PA28 Floodplain Connectivity 2019

Tucannon Habitat Programmatic

2019 Annual Summary (January 2019– December 2019)

BPA Project #2010-01-00

February 2020

Prepared by: Snake River Salmon Recovery Board

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Acknowledgments:

A special thanks goes to the partners of the Tucannon Programmatic, it is through your hard work and continued support that measurable habitat improvement is achieved. Also, the landowners for having faith in a sciences based process and committing to restoring habitat and preserving valuable species for future generations.

Implementers:

Columbia Conservation District
Confederated Tribes of the Umatilla Indian Reservation
Nez Peirce Tribe
Snake River Salmon Recovery Board
US National Forest
Washington Department of Fish and Wildlife

Funders:

Bonneville Power Administration:
Salmon Recovery Funding Board:
Washington Conservation Commission:

Partners:

Snake River Salmon Recovery Board
Tucannon Habitat Programmatic
2019 Annual Summary Report
Project 2010-01-00

Introduction: This report summarizes the habitat restoration projects and associated restoration support funded, partially or entirely, through the Tucannon Programmatic Habitat (Program) for the calendar year of 2019. The primary funding sources included in this report include the Bonneville Power Administration (BPA) and Washington State Salmon Recovery Funding Board (SRFB). Most projects also include at least some level of additional cost share, both in-kind and cash, not included in this report. In 2019, the Program and its partners initiated two restoration projects, supported WDFW in the implementation of wetland planting, supported the development of three preliminary designs for implementation 2020-2022 and supported the development of one conceptual designs for advancement in 2020. The Program continued to support the Columbia Conservation District in updating the 2011 Tucannon Conceptual Restoration Plan, with the completion of the new plan anticipated early in 2020.

The Tucannon River Program Habitat Project 2010-007-00 is a restoration "Umbrella" project focusing on improving Snake River spring Chinook habitat in the Tucannon River, near Dayton, WA (Figure 1). The Program is managed by the Snake River Salmon Recovery Board (SRSRB) in conjunction with the following partners: the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Columbia Conservation District (CCD), Nez Perce Tribe (NPT), U.S. National Forest (USNF) and the Washington Department of Fish and Wildlife (WDFW). The Program partners have been working as a group for 9 years in the implementation of the Conceptual Restoration Plan, Reaches 6 to 10 Tucannon River Phase II (Anchor November 2011). The Program collectively has funded 14 projects identified and prioritized in the plan and coordinated treatments on 5 others (Figure 2).

The SRSRB serves as the Regional Organization and the Lead Entity for salmon recovery in the Washington State portion of the Snake River basin and the Washington State portion of the Walla Walla River basin. The SRSRB is supporting the implementation of the Salmon Recovery Plan for SE Washington (SRSRB 2011) by guiding regional SRFB funding to high priority habitat limiting factors, and providing scientific & biological technical support to project implementers. The SRSRSB provides a broader perspective for salmon recovery than a typical one-watershed process, by participating in salmon recovery efforts and issues throughout the State of Washington not only working to develop and maintain partnerships in restoration but also in monitoring and land management issues. Lastly, the SRSRB also provides a sounding board for public input and involvement in salmon recovery both in projects and in approaches, building the baseline support need for large-scale restoration.

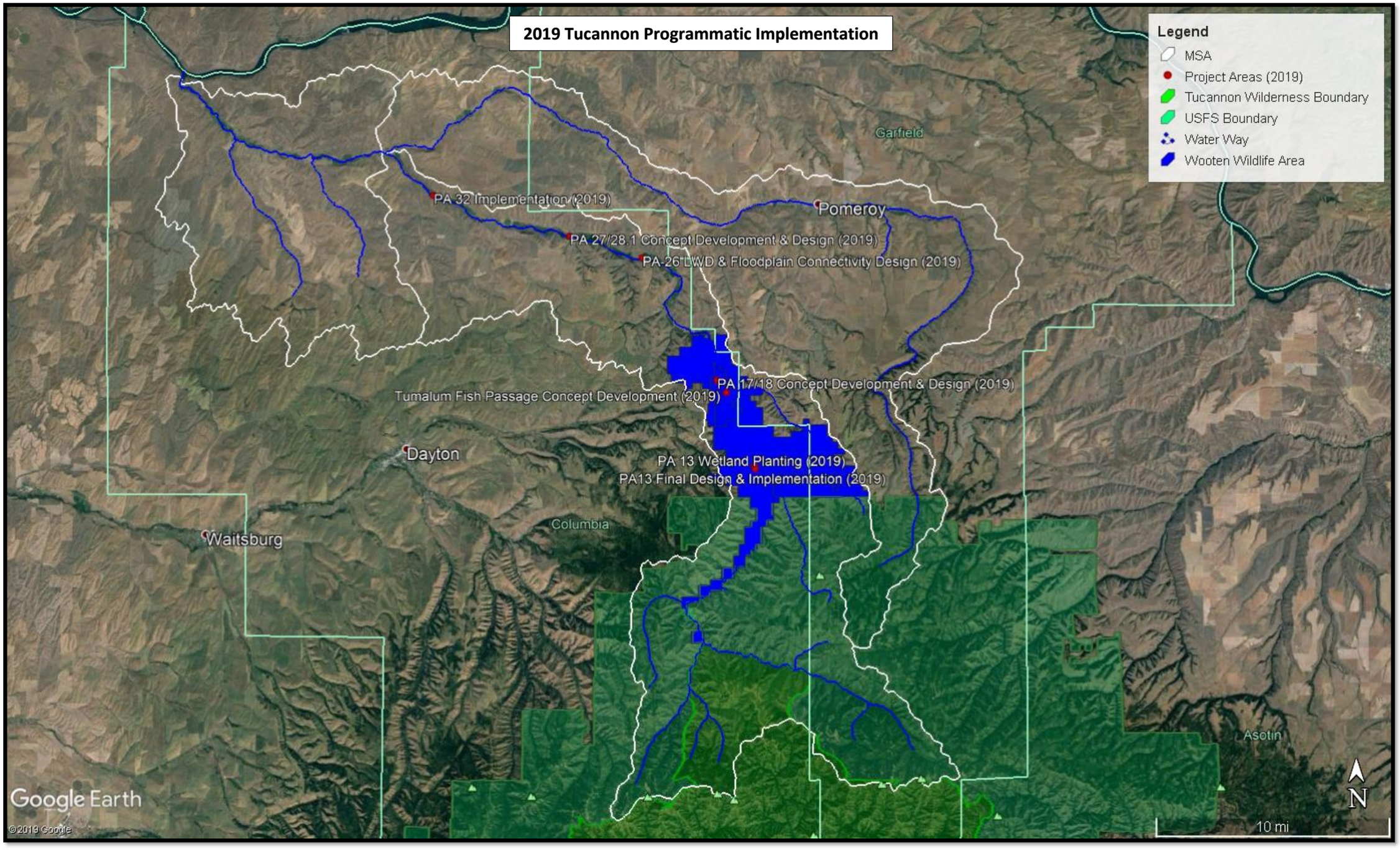


Figure 1: Google Map of the Tucannon basin, from the headwaters in the Blue Mts (lower) downstream to the Snake River (upper) located in SE Washington east of the City of Dayton. The red dots indicate the approximate locations of the three Programmatic supported projects, the two design projects and the two project concepts implemented in 2019.

