FY2016 ANNUAL REPORT

MARCH 1, 2016 THROUGH FEBRUARY 28, 2017

YAKAMA RESERVATION WATERSHEDS PROJECT

BPA Project #1996-035-01-Contract #56662 REL 99

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Toppenish Creek restoration project completed September 2016. Photo taken via drone courtesy of the North Yakima Conservation District.

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Introduction:

Project Overview

The Yakama Reservation Watershed Project (YRWP) combined the Ahtanum, Toppenish and Satus creek watershed in 2005. Since the last report in 2015, YRWP staff has continued several tasks including; close monitoring of stream discharge and irrigation withdrawals, monitoring of juvenile steelhead and coho outmigration, steelhead spawning surveys, and analysis of irrigation extent and timing. We have also continued our restoration efforts in these three watersheds, completing two in-stream restoration projects (Toppenish Creek river mile 37 and Ahtanum Creek @ 62nd avenue), meadow protection enclosure fencing, and engineer design for the Toppenish Creek 3-way levee project.

Restoration Projects

A. Toppenish Creek River Mile 37

Background and Location:

The Yakama Nation Fisheries Program (YNFP) identified Toppenish Creek (Toppenish) in the vicinity of river mile (RM) 37 as a candidate location for habitat restoration (Figure 1). Toppenish is a tributary to the Yakima River, and is utilized by ESA listed middle Columbia River steelhead (*Oncorhynchus mykiss*) during multiple freshwater life history stages. *Oncorhynchus mykiss* exhibit complex life history traits and are capable of multiple spawning years in addition to being anadromous (Steelhead) or freshwater residents (rainbow trout). The middle Columbia River steelhead (steelhead) population is considered to be an evolutionary significant unit comprised of a distinct population segment; meeting specific physical, behavioral, and genetic criteria laid-out in the ESA (NMFS 2009).

History:

Spawning and rearing habitat availability in Toppenish has been impacted by human land uses, predominantly those related to agricultural practices and associated water withdrawals. Logging, grazing, and road construction throughout the Toppenish watershed have also contributed to declining habitat conditions. Direct impacts include channelization, grade control structures, bank armoring, canals and ditches, increased turbidity and temperature, and substrate embeddedness (Resseguie 2010). These impacts have resulted in ongoing channel incision, bank instability, floodplain disconnection, wetland losses, and a reduction in riparian cover and function. As a result, high quality off-channel habitat, suitable spawning gravels, and cover for fish are all lacking in Toppenish. Toppenish once supported healthy populations of steelhead, Chinook, coho, and rainbow trout (InterFluve 2014). These populations have experienced sharp declines since human development of the landscape. Currently, small populations of coho are present in lower Toppenish, with rainbow trout and steelhead utilizing the project reach (InterFluve 2014).

Restoration Goals:

This restoration effort is primarily intended to increase spawning and rearing habitat for summer steelhead in Toppenish Creek. Specific restoration goals to achieve this end include the following:

- Slow instream velocities to reduce bed scour,
- Increase the number and quality of pools,
- Collect and store incoming sediment to prevent future bed degradation and trigger aggradation to raise the channel bed,
- Reactivate former floodplain surfaces and side channels that have been vertically isolated through incision,
- Provide diverse instream habitat with significant overhead and lateral cover,
- Disperse flows into multiple small channels to reduce flow depth and increase hydraulic complexity and sorting of spawning gravels,
- Increase instream water storage through increased depth of hyporheic gravels,
- Enhance lateral connectivity and water storage in the adjacent soil prism to increase flows during low flow conditions and support riparian vegetation,
- Provide stable large wood accumulations where the existing beavers can build larger, stable dams, further increasing instream and lateral water storage for fish rearing areas and recovery of the riparian community.

Project Photos:

Figure 1. Image depicts restoration work post implementation along Toppenish Creek near river mile 37 (8/8/16-9/2/16). Habitat structures pictured in images above were designed by Natural Systems Design (NSD).

