2021 STATUS AND TRENDS ANNUAL REPORT

Yakama Nation Fisheries

March 2022

FOREWORD

Excerpt from *Land of the Yakamas* (2021)

Pahto plays a very important part as well as the other mountains in the Cascade Range, as they provide clean and cold water for all of the resources that are within the mountains and to the valleys and for all the animals, for everything.

You hear that term "traditional ecological knowledge". We understand it. We know it. Our elders knew it. And that's why we always share our concerns for the progress that is made by Western society.

Climate change has been happening. Low fish-count runs; smaller, shorter winter seasons; wildfires are more frequent.

There will always be impacts. That's what we've been saying all along. That's what our ancestors have been saying all along. And in the end, when development is done, what impacts will it have on our natural resources? Our elders would say they don't have a voice so you have to speak up for those resources. We hear "resources" but we define it as our First Foods. Plant life, the ones that walk, the ones that fly, the ones that swim, the ones that grow. Even the trees, they would say it's the lungs of our Mother Earth that provides air for us to breathe.

The Northwest is a key part in the world with our Cascade Range, the mountain tops, everything. My hopes and dreams for our children of these lands around us is that it can be protected. It can be managed in a safe, proper way.

- Jeremy Takala
Yakama Nation Tribal Council
Fish and Wildlife Committee Chairman

Contents

To learn more, visit: yakamafish-nsn.gov and dashboard.yakamafish-star.net

Yakama Nation Restoration Accomplishments 2011-2021*

309 Miles
Stream habitats made accessible to fish

1,415 Miles
Stream & riparian habitat improved, treated, or protected

3,030 Habitat Features
Large Woody Debris & Pool structures created instream**

12,700 Acres
Wetland habitats improved or protected

6 Fish Species
Being restored

(8 populations/runs)

161 Beavers
Released & relocated

175,000 People
Educated and informed

11,500 Pounds
Trash removed

*Funded by Bonneville Power Administration. Source cbfish.org. Additional restoration work funded from other sources.
**Additional 21,000 individual, unanchored logs installed instream for habitat complexity.

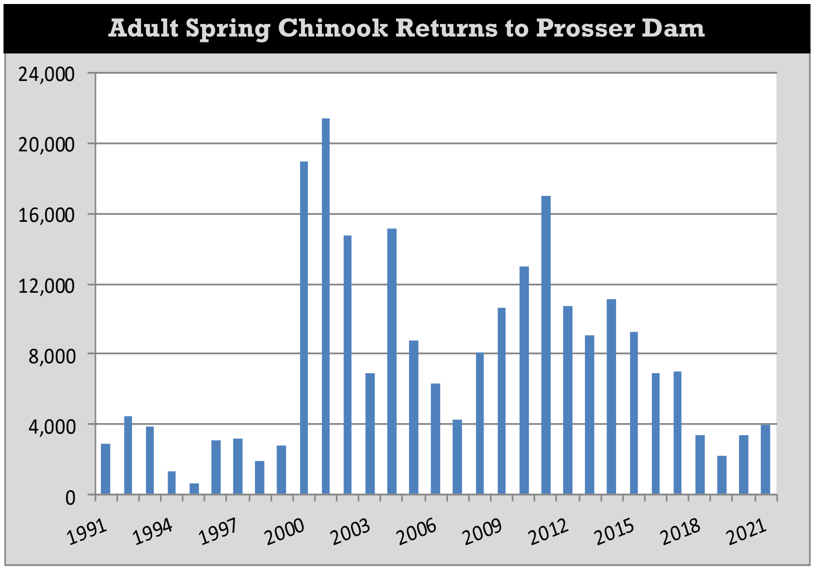
Levi George Supplementation and Research Facility — Spring Chinook

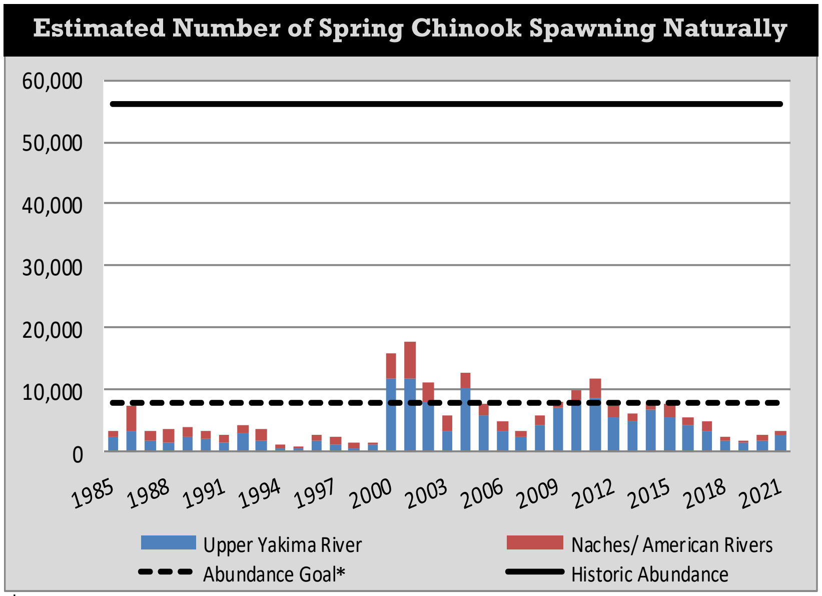
At the time of the 1855 Treaty, about 200,000 adult spring Chinook returned annually to the Yakima River. By the 1990s returns had declined to less than 3,500 fish, limiting tribal harvest.

In 1997, we opened the Levi George Cle Elum Supplementation and Research Facility (CESRF) to enhance spring Chinook returns and provide additional fishing opportunities. The facility was built to test the assumption that artificial production can be used to increase harvest and natural production while maintaining long-term genetic fitness of the fish population being supplemented and limiting adverse genetic and ecological interactions with non-target species.

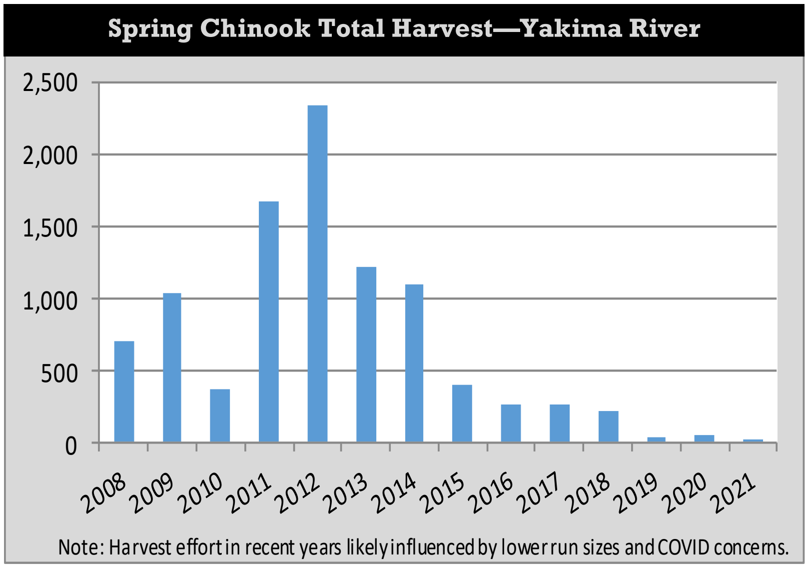
Production activities that occur at the facility include adult holding, spawning, incubation, and rearing of juvenile spring Chinook.

Visitors at an open house at CESRF (YN)





*High-range goal is for healthy and harvestable natural populations fully occupying restored habitat. See "Sources" p. 30.



Melvin R. Sampson Coho Hatchery

During the fall of 2021, the first coho were spawned at the Melvin R. Sampson Hatchery near Ellensburg.

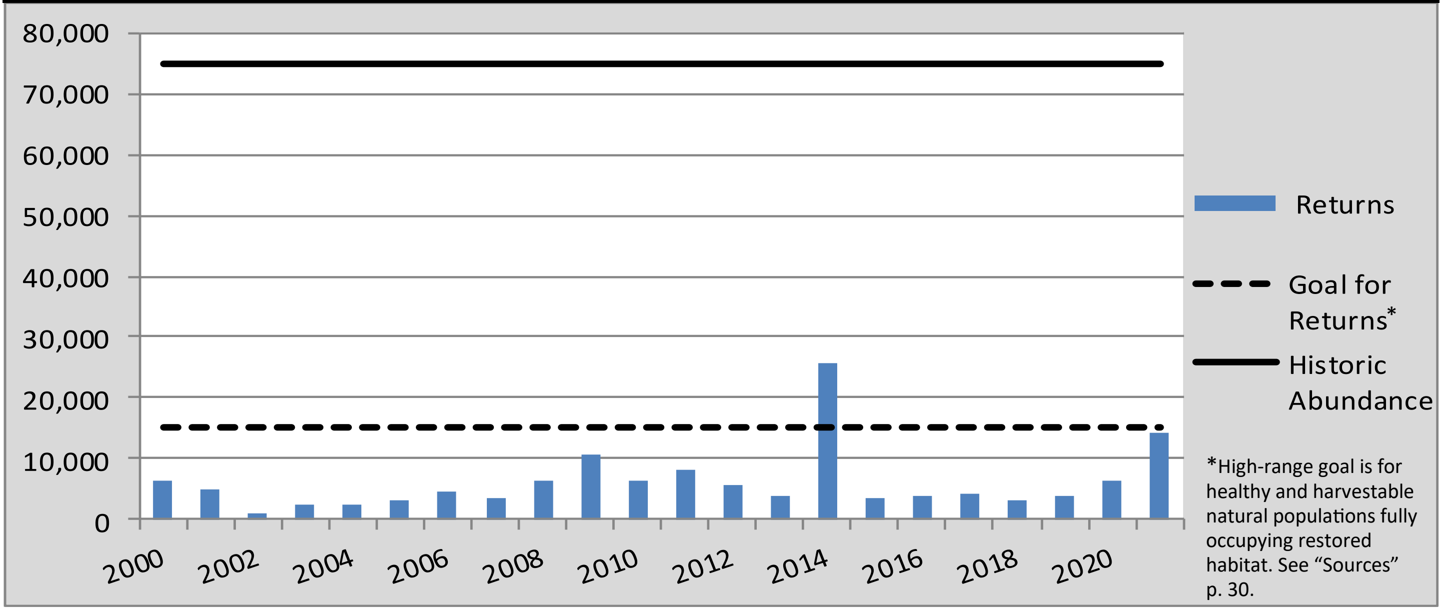
Mel was instrumental in starting and leading the Yakama-Klickitat Fisheries Project and an inclusive all-stocks initiative that has returned natural populations of summer Chinook, coho, sockeye, and Pacific lamprey to the Yakima Subbasin. As a highly respected tribal elder, Mel served 18 years on the Yakama Nation's Tribal Council, including the role of Council Chairman.

Funded by BPA through the Yakima-Klickitat Fisheries Project, the hatchery includes several environmentally sustainable features. Because limited water supply is a challenge in the subbasin during the summer and fall, there was a need to develop innovative ways to re-use water. To conserve water, the facility includes a partial recirculation system that allows for 80% of the water to be reused. This technology allows us to use 930 to 1,200 gallons of water per minute during peak demands, compared to more than 12,000 gallons per minute at a conventional facility. Also, to offset energy use via traditional sources, the hatchery is equipped with a solar grid.

With the new hatchery, we will be able to produce 700,000 juvenile coho annually for release into the subbasin in order to increase harvest levels, natural spawning abundance, and spatial/temporal distribution.

Hatchery staff at first coho spawn at new facility 2021 (YN)

Adult Coho Returns to the Yakima River Mouth



*High-range goal is for healthy and harvestable natural populations fully occupying restored habitat. See "Sources" p. 30.

