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Mr. Thaler:

This letter serves as a transmittal to summarize several changes or clarifications to the KRRC's Definite Plan relative to information previously provided to the SWRCB in September 2017 (CEQA Technical Submittal) and January 2018 (Administrative Draft Definite Plan). In each case, the changes or clarifications reflect the outcome of ongoing field work, technical analyses and/or resource agency input and coordination.

The revisions can be broken up into three primary categories, as listed below:

1. **Access Road and Bridge Improvements:** Changes to the plan for improvements or maintenance associated with roads and bridges is summarized in Table 1. In some cases, temporary bridge and/or strengthening options for construction access have been included. Any proposed option would fit within the previously identified footprint, and would provide equal or better future function relative to existing conditions.

2. **Fish Hatchery Plan:** The latest fish hatchery plan is provided as Attachment 1 to this letter and was developed in close coordination with federal and state fisheries resource agencies. The information provided in Attachment 1 supersedes hatchery related information provided in previous submittals to the SWRCB. A summary of key revisions is provided below:
    a. Production: Overall post-dam removal production goals match previous submittals, however, the production goals at specific hatchery facilities have been revised.
    b. Iron Gate Hatchery: The revised plan includes an updated understanding of the facilities that will remain in operation (incubation building, three raceways, auxiliary ladder/trap), new facilities to be constructed (water supply intake, intake UV treatment, two new holding ponds within existing raceway, new spawning facility) and the range of water supply flows (1.5 to 8.75 cfs) required throughout the year to meet the production goals. Additional detail is provide on the various features and operations associated with the proposed hatchery.

c. Fall Creek Hatchery: The revised plan provides additional detail on the various features and operations associated with the proposed hatchery.

3. **Mitigation related to Climate Change:** The KRRC believes that the previously identified greenhouse gas/global climate change mitigation measures CC-1 (use the market mechanism under development as part of AB 32) should be removed from consideration since the Project construction impacts to GHG do not pass the threshold of significance.

## Table 1 Road and Bridge Revisions

| Definite Plan Section No. | Road Name | Description of Revision |
|---|---|---|
| 5.2.2 | The Dalles California Highway | Pavement rehabilitation previously described as "may be required", now described as "will likely not be needed." |
| 5.2.2 | Oregon Route 66 | Pavement rehabilitation previously described as "may be required", now described as "will likely not be needed." |
| 5.2.2 | Keno Worden Road | Pavement rehabilitation previously described as "may be required", now described as "will likely not be needed." |
| 5.2.2 | J.C. Boyle Powerhouse Road | Addition: Road maintenance is anticipated in some areas |
| 5.2.2 | J.C. Boyle Disposal Access Road | Addition: This road will be demolished and restored to native vegetation post-construction. |
| 5.2.2 | J.C. Boyle Right Abutment Access Road | Addition: This road will be demolished and restored to native vegetation post-construction. |
| 5.2.2 | J.C. Boyle Penstock Access Road | Addition: These roads will be demolished and restored to native vegetation post-construction. |
| 5.3.2 | Dry Creek Bridge | Previously proposed bridge replacement; Revised to allow for other options including a temporary bridge (existing bridge would remain and not be used for construction access) or strengthening of the existing bridge structure. Final design process will determine which option is implemented. |
| 5.3.2 | Fall Creek Bridge | Previously proposed bridge replacement; Revised to allow for other options including a temporary bridge (existing bridge would remain and not be used for construction access) or strengthening of the existing bridge structure. Final design process will determine which option is implemented. |
| 5.4.2 | Daggett Road Bridge | Previously proposed bridge replacement; Revised to allow for other options including a temporary bridge (existing bridge would remain and not be used for construction access) or strengthening of the existing bridge structure. Final design process will determine which option is implemented. |
| 5.5.2 | Lakeview Road Bridge | Previously proposed bridge replacement; Revised to allow for other options including a temporary bridge (existing bridge would remain and not be used for construction access) or strengthening of the existing bridge structure. Final design process will determine which option is implemented. |
| 5.5.2 | Access Road from Long Gulch Recreation Facility to Lakeview Road | Road not previously included: Road surface maintenance may be required during construction. This access road will be demolished and the area restored to native habitat at the completion of dam removal. |

| Definite Plan Section No. | Road Name | Description of Revision |
|---|---|---|
| 5.5.2 | Access Road from Overlook Point Recreation Facility to Copco Road | Road not previously included: Road surface maintenance may be required during construction. This access road will be demolished and the area restored to native habitat at the completion of dam removal. |

Please let us know if you have any question or concerns pertaining to the information provided in this submittal. The KRRC looks forward to continuing to work together to move the Project forward toward implementation.

Sincerely,

Mark Bransom
Executive Director
Klamath River Renewal Corporation

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# Attachment 1 – KRRC Hatchery Plan

# 7.8 Fish Hatchery Plan

The existing Iron Gate fish hatchery (IGH) facilities are part of the Lower Klamath Project, and modifications or improvements to infrastructure and operation are proposed to the IGH facility as part of the hatchery plan for the Project. KRRC's obligations with respect to IGH and Fall Creek Hatchery (FCH), and those of PacifiCorp and other parties to the KHSA, are summarized as follows:

- The PacifiCorp Hatchery Facilities within the State of California shall be transferred to the State of California at the time of transfer to the DRE of the Iron Gate Hydro Development or such other time agreed by the Parties, and thereafter operated by the CDFW with funding from PacifiCorp.

- PacifiCorp will fund 100 percent of hatchery operations and maintenance necessary to fulfill annual mitigation goals developed by the CDFW in consultation with NMFS. This includes funding the Iron Gate Hatchery facility as well as funding of other hatcheries necessary (e.g. FCH) to meet ongoing mitigation goals following facilities removal.

- Funding will be provided for hatchery operations to meet mitigation requirements and will continue for eight years following the decommissioning of Iron Gate Dam.

- PacifiCorp will fund a study to evaluate hatchery production options that do not rely on the current Iron Gate Hatchery water supply.

- Based on the study results and with the approval of the CDFW and NMFS, PacifiCorp will provide one-time funding to construct and implement the measures identified as necessary to continue to meet agency developed mitigation production objectives for a period of eight years following the decommissioning of Iron Gate Dam.

The KHSA establishes a framework to allow for CDFW's continued hatchery operations at a level determined by NMFS and CDFW to be sufficient for purposes of implementation of the Definite Plan. The KHSA also establishes a source of funding that is needed to achieve this objective. KRRC's role in accomplishing these objectives is to cooperate and facilitate the transfer of the IGH (and any improvement to be made to IGH or other hatcheries necessary to meet ongoing mitigation objectives) to CDFW, and to cooperate with CDFW in its implementation of the Definite Plan so as to facilitate ongoing hatchery operations for a period of eight years following the removal of Iron Gate Dam.

## 7.8.1 Existing IGH Facility and Operations

IGH was constructed in 1962 to mitigate for lost anadromous salmonid spawning and rearing habitat between Copco No. 2 Dam and Iron Gate Dam. The historic mitigation goals include a release of 6,000,000 Chinook salmon (5,100,000 fingerlings and 900,000 yearlings), 75,000 Coho salmon yearlings, and 200,000 steelhead trout yearlings, annually. The Southern Oregon Northern California Coast (SONCC) Coho salmon Evolutionarily Significant Unit (ESU), which includes Coho salmon produced at IGH, is listed as threatened under the California Endangered Species Act (CESA) and the federal Endangered Species Act

(ESA). A Hatchery and Genetics Management Plan (HGMP) and Section 10(a)(1)(A) Enhancement of Survival Permit was issued to the CDFW in 2014 for the IGH Coho salmon artificial propagation program (Section 10(a)(1)(A) Permit 15755). Under the HGMP, the purpose of the Coho salmon program is to aid in the conservation and recovery of the Upper Klamath Population Unit of the SONCC Coho salmon ESU by conserving genetic resources and reducing short-term extinction risks prior to future restoration of fish passage above IGD. Adult steelhead returns declined dramatically during the 1990's for unknown reasons and no steelhead have been produced at IGH since 2012. Chinook returns continue to be variable but generally sufficient broodstoack return to IGH to produce the mitigation goals.

