



**Thompson Falls Hydroelectric Project (No. 1869)  
Thompson Falls Technical Advisory Committee Meeting  
Missoula, Montana (MFWP Office)  
February 7, 2019**

**Welcome** (12:25 PM)

Andy Welch, NorthWestern Energy welcomed everyone and facilitated the meeting. The primary objectives of the meeting are to discuss ladder operations and potential for developing prioritization guidelines for proposals requesting TAC funding.

**Introductions**

Table of those attending the meeting is provided at the end of this document.

**History of the Thompson Falls Upstream Fish Passage**

Ginger Gillin (GEI) provided a presentation on the history of the ladder, including the planning for the fish ladder, data collection and results, and ultimate decisions for the location of the ladder.

There was a review of agency goals and objectives regarding fish passage based on FWP's *Draft Position Paper on Fish Passage at Lower Clark Fork River Dams* (March 14, 2011) and FWS *Guiding Principles for Bull Trout Passage through the Clark Fork River Corridor, MT & ID* (March 31, 2011)

Craig Barfoot (CSKT) mentioned that CSKT also prepared a letter in support of support fish passage at Thompson Falls Dam with the exception of walleye. The CSKT letter was consistent with FWP March 2011 position paper.

**Review/Discuss Fish Ladder Goals & Objectives**

Andy Welch (NorthWestern) presented ladder goals and objectives from NorthWestern and opened the discussion to the group regarding ladder operations.

Andy requested feedback from the TAC about whether the goals and objectives developed and identified in 2011 remain the same. If the goals and objectives of the agencies remain the same, then orifice mode appears to be the most effective mode for passage of native species and sport-species.

**Ladder Operations in 2019 and Beyond**

In 2018, the TAC decided to run ladder in notch in 2018 and 2019. However, after two years of operating in notch mode (2017-2018) and review of the data, NorthWestern proposes to not run the ladder in notch 2019 but switch to orifice mode in 2019 and into the future to maximize passage opportunity.



Kevin Aceituno (FWS) is fine running the ladder in orifice mode. Kevin is more concerned moving forward into relicensing and addressing questions such as, Are the bull trout trying to find the ladder and trying to ascend the ladder having success? The data do not indicate orifice will prevent bull trout from ascending. We (FWS) are focused on the other question, are there bull trout not finding the ladder? For example, the two-bull trout initially tagged in the Thompson River (as juveniles in 2015 and 2017) detected in Prospect Creek (downstream of the dam) in Fall 2018. These fish did not go to the ladder, why? The ladder was closed much of the season, so it maybe they approached the ladder, but it was not operating.

Ryan Kreiner (FWP) is okay with operating in orifice mode. The conversation came up a few years ago when bull trout entered the ladder and did not ascend. We (FWP) want to see if there were things we could do to improve passage such as look into opportunities to explore other trap sites at the Project. Based on telemetry data fish favored the left bank, but through the manipulation of the spill configuration, we were able to attract fish to the right bank. So maybe there is an opportunity to trap fish on left side.

Ladd Knotek (FWP), GEI did a great job on the hydraulics report and identifying opportunities to fine tune orifice operations.

Andy Welch (NorthWestern) - Have the Goals and Objectives reviewed in the PPT presented in today's meeting changed? Are we still on the same page? Do we want to continue to enhance native fishery and sport fish?

FWS- the goal remains the same: "...safe, timely and effective two-way passage for bull trout and secondary would be native species." One goal, volitional passage may need modifying because it won't happen as long as walleye remain an issue downstream. FWS suggests volitional is not likely feasible under current conditions.

NorthWestern – from a company standpoint, NorthWestern will always have a goal of volitional passage but understands the current situation with walleye present downstream does not make that feasible right now.

Ladd Knotek (FWP) – the other issue was discussed was non-native salmonid sport fish (hybrid rainbow x cutthroat, rainbow, and brown trout). Catchable trout downstream of St. Regis is about 300 fish/mile, which is relatively low. We also know there is an issue of brown trout expansion in some areas. Ladd thinks brown trout densities are higher in the Clark Fork River (CFR) upstream of Thompson Falls Dam, so it's unclear if passage of brown trout is an issue or not.

Marc Terrazas (FWP) – are we passing the most "industrious" brown trout upstream? Are we enhancing the recreational fishery?



Ryan Kreiner (FWP) – If we don't pass the nonnative trout (like Brown Trout) upstream of Thompson Falls Dam, are we forcing them into Prospect Creek (a bull trout tributary) or other bull trout tributaries downstream of Thompson Falls Dam. Ryan agrees with goals presented in the PPT by Ginger and Andy of passing as many fish (bull trout, natives, nonnative sport fish) as you can.

Ladd Knotek (FWP) – Goals have historically been and continue to be priority passage of 1) bull trout, 2) native species 3) sport fish (nonnatives).