Prosser Hatchery — Fall Chinook

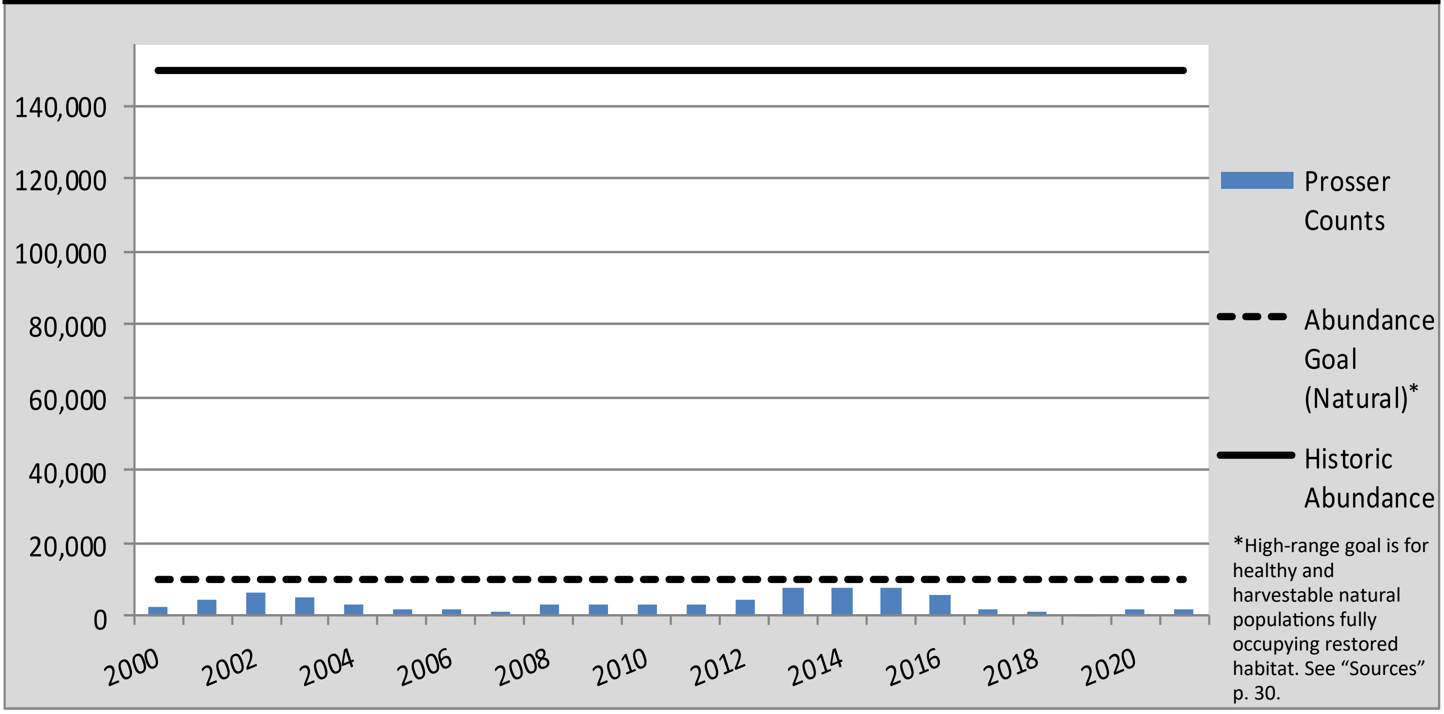
Prior to the Treaty era, up to 100,000 fall Chinook returned annually to the Yakima Subbasin. With the completion of hydroelectric dams, there has been a loss of natural production. One factor contributing to this loss is the inundation of spawning habitat. Consequently, reduced production led to the loss of harvest opportunities.

The US v. Oregon Columbia River Management Plan established annual release targets for hatchery fall Chinook in the Yakima Basin to augment harvest opportunity in Zone 6 fisheries and to increase natural spawning abundance. Annual releases have averaged approximately 1.75 million subyearlings since 1983.

Initial hatchery releases consisted of fish originating from outside the subbasin. By 1997, production of Yakima River-origin fish was occurring at Prosser Hatchery. Currently, fall Chinook returning to the Yakima River include upriver brights from Little White Salmon Hatchery and progeny of Yakima River adults.

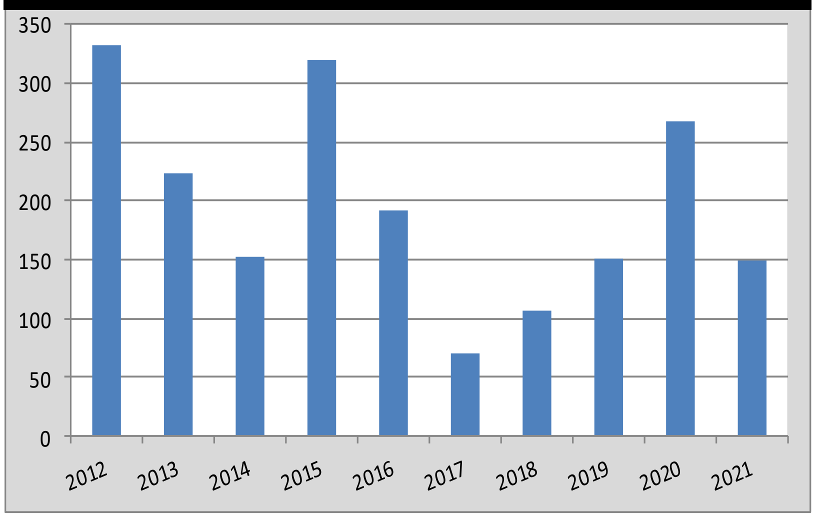
YKFP Project Manager Joe Blodgett processing broodfish at Prosser Hatchery. (YN)

Adult Fall Chinook Returns to Prosser Dam



Kelt being reconditioned on a shrimp krill diet (YN)

Reconditioned Steelhead Kelts Released in the Yakima Basin



Prosser Hatchery — Steelhead Kelts

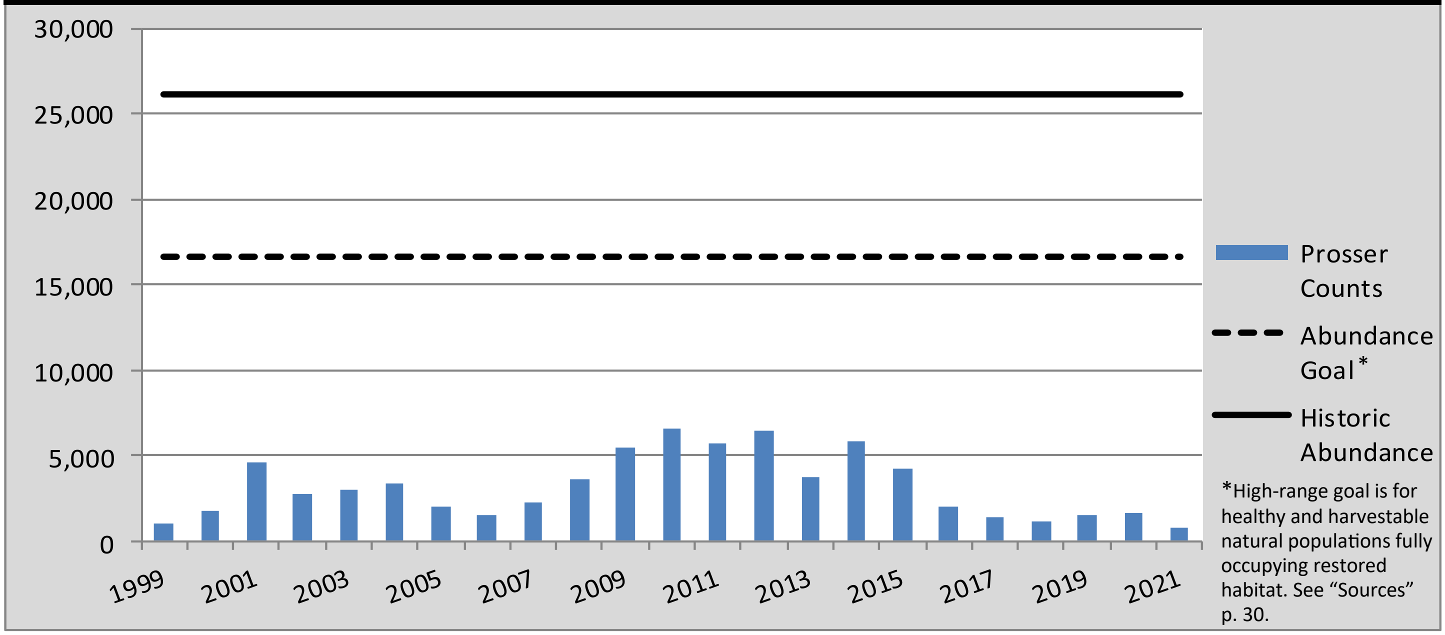
Historically, up to 40,000 steelhead returned annually to the Yakima Subbasin. By the 1990s, annual returns declined to around 1,000. Since 1999, we have been developing reconditioning strategies for kelts (post-spawn fish).

Steelhead are capable of spawning more than once; however, their physical condition after spawning combined with having to pass several dams and survive other dangers limit survival as they migrate to the ocean and back. To improve a steelhead's potential to spawn again, we have been developing a process to improve their condition.

A portion of emigrating kelts are diverted into the Chandler irrigation canal and collected at the Prosser Juvenile Monitoring Facility. Upon capture, fish are held and cultured in reconditioning tanks at Prosser Hatchery.

After six months, fish are released to the river at the same time as steelhead are returning from the ocean. Reconditioned kelts naturally choose their mates, spawning location, and upstream migration and spawn timing.

Adult Steelhead Returns to Prosser Dam



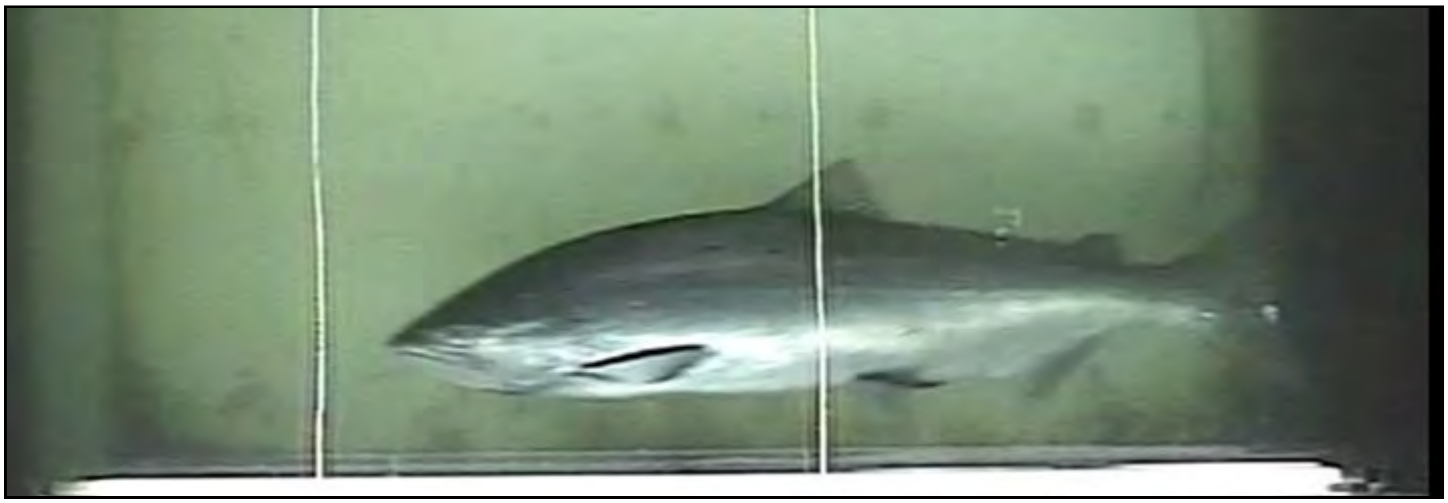
YAKIMA SUBBASIN

Summer Chinook Reintroduction Project

By 1970, summer Chinook were extirpated from the Yakima Subbasin. Summer-run Chinook are being re-introduced to the subbasin using Prosser Hatchery and temporary infrastructure at the Marion Drain Hatchery.

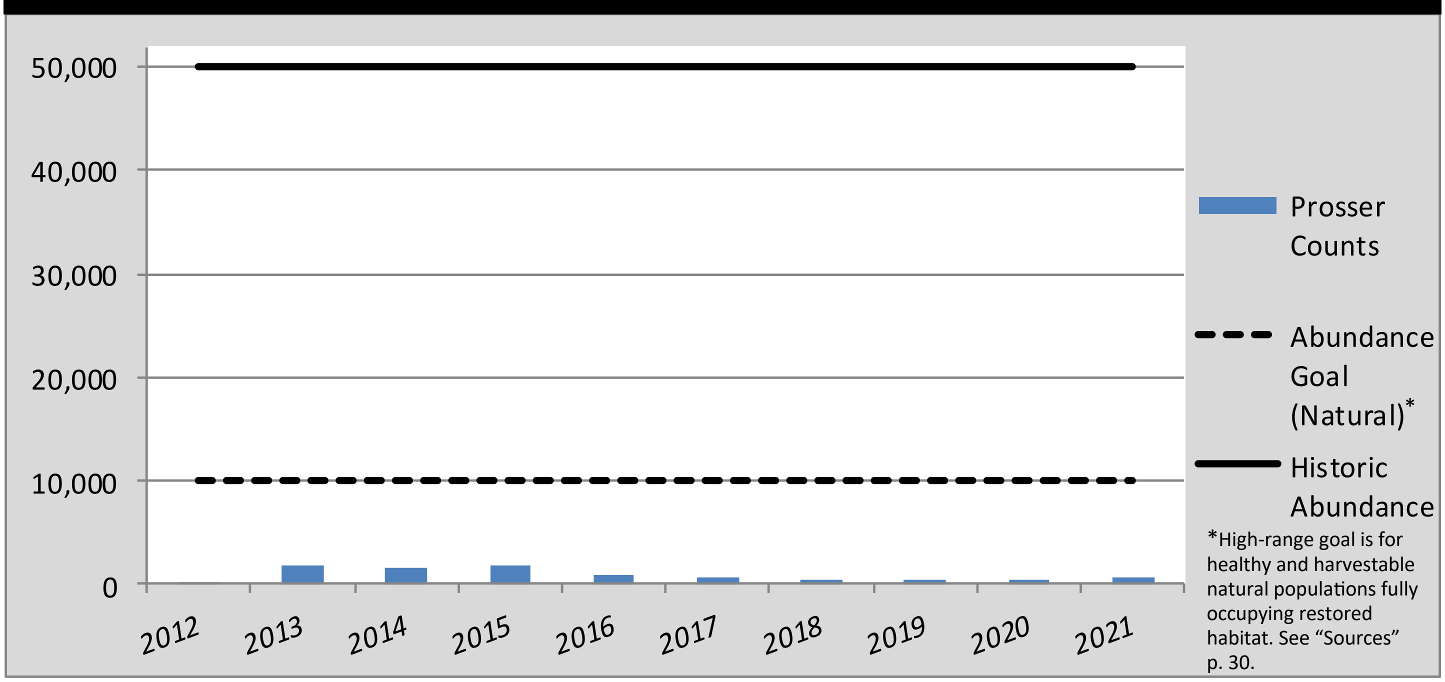
Our summer Chinook Reintroduction Project includes two phases. During the first phase, we have been releasing 500,000 fish annually above Prosser Dam to recolonize habitat and provide tribal harvest opportunities. For this phase, juvenile production at the hatchery is dependent on eggs received from the Wells Hatchery.

The second phase for the program is to transition to using a local, natural-origin broodstock for production purposes. Combined with improved habitat quality, through our on-going restoration work, this phase will allow us to reach our goal for a self-sustaining and locally-adapted population; however, hatchery supplementation may be essential to realize annual harvest goals.



Summer Chinook passing through the Prosser Enumeration facility. (YN)

Adult Summer Chinook Returns to Prosser Dam



Yakama Nation White Sturgeon Hatchery

The construction of hydroelectric facilities in the middle and upper Columbia River have altered seasonal flows, impacted spawning and rearing habitat, and impeded sturgeon migrations. These impacts have resulted in low juvenile survival. As a result, we began to evaluate the potential for artificial production of white sturgeon in the 1990s.

By 2009, the Yakama Nation White Sturgeon Hatchery was completed, with funds from BPA and the Grant and Chelan PUDs. Since its opening, we have spawned and reared fish annually for release into Priest Rapids, Wanapum and Rocky Reach reservoirs to supplement natural production until harvestable populations exist throughout the middle Columbia and lower Snake rivers.

Yakama nation biologists spawning white sturgeon at the Sturgeon Hatchery and releasing juveniles into the Columbia River. (YN)

Juvenile White Sturgeon Released by the Yakama Nation

Our Project Goals

- To supplement wild production by releasing hatchery reared juveniles until healthy self-sustaining harvestable populations can be achieved.
- Enhanced natural spawning and fisheries throughout the mid-Columbia and Lower Snake Rivers.
- From 2010-2018, about 83,000 tagged yearling sturgeon have been produced for release in mid-Columbia reservoirs.
- The future production goal is 20,000 fish, annually.

Spawning Process

- Collect wild adult white sturgeon
- Live-spawn in the hatchery, release broodfish near their capture site
- Fertilize and hatch the eggs, rear the juveniles for about a year
- Release the juvenile sturgeon to mid-Columbia reservoirs in the spring

Future Plans

- Working in the Mid-Columbia River to date, we will be expanding releases throughout mainstem Columbia River consistent with the Master Plan.

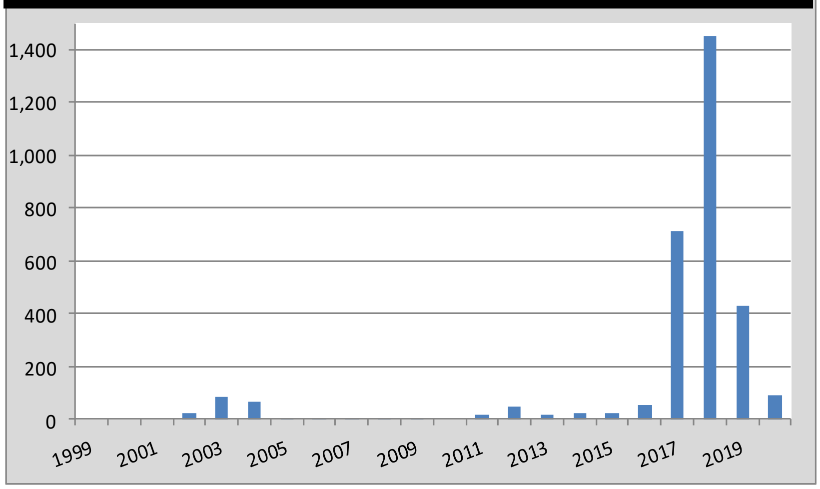
Prosser Hatchery — Pacific Lamprey

For over 10,000 years we have depended on lamprey for food and medicine. We harvested lamprey in a sustainable manner, taking only what our families needed for subsistence. During this time, lamprey were plentiful. Due to various factors, this is no longer the case.

Our goal is to restore natural production of lamprey to a level that will provide robust species abundance, significant ecological contributions, and meaningful harvest. To increase the number of lamprey returning to the Yakima Subbasin, we annually collect adults at Bonneville, The Dalles, and John Day dams for the purpose of translocating the fish to various locations in the subbasin. We are also developing hatchery techniques to reintroduce juveniles, are rescuing stranded fish, and installing lamprey ladders.

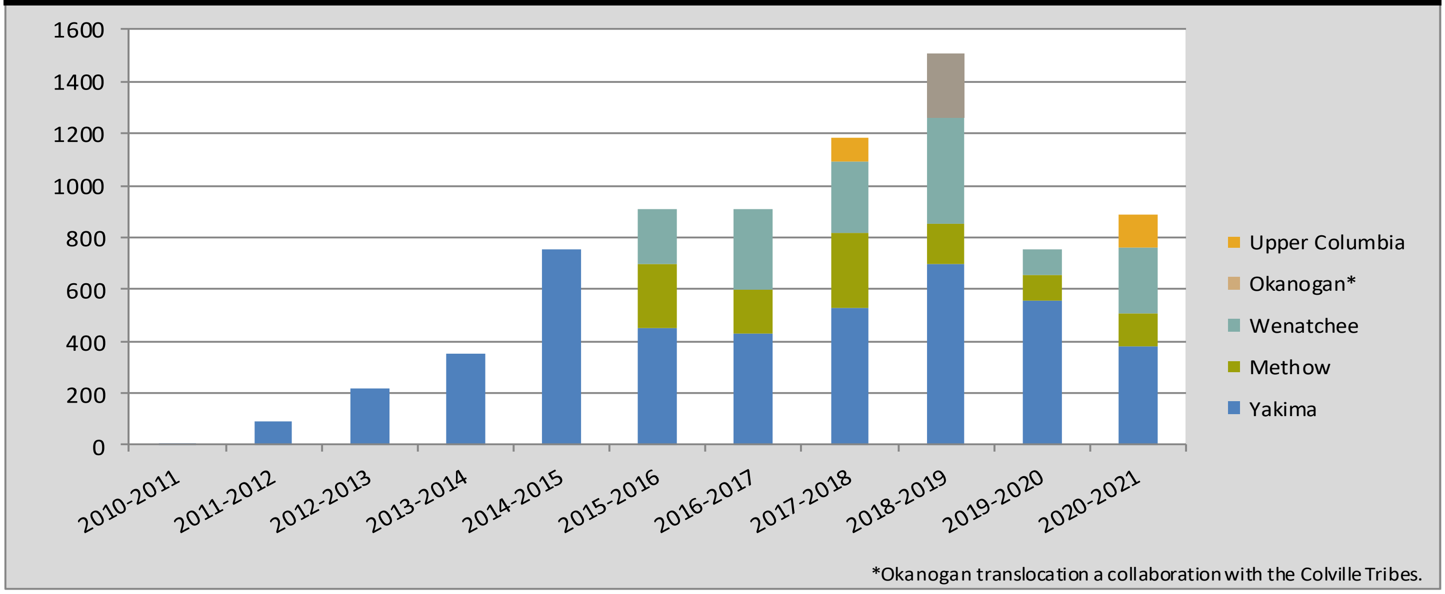
Release of translocated lamprey is often a community event (Ahtanum Creek, YN).

Adult Pacific Lamprey Returns to Prosser Dam *



**Note: Starting in 2018, return estimates are based on PIT tag studies rather than window counts.*

Adult Pacific Lamprey Translocations (All Subbasins)



Sockeye Reintroduction — Lake Cle Elum

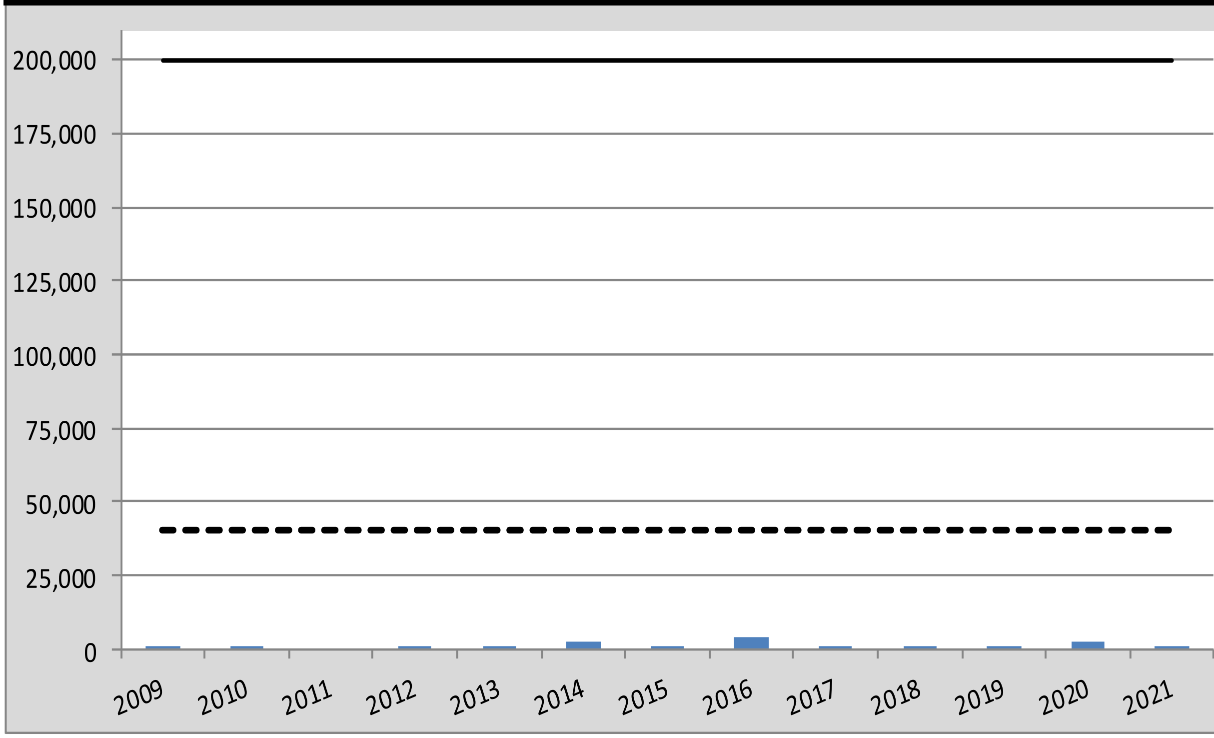
In the early 20th century, construction of the Yakima Basin Irrigation Project without fish passage caused the extirpation of sockeye as fish could no longer access spawning grounds and nursery lakes. Prior to this, more than 200,000 sockeye returned annually to the upper portion of the subbasin.

In 2009, with support from several partners and an agreement with *U.S. v. Oregon* Parties, we began to reintroduce adult sockeye into Lake Cle Elum to re-establish a naturally spawning population that is sustainable and capable of supporting harvest in the subbasin. The process of collecting adults at Priest Rapids and/or Roza dams and transporting them to Lake Cle Elum for release will continue until upstream passage is established at Cle Elum Dam.

In 2013, we recorded the first adult sockeye, progeny from reintroduced fish, to return to the Yakima subbasin in over 100 years. Cooperative efforts to restore downstream juvenile passage are ongoing and are expected to be completed in 2023.

Pictured at Left: Adult sockeye being prepared for transport to Cle Elum Lake and a juvenile sockeye representing successful spawning of the transported fish.

Adult Sockeye Counted at Prosser Dam



*Mid-range goal is for healthy and harvestable natural populations fully occupying available habitat. See "Sources" p. 30.

YAKIMA SUBBASIN

Bull Trout Rescue, Rehabilitation, and Reintroduction — Upper Yakima Subbasin

Seasonal dewatering in the upper Yakima Subbasin often results in stranding and desiccation of juvenile bull trout. The impact can be significant since these isolated populations also face challenges associated with degraded instream habitat, migration blockages, warming temperatures, and invasive species.

We are helping to address these limiting factors by rescuing stranded juvenile fish during low-water periods, rehabilitating them, and reintroducing them to good-quality historic habitats. Thus we are increasing the natural reproductive potential of and reducing risk to populations, since these fish would have died otherwise.

Project goals include rehabilitating up to 1,250 juvenile bull trout annually. In 2019-2020, our first year, we released 200 rehabilitated bull trout that were rescued from the Kachess River and Gold Creek. In 2020-2021 we released 594 rescued fish, and for the 2021-2022 season we are rehabilitating 558 fish. Survival during holding has increased to over 90%, during which time the bull trout grow significantly.

Bull trout rescue project activities, and Kachess Lake (YN)

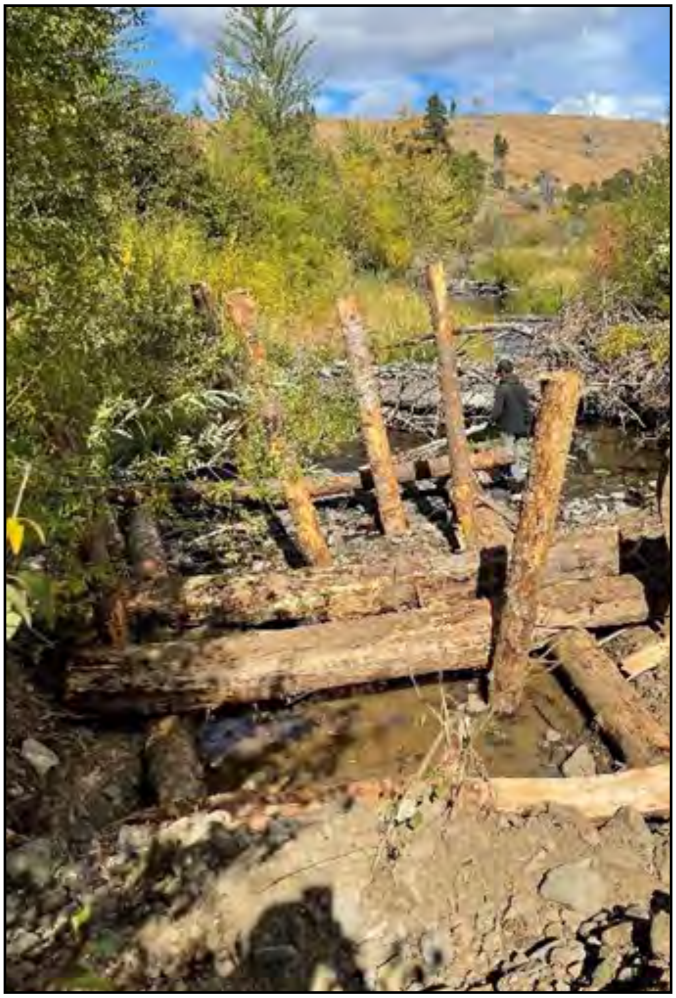
Swauk Creek — Large Wood Replenishment Project

Swauk Creek provides habitat for ESA-listed steelhead, coho, and resident trout. In the past, we restored sections of the creek between RM 0.2 to 0.8 and 1.7 to 3.0. Situated between these restored areas was a section that lacked wood and was disconnected from its floodplain. There, the hydrologic, physical, and ecological processes that maintain habitat for native species were severely altered.

In 2021, we placed 345 logs and wood structures in the degraded section. The structures deflect streamflow, encourage secondary channel development, trap mobile wood to prevent damage to an existing bridge, bolster existing beaver dams to ensure they do not blow out during freshets, and promote instream complexity (including roughness, cover, and pools).

A total of 115 potted plants (aspen, cottonwood, dogwood, serviceberry, Wood's rose, Garry oaks, elderberry, bitter cherry, and willow) were planted in access lanes and a seed blend developed specifically for the Swauk Valley Ranch (BFI Natives; Swauk Forest mix) was spread at ~7lbs per acre to revegetate disturbed grassland areas.

Through our effort, 0.5 miles of stream and 450 feet of side-channel habitat were restored.



Construction of a wood-trapping structure. (YN)

Wood structures installed in Swauk Creek included a channel spanning structure (left) designed to bolster existing beaver dams and a bar apex structure (right) that was keyed into the streambank. (YN)

Taneum Creek Rag-Heart Habitat Enhancement

In 2021, we restored 1.5 miles of instream habitat and floodplain connectivity in Taneum Creek (RM 1.8- 2.4 and 2.4- 3.4). By installing 13 channel-spanning wood structures and placing 47 root wads in the stream, we increased: 1) quality of pool habitat, 2) complex cover within the main channel, 3) floodplain function and groundwater storage, 4) channel length, and 5) beaver recolonization potential, resulting in enhanced instream habitat quality and quantity.

In addition, as a result of the stream restoration work, an advancing headcut causing a fish passage barrier was remedied, allowing ESA-listed steelhead, coho, Chinook, rainbow trout, and cutthroat trout restored access to improved habitats.

To restore terrestrial habitat disturbed during the project, access routes and staging areas were seeded with native grasses, container plants were installed and weed free straw was used as a mulch to maintain moisture during the growing season. For 2022, deep planting and temporary fencing will be completed to re-establish and protect the riparian corridor.

Before, during, and after habitat restoration work at the Heart K reach above the KRD siphon and flume (YN)

North Fork Teanaway Floodplain Restoration Project

In 2021, we restored the North Fork Teanaway River floodplain (RM 5.5 and 5.9) to improve channel and floodplain connectivity and riparian habitat. We augmented instream and floodplain habitat complexity in Swauk and Taneum Creeks and the Teanaway River.

Restoration efforts included the installation of six engineered log jams, placement of 300 logs, and the breaching of levees along floodplain channels. By removing levees and re-introducing wood, the river can now re-occupy historic channel paths and initiate natural processes such as riparian vegetation regrowth, macroinvertebrate production, and beaver colonization. In addition, the restoration will contribute to reducing the threat of fish stranding. To restore the terrestrial area, we installed 130 container plants and seeded 6.59 acres.

Since the completion of the project, new floodplain channels, and sediment retention have been realized. Many of the unanchored wood structures that we placed in the river were designed to allow for the logs to "peel off" during high flow, resulting in the transport of wood to downstream locations. To date, wood structures have remained intact while experiencing flood events. We expect these structures will continue to increase channel migration in the coming years.

Our effort resulted in the restoration of 0.5 miles of stream and 16 acres of floodplain habitat.

River mile 5.86 where a berm was breached and an engineered flow deflector was installed creating a new floodplain flow path. (YN)

Structure construction (left) and following completion during an elevated flow on November 15, 2021. (YN)

KLICKITAT SUBBASIN

Klickitat Hatchery

Completed in 1954 with funding provided by the Mitchell Act as mitigation for effects of hydropower development and operation on fisheries, the Klickitat Hatchery is jointly operated by WDFW and YN, and allows us to rear and release fish to support Tribal and non-tribal fisheries in Zone 6 and the Klickitat River.

Now supported by various funding sources, we implement four segregated harvest fish programs in the subbasin, for which spring Chinook, fall Chinook, and coho are supported by the Klickitat Hatchery. The steelhead program relies on other hatcheries for the rearing and release of juvenile fish. In a segregated program, hatchery fish populations are maintained primarily or exclusively by adults returning to the hatchery, with little to no interaction with the naturally spawning population. A process is currently underway, however, to move Klickitat spring Chinook to an "integrated" program, in support of strengthening wild populations.

Spring Chinook

The hatchery annually aims to rear and volitionally release 600,000 juveniles that originate from brood fish collected at Lyle Falls and the Klickitat hatchery. Future goals of an integrated program are to release up to 800k yearling smolts.

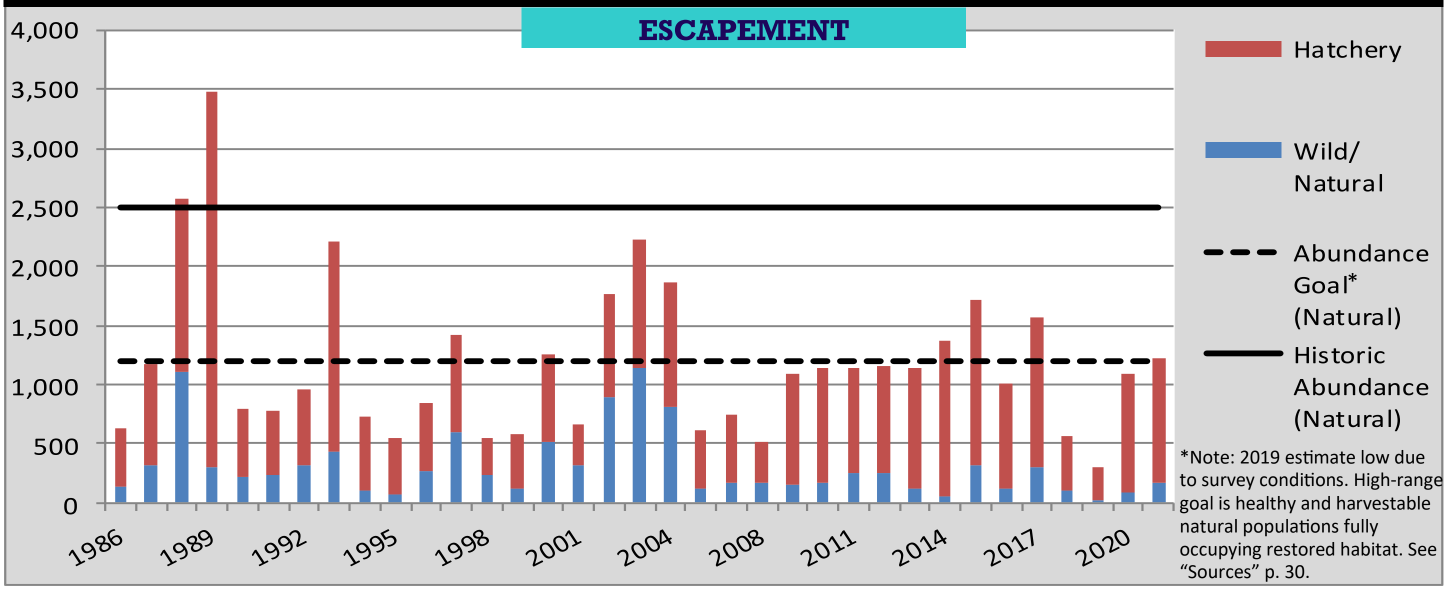
Fall Chinook

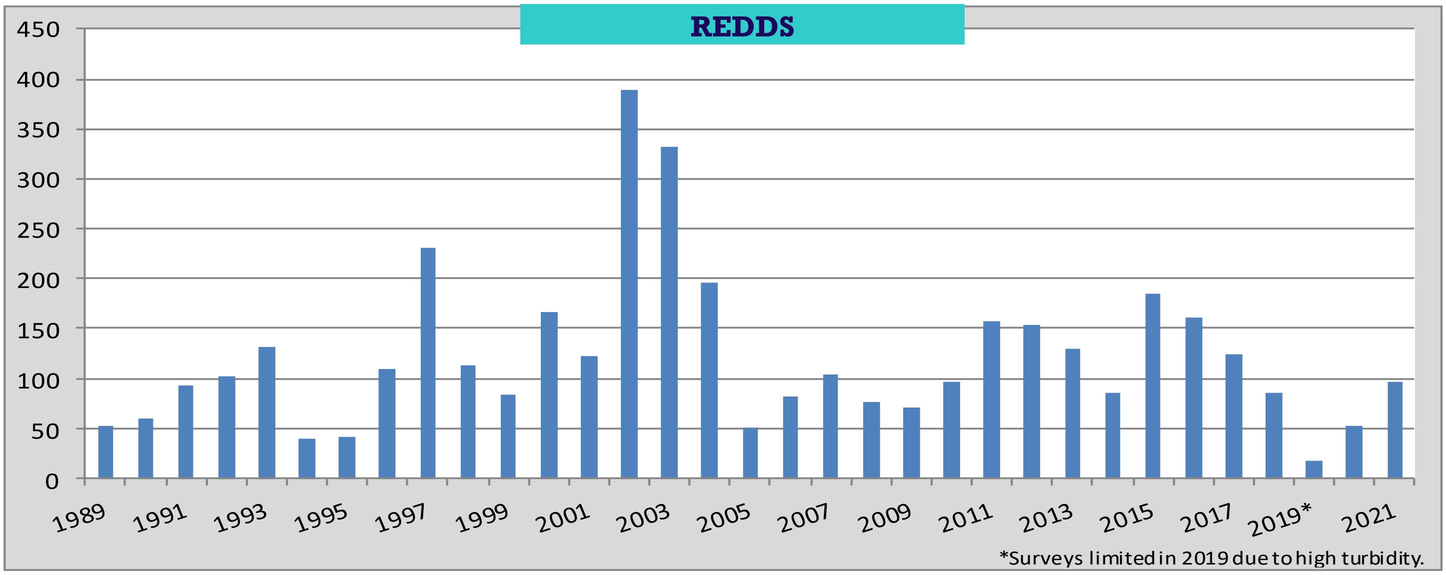
Beginning in 1986, production at the hatchery switched from tule stock to upriver bright fall Chinook. Today, eggs are transferred primarily from Little White Salmon National Fish Hatchery to Klickitat Hatchery for rearing and on-site release. The program produces up to five million smolts annually.

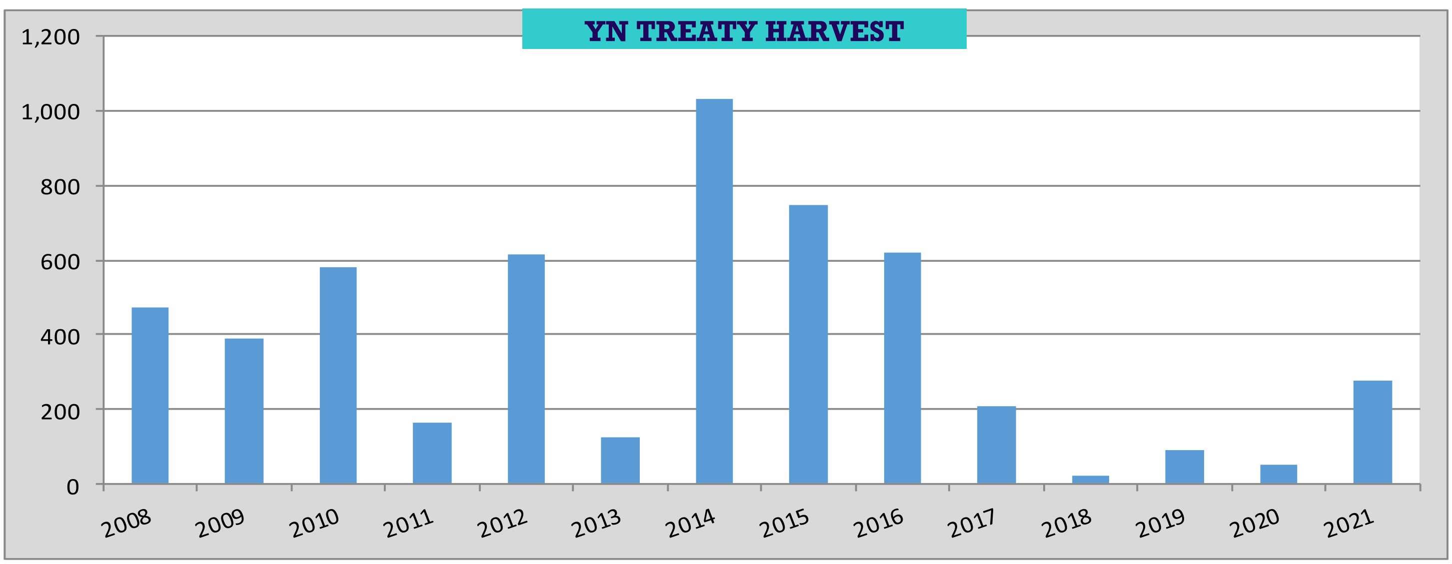
Coho

Coho were introduced in 1952 to achieve harvest obligations. The hatchery strategy calls for the use of fish returning to the Klickitat River as broodstock resulting in the annual production and release of 1 to 1.2 million juveniles at the hatchery. An additional 2.5 to 2.7 million out-of -basin juveniles are also released annually.

Klickitat Spring Chinook

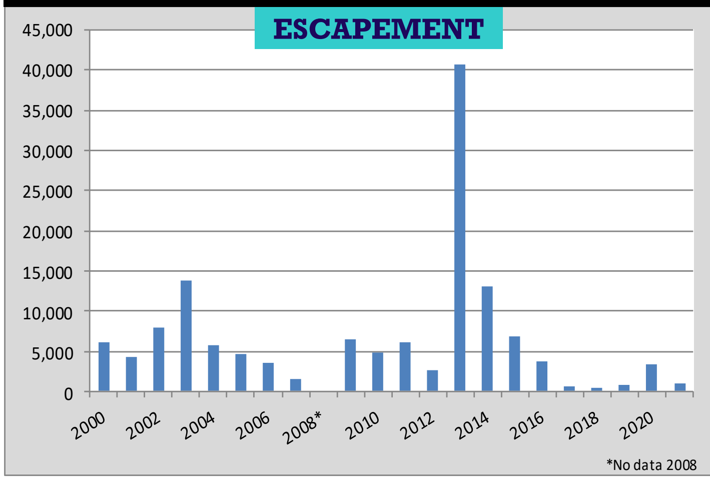


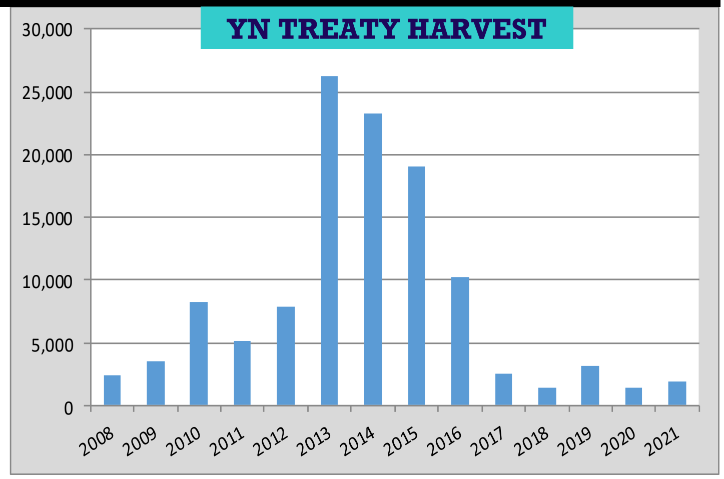




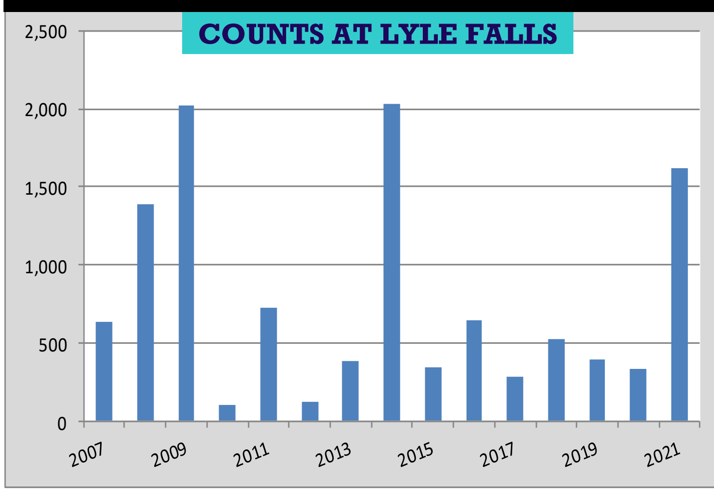
KLICKITAT SUBBASIN AND ROCK CREEK

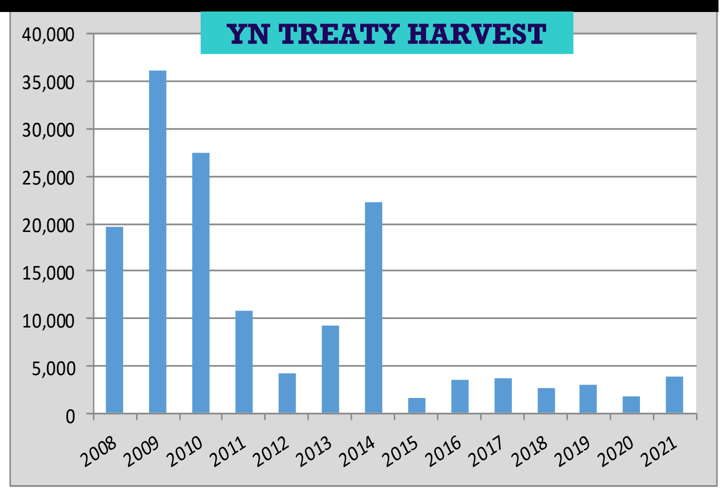
Klickitat Fall Chinook



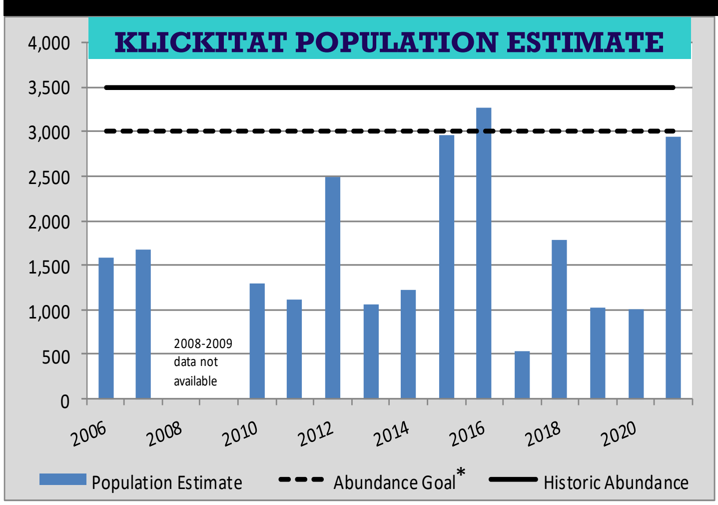


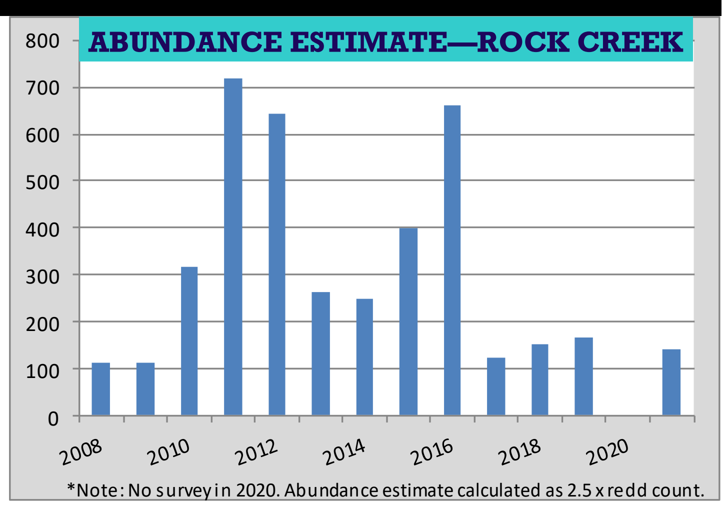
Klickitat Coho





Summer and Winter Steelhead





*High-range goal is for healthy and harvestable natural populations fully occupying restored habitats. See “Sources” p. 30.

White Creek 191 Road Crossing Project

White Creek, the largest tributary of the Klickitat River, provides spawning and rearing habitat for ESA-listed steelhead. The White Creek watershed may be the most important spawning and rearing tributary watershed within the Klickitat Subbasin, as 41% of the observed spawning in the subbasin occurs in White Creek. Rearing habitat has been identified as a limiting factor. Where feasible, providing for unrestricted fish movement is critical to the expression of certain life histories and strategies to enable adaptation to low-flow conditions.

Through this project, we removed an undersized culvert that was preventing juvenile steelhead from entering critical rearing habitat during low to no-flow periods in late summer and early fall. By replacing the culvert with a bridge, more than 3 miles of spawning and rearing habitat are now accessible to juvenile steelhead.

Construction of the new bridge reduces annual maintenance needs, allows upstream migration of all fish species regardless of age, and facilitates the longitudinal movement of wood and sediment across a wide range of flow conditions.

Before (top row) and after conditions following the replacement of an undersized culvert associated with the 191 Road in the White Creek watershed. (YN)

METHOW AND WENATCHEE SUBBASINS

Coho Reintroduction — Upper Columbia

By the end of the 20th century, coho in the mid- and upper-Columbia River basins were extirpated due to hydropower development, unscreened irrigation diversions, overharvest in the lower-Columbia River, and habitat degradation. The Yakama Nation recognized the potential to return coho to the Methow and Wenatchee River subbasins.

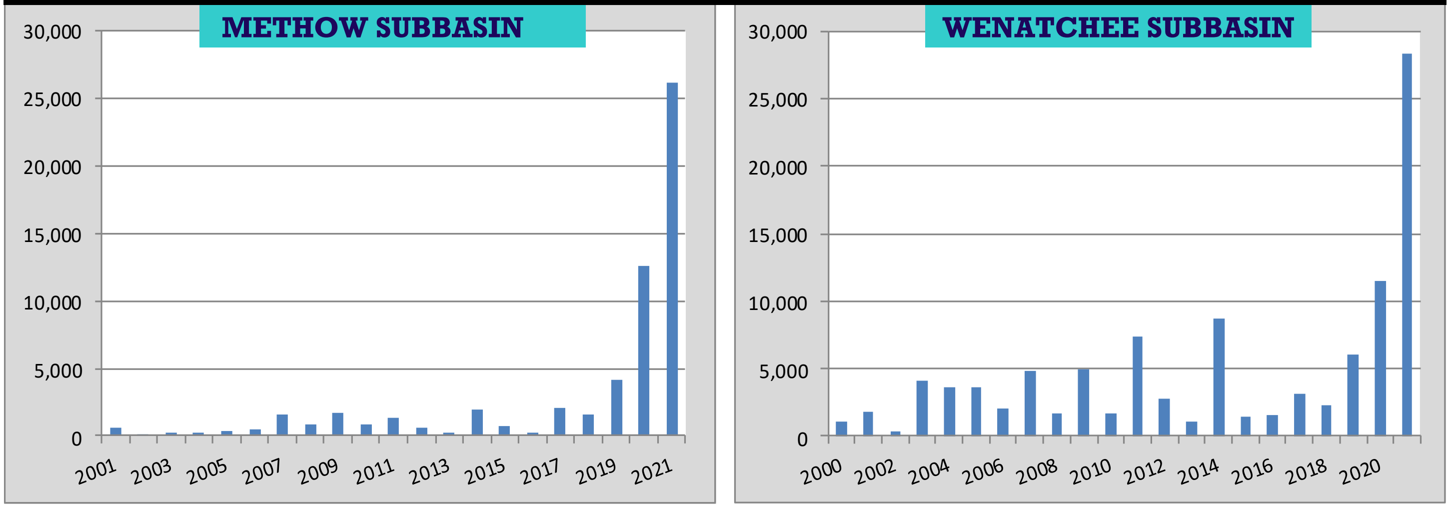
Since 2000, we have been collaborating with the US Fish & Wildlife Service (Willard NFH, Leavenworth NFH, and Winthrop NFH), Oregon Department of Fish & Wildlife (Cascade FH), and various local landowners to assist with re-establishing spawning coho populations to levels that can support harvest. Although broodfish were initially sourced from lower Columbia River stocks, a transition to local broodstock occurred as early as 2005. Through guidance of our long term Master Plan, we continue to expand project releases while initiating natural-origin production within historic spawning areas; ultimately creating sustainable spawning aggregates within target watersheds.

Adult female coho broodfish. (YN)

Research conducted with snorkel surveys.

Juvenile coho (YN)

Coho Escapement Estimates—Natural and Hatchery*



*Note: New model used to calculate estimates from 2019 onwards.

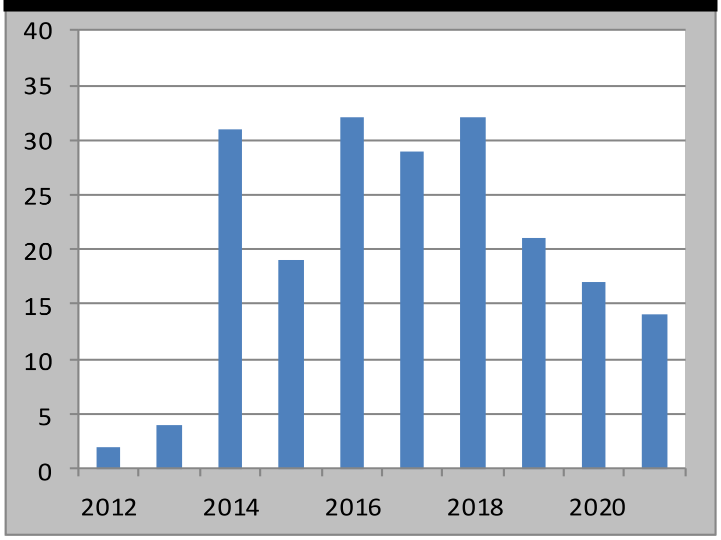
Methow Steelhead Kelt Facility at the Winthrop National Fish Hatchery — Steelhead Kelt Reconditioning

Steelhead display a variety of life history strategies including the ability to spawn more than once. Low rates of repeat spawning in the upper Columbia River exist likely due to mortality associated with energetic demand, degraded habitat, and post-spawning migration through the Columbia River hydropower system.

Reconditioning post-spawn steelhead (kelts), may help upper Columbia populations that experience high mortality rates. Kelt reconditioning includes a 6 to10 month period in a captive environment where fish reinitiate feeding, grow, and redevelop mature gonads.

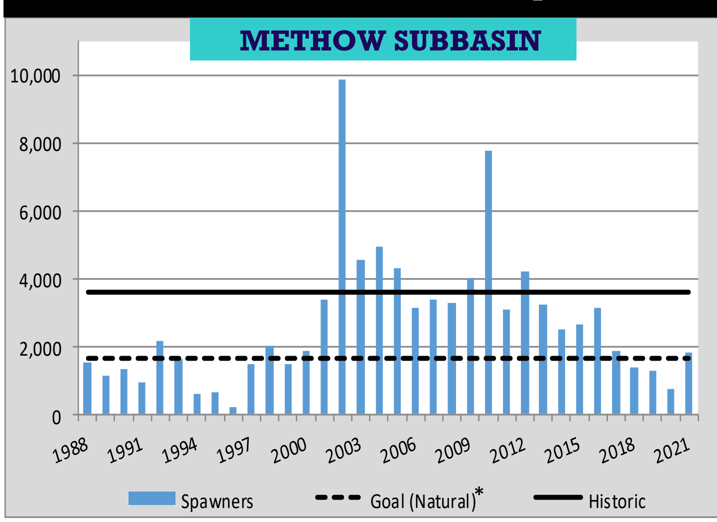
In 2011, we opened the Methow Steelhead Kelt Facility at the Winthrop National Fish Hatchery, allowing us to recondition up to 136 kelts at any given time. The goal of our Upper Columbia River Steelhead Kelt Reconditioning Project is to determine whether the abundance of naturally-produced steelhead on natural spawning grounds can be increased through the proven increase in lifetime reproductive success.

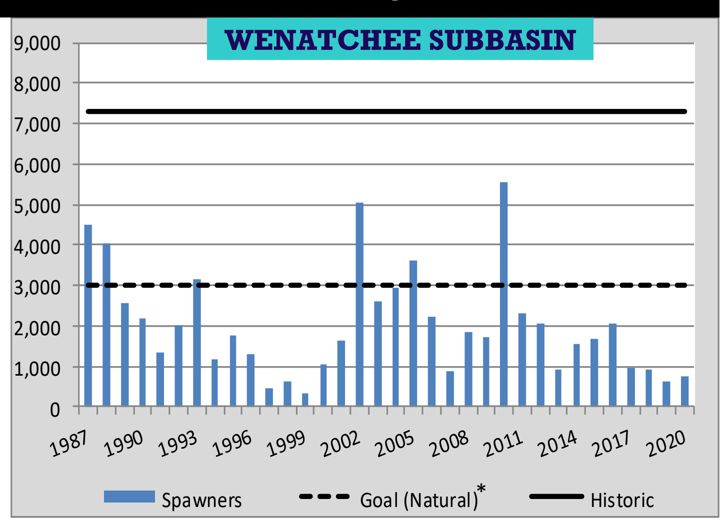
Reconditioned Steelhead Kelts Released



Condition of a steelhead kelt as it enters the reconditioning program (top) and a reconditioned fish prior to release. (YN)

Steelhead Escapement Estimates—Natural and Hatchery





*High-range goal is for healthy and harvestable natural populations fully occupying restored habitats. See “Sources” p. 30.

METHOW AND WENATCHEE SUBBASINS

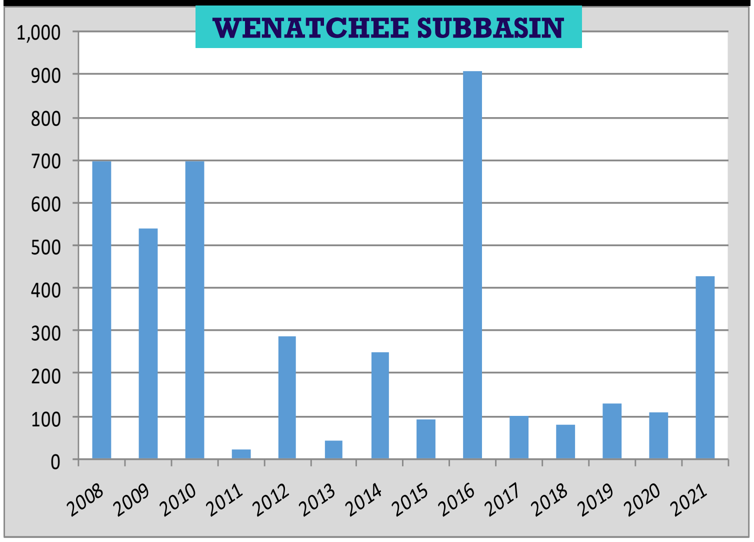
Methow Fish Hatchery (Goat Wall Acclimation Site) — Spring Chinook and Summer Steelhead

Our Upper Columbia Salmon and Steelhead Acclimation Project, which began in 2009, is designed to provide additional acclimation opportunities for existing spring Chinook and steelhead hatchery mitigation programs in the Wenatchee and Methow subbasins. Juvenile spring Chinook are reared at the Methow Fish Hatchery prior to being transported, by our staff, to acclimation ponds for volitional release in mid-April. Since 2017, juvenile releases have been limited to the Goat Wall pond.

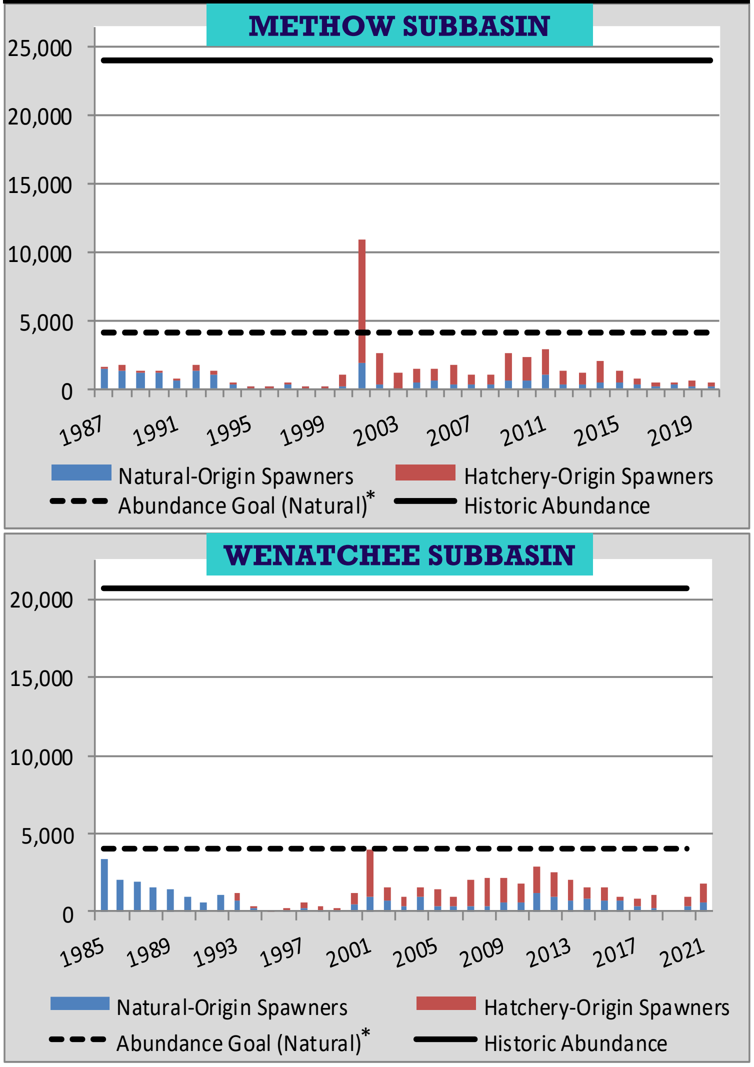
We use natural ponds for short-term acclimation to improve the efficacy of existing supplementation programs, by encouraging returning fish to seek available good quality habitat where they may successfully spawn, thus helping to rebuild natural populations. This effort is important since Wenatchee spring Chinook have been shown to have reproductive success equal to natural-origin spawners when they spawn in areas of high quality habitat and low spawner densities.

Yakama Nation biologists prepare the Goat Wall pond for the arrival of juvenile spring Chinook. (YN)

Spring Chinook YN Treaty Harvest—Icicle River



Spring Chinook Spawner Escapement Estimate



*High-range goal is for healthy and harvestable natural populations fully occupying restored habitats. See "Sources" p. 30.

Chewuch River Mile 4.2 Fish Enhancement Project


Coho salmon spawning in the new side channel. (YN)


Large wood structure installed in the main channel of the Chewuch River. (YN)

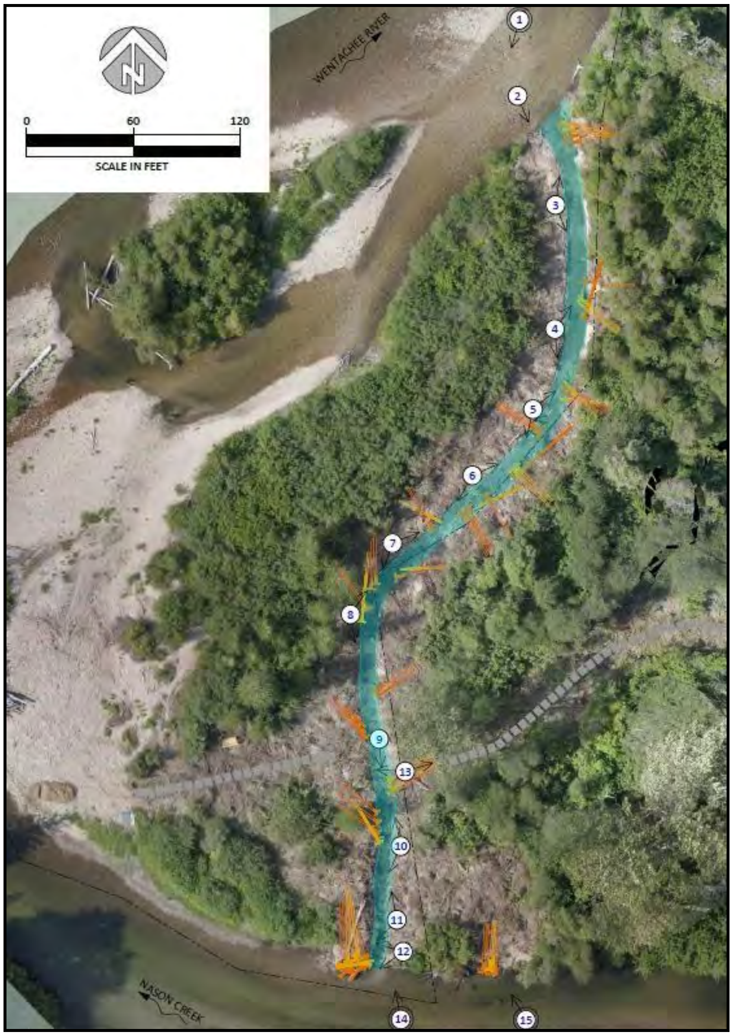
Located in the middle of the Methow Subbasin, the lower Chewuch River has been degraded by levee construction, land clearing, and instream wood removal. As a result, the river channel has become over simplified and disconnected from it's historic floodplain. These conditions have degraded the river habitat's productivity and ability to support spring Chinook and steelhead spawning and juvenile rearing.

Opportunities for adding habitat complexity and reconnecting floodplains were identified by the Yakama Nation in 2010, and project actions were developed with WDFW on lands within the Methow Wildlife Area. In 2021, we addressed degraded conditions by installing two wood structures, reconnecting the river to 3 acres of floodplain and restoring 0.25 miles of perennial side-channel, thus increasing in-river margin and off-channel habitat for juvenile salmonids. Also, the greater floodplain connectivity will help to expand wetland cover, boost trophic productivity, and increase groundwater recharge, which will help improve low-flow habitat conditions.

Because the new perennial side channel is connected to the groundwater aquifer, stream temperatures are expected to become more optimal for salmonid growth during times of stress in the main river channel as a result of this restoration project.



Chewuch River perennial side-channel restored to provide off-channel habitat for juvenile salmonids. (YN)



Arial view of the Nason Creek restoration site. (YN)

Nason Creek Confluence Habitat Project

Highway construction, residential development, and flood control measures (e.g. removal of wood from the river channel) have disconnected the historic alluvial fan system where Nason Creek enters the Wenatchee River (Nason Creek confluence). Loss of large wood in the river channels has led to low floodplain connectivity in the area.

Our studies have shown that the Nason Creek confluence should have more connected side-channel habitats than currently available. This habitat provides refuge and rearing areas for juvenile spring Chinook and steelhead.

To improve the habitat conditions at this historic alluvial fan, we completed a habitat restoration project in 2021. Complex side-channel habitat was created by excavating a remnant floodplain channel and recreating a 0.12 mile perennial side-channel system which intercepts shallow alluvial groundwater to provide cooler water in the summer and warmer water in the winter. Fifteen log jam structures and three small wood structures were installed in the channel and in Nason Creek to provide enhanced habitat complexity and cover for fish, benefiting their growth and production.

Side-channel habitat created and wood structures installed at the Nason Creek and the Wenatchee River confluence. (YN)

Skinney Creek Channel Reconstruction Project

Located in the Wenatchee Subbasin, the construction of State Highway 2 straightened and constrained Skinney Creek, degrading 0.5 miles of stream habitat near its confluence with Chiwaukum Creek. Wetland mitigation work also resulted in channel instability and fish passage barriers. In 2013, the highway was realigned providing us with an opportunity to relocate the creek into the abandoned highway location to improve spawning and rearing habitat for spring Chinook and steelhead, as well as to address the barrier issues.

In 2021, we removed the old highway fill and constructed a 0.4 mile stream channel with associated floodplain habitats. The effort included the addition of pool/riffle sequences, 123 pieces of wood, and floodplain alcoves. In addition, six fish passage barriers were removed and replaced with stream simulation riffles and new wood cover.

Our efforts have resulted in fish now having perennial access to the stream, while the increase in pools, wood cover, channel sinuosity, gravel recruitment, better flow conditions, and vegetation cover have greatly improved spawning and rearing habitat for salmonids in lower Skinney Creek.

Realigned State Highway 2 prior to the reconstruction of the Skinney Creek channel. (YN)

Reconstructed 0.4 mile stream channel and floodplain habitat associated with Skinney Creek (YN)

Golden Doe Large Wood Enhancement Project

Past activities in and along the Methow River, including the installation of levees and removal of large wood, have resulted in channel incision and the loss of floodplain habitat. As a consequence, rearing habitat for juvenile steelhead and spring Chinook salmon have also become degraded.

To address these conditions, we completed a habitat restoration project in 2021, during which we restored 0.5 miles of mainstem river channel. We also added floodplain roughness elements to recover natural processes that create and sustain productive fish habitat.

Working in a wide valley where a productive floodplain once existed, we installed 13 wood structures to promote sediment sorting and restorative depositional patterns. The structures will also help to improve streambed conditions and floodplain reconnection. Long-term benefits will include increased wood cover complexity in the main channel and split-flow channel conditions which meander through better vegetated, and shaded, sediment bars.

Floodplain roughness (top), bar-apex (middle), and split-flow (lower) log structures were installed in the Methow River to recover natural processes that create and sustain productive fish habitat. (YN)

Upper Burns Side-Channel Habitat Restoration

Above: Lower Channel Inlet Apex Log Structure & Pool (YN)

Pre-project habitat conditions were degraded in this segment of the Entiat River due to historic land clearing and instream wood removal. These activities resulted in a simplified channel and disconnected floodplain that reduced the quality and quantity of fish habitat while disrupting natural flow patterns that would have helped to create and sustain complex fish habitat.

To improve the site for fish, we completed a project in 2021, restoring 0.5 miles of perennial side channel, 0.35 miles of stream, and 3 acres of floodplain. We installed 7 instream wood structures, created 7 pools, and planted 2,500 native trees and shrubs and 4,000 wetland plant plugs.

Benefits of perennial side channel habitat includes providing rearing salmon and steelhead better cover and foraging habitat when mainstem channel conditions are stressful. Reconnected floodplains reduce the energy of peak flows while storing more groundwater which will later help to maintain flows during drought conditions. The addition of instream wood will provide better habitat complexity for fish and their food base while absorbing energy from erosive flows that, in turn, will maintain spawning gravel and pools for holding.

Post Project, Middle Channel with first snow, October, 2021 (YN)

COLUMBIA RIVER ZONE 6 HARVEST

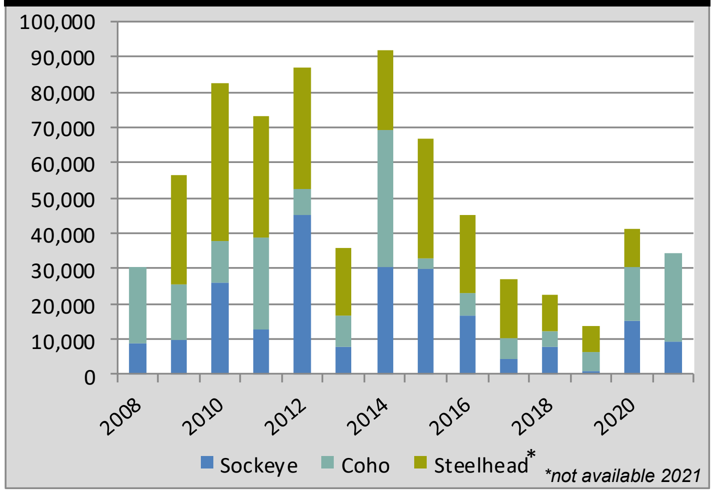
Through the Treaty of 1855*, the Yakama Nation reserved the right to maintain natural resources on which our culture and livelihoods depend, including rights to water, land, and natural foods and medicines at all usual and accustomed places.

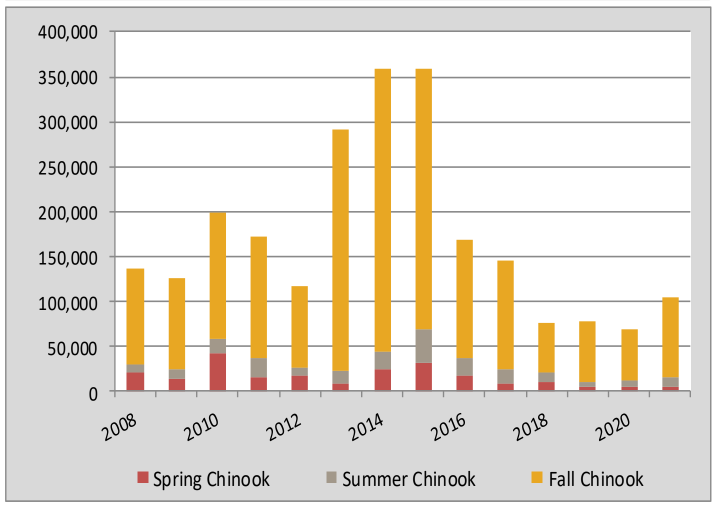
Additional court rulings assured us the right to self-regulation of our own fish management and take, a fair share of all allowable harvest, and the restoration of fish historically present and/or mitigation for losses.

The Yakama Nation manages fisheries resources to ensure continued access by our members to fulfill ceremonial, subsistence, and commercial needs.

*Yakama Nation Treaty of 1855 (12 stat. 951) with the United States of America

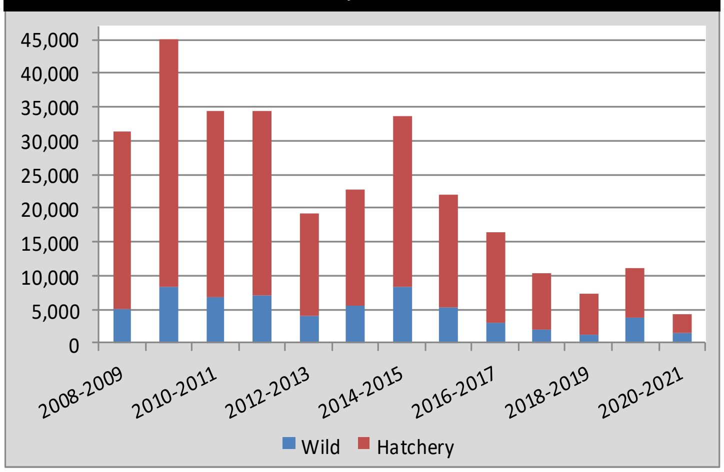
Zone 6 Total Treaty Harvest: Commercial, Sustenance, Gillnet, Platform H&L



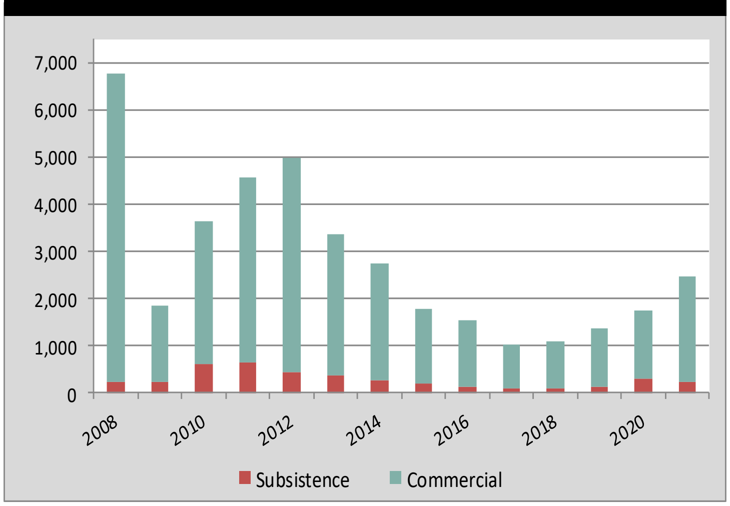


Note: 2021 data preliminary. Fall Chinook is combined bright and tule.

Zone 6 Total Treaty Steelhead Harvest Commercial, Platform H&L

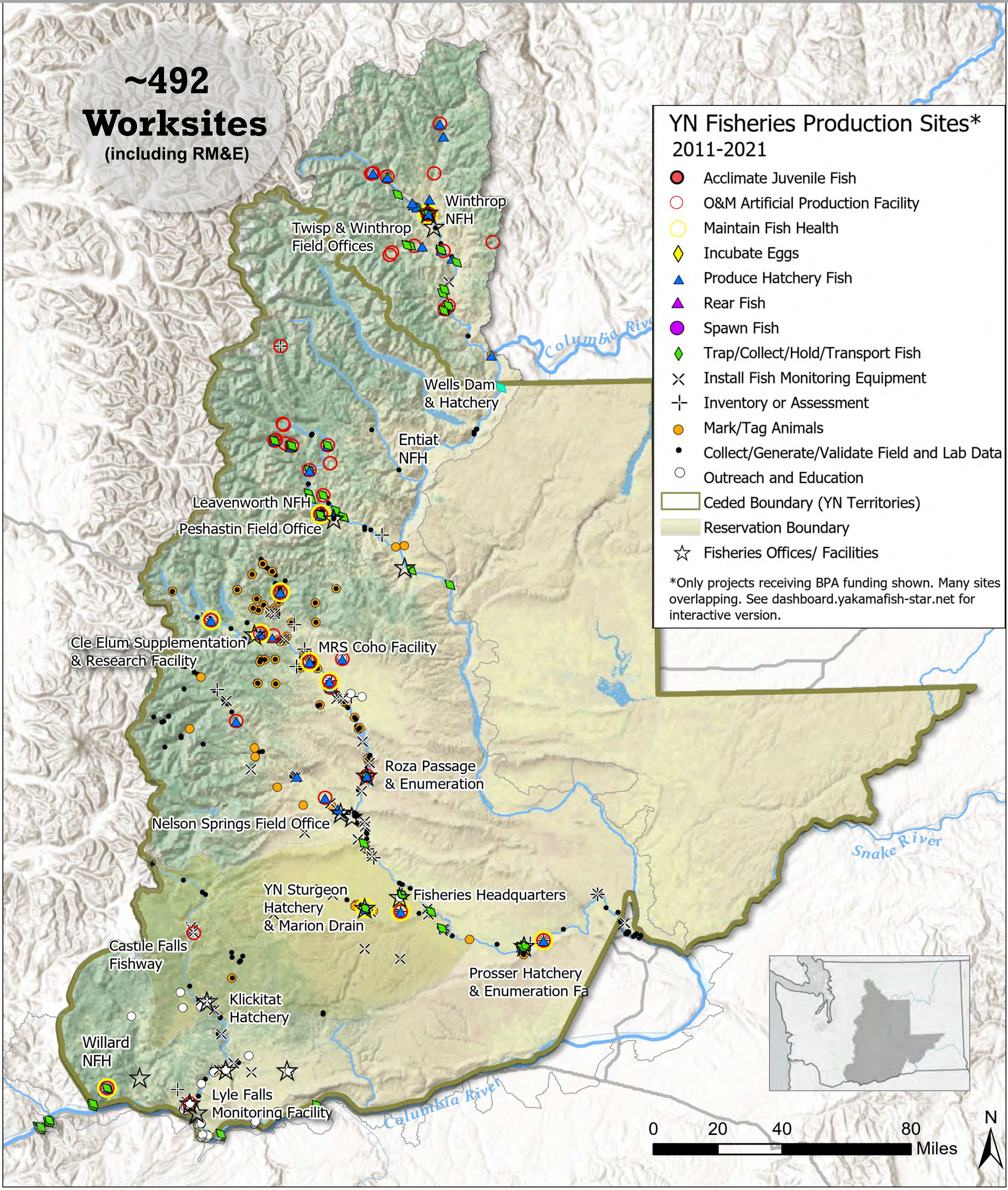


Zone 6 Total Treaty Sturgeon Harvest

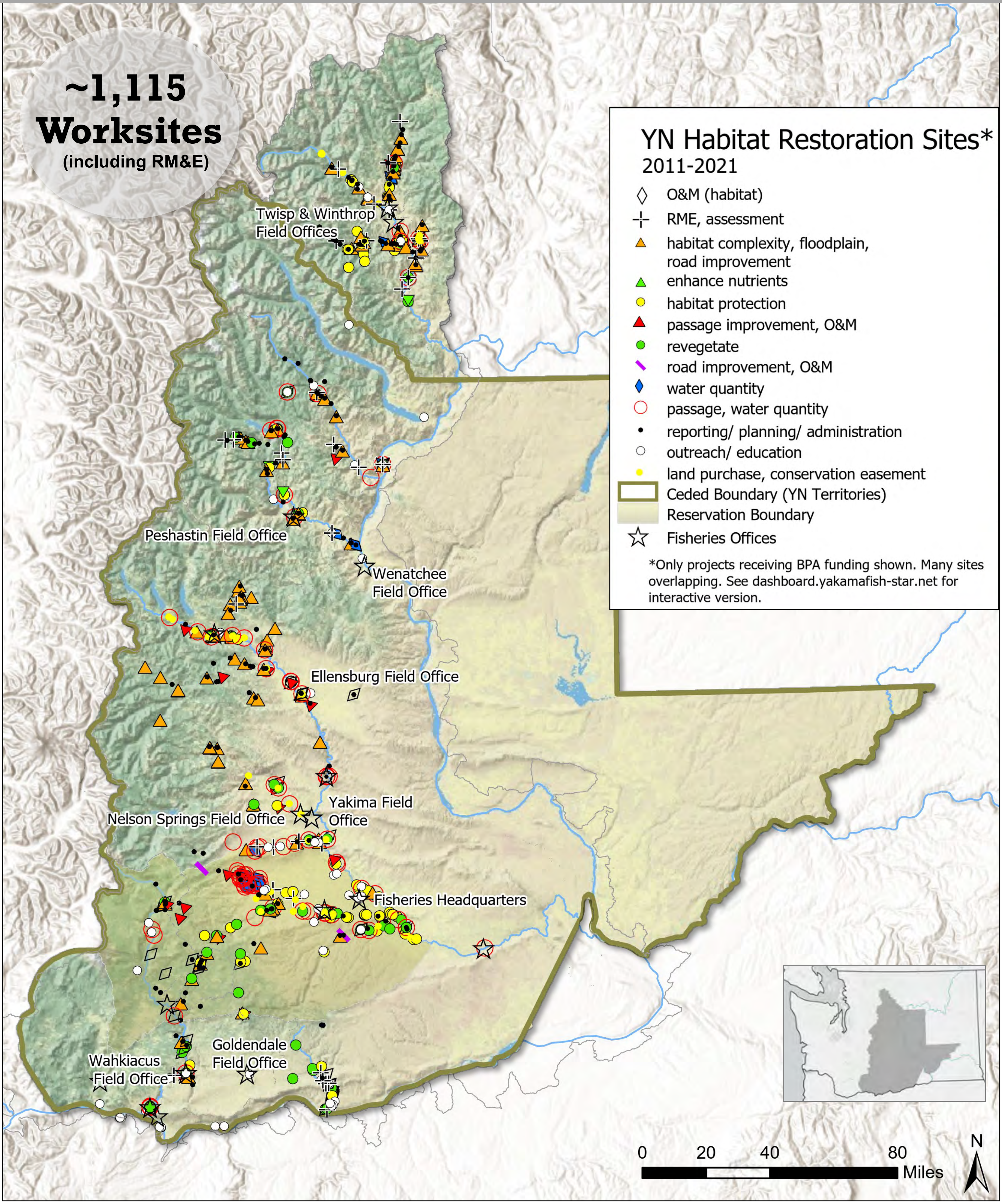


Above: Fishing scaffolds below John Day Dam (CRITFC)

PRODUCTION & SPECIES RESTORATION SITES



HABITAT RESTORATION SITES



SOURCES

Land of the Yakamas	Quote from YN Tribal Councilman, Fish and Wildlife Committee, Jeremy Takala, from a film by the Yakama Nation and the filmmakers and crew of River Roots production company. Viewable at yakamafish-nsn.gov and vimeo.com, this film expresses our vision for healthy lands and waters that sustain the cultural practices of Yakamas and improves life for our neighbors and future generations.
Species Status and Trends	Fish population descriptions: Hatchery reform summaries and BPA annual reports, master plans, subbasin plans and recovery plans, presentations given at the Yakima and Klickitat annual science conferences, and from WDFW's species website (https://fortress.wa.gov/dfw/score/score/species) **Abundance Goals and Historic Abundances** as shown in graphs are from Marine Fisheries Advisory Committee [MFAC] Columbia Basin Partnership [CBP] "Vision for Salmon And Steelhead: Goals to Restore Thriving Salmon and Steelhead to the Columbia River Basin" Report, 2019. Goals are shown as "high-range" provisional quantitative goals for natural production, unless otherwise indicated, at which point the natural population is considered "healthy and harvestable" where habitats are restored and populated to maximum capacity. Mid-range goals are generally defined as the number of natural-origin spawners that could effectively use available habitat and sustain high levels of harvest, which is judged as about halfway between low-range goals (of viable population status) and high-range goals.
Yakima	Prosser Dam counts: http://dashboard.yakamafish-star.net/DataQuery/adult_passage_counts Estimated Spawners: Bosch, Bill. (2021). Run Size Forecast for Yakima River: Adult Spring Chinook, 2022. [white paper]. YKFP. November 20, 2021. Kelts Released: Bill Bosch, YN, Personal Communication, 2022 Sturgeon Project: Donella Miller, YN, personal communication, 2022. Pacific Lamprey Project: Ralph Lampman, YN, personal communication, 2022.
Klickitat	Summer/winter steelhead and spring Chinook population estimates: Joe Zendt, YN, personal communication, 2022. Lyle Falls fish trap counts: http://dashboard.yakamafish-star.net/DataQuery/adult_passage_counts Fall Chinook and coho harvest: Megan Begay, YN, personal communication, 202, TAC BA tables. Rock Creek steelhead: Elaine Harvey, YN, personal communication, 2022.
Wenatchee/ Methow	Coho escapement estimates: Cory Kamphaus, YN, BPA Annual Project Reports and personal communication, 2022. Steelhead Kelts Released: Matt Abrahamse, YN, personal communication, 2022. Spring Chinook and Wenatchee steelhead escapement: WDFW's species data website (https://fortress.wa.gov/dfw/score/score/species/species.jsp) "The Score" Methow steelhead escapement: grantpud.org
Tribal Harvest	Harvest Data: Megan Begay, YN , personal communication, and 2021 Joint Staff Report: Stock Status and Fisheries for Fall Chinook Salmon, Coho Salmon, Chum Salmon, Summer Steelhead and White Sturgeon. Joint Columbia River Management Staff (www.dfw.state.or.us), TAC BA tables.
Habitat Spotlights	Habitat Restoration Project staff, YN, personal communication, and BPA Funded Project Completion Forms, 2022.
Maps	Created by the STAR project on ESRI software. Backgrounds are from ESRI, USGS, National Geographic and NOAA. Worksite locations are downloaded from BPA reporting site (cbfish.org) with STAR Project categories applied.

Yakama Nation Fisheries

HONOR. PROTECT. RESTORE.

BONNEVILLE POWER ADMINISTRATION

This report was funded by the Bonneville Power Administration, U.S. Department of Energy, under Project Number 200900200, as part of BPA's program to protect, mitigate, and enhance fish and wildlife affected by the development and operation of hydroelectric facilities on the Columbia River and its tributaries. The views expressed in this report, however, are those of the authors and do not necessarily reflect the official policy or position of the BPA.