64,355
North Toutle Hatchery	Green River	Fall Chinook	6/28/2020	2019	95,040	1,047,812	1,291	5,879	1,150,022
North Toutle Hatchery	Green River	Coho	4/27/2020	2018	29,576	79,680	-	212	109,468
Ringold Springs Hatchery	Springs Creek	Fall Chinook	5/20/2020	2019	362,571	3,213,985	363	6,203	3,583,122
Ringold Springs Hatchery	Springs Creek	Coho	4/16/2020	2018	54,138	196,697	136	493	251,464
Skamania Hatchery	Klickitat River	Summer Steelhead	4/20/2020	2019	-	89,537	-	749	90,286
Skamania Hatchery	Rock Creek	Winter Steelhead	5/11/2020	2019	-	19,969	-	80	20,049
Skamania Hatchery	Washougal River	Winter Steelhead	4/15/2020	2019	-	85,075	-	16	85,091
Skamania Hatchery	Salmon Creek	Winter Steelhead	5/11/2020	2019	-	35,925	-	101	36,026
Skamania Hatchery	Washougal River	Summer Steelhead	4/23/2020	2019	-	70,069	-	197	70,266
South Fork Toutle	South Fork Toutle	Summer Steelhead	3/21/2020	2019	-	40,823	-	81	40,904
Washougal Hatchery	Washougal River	Fall Chinook	6/17/2020	2019	98,423	1,784,858	1,014	18,393	1,902,688
Washougal Hatchery	Klickitat River	Coho	3/23/2020	2018	70,320	2,405,993	212	7,239	2,483,764
Washougal Hatchery	Washougal River	Coho	4/14/2020	2018	43,252	85,948	344	684	130,228

[1/] 100% otolith marked

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 (2010b) 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
Grays/Chinook*	83	62	35	91	185	219	80	295	515	344	203
Elochoman/Skamokawa	136	63	62	80	147	230	90	77	27	38	57
Mill, Abernathy, Germany	156	94	21	128	34	80	87	17	6	12	24
Coweeman	413	622	463	1,568	794	1,359	411	721	216	287	724
Lower Cowlitz	2,550	2,745	1,553	3,477	2,923	4,186	2,878	2,924	3,002	4,514	4,670
Green/SFK Toutle/NFK Toutle	227	198	235	914	403	374	367	312	138	125	346
Kalama	593	428	288	812	764	2,889	2,539	1,732	1,643	1,474	3,219
Lewis	1,485	1,572	1,308	3,994	3,277	3,292	2,128	1,771	1,724	1,504	4,234
Washougal	589	473	256	1,197	997	1,332	883	655	903	1,575	3,772
Total	6,233	6,258	4,221	12,261	9,524	13,962	9,463	8,504	8,173	9,873	17,249

[1] Preliminary estimates for 2020. All estimates subject to updates.

[2] 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
Coweeman	4,064	4,030	3,288	3,969	6,778	1,090	3,229	2,804	3,021	3,336	5,106
East Fork Lewis	1,823	2,014	2,764	2,726	4,280	559	869	1,424	1,866	2,496	2,121
Elochoman/Skamokawa	751	700	571	801	3,337	299	762	1,096	1,200	1,817	2,188
Grays/Chinook	431	89	785	844	3,385	243	639	284	285	654	1,287
Kalama	11	25	38	55	99	19	116	95	107	207	375
Lower Cowlitz	7,510	6,129	5,806	7,406	25,214	2,602	4,867	2,917	3,109	3,917	5,176
Lower Gorge	599	580	493	680	1,363	367	878	542	624	1,113	1,086
Mill/Abernathy/Germany/Coal	1,145	613	585	736	2,561	667	1,139	857	957	1,501	1,588
North Fork Lewis	2,635	1,650	1,638	1,366	4,964	1,006	3,424	4,366	3,305	5,232	8,300
North Fork Toutle	1,799	1,081	1,529	3,046	5,651	719	1,713	1,007	1,009	2,217	2,264
Salmon Creek	2,923	1,989	1,500	1,979	5,295	1,021	2,442	2,109	2,370	3,168	3,398
South Fork Toutle	1,824	1,367	2,081	3,558	11,275	1,351	2,929	1,287	1,255	2,693	3,342
Tilton	898	1,964	1,269	2,654	8,923	1,361	2,628	5,197	1,321	1,558	2,368
Upper Cowlitz and Cispus	2,773	7,614	1,604	10	6,851	376	911	5,201	171	3,563	8,862
Washougal	678	657	501	533	583	123	260	236	265	722	1,016
Totals	29,864	30,502	24,452	30,363	90,559	11,803	26,806	29,422	20,865	34,194	48,477

[1] Natural Origin estimates are estimates of unclipped coho. Preliminary estimates for 2020. 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
* Elochoman/Skamokawa - In 2009 severe flooding limited surveys/visibilty = 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	TBD	NA 1/	145	446

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 chum population estimates.

