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To: Shane Bickford and Greg Mackey
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Subj: March Hatchery and Natural Production Report
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Cc: Distribution list.

HATCHERY ACTIVITIES

All 2016 brood fish at Methow Hatchery were held on a mix of 93% surface and 7% well water, and all 2017 brood fish were reared on 100% well water during the month. Post-transfer, 2016 brood fish at acclimation sites (Twisp and Chewuch) were held on 100% surface water. At Wells Hatchery, the yearling Chinook in dirt-pond 1 were held on 100% surface water during March. The safety-net steelhead groups (Methow, Okanogan, and Columbia) and the 2016 brood rainbow were held on mixed water containing up to 75% surface water. All other populations remained on 100% well water during the month.

2016 Twisp Spring Chinook Salmon

On 13 April, a total of 30,639 fish were transferred to the Twisp Acclimation Pond (TAP) with one mortality reported prior to transfer. Ten additional mortalities were reported during the remainder of the month leaving 30,629 fish in the TAP at the end of the month. These fish had a mean fork length of 133 mm prior to transfer and were at approximately 20 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

On 13 April, a total of 28,912 fish were transferred to the Goat Wall Acclimation Pond (GWAP) with three mortalities reported prior to transfer. A total of 110 additional mortalities were reported during the remainder of the month leaving 28,802 fish in the GWAP at the end of the month. Predation was not estimated yet, but will be in April. On 14 April, a total of 65,439 fish were transferred to the Chewuch Acclimation Pond (CAP) with 31 mortalities reported prior to transfer. A total of 34 additional mortalities were reported leaving 65,405 fish in the CAP at the end of the month. A total of 124,137 fish were on-station at Methow Hatchery with an additional 137 mortalities reported during the month, 100 of which were from estimated predation in pond 13 by hooded mergansers. Improved avian protection was installed in Pond 13 during autumn of 2017. This greatly reduced bird predation but hooded mergansers can still fly

between the more tightly spaced bird wires, albeit at a greatly reduced rate from winter 2016/17. Further avian protection measures are planned for 2018. On-station fish had a mean fork length of 131 mm during the month and were at approximately 21 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 28,676 fry were on-station at the end of the month with five additional fry reported as mortalities. These fish had a mean fork length of 55 mm during the month and were at approximately 240 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 Methow Composite Spring Chinook Salmon

A total of 223,533 fry were on-station at the end of the month with 61 additional fry reported as mortalities. These fish will support releases from the Chewuch Acclimation Pond (release target = 61,000), Goat Wall Acclimation Pond (release target = 25,000), and from Methow Hatchery (release target = 107,765). These fish had a mean fork length of 56 mm during the month and were at approximately 229 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 Wells Summer Chinook Salmon

Wells Hatchery had 356,240 fish on-station for the yearling program. These fish had a mean fork length of approximately 185 mm and were at about 11 FPP at the end of the month. Post-marking mortality for this population will be assessed after release from dirt-pond 1. Summer Chinook are being reared to fulfill HCP mitigation obligations (Appendix A).

2017 Wells Summer Chinook Salmon

Wells Hatchery had an estimated 332,000 fry for the yearling program and 431,642 fry for the subyearling program on-station at the end of the month. Mortality during March totaled an additional 5,866 subyearling fry; the majority of these losses are ascribed to continued residual fallout from physical deformities and ill thrift detailed in the February Hatchery and Natural Production Report. Summer Chinook are being reared to fulfill HCP mitigation obligations (Appendix A).

2017 Summer Steelhead

Wells Hatchery had 351,094 steelhead progeny for releases into the Methow, Columbia, and Okanogan (MCO) rivers. The hatchery also had 22,242 Omak WxW progeny and 54,297 progeny from the Winthrop National Fish Hatchery (WNFH) conservation program, which includes progeny from Twisp River broodstock collections, on-station at the end of March. An additional 11,320 Omak WxW progeny were transferred to the St. Mary's Acclimation Pond on 19 March. The WNFH-Twisp group on-station represents a single year stop-gap measure

instituted by the HCP Hatchery Committee to address potential genetic risks to the Twisp population. A longer term plan is to be implemented for brood year 2018. Mortality during the month totaled an additional nine Omak WxW progeny, 12 WNFH conservation progeny, and 96 MCO progeny during the month. Steelhead progeny are being reared to fulfill Douglas PUD HCP and Grant PUD mitigation obligations (Appendix A).

2018 Summer Steelhead

Spawning of the 2018 brood began on 26 December and was postponed on 14 March when program goals for Wells ladder-collected fish were met. A total of 75 females were spawned from this collection and overall pre-spawn mortality totaled 31 fish by the end of March (19%), including three fish that died during trapping, and three unaccounted-for fish that are likely mortalities associated with the adult holding and sampling facility. On 14 March, a total of nine fish in excess of broodstock needs were killed as surplus.

