

YBIP Highlights

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YAKIMA BASIN
BUILDING A FUTURE FOR WATER,
WILDLIFE & WORKING LANDS

Welcome to the Yakima Basin Integrated Plan 2020 Highlights

Welcome to the 2020 Highlights, reviewing the progress made in the Yakima basin to improve water supplies and restore ecological functions under the Yakima Basin Integrated Water Management Plan. The year 2020 proved challenging, due to the COVID-19 pandemic and ancillary restrictions. Still, we were able to move forward many initiatives and pivot as needed to advance the objectives under the Integrated Plan.

As we look to 2021, we have many successes to share and joint ventures to continue. We open with greetings from the Confederated Tribes and Bands of the Yakama Nation, one of our most valued partners and stewards of the basin:

Greetings,

On behalf of the Yakama Nation, I would like to express our pleasure to be an integral part in the conception, development, and implementation of the Yakima Basin Integrated Plan. These unique partnerships result in long-term benefits for our people and the resources we value. Since time immemorial, Yakamas have recognized the ecological and religious significance of water to our existence as people.

As caretakers of the resource and as partners in the Integrated Plan, we continue to invest in and lead habitat restoration, salmon enhancement and reintroduction, and water conservation throughout the basin.

We look forward to the day when our children and our children's children benefit from the work that we are doing today. Thank you.
Sincerely,

Gerald Lewis

Gerald Lewis
Fish & Wildlife Committee Chairman
Yakama Nation Tribal Council

Front cover (bottom): Sockeye in Cle Elum River still shot from video by Andrew Matala, Yakama Nation.



Progress continues at Cle Elum

Following the success of raising the radial gates on the spillway at Cle Elum Dam by three feet, we have made great progress to protect shorelines, upgrade campgrounds, boat launches and day-use areas along the reservoir's shores. These activities will accommodate the pool raise that will increase storage capacity by 14,600 feet.

Construction of shoreline protection at the last of three U.S. Forest Service facilities began at Wish Poosh campground and boat launch spring 2021.

The pool raise is crucial for supporting salmon migration, providing additional stored water for out migration and an integral part of the helix-designed fish passage, which also is underway.

We continue to meet with landowners as work continues to upgrade the shorelines, which will be completed prior to raising the reservoir.

When the project is completed, the additional water will be dedicated to enhancing instream flows for fish rearing, habitat and migration, and may allow the passage operations to occur sooner in the season.

Left: A campsite at Cle Elum River campground with constructed vegetated berm to mitigate the three-foot raise. The berm was designed to appear natural and provide habitat for local species.

Right: Existing rock revetment at Sandelin Lane, additional shoreline protection is planned for this location.

Bottom: Anchored logs were installed at Speelyi beach to dissipate waves and create habitat.



Improvements pave the way for fish passage

Left: Work continues in the secant pile, placing foundations for gate and helix structures.

Top: First conduit box being placed for connection between reservoir intake to helix. The conduit will transport the juvenile fish from the reservoir to the helix.

Bottom: Concrete lining is being placed in the tunnel invert and crown. The tunnel will transport the juvenile fish from the helix to the Cle Elum River.

Construction is well underway on an innovative helix design to transport juvenile fish downstream, replacing a temporary flume on the spillway at Cle Elum Dam. Combined with the Cle Elum pool raise, sockeye salmon will be able to out migrate April 1 through June in most years, greatly enhancing the survival of this important basin species.

Surface flow from the reservoir will attract juvenile salmon to an open intake and gate system, transporting them into the smooth flowing water of the helix and into the bypass tunnel to the Cle Elum River. From there, the salmon will out migrate to the Yakima River and on out to the ocean to mature before returning to spawn above Cle Elum Reservoir.

Construction of the intake, gate and helix will continue for the next few years. Construction for the downstream bypass tunnel will be complete in early 2021.

Also shovel ready, is an upstream adult collection facility that will capture fish and funnel them into a truck to haul them for release to upstream tributaries or directly to the reservoir. Construction is set to begin in 2023 on the adult collection facility.

Reservoir to provide relief during drought years

We have been exploring how to use up to 200,000 acre-feet of water stored at Kachess Reservoir. The Dingell Act, passed in March 2019, authorizes Reclamation to enter into agreements with irrigation districts to construct, operate and maintain a Kachess drought relief pumping plant.

