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Subj: May Hatchery and Natural Production Report

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Cc: Distribution list.

HATCHERY ACTIVITIES

All 2015 brood fish at Methow Hatchery were held on 100% well water during the month. All fish populations at Wells Hatchery were held on 100% well water during the month of May except the 2014 brood Chinook yearlings (90% surface water) and the 2015 brood safety-net steelhead (75% surface water).

2015 Twisp Spring Chinook Salmon

A total of 40,109 fish were on-station at the end of the month with 16 additional fish reported as mortalities. These fish had a mean fork length of 80 mm and were at 79 fish per pound (FPP) during the month. The number of fish on-station that apply to HCP mitigation obligations are listed in Appendix A.

2015 Methow Composite Spring Chinook Salmon

A total of 201,015 fish were on-station at the end of the month with 162 additional fish reported as mortalities. These fish had a mean fork length of 80 mm and were between 79 FPP during the month. The number of fish on-station that apply to HCP mitigation obligations are listed in Appendix A.

2016 Brood Spring Chinook Salmon

By 29 May, a total of 586 spring Chinook Salmon were trapped and sampled at Wells Dam. Of these, 73 potential wild Methow Basin-origin fish were retained for scale and DNA analysis. A total of six fish were released based on hatchery-origin scale samples, and 19 wild fish were released based on assignments of DNA samples to baselines originating outside the Methow Basin (e.g., Wenatchee). During the month of May, the Twisp River weir was operated for the Twisp River steelhead reproductive success study and for Methow Hatchery (MH) spring Chinook broodstock collection. One hatchery female was trapped and released at the Twisp River weir during May. A total of 13 hatchery adults and one hatchery jack were trapped at the

MH outfall trap and transferred to WNFH during the month. A total of 48 fish were retained for the 2016 broodstock, one of which was for the Twisp program (Table 1). Trapping at Wells Dam, MH outfall, and the Twisp River weir will continue through June.

Table 1. 2016 spring Chinook salmon broodstock collection by program, collection site, and origin.

| Program | Origin | Target | Broodstock retained | | | | Total to date | | % of target | |
|---------|--------|--------|---------------------|----|------------|---|---------------|----|-------------|------|
| | | | Wells Dam | | Twisp Weir | | F | M | F | M |
| | | | F | M | F | M | | | | |
| Twisp | NOR | 18 | 0 | 1 | 0 | 0 | 0 | 1 | 0.0 | 11.1 |
| Twisp | HOR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- | -- |
| MetComp | NOR | 104 | 24 | 22 | 0 | 0 | 24 | 22 | 46.2 | 42.3 |
| MetComp | HOR | 0 | 1 | 0 | 0 | 0 | 1 | 0 | -- | -- |
| Total | | 122 | 25 | 23 | 0 | 0 | 25 | 23 | 41.0 | 37.7 |

2014 Wells Summer Chinook Salmon

Wells Hatchery planted the remaining population of 36,000 yearling Chinook into the Columbia River during May, for a total brood release of 350,000 fish. An additional 8,953 fish were listed as predation mortalities during over-winter rearing. At release, these fish had a mean fork length of 164 mm and were at about 9.4 FPP (Table 2). These fish were being reared to fulfill HCP mitigation obligations (Appendix A).

2015 Wells Summer Chinook Salmon

Wells Hatchery had 344,395 summer Chinook Salmon fry for the yearling program on-station at the end of the month, with an additional 674 fry listed as monthly mortalities. The hatchery released 439,709 fry for the subyearling program into the Columbia River during May. At release these fish had a mean fork length of 85 mm and were at about 64 FPP (Table 2). These progeny are being reared to fulfill HCP mitigation obligations (Appendix A).

2015 Summer Steelhead

Wells Hatchery planted the remaining 54,800 HxH progeny into the Okanogan River basin during May with 34,000 of those fish released into Salmon Creek, and 20,800 fish released into the Similkameen River, for a total Okanogan Basin release (not including Omak Creek WxW) of 65,687 fish (Table 2). The hatchery also planted 116,803 steelhead into the Columbia River for a total release of 174,443 fish when combined with April releases (Table 2). These fish were reared to fulfill Douglas HCP (Methow and Columbia releases) and Grant PUD (Okanogan releases) mitigation obligations (Appendix A).