Spring 2018 broodstock collections of fish for the Methow safety-net (MSN) program were productive enough to fulfill the entire program, and spawning of these fish began on 28 March, with a total of eight females spawned. Spawning will continue weekly until sufficient eggs are collected to achieve the release goal of 100,000 smolts. Spawning of steelhead for the Okanogan HxH program has produced approximately 45k eggs and fry with an additional eight families (unhatched) being held for this release group in the event spring broodstock collections in the Okanogan Basin are not productive enough to achieve program goals. Steelhead progeny are being reared to fulfill Douglas PUD and Grant PUD HCP mitigation obligations.

2016 Spokane Rainbow Trout

Wells Hatchery had 35,475 rainbow trout from the 2016 brood on-station at the end of the month, of which, 2,111 are reared for a larger size (jumbo) at release. An additional 33 catchable-sized, and three jumbo-sized fish were reported as mortalities during the month. These fish are reared to fulfill the Off-License Settlement Agreement (Appendix B).

2017 White Sturgeon

Wells Hatchery had 1,135 White Sturgeon progeny on-station at the end of the month with 40 additional fish reported as mortalities during March. White Sturgeon progeny were at approximately six FPP during the month and are reared at Wells Hatchery under the Aquatic Settlement Agreement (Appendix C).

2018 Kamloops Rainbow Trout

Wells Hatchery had 33,803 Kamloops Rainbow Trout on-station at the end of the month after removing 321 additional mortalities. The population was adjusted upwards by 8,984 fish during the month due to routine inventory monitoring. These progeny will support fall 2018 and spring 2019 plants and are reared under 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>

Steelhead Spawning Ground Surveys

Steelhead spawning ground surveys were initiated in March. No redds were found within mainstem Methow River index reaches between the Winthrop PIT tag array (MRW) and the town of Pateros. One redd was found in the Methow Hatchery outfall, and personnel from the USFWS found a total of four redds in the WNFH outfall during March. 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.

2018 Smolt Trapping

The Methow River trap was installed on 1 March, and the Twisp River trap first operated on 9 March. Traps at both sites operated through the end of the month with no major interruptions. During the month, subyearling wild Chinook fry and yearling wild Chinook were the primary species captured at the Methow and Twisp trap sites respectively (Table 1). Biological data collected from trapped fish is detailed in Table 2. Methow River discharge for the period operated ranged from 17.0 to 35.1 m³s, providing expected trap efficiencies between 1.4 and 1.7 percent. Twisp River discharge for the period operated ranged from 2.6 to 5.7 m³s, providing expected trap efficiencies between 15.5 and 18.8 percent.

Table 1. Monthly salmonid captures at Methow Basin smolt traps in 2018. SHR = wild steelhead/rainbow.

| Species/origin | Methow | Twisp | Basin total |
|------------------------|--------|-------|-------------|
| | March | March | |
| Yearling Chin/wild | 37 | 110 | 147 |
| Yearling Chin/hatchery | 2 | 0 | 2 |
| Sub Chin/wild/fry | 1,069 | 9 | 1,078 |
| SHR/wild/transitional | 1 | 0 | 1 |
| SHR/wild/parr | 0 | 24 | 24 |
| Bull Trout | 0 | 1 | 1 |
| Coho/wild/fry | 47 | 10 | 57 |
| Sockeye/wild/fry | 42 | 0 | 42 |
| Total | 1,198 | 154 | 1,352 |

Table 2. Biological sampling of juvenile salmonids captured at Methow Basin smolt traps during March.

| Species/stage | Location | Length (mm) | | | Weight (g) | | | Mean K-factor |
|-----------------------------|----------|-------------|------|----------|------------|-----|----------|---------------|
| | | Mean | SD | <i>N</i> | Mean | SD | <i>N</i> | |
| Yearling Chinook/wild | Methow | 100.8 | 10.0 | 37 | 11.1 | 3.4 | 37 | 1.0 |
| Yearling Chinook/wild | Twisp | 94.2 | 6.5 | 110 | 9.0 | 1.7 | 110 | 1.1 |
| Yearling Chinook/hatchery | Methow | 125.0 | 7.1 | 2 | 21.0 | 3.3 | 2 | 1.1 |
| Sub Chinook/wild/fry | Methow | 38.9 | 2.2 | 448 | -- | -- | -- | -- |
| Sub Chinook/wild/fry | Twisp | 36.9 | 1.1 | 9 | -- | -- | -- | -- |
| Steelhead/wild/transitional | Methow | 212.0 | -- | 1 | 91.3 | -- | 1 | 1.0 |
| Steelhead/wild/parr | Twisp | 92.8 | 24.7 | 24 | 10.1 | 8.4 | 24 | 1.1 |
| Bull Trout | Twisp | 180.0 | -- | 1 | 47.7 | -- | 1 | 0.8 |
| Coho/wild/fry | Methow | 35.9 | 2.2 | 42 | -- | -- | -- | -- |
| Coho/wild/fry | Twisp | 36.7 | 0.9 | 10 | -- | -- | -- | -- |
| Sockeye/wild/fry | Methow | 27.7 | 1.7 | 38 | -- | -- | -- | -- |