In fall 2020, the Roza Irrigation District Board selected the floating pumping plant alternative to access additional stored water for farmers during drought years at Kachess Reservoir. This triggers further environmental review, following Reclamation's record of decision on the Kachess drought relief pumping plant, released April 2019, that identified the need for additional analyses.

Water pumped from the lower reservoir would serve the Roza Irrigation District via the Kachess River to the Yakima River. Along the way, the Kittitas Reclamation District Tributary Supplementation Program (*see KRD: Integrat-*

ing all seven elements for more details) diverts the water at Easton Reservoir to hydrate creeks that otherwise dry up and lets the water flow back into the Yakima River above Roza Dam in time to meet downstream irrigators' needs. The KDRPP project would mitigate impacts to threatened bull trout populations via habitat improvements in the reservoir, its tributaries or in surrounding reservoirs.

Primary funding for construction and operation comes from the participating partners in exchange for receiving a portion of the water in drought years. To date, the Roza Irrigation District has been the primary district interested in the near term. Other participants could include the Wapato Irrigation Project on the Yakama Reservation, KRD and Kennewick Irrigation District.

Stored water would be pumped only during droughts, (when supply is less than 70% to provide up to 70% supply for proratable water users) and the lake (which is 400 feet deep in places at full pool) would remain a minimum of 250 feet deep, even if the entire 200,000 acre-feet were accessed.



Kachess Reservoir looking north close to minimum pool, Kachess Dam at bottom left.

15,000 sockeye transported to Cle Elum Reservoir

In 2020, record numbers of sockeye salmon returned to the Yakima basin to spawn above Cle Elum Reservoir. The Yakama Nation Fisheries transported 10,000 sockeye from Priest Rapids on the Columbia River to Lake Cle Elum. Also, 5,000 in-basin sockeye returning via the Yakima River were trapped at Roza Dam and hauled to Cle Elum Reservoir. Reintroduction of sockeye continues to bring hope of even greater returns once permanent fish passage is operational, which is anticipated in 2024.





Critical partnerships turn a dream into reality

Above: Bull trout being released at Kachess Reservoir May 2020 as part of rescue, captive rearing and release program.

Bull trout have been a long-term concern for the Yakama Nation who have been leading efforts to restore and enhance bull trout habitat in partnership with the other Yakima Basin Integrated Plan partners throughout the watershed.

Efforts to improve conditions for bull trout, an important native species of the Yakima River system, continue with collaborations in the basin. These include ongoing tagging, tracking and rescue, and rearing efforts to improve survivability.

A team of biologists from the Yakama Nation, Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service, Washington Department of Ecology and Bureau of Reclamation work to turn this dream into a reality. Jason Romine, USFWS, described the tagging and tracking results from 2019 for fish in Kachess River above Kachess Reservoir and Gold Creek above Keechelus Reservoir. Bull trout migration is monitored using Passive Integrated Transponders tags and acoustic telemetry.

Yakama Nation biologists conducted rescue and rearing efforts in coordination with WDFW, USFWS, Ecology, Reclamation and

Mid-Columbia Fisheries Enhancement Group. The team captured nearly 1,200 bull trout and brought them to the Yakama Nation's rearing facility in July and August 2019. Some bull trout were moved upstream of the dewatered reach from which they were rescued. The fish generally met their target release size in the rearing facility, though there was significant cannibalism amongst the bull trout from Kachess River (14% survival). There was less cannibalism in the Gold Creek group (73% survival). In late May 2020, 152 fish were released into Kachess Reservoir, and 78 fish were released in Keechelus Reservoir, their watershed of origin. The Tribe will focus on strategies to increase captive rearing survival in 2020–2021, and reintroduction efforts in the upper Yakima River tributaries will continue.

Project plans in 2021 also include implementing the reintroduction of bull trout to historic habitats in the upper Yakima, using the healthy South Fork Tieton River as a donor population. Closely monitored and adaptively managed reintroduction efforts will begin in Taneum Creek and expand to other suitable streams as permitting is obtained. Additionally, a pilot study designed to suppress and eventually eradicate non-native brook trout populations in bull trout habitats is underway. The goal of the pilot study is to minimize or eliminate brook trout impacts on bull trout populations and maximize reintroduction efforts.

