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To: Shane Bickford and Greg Mackey
From: Charlie Snow, Charles Frady, and David Grundy
Subj: November Hatchery and Natural Production Report
Date: 8 December 2017
Cc: Distribution list.

HATCHERY ACTIVITIES

All fish at the Wells and Methow hatcheries were reared on 100% well water during the month.

2016 Twisp Spring Chinook Salmon

A total of 30,684 fish were on-station at the end of the month with 14 additional fish reported as mortalities. These fish had a mean fork length of 110 mm during the month and were at approximately 26 fish per pound (FPP). The number of fish on-station that apply to Douglas PUD, Chelan PUD, and Grant PUD HCP mitigation obligations are listed in Appendix A.

2016 Methow Composite Spring Chinook Salmon

A total of 219,380 fish were on-station at the end of the month with 251 additional fish reported as mortalities. Approximately 66,000 and 29,000 of the WxW MetComp fry on-station are destined for the Chewuch (61,000 release target) and Goat Wall (25,000 release target) acclimation ponds, respectively. These fish had a mean fork length of 110 mm during the month and were at approximately 26 FPP. The number of fish on-station that apply to Douglas PUD, Chelan PUD, and Grant PUD HCP mitigation obligations are listed in Appendix A.

2017 Twisp Spring Chinook Salmon

A total of 28,901 fry remained in incubation during the month. The number of fish on-station that apply to Douglas PUD, Chelan PUD, and Grant PUD HCP mitigation obligations are listed in Appendix A.

2017 Methow Composite Spring Chinook Salmon

A total of 3,892 fry were ponded during the month of November with an additional eight fry reported as mortalities. A total of 221,668 fry remained in incubation during the month. These fish will support releases from the Chewuch Acclimation Pond (release target = 60,516), Goat Wall Acclimation Pond (release target = 25,000), and from Methow Hatchery (release target = 108,249). The number of fish on-station that apply to Douglas PUD, Chelan PUD, and Grant PUD HCP mitigation obligations are listed in Appendix A.

2016 Wells Summer Chinook Salmon

Wells Hatchery had 356,340 fry on-station for the yearling program, and no mortality was reported during November. These fish were at approximately 18 FPP at the end of the month and are being reared to fulfill HCP mitigation obligations (Appendix A).

2017 Wells Summer Chinook Salmon

Spawning of the 2017 brood of summer Chinook Salmon at Wells Hatchery began on 4 October and was completed by 13 November with an estimated 588 fish spawned for the Wells yearling and subyearling programs and the Yakama Nation's Yakima River reintroduction program (Table 1). Pre-spawn mortality has totaled 224 additional fish (27.6%) for the season. Fish health reports identified *Columnaris* with incidental fungus as the primary cause of the mortality. Treatments were initiated in October, but the severity of the infection and the later-than-usual spawn timing resulted in a high number of fish succumbing to the disease instead of being spawned. Twelve of the fish spawned to-date were collected in late October from the Wells Hatchery volunteer ladder to mitigate for the pre-spawn losses.

Table 1. Weekly spawning and mortality to-date of the 2017 brood summer Chinook Salmon at Wells Hatchery.

Spawn date	Wild		Hatchery		Grand total
	Male	Female	Male	Female	
10/4/2017	6	3	35	38	82
10/11/2017	13	9	100	102	224
10/18/2017	8	13	61	53	135
10/25/2017	3	4	46	34	87
11/1/2017	1	1	16	16	34
11/8/2017	1	2	11	9	23
11/13/17	0	0	2	1	3
Total	32	32	271	253	588
Brood mortality	8	19	77	120	224
Grand total	40	51	348	373	811

2017 Summer Steelhead

Wells Hatchery had 351,561 steelhead progeny for releases into the Methow, Columbia, and Okanogan (MCO) rivers. The hatchery also had 33,962 Omak WxW progeny and 55,620 progeny from the Winthrop National Fish Hatchery (WNFH) conservation program, which includes progeny from Twisp River broodstock collections, on-station at the end of November. Mortality during the month totaled an additional 356 Omak WxW progeny, 740 WNFH conservation progeny, and 329 MCO progeny during the month. An additional 37,000 surplus steelhead progeny were planted into Spectacle Lake (Okanogan County) on 22 November. At planting, those fish were at approximately 75 FPP. Steelhead progeny are being reared to fulfill Douglas PUD HCP and Grant PUD mitigation obligations (Appendix A).

2018 Summer Steelhead

Wells Hatchery had 163 adult steelhead for 2018 broodstock on-station at the end of November. Mortality has totaled six additional fish by the end of the month (3.5%), including three fish that died during trapping. Spawning of the 2018 brood will likely begin in late December, with progeny being reared to fulfill Douglas PUD and Grant PUD HCP mitigation obligations.

2016 Spokane Rainbow

Wells Hatchery had 35,951 rainbow trout from the 2016 brood on-station at the end of the month and an additional 123 fish were reported as mortalities during the month. Hatchery personnel planted an additional 5,301 rainbow progeny into Conconully Lake during November. These fish were at about four FPP and are reared to fulfill the Off-License Settlement Agreement (Appendix B).

2017 White Sturgeon

Wells Hatchery had 1,299 White Sturgeon progeny on-station at the end of the month with 50 additional fish reported as mortalities during November. White sturgeon progeny ranged between 56 and 186 FPP during the month and are reared at Wells Hatchery under the Aquatic Settlement Agreement (Appendix C).

2017 Lahontan Cutthroat

Wells Hatchery planted the remaining population of Lahontan Cutthroat Trout progeny from broodstock spawned at Lake Lenore (Grant County) into Blue Lake (Okanogan County) on 2 November ($N = 5,541$). At release, these fish were at approximately 86 FPP. These fish are reared to fulfill the Off-License Settlement Agreement (Appendix B).

NATURAL PRODUCTION ACTIVITIES

PIT Tag Antenna Arrays

Data collected at all Methow basin PIT tag interrogation sites operated under this program, including Twisp (TWR), lower Methow (LMR), Lower Chewuch (CRW), Gold Creek (GLC), Libby Creek (LBC), and Wolf Creek (WFC) are uploaded to the PTAGIS database regularly, and can be viewed at the following website: <http://www.ptagis.org/data/quick-reports/small-scale-site-detections>

2017 Smolt Trapping

River conditions were favorable for trapping at both the Methow and Twisp sites during the majority of the month. A rapid increase in river discharge on 23 November increased debris loads and traps at both sites had to be pulled during a portion of the night. Subyearling wild Chinook parr were the primary species captured at both the Methow and Twisp trap sites during the month (Table 2). Biological data collected from trapped fish is detailed in Table 3. Methow River discharge for the period operated ranged from 13.6 to 64.0 m³s, providing expected trap efficiencies greater than 0.8 percent. Twisp River discharge for the period operated ranged from 1.7 to 20.2 m³s, providing expected trap efficiencies between 3.2 and 11.4 percent.

Table 2. Monthly salmonid captures at Methow Basin smolt traps in 2017. SHR = wild steelhead/rainbow. M-A=March through August total.

Species/origin	Methow				Twisp				Basin total
	M-A	Sept	Oct	Nov	M-A	Sept	Oct	Nov	
Precocial Chin/wild	0	0	0	0	39	29	0	0	68
Precocial Chin/hat.	0	0	0	0	15	1	0	0	16
Yearling Chin/wild	490	0	0	0	809	0	0	0	1,299
Yearling Chin/hatch	13,325	0	0	0	3,827	0	0	0	17,152
Sub Chin/wild-parr	580	2	13	143	139	43	147	454	1,521
Sub Chin/wild-fry	3,842	0	0	0	210	0	0	0	4,052
SHR/wild-trans.	373	0	0	0	236	0	0	0	609
SHR/wild-parr	40	1	1	10	227	18	29	236	562
SHR/wild-fry	6	0	0	0	22	0	1	0	29
Steelhead/hatchery	2,699	0	1	0	2,623	6	4	5	5,338
Coho/wild-smolt	5	0	0	0	4	0	0	0	9
Coho/wild-parr	1	0	0	0	1	0	2	3	7
Coho/wild-fry	2	0	0	0	0	0	0	0	2
Coho/hatchery	2,221	0	0	0	0	0	0	0	2,221
Bull trout	2	0	2	0	5	0	4	8	21
Cutthroat Trout	1	0	0	0	6	0	0	0	7
Sockeye/wild-fry	261	0	0	0	2	0	0	0	263
Total	23,848	3	17	153	8,165	97	187	706	33,176

Table 3. Biological sampling of juvenile salmonids captured at Methow Basin smolt traps during November.

Species/stage	Location	Length (mm)			Weight (g)			Mean K-factor
		Mean	SD	<i>N</i>	Mean	SD	<i>N</i>	
Sub Chinook/wild/parr	Methow	98.0	7.9	143	10.1	2.6	143	1.1
Sub Chinook/wild/parr	Twisp	91.9	7.6	454	8.5	2.1	454	1.1
Steelhead/wild/parr	Methow	149.6	42.9	10	38.9	26.5	10	1.0
Steelhead/wild/parr	Twisp	109.7	37.8	236	17.9	16.6	236	1.0
Steelhead/hatchery/parr	Twisp	175.0	18.7	5	54.5	16.5	5	1.0
Coho/wild/parr	Twisp	111.3	7.1	3	14.3	2.1	3	1.0
Bull Trout	Twisp	217.6	28.8	7	107.7	50.7	7	1.0

Appendix A. Number of fish reared at Wells and Methow hatcheries to meet Douglas County PUD Habitat Conservation Plan mitigation objectives and other hatchery rearing agreements. Values are derived by applying fixed mitigation levels to the entire population on-station, and do not necessarily reflect separate rearing or release strategies.

Brood year	Species	Life stage	Program	Target release No.	Month												Total released /transfer
					Dec '16	Jan '17	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
2015	Spring Chinook	Yearling smolt	CCPUD NNI	60,516 <i>released</i>	65,638	65,618	65,608	51,720	--	--	--	--	--	--	--	--	51,697
2015	Spring Chinook	Yearling smolt	GCPUD Priest Rapids NNI	134,126 <i>released</i>	145,478	145,435	145,413	114,630	--	--	--	--	--	--	--	--	114,579
2015	Spring Chinook	Yearling smolt	DCPUD Wells NNI	29,123 <i>released</i>	31,588	31,578	31,574	24,890	--	--	--	--	--	--	--	--	24,879
2016	Spring Chinook	Yearling smolt	CCPUD NNI	60,516 <i>released</i>	68,677	68,677	68,594	68,032	68,032	67,814	67,806	67,792	67,783	67,765	67,700	67,628	--
2016	Spring Chinook	Yearling smolt	GCPUD Priest Rapids NNI	134,126 <i>released</i>	152,213	152,213	152,030	150,785	150,785	150,302	150,284	150,253	150,234	150,192	150,049	149,890	--
2016	Spring Chinook	Yearling smolt	DCPUD Wells NNI	29,123 <i>released</i>	33,050	33,050	33,011	32,740	32,740	32,635	32,631	32,625	32,620	32,611	32,580	32,546	--
2017	Spring Chinook	Yearling smolt	CCPUD NNI	60,516 <i>released</i>	--	--	--	--	--	--	--	--	--	--	68,820	68,817	--
2017	Spring Chinook	Yearling smolt	GCPUD Priest Rapids NNI	134,126 <i>released</i>	--	--	--	--	--	--	--	--	--	--	152,530	152,526	--
2017	Spring Chinook	Yearling smolt	DCPUD Wells NNI	29,123 <i>released</i>	--	--	--	--	--	--	--	--	--	--	33,119	33,118	--
2015	Summer Chinook	Yearling smolt	DCPUD Fixed Hatchery Compensation	320,000 <i>released</i>	336,117	336,117	335,239	333,462	--	--	--	--	--	--	--	--	329,809
2016	Summer Chinook	Sub-yearling	DCPUD Fixed Hatchery Compensation	484,000 <i>released</i>	583,000	513,238	444,000	443,117	470,247	234,710	--	--	--	--	--	--	234,710
2016	Summer Chinook	Yearling smolt	DCPUD Fixed Hatchery Compensation	320,000 <i>released</i>	372,107	372,107	372,107	366,490	362,301	361,696	359,464	359,127	356,640	356,340	356,340	356,340	--
2016	Summer steelhead	Yearling smolt	DCPUD Fixed Hatchery Compensation ¹	300,000 <i>released</i>	314,795	314,694	314,555	314,262	217,219	--	--	--	--	--	--	--	90,679
2016	Summer steelhead	Yearling smolt	DCPUD Wells NNI ¹	8,000 <i>released</i>	8,395	8,392	8,388	8,380	5,793	--	--	--	--	--	--	--	2,418
									5,503	--	--	--	--	--	--	--	7,921

Appendix A. Continued.

Brood year	Species	Life stage	Program	Target release No.	Month												Total released /transfer
					Dec '16	Jan '17	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
2016	Summer steelhead	Yearling smolt	GCPUD Priest Rapids NNI	80,000 <i>released</i>	83,945	83,918	83,881	83,803	57,925	--	--	--	--	--	--	--	79,211
2016	Summer steelhead	Yearling smolt	GCPUD Priest Rapids NNI	20,000 <i>transferred</i>	34,542	34,542	33,461	32,868	--	--	--	--	--	--	--	--	26,054
2017	Summer steelhead	Yearling smolt	DCPUD Fixed Hatchery Compensation ¹	300,000 <i>released</i>	--	--	--	--	--	--	329,265	324,326	354,002	357,470	343,318	314,831	--
2017	Summer steelhead	Yearling smolt	DCPUD Wells NNI ¹	8,000 <i>released</i>	--	--	--	--	--	--	8,780	8,649	9,440	9,533	9,155	8,395	--
2017	Summer steelhead	Yearling smolt	GCPUD Priest Rapids NNI	80,000 <i>released</i>	--	--	--	--	--	--	87,840	86,487	94,400	95,325	91,551	83,955	--
2017	Summer steelhead	Yearling smolt	GCPUD Priest Rapids NNI	20,000 <i>transferred</i>	--	--	--	--	--	--	--	33,977	31,787	31,787	31,755	33,962	--

¹40,000 Inundation steelhead to be released in the Twisp with 8,000 NNI fish to total 48,000. 100,000 inundation steelhead to be released in the Methow as a safety net program. 160,000 inundation steelhead to be released directly to the Columbia.

Appendix B. Fish reared at Wells or Methow hatcheries under the Off-License Settlement Agreement.

Brood year	Species	Life stage	Program	Target (pounds) disposition	Month												Total released /transfer
					Dec '16	Jan '17	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
2015	Rainbow trout	Juv	WDFW sport fish	Number (pounds) released	32,975	33,741	33,652	33,280	20,308	5,398	--	--	--	--	--	--	51,384
					(7,516)	(8,656)	(8,288)	(11,110)	(9,104)	(2,720)	(1,854)	(--)	(--)	(--)	(--)	(--)	
2016	Rainbow trout	Juv	WDFW sport fish	Goal is 20,000 pounds annual combined	72,878	68,293	62,418	62,379	61,927	61,612	59,120	57,374	57,001	57,001	37,001	35,951	25,301
					(73)	(20)	(65)	(142)	(405)	(692)	(1,056)	(1,739)	(3,563)	(6,333)	(7,400)	(8,988)	
2017	Lahontan cutthroat	Juv	WDFW sport fish	Goal is 20,000 pounds annual combined	--	--	--	--	--	178,526	169,589	169,589	3,768	5,541	5,533	--	177,288
					(--)	(--)	(--)	(--)	(--)	(178)	(169)	(242)	(5)	(32)	(56)	(64)	
					--	--	--	--	--	--	--	--	171,747	--	--	5,541	(314)

Appendix C. Fish reared at Wells Hatchery pursuant to the Aquatic Settlement Agreement – White Sturgeon Management Plan.

Brood year	Species	Life stage	Program	Target disposition	Month												Total released/culled /transferred	
					Dec '16	Jan '17	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov		
2016	White sturgeon	Juvenile rearing	Wells White Sturgeon Supplementation	<i>Up to 5,000</i>	9,343	9,495	6,690	6,654	6,654	5,090	--	--	--	--	--	--		
				<i>Culled</i>	--	--	--	--	--	--	--	--	--	--	--	--		
				<i>Transferred</i>	--	2,293	--	--	--	1,362	--	--	--	--	--	--	--	3,655
				<i>Wells reservoir</i>	--	--	--	--	--	--	5,125	--	--	--	--	--	--	5,125
2017	White sturgeon	Juvenile rearing	Wells White Sturgeon Supplementation	<i>Up to 325</i>	--	--	--	--	--	--	--	2,053	1,581	1,461	1,440	1,299		
				<i>Culled</i>	--	--	--	--	--	--	--	--	--	--	--	--		
				<i>Transferred</i>	--	--	--	--	--	--	--	--	--	--	--	--		
				<i>Wells reservoir</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--