2019 Information for Reporting on MA BIOP Terms and Conditions #8
Provided to James Dixon from Cindy LeFleur
January 22, 2020

This report provides information to address the requirements of the Terms and Conditions (T&C) 8a, 8b, 8c, 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.
    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 2018 numbers marked and tagged.

MITCHELL ACT Marking and Tagging
Calendar Year 2018

Project	Release Location	Species/Run	Release Start Date	Marked	Marked & Tagged	Tagged	Unmarked	Total Released
Beaver Creek Hatchery	Elochoman River	Coho	4/17/2018	54,500	19,400			73,900
Beaver Creek Hatchery	Elochoman River	Winter Steelhead	4/16/2018	114,109				114,109
Beaver Creek Hatchery	Elochoman River	Summer Steelhead	4/16/2018	33,787				33,787
Coweeman	Coweeman	Winter Steelhead	4/21/2018	12,205				12,205
Deep River Net Pens	Deep River Net Pens	Spring Chinook	11/26/2018		170,000			170,000
Deep River Net Pens	Deep River Net Pens	Coho	5/1/2018	681,000	42,000			723,000
Fallert Creek Hatchery	Kalama River	Spring Chinook	3/1/2018	410,482	98,943			509,425
Fallert Creek Hatchery	Kalama River	Fall Chinook	6/5/2018	3,561,007	201,180			3,762,187
Fallert Creek Hatchery	Kalama River	Winter Steelhead	4/30/2018	35,075				35,075
Fallert Creek Hatchery	Kalama River	Summer Steelhead	4/27/2018	91,078				91,078
Grays River Hatchery	Grays River	Chum	3/27/2018			131,984		131,984
Grays River Hatchery	Grays River	Coho	5/1/2018	43,550		12,000		55,550
Kalama Falls Hatchery	Kalama River	Fall Chinook	6/5/2018	3,600,664	106,428			3,707,092
Kalama Falls Hatchery	Kalama River	Coho	4/5/2018	247,711	44,450			292,161
Kalama Falls Hatchery	Kalama River	Winter Steelhead	4/17/2018		84,446			84,446
Skamania Hatchery	Salmon Creek	Winter Steelhead	5/9/2018	37,654				37,654
North Toutle Hatchery	Green River	Fall Chinook	6/19/2018	659,273	96,415			755,688
North Toutle Hatchery	Green River	Coho	5/1/2018	118,394	32,152			150,546
Ringold Springs Hatchery	Columbia River	Fall Chinook	5/25/2018	3,094,212	427,266			3,521,478
Ringold Springs Hatchery	Columbia River	Summer Steelhead	4/6/2018	116,698	40,395			157,093
Skamania Hatchery	Klickitat River	Summer Steelhead	4/23/2018	91,786				91,786
Skamania Hatchery	Rock Creek	Winter Steelhead	4/16/2018	20,035				20,035
Skamania Hatchery	Washougal River	Winter Steelhead	4/17/2018	87,855				87,855
Skamania Hatchery	Washougal River	Summer Steelhead	4/17/2018	71,382				71,382
South Fork Toutle	South Fork Toutle	Summer Steelhead	4/25/2018	19,843				19,843
Washougal Hatchery	Washougal River	Fall Chinook	6/18/2018	1,835,090	104,324			1,939,414
Washougal Hatchery	Klickitat River	Coho	3/26/2018	2,156,903	72,171			2,229,074
Washougal Hatchery	Washougal River	Coho	5/1/2018	83,509	44,430			127,939

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). WDFW has a draft report regarding Chinook spatial data that will be included in the 2013-2017 VSP report (Wilson et al 2019 in process). The report is expected to be released in early 2020 and will be provided to NMFS. 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
Grays/Chinook [2]	83	62	35	91	185	219	80	295	516
Elochoman/Skamokawa	136	63	62	80	147	230	91	77	27
Mill, Abernathy, Germany	156	94	21	128	34	80	87	17	6
Coweeman	413	622	463	1,568	794	1,359	411	721	216
Lower Cowlitz	2,550	2,745	1,553	3,477	2,923	4,186	2,878	2,924	3,002
Green/SFK Toutle	227	198	235	914	403	374	367	312	138
Kalama	593	428	288	812	764	2,889	2,539	1,732	1,643
Lewis	1,485	1,572	1,308	3,994	3,277	3,292	2,128	1,771	1,724
Washougal	589	473	256	1,197	997	1,332	883	655	903
Average	693	695	469	1,362	1,058	1,551	1,052	945	908