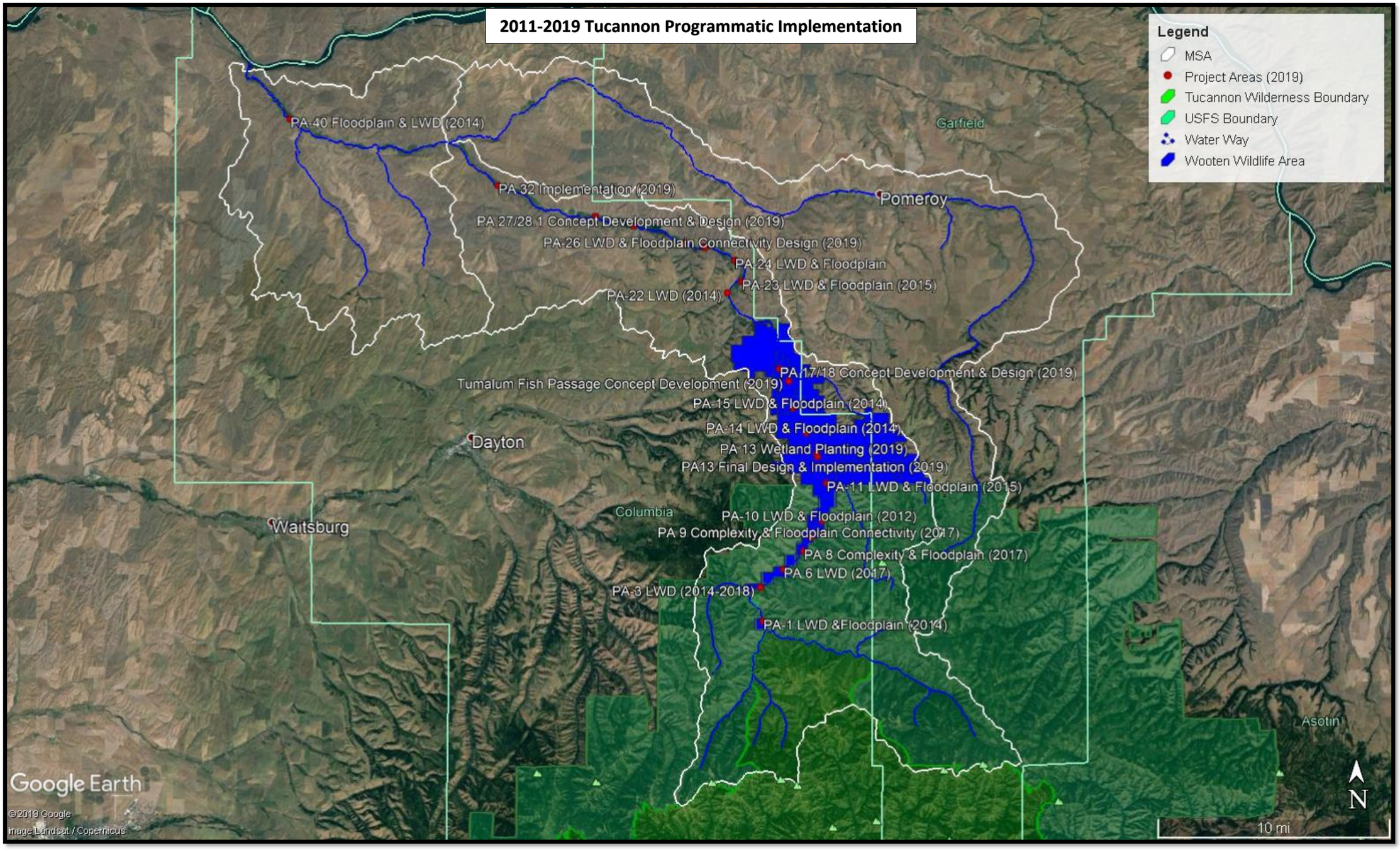


Figure 2: The map above identifies the approximate locations of projects that have had restoration actions designed or implemented, as part of the Tucannon Habitat Programmatic between 2011 and 2019.

2019 Implementation:

Project Title: PA13 Levee Removal and Channel Reconfiguration Final Design & Site Preparation

Implementer: Washington Department of Fish & Wildlife

BPA Programmatic Funding (2010-077-00): In FY19, $140,000 (#74314 REL 65), In FY18, $93,666 (#74314), In FY17, $58,500 (#75493), In FY16, $69,669 (#72044)

Matching Funds: WDFW received Washington State Capitol Funding to remove levees surrounding Rainbow Lake increasing available floodplain to PA13, the approximate contribution toward the project is $275,000 cash. WDFW received a SRFB grant in FY19 $395,000 to be used for implementation.

Project Timeline: Concept Development 2017, 60%-90% Design 2018, Final design funding site preparation and material sourcing 2019, Instream work Phase I started in 2019-20 with wetland planting and site preparation, and Phase II instream and riparian planting 2021

Location: Tucannon River mile 39 to river mile 40; Start Lat/long 46.319376 / -117.664189 End (Lat/Lon) 46.309638 / -117.657055.

Recovery Expectations: Due to the degraded nature of this project reach (Figure 3), it is anticipated levee removal and channel reconfiguration it is anticipated that as-built conditions will be very close to the anticipated design condition. Winter freshets and high flow are anticipated to redistribute and sort gravel and cobble to increase spawning habitat quality over a 2-5 yr time frame.

Priority Populations & Life Stages: Snake River ESU Spring/Summer Chinook (Threatened), Snake River DPS Summer Steelhead (Threatened) and all life stages.

Potential Future Actions: Following implementation at this project efforts will be made to monitor gravel deposition, side channel connectivity and riparian health. In the event of gravel transport deficiency additional gravel and LWD loading may be implemented as part of the design strategy.

Project Goals & Objectives: The current goal for this project is to increase floodplain connectivity and channel complexity to the 1 mile reach between the Hatchery weir and the Hatchery Bridge.

Short Term Objectives: Increase channel roughness and structure within the one mile reach.

- Construct 31 ELJs and supplement gravel and a cobble materials to raise bed elevation.
- Place LWD complexity to achieve a minimum of 2 pieces per bank full width over a 10 year average.

Short Term Objectives: Increase floodplain connectivity to the one mile reach

- Remove approximate 0.31 miles of river levee
- Reconnect > 1 mile of isolated side channels
- Reconnect >21 acres of new floodplain.
- Connect ~3 acres of off channel wetland habitat.

Long Term Objective:

- Improve adult holding for spring Chinook and steelhead
- Improve spring Chinook spawning habitat
- Improved spring Chinook and steelhead

Figure 3: PA 13 river reach downstream from the Tucannon River fish trap. Image captured in 2017 standing on an ELJ build immediately below the trap to aid in fish passage into the trap.

Project Background and Summary:

Background: Project Area 13 was identified as a high priority restoration project in the Tucannon Conceptual Restoration Plan (Anchor QEA 2011 April) and was prioritized in the plan for early implementation and approved for funding by the Regional Technical Team and the Salmon Recovery Board, in 2019. The project reach is characterized as being highly confined by river levees protecting Rainbow Lake and the Tucannon Fish Hatchery infrastructure. The river through the reach had been straightened and became incised below the hatchery fish trap reducing channel complexity (Figure 3). The reach is located in the center of the Tucannon spring Chinook spawning reach and while a relatively high proportion of redds are observed within the reach annually, available spawning habitat is poor and rearing habitat is limited.

In 2016, WDFW initiated the removal and set back of the Rainbow Lake dam increasing available disconnected floodplain by >3.6 acres. These acres were previously lake bed (Impoundment) and remained behind ~925' of river levee until 2018 when the levee/dam was removed by WDFW (Figure 4). The removal of the lake dam allowed for the creation of wetland habitats to be created in the footprint of the displaced reservoir. In 2019, the Program worked with WDFW in the creation of this wetland through the shaping of the landform (WDFW match) and planting of wetland plant species (Figure 6).

Project Summary: Project Area 13 was designed by WDFW in 2018-19 for the purpose of enhancing and restoring instream habitat in this project area through a variety of treatment actions in the main channel, along the banks, and within the floodplain. The treatments include; removal of river levees and rip rap to, reconnecting side channels, the construction of a channel meander, and construction of instream habitat features such as engineered log jams to raise the river bed, and riparian planting. The principal benefits of project implementation will be restoration of historic spring Chinook spawning, rearing, and migration corridor habitats. The associated recovery of riparian areas is expected to be induced by naturally occurring flooding over the long term.

Expected Implementation Actions (from restoration design): Reconnect >1 mile isolated side channel (~50/50 perennial-ephemeral) habitat through the removal of ~650 of river levee, and the placement of associated log jams (Figure 5). The removal of levees and placement of logjams will reconnect ~14.6 acers of low floodplain, and an additional 3.6 acers previously part of Rainbow Lake impoundment footprint (Figure 4). Install ~31 ELJs and other LWD structures in the main channel to increase channel complexity over a 0.8 mile reach. Additional, unsecured mobile LWD will be placed in main channel, side channels and on the floodplain for complexity. Re-plant adjacent floodplain and riparian areas where disturbed to re-vegetate and restore disturbed construction access sites and staging areas. During planting, efforts will be made to increase pines and cottonwoods throughout the reach for the purpose of future LWD key piece recruitment. The 2020-21 removal of the addition 650 feet of river levee is anticipated to reconnect the 3.6 ac wetland created in 2019, (Figure 5).

Program to mitigate for lost fisheries and is managed by WDFW. Beginning in 2017, WDFW began implementing their floodplain management plan with the first project targeting reconfiguration of the impoundment funded by the State of WA as a capital project. The goals of this project were to reduce the impoundments encroachment on the floodplain, improve public fishery value and hatchery water supply. The objective that most aligned with the Tucannon Habitat program is the removal of ~950 ft. of the original reservoir dam (Figure 4) and the creation of ~3.5 acre wetland on the previously inundated reservoir bed. The reservoir was drained in 2017 and the new impoundment was dredged to a new configuration and depth leaving an area of ~5.5 surface acres. In the fall of 2018, a new dam was constructed excluding ~3.5 acres of reservoir bed, which was reshaped and planted with wetland species. The wetland were planted in March 2019 with ~3,000 willow, and ~500 cottonwood plugs and 250

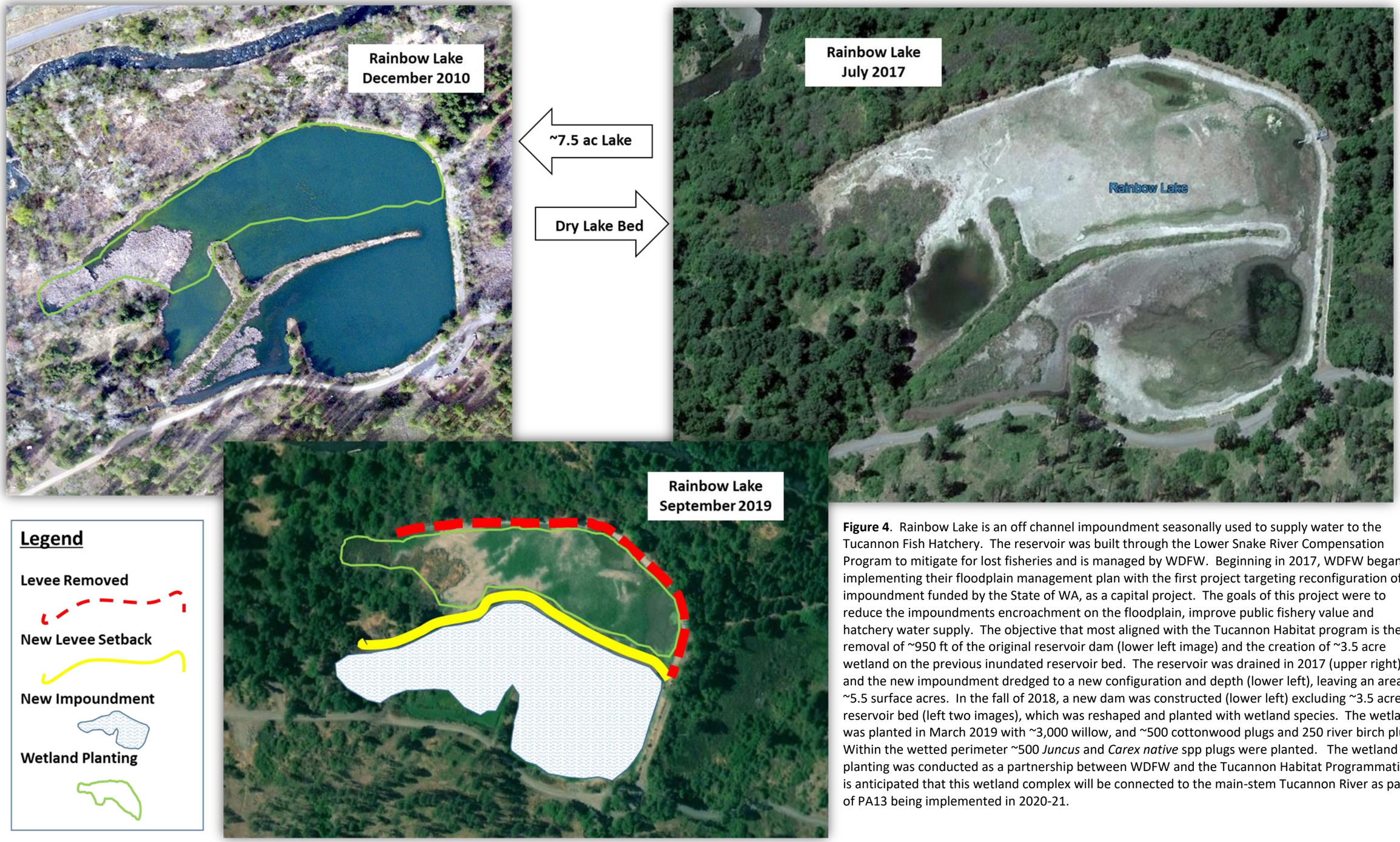


Figure 4. Rainbow Lake is an off channel impoundment seasonally used to supply water to the Tucannon Fish Hatchery. The reservoir was built through the Lower Snake River Compensation Program to mitigate for lost fisheries and is managed by WDFW. Beginning in 2017, WDFW began implementing their floodplain management plan with the first project targeting reconfiguration of the impoundment funded by the State of WA, as a capital project. The goals of this project were to reduce the impoundments encroachment on the floodplain, improve public fishery value and hatchery water supply. The objective that most aligned with the Tucannon Habitat program is the removal of ~950 ft of the original reservoir dam (lower left image) and the creation of ~3.5 acre wetland on the previous inundated reservoir bed. The reservoir was drained in 2017 (upper right) and the new impoundment dredged to a new configuration and depth (lower left), leaving an area of ~5.5 surface acres. In the fall of 2018, a new dam was constructed (lower left) excluding ~3.5 acres of reservoir bed (left two images), which was reshaped and planted with wetland species. The wetland was planted in March 2019 with ~3,000 willow, and ~500 cottonwood plugs and 250 river birch plugs. Within the wetted perimeter ~500 *Juncus* and *Carex native* spp plugs were planted. The wetland planting was conducted as a partnership between WDFW and the Tucannon Habitat Programmatic, it is anticipated that this wetland complex will be connected to the main-stem Tucannon River as part of PA13 being implemented in 2020-21.

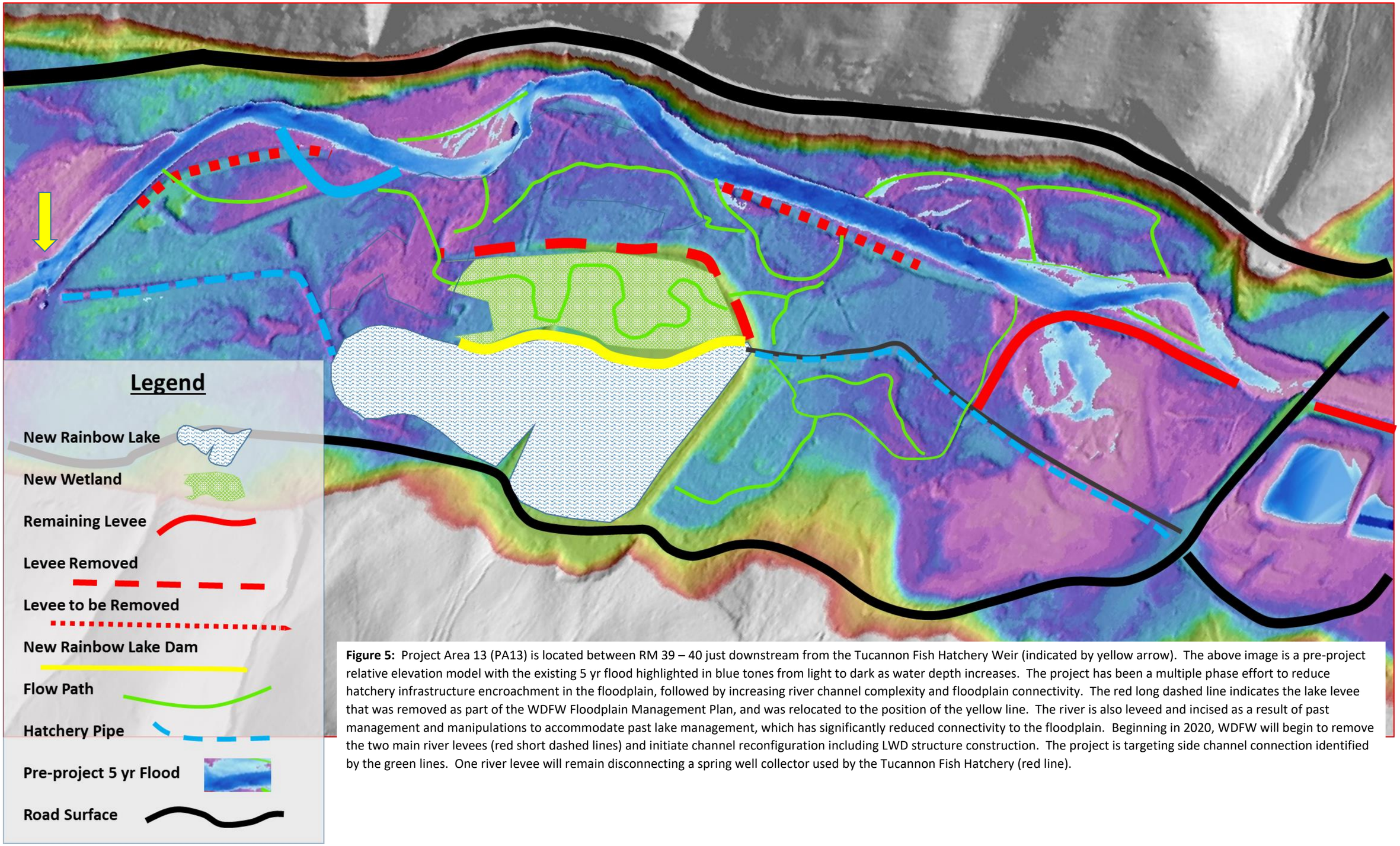


Figure 5: Project Area 13 (PA13) is located between RM 39 – 40 just downstream from the Tucannon Fish Hatchery Weir (indicated by yellow arrow). The above image is a pre-project relative elevation model with the existing 5 yr flood highlighted in blue tones from light to dark as water depth increases. The project has been a multiple phase effort to reduce hatchery infrastructure encroachment in the floodplain, followed by increasing river channel complexity and floodplain connectivity. The red long dashed line indicates the lake levee that was removed as part of the WDFW Floodplain Management Plan, and was relocated to the position of the yellow line. The river is also leveed and incised as a result of past management and manipulations to accommodate past lake management, which has significantly reduced connectivity to the floodplain. Beginning in 2020, WDFW will begin to remove the two main river levees (red short dashed lines) and initiate channel reconfiguration including LWD structure construction. The project is targeting side channel connection identified by the green lines. One river levee will remain disconnecting a spring well collector used by the Tucannon Fish Hatchery (red line).

river birch plugs. Within the wetted perimeter ~500 *Juncus* and *Carex native* spp plugs were planted. The wetland planting was conducted as a partnership between WDFW and the Tucannon Habitat Programmatic, it is anticipated that this wetland complex will be connected to the main-stem Tucannon River as part of PA13 being implemented in 2020-21.

Figure 6: Project Area 13 off channel wetland created in 2018-19 by the removal and setting back of the Rainbow Lake dam and was planted in 2019 in cooperation between WDFW and the Program. In the spring 2020 the wetlands were fully inundated during a 25 yr. flood event and performed as intended.

Project Title: PA17/18 Design Concept Development

Implementer: Confederated Tribes of the Umatilla Indian Reservation

BPA Programmatic Funding (2010-202-00): In 2018 - $35,700 (#73982)

Other BPA Funds (2008-202-00): In 2019 - $164,535 (#73982 REL 72)

Matching Funds: No other matching funds have been identified for this project area at the time, but it is anticipated that CTUIR would consider pursuing floodplains by design or SRFB grant as match in 2021.

Location: The project reach is located between RM 33.1 and 36.35. With a start Lat/lon46.376913 -117.693008 and end Lat/lon 46.352667 -117.684059

Project Time Line: Coordinate and outreach 2017, concept development and build landowner support 2018-19, 90% design 2020, construct 2021-22.

Priority Populations & Life Stages: Snake River ESU Spring/Summer Chinook (Threatened), Snake River DPS Summer Steelhead (Threatened) and all life stages

Project Goal & Objectives: The project goal will be to increase hydration of an inset floodplain through the construction of log jams, and the connection/creation of side channels. Specific project objectives will be developed during the design process in 2019-20.

Summary: The Project Area 17/18 floodplain and channel complexity project goal in 2019 were to make contacts with private landowners through a number of public meetings and events held within the basin. The results of these efforts has led to enough interest amongst the landowner group to move forward from concept development to preliminary design (Figure 7) and the development of landowner agreements in 2019.

Current Emphasis: In 2020, CTUIR will continue to work with private landowners within this high priority (Tier I) reach to identify and implement restoration objectives that have high fish benefit while working with the 22 property owners within this reach. As of the winter of 2019 the majority of the landowners within the ~3 mile reach have expressed interest in doing some level of restoration and have returned signed agreement forms to CTUIR based on their review of the concept drawing. CTUIR has continued working with a design engineer (using Tucannon Accord funding) to produce a preliminary designs (Figure 7) for review with landowners and is currently receiving landowner comments. CTUIR will continue to work with BPA EC review to complete a final design in 2020.

Project Title: Tumalum Fish Passage

Implementer: Nez Pierce Tribe

BPA Programmatic Funding (2010-077-00): In 2020, $275,000 (CR-338656)

Other BPA Funding (2007-393-00): In 2019, NPT committed ~$116,000 (#74017 REL 45) (

Matching Funds: Matching funding toward this project are being pursued in the FY20 SRFB grant round, through the SRSRB LE process in 2020. It is assume that about $200,000 for implementation 2020-21 would be requested in the round.

Location: Tucannon River mile 32.7

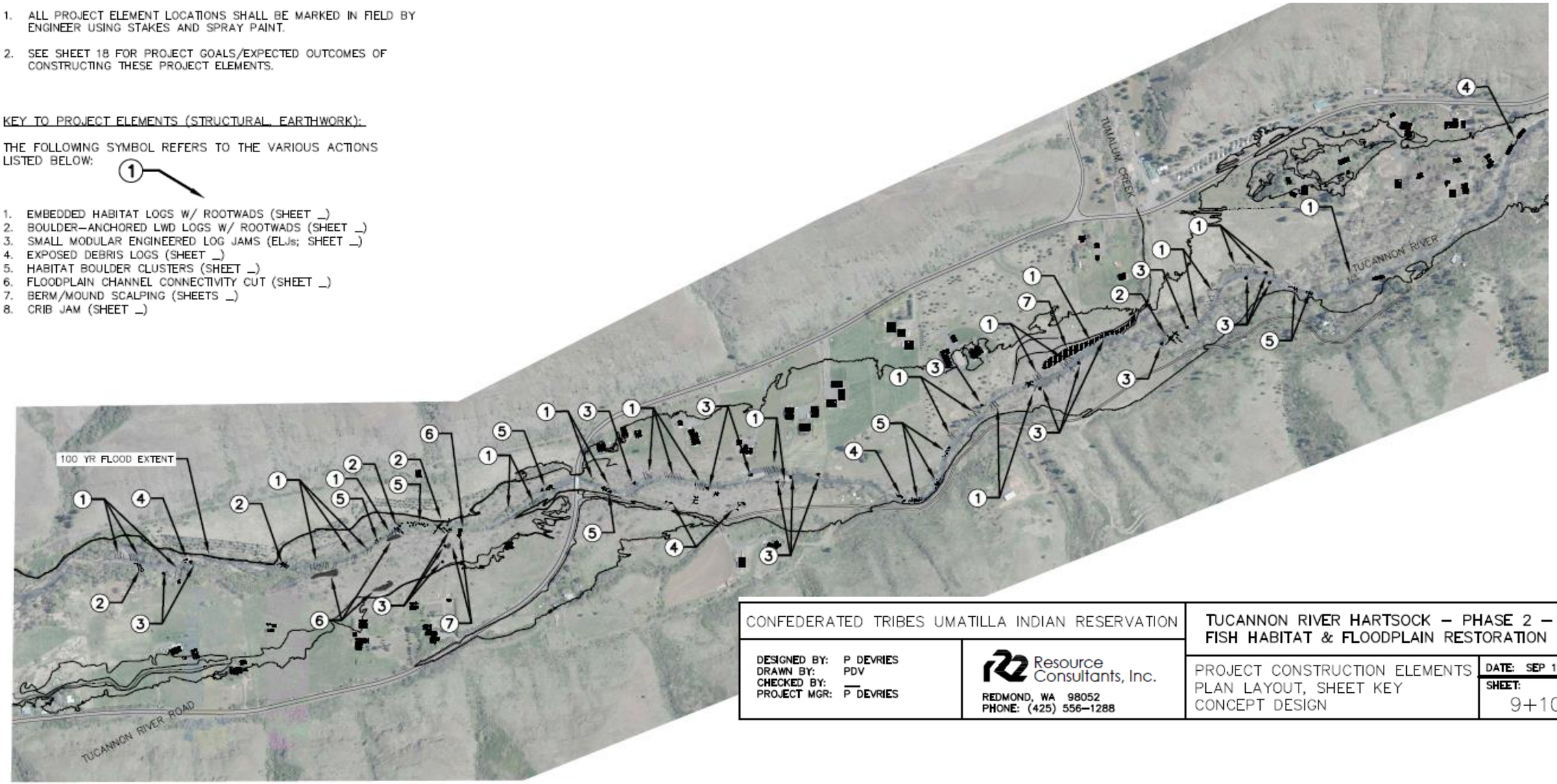
NOTES:

1. ALL PROJECT ELEMENT LOCATIONS SHALL BE MARKED IN FIELD BY ENGINEER USING STAKES AND SPRAY PAINT.
2. SEE SHEET 18 FOR PROJECT GOALS/EXPECTED OUTCOMES OF CONSTRUCTING THESE PROJECT ELEMENTS.

KEY TO PROJECT ELEMENTS (STRUCTURAL, EARTHWORK):

THE FOLLOWING SYMBOL REFERS TO THE VARIOUS ACTIONS LISTED BELOW:

1. EMBEDDED HABITAT LOGS W/ ROOTWADS (SHEET _)
2. BOULDER–ANCHORED LWD LOGS W/ ROOTWADS (SHEET _)
3. SMALL MODULAR ENGINEERED LOG JAMS (ELJs; SHEET _)
4. EXPOSED DEBRIS LOGS (SHEET _)
5. HABITAT BOULDER CLUSTERS (SHEET _)
6. FLOODPLAIN CHANNEL CONNECTIVITY CUT (SHEET _)
7. BERM/MOUND SCALPING (SHEETS _)
8. CRIB JAM (SHEET _)



CONFEDERATED TRIBES UMATILLA INDIAN RESERVATION		TUCANNON RIVER HARTSOCK – PHASE 2 – PA17 FISH HABITAT & FLOODPLAIN RESTORATION
DESIGNED BY: P DEVRIES DRAWN BY: PDV CHECKED BY: — PROJECT MGR: P DEVRIES	Resource Consultants, Inc. REDMOND, WA 98052 PHONE: (425) 556–1288	PROJECT CONSTRUCTION ELEMENTS PLAN LAYOUT, SHEET KEY CONCEPT DESIGN
		DATE: SEP 11, 2018 SHEET: 9+10 REV: —

Figure 7: Project Area 17-18 is currently being designed by CTUIR in coordination with the Tucannon Habitat Programmatic. In 2029, CTUIR worked with R2 Resource Consultant to advance a conceptual restoration plan for the ~3 mile reach into a preliminary design targeting the removal of unneeded river confining features, the placement of channel roughness features and the development of side channels In 2020, CTUIR will work with the engineer and the landowners to finalize designs .

Project Time Line: Initial preliminary design development began in 2019 (#74017 REL 45) to be completed by April, 2020. In 2020, NPT will work to finalize designs and (CR-338656) initiate implementation in 2020-21.

Recovery Expectations: This project is located in Tumalum Creek a small disconnected (33% passable culvert) tributary to the main stem Tucannon. It is anticipated this project will reconnect the tributary and increase fish access and use through channel improvement in the lower mile of the tributary.

Priority Populations: Snake River DPS Summer Steelhead (Threatened), for all life stages.

Potential Future Actions: It is not anticipated that future actions would be required in relation to the removal of the fish passage barrier. Additional floodplain structures may be desired once the floodplain and stream channel objective is met. Revisit riparian planting and health over time as floodplain land scape evolves from shrub step dominated to typical wetted Tucannon riparian forest type.

Project Goals and Objectives

Goal: Restore (100%)fish passage into the Tumalum watershed through the modification of the Tucannon Road crossing located ~2,500 ft from the confluence with the Tucannon.

Conceptual Project Objectives: Detailed objectives will be developed during project development.

I. Develop a fish passage design for the Tucannon Road Crossing, to provide 100% passage
II. Long Term Obj. (3-5 yrs): Improve stream channel and Riparian function in this stream delta for both fish passage and geomorphic process.
III. Planting to restore a floodplain and upland terrace forest

Project Background & Summary

Background: Tumalum Creek is a tributary of the Tucannon River that has been disconnected by a road culvert under the Tucannon Rd. The culvert has formed a barrier based on slope and drop, and currently blocks fish passage (33% passable based on slope and drop, 2019 WDFW survey) into the basin (Figure 8). The road crossing is located within the tributary delta which has been modified and the channel has been channelized and leveed to follow directly downstream to the Tucannon. Fish access to the main stem will be improved by improved by reducing confinement on the delta and increasing channel complexity. Channel habitat features are being coordinated with CTUIR and PA17/18 Design Concept Development.

Summary: The NPT worked to secure a habitat resource design sub-contractor to produce preliminary designs to a 60% level beginning in 2019 and is expected to be at 60% design in March 2020. The NPT is working to develop grant requests to finalized design and initiate implementation in 2020-21. The Program is working with BPA and NPT to put a contract (CR-338656) in place to support both completing the final design and implementation.

The removal of passage barrier will open complete access to more than 6 miles of salmonid spawning and rearing habitat. The added benefit to habitat work in the immediate vicinity up and downstream from the barrier on adjacent properties will provide additional benefit to fish passage and rearing.

Project Title: TUCANNON (PA-26) PHASE II: ADD FUNCTION & COMPLEX

Implementer: Columbia Conservation District

BPA Programmatic Funding (2010-077-00): In 2020, $231,720 (CR-340020).

Other BPA Funding (1994-018-06): In 2019, CCD committed ~$26,000 (#81774), In 2013, $152,000 (#59663). In 2011, $64,000 (#50146)

Matching Funds: In 2019, the CCD was awarded a SRFB grant for $304,775 (19-2094), In 2016 a grant from the Conservation Commission $50,000 and in 2009 and 2010, the CCD was awarded two SRFB grants totaling $694,260 (10-1633 & 9-1742) to remove the river levee.

Location: Tucannon River mile 23.1 to 26.8

Project Time Line: The initial project including levee removal and setback was completed in 2012. Phase I of the LWD structure placement was implemented in 2013 (#59663 - #50146), Phase II preliminary designs were initiated in 2019, and are planned for completion in 2020. Implementation of Phase II is planned for 2020-21. Phase III design is may be considered for 2020-21, a determination will be made in early 2020.

Recovery Expectations: This project is located in a dynamic section of the Tucannon River Valley, and it is expected that changes in channel form and habitat complexity will occur at a relatively fast rate compared to other locations within the basin following LWD structure placement. The flow rate required to activate bed load in this reach occurs in a 1-2 return interval (~600-1,000 cfs), which is expected to result in a quick habitat response, within 5-10 yrs. Periodic site visits and rapid habitat surveys (following high water events) will continue to make observations in side channel development and floodplain connectivity.

Priority Populations: Snake River ESU Spring/Summer Chinook (Threatened), Snake River DPS Summer Steelhead (Threatened), Columbia River bull trout (threatened), Pacific Lamprey (SPP of Concern).

Priority Life Stages Targeted: All life stages

Figure 8: Tumalum Creek is a tributary of the Tucannon and currently is utilized by summer steelhead as spawning and rearing habitat. The culvert at the Tucannon Road crossing is currently only 33% passable based on slope and drop out of the culvert. The image above show the stream crossing with to images showing the entrance (upper right) and exit from the culvert (lower left).

Potential Future Actions: Due to the restoration goal for this site of reconnecting floodplain it may be required in upcoming years to revisited pilot channel cuts and associated LWD structures to ensure side channel objective are met. Additional floodplain structures may also be desired once the floodplain objective are met. Revisit riparian planting and health over time as floodplain land scape evolves from shrub step dominated to typical wetted Tucannon riparian forest type.

Project Goals and Objectives

Goal: Return a roughly 0.8 miles reach within the 3.7 mile long project area 26 identified in the Tucannon Conceptual Restoration Plan (Anchor 2011 April) and located on three private farms, closer to its historic, naturally functioning state, increase fish habitat quality/quantity and floodplain connectivity.

Objectives:

- Phase II Short Term Obj. (3 yrs): Installing LWD structures within the bank full channel that create pool habitat, instream cover habitat, channel complexity, substrate sorting and floodplain connectivity.
    - Place 28 log jams within the main channel (0.8 mile) for the purpose of creating channel complexity and increasing localized floodplain connectivity.
    - Place 15 log structure within floodplain flow paths to create complexity during winter and high flow periods
    - Increase pool frequency and volume > 50% within 3 years
    - Increase flood frequency and duration on 14 acres of available floodplain from the >5yr interval to <2 yr interval.
- Phase II Long Term Obj. (3-5 yrs): Increase floodplain connectivity and channel complexity.
    - Maintain > 2 key pieces beyond 10 years
    - Anticipated a 50% increase side channels within the first 10 yrs.
    - Connect disconnected low floodplain (<2 yr flow) ~ 14 acres
- Planting to restore a floodplain and upland terrace forest
    - 1,200 trees interstitially planted
    - 0.5 acres of new cover trees planted

Background & Project Summary

Background: In 2011, river levees and gravel berms were removed or breached throughout the entire reach as part of the 3.7 mile long PA 26 Phase I project. The goal of Phase I was to restore properly functioning geomorphic condition by reducing river channel and floodplain confinement. In 2011, levee removal was a relatively new and innovative restoration technique for SE Washington State, resulting in a conservative approach being implemented where the levee would be removed and set back in the first year, and channel modifications would be delayed to make observations on how the channel would recover naturally ("letting the river do the work"). Based on observations made in 2013, seventeen log jams were placed within the

3.5 mile reach as a pilot in accordance with landowners wishes at the time. Five log jams were placed within the upper 0.8 mile reach now being designed in Phase II (CR-340020) to provide fish cover while observations were ongoing. Monitoring surveys conducted by CHaMP and the Tucannon Habitat Programmatic between 2012 and 2017 indicated limited change in channel shape or gravel storage within the reach and that the ~14 ac of floodplain liberated by the 2011 levee removal project had experienced very limited flood inundation. The CHaMP program recommended additional LWD structure placement to sort and retain gravel bars to encourage lateral channel migration and increased floodplain inundation frequency and duration. The Phase II proposed work (CR-340020) is located on the upper ~0.8 miles of the project reach on which restoration actions were performed in 2011 & 2013 Phase I and is the first significant log jam project to be proposed for implementation following the CHaMP recommendations.

Problem Statement: Geomorphic processes, floodplain connectivity, and accompanying habitat for spring Chinook and summer steelhead within the reach have been influenced by historic land use practices, tree harvest/clearing, and excavation and other bulk earthwork activities at various locations within the 100-year floodplain. These activities have led to limited instream and floodplain habitat complexity, degraded floodplain connectivity and riparian condition, elevated summer water temperatures, and elevated embeddedness all key habitat limiting factors for Chinook and steelhead (Anchor QEA 2011a). This project aims to address many of these factors through stream restoration and habitat enhancement which would lead to natural functioning conditions.

Summary: The PA26 Phase II LWD Structure placement project being designed by the CCD will focus on developing better connection of the winter flood flow (>~140cfs or <1yr), with adjacent floodplain previously reconnected in 2012. The approach being designed will use LWD roughness features within the ordinary wetted channel to encourage gravel bar development and stream bed aggradation to initiate channel meander and better floodplain connection. It is anticipated that through regular floodplain inundation side channels and riparian function will be regained contributing resilience in salmonid recovery. In total, within the upper 0.8 mile long reach 26 individual log structures will be constructed in channel and 15 will be constructed on the floodplain in likely flow paths to aid in the shaping of future side channels as they develop. The stream work should provide increased inundation both in frequency and duration of ~ 14 acres of floodplain. A preliminary design (30%) was completed in 2019 and was used to leverage a SRSRB grant award (Figure 9). The 60 % design has been advanced and will be delayed until the project reach can be reviewed following the 25 yr flood event which occurred on February 7th, 2020. It is highly possible this project will need updates and new structure placement will be required following the changes within channel following the event.

Future work in this project area will be considered and negotiated with the downstream landowner in up-coming fiscal years. The effort in the next reach downstream may involve similar type of actions currently being implemented including removal of confining features and structure placement.)

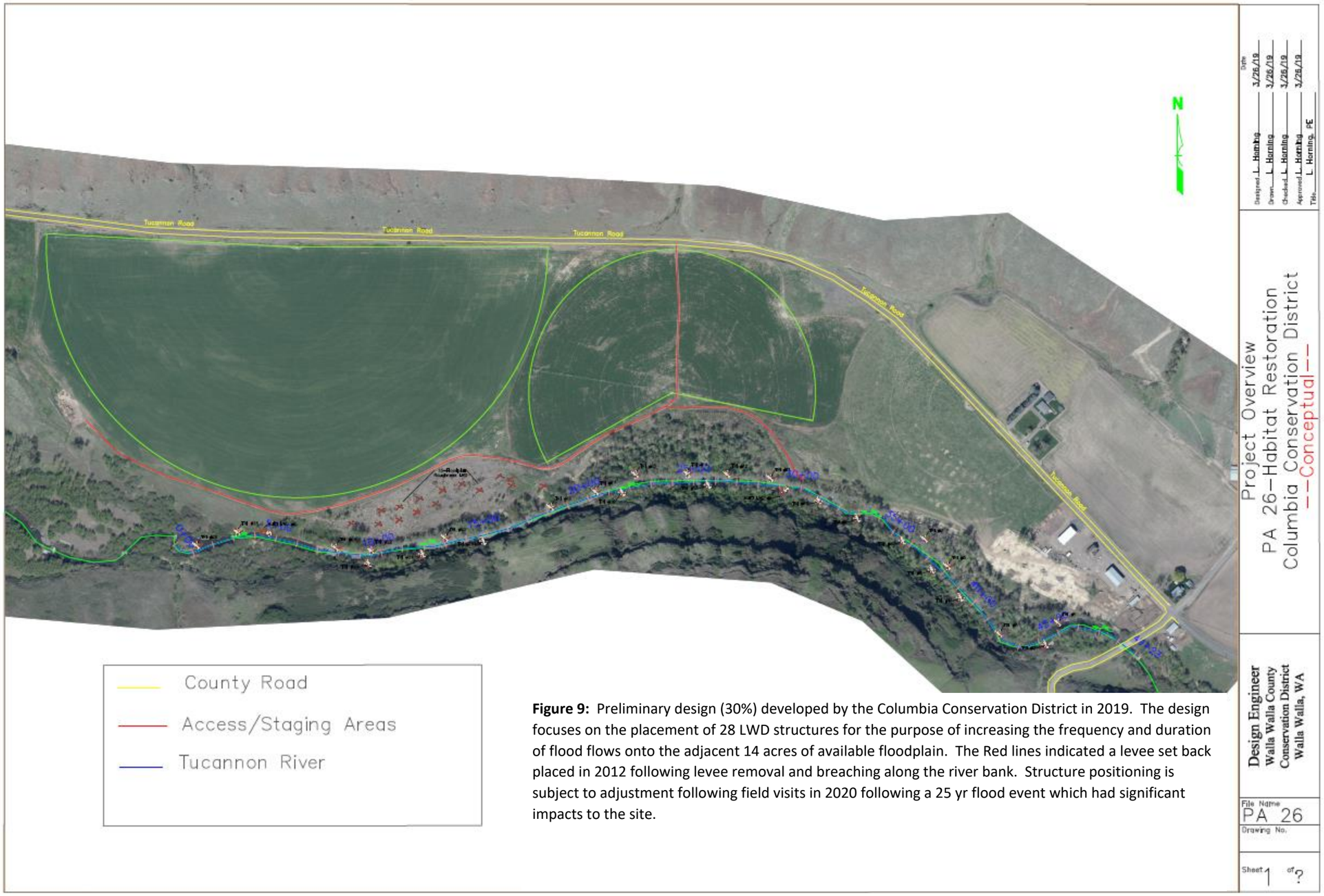


Figure 9: Preliminary design (30%) developed by the Columbia Conservation District in 2019. The design focuses on the placement of 28 LWD structures for the purpose of increasing the frequency and duration of flood flows onto the adjacent 14 acres of available floodplain. The Red lines indicated a levee set back placed in 2012 following levee removal and breaching along the river bank. Structure positioning is subject to adjustment following field visits in 2020 following a 25 yr flood event which had significant impacts to the site.

Project Title: PA27/28.1 Add Function & Complexity: Phase I Design & Implementation

Implementer: Confederated Tribes of the Umatilla Indian Reservation

BPA Programmatic Funding (2010-077-00): In 2020, - $827,500 (#CR-338681) and in 2019, $73,112 (CCR-43470).

Other BPA Funding (2008-202-00): In 2020, CTUIR committed ~$151,000 (CR-336509).

Matching Funds: Matching funds have not been quantified for this project area, but will likely be in the form of forgone cropland to be reconnected to the flood prone area.

Location: Tucannon River mile 22.25 to 23.2.5

Project Time Line: Project design was initiated late in 2019 (CCR-43470) and is planned to be completed in the spring of 2020. Initial project Phase I implementation is planned to begin in 2020 (#CR-338681), with Phase II following in 2021 and Phase III in 2021-2022).

Recovery Expectations: This project is located in a dynamic section of the Tucannon River Valley, and it is expected that change in channel form and habitat complexity will occur at a relatively fast rate compared to other locations within the basin. The flow rate required to activate bed load in this reach occurs in a 1-2 recurrence interval, so the project is expected to contribute significantly to habitat uplift within 2-5 yrs. Periodic site visits and rapid surveys (following high water events) will continue to follow development in side channel and floodplain connectivity.

Priority Populations: Snake River ESU Spring/Summer Chinook (Threatened), Snake River DPS Summer Steelhead (Threatened), Columbia River bull trout (threatened), Pacific Lamprey (SPP of Concern).

Priority Life Stages Targeted: All life stages

Potential Future Actions: Due to the restoration goal for this site of reconnecting floodplain it may be required in upcoming years to revisited pilot channel cuts and associated LWD structures to ensure side channel objective are met. Additional floodplain structures may also be desired once the floodplain objective is met. Revisit riparian planting and health over time as floodplain land scape evolves from shrub step dominated to typical wetted Tucannon riparian forest type.

Project Goals and Objectives

Goal: Return a roughly 1 mile reach within project area 27/28 identified in the Updated Tucannon Conceptual Restoration Plan (Anchor 2020) and located on a private farm, closer to its historic, naturally functioning state, increase fish habitat quality/quantity and floodplain connectivity.

Objectives: Specific objectives for this restoration project will be identified in early 2020 as part of the Basis of Design Report.

- Short Term Obj. (3 yrs): Installing LWD structures within the bank full channel that create pool habitat, instream cover habitat, channel complexity, substrate sorting and floodplain connectivity.
- Long Term Obj. (3-5 yrs): Increase floodplain connectivity and channel complexity.
- Planting to restore a floodplain and upland terrace forest

Project Summary: Project Area (PA) 27/28.1 is located within the active river channel and floodplain of the Tucannon River, on private property from RM-22.25 to RM-23.1 (approx). The project is identified as a Tier-1 project in the Updated Tucannon Conceptual Restoration Plan (Anchor QEA, 2020) developed for the Tucannon River. The primary objectives of the project are to increase floodplain connectivity through: removing channel confining features, increasing off-channel habitat and reconnecting side-channel habitats; and improving channel complexity through placement of large wood debris in the form of constructed log jams and single-log wood placements.

Status (FY20): The project is currently in the design phase (see contract #73982 REL42); CTUIR project staff began working with the private landowner and design subcontractor through the construction design period in an abbreviated timeframe (Dec 2019- Jun 2020), to be ready for implementation as early as Jul 2020.

CTUIR will lead the implementation management and supervision for: pre-construction site preparation, permitting, and design finalization at PA-27/28.1. Restoration actions proposed for the project area are identified in the Updated Tucannon Conceptual Restoration Plan as a high priority for habitat improvements (Anchor QEA, Nov 2020), and focus on increasing the amount of large wood debris (LWD) to increase channel complexity and floodplain connectivity, the highest priority actions for spring Chinook in the Tucannon. Description of the project areas with respect to existing natural processes and habitat conditions will be provided in the associated project Design Report, along with the specific physical and biological objectives that the proposed restoration features are expected to achieve for each phase of the design/build for the project areas.

The design focus for the project area is on improving the multiple habitat structure, floodplain connection, and stream function deficiencies associated with this reach of the Tucannon River (Figure 10). Enhancing and restoring instream habitat in this project area will be accomplished through a variety of treatment actions in the main channel, along the banks, and within the floodplain. These design features are intended to benefit spring Chinook by providing better refuge and spawning habitat for adults, reducing redd scour during winter flood events, and increasing rearing habitat and over-winter survivals for juvenile salmonids.

Expected Implementation Actions (from the Design Report): Install ~32 ELJs and other additional LWD structures or wood placements in the main channel to increase channel

complexity over a 0.87 mile reach (Figure 10). Additional unsecured mobile LWD will be placed in the main channel, side channels and on the floodplain for complexity. Riparian planting on adjacent floodplain and riparian areas, and disturbed construction access sites and staging areas. Planting efforts will emphasize an increase in pines and cottonwoods throughout the reach for the purpose of future LWD key piece recruitment.

Project Title: Tucannon River Habitat Restoration (PA32)

Implementer: Columbia Conservation District

BPA Programmatic Funding (210-202-00): FY19 $5,000 (#81783) FY18 $5,000 (#78668)

Other BPA Funds (1994-018-06): FY19 CCD finalize design & implement levee removal $367,105 (#81774), and in FY18 CCD $35,217 (#78668) was used to produce restoration designs.

Matching Funds: In FY19 the CCD received a SRFB grant for $224,757 (# 18-2091) to complete construction.

Project Time Line: 2018 Design and permit, 2019 implement levee removal and construction of setback levee and in 2020 implement Phase I LWD construction and design Phase II.

Location: Start Lat/lon 46.482834/-117.953257, End Lat/lon 46.477932/-117.942397 (Figure 1)

Priority Populations: Snake River ESU Spring/Summer Chinook (Threatened), Snake River DPS Summer Steelhead (Threatened)

Priority Life Stages: All life stages for all species are present at this project.

Project Goal & Objectives: Connect floodplain habitats (at 1-2 yr flood interval) through levee removal and LWD structure placement in stream and on floodplain.

a. Remove ~670' of river levee and reconnect ~26 acres of low floodplain at <1 yr flow interval through placement of key LWD structure and roughness features.
b. Place 54 LWD structures for the purpose of increasing channel complexity and roughness and increase floodplain connectivity.

Project Back Ground & Summary:

Background: The Program provided the CCD, design and technical support toward the development of PA 32 in 2018-19, including a pre-design rapid habitat survey and design surveys. The program supported the CCD in concept development and review as well as permitting technical support. A restoration design was finalized in 2019 and implementation was initiated in September 2019. In 2019 the CCD worked to complete

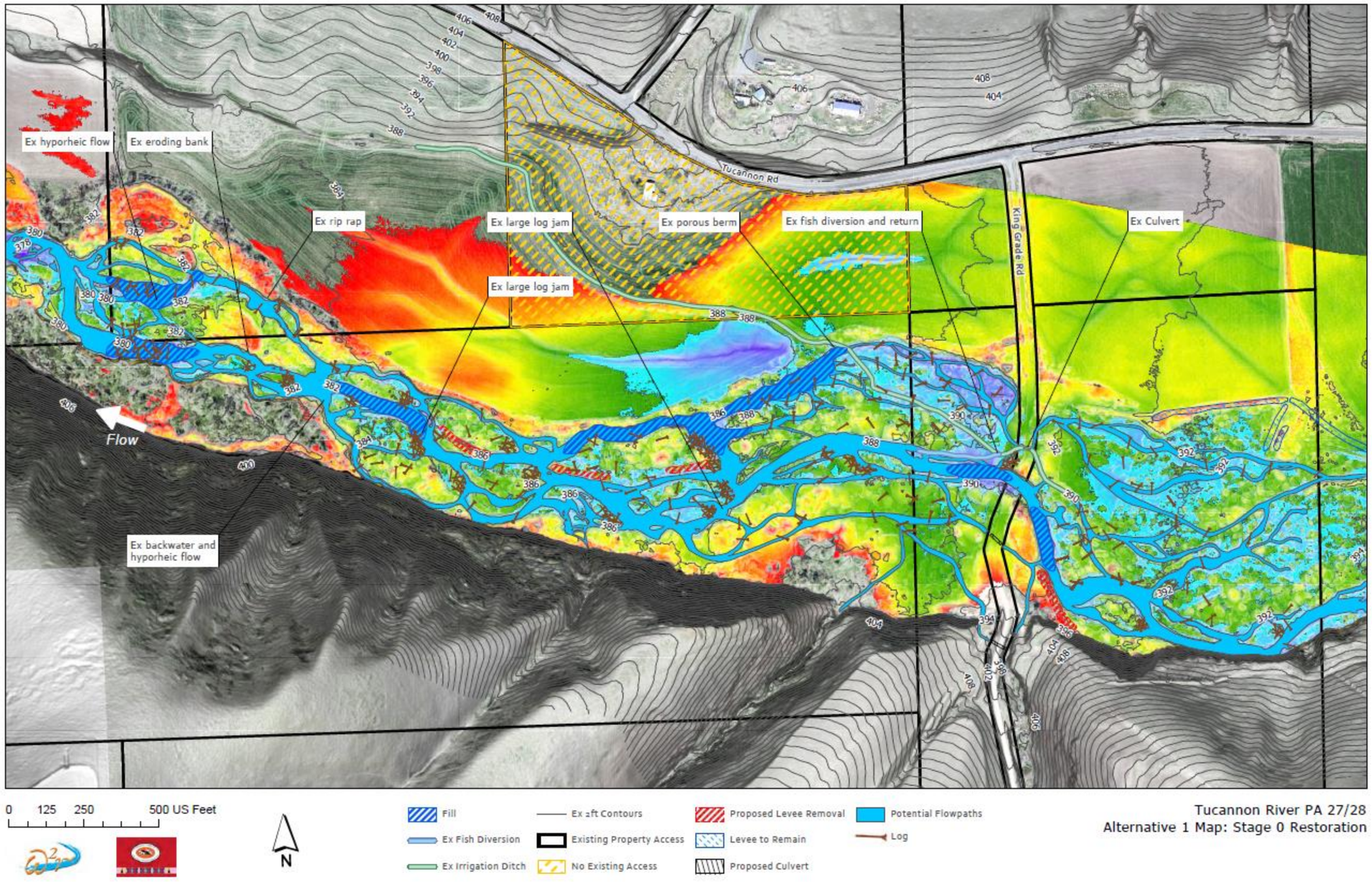


Figure 10: PA27/28 design Alternative 1 is focused on maximizing floodplain connectivity within the confines of private production farms and infrastructures.

permitting prior to the July 15th - August 22nd instream work window, but was unable to clear the permitting process before the end of August creating a one year delay in LWD placement stream work, however the out of stream work including levee removal and setback were completed in 2019.

Summary: The project will place approximately 54 structures composed of 162 key pieces (>6m long & 0.3 m dia) with root-balls attached, small to medium size "racking trees, and slash (tree limbs and other course woody debris). The design also includes multiple levels of stability to individual log structures to mimic a natural residence time to the large wood within the project reach. Structures includes highly mobile wood (i.e small course debris and racking trees) and single large trees with mobility at certain flow velocities.

In 2019, the construction of a ~2,500' off-set levee (Figure 11), and removal of a 625 levees was completed to increase floodplain connectivity on~26 acres of low-lying floodplain. In 2020, installation of an additional 18 LWD structures on the floodplain will create floodplain roughness elements to reduce potential overland scouring impacts but still enhance complexity and connectivity between habitat elements in this channel segment.

It is the intention of this project to increase the overall floodplain connection at 1 yr and 2 yr flood intervals as described in Clure and Thorne (2013) to improve habitat availability at the frequent flows. This approach has allowed the Program the ability to increase available winter rearing habitats significantly in many areas of the basin and most recently ~4 miles upstream in PA28. In this case a setback levee will be required to minimize impacts to agriculture fields adjacent to the project (Figure 11).

Project Title: Conceptual Habitat Restoration Strategy: Tucannon Plan Update

BPA Programmatic Funding (2010-202-00): In 2018, $225,000 (#76992)

Other BPA Funds (1994 018-06): The sum of contribution from the CCD was not available at the drafting of this report.

Location: Tucannon Basin, not including the Pataha Creek

Project Time Line: 2018 fill data gaps and conduct field evaluations. In 2019 finalize assessment and supporting material and update the Conceptual Restoration Plan to a draft documents. A final draft document is planned for completion in the summer of 2020.

Priority Populations: Snake River ESU Spring/Summer Chinook (Threatened), Snake River DPS Summer Steelhead (Threatened), Snake River Fall Chinook (Threatened), Columbia Basin Bull trout (Threatened). The conceptual restoration plan focuses on restoring natural habitat function in the Tucannon Basin which we feel improves conditions for all species present including pacific lamprey and bivalves.

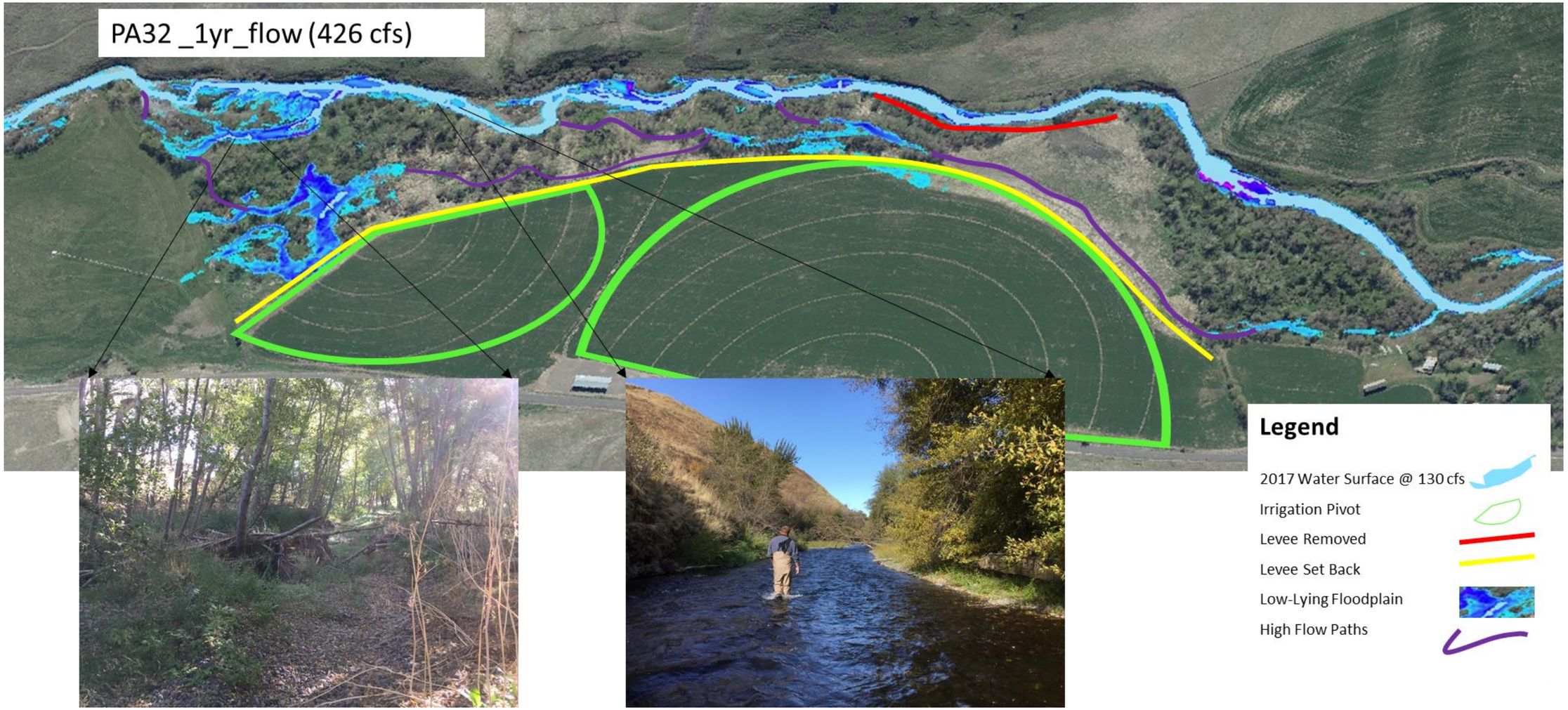


Figure 11: Project Area 32 is located in an entrenched and disconnected reach but has opportunities to reconnect floodplain at <1 yr interval while maintaining existing agriculture. The map illustrates the 1yr flood elevation in the blue color ramp where increased connectivity will be gained at the 1 yr interval. The purple curves indicate the anticipated flow paths to be connected between a 1 yr flow event following LWD structure placement. The red line indicated the position of a river levee that was removed and the yellow line a setback levee built in 2019, to minimize impacts to the agricultural field. The two images indicate the position of the pre-project photos collected in 2018, with the left one showing disconnected flow path and the right a part of the plain bed channel prevalent throughout the reach.

Priority Life Stages: All life stages.

Project Goal & Objectives: The overall goal of the Tucannon Conceptual Restoration Plan (Anchor 2011) update is to apply what we have learned in the first 8 years of implementation within the Tucannon, evaluate work completed, and update/confirm the restoration goals and objectives. Then updating the Conceptual Restoration Plan restoration actions and prioritize work for 2020-2028.

Objectives:

a. Evaluate limiting factor priorities.
b. Articulate and solidify restoration goals and define both short term and long term restoration objectives for projects.
c. Update and evaluate fish distribution and habitat use date collected for the WDFW in basin Tucannon Life Cycle Model.
d. Consideration to all priority native fish species.
e. Consideration of tributaries and connectivity throughout the Tucannon basin.
f. Evaluate project implementation and change detection information.
g. Evaluate, prioritize and incorporate project reaches 2-5 in winter rearing habitats.
h. Produce a prioritized list of projects and designate implementers.
i. Formalize and prioritize adaptive management actions.

Project Background & Summary:

Background: In April 2011, the Columbia Conservation District (CCD) completed work with Anchor QEA to conduct the Tucannon River Geomorphic Assessment and Habitat Restoration Study (Anchor QEA 2011 April). Later that year, focusing on the high-priority areas for Tucannon spring Chinook, the District coordinated the development of a habitat restoration plan for the Tucannon River from RM-20 upstream to RM-50: the Conceptual Restoration Plan (Reaches 6-10), Tucannon River Phase II (Anchor QEA 2011 Nov). In coordination with the CCD, the SRSRB work to complete the Conceptual Restoration Plan for reaches 2-5, completing the entire lower 50 miles of river in the Integrated Species Restoration Prioritization Tucannon River (Anchor 2012). These assessments and restorations plans have provided the marching orders for the Program and the implementers beginning in 2011 through 2019.

Overview: Since the 2011 assessment and prioritization, the Tucannon River has experienced significant implementation of instream and floodplain restoration, and some notable geomorphic change has been observed both in areas of targeted restoration projects as well as through natural processes in untreated areas. The 2011 assessment identified significant data gaps and exposed areas of limited information useful in analysis and prioritization. Many of these data gaps have been narrowed and a sharper interest in fish use and distribution and how this information affects the big picture of salmon recovery has been institutionalized in the

minds of practitioners in the basin. In addition, the use of blue-green Light Detection and Ranging (LiDAR) has become more common place and prices have decreased for LiDAR and aerial photographic data collection, enabling the topographical and data set for the Tucannon River to be updated in 2017 and aerial imagery to be taken in 2018.

The goal of this Habitat Prioritization and Conceptual Restoration Plan (HPCRP) assessment is to provide an updated prioritization that advances the mission of salmon recovery in the basin, incorporates updated and improved data sets, and builds upon lessons learned and materials availability in the region, setting the direction for the next decade of salmon recovery efforts. Additionally, this prioritization builds on the geomorphic assessment and seeks to lay out a methodology for evaluation and prioritization that can be easily repeatable as restoration efforts continue and additional data become available. Finally, this prioritization will recommend restoration strategies for each project area that can be implemented to improve performance metrics used in the analysis and prioritization and help track progress toward goals and objectives laid out in the updated plan.

Future Project Implementation

In 2019, the Program worked to finalize project designs for implementation in out years and is planning future implementation on a number of projects identified as future work in the 2018 summary report. Following the completion of the Conceptual Plan update in early 2020 the Program will initiate action on priorities as they are outlined in the plan. In 2020, the Program continues to address the priority work outlined in the 2011 Plan (Anchor QEA 2011).

NWPCC Staff Recommendations

The SRSRB, in coordination with BPA, began work in 2017 to address the NWPCC staff recommendations made in the June Decision Memo to the NWPCC. We continued in 2019 to be committed to making positives changes in our umbrella project in response to ISRP's review and NWPCC staff recommendations. To initiate these changes the Program and its partner are nearing completion on an update to the Tucannon Conceptual Restoration Plan and is addressing staff recommendation in the new plan. The following summarize progress toward addressing the recommendations:

#2 Measurable Objectives-The SRSRB developed recovery and restoration goals and objectives in the Salmon Recovery Plan for SE Washington (2005), and further refined them in the Tucannon Conceptual Restoration Plan (2011). In the current restoration plan update the Program is working to make the Program metrics quantifiable and measurable at both the project and program level. While the Program can generate short-term objectives (3-5 years) based on the current portfolio of projects identified and their expected outcomes (2011 Conceptual Restoration Plan), long-term objectives (5-10 years) will be based on the outcomes

of the Conceptual Restoration Plan update 2020. The Conceptual Restoration Plan long-term objectives beyond 2020 will be based on all the following considerations -FCRPS BiOp process, resulting BPA mitigation commitments, regional prioritization of projects (also conducted within the plan), and funding coordination.

Short-term objectives: At the project scale, we have worked with sponsors and partners to identify project-specific objectives during project development and design phases. Currently these objectives are based on habitat outcomes for species and life stages. We are currently developing ways to roll these project-scale objectives up in a meaningful way as part of the Conceptual Restoration Plan update

Long-term objectives: The most useful type of objectives would be those that help the Program and BPA make decisions about project prioritization, funding, and design. The Conceptual Restoration Plan update will result in a comprehensive, prioritized regional project list with associated project outcomes related to fish, habitat, and population productivity and viability (expected early 2019). Based on the needs identified in the updated Conceptual Restoration Plan, BPA mitigation commitments, funding coordination, and expected BPA funding it may be possible to select the set of Program projects and layout meaningful objectives beyond 2026. This would allow the Program and BPA to forecast potential habitat or fish-related outcomes further into the future.

The SRSRB and Program hope to be able to track progress toward meeting objectives through the reforms to the M&E programs in the basin, but currently there are few monitoring effort aimed at measuring fish and habitat outcomes at project sites or project reaches. The draft Conceptual Restoration Plan (Anchor 2019) identify a number of prioritization weighting metric collected through remote sensing (LiDAR) and rapid habitat surveys (implementation monitoring) to evaluate outcomes at sites (e.g. PA3) where measurable objectives have been developed. One particularly interesting outcome will be modeling channel complexity before and after project implementation for low flow, winter flow and the 1 year flow interval, described in the draft Tucannon Conceptual Restoration Plan (Anchor QEA 2019 Oct). This type of modeling may allow us to develop and track changes in habitat fish capacity and suitability over time. The Program is investigating thhe potential for animation of these models on line at Tucannon.org hosted by CTUIR, to streamline data QA/QC and progress reporting. Collectively, the Program and partners are developing a streamline monitoring plan in 2020, which will focus on a subset of limiting factors we find most effective for capturing Tucannon priorities and that are quantifiable and measurable. The goal would then be to use as much remote sensing information and approaches that are animated (reproducible) to reduce the effort and subjectivity of larger more complicated monitoring efforts.

#3 Use of Data and Information-The Program and our partners continue to rely on existing literature and the Tucannon Assessment and Conceptual Restoration Plan to inform our review of the biological benefits of proposed habitat actions. The current Restoration Plan update is focusing on integrating new date where it is available both locally and in literature.

#4 RM&E-The SRSBB is involved in the NWPCC effort to develop an M&E Strategy and is open to any guidance that could improve data and information available for project selection, design, implementation, and evaluation if and when it is developed. The Program will provide the NWPCC with the finding of our local technical team in the development of a streamlined monitoring plan for the Tucannon basin.

#5 Screening Criteria-The Program and BPA, through coordination with the SRSRB Regional Technical Team, continue to consider and incorporate information on climate and are developing priorities based on future predicted changes. We currently have very little information on contaminants within the basin beyond the TMDL (WDOE 2010) for temperature. Human population growth within the Tucannon basin in relation to real estate development has been relatively stable over the last decade with few new home being constructed. There is some information regarding demands on natural resources identified in a WDFW studies conducted on public resource use on the Wooten Wildlife Area. One avenue to track changes in land use the Program is utilizing from the LiDAR data collected in 2010 and in 2017 will be riparian habitat cover and height. The Program feels that increasing trends in riparian cover would be an indication of stable growth and a deceasing trend may indicate increasing activity.

#6 Information Gathering-The Program and partners continue to gather implementation and effectiveness monitoring data when it is available and summarize those data in annual and 3-year reports to the ISRP and NWPCC. Projects in partnership with CTUIR generally have implementation monitoring conducted pre and post construction but very few have effectiveness monitoring. Without dedicated funding for either type of monitoring for Programmatic Projects the information is limited and often inconsistent. The Program has coordinated the development of a website and GIS supported data base with the CTUIR in 2019, which will be available for release in 2020 at the domain Tucannon.com.

#7 Monitoring Sites-The monitoring projects directly associated with the Program are input into monitoringresrouces.org but to this point the restoration project data is stored at hws.paladinpanoramic.com and Snakeriverboard.org.

#8 Two-Year Contracts-The SRSRB encourages the NWPCC to coordinate directly with BPA on the potential for two-year contracts for the umbrella projects. The Tucannon Programmatic would benefit from such a change.

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