Restoration project aims to improve floodplain connectivity and habitat resiliency



Today Gold Creek, considered the headwaters of the Yakima River located near Snoqualmie Pass, is still home to one of just four remaining populations of bull trout in the upper Yakima basin.

In early 2020, the USFS, WDFW and Yakama Nation kicked off an environmental assessment to determine restoration strategies that could work best for the Gold Creek Valley and Gold Creek Pond.

While the primary purpose of this effort is to restore the once thriving habitat, especially for threatened bull trout, other salmonid species and wildlife connectivity, partners recognize the importance of the recreational, visual, and accessibility values that current visitors enjoy and are developing elements that maintain access. This collaborative restoration project will improve habitat conditions at Gold Creek, so keystone species like bull trout can thrive, thereby improving the entire ecosystem.

These same improvements would also benefit chinook salmon, sockeye salmon, and Mid-Columbia steelhead during future recovery efforts. Existing recreation opportunities would be modified to accommodate restoration; similar day-use opportunities would be provided in this valued area.

Final analysis and a draft decision are expected February 2022.



Top: Aerial photo of Gold Creek Pond with Keechelus Reservoir in the distance.

Bottom: Picnicking at Gold Creek Pond, one of many ways to recreate in this area.



KRD: Integrating all seven elements

Left: KRD siphon before fish passage was installed fall 2020.

Middle: KRD installing temporary fish passage over siphon.

Right: Tucker Creek fish passage over KRD siphon location in operation.

KRD and its YBIP partners are demonstrating how their originally designed irrigation water delivery system can be “retooled” by integrating all seven elements of the Integrated Plan to help achieve its goals: to benefit anadromous and resident salmonid populations, increase Yakima Project operational flexibility, and improve the reliability of the water supply for irrigation and municipal supply uses.

An example, is the KRD Tributary Supplementation Program initiated in 2015 by KRD, providing flow augmentation to tributaries (i.e., Tucker, Big, Little, Taneum and Manastash) that prior to 2015 were intermittent or experienced low flow. Enhanced tributary flows also help macroinvertebrates that serve as food for several fish species, preserve and enhance the riparian habitat, and increase salmonid rearing and spawning habitat. In addition, in drought years, a portion of the water from the proposed KDRPP could be diverted into the KRD main canal and delivered to these small tributaries in the Kittitas Valley that otherwise dry up and then flow back into the Yakima River above the Roza Diversion Dam in time to meet irrigators’ needs.

To address surface water storage, the KRD is investigating sites in the Kittitas Valley through the Upper Yakima System Storage Study. This project is entering phase two of examining a handful of locations from the original list of 50 sites.

In June 2020, the Kittitas Reclamation District completed its Yakima River Basin Managed Aquifer Recharge Assessment, identifying the most promising sites (with an emphasis in the Kittitas Valley) for groundwater recharge to be used for instream and out-of-stream purposes. The top sites in the Kittitas Valley were Taneum, Big, Little and Naneum creeks.

While the YBIP Fish Passage element is focused on fish passage at the major storage reservoirs, in October, KRD, Trout Unlimited and other YBIP partners designed and constructed a temporary wooden pool-weir fishway in Tucker Creek, eliminating a 90-year passage barrier at the main canal siphon. With stream flows and fish passage re-established on Tucker Creek, access to an additional 1.5 miles of quality salmonid habitat has been realized. Monitoring of the temporary fish passage at Tucker Creek is in process and will help inform a permanent solution.



Log installation for fish habitat.

Schaake habitat project phase 2 construction completed

Reclamation is restoring 130 acres of floodplain over a two-mile reach of the Yakima River. This is one of the largest floodplain projects in the Yakima basin. Phase 1 construction was completed in 2019 and primarily focused on levee removal, construction of a flood protection berm, floodplain excavation, and revegetation. Phase 2 construction was completed in October 2020 and included installation of a large culvert, additional floodplain excavation, wetland creation, and large wood placement to attenuate large flow events. Phase 3 construction in fall 2021 will complete side channel excavation and inlet structures. Revegetation and monitoring will take place throughout the project into 2025. A flood event in February 2020 exemplified the success of the project and served as proof-of-concept for the project.



Water conservation effectiveness is on the rise

Left: KRD places canal lining on North Branch Canal before watering up for the 2020 irrigation season.