Table 6. Columbia River Chum abundance in select Washington tributaries, 2010-2020.

Location	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Crazy Johnson Creek	865	2,304	3,475	1,925	1,541	4,193	5,987	3,681	899	72	2,863
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
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
Grays R. broodstock take	288	294	220	250	246	128	128	118	250	222	195
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
Multnomah area	458	647	120	222	334	1,142	1,162	93	394	470	557
St Cloud area	126	343	1	84	85	344	242	103	123	89	90
Horsetail area	54	119	92	59	75	420	656	56	320	213	135
Ives area	214	162	230	175	409	1,306	1,914	347	1,724	3,031	981
Duncan Creek	48	85	4	27	24	153	208	7	129	76	78
Hardy Creek	175	157	75	56	108	350	354	14	193	64	104
Hamilton Creek	404	542	352	255	260	249	332	162	548	1,367	1,118
Hamilton Spring Channel	190	325	137	392	678	1,397	1,265	742	1,583	341	413
Grays return	6,668	11,103	8,229	5,384	5,039	11,709	31,267	6,780	7,061	7,690	13,641
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
Sum	**10,485**	**18,395**	**11,826**	**8,120**	**8,484**	**21,827**	**42,645**	**9,951**	**14,593**	**14,762**	**19,441**

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
Grays/Chinook*	51.4%	85.1%	78.1%	94.5%	80.9%	71.1%	77.4%	47.7%	29.7%	41.8%	65.2%
Elochoman/Skamokawa	89.2%	94.2%	69.9%	82.2%	78.0%	76.3%	75.1%	32.3%	64.9%	75.9%	65.8%
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%
Coweeman	29.3%	11.9%	11.8%	32.5%	4.3%	2.3%	6.4%	14.3%	11.5%	21.7%	7.8%
Lower Cowlitz	31.7%	25.5%	43.0%	19.5%	32.8%	30.0%	25.9%	19.4%	15.5%	11.0%	8.0%
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%
Kalama	88.8%	94.4%	96.1%	90.4%	91.9%	54.9%	39.8%	43.0%	35.3%	46.4%	32.0%
Lewis	36.4%	29.3%	32.3%	30.7%	43.8%	54.9%	55.3%	48.6%	36.5%	25.9%	27.6%
Washougal	89.3%	85.4%	73.8%	66.9%	34.7%	54.4%	60.0%	40.8%	11.4%	13.3%	25.2%
Average	66.4%	67.2%	62.8%	60.6%	56.5%	52.5%	52.4%	41.7%	34.3%	45.1%	39.3%

[1] Preliminary estimates for 2020. All estimates subject to updates. PHOS results include corrections for un-clipped hatchery fish.