[1] Preliminary estimates for 2018. 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
Coweeman	3,199	2,356	2,587	3,501	4,692	803	2,654	2,156	3,036
EF Lewis	1,458	1,493	2,179	2,324	1,868	347	414	910	1,532
Elochoman/Skamokawa	603	551	367	650	2,572	204	589	780	944
Grays/Chinook	269	53	421	677	2,826	145	489	175	165
Kalama	2	5	24	45	58	12	79	53	65
Lower Cowlitz	6,399	3,040	2,547	3,853	18,178	1,709	4,290	2,361	2,370
Lower Gorge	386	453	454	553	564	323	543	406	404
Mill, Abernathy, Germany	868	410	377	570	1,946	494	946	635	739
NF/Mainstem Toutle	1,105	556	1,000	2,316	4,680	535	1,432	743	701
North Fork Lewis	1,807	910	999	1,245	2,116	403	1,800	2,917	1,241
Salmon Creek	1,572	1,236	1,284	1,668	2,218	731	1,546	1,900	2,364
SF Toutle	1,490	847	1,582	3,125	7,781	838	2,168	832	771
Tilton	979	2,087	1,444	2,744	9,070	1,394	2,667	2,803	1,336
Upper Cowlitz and Cispus	2,905	7,878	1,687	8	6,921	381	906	2,621	169
Washougal	480	546	542	543	302	114	189	214	188
Totals	23,522	22,421	17,494	23,822	65,792	8,433	20,712	19,506	16,025

[1] Natural Origin estimates are estimates of unclipped coho

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
* 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	NA	367	456	303

Table 6 shows chum population estimates.

Table 6. Columbia River Chum abundance in select Washington tributaries, 2010-2018.

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

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
Grays/Chinook [2]	51.4%	85.1%	78.1%	94.5%	80.9%	71.1%	77.4%	47.7%	29.7%
Elochoman/Skamokawa	89.2%	94.2%	69.9%	82.2%	78.0%	76.3%	75.1%	32.3%	50.0%
Mill, Abernathy, Germany	93.5%	92.1%	85.7%	80.6%	93.8%	91.9%	78.1%	82.6%	11.5%
Coweeman	29.3%	11.9%	11.8%	32.5%	4.3%	2.3%	6.4%	14.3%	11.5%
Lower Cowlitz	31.7%	25.5%	43.0%	19.5%	32.8%	30.0%	25.9%	19.4%	15.5%
Green/SFK Toutle	88.1%	86.8%	74.1%	47.9%	48.6%	36.8%	53.9%	47.1%	43.5%
Kalama	88.8%	94.4%	96.1%	90.4%	91.9%	54.9%	39.8%	43.0%	35.3%
Lewis	26.7%	16.8%	14.6%	30.8%	43.9%	55.0%	55.5%	49.4%	28.0%
Washougal	89.3%	85.4%	73.8%	66.9%	34.7%	54.4%	60.0%	40.8%	11.4%
Average	65.3%	65.8%	60.8%	60.6%	56.6%	52.5%	52.4%	41.8%	26.3%

[1] Preliminary estimates for 2018. 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. Figures 1 shows pHOS results for the Cascade stratum and Figure 2 shows pHOS results for the Coast and Gorge strata, including confidence intervals.

