Data Submitted (UTC 11): 4/11/2020 7:00:00 AM
First name: Robert
Last name: Mecklenburg
Organization:
Title:
Comments: See attached document for full comments.

SUMMARY OF COMMENTS

* There is strong evidence against the conclusion that Gold Creek Pond, Heli's Pond, or the groundwater drainage system are primary contributors to dewatering of Gold Creek. There is no objective data to support configuration of the streambed of Gold Creek as a contributor to dewatering.

* There is strong evidence against reconstruction of Gold Creek Pond, Heli's Pond or the Starwater drainage line as means to re-water the creek and improve habitat for bull trout.

* There is strong evidence to support the conclusion that reduction in snowpack is the primary contributor to dewatering of Gold Creek.

* There is strong evidence that the deficit in snowpack and continuing loss of snowpack makes it unlikely that any of the proposed actions will re-water the creek or recover the bull trout population.

[Forest Service note: Full text of attached comments added below. Due to formatting constraints, images cannot be converted to text. Additional notes are provided within the copied text as appropriate.]

INTRODUCTION
MY PERSPECTIVE

I am a research scientist who has worked for the National Institutes of Health, the Food and Drug Administration, the Centers for Disease Control, and the State of Washington. My professional activity includes appraisal of scientific papers submitted for publication in scientific journals and evaluation of project proposals to inform policy decisions. I have supported the I-90 Wildlife Corridor Project, Forterra, the Mountains to Sound Greenway Project and Conservation Northwest.

PURPOSE AND ACTIONS FROM THE NEPA DOCUMENT

The scoping document states that: 1) [ldquo] The primary purpose of this project is to recover Gold Creek bull trout, [hellip][rdquo], 2) Annual dewatering of Gold Creek is a significant cause of bull trout mortality, and 3) proposed actions, focused on the [ldquo]primary contributors to seasonal dewatering[rdquo], include reconstruction of Gold Creek Pond, Heli[rsquo]s Pond, the channel of Gold Creek and a groundwater drainage system under Starwater cabins.

The proposed actions are based on an unlikely and unquestioned assumption, used as an [ldquo]anchor[rdquo] point for the project, namely that creation of the ponds, the drain line and the configuration of the streambed are the cause of dewatering of Gold Creek and further, that reconstructing these three would re-water the creek and confer benefit to bull trout.

This assumption is clearly incorrect. It is common knowledge that Gold Creek dewatered extensively and consistently beginning no later than 1968, at least 10 years prior to creation of Gold Creek Pond, 13 years prior to construction of Starwater drain lines, and 26 years prior to creation of Heli[rsquo]s Pond.

Substantial evidence indicates these three contain neither the cause nor the remedy for dewatering. The proposal offers no plan to re-water the creek or to provide material benefit to bull trout.

SUMMARY OF COMMENTS

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[middot] There is strong evidence that the deficit in snowpack and continuing loss of snowpack makes it unlikely that any of the proposed actions will re-water the creek or recover the bull trout population.

METHODS

To assess the efficacy of the proposed actions in meeting the primary purpose of the project, I have reviewed independently and with others:

[middot] Published historical data and direct reports from landowners residing adjacent to Gold Creek prior to construction of the Gold Creek Pond,

[middot] Methodology, data, and conclusions of NSD technical documents,

[middot] Federal and state climatological data and reports,

[middot] Scientific literature related to dewatering of watercourses in the Northwest,

[middot] Expert opinion presented at public meetings,

[middot] Documents related to the Integrated Plan and the Final EIS for the [ldquo]K projects[rdquo]

In addition, I have attended multiple meetings with agency individuals from Reclamation, the Snoqualmie-Mount Baker and Okanogan-Wenatchee National Forests, agency committees such as the Technical Work Group and Bull Trout Working Group, Forterra, and Conservation Northwest. I[rsquo]ve met many times with Natural Systems Design (NSD) and Kittitas Conservation Trust (KCT).

Four categories of information are excluded or are underrepresented in the scoping document, each of which is essential to evaluation of the efficacy of the proposed actions and each of which should be included. These include:

1. STATEMENT OF A SPECIFIC, MEASURABLE, AND FEASIBLE GOAL PERTINENT TO RECOVERY OF BULL TROUT.

2. INCLUSION IN THE NEPA DOCUMENT ACKNOWLEDGEMENT THAT CONSISTENT SEASONAL DEWATERING OF GOLD CREEK OCCURRED AT LEAST 10 YEARS PRIOR TO CREATION OF GOLD CREEK POND, 26 YEARS PRIOR TO CONSTRUCTION OF HELI[rsquo]S POND AND 13 YEARS PRIOR TO CONSTRUCTION OF STARWATER DRAIN LINES.

3. INCLUSION IN THE NEPA DOCUMENT A QUANTITATIVE EFFECT OF DECLINING SNOWPACK ON GOLD CREEK, IN COMPARISON TO THE QUANTITATIVE CONTRIBUTIONS OF PURPORTED [ldquo]PRIMARY CONTRIBUTORS TO SEASONAL DEWATERING[rdquo] CITED IN THE NEPA DOCUMENT.

4. INCLUSION OF RESULTS OF INDEPENDENT SCIENTIFIC APPRAISALS OF NSD[rsquo]S METHODOLOGY, CONCLUSIONS AND RECOMMENDATIONS.

The remainder of this document will discuss these four items in greater detail.

RESULTS

1. STATEMENT OF A SPECIFIC, MEASURABLE, FEASIBLE, AND RELEVANT GOAL PERTINENT TO RECOVERY OF BULL TROUT.

An essential intermediate outcome measure for recovering bull trout is achieving perennial flow in Gold Creek to eliminate stranding pools. A final outcome should be, for example, achieving a sustainable population of 100 fish within 10 years. Completing a project is not an outcome.

This figure adapted from of NSD[rsquo]s 2013 draft Hydrology Figure 18 addresses feasibility. It shows that the length of the dewatered reach extends 1.25 miles upstream from the pond and 70 feet above the surface elevation of the pond. In addition, and as noted below, Gold Creek has incurred an a loss of 60% of its April snowpack over the last 70 years, a decline that continues at a rate of approximately 10% per decade. Restoring this reservoir of snow water and adding additional water to offset the ongoing deficit is a necessary specification to fill the creek. Reducing the rate of current losses may slow progression but will not repair the cumulating effect of declining snowpack.

QUESTION: Why doesn[rsquo]t the NEPA proposal include a discussion of the above requirements, the means to achieve perennial flow, and data to estimate the likelihood of achieving this intermediate goal?
[Forest Service note: Due to formatting constraints, the referenced image could not be converted to text. The image is titled [ldquo]Figure 18 [ndash] Profile with current and historic channel widths through the project reach[rdquo] attributed to the [ldquo]Gold Creek Habitat Assessment & Conceptual Design[rdquo] by Natural Systems Design. The commenter provides narrative descriptions of content in the text above. Image is available for review in the original document.]

2. CONSISTENT SEASONAL DEWATERING OF GOLD CREEK OCCURRED AT LEAST A DECADE PRIOR TO CREATION OF GOLD CREEK POND, HELI[rsquo]S POND AND STARWATER DRAIN LINES.

The NEPA document includes an imprecise statement concerning dewatering of the creek. The NEPA document should include the evidence from multiple sources that a mile of Gold Creek dewatered consistently for at least 50 years, and as noted above, many years prior to existence of the proposal[rsquo]s [ldquo]primary contributors to seasonal dewatering[rdquo].

The area adjacent to Gold Creek between Gold Creek Pond and Heli[rsquo]s Pond (RM 1-2) has been continuously occupied since 1968. The creek has been observed and bull trout rescued from stranding pools by multiple cabin owners over this interval. Here[rsquo]s a historical recap:

The image contains a vertical timeline running from 1940 to 2020. Some elements are single years, some occur over multiple years.

1945-07 Average April snowpack declines 9.3% per decade at nearby Olallie Meadows recording station

1968 Jim Bennett notes a mile of dry creek bed the summer he builds the first cabin on Gold Creek

1968-78 Gold Creek dewaters 10 years prior to creation of the Pond

1970-75 Four additional early cabin owners near the creek confirm consistent and extensive dewatering

1978-83 Gold Creek Pond is constructed adjacent to the lower end of the mile of dewatered creek

1968-81 Gold Creek dewaters 13 years prior to Starwater drain lines

1981 Drain lines are placed under Starwater lots

1968-94 Gold Creek dewaters 26 years prior to creation of Heli[rsquo]s Pond

1994 Heli[rsquo]s Pond is constructed a mile upstream from Gold Creek Pond

1996 Flood control berms are added a mile upstream from Gold Creek Pond

1968-present Gold Creek continues to dewater annually

2015 KCT and NSD assert the Pond dewaters the Creek and recommend filling Gold Creek Pond

2019 KCT acknowledges the Creek dewatered prior to construction of Gold Creek Pond and filling Gold Creek Pond would not re-water the creek

[Forest Service note: Due to formatting constraints, the referenced image could not be converted to text. A description and retyped text are provided above. Items are arranged in the same top to bottom order as displayed in the image. Image[rsquo]s red text is displayed in italics. Image is available for review in the original document.]

Supporting data: Local history of dewatering prior to ponds and drain lines

a. Date of construction of the Pond.

According to the US Forest Service, the Pond was constructed between the late 1970s and 1983.

[Forest Service note: Due to formatting constraints, the submitted image could not be converted to text. The image is labeled [ldquo]USFS sign at Gold Creek Pond.[rdquo] The title [ldquo]AS THE NOISE DIED AWAY[rdquo] is legible. The remaining text could not be read. Image is available for review in the original document.]

USFS sign at Gold Creek Pond

b. Date of documentation of onset of extensive de-watering.

In 1968, ten years prior to the construction of the Pond, Jim Bennett described extensive dewatering of Gold Creek when he built the first recreational cabin adjacent to the Creek. In his words:

1968
[ldquo]We relied on trips to the Creek with buckets in hand for our drinking and washing water supplies. But as the weather grew drier and hotter, we had to go farther and farther upstream to find water.

Eventually, when summer turned to early fall, the rains returned, and the stream returned closer to home.[rdquo]
-from chapter II, 1968, TheSpirit of Ski Tur Valley, James Bennett, Xlibris Corporation.

Note: this cabin is located at RM 1.7. In his book, Jim also reports unauthorized vehicles driving around a security gate on the dry streambed in the area of RM 1.3-1.4.

c. Documentation of consistent and extensive dewatering since 1968.

The area adjacent to Gold Creek between RM 1 and 2 has been continuously occupied since 1968. Four additional cabin owners report consistent dewatering in the interval between 1968 and 1978, when work commenced to construct of the Pond.
[Forest Service note: Due to formatting constraints, the submitted image could not be converted to text. The image appears to be a book cover reading [lsquo]THE SPIRIT OF SKI TUR VALLEY James G. Bennett[rdquo]. Image is available for review in the original document]

1972
[ldquo]Chuck and his original partners leased the lot in 1971 and built the foundation and sub-floor. When the partners backed out in 1972, Chuck asked Mike if we were interested. We started work on the sub floor that summer. It had been a record year for the snow pack so we had to dig down to the sub floor in mid-June. I remember that in July, there was water in the creek, but by the end of August it had dried up. We always thought if there was no snowpack in the mountains it meant no water in the creek.[rdquo]

--N.B

Early to mid-1970s

I was able to track down Mike D. He concurred with me that indeed Gold Creek did consistently dewater in late summer in the early- mid 1970[rsquo]s.[rdquo]

-- C.D. reporting for M.D.
1972
[ldquo]My family had a lot in Ski Tour Valley from 1972 until 1995[hellip] With the exception of a few years (perhaps two or three in the last 20+ years) the water level during dry weather recedes to the point that the entire creek bed is dry (except for a few "Fishing holes" which may have a fish or two trapped in a shallow pond.) These fish usually don't last for more than a day or two. This dry bed situation can last for several days to several weeks. It kills virtually every living fish and frog etc. The "critters" take care of the cleanup. [ldquo]

-- T.M.
1975
[ldquo]As you know the D. family has been a part of the Ski Tur Valley community since 1974. We have witnessed de-watering of Gold Creek in mid-late August on a regular yearly basis since our first summer in 1975. We would always attempt to rescue the bull trout from the shallow water potholes and take them upstream to no avail. The Creek would commonly de-water well past the trail head to Joe and Alaska Lakes, a good two or more miles upstream.[rdquo]

--C.D.

d. KCT acknowledges on their website that Gold Creek has dewatered since at least the 1960[rsquo]s and that filling the pond will not re-water the creek.

At the Gold Creek Pond Design Charrette in December 2018, Mike Ericsson of NSD and William Meyer of WDFW each acknowledged that filling the pond would not re-water the mile of dewatered creek.

Data from KCT, Gold Creek Pond Restoration Design Charette document, December 13, 2018

QUESTION: How do the authors of the NEPA proposal conclude that Gold Creek Pond, Starwater drain lines and Heli[rsquo]s Pond are primary contributors to seasonal dewatering a mile of Gold Creek when there is data that shows consistent and extensive seasonal dewatering of Gold Creek occurred at least:
[middot] 10 years prior to creation of the Pond,

[middot] 13 years prior to Starwater drain lines,

[middot] and 26 years prior to creation of Heli[rsquo]s Pond?

3. DOCUMENTED DECLINE IN APRIL SNOWPACK IS THE PRIMARY CAUSE OF DEWATERING OF GOLD CREEK.

KCT and NSD have made an unsupported claim that Gold Creek Pond, Heli[rsquo]s Pond, and the Starwater drain line are the primary contributors to dewatering without measuring their effect or comparing results to the well-documented quantitative effect of loss of snowpack.

There is strong evidence to support the conclusion that the documented decline in April snowpack is the dominant cause of dewatering of Gold Creek.

Supporting data: Declining snowpack associated with climate change

a. April snowpack has declined rapidly across the Northwest for 60 years.

The key requisite for bull trout habitat in late summer is water from snowmelt. According to the Environmental Protection Agency, [ldquo]Large and consistent decreases (in snowpack) have been observed throughout the western United States. Decreases have been especially prominent in Washington, Oregon, and the northern Rockies[rdquo].

https://www.epa.gov/climate-indicators/climate-change-indicators-snowpack

[Forest Service note: Due to formatting constraints, an included image could not be converted to text. Image is available for review in the original document. The image is titled [ldquo]Trends in April Snowpack in the Western United States 1955-2016.[rdquo] The commenter provides narrative description of image content in the text above.]

b. Less than half of previous April snowpack remains in Gold Creek Valley.

This graph from the Office of the Washington State Climatologist illustrates three points relevant to proposals to restore Gold Creek Pond. The trend line is generated by a large quantity of data and meets standards for statistical significance.

[middot] Documentation of seasonal dewatering of Gold Creek in 1968 was preceded by years of rapid loss of April snowpack,

[middot] The creek has lost 58% of its April snowpack with continuing losses of an additional 10% per decade, and

[middot] At the present rate of decline, the quantity of April snowpack remaining in Gold Creek Valley in 50 years will likely be much less than at present.

https://climate.washington.edu/climate-data/trendanalysisapp/

[Forest Service note: Due to formatting constraints, an included image could not be converted to text. Image is available for review in the original document. The image depicts [ldquo]April Snow Water Equivalent (1945-2007)[rdquo] for Olallie Meadows. The commenter provides narrative description of image content in the text above.]

c. The diminished snowpack is also melting more rapidly, further reducing stream flow.

This study shows that climate change is also associated with earlier melt-off. The authors recorded data from 42 Northwest stream gauges from 1948 to 2013. They found the statistical center of timing of runoff occurred 7.8 days earlier over the period of observation. This data set also indicated a decline in mean annual stream flow of 23% over the 42 stream gauges.

https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2015WR018125

[Forest Service note: Due to formatting constraints, an included image could not be converted to text. Image is available for review in the original document. The commenter provides narrative description of image content in the text above.]

d. Abundant data indicates continuing trends in rising temperatures, decreased snowpack and progressive dewatering of creeks.

This graph from NASA shows the nearly 70-year trend of increasing global temperature is accelerating.

According to NASA, there is nothing to suggest that this trend will moderate.

https://data.giss.nasa.gov/gistemp/graphs/

[Forest Service note: Due to formatting constraints, an included image could not be converted to text. Image is available for review in the original document. The image depicts [ldquo]Global Mean Estimates based on Land and Ocean Data[rdquo] The commenter provides narrative description of image content in the text above.]

1.
1. In the Upper Yakima, rising environmental temperature correlates with disappearing snowpack, more rapid melt-off, reduced stream flow and widespread dewatering of creeks.

These photos illustrate widespread dewatering in local creeks: Upper Kachess River, Gold Creek, and Deep Creek. Each watershed has unique features but the common denominator is declining snowpack. The aggregate loss of snowpack in the Gold Creek watershed in recent decades and rapid ongoing losses constitute a deficit in snow water equivalent that is a irreversible barrier to re-watering the creek.

[Forest Service note: Due to formatting constraints, three included images could not be converted to text. Images are available for review in the original document. The commenter provides narrative description of image content in the text above.]

Photo credits: KCT and YBFYRB

While hundreds of environmental scientists rank climate change as a high priority, and while the Integrated Plan is seeking additional water at Lake Kachess to forestall the effect of more frequent drought for growers, the reports by KCT and NSD over the last five years, the actions leading to the NEPA process, and the scoping document itself fail to acknowledge or discuss climate change as the major known contributor to dewatering of Gold Creek and as a limiting factor to the long- term success of the project for bull trout.

QUESTION: Since the effects of climate change preceded dewatering, and are both necessary and sufficient to account for dewatering, and since the magnitude of ongoing loss of snowpack make it unlikely that the project proposals will re-water the creek, what is the rationale for failing to engage in an intensive evaluation of the effect of climate change on sustainability of bull trout in Gold Creek?

QUESTION: How will the project proposals mitigate projected loss of snowpack in future decades?

1. APPRAISALS OF NSD[rsquo]S METHODOLOGY, CONCLUSIONS AND RECOMMENDATIONS.

In their document, NSD engineers assert that Gold Creek Pond is the major contributor to dewatering and recommends filling of the Pond. To our knowledge, this work has never been subject to independent critical review. NSD[rsquo]s finding of a groundwater gradient involving the pond is acknowledged, but the conclusion that this finding is a primary contributor to dewatering the creek does not align with evidence: the creek dewatered long before the pond and its gradient existed.

Supporting data: Technical appraisals of NSD[rsquo]s Gold Creek Conceptual Restoration Design Memo of April 28, 2015.

1.
1. Appraisals 1 and 2: Two reviewers with professional experience in assessing governmental technical documents.

These reviewers appraised methodology, data sets and conclusions in NSD[rsquo]s Design Memo, finding no evidence to support the conclusion that the Pond was the major contributor to dewatering the Creek.

1.
1.
* Appraisal 1

From a Gold Creek Valley cabin owner, PhD in fish population ecology, previously of Northwest Fisheries Science Center, NOAA Fisheries:

[hellip] the project design memo to KCT does not provide any evidence or rationale supporting the claim that [ldquo]... Gold Creek gravel pit (Pond) is the major contributor to seasonal dewatering of Gold Creek.[rdquo] It attributes that conclusion instead to the surface and groundwater study conducted in 2013 and 2014 by Natural Systems Design (NSD).

The document mentions but does not discuss or compare the relative impacts of mining in the Gold Creek valley and limits the discussion of impacts of timber harvest to the loss of old growth trees in terms of bank stabilization and as a source of large woody debris. The impacts of this loss are described as channel widening and reduction of habitat complexity.

It also does not mention the impact of climate change, which has likely been at least as great as that of the excavation of Gold Creek Pond and will likely more than offset any benefits that could be gained by filling the pond. The increase in average temperatures will result in more of the precipitation occurring as rain and less as snow. This in turn means higher expected winter flows and lower expected summer flows, increasing both the extent and duration of dewatering events.

From around 1880 up into the 1950s, mines in the upper Gold Creek drainage extracted ore containing gold, silver, and copper. It appears that mines in the upper drainage were hard rock mines, as opposed to placer mines, but they would have produced tailings that could have added to the sediment load in Gold Creek.

Impacts of logging in the watershed are almost certainly greater than those of mining and are not limited to channel widening and loss of large woody debris. Trees intercept precipitation, reducing surface runoff, and increasing the contribution to groundwater. This buffers streamflow, reducing both peak flows and dewatering. They also stabilize the soil, reducing erosion. The process of logging, as it was done in the Gold Creek drainage, entails constructing skid roads and haul roads to remove the timber, as well as disrupting the groundcover and soil surface. All of this activity increases the fluctuation in streamflow and also increases erosion, which ultimately winds up in the creek adding to the bedload.

The 1970 aerial photo (Gold Creek Geomorphology Assessment Memo, figure 5) shows that logging occurred on both sides of the valley upstream of RM2.6, which is about the upstream limit shown in the photo. This is more than a mile upstream from SG7 where dewatering first occurs and appears to persist the longest. The sides of the valley are steeper here, as is the gradient of the streambed. It is highly likely that this resulted in a substantial input of sediment to Gold Creek, which would have been transported downstream to where the creek has a lower gradient.

In a stable streambed, the banks are higher that the streambed itself. As the channel widens, the stream recruits gravel from the stream banks, which raises the elevation of the streambed and fills in pools, decreasing habitat complexity. Increased sediment loads from erosion further aggrade the streambed and necessarily widen the channel. Channel widening will exacerbate streambed aggradation by spreading the flow over a larger surface area, reducing the capacity of the stream to transport bedload by spreading the energy over a broader area. Even if the water surface elevation is stable, streambed aggradation will increase the frequency and duration of dewatering. If the streambed overtops the banks, the stream will necessarily find a new channel. But I don[rsquo]t think there are any historical measurements of the streambed elevation to compare the current profile to.

In the memos documenting the surface and groundwater study in 2013 and 2014, the most compelling evidence presented is the groundwater surface elevation (WSE) contour maps and profile (Figs 18 and 19) from the 2014 memo. A couple of observations about these figures:

Figure 18: The WSE contour maps are based on a very limited data set of 6 groundwater wells and 6 or 7 surface gauges, with the assumption that the surface gauges represent the potential elevation of the groundwater. The dashed portions of the contours are simply projected without any data, but even the solid portions of the contours seem to project beyond the data. Groundwater will flow perpendicular to the surface elevation contours, but the orientation of the contours in these figures is based on very limited data.

In the 2013 memo, under the topic of Groundwater Wells on page 2, they describe an attempt to hand-dig dig a

groundwater well in the western floodplain, outside the influence of Gold Creek Pond, but this was abandoned when they failed to reach groundwater at a depth of about 10 feet. This suggests that the groundwater surface elevation may be even lower western floodplain, outside the influence of Gold Creek Pond, than it is in the eastern floodplain.

Figure 19: Again, the figure is based on a very limited data set. It appears that the existing WSE depicted generated by simply linearly connecting the measurements from a few of the groundwater wells, and the assumption that WSE of groundwater is in equilibrium with the elevation of the surface of Gold Creek Pond. The interpolated Pre-Pond WSE appears to simply be a straight line roughly parallel to the ground surface. In both 2013 and 2014, dewatering was first detected at SG-7 and it spread upstream and downstream from there. SG-7 is located at approximately RM 1.5. The figure depicts the influence of Gold Creek Pond on groundwater WSE from RM 0.5 up to RM 1.7. By the time you get to RM 1.5, the influence of Gold Creek Pond is negligible. Thus, it appears that dewatering extends upstream well beyond the purported influence of Gold Creek Pond.

1.
1.
* Appraisal 2

From aerospace engineer and property owner in Gold Creek Valley for 36 years:

I have reviewed the attached documents and, while certainly not an expert in these areas, do have some comments which I hope will contribute to the dialog:

1. The report states that there are "multiple potential contributors to seasonal dewatering: Gold Creek Pond, Historical channel widening, Heli's Pond and the buried drainage system." There are at least two other factors that come to mind which should be considered in the analysis: The observed reduction in snow pack levels, on average, in recent years and also the fact that 'before' the ponds, the creek is known to have dried (Bennet's book). Thus, I think the statement "it is clear that the Gold Creek gravel pit (pond) is the major contributor to seasonal dewatering of Gold Creek" may be an overstatement of what is known until all factors are considered.

1. From the data from the monitoring wells and observations in 2013 and 2014, there appears to be little doubt that the presence of Gold Creek Pond does contribute to lowering the ground water level in the summer. And, the experts say, this then contributes to the dewatering of the creek upstream. Assuming that is true, the question that would need to be addressed is: What proportion of the 'dewatering' events expected in the future would actually be stopped by the massive project of filling the pond? Since we know the pond has dried before the pond's existence, it would not be 100%. An estimate should be made of the probability of dewatering before the 'fix' and after, including the projected impacts of reducing snowpack. Let's say the estimate is all this work would reduce dewatering by 50%. Then, you could do a cost/benefit analysis to see if this approach is 'worth it.' i.e., if the fish are not going to be able to get upstream every third year, say, would that allow them to be viable as a population?

1. A question that came to mind is, do we know when there was a healthy population of Bull Trout in the Gold Creek drainage? Was it 70 years ago (before logging) or 50 years ago (post logging, before pond) or?

1. The report states, "The combination of drawing groundwater away from Gold Creek and reducing the groundwater elevation up-valley of the pond was identified as the greatest contributor to seasonal dewatering in the creek." What is the probability this is correct, it can't be 100% certain in any assessment that is this complex? Even if it is true, what is the probability that the creek will actually stop dewatering to a significant extent?

1.
* The report states that logging along the creek banks allowed the channel to widen, etc.: This makes a lot of sense to me and would impact the ability of the fish to migrate, even in the presence of the low flows during the summer months when they attempt to go upstream. However, if the creek is dry, it is dry regardless of the width, it would seem, so we are back to that fundamental question: Is there enough flow available to keep the creek flowing continuously? Since Bennet observed 'no' before the pond and with the impacts of climate change, the answer may unfortunately be no.

1.
* The project goal is to 'restore perennial flow and improve upstream habitat.' Certainly, both are needed to help the fish problem and are laudable goals. However, we know that the creek dried before the pond was there and we know that the predicted effects of climate change are that there will be even less flow available in the future. Before any work starts on filling the pond and even on the restoration of the creek bed, an understanding should be developed on: What is the likelihood of success (the risks/probabilities) once all this is completed? What are the potential negative, and other than the fish positive effects of all this work? And, what is the cost, including the environmental impact, of this huge project?

1.
* I noted that the reports refer to Bennet's book, but only in regard to Heli's pond? Perhaps I missed the reference to the creek drying?

1.
* The report conclusion states: "historic disturbances have contributed to the frequency and duration of dewatering of Gold Creek.' This seems to probably be true, based on the data presented. But that does not mean the creek did not dewater before the disturbances and would, therefore, still dewater after the disturbances were mitigated through the proposed project actions. In fact, the Dec 5, 2013 report, on page 12, states "It is likely that Gold Creek experienced dewatering events historically during draught conditions, however landscape alterations in the valley have exacerbated the problem." Again, assessments regarding the benefits and costs, probabilities of success (and failure) would be very beneficial to the decision making.

1.
1. Appraisal 3: Forterra has expressed similar concerns as noted in their letter of February 2019.

[Forest Service note: The Forterra letter referenced above was provided as imaged and is available for review in the original document. The commenter provides a narrative description of their assessment of relevant content.]

QUESTION: How do project proponents address the issues raised by the two reviewers and Forterra?

1.
1. Appraisal 4: Comments from SRF Board regarding KCT[rsquo]s streambed proposal, Gold Creek Instream Habitat Design (15-1153).

* [ldquo]Intensity of the proposed treatments is excessive.[rdquo]
* [ldquo]The enormous energy in the system (based on sediment observed on site) will make a project very challenging.[rdquo]
* [ldquo]Is building side channels a good idea here?[rdquo]
* [ldquo]A more direct connection with the project actions and the specific needs of bull trout would be helpful.[rdquo]
* [ldquo]Will this project provide benefits without restoration (filling) of the pond?[rdquo]
* [ldquo]Landowners presented concerns on site about the project design. It would be nice to have a support letter from the landowners which identifies issues and how they will be resolved early in the design phase.[rdquo]
* [ldquo]Are there less expensive alternatives that focus on the core limiting factor of the [ldquo]dewatering with less focus on channel complexity?[rdquo]

QUESTION: How do project proponents plan to address these issues?

1.
1. Appraisal 5: My appraisal of NSD[rsquo]s methodology, conclusions, and recommendations regarding the channel of Gold Creek, Starwater drain lines, and Heli[rsquo]s Pond.

The channel of Gold Creek
1.
1.
* NSD refers to channel width as a factor in accelerating dewatering and increasing infiltration (NSD 2013 Hydrology Memo). The width of watered streambed is a small fraction of the overall channel width as evident from NSD[rsquo]s many aerial photographs. The creek occupies its full channel only briefly during infrequent high-water events. The width of watered streambed is also highly dynamic with substantial variation over a period as short of several days. It appears that NSD has used full channel in their calculations.

QUESTION: Is it not possible that the choice of width of streambed vs. width of width of active channel choice overstates the magnitude of infiltration as a contributor to dewatering?

QUESTION: What is the relative contribution of channel widening to dewatering compared to loss to snowpack?

1.
1.
* NSD recommends adding 71 engineered log jams, 40[rsquo]x40[rsquo], to a mile of Gold Creek to improve habitat for bull trout but has not provided a means to correct dewatering. As Mike Ericsson has stated, [ldquo]we are not adding water to the system[rdquo].

QUESTION: What is the benefit of adding engineered log jams to a creek bed that is dry and becoming drier?

1.
1.
* NSD measured groundwater levels in Gold Creek Valley in 2013 and 2014. The gauges were placed 10 feet below the surface of the ground and most went dry during the test periods.

QUESTION: What is the plan to reach groundwater in the Creek given NSD[rsquo]s acknowledgement that even filling Gold Creek Pond would not raise groundwater sufficiently to re-water the Creek?
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* NSD has yet to resolve issues cited in their risk assessment. The project site is located in a residential area that occupies a flood plain. In this area, the grade of the streambed decreases and bed load is high. Immense quantities of rock are periodically deposited at this site and thousands of trees downed by an avalanche are upstream. NSD[rsquo]s plan to narrow the creek and add 71 engineered logjams to trap debris is a risk to property acknowledged by NSD. NSD[rsquo]s risk assessment document of 7/20/17 identifies aggradation, channel avulsion, and trapping of large wood to create overflow and flooding a risk of their proposal. NSD uses hydraulic models to predict these risks. We are not aware of measurements of peak creek flow to inform these estimates (see below). Stream flow and bed load, including large wood, are uncontrolled and uncontrollable variables that increase risk to property. Side channels in NSD[rsquo]s proposal are also exposed to obstruction from bedload. NSD has neither resolved these issues nor agreed to take accountability for adverse outcomes.

[Forest Service note: Due to formatting constraints, included image could not be converted to text. Image is available for review in the original document.]

Photo of moderate Gold Creek high water event at Burn Pile Road in 2015

QUESTION: How do project proponents intend to manage the uncontrolled variables of peak flow and bed load?

QUESTION: Will proponents assume accountability for adverse consequences?

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* NSD has not established a consistent and reliable measurement of peak flow in Gold Creek. In their May 31, 2013 Technical Memorandum NSD states, [ldquo]Stream discharge measurements in lower Gold Creek range from 12.3 cfs in mid-August to 19.9 cfs in late September and a peak flow of 331 cfs was measured in mid-June (Thomas 2001). More recently NSD used a surrogate measurement for peak flow that combined a single Icicle Creek peak flow measurement with a corresponding rainfall recording from Olallie Meadows. It appears that NSD has not collected sufficient data over time to understand peak flow in Gold Creek.

QUESTION: How do project proponents plan to measure peak flow with reliability?

Starwater drain lines

1. The NEPA document should include the fact that a mile of Gold Creek dewatered consistently for 13 years prior to installation of Starwater drain lines.
2. NSD[rsquo]s Concept Memo of 4/28/15 states [ldquo]because the drainage line has flowing water when dewatering of the creek occurs, we proposed filling and sealing the pipe and manholes at the lower end (approx. 1320 ft of pipe)[rdquo].
3. While the creek dries in the summer, there is substantial water entering the lower valley from Rampart Ridge to the east. The drain line was installed to manage flooding from this source.

QUESTION: Will NSD determine the source, direction and magnitude of water in this location before concluding water in drain lines is a primary contributor to dewatering Gold Creek?

1. NSD has not determined the configuration of drain lines under Starwater cabins. NSD[rsquo]s map of drain lines is based on location and depth of inverts and should be determined with accuracy.

QUESTION: Will project proponents determine the architecture of the drainage system before proposing alterations?

1. The effect of filling drain lines may have unintended adverse consequences for existing structures in terms of groundwater accumulation.

QUESTION: Who has accountability for unintended adverse consequences related to raising groundwater in this area?

Heli[rsquo]s Pond

1. The NEPA document should include the fact that a mile of Gold Creek dewatered consistently for 26 years prior to creation of Heli[rsquo]s Pond.
2. The NEPA document should include the fact that Heli[rsquo]s Pond and associated berms are flood protection for the Ski Tur community.
3. NSD observed that [ldquo]The surface elevation of the pond was found to be above the elevation of flowing water in Gold Creek across from the pond throughout the year (NSD 2013b, 2014a),[rdquo] yet further speculate [ldquo]Heli[rsquo]s Pond may be drawing water from Gold Creek at the upstream end of the pond[rdquo].
4. NSD acknowledges that, [ldquo]Due to these uncertainties, restoration of Heli[rsquo]s Pond is considered lowest priority of all the restoration actions proposed, and any proposed actions will need the full support of Forterra and the SkiTur community prior to implementation.[rdquo]
5. NSD offers no quantification of the contribution of Heli[rsquo]s Pond to dewatering of Gold Creek.
6. Despite lack of data and acknowledged uncertainties, the NEPA document lists Heli[rsquo]s Pond as one of the [ldquo]primary contributors to seasonal dewatering[rdquo].
7. Fire District 51 has designated Heli[rsquo]s Pond as a source of water for fighting wildfires.

EXPECTATION: In view of the lack of evidence that Heli[rsquo]s Pond contributes to dewatering and in view of its benefit in flood protection and as a source for fighting wildfires, reconstruction of Heli[rsquo]s Pond should be removed from the NEPA document.

CONCLUSIONS

* There is strong evidence against the conclusion that Gold Creek Pond, Heli[rsquo]s Pond, or the groundwater drainage system are primary contributors to dewatering of Gold Creek. There is no objective data to support configuration of the streambed of Gold Creek as a contributor to dewatering.
* There is strong evidence against reconstruction of Gold Creek Pond, Heli[rsquo]s Pond or the Starwater drainage line as means to re-water the creek and improve habitat for bull trout.
* There is strong evidence to support the conclusion that reduction in snowpack is the primary contributor to dewatering of Gold Creek.
* There is strong evidence that the deficit in snowpack and continuing loss of snowpack makes it unlikely that any of the proposed actions will re-water the creek or recover the bull trout population.

THERE IS ANOTHER OPTION TO RECOVER BULL TROUT.

The paper, Feasibility Assessment of a proposed Bull Trout (Salvelinus confluentus) reintroductionprogram for Taneum Creek in the upper Yakima River by Andrew Matala, Todd Newsome, and Dave Fast, presented recently at the Bull Trout Working Group, offers an approach to achieving sustainability of bull trout populations by considering isolated fish populations and watercourses in the Yakima Valley as part of a greater whole.

The snowpack is inadequate and declining irreversibly in Gold Creek Valley: We cannot bring water to bull trout; we must bring bull trout to water.