CLEAN, FLOWING WATERS FOR WASHINGTON
The Center for Environmental Law & Policy

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Dear Mr. Bowen:

Thank you for the opportunity to provide comments on the draft 401 certification prepared for the Leavenworth National Fish Hatchery (LNFH or Hatchery). These comments are submitted on behalf of the Center for Environmental Law & Policy (CELP) and Wild Fish Conservancy (WFC). CELP is a public interest, member-supported organization dedicated to protection and restoration of Washington's freshwater resources. Wild Fish Conservancy (WFC) is a Washington based non-profit organization dedicated to the recovery and conservation of the region's wild-fish ecosystems. WFC promotes technically and socially responsible habitat, hatchery, and harvest management to better sustain the region's wild-fish heritage. WFC has been working with the local community to restore Icicle Creek since 1997.

CELP and WFC are mindful of the Yakama Nation's and the Colville Tribes' interests in maintaining a viable terminal fishery at the Hatchery. It is not our intent to recommend a course of action that would put LNFH out of business or destroy the mitigation fishery that tribal members use and enjoy. However, we do believe it is possible for the mitigation fishery to co-exist with a natural river ecosystem that complies with water quality standards and provides habitat for the full range of aquatic life that inhabit Icicle Creek.

CELP's and WFC's concerns relate to the health of Icicle Creek. We are particularly concerned that any permits issued to LNFH ensure that instream flows are sufficient to protect and restore native fisheries in the natural stream system.

Overall, this draft certification is incomplete, and Ecology's public notice is not clear as to whether the basis is the provisions of the draft NPDES permit issued by EPA or if it is meant to be more inclusive.[1] Along with comments on the conditions Ecology places on the draft NPDES permit,

[1] Ecology's statement in its draft 401 Certification regarding certifying the draft rather than final NPDES permit being "contrary to the requirements outlined in the Federal Clean Water Act" is also puzzling. Does Ecology consider this draft 401 itself to be contrary to law? If so, why was it issued?

CELP comments below on the entire suite of the LNFH's activities, including its effects on water quality standards, and offers appropriate conditions to ensure that this 401 Certification ensures that water quality standards are met, in accordance with Ecology's duties under Section 401 of the CWA.

1. **The relevant water quality standards for Icicle Creek are not discussed**

Washington's water quality standards (WAC 173-201A), as they apply to Icicle Creek, are not discussed in the draft certification. The water quality standards are the basis for the Section 401 certification process and thus should be explicitly stated in the certification.

Icicle Creek and its tributaries are classified as follows in Washington's water quality standards (WAC 173-201A-602):

| | Aquatic life use | Recreational use |
|---|---|---|
| Icicle Creek (including tributaries) from mouth to confluence national forest boundary | Core summer salmonid habitat | Primary contact |
| Icicle Creek (including tributaries) from national forest boundary to confluence with Jack Creek | Core summer salmonid habitat | Extraordinary primary contact |
| Icicle Creek above and including Jack Creek (including all tributaries) | Char spawning and rearing | Extraordinary primary contact |

The "char spawning and rearing" use and the "core summer salmonid habitat" use are described as follows (WAC 173-201A-200(1)(a)):

> (i) **Char spawning and rearing**. The key identifying characteristics of this use are spawning or early juvenile rearing by native char (bull trout and Dolly Varden), or use by other aquatic species similarly dependent on such cold water. Other common characteristic aquatic life uses for waters in this category include summer foraging and migration of native char; and spawning, rearing, and migration by other salmonid species.
>
> (ii) **Core summer salmonid habitat**. The key identifying characteristics of this use are summer (June 15 – September 15) salmonid spawning or emergence, or adult holding; use as important summer rearing habitat by one or more salmonids; or foraging by adult and sub-adult native char. Other common characteristic aquatic life uses for waters in this category include spawning outside of the summer season, rearing, and migration by salmonids.

Thus, the standards require the protection not of only key species and their aquatic life history functions, but also that of "all indigenous fish and nonfish aquatic species." There are specific numeric

water quality criteria associated with these uses for temperature, dissolved oxygen, turbidity, dissolved gas, pH, toxics, and radioactive materials.

In addition, the reach from the LNFH downstream to the mouth is designated for salmon and trout spawning and has a 13°C temperature criterion (a 7-day average of daily maximum temperatures) that applies from August 15 through July 15 according to Ecology publication number 06-10-038, **"**Waters Requiring Supplemental Spawning and Incubation Protection For Salmonid Species," revised January 2011[2]. Under the "core summer salmonid habitat" aquatic life use, the temperature criterion would normally be 16°C, so this represents a more stringent temperature criterion downstream of the LNFH.

Icicle Creek is home to several native salmonid species, including bull trout, steelhead, Chinook salmon, coho salmon, mountain whitefish, several species of sucker, and Pacific lamprey. Critical life stages and associated biological and ecological requirements of these fish include: spawning; egg incubation; juvenile rearing; upstream migration by pre-spawning adult salmon, trout, suckers, whitefish, and lamprey as well as upstream migration of juvenile fishes; and downstream migration by post-spawning suckers, whitefish, steelhead, and bull trout, and again, juvenile fishes. The streambed and riparian vegetation are home to invertebrates, particularly insects, which constitute the overwhelming majority of the diet of juvenile fishes native to the Icicle. These populations of various aquatic species compose some of the existing uses of Icicle Creek and their protection must be considered in this certification. The existing uses of upper Icicle Creek are relevant because they are affected by activities of the LNFH that impact streamflows.

All segments of Icicle Creek are also designated for domestic water supply, industrial water supply, agricultural water supply, stock watering supply, wildlife habitat, harvesting, commerce/navigation, boating, and aesthetics. Most likely the wildlife habitat, boating, and aesthetics uses are the most relevant, however, all of the uses must be considered in Ecology's evaluation and protected with relevant conditions to the certification. If any uses cannot be attained even through additional conditions to the certification, then the certification must be denied.

**2. The LNFH operations, and the role of those operations in causing or exacerbating water quality impairments are not discussed**

The previous Section 401 certification for this facility referred to a document entitled "Proposed Flow Management Operations" that the LNFH submitted with the Section 401 application to Ecology (USFWS 2009). While that document had many deficiencies, it did provide a basis for evaluating the operations of the LNFH with regard to water quality. Also, the previous certification issued by Ecology required submission of a "final" flow management operations plan to be submitted within four years of the issuance of the certification (Ecology 2010). It is unclear whether that plan was submitted.

This draft certification, in contrast, refers to no outside document nor does it describe the LNFH's operations or how those operations currently prevent attainment of water quality standards in Icicle Creek and contribute to non-attainment in the Wenatchee River. The most recent information we located regarding LNFH operations was included in an Endangered Species Act biological opinion

[2] https://fortress.wa.gov/ecy/publications/documents/0610038.pdf accessed September 1, 2017.

issued by NOAA Fisheries in 2015 regarding the LNFH's effects on ESA-listed species (NOAA 2015) and in the Fact Sheet for the EPA-issued draft NPDES permit (USEPA 2016a).

The primary task of the LNFH is to raise and release spring Chinook salmon smolts. Adult spring LNFH-origin Chinook salmon return to the LNFH every late spring/early summer. The returned fish are spawned and the fertilized eggs placed into trays. In a few months the hatched eggs are placed into nursery tanks, where they are first fed. After a few more months the juvenile salmon are moved to raceways where they will grow another fourteen months. They are then released into Icicle Creek, roughly twenty-two months after their parents returned. Thus, the LNFH always has fish on station and a need for water and a need to discharge wastewater. The LNFH propagates an introduced (non-local) hatchery stock of spring Chinook and the facility is currently also used for the acclimation, release, and restoration of coho salmon in the Wenatchee River in cooperation with the Yakama Nation

The LNFH's facilities include adult holding ponds, concrete raceways, covered raceways, "Foster-Lucas" rearing ponds, indoor nursery tanks, egg incubation facilities, and water control structures in Icicle Creek. The source water (a surface water intake at RM 4.5 and seven groundwater wells on hatchery property) is routed through the egg incubation trays, nursery tanks, raceways, and ponds.

Since 2009, the LNFH has had a target release of 1.2 million spring Chinook smolts. The previous target was 1.6 million smolts; the reduction since 2009 is likely the last significant change to hatchery operations with regard to phosphorus discharges. The completion of a second pollution abatement pond in 2011 might help reduce phosphorus discharges, but probably not in a significant manner.

During normal operation, water flowing through the raceways, tanks, and ponds at the Hatchery is discharged directly into Icicle Creek at RM 2.8 via Outfall 1. In 2016, EPA used a figure of 25 MGD in developing the draft NPDES permit. The adult pond and raceway wastewater contains some organic solid wastes that consist of uneaten food and fecal material. The quantity of these wastes in the discharge depends upon the volume of fish food being fed, the pounds of fish held at the time, pond design, cleaning techniques, and the amount of waste that settles out of the water prior to its discharge.

The pollution abatement ponds discharge into Icicle Creek at Outfall 2 (RM 2.7). Outfall 2 is used during rearing unit cleaning and maintenance activities. When a discharge is occurring from this outfall, the volume of water discharged from Outfall 1 is reduced by an equivalent amount. The discharge from Outfall 2 occurs daily and volume increases when cleaning rearing units. In 2016, EPA used a figure of 4.6 MGD in developing the draft NPDES permit.

Outfall 6 (~RM 3.3) in the hatchery canal is used, as necessary, to recharge the Hatchery's wells. When in operation, discharge from Outfall 1 is reduced by the amount released at Outfall 6. In 2016, EPA used a figure of 25 MGD in deriving the draft 2016 permit. This is a new outfall not previously permitted.

The LNFH also operates several structures, located in or adjacent to the Icicle Creek stream channel, that are operated to restrict flow into the stream channel and/or block the upstream and downstream migration of native fish species. The operations can negatively affect key life stage requirements of native fish species. Prominent among these structures are the following:

- The channel-spanning weir and fish ladder that are components of the LNFH's surface water withdrawal structure at RM 4.5.

- Dam 2 (Headgate) at the upstream end of the bypassed creek channel and adjacent to the upstream terminus of the hatchery channel at RM 3.8.

- The hatchery channel that was dug through the floodplain adjacent to the natural creek channel between RM 2.8 and 3.8 at the time the LNFH was constructed in 1939-40. The hatchery channel was designed to convey all or a majority of the natural stream flow and thereby permit this flow to be diverted away from Icicle Creek so that the one-mile long segment of the Icicle Creek channel (adjacent to the hatchery channel) could be subordinated to the holding and spawning of returning adult hatchery salmon.

- Dam 5 near the downstream end of the bypassed Icicle Creek channel, immediately upstream of the junction of Icicle Creek with the spillway pool that was created in the Icicle Creek channel immediately below the downstream terminus of the hatchery channel at RM 2.8.

The LNFH's surface water intake structure at RM 4.5 consists of a channel-spanning weir and a fish ladder near the left bank. The top (exit) of the ladder is located next to the grizzly rack at the top of the intake conveyance channel. Fish exiting the ladder as well as downstream-migrating fish can be entrained in the conveyance channel. Entrained fish enter the intake pipeline and are conveyed nearly one mile underground before exiting the pipe (dead or alive, injured or uninjured) where they exit into the sand settling basin. During most of the year, including low and high flow conditions, upstream-migrating fish cannot pass upstream by leaping the diversion dam but must pass *via* the ladder. During summer low flow, LNFH staff place boards into fixtures on the top of the diversion dam to raise the water surface elevation in order to increase flow into the intake, making it impossible for upstream-migrating fish to surmount the dam during moderate flows that can occur intermittently during the summer. Also, at times, LNFH personnel use the ladder to flush sediment from near the intake (NOAA 2015).

Dam 2 can and is routinely operated to block upstream fish migration in one of two ways, depending on flow conditions in the creek. During low to moderate flows the dam gates can be lowered to such an extent that upstream-migrating fish cannot get through it. At higher flows, openings in Dam 2 that are passable at lower flows can be impassable due to the velocity of the water flowing through the opening below the bottom of the gates ("firehose effect"). Dam 2 is also operated to control flows between Icicle Creek and the hatchery channel in order to 1) block upstream passage of hatchery-origin spring Chinook salmon during broodstock collection (mid-May through June), 2) increase flows in the hatchery channel to promote smolt emigration, 3) recharge the aquifer that serves the LNFH groundwater wells, 4) control flood flows and, 5) perform routine maintenance of Dam 2 and other LNFH structures.

Dam 5 can be fitted with "racks" that render it impossible for upstream migrating fish to pass. During the times when these racks are in place, downstream migrating fish can be lethally impinged against the upstream side of the racks if flows in the creek channel are too great. Avoiding this

situation requires the openings of Dam 2 to be sufficiently restricted. In turn this can result in insufficient flow entering Icicle Creek to create or maintain natural channel habitats and generally results in a reduction in the quantity of habitat suitable for the life stages of resident native fish.

These structures and their operations from 1940 to 2005 created a legacy of ecological impairment and loss of riverine and riparian characteristics and associated habitats in the bypassed creek channel, as well as depressed populations of migratory fish upstream of the LNFH. Only during the last few years has a semblance of a more natural flow regime been gradually re-established, and even that has been done only on a limited, part-time basis.

- **Dissolved oxygen and pH**

The subject of the draft certification is a draft NPDES permit issued by EPA on the various discharges of wastewater from the LNFH to Icicle Creek, but the draft certification does not discuss the discharges. Neither does the draft discuss existing problems with dissolved oxygen and pH in Icicle Creek and the Wenatchee River, two parameters causing water-quality impairment and causing the waters of Icicle Creek to be listed on the state's 303(d) list and contributing to the impairment of the Wenatchee River.

The wastewater discharged by the LNFH contains excess phosphorus, and violations of the applicable water quality criterion for pH have been recorded in lower Icicle Creek as a result. This phosphorus loading also contributes to water quality standards violations in the Wenatchee River. The EPA-approved TMDL (Total Maximum Daily Load) for Icicle Creek and the Wenatchee River established a wasteload allocation (WLA) for total phosphorus for the LNFH (Ecology 2009). While the draft NPDES permit issued by EPA includes an effluent limitation based on the WLA for the LNFH that was determined in the TMDL, the draft permit also includes an overly-generous "compliance schedule" that does not ensure that the WLA-based effluent limitation will ever become effective (see section below on the draft NPDES permit).

- **Temperature and flow**

The draft certification fails to note or discuss that Icicle Creek is also listed for instream flow and temperature impairment. Instream flows are identified as a water quality impairment that cannot be resolved via TMDL. A temperature TMDL was adopted in 2007; however, a promised implementation plan has not been forthcoming (Ecology 2007).

Ecology doesn't mention either temperature or flow impairments in the draft certification. In the Fact Sheet for the NPDES permit, EPA states (USEPA 2016a).

> The facility helps to augment Icicle Creek flows with its discharge, as previously noted, groundwater and supplemental water from Snow and Nada Lakes is pulled in to the Hatchery as influent, along with the water diverted from Icicle Creek and run through the facility.

The LNFH has long maintained that their operations improve water temperatures in Icicle Creek, but this assertion has not been subject to any real scrutiny by the LNFH or any regulatory agency. Instead, the fact that the LNFH's main discharge is often cooler than late summer or early fall

temperatures in Icicle Creek upstream of the main discharge is stated while the problems caused by the LNFH go unmentioned. The LNFH exacerbates ambient temperature problems in Icicle Creek by the nature of its surface water withdrawal at RM 4.5 as well as its diversion of Icicle Creek at RM 3.8 at Dam 2 for aquifer recharge during low-flow times of year. It's no wonder that the massive LNFH discharge, with its temperature a result of optimal conditions for the raising of hatchery salmonids, "improves" the temperature of a dewatered Icicle Creek. Only a river with a much higher late-summer flow could fail to have its temperature "improved" by the addition of approximately 50 cfs of salmonid hatchery raceway effluent.

As it turns out, any augmentation is very likely much less significant than thought by EPA. If the LNFH augments the flow of Icicle Creek at all, it is only during certain times of year. Some low-flow periods occur in autumn and winter when there are no significant irrigation diversions from Icicle Creek and no releases from Snow and Nada lakes.

"Groundwater" from the LNFH's wells are for the most part, Icicle Creek water. The reason the LNFH established the new Outfall 006, as noted in the EPA Fact Sheet (p. 16) is "to keep flow in the Hatchery Channel and recharge the LNFH groundwater wells." Almost all, if not all, groundwater used by the LNFH is essentially "recycled" Icicle Creek water (Montgomery Water Group 2004; Aspect Consulting 2016) as most of the LNFH's wells are in the shallow aquifer (hence, the need for aquifer recharge *via* Outfall 006). Groundwater yield from all of the LNFH's current wells is a maximum of 6-8 cfs (Aspect Consulting 2016) and recycled Icicle Creek water would make up the majority of that.

The draft 401 Certification also fails to discuss the fact that use of Icicle Creek groundwater to recharge groundwater that the LNFH withdraws is a beneficial use of water that requires a permit (see below).

Also, Snow Lake and Nada Lake are high-elevation lakes in the Icicle Creek basin and it is not known how Icicle Creek flow would be affected if the lakes were left to their own devices and not manipulated by the LNFH. Without a detailed analysis, there is little basis for the statement that Icicle Creek flow is augmented by diversions from Snow and Nada lakes. Regardless, the net benefit downstream of the LNFH diversion at RM 4.5 would be *at most* 10-15 cfs (Snow/Nada augmentation minus LNFH/COIC diversion) (Montgomery Water Group 2004).

In short, absent a detailed analysis of the LNFH's overall effect on Icicle Creek's water temperature and flow, an assumption that the LNFH's operations "improve" water temperature and flow in Icicle Creek is unsupported.

- **Fish migration**

In the past, the LNFH operated its instream structures with no regard to the life history requirements of native fish and other aquatic life. Over the last twenty years (approximately), changes were made to LNFH operations, through a number of ESA Section 7 consultations between the LNFH and the Services (NOAA Fisheries Service and USFWS Ecological Services) and settlements of suits brought by non-governmental organizations. Those changes have resulted in some improvements in conditions for native aquatic life of Icicle Creek. Whether those improvements are sufficient to determine if water quality standards are being attained (e.g., protection of designated and existing uses by ensuring that hatchery operations do not significantly diminish conditions needed to maintain

essential life history functions of native aquatic life) should be the subject of this draft certification. Ecology provides no discussion of this in the draft.

It was clear long before the 2010 Section 401 certification was issued that the LNFH's instream structures had not been designed from the outset to maximize opportunities for native fish migration (upstream and downstream), and in fact, were designed to minimize fish migration. Nonetheless, they could be operated in a manner to maximize native fish migration opportunities (as evidenced by terms and conditions of the various ESA Section 7 biological opinions). We assume Ecology's rationale in the previous certification (Ecology 2010) in directing the LNFH to complete and submit instream flow incremental methodology (IFIM) and fish passage studies was to help determine instream flows and operational schemes for instream flow structures with regard to native fishes. Ecology's task now is to use this information to appropriately condition this certification so that water quality standards will be attained.

- **Diversion of Icicle Creek at Dam 2**

One of the problems with the operation of the LNFH is the use of Dam 2 (or "headgate") to divert water from Icicle Creek into the hatchery channel to ensure aquifer recharge for its groundwater wells. CELP has long maintained that this diversion is illegal absent a water right specific to that purpose. The LNFH has apparently worked to solve the aquifer recharge problem by building a new outfall for their wastewater (Outfall 006) that will discharge water into the hatchery channel near Dam 2. There is no operation plan or schedule outlined in the draft certification, however, and therefore there is nothing constraining the LNFH from continuing to divert water into the hatchery channel. Even after the outfall is constructed and permitted, nothing would stop the LNFH from deciding it was too expensive to operate and returning to aquifer recharge via diversion at Dam 2. And Ecology cannot fail to include proper conditions in this certification to ensure that Icicle Creek water is not diverted into the hatchery channel simply because the LNFH may be constrained in other documents (e.g. ESA Section 7 biological opinions issued by NOAA Fisheries and USFWS Ecological Services).

CELP previously submitted a letter to the Department of Ecology on July 28, 2008 detailing the history of water rights and water diversions for the LNFH. In that letter we requested that Ecology take action to prevent illegal diversions of water and to protect flows in Icicle Creek (the historical Icicle Creek channel). No action was taken. Our July 28, 2008 letter is included as an attachment to and incorporated by reference into these comments.

The diversion of water and use for recharge requires a Washington state water right, including a reservoir permit for artificial groundwater storage and secondary use permits. RCW 90.03.370(2), (3) and (4). Washington water rights, which require consideration of water quality as a public interest and beneficial use factor, are another "appropriate requirement of state law" that must be included in Washington's Section 401 certification process.

