2020 Information for Reporting on MA BIOP Terms and Conditions #8
Provided to James Archibald from Cindy LeFleur
January 5, 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 2019 numbers marked and tagged.

MITCHELL ACT Marking and Tagging
Calendar Year 2019.

Project	Release Location	Species/Run	Release Start Date	Brood Year	Marked	Marked & Tagged	Tagged	Unmarked	Total Released
Beaver Creek Hatchery	Elochoman River	Coho	4/15/2019	2017	61,379	41,000		371	102,750
Beaver Creek Hatchery	Elochoman River	Winter Steelhead	4/15/2019	2018	126,424			1,040	127,464
Beaver Creek Hatchery	Elochoman River	Summer Steelhead	4/15/2019	2018	30,902			95	30,997
Deep River Net Pens	Deep River Net Pens	Spring Chinook	4/18/2019	2018	1,168	128,598	232	2	130,000
Deep River Net Pens	Deep River Net Pens	Spring Chinook	12/27/2019	2018	517	130,703	777	3	132,000
Deep River Net Pens	Deep River Net Pens	Coho	5/6/2019	2017	654,705	42,840	284	2,171	700,000
Fallert Creek Hatchery	Kalama River	Spring Chinook	3/1/2019	2017	383,317	123,524	533	2,535	509,909
Fallert Creek Hatchery	Kalama River	Fall Chinook	6/3/2019	2018	2,999,437	97,244	587	5,831	3,103,099
Fallert Creek Hatchery	Kalama River	Winter Steelhead	5/8/2019	2018	57,294				57,294
Fallert Creek Hatchery	Kalama River	Summer Steelhead	4/5/2019	2018	88,396			212	88,608
Grays River Hatchery	Grays River	Chum [1/]	3/12/2019	2018				179,581	179,581
Kalama Falls Hatchery	Kalama River	Fall Chinook	6/24/2019	2018	3,513,985	100,389	819	28,695	3,643,888
Kalama Falls Hatchery	Kalama River	Coho	4/2/2019	2017	255,944	44,294	178	1,028	301,444
Kalama Falls Hatchery	Kalama River	Winter Steelhead	5/8/2019	2018	661	51,359	103	1	52,124
Skamania Hatchery	Salmon Creek	Winter Steelhead	4/29/2019	2018	38,103			76	38,179
North Toutle Hatchery	Green River	Fall Chinook	6/25/2019	2018	1,000,763	97,641	907	21,901	1,121,212
North Toutle Hatchery	Green River	Coho	5/1/2019	2017	58,223	20,758	321	235	79,537
Ringold Springs Hatchery	Columbia River	Fall Chinook	6/14/2019	2018	3,582,572	424,786	4,291	36,188	4,047,837
Ringold Springs Hatchery	Columbia River	Summer Steelhead	3/30/2019	2018	170,260			170	170,430
Ringold Springs Hatchery	Columbia River	Summer Steelhead	12/21/2019	2019	49,497			154	49,651
Skamania Hatchery	Klickitat River	Summer Steelhead	4/22/2019	2018	89,333			703	90,036
Skamania Hatchery	Rock Creek	Winter Steelhead	4/17/2019	2018	20,958			42	21,000
Skamania Hatchery	Washougal River	Winter Steelhead	4/15/2019	2018	88,901			349	89,250
Skamania Hatchery	Washougal River	Summer Steelhead	4/15/2019	2018	65,515			125	65,640
South Fork Toutle	South Fork Toutle	Summer Steelhead	4/15/2019	2018	19,880			48	19,928
Washougal Hatchery	Washougal River	Fall Chinook	6/20/2019	2018	1,074,720	103,331	938	9,761	1,188,750
Washougal Hatchery	Klickitat River	Coho	3/25/2019	2017	2,379,933	72,915	146	21,700	2,474,694
Washougal Hatchery	Washougal River	Coho	4/24/2019	2017	97,219	44,795	86	185	142,285

[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
Grays/Chinook*	83	62	35	91	185	219	80	295	516	344
Elochoman/Skamokawa	136	63	62	80	147	230	91	77	27	38
Mill, Abernathy, Germany	156	94	21	128	34	80	87	17	6	12
Coweeman	413	622	463	1,568	794	1,359	411	721	216	287
Lower Cowlitz	2,550	2,745	1,553	3,477	2,923	4,186	2,878	2,924	3,002	4,517
Green/SFK Toutle/NFK Toutle	227	198	235	914	403	374	367	312	138	116
Kalama	593	428	288	812	764	2,889	2,539	1,732	1,643	1,474
Lewis	1,485	1,572	1,308	3,994	3,277	3,292	2,128	1,771	1,724	1,504
Washougal	589	473	256	1,197	997	1,332	883	655	903	1,575
Total	6,233	6,258	4,221	12,261	9,524	13,962	9,464	8,504	8,174	9,867

[1] Preliminary estimates for 2019. 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
Coweeman	3,199	2,356	2,587	3,501	4,692	803	2,654	2,156	3,036	2,078
EF Lewis	1,458	1,493	2,179	2,324	1,868	347	414	910	1,532	2,149
Elochoman_Skamokawa	603	551	367	650	2,572	204	589	780	944	1,662
Grays_Chinook	269	53	421	677	2,826	145	489	175	165	165
Kalama	2	5	24	45	58	12	79	53	65	53
Lower Cowlitz	6,399	3,040	2,547	3,853	18,178	1,709	4,290	2,361	2,370	5,275
Lower Gorge	386	453	454	553	564	323	543	406	404	1,086
MAG	868	410	377	570	1,946	494	946	635	739	1,882
NF_MS Toutle	1,105	556	1,000	2,316	4,680	535	1,432	743	701	3,364
North Fork Lewis	1,807	910	999	1,245	2,116	403	1,800	2,917	1,241	2,349
Salmon Creek	1,572	1,236	1,284	1,668	2,218	731	1,546	1,900	2,364	2,485
SF Toutle	1,490	847	1,582	3,125	7,781	838	2,168	832	771	2,401
Tilton	979	2,087	1,444	2,744	9,070	1,394	2,667	2,803	1,336	1,580
Upper Cowlitz and Cispu	2,905	7,878	1,687	8	6,921	381	906	2,621	169	3,603
Washougal	480	546	542	543	302	114	189	214	188	591
Totals	23,522	22,421	17,494	23,822	65,792	8,433	20,712	19,506	16,025	30,723

[1] Natural Origin estimates are estimates of unclipped coho. Preliminary estimates for 2019. 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	274	153	322	130
* 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	TBD	331	392	445

Table 6 shows chum population estimates.

Table 6. Columbia River Chum abundance in select Washington tributaries, 2010-2019.

Location	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Crazy Johnson Creek	865	2,304	3,475	1,925	1,541	4,193	5,987	3,681	899	72
WF Grays River	1,814	5,996	2,817	1,857	1,145	6,297	19,023	1,930	2,902	3,406
Mainstem Grays River	3,701	2,509	1,717	1,352	2,107	1,091	6,129	1,051	3,010	3,990
Grays R. broodstock take	288	294	220	250	246	128	128	118	250	182
I-205 area	2,148	4,912	2,586	1,466	1,472	4,757	5,245	1,647	2,604	1,421
Multnomah area	458	647	120	222	334	1,142	1,162	93	394	470
St Cloud area	126	343	1	84	85	344	242	103	123	89
Horsetail area	54	119	92	59	75	420	656	56	320	213
Ives area	214	162	230	175	409	1,306	1,914	347	1,724	3,240
Duncan Creek	48	85	4	27	24	153	208	7	129	76
Hardy Creek	175	157	75	56	108	350	354	14	193	64
Hamilton Creek	404	542	352	255	260	249	332	162	548	1,367
Hamilton Spring Channel	190	325	137	392	678	1,397	1,265	742	1,545	201
Grays return	6,668	11,103	8,229	5,384	5,039	11,709	31,267	6,780	7,061	7,650
I-205 to Bonneville return	3,817	7,292	3,597	2,736	3,445	10,118	11,378	3,171	7,580	7,141
Sum	**10,485**	**18,395**	**11,826**	**8,120**	**8,484**	**21,827**	**42,645**	**9,951**	**14,641**	**14,791**

