



2020 ANNUAL REPORT

Habitat and Species Restoration Status and Trends



March 2021

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For more information see:
Yakama Nation Fisheries:
yakamafish-nsn.gov
and
The STAR Dashboard:
dashboard.yakamafish-star.net

FROM THE NEW FISHERIES PROGRAM MANAGER



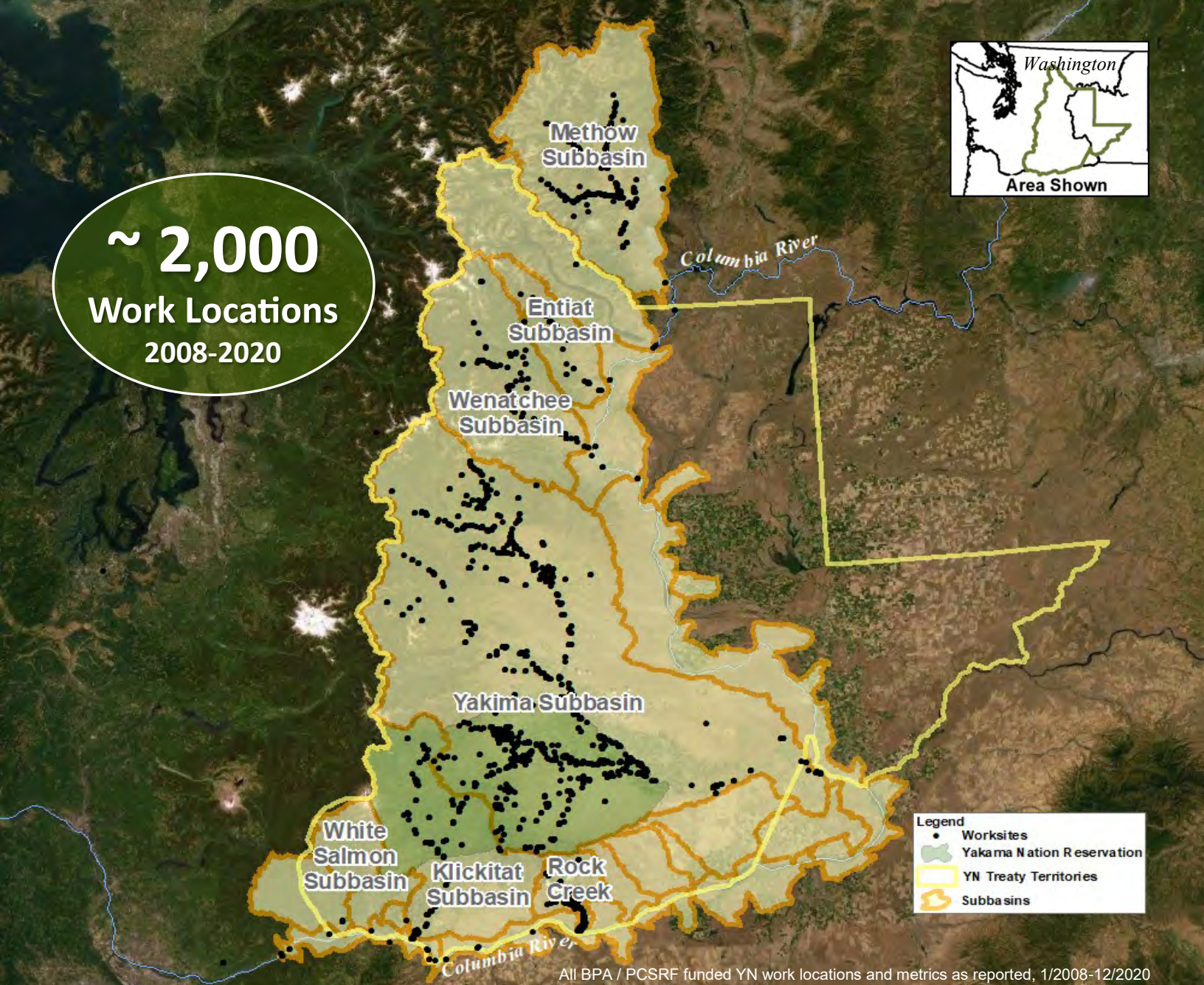
(Photo: Yakama Nation Review)

This has been a very difficult year for many due to the pandemic virus, and we mourn tragic personal losses. It has been difficult for the Yakama Nation's Fishers as well who have been impacted by lengthy shutdowns and necessary distancing. While some projects at Fisheries were not able to implement everything they had planned last year due to the pandemic, the restoration of fish species and their habitats has continued, and we have still made significant progress, as is summarized in this report. Our goals are big, no less than "*Make it the way it was*", as poignantly stated by elder Bill Yallup Sr., therefore we will get past this challenge and continue working hard toward a better future. We're in this for the long haul, with many more achievements and challenges to come, while we remember those we have lost, and as we continue to support each other and to restore all our natural resources for this and future generations.

Donella Miller
Program Manager
Yakama Nation Fisheries



~ 2,000
Work Locations
 2008-2020



All BPA / PCSRF funded YN work locations and metrics as reported, 1/2008-12/2020

Restoration Accomplishments: 2008-2020*



1,483 Miles
 Stream & riparian habitat improved, treated, or protected



3,140 Pools & LWD
 (Large Wood) Habitat structures created instream



12,264 Acres
 Wetland habitat improved or protected



447 Miles
 Habitat made accessible to fish

*With BPA and/or PCSRF funding.

By the 1970s and 1980s, all of the Yakima River salmonid stocks were either extirpated or severely depressed. Summer-run Chinook were absent from the Yakima Subbasin by 1970, and coho were gone by the early 1980s. By the early 1990s, adult spring Chinook runs were less than 3,500 and steelhead returns were less than 1,000. To restore these culturally, ecologically, and economically important species, the Yakama Nation is applying a combination of habitat restoration, hatchery supplementation and reintroduction efforts to restore sustainable and harvestable populations of salmonids and other at-risk species and the ecosystems that support them.

Salmon and steelhead populations are impaired in the Yakima Subbasin due to a number of impacts. Primary ecological concerns include impaired riparian vegetation, streambed and channel form, and diminished in-channel complexity. Secondary ecological concerns affecting fish include altered primary productivity, food competition, altered hydrological processes, water quantity and flow timing, and simplified side-channel and wetland connections. For several decades the Yakama Nation has been implementing restoration projects, supported through various funding sources, with the aim of restoring stream functions needed to sustain salmon and steelhead and other priority species throughout the Yakima Subbasin.