The IGH spawning/trapping facility is located approximately ½ mile downstream of Iron Gate Dam, adjacent to the Bogus Creek tributary. The main hatchery complex includes an office, incubator building, rearing/raceway ponds, fish ladder with trap, settling ponds, visitor information center, and four employee residences (see Figure 7.8-1). The collection facility is located at Iron Gate dam and includes a fish ladder consisting of 20 ten-foot weir-pools that terminates in a trap, a spawning building and six 30-foot circular holding ponds.

The IGH operates with a gravity fed, flow-through system that has five discharge points into the Klamath River. The IGH obtains its water supply from Iron Gate Reservoir. Two subsurface influent points at a depth of seventeen feet and seventy feet deliver water to IGH. Up to 50 cfs is diverted from the Iron Gate Reservoir to supply the 32 raceways and fish ladder.

The existing spawning facility discharges through the main ladder, and steelhead return line. An overflow line drains excess water from the aeration tower. The hatchery facility also has a discharge at the tail race that supplies the auxiliary ladder or fish discharge pipe, and two flow-through settling ponds for hatchery effluent treatment which converge to a single discharge point.

The hatchery is operated by the CDFW. Per the license, 80 percent of operations and maintenance costs are required to be funded by PacifiCorp, but PacifiCorp currently funds 100 percent of those costs pursuant to the KHSA.

Implementation of the Definite Plan will result in the demolition of the existing fish collection facility located at the toe of Iron Gate Dam.

Due to the reservoir drawdown and dam removal, the existing water supply intake will become unusable, as its elevation will be above the water level post-draw down and high suspended sediment concentrations during drawdown. The water supply intake and associated infrastructure will be demolished along with the dam and hydropower developments. These existing functions will be replaced by the reopening and operation of the Fall Creek Hatchery (FCH) by CDFW and by making improvements to IGH. The cost of these improvements will be borne by PacifiCorp, to the extent of its funding obligations under the KHSA.


Figure 7.8-1 Iron Gate Hatchery

## 7.8.2 Existing Fall Creek Hatchery

The FCH was built in 1919 by the California Oregon Power Company as compensation for lost of spawning grounds due to the construction of Copco No. 1 Dam. Six of the original rearing ponds remain (two above Copco road and four below the road). These ponds were last used from 1979 through 2003 to raise 180,000 Chinook salmon yearlings which were released into the Klamath River at Iron Gate Hatchery. Although the raceways remain and CDFW continues to run water through them, they have not produced fish since 2003 when all mitigation fish production was moved to IGH. The facility has retained its water rights but will need substantial renovation to become operational.

## 7.8.3 Proposed Fish Hatchery Plan

As a state and federally listed species in the Klamath River, coho production is the highest priority for NMFS and CDFW, followed by Chinook salmon, which support tribal, sport, and commercial fisheries. Steelhead production is the lowest priority. Due to limited available water and rearing capacity to meet Chinook yearling mitigation goals, and recent low steelhead returns, NMFS and CDFW have determined that steelhead production be discontinued.

NMFS and CDFW have recommended a plan for hatchery operations for the 8-year period following dam removal. In order to implement this plan, IGH and FCH must be operational prior to drawdown of the Iron Gate reservoir. The plan also requires that the Definite Plan be implemented in a manner that is consistent with the North Coast Regional Water Quality Control Board (NRWQCB) "Policy in Support of Restoration in the North Coast Region." The plan also requires CDFW to employ Best Management Practices to minimize discharge at IGH and FCH.

The NMFS/CDFW goals for fish production at IGH and FCH are summarized in Table 7.8-1.

**Table 7.8-1 Comparison of Previous Mitigation Goals and Revised NMFS/CDFW Production Recommendation**

| Species/Life Stage | 1960's Mitigation Goal (at IGH) | Production Goal Post-Dam Removal | Release Dates |
|---|---|---|---|
| Coho Yearlings | 75,000 | 75,000 at FCH | March 15 – May 1 |
| Chinook Yearlings | 900,000 | 115,000 at FCH | Oct 15 – Nov 20 |
| Chinook Smolts | 5,100,000 | 3,400,000 at IGH | April 1 – May 31 |
| Steelhead | 200,000 | 0 | NA |

Source: NOAA Fisheries and CDFW Technical Staff Recommendation for Klamath River Hatchery Operations in California Post-Dam Removal, May 31, 2018.

### Improvements at IGH

IGH will be transferred by PacifiCorp to CDFW with funding provided by PacifiCorp under terms of the KHSA section 7.6.6 and 7.6.6 A. Operational components of IGH shall be retained by CDFW. To the extent necessary to maximize use of available water supplies, PacifiCorp will implement water use efficiency improvements such as water aeration as it enters the pond headboxes, mid-raceway water aeration and water reuse. IGH will utilize water diverted from Bogus Creek to operate the hatchery incubation building, two 300-foot adult holding ponds configured from two existing raceways, three 400-foot raceways, and the auxiliary fish ladder and trap. IGH will use between 3.75 to 8.75 cfs October through May (see Table 7.8-2) to rear a targeted goal of 3.4 million Chinook smolts for release in April through May of each year. Adult Coho salmon and Chinook salmon broodstock will be collected using the existing auxiliary ladder and held at IGH in the adult trap and holding ponds. The Chinook salmon program will use a maximum of 4,000 adult Chinook broodstock fish to meet the production goals. The Coho salmon program will use a maximum of 270 adult broodstock fish to meet the conservation goals identified in the HGMP and Section 10(a)(1)(A) Permit 15755. A new spawning facility will be constructed that utilizes, to the extent possible, components of the spawning facility at Iron Gate Dam.

Table 7.8-2 Estimated Water Needs at IGH rearing 3.4 million Chinook smolts (cfs)

| Facility | Jan | Feb | Mar | April | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rearing Ponds | 2.25 | 2.25 | 2.25 | 6.75 | 6.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.25 |
| Hatchery Building | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 0.00 | 0.00 | 0.00 | 0.00 | 1.50 | 1.50 | 1.50 |
| Spawning | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.50 | 0.50 |
| Adult Holding & Ladder | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.50 | 4.50 | 4.50 |
| **Total** | **3.75** | **3.75** | **3.75** | **8.25** | **8.25** | **0.00** | **0.00** | **0.00** | **0.00** | **6.50** | **6.50** | **8.75** |

Source: NOAA Fisheries and CDFW Technical Staff Recommendation for Klamath River Hatchery Operations in California Post-Dam Removal, May 31, 2018.

### Water Needs

As shown in Table 7.8-2, the maximum amount of Bogus Creek water necessary to meet IGH needs is 8.75 cfs in December and 8.25 cfs in April and May. In April and May, the IGH hatchery incubation building requires 1.5 cfs of water for Coho egg incubation and fry rearing. The three raceways will need up to 2.25 cfs each (6.75 cfs total). The adult trap and two raceway holding ponds will need 2.25 cfs each (4.50 cfs total) during October, November, and December. Because anadromous salmonids currently use Bogus Creek as a natural spawning area, the water supply from Bogus Creek will need to be filtered and treated with ultra violet (UV) light to reduce the potential threat of disease introduction into the hatchery. The potential footprint options for the treatment system are shown on Figure 7.8-2.

To reduce the potential adverse effects of diverting water from Bogus Creek on naturally produced Coho salmon, the pump station for the hatchery water supply will be constructed as far downstream towards the Klamath River confluence as practicable. This will reduce the length of Bogus Creek rearing habitat affected by water withdrawals downstream of the pump station. An envelope for the potential pump station location on Bogus Creek system is shown on Figure 7.8-2.