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

NOAA Population	2010	2011	2012	2013	2014	2015	2016	2017	2018
Coweeman	8.6%	4.3%	3.0%	12.0%	16.6%	21.7%	13.3%	4.7%	4.5%
EF Lewis	25.3%	4.7%	6.0%	8.5%	18.6%	23.0%	55.9%	37.0%	12.1%
Elochoman/Skamokawa	73.2%	56.7%	30.7%	41.4%	34.4%	46.6%	40.0%	18.3%	36.3%
Grays/Chinook	83.1%	95.9%	40.2%	63.2%	35.0%	67.8%	60.2%	80.3%	84.2%
Kalama	99.3%	97.4%	89.3%	88.2%	90.9%	89.9%	66.2%	68.1%	69.3%
Lower Cowlitz	9.3%	8.4%	12.4%	20.3%	7.2%	8.1%	8.5%	23.9%	20.3%
Lower Gorge	24.2%	8.8%	13.8%	19.8%	29.4%	11.3%	6.2%	16.9%	19.9%
Mill, Abernathy, Germany	12.0%	19.3%	2.1%	7.4%	12.1%	6.5%	13.0%	8.1%	14.9%
NF/Mainstem Toutle	57.2%	25.5%	18.4%	16.9%	32.3%	54.8%	58.6%	30.3%	32.3%
North Fork Lewis	3.8%	11.2%	16.4%	85.7%	80.5%	90.2%	76.6%	62.4%	84.7%
Salmon Creek	2.5%	2.8%	4.0%	1.6%	1.1%	1.8%	3.5%	9.3%	9.9%
SF Toutle	20.2%	13.9%	10.5%	13.8%	19.1%	49.8%	21.3%	8.0%	6.4%
Tilton	71.7%	69.7%	77.9%	58.3%	34.7%	36.4%	61.6%	46.0%	65.6%
Upper Cowlitz and Cispus	86.6%	61.2%	75.3%	99.9%	76.5%	71.3%	90.6%	51.1%	96.7%
Washougal	40.5%	7.5%	9.9%	31.1%	71.7%	69.4%	75.1%	75.5%	78.7%
Average	41.2%	32.5%	27.3%	37.9%	37.3%	43.2%	43.4%	36.0%	42.4%

[1] All estimates subject to updates.