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 | |
|------------|----------------|----------------|-----------------------------------|----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------------------------|---------|
| | | | | | Apr '17 | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan '18 | Feb | | | |
| 2015 | Spring Chinook | Yearling smolt | CCPUD NNI | 60,516 <i>released</i> | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 51,697 |
| 2015 | Spring Chinook | Yearling smolt | GCPUD Priest Rapids NNI | 134,126 <i>released</i> | 114,579 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 114,579 |
| 2015 | Spring Chinook | Yearling smolt | DCPUD Wells NNI | 29,123 <i>released</i> | 24,879 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 24,879 |
| 2016 | Spring Chinook | Yearling smolt | CCPUD NNI | 60,516 <i>released</i> | 68,032 | 67,814 | 67,806 | 67,792 | 67,783 | 67,765 | 67,700 | 67,628 | 67,546 | 67,437 | 67,400 | 67,333 | -- | -- |
| 2016 | Spring Chinook | Yearling smolt | GCPUD Priest Rapids NNI | 134,126 <i>released</i> | 150,785 | 150,302 | 150,284 | 150,253 | 150,234 | 150,192 | 150,049 | 149,890 | 149,707 | 149,464 | 149,384 | 149,236 | -- | -- |
| 2016 | Spring Chinook | Yearling smolt | DCPUD Wells NNI | 29,123 <i>released</i> | 32,740 | 32,635 | 32,631 | 32,625 | 32,620 | 32,611 | 32,580 | 32,546 | 32,506 | 32,454 | 32,436 | 32,404 | -- | -- |
| 2017 | Spring Chinook | Yearling smolt | CCPUD NNI | 60,516 <i>released</i> | -- | -- | -- | -- | -- | -- | 68,820 | 68,817 | 66,059 | 68,269 | 68,226 | 68,208 | -- | -- |
| 2017 | Spring Chinook | Yearling smolt | GCPUD Priest Rapids NNI | 134,126 <i>released</i> | -- | -- | -- | -- | -- | -- | 152,530 | 152,526 | 146,413 | 151,310 | 151,214 | 151,176 | -- | -- |
| 2017 | Spring Chinook | Yearling smolt | DCPUD Wells NNI | 29,123 <i>released</i> | -- | -- | -- | -- | -- | -- | 33,119 | 33,118 | 32,915 | 32,854 | 32,833 | 32,825 | -- | -- |
| 2015 | Summer Chinook | Yearling smolt | DCPUD Fixed Hatchery Compensation | 320,000 <i>released</i> | 329,809 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 329,809 |
| 2016 | Summer Chinook | Sub-yearling | DCPUD Fixed Hatchery Compensation | 484,000 <i>released</i> | 470,247 | 234,710 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 469,420 |
| 2016 | Summer Chinook | Yearling smolt | DCPUD Fixed Hatchery Compensation | 320,000 <i>released</i> | 362,301 | 361,696 | 359,464 | 359,127 | 356,640 | 356,340 | 356,340 | 356,340 | 356,240 | 356,240 | 356,240 | 356,240 | -- | -- |
| 2017 | Summer Chinook | Sub-yearling | DCPUD Fixed Hatchery Compensation | 484,000 <i>released</i> | -- | -- | -- | -- | -- | -- | -- | -- | -- | 468,729 | 447,267 | 431,642 | -- | -- |
| 2017 | Summer Chinook | Yearling smolt | DCPUD Fixed Hatchery Compensation | 320,000 <i>released</i> | -- | -- | -- | -- | -- | -- | -- | -- | -- | 332,000 | 332,000 | 332,000 | -- | -- |

Appendix A. Continued.