### Water availability

The Bogus Creek water diversion will be operated to maintain a minimum of 50% of the instream flow in the creek at the point of diversion. Table 7.8-3 includes a summary of creek flows based on available monitoring data from August 2013 to April 2018. This limited data set indicate that there are four months where hatchery water needs could exceed 50 percent of instream flow (October, November, April, and May). Tables 7.8-4 through 7.8-7 further separate the first and second half of each of these four months comparing of the maximum, minimum, and average Bogus Creek flows to IGH flow requirements. Cells highlighted in grey indicate time periods when flows are insufficient to meet total hatchery demand and maintain minimum (50 percent) creek flow. Flow deficient periods over the 2013 and 2014 data set include:

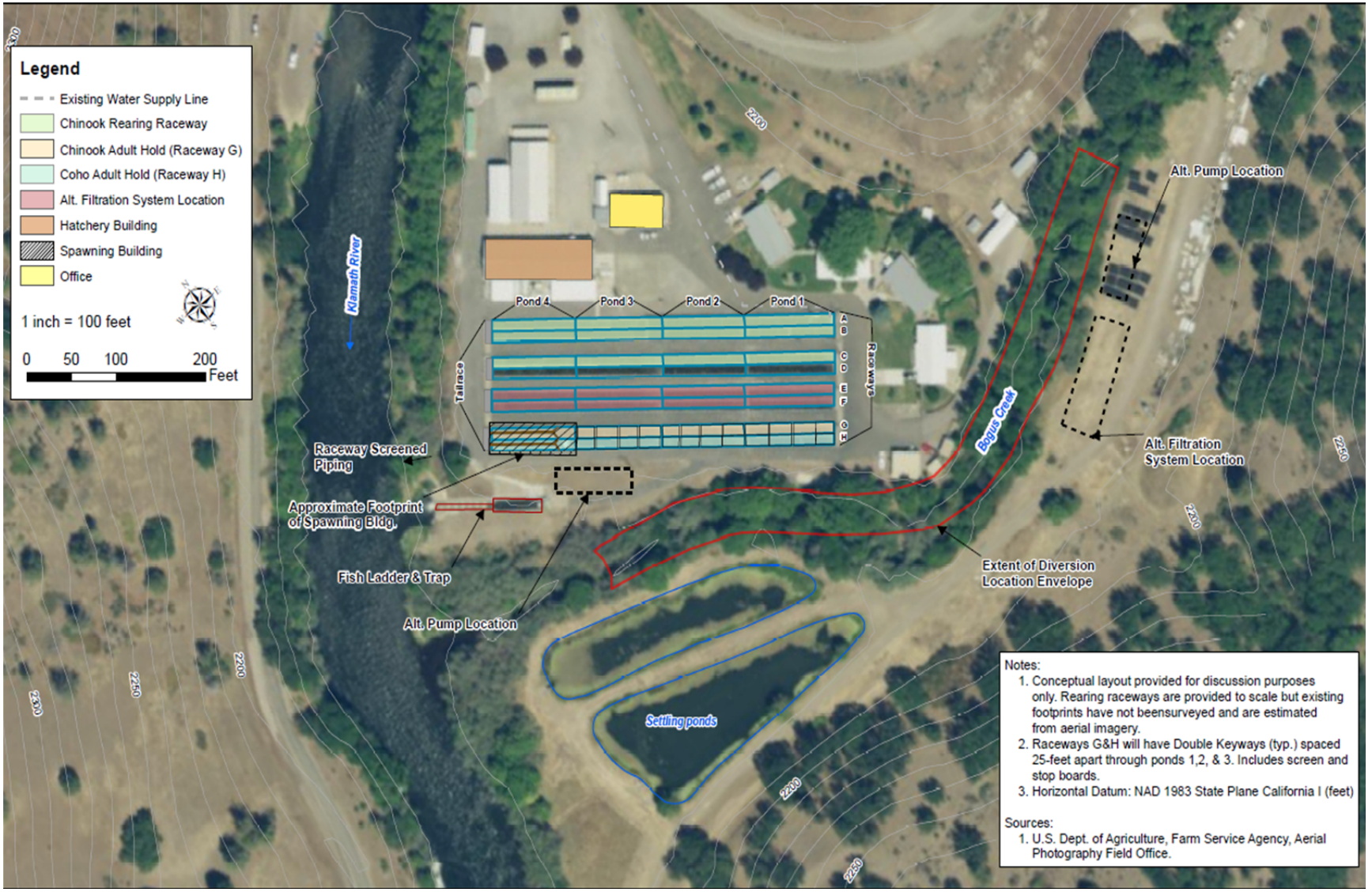


**Figure 7.8-2 Conceptual Layout of Iron Gate Hatchery Improvements**

- In April 2014, minimum and average Bogus Creek flows fall below the hatchery requirement for both the first and second halves of the month. In 2015 the minimum flow rate for the first half of the month falls below the hatchery requirement and the minimum and average flows fall below the requirement for the second half of the month.
- In May, minimum hatchery flows were not available in all years for the first half of the month and maximum, minimum, and average flows were insufficient in 2014 and 2015. In the second half of the May 2014, the maximum, minimum, and average creek flows are insufficient to meet hatchery requirements while maintaining 50 percent creek flow.
- In October, the first half of the month creek flows are insufficient to meet hatchery requirements for all four years and average flows do not meet the requirement in 2014 and 2016. In the second half of October, minimum and maximum flows in 2014 do not meet hatchery requirements.
- In November, the first half of the month shows that the 2013 minimum and average flows and the 2014 minimum flow did not meet hatchery requirements. In the second half of November, minimum flows were insufficient to meet hatchery requirements in 2013 and 2014.

**Table 7.8-3 Observed minimum, maximum, and 4-year average flow in cfs by month in Bogus Creek from 8/8/2013 to 4/16/2018**

| Flow | Jan | Feb | Mar | April | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum | 12.14 | 13.90 | 17.35 | 8.23 | 7.20 | 3.57 | 2.19 | 1.77 | 1.78 | 7.40 | 10.96 | 14.89 |
| Maximum | 253.2 | 184.9 | 144.3 | 80.94 | 48.85 | 28.99 | 11.53 | 11.49 | 28.00 | 52.10 | 32.94 | 288.6 |
| **4-year Average** | **32.92** | **39.26** | **37.30** | **28.97** | **18.92** | **9.94** | **5.46** | **5.72** | **8.98** | **16.99** | **20.80** | **27.79** |

Note: Minimum and maximum values represent the absolute minimum and maximum values observed in each month.
Source: NOAA Fisheries and CDFW Technical Staff Recommendation for Klamath River Hatchery Operations in California Post-Dam Removal, May 31, 2018.

**Table 7.8-4 April Juvenile Rearing Water Availability and Requirements**

| Year | 1st Half April | | | | | | 2nd Half April | | | | | | IGH Req (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Flow (cfs) | | | 50% of Flow (cfs) | | | Total Flow (cfs) | | | 50% of Flow (cfs) | | | |
| | Max | Min | Ave | Max | Min | Ave | Max | Min | Ave | Max | Min | Ave | |
| 2013 | NA | NA | NA | NA | NA | NA | NA | NA | 0.00 | NA | NA | NA | 8.25 |
| 2014 | 18.61 | 9.77 | 16.01 | 9.30 | 4.89 | 8.01 | 19.56 | 8.23 | 13.31 | 9.78 | 4.12 | 6.65 | |
| 2015 | 22.53 | 13.64 | 19.42 | 11.27 | 6.82 | 9.71 | 18.58 | 11.31 | 14.80 | 9.29 | 5.65 | 7.40 | |
| 2016 | 42.95 | 32.77 | 36.45 | 21.48 | 16.39 | 18.23 | 36.52 | 23.94 | 30.66 | 18.26 | 11.97 | 15.33 | |
| 2017 | 80.94 | 42.73 | 49.89 | 40.47 | 21.36 | 24.95 | 51.05 | 37.98 | 45.57 | 25.52 | 18.99 | 22.79 | |

Notes: 2013 to 2018 dataset begun in August 2013; Greyed cells indicate Bogus Creek flow less than IGH requirement for 50% of base flow.
Source: NOAA Fisheries and CDFW Technical Staff Recommendation for Klamath River Hatchery Operations in California Post-Dam Removal, May 31, 2018.

### Table 7.8-5 May Juvenile Rearing Water Availability and Requirements

| Year | 1st Half May | | | | | | 2nd Half May | | | | | | IGH Req (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Flow (cfs) | | | 50% of Flow (cfs) | | | Total Flow (cfs) | | | 50% of Flow (cfs) | | | |
| | Max | Min | Ave | Max | Min | Ave | Max | Min | Ave | Max | Min | Ave | |
| 2013 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 8.25 |
| 2014 | 16.33 | 10.15 | 13.23 | 8.16 | 5.07 | 6.61 | 8.25 | 12.64 | 12.64 | 4.13 | 6.32 | 6.32 | |
| 2015 | 16.33 | 9.95 | 13.15 | 8.16 | 4.98 | 6.58 | 30.36 | 30.36 | 30.36 | 15.18 | 15.18 | 15.18 | |
| 2016 | 23.39 | 10.10 | 19.28 | 11.69 | 5.05 | 9.64 | 19.14 | 19.14 | 19.14 | 9.57 | 9.57 | 9.57 | |
| 2017 | 48.85 | 9.52 | 37.78 | 24.43 | 4.76 | 18.89 | 39.58 | 39.58 | 39.58 | 19.79 | 19.79 | 19.79 | |

Notes: 2013 to 2018 dataset begun in August 2013; Greyed cells indicate Bogus Creek flow less than IGH requirement for 50% of base flow.
Source: NOAA Fisheries and CDFW Technical Staff Recommendation for Klamath River Hatchery Operations in California Post-Dam Removal, May 31, 2018.

### Table 7.8-6 October Adult Holding Water Availability and Requirements

| Year | 1st Half October | | | | | | 2nd Half October | | | | | | IGH Req (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Flow (cfs) | | | 50% of Flow (cfs) | | | Total Flow (cfs) | | | 50% of Flow (cfs) | | | |
| | Max | Min | Ave | Max | Min | Ave | Max | Min | Ave | Max | Min | Ave | |
| 2013 | 15.36 | 10.70 | 13.75 | 7.68 | 5.35 | 6.88 | 14.84 | 10.26 | 12.74 | 7.42 | 5.13 | 6.37 | 6.5 |
| 2014 | 21.42 | 9.79 | 12.83 | 10.71 | 4.89 | 6.42 | 26.27 | 15.35 | 17.40 | 13.13 | 7.68 | 8.70 | |
| 2015 | 20.03 | 13.63 | 17.03 | 10.01 | 6.81 | 8.51 | 22.06 | 16.75 | 20.01 | 11.03 | 8.37 | 10.01 | |
| 2016 | 33.38 | 7.40 | 12.97 | 16.69 | 3.70 | 6.49 | 52.10 | 14.62 | 25.12 | 26.05 | 7.31 | 12.56 | |
| 2017 | 19.01 | 8.87 | 14.29 | 9.51 | 4.44 | 7.14 | 30.96 | 17.58 | 22.84 | 15.48 | 8.79 | 11.42 | |

Notes: Greyed cells indicate Bogus Creek flow less than IGH requirement for 50% of base flow.
Source: NOAA Fisheries and CDFW Technical Staff Recommendation for Klamath River Hatchery Operations in California Post-Dam Removal, May 31, 2018.

**Table 7.8-7 November Adult Holding Water Availability and Requirements**

| Year | 1st Half November | | | | | | 2nd Half November | | | | | | IGH Req (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Flow (cfs) | | | 50% of Flow (cfs) | | | Total Flow (cfs) | | | 50% of Flow (cfs) | | | |
| | Max | Min | Ave | Max | Min | Ave | Max | Min | Ave | Max | Min | Ave | |
| 2013 | 13.01 | 10.96 | 12.35 | 6.51 | 5.48 | 6.17 | 16.45 | 12.87 | 14.38 | 8.22 | 6.43 | 7.19 | 6.5 |
| 2014 | 16.89 | 12.75 | 13.87 | 8.44 | 6.38 | 6.94 | 25.50 | 12.72 | 15.23 | 12.75 | 6.36 | 7.62 | |
| 2015 | 24.12 | 19.78 | 21.45 | 12.06 | 9.89 | 10.73 | 23.36 | 20.91 | 22.14 | 11.68 | 10.45 | 11.07 | |
| 2016 | 28.61 | 28.61 | 28.61 | 14.31 | 14.31 | 14.31 | 28.61 | 28.61 | 28.61 | 14.31 | 14.31 | 14.31 | |
| 2017 | 29.92 | 23.57 | 24.87 | 14.96 | 11.79 | 12.43 | 32.94 | 23.49 | 26.53 | 16.47 | 11.75 | 13.27 | |

Notes: Greyed cells indicate Bogus Creek flow less than IGH requirement for 50% of base flow.
Source: NOAA Fisheries and CDFW Technical Staff Recommendation for Klamath River Hatchery Operations in California Post-Dam Removal, May 31, 2018.

In summary, there were periods in all 5 years of Bogus Creek flow data for all four months where IGH flow requirements were not met if 50 percent of flow was maintained in Bogus Creek. Hatchery flows were met more often in April and November than May and October. The first halves of May and October met the hatchery requirements less often. It was not expected that the first half of May would show less availability that the second half of the month. This is may be explained by the short duration of the dataset or drought conditions between 2013 and 2017 that may not represent long-term conditions. For these reasons, this analysis should be considered conservative and is indicative of the need for additional Bogus Creek flow data prior to dam removal and implementation of operational strategies to reduce hatchery water use during these shoulder months while maintaining hatchery production.

Water rights for water diverted from Bogus Creek are already secured as a riparian right available to the owner of the property at the time of diversion.

### Shoulder Month Water Conservation Measures

As Bogus Creek flow data show, there may be times in April, May, October and November (shoulder months) where Bogus Creek provides inadequate flow for IGH while also maintaining 50 percent of base flow in the creek. CDFW and NMFS have identified the following real-time actions that can be instituted to maintain creek flow and hatchery production objectives.

- Adult hold in October and November: As shown in Table 7.8-2, 4.5 cfs is needed for adult holding in October and November to operate two adult hold ponds. Individual adults return at different times beginning in October and lasting through December. Consequently, operating two adult hold ponds in the early return period (October to mid-November) may not be necessary in most years. During periods of low creek flow, adult salmon will be selectively collected (i.e. green spawners returned to the river, ripe spawners retained) and held in numbers/densities consistent with available flow and temperature in Bogus Creek so that a minimum of 50% of instream flow is maintained. As a guideline, if October daily average flows in Bogus Creek are less than 8.5 cfs, water will not be diverted for adult holding. When flows reach a daily average of 8.5 cfs, one adult hold raceway would be operated at 2.25 cfs, with 1.5 cfs for the hatchery building and 0.5 cfs for spawning, for a

total facility water need of 4.25 cfs. When flows reach a daily average 13 cfs or greater (second half of October in most years), two adult hold raceways could be operated (4.5 cfs) for a total facility water need of 6.5 cfs (see Table 7.8-6). These water diversion rates will not be implemented unless a daily average maximum water temperature trigger of 14 degrees C in Bogus Creek is met for egg incubation purposes.

- Juvenile rearing in April and May: As shown in Tables 7.8-4 and 7.8-5, 8.25 cfs is needed in April and May for juvenile rearing and Coho egg/fry production for Fall Creek. If insufficient water is available in Bogus Creek, CDFW may employ early release strategies to maintain 50 percent of the creek's base flow. Early release strategies may also be employed if Bogus Creek and/or Klamath River water temperatures are above 18.3 degrees C (65 degrees F) for a prolonged period to assist with the survivability of juvenile fish. As with adult holding, juvenile salmon will be held in numbers/densities consistent with available flow and temperature in Bogus Creek. Recirculation and reuse of a portion of the raceway tailwater may also be used to augment hatchery water supplies during low creek flow years, as further described below.

### Water Aeration Needs

Since water used by IGH for post-dam removal operations will be pumped from Bogus Creek (Table 7.8-3), aeration at the head of the raceway ponds will be needed to dissipate unwanted gasses from the water supply. Aeration will off-gas the water and allow re-oxygenation. Additional mid-raceway aeration will also be needed to maintain dissolved oxygen levels near saturation.

### Chinook Salmon Tagging and Marking

Application of coded Wire Tags (CWTs) and adipose fin-clip marking will be conducted at IGH as fish reach the minimum size for tagging (200 fish/lb). The mark and tag rate will be at the CDFW standard of 25%. It is anticipated that tagging will occur between March and May. The existing tagging trailer is adequate to meet tagging and marking objectives for Chinook salmon.