Table 2. Release number, location, and size of selected Wells Hatchery Complex salmonid stocks in May.

| Species | Brood | Number released | Location | Fork (mm) | | Weight (g) | | | K-factor |
|-----------|-------|-----------------|----------------|-----------|------|------------|----|------|----------|
| | | | | Mean | CV | Mean | SD | FPP | |
| Sum. Chin | 2014 | 350,000 | Columbia River | 164 | 7.5 | 48.1 | 10 | 9.4 | 1.07 |
| Sum. Chin | 2015 | 439,709 | Columbia River | 85 | 6.7 | 7.1 | 2 | 64.0 | 1.16 |
| Steel HxH | 2015 | 99,909 | Methow Hatch. | 198 | 12.6 | 75.3 | 27 | 6.0 | 0.93 |
| Steel HxH | 2015 | 174,443 | Columbia River | 206 | 15.7 | 84.8 | 37 | 5.3 | 0.91 |
| Steel HxH | 2015 | 65,687 | Okanogan Basin | 183 | 11.6 | 35.4 | 22 | 7.4 | 1.00 |

2016 Summer Steelhead

Spawning of 2016 brood steelhead was completed during the month with an estimated 561,000 eggs collected for Methow, Okanogan, and Columbia River release. At Methow Hatchery, a total of six wild and five hatchery females were spawned with seven hatchery males for the Twisp steelhead program. Two additional hatchery Twisp females will be transferred from the Methow Safety Net program at Wells Hatchery to complete the Twisp quota. Twisp River broodstock collection goals (100% wild fish) were not met primarily because high flows reduced the weir efficiency during much of the expected migration period. An estimated 63,000 eggs were collected for the 2016 Twisp program. Fertilized eggs at Wells Hatchery remain in incubators and will be apportioned to their respective programs when ponding of hatched fry begins.

2014 Spokane Rainbow

Wells Hatchery had 3,037 rainbow trout progeny from the 2014 brood on-station at about 2.2 FPP after planting 7,162 trout in Okanogan County lakes during the month of May. Eighteen additional fish were reported as mortalities during the month. These fish are reared to fulfill the Off-License Settlement Agreement (Appendix B).

2015 Spokane Rainbow

Wells Hatchery had 63,352 rainbow trout fry on-station at the end of the month after subtracting 266 mortalities. These fish were at about 80 FPP during the month and were reared to fulfill the Off-License Settlement Agreement (Appendix B).

2015 White Sturgeon

Wells Hatchery had 5,153 sturgeon progeny originating from Lake Roosevelt on-station at the end of the month, with three additional fish reported as mortalities during the month. White sturgeon progeny are reared at Wells Hatchery under the Aquatic Settlement Agreement (Appendix C).

2016 Lahontan Cutthroat

Wells Hatchery had an estimated 161,503 fry from Lake Lenore Lahontan Cutthroat trout on-station at the end of May. An additional 34,033 progeny were listed as mortality during the month. These fish are being 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), Lost River (LOR), Early Winters Creek (EWC), 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>

Steelhead Trapping

Trapping at the Twisp River weir started on 4 March with the first steelhead (wild female) passed upstream on 7 March. Through the end of May, a total of 161 steelhead were trapped, of which, 11 wild fish and 50 hatchery fish were retained for broodstock. A total of 74 steelhead were passed upstream, and trapping priority was changed from steelhead to spring Chinook at the end of May.

The Methow Hatchery outfall trap was operating by the end of February, and by the end of May, a total of 119 steelhead were trapped at the site. Of those, eight were retained for hatchery broodstock, four suspected wild fish were released upstream, and 107 excess adipose fin-clipped fish were euthanized.

Steelhead Spawning Ground Surveys

Steelhead spawning ground surveys were initiated in March and continued as environmental conditions permitted. A total of 10 redds were found within mainstem Methow River index reaches between the Winthrop PIT tag array (MRW) and the town of Pateros by the end of May. A total of 23 redds were found in the Methow Hatchery outfall and 10 redds were found in the 1890's channel; a recently completed habitat project creating an approximate 1200 m channel entering the Methow River just upstream of the town of Twisp. USFWS personnel counted a total of 100 redds in the WNFH outfall by the end of May. Detections of PIT-tagged steelhead will be used at multiple sites throughout the Methow Basin in conjunction with mainstem redd surveys to estimate overall spawning abundance and distribution of HOR and NOR steelhead.

2016 Smolt Trapping

Trap operation at both the Methow and Twisp sites was interrupted during May due to high river discharge. The Twisp trap was removed from the river on 21 April, and remained out until river discharge dropped enough to operate the trap again on 21 May. The Methow trap did not operate between 4 and 13 May due to high river discharge. During the month, sub yearling wild Chinook fry and hatchery steelhead were the primary species captured at the Methow and Twisp trap sites, respectively (Table 3). Biological data collected from trapped fish is detailed in Table 4. Methow River discharge for the period operated ranged from 111.3 to 242.7 m³s, providing expected trap efficiencies below 1.7 percent. Twisp River discharge for the period operated ranged from 16.8 to 27.9 m³s, providing expected trap efficiencies below 5.7 percent.

Table 3. Monthly salmonid captures at Methow Basin smolt traps in 2016. SHR = wild steelhead/rainbow.

| Species/origin | Methow | | | | Twisp | | | | Basin total |
|---------------------|-----------|--------------|--------------|--------------|----------|------------|--------------|------------|---------------|
| | Feb | Mar | Apr | May | Feb | Mar | Apr | May | |
| Yearling Chin/wild | 6 | 283 | 166 | 24 | 4 | 123 | 266 | 8 | 881 |
| Yearling Chin/hatch | 0 | 0 | 3,331 | 8 | 0 | 0 | 2,177 | 0 | 5,516 |
| Sub Chin/wild-parr | 0 | 0 | 57 | 458 | 0 | 0 | 0 | 31 | 546 |
| Sub Chin/wild-fry | 69 | 988 | 2,118 | 756 | 3 | 31 | 92 | 5 | 4,062 |
| SHR/wild-trans. | 0 | 17 | 160 | 11 | 0 | 6 | 144 | 4 | 343 |
| SHR/wild-parr | 2 | 21 | 45 | 18 | 0 | 13 | 93 | 14 | 207 |
| Steelhead/hatchery | 0 | 1 | 333 | 83 | 0 | 0 | 2,003 | 38 | 2,458 |
| Coho/wild-smolt | 0 | 34 | 76 | 8 | 1 | 8 | 35 | 3 | 165 |
| Coho/wild-parr | 1 | 2 | 0 | 5 | 0 | 8 | 0 | 0 | 16 |
| Coho/wild-fry | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Coho/hatchery | 0 | 0 | 38 | 59 | 0 | 0 | 0 | 0 | 97 |
| Bull trout | 0 | 1 | 0 | 0 | 0 | 4 | 1 | 2 | 8 |
| Sockeye/wild-fry | 14 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 18 |
| Total | 92 | 1,349 | 6,324 | 1,434 | 8 | 194 | 4,811 | 106 | 14,318 |

Table 4. Biological sampling of juvenile salmonids captured at Methow Basin smolt traps during May.

| Species/stage | Location | Length (mm) | | | Weight (g) | | | K-factor |
|-----------------------------|----------|-------------|------|----------|------------|------|----------|----------|
| | | Mean | SD | <i>N</i> | Mean | SD | <i>N</i> | |
| Yearling Chinook/wild | Methow | 97.6 | 8.2 | 23 | 11.1 | 3.0 | 23 | 1.2 |
| Yearling Chinook/wild | Twisp | 100.8 | 4.8 | 8 | 11.7 | 2.1 | 8 | 1.1 |
| Yearling Chinook/hatchery | Methow | 130.5 | 0.7 | 2 | 22.3 | 1.5 | 2 | 1.0 |
| Sub Chinook/wild/parr | Methow | 58.9 | 7.3 | 137 | 2.4 | 1.1 | 117 | 1.2 |
| Sub Chinook/wild/parr | Twisp | 59.5 | 6.7 | 29 | 2.7 | 0.9 | 29 | 1.3 |
| Sub Chinook/wild/fry | Methow | 41.8 | 4.3 | 227 | -- | -- | -- | -- |
| Sub Chinook/wild/fry | Twisp | 48.3 | 1.2 | 3 | -- | -- | -- | -- |
| Steelhead/wild/transitional | Methow | 150.5 | 18.6 | 11 | 37.3 | 11.3 | 11 | 1.1 |
| Steelhead/wild/transitional | Twisp | 156.3 | 18.5 | 4 | 42.6 | 15.0 | 4 | 1.1 |
| Steelhead/wild/parr | Methow | 102.6 | 16.2 | 18 | 13.6 | 7.9 | 18 | 1.3 |
| Steelhead/wild/parr | Twisp | 93.9 | 14.3 | 14 | 10.0 | 4.5 | 14 | 1.2 |
| Steelhead/hatchery/smolt | Methow | 173.3 | 14.1 | 14 | 51.3 | 10.4 | 14 | 1.0 |
| Steelhead/hatchery/smolt | Twisp | 162.5 | 15.8 | 38 | 44.7 | 13.4 | 38 | 1.0 |
| Coho/wild/smolt | Methow | 99.1 | 16.0 | 8 | 12.3 | 6.0 | 8 | 1.3 |
| Coho/wild/smolt | Twisp | 103.3 | 10.3 | 3 | 12.8 | 2.7 | 3 | 1.2 |
| Coho/wild/parr | Methow | 70.3 | 5.5 | 3 | 5.5 | 1.4 | 3 | 1.6 |
| Coho/hatchery/smolt | Methow | 125.0 | 7.2 | 10 | 21.8 | 4.0 | 10 | 1.1 |
| Sockeye/wild/fry | Methow | 27.5 | 3.5 | 2 | -- | -- | -- | -- |