| Brood year | Species | Life stage | Program | Target release No. | Month | | | | | | | | | | | | Total released /transfer | |
|------------|------------------|----------------|--|--------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------------------------|---------|
| | | | | | Apr '17 | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan '18 | Feb | Mar | | |
| 2016 | Summer steelhead | Yearling smolt | DCPUD Fixed Hatchery Compensation ¹ | 300,000 | 217,219 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 297,041 |
| | | | | <i>released</i> | 90,679 | 206,362 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| 2016 | Summer steelhead | Yearling smolt | DCPUD Wells NNI ¹ | 8,000 | 5,793 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 7,921 |
| | | | | <i>released</i> | 2,418 | 5,503 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| 2016 | Summer steelhead | Yearling smolt | GCPUD Priest Rapids NNI | 80,000 | 57,925 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 79,211 |
| | | | | <i>released</i> | 24,181 | 55,030 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| 2016 | Summer steelhead | Yearling smolt | GCPUD Priest Rapids NNI | 20,000 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 26,054 |
| | | | | <i>transferred</i> | 26,054 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| 2017 | Summer steelhead | Yearling smolt | DCPUD Fixed Hatchery Compensation ¹ | 300,000 | -- | -- | 329,265 | 324,326 | 354,002 | 357,470 | 343,318 | 314,831 | 286,515 | 313,570 | 313,530 | 313,447 | -- | -- |
| | | | | <i>released</i> | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| 2017 | Summer steelhead | Yearling smolt | DCPUD Wells NNI ¹ | 8,000 | -- | -- | 8,780 | 8,649 | 9,440 | 9,533 | 9,155 | 8,395 | 7,640 | 8,362 | 8,316 | 8,359 | -- | -- |
| | | | | <i>released</i> | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| 2017 | Summer steelhead | Yearling smolt | GCPUD Priest Rapids NNI | 80,000 | -- | -- | 87,840 | 86,487 | 94,400 | 95,325 | 91,551 | 83,955 | 76,404 | 83,619 | 83,608 | 83,586 | -- | -- |
| | | | | <i>released</i> | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| 2017 | Summer steelhead | Yearling smolt | GCPUD Priest Rapids NNI | 20,000 | -- | -- | -- | 33,977 | 31,787 | 31,787 | 31,755 | 33,962 | 33,426 | 33,415 | 33,396 | 22,242 | -- | 11,320 |
| | | | | <i>transferred</i> | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 11,320 | |

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 |
|------------|------------------------|------------|-----------------|---------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|--------------------------|
| | | | | | Apr '17 | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan '18 | Feb | Mar | |
| 2015 | Rainbow trout | Juv | WDFW sport fish | Number (pounds) released | 20,308 | 5,398 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 51,384 |
| | | | | | (9,104) | (2,720) | (1,854) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | | |
| | | | | | 12,900 | 14,890 | 3,594 | -- | -- | -- | -- | -- | -- | -- | -- | | |
| 2016 | Rainbow trout | Juv | WDFW sport fish | Goal is 20,000 pounds annual combined | 61,927 | 61,612 | 59,120 | 57,374 | 57,001 | 57,001 | 37,001 | 35,951 | 35,784 | 35,566 | 35,511 | 35,475 | 25,301 |
| | | | | | (405) | (692) | (1,056) | (1,739) | (3,563) | (6,333) | (7,400) | (8,988) | (8,750) | (12,454) | (14,869) | (14,853) | |
| | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| 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 | -- | -- | -- | -- | |
| 2018 | Kamloops Rainbow trout | Juv. | WDFW sport fish | Goal is 20,000 pounds annual combined | -- | -- | -- | -- | -- | -- | -- | -- | -- | 26,199 | 24,819 | 33,803 | -- |
| | | | | | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (--) | (26) | (11) | (66) | |
| | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |

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 |
|------------|----------------|------------------|--------------------------------------|--------------------|---------|-------|-------|-------|-------|-------|-------|-------|-------|---------|-------|-------|------------------------------------|
| | | | | | Apr '17 | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan '18 | Feb | Mar | |
| 2016 | White sturgeon | Juvenile rearing | Wells White Sturgeon Supplementation | Up to 5,000 | 6,654 | 5,090 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3,655 |
| | | | | Culled | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | |
| | | | | Transferred | -- | 1,362 | -- | -- | -- | -- | -- | -- | -- | -- | -- | | |
| | | | | Wells reservoir | -- | -- | 5,125 | -- | -- | -- | -- | -- | -- | -- | -- | 5,125 | |
| 2017 | White sturgeon | Juvenile rearing | Wells White Sturgeon Supplementation | Up to 325 | -- | -- | -- | 2,053 | 1,581 | 1,461 | 1,440 | 1,299 | 1,262 | 1,182 | 1,175 | 1,135 | -- |
| | | | | Culled | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| | | | | Transferred | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| | | | | Wells reservoir | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |