



Tumwater Dam Stakeholder Discussion – Meeting Notes

January 13th, 2016

Final version 3/10/16



Tumwater Dam Stakeholders Discussion

Sponsored by Cascade Columbia Fisheries Enhancement Group

January 13, 2016

Technology Conference Center; Wenatchee, Washington

Agenda

Time	Topic
8:30	Morning snacks and coffee available
9:00	Welcoming – <i>Jason Lundgren, Executive Director CCFEG</i>
9:10	Meeting Objectives and Administrative Details
9:15	Introductions of Participants
9:45	Understanding Tumwater Dam <ul style="list-style-type: none">• History• Context in:<ul style="list-style-type: none">○ Tribal, State, and Federal Recovery Plans○ Habitat Conservation Plans○ FERC licenses• Current Activities at dam• Decision-making bodies
10:30	Break
10:45	Concerns about Tumwater Dam <ul style="list-style-type: none">• Fish Movement• Operations• Recreation/boating• Highway maintenance• Hydraulics/Hydrology/Sediment movement/River processes• Water and sediment quality• Dam safety and aging• Other
11:30	Envisioning the Future
12:15	Where do we go from here?
12:45	Closing and Acknowledgements

- Cascade Columbia Fisheries Enhancement Group – Jason Lundgren, Executive Director; jason@ccfeg.org

- Facilitator – George Schneider, PE; George Schneider & Associates – georgeschneider2000@gmail.com

Final Notes 3/10/16

Notes:

- (1) Sean Koester (CCFEG) and George Schneider (facilitator) took meeting minutes. Final editing by George Schneider.
- (2) Additional comments that were received on March 1, 2016 by the USFWS CWFO summarize several ideas not fully discussed at the meeting. Those ideas include information about historical information, recovery, whole watershed restoration, ESA, monitoring, and possible next steps. These comments have not been incorporated into the minutes, because they were not part of the actual discussion. Since they add important value to the Tumwater Dam conversation, however, they have been attached at the end.
- (3) Important acronyms, in alphabetical order:
 - CCFEG – Cascade Columbia Fisheries Enhancement Group
 - CCT – Colville Confederated Tribes
 - CDNR – Chelan Dept. of Natural Resources
 - CPUD – Chelan Public Utility District
 - FERC – Federal Energy Regulatory Commission
 - HCP – Habitat Conservation Plan
 - NOAA, NMFS – National Oceanographic and Atmospheric Administration, National Marine Fisheries Service
 - RRF – Rocky Reach Fish Forum
 - USFS – United States Forest Service
 - USFWS – United States Fish and Wildlife Service
 - USFWS CWFO – United States Fish and Wildlife Service, Central Washington Field Office
 - WDFW – Washington Dept. of Fish and Wildlife
 - WDNR – Washington Dept. of Natural Resources
 - WDOE – Washington Dept. of Ecology
 - WDOT – Washington Dept. of Transportation
 - UCSRB – Upper Columbia Salmon Recovery Board
 - YN – Yakama Nation

Introductions

Attendees were asked to state their names, organization and role, and their favorite river.

Understanding Tumwater Dam

This portion of meeting began with Alene Underwood from the Chelan PUD giving a presentation on the history of Tumwater Dam as well as an overview of its current operations. Some of the key points of her presentation - and the ensuing discussion - are noted below:

- Dam constructed in 1909, used to power electric locomotives through tunnel. Stopped production in 1956 due to rockslides that damaged the penstock. Purchased by the PUD in 1957. In 1987 the permanent fishway was installed using BPA funds.
- The so-called “Wenatchee River Project” contemplated at least three more dams on the Wenatchee River, but these were never built. The Chelan PUD studied re-electrification at Tumwater Dam in the 1960’s and 1980’s and determined it wouldn’t be economically

- viable. When asked if it is viable to electrify Tumwater Dam today, Alene answered saying that they have not looked into this since the 1980's, so they do not know.
- Current use of Tumwater, by Chelan PUD, is guided by HCP obligations for hatchery production under the PUD's Rocky Reach and Rock Island Hydroelectric Projects. The fishway and trap are part of the Rocky Reach FERC license. The term of the Rocky Reach license is until 2052. Adaptive management is a strong part of the HCPs.
 - There are many entities using the Tumwater fishway and trap for various fish management and scientific research activities. Groups include Chelan PUD, Grant PUD, WDFW, Yakama Nation Fisheries, and USFWS. Different groups rely on Tumwater Dam to help monitor fish and meet permit requirements (related to operations of mainstem Columbia River dams) and hatchery production goals.
 - The HCP hatchery committee (HC) is made up of members from the Chelan PUD, WDFW, USFWS, NOAA NMFS, Colville Confederated Tribes, and the Yakama Nation. The purpose of the HCP HC is to implement Chelan PUDs hatchery mitigation programs. The HCP coordinating committee (CC) (comprised of the same entities as the HCP HC) ensures that passage of HCP Plan Species through the project is unencumbered.
 - The Rocky Reach Fish Forum (RRFF) has the same member groups plus Ecology, with different individual members. The Rocky Reach Settlement Agreement is a part of the Rocky Reach License and the RRFF implements management plans for sturgeon and lamprey (among other plans) at Rocky Reach Dam. And as well, these are different from Biological Opinions that have requirements. There is some overlap in all these.
 - The HCP HC's role includes an annual broodstock collection plan and Tumwater is currently the location for collection for some program components. Then the committee has to put together a Tumwater operations plan of who is using it when and what they are doing, consistent with applicable permit requirements. Mike Tonseth (WDFW) drafts this plan, and he noted that a big part of the plan at Tumwater is checks and balances of the operations there.
 - Bill Gale (USFWS) noted that all of the programs that the PUD is funding with regards to Tumwater are "recovery related" – that is, it is used as a tool to assist in species recovery. It's not a segregated harvest program. Activities at Tumwater center around broodstock collection and adult management - two key components to species recovery. This is why Tumwater is so important to the hatchery process. Tumwater enables biologists to have a monitoring location to understand and manage the proportion of hatchery influence (the number of hatchery spawners) on the spawning grounds. It also currently acts as an important location for being able to pull strays from the LNFH Carson stock.
 - Kelly Murdock from the Yakama Nation added that Tumwater is very important for their efforts to reintroduce coho salmon to the Wenatchee River basin. They use Tumwater as a site for broodstock collection. The eggs are reared at different facilities, and the fry are acclimated at different sites on the Wenatchee River for release.
 - A discussion ensued around the process of "adult management" at Tumwater. Mike Tonseth elaborated saying that adult management means removing excess hatchery adults from the river. This is done if hatchery returns are in excess of what is needed for escapement goals. PHOS (proportion of hatchery-origin spawners) levels can vary depending on the natural origin return size, and this is what we are trying to manage for.
 - What data is collected at Tumwater, and why? Mike Tonseth stated that they are looking for abundance, age structure, and diversity. Andrew Murdoch (WDFW) replied saying that they handle all of the trapped or most of the trapped fish. They are collecting data on the species, size, age, sex, and PIT tag presence. They try not to touch summer Chinook unless they are for broodstock. Same for sockeye unless they are sampling for a spawning estimate.
 - Management of operations changed as recently as five years ago. All of the hatchery fish used to be allowed on the spawning grounds, but not anymore. Adult management for steelhead started in 2011, and in 2013 for spring Chinook. Tumwater is a great site to

remove fish for hatchery broodstock, and adaptive management is a big change in how we operate now.

- Steve Rainey (USFWS consultant) indicated that there is a difference between restoration and supplementation hatcheries. Mike Tonseth said that a restoration hatchery program that incorporates natural origin broodstock is intended to make it to the spawning grounds in order to support natural stocks. Mike suggested that the intent of harvest programs is harvesting fish and their parents are generally hatchery fish. He provided the LNFH as an example of such a program adding that we don't want fish from the LNFH on spawning grounds on the upper Wenatchee River.
- Steve Rainey explained that he has worked on fish passage issues for a long time and on a lot of projects. He helped design the fishway at Tumwater Dam. He went over the physical facts of the dam and its fishway, describing the ogee dam crest, apron, and fishway. He said that upstream salmonid passage is good when they are not trapping, and poor when they are trapping. (Facilitators Note: this statement of "poor when trapping" is not agreed with by some of the stakeholders. It has been noted that WDFW and Chelan PUD biologists monitor passage during trapping and try to ensure that requirements for minimization of delay are met. See also next bullet). Lamprey passage is poor year-round.
- Steve was asked how often Tumwater was in Trapping Mode, and what the delay was during that period. Mike Tonseth said it depends on the species and time of year, adding that they generally monitor trapping operations to ensure no more than a 48-hour delay of fish in the ladder. Prior to 2008 there was no PIT tag data to know whether there were delays or not. The monitoring system currently consists of PIT tag antennae at weirs 15 and 18 in the ladder (weir 18 is very close to the top, or upstream, end of the ladder). Under current protocols, if the median passage time of tagged fish between weirs 15 and 18 exceeds 48 hours, trapping stops. Trapping resumes when the median passage time drops below 24 hours. No monitoring is done to detect delays in the ladder below weir 15, or downstream of the fish ladder entrance below the dam. (Facilitator's Note: some of these monitoring details were clarified in a post-meeting phone call with Mike).
- In 2010 there were significant delays noted. Operators/biologists improved trapping timing, duration, and location in 2011 and have monitored for delays since that time; no delays have occurred. When asked if there were any issues with juvenile downstream passage, Steve answered that there doesn't seem to be much of an injury factor or delay for juveniles, especially at higher flows. Steve explained passage at different flows. He also explained the operations in trapping and non-trapping scenarios.
- The HCP HC approves changes to the operational protocols at Tumwater annually.
- It was noted that there is a dam lower on the Wenatchee River as well, and asked about the differences in management and passage between these two facilities, and whether Dryden dam could achieve Tumwater's goals. Steve Rainey said that fish can pass over Dryden dam at higher flows. Alene added that they do collect some fish at Dryden Dam, and have decided to move as many activities as possible from Tumwater to Dryden to improve operations at Tumwater - but they do some things at Tumwater that they can't do at Dryden. A good example is that they collect hatchery steelhead at Dryden and wild steelhead at Tumwater. Jeff Korth (WDFW) stated that the activities that take place at Dryden Dam reduce the impacts that the Tumwater facility has on fish.

Concerns about Tumwater Dam

Lamprey

- RD Nelle (USFWS) gave a presentation on the presence and distribution of Pacific lamprey in the Wenatchee River. He showed the historic and current distribution as well as some population estimates. He described their and other agencies' sampling efforts for lamprey in the Wenatchee. Lamprey are a species of concern for USFWS.

- Currently there are lamprey present below Tumwater (detected as close as 1 km below the dam), but not between the dam and Lake Wenatchee (95% confidence level). In 1981 biologists from the Chelan PUD detected lamprey above Tumwater. The USFWS and others did a quick adult lamprey passage assessment recently when the fishway at Tumwater was dewatered. They found some features that would not be good for lamprey passage such as sharp edges, pitted concrete, a raised sill between steps, and others.
- James White (UCSRB) stated that it looked like we have confirmed lamprey presence above the dam previously, so it seems like passage is definitely an issue. He asked if we are explicitly making that statement. RD stated that we just don't know. Steve Rainey added that when the fishway was design lamprey weren't on the radar. It has been in the last 10-15 years that lamprey have been looked at.

Boating

- Tom O'Keefe (American Whitewater) said that Tumwater Canyon has emerged as a popular whitewater resource in recent years. The whole river reach is important to the boating community. The Forest Service recognizes the recreational value in their scenic plans. We have people coming from all over the country to train there. When asked if the dam is an impediment or an attractant, Tom replied saying that it's an attractive nuisance; and it does degrade the overall recreational quality.

Highway 2

- Claton Belmont (WSDOT) said that Tumwater canyon is an important East – West corridor. WSDOT inherited that section of Hwy 2 in the 1920's from the railroad. There are issues with rock falls in the canyon, and some segments of the highway near the dam, as well as away from the dam, have been lost in high water years. The highway section just downstream of the dam has been hardened and has been stable in recent years. Analysis has shown it is more cost effective to do repairs to that section of highway than to remove the dam or move the highway to the Chumstick Canyon.
- Rocky Hrachovec (Natural Systems Design) stated that Tim Abbe of his firm did a study for WSDOT in 2009 of the reach around Hwy 2. Low flows are 350 cfs, average 8,200 cfs, 100-year flood of 28,000 cfs, and 500-year of 37,000 cfs. One key conclusion from this study was that the dam exacerbates channel constriction and road failure at that location. Although even without the dam the road would be in a bad location. Landslides have been prevalent for a long time. The railroad made a good call pulling out of the canyon. There is about ¼ million yards of sediment behind the dam. The model says that if you pop the dam out then there would be a local effect directly upstream and downstream of the dam. The dam has direct negative impacts on the road, but removing the dam probably won't fix the road issues. Removal would however restore natural processes in this reach. Even with the dam removed we are still looking at a system very heavily modified by humans. Big washouts happen at flows over 33,000 cfs, and repair costs of about \$1 / 4 million - still not as much as replacing the road.
- There was discussion about the alluvial fan directly below Tumwater Dam. It is expected that this alluvial fan will become more of an issue as the result of recent fires. Garrett Jackson (WSDOT) mentioned that the dam does have a positive effect on part of the highway because of the calming effect of Lake Jolanda behind the dam. When asked if DOT would ever abandon Tumwater Canyon and move the highway, Claton said that there haven't been any recent studies on doing this.

Water temperatures and TMDLs

- Mark Peterschmidt (Ecology) noted that elevated temps are some of the biggest issues on the east slopes of the cascades. There is a temperature TMDL (total maximum daily load) on the Wenatchee River including Tumwater Canyon. However the TMDL is pretty silent on Tumwater Canyon and Tumwater Dam. A summary of the implementation strategy is basically to work with changes as they occur or are proposed. The DOE hopes to improve water quality as other things are improved.
- Russ Ricketts (Native Fish Society) asked if there has ever been any temperature monitoring in this reach. How warm does Lake Jolanda get in a year like last year? Could it be a thermal barrier? Mark responded saying that the DOE has done some monitoring and what they have done is available on their webpage. (Note: Mark was a last-minute sub for Sage Park, so didn't have time for preparation for this meeting).

Dam Safety and Maintenance

- Chelan PUD has a safety engineer who does annual and routine checks of Tumwater Dam. The dam has a "low" hazard rating. When asked about the life expectancy of the dam, Alene said that depends on a lot of factors. Rocky stated from his personal experience with the removal of the Mill Creek Dam that "they don't make concrete like they used to". He added that just because Tumwater Dam is 100 years old doesn't mean it's falling apart.

Recovery and Management Plans

- Steve Lewis (USFWS) said that Tumwater Dam is not specifically targeted in the current Bull Trout Recovery Plan, but that it is part of some of the global issues such as passage, delays, etc. **(Note: In a post-meeting comment letter, attached, USFWS corrected and added to this information).**
- Phil Archibald (CCFEG board member) recalled a discussion quite a few years ago that may have been speculative about passage and injury over the ogee spillway. The dam also catches a lot of wood, any issues with that? There are some things that are still worth investigating about this dam as well.
- James White (UCSRB) stated that Tumwater was a very rich discussion during the creation of the salmon recovery plan. It was decided that because of greater benefits vs. impacts, it was not called out in the plan. He further added that we couldn't not have Tumwater Dam and also operate with the current hatchery management tools. The management tools Tumwater provides outweigh the costs to the listed species.

Bull Trout

- Karl Halupka (USFWS) said that he thinks that there is uncertainty around what happens to bull trout when they encounter Tumwater Dam, especially around low flows. We have low abundance in our local populations, so injury to a few bull trout can really be an issue. Steve Rainey said that before we wonder if bull trout could get injured at low flows, we should consider if they would even go over the dam at low flows.

Upstream Passage Delays

- As described above, the protocols in place to minimize upstream passage delay rely primarily on a monitoring system consisting of PIT tag antennae at weirs 15 and 18 in the ladder (weir 18 is very close to the top, or upstream, end of the ladder). No monitoring is done to detect delays in the ladder below weir 15, or in the river downstream of the fish ladder entrance below the dam. Improved monitoring would be needed to determine the occurrence and duration of additional delays that might be occurring downstream of the present PIT tag array.

Use of Lake Jolanda

- No residents or business owners attended the meeting, though George mentioned that in a pre-meeting discussion, the owner of Alps Candy Shop did not express concern over the possibility of the lake reverting to a river if the dam was removed. He said people come for the delicious sweets - not the water! He expressed confidence in the management of the facility by Chelan PUD.

Envisioning the Future

- Breakout Group 1: Given several unknowns (passage issues, sediment quality, water temperature), two over-riding objectives emerge: 1) removing the need for hatchery supplementation in the Upper Wenatchee, and 2) understanding and remedying the lamprey passage issues. A focus on the restoration of habitat in the upper Wenatchee watershed would help remove the need for hatchery supplementation.
- Breakout Group 2: There are not apparent viable alternatives to Tumwater Dam, but the lamprey distribution can be addressed, and the monitoring program needs to remain effective. We all recognize that there are issues, and we should spend the next 10 to 20 years resolving those issues.
- Breakout Group 3: Few alternatives to Tumwater Dam are apparent for management of fish stocks, as tributary weirs have their own set of significant problems and challenges in a river system like this. We should look for opportunities to improve downstream passage and lamprey distribution. There are some issues at Tumwater, but with a great benefit, and few alternatives. Making the necessary changes to improve passage conditions is the best course of action given the current situation.
- Breakout Group 4: Weirs in tributaries could be an alternative, but are very challenging, and Tumwater Dam could be modified for passage improvement. The hatchery programs could be continuously refined by responding to future delistings and changes in the overall context of recovery and harvest objectives. We should consider trading off habitat improvement with hatchery production, with a goal to reduce hatchery production.
- Breakout Group 5: Noted that we are currently keeping the dam to mitigate for the impacts of other dams. What are the drivers to remove Tumwater Dam? Passage? Not really. Falling apart? No. Maintenance costs? No. Recreation drivers? No. DNR lease? No. Natural processes? Maybe. The status quo at this dam has a lot of inertia, and will take a lot of effort to get it out. Their vision for the future is a free flowing river with a fish counting/collection facility somewhere upstream of the Icicle River and downstream of the Chiwawa River.
- Breakout Group 6: Rocky Reach Fish forum should work on the passage issues at Tumwater Dam. If we improve the habitat conditions, that will create more wild fish to replace the hatchery fish. Existing DNR lease should be updated with new plan of operations, with an agreement to operate in accordance with good management of ecological processes. The public safety risk should be investigated. Allen Lebovitz (WDNR) said that the dam sits on state-owned aquatic lands managed by DNR, and that there is an agreement about the intended purpose of the dam, although there could be some interpretation of that agreement. Maybe we need a new plan of operations tying into stewardship. The plan of operations at Tumwater Dam should include how the dam will manage natural ecological processes and fish impacts. Allen said that they would

want to make sure the facility doesn't create hazards to public safety or is otherwise a public safety risk.

Possible Next Steps (suggested by Participants)

- The existing Rocky Reach Fish Forum (RRFF) has a history of addressing issues with Tumwater Dam fishway and trap and the over-arching strategies and plans that relate to Tumwater. Utilize the RRFF (with input and coordination with the HCP Hatchery and Coordinating Committees, and other experts and outside groups as needed and requested) to investigate and recommend actions related to:
 - Passage improvements – upstream delay, downstream passage, etc.
 - Monitoring improvements – goal is to expand the level and efficiency of detection of fish movement
 - Lamprey distribution issues
 - Ecological and physical processes
 - Possible temperature issues
- Request that the RRFF develop/update an explicit statement of objectives that are served by Tumwater Dam. This could serve multiple functions: (1) shared understanding on the functions that agencies expect the dam to serve; (2) going thru the exercise might correct misperceptions and/or lead to more accurate understanding, and; (3) serve as the basis for determining whether current objectives/functions could be provided through alternative approaches or locations, or even abandoned. Provide this assessment to interested stakeholders for comment and input.

Final Thoughts from the Facilitator

I really appreciated the enthusiastic response to this CCFEG initiative, and was gratified that the meeting went so well. A lot of information, opinions, and diversity of perspectives were shared, always in a respectful manner.

As I stated in my introduction, one ideal vision of the future does not contain Tumwater Dam, since that vision assumes the full recovery of native fish stocks, hence the elimination of the need for hatcheries and Tumwater Dam as a tool in hatchery and wild fish management. But that future may be far off. And, it could be argued that hatcheries are absolutely necessary if we wish to continue commercial, sport and tribal fisheries at current levels. In the meantime, the dam is considered a convenient and indispensable facility by most of those agencies involved in mainstem Columbia dam mitigation, hatchery programs, and research/ data collection. Ongoing monitoring and improvement at the dam's fishway and trap is the prevailing practice.

That some stakeholders believe the dam and its operations have detrimental impacts is also apparent. It appears that the existing forums created under the HCP, FERC license, and watershed planning processes are well positioned to continue to consider how to quantify and minimize these effects while still meeting the goals and requirements of FERC licenses, HCPs, and other legal agreements and permits. But other factors play in as well, including regional recovery plans, hatchery reform, climate change, and evolving social attitudes toward rivers and societies' relationship to them. The complexity of all of the above suggests that periodic broad stakeholder engagement is wise.

I noted this interesting exchange at the meeting, which underscores some of the complexity:
“Tumwater Dam is the biggest physical obstacle, and could be the largest hindrance to ecosystem function in this watershed. We cannot achieve fish recovery without recovering the physical processes in this watershed”. Followed by: “We can’t achieve watershed recovery without fish recovery. Tumwater Dam would have to be one of the last things to come out.”

Thank you for all the good work you do, and good luck!

George Schneider, PE

	Name	(Alphabetical Order by Organization)	Job Title	Email	At meeting ?
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2.	Michael Garrity	American Rivers		mgarrity@americanrivers.org	
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4.	Jason Lundgren	CCFEG	Executive Director	jason@ccfeg.org	yes
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6.	Sean Koester	CCFEG	Monitoring, Outreach and Education	sean@ccfeg.org	yes
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17.	George Schneider	George Schneider and Assoc.	Facilitator	georgeschneider2000@gmail.com	yes
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20.	Tim Abbe	Natural Systems Design		tim@naturaldes.com	
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52.	Mark Peterschmidt	WDOE	Water Quality	Mark.peterschmidt@ecy.wa.gov	yes
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54.	Claton Belmont	WSDOT	Region Environmental Mgr	belmonc@wsdot.wa.gov	yes
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60.	Brandon Rogers	Yakama Nation		rogb@yakamafish-nsn.gov	

Comments for Tumwater Dam Stakeholder Meeting and Notes

Compiled by Judy Neibauer, Fish and Wildlife Biologist, USFWS, Central Washington Field Office
March 1, 2016

1. History: There is some additional history that can be gathered from the USFS archeology and lands staff, Federal Highways, and likely Burlington Northern that would be a good augmentation for this section in the notes or leave a placeholder for gathering this other information at a later time. USFS lands adjoin and/or may part of the lands under the dam. There are archeology sites along the Wenatchee River. If any action is to occur, having the USFS partnership is key to understanding adjacent impacts and uses. There is an older Watershed Assessment completed by the USFS that further describes this area of the Wenatchee Basin and its history. The Forest Service Leavenworth or Wenatchee Offices would have a copy of this.

2. Recovery: We need to be careful how we portray the word "recovery" in these notes particularly how the dam relates to recovery. The dam is not there for "recovery", but because it is there it is currently used as a tool. It is used in place of other means to gather "population information" or to capture non-wild fish. The population information helps to develop status assessments for recovery or for development of population information (i.e., for reviewing listing status or hatchery work), or for the monitoring of impacts/threats to populations caused by dams on the Columbia or for future fisheries/hatcheries... Thus, most recovery plans don't advocate for having a dam to recover a species. Data can also be gathered in other ways and should be the point of a discussion.

For example, for Bull Trout Recovery, the USFWS 2015 final Bull Trout Recovery Plan (BTRP) has several criteria aimed at recovery of bull trout. It discusses that threats need to be reduced to improve demographics and criteria applies both within a core area (i.e. Wenatchee) and outside a core area in shared FMO (i.e. Columbia River, lakes, etc). Recovery Actions in a general nature are listed and the following goals are described: "Minimize demographic threats to bull trout by restoring connectivity or populations where appropriate to promote diverse life history strategies and conserve genetic diversity." Maintaining Connectivity both within and outside of core areas are necessary is part of the "Recovery Criteria" (Page 46-47; and 50-52).

Threats and Actions are further described in the BTRP appendices. Specifically, the Mid-Columbia River Bull Trout Recovery Unit Implementation Plan (RUIP) mentions the following threats and actions:

Tumwater Dam is identified as part of an ongoing threat to bull trout demographics and connectivity (Pg C-19, described in the "Entrainment and Connectivity/Fish Passage" (Page C-19) section; and Tumwater is listed as an example action in the Recovery Measures Narrative (Pg C-93 and C-95), and is mentioned as a recovery action in several places (Pg C-222-C224) and in the Implementation table as action #1.2.5 and #2.1.4.

As well, "whole watershed restoration" is described as part of actions associated with # 1.2.2 and is described as a conservation recommendation (Pg C-100); and it is an expected goal we work towards (Pg C-92) for instream projects in all our Central Washington bull trout Core Areas.

Finally, in salmon recovery plans, protecting and improving stronghold populations is described as an important aspect of recovery. Improving connectivity to populations (i.e. Nason and Icicle Creek) to enhance all life history forms is also described as essential. Tumwater dam is the only structure in the Wenatchee River that fully interrupts connectivity in spawning areas for both Chinook and Steelhead and forage, migration, overwintering habitat for bull trout. Fish passage

features currently are designed to allow salmon passage. Larger migratory bull trout seem to be able to move up the fish ladder. However, passage, is likely hampered for other smaller bull trout and other native fish species some of which make up the preybase for bull trout and other native trout including smaller steelhead.

Tumwater Dam is mentioned in the Upper Columbia Biological Strategy in several places for example: First, in "Table E1" on Page 8 in the Middle Wenatchee River assessment unit as a priority 1 data gap. Second, it is mentioned in the detailed summary for the assessment unit priority actions table. Tumwater is again listed for data gaps (Pgs 21-24) and the mainstem upper/middle Wenatchee is mentioned as being in need for restoration components.

