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FY2014 ANNUAL REPORT

MARCH 1, 2014 THROUGH FEBRUARY 28, 2015

YAKAMA RESERVATION WATERSHEDS PROJECT

BPA Project #1996-035-01-Contract #56662-REL 50

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I. Introduction

A. Project Overview

In June of 2005, the Ahtanum Watershed Assessment, Toppenish Watershed and Satus Watershed Projects were combined into one project, named the Yakama Reservation Watersheds Project (YRWP). Since the last report in 2013, YRWP staff has continued several tasks including: close monitoring of stream discharge and irrigation withdrawals, monitoring of juvenile steelhead outmigration, steelhead spawning surveys, and analysis of irrigation extent and timing. We have also continued our restoration efforts in the three watersheds, completing the design, construction and revegetation of a floodplain restoration project on North Fork Toppenish Creek, riparian planting, and planning and identification of restoration opportunities for upcoming fiscal years.

II. Restoration

A. North Fork Toppenish Creek Culvert Removal and Floodplain Enhancement

Project Overview

The project site is located on North Fork Toppenish Creek near its confluence with the main stem Toppenish Creek (RM 55) (Lower Yakima River > Toppenish Creek > North Fork Toppenish). North Fork Toppenish Creek produces a mean of 7 steelhead redds/year (2006-2011) with a maximum of 16 (2009) in the 4 miles of available steelhead spawning habitat. The Creek was impacted by the infrastructure of an abandoned transportation route acting as a longitudinal dam (or dike) along the stream channel, causing lateral floodplain disconnection. The confined channel eroded through the fill material of the road at two culvert locations creating fish passage barriers. The upstream culvert (figure 1) strands juvenile fish including ESA listed Middle Columbia River Steelhead (MCRS) during mid to low flow periods. The lower culvert (figure 2), located 2,500 feet downstream, was periodically a migratory barrier to juvenile and adult MCRS due to inundation of debris and hydraulics.

Figure 1. Upstream culvert and road that was later removed. Historic floodplain is to the right of the image and NF Toppenish Creek is to the left.

Figure 2. Lower culvert. Photo taken March, 2012

The site is located at the distal end of a sediment transport reach with bedrock near or at the streambed surface. The majority of the spawning habitat upstream of the upstream culvert is naturally confined due to the immature geology of the site. However, at the upper culvert site down to the confluence, the potential for floodplain storage is huge and was cut-off from the channel for most of the season. Diking and other channel modifications/simplification associated with the roadway had disrupted the natural sediment transport regime and water storage potential. As lateral migration had been essentially arrested to varying degrees by the road and associated infra structure, the channel has undergone considerable vertical migration near the confluence with Toppenish Creek.

The roads causing all the problems are no longer used for vehicles. Mass wasting has occurred at multiple locations upstream of the (former) road crossings and downstream. By travelling east from the lower culvert, the road parallels Toppenish Creek downstream to Willy Dick Creek and has been completely washed out by Toppenish Creek in multiple locations. The west side of the culvert has a roadway descent that funneled water over ~ ½ mile of road, directly into the creek for much of the year (figure 3). A well vegetated floodplain/upland habitat exists adjacent to the road to the north which could serve as a suitable area for interception of the roadway run off.

Figure 3. Surface runoff draining to North Fork Toppenish Creek at the lower culvert

YRWP staff concluded that by removing the lateral impediments and culverts, and utilizing upland and riparian areas within the site area for interception and water storage, the stream channel would return to more of a response reach, providing storage of spawning gravels and water for summer base flows in Toppenish Creek. Floodplain reconnection would also increase

rearing habitat for juvenile salmonids due to the intact area of existing riparian vegetation and side channels currently disconnected from the creek. The ultimate goal of the action was to increase the quality and quantity of MCRS spawning and rearing habitat, improve fish passage, and enhance water quality, and quantity.

Methods

Late winter of 2014, YRWP staff conducted a topographic survey of the site using a total station. Data collected from the survey was analyzed in ARC GIS and Auto CAD Civil 3D to determine fill quantities, and to develop an engineered plan for contractors to bid on, acquire permits (YN water code, HIP III programmatic), guide cultural resources surveying, present to the Interdisciplinary team, and ultimately to construct the project.

Construction began on the project in September. Due to the remote location of the site and the difficult terrain, heavy equipment was mobilized nearly 17 miles which took nearly a day. Initially, two water bars were constructed on the road leading to the lower culvert to divert surface water into the adjacent riparian area per the project plans. The lower culvert was removed from the creek without entering the water, after fish were excluded (upstream and downstream of the culvert) using block nets. The bank was sloped to the specification of the plans (figure 4), and two additional water bars were constructed on the roadway. Fill derived from the bank excavation was contoured into the hill slope above the most upstream water bar.

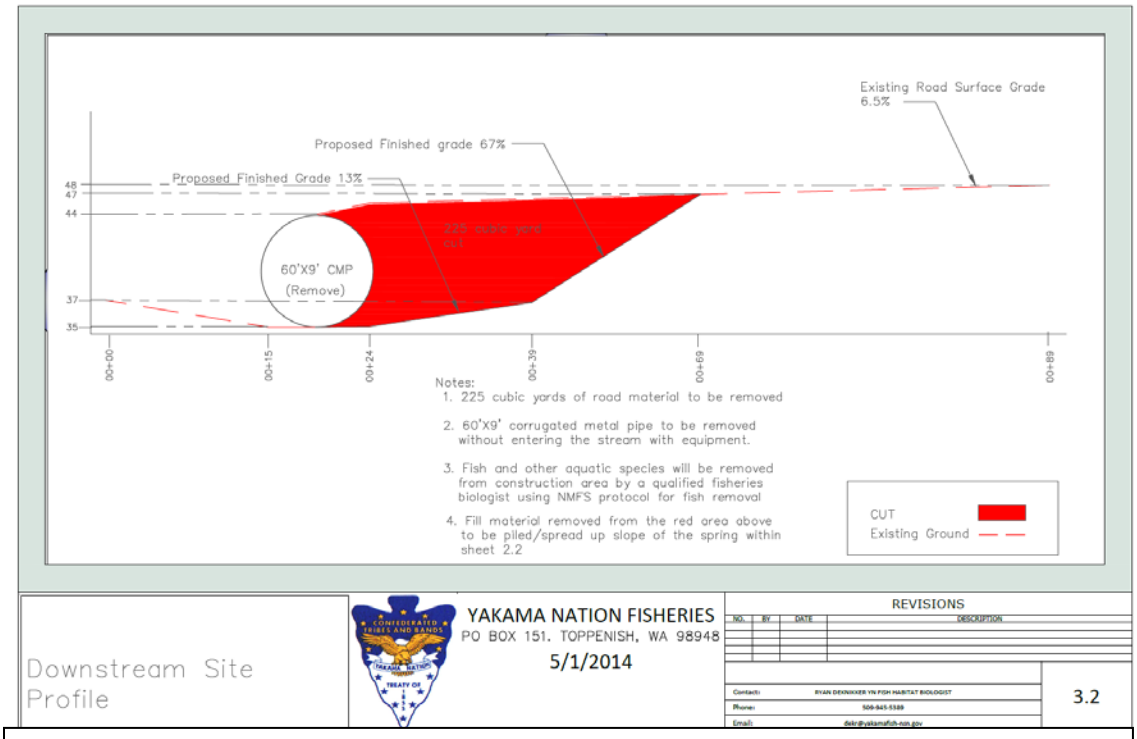

Figure 4. Profile view of downstream culvert removal design

A temporary stream crossing was installed to allow equipment access to the upstream culvert site and existing vegetation was grubbed. Excavation began on the road prism and culvert. The culvert invert was just at the edge of water elevation of the active portion of the North Fork Toppenish Creek channel (wetted width). Woody materials salvaged from the roadway and excavation was dispersed over the disturbed areas to provide surface roughness and provide habitat (figure 5).

Figure 5. Salvaged logs spread throughout the disturbed area (previous road prism occupation) at the upper culvert site.

Upon completion of the heavy equipment construction activities, the site was seeded with native riparian and upland seed mix, and riparian areas were planted using container plants.

Results

As surface water elevations rose in North Fork Toppenish Creek, the area where the upstream culvert was removed was quickly activated, diverting approximately 50% of the flow into the adjacent floodplain and historic channel network (figure 6). The scour pool at the outlet of the culvert that was removed is filling with cobble, and no passage issues exist. YRWP staff believes that approximately 75% of the flow will be flowing into the restored floodplain by winter's end.

Figure 6. Former upper culvert alignment. The newly connected floodplain is in the background.

Figure 7. Former road alignment at upper culvert. This photo is the same location as figure 1, post construction.

The lower culvert site will now allow unimpeded passage of MCRS, juvenile and adult, at all flows (figure 8). 375 container plants were installed throughout the site depending on species in addition to 50 lbs of native seed mix. Container plantings at each of the culvert sites and the flood plain areas are surviving well thus far and the native seed has sprouted and is helping stabilize the disturbed areas.The road drainage work conducted at the lower culvert area will greatly improve water quality and storage (figure x).

Figure 8. Lower culvert site post construction and revegetation

Cut and fill quantity estimates were accurate in that approximately 2,800 cubic yards of fill was moved and the design estimate was 2,750 cubic yards. A trail camera was installed at the upper culvert site, taking a still photograph of the floodplain and historic channel activation every half hour during daylight hours. The project stayed on budget and is functioning as it was designed to function.

B. Willy Dick Creek Revegetation

Project Overview

YRWP completed a restoration project on and adjacent to Willy Dick Creek, a tributary of Toppenish Creek. The project included the removal of over 200 yards of levee materials, re-routing Willy Dick Creek into its historic alignment and revegetation. This BPA contract funded the revegetation phase of the project.

Methods

YRWP staff planted over 300 container plants sourced from a local native plant nursery, and 50 lbs of riparian and upland seed at the site (figure 9). Plants were flagged to monitor survival overtime and watered until sufficient precipitation provided sufficient water availability.

Figure 9. YRWP staff planting container plants at the Willy Dick Creek site, October 2014

Results

It is too early to report the survival results of the plantings. Grass growing from seed planted is abundant at the site. It will be necessary to plant more container plants along the riparian areas. The channel is now aligned in its historic floodplain and it was too difficult to predict with much confidence where that alignment would be in many locations in order to define where to plant the riparian plants (Willy Dick Creek is partially ephemeral). An outreach project was conducted last summer with Yakama Nation Tribal School students which involved classroom and fieldwork, to predict where the riparian vegetation would likely need to go. However, the results were inconclusive.

III. Operations and Maintenance

A. Stock Wells

YRWP staff repair and maintain 33 solar powered stock pumps (Figure 10) and 3 stock water pipelines in the Ahtanum and Toppenish Watersheds. These pumps and pipelines are used to provide stock water when YN minimum instream flow criteria mandate the cessation of irrigation. It is necessary to have many wells because there are many individual cattle operations, several of which may not always be served by a single well. Operating these wells has been a difficult task which we are still in the process of perfecting. Project staff anticipates

constructing more stock pipelines that will be associated with the existing stock pumps. This will better meet multiple users' needs while only using one stock pump.

Figure 10. Stock pump and watering trough.

Routine maintenance of these facilities includes fixing a significant amount of broken PVC plumbing (often associated with cattle damage), replacing the electrical pieces of the pump's control systems as they wear out and upgrading the water troughs associated with the pumps.

Project staff have found that most of the infrastructure associated with the watering troughs (hoses, float switches, trough supports etc.) were too lightly built. Over the last year we have been working to upgrade this infrastructure with more rugged float switches, flexible PVC hoses instead of garden-type hoses, more sturdy stanchions for the troughs and gravel aprons around the troughs to prevent soil erosion.

In addition we have found it necessary to replace several of the protective fences surrounding the installations. The original fences were usually standard barbed wire and it has become apparent that a post and pole type fence is more appropriate for this application.

We have experienced relatively few problems with the solar arrays associated with the pumps. Several arrays have been upgraded to provide more power and thus more pumping capacity to units that experience high demand.

B. Fencing

As in past years, staff maintained over 158 miles of range unit boundary fence, 15 miles of riparian fence and 22 miles of meadow exclosure fence. The YRWP maintains range unit boundary fence in places where those fences keep cattle out of sensitive areas. Staff build and maintain riparian fencing. Some of the maintenance is done in cooperation with the Bureau of Indian Affairs' Range Program, however that program is chronically understaffed, and much of the work falls to the YRWP.