It is improper for the Department of Ecology to issue a certification for the Hatchery that authorizes continued operations that do not meet basic state law requirements for diversion and artificial storage of public waters. Either Ecology must condition this certification to prohibit diversion of Icicle Creek water into the hatchery channel for the purposes of aquifer recharge, or the LNFH must apply for and be issued a water right to do so if it wants to retain the option of diverting Icicle Creek at Dam 2 for this purpose.

### 3. The draft certification does not discuss the relevant flows needed to attain standards in Icicle Creek

Washington water quality standards require an instream flow for Icicle Creek reach adjacent to the LNFH hatchery channel. Federal and state laws also establish that instream flows must be protected as part of the certification. Protection of instream flows *via* the certification process is not optional, given water quality impairment and related ESA status of some of Icicle Creek's native fish species. The draft Certification is deficient for failure to require instream flows that ensure attainment of the water quality standards. The omission is especially puzzling given 1) the studies that were completed by the LNFH as required by the 2010 Section 401 certification issued by Ecology, and 2) the Wenatchee River Basin Rule, WAC 173-545-070, which establishes the appropriate instream flow for the reaches of Icicle Creek affected by the LNFH and relevant to this draft certification.

Aquatic habitats in Icicle Creek must be provided with flows that reflect natural patterns of variability and timing in order to continue to form and maintain functioning aquatic habitats required by native fishes and in order to provide the conditions that facilitate normal spawning, incubation and emergence, rearing, and migration. Unregulated rivers naturally provide such conditions but anthropogenic alterations such as water withdrawals and flow regulations by dams and diversions can, through various mechanisms, impair these functions and in doing so prevent the attainment of designated uses for each of these species and life stages. Therefore, to achieve the physical criteria set forth in the water quality standards described above, and as an independent factor in ensuring protection of habitat, instream flows must be maintained in Icicle Creek at an adequate level to protect essential life history functions of salmonids and other aquatic life.

Section 401 requires that the LNFH project comply not only with state water quality standards, but with "any other appropriate requirement of state law." 33 U.S.C. 1341(d). RCW 90.54.020 serves as the enabling statute for establishing instream flows, including the Wenatchee Basin rule.[3] State law requires the maintenance of ecologically healthy flows, i.e., "[p]erennial rivers and streams of the state shall be retained with base flows necessary to provide for preservation of wildlife, fish, scenic, aesthetic and other environmental values ..." RCW 90.54.020(3)(a) (emphasis added).

The Wenatchee River instream flow rule, Chapter 173-545 WAC, is another such requirement. The Wenatchee River instream flow rule requires that projects that propose to reduce flow in the river and its tributaries are subject to the specific flows established in the rule, or "different flows" as ordered by Ecology. WAC 173-545-060(10). Ecology should either incorporate the flows established in the Wenatchee River Basin rule into the 401 Certification or establish alternative flows using the studies that Ecology mandated through the previous certification. Ecology cannot rely on an instream

[3] The Washington Supreme Court has affirmed that RCW 90.54.020(3)(a) qualifies as an "appropriate requirement" of state law for purposes of Section 401, noting that:

> Inasmuch as issues regarding water quality are not separable from issues regarding water quantity and base flows, we further hold that RCW 90.54.020(3)(a) qualifies as an "appropriate requirement of State law" for purposes of section 401(d), and therefore that Ecology's base flow limitation in the 401 certificate was an appropriate measure to assure compliance with RCW 90.54.020(3)(a) as well as the water quality standards.

*Wash. Dept. of Ecology v. PUD No. 1 of Jefferson County*, 121 Wn.2d 179, 192 (1993).

flow mandated by any ESA Section 7 biological opinion to substitute for an appropriate condition in this Section 401 certification. We discuss this in further detail below in this letter.

- **Results of instream flow studies mandated by Ecology**

The USFWS conducted the IFIM and fish passage studies mandated by Ecology in the 2010 Section 401 certification, submitted them to Ecology, and presented the results to the Icicle Work Group (IWG). The IWG established a subcommittee made of technical experts (Ecology is a member) in order to support the IWG's Guiding Principle #1: "[s]treamflow that provides passage, provides healthy habitat, serves channel formation function, meets aesthetic and water quality objectives, and is resilient to climate change." To that end, the committee reviewed the USFWS IFIM study (Skalicky *et al.*, 2013) and fish passage study (Anglin et al., 2013) and made presentations to the full IWG on their findings (the slides from these presentations are available to the public) [4,5]. We have summarized their recommendations below.

| | Reach 1: RM 5.7 to headwaters | Reach 2: RM 5.7 to RM 4.5 | Reach 3: RM 4.5 to RM 3.8 | Reach 4: RM 3.8 to 2.7 | Reach 5: RM 2.7 to mouth |
|---|---|---|---|---|---|
| January | | | | 250 | |
| February | | | | 250 | |
| March | | | | 250 | |
| April | | | | | 650 |
| May | | | | | |
| June | | | | | |
| July | | | | | |
| August | | 200 | 291 | 250 | 400 |
| September | 200 | 200 | 291 | 250 | 275 |
| October | | | 291 | 250 | 267 |
| November | | | | 250 | |
| December | | | | 250 | |

Ecology could accept and use those recommendations, given that it participated in the committee's work, or it could conduct a more detailed analysis of the studies and condition the certification accordingly[6].

[4] For an independent review of the USFWS studies, we refer Ecology to a December 13, 2013 letter from Kurt Beardslee, Wild Fish Conservancy (WFC), to Tom Tebb, Ecology (Attachment A to these comments). In that letter, WFC reviewed the studies and recommended instream flows nearly identical to the IWG subcommittee's recommendations as well as the instream flows contained in the Wenatchee River basin rule.

[5] http://www.co.chelan.wa.us/natural-resources/pages/icicle-creek-instream-flow-committee, accessed September 6, 2017.

[6] The presentations of the Instream Flow Committee do not specify the interval over which the flow is calculated. The Wenatchee River instream flow rule specifies that the regulatory flows are "instantaneous," and that interval is our recommendation if Ecology adopts different instream flows for the relevant Icicle Creek reaches. The Icicle Work Group adopted flow "targets" that were lower than the Instream Flow Committee recommendations, intended as goals for the

- **Use of the WAC instream flow in lieu of studies**

If, for any reason Ecology should doubt that the studies submitted by the LNFH are suitable for establishing an appropriate instream flow for Icicle Creek, the local watershed management rule, WAC Ch. 173-545, establishes by regulation the instream flows that govern Section 401 conditions. Instream flows adopted for "Icicle Creek near Leavenworth" indicate that Icicle Creek should, depending on the time of year, flow at a rate ranging between 267 and 650 cubic feet per second. WAC 173-545-060(7). The rule also provides a directive with respect to reaches of the stream that are proposed for de-watering:

> Projects that would reduce the flow in a portion of a stream's length (e.g.: Hydroelectric diversion projects) are consumptive with respect to the bypassed portion of the stream and are subject to specific instream flow requirements for the bypassed reach. The department may require detailed, project-specific instream flow studies to determine a specific instream flow for the bypassed reach. The flows established in subsection (7) of this section shall apply to the bypassed stream reach unless the department, by order, determines that different flows may be maintained in the bypassed reach. WAC 173-545-060(10).

LNFH's diversion of water at Dam 2 currently reduces flows in the natural reach of Icicle Creek adjacent to the Hatchery (and, absent regulatory controls, will do so in future). While the Hatchery's 1942 water right predates the Wenatchee River instream flow rule, the new diversion of water at Dam 2 does not. Ecology's 401 certification should include a project-specific bypass flow for this reach as contemplated by subsection 7 of the WRIA 45 instream flow rule.

**4. Deficiencies in the draft NPDES permit issued by EPA**

Attached to this letter and incorporated by reference is the February 3, 2017 comment letter (email) CELP and Wild Fish Conservancy submitted to EPA on the draft NPDES permit. Our concerns are summarized here.

- **EPA did not follow standard hydrological practice when calculating critical flows for Icicle Creek.**

While it has been long-standing hydrological practices to use at least ten years of daily flow records from a USGS gage to determine low-flow events (e.g., 7Q10), EPA instead used "miscellaneous" measurements from the gage. Rather than utilizing the approximately 8,000 daily flows, EPA used fewer than 200 data points.

- **EPA did not account for diversions between the USGS gage station and the main LNFH outfall when calculating critical flows for Icicle Creek.**

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water supply improvement projects contemplated by the IWG. In addition, the IWG intended those target flows to "inform" regulators, not "determine their outcomes." (http://www.co.chelan.wa.us/files/natural-resources/archives/icicle-work-group/2014/September%2016/IWG%20Meeting%20Summary%209-16-14.pdf).

EPA failed to account for diversions of Icicle Creek water by the Icicle and Peshastin Irrigation Districts (at their shared diversion point), the City of Leavenworth, and the Cascade Orchard Irrigation Company, all of which combined divert significant amounts of Icicle Creek water. EPA also misunderstood the nature of "augmentation" of Icicle Creek flow from the LNFH's diversion from Snow and Nada Lakes (discussed above).

- **EPA set arbitrarily high interim effluent limitations for temperature and total phosphorus.**

EPA took the effluent monitoring data set and determined that the 95$^{th}$ percentile of the effluent concentrations for total phosphorus was a reasonable "interim" permit effluent limitation, and acted similarly in regard to temperature. Those interim limits, coupled with a near-ten-year compliance schedule, would not only allow the LNFH to continue to pollute Icicle Creek and the Wenatchee River, but might in fact allow the facility to expand production and actually worsen conditions.

- **EPA failed to follow its own guidance and arbitrarily set a compliance schedule for nearly ten years.**

This is the biggest failure of EPA's draft permit, and unfortunately, in the draft certification Ecology concurred with EPA. EPA failed to follow its own guidance when developing the 9-year 11-month compliance schedule. Compliance schedules are only to be granted when EPA has reason to believe that the facility can actually be in compliance at the end of the schedule, and EPA gave no indication in the Fact Sheet of any evidence it had that the LNFH could in fact meet the final effluent limitations by the end of the compliance schedule.

In fact, in a January 30, 2017 letter from David B. Irving, LNFH to the Director, Office of Water and Watershed, EPA Region 10, the LNFH made a general objection to the compliance schedule in the draft NPDES permit because 1) the LNFH could not guarantee that funding would be available for needed improvements, and 2) the effluent limitations (and by extension, the WLA for total phosphorus in the dissolved oxygen/pH TMDL) were "unjustifiable." The LNFH requested that EPA revisit the effluent limitations for total phosphorus and temperature. How can Ecology have assurance that the LNFH is attempting to meet the final effluent limitations at the end of the compliance schedule when it questions the validity of the TMDL that is the basis for the effluent limitations?

The LNFH has known of its WLA for phosphorus since the TMDL was approved in 2009 (it had knowledge in 2006 that Ecology considered the phosphorus discharge to be a problem) and of temperature issues since 2007. Past draft NPDES permits (2006, 2010) and Ecology's previous Section 401 certification in 2010 gave the LNFH stringent total phosphorus effluent limitations. Ecology's 2010 certification contemplated compliance five years after issuance of a final NPDES permit. During those regulatory processes, as far as we know, the LNFH did not once challenge the validity of the TMDLs.

Now it does. It seems clear to us that the LNFH will not make any needed changes until it gets clear directives from Ecology and other regulatory agencies to comply with same water quality laws

that govern the behavior of thousands of other facilities in the state. A compliance schedule of nearly ten years sends the wrong message and does not provide the "reasonable assurance" of compliance with state water standards and laws that Section 401 requires.

**5. EPA's antidegradation analysis**

EPA did not include an antidegradation analysis when it released the draft NPDES permit for public notice, and instead released it with this draft certification.

- **Tier I protection**

While EPA correctly notes that a "facility must meet Tier I requirements to ensure that all existing and designated uses are maintained and protected" it only evaluated the permit (compliance with numeric water quality criteria) and not the full suite of the LNFH's activities. It is our assumption that Ecology will address these matters when issuing a final Section 401 certification.

- **Tier II protection**

Following Washington's procedures for Tier II evaluations, EPA determines that there are no parameters that trigger a full Tier II review. We believe that EPA's determination is incorrect.

EPA failed to consider the discharge of sediment when LNFH cleans the water intake area at the water intake structure (RM 4.5; discussed below; referenced in the latest NOAA biological opinion [2015]). In addition, regarding the outfalls where the discharge of solids is permitted, EPA relies on best management practices and narrative directives in the permit to minimize the discharge of solids, but does not cite any monitoring data to show that the turbidity standard of 0.5 NTU will not be violated or has not been violated in the past.

Regarding ammonia toxicity, EPA makes a questionable assumption in that there would be no toxicity instream because ammonia toxicity has not been noted inside the LNFH's fish holding structures. While EPA correctly notes that the relationship between ammonia and ammonium (and therefore the toxicity) is highly dependent on pH and temperature, it fails to note that the LNFH discharge is responsible for (high) pH excursions in Icicle Creek. The ammonia-ammonium relationship is also highly dependent on diel cycles, and the added stress of lower nighttime dissolved oxygen, higher pH and ammonia may in fact cause downstream toxicity problems on low-flow, summer nights following warm days. The monitoring for ammonia in EPA's draft permit (once-per-month grab samples for ammonia) will provide little information.

EPA also uses its questionable low critical flows (as discussed above, EPA used an incomplete data set and failed to adjust for irrigation and city of Leavenworth diversions) to calculate dilution ratios. We do not believe those critical flows are valid.

Ecology should request that EPA re-draft the antidegradation analysis. Ecology should also include additional conditions for sediment flushing at the water intake structure and for more meaningful ammonia monitoring.

- **Ecology's additional 401 conditions**

Other than our comments above, we have no comments on the additional conditions to the draft NPDES permit, with the exception that neither EPA in the draft permit, nor Ecology in this draft certification, condition the LNFH's activity of flushing sediment at the water intake structure. According to NOAA (2015), LNFH personnel conduct "[m]aintenance at the point of diversion (i.e., sluicing or dredging material from the conveyance channel, sand settling chamber, and fish ladder) [and] causes a temporary increase in turbidity." Even if this happens on only an intermittent basis, this is an unpermitted discharge of pollutants from a point source into waters of the United States and must be permitted or ordered to cease.

**6. Ecology must develop appropriate conditions for this 401 certification or deny it**

Both NOAA Fisheries Service and the US Fish and Wildlife Service have rendered biological opinions on the severity of the effects on ESA-listed species by the activities of the LNFH, and those biological opinions included "terms and conditions" that set operational parameters for the Hatchery. While those "terms and conditions" can certainly be researched by Ecology in its development of a Section 401 certification, Ecology must be cautious in simply assuming that Icicle Creek will attain water quality standards if the LNFH abides by the terms and conditions of the various biological opinions.

First, the Services conduct their consultations on listed species only. Species that are not listed are not generally considered by the action agencies or the Services. Ecology, on the other hand, must protect all the aquatic life of the affected waterbodies along with other existing and designated uses in formulating a Section 401 certification.

Second, in an ESA Section 7 consultation, the Services are limited in what changes they can suggest to an agency's action in order to minimize the "take" of listed species. That is true even if "jeopardy" is determined. If a no "jeopardy" determination is made, the Services are limited in that the allowance of "incidental take" is conditions with "reasonable and prudent measures" and "terms and conditions" to minimize the take. But the reasonable and prudent measures "cannot alter the basic design, location, scope, duration, or timing of the action and may involve only minor changes."

Ecology, on the contrary, is not obligated to give any deference to an applicant's proposed action. If a reasonable assurance cannot be made that water quality standards will be attained, the certification must be denied. If the certification is granted, Ecology is obligated to condition the certification in such ways that would ensure attainment. In short, Ecology is the final arbiter of the nature of the action, through ensuring that the standards will be attained. We do not mean to say that Ecology is prevented from working with the applicant in order to find solutions, but that the water quality standards take priority over the action, even if more than "minor" changes to the action are needed to attain standards.

Third, the Services conduct their jeopardy analyses over a number of populations in many individual waterbodies which are geographically and biologically lumped into large "recovery units" or "distinct population segments." The Services might determine that the "take" of some individuals or

some reproductive impairment – even if that loss might be complete in certain waterbodies – will not result in "jeopardy" because the jeopardy analysis was done for a large geographic or biological unit.

Ecology, however, cannot use the Columbia River, the upper Columbia River, or even the Wenatchee River basin as the scale for its analyses, but instead must consider the effects on the existing uses and designated uses of Icicle Creek and any other affected waterbodies. The "incidental take" sanctioned by the Services might very well be so great that it results in a violation of water quality standards in a particular waterbody. Indeed, because activities are prohibited from "partially" eliminating an existing use (USEPA 2012), Ecology must specifically assess the LNFH's effects on the particular affected reaches of Icicle Creek and not the stream as a whole (existing uses can only be eliminated inside designated mixing zones or through the issuance of a CWA Section 404 permit). Ecology cannot allow, for instance, steelhead spawning to be eliminated from or significantly impaired in the historical channel of Icicle Creek simply because steelhead spawning occurs in other reaches of the waterbody.

In any event, while a particular biological opinion might be of some use to Ecology insofar as it serves as a source regarding biological information and the operations of the LNFH, its conclusions regarding jeopardy and incidental take do not correspond to a determination that water quality standards are attained. Instead, Ecology must determine the appropriate conditions for the certification so that standards are attained.

Similarly, Ecology cannot simply substitute agreements of the Icicle Work Group (IWG) for appropriate conditions to this draft certification. The IWG is supposed to be a collaborative effort among diverse stakeholders to find solutions all parties can support, but CELP's experience has been otherwise. Regardless, Ecology cannot abrogate its responsibilities under state and Federal law and allow a collaborative process to set regulatory sideboards, no matter how inclusive and innovative the group might be.

Although the committee determined that late summer/early fall flows in Icicle Creek (RM 2.8 to 3.8, the "historical channel") needed to be approximately 250 cfs in order to best support the native fishes, the full IWG determined an instream "goal" of 100 cfs. At this point, Ecology must make an independent determination of what flows will allow attainment of water quality standards and cannot rely on the IWG process to determine appropriate conditions.

**Conclusions**

In summary, the draft 401 certification falls short of providing "reasonable assurance" that all applicable requirements of state law will be met, most seriously by omitting any provision that protects an adequate instream flow in Icicle Creek.

CELP and WFC request that Ecology include a requirement that conditions LNFH operations on a streamflow that adequately protects the Creek and its instream values. The final 401 certification should also discuss the state water quality standards applicable to Icicle Creek and how the Hatchery's operations jeopardize water quality, and include provisions to ensure that appropriate water quality standards are met. Finally, we request that Ecology hold a public hearing before issuing a final 401 Certification on the Hatchery permit.

Sincerely,

Trish Rolfe

Trish Rolfe, Executive Director
Center for Environmental Law & Policy

/s/ Kurt Beardslee /s/
Kurt Beardslee, Executive Director
Wild Fish Conservancy

cc: Michael Lidgard, NPDES Unit Manager, USEPA
Robyn Thorson, Regional Director, USFWS
Lori Gray, Regional Director, US BOR

**Attachments**

February 3, 2017 email comments to EPA on draft NPDES permit
July 28, 2008 letter from CELP to Ecology on water rights
December 19, 2013 letter from Kurt Beardslee, WFC, to Tom Tebb, Ecology, on instream flow recommendations

**References**

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CLEAN, FLOWING WATERS FOR WASHINGTON

The Center for Environmental Law & Policy

February 3, 2017

**Via Email Only**

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RE: Draft NPDES Permit for the Leavenworth National Fish Hatchery (WA0001902)

Dear Mss. Psyk, Nogi, and Wu:

The following comments are offered on behalf of Wild Fish Conservancy (WFC) and the Center for Environmental Law and Policy (CELP) on the draft National Pollutant Discharge Elimination System (NPDES) permit for the Leavenworth National Fish Hatchery (LNFH). We have reviewed the draft permit and Fact Sheet, along with the expired permit and other documents. We have also reviewed various reports produced by the Washington Department of Ecology (Ecology) on the water quality and biological health of Icicle Creek, as well as the 2010 Clean Water Act Section 401 Certification issued by Ecology. Any cited documents that are not generally available are included with these comments, per 40 CFR 124.13. Our specific comments are organized by relevant sections of the Fact Sheet and draft permit. This letter also includes a request by WFC and CELP for a Public Hearing to address issues related to the compliance schedule proposed in the draft permit.

**Identification of Groups Providing Comments and Requesting Public Hearing:**

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**Fact Sheet comments:**

**III. A. Point Source Demonstration**. The Fact Sheet adequately demonstrates that the LNFH discharges pollutants into waters of the US through point sources. Such discharges are illegal without a Clean Water Act Section 402 permit. EPA does not need to consider the concentrated aquatic animal production facility regulation (40 CFR 122.24 and Appendix C of 40 CFR Part 122) when determining if this facility requires an NPDES permit.