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
Grays/Chinook*	51.4%	85.1%	78.1%	94.5%	80.9%	71.1%	77.4%	47.7%	29.7%	41.8%
Elochoman/Skamokawa	89.2%	94.2%	69.9%	82.2%	78.0%	76.3%	75.1%	32.3%	50.0%	75.9%
Mill, Abernathy, Germany	93.5%	92.1%	85.7%	80.6%	93.8%	91.9%	78.1%	82.6%	11.5%	21.7%
Coweeman	29.3%	11.9%	11.8%	32.5%	4.3%	2.3%	6.4%	14.3%	11.5%	21.7%
Lower Cowlitz	31.7%	25.5%	43.0%	19.5%	32.8%	30.0%	25.9%	19.4%	15.5%	10.9%
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%
Kalama	88.8%	94.4%	96.1%	90.4%	91.9%	54.9%	39.8%	43.0%	35.3%	46.4%
Lewis	26.7%	16.8%	14.6%	30.8%	43.9%	55.0%	55.5%	49.4%	28.0%	25.9%
Washougal	89.3%	85.4%	73.8%	66.9%	34.7%	54.4%	60.0%	40.8%	11.4%	13.3%
Average	65.3%	65.8%	60.8%	60.6%	56.6%	52.5%	52.4%	41.8%	26.3%	36.9%

[1] Preliminary estimates for 2019. 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
Coweeman	8.6%	4.3%	3.0%	12.0%	16.6%	21.7%	13.3%	4.7%	4.5%	32.1%
EF Lewis	25.3%	4.7%	6.0%	8.5%	18.6%	23.0%	55.9%	37.0%	12.1%	7.4%
Elochoman_Skamokawa	73.2%	56.7%	30.7%	41.4%	34.4%	46.6%	40.0%	18.3%	36.3%	38.9%
Grays_Chinook	83.1%	95.9%	40.2%	63.2%	35.0%	67.8%	60.2%	80.3%	84.2%	89.5%
Kalama	99.3%	97.4%	89.3%	88.2%	90.9%	89.9%	66.2%	68.1%	69.3%	70.3%
Lower Cowlitz	9.3%	8.4%	12.4%	20.3%	7.2%	8.1%	8.5%	23.9%	20.3%	4.7%
Lower Gorge	24.2%	8.8%	13.8%	19.8%	29.4%	11.3%	6.2%	16.9%	19.9%	27.7%
MAG	12.0%	19.3%	2.1%	7.4%	12.1%	6.5%	13.0%	8.1%	14.9%	27.7%
NF_MS Toutle	57.2%	25.5%	18.4%	16.9%	32.3%	54.8%	58.6%	30.3%	32.3%	44.6%
North Fork Lewis	3.8%	11.2%	16.4%	85.7%	80.5%	90.2%	76.6%	62.4%	84.7%	66.8%
Salmon Creek	2.5%	2.8%	4.0%	1.6%	1.1%	1.8%	3.5%	9.3%	9.9%	9.2%
SF Toutle	20.2%	13.9%	10.5%	13.8%	19.1%	49.8%	21.3%	8.0%	6.4%	11.6%
Tilton	71.7%	69.7%	77.9%	58.3%	34.7%	36.4%	61.6%	46.0%	65.6%	74.3%
Upper Cowlitz and Cispus	86.6%	61.2%	75.3%	99.9%	76.5%	71.3%	90.6%	51.1%	96.7%	62.4%
Washougal	40.5%	7.5%	9.9%	31.1%	71.7%	69.4%	75.1%	75.5%	78.7%	56.5%
Average	41.2%	32.5%	27.3%	37.9%	37.3%	43.2%	43.4%	36.0%	42.4%	41.6%

[1] All estimates subject to updates. 2019 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, 2020

Produced by Ann Leroux, WDFW

For the monitoring period October 2019 through September 2020. 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.

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 2019 through September 2020:

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 2019. The authorized numbers are from Table 121 in the MA BIOP.

Table 9. Natural-Origin adults and jacks handled at hatchery facilities in 2019 and associated mortality.

						Calendar Year 2019		
		Integrated Programs	NOR	Number Authorized		Number		
Watershed	Hatchery	Direct Take	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	184	13	34 adults and 1 jack spawned
		Integrated	Coho	10,000	<100	552	21	87 adults and 1 jack spawned
			Chum	0	0	0	0	
	2018 BY Summer		Steelhead	10	1	2	0	
Grays River	Grays River		Fall Chinook	25	1	0	0	
		Integrated	Coho	150	<3	3	0	3 adult spawned
			Chum	50	1			Take included in another BIOP
Elochoman River	Beaver Creek		Fall Chinook	20	1	0	0	
			Coho	20	1	33	8	
			Chum	20	1			Take included in another BIOP
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	693	4	
			Spring Chinook	500	<5	51	0	
	Early Coho		Coho	3,000	<90	21	0	Take limits not designated as early/late
	Late Coho		Coho			214	1	Take limits not designated as early/late
			Chum	25	1	2	0	
			Summer & Winter Steelhead	3,400	<34			
	2019 BY		Summer Steelhead			52	8	52 spawned
	2019 BY		Winter Steelhead			128	6	55 spawned
	2020 BY		Summer Steelhead			127	15	
	2020 BY		Winter Steelhead			6	0	
Washougal River	Washougal	Integrated	Fall Chinook	3,000	<30	245	15	57 adults and 2 jacks spawned
		Integrated	Coho	1,000	<10	145	0	43 adults spawned
			Chum	25	<1			Take included in another BIOP
Washougal River	Skamania	Summer/Winter	Steelhead	400	<5			
2019 BY		Summer	Steelhead			1	0	
2019 BY		Winter	Steelhead			12	0	
2020 BY	2020 BY Washougal	Summer	Steelhead			15	0	
2020 BY Summer	2020 BY	Summer	Steelhead			86	2	

Table shows handle and mortalities associated with weirs in 2019. The authorized numbers are from Table 122 in the MA BIOP.

Table 10. Natural-Origin adults and jacks handled at weirs in 2019 and associated mortality.

				Calendar Year 2019		
	Species	Number Authorized		Number		
Watershed	Encountered	Handled	Mortalities	Handled	Mortalities	Comments
NF Toutle	Fall Chinook	700	<21	181	1	Put upstream/broodstock
	Coho	2,300	<70	531	21	Put upstream/broodstock
	Chum	250	<8	0	0	
	Summer Steelhead	50	<2	0	0	2 winter steelhead handled
Grays River	Fall Chinook	750	<23	12	0	
	Coho	800	<24	39	0	
	Chum	8,500	<225	2	0	
Elochoman River	Fall Chinook	750	<23	42	0	
	Coho	800	<24	316	1	
	Chum	1,000	<30	565	3	
Kalama River	Fall Chinook	3,200	<96	1,068	4	3 spring Chinook/0 mortalities
	Coho	150	<5	61	1	5 pink salmon/0 mortalities
	Chum	250	<8	4	0	1 sockeye/0 mortalities
	Summer Steelhead	200	<6	97	1	2020 BY
Washougal River	Fall Chinook	1,200	<36	330	0	
	Coho	80	<3	17	1	
	Chum	250	<8	0	0	
	Summer Steelhead	100	<3	25	0	2020 BY
Coweeman River	Fall Chinook	1,600	<48	243	0	
	Coho	800	<24	178	0	
	Chum	100	<3	0	0	
	Winter Steelhead	300	<9	5	0	
Cedar Creek	Fall Chinook	400	<12	203	1	Ladder and weir/Sp Chin 2 handle/4 mort
	Coho	1,000	<30	317	2	Morts were CWT fish
	Chum	250	<8	0	0	
	Summer Steelhead	50	<2	0	0	2 winter sthd handle

Table shows handle and mortalities associated with hatchery operations and weirs combined in 2019. The authorized numbers are based on adding the authorized numbers from Table 121 and Table 121 in the MA BIOP.

Table 11. Natural-Origin adults and jacks handled at hatcheries and weirs combined in 2019 and associated mortality.

				Calendar Year 2019		
	Species	Number Authorized		Number		
Watershed	Encountered	Handled	Mortalities	Handled	Mortalities	Comments
Ringold Springs	Steelhead	1	0	0	0	
NF Toutle	Fall Chinook	2,700	<81	365	14	
	Coho	12,300	<170	1,083	42	
	Chum	250	<8	0	0	
	Summer Steelhead	50	<2	2	0	
	Winter Steelhead	10	1	2	0	
Grays River	Fall Chinook	775	<24	12	0	
	Coho	950	<27	42	0	
	Chum	8,550	<226	2	0	
Elochoman River	Fall Chinook	770	<24	12	0	
	Coho	820	<25	72	8	
	Chum	1,020	<31	2	0	
Kalama River	Fall Chinook	9,200	<156	1,761	8	
	Spring Chinook	500	<5	54	0	
	Coho	3,150	<95	296	2	5 pink salmon/0 mortalities
	Chum	275	<9	6	0	1 sockeye/0 mortalities
2019 BY	Summer Steelhead	200	<6	52	8	
2019 BY	Winter Steelhead			128	6	
2020 BY	Summer Steelhead			224	16	
2020 BY	Winter Steelhead			6	0	
	Summer and Winter Steelhead	3,400	<34			
Washougal River	Fall Chinook	4,200	<66	575	15	
	Coho	1,080	<13	162	1	
	Chum	275	<9	0	0	
2019 BY	Summer Steelhead			1	0	
2019 BY	Winter Steelhead			12	0	
2020 BY	Summer Steelhead	100	<3	126	2	
	Summer and Winter Steelhead	400	<5			
Coweeman River	Fall Chinook	1,600	<48	243	0	
	Coho	800	<24	178	0	
	Chum	100	<3	0	0	
	Winter Steelhead	300	<9	5	0	
Cedar Creek	Fall Chinook	400	<12	203	1	Sp Chin 2 handle/4 mort
	Coho	1,000	<30	317	2	
	Chum	250	<8	0	0	
	Summer Steelhead	50	<2	0	0	2 winter sthd handle

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 2020:
Floy tagged and returned to stream: 66
Genetic tissue sample from fish returned to stream: 0

NOR Winters Spawn Year 2019:
Floy tagged and returned to stream: 0
Genetic tissue sample from fish returned to stream: 41
Table 12 shows the number of steelhead smolts handled and associated handling mortalities at the Kalama smolt trap in 2019.

Table 12. Kalama Smolt Trapping, 2019

	Handled		Mortalities	
	Permitted	Actual	Permitted	Actual
Spring Chinook [1]	1,330	1,008	67	0
Fall Chinook		0		0
Coho	1,300	54	65	0
Chum		0		0
Steelhead (summer) [2,3]	8,000	5,037	Up to 550	190
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] One adult steelhead kelt was captured in the Kalama smolt trap; not included in the totals in table (unknown run).

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

The Toutle Fish Collection Facility 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 Toutle Fish Collection Facility (FCF) in 2019. 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, 2019-2020*.

	Number Handled	Number Mortalities
Wild Winter steelhead	166	1
Wild Coho	81	0
Wild Fall Chinook	0	0
Wild Summer steelhead	0	0

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

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

Project update: In 2016, the Washington Department of Fish & Wildlife, Oregon State University (OSU), and NOAA initiated a collaboration aimed at evaluating 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. The last of the Mitchell Act funds were spent before September 2018. Therefore, we have no Mitchell Act funding related activities to report from the past six months.

Overall, the project is nearly complete. Specifically, the graduate student (Brittany Beebe) who was working on this project defended her Master's Thesis at OSU in the fall of 2019. In the spring of 2020, we submitted a manuscript that describes our project and results for publication to the North American Journal of Fisheries Management. The manuscript has been accepted and will be published as a Feature Article in an upcoming edition. 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. In the spring of 2021, we will be sharing an overview of the project, our final results, and recommendations with internal and external Agency parties.

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