B. Ahtanum @ 62nd :

Background and Location:

The project reach includes 1.7-miles (mi) between river mile (RM) 8.5 - 10.2 of Ahtanum Creek in north central Yakima County, approximately 6-mi west of Union Gap, WA (Map 1). The watershed contributing to the project reach is approximately 71-mi^2, spanning a vertical relief of 5,900-feet (ft) from RM 8.5 to the headwaters. The reach extends between the 62nd and 79th Avenue bridges, with an average channel slope of 0.6%, but is locally up to 0.9% in straightened channel segments such as RM 8.8 – 8.7 and 10.2 – 10.1. Ahtanum Creek flows primarily to the east through the project reach, meandering through an alluvial valley at the distal end of an alluvial fan.

History:

The North Yakima Conservation District (NYCD) and Yakama Nation (YN) have identified the reach of Ahtanum Creek between the South 62nd and 79th Avenue bridges as a candidate location for salmonid habitat restoration. The proposed restoration reach was targeted by NYCD and YN to address the following limiting factors impacting the spawning, rearing, and migration of ESA

listed threatened summer steelhead and bull trout, as well as non-listed spring Chinook and coho. (Ecology 2005) :

- Floodplain disconnection/channel incision (loss of rearing habitat, lowering water table, riparian species impacted, bank destabilization)
- Impaired riparian function (channel length lacking sufficient shade, root strength, source of large woody material (LWM))
- Fish passage barrier (concrete debris in channel)
- Stream bank armoring (channel simplification, local incision, lack of cover)
- Lack of instream complexity (low LWM frequency, pools with cover, uniform substrate)

Restoration Goals:

The goal of this restoration project was to address all of these limiting factors within the project reach to the degree possible given known site constraints and available funding. The proposed restoration focused on restoring natural geomorphic processes and historic wood loading, to the degree possible given the site constraints, to directly address the key limiting factors impairing habitat.

Project Photos:

Figure 2. Images depict restoration work during and after implementation (9/6/16-10/14/16). Structures were designed by Natural Systems Design (NSD).

Fencing:

A. Upper Toppenish

The Upper Toppenish Meadow Buck and Pole Fence was completed during the summer of 2016. The fence protects valuable meadow resources and minimizes livestock degradation to stream resources.

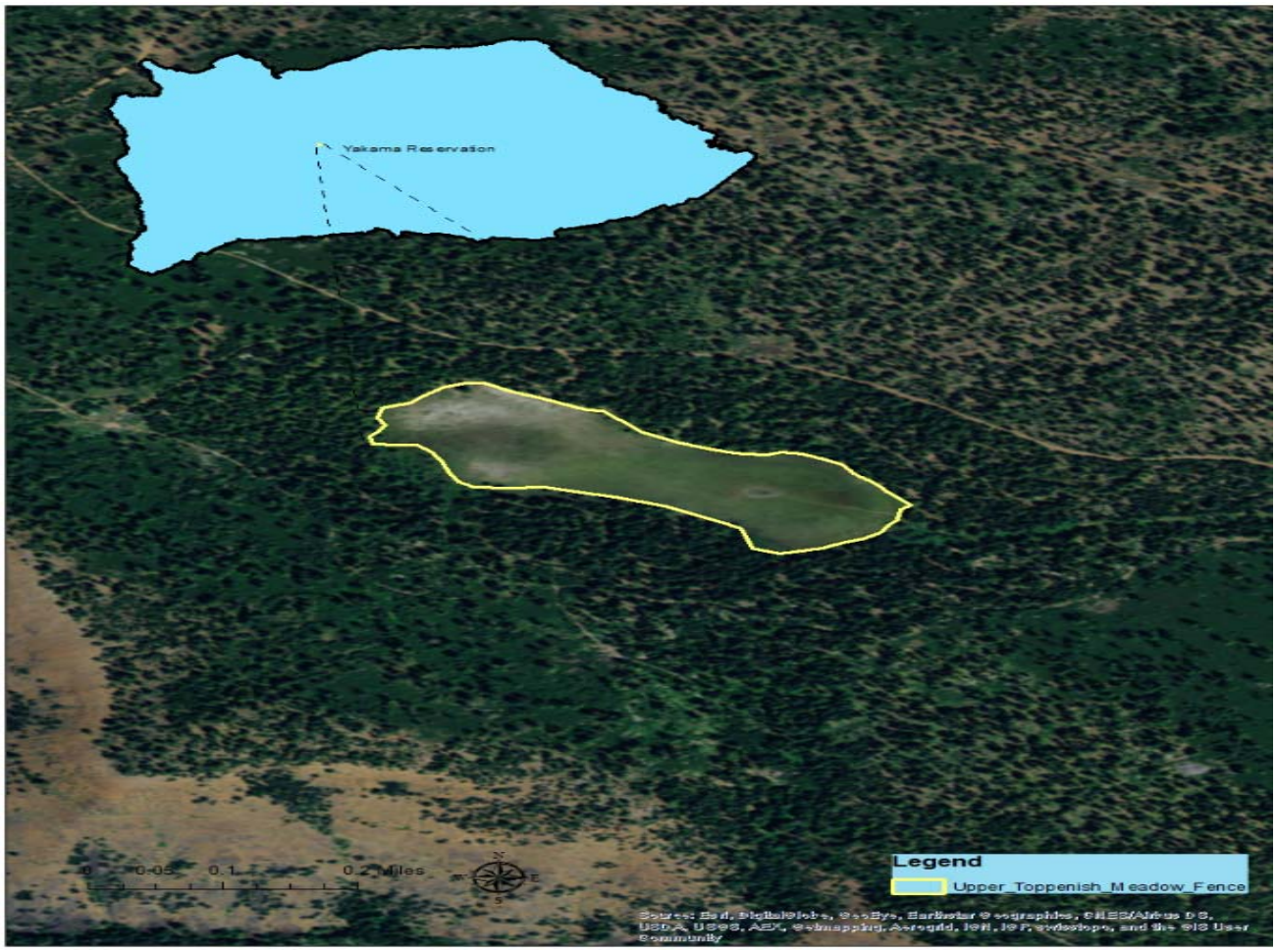

Figure 3. Map depicts where the meadow fencing was conducted in the Upper Toppenish Creek watershed. The buck and pole style fence protects meadow resources while reducing negative impacts to livestock and wildlife.

B. Lakebeds fence:

The Lakebeds fence was started during the summer of 2016. It is a combination of buck and pole and 4-strand barbed wire. The fence will protect valuable cultural, meadow, and stream resources. The fence was only partially constructed during the summer of 2016. The project was larger than initially anticipated. An attempt to complete the fencing project will be made in 2017.

Figure 4. Image depicts meadow and approximate area that fence was constructed during the summer of 2016. Final assessments and fence work will continue into the 2017 field season.

Engineering:

A. Toppenish Creek 3-way levee project

Introduction

The proposed project site is located on Toppenish Creek 3-way at River Mile 45 within the Yakima River subbasin. Toppenish Creek is used by Endangered Species Act (ESA) listed Middle Columbia River Steelhead (MCRS) during numerous freshwater life history stages. This section of creek has the ability to provide essential habitat for steelhead spawning and rearing. The site has been confined by a dike causing discontinuity between the creek and its historic channel and floodplain. The dike was built to prevent the town of White Swan homes from flooding. The goal of this project is to reconnect the creek to its historic floodplain, improve the aquifer and enhance fish habitat. This project will require a fish screen in an area that can be shifty during high flows.

Site Specifics

The site is within an alluvial fan and has been confined from the alluvial fan by a several thousand linear ft. of levee along the channel margin and the historic floodplain. In the Toppenish Creek watershed, land uses such as; (confinement by levee, logging, grazing, urban development, agriculture, and management) have involved wood removal, channel straightening, confinement and reduction in the potential for establishment of large woody material. This project will address stream channel confinement by removing an existing levee and providing access to the adjacent floodplain therefore increasing the potential for groundwater recharge in this area of Toppenish Creek. Revegetation of the floodplain will occur to promote wood recruitment and increase roughness. The ultimate goal of the action is to increase the quality and quantity of MCRS spawning and rearing habitat and enhanced water quality and quantity.

Project Specification

Task 1.0 –Site Investigation and Baseline Analysis

Task 2.0 –Alternative Analysis

Task 3.0 –Concept Designs

Task 4.0 – Project Management

*Note: Site investigation will be ongoing through the month of January 2017. An alternatives analysis and concept designs will be discussed after the ground survey has taken place and a hydraulic model has been run. A final report will detail the findings and the selected restoration strategy that is selected to move forward.

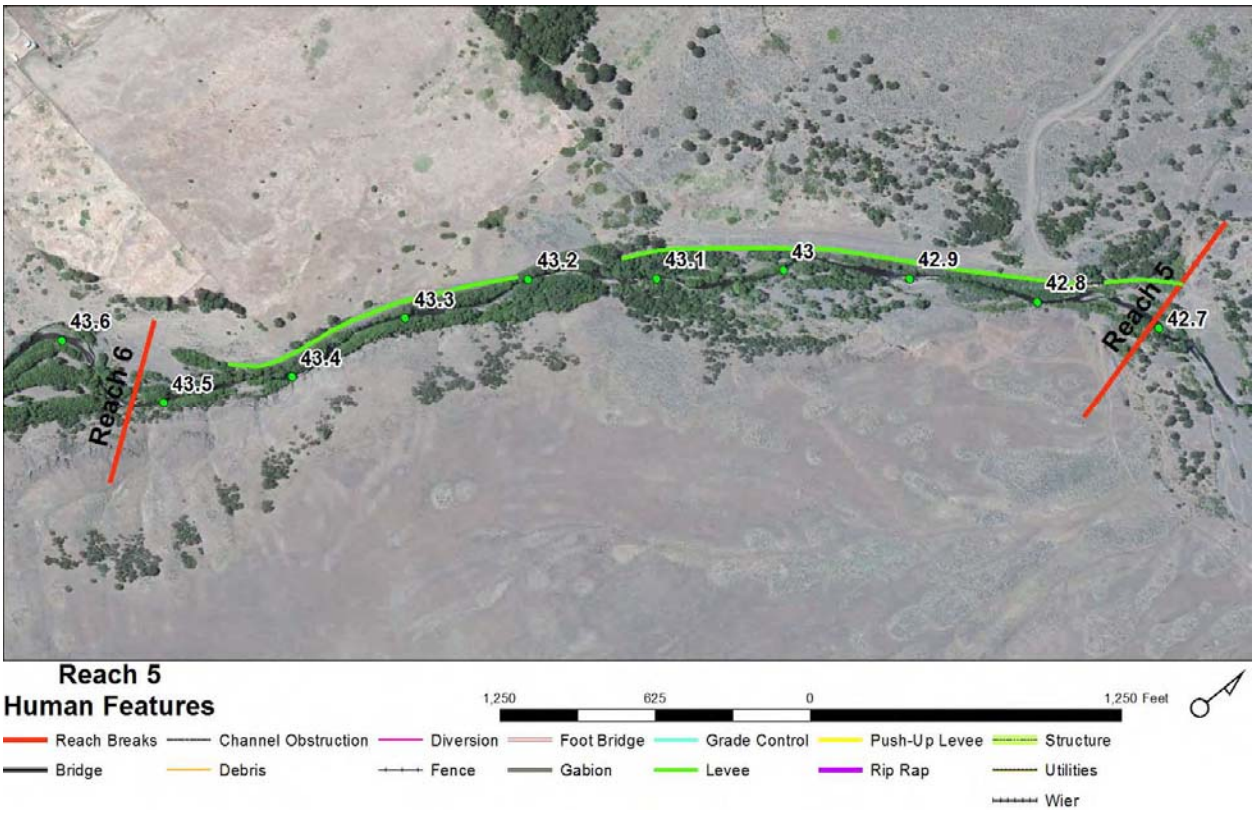

Figure 5. Map depicts reach of Toppenish Creek from river mile 42.7-43.5 where the stream is constrained by a levee. Design concepts and alternatives are being identified for future restoration efforts between Reach 5 and Reach 6.

Habitat Assessment:

A. Simcoe Creek Reach Assessment

Overview and Location:

Yakama Nation Fisheries, Yakama Nation Reservation Watershed Project (YRWP) will be conducting a reach assessment and project identification project (the project) within the Simcoe Creek Watershed. Project components will consist of:

1. Reach Assessment - Reach and Sub-Unit scale evaluation and project opportunity identification
2. Stream Habitat Assessment - Survey and assessment of stream habitat characteristics
3. REI Metrics - Evaluation of habitat conditions using Reach-Based Ecosystem Indicators (REI)

The project will occur in the Simcoe Creek Watershed from river mile 8.1 near North White Swan Road to river mile 13.9 near the USGS gauging station, within the Yakama Nation Reservation. The reach assessment portion of the project will encompass approximately six miles of Simcoe Creek.

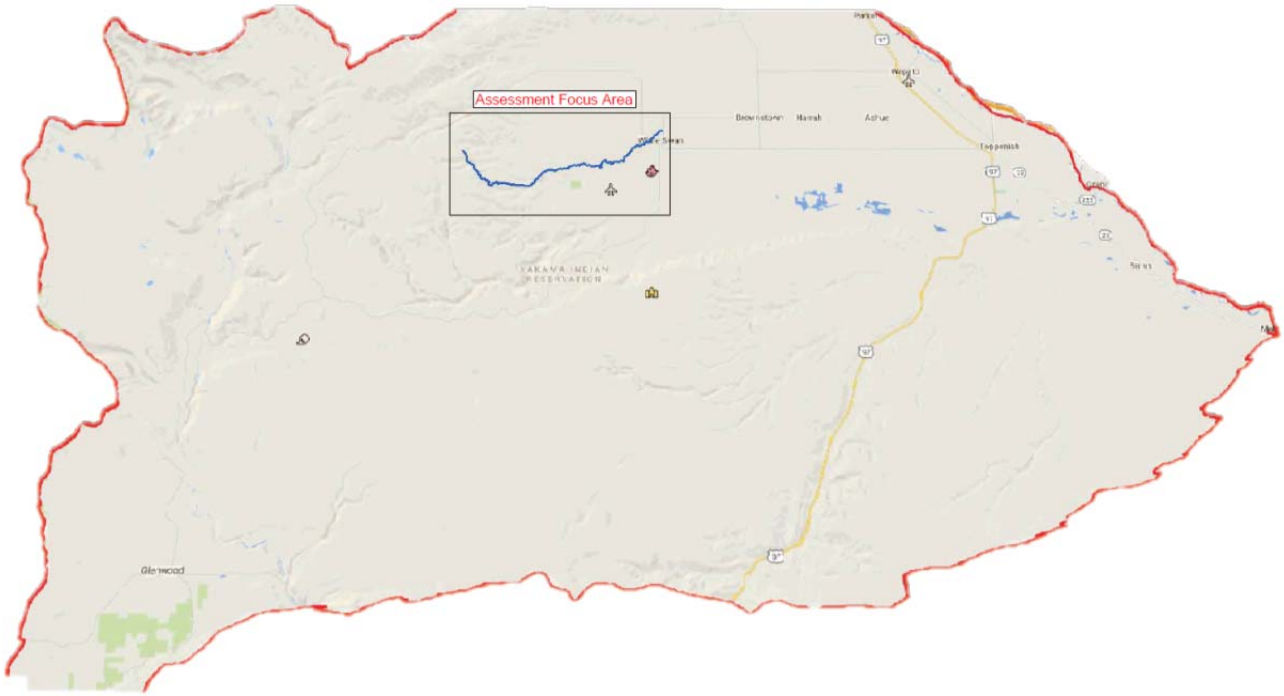

Figure 6. Map depicts area where the Simcoe Creek reach assessment was conducted. Habitat conditions and potential project identification were assessed during the survey of Simcoe Creek 11/21/16-12/2/16.

Project Tasks:

Task 1 – Initiation meeting, Data Collection and Review

Attend a meeting with Yakama Nation Fisheries Staff and stakeholders to discuss goals and objectives and to initiate data acquisition to support Task 2. In preparation for this meeting, the selected contractor will work with YNF staff to outline the objectives and tasks for the project. It is assumed that Yakama Nation Fisheries Staff will be the liaison with stakeholders and coordinate meeting schedule and venue.

This task also collects existing data sources from previous analysis efforts within the boundaries of the reach assessment and tributaries. Existing field data, GIS datasets, and remotely-sensed data will be acquired and analyzed as part of this effort. Data sources and information may include, but are not limited to:

- GIS and other data sources including aerial photography, historical mapping, geology, soils, roads, forest cover, land-use, landownership, hydromodifications, water withdrawals, and others.
- Topographic mapping and data, including LiDAR and a longitudinal channel profile
- Significant human features
- Hydraulic data (if available)
- Previous restoration activities or restoration planning
- Existing and potential fish use and distribution
- Stream habitat survey data (if available)

Task 2 – Basin and Valley Segment Scale Assessment

This broad-scale assessment characterizes basin-scale (i.e. 4-5th field HUC) and valley segment-scale physical processes using existing available resources. This assessment provides geomorphic context for reach-scale assessments and project identification. Analysis is primarily conducted using available spatial and aerial photograph data sources.

At the basin scale, the general condition of watershed processes will be described, including basin hydrology and sediment supply. Attributes to be used in this analysis include forest cover, geology/soils, road density, drainage density, watershed slope, land-use, and landownership. This is not a detailed watershed analysis, but rather a characterization of the salient watershed conditions that will provide context for assessment work at the smaller spatial scales. For some attributes, information to support this assessment may already be available as part of existing studies. Data collected as part of the basin assessment will be evaluated using applicable Reach-based Ecosystem Indicators (REI), as appropriate.

The valley segment-scale analysis will characterize the geomorphic and bio-physical processes occurring across the entire study area. Available data sources (e.g. digital terrain models, aerial photography, and available site-specific data) will be used to describe the geomorphic condition of stream channels, including sediment transport conditions, flooding processes, channel migration, riparian ecology, and the influence of hydromodifications. Historical conditions and trends will be described using available data sources, where available. These may include historical aerial photography and historical land surveys. Physical process conditions will be used to delineate individual stream reaches; using tributary junctions, gradient, and valley confinement as initial metrics for reach delineation. Any available fish use information for the study area will also be compiled and reviewed as part of this task. Data collected as part of the valley segment assessment will be evaluated using the REI, as appropriate. The valley segment-scale assessment will be used to highlight the individual reaches that have the greatest potential for habitat enhancement.

Task 3 –Reach assessment

Stream habitat and geomorphology surveys will be conducted on approximately 6 miles of Simcoe Creek. For these assessments, it is assumed that any necessary landowner or access permissions will be coordinated by Yakama Nation Fisheries staff.

Stream habitat survey – The habitat survey will characterize stream channel and riparian habitat conditions. The survey will help to identify areas that could benefit most from habitat enhancement and will serve as a baseline for future monitoring of project effectiveness. The habitat survey will be conducted using the USFS Level II protocol. The methodology employs a habitat unit survey along with general characterization of substrate, large woody debris, and riparian conditions. A reach delineation will be performed as part of this effort and sub-reaches will be delineated based on site observations.

Stream habitat survey summaries will be produced that document the findings of the stream habitat survey. Data will be presented in tables and figures and will include narrative interpretations of the results, especially as they apply to the identification of habitat enhancement activities. Data from this assessment will be applied to selected REI metrics.

Geomorphology assessment – A geomorphologist(s) will walk each reach in the study area and will characterize bio-physical conditions and channel processes. Any existing geomorphic or geologic information or studies previously completed will be analyzed. This information will be thoroughly reviewed prior to the geomorphology surveys in order to provide context for field investigations. Reach Assessment activities will build off of the existing information to further refine and focus the geomorphology assessment at the reach and subreach scales. In particular, an emphasis will be placed on identifying site-specific geomorphic conditions to inform the selection of habitat restoration actions.

Geomorphic conditions will be noted. Conditions with respect to the following observed characteristics will be included in the analysis: 1) sediment transport and response conditions, 2) channel incision and channel evolution trends (erosion and stability), 3) substrate types, distribution, and availability, 4) influence and role of large woody debris, 5) floodplain, channel migration zone, and habitat connectivity, 6) surface and subsurface flow interactions, 7) influence of past and current human structures and activities, and 8) interaction of the stream with riparian ecological processes. Analysis of aerial photography, topographic data, historical information, geology mapping, and other data sources will be used to complete the geomorphology analysis. The condition and impact of land uses (historical and current) on reach-scale processes and habitat will be described. Risks and constraints associated with existing or planned land-uses will be documented.

Identification of project opportunities – Project opportunities will be identified in tandem with the geomorphology survey. Identification of opportunities will be guided by the combination of: 1) existing study analysis, and 2) site observations of geomorphology, habitat, riparian, and land-use impairments. Opportunities for stream habitat enhancement will be identified and general project descriptions will be produced. Project descriptions will include: 1) location information, 2) overview of existing conditions, 3) treatment alternatives, and 4) access and feasibility considerations. Photographs and GPS coordinates or air photo map locations will be taken to document observed conditions and location information. Potential project opportunities will be described and mapped.

Task 4 –Evaluation of Project Opportunities
Habitat enhancement project opportunities will be evaluated according to other feasibility and logistical factors, such as landownership and construction access. A decision matrix or similar technique will be utilized that allows for the evaluation of projects according to restoration objectives and other evaluation criteria. Criteria to be included in the decision matrix will be based upon stakeholder objectives and the findings of the assessments in Tasks 2 and 3. Evaluation criteria will give priority to protecting functioning habitat, restoring physical processes, and reconnecting isolated habitats. The matrix will include additional criteria such as species addressed, habitat limiting factors addressed, compatibility with geomorphic setting, costs, feasibility, and risks to infrastructure. The evaluation methodology will be prepared and provided for review and comment by YIN and stakeholders as appropriate.

Task 5 – Preliminary Conceptual Designs
A subset (approximately 3 to 5) of the high priority projects will be moved forward to the conceptual design level. Conceptual designs will include a description of existing conditions, project objectives, treatment alternatives, and access/feasibility considerations. An aerial photograph with an overlay of the project area will be included. Typical plan, profile, and cross-section drawings of project components will be included as appropriate. A planning-level cost estimate will also be provided.

Task 6 –Meetings and Coordination
4 meetings with Yakama Nation Fisheries Staff and others as appropriate. These meetings will occur throughout the scope of the project in order to communicate project status and obtain input from stakeholders / cooperators. It is assumed that Yakama Nation Fisheries Staff will be the liaison with stakeholders and coordinate meeting schedules and venues. Preparation and Power Point presentations for the meetings. It is assumed the meetings will occur in the Toppenish area.

This task also includes the production of 30 draft copies and 30 final copies (all bound and in color) of the final report for the reach assessments (60 report copies total).

Task 7 – Project Management
Regular communication with YIN staff and reporting of project status. Routine communications with YIN and others as needed to carry out project activities.

References

InterFluve. 2014. Upper Toppenish Creek reach assessment & restoration strategy. Draft report submitted to the Yakama Nation Fisheries Program. InterFluve, Inc.

National Marine Fisheries Service (NMFS). 2009. Middle Columbia River Steelhead distinct population segment ESA recovery plan. National Marine Fisheries Service. Northwest Region. National Oceanagraphic and Atmospheric Administration. U.S. Department of Commerce.

Resseguie, T. 2010. Improvements to Steelhead population monitoring on Toppenish Creek. Yakama Nation Fisheries Resource Management Program.

Washington State Department of Ecology (Ecology). 2005. Final Programmatic Environmental Impact Statement for the Ahtanum Creek Watershed Restoration Program. Ecology Publication # 05-06-016