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 /trans. | | |
|------------|------------------|----------------|--|----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|------------------------|---------|---------|
| | | | | | Jun '15 | Jul | Aug | Sep | Oct | Nov | Dec | Jan '16 | Feb | Mar | Apr | May | | | |
| 2014 | Spring Chinook | Yearling smolt | CCPUD NNI | 60,516 <i>released</i> | -- | -- | -- | -- | 71,930 | 71,892 | 71,878 | 71,862 | 71,847 | 71,821 | -- | -- | 71,812 | 71,812 | |
| 2014 | Spring Chinook | Yearling smolt | GCPUD Priest Rapids NNI | 134,126 <i>released</i> | 181,980 | 180,905 | 180,840 | 180,827 | 159,425 | 159,341 | 159,307 | 159,272 | 159,240 | 159,183 | -- | -- | 159,161 | 159,161 | |
| 2014 | Spring Chinook | Yearling smolt | DCPUD Wells NNI | 29,123 <i>released</i> | 39,514 | 39,280 | 39,266 | 39,263 | 34,616 | 34,598 | 34,591 | 34,583 | 34,576 | 34,564 | -- | -- | 34,559 | 34,559 | |
| 2015 | Spring Chinook | Yearling smolt | CCPUD NNI | 60,516 <i>released</i> | -- | -- | -- | -- | 67,531 | 67,531 | 67,367 | 65,494 | 65,330 | 65,270 | 65,259 | 65,211 | -- | -- | |
| 2015 | Spring Chinook | Yearling smolt | GCPUD Priest Rapids NNI | 134,126 <i>released</i> | -- | -- | -- | -- | 149,676 | 149,676 | 149,310 | 145,158 | 144,794 | 144,664 | 144,638 | 144,531 | -- | -- | |
| 2015 | Spring Chinook | Yearling smolt | DCPUD Wells NNI | 29,123 <i>released</i> | -- | -- | -- | -- | 32,499 | 32,499 | 32,420 | 31,519 | 31,440 | 31,411 | 31,405 | 31,382 | -- | -- | |
| 2014 | Summer Chinook | Yearling smolt | DCPUD Fixed Hatchery Compensation | 320,000 <i>released</i> | 360,101 | 358,953 | 358,953 | 358,953 | 358,953 | 358,953 | 358,953 | 358,953 | 358,953 | 358,953 | 43,953 | -- | 314,000 | 36,000 | 350,000 |
| 2015 | Summer Chinook | Sub-yearling | DCPUD Fixed Hatchery Compensation | 484,000 <i>released</i> | -- | -- | -- | -- | -- | -- | 560,543 | 494,310 | 427,696 | 427,075 | 439,709 | -- | 439,709 | 439,709 | |
| 2015 | Summer Chinook | Yearling smolt | DCPUD Fixed Hatchery Compensation | 320,000 <i>released</i> | -- | -- | -- | -- | -- | -- | 350,845 | 350,845 | 350,845 | 348,172 | 345,069 | 344,395 | -- | -- | |
| 2015 | Summer steelhead | Yearling smolt | DCPUD Fixed Hatchery Compensation ¹ | 300,000 <i>released</i> | 434,919 | 421,267 | 415,058 | 356,072 | 339,722 | 312,263 | 312,164 | 310,570 | 310,158 | 310,143 | 134,985 | -- | 130,363 | 177,334 | 307,697 |
| 2015 | Summer steelhead | Yearling smolt | DCPUD Wells NNI ¹ | 8,000 <i>released</i> | 11,598 | 11,234 | 11,068 | 9,494 | 9,059 | 8,327 | 8,324 | 8,282 | 8,270 | 8,270 | 3,599 | -- | 3,476 | 4,729 | 8,205 |
| 2015 | Summer steelhead | Yearling smolt | GCPUD Priest Rapids NNI | 80,000 <i>released</i> | 115,978 | 112,334 | 110,682 | 94,940 | 90,592 | 83,270 | 83,243 | 82,819 | 82,709 | 82,705 | 35,996 | -- | 34,764 | 47,289 | 82,052 |