Andy Welch (NorthWestern) – Asked Shana Bernall (Avista) if they are dealing with the same type of passage issues, passage goals and objectives and agreement on which species can be passed upstream?

Shana Bernall (Avista) we are moving fish from Idaho to Montana so we have to do pathogen analysis and currently we only can pass BULL and WCT upstream of Cabinet Gorge Dam and only BULL above Noxon Rapids Dam. No WCT can be transported from downstream of Cabinet Gorge Dam into Region 4. Mountain Whitefish are also not being transported upstream because IPN was detected in MWF below Cabinet Gorge Dam.

Question asked: Is Infectious Pancreatic Necrosis (IPN) a disease only in salmonids?

*Answer: IPN is a highly contagious disease of trout and salmon. High mortality is typically experienced, especially in fry and fingerling rainbow, brook and brown trout. No species of salmonid fish is completely resistant to the virus. IPN virus also causes mortality in striped bass, sea bass, menhaden, halibut, yellowtail and eel. IPN and IPN like viruses have been isolated from over 65 species of aquatic vertebrates and invertebrates in both freshwater and marine environments. IPN virus occurs in many parts of the world including North, Central and South America, Europe (including the UK), Scandinavia, Japan and Southeast Asia. It has not yet been described in Africa, Australia and New Zealand. The virus tends to become endemic to most watersheds in which it is found.*

<https://www.troutlodge.com/en/resources/technical-papers/infectious-pancreatic-necrosis-ipn/>

Andy Welch (NorthWestern) – it sounds like we are on the same page and our goals and objectives for upstream fish passage at Thompson Falls Ladder prioritize fish in the following order, starting with the highest priority:

- ) Pass bull trout
- ) Pass native species
- ) Pass nonnative salmonid sport fish, but not to the detriment to the first two objectives. (e.g., if brown trout expansion extends into bull trout systems)
- ) Overarching goal is volitional passage and NorthWestern understands volitional passage is not feasible with the presence of walleye downstream of Thompson Falls Dam and the absence of walleye upstream.



There was a question about how nonnative non-salmonid sport fish fit into the prioritization list above – Ladd (FWP) is not concerned about smallmouth bass (SMB) because their densities are higher upstream. Ryan (FWP) - In 2011 (draft position paper), FWP didn't believe these nonnative non-salmonid sport fish would use the ladder and were not a concern (thus no real position presented in the 2011 draft paper). Marc (FWP) – if we keep SMB in Noxon, does it keep predation pressure on walleye? Ladd – primary diet of SMB is not walleye fry (it's crayfish and MWF). FWP and FWS (during TAC meetings in the past) discussed not passing SMB at one time. Craig Barfoot (CSKT) - SMB don't feed much in cool water (less than 8-10 degrees). Ryan (FWP) – SMB are not our primary target for fish passage. The two largest years of SMB recorded at the ladder coincided with large numbers in Noxon surveys. Not opposed to not passing SMB, but what do we do with them? They don't show up in the ladder until about 18 °C...

Jon Hanson (USFS) – do we need to memorialize these goals and the prioritize them?

Brent Mabbott (NorthWestern) - recommend review goals and objectives every 5 years to determine if goals and objectives remain the same.

Kevin (FWS) – agrees to operating the ladder in orifice in 2019 and maybe for the next few years... that is not us (FWS) saying that a possibility of a mixed mode operation is off the table. It's smart to keep meeting, reviewing information, and discussing options.

Andy (NorthWestern) – We (NorthWestern) have two parallel paths: 1) the 10-year report plus a new operations plan (here's what we are doing to pass fish) and 2) the start of relicensing and potential studies.

Ladd (FWP) – there are more brown trout upstream of dam than downstream. Is there preferential use of habitat by the migrating ones? Ryan (FWP) - We know some ladder brown trout enter Fishtrap and WF Thompson River and there are many more LL in Thompson River but not PIT-tagged. Are ladder fish pioneering more than the other LL (not-tagged) already in Thompson River?

Ladd (FWP) - # of catchable brown trout is less than 10% in the reaches. Brown Trout are harder to catch and less significant part of the recreational fishery compared to Rainbow and Cutthroat and RBxWCT hybrids. So if there is evidence that LL pose a threat to bull trout, LL are not a recreational issue to not release upstream of Thompson Falls Dam. Ladd – Subadult brown trout (not large adults) have been identified as expanding into Bull Trout areas. We don't understand how or why LL take hold and expands into the system... not sure if identified mechanism.

Ryan (FWP) – When first started working in Thompson Falls, Ryan heard there were big brown trout in Prospect Creek but don't find them when electrofishing Prospect since ladder started. Not sure if ladder is dispersing upstream.