**III. C. Previous Permit and Permit History.** We have long asserted, and a US District Court decision has recently affirmed, that the LNFH is discharging pollutants from point sources into waters of the United States without a permit in violation of the Clean Water Act. EPA issued draft NPDES permits in 2006 and 2010, but neither of those permits was finalized. According to EPA, the 2006 permit was not finalized because of two TMDL determinations made by Ecology before Ecology issued a 401 Water Quality Certification in 2010. EPA then decided to issue a new draft (the 2010 draft). This Fact Sheet states (p. 17) that EPA determined in 2011, after the comment period for the 2010 draft permit had closed, that operational changes made at the LNFH would necessitate the LNFH to submit a new application for a NPDES permit. That was received in 2011 and the LNFH submitted additional information in 2012.

EPA has not issued a final permit for this facility for the last thirty-seven years or enforced against it for unauthorized discharges, thus extending extraordinary latitude to this facility. If the permit is finalized as drafted, the facility will continue to pollute Icicle Creek and the Wenatchee River. EPA needs to close the loopholes in this permit.

**V. A. Antidegradation.** We disagree with EPA's decision to forgo an antidegradation analysis and rely on the Section 401 Certification from Ecology. EPA should have either 1) conducted its own antidegradation analysis and submitted that along with the rest of the draft permit to Ecology for the Section 401 Certification, or 2) waited to issue this draft notice until after receiving and incorporating the antidegradation analysis in the "preliminary" Section 401 Certification from Ecology. It is impossible for us or any member of the public to give this draft permit an adequate review when essential pieces are missing. EPA must allow another opportunity for public comment on this draft NPDES permit once an antidegradation analysis is available and included.

**V. B. Receiving Water Low Flow Conditions.** We have two concerns with this issue: 1) EPA used an inadequate dataset for its calculations and, 2) EPA failed to account for water diversions of Icicle Creek flow that could significantly affect low flow conditions adjacent to the LNFH.

1. The Fact Sheet states (p. 23) that

> The EPA reviewed information on Icicle Creek flows from the USGS gaging Station 12458000 (Icicle Creek Above Snow Creek, Near Leavenworth), which is located upstream of the LNFH. That selected stream flow field measurement data can be found at http://nwis.waterdata.usgs.gov/wa/nwis/measurements/?site_no=12458000&agency_cd=USGS
>
> The EPA accessed this website on May 18, 2016 and derived critical low flows for Icicle Creek upstream of the Hatchery using the stream flow data downloaded from the USGS website. The USGS labels the data that is posted online as "Good", "Fair", "Poor" or

> "Unspecified". The EPA took the subset of the flow data labeled "Good" and used it to calculate the critical low flows on Icicle Creek upstream of the LNFH. Critical flows can be calculated according to the EPA TSD, and are shown in the table, below.

We accessed the above link on January 19, 2017 and downloaded the dataset. Our examination indicates that the dataset includes only 168 field measurements of flow labeled "Good" on which presumably EPA has based its critical flow computations. We understand the concepts behind the various low-frequency flows and their applications, and have examined the referenced Technical Support Document for Water Quality-Based Toxics Control (TSD) (USEPA 1991). The TSD gives no information of the dataset's required size for a reliable computation of the various flows, but that's not surprising because as far as we can tell it is not meant to be a hydrology reference.

However, the US Geological Survey does give advice regarding low-frequency flows. A 2009 USGS document USGS 2009a) summarized the approach thus:

> Flow-duration data commonly are used to statistically characterize streamflow. Flow-duration data are daily mean flow values measured over a specified time interval that have been exceeded various percentages of the specified time interval. For example, a 5-percent exceedance probability represents a high flow that has been exceeded only 5-percent of all days of the flow record. Conversely, a 95-percent exceedance probability would characterize low-flow conditions in a stream, because 95 percent of all daily mean flows in the record are greater than that amount. For flow-duration statistics to be reliable indicators of probable future conditions, a minimum of 10 years of record typically is used (Searcy, 1959).

The referenced Searcy (1959) document is another USGS publication. Another recent USGS document (USGS 2009b) affirms the need for more extensive datasets:

> However, low-flow frequency statistics computed from continuous-record gaging stations with longer periods of record are likely to be more accurate than statistics from stations with shorter periods of record, and continuous record stations of any length are likely to be more accurate than statistics estimated at miscellaneous measurement sites.

In this case, it is unclear to us why EPA would choose a dataset with fewer than 200 miscellaneous measurements when the automated gage at the USGS station provides daily gage data and has since October 1, 1993[1]. Even if a number of recent readings have not yet been "approved" by USGS (those since June 5, 2016, when the dataset was accessed on January 23, 2017; measurements from June 6, 2016 to the present are labeled "provisional"), we calculate that the USGS dataset contains over 8000 daily flow records. This dataset should be used instead of the extremely limited dataset employed by EPA in preparing this draft permit, in keeping with accepted hydrological practice.

2. EPA's analysis of flow "augmentation" is sketchy and incomplete. The Fact Sheet states (p. 23) that:

> The EPA also reviewed Icicle Creek flow information downstream of the Hatchery at the

[1] The gage at that station also operated from 1936 through 1971, but we believe the more recent period (1993-present) would be more representative of current conditions considering climate change.

> Ecology Gaging Station 45B070. Those stream flow measurements can be found at https://fortress.wa.gov/ecy/eap/flows/station.asp?sta=45B070#block2
> The data is from flow measurements taken from 2007 -2015 at Ecology's monitoring station in 15 minute increments. The EPA accessed this website on May 18, 2016. The table below shows the calculated critical flow rates for Icicle Creek downstream of the Hatchery, using the low-flow calculations based on the EPA TSD.

We made a cursory examination of the dataset at the referenced Ecology website and it appears that there are many more data on which to calculate critical flows downstream of the LNFH (although we did not enumerate the number of daily flows rated as "good" by Ecology over the 10-year record), in contrast to the dataset EPA used described above. But we are unclear as to why EPA calculated critical flow rates below the LNFH. The Fact Sheet continues, after two tables comparing critical flows above and below the Hatchery:

> The data analyzed shows that the 1Q10, 7Q10, and 30Q5flows in Icicle Creek **are higher downstream of the LNFH than upstream**. The facility helps to augment Icicle Creek flows with its discharge, as previously noted, groundwater and supplemental water from Snow and Nada Lakes is pulled in to the Hatchery as influent, along with the water diverted from Icicle Creek and run through the facility (original emphasis).

If the reason for the emphasized first statement is to buttress the assertion in the second statement, we strongly disagree. "Augmentation" is very likely much less significant than thought by EPA. If the LNFH augments the flow of Icicle Creek at all, it is only during certain times of year. Some low-flow periods occur in autumn and winter when there are no significant diversions from Icicle Creek and no releases from Snow and Nada lakes.

First, "groundwater" from the LNFH's wells are for the most part, Icicle Creek water. The reason the LNFH established the new Outfall 006, as noted in the Fact Sheet (p. 16) is "to keep flow in the Hatchery Channel and recharge the LNFH groundwater wells." Almost all, if not all, groundwater used by the LNFH is essentially "recycled" Icicle Creek water (Montgomery Water Group 2004; Aspect Consulting 2016) as most of the LNFH's wells are in the shallow aquifer (hence, the need for aquifer recharge via Outfall 006). Groundwater yield from all of the LNFH's current wells is a maximum of 6-8 cfs (Aspect Consulting 2016) and recycled Icicle Creek water would make up the majority of that. The recharge area is located approximately at RM 3.8.

Second, Snow Lake and Nada Lake are high-elevation lakes in the Icicle Creek basin and it is not known how Icicle Creek flow would be affected if the lakes were left to their own devices and not manipulated by the LNFH. Without a detailed analysis, there is little basis for the statement that Icicle Creek flow is augmented by diversions from Snow and Nada lakes. Regardless, the net benefit downstream of the LNFH diversion at RM 4.5 would be at most 10-15 cfs (Snow/Nada augmentation minus LNFH/COIC diversion) (Montgomery Water Group 2004).

Most seriously, even if there was a net augmentation, EPA failed to adjust its calculated low-frequency flows at the USGG gage from diversions downstream of the gage but upstream of the LNFH's outfalls. The Icicle/Peshastin Irrigation District (IPID) diverts water downstream of the gage, as does the City of Leavenworth, the LNFH, and Cascade Orchard Irrigation Company (COIC). The COIC and LNFH share a diversion structure. These diversions are upstream of the LNFH's outfalls. The IPID diverts

80 to 100 cfs, and until they stop diversions in late September/early October, Icicle Creek flows can get much lower than even the 1Q10 calculated by EPA. Montgomery Water Group (2004) estimated that in 1998, an **average** flow year, September flows downstream of the LNFH/COIC diversion (but upstream of the LNFH discharges) were only 26.0 cfs.

In other words, it should not be surprising to see higher flows downstream of the LNFH because major water diversions downstream (e.g., IPID and COIC) of the USGS gage usually cease diversions in September. The only "consumptive" use of Icicle Creek in that reach is the City of Leavenworth that withdraws a relatively insignificant (2 cfs) amount. The LNFH withdraws water at RM 4.5 and at times in the past diverted water for aquifer recharge at RM 3.8 (which gets withdrawn as groundwater) but discharges that water back at RM 2.8. Ecology's gage is at RM 2.2.

Attached as an Appendix to these comments is a report prepared by Wild Fish Conservancy and the Icicle Creek Watershed Council and submitted by those groups along with CELP and Ms. Harriet Bullitt to the full Icicle Working Group in 2013 (WFC and CELP are no longer members of the IWG). It illustrates the complex hydrology of Icicle Creek with its numerous diversions, some seasonal, and various additions of water, all based on low-frequency flow statistics calculated using an adequate database. The report should not be relied upon as accurate as to what "projects" the IWG may now be considering to augment instream flow or reduce diversions; if EPA desires that information it should contact the IWG directly. Instead, we include it so that EPA can better understand the flow characteristics of Icicle Creek in the vicinity of the LNFH and to point out that critical low flows can occur in October and December when major diversions and additions from Snow and Nada lakes have ceased for the season[2].

Our overall point regarding is that besides using a limited data set to calculate low-frequency design flows, EPA failed to take into account the seasonal nature of major diversions that occur on Icicle Creek. EPA may have grossly overestimated the "augmentation" of Icicle Creek flow by the LNFH. Critical low flows should be computed on a monthly basis using more relevant and up-to-date information regarding the diversions, and a larger streamflow dataset.

**V. B. Technology-Based Effluent Limits**

The discussion on p. 32 of how the kg/day limit is derived refers to the wrong units for the 3.79 multiplier. In order to go from mg/L and MGD to kg/day, the correct multiplier would have units of liters/gallon (which is, in fact, 3.79). This is very confusing to the reader (the Permit itself does not specify the units on the conversion factor; see p 12 n. 34). This needs to be made correct and consistent.

**C. Water Quality Limited Waters.** In the subsection entitled *Dissolved Oxygen, pH, and Total Phosphorus* (p. 25), EPA correctly notes that the EPA-approved TMDL for dissolved oxygen, pH, and total phosphorus envisioned attainment of water quality standards by 2019.

[2] One of the diversions from Icicle Creek that the report listed was 20 cfs diverted at Structure 2 for groundwater recharge. Now, the LNFH's operation of its new Outfall 006 would obviate the need for diverting Icicle Creek water. Even if that 20 cfs is not subtracted, the report shows flows much lower than EPA's calculated critical flows, especially in the reach between the LNFH diversion (RM 4.5) and Outfall 001 at RM 2.8.

In the subsection entitled *Polychlorinated biphenyls (PCBs)* EPA cites the 2005 USFWS study on PCBs. As we pointed out in our comments on the 2006 draft permit and the 2010 draft permit, that study has serious limitations. We are disappointed that EPA continues to rely on it. The Ecology study (Ecology 2016), despite its limitations in the number of samples, is more credible than the USFWS (2005) study as a reason for including only BMPs to manage PCBs through this permit.

**VI. C. Water Quality-Based Effluent Limits**.

We believe EPA should re-analyze the WQBEL calculations using critical design flows derived from a more complete data set (refer to our comments on **V. B. Receiving Water Low Flow Conditions**, above).

**D. Facility Specific Limits.**

The opening paragraph of this section should include a statement regarding that both TBELs and WQBELs are subject to an anti-backsliding review, as it seems as if the final effluent limitations for total suspended solids were based on neither a TBEL nor a WQBEL basis.

The subsection entitled *Temperature* discusses USFWS data regarding instream temperatures and the effects of flow additions from Snow and Nada lakes via Snow Creek. We do not dispute the data and therefore the temperature reduction that occurs as a result of the addition, but feel the need to point out that the increase in instream temperature downstream of the LNFH/COIC diversion structure is aggravated by the LNFH's large diversion of water from Icicle Creek, subjecting the remaining flow to increased warming. The discussion and graph on p. 44 seems to belong better in this section than in the discussion on the compliance schedule. EPA does not give any reason why it chose the 95$^{th}$ percentile of the 7DADMs as the interim limit for temperature.

Regarding the subsection entitled *Total Phosphorus*, we believe that the discussion on pp 45-46 regarding the dataset for total phosphorus should be in this section.

EPA uses the 95$^{th}$ percentile of the monitoring data from Outfalls 001 and 002 to set interim limits, and goes on to convert the "average monthly limit" to a "maximum daily limit" for each Outfall. The Fact Sheet references the TSD and we are unclear as to why EPA used this document (that supports WQBEL development for toxic substances) as a reference to derive what is essentially a technology-based, or performance-based limit.

But we are more concerned about the use of the 95$^{th}$ percentile for both temperature and total phosphorus. EPA does not state why it uses the 95$^{th}$ percentile rather than the 50$^{th}$, 75$^{th}$, 90$^{th}$ or the 99$^{th}$, for instance).

The graphs on page 46 are not based on continuous data and the data should be depicted as should be scatter graphs rather than line graphs that imply continuous data. Also, EPA should have, if it did not, discounted the data points gathered outside the period of time when the WLA would be in effect (March 1 – May 31 and July 1 – October 31) to account for relevant seasonal differences in influent/effluent quality.

We also question why the phosphorus dataset is so limited. We understand that EPA considered the data submitted by the LNFH in 2011, but Ecology ordered the LNFH to conduct total phosphorus monitoring in the Section 401 Certification issued in 2010. Seeing as how EPA didn't release a draft permit until late in 2016, there should have been a more extensive dataset.

We note that **the sum of the mass-based interim maximum daily limits from Outfalls 001 and 002 is nearly seven times (1.6 kg/day + 1.9 kg/day) the mass-based final maximum daily limit for the facility (0.52 kg/day).** We believe that this is too high and EPA should use a lower percentile (e.g., 50$^{th}$ or 75$^{th)}$ in order to further limit the pollution of Icicle Creek and the Wenatchee River in the long interval until the final effluent limitations are in effect.

EPA makes a reasonable assumption that the monitoring data from 2006-2011 is a reflection of the operational changes the LNFH has made since 2005 as outlined on page 17 of the Fact Sheet:

> These changes included, but are not limited to, actions to improve the quality (i.e., lower phosphorus levels) of the water discharged by the LNFH into Icicle Creek. The changes to LNFH operations that have occurred since 2005 included, but are not limited to: (1) a reduction in hatchery production from 1,625,000 to 1,200,000 million (*sic*) SCS; (2) the use of low phosphorus feed during the critical months of March, April, July, August, and September (with the exception of feed for fry in the nursery) when available; and the construction and operation of a second pollution abatement pond.

We note that the *US v. Oregon* Management Agreement (https://www.fws.gov/pacific/fisheries/hatcheryreview/Reports/snakeriver/SR--079.revised.2008-17USvOR_Mngmt_Agrmt.pdf) expires at the end of this year, and the current Agreement states that the reduction in the LNFH's production is considered to be an "interim action" and that the parties intend to bring the production levels back to the 1.625 million SCS production level. This was also affirmed at a recent Icicle Working Group meeting (IWG 2017). *US v. Oregon* cannot mandate higher production at the cost of water quality standards violations. Until the LNFH makes major changes to its infrastructure to reduce phosphorus loading, more fish produced at this facility means more pollution.

EPA has set abnormally high interim limits for total phosphorus and nearly ten years to comply with the final limit, perhaps giving room for the LNFH to expand production and therefore not only continue, but perhaps worsen the on-going pollution of Icicle Creek and the Wenatchee River. EPA should set lower interim limits for total phosphorus and place enforceable permit conditions mandating the use of lower phosphorus fish food during the critical times of year.

**E. Schedules of Compliance for Temperature and Total Phosphorus (also comments on Table 4 of the draft permit).**

The reference to Idaho's WQS in the opening paragraph appears to be a typo. Please see our comments above regarding the discussion on pp. 45-46 of this section regarding the phosphorus dataset and EPA's derivation of the interim limit.

We have examined the USEPA NPDES Permit Writers' Manual (USEPA 2010) and the memorandum referenced in the Compliance Section of the Manual (USEPA 2007). We note the following points taken from the memorandum (USEPA 2007).

> 5. In order to grant a compliance schedule in an NPDES permit, the permitting authority has to make a reasonable finding, adequately supported by the administrative record, that the compliance schedule "will lead[ ] to compliance with an effluent limitation . . . " "to meet water quality standards" by the end of the compliance schedule as required by sections 301(b)(1)(C) and 502(17) of the CWA. See also 40 C.F.R. §§ 122.2, 122.44(d)(1)(vii)(A).
>
> *****
>
> 8. Factors relevant to whether a compliance schedule in a specific permit is "appropriate" under 40 C.F.R. § 122.47(a) include: how much time the discharger has already had to meet the WQBEL(s) under prior permits; the extent to which the discharger has made good faith efforts to comply with the WQBELs and other requirements in its prior permit(s); whether there is any need for modifications to treatment facilities, operations or measures to meet the WQBELs and if so, how long would it take to implement the modifications to treatment, operations or other measures; or whether the discharger would be expected to use the same treatment facilities, operations or other measures to meet the WQBEL as it would have used to meet the WQBEL in its prior permit.
>
> *****
>
> 9. Factors relevant to a conclusion that a particular compliance schedule requires compliance with the WQBEL "as soon as possible," as required by 40 C.F.R. § 122.47(a)(1) include: consideration of the steps needed to modify or install treatment facilities, operations or other measures and the time those steps would take. The permitting authority should not simply presume that a compliance schedule be based on the maximum time period allowed by a State's authorizing provision.

We disagree with the decision to give the LNFH a 9 year, 11 month compliance schedule. Paragraph 5 cited above states that EPA must have evidence that the final limit will in fact be met by the end of the compliance schedule. Because nothing is cited in this section of the Fact Sheet, we must assume that EPA does not have any evidence that the LNFH can in fact meet the final limit by the end of the compliance schedule.

Regarding Paragraph 8 cited above, the LNFH has known about water quality issues from temperature and, especially, phosphorus for some time. Ecology first identified high phosphorus loading from Icicle Creek that was attributable to the LNFH in Ecology's field study to support TMDL development (Ecology 2006). USFWS acknowledged this in Biological Assessments for hatchery operations prepared in 2006 and 2011 (USFWS 2006; 2011). In 2010, Ecology issued a Section 401 Water Quality Certification that directed compliance with the WLA for total phosphorus within five years, based on the TMDL's target for attaining WQS in the basin by 2018 (Ecology 2010). The Certification also directed the LNFH to conduct phosphorus and temperature monitoring, and develop plans to reduce phosphorus loading and temperatures. The LNFH did not prepare the required plan to monitor phosphorus.

The LNFH has moved at a very slow pace to address these problems. The LNFH investigated a recirculating system in 2009 (Freshwater Institute, 2009) but even now it has not yet reached a pilot stage (IWG 2017). It seems to be content to continue business as usual, and the extremely high interim limits combined with a very generous compliance schedule allows pollution to continue.

Paragraph 9 cited above indicates that compliance schedules should not simply be extended to the maximum allowed by a states WQS. Washington allows a maximum of 10 years. This compliance schedule is 9 years, 11 months, and it appears to us that reducing the maximum by only one month is token attempt to comply with this guidance. EPA is essentially extending to the LNFH the maximum time possible. If EPA has specific information regarding the LNFH's timetable that speaks to the specific need for a 9 year, 11 month compliance schedule, it should discuss it in the Fact Sheet.

Table 4 outlines the schedules of compliance for temperature and total phosphorus. We believe that for the most part, the tasks repeat what the LNFH was already ordered to do in Ecology's 2010 Section 401 Certification, or else they refer to events in the future that no one, including EPA, can reasonably predict. Regarding the first point, the LNFH is directed in Task 2 to:

> At a minimum, the feasibility of the following measures must be evaluated for achieving compliance with the effluent temperature limits:
>
> 1) facility improvements and/or adding additional technologies to facility operations;
>
> 2) offsets and/or possible trading mechanisms; such as offsite mitigation;
>
> 3) shading and riparian restoration; and
>
> 4) changes in/to sources of Hatchery influent, in addition to any other measures evaluated by the Permittee.