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 | | |
|------------|--------------------|------------|-----------------|---------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|----------|---------|---------|--------------------------|--------|---------|
| | | | | | Jun '15 | Jul | Aug | Sep | Oct | Nov | Dec | Jan '16 | Feb | Mar | Apr | | May | |
| 2013 | Rainbow trout | Juv | WDFW sport fish | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| | | | | | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | 52,924 |
| | | | | | 8,714 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2014 | Rainbow trout | Juv | WDFW sport fish | | 64,645 | 62,884 | 54,160 | 54,078 | 33,778 | 33,728 | 33,670 | 33,647 | 33,617 | 13,732 | 10,709 | 3,037 | | |
| | | | | | (1,847) | (2,994) | (4,513) | (8,261) | (5,703) | (6,855) | (8,598) | (9,861) | (11,566) | (6,638) | (4,951) | (1,380) | | |
| | | | | | -- | -- | -- | -- | 20,075 | -- | -- | -- | -- | 19,850 | 2,180 | 7,162 | 49,017 | |
| 2015 | Rainbow trout | Juv | WDFW sport fish | Number (pounds) released | -- | -- | -- | -- | -- | -- | -- | 75,181 | 74,402 | 73,936 | 63,618 | 63,352 | | |
| | | | | | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (75) | (39) | (114) | (260) | (792) | | |
| | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2015 | Lahontan cutthroat | Juv | WDFW sport fish | Goal is 20,000 pounds annual combined | 163,293 | 157,238 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | |
| | | | | | (74) | (209) | (183) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | | |
| | | | | | -- | -- | 126,910 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 126,910 |
| 2016 | Lahontan cutthroat | Juv | WDFW sport fish | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 200,000 | 161,503 | | |
| | | | | | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (200) | (161) | | |
| | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2015 | Kokanee | Eyed-eggs | Palmer Lake | | -- | -- | -- | 420,000 | -- | -- | -- | -- | -- | -- | -- | -- | | |
| | | | | | (--) | (--) | (--) | (420) | (329) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | | |
| | | | | | -- | -- | -- | -- | 329,576 | -- | -- | -- | -- | -- | -- | -- | -- | 329,576 |

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 | | |
|------------|----------------|------------------|-----------------|------------------------|---------|--------|--------|--------|--------|-------|-------|---------|-------|-------|-------|-------|------------------------------------|--------|-------|
| | | | | | Jun '15 | Jul | Aug | Sep | Oct | Nov | Dec | Jan '16 | Feb | Mar | Apr | May | | | |
| 2014 | White sturgeon | Juvenile rearing | Wells | <i>Up to 5,000</i> | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | |
| | | | White | <i>Culled</i> | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 97,586 | |
| | | | Sturgeon | <i>Transferred</i> | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 8,236 |
| | | | Supplementation | <i>Wells reservoir</i> | 5,007 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 5,007 |
| 2015 | White sturgeon | Juvenile rearing | Wells | <i>Up to 5,000</i> | 39,671 | 22,409 | 22,111 | 20,992 | 11,728 | 8,638 | 7,665 | 7,416 | 7,405 | 5,203 | 5,198 | 5,153 | -- | | |
| | | | White | <i>Culled</i> | -- | -- | -- | -- | -- | 1,462 | -- | -- | -- | -- | -- | -- | -- | -- | 1,462 |
| | | | Sturgeon | <i>Transferred</i> | -- | -- | -- | -- | 2,800 | -- | -- | -- | -- | -- | 2,200 | -- | -- | -- | 5,000 |
| | | | Supplementation | <i>Wells reservoir</i> | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |