Appendix G

RTT Comments & IFI Response

Middle Twisp River (RM 7.8 – 18.12)

UCRTT
UPPER COLUMBIA REGIONAL TECHNICAL TEAM

December 10, 2014

To: Hans Smith
From: RTT
Re: Middle Twisp Reach Assessment

The RTT would like to thank the Yakama Nation for the opportunity to review the Middle Twisp Reach Assessment and appreciates the YN's patience in waiting for our response. The comments below were developed by Chuck Peven and Joe Lange on behalf of the RTT.

Introduction

The section of the Twisp River that this Reach Assessment (RA) addresses encompasses portions of two assessment units (AU); the Lower (RM 0-14) and Upper Twisp (RM 14-31). In the Upper Twisp, factors that the RTT believes (RTT 2014) are affecting habitat conditions are:

- Campground effects on riparian in several locations.
- Channel clearing and LWD removal reduced channel complexity.
- Road placement and bank hardening have isolated sections of the main channel from its floodplain and side channels in a few places.
- Skid roads in riparian areas increase dispersed recreation use impacts to the stream.

While in the Lower Twisp AU:

- Low instream flows and high water temperatures in the lower Twisp River affect several species at several life history stages (The lower Twisp River is listed on the Washington State 303(d) list for inadequate instream flow and for temperature exceedance).
- The Twisp River (from Buttermilk Creek to the mouth) has been cut off from its floodplain and side channels through dikes and riprap in places, resulting in a simplified channel; see (Inter-fluve 2010) for additional details.
- In the lower Twisp River (RM 0.0 – 16.5) LW levels and recruitment potential are well below geomorphic potential (Inter-fluve 2010).
- The MVID West Canal diversion on the Twisp River at RM 3.9 is a river cobble levee dam that must be pushed up each year, disturbing salmonid rearing and spawning habitat.
- Development of riparian and floodplain areas has impaired channel migration, riparian condition and floodplain function (Inter-fluve 2010).
- Residential development has impacted riparian in many locations.

In addition, the RTT believes (RTT 2014) that the ecological concerns (ECs; in priority order) in the Upper Twisp are:

1. Peripheral and Transitional Habitats (Side channel and Wetland Habitat Conditions)
2. Channel Structure and Form (Instream Structural Complexity)
3. Channel Structure and Form (Bed and Channel Form)
4. Riparian Condition (Riparian Condition)
5. Food (Altered Primary Productivity)
6. Sediment (Increased Sediment Quantity)
7. Species Interactions (Introduced Competitors and Predators)

And in the Lower Twisp:

1. Water Quantity (Decreased Water Quantity)
2. Channel Structure and Form (Bed and Channel Form)
3. Peripheral and Transitional Habitats (Side channel and Wetland Habitat Conditions)
4. Channel Structure and Form (Instream Structural Complexity) *(below Buttermilk Creek)*
5. Riparian Condition (Riparian Condition)
6. Food (Altered Primary Productivity)
7. Sediment (Increased Sediment Quantity)
8. Species Interactions (Introduced Competitors and Predators)

The RTT realizes that since the RA did not address the exact geographic area of the AUs, so some of the ECs may not apply to the area that was assessed. The RA broke the total study area into sub-reaches, and sub-reaches 1-4 (RMs 7.8-13.6) are in the Lower Twisp AU and sub-reaches 5 and 6 (RMs 13.6-18.12) are in the Upper Twisp AU.

Results

General Comments

The RTT believes that this RA could be improved with more attention to logic flow and editorial needs. In many cases, information is summarized and the text does not guide the reader in all cases to where the additional detail may be found.

We were curious why the USBR subbasin assessment (USBOR 2008) information was not used to a greater extent. There is information in some of the appendices that this assessment could have extended on instead of having to collect it all again.

As recommended in the Appendix D of the biological strategy, the reach assessment should describe the historic condition, how those historic conditions have been altered or changed, identify how/why the change occurred, and describe the target conditions for which habitat improvement actions should aim, understanding that complete replication of past conditions is likely not feasible. We did not see this information in the assessment.

Detailed Comments

Main Report

Section 2.4.2:

- Channel Manning's "n" should also be calculated on pebble count data (e.g. Limerinos or similar equations) and should be adjusted as depth/flow change.
- Use of LiDAR data should be validated with measurements of actual measured elevations in the field.
- The hydraulic analysis should also include low flows. Errors in the floodplain would have little to no effect for these small flood flows. A base flow should be determined at the time of the LiDAR flight. This base flow should be subtracted from the flood flows that are used in the hydraulic analysis if only LiDAR data is used. The BOR collected GPS or total station survey data which was used in the Methow Subbasin Geomorphic Assessment (USBOR 2008). These data should be used in combination with the LiDAR data.
- The results from the hydraulic analysis should be shown in detail in an appendix.
- There is no validation of the hydraulic model. The water surface elevation should be measured in the field, at several known discharges, and compared with the predicted water surface for the hydraulic model. Adjustments within the model should be made until the model results are comparable to field measurements.
- The USFS collected pebble counts for the Methow Subbasin Geomorphic Assessment (USBOR 2008) at each surveyed cross section (~2 per mile). This data should be combined with the data collected for the assessment. All data should be contained in an appendix.

Section 2.4.3:

- Figure 8: Should be reaches 1-3 (not 1-32).

Section 2.5.1:

- What data was utilized to determine stream morphology and how was it collected?
- How are the metrics (pool, glide, riffle, rapid, etc.) in Table 7 defined?
- Figure 61: RM 12.15, river-left: we could find no information on the ditch other than it located on Figure 61. Additional information should be included.

Section 3.5.2:

- Geology and Landforms: The term "healthy" may be misleading and should be removed.
- Figure 70: Hydraulic modeling of lower flows (<2-YR) would help identify low flow side channel features within this reach.

Section 3.5.3:

- Human Alterations: The statement that most of the reach length is largely unaffected by human alterations may be an incorrect. Removal of large trees through logging may be the primary cause of accelerated lateral migration and the extreme dynamic nature of the channel in this reach.
- Figure 80: Please add river miles to this figure.

Section 3.6.1:

- Last sentence, first paragraph, please remove the word "healthy."

Appendix C

Page 2:

- Right and left bank margin jams should be considered in braided, high dynamic areas to reduce the rate of lateral migration. In addition to this measure, riparian re-vegetation should emphasize the establishment of large conifers and cottonwoods.
- Cooler water temperatures were identified at RM 14.48 in the TIR surveys (2001, 2009) which were stated as being from hyporheic flow and a side channel. Why are no projects identified that would improve these conditions?

Page 3:

- Is there potential for an apex jam or boulder cluster at the island at RM 13.15?
- Check referenced RM's. It appears that the high flow channel entrance is at ~RM 12.85, river-left, and extends down ~RM 12.68.
- Reach 4 is shown as extending from RM 12.22 to 13.60 (not 13.9). If kept with "Buttermilk Fan" project then Reach should be 4-5.
- RM 12.6 - 12.9: Boulder clusters?
- Is there potential for an apex jam or boulder cluster at the island at RM 12.1?

Page 4:

- Is there potential for the removal of the riprap on river-left at RM 10.95? It is difficult to tell from the ortho photo if the riprap is protecting infrastructure.
- Additional boulders could be added to the large boulder to form a boulder complex which could begin a natural log jam to form.
- Should this be RM 9.96 to 10.1 (not 10.96)?

Page 5:

- Reach 1: Why is there no proposed removal of riprap at RM 8.4 and reconnection of the oxbow from RM 8.3 to 8.4 (Reach 1).
- Reach 1 & 2: Why is large wood proposed in a high gradient, confined reach? It seems that channel margin complexity enhanced with large boulders may be more

appropriate in Reach 1 & 2. The assessment identifies hydraulic complexity being provided by boulders (page 52).

The next section is a broader view of some of the proposed actions.

Sub-reaches 1-4

In sub-reach 1, there appears to be little opportunity to do much except some riparian restoration (Section 4.5.1), which is the 6th priority EC (RTT 2014). One area may be available for side channel creation (4th priority EC), and other areas where large wood could be deployed to enhance in-stream habitat complexity. The RA states that the addition of wood structures may be small scale and isolated and may not provide enough benefit. The RTT disagrees based on monitoring information from the Entiat River that showed fish use of isolated, small wood structures was most likely beneficial (Polivka et al. in press).

In the table that follows Section 4.5.1 (we suggest numbering and titling these tables), under the attribute "Floodplain Connectivity," there is an action identified to reconnect habitat via "infrastructure modification." It is not clear what this action entails and the RTT is curious about this recommendation because the summary of this reach suggests that these opportunities are limited because of natural confinement of the reach. This same concern applies to the next attribute ("bank condition/channel migration," which would apply to the EC *bed and channel form*). In addition, an action is identified under this attribute for *placement of structural habitat elements*, but the RTT is not clear what this means and why it is suggested under this attribute. Under the attribute "off-channel habitat" an action type is identified for *habitat reconnection via infrastructure modification*. What existing infrastructure would be modified? Are there levees that can be removed? We suggest that if using the term infrastructure that it relate to man-made attributes, or the infrastructure items that will be addressed are identified.

In sub-reach 2, Section 4.5.2 states that there is "very limited opportunity for meaningful restoration." In the table that follows Section 4.5.2, under attributes "pools" and "large wood and log jams," the action type *placement of structural habitat elements* is suggested under the "Newby to Bridge" project, but Appendix C (what happened to B?) does not show where this action type could occur. If the direction is not to add these action types, then we suggest that they be removed from the table following section 4.5.2.

For sub-reach 3, there appears to be many restoration opportunities as discussed in section 4.5.3. Section 4.5.3 discusses two projects, "Newby Narrows" and "Jennings." However, in Appendix C, there is the Jennings project, but what we assume is the Newby Narrows project is entitled "Old Oxbow." We suggest making sure that these project names are reconciled. Regardless of the names, the project opportunities look like they will increase off-channel habitat to a significant degree, addressing the 4th priority EC. There are bar apex jams identified in various areas fir the "Old Oxbow" project in Appendix C that do not appear to be linked to reconnection of side channel habitat. Please explain why these structures are suggested in the places that are shown in Appendix C. We assume they are supposed to function as more than habitat complexity

structures since there appears to be separate structures identified along the various locations. The same question relates to the Jennings project for some of the "margin jam" locations (most are clearly associated with side channels, but some do not appear to be).

The projects identified for sub-reach 4 appear straight forward and the potential constraints are identified well.

Conclusions for Sub-reaches 1-4

The top six ECs for the Lower Twisp AU that the RTT has identified appear to be addressed to various degrees within the reach assessment. While the number one priority EC (*water quantity*) and number 2 priority EC *(water quality (temperature))* are not directly addressed, the project types identified within the reach assessment will most likely address them through the amount of side channel reconnection that is suggested.

Sub-reaches 5 and 6

Based on the information presented, the bottom portion of sub-reach 5 appears to be well functioning habitat as discussed in section 4.5.5. The RTT agrees that protection should be the focus in this reach and does not believe the addition of large trees (Buttermilk Bends Project), as suggested within the reach assessment is necessary because it is not likely to provide a significant habitat increase for the likely amount of effort. In addition, the table that follows section 4.5.5 suggests that roads, riprap, lawns and houses are affecting the riparian zone and restoration is needed. We believe that the map on pages 11 and 12 of Appendix C are incorrect: they states "Reach 6" where most of what is viewed for the Scaffold Camp Project appears in sub-reach 5. This caused some confusion among reviewers, especially since the area of sub-reach 5 downstream from this area (downstream of RM 15.3) does not show any human attributes such as lawns and houses, which the Scaffold Project is aimed at addressing. We suggest rectifying this mistake.

In addition, the figure on page 12 shows placements of whole trees within the main channel of the river. We recognize that these drawings are preliminary, and the locations of suggested restoration actions need to be refined, but please explain what function they will perform, how they will be located, and how they will be held in place.

Also on page 12, one of the actions (large white box near top of page) suggested is to remove levees and re-grade the floodplain area to create side channel area. Before this is considered, it would be nice to understand how much floodplain area needs to be re-graded and whether the potential biological benefit would be worth the effort. Could the levees be removed and then the floodplain be allowed to re-grade itself in higher flows?

In the table that follows 4.5.5, the description for pools suggests that the current condition (13.2 pools/mile) far exceeds the target condition (~ 4 pools/mile). Why are there suggested action types? We realize that some of the actions that are meant to address other attributes will create pools, but it seems to be clear, no action types should be suggested (this is a comment that may relate to other tables as well).

For the "Eagle Project," we have similar comments as above regarding the placement of whole trees. Also, we encourage the connection to the wetland as described. However, we do not understand the need for riparian restoration in the Eagle Project area; it appears to be intact.

The "War Project" appears straightforward and some of the same comments (whole tree placement, need for riparian restoration, suggested actions for pools when the existing condition exceeds the target) apply in this area also.

Conclusions for Sub-reaches 5 and 6

The reach assessment appears well focused on addressing the top three ECs identified by the RTT in this section of river, especially related to side channel development/reconnection. While we recognize that there may be discreet areas where riparian restoration is needed, the area appears in relatively good shape and we would recommend not extending a lot of effort for this restoration attribute.

Overall Conclusion

Overall, the reach assessment describes the current condition of the habitat well, including the threats that have existed in the past and continue to affect fish habitat condition. Some of the actions suggested may not be necessary or provide enough benefit to be worthwhile. Additional evaluation (beyond the assessment) will be needed once specific projects begin to be identified.

References

Inter-fluve. 2010. Lower Twisp River Reach Assessment For the Yakama Nation, Toppenish, WA 115 pages plus appendices.

Polivka, K. M., E. A. Steel, and J. L. Novak. in press. Juvenile salmon and steelhead occupancy of stream pools treated and not treated with restoration structures, Entiat River, Washington. Canadian Journal of Fisheries and Aquatic Sciences.

RTT. 2014. A biological strategy to protect and restore salmonid habitat in the Upper Columbia Region. A Draft Report to the Upper Columbia Salmon Recovery Board. From The Upper Columbia Regional Technical Team. 45 pages plus appendices. .

USBOR. 2008. Methow Subbasin Geomorphic Assessment Okanogan County, Washington. Bureau of Reclamation, Denver, CO. and Wintrhop, WA. 120 pages plus appendices. http://www.usbr.gov/pn/programs/fcrps/thp/ucao/methow/geomorphicassessment/geomorph2008.pdf.

Response to RTT Comments on the August 2014 DRAFT Middle Twisp Reach Assessment.

Comments received by Yakama Nation December 10, 2014.
Responses provided by Inter-Fluve January 2015

We appreciate the thorough review and thoughtful suggestions on the DRAFT Reach Assessment by Chuck Peven and Joe Lange on behalf of the RTT. The review comments have helped to strengthen and improve the final document. Responses to the comments are included below.

Introduction

Thank you for the summary of the RTT factors and Ecological Concerns. The findings of the Reach Assessment are very much in keeping with the factors and ECs that apply to the specific study area covered in the RA. The RA has further defined and characterized the specific degree and mechanisms of degradation with respect to these factors and ECs, and has also identified additional factors and concerns affecting channel processes and habitat.

General comments

1) Logic flow and editorial needs – Technical editing of the document was performed for the Final to address logic flow and editorial needs. Chapter 2 was re-configured to improve flow and readability. Detailed information on Geology, Historical Forms and Processes, and Human Disturbance History was moved into 3 separate appendices, replacing the previous "Appendix D" in the draft report.
2) Using USBR data – USBR data from the subbasin assessment was used extensively. We have added information to be clearer on when and how we used it. New data that were collected built upon and refined the USBR data for use at the reach-scale, but did not duplicate data collection efforts where sufficient data were already available.
3) Historic and target conditions – In the reviewed draft, historical information was placed in Appendix D (Historical Conditions and Human Disturbance History). In addition, the change from historical conditions is the focus of the reach chapters. Chapter 2 of the report has been re-arranged for the final draft and we now have a section in the main report on Historical Conditions, with most of this information still contained in an appendix in order to improve readability of the main document. There is also now a separate appendix for Human Disturbance History, which also helps identify how habitat and processes have changed from the historical condition. With respect to target conditions, these are a core part of the Restoration Strategy and we believe they are clearly stated there. The strategy also includes the recommended actions for bringing existing conditions up to target conditions.

Detailed Comments

Main Report

Section 2.4.2:

We appreciate these suggestions to improve the hydraulics analysis. Using a LiDAR-based model has been performed based on past recommendations by the RTT; and although we think it is useful for some purposes (e.g. to help understand general floodplain connectivity

and effect of human structures), it is important to recognize that this is a coarse-scale planning-level tool to help inform the assessment. It is not intended for detailed analysis at the project-scale. Detailed 1D and 2D models, based on surveyed data, are currently being used for project design in specific areas. Model validation using surveyed WSEs, LiDAR validation using ground surveys, roughness based on pebble count data, etc are indeed used for the project-specific models, but are beyond the scope or purpose of the Reach Assessment model. As for the use of the model for analysis of low flows, we believe the LiDAR-based model would be inappropriate for this given the absence of bathymetry data. And although subtracting the flow at the time of the LiDAR flight may improve the results, it does not solve this problem. Thank you for the information regarding the USFS pebble counts. Although these are not included in the Reach Assessment analysis, we will apply these as appropriate for work at the project-scale.

Section 2.4.3:

Change made

Section 2.5.1:

- Bullet point 1 – Bed morphology is based on the habitat assessment (Appendix A). A reference to the habitat assessment was added here.
- Bullet point 2 – This information is included in the habitat assessment (Appendix A). A reference to the habitat assessment was added to the table caption.
- Bullet point 3 – Did not understand the comment. There is no mention of a ditch or Figure 61 in this section. Figure 61 does show a ditch, but not sure what "additional information" was being requested. We do not know what the origin of the ditch is.

Section 3.5.2:

- Bullet point 1 – Agreed. Removed the word "healthy" and replaced with a more detailed description of the conditions.
- Bullet point 2 – The LiDAR-based model is not adequate for evaluation of low flows due to the lack of channel bathymetry data.

Section 3.5.3:

- Bullet point 1 – Agreed, this paragraph was edited accordingly
- Bullet point 2 – Change made

Section 3.6.1:

Change made

Appendix C

The handful of editorial recommendations/corrections were made. With respect to the comments on the recommend treatments, it is important to note that the treatments identified in the RA are very preliminary (pre-concept) and are intended to convey the general recommended approach to restoration. More specific treatment alternatives will be developed based on detailed site surveys, detailed hydraulic modeling, input from landowners, and additional data collection. Site assessment and treatment alternatives are currently being developed for three top-priority sites in

Reaches 3, 5, and 6. The specific comments provided by the RTT will be considered and incorporated as appropriate as part of these project design efforts, where they apply.

Sub-reaches 1-4

This section contains some overall comments on the recommended restoration strategies for these reaches. As stated earlier in response to comments on Appendix C, we appreciate these suggestions and they will be considered and incorporated as appropriate as part of more detailed project design efforts.

Tables in Section 4.5.1 were numbered and titled.

The comments on the strategy tables resulted in some edits that improved the consistency between the Action Types and the specific elements contained in the Projects themselves. Some of the questions that were not specifically addressed may be clarified by referring to the definitions of the restoration "Action Types", which are included previously in Section 4.3.

As for not identifying specific places in Reaches 1 and 2 for "Placement of Structural Habitat Elements", we did not identify specific areas because we believe their locations will be opportunistic due to private lands, numerous riprap banks, houses and yards close to the channel, etc. We do, however, believe that where these wood placements can occur, they would be beneficial, so we think it is good to still include this potential action. Further coordination with landowners will be necessary to determine feasibility and specific locations.

We have reconciled the names for the Newby Narrows (formerly "Old Oxbow") project.

With respect to purposes of the jams, these are described in the Appendix C text. Apex jams are used to create split-flow conditions and to build mid-channel bars as well as to activate side-channels. Margin jams may serve numerous purposes. It is beyond the scope of this document to describe the purpose of every jam, especially since specific locations are very conceptual at this point. Further phases of design will identify and describe the specific location and purpose of each structure as well as for all other habitat enhancement actions.

Conclusions for Sub-reaches 1-4

No response required

Sub-reaches 5 and 6

This section contains some overall comments on the recommended restoration strategies for these reaches. As stated earlier in response to comments on Appendix C, we appreciate these suggestions and they will be considered and incorporated as appropriate as part of more detailed project design efforts.

Reach labels on the Scaffold Camp project maps were corrected

The function of the whole trees (map in Appendix C page 12) is explained in the text in the table ("…to serve as key members to collect fluvially-transported wood and build log jams").

Ballasting methods will be determined during project design based on detailed hydraulics analysis and with reference to stability criteria (yet to be developed). The same applies to the same comment for the Eagle Project and the War Project.

Agreed about the need to determine the biological benefit of floodplain work at Scaffold Camp. This is designed to be a long-term process-based approach to restoration. There will be numerous alternatives considered with respect to how to address the levees and floodplain restoration in order to maximize biological benefits.

With respect to actions to increase pools at Scaffold Camp, the high pools/mi is largely due to the downstream portion of the reach that is higher quality and has high pool frequency. Pools at the Scaffold Camp project area are of lessor quality and could benefit from enhancement efforts. The same applies to the same comment for the War Project.

Conclusions for Sub-reaches 5 and 6

No response required

Overall Conclusion

No response required