The LNFH was directed to do the following by Ecology in the 2010 Section 401 Certification:

> Instream Temperature. Within two years of the issuance of this Order, the Leavenworth NFH shall submit a Temperature Study Plan to evaluate measures to reduce temperatures in Icicle Creek. The Temperature Study Plan shall include a QAPP consistent with the requirements of paragraph D for monitoring water temperatures at appropriate locations and frequencies and shall be submitted to Ecology for its review and written approval.
>
> i. Plan Contents. The Temperature Study Plan shall include an evaluation of measures to:
>
> - Lower temperatures in Icicle Creek to temperatures that would occur under natural conditions, focusing on the critical period between June and October.
>
> - Meet the site-potential shade throughout the length of the historic river channel and hatchery channel.
>
> ii. Plan Review and Approval. Within four years of the issuance of this Order, the Leavenworth NFH shall submit a report describing the results of the above study, including the

environmental impacts, feasibility, costs, and potential schedules for implementation of each feasible alternative. Once approved by Ecology, the Leavenworth NFH shall within 180 day prepare and submit an Implementation Plan for review and written approval by Ecology.

iii. Implementation. Upon Ecology's approval of the Implementation Plan, Leavenworth NFH shall implement it in accordance with the schedule set forth in the approved Implementation plan.

In a January 6, 2016 letter to Ecology, the LNFH requested that the 2010 Section 401 Certification be rescinded, in part because "the FWS has completed all of the scientific analysis" [and] "is continuing to pursue ongoing studies… as requested by DOE in the 2010 CWA 401 certification." If in fact the LNFH has done much or all of what Ecology requested in 2010 regarding temperature, it would seem that EPA's Task No 2. listed in Table 4 of the permit is redundant. The LNFH should be at or near the implementation phase in order to meet the temperature limits in this draft permit.

Similarly, the specific directives regarding phosphorus are similar or identical to the tasks outlined in EPA's draft 2010 permit or Ecology's 2010 Section 401 certification. The LNFH has long known what it needs to do to reduce its phosphorus loads.

Task No. 4 of Table 4 regarding design is envisioned to take place five years from permit issuance, while its analog in the 2010 draft permit was envisioned to need only three years. Seeing as how the LNFH has known about its excess phosphorus loading since 2006, known of the enforceable TMDL and its WLA since 2009, and was under an Ecology order in 2010 to comply with the WLA by 2015, we believe that another five years to reach a suitable design is too generous. As we said above, the LNFH had received plans for a pilot recirculation system in 2009 that it still has not implemented. This history of this hatchery is clear: it uses time not to take action, but to find other reasons why it should be given yet more time.

Overall, we do not believe that the LNFH has made a good-faith effort to address the temperature and phosphorus issues that it has known about for over a decade. It should not be given another decade to begin to comply with the WQS; neither has EPA shown sufficient reason why this facility should be given such a long compliance schedule.

**VIII. B. Best Management Practices (BMP) Plan**. We believe that there should be a permit condition mandating cleaning of the pollution abatement ponds, either on a temporal or performance-based (e.g., when sediments reach a certain depth) basis. EPA should consider Conservation Recommendation 17 of the Biological Opinion on the Operation and Maintenance of the Leavenworth National Fish Hatchery through 2011 (FWS Service Reference Numbers 13260-2008-F-0040 and 13260-2006-P-00102008; February 15, 2008) which states: "After the pond is cleaned of its current material, ensure that in the future the pollution abatement pond is cleaned frequently enough that it adequately protects water quality, regardless of whether it is physically full or not. This effort should not contradict any instructions or requirements that may be included by EPA in the NDPES permit. Guidance how to calculate efficiency of a pollution abatement pond, when to clean it, and other considerations can be found at:" https://www.deq.idaho.gov/media/488801-aquaculture_guidelines.pdf (link updated from that listed in the Biological Opinion). Language such as this should be placed into the LNFH permit.

**IX. A. Endangered Species Act.** We note that the LNFH-specific Foreword that EPA prepared and submitted to the Services along with the Federal and Tribal Hatchery General NPDES Permit does not mention the 9 year, 11 month, compliance schedule. We do not believe that issuance of this permit, that does not require compliance with water quality standards until nearly 10 years from permit issuance, translates to a "may affect, not likely to adversely affect" the ESA-listed salmonids of Icicle Creek and the Wenatchee River. Given that the water quality criteria that are violated by the facility (dissolved oxygen, pH, and temperature) are in place to protect aquatic life, we believe that the issuance of this permit will result in "take" of listed species. Such "take" is a violation of Section 9 of the ESA absent an incidental take statement issued by the appropriate Service (NOAA Fisheries or USFWS). We believe that EPA should request formal consultation from the Services to fully comply with its ESA duties.

**Draft Permit comments:**

Regarding the 15.0 mg/L instantaneous maximum limit for net Total Suspended Solids in Table 1, we believe that analyzing a grab sample would provide a more meaningful result than from analyzing a composite sample.

**Summary:** While this permit is an improvement over the 2010 draft, it still has major flaws that will allow pollution of Icicle Creek and the Wenatchee River to continue. Most notably:

- EPA used an insufficient dataset to calculate critical design flows and does not show that it has an adequate understanding of the impact of water diversions on Icicle Creek low flows;
- there is no antidegradation analysis included with the draft permit, nor has a preliminary Section 401 Certification that includes such an analysis been done and included with the draft permit;
- the interim limits for temperature and phosphorus allow for unacceptably high loads, i.e., pollution to the receiving waters;
- the 9 year, 11 month compliance schedule is not warranted given the decade that the LNFH has had to address these problems but has not; and
- the interim limits and long compliance schedule will result in continued "take" of ESA-listed salmonids and EPA should formally consult with the Services to ensure their action will not jeopardize listed species.

We recommend that EPA withdraw this permit, address the above major concerns, and re-issue another draft as soon as possible.

**Request for Public Hearing:**

WFC and CELP hereby request that EPA hold a public hearing on the draft NPDES permit. The issues to be addressed at the hearing relate to the compliance schedule proposed in the draft permit for phosphorus, including whether the facility will meet the limit at the end of the compliance schedule and whether the compliance schedule requires compliance with the WQBEL "as soon as possible."

Thank you for the opportunity to comment.

Sincerely,

Kurt Beardslee
Wild Fish Conservancy

Trish Rolfe
Center for Environmental Law and Policy

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Appendix: Report of CELP, Harriet Bullitt, ICWC, and WFC to the Icicle Working Group Facilitation Team on Low Flows. July 2013.

# Analysis of Icicle Creek Instream Flow Benefits Of Three "Base Projects" During Low-Flow Months

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July 2013

# Executive Summary

The Center for Environmental Law and Policy, Harriet Bullitt, Icicle Creek Watershed Council, and Wild Fish Conservancy are stakeholders in the Chelan County-led effort to improve instream flows in Icicle Creek. A number of "base projects" were proposed at the May 17, 2013, meeting in Leavenworth. The projects either increase flow by releases from storage in the basin, or preclude the need to divert Icicle Creek water through improvements/efficiencies to irrigation system or by diverting water from the Wenatchee River.

At the May 17, 2013 meeting of the Icicle Working Group, Chelan County proposed an initial "Integrated Project List" that included nine base projects. Three of those nine base projects are analyzed in this paper: 1) a "pump exchange" with the Icicle-Peshastin Irrigation Districts(IPID), 2) improvement efficiencies in the IPID and Cascade Orchards Irrigation Company (COIC) systems, and 3) savings in water diverted by the Leavenworth National Fish Hatchery (collectively the "three base projects"). While the group expressed general support for the overall goal of these three projects—increasing flows in Icicle Creek—there was not consensus that these three projects would be the most effective means of achieving that goal. Moreover, a number of stakeholders expressed concern about two other base projects involving some of the Alpine Lakes, as well as the project to amend the Icicle instream flow rule.

This report assesses the benefits of the three base projects against low stream flows in September, October, and December. The three base projects will not result in enough "saved" water (not diverted from Icicle Creek) to result in sufficient instream flow. Definite predictions on habitat cannot be made until the results of the IFIM study for the historical channel (RM 3.8 to 2.8) are available, but this examination of low-flow months indicates that even after the three base projects are implemented, periods of very low instream flows would occur.

One reason why this is the case is that two of the three base projects affect only seasonal diverters – the IPID and COIC. Even though up to 40 cfs may no longer need to be diverted from Icicle Creek after implementing a pump exchange program with IPID and realizing improvements and efficiencies to both irrigation systems, those savings will not apply once those entities stop diverting on September 30 of the year. Any improvements after that date must come from either smaller diversions by the Leavenworth National Fish Hatchery, or from instream flow augmentation from storage, which may be problematic in autumn and winter.

The following chart summarizes the analysis. For many days in September, December, and especially October, Icicle Creek would continue to experience insufficient benchmark flows between RM 4.5 to RM 2.8, even after the three base projects were implemented.

| **Month / Flow** | **Days below 50 cfs** | **Days below 40 cfs** | **Days below 30 cfs** |
|---|---|---|---|
| September | 18 | 10 | 0 |
| October | 31 | 28 | 9 |
| December | 8 | 3 | 1 |

These data indicate that as much or more attention must be paid to instream flow in October and December as in September.

## Introduction

The purpose of this report is to assess the benefits of three "base projects" presented at the May 17, 2013 meeting of the Icicle Subbasin stakeholders. Those projects include: 1) a "pump exchange" with the Icicle-Peshastin Irrigation Districts (IPID) that results in 30 cfs not diverted from Icicle Creek, 2) improvement efficiencies in the IPID and Cascade Orchards Irrigation Company (COIC) systems resulting in another 10 cfs not diverted, and 3) savings in water diverted by the Leavenworth National Fish Hatchery resulting in a savings of 20 cfs. A number of stakeholders, however, expressed concern about other base projects, 1) Alpine Lakes optimization, modernization, and automation (14.57 cfs over 75 days); 2) Eight-Mile Lake restoration, involving some of the Alpine Lakes; and 3) amending the instream flow rule. Those projects will not be assessed, although this report can serve as a basic template to evaluate the benefits of implementing other projects.

The presentation on May 17 used the mean flow of the month of September for Icicle Creek as a basis for comparison, i.e., how the implementation of the base projects will improve habitat over that provided by the mean (average) monthly flow for September. It is not clear why the mean flow was used. Mean flows are skewed by high runoff events and can therefore give a false sense of security. A flow that reflects a frequency -- *how often* a flow occurs -- is more to the point than the average monthly flow for comparison purposes. For instance, if one chose the median flow, one would then be sure that the chosen baseline flow occurred at least 50% of the days of the time period in question. Another way to express the median flow is the "50% exceedence flow."

Assembling a set of projects for the purpose of augmenting stream flow to protect aquatic life and aesthetics, however, should use a more stringent flow than the median flow. The 95% exceedence flow, those flows that are equaled or exceeded 95% of the time, is a reasonable flow to use for this purpose. First, if the effort to improve aquatic life is to succeed, it needs to ensure that adequate flow will be realized almost every year. Adequate flow for one-half or even three-quarters of the years will not suffice. Second, recovery of steelhead and bull trout will be greatly enhanced by more normative flows. Besides habitat, adequate flow is needed so that these fish can negotiate fish passage impediments. These impediments can become blockages if flow is inadequate.

Low flows in Icicle Creek occur in late summer and early fall. September is therefore a proper month to consider. But low flows can also occur later in autumn or in winter. While the seasonal aspect of the IPID diversion assures that the largest diverter is no longer a factor by September 30, the same cannot be said about the second-largest diverter, the LNFH, which diverts surface water year-round. For that reason, this exercise constructed low-flow hydrographs for the months of September, October, and December[1], and compared the existing conditions to those that would result if the three base projects described above were implemented. This was done in order to ensure that the stakeholder effort does not go to great lengths to augment stream flow for aquatic life in September -- only to find the habitat is quickly lost in October or December.

1 A cursory examination indicated flows in December were generally lower than those occurring in November, January, February, or March.

This exercise does not attempt to look ahead to the changes that are happening to climate and Icicle Creek hydrology, not because they are not important, but due to a lack of time. This exercise did construct the low-flow monthly hydrographs using the flow data from water years 1994 through 2012, rather than use the entire period of record. That is contrary to what hydrology texts recommend, that is, using as long as a record as possible. Because evidence of a changing climate is already apparent from an examination of the record, however, we concluded that the years since 1994 would be more predictive of future conditions. In any event, we believe that the working group must assess any package of projects through the expected changes to the yield of the Icicle Creek watershed over the next thirty to fifty years.

**Methods**

Flow Record

As stated above, this report uses the USGS Icicle Creek gage station (12458000) at RM 5.8, from the years 1994-2012. The 2004 Water Management Plan states that the flow record is augmented in summer months by a 15 cfs release from the Alpine Lakes by IPID. The 95% exceedence flows were derived from the daily flow record for the months of September, October, and December using Excel. Those flows were then put into tabular form along with the diversion and additions of Icicle Creek in descending order (RM 5.8 to RM 2.8).

Base Projects

The evaluated projects include three projects ("base projects") presented by Chelan County at the May 17, 2013, stakeholder meeting in Leavenworth (Table 1).

**Table 1. Base projects evaluated in this report.**

| **Project Name** | **Description** | **Instream flow benefit** |
|---|---|---|
| Icicle-Peshastin Irrigation District (IPID) Pump Exchange | Pump exchange at Dryden or Leavenworth | 30 cfs (May 1 to Sep 30); for this exercise, September only |
| IPID and Cascade Orchard Irrigation Company Efficiencies | Management plan and infrastructure improvements | 9.9 cfs (5 cfs from IID, 3.3 cfs from PID, 1.6 cfs from COIC; May 1 to Sep 30); for this exercise, September only |
| Leavenworth National Fish Hatchery conservation | Combination of on-site reuse, effluent pump-back (for aquifer recharge), or wellfield enhancements | 20 cfs (presumably year-round; this exercise assumes that the project was something that obviated the need for the aquifer recharge diversion) |

The "base project" for the LNFH was a "performance standard" of 20 cfs water saved, and in this analysis it is assumed to have been attained through a cessation of the diversion for aquifer recharge (RM 3.8). If the LNFH "performance standard" was met, for instance, through a 20 cfs reduction in the surface water diversion at RM 4.5, any instream flow benefits would accrue in a longer reach (RM 4.5 to RM 2.8 *vs*. RM 3.8 to 2.8).

Diversions and Additions

The 2009 LNFH Proposed Flow Management Operations document and the 2004 LNFH Water Management Plan (by the Montgomery Water Group) give estimates for various amounts of water diverted or added to Icicle Creek by the various water right holders (Table 2). The amounts assigned to diverters in Table 2, are less than the recorded water rights, with the exception of the City of Leavenworth, as the amount assigned is equal to the recorded water right.

**Table 2. Diversions and additions to Icicle Creek in descending river mile (RM) order.**

| | **RM** | **Type** | **Duration** | **Amount used in this analysis (cfs)** |
|---|---|---|---|---|
| City of Leavenworth intake | 5.7 | diversion | Year-round | 2 (all months) |
| Icicle-Peshastin Irrigation District intake | 5.7 | diversion | May 1 to Sep 30 | 78 (Sep only) |
| Snow Creek confluence | 5.5 | addition | Base flow of stream is year round; LNFH adds water from Snow/Nada lakes in August and September | 50 (Sep, the contribution from Snow Creek plus Snow/Nada lakes); 4 (Oct and Dec, representing base flow in Snow Creek) |
| Leavenworth National Fish Hatchery surface water intake | 4.5 | diversion | Year-round | 40, 41, and 35 for Sep, Oct, and Dec, respectively |
| Cascade Orchard Irrigation Company intake | 4.5 | diversion | May 1 to Sep 30 | 6 (September only) |
| Leavenworth National Fish Hatchery headgate (used to divert water for aquifer recharge) | 3.8 | diversion | As needed in the period August through March when stream flows are less than 300 cfs* | Assumed to be 20 cfs, or stream flow when stream flow less than 20 cfs ** |
| Leavenworth National Fish Hatchery fish ladder/outfall plus any flow over spillway dam | 2.8 | addition | Year-round | Sum of surface water intake + ground water used (Sep: 40 + 7; Oct 41+ 4; Dec 35 + 5)*** |

*The 2011Biological Assessment (prepared for the ESA consultation for bull trout) states " [w]hen stream flow in Icicle Creek is approximately below 300 cfs, LNFH may need to lower one or more radial gates of structure 2 for fifteen or more days at a time to ensure that enough water is in the hatchery channel for aquifer recharge." There are no ESA constraints on the LNFH's operation of Dam 2 for aquifer recharge in September, October, or December.

[**]A figure of 20 cfs was chosen to equal the 20 cfs "performance standard" assigned to the LNFH in the stakeholder process; an assumption that a diversion of only 20 cfs occurs when stream flow is greater than 20 cfs gives the benefit of the doubt to the LNFH. In any case, for this analysis, 20 cfs was considered sufficient to recharge the aquifer, although this calculation is not intended to be an accurate model of the groundwater use or recharge characteristics of this reach, but instead a simplification constructed for this analysis.

[***] Before the projects are implemented. This projection assumes that ground water use equals pump-back in a steady-state; therefore, after the three base projects were implemented, the addition at RM 2.8 consists solely of the surface water diversion amount.

## Results

Existing Conditions: September

September low flows are critical in that diversions continue to take place as stream flow decreases to nearly base flow (Table 3). Flows at the USGS gage (RM 5.8) fall below 100 cfs. The 95% exceedence flow for many days in September is insufficient for the IPID and City of Leavenworth diversions.

Currently, the LNFH releases ~ 50 cfs from Snow and Nada lakes (plus the base flow from Snow Creek) that enters Icicle Creek at RM 5.5. That water supplies the LNFH's diversion plus enough to operate the fish ladder at the diversion dam at RM 4.5. Many days in a low-flow September, the reach from RM 4.5 to RM 3.8 is wetted only by a few cfs of water that is not diverted by LNFH and COIC. But any remaining water can be diverted (and during low-flow periods, is very likely to be diverted) by LNFH at the headgate at RM 3.8 into the hatchery canal to recharge the aquifer.

The existing conditions scenario indicates that the LNFH essentially releases the water it needs for its surface water diversion from Snow/Nada lakes, as Icicle Creek flow is not sufficient for all users. Below the IPID/City intakes, the stream flow is essentially zero. The Snow/Nada lakes addition wets the channel between RM 5.5 and 4.5, but downstream of the LNFH/COIC intakes, the stream is again reduced to near zero. Any remaining water is liable for diversion by LNFH for aquifer recharge at RM 3.8.

**Table 3. Instream flow in Icicle Creek during existing conditions in a low-flow September (95% exceedence flow).**

| | | Flow-affecting event (diversion or addition) | | | | |
|---|---|---|---|---|---|---|
| | RM 5.8: Icicle Creek 95% exceedence flow @ USGS gage | RM 5.7: Minus 80 cfs (IPID 78 cfs net; City 2 cfs) | RM 5.5: Plus 50 cfs (Snow/Nada Lakes + Snow Creek base flow) | RM 4.5: Minus 46 cfs (LNFH 40 cfs ; COIC 6 cfs) | RM 3.8: Minus 20 cfs or stream flow if less than 20 (LNFH aquifer recharge diversion) | RM 2.8: Plus 47 cfs (LNFH surface water diversion plus ground water use) |
| | RM 5.8 to 5.7 | RM 5.7 to 5.5 | RM 5.5 to 4.5 | RM 4.5 to 3.8 | RM 3.8 to 2.8 | RM 2.8 to mouth (discounting accretion) |
| 1-Sep | 117 | 37 | 87 | 41 | 25 | 72 |
| 2-Sep | 109 | 29 | 79 | 33 | 13 | 60 |
| 3-Sep | 100 | 20 | 70 | 24 | 4 | 51 |
| 4-Sep | 101 | 21 | 71 | 25 | 5 | 52 |
| 5-Sep | 99 | 19 | 69 | 23 | 3 | 50 |
| 6-Sep | 96 | 16 | 66 | 20 | 0 | 47 |
| 7-Sep | 93 | 13 | 63 | 17 | 0 | 47 |
| 8-Sep | 90 | 10 | 60 | 14 | 0 | 47 |
| 9-Sep | 88 | 8 | 58 | 12 | 0 | 47 |
| 10-Sep | 91 | 11 | 61 | 15 | 0 | 47 |
| 11-Sep | 90 | 10 | 60 | 14 | 0 | 47 |
| 12-Sep | 87 | 7 | 57 | 11 | 0 | 47 |
| 13-Sep | 84 | 4 | 54 | 8 | 0 | 47 |
| 14-Sep | 85 | 5 | 55 | 9 | 0 | 47 |
| 15-Sep | 81 | 1 | 51 | 5 | 0 | 47 |
| 16-Sep | 81 | 1 | 51 | 5 | 0 | 47 |
| 17-Sep | 81 | 1 | 51 | 5 | 0 | 47 |
| 18-Sep | 78 | 0 | 50 | 4 | 0 | 47 |
| 19-Sep | 78 | 0 | 50 | 4 | 0 | 47 |
| 20-Sep | 76 | 0 | 50 | 4 | 0 | 47 |
| 21-Sep | 75 | 0 | 50 | 4 | 0 | 47 |
| 22-Sep | 74 | 0 | 50 | 4 | 0 | 47 |
| 23-Sep | 74 | 0 | 50 | 4 | 0 | 47 |
| 24-Sep | 73 | 0 | 50 | 4 | 0 | 47 |
| 25-Sep | 72 | 0 | 50 | 4 | 0 | 47 |
| 26-Sep | 71 | 0 | 50 | 4 | 0 | 47 |
| 27-Sep | 71 | 0 | 50 | 4 | 0 | 47 |
| 28-Sep | 70 | 0 | 50 | 4 | 0 | 47 |
| 29-Sep | 70 | 0 | 50 | 4 | 0 | 47 |
| 30-Sep | 74 | 0 | 50 | 4 | 0 | 47 |

With Base Projects Implemented: September

With implementation of the three base projects (assuming that the IPID pump exchange is 30 cfs, not 15 cfs as originally proposed), stream flow generally improves. However in a low-flow year, the three base projects are insufficient. Assuming a 30 cfs input into Icicle Creek from the pump-exchange project plus an additional 10 cfs realized from improvement/efficiencies from IPID and COIC, the reach from RM 4.5 to 2.8 nonetheless falls below 50 cfs for almost 2/3 of the days in a low-flow September, and that is even when Snow/Nada lakes water is released (Table 4).

In addition to returning water to the Icicle Creek from the three base projects, assurances, via binding agreements, must be made to ensure that any newly returned water stays in the Creek. Specifically 1) IPID must agree to continue to augment Icicle Creek flow with at least 15 cfs from Alpine Lakes during low-flow years; and 2) LNFH must agree to continue to release Snow/Nada lakes water, and not capture the saved water from the IPID pump exchange/efficiency projects. Also, we suggest that if the IPID intake is rebuilt and properly screened as part of this package of projects, that the intake be sized to the water right minus the project savings.

**Table 4. Instream flows during a low-flow September after three base projects implemented.**

| | | Flow-affecting event (diversion or addition) | | | |
|---|---|---|---|---|---|
| | RM 5.8 Keswick Creek 95% exceedence flow @ USGS gage | RM 5.7: Minus 42 cfs (IPID 40 cfs; City 2 cfs) | RM 5.5: Plus 50 cfs (Snow/Nadia Lakes + Snow Creek base flow) | RM 4.5: Minus 46 cfs (LNFH 40 cfs ; CCRC 4 cfs) | RM 2.8: Plus 40 cfs (LNFH surface water diversion plus ground water use) |
| | RM 5.8 to 5.7 | RM 5.7 to 5.5 | RM 5.5 to 4.5 | RM 4.5 to 2.8 | RM 2.8 to mouth (discounting accretion) |
| 1-Sep | 117 | 75 | 125 | 81 | 121 |
| 2-Sep | 109 | 67 | 117 | 73 | 113 |
| 3-Sep | 100 | 58 | 108 | 64 | 104 |
| 4-Sep | 101 | 59 | 109 | 65 | 105 |
| 5-Sep | 99 | 57 | 107 | 63 | 103 |
| 6-Sep | 96 | 54 | 104 | 60 | 100 |
| 7-Sep | 93 | 51 | 101 | 57 | 97 |
| 8-Sep | 90 | 48 | 98 | 54 | 94 |
| 9-Sep | 88 | 46 | 96 | 52 | 92 |
| 10-Sep | 91 | 49 | 99 | 55 | 95 |
| 11-Sep | 90 | 48 | 98 | 54 | 94 |
| 12-Sep | 87 | 45 | 95 | 51 | 91 |
| 13-Sep | 84 | 42 | 92 | 48 | 88 |
| 14-Sep | 85 | 43 | 93 | 49 | 89 |
| 15-Sep | 81 | 39 | 89 | 45 | 85 |
| 16-Sep | 81 | 39 | 89 | 45 | 85 |
| 17-Sep | 81 | 39 | 89 | 45 | 85 |
| 18-Sep | 78 | 36 | 86 | 42 | 82 |
| 19-Sep | 78 | 36 | 86 | 42 | 82 |
| 20-Sep | 76 | 34 | 84 | 40 | 80 |
| 21-Sep | 75 | 33 | 83 | 39 | 79 |
| 22-Sep | 74 | 32 | 82 | 38 | 78 |
| 23-Sep | 74 | 32 | 82 | 38 | 78 |
| 24-Sep | 73 | 31 | 81 | 37 | 77 |
| 25-Sep | 72 | 30 | 80 | 36 | 76 |
| 26-Sep | 71 | 29 | 79 | 35 | 75 |
| 27-Sep | 71 | 29 | 79 | 35 | 75 |
| 28-Sep | 70 | 28 | 78 | 34 | 74 |
| 29-Sep | 70 | 28 | 78 | 34 | 74 |
| 30-Sep | 74 | 32 | 82 | 38 | 78 |

Existing Conditions:  October

By October 1, Icicle Creek is no longer augmented by releases from the Alpine Lakes by IPID (reflected in the gage record).  In addition, LNFH has stopped its releases from Snow/Nada lakes and the contribution from the Snow Creek watershed consists only of base flow.  According to its Proposed Flow Management Operations plan, LNFH continues its surface water diversion (41 cfs) and could divert water into the canal for aquifer recharge (again, assumed as a 20 cfs diversion).  In a low-flow year, the LNFH would almost certainly divert water in October for aquifer recharge purposes.

These factors result in little water in in Icicle Creek in October (Table 5).  Instream flow in the historical channel is less than 20 cfs during all but three days in October.

**Table 5. Instream flow in Icicle Creek during existing conditions in a low-flow October (95% exceedence flow).**

| | | Flow-affecting event (diversion or addition) | | | | |
|---|---|---|---|---|---|---|
| | RM 5.8: Icicle Creek 95% exceedence flow @ USGS gage | RM 5.7: Minus 2 cfs (City) | RM 5.5: Plus 4 cfs (Snow Creek base flow) | RM 4.5 Minus 41 cfs (LNFH surface water diversion) | RM 3.8: Minus 20 cfs (LNFH aquifer recharge diversion) | RM 2.8: Plus 45 cfs (LNFH surface water diversion plus ground water use) |
| | RM 5.8 to 5.7 | RM 5.7 to 5.5 | RM 5.5 to 4.5 | RM 4.5 to 3.8 | RM 3.8 to 2.8 | RM 2.8 to mouth (discounting accretion) |
| 1-Oct | 70 | 68 | 72 | 31 | 11 | 56 |
| 2-Oct | 68 | 66 | 70 | 29 | 9 | 54 |
| 3-Oct | 67 | 65 | 69 | 28 | 8 | 53 |
| 4-Oct | 66 | 64 | 68 | 27 | 7 | 52 |
| 5-Oct | 65 | 63 | 67 | 26 | 6 | 51 |
| 6-Oct | 65 | 63 | 67 | 26 | 6 | 51 |
| 7-Oct | 65 | 63 | 67 | 26 | 6 | 51 |
| 8-Oct | 65 | 63 | 67 | 26 | 6 | 51 |
| 9-Oct | 69 | 67 | 71 | 30 | 10 | 55 |
| 10-Oct | 68 | 66 | 70 | 29 | 9 | 54 |
| 11-Oct | 67 | 65 | 69 | 28 | 8 | 53 |
| 12-Oct | 69 | 67 | 71 | 30 | 10 | 55 |
| 13-Oct | 75 | 73 | 77 | 36 | 16 | 61 |
| 14-Oct | 76 | 74 | 78 | 37 | 17 | 62 |
| 15-Oct | 77 | 75 | 79 | 38 | 18 | 63 |
| 16-Oct | 74 | 72 | 76 | 35 | 15 | 60 |
| 17-Oct | 73 | 71 | 75 | 34 | 14 | 59 |
| 18-Oct | 71 | 69 | 73 | 32 | 12 | 57 |
| 19-Oct | 70 | 68 | 72 | 31 | 11 | 56 |
| 20-Oct | 70 | 68 | 72 | 31 | 11 | 56 |
| 21-Oct | 74 | 72 | 76 | 35 | 15 | 60 |
| 22-Oct | 73 | 71 | 75 | 34 | 14 | 59 |
| 23-Oct | 77 | 75 | 79 | 38 | 18 | 63 |
| 24-Oct | 79 | 77 | 81 | 40 | 20 | 65 |
| 25-Oct | 86 | 84 | 88 | 47 | 27 | 72 |
| 26-Oct | 82 | 80 | 84 | 43 | 23 | 68 |
| 27-Oct | 78 | 76 | 80 | 39 | 19 | 64 |
| 28-Oct | 76 | 74 | 78 | 37 | 17 | 62 |
| 29-Oct | 77 | 75 | 79 | 38 | 18 | 63 |
| 30-Oct | 75 | 73 | 77 | 36 | 16 | 61 |
| 31-Oct | 73 | 71 | 75 | 34 | 14 | 59 |

With Base Projects Implemented: October

Because by October, neither IPID nor COIC are diverting, the two base projects that depend on their diversions are inapplicable in October (Table 6). Only the LNFH base project is operable in October--but its impact is nominal. Assuming the LNFH ceases the aquifer recharge diversion at RM 3.8, the historical channel has very low instream flows of below 40 cfs for all but three days in October. Without the results of the IFIM study, however, we cannot postulate what the impacts these month-long low flows would have on habitat.

To increase Icicle Creek's instream flow in October, further consideration must be given to potential projects that would reduce the LNFH's diversions and/or augment instream flow through releases from Snow/Nada lakes or any other controlled lakes in the Icicle Creek watershed. This released water must be specifically designated for augmenting instream flow.

**Table 6. Instream flows during a low-flow October after three base projects implemented.**

| | | Flow-affecting event (diversion or addition) | | | |
|---|---|---|---|---|---|
| | RM 5.8: Icicle Creek 95% exceedence flow @ USGS gage | RM 5.7: Minus 2 cfs (City) | RM 5.5: Plus 4 cfs (Snow Creek base flow) | RM 4.5 Minus 41 cfs (LNFH surface water diversion) | RM 2.8: Plus 41 cfs (LNFH surface water diversion) |
| | RM 5.8 to 5.7 | RM 5.7 to 5.5 | RM 5.5 to 4.5 | RM 4.5 to 2.8 | RM 2.8 to mouth (discounting accretion) |
| 1-Oct | 70 | 68 | 72 | 31 | 72 |
| 2-Oct | 68 | 66 | 70 | 29 | 70 |
| 3-Oct | 67 | 65 | 69 | 28 | 69 |
| 4-Oct | 66 | 64 | 68 | 27 | 68 |
| 5-Oct | 65 | 63 | 67 | 26 | 67 |
| 6-Oct | 65 | 63 | 67 | 26 | 67 |
| 7-Oct | 65 | 63 | 67 | 26 | 67 |
| 8-Oct | 65 | 63 | 67 | 26 | 67 |
| 9-Oct | 69 | 67 | 71 | 30 | 71 |
| 10-Oct | 68 | 66 | 70 | 29 | 70 |
| 11-Oct | 67 | 65 | 69 | 28 | 69 |
| 12-Oct | 69 | 67 | 71 | 30 | 71 |
| 13-Oct | 75 | 73 | 77 | 36 | 77 |
| 14-Oct | 76 | 74 | 78 | 37 | 78 |
| 15-Oct | 77 | 75 | 79 | 38 | 79 |
| 16-Oct | 74 | 72 | 76 | 35 | 76 |
| 17-Oct | 73 | 71 | 75 | 34 | 75 |
| 18-Oct | 71 | 69 | 73 | 32 | 73 |
| 19-Oct | 70 | 68 | 72 | 31 | 72 |
| 20-Oct | 70 | 68 | 72 | 31 | 72 |
| 21-Oct | 74 | 72 | 76 | 35 | 76 |
| 22-Oct | 73 | 71 | 75 | 34 | 75 |
| 23-Oct | 77 | 75 | 79 | 38 | 79 |
| 24-Oct | 79 | 77 | 81 | 40 | 81 |
| 25-Oct | 86 | 84 | 88 | 47 | 88 |
| 26-Oct | 82 | 80 | 84 | 43 | 84 |
| 27-Oct | 78 | 76 | 80 | 39 | 80 |
| 28-Oct | 76 | 74 | 78 | 37 | 78 |
| 29-Oct | 77 | 75 | 79 | 38 | 79 |
| 30-Oct | 75 | 73 | 77 | 36 | 77 |
| 31-Oct | 73 | 71 | 75 | 34 | 75 |

Existing Conditions: December

As December's diversions are practically identical to October's, the question is whether there are some periods of sustained low flows that approach the very low flows of October. Due to increased precipitation, low ambient stream flows in Icicle Creek occur less frequently than in October, but the LNFH diversions in December are comparable to those in October. A constructed hydrograph for December reveals that there are eighteen days under 40 cfs, eight days under 30 cfs, and three under 20 cfs in the reach RM 3.8 to 2.8 (historical channel) (Table 5).

**Table 7. Instream flow in Icicle Creek during existing conditions in a low-flow December (95% exceedence flow).**

| | | Flow-affecting event (diversion or addition) | | | | |
|---|---|---|---|---|---|---|
| | RM 5.8: Icicle Creek 95% exceedence flow @ USGS gage | RM 5.7: Minus 2 cfs (City) | RM 5.5: Plus 4 cfs (Snow Creek base flow) | RM 4.5 Minus 35 cfs (LNFH surface water diversion) | RM 3.8: Minus 20 cfs (LNFH aquifer recharge diversion) | RM 2.8: Plus 40 cfs (LNFH surface water diversion plus ground water use) |
| | RM 5.8 to 5.7 | RM 5.7 to 5.5 | RM 5.5 to 4.5 | RM 4.5 to 3.8 | RM 3.8 to 2.8 | RM 2.8 to mouth (discounting accretion) |
| 1-Dec | 106 | 104 | 108 | 73 | 53 | 93 |
| 2-Dec | 105 | 103 | 107 | 72 | 52 | 92 |
| 3-Dec | 105 | 103 | 107 | 72 | 52 | 92 |
| 4-Dec | 105 | 103 | 107 | 72 | 52 | 92 |
| 5-Dec | 102 | 100 | 104 | 69 | 49 | 89 |
| 6-Dec | 101 | 99 | 103 | 68 | 48 | 88 |
| 7-Dec | 99 | 97 | 101 | 66 | 46 | 86 |
| 8-Dec | 97 | 95 | 99 | 64 | 44 | 84 |
| 9-Dec | 88 | 86 | 90 | 55 | 35 | 75 |
| 10-Dec | 84 | 82 | 86 | 51 | 31 | 71 |
| 11-Dec | 82 | 80 | 84 | 49 | 29 | 69 |
| 12-Dec | 64 | 62 | 66 | 31 | 11 | 51 |
| 13-Dec | 62 | 60 | 64 | 29 | 9 | 49 |
| 14-Dec | 66 | 64 | 68 | 33 | 13 | 53 |
| 15-Dec | 77 | 75 | 79 | 44 | 24 | 64 |
| 16-Dec | 77 | 75 | 79 | 44 | 24 | 64 |
| 17-Dec | 81 | 79 | 83 | 48 | 28 | 68 |
| 18-Dec | 82 | 80 | 84 | 49 | 29 | 69 |
| 19-Dec | 84 | 82 | 86 | 51 | 31 | 71 |
| 20-Dec | 83 | 81 | 85 | 50 | 30 | 70 |
| 21-Dec | 90 | 88 | 92 | 57 | 37 | 77 |
| 22-Dec | 89 | 87 | 91 | 56 | 36 | 76 |
| 23-Dec | 89 | 87 | 91 | 56 | 36 | 76 |
| 24-Dec | 88 | 86 | 90 | 55 | 35 | 75 |
| 25-Dec | 87 | 85 | 89 | 54 | 34 | 74 |
| 26-Dec | 87 | 85 | 89 | 54 | 34 | 74 |
| 27-Dec | 94 | 92 | 96 | 61 | 41 | 81 |
| 28-Dec | 97 | 95 | 99 | 64 | 44 | 84 |
| 29-Dec | 97 | 95 | 99 | 64 | 44 | 84 |
| 30-Dec | 96 | 94 | 98 | 63 | 43 | 83 |
| 31-Dec | 93 | 91 | 95 | 60 | 40 | 80 |

With Base Projects Implemented: December

In the historical channel (RM 3.8 to 2.8), the average in December over the period studied was eight days below 50 cfs, three below 40 cfs, and one below 30 cfs.

Any additional projects that the stakeholder group considers to increase instream flow in October should be separately analyzed for December or later in winter.

**Table 8. Instream flows during a low-flow December after three base projects implemented.**

| | | Flow-affecting event (diversion or addition) | | | |
|---|---|---|---|---|---|
| | RM 5.8: Icicle Creek 95% exceedence flow @ USGS gage | RM 5.7: Minus 2 cfs (City) | RM 5.5: Plus 4 cfs (Snow Creek base flow) | RM 4.5 Minus 35 cfs (LNFH surface water diversion) | RM 2.8: Plus 35 cfs (LNFH surface water diversion) |
| | RM 5.8 to 5.7 | RM 5.7 to 5.5 | RM 5.5 to 4.5 | RM 4.5 to 2.8 | RM 2.8 to mouth (discounting accretion) |
| 1-Dec | 106 | 104 | 108 | 73 | 108 |
| 2-Dec | 105 | 103 | 107 | 72 | 107 |
| 3-Dec | 105 | 103 | 107 | 72 | 107 |
| 4-Dec | 105 | 103 | 107 | 72 | 107 |
| 5-Dec | 102 | 100 | 104 | 69 | 104 |
| 6-Dec | 101 | 99 | 103 | 68 | 103 |
| 7-Dec | 99 | 97 | 101 | 66 | 101 |
| 8-Dec | 97 | 95 | 99 | 64 | 99 |
| 9-Dec | 88 | 86 | 90 | 55 | 90 |
| 10-Dec | 84 | 82 | 86 | 51 | 86 |
| 11-Dec | 82 | 80 | 84 | 49 | 84 |
| 12-Dec | 64 | 62 | 66 | 31 | 66 |
| 13-Dec | 62 | 60 | 64 | 29 | 64 |
| 14-Dec | 66 | 64 | 68 | 33 | 68 |
| 15-Dec | 77 | 75 | 79 | 44 | 79 |
| 16-Dec | 77 | 75 | 79 | 44 | 79 |
| 17-Dec | 81 | 79 | 83 | 48 | 83 |
| 18-Dec | 82 | 80 | 84 | 49 | 84 |
| 19-Dec | 84 | 82 | 86 | 51 | 86 |
| 20-Dec | 83 | 81 | 85 | 50 | 85 |
| 21-Dec | 90 | 88 | 92 | 57 | 92 |
| 22-Dec | 89 | 87 | 91 | 56 | 91 |
| 23-Dec | 89 | 87 | 91 | 56 | 91 |
| 24-Dec | 88 | 86 | 90 | 55 | 90 |
| 25-Dec | 87 | 85 | 89 | 54 | 89 |
| 26-Dec | 87 | 85 | 89 | 54 | 89 |
| 27-Dec | 94 | 92 | 96 | 61 | 96 |
| 28-Dec | 97 | 95 | 99 | 64 | 99 |
| 29-Dec | 97 | 95 | 99 | 64 | 99 |
| 30-Dec | 96 | 94 | 98 | 63 | 98 |
| 31-Dec | 93 | 91 | 95 | 60 | 95 |

**Discussion**

The LNFH "base project" is a combination of on-site reuse, effluent pump-back and/or wellfield enhancements. This analysis only considers the effluent pump-back option because it removes LNFH's need to divert for aquifer recharge at RM 3.8. The water re-circulation or re-use option would allow the hatchery to divert 20 cfs less water at RM 4.5 and would result in greater instream flow benefits beginning at that point on the river. But those benefits might be wiped out at RM 3.8 if aquifer recharge diversion continues. The radial gates at Dam 2 are not precision instruments, and an assumption that the LNFH diverts only 20 cfs at RM 3.8 during low flow years may in fact be an underestimate. More precise data are required to evaluate the benefit of that option.

In any event, the three options listed under the LNFH base project, if implemented, would not collectively result in enough "saved" water to provide sufficient instream flow to Icicle Creek in low flow months (Table 9). In September, of course, the IPID and COIC projects would be helping instream flow, to the point where October is a much more critical low-flow month than September.