Right: Piping being installed on Wapato Irrigation Project. One of many conservation projects being implemented to improve system efficiency.

We have tabulated the multitude of water conservation projects funded under the Integrated Plan and determined how far we have come in meeting the 2029 goal of achieving 85,000 acre-feet in water savings. So far, the partners have implemented approximately 100 conservation and water efficiency projects in the last seven years.

With approximately \$87 million of state, federal and farmer dollars invested, these projects have yielded over 49,000 acre-feet of conserved water. That breaks down to approximately \$1,800 per acre-foot of water. With these projects, we have accomplished about 58% of the Integrated Plan's first phase conservation goals.

The water savings support stream flows to aid fish and riparian habitat and provide drought resiliency for irrigators. Some conserved water will allow the Wapato Irrigation Project to provide additional irrigation on tribal land.

To account for what projects have occurred, we have gathered information from our partners with the Yakama Nation, Reclamation, irrigation districts, conservation districts, cities, counties and other involved organizations.

Nearly all parties involved are moving ahead with plans for future conservation projects. A strategy is underway to prioritize projects to achieve the 2029 goal and make the basin irrigation systems as efficient as possible. We anticipate technological advances will continue to evolve and increase conservation effectiveness in the future. It is a challenge, but one that is being taken on with eagerness and enthusiasm.

Streamlined processes will help transaction efficiencies

Water markets help re-allocate water during times of shortage in the Yakima basin. KRD, in close partnership with Trout Unlimited, Ecology, Reclamation and water users, is making progress to identify transaction costs for water transfers and the mechanisms and pathways to improve transaction efficiency.

The work is progressing toward a Yakima Basin Smart Market, a computer-based system that electronically matches willing buyers/sellers, streamlining the process. By automating processes wherever possible, the Smart Market will help buyers and sellers quickly and efficiently move water.

A critical part of the research process is involvement of a stakeholder group that reviews the work and provides technical expertise to help build toward a more accessible market. Environmental impacts of water transfers on fish, wildlife and river health will continue to be important and taken into consideration when transfers are made.



Sprinkler line irrigating crop in Yakima basin.

Improved recharge generates late season flows

In 2019–2020 Yakama Nation's Toppenish Fan Alluvial Aquifer Recharge project recharged approximately 1,500 acre-feet to the shallow aquifer. Recharged groundwater flows towards Simcoe Creek, generating late season baseflow and providing cool water to a steelhead-bearing creek. Recharge may also re-activate of springs and seeps, which provide cultural foods for the members of the Yakama Nation.

Left: Location of passive groundwater infiltration via water spreading over the surface near Toppenish Fan.





Heritage Gardens

Creating a conservation ethic across the basin

The municipal subgroup of the Integrated Plan is working to develop municipal water conservation goals that are meaningful and measurable. We are also looking at borrowing ideas that have worked for others in Washington State. For example, the working group hired a conservation group from Benton County, just south of Yakima, to develop a heritage garden program that would apply to the entire Yakima basin region. By applying the concept Integrated Plan wide, we can foster a conservation ethic with businesses, residents and planning groups in all of our communities.

In 2020, the Heritage Gardens of the Columbia River Basin adapted quickly to the ever-changing environment related to COVID-19 and moved to a virtual platform to continue to share their knowledge for creating landscapes and gardens that rely on less water.

In May and October, the Heritage Gardens program hosted free public webinars. The May webinar focused on native plants and pollinators, and the October webinar focused on the Missoula Floods, native plants and bee pollinators, and native landscape design. Highlights included a local backyard transformed into a heritage garden over the years.

Additionally, in July a drive-through book sale occurred for the book, *Plant Selection Guide - Heritage Gardens of the Columbia River Basin*.

Looking toward the 2021, Heritage Gardens is hopeful to host a Butterfly Discovery Day as well as in-person webinars to continue sharing information to interested parties.