**Andy (NorthWestern) requested the TAC provide an official vote on operating the ladder in orifice mode in 2019 and into the future and the upstream fish passage prioritization at Thompson Falls Ladder as presented below:**

- ) **Pass bull trout**
- ) **Pass native species**
- ) **Pass nonnative salmonid sport fish, but not to the detriment to the first two objectives. (e.g., if brown trout expansion extends into bull trout systems)**
- ) **Under arching goal is volitional passage and NorthWestern understands volitional passage is not feasible with the presence of walleye downstream of Thompson Falls Dam and the absence of walleye upstream.**

**TAC Vote: Unanimous Yes (CSKT, FWS, FWP, NorthWestern)**

**Craig Barfoot (CSKT) – Yes; Andy Welch (NorthWestern) – Yes; Kevin Aceituno (FWS) – Yes; Ladd Knotek/Ryan Kreiner (FWP) - Yes**

Andy Welch (NorthWestern) – Are we still passing SMB upstream? FWS – prefer to not pass if SMB cannot be killed at the dam. Ladd (FWP) – the numbers of SMB upstream of dam is orders of magnitude more, so not a concern. Craig (CSKT) – large fishery in Flathead River and some overwintering. Passage at dam not a concern. Kevin (FWS) – not a priority topic, FWS vote is to not pass them, but if the group wants to pass, not going to fight it. Andy (NorthWestern) – no opinion if SMB passed or not. Leave passage up to folks operating the ladder in 2019. However, if SMB are not passed, they need to be marked (tagged, punch, etc.) so they do not inflate fish counts and are identified as returning fish in the database.

### **Review of Ladder Hydraulic Evaluation Report**

Chad Masching (GEI) provided a PPT summarizing the hydraulic evaluation report of the ladder that was completed for orifice mode in 2016 and notch mode in 2017.

General terminology and ladder configuration information:

Notch = Overflow mode

Pools 45-48 always operate in orifice mode (exit control), can handle fluctuations in pools in forebay (reservoir). If the forebay operates too high water can bleed off at pool 45 to tailrace

Middle ladder 8-44 pools (mode options for notch and orifice). When discussing mode operations in the annual reports, they refer to the middle pools 8-44.



Pools 2-7 always operate in overflow mode (notch), never in orifice (as had been the case since 2011) due to the add in flows from pool 3, 5, 7 (chimneys) requires notch mode operation in order for those flows to work.

There are 2 fish ladder entrances – one for high tailrace and one for low tailrace levels. The entrances were not intended to operate concurrently. However, operations have had both entrances open.

**Orifice Mode Review:** In August 2016 forebay 2396.9 ft, pool 45 2396.6 ft (design criteria at 2393.0 ft), Pool 45 level sets condition for rest of the pool. Brent found he could add more water to the ladder than the design limit. Design was based on 1 ft pool to pool drop. Found some cases pool drop was more than 1 ft and less than 1 ft. Additional velocities went through the orifices so weren't getting the head drop resulting in carry over velocity so when going to turning pool, water hit a "wall", reset and repeated the process. Pool 19 and 20, drop 1.5 ft. Above pool 21, operating with more energy (higher head) than lower pools.

In orifice mode – with ladder operating at higher elevation, ladder dissipated energy better and provided more black (calm) water for fish. There are some areas to improve hydraulics especially at pool 19-20.

**Notch/Overflow Mode Review** – August 2017 pool 45 2393.25 ft (design criteria at 2393.0 ft). Notch mode increased carry over energy (velocity) in straight runs than in orifice. Pool drop was closer to 1 ft drop pool to pool. Saw corrections at turning pools and a couple of areas with plunging flows. Hydraulic line actual was close to design except for pool 8-9. pool 9 orifice, then pool 8 orifice. pool 7 notch – not ideal hydraulic conditions.

Major findings for notch mode – operating at higher pool 45 level than design is not favorable. Orifice pit tag antenna pools 7/8 and 8/9 disrupt flows (overflow to orifice to overflow), primarily exclude weaker swimmers, carry over energy in straight pools progressively increases, weir submergence and plunging flow was noted at pool 36/37 weir

### GEI Conclusions

- ) Operate in orifice with pool 45 at higher flows, improved overall hydraulics.
- ) If operate in overflow then don't raise pool 45 above 2393 ft level. If operate in overflow, then pull out tag readers in pools 7/8, 8/9 and replace to not disrupt hydraulics.
- ) What can be done to improve flows: concentrate on one operating mode. In orifice, one option may be to look at internal baffles and weir modifications. Another consideration to monitor fish (example, another Tag array). Another option is a computational flow dynamics (CFD) where you can change weir configurations in a model versus in-real time. Utilize new technologies to optimize ladder flow.

Marc (FWP) – have you (GEI) worked out specific recommendations for where the baffles should go?