**Table 9. Number of days below benchmark flows in RM 4.5 to RM 2.8 in low-flow months after base projects implemented.**

| Month / Flow | Days below 50 cfs | Days below 40 cfs | Days below 30 cfs |
|---|---|---|---|
| September | 18 | 10 | 0 |
| October | 31 | 28 | 9 |
| December | 8 | 3 | 1 |

Even with implementation of the three base projects, this chart underscores that low flows continue to be a problem in September, October, and December. The benefits of the IPID- and COIC-related projects, moreover, cease on September 30$^{th}$ when the districts stop diverting. After that date, smaller diversions from LNFN or augmentation from storage (if feasible) are the only possible means to increase instream flows. Definite predictions for habitat cannot be made until the results of the IFIM study for the historical channel (RM 3.8 to 2.8) are available.

CLEAN, FLOWING WATERS FOR WASHINGTON

The Center for Environmental Law & Policy

Ken Slattery
Washington Department of Ecology
Program Director, Water Resources Program
P.O. Box 47600
Olympia, WA 98504-7600

July 28, 2008

Mr. Slattery:

The Center for Environmental Law & Policy (CELP) is a public interest organization focused on protection of water resources in western Washington and the Columbia River watershed. Included in CELP's mission is the protection and restoration of instream flows at levels that promote and sustain natural fisheries. This letter is written on behalf of CELP and Wild Fish Conservancy of Duvall, Washington.

Wild Fish Conversancy (WFC) is a Washington based non-profit organization dedicated to the recovery and conservation of the region's wild-fish ecosystems. WFC promotes technically and socially responsible habitat, hatchery, and harvest management to better sustain the region's wild-fish heritage. WFC has been working with the local community to restore Icicle Creek since 1997. In 2005, WFC commenced a ten-year study of the aquatic ecology of Icicle Creek and other Wenatchee River basin streams.

In 2006 the Bureau of Reclamation convened a facilitated stakeholder process (Project Alternative Solutions Study or PASS process) by which they plan to provide solutions to the Leavenworth National Fish Hatchery's (LNFH) infrastructure needs (including water supply intake) and provide a blueprint for the dormant Icicle Creek Restoration Project. Wild Fish Conservancy is participating in the PASS process, and has found that, as discussions have moved forward, questions on the legal responsibilities and obligations of the LNFH continue to arise and must be answered so that PASS participants can properly analyze alternatives. Their participation in the PASS process notwithstanding, WFC believes that the LNFH must meet all state and federal legal obligations.

CELP and WFC are concerned about an illegal diversion of water by the LNFH from Icicle Creek, a tributary to the Wenatchee River, which depletes flows in Icicle Creek causing adverse effects to wild salmonids. Our concerns and the facts surrounding this diversion are set forth below. We are writing to request that the Department of Ecology Water Resources Program (1) make a determination that LNFH's diversion of water from Icicle Creek into the hatchery canal is



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www.celp.org

unpermitted and therefore illegal and (2) issue an enforcement order directing LNFH to cease its illegal diversions. CELP and WFC are willing to work with Ecology and LNFH to find a legal solution to water supply issues at the hatchery, however, this solution cannot occur outside the requirements of the state water code.

## Background

Icicle Creek originates in a particularly high and rugged portion of the Cascade Mountain range. It flows easterly to join the Wenatchee River near Leavenworth.[1] Extreme flows recorded in Icicle Creek vary from a minimum of 44 cubic feet per second (cfs) (11/30/1936) to a maximum of 11,600 cfs (5/28/1948) as measured at the USGS gauging station located above Snow Creek upstream of all the major diversions.[2] Mean annual flow is 628 cfs.[3] Waters of Icicle Creek are diverted by the Icicle-Peshastin Irrigation District, other smaller irrigation systems, the Leavenworth National Fish Hatchery (LNFH) and the City of Leavenworth.[4] It is LNFH's diversion during the low flow periods of the year that is particularly troubling. When water is diverted into the hatchery canal during low flow periods it can result in the near dewatering of the natural channel creating fish passage barriers and decreased habitat quality and quantity.

WFC has been active in Icicle Creek basin in mitigating the impact of the operations of LNFH on native fish populations. Of particular interest are the native bull trout, non-hatchery chinook, and steelhead. The diversion of water out of the natural channel coupled with the LNFH operations creates passage barriers for these species (leaving them unable to reach up-river habitat), damages redds and degrades habitat by exacerbating sedimentation and decreasing flow. WFC is concerned that LNFH is illegally diverting large amounts of water from the natural channel of Icicle Creek into an artificial canal for the purpose of groundwater recharge for LNFH's wells and for other purposes. This letter provides a summary of the surface and ground water rights held by LNFH as well as a legal summary of these rights. We conclude LNFH is illegally diverting water out of Icicle Creek in order to flush smolts, prompt adult fish return, flood control for nearby homes, and recharge the aquifer to support groundwater pumping for the benefit of the hatchery.

## Leavenworth National Fish Hatchery

LNFH is located along Icicle Creek, a tributary of the Wenatchee River, approximately 30 miles above the Wenatchee's confluence with the Columbia River. It is about four miles south of Leavenworth, Washington. The LNFH was authorized by the Grand Coulee Fish Maintenance Project on April 3, 1937 and re-authorized by the Mitchell Act (52 Stat. 345) on May 11, 1938. The purpose of the project is to provide mitigation for the impact of Grand Coulee Dam on upstream migratory fish populations, which were decimated by construction of the dam. Construction of LNFH occurred between 1938 and 1940. LNFH raises both spring chinook and coho salmon, but the coho salmon are not released from the facility.[5]

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[1] Marsha Berry and Judy Kelly, Wenatchee River Basin Instream Resources Protection Program, Dep't of Ecology, p. 9 (1982).
[2] *Id.*
[3] *Id.*
[4] *Id.*
[5] The coho are raised through an agreement with the Yakama Nation. LNFH raises the coho until they reach "eyed stage" after which they are shipped to another facility for the remainder of their development.

LNFH uses both ground and surface water, in combination, for raising fish throughout the year. LNFH holds one surface water right for 42 cfs and four groundwater rights that total 6,700 gpm (approximately 14.9 cfs). Surface water is diverted from Icicle Creek into an intake pipe approximately 1 ½ miles up-river from LNFH where it is discharged to a settling basin before being used in the raceway and tanks. The groundwater is withdrawn from seven wells spread throughout the facility. The majority of the water used by LNFH comes from surface water. Table 1 shows the relationship between the two sources over a three-year average (1999, 2002, and 2003).

**Table 1**[6]

| Month | Icicle Creek (cfs) | Wells (cfs) |
|---|---|---|
| January | 33.4 | 6.4 |
| February | 36.7 | 8.8 |
| March | 37.3 | 8.8 |
| April | 27.4 | 10.3 |
| May | 20.3 | 5.1 |
| June | 28.9 | 1.4 |
| July | 35.4 | 4.3 |
| August | 35.5 | 5.3 |
| September | 29.8 | 6.5 |
| October | 38.8 | 3.5 |
| November | 38.0 | 3.3 |
| December | 38.9 | 4.8 |

LNFH uses groundwater when surface water quantity or temperature is inadequate for fish rearing.[7] However, the aquifer lacks adequate capacity to allow LNFH to pump its maximum quantities.[8] The lack of available groundwater has led LNFH to artificially recharge the aquifer by diverting water into the (artificial) hatchery canal.

LNFH recharges the aquifer by illegally diverting water out of Icicle Creek and through the hatchery canal. As water runs through the canal it leaks into the aquifer. It is estimated that 92 percent of the water entering the aquifer comes from the artificial canal via the illegal Icicle Creek diversion.[9]

## I. LNFH Water Rights

LNFH at one time held surface rights for large quantities of water. Indeed, two of its rights, Certificate Nos. 1823 and 1824, originally authorized a combined diversion of up to 500 cfs. The majority of this water was relinquished back to the state and is no longer available for use by LNFH.

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[6] Water Management Plan for Leavenworth National Fish Hatchery, Dec. 2004 (Montgomery Water Group).
[7] Report of Phase 1 and Phase 2 Hydrogeologic Services, GeoEngineers p. 3 (Feb. 2, 1995). Groundwater is used to cool surface water in the summer and warm it in the winter.
[8] *Id.* at 6.
[9] GeoEngineers, p. 12

### a. Surface Water Rights

In 1942, LNFH received two surface water rights (Certificates 1823 and 1824) for fish propagation purposes. LNFH's surface water rights are junior, and therefore subject, to the adjudicated rights of several irrigation districts in the basin.[10] Surface right No. 1823 authorized diversion of 300 cfs of water from the Wenatchee River to a discharge point just above LNFH. However, when it was discovered that water from the Wenatchee was unusable for hatchery purposes, the diversion works were abandoned and the water right was relinquished in 1984.[11]

Surface right No. 1824 initially authorized a diversion of 200 cfs from Icicle Creek. However, in 1983 it was discovered that LNFH's physical diversion could only accommodate approximately 42 cfs and the remaining 158 cfs of the right had never been used.[12] Ecology issued a superseding certificate in 1983 quantifying the right at a Qi of 41.7 cfs and confirming relinquishment of the unused 158 cfs. The sole point of diversion for this right is located at River Mile (RM) 4.5, which is 1 ½ miles upriver of LNFH and shared with Cascade Orchards Irrigation Company. Table 2 lists LNFH's active surface water right. Table 3 lists LNFH surface water rights that have been relinquished.

**Table 2 Active Surface Right**

| Date Issued or modified | Certificate Number | Location of Diversion | Beneficial Use | CFS | Acre Ft./ Year |
|---|---|---|---|---|---|
| 01/13/1984 Priority date of 3/26/1942 | Superseding Cert. 1824 | 200 feet north and 700 feet west of the east quarter corner of Section 27 from Icicle Creek. | To be used continuously for fish propagation | 42 | None Listed |

**Table 3 Relinquished Surface Rights**

| Date Relinquished | Certificate Number | Location of Diversion | Beneficial Use | CFS | Acre Ft./Year |
|---|---|---|---|---|---|
| 01/13/1984 | 1824 | **Icicle Creek (two diversions)**<br>**1. Icicle Pipe Line** "wood stave pipe & concrete wing dam."<br>**-Structures are:** Dam 1 & a 6900 ft. long pipe.<br>**-Located at:** 760 ft. Northwest of East quarter corner of Sec. 27, being SE ¼ of NE ¼ of Sec. 27.<br><br>**2. Diversion holding pool channel** "historic channel modified with concrete, metal, and wood dams with regulating gates"<br>**-Structures are:** Dams #2-5 (see map below)<br>**-Located at:** 1240 ft. South of North quarter corner of | Hatchery and holding pond supply<br><br>The propagation of fish to maintain the run of salmon which will be disturbed by virtue of the development of the Columbia Basin Project, and the erection of Grand Coulee Dam, and is incidental thereto. The use of said waters is a non-consumptive use not affecting appropriators below Leavenworth Hatchery. | 158 | |

[10] *State v. Icicle Irrigation District*, No. 8252 (Chelan County Ct. filed Oct. 28, 1929); *aff'd State v. Icicle Irrigation District*, 159 Wash. 524, 294 P. 245 (1930).
[11] Relinquishment of Certificate of Water Right #1823 (Nov. 7, 1983)
[12] Superseding Certificate #1824.

| | | | | | |
|---|---|---|---|---|---|
| | | Sec. 26. | | | |
| 01/13/1984 | 1823 | **Wenatchee River**<br>**1. Diversion Channel**<br>"2 mile concrete channel from the Wenatchee at the lower end of Tumwater Canyon, to holding ponds"<br>**- Structures are:** concrete & earthen canal<br>**- Located at:** from SW1/4 of Section 11 to center of SE ¼ of Sec 23, then extension to holding pond in center of N ¼ of Sec. 26. | To be used continuously for fish propagation. | 300<br><br>(200 April to October with 100 on stand-by). | |

### b. Ground Water Rights

The hatchery maintains four groundwater rights: Claim Nos. 012008 and 012009, and Certificate Nos. 3103-A and G4-27115. Claims 012008 and 012009 were amended to replace wells 2 and 3 with new wells (2a and 3a). Claim 012009 and Certificates 3103-A and G4-27115 were also amended to allow for the drilling of observation wells. In sum, the hatchery holds rights to 6,700 GPM instantaneous, and a maximum of 7,477 acre feet per year from seven wells. Like surface water, these rights are junior to rights held by irrigation districts within the basin. [13]

**Table 4** **Groundwater Rights**

| Date Issued or modified | Certificate Number | Location of Withdrawal and Depth | Beneficial Use | GPM | Acre Ft./ Year |
|---|---|---|---|---|---|
| 08/1/1939 | Claim 012008 | **Well #3 (replaced by 3a)**<br>**Construction:**<br>**Source:** shallow aquifer<br>**Depth:** 98 feet | For fish cultural purposes and all related use thereto in the operation of the Leavenworth National Fish Hatchery | 700 | 570 |
| 06/1/1940 | Claim 012009 | **Well #2 (replaced by 2a)**<br>**Source:** shallow aquifer<br>**Depth:** 203 feet | For fish cultural purposes and all related use thereto in the operation of the Leavenworth National Fish Hatchery | 900 | 730 |
| 10/10/1957 | 3103-A | **Well #1**<br>**Source:** shallow aquifer<br>**Depth:** 80 feet | For fish cultural purposes | 1,200 | 1,120 |
| 10/20/1980 | G4-27115 | **Four Wells: #4, #5, #6, #7**<br>**Source:** 4 and 7 are shallow aquifer, 5 is deep aquifer, 6 is both shallow and deep aquifer.<br>**#4 Depth:** 237 feet<br>**#5 Depth:** 279 feet<br>**#6 Depth:** 170 feet<br>**#7 Depth:** 110 feet | To be used continuously for non-consumptive fish propagation. | 3,900 | 5,257 |

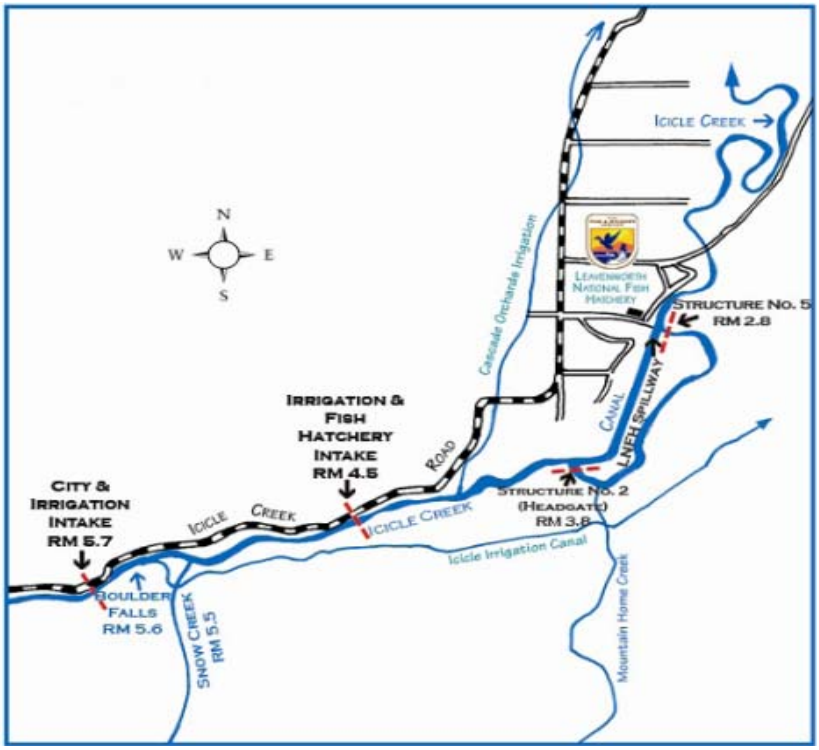
[13] *State v. Icicle Irrigation District*, No. 8252 (Chelan County Ct. filed Oct. 28, 1929); *aff'd State v. Icicle Irrigation District*, 159 Wash. 524, 294 P. 245 (1930).

### c. Reservoir Right

Reservoir Certificate No. 1825 allows LNFH to dam Snow Creek to create a reservoir, referred to here as "Snow Lake," above the hatchery. The reservoir right is for 16,000 acre-feet with a priority date of 1942. The Icicle Irrigation District and Peshastin Irrigation District (the Districts) hold senior rights to water that were impaired by creation of the new reservoir. LNFH agreed to provide 750 AFY, at a rate not to exceed 30 cfs, from the reservoir to the Districts in exchange for their agreement to give up rights to 1,000 AFY of Snow and Nada Lake storage.[14]

The reservoir right is restricted to the months of "July through October inclusive" and its purpose is for "supplementing supply for hatchery and holding pools." The "holding pools" referred to in this permit were those originally created in the natural channel of Icicle Creek. The average annual release of water from Snow Lake between August and October for the years 1994-2002 was 4,140 acre-feet.[15]

**Diagram 1**




## II. Legal analysis

### a. The Diversion of Water from Icicle Creek into the Artificial Canal for Aquifer Recharge Requires a Water Right, Which LNFH Does Not Have

[14] Contract between United States of America and Icicle and Peshastin Irrigation Districts, Symbol #r-1383, in 309 Chelan County Auditor 162 (1941).
[15] *Supra*, note 5 p. 7.

Under Washington's Surface Water Code, a water user may not divert water from a stream and put it to beneficial use without a permit.[16] However, this is what is occurring at the LNFH head-gate dam, where water is diverted for the purpose of recharging wells operated by LNFH.

The LNFH canal was originally designed to divert water away from the natural channel of Icicle Creek in order to prevent high water from damaging the instream holding pools. In 1979 LNFH decided against using the natural channel for holding pools and switched to off-channel hatchery pools.

LNFH holds just one surface water right, Superseding Certificate 1824, for 41.7 cfs. The authorized point of diversion for this right is "200 feet north and 700 feet west of the east quarter corner of Section 27."[17] This point of diversion describes the location of the diversion structure where LNFH currently diverts water into a pipeline where it is conveyed to the Hatchery. The pipeline is capable of carrying no more than 42 cfs.

The original application and permit listed a second point of diversion: "Diversion Holding-pool channel 1240 feet south of the north quarter corner of Section 26, T.24N., R.17E., W.M., being within the SW1/4NE1/4 of Section 26, T.24N, R.17E., W.M., County of Chelan."[18] The "holding-pool channel" is described as "the natural Icicle Creek channel modified by three concrete and steel dams which create deep holding pools for adult salmon."[19]

In the early 1980's, having discovered that LNFH had stopped using the natural channel for its holding pools, Ecology issued a superseding certificate reducing the amount of water authorized for diversion under the right. The superseding certificate states, "The undersigned has used a maximum of 42 cubic feet per second from Icicle Creek and at no time has used more than that." Furthermore, the superseding certificate only lists the pipeline intake as the authorized point of diversion for this right.

The water used in the holding pools did not need a right to *divert* the water into the natural channel, but it did need a right to protect this right against subsequent appropriations from Icicle Creek. However, when LNFH stopped using the natural channel for fish propagation it did not seek to change the place of use from the natural channel to the artificial canal. Since LNFH stopped using the holding pools in the natural channel, Ecology properly eliminated the head-gate "diversion/place of use" from the certificate and limited LNFH's surface water diversion to 42 cfs with a point of diversion 1 ½ miles up-river.

In the 1990's, LNFH began diverting water out of the natural channel and into the artificial canal for aquifer recharge purposes without filing for a new water right. Currently, LNFH is using the head-gate dam to divert water into the artificial canal for several beneficial uses.[20] Water is diverted for flood control (to protect nearby home owners) and aquifer recharge. In the spring, water is diverted to flush smolts and May through July water is diverted to attract adult hatchery-raised fish to the fish ladder. These diversions are occurring without authorization from Ecology.

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[16] RCW 90.03.250 (2007).
[17] Superseding Certificate 1824 (January 5th, 1984).
[18] Application No. 5671 and Permit 3537
[19] *Id.*
[20] Leavenworth National Fish Hatchery Tier II Water Quality Analysis, p. 8. (April 30, 2008)

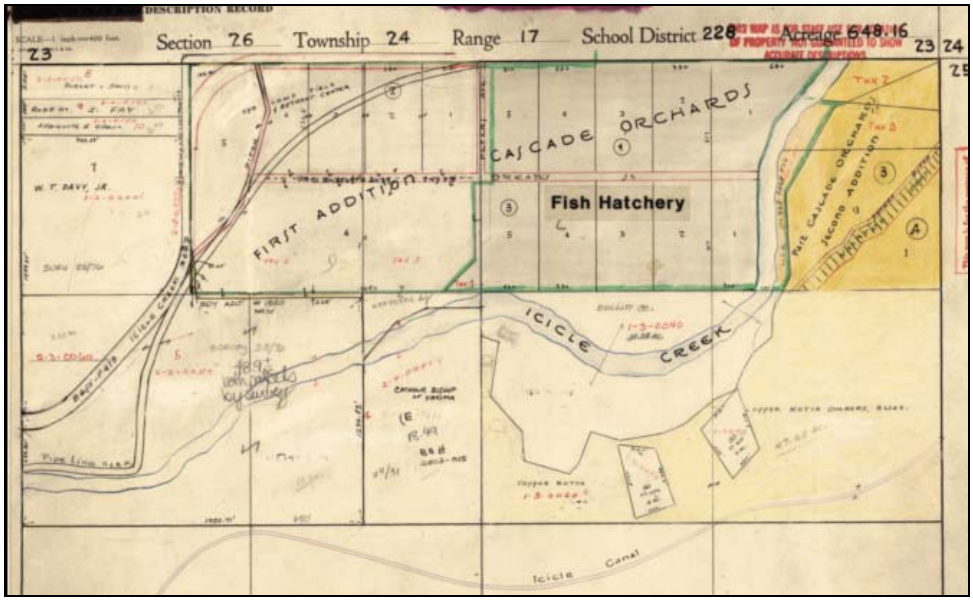
LNFH does not hold a water right authorizing a diversion out of Icicle Creek at the head-gate dam for any purpose.