### Fish Feeding and Rearing

Fish will need to be fed a high-quality feed to optimize growth and improve health to meet a minimum marking/tagging size of 200 fish/lb on schedule. Feed storage will be at IGH, for both IGH and FCH. IGH will continue to use the existing bulk feed bins and cool room storage.

### Filtration and UV

Water from Bogus Creek used within the rearing facilities will be filtered and UV disinfected. Anadromous salmonids bring disease and pathogens to the supply water, and water used for rearing of fish in the raceways must be filtered and UV disinfected to avoid spreading disease to the hatchery and hatchery produced fish. The hatchery building currently has a filtration and UV system in place for egg rearing. The adult holding pond, trap, and ladder will not require treatment.

Specific design criteria for the treatment system are still under consideration. The filtering system will need to remove high Total Suspended Sediment (TSS) resulting from winter/spring storm events that can directly affect fish health, as well as remove low ambient TSS that can inhibit the effectiveness of the UV disinfection system. From 2008-2013, Bogus Creek exhibited average turbidity of 4.5 nephelometric turbidity units (NTU) equivalent to approximately 5- 11 mg/L TSS. On April 8, 2018, the Karuk Tribe measured Bogus Creek turbidity during a flushing flow event at Iron Gate Dam, where flow in Bogus Creek was greater than 100 cfs during a storm event. Turbidity in Bogus Creek was measured at 64 formazin nephelometric units (FNU). FNU is equivalent to NTU but uses a different method of measurement. The maximum turbidity in Bogus Creek resulting from a storm event is unknown and requires further monitoring.

To identify and evaluate the appropriate setting requirements and filtration technologies, the KRRC, NMFS, and CDFW will establish temporal TSS exposure goals for the rearing ponds and incubation that will include the 24-hour average, six-day average, 30-day average, 1-day maximum and instantaneous maximum. Exposure goals will be developed with an understanding of current IGH water quality criteria and through review of salmonid exposure to TSS in scientific literature (e.g. Newcombe and Jenson 1996; Bash, et. al.,2001). The KRRC's goal is to identify a treatment process capable of removing TSS to a level protective of fish that is also not reliant upon settling or flocculating agents or chemicals (e.g. alum and potassium permanganate). Options include:

- Slow sand filtration
- Rapid media filtration
- Membrane or alternative filtration technology

The UV disinfection requirements will be adopted from other CDFW hatcheries and will include target pathogens, levels of disinfection, UV transmittance, the need for redundancy and lamp fouling. Independent of the treatment technology used, it is anticipated that the new equipment footprint (filtration and UV) will be entirely constructed within the footprint of the existing IGH facility.

In 2018-2019, comprehensive sampling and bench-scale testing will be conducted to characterize the particulates and settling rates of Bogus Creek storm water; and possibly pilot-scale filtration tests and UV effectiveness using Bogus Creek water.

### Adult Collection and Holding

Adult trapping will use the existing fish ladder and auxiliary trap at IGH located south of the rearing raceways (See Figure 7.8-2). Extending the existing ladder into the river with a slight turn down river, may create better attraction water for the returning adults. However, this extension will occur within the approach channel to the auxiliary fish ladder and this channel has been excavated to a depth of approximately 20-feet, which could complicate the extension.

Adult fish will enter the ladder and be trapped in the adult collection area. The adult trap and hold area will consist of the existing fish ladder, adult collection pond trap and a fish-lift with a fish return line to the river. A submersible pump in the Klamath River will be added with a 1.5-inch line running to the top of the fish ladder to add Klamath River water for added attraction.

Using a mechanical crowder, fish that have entered the trap will be pushed into the fish-lift, where they will be sorted and slid into a truck for transport to the G or H adult holding raceways, depending on species. From the truck, a portable slide will be used to dump the fish from the truck into the raceways.

The adult holding ponds (ponds 1-3 of raceways G and H, see Figure 7.8-2) will have head box and head screens and provide adequate aeration with water flowing through screens and over wooden dam boards placed in double keyways every 25 feet. These existing raceway ponds will continue to have the standard grade of 0.5-foot elevation decrease over each 100-foot of pond length.

Adult Chinook and Coho will be segregated, with Coho in ponds 1 through 3 of raceway H and Chinook in ponds 1 through 3 of raceway G. Coho will be contained in PVC numbered tubes in pond H1, moved to G 3 and through an access door, lifted within the tubes into the spawning house. A barrier will be needed to be attached on the outside wall of H, and on the North side of center wall, and then outside wall of G ponds, possibly a 4-foot chain link fence, to keep fish from jumping out of their ponds. This also allows for use of the mechanical crowder within H ponds. Slide gates will be needed where each of the flumes enters piping under the spawning house. Screens will also be required to keep fish out of the pipes. Keyways at 25-foot intervals will be required in each of the raceways for screens and checkboards. The center wall will be cut just above each 25-foot keyway section to provide a 46-inch portal slot to move fish from G or H pond and crowded to the end of H-3 where the fish will enter the through a hinged door to the spawning house. Each portal slot will need keyways for boards, or screen, to create a barrier, plus a steel support will be needed over each portal slot to provide a sturdy surface for the mechanical crowder that rides atop the pond walls. Raceway flow should be at the established 2.25 cfs, for a total of 4.5 cfs for the two raceways. Pumped water from Bogus Creek will require an aeration tower to remove excess carbon dioxide and other gasses that may be entrained in the water during pumping. Mid-pond aerators may be required in the holding ponds if dissolved oxygen falls below required concentration. If needed, portable aerators can be acquired and used.

### Spawning House

Once in the spawning building, the fish will be sorted by gender, mark/unmarked, jacks and sexual maturation. They will then be placed into the adult holding ponds, or if needed, returned to the river through the fish return line. The spawning house will be located over pond 4 of raceways G and H. Pond 4 flows will continue under the facility to convey flow to the tailrace; however, flow will be conveyed in pipes to eliminate the need for periodic cleaning. The new spawning house will be laid out in the same manner as the existing spawning house below the dam. It is anticipated at this time that all internal components of the existing fish trap and spawning building will be reused at the new facility at IGH as much as possible, including:

- Auxiliary trap lift
- Sort apron
- Drug tank with submersible pump and UV disinfection
- Sort table
- Egg table
- Miscellaneous work table
- Storage closet
- KRP data area
- Electro-anesthesia (e-shock) tank
- Rinse sink
- Water hardening tank
- 2-1/2-foot wide conveyor belt
- Access door of sufficient height and width to allow entry into the facility by a forklift.

The structure will be located on a slab spanning ponds G4 and H4. In addition to the house, the slab will include a lift for Chinook and door for the Coho tubes, a trap lift and an access ramp for a forklift or other vehicular access. The house itself will include a sorting apron, an electric anesthesia tank (e-shock tank), sort table with sides that connect to the conveyor belt, spawning table, storage area, egg rinsing and water hardening station, rinse sink for egg processing, e-shock equipment area, and flume water supply area to hold processed adults. A garage door and person-door are needed at the front of the building for ease of access and equipment. Coho will be sorted prior to the e-shock tank and prevented from entering the tank. Chinook will be sorted after they have been anesthetized in the tank.

The auxiliary trap door will open inward so wet fish may slide down the sorting apron. Chinook, not Coho, will fall into a basket and be anesthetized in the e-shock tank. Then fish will be lifted onto the wet sorting table where some will be moved to the right for lethal research sampling and put on conveyor belt used to transport the fish out of the spawning house; others will be put onto the spawning table to be euthanized, rinsed, spawned, then put onto right side table for research sampling and then placed onto the conveyor belt out of the spawning house. This conveyor belt will extend beyond the tailrace to the driveway for storage and/or disposal.

Egg collection pans will be taken from the spawning table to the egg processing stations where they will be rinsed, disinfected and water hardened for 1 hour.  Eggs will then go directly to the hatchery building for processing.

Ponds G4 and H4, over which the spawning house will span, measure 97 feet by 10 feet; therefore, the spawning house can be as large as 20 feet wide by approximately 100 feet long. However, if the pond walls cannot support the house slab, it may have to extend beyond them. The roof line of the existing facility at the dam measures 47 feet by 24 feet. The new facility can measure slightly narrower (20 feet vs. 24 feet) and

longer, if necessary. If a 24-foot width is needed, an additional 2 feet can be obtained on each side of the ponds. The driveways between the raceways are approximately 14 feet wide. If 2 feet is taken from the driveway between raceways F and G, the remaining 12 feet should be adequate for most truck traffic. Although the width of the drive needs to accommodate the feed truck with its side extension tubes.