[2] 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
Coweeman	9.2%	4.7%	4.1%	12.5%	16.8%	22.5%	15.4%	10.2%	20.2%	29.5%	14.6%
East Fork Lewis	26.5%	6.6%	7.0%	9.0%	19.0%	25.1%	51.4%	37.1%	12.6%	9.1%	10.7%
Elochoman/Skamokawa	72.5%	56.4%	33.9%	41.4%	34.5%	46.3%	40.4%	22.4%	36.4%	33.4%	14.1%
Grays/Chinook	82.4%	95.2%	43.9%	63.0%	35.9%	64.7%	59.8%	76.6%	77.5%	65.8%	40.6%
Kalama	98.0%	93.4%	87.5%	86.3%	90.6%	89.2%	66.3%	65.1%	65.9%	63.7%	64.9%
Lower Cowlitz	16.0%	13.9%	15.1%	16.2%	4.9%	8.8%	9.4%	19.8%	10.4%	6.7%	7.8%
Lower Gorge	25.3%	11.8%	16.8%	21.9%	30.7%	14.1%	7.9%	20.0%	21.5%	25.5%	15.7%
Mill/Abernathy/Germany/Coal	12.2%	19.2%	2.3%	7.5%	12.1%	6.8%	13.0%	8.3%	15.3%	27.3%	9.8%
North Fork Lewis	24.4%	22.7%	14.7%	84.8%	65.0%	79.1%	65.0%	54.7%	68.2%	48.5%	42.5%
North Fork Toutle	55.4%	32.2%	21.3%	18.2%	32.5%	54.9%	60.4%	32.7%	31.8%	22.4%	17.5%
Salmon Creek	16.0%	8.8%	7.6%	3.3%	2.1%	4.4%	6.9%	12.0%	11.1%	12.2%	15.3%
South Fork Toutle	20.5%	15.7%	12.0%	14.4%	19.2%	48.9%	22.1%	12.8%	11.8%	9.6%	2.9%
Tilton	69.8%	68.8%	74.1%	58.6%	35.5%	53.2%	62.1%	50.1%	70.5%	78.4%	79.3%
Upper Cowlitz and Cispus	87.5%	60.8%	58.2%	99.8%	76.7%	71.5%	90.6%	55.3%	97.2%	63.4%	56.6%
Washougal	40.2%	10.1%	12.0%	32.3%	71.1%	68.4%	74.5%	74.9%	73.5%	56.3%	57.4%
Average	43.7%	34.7%	27.4%	37.9%	36.4%	43.9%	43.0%	36.8%	41.6%	36.8%	30.0%

[1] All estimates subject to updates. 2020 estimates are preliminary.

Steelhead Gene Flow Monitoring

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 Evolutionarily Significant Unit (ESU). The introgression study which that was described in the report is still in progress. WDFW is planning to use those results to guide development of future (new) monitoring methods. WDFW was planning to provide results and recommendations for methodologies to NMFS in early 2020, but setbacks have occurred in finalizing the report (COVID19). Work is on-going to complete the report and results will be provided to NMFS.

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, 2021. Produced by Ann Leroux, WDFW.

Information provided is for the monitoring period October 2020 through September 2021. WDFW MA facilities are compliant with the NPDES Permit (Upland Fin-fish Hatching and Rearing General Permit) effective date April 1, 2016, expiration date March 31, 2021. Permit was extended to October 1, 2021. New permit was issued August 18, 2021. Effective date October 1, 2021 and 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 reported to Ecology as required under the NPDES permit. List of exceedances for the period October 2020 through September 2021:

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 2020. The authorized numbers are from Table 121 in the MA BIOP.

Table 9. Natural-Origin adults and jacks handled at hatchery facilities in 2020 and associated mortality.

				Number Authorized		Calendar Year 2020 Number [1/]		
Watershed	Hatchery	Integrated Programs Direct Take	NOR Species	Handled	Mortalities	Handled	Mortalities	Comments
Columbia River	Ringold Springs		Steelhead	1	0	0	0	
North Fork Toutle River	Toutle Hatchery	Integrated	Fall Chinook	2,000	<60	448	68	
		Integrated	Coho	10,000	<100	906	15	
			Chum	0	0	0	0	
	2021 BY Summer		Steelhead	10	1	5	0	released
Grays River	Grays River		Fall Chinook	25	1			Hatchery closed
		Integrated	Coho	150	<3			
			Chum	50	1			
Elochoman River	Beaver Creek		Fall Chinook	20	1	1	0	released
			Early coho			7	0	released
		Integrated	Late coho	20	1	79	57	78 lethal spawned (includes fish from weir)
			Chum	20	1	0	0	
			Winter Steelhead	NA	NA	1	0	No take limit identified. Fish released
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	960	19	941 released
			Spring Chinook	500	<5	91	1	released
			Early coho			40	0	released
			Late coho	3,000	<90	278	0	released
			Chum	25	1	0	0	
			Summer & Winter Steelhead	3,400	<34			
	2020 BY Summer	Wild brood/Integrated	Summer Steelhead			10	10	
	2021 BY Summer	Wild brood/Integrated	Summer Steelhead			202	6	
	2020 BY Winter		Winter Steelhead			464	2	
	2021 BY Winter		Winter Steelhead			43	0	
Washougal River	Washougal	Integrated	Fall Chinook	3,000	<30	149	45	
		Integrated	Coho	1,000	<10	64	0	26 released/38 spawned
			Chum	25	<1			take included in HGMP for broodstock program
	Skamania		Fall Chinook			5	0	released
	Skamania		Coho			3	0	released
Washougal River	Skamania	Summer/Winter	Steelhead	400	<5			
2021 BY		Summer	Steelhead			12	0	released
2020 BY		Winter	Steelhead			36	0	released
	Washougal							
2021 BY		Summer	Steelhead			45	0	released

[1/] Handled numbers in 2020 are for fish returning to the hatchery but not transported from the weir. Mortalities include fish returning to the hatchery or transported from the weir.

Table shows handle and mortalities associated with weirs in 2020. The authorized numbers are from Table 122 in the MA BIOP.

Table 10. Natural-Origin adults and jacks handled at weirs in 2020 and associated mortality.

		Calendar Year 2020				
	Species	Number Authorized		Number		
Watershed	Encountered	Handled	Mortalities	Handled	Mortalities	Comments
NF Toutle	Fall Chinook	700	<21	461	16	All numbers are reported on the hatchery
	Coho	2,300	<70	906	7	table
	Chum	250	<8	0	0	
	Summer Steelhead	50	<2	5	0	
Grays River	Fall Chinook	750	<23	6	0	1 spring Chinook released
	Coho	800	<24	5	0	5 upstream
	Chum	8,500	<225	0	0	
Elochoman River	Fall Chinook	750	<23	92	0	1 spring Chinook released
	Coho	800	<24	1,148	2	10 winter steelhead released
	Chum	1,000	<30	NA	NA	take included in HGMP for broodstock program
Kalama River	Fall Chinook	3,200	<96	2,659	6	
	Coho	150	<5	205	0	
	Chum	250	<8	0	0	
2021 BY	Summer Steelhead	200	<6	171	1	6 spring Chinook released
Washougal River	Fall Chinook	1,200	<36	536	13	
	Coho	80	<3	35	0	
	Chum	250	<8	0	0	
2021 BY	Summer Steelhead	100	<3	37	0	
Coweeman River	Fall Chinook	1,600	<48	511	3	
	Coho	800	<24	286	0	
	Chum	100	<3	0	0	
	Winter Steelhead	300	<9	0	0	4 summer steelhead released
Cedar Creek Weir	Fall Chinook			467	2	2 spring Chinook mortalities
	Coho			131	1	
	Chum			0	0	
	Summer Steelhead			0	0	
Cedar Creek Ladder	Fall Chinook			109	0	released
(Maiden fish not	Coho			227	0	released
seen at weir below)	Chum			0	0	1 sockeye released
	Summer Steelhead			2	0	
Cedar Creek Total	Fall Chinook	400	<12	576	2	2 spring Chinook mortalities
	Coho	1,000	<30	358	1	
	Chum	250	<8	0	0	1 sockeye released
	Summer Steelhead	50	<2	2	0	

Table shows handle and mortalities associated with hatchery operations and weirs combined in 2020. 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 2020 and associated mortality.

		Calendar Year 2020				
		Number Authorized		Number		
Watershed	Species Encountered	Handled	Mortalities	Handled	Mortalities	Comments
Ringold Springs	Steelhead	1	0	0	0	
NF Toutle	Fall Chinook	2,700	<81	448	68	
	Coho	12,300	<170	906	15	
	Chum	250	<8	0	0	
	Summer Steelhead	50	<2	5	0	
	Winter Steelhead	10	1	0	0	
Grays River	Fall Chinook	775	<24	6	0	1 spring Chinook released
	Coho	950	<27	5	0	
	Chum	8,550	<226	0	0	
Elochoman River	Fall Chinook	770	<24	93	0	1 spring Chinook released
	Coho	820	<25	1,234	59	10 winter steelhead released
	Chum	1,020	<31	0	0	
Kalama River	Fall Chinook	9,200	<156	3,619	25	
	Spring Chinook	500	<5	97	1	
	Coho	3,150	<95	523	0	
	Chum	275	<9	0	0	
2020 BY	Summer Steelhead	200	<6	10	10	
2020 BY	Winter Steelhead			464	2	
2021 BY	Summer Steelhead			373	7	
2021 BY	Winter Steelhead			43	0	
	Summer and Winter Steelhead	3,400	<34			
Washougal River	Fall Chinook	4,200	<66	690	58	
	Coho	1,080	<13	102	0	
	Chum	275	<9	0	0	
2020 BY	Winter Steelhead			36	0	
2021 BY	Summer Steelhead	100	<3	94	0	
	Summer and Winter Steelhead	400	<5			
Coweeman River	Fall Chinook	1,600	<48	511	3	
	Coho	800	<24	286	0	
	Chum	100	<3	0	0	
	Winter Steelhead	300	<9	0	0	4 summer steelhead released
Cedar Creek	Fall Chinook	400	<12	576	2	2 spring Chinook mortalities
	Coho	1,000	<30	358	1	
	Chum	250	<8	0	0	1 sockeye released
	Summer Steelhead	50	<2	2	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 need 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 2021:

Floy tagged and returned to stream: 65
Genetic tissue sample from fish returned to stream: 118

NOR Winters Spawn Year 2020:

Floy tagged and returned to stream: 0
Genetic tissue sample from fish returned to stream: 14
Table 12 shows the number of steelhead smolts handled and associated handling mortalities at the Kalama smolt trap in 2020.

Table 12. Kalama Smolt Trapping, 2020

	Handled		Mortalities	
	Permitted	Actual	Permitted	Actual
Spring Chinook [1]	1,330	266	67	1
Fall Chinook		0		0
Coho	1,300	70	65	0
Chum		0		0
Steelhead (summer) [2,3]	8,000	4,797	Up to 550	3
Steelhead (winter) [2,3]	8,000	0	Up to 550	0

[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.

[3] Does not include three adult steelhead kelt that were captured in the Kalama smolt trap; one of which was a discovered as a mortality (unknown run).

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 research 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, 2020*.

	Number Handled	Number Mortalities
Wild Winter steelhead	168	0
Wild Coho	79	0
Wild Fall Chinook	0	0
Wild Summer steelhead	0	0

*Steelhead returns from Nov 2019-June 2020.
Coho returns during fall of 2020

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

From 2016 – 2020, the Washington Department of Fish & Wildlife, Oregon State University (OSU), and NOAA collaborated on a research project to evaluate the efficacy of fish rescue as a drought adaptation strategy for imperiled coho salmon. The majority of this project was funded through a grant from the Northwest Climate Science Center while a small proportion was provided through Mitchell Act funding that was spent before September 2018. Results from this work have been peer-reviewed and published in the North American Journal of Fisheries Management as a Featured Paper. The core product of our project was the development of a life-cycle model that we've translated into an R-Shiny application that is available online (https://shiny.wdfw-fish.us/CohoPopulationDynamics/). This application allows users to explore how fish rescue affects salmon population dynamics through customized parameterization of the model. Moving forward, the core group of collaborators will continue to disseminate the results and support tools with internal and external Agency parties as needed. As it pertains to the MA BIOP, this project should be considered complete.

References

Buehrens, T. et al. 2017. Mitchell Act Steelhead Hatchery Monitoring Progress Report. December 2017. Washington Department of Fish and Wildlife.

Harlan, L. 2018. Report on the Coded-Wire Tag Program for Chinook and Coho Salmon Produced by WDFW Columbia River Basin Hatcheries. Washington Department of Fish and Wildlife Ridgefield, WA 98642. May 2018.

Rawding, D. et al. 2010b. Preliminary Spawning Distribution of Tule Fall Chinook Salmon in Washington's Portion of the Lower Columbia River Evolutionary Significant Unit Based on Field Observation, GIS Attributes, and Logistic Regression. Washington Department of Fish and Wildlife. Olympia, WA. 17pp.

Thom, B. 2018. Hatchery and Genetic Management Plans Submitted by Oregon Department of Fish and Wildlife and Washington Department of Fish and Wildlife under Limit 5 of the Endangered Species Act 4(d) Rule – Decision Memorandum. National Marine Fisheries Service. January 16, 2018.

Wilson, J. et. al. 2020. Estimates of Adult Fall Chinook Salmon Spawner Abundance and Viable Salmonid Population Parameters in the Washington Portion of the Lower Columbia River Evolutionarily Significant Unit, 2013-2017. July 2020.