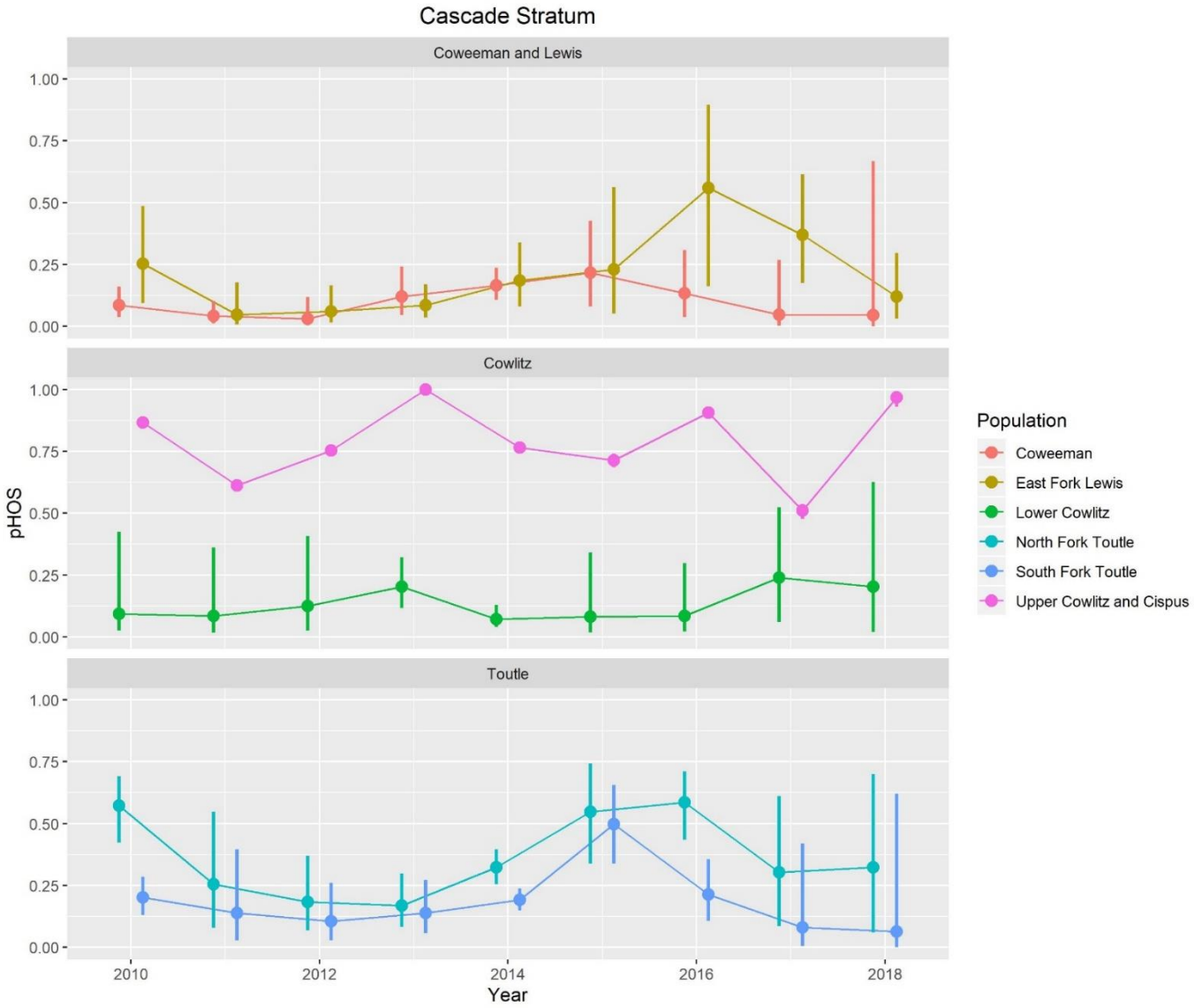

Figure 1. Coho population pHOS values for the Cascade Stratum with confidence intervals.