### Coho Eggs

Based on an annual evaluation of rearing conditions, a decision will be made by CDFW and NMFS as to whether Coho salmon eggs and fry will be hatched and reared at FCH, IGH, or a portion at each facility. Coho salmon at IGH will be hatched and reared within the hatchery building existing rearing tanks until they reach a size of approximately 300 fish per pound. Coho salmon will then be transported to FCH for rearing until release.

### Chinook Eggs

During the first through third years of operation post dam removal and potentially beyond, Chinook salmon eggs collected from broodstock will be incubated within the IGH hatchery building. The hatchery building has an adequate filtration and UV system; however, sediment pretreatment will be needed to remove high TSS during storm events in Bogus Creek to protect the hatchery building filter from fouling. When Chinook return to Fall Creek, eggs may be collected and incubated at Fall Creek to raise the approximately 140,000 Chinook yearlings at FCH. The entire smolt production (3.4 million) will occur at IGH and egg rearing for smolts will occur exclusively at IGH.

### IGH Fish Releases

In general, the release of Chinook salmon smolts will occur between April 1 and May 31. However, early release of smolts prior to April 1st may occur based on water quality and quantity thresholds. Bogus Creek water reliability and quality can diminish in late spring and can exhibit very low flows in dry years that would be insufficient to operate the hatchery. In response, CDFW and NMFS have identified physical and biological parameter at IGH that would trigger early release of fish to reduce or avoid hatchery related fish mortality. These release thresholds include Bogus Creek water availability, Bogus Creek water temperatures, and threat of disease epizootics in rearing ponds. CDFW and NMFS will further develop numeric trigger thresholds whereby some or all fish would be released (e.g. Bogus Creek 24-hour average water temperature exceeds 18 to 19 degrees C - See Figure 7.8-3). Water reuse/recirculation as described below would also be used to extend release dates when Bogus Creek flow is low, but water temperature is sufficient to recirculate in the raceways without exceeding trigger thresholds. These thresholds need to be established by CDFW.

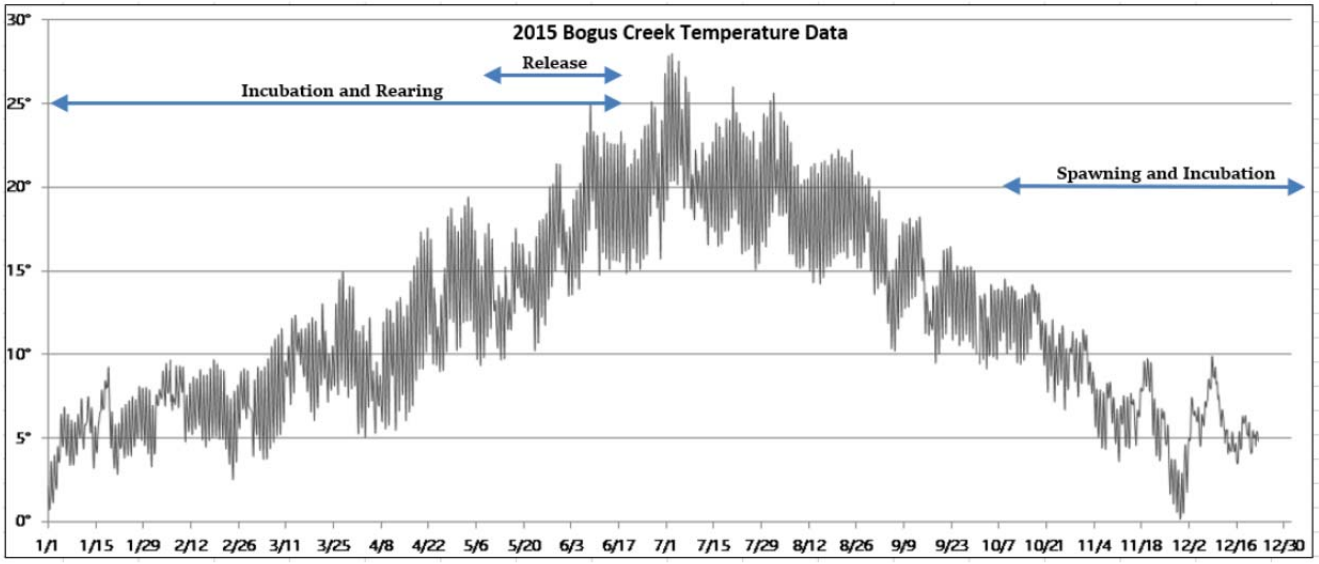


**Figure 7.8-3 Bogus Creek Continuous Water Temperature for 2015 (CDFW)**

### Bogus Creek Flow to IGH

NMFS and CDFW will coordinate to minimize effects of Bogus Creek diversions on Coho salmon and their critical habitat. Water diversion rates from Bogus Creek will be monitored to ensure at least 50% of creek flow remains in the creek at the point of diversion. However, Bogus Creek will be evaluated to assess habitat below the proposed hatchery diversion to determine the minimum amount of in-stream flow necessary to provide connectivity in Bogus Creek, and to ensure anadromous salmonid spawning and rearing habitat. Hydraulic modeling and a geomorphic assessment will be conducted in conjunction with habitat assessment to site the approximately 4,000 gpm pump station. This assessment will include:

- Assessment of Bogus Creek habitat: NMFS and CDFW will examine the anadromous fish spawning and rearing habitat in Bogus Creek below the proposed diversion at various low-flow levels to determine effects to habitat of various levels of water diversion.
- Monitoring of flow and TSS: Flow will be monitored through development of stage discharge relationships at key transects to determine if adequate fish passage conditions are provided. Data collection will begin in the spring and summer of 2018 and will continue as natural flow conditions in the stream vary. Winter storm conditions will be monitored in 2018/2019 to understand TSS concentration and sediment grain size distribution to optimize a sediment removal treatment system.
- Geomorphic and hydraulic assessment: Using an open channel model like HEC-RAS will provide depth and velocity predictions to determine the ideal location for the pump station including a starting water surface elevation at the Klamath River confluence to determine any backwater effects that could occur during high flow.

- Coordination between agencies: Following the habitat assessment, NMFS and CDFW will determine the appropriate flow level or percentage of diversion permitted each month given seasonal hatchery needs and fish development.
- Adjustments to diversions: Based on the results of Bogus Creek evaluation, NMFS and CDFW may coordinate to change the percentage of flow permitted to be diverted from Bogus Creek to IGH to be protective of both Bogus Creek habitat and the hatchery program.
- Reporting: NMFS and CDFW will coordinate to determine reporting specifications for Bogus Creek diversions.

#### Settling Pond Operations and Permitting

The existing settling ponds will be used for hatchery operations and modifications in layout or function are not anticipated. IGH discharge to the Klamath River will continue to be permitted as part of the existing 13267 Order modified with the proposed modifications to the facility.

#### Water Reuse/Recirculation

Water may be reused (recirculated) from the rearing raceways if Bogus Creek flows are insufficient to meet minimum operational needs while balancing flow requirements in the creek. Depending upon creek water temperatures and flow, a portion of the raceway discharge would be recirculated back through the raceways reducing reliance on Bogus Creek. Recirculation would be coupled to early release thresholds described above to extend the rearing period. Water temperatures are below 19 degrees C in May (see Figure 7.8-3), rising above 20 degrees C in June and 25 degrees C in July and hatchery staff report that water can warm approximately 2 degrees C when passed through the raceways. Additional analysis of Bogus Creek water is needed to understand the effectiveness of recirculation given annual variations in flow and temperature during the early release period (April 1 and May 31).

### Improvements at FCH

To raise yearling Coho and Chinook salmon, the FCH facility will be upgraded by modifying plumbing to accommodate the installation of circular tanks and a UV treatment system, including primary filtration similar to the UV system used at IGH (collectively the UV system). It is anticipated that modifications will be made within the existing facility footprint (see Figure 7.8-4) to minimize environmental and cultural resource disturbances. The FCH UV system will treat and disinfect the egg incubation water source only. No UV treatment is proposed for rearing. Additional space requirements not depicted on Figure 7.8-4 will be needed for operations (e.g. a settling basin, vehicle parking, pertinent buildings, tagging trailer, etc.); that, except for the settling basin, can be accommodated on existing developed or disturbed areas around the hatchery and powerhouse. Use of these spaces will require coordination and concurrence with PacifiCorp. Non-consumptive water diversion from Fall Creek will support hatchery operations and will be returned to the creek at the settling pond location or fish ladder, minimizing adverse effects to Fall Creek aquatic resources. To protect the quality of the City of Yreka's water supply and prevent fish pathogen introduction into the

hatchery, fish will not be allowed upstream of Dam A (main diversion point) or Dam B (alternate diversion point).

Up to 10 cfs of water may be diverted from PacifiCorp's hydro-generation tail race canal supplied from either Dam A or B, below the City of Yreka's diversion facility. Water will be gravity fed and plumbed to each rearing location and all circular tanks, pending a confirmatory site survey. During periods when the powerhouse tail race is not flowing, hatchery water will be diverted from Dam B to Dam A. Hydraulic analysis will be required to assess depths and velocities in Fall Creek to determine threshold criteria for resident and migrating Chinook and Coho salmon.

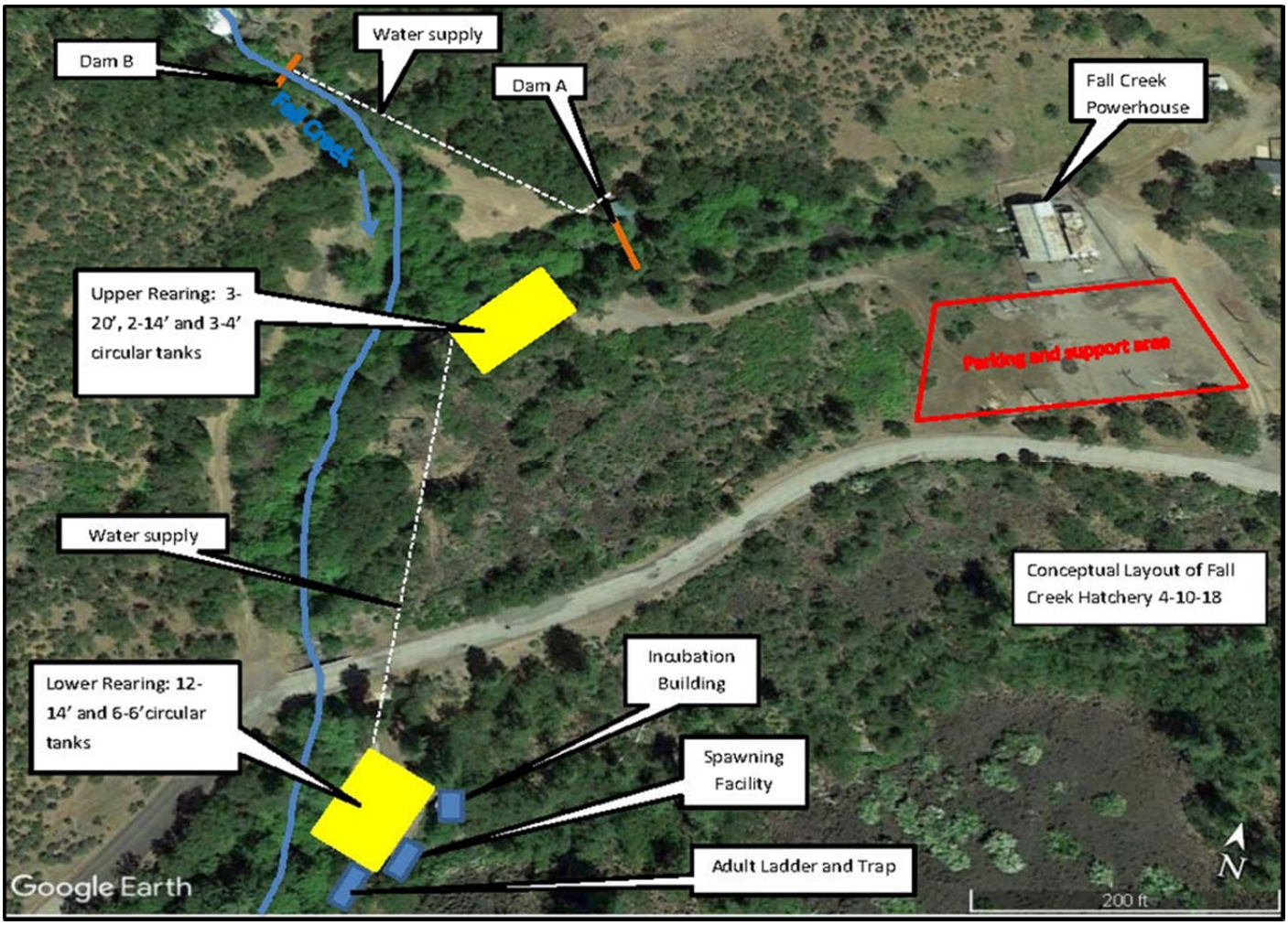


**Figure 7.8-4 Conceptual Layout of Fall Creek Hatchery Improvements**

### Adult Collection and Holding

It is not anticipated that salmon will return to Fall Creek in sufficient numbers for broodstock until at least three years following dam removal (the first fish raised at FCH will return as three-year old's in 2024). Between 2021 and 2024, or until fish return to FCH, spawning and egg collection will occur at IGH. A separate protocol will be needed to transfer eggs to FCH from IGH to reduce transportation mortality. Once FCH salmon returns begin to occur, CDFW and NMFS have identified two options to collect fish:

- Option 1: An adult ladder and trap will be constructed in the lower rearing location. Adult holding will include one or two new 14-foot diameter or smaller circular tank(s). A new fish ladder and trap will allow fish access to this tank(s).
- Option 2: Adult trapping will be at the mouth of Fall Creek using a new picket weir and trap. Once adults are trapped they will be transferred either by truck, or possibly by a Whooshh™ fish transfer system, to the new adult fish ladder and trap located in the lower rearing area.

The fish ladder and adult holding tanks will be supplied with water from the lower tanks (4.33 cfs) excluding periods of cleaning, feeding, and therapeutic use when water will be discharged to the settling pond. If pass through water from the lower tanks is insufficient to meet fish ladder and adult holding needs, additional water (UV treatment not required) may need to be diverted into the fish ladder.

### Spawning

Spawning at FCH will be managed to meet the joint program goals at both IGH and FCH. When adult Chinook and Coho return to Fall Creek, the adults will be sorted for ripeness and spawned according to production goals for Chinook salmon and conservation goals described in the HGMP for Coho salmon.

A facility needs to be designed and constructed for future spawning operations at FCH. Migrating Coho and Chinook salmon will need 3-4 years to imprint, so a FCH spawning house is not an immediate necessity; however, design should be developed now.

### Egg Incubation

FCH will incubate Coho salmon and Chinook salmon eggs in a new incubator building using eight vertical flow incubator stacks. Each stack will use up to 10 gpm, for a total of 80 gpm (0.18 cfs). The incubator water will need to be treated using a 100 gpm in-line UV system. Water from egg incubation will be discharged to the settling pond.

### Circular Tanks

Rearing at FCH will consist of two areas: the upper and lower ponds. For each location, it is anticipated that circular tanks will sit within the existing concrete rearing pond footprints. The upper ponds will consist of three 20-foot circular tanks, two 14-foot circular tanks, and three four-foot circular tanks. The lower ponds will consist of twelve 14-foot circular tanks, and six 6-foot circular tanks. The incubation building, fish ladder,

adult capture and holding ponds and spawning house will be located adjacent to the lower raceways (Figure 7.8-4). Water from the rearing ponds will either be discharged to Fall Creek through the fish ladder or if treatment is needed, to the settling pond as described below.