Habitat improved for fish and wildlife Yakima Subbasin 2008-2020

1,641

Pools

Created for in-stream habitat

401

Log structures

Installed for in-stream habitat

(plus 20k unanchored logs)

12,905

Acres

Wetland treated or protected

YAKIMA Subbasin

Examples of habitat restoration projects being implemented include: installing engineered log-jams and debris catching structures, reconnecting downcut streams with their floodplains, installing rootwads and unanchored logs instream, protecting and re-planting riparian vegetation, removing invasive plants, removing fish passage barriers, breaching dikes, removing trash, identifying alternative water sources, and reconnecting old and creating new stream channels.

To enhance adult returns and mitigate the loss of traditional harvest opportunities, fish are reared at the Levi George Supplementation and Research Facility at Cle Elum, Prosser Hatchery, Marion Drain Hatchery, Yakama Nation Sturgeon Hatchery, and the new Melvin R. Sampson Coho Hatchery and associated acclimation sites. Spring Chinook are produced at Cle Elum, while summer and fall Chinook are reared at Prosser Hatchery and Marion Drain. Coho, a component of the Yakama Nation's reintroduction efforts, are now starting to be produced at the MRS Coho Facility. Additional species cultured at Prosser Hatchery include Pacific lamprey and reconditioned steelhead kelts. In addition, sockeye are being reintroduced to headwater lakes and transported until volitional passage can be established.

1,127

Miles

Riparian habitats improved or protected

147

Miles

Stream improved or protected

161,375

Acres

Upland treated or protected

YN metrics as reported (funded by BPA and PCSRF), 1/2008-12/2020 for the Yakima Subbasin.
Photo: NF Teanaway Habitat Restoration, 2020, YN

YAKIMA Subbasin

Taneum Cedar Meadows Floodplain Enhancement

Date Completed: October 2020

Project Partner: Mid-Columbia Fisheries Enhancement Group

Funding Source: Bonneville Power Administration & Washington State Salmon Recovery Funding Board

Focal Species: Yakima steelhead, coho, resident rainbow trout, bull trout

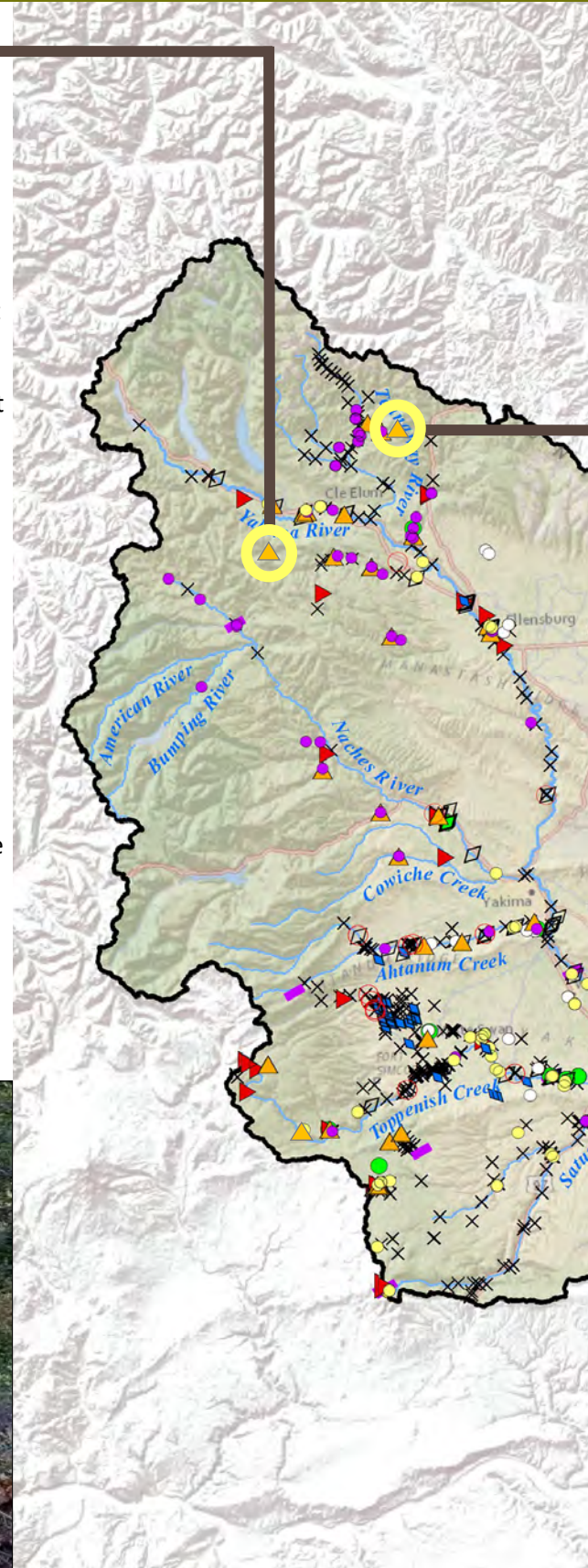
Problem: This 1/2 mile stream reach in Taneum Creek is lacking woody material, is oversimplified, and disconnected from its floodplain as a result of past land management practices.

Restoration Actions: Reconnect the stream with its floodplain and increase instream complexity, including cover and pools for native fish.

Accomplishments:

- Placed 150 logs and 50 yd³ slash in Taneum Cr. and the adjacent floodplain
- 6 large wood structures installed to help aggrade the stream channel and reconnect the stream to its floodplain, while also creating habitat complexity
- Dogwood and willow livestakes, along with snowberry and alder container plants, were planted along the stream
- Access to nearby campground was curtailed with large rock, to reduce increasing environmental damage from campers

Benefits: Increased instream complexity, roughness, cover and pool formation improves the quality and quantity of habitat for multiple age classes of salmon & trout species. This project has also improved the hydrologic, physical, and ecological processes that maintain that habitat for native species.



North Fork Teanaway River Restoration Project (Year 2)

Date Completed: September 2020

Project Partner: Mid-Columbia Fisheries Enhancement Group

Funding Source: Bonneville Power Administration

Focal Species: Yakima spring Chinook and steelhead, Pacific lamprey

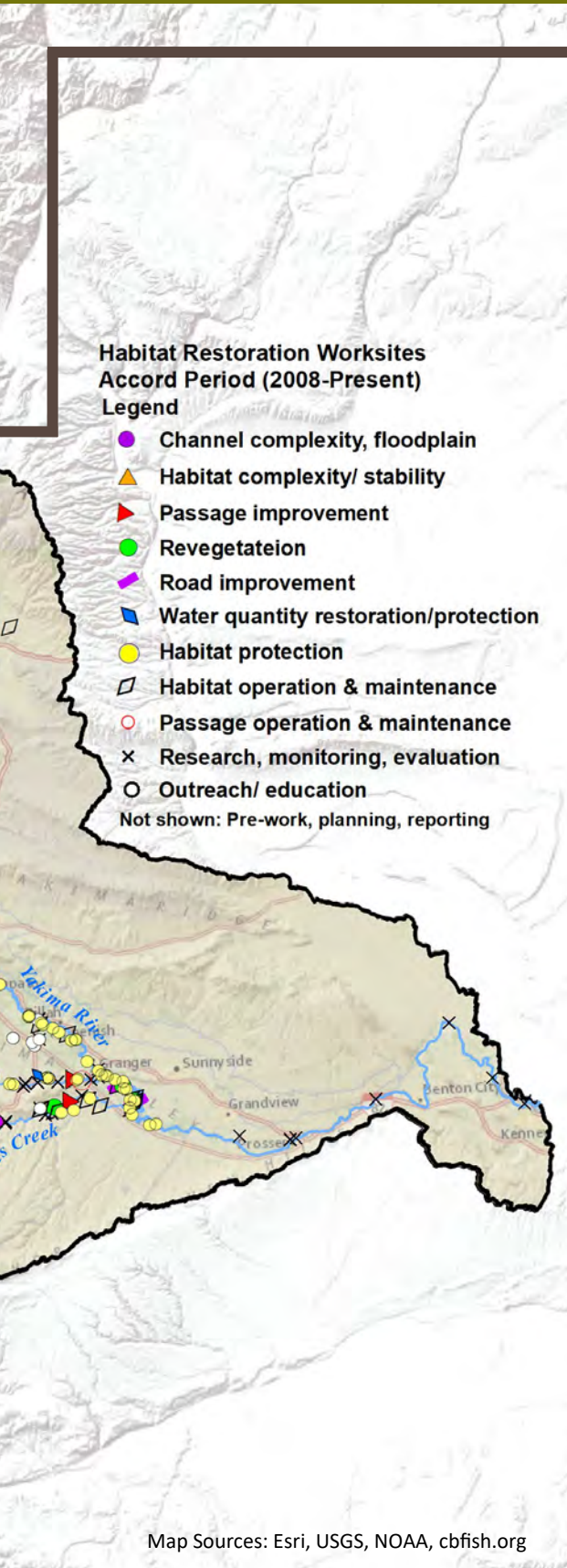
Problem: Past land use practices have resulted in channel straightening, reduced instream complexity and disconnected side channels. Available fish habitat is reduced in quality and quantity.

Restoration Actions: Increase side channel connectivity, instream complexity, connection with an active floodplain, and habitat-maintaining flows.

Accomplishments:

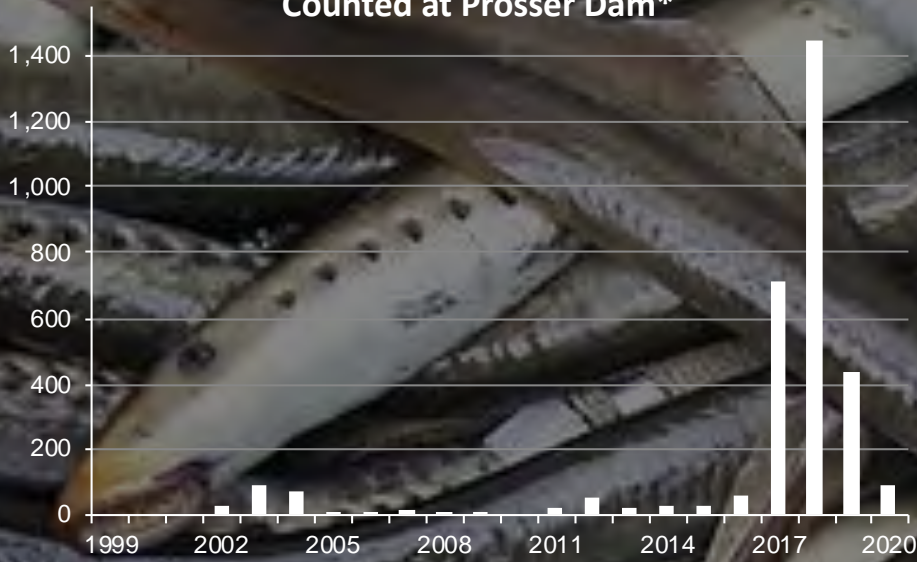
- Installed 18 flow splitter and deflector log jams
- Added 900 pieces large woody material and 3 wood trapping structures instream
- Removed a levee from the mouth of Jack Creek
- Augmented instream river gravels with material from the levee

Benefits: By spreading out stream flows and storing water in (publicly owned) floodplains, we will be reducing flood peaks and reconnecting side channels, reducing stream temperatures, and supporting a healthy riparian ecosystem. We will also be restoring fish habitat through the creation of deep pools, by retaining spawning gravels, creating off-channel habitats, providing high velocity refuges, and improving instream cover.



YAKIMA Subbasin

Adult Pacific Lamprey Counted at Prosser Dam*

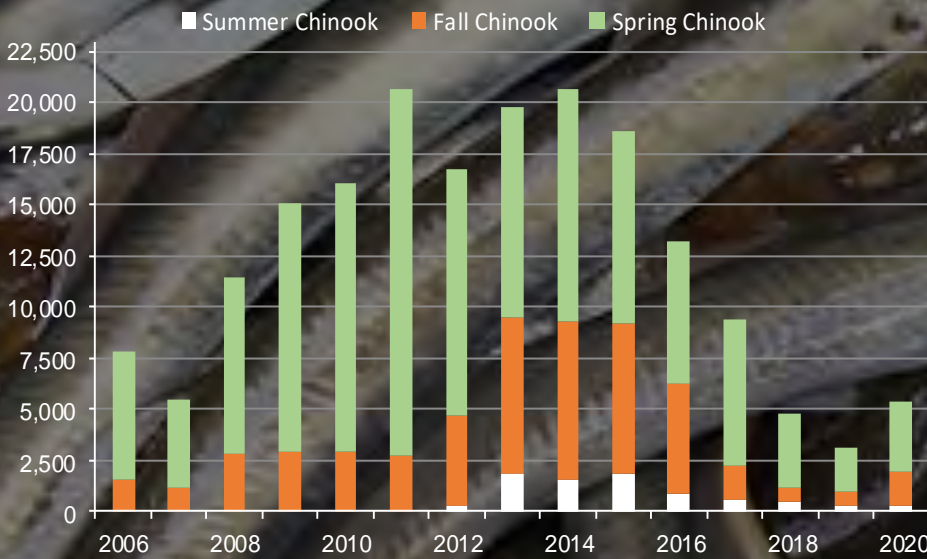


*2018-2020 counts based on PIT tag study due to very low window count detection efficiencies in those years. Source: YN

Pacific Lamprey

- Restoration program began in 2009
- 4,080 adults translocated to the Yakima Basin since 2011 (plus 2,454 to Methow, Wenatchee, Klickitat)
- Two new adult lamprey passage structures installed at Prosser Dam, and several more will be installed at Sunnyside, Wapato, and Toppenish Unit 2 dams in 2021. Pilot juvenile passage structure will be installed at Ahtanum Creek Diversion in 2021
- Distribution and abundance improving, including wild spawning, larvae, and juvenile outmigrants

Yakima River Chinook*



*Note: Spring Chinook counted at Yakima River mouth, Summer and Fall counted at Prosser Dam.

Chinook

- Extirpated in the 1970s, summer Chinook reintroduced by the Yakama Nation in 2009
- Spring Chinook spatial distribution is increasing
- Supplemented by the Yakama Nation from 1983, fall Chinook spawner distribution is increasing
- Fall Chinook contributing to Treaty fishery, with 10-year average of 4,022 reaching Prosser Dam annually
- Current cooperative research identifying sources of Lower River morality to address

Yakima River Abundance Indices for 2020

Spring Chinook¹

3,362

Fall Chinook²

1,724

Summer Chinook²

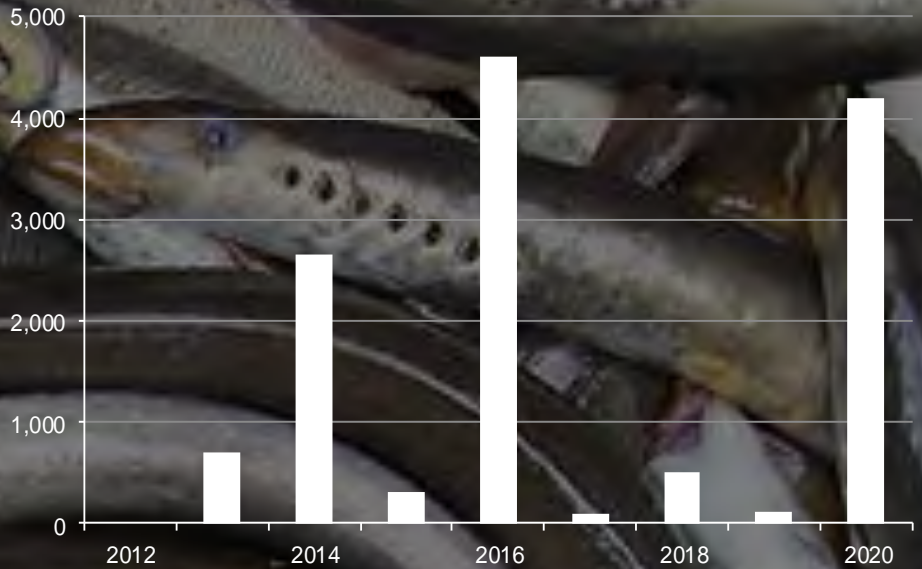
254

SPECIES Status and Trends

Sockeye

- Extirpated from the Yakima Basin in the early 1990s
- Yakama Nation reintroduced adults to Lake Cle Elum in 2009
- First adults returned in 2013
- Cooperative efforts to restore passage in and out of nursery lakes is underway
- Plans to reintroduce sockeye to other headwater lakes in the region in the future
- High mortality and/or delayed migration of returns due to high stream temperatures in some years

Sockeye Counted at Roza Dam

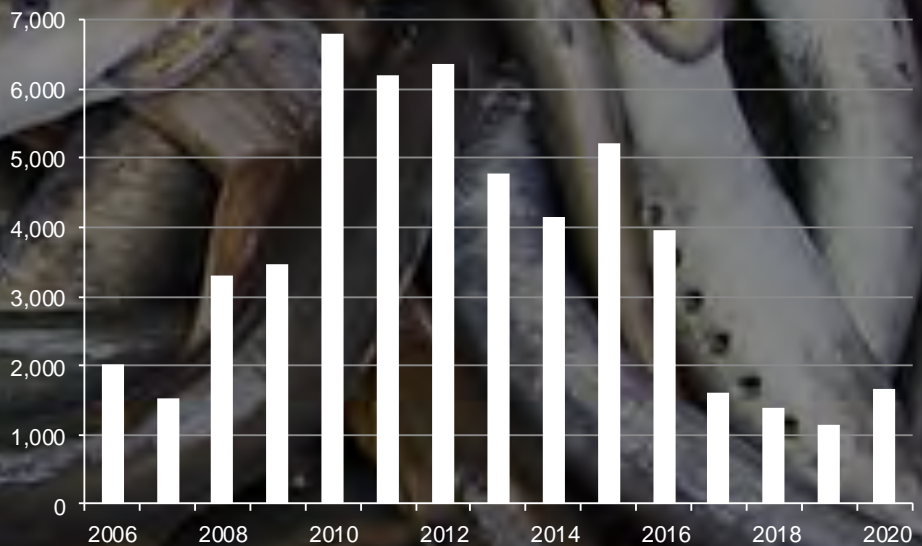


Source: YN

Summer Steelhead

- Comprised of 4 populations: Toppenish, Satus, Naches and Upper Yakima
- Listed as threatened in 1999, but overall the population-group trend has increased
- Runs are almost entirely naturally produced fish
- Yakama Nation is working on increasing kelt (repeat spawner) survival to increase lifetime reproductive success, releasing an average 228 reconditioned kelts per year into the Yakima River

Summer Steelhead Counted at Prosser Dam



Spawning year ending in. Source: YN

Sockeye³

4,194

Coho⁴

6,502

Steelhead²

1,657

1) Run size Yakima River mouth. 2) Posser Dam counts, steelhead year ending in. 3) Roza Dam counts. 4) Yakima River mouth counts. Adult, jack, marked, unmarked combined.

In the 1950s, an average of 2,500 spring Chinook (adults and jacks) returned annually to the Klickitat Subbasin; however, from 1977 to 2003 returns decreased to an average of 1,900 fish annually (including hatchery-origin fish). The Klickitat Subbasin supports native winter and summer steelhead and historically provided a significant steelhead fishery. From 1987 to 2003, the average escapement of steelhead (winter and summer) was fewer than 300 fish of both wild and hatchery-origin. To restore these species, the Yakama Nation is protecting and restoring critical habitats and conducting research and monitoring, as well as implementing hatchery reform practices.

In 2006, the Yakama Nation assumed responsibility for operation of the Klickitat Hatchery and Lyle and Castile Falls fishways through funding under the Mitchell Act. The Yakama Nation has continued efforts to culture hatchery spring and fall Chinook and coho to mitigate for lost harvest opportunities due to impacts of the hydrosystem. We use fish produced in the Klickitat facilities to re-establish, supplement, and/or increase natural production and harvest opportunities while maintaining long-term fitness of the target populations and limiting/avoiding impacts on non-target species. We are also transitioning Klickitat spring Chinook production through hatchery reform to a conservation/ harvest program with increased natural influence. Most production efforts are supported by Mitchell Act funding. Fishway operation and maintenance are funded in part with BPA Accord funding.

Habitat improved for fish and wildlife Klickitat, Rock Creek, White Salmon Subbasins 2008-2020

789

Acres

**Upland treated
or protected**

225

Pools

**Created for
instream habitat**

226

Log structures

**Installed for
instream habitat**

(plus unanchored logs)

SOUTHERN CEDED Subbasins

Past land use in the Southern Ceded subbasins of the Yakama Nation have resulted in conditions that are limiting salmonid populations. Examples include loss of instream structural complexity, simplification of bed and channel form, loss of connection with floodplains and side-channels, loss of riparian vegetation and instream large wood, decreased water quantity, and altered flow timing.

The Yakama Nation has been implementing restoration projects to protect high-quality habitat and prevent further deterioration of degraded areas, while restoring and improving the condition of riparian, wetland, and stream channel habitat in areas that support steelhead and spring Chinook. Restoration efforts are aimed at re-establishing healthy stream processes by addressing watershed problems, improving habitat conditions and water quality. Examples include installing instream large wood structures and pools, protecting and revegetating riparian areas, removing passage barriers, and restoring connections with side-channels and floodplains. Protection activities complement the restoration efforts by securing refugia and preventing habitat degradation.

118

Miles

**Riparian improved
or protected**

26

Miles

**Stream improved,
created, protected**

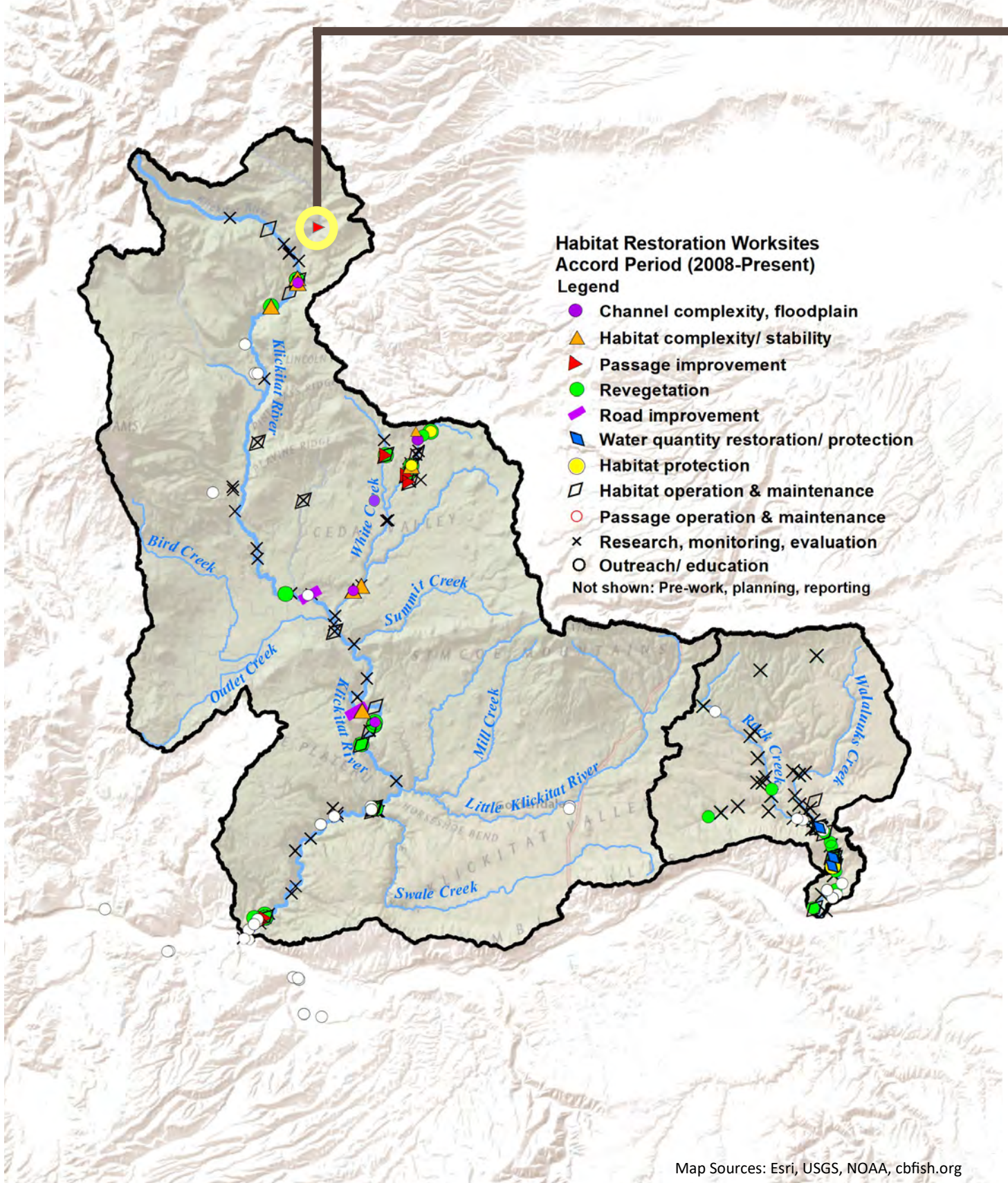
130

Acres

**Wetland improved,
protected**

YN metrics as reported (funded by BPA and/or PCSRF, 1/2008-12/2020 for the Southern Ceded Subbasins.
Photo: Klickitat River, Columbia Land Trust

SOUTHERN CEDED Subbasins



Piscoe Creek Road Crossing (Fish Passage Improvement) Project

Date Completed: October 2020

Funding Source: Washington Salmon Recovery Funding Board (PCSRF), and BPA

Focal Species: Middle Columbia steelhead and resident rainbow trout

Problem: Undersized culverts causing frequent road washouts and chronic road maintenance for Forest Road 80, in addition to blocking access to high quality fish habitats upstream.



Above: Pre-project conditions, illustrating fish passage issues.

Restoration Actions:

- Remove undersized culverts and replace with fish-passage friendly bridge
- Raise and regrade sagging road and approaches to bridge to eliminate risk of overtopping and road damage during floods

Accomplishments:

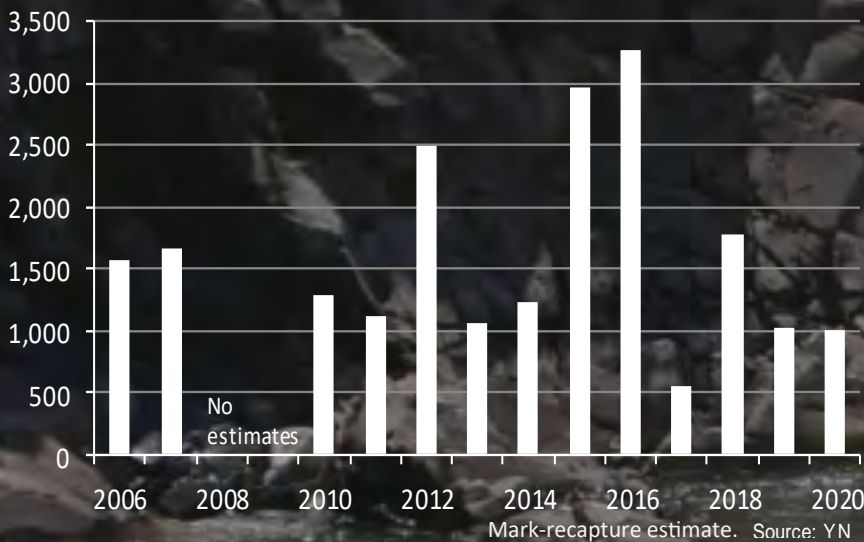
- Fish access to 5.5 miles tributary spawning and rearing habitat reconnected with Klickitat River
- Raised roadbed and increased flow capacity to prevent additional overtopping during flood flows

Benefits: Rearing habitat is a limiting factor for steelhead and resident rainbow trout production in the Klickitat watershed. The upper Klickitat area and Piscoe Creek in particular provide valuable spawning and rearing habitat for mid-Columbia ESA-threatened steelhead and resident rainbow trout. Restoring access to these habitats is therefore an important benefit to them, potentially improving their reproductive success.



KLICKITAT & ROCK CREEK Subbasins

Natural Summer/Winter Steelhead Run-size Estimate at Lyle Falls (Klickitat RM 2.4)



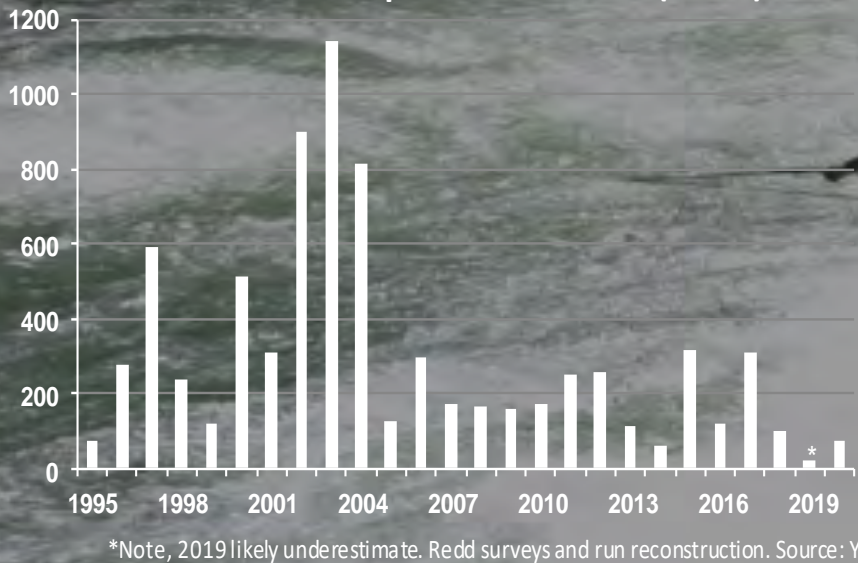
Klickitat Steelhead

- Treaty-era returns were estimated at 3,000-6,000 fish
- Spatially diverse population with spawning in the lower and middle Klickitat Subbasin
- Most hatchery releases (by WDFW) are not spawning in the wild

Rock Creek Steelhead

- Watershed protection, research, and restoration is underway to improve conditions for native steelhead

Natural Spring Chinook Klickitat Escapement Estimate (Adult)



Klickitat Spring Chinook

- Once harvested in significant numbers, reduced to returns of 900-1000 in the late 1970s
- Native to the Klickitat, most spawning is in the upper watershed
- Supplemented by production from Klickitat Hatchery
- Hatchery reforms in place to increase natural influence
- Passage improvements implemented by the Yakama Nation to increase colonization above Castile Falls

Adults Counted at Klickitat Lyle Falls Trap in 2020*

Steelhead

616

Spring Chinook

634

Summer Chinook

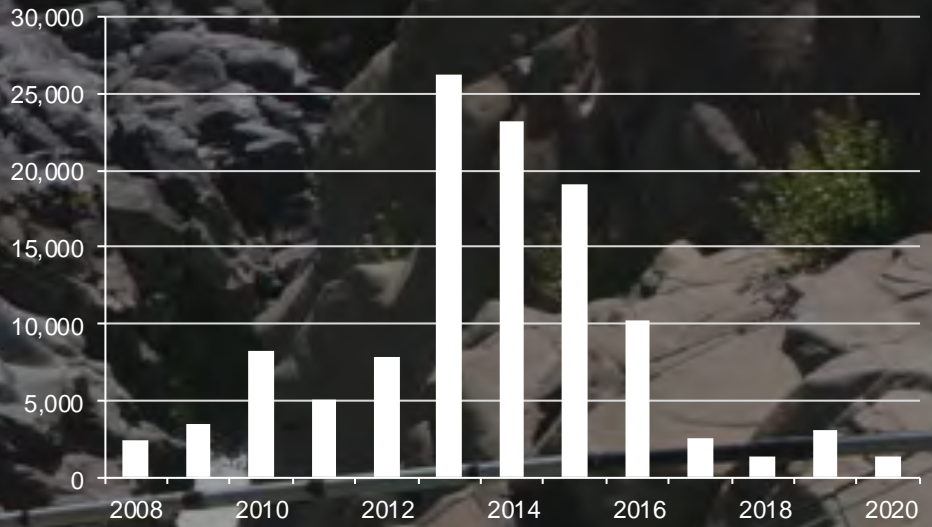
8

SPECIES Status and Trends

Klickitat Fall Chinook

- Introduced in 1952 to meet harvest obligations
- Sustained by Yakama Nation hatchery releases
- Average 3.4 million smolts released annually since 2008 (target of 4 million)
- Spawning occurs in the middle and lower Klickitat River below Klickitat Hatchery (Klickitat River Mile 42)

Yakama Nation Fall Chinook Harvest Klickitat River

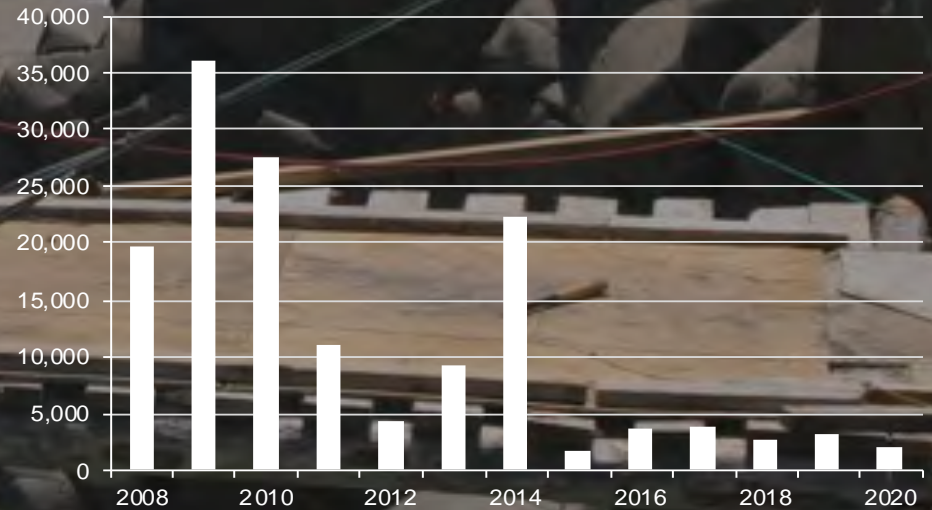


Source: YN

Klickitat Coho

- Released to mitigate for lost harvest opportunities
- 1 million fish released annually
- Sport and tribal harvest have increased since 2008
- Goal to transition to locally adapted population, separate from wild fish stocks

Yakama Nation Coho Harvest Klickitat River



Source: YN

Photo: Klickitat Gorge Tribal fishing. (CRITFC)

Fall Chinook

1,171

Coho

325

*Note: Lyle Falls trap counts (at Klickitat RM 2.4) only represent a subsample of the total run. Numbers here include marked and natural adults.

During the pre-treaty era, salmonids were abundant in the Wenatchee Subbasin, however, runs were depleted through exploitation and habitat degradation. Spring Chinook redd counts have fluctuated since the 1950s. From 2002-2019 the spring Chinook escapement estimate was around 1,700. Decadal counts for summer steelhead have fluctuated since the 1930s, with a significant increase observed in the early-2000s. Icicle Creek steelhead are originally of hatchery origin, and are not listed under the Endangered Species act, however the other steelhead and spring Chinook in the Subbasin are.

Coho were extirpated from the middle reach of the Columbia River Basin in the early-1990s. The reintroduction of coho in the middle and upper Columbia River has been dependent on releases of hatchery-origin coho in the past. The Yakama Nation's reintroduction program initially depended on broodfish from the Lower Columbia River; however, the program now only uses in-basin, locally adapted broodstock. In addition, to help restore steelhead and spring Chinook production and long-term sustainability, the Yakama Nation is acclimating juvenile fish in natural ponds throughout the species' historic range.

Habitat improved for fish and wildlife Wenatchee Subbasin 2008-2020

14

Miles

**Riparian areas
improved or
protected**

35,850

Pounds

**Salmon carcasses
added for nutrients**

11

Acres

**Aquatic habitats
treated & improved**

WENATCHEE Subbasin

Past forest management practices and recreational, agricultural, municipal, and residential development have led to the decline of habitat quality/quantity that salmonids are dependent upon in the Wenatchee Subbasin. Impairments include reduced habitat complexity, connectivity, water quantity and quality, and riparian function. Impaired stream complexity, wood and gravel recruitment, floodwater retention, stream flows, and water quality contribute to limiting salmonid production. The Yakama Nation is currently implementing restoration projects that help to address many of these ecological concerns. Examples include removing passage barriers, restoring and protecting wetland and riparian habitats, protecting instream flow and improving water management, creating new side-channels, and installing large wood structures and pool habitats for added instream complexity.