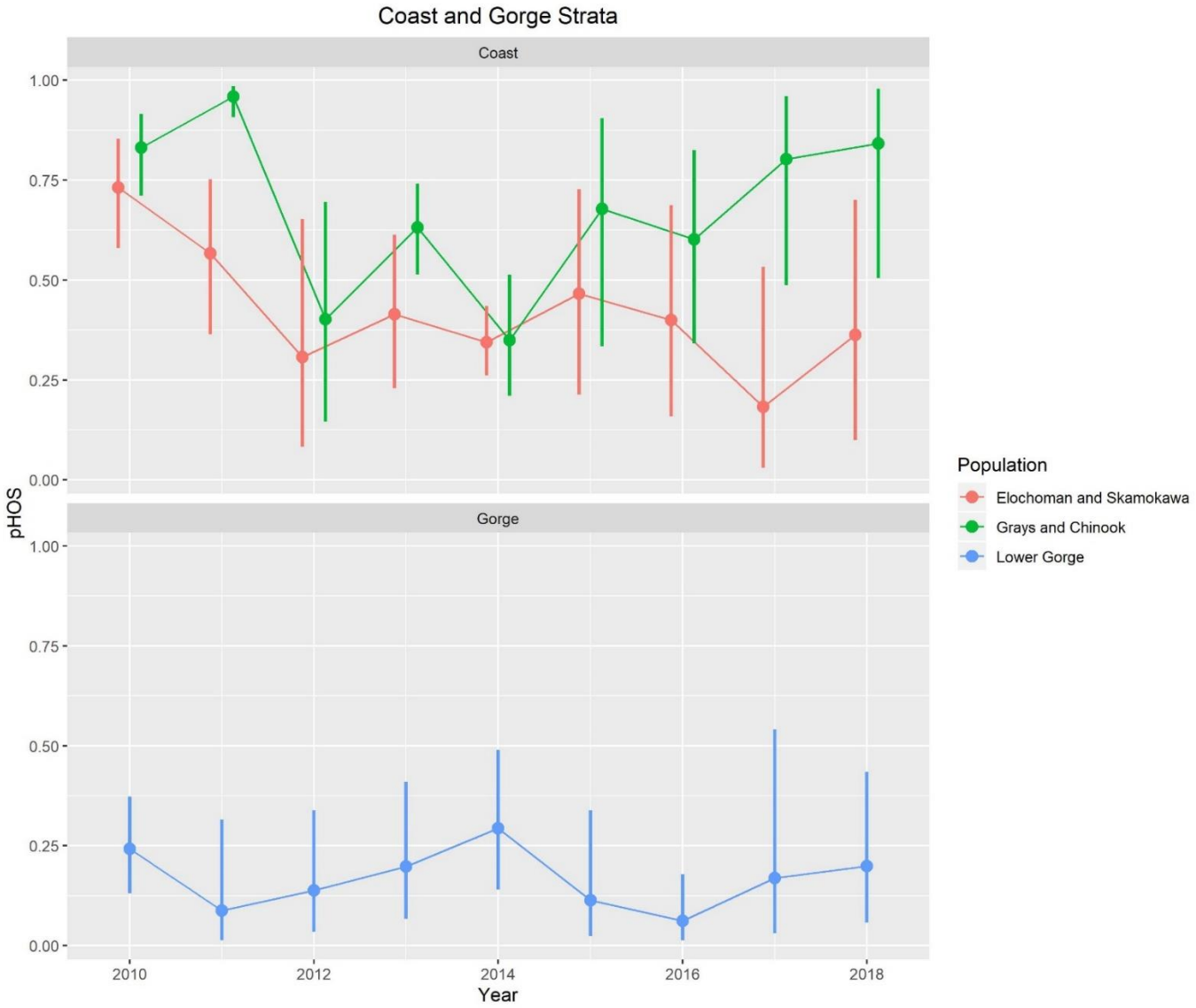

Figure 2. Coho population pHOS values for the Coast and Gorge Strata with confidence intervals.

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 will provide results and recommendations for methodologies to NMFS when the introgression study information is complete, by spring of 2020.

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, 2019

Produced by Ann Leroux, WDFW

For the monitoring period October 2018 through September 2019. 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 2018 through September 2019:

Facility	Monitoring Period	Exceedance	Explanation
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 2018. The authorized numbers are from Table 121 in the MA BIOP.

Table 9. Natural-Origin adults and jacks handled at hatchery facilities in 2018 and associated mortality.

						Calendar Year 2018		
		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	2018 Brood
North Fork Toutle River	Toutle Hatchery	Integrated	Fall Chinook	2,000	<60		5	20 spawned. Pond morts. Total handle is in weir table
		Integrated	Coho	10,000	<100		2	9 spawned. Pond morts. Total handle is in weir table.
			Chum	0	0	0	0	
	2018 BY Summer		Steelhead	10	1	1	0	released upstream
Grays River	Grays River		Fall Chinook	25	1	0	0	
		Integrated	Coho	150	<3	0	0	
			Chum	50	1	248	0	all spawned
Elochoman River	Beaver Creek		Fall Chinook	20	1	0	0	
			Coho	20	1	2	0	released upstream
			Chum	20	1	15	0	released upstream
Kalama River	Fallert Creek		Fall Chinook			0	0	
*Allowed handle/mortality is			Spring Chinook			0	0	
combined for Fallert and K. Falls			Coho			0	0	
			Chum			0	0	
			Steelhead			0	0	
	Kalama Falls		Fall Chinook	6,000	<60	534	3	released from hatchery
			Spring Chinook	500	<5	61	4	
	Early Coho		Coho	3,000	<90	32	0	released from hatchery
	Late Coho		Coho			272	0	released from hatchery
			Chum	25	1	0	0	
			Summer and Winter Steelhead	3,400	<34			
2018 BY Summer	2018 BY		Wild summer Steelhead			257	37	21 lethal spawn, 26 live spawn/rest released
2018 BY Winter	2018 BY		Wild winter Steelhead			598	11	148 live spawn
Washougal River	Washougal	Integrated	Fall Chinook	3,000	<30	59	2	20 fish received from weir, 18 spawned, 2 morts
		Integrated	Coho	1,000	<10	51	0	spawned
			Chum	25	<1	182	0	spawned
Washougal River	Skamania	Summer/Winter	Steelhead	400	<5			
2018 BY Summer	2018 BY		Steelhead			6	0	released upstream
2018 BY Winter	2018 BY		Steelhead			33	0	released upstream
2018 BY Summer	Washougal		Steelhead			91	0	released upstream

Table shows handle and mortalities associated with weirs in 2018. The authorized numbers are from Table 122 in the MA BIOP.

Table 10. Natural-Origin adults and jacks handled at weirs in 2018 and associated mortality.

				Calendar Year 2018		
	Species	Number Authorized		Number		
Watershed	Encountered	Handled	Mortalities	Handled	Mortalities	Comments
NF Toutle	Fall Chinook	700	<21	107	2	Upstream/used for brood. Trap morts.
	Coho	2,300	<70	83	3	Upstream/used for brood. Trap morts.
	Chum	250	<8	0	0	
	Summer Steelhead	50	<2	0	0	
Grays River	Fall Chinook	750	<23	30	0	
	Coho	800	<24	20	0	
	Chum	8,500	<225	1	0	
Elochoman River	Fall Chinook	750	<23	26	0	
	Coho	800	<24	82	0	
	Chum	1,000	<30	1	0	
Kalama River	Fall Chinook	3,200	<96	1,459	4	
	Coho	150	<5	51	0	
	Chum	250	<8	9	0	
	Summer Steelhead	200	<6	184	4	
Washougal River	Fall Chinook	1,200	<36	151	1	Put upstream or used for broodstock
	Coho	80	<3	5	0	
	Chum	250	<8	0	0	
	Summer Steelhead	100	<3	40	0	
Coweeman River	Fall Chinook	1,600	<48	243	0	
	Coho	800	<24	50	0	
	Chum	100	<3	0	0	
	Winter Steelhead	300	<9	0	0	
Cedar Creek	Fall Chinook	400	<12	68	1	Released upstream
	Coho	1,000	<30	424	2	Released upstream
	Chum	250	<8	0	0	
	Summer Steelhead	50	<2	1	0	2019 BY Winter steelhead - released

Table shows handle and mortalities associated with hatchery operations and weirs combined in 2018. 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 2018 and associated mortality.

				Calendar Year 2018		
	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	107	7	20 spawned
	Coho	12,300	<170	83	5	9 spawned
	Chum	250	<8	0	0	
	Summer Steelhead	50	<2	1	0	
	Winter Steelhead	10	1	0	0	
Grays River	Fall Chinook	775	<24	30	0	
	Coho	950	<27	20	0	
	Chum	8,550	<226	249	0	all spawned
Elochoman River	Fall Chinook	770	<24	26	0	
	Coho	820	<25	84	0	
	Chum	1,020	<31	16	0	
Kalama River	Fall Chinook	9,200	<156	1,993	7	
	Spring Chinook	500	<5	61	4	
	Coho	3,150	<95	355	0	
	Chum	275	<9	9	0	
	Summer Steelhead	200	<6	441	41	27 live spawned
	Summer and Winter Steelhead	3,400	<34	598	11	
Washougal River	Fall Chinook	4,200	<66	210	3	18 spawned
	Coho	1,080	<13	56	0	all spawned
	Chum	275	<9	182	0	all spawned
	Summer Steelhead	100	<3	137	0	
	Summer and Winter Steelhead	400	<5	33	0	Winter Steelhead
Coweeman River	Fall Chinook	1,600	<48	243	0	
	Coho	800	<24	50	0	
	Chum	100	<3	0	0	
	Winter Steelhead	300	<9	0	0	
Cedar Creek	Fall Chinook	400	<12	68	1	
	Coho	1,000	<30	424	2	
	Chum	250	<8	0	0	
	Summer Steelhead	50	<2	1	0	Winter steelhead

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 out-migrant 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 2019:

Floy tagged and returned to stream: 80
Genetic tissue sample from fish returned to stream: 0

NOR Winters Spawn Year 2018:

Floy tagged and returned to stream: 0
Genetic tissue sample from fish returned to stream: 133

Table 12 shows the number of steelhead smolts handled and associated handling mortalities at the Kalama smolt trap in 2018.

Table 12. Kalama Smolt Trapping, 2018

	Handled		Mortalities	
	Permitted	**Actual**	**Permitted**	**Actual**
Spring Chinook [1]	1,330	97	67	3
Fall Chinook		0		0
Coho	1,300	42	65	0
Chum		0		0
Steelhead (summer) [2]	8,000	2,549	Up to 550	6
Steelhead (winter) [2]	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.

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 2018. 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, 2018-2019*.

	Number Handled	Number Mortalities
Wild Winter steelhead	162	0
Wild Coho	8	0
Wild Fall Chinook	0	0
Wild Summer steelhead	0	0

*Steelhead returns from Nov 2018-June 2019.
Coho returns during fall of 2018

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.

Regarding the project as a whole, we are in the final stages and will soon have products that can be shared with managers and other interested parties. Specifically, the graduate student who was working on this project defended her Master's Thesis at OSU this past fall and is currently working on finalizing a manuscript for publication. Also, as part of this project, we developed a life-cycle model that will be published online through an R Shiny App later this month. This Shiny application will allow users to explore how seasonal fish rescue affects the population dynamics of coho salmon.

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