### Water Needs

Water will be diverted from Dam A to provide 2.2 cfs to the upper rearing area, and 5.65 cfs to the lower rearing area. Up to 2.2 cfs would be diverted for the fish ladder and adult capture area during the months of October through January. The maximum total volume of water required to operate the FCH is 9.24 cfs (Table 7.8-8) which occurs in November and includes additional water from unused tanks to operate the fish ladder and trapping area. The SWRCB has confirmed that CDFW's consumptive water right permit of 10 cfs is valid for hatchery operations.

**Table 7.8-8 Estimated Water Needs at FCH rearing 115,000 Chinook yearlings and 75,500 Coho (cfs)**

| Facility | Jan | Feb | Mar | April | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Round Tanks | 1.26 | 1.29 | 1.58 | 1.66 | 1.08 | 0.58 | 1.01 | 1.48 | 2.29 | 3.30 | 4.06 | 1.14 |
| Hatchery Building | 0.18 | 0.18 | 0.18 | 0.18 | 0 | 0 | 0 | 0 | 0 | 0.18 | 0.18 | 0.18 |
| Spawning | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.67 | 0.67 | 0.67 |
| Adult Holding & Ladder | 4.33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.33 | 4.33 | 4.33 |
| **Total** | **5.77** | **1.47** | **1.76** | **1.84** | **1.08** | **0.58** | **1.01** | **1.48** | **2.29** | **8.48** | **9.24** | **6.32** |

Source: NOAA Fisheries and CDFW Technical Staff Recommendation for Klamath River Hatchery Operations in California Post-Dam Removal, May 31, 2018.

### Settling Pond

FCH will require a settling pond for post-use water treatment. However, the FCH footprint will not support a settling pond, so two nearby sites were identified for further evaluation as shown in Figure 7.8-5. These include:

3. A Parcel B location approximately 1/2 mile downstream of the FCH lower raceways on the left Fall Creek overbank at the access road to the PacifiCorp electrical substation across from the City of Yreka chlorination facility.
4. A second Parcel B location also on the left Fall Creek overbank just north of and along Daggett Road, approximately 4,300 feet downstream of the of the lower FCH raceways. This site is also adjacent to the Klamath River. This site is located within the FEMA-designated approximate Zone A floodplain of the river.

Because these locations are offsite and downstream of the FCH, a conveyance pipeline with either minimum burial or at-grade, will be required to transport flows from the hatchery to the pond. It appears that sufficient hydraulic head exists for gravity flow to all sites.

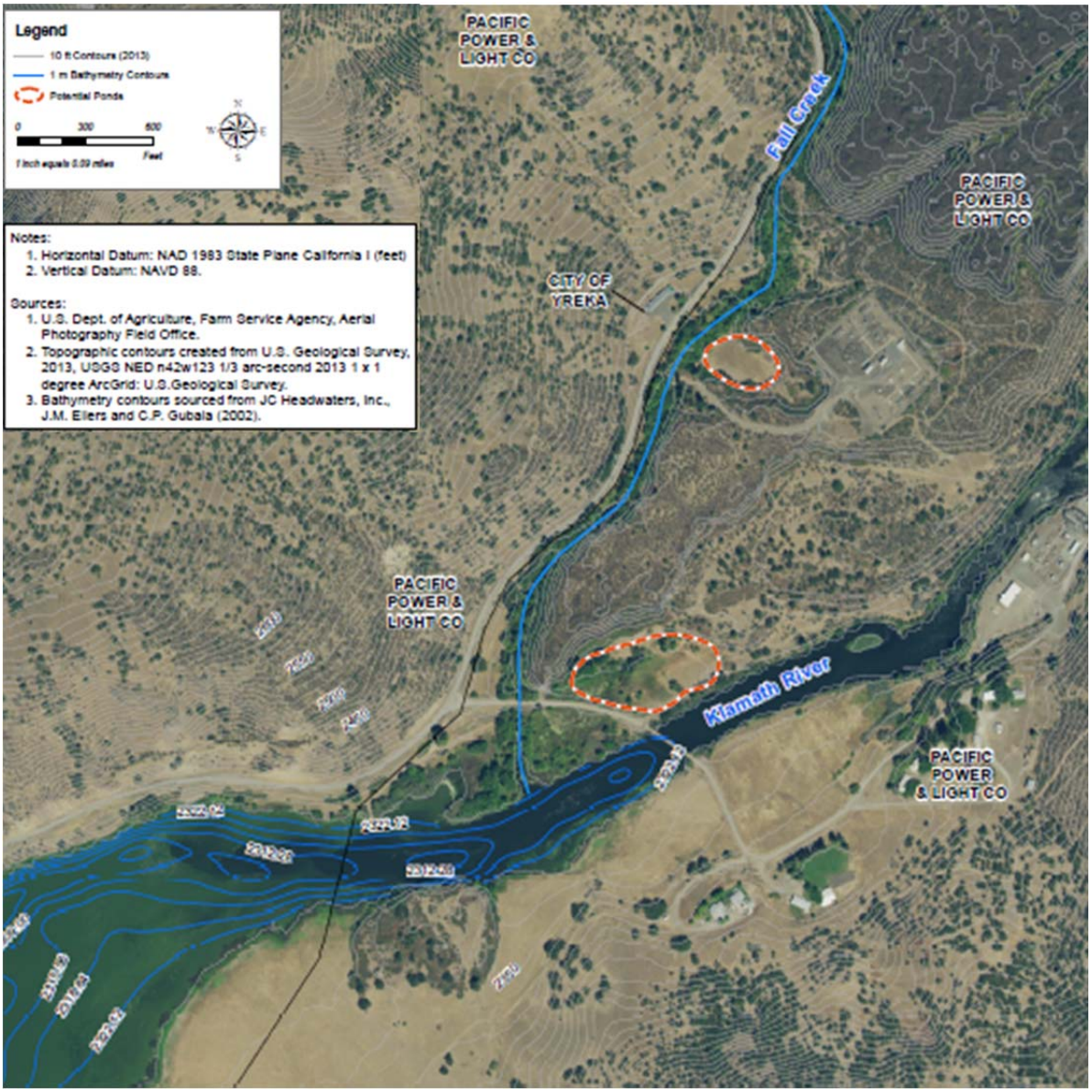


**Figure 7.8-5 Potential Settling Pond Locations for FCH**

The settling pond will treat water discharged from the incubation and spawning building all times and from all circular tanks during cleaning, following feeding or use of therapeutics. Otherwise, water from the rearing tanks will be discharged through the fish ladder located in the lower pond area. From the new pond location, water will be discharged back to Fall Creek. At this time, it's anticipated that the RWQCB will permit the

discharge under the general NPDES permit for hatcheries with effluent discharge requirement phased in over eight years via a companion compliance order. Selection of a settling pond location and pond layout is pending consultation with Indian tribes with historic and cultural connection to the area.

### CWT and Marking

Application of CWTs and adipose fin clip marking of the Chinook salmon yearlings reared at FCH will be performed at the CDFW standard 25% constant fractional mark rate and are proposed to be processed by hand using Mk IV CWT tagging machines. It is anticipated that hand processing these Chinook yearlings with two CWT machines can be completed in 7 to 15 days. Northwest Marine Technologies (NMT) Mk IV Injectors technical specifications indicate these units are powered by 12-24 V DC batteries. However, the power source for these units has been assumed to be 110V and needs to be confirmed with Westmark. Coho salmon will be 100% marked with a left maxillary clip by hand and the hand clipping can be completed in roughly 10 to 20 days.

### FCH Fish Releases

Release strategy for Coho and Chinook salmon produced at the FCH is still under evaluation. Planned dates of release are October 15 through November 20 for Chinook salmon yearlings, and March 15 through May 1 for Coho salmon yearlings. Options include direct release at FCH or IGH.

## General Hatchery Plan Assumptions

The following assumptions have been made regarding technical criteria at both IGH and FCH:

- For the purposes of planning and designing hatchery operations, all hatchery production at IGH and FCH is limited to the eight years following dam removal. After eight years, the hatcheries will cease operations and be decommissioned.
- IGH and FCH must be operational prior to draw down per the Klamath Hydroelectric Settlement Agreement (KHSA 2016, see section 7.6.6.B).
- CDFW will employ Best Management Practices to minimize discharges at IGH and FCH.