The use of water for aquifer recharge, flood control, and fish flushing and attracting purposes are beneficial uses and require a water right. The diversion at the headgate dam is for beneficial uses of water with respect to Icicle Creek. LNFH is illegally diverting water from Icicle Creek at the head-gate dam for these purposes.

**b. The Artificial Canal, Constructed in the early 1940s, is Not Part of the Natural Icicle Creek and Ecology does Not have the Authority to Reclassify it**

It is undisputed that LNFH constructed the approximately 4000-foot long canal during the late 1930s or early 1940s. Prior to the construction of the artificial canal, Icicle Creek flowed entirely through the natural channel. Maps predating the construction of LNFH do not indicate Icicle Creek naturally flowed through the area now occupied by the artificial canal (See Diagram 2).

**Diagram 2**




**Chelan County Plat map predating LNFH construction.**

However, since at least 2001 USFWS has stated that the artificial canal is the "actual" Icicle Creek and that the natural channel of Icicle Creek is either a subcomponent of the natural system or no longer part of the natural system, and they assert that Ecology has "informally" given them this interpretation on more than one occasion. The apparent justification for this determination is the language in the original certificate for water right No. 1824. As discussed above, this certificate originally contained two points of diversion; one up-river of the hatchery where the current diversion under this right occurs and another at the present location of Dam 2. USFWS and possibly Ecology interpret the fact that the Dam 2 diversion was included in the original permit as intent to reclassify the artificial canal as the "natural" Icicle Creek. This is a spurious interpretation.

Ecology lacks authority to unilaterally determine the "naturalness" of watercourses within the state. Ecology cannot make a determination that the LNFH artificial canal is now Icicle Creek; particularly given that this decision is based on vague language found in a water right issued almost 70 years ago. Washington case law indicates that determinations of what constitutes a "natural" watercourse are either a matter of law or fact to be determined through the courts.[21]

The designation of the hatchery's artificial canal as a natural water course appears to be an attempt to avoid the requirements of the state water code. The fallacy of this approach is evident in the problem at hand. Without requiring a water right for the diversion into the hatchery canal, there has been no determination of impacts on other water users or the public interest, including the need to maintain instream flows to protect native fisheries.

Moreover, the informal nature of the purported determination that the artificial hatchery canal comprises part or all of the natural system also makes it suspect. For many years several interested parties have inquired to Ecology as to why no water right is required for the diversion into the artificial canal. We can find no documents or orders that address, describe and/or justify the alleged change in what Ecology staff have informally described as the change in the natural system. A decision to re-define the natural channel of a stream system is a serious matter. Lack of documentation indicates arbitrary action by the agency.

**c. Waste**

Assuming, for the sake of argument, LNFH may legally divert some amount of water out of the natural channel and into the artificial canal, it still may not do so in an inefficient manner. LNFH has *no right* to divert water from Icicle Creek into the artificial canal, but if it did, it could be challenged as wasteful and contrary to beneficial use requirements. LNFH holds water rights for "fish propagation" and "fish cultural purposes."[22] Its groundwater rights total 6,700 gpm, which is equivalent to 14.9 cfs, but the local aquifer is incapable of sustaining this level of pumping. The water simply is not available in the quantities allocated under LNFH's groundwater rights. To augment groundwater, LNFH diverts water, without a permit, into the artificial canal during low flow periods in order to recharge the aquifer, and its wells. The hydraulic continuity between surface and groundwater is high in this area and the artificial canal leaks a significant amount of the diverted flows into the aquifer. This leakage allows the aquifer to recharge and allows LNFH to pump the maximum quantities under its groundwater rights.

To accomplish aquifer recharge, LNFH diverts far more than it pumps. During winter it is estimated that LNFH diverts an average of 200 cfs into the artificial canal in order to fully utilize its wells. This diversion severely limits fish passage in the natural channel of Icicle Creek due to low water levels. Therefore, even acting under the assumption that LNFH has some right to divert water into the canal it must limit the diversion to only that which is reasonably efficient to meet its purpose of use on the water right.

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[21] *See*, *King County v. Boeing Co.*, 62 Wn.2d 545, 550, 384 P.2d 122, 126 (1963); *Tierney v. Yakima County*, 136 Wn. 481, 483-4, 239 P. 248, 249 (1925) (question of fact); *Wilber v. Western Properties*, 14 Wn. App. 169, 172, 540 P.2d 470, 473 (1975) (question of law).

[22] *See*, Tables 2 and 4.

Again, this argument is secondary. The facts show that LNFH is diverting water out of Icicle Creek at the head-gate dam for several beneficial uses. It has no legal right to do so and is therefore in violation of the Water Code.

**III. Conclusion**

Washington's Surface Water Code requires a permit for the diversion and beneficial use of water. LNFH currently has two diversions from Icicle Creek. However, only one of these diversions is legally authorized. LNFH holds one surface water right for 42 cfs with a point of diversion 1 ½ miles up-river from the facility. This right is authorized via Certificate No. 1824. A second diversion exists at the head-gate dam. LNFH manipulates this diversion to take water out of Icicle Creek and convey it into the artificial canal in order to recharge the aquifer from which groundwater withdrawals are made. LNFH holds no claim, permit, or certificate authorizing diversion of Icicle Creek at the head-gate dam for aquifer recharge or any other purpose. Therefore, this diversion is illegal under the Water Code.

CELP and WFC would appreciate meeting with you to discuss LNFH water rights in relation to their operation of the head-gate dam and instream flow needs in Icicle Creek. We will contact you soon, or feel free to contact Patrick Williams at 206-547-5047 to arrange a meeting. Thank you for your consideration.

Sincerely,

*Rachael Paschal Osborn*

Rachael Paschal Osborn, Executive Director

*Patrick Williams*

Patrick Williams, Staff Attorney

cc. Tom Cook, PASS Facilitator
Tom Tebb, Ecology Central Regional Director Water Resources
Julie Collins, LNFH Complex Manager
Ms. Harriet Bullitt, adjacent landowner
Icicle Creek Watershed Council
Cot Rice, Cascade Orchards Irrigation Company
Joel Teely, Icicle-Peshastin Irrigation District
Susan Adams, Washington Water Trust

Wild Fish Conservancy
NORTHWEST
SCIENCE EDUCATION ADVOCACY

December 19, 2013

Mr. Tom Tebb, Regional Director
WA Department of Ecology
15 West Yakima Ave -- Suite 200
Yakima, WA 98902-3452

Re: Leavenworth National Fish Hatchery CWA Section 401 Certification

Dear Mr. Tebb:

At the September 17, 2013, meeting of the Icicle Working Group in Wenatchee, staff from the US Fish and Wildlife Service presented results of an instream flow/fish habitat analysis as well as a fish passage study of Icicle Creek in the vicinity of the Leavenworth National Fish Hatchery (LNFH). Also at that meeting, Mr. Dave Irving, manager of the Leavenworth Fisheries Complex, stated that the reports would be considered by the LNFH when preparing a new Flow Management Report, as required by Ecology as part of the Clean Water Act Section 401 certification.

The Clean Water Act Section 401 certification issued in 2010 by Ecology required both an IFIM (Instream Flow Incremental Methodology) study and a fish passage study. The certification states that the IFIM report's results "shall include flow recommendations" which were intended to be incorporated into a "proposed Final Flow Management Plan" (Section B.2.c. of Ecology Order 7192). The section of the certification relevant to the fish passage study (Section B.3) has similar requirements; in addition, that study is also to include "structural options."

We have reviewed the recent instream flow/fish habitat study and the fish passage study (Skalicky and others 2013; Anglin and others 2013, respectively), both dated September 2013, and neither study includes the requirements specified in the Section 401 certification. It appears to us the flow/habitat study is only a partial fulfillment of the Section 401 certification's conditions, and that it would need to be supplemented by flow recommendations to meet the conditions. Similarly, the fish passage study does not include the flow recommendations called for in the condition. It also does not include any discussion of structural options.

Perhaps the LNFH has since submitted additional information to Ecology to supplement these studies. In any case, we are concerned that the process is less transparent than that envisioned by the certification. The LNFH may prepare and submit a Final Flow Management Plan that contains no record of how the results of the studies were considered in the development of the Plan. Ecology should ensure that the USFWS supplements both studies with the requisite recommendations and structural options (for the fish passage study), as clearly outlined in the certification.

The remainder of this letter contains our views and recommendations to Ecology regarding minimum instream flows for habitat and fish passage, based on the September 2013 USFWS studies and our understanding of Icicle Creek. We believe that our recommendations will assist Ecology in determining flows that will result in the attainment of water quality standards, or at least minimize the periods of non-attainment.

## Protection of Existing and Designated Uses

Washington's water quality standards are explicit in that that "[e]xisting and designated uses must be maintained and protected" (WAC 173-201A-310(1)). It does not appear that Ecology has articulated formal implementation methods for "Tier I" antidegradation, which protects existing uses. Nonetheless, simply comparing the quality of the LNFH's discharges to Washington's numeric water quality criteria will not suffice. Ecology must evaluate the activities of the LNFH in terms of the existing and designated uses of Icicle Creek and all other affected waterbodies.

Aquatic habitats in Icicle Creek must have flows that reflect natural patterns of variability and timing in order to continue to form and maintain functioning aquatic habitats required by native fishes and invertebrates, and in order to provide the conditions that facilitate normal spawning, incubation and emergence, rearing, and migration. Unregulated rivers naturally provide such conditions but anthropogenic alterations such as water withdrawals and flow regulations by dams and diversions can, through various mechanisms, impair these functions. In doing so, the alterations impair life history functions for aquatic life and thus prevent the protection of existing uses and attainment of designated uses.

Biological attributes of a waterbody are in fact, "existing uses" and therefore must be protected. The most recent USEPA Water Quality Standards Handbook (USEPA 2012) provides the most detailed description and is relevant here:

> No activity is allowable under the antidegradation policy which would partially or completely eliminate any existing use whether or not that use is designated in a State's water quality standards. The aquatic protection use is a broad category requiring further explanation. Non-aberrational resident species must be protected, even if not prevalent in number or importance. Water quality should be such that it results in no mortality and no significant growth or reproductive impairment of resident species. Any lowering of water quality below this full level of protection is not allowed.

Besides Endangered Species Act-listed salmonids (Chinook salmon, steelhead, and bull trout), Icicle Creek is inhabited by several other indigenous fish species, including coho salmon, mountain whitefish, several species of sucker, Pacific lamprey, and others. Critical life stages and associated biological and ecological requirements of these fish include: spawning; egg incubation; juvenile rearing; upstream migration by pre-spawning adult salmon, trout, suckers, whitefish, and lamprey as well as upstream migration of juvenile fishes; and downstream migration by post-spawning suckers, whitefish, steelhead, and bull trout, and again, juvenile fishes. The streambed and riparian vegetation are inhabited by invertebrates, particularly insects, which constitute the overwhelming majority of the diet of juvenile fishes native to the Icicle. These populations of various aquatic species compose some of the existing and designated uses of Icicle Creek and their protection must be considered in this evaluation. The existing and designated uses of upper Icicle Creek are relevant as well because activities of the LNFH directly affect fish migration to the upper Icicle basin and therefore the existing and designated uses of reaches of Icicle Creek and its tributaries above the LNFH.

Icicle Creek and its tributaries are classified as follows in Washington's water quality standards (WAC 173-201A-602):

| | Aquatic life use | Recreational use |
|---|---|---|
| Icicle Creek (including tributaries) from mouth to confluence national forest boundary | Core summer salmonid habitat | Primary contact |
| Icicle Creek (including tributaries) from national forest boundary to confluence with Jack Creek | Core summer salmonid habitat | Extraordinary primary contact |
| Icicle Creek above and including Jack Creek (including all tributaries) | Char spawning and rearing | Extraordinary primary contact |

All aquatic life uses protect "all indigenous fish and nonfish aquatic species" as well as the "key species" of the description (WAC 173-201A-200(1)). In that respect, the standards mirror the language in the USEPA Water Quality Standards Handbook cited above: protection of "uses" requires the protection of all aquatic species. The "char spawning and rearing" use and the "core summer salmonid habitat" use are described as follows (WAC 173-201A-200(1)(a)):

> (i) **Char spawning and rearing**. The key identifying characteristics of this use are spawning or early juvenile rearing by native char (bull trout and Dolly Varden), or use by other aquatic species similarly dependent on such cold water. Other common characteristic aquatic life uses for waters in this category include summer foraging and migration of native char; and spawning, rearing, and migration by other salmonid species.
>
> (ii) **Core summer salmonid habitat**. The key identifying characteristics of this use are summer (June 15 – September 15) salmonid spawning or emergence, or adult holding; use as important summer rearing habitat by one or more salmonids; or foraging by adult and sub-adult native char. Other common characteristic aquatic life uses for waters in this category include spawning outside of the summer season, rearing, and migration by salmonids.

In addition, the reach from the LNFH downstream to the mouth is designated for salmon and trout spawning and has a 13°C temperature criterion (a 7-day average of daily maximum temperatures) that applies from August 15 through July 15 according to Ecology publication number 06-10-038, "Waters Requiring Supplemental Spawning and Incubation Protection For Salmonid Species," November 2006[1]. The temperature criterion for the "core summer salmonid habitat" aquatic life use is 16°C, so this represents a more stringent temperature criterion downstream of the LNFH.

All segments of Icicle Creek are also designated for domestic water supply, industrial water supply, agricultural water supply, stock watering supply, wildlife habitat, harvesting, commerce/navigation, boating, and aesthetics. Most likely the wildlife habitat, boating, and aesthetics uses are the most relevant here. All of these uses must be considered, however, in Ecology's evaluation, and protected with relevant conditions to the certification. If any uses cannot be attained even through additional conditions to the certification, then the certification must be denied.

## Use of Biological Opinions

As you are aware, various fish species of Icicle Creek and the Wenatchee River are listed under the Endangered Species Act (ESA), and some critical habitat has been designated as well[2]. A number of biological opinions have been rendered by NOAA Fisheries Service and the US Fish and Wildlife Service on the severity of the effects on listed species by the LNFH's various activities. These opinions were developed under the authority of Section 7 of the ESA that requires that the actions of Federal agencies do not "jeopardize" listed species. No relevant biological opinion issued by either Service has ever determined that any activity of the LNFH was likely to cause "jeopardy" of any listed species, although the most recent biological opinions have determined that "take" of listed species will occur from the LNFH's operations. Those biological opinions have included "incidental take" statements that provide the LNFH with exemptions from the take prohibitions of Section 9 of the ESA.

While biological opinions should contain comprehensive information on the activities of the LNFH, and the effects of those activities on listed species (and by extension, generalized effects on aquatic life), the conclusions, however, are of limited utility in the context of a Section 401 Clean Water Act certification for a number of reasons.

First, the Services conduct their consultations on listed species only[3]. Species that are not listed are not generally considered by the action agencies or the Services. Ecology, on the other hand, must protect all the aquatic life of the affected waterbodies along with other existing and designated uses protected under the applicable water quality standards in formulating a Section 401 certification.

Second, in an ESA Section 7 consultation, the Services are limited in what changes they can suggest to an agency's action in order to minimize the "take" of listed species. That is true even if "jeopardy" is determined[4]. If a no "jeopardy" determination is made, the Services are limited in that the Services can condition the allowance of "incidental take" with "reasonable and prudent measures" and "terms and conditions" to minimize the take. But the reasonable and

prudent measures "cannot alter the basic design, location, scope, duration, or timing of the action and may involve only minor changes[5]."

Ecology, on the contrary, is not obligated to give any deference to an applicant's proposed action. If a reasonable assurance cannot be made that water quality standards will be attained, the certification must be denied. If the certification is granted, Ecology is obligated to condition the certification in such ways that would ensure attainment. In short, Ecology is the final arbiter of the nature of the action, through ensuring that the standards will be attained. We do not mean to say that Ecology is prevented from working with the applicant in order to find solutions, but that the water quality standards take priority over the action, even if more than "minor" changes to the action are needed to attain standards.

Third, the Services conduct their jeopardy analyses over a number of populations in many individual waterbodies which are geographically and biologically lumped into large "recovery units" or "distinct population segments." The Services might determine that the "take" of some individuals or some reproductive impairment – even if that loss might be complete in certain waterbodies – will not result in "jeopardy" because the jeopardy analysis was done for a large geographic or biological unit.

Ecology, however, cannot use the Columbia River, the upper Columbia River, or even the Wenatchee River basin as the scale for its analyses, but instead must consider the effects on the existing uses and designated uses of Icicle Creek and any other affected waterbodies. The "incidental take" sanctioned by the Services might very well be so great that it results in a violation of water quality standards in a particular waterbody. Indeed, because activities are prohibited from "partially" eliminating an existing use (USEPA 2012), Ecology must specifically assess the LNFH's effects on the particular affected reaches of Icicle Creek and not the stream as a whole. Ecology cannot allow, for instance, steelhead spawning to be eliminated from or significantly impaired in the historical channel of Icicle Creek simply because steelhead spawning occurs in other reaches of the waterbody.

Another relevant example is that the current biological opinion for bull trout allows for the "take" of bull trout by the LNFH's activities and structures that prevent bull trout migration to the upper Icicle Creek basin. In that opinion, the USFWS determined that there would be no jeopardy, but there would be "incidental take" from closing Structure 2 in the month of August for the purposes of aquifer recharge: "[o]ur best estimate is that as many as 64 bull trout of all life history stages may be incidentally taken due to degraded habitat conditions over a 15-day period in August due to aquifer recharge" (USFWS 2011a). That level of impairment results in non-attainment of water quality standards. Degradation of habitat for almost one-half the month of any year such that sixty-four bull trout would be "taken" is in fact a violation of water quality standards given the low numbers of bull trout in Icicle Creek.

In any event, while a particular biological opinion might be of some use to Ecology insofar as it serves as a source regarding biological information and the operations of the LNFH, its conclusions regarding jeopardy and incidental take do not correspond to a determination that water quality standards are attained.

## Operation of LNFH Structures and Instream Flows

The most recent Flow Management Operations report submitted to Ecology by the LNFH (USFWS 2009) provides information regarding the operation of the LNFH's structures. Structure 2 is the most relevant to instream flows in and passage through the historical channel, as it can be operated to manipulate flows in that reach of Icicle Creek or prevent fish from ascending or descending. The LNFH report states that there are four reasons why the gates at Structure 2 are operated: 1) broodstock collection/tribal fishing, 2) smolt emigration, 3) aquifer recharge and, 4) flood control (USFWS 2009, p 8). Regarding aquifer recharge, the operation of Structure 2 is as follows:

> At low flows structure 2 gates must be closed to divert water into the hatchery canal to recharge the aquifer. Since 2005, these gates **are not closed more than two weeks at one time** in order to maintain flows in the historical channel. Hatchery staff found that they need more than two weeks to significantly influence recharge of the aquifer (emphasis added).

A newer document, the Biological Assessment for the Operation and Maintenance of Leavenworth National Fish Hatchery, March 4, 2011 (USFWS 2011b), provides additional information that confirms this general operational protocol, but also provides more detail that contradicts the Flow Management Plan (USFWS 2009). The assessment states (p. 25):

> The hatchery channel is dewatered when the stream flow in Icicle Creek above both channels is approximately below 300 cfs and flow into the historical channel is unrestricted. Dewatering of the hatchery channel can occur in late summer, fall, and early winter for short or long periods of time. Dewatering of the hatchery channel reduces recharge to the shallow aquifer causing groundwater levels and pumping capacities to drop when wells are in production. LNFH is currently trying to quantify how much and how long water needs to be in the hatchery channel to recharge the aquifer consistent with historic well operation. Also, LNFH has installed variable frequency drive pumps on all of its wells to increase control of pumping rates and capacity. **When stream flow in Icicle Creek is approximately below 300 cfs, LNFH may need to lower one or more radial gates of structure 2 for fifteen or more days at a time to ensure that enough water is in the hatchery channel for aquifer recharge** (emphasis added; internal citations omitted).