3. Whole Watershed Restoration Approach: In terms of the habitat/and river channel there is the need for some assessment and determination of impacts caused from the placement/location of the dam.

With the history of log drives, the railroad, the highway, and structure of the dam itself, an assessment for "Whole" Watershed" restoration should analyze Tumwater Dam as part of a mainstem restoration strategy for improvements of 1) connected populations/preybase or native fish assemblages; and 2) connected and functioning instream and riparian habitat.

The development of a "whole watershed" approach would meet the needs of the bull trout recovery action mentioned above in comment #2. Along with any restoration in this area, plans would need to minimize impacts to existing listed species. Understanding whole watershed restoration plans would likely help to develop alternatives and minimize the number of equipment entries and impacts. Understanding the direct impacts to salmonid populations and their preybase, or "native fish assemblages" at the dam site and understanding how the dam may impact population and habitat features both upstream and downstream is also desirable.

4. ESA discussions/coverage of Tumwater Dam:

Currently, the Chelan PUD has a Biological Opinion for bull trout harm and harassment for the operation of the Fish Ladder at Tumwater Dam under Section 7 of the ESA. They have specific requirements to minimize harm and to report impacts and "take" for the ladder operation. However, the operation and maintenance of the Dam is not covered in a Biological Opinion and does not have any take coverage. This is mentioned in our FERC re-licensing consultation letter to the Chelan PUD.

As well, WDFW coordinates with USFWS and NOAA under Section 6 of the ESA for coordination of impacts to bull trout and any take as it occurs as part of their operations, including direct take incurred through handling of fish and their fish monitoring activities and impacts on bull trout is annually reported to the USFWS.

The Yakama Nation is covered for their impacts and is authorized for specific take for their current coho program and is responsible for reporting those impacts.

Thus, ESA coverage depends on the funding, authorization, or the owner. Coordination with USFWS and NOAA, to understand impacts to the species, will need to occur as any changes in operation of the ladder or maintenance to the dam are formulated. Similarly, early discussion with the Services about alternatives for instream restoration work will need to occur.

5. Overview of Monitoring Activities: The service is actively working with all partners operating the dam to minimize harm, harassment, wounding, killing (i.e. Take) of bull trout from fish handling and monitoring activities at dams and weirs. Individual bull trout are impacted multiple times while moving downstream and upstream. Individuals from multiple populations are impacted. We have both telemetry and some PIT tag data that shows which populations might be impacted, timing of use, and some passage information. This would be helpful for you during any management options.

6. Next Steps: The Service would like to see a larger group of stakeholders along with the Fish forum individuals work together to keep the momentum of this work going. Having the USFS, the Wenatchee watershed habitat committee, and other interested publics are important. Options for alternate monitoring sites should be reviewed, hydraulic and habitat assessments should be completed. To begin discussions, the development of a table with dam activities and potential alternative locations or monitoring program changes might help to begin a good discussion and may lead the group to what assessments might be needed to be to begin to think about reducing, removing/reducing impacts at Tumwater Dam, changes in locations for future monitoring efforts.

Summary: In summary, we would like to see momentum continue, including; 1) an assessment of fish monitoring activities and a brainstorm activity with the development of a list of alternative methods for future monitoring that reduces impacts to native fish including bull trout and their preybase; 2) a passage assessment for bull trout, lamprey, whitefish, sockeye, salmon, etc.... and the other native fish would assist in understanding delay, passage issues, etc., and that might help to determine alternative actions; and 3) a whole watershed restoration assessment that would guide restoration alternatives. With numbers of bull trout declining in some populations, improving connectivity and minimizing direct harm to bull trout and other species are important for insuring survival to recover bull trout. Maintaining a dam with the purpose for monitoring/trapping fish populations in the basin does not assist in meeting connectivity criteria outlined in the Final Bull Trout Recovery Plan.