Chad (GEI) - we have identified general specifications, but modeling may be beneficial. the ladder is a dynamic beast, any time you modify one pool another pool will be impacted.

Andy (NorthWestern) –NorthWestern will look into the CFD model and find out associated costs to model and evaluate the system.

Marc (FWP) – do we need to keep pools 1-7 in notch only? Chad (GEI) – my understanding is the add in flows from pool 3, 5, 7 (chimneys) requires notch mode operation in order for those flows to work. At low flows you won't see add in flows until a certain level, so there is potential to operate lower pools.

Marc (FWP) - Do we still need to run stilling basin at base flow. Chad & Brent: Yes. It goes into pool 1. Brent – another thing we do is open ½ a panel (100-125 cfs) for attractant flow.

Andy - NorthWestern is looking into modeling option and waiting on costs before moving on.

GEI's hydraulic report will be uploaded to the Project website:  
<http://www.thompsonfallsfishpassage.com/reference.html>

### **Prioritization of TAC Proposals**

Andy Welch (NorthWestern) provided a presentation on annual TAC Funding and Spending 2009-2019. Annual funding \$100,000, reserve funding caps at \$250,000. We have had funding available for most projects we wanted to move forward. We haven't had a need to prioritize projects at this time. Are prioritization/ranking criteria needed for annual review of projects?

FWS – thinks it is worthwhile to develop and have it handy before you have issues (or competing projects). A framework document would be beneficial.

Andy - Do we want to refine the tier prioritization concept that was drafted and presented at the Annual TAC meeting in November 2018? Maybe we need multiple ranking criteria. tiers were developed based on bull trout habitat, geography and not included is quality of projects. To-date, the review process has been self-regulated, but maybe we need more formal criteria and guidelines. Andy presented some criteria ideas/concepts (narrative guidelines).

Don Skaar (FWP) – How did this need for prioritization for projects evolve? Andy – two-fold, brought up in the TAC meeting and a follow up after adding Prospect Creek (downstream tributary).

Ladd (FWP) – advantageous to get proposals out to the group earlier. Ryan (FWP) – agree it would be good to review prior to project.

Andy – NorthWestern's preference would be to not have a ranking criteria but to have a narrative guidelines.



Kevin (FWS) – main concern is the challenge to hash out details of projects plus voting at the annual TAC meeting. FWS would like to get proposals for review and discussion earlier.

Andy (NorthWestern) – to summarize, it sounds like the TAC wants a combination of the narrative guidelines presented at this meeting and the tiered prioritization system. The geographic tiers (outlined below) will exclude the mainstem CFR because USFWS BO TC2 specifies bull trout spawning and rearing tributaries.

Narrative guidelines:

- ) Narrative + Tier Prioritization
- ) Targeted Bull Population
  - o Evidence of migratory or resident population
- ) Significance of potential impact on Bull Trout population (overall value)
- ) Funding match
- ) Number of project partners

Tier Prioritization of Project Proposals for TAC Funding - Proposals must meet mitigation funding objectives.

- ) Tier 1 Stream – *Thompson River drainage*, a tributary immediately upstream of Thompson Falls Dam with known migratory Bull Trout presence.
- ) Tier 2 Streams – Tributaries downstream and upstream of Thompson Falls Dam between the Prospect Creek and Fish Creek in the middle CFR drainage and the Jocko River in the Flathead R. drainage that still support migratory bull trout. Other tributaries include: *St. Regis R., Cedar Creek, Trout Creek*.
- ) Tier 3 Streams – Tributaries upstream of Thompson Falls Dam, in the reach from Fish Creek upstream to the Blackfoot River confluence that still support migratory bull trout.
- ) Tier 4 Streams – Tributaries upstream of the confluence with Blackfoot River that still support migratory bull trout.

**NorthWestern will revise the Proposal form to include the narrative guidelines (listed above) and tier prioritization (listed above) for TAC review.** A new proposal form will be prepared and go out to group for review and make sure everyone okay with it before finalized. Once finalized it will be available on the Project website. <http://www.thompsonfallsfishpassage.com>

During this meeting TAC agreed project proposals need to be submitted earlier. **New Deadline for Project Proposals will be November 1.** Submit proposals to NorthWestern by November 1, 2019. NorthWestern will distribute to TAC for review and discussion prior to the TAC meeting. This schedule will allow more time to review and discuss prior to the annual TAC meeting typically held in early December.



Ryan (FWP) – potential project involved property purchase opportunity in the Thompson River. Ryan will notify group as soon as possible. Proposal will likely be out of the normal funding review cycle.

Jon Hanson (USFS) – Any desire by TAC members to look at the TAC funded projects? What does the group want to see and when? Something for the group to think about and discuss next time.

**Adjourn 3:35 pm**

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**February 7, 2019 Meeting Attendees**

<b>Name</b>	<b>Affiliation</b>	<b>Email</b>
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