From these two documents, we are unclear as to how the LNFH actually operates Structure 2, that is, if they in fact limit the closures to two weeks or less as they outlined in 2009, or if they divert water into the canal for more than fifteen days as they stated they "may need" to do in 2011. Nonetheless, the Ecological Services division of USFWS responded with a biological opinion (USFWS 2011a) that found that the operation of Structure 2 for aquifer recharge would result in a "take" of bull trout. USFWS may have believed that it could not prevent this take by prohibiting the closure of Structure 2 for aquifer recharge through a biological opinion and incidental take statement. Ecology has no such constraints. Aquifer recharge is the most problematic scenario for ensuring adequate flows for passage and habitat in the historical channel.

## The Instream Flow/Habitat and Fish Passage Reports

It appears that the instream flow/habitat study included a reasonable mix of species in regard to the biota of Icicle Creek and those species represent a variety of habitat needs. Given that all of these habitat types must be protected in order to protect the species, it seems that a minimum instream flow should be one that provides the most habitat for the most species, with some special consideration given to ESA-listed species. The instream flow/habitat study includes descriptions of the relationships between spawning habitat and flow as well as rearing habitat and flow. The minimum flow for any particular time interval should be the flow that provides adequate habitat for both types, provided that the flow that maximizes habitat of one type does not significantly decrease the amount of the other habitat type (i.e., ensure that a flow that maximizes rearing habitat for all the species is not significantly detrimental to spawning and vice versa).

The fish passage report also assesses the needs of a number of representative species. This report also considers the detrimental effects of high velocities resulting from high flows at the instream structures and through the historical channel. A minimum flow recommendation for any particular time interval should maximize passage for the greatest number of species.

The two reports need to be considered together, in that the minimum instream flow for any time interval must be the greater of the two flows derived from the two reports, provided that the greater flow does not result in significantly reduced habitat or passage.

Neither report considers the relationship between flow and any applicable water quality parameter. If flows in the historical channel are increased (diversions to the hatchery canal are decreased), it is unclear whether instream temperatures will comply with the applicable criterion, but it is likely that temperatures will be improved over those currently found in the stream.

Instream Flow/Habitat Study

The study considered habitat/flow relationships from 20 cfs to 1,500 cfs in the historical channel for both spawning and rearing habitat. Of the eight evaluated species, four species are spring/early summer spawners. Regarding an instream flow to maximize spawning habitat for those species, it would appear that flows in the historical channel would have to be reduced to 180 to 200 cfs in April - June to provide 51 to 54% of the possible spawning habitat for cutthroat, with the other evaluated species having greater amounts. Spawning habitat for Chinook salmon and steelhead, both ESA-listed species, would be maximized at those flows.

A number of administrative and physical factors come into play, however, when attempting to reduce flows in the historical channel. The current bull trout biological opinion contains a mandate to open Structure 2 by June 24 of any given year (USFWS 2011b). That does represent only the last six days of the three month period, and perhaps USFWS Ecological Services would agree to move the date of Structure 2 opening. Perhaps a more relevant question is whether Structure 2 can be operated to restrict flows with sufficient precision. It may be that the USFWS Ecological Services, NOAA Fisheries, Ecology, and the LNFH will need to negotiate an

instream flow/operating protocol for Structure 2 for the time period April – June with proper consideration to ESA and CWA requirements. Because of these complications, Wild Fish Conservancy does not have any recommendations to reduce flows in the time period April through June based on the instream flow/habitat study at this time.

Beginning July 1, however, there are no such constraints; in fact, restrictions of flow for aquifer recharge in August may result in "take" of bull trout, and maintaining flows in the historical channel will obviously improve habitat and passage. The following table summarizes the relationship between spawning habitat (for four summer/fall/winter spawners) and flow (cfs) in the historical channel. The percentage per species is grouped by quartiles; our goal here is to determine the lowest flow that provides at least 51% of the available habitat for all species.

Relationship between spawning habitat (late summer/fall spawners) and flow:

| Flow | Coho | Chinook | Whitefish | Sucker | 0-25 | 26-50 | 51-75 | 76-100 |
|---|---|---|---|---|---|---|---|---|
| 20 | 56% | 17% | 4% | 49% | 2 | 1 | 1 | 0 |
| 30 | 73% | 32% | 7% | 70% | 1 | 1 | 2 | 0 |
| 40 | 84% | 47% | 10% | 83% | 1 | 1 | 0 | 2 |
| 50 | 91% | 60% | 13% | 91% | 1 | 0 | 1 | 2 |
| 60 | 96% | 71% | 16% | 96% | 1 | 0 | 1 | 2 |
| 70 | 98% | 79% | 19% | 98% | 1 | 0 | 0 | 3 |
| 80 | 100% | 87% | 23% | 99% | 1 | 0 | 0 | 3 |
| 90 | 100% | 92% | 26% | 100% | 0 | 1 | 0 | 3 |
| 100 | 100% | 96% | 29% | 99% | 0 | 1 | 0 | 3 |
| 120 | 98% | 100% | 36% | 95% | 0 | 1 | 0 | 3 |
| 140 | 94% | 100% | 42% | 92% | 0 | 1 | 0 | 3 |
| 160 | 90% | 100% | 49% | 90% | 0 | 1 | 0 | 3 |
| **180** | **86%** | **99%** | **55%** | **86%** | **0** | **0** | **1** | **3** |
| 200 | 82% | 98% | 62% | 83% | 0 | 0 | 1 | 3 |
| 250 | *76%* | 94% | 75% | *76%* | 0 | 0 | 1 | 3 |
| 300 | 70% | 91% | 85% | 71% | 0 | 0 | 2 | 2 |
| 350 | 66% | 87% | 92% | 66% | 0 | 0 | 2 | 2 |
| 400 | 62% | 82% | 97% | 60% | 0 | 0 | 2 | 2 |
| 450 | 59% | 79% | 99% | 54% | 0 | 0 | 2 | 2 |
| 500 | 56% | 75% | 100% | 48% | 0 | 1 | 2 | 1 |

The lowest flow that maximizes spawning habitat (by quartile) in the historical channel is 180 cfs (bolded above). Any lower flow does not provide at least 51% of the available habitat for all species (upper two quartiles). This flow should be maintained in the historical channel in the time period July through December inclusive to maximize spawning habitat for species that spawn July through December.

An examination of the relationship between *rearing* habitat and flow, however, reveals that a flow of 180 cfs does not provide at least 50% of *rearing* habitat for all species. The corresponding flow for rearing habitat (the flow that provides at least 50% of the available rearing habitat for all species) is 250 cfs.

Relationship between rearing habitat (all months) and flow:

| Flow | Chinook juvenile | Steelhead juvenile | Rainbow juvenile | Cutthroat juvenile | Whitefish juvenile | Whitefish adult | Sucker | Bull Trout | 0 to 25 | 26 to 50 | 51 to 75 | 76 to100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 43% | 30% | 30% | 49% | 1% | 3% | 82% | 48% | 2 | 5 | 0 | 1 |
| 30 | 58% | 39% | 39% | 63% | 3% | 4% | 95% | 62% | 2 | 2 | 3 | 1 |
| 40 | 70% | 48% | 48% | 72% | 4% | 6% | 99% | 71% | 2 | 2 | 3 | 1 |
| 50 | 78% | 55% | 55% | 79% | 6% | 8% | 100% | 76% | 2 | 0 | 2 | 4 |
| 60 | 84% | 61% | 61% | 85% | 8% | 10% | 99% | 81% | 2 | 0 | 2 | 4 |
| 70 | 89% | 67% | 67% | 89% | 10% | 12% | 97% | 85% | 2 | 0 | 2 | 4 |
| 80 | 92% | 72% | 72% | 92% | 13% | 14% | 95% | 88% | 2 | 0 | 0 | 6 |
| 90 | 95% | 76% | 76% | 95% | 15% | 16% | 92% | 91% | 2 | 0 | 0 | 6 |
| 100 | 97% | 79% | 79% | 97% | 18% | 19% | 90% | 93% | 2 | 0 | 0 | 6 |
| 120 | 99% | 85% | 85% | 99% | 24% | 23% | 84% | 96% | 2 | 0 | 0 | 6 |
| 140 | 100% | 90% | 90% | 100% | 29% | 28% | 78% | 99% | 0 | 2 | 0 | 6 |
| 160 | 99% | 93% | 93% | 100% | 35% | 33% | 72% | 100% | 0 | 2 | 1 | 5 |
| 180 | 98% | 96% | 96% | 99% | 40% | 37% | 68% | 100% | 0 | 2 | 1 | 5 |
| 200 | 96% | 98% | 98% | 97% | 45% | 42% | 64% | 100% | 0 | 2 | 1 | 5 |
| **250** | **91%** | **100%** | **100%** | **93%** | **57%** | **52%** | **59%** | **97%** | **0** | **0** | **3** | **5** |
| 300 | 85% | 99% | 99% | 87% | 66% | 60% | 54% | 93% | 0 | 0 | 3 | 5 |
| 350 | 80% | 97% | 97% | 81% | 74% | 67% | 51% | 89% | 0 | 0 | 3 | 5 |
| 400 | 78% | 97% | 97% | 79% | 80% | 73% | 47% | 87% | 0 | 1 | 1 | 6 |
| 450 | 75% | 96% | 96% | 75% | 85% | 77% | 43% | 83% | 0 | 1 | 0 | 7 |
| 500 | 72% | 94% | 94% | 71% | 88% | 81% | 39% | 79% | 0 | 1 | 2 | 5 |

A flow of 250 cfs must be re-assessed in terms of spawning habitat for the late summer/fall spawners, and while that flow reduces coho, Chinook, and sucker spawning habitats in their respective spawning months, it does not significantly reduce them:

| Flow | Coho | Chinook | Whitefish | Sucker | 0-25 | 26-50 | 51-75 | 76-100 |
|---|---|---|---|---|---|---|---|---|
| 180 | 86% | 99% | 55% | 86% | 0 | 0 | 1 | 3 |
| 200 | 82% | 98% | 62% | 83% | 0 | 0 | 1 | 3 |
| 250 | 76% | 94% | 75% | 76% | 0 | 0 | 1 | 3 |

Therefore, in order to maximize habitat for all evaluated species, and balancing the spawning habitat needs of some against the rearing habitat needs for other species, the Icicle Creek historical channel requires a minimum instream flow of 250 cfs (or natural flow if natural stream flow is lower). That flow, however, needs to be compared to the results of the fish passage study.

Fish Passage Study

The results of the fish passage study are less detailed than are the results of the instream flow/habitat study. Fish passage through Structure 5, Structure 2, and the historical channel can be constrained by depth (when flows are very low) or velocity (when flows are higher). An instream flow of 250 cfs does provide adequate depth for most species, and is not so high to create a velocity barrier. Put another way, there is nothing in the fish passage study that presents strong arguments against an instream flow of 250 cfs, or argues for a different instream flow in order to optimize passage.

The fish passage study does note that flows of 60 cfs to 200 cfs are needed to create adequate depths and allow passage for the evaluated species through the length of the historical channel. A flow of 250 cfs does not create any additional velocity barriers.

Like habitat/flow relationships in April – June, the relationships between passage and flow are complicated by high flows and ESA requirements and require consideration of numerous issues. Wild Fish Conservancy has no recommendation at this time on instream flows for the time period of April through June, but may in the future.

Wild Fish Conservancy also does not have recommendations for flow requirements at the LNFH Water Intake Structure. While the study points out many of the flaws of the existing fish ladder and water intake, and the potential difficulties of attempting to improve the ladder, it does not make recommendations. Our recommendation to Ecology is to direct the USFWS to fulfil the certification's condition and submit a study that contains "structural options."

## Icicle Creek Stream Flows

The instream flow/habitat report established relationships between flows in the historical channel and the USGS gage near the Snow Creek confluence. The report itself is not clear on the applicability of the relationships, noting that "the relationship may change" depending on inputs from Snow and Nada Lakes and the closure of Structure 2. The relationship was established on flow data from October 5, 2010 to November 30, 2012, so presumably the relationships were established during all possible combinations of the Snow/Nada Lakes input and Structure 2 closure. In any event, our comments here use these relationships.

Our recommendation of a 250 cfs maintenance flow (or natural stream flow if it is less than 250 cfs) in the historical channel translates to a flow of 325 cfs at the Snow Creek USGS gage, according to the relationship described above. Flows lower than or equal to 325 cfs are found in all months of the year except May and June (based on an analysis of the flow record from October 1, 1993 to December 2, 2012). Therefore, a minimum flow of 250 cfs (or natural stream flow if natural stream flow is less than 250 cfs) should be maintained July 1 through April 30. Most years, low flows in both April and July will not be a problem, but they can occur, and restrictions on aquifer recharge should be made accordingly.

| Time Interval | Percentage of days with flow 325 cfs or less | Percentage of days with flow 326 cfs or greater |
|---|---|---|
| Jan 1-15 | 66.3% | 33.7% |
| Jan 16-31 | 61.8% | 38.2% |
| Feb 1-15 | 69.5% | 30.5% |
| Feb 16-29 | 66.7% | 33.3% |
| Mar 1-15 | 70.9% | 29.1% |
| Mar 16-31 | 54.9% | 45.1% |
| Apr 1-15 | 31.6% | 68.4% |
| Apr 16-30 | 6.0% | 94.0% |
| May 1-15 | 0.0% | 100.0% |
| May 16-31 | 0.0% | 100.0% |
| Jun 1-15 | 0.0% | 100.0% |
| Jun 16-30 | 0.0% | 100.0% |
| Jul 1-15 | 5.6% | 94.4% |
| Jul 16-31 | 29.6% | 70.4% |
| Aug 1-15 | 68.1% | 31.9% |
| Aug 16-31 | 89.8% | 10.2% |
| Sep 1-15 | 98.2% | 1.8% |
| Sep 16-30 | 94.0% | 6.0% |
| Oct 1-15 | 90.0% | 10.0% |
| Oct 16-31 | 77.8% | 22.2% |
| Nov 1-15 | 58.0% | 42.0% |
| Nov 16-30 | 45.7% | 54.3% |
| Dec 1-15 | 60.3% | 39.7% |
| Dec 16-31 | 68.8% | 31.3% |

The flow of 325 cfs is very close to the median flow for Icicle Creek (319 cfs) and the 300 cfs flow identified by the LNFH as the flow below which aquifer recharge is needed, necessitating the closure of Structure 2 and resulting in reduced instream flow in the historical channel (USFWS 2011b).

In fact, if the months of May and June are omitted from the flow record, which makes the flow record more relevant when considering aquifer recharge scenarios, the median flow for Icicle Creek falls to 265 cfs, and flows below 300 cfs occur 56.9% of the time. In other words, the trigger flow identified by USFWS for the diversion of water from Icicle Creek proper into the hatchery channel occurs 56.9 % of the days outside the spring runoff months. Wild Fish Conservancy believes that, given the results of the instream flow/habitat studies and the fish passage study, this operating scenario is not compatible with attainment of water quality standards.

Natural stream flow is less than 325 cfs many days of the year, and thus, spawning and rearing habitat is not maximized in the historical channel on those days. For the most part, however, that is irrelevant: the fact that aquatic communities might undergo stress from low flows that occur *naturally* does not grant license to the LNFH to inflict that stress as much as it outlines in its various descriptions of its operations (USFWS 2009; 2011a; 2011b). Beginning when it was built, and continuing through its present operating procedures, the LNFH does not operate in a manner compatible with the minimal standards for protection of aquatic life.

## The LNFH's Need For Aquifer Recharge

The LNFH's need for aquifer recharge is based on its groundwater use. The Proposed Flow Management Plan (USFWS 2009) gives only cursory descriptions of the LNFH's use of groundwater. The 2011 biological opinion on bull trout (USFWS 2011a) gives more detail:

> Well water is used to supplement and temper river water to meet production goals (p. 17).
>
> The adult holding ponds are supplied with a combination of surface water (Icicle Creek) and groundwater (well) to maintain optimal water temperatures (in the range of $55^{O}$F) during holding (p.18).
>
> Eggs from one female are placed in individual incubator trays that receive three to four gallons per minute (gpm) of ground water from the fertilization to the eyed stage rearing period (p. 19).

In addition, a USFWS hatchery review report gives some information on which hatchery raceways are supplied with groundwater (USFWS 2007):

> Only the upper bank of raceways receives single pass fresh well water. **There is a need to plumb well water to middle and lower decks of 8'x80' raceways to improve water quality.** This project is identified by the Bureau of Reclamation in their RAX (Replacements, Additions, and Extraordinary Maintenance) survey (emphasis added).

We do not know whether these plumbing changes have been made. Regardless, other than the use of groundwater for egg incubation (450 females x up to 4 gpm totaling 1800 gpm if each tray is individually watered), groundwater is used for maintaining an optimal temperature of approximately $55^{O}$F in raceways and holding ponds. The LNFH has ground water rights totaling 6700 gpm (USFWS 2011a).

It is unclear to us what groundwater use is an actual requirement for the LNFH (i.e., the LNFH could not operate without it) and how much is *desired* by the LNFH to enhance the operation (i.e., if water temperatures in the raceway are not "optimal" then fish do not grow to the desired size). No document we examined stated why incubator trays were supplied with groundwater rather than surface water (or a blend of the two). Also, we note that there is a difference of $5.8^{O}$F between the "optimal" temperature desired by the LNFH for its raceways and the maximum water quality criterion applicable to the historical channel. Should the aquatic life of Icicle Creek be subject to lower flows and higher temperatures simply because the LNFH desires an

"optimal" temperature for its raceways, rather than being content with a less-than-optimal (but adequate) temperature? This is not a rhetorical question. The use of groundwater is directly linked with the "need" for aquifer recharge, which has caused major problems for the aquatic life of Icicle Creek in the past. The LNFH has never justified its use of groundwater in any of the numerous documents produced in the past. In addition, the "need to plumb well water" to additional raceways implies that the LNFH will be placing greater demands on groundwater. Because it is unlikely that additional groundwater rights would be granted (if requested), modifying more raceways at LNFH to use well water likely means there will be more frequent periods when aquifer recharge will "need" to occur. Ecology should request a more detailed description of the LNFH's operation, including what groundwater use is absolutely essential and what is simply desired, as well as the LNFH's future plans, in order to assist the LNFH so that it can continue to use groundwater but without violating water quality standards.

It might be that the LNFH will need to adjust production numbers or smolt size at release or make other arrangements, but we do not believe that the US v. Oregon Management Agreement[6] takes precedence over attainment of water quality standards. The Agreement itself notes that production at the LNFH was reduced from 1.625 million fish to 1.2 million fish, partially due to "water quality" concerns (p. 99). The 2011 Biological Assessment (USFWS 2011b) states that the production level was reduced in the Agreement "to improve fish health and to improve the quality of water (lower phosphorus) discharged into Icicle Creek." If production levels can be reduced to lower phosphorus levels, then they can be reduced or other modifications made to maintain instream flows and habitat, and apparently the USFWS believes so as well, having made recent changes in order to further attainment of water quality standards.

**Summary**

After reviewing the instream flow/habitat and fish passage studies completed by the USFWS this year, Wild Fish Conservancy recommends that Ecology condition the Section 401 Clean Water Act certification such that the LNFH cannot operate Structure 2 from July 1 through April 30 for the purposes of aquifer recharge unless a minimum instream flow of 250 or greater is maintained in the historical channel of Icicle Creek. Ecology has an obligation to protect this stream and help it recover, and it can start by setting conditions on the LNFH's operations that bring the facility into CWA compliance by protecting the existing uses and allowing the designated uses to be attained.

Thank you for the opportunity to comment. Please contact me or Mark Hersh (mark@wildfishconservancy.org) if you have any questions.

Sincerely,

Kurt Beardslee
Executive Director

cc: Tom Young (via email: TomY@atg.gov)
Dave Irving, LNFH Complex (via email: Dave_Irving@fws.gov)

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[1] https://fortress.wa.gov/ecy/publications/publications/0610038.pdf. Accessed November 7, 2013.
[2] The upper Columbia River populations of spring Chinook (*Oncorhynchus tshawytscha*) and steelhead (*O. mykiss*), and the entire Columbia River population of bull trout (*Salvelinus confluentus*) are ESA-listed. Details regarding the listings and the critical habitat designations can be found at http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/salmon_and_steelhead.html and http://www.fws.gov/pacific/bulltrout/ . Accessed December 5, 2013.
[3] Federal action agencies are also required to hold a "conference" with the Services if an action might affect a candidate species that occurs in the action area. *See* ESA Section 7(a)(4).
[4] If jeopardy is found the appropriate Service is to develop "reasonable and prudent alternatives" if possible. Reasonable and prudent alternatives are defined as "alternative actions identified during formal consultation that can be implemented in a manner consistent with the intended purpose of the action, that can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction, that is economically and technologically feasible, and that the Director believes would avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat." 50 CFR 402.02.
[5] 50 CFR 402.14(i)(2).
[6] http://www.fws.gov/pacific/fisheries/hatcheryreview/Reports/snakeriver/SR--079.revised.2008-17USvOR_Mngmt_Agrmt.pdf . Accessed December 5, 2013.