Re-envisioning a salmon stream in a working landscape

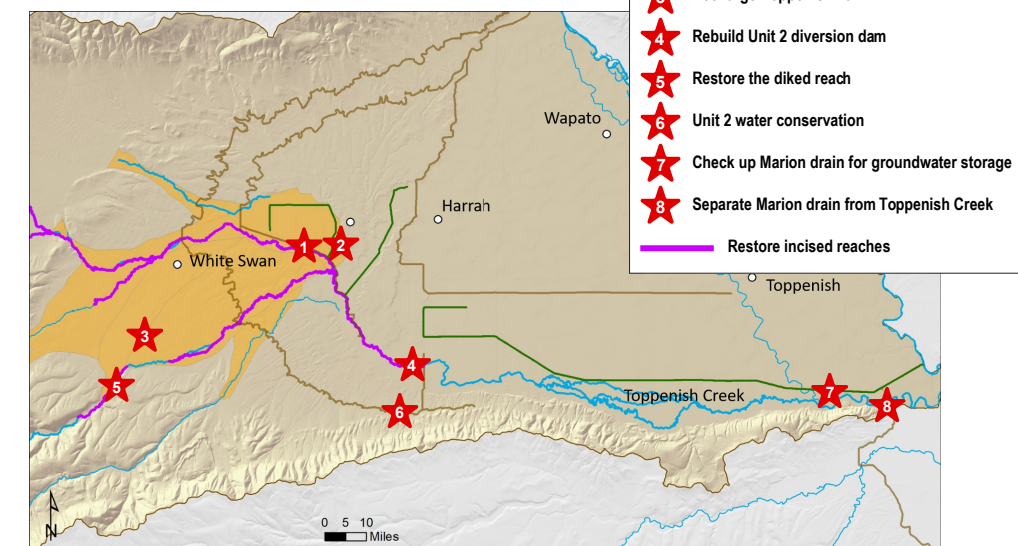
Lower Toppenish Creek runs 45 miles through the Yakama Reservation from the foothills of the East Cascades to its confluence with the Yakima River. This creek provides water, fish, wildlife and medicine for the Yakama people; however, land-use changes and irrigation developments over the last century have reduced the water quality and degraded fish and wildlife habitat.

In particular, engineers in the early 1900s incorporated the creek into the Wapato Irrigation Project as a canal and a drain, with little regard for natural stream function or aquatic habitat. In recent decades, the Yakama Nation has pushed for the restoration of lower Toppenish Creek, in the process of developing the Toppenish Creek Corridor Enhancement Plan with support from Reclamation.

The Toppenish Creek Corridor Plan integrates irrigation re-engineering and ecological restoration along 45 miles of stream and floodplain. The plan has two overarching goals: 1) to separate the natural stream channels from the canals and drains of the Wapato Irrigation Project, and 2) restore stream and floodplain habitat that has been impaired because of to land-use changes. Currently, the Yakama Nation and Reclamation are preparing a five-year agreement that will jump-start implementation with work on eight priority projects included in the first 10 years of the Integrated Plan.

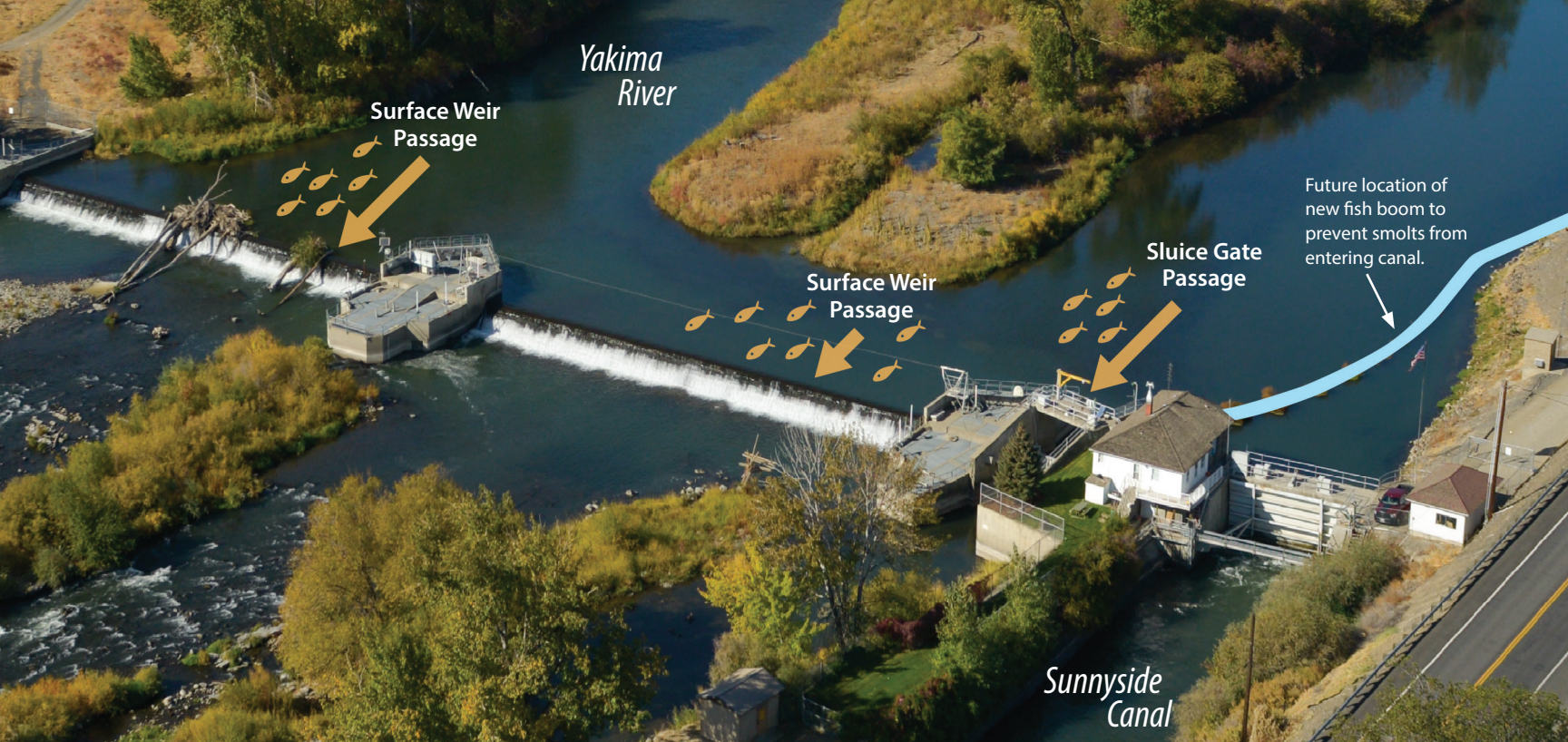
While the Toppenish Creek Corridor Plan was being developed, the Yakama Nation pushed to enact multiple habitat restoration actions on Toppenish Creek to address urgent needs. These include restoring more than a mile of stream habitat and 15 acres of spawning and rearing habitat for threatened Middle Columbia steelhead. These and other projects support the Toppenish Creek Corridor Plan goals and pave the way for accelerated progress as the plan is implemented.

Key actions over the next five years will include preventing steelhead migration into Marion drain by separating the drain waters from Toppenish Creek, increasing water use efficiency on the 17 mile Unit 2 Canal, increased monitoring of groundwater recharge in the Toppenish alluvial fan area, enhancing historic wetlands, and comprehensive habitat restoration on 2.5 miles of stream and floodplain.



Map: Actions planned for the first five years of the Toppenish Creek Corridor Plan.

Bottom: Excavator beginning the work of tearing down the old levee as the first step of levee setback in the Toppenish Creek 3-way Levee project, completed in 2018.



Smolt passage improves on the lower river

Above: Infographic shows Sunnyside Dam diversion is being modified to facilitate passage of smolts downstream.

Lower Yakima River Smolt Survival Study

While much work has occurred in the upper Yakima basin, our focus is turning to critical issues in the lower Yakima River, from the Union Gap near the City of Yakima to the Yakima River delta. Existing infrastructure, predators, low flows and warm water temperatures can be bottlenecks for fish migration and cause increased mortality.

Large numbers of juvenile salmon (smolts) migrate to the ocean annually during the springtime. Smolt survival can influence the abundance of returning adults and the availability of fish for harvest years later. River flows, water quality, passage at irrigation diversion dams, and predation are primary factors affecting smolt survival. The Lower Yakima River Smolt Survival Study, which started in 2018, is investigating factors affecting smolt survival from the City of Yakima to the confluence with the Columbia River.

In 2020, research was paused in late March due to state-wide travel restrictions. However, by early May, USGS and Yakama Nation developed safe work practices, resumed tagging, and released 348 spring chinook, 495 sub yearling chinook, and 376 steelhead at

Wapato, Sunnyside, and Prosser dams. Data are currently being analyzed, and in 2021, the study will focus on reporting results for the past three years and monitoring the Sunnyside Dam fish guidance boom project. Early indications are juvenile fish survival is higher if fish can be redirected to stay in the river and not enter the canal.

Sunnyside Dam Smolt Passage Improvement Project

The first project developed to improve lower river smolt survival is a partnership with the Sunnyside Division Board of Control at Sunnyside Dam, which diverts irrigation water into Sunnyside Canal. A fish guidance boom and dam gate modifications are being designed and installed during 2020–2021. The boom and gate modifications are designed to reduce the number of fish diverted through the canal and improve overall fish survival as they migrate past the dam. Fish survival will be studied and reported on to evaluate project effects.

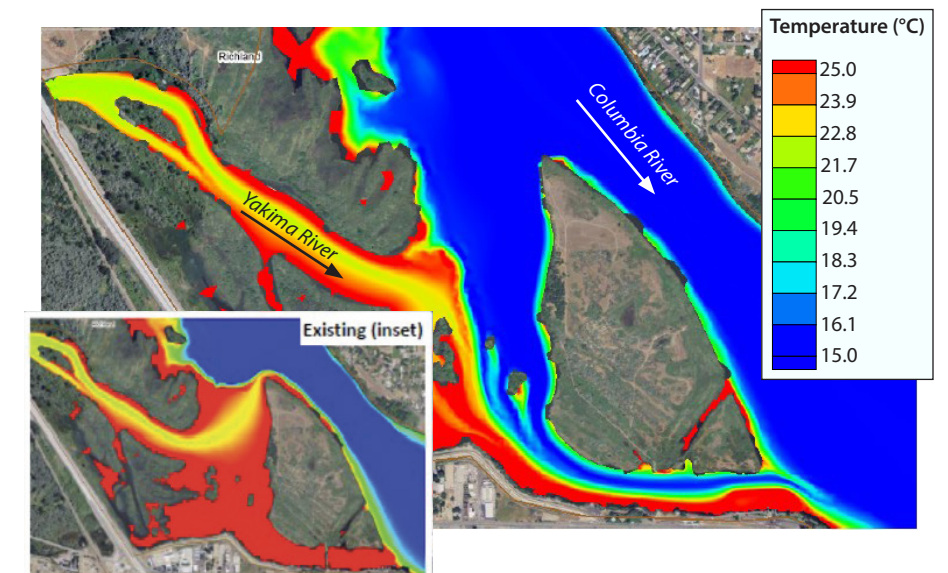
Causeway removal to aid in reducing negative impacts

For the past several years, our work has focused on improving fisheries, habitat and water quality in the upper Yakima basin. However, there are many issues in the lower Yakima River that negatively impact fisheries, water quality, water supply and public health that need to be addressed.

One such issue is the Bateman Island causeway. Bateman Island is located at confluence of the Yakima and Columbia rivers. The causeway on the south side of the island blocks cooling Columbia River flows, thereby creating a backwater habitat that forms a thermal barrier hindering salmon and steelhead from migrating up the Yakima River.

In addition to stalling salmon and steelhead migration, the warm backwater habitat is ideal habitat for non-native fishes that prey on out-migrating juvenile salmonids. High water temperatures also encourage algal blooms and invasive water stargrass growth, and create ideal conditions for mosquitoes and disease pathogens. Overall, this causeway has led to severely degraded water quality and flows.

In August 2019, the U.S. Army Corps of Engineers formally accepted the Yakima River Delta Ecological Restoration project under Section 1135 of Water Resources Development Act 1986 ecological restoration authority. The Washington Department of Fish and Wildlife is the non-federal sponsor. Almost \$1 million has been committed to remove the causeway to date. The first phase includes evaluating options and selecting a preferred restoration plan, and is anticipated to be completed by the end of 2021. Design and construction are slated for completion in 2025.



Top: The causeway contributes to water quality and temperature issues at the confluence of the Yakima and Columbia rivers.

Bottom: Thermal overview showing water temperatures with causeway removed. The existing (inset) shows how the causeway is affecting water temperatures and blocking fish passage near mouth of the Yakima River.



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Cle Elum Reservoir