5.3

Miles
Stream with
improved complexity
& form

33

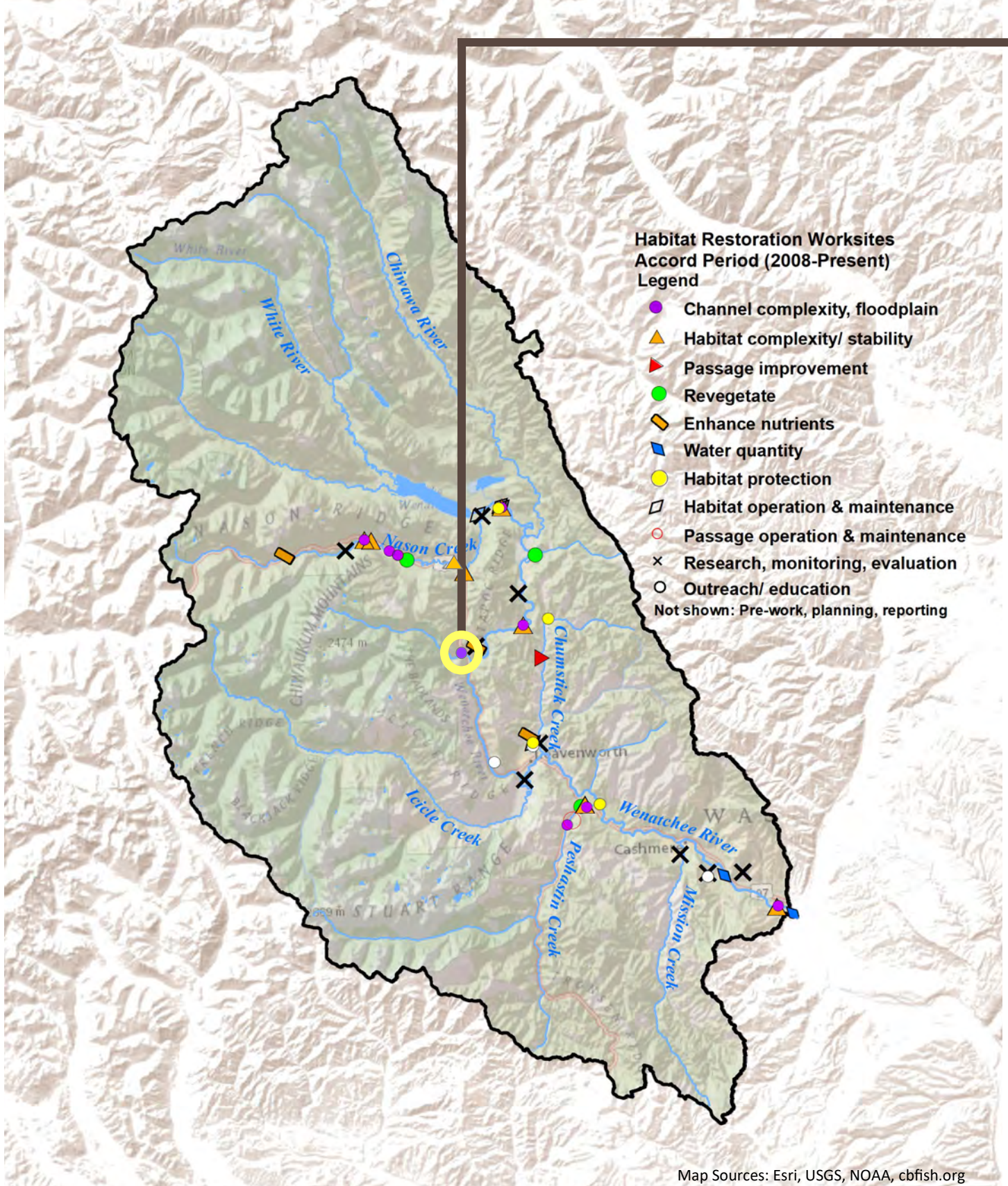
Pools
Added for instream
habitat

93

Log structures
Added for instream
habitat
(plus unanchored logs)

YN metrics reported to cbfish.org (funded by BPA), 1/2008-12/2019 for the Wenatchee Subbasin, although some may be redundant with the Entiat and Methow. *Photo: Peshastin Creek Habitat Enhancement (YN)*

WENATCHEE Subbasin



Map Sources: Esri, USGS, NOAA, cbfish.org

Skinney Creek Channel Realignment Project

Planned Implementation: 2021

Funding Source: Bonneville Power Administration

Landowners and Partners: U.S. Forest Service and WSDOT

Focal Species: Upper Columbia spring Chinook and steelhead

Problem: For many decades, Skinney Creek has been trapped in a straight-lined ditch feature along the margin of State Highway 2. This condition has greatly reduced the quality of instream and riparian habitats, and resulted in degraded hydrologic function. In addition, during the project planning process, it was determined that the WSDOT wetland mitigation site at the outlet of Skinney Creek was structurally failing and needed to be stabilized.



Above: Existing creek (left) and planned meandering location in the abandoned highway corridor (right).

Planned Restoration Actions: To re-meander 1 mile of the salmon-bearing Skinney Creek channel near its confluence with Chiwaukum Creek and the Wenatchee River, near the upstream extent of Tumwater Canyon. The proposed stream restoration is also an opportunity to restore the failing wetland mitigation site at the mouth of the creek. Extensive adjacent wetland habitats will also be created to improve site hydrology and increase potential food sources for fish using the re-meandered stream channel.

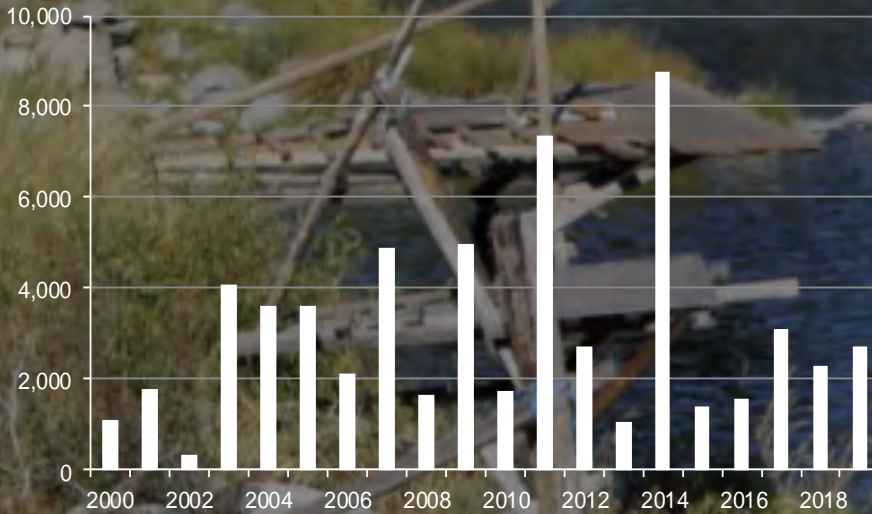
Benefits: The re-meandered channel will dramatically improve instream habitat conditions for spawning adult and rearing juvenile salmonids. The project will include creating new inset floodplain benches and adding hundreds of pieces of large woody material to the currently barren creek channel, increasing habitat complexity, potential food sources, and reducing peak flow velocities.



Current habitat conditions (left) and projected post-project conditions (right).

WENATCHEE Subbasin

Coho Escapement Estimate* (Natural and Hatchery)

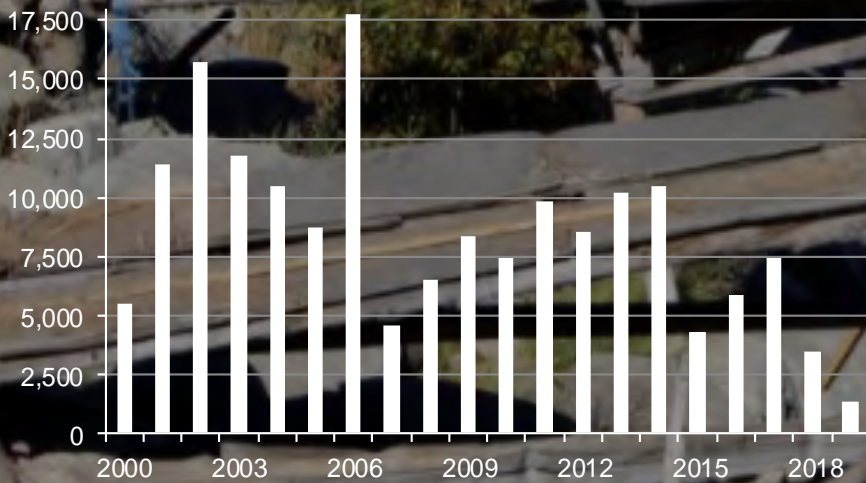


*In-basin. Likely underestimate. Source: YN

Coho

- Extirpated in the 1930s, the Yakama Nation began reintroduction in 1999
- Goal: Locally adapted, naturally producing harvestable population
- Average 886,000 smolts released annually since 2004
- Natural reproduction is now occurring in the subbasin

Summer Chinook Escapement Estimate (Natural and Hatchery)



Expanded redd counts. Source: GPUD

Summer Chinook

- Hatchery releases by GPUD/CCPUD for increased harvest opportunities
- An integrated program, hatchery fish are released in the Lower Wenatchee to reduce potential impacts on spring Chinook

Adult Spawning Escapement Estimate 2019

Summer Chinook

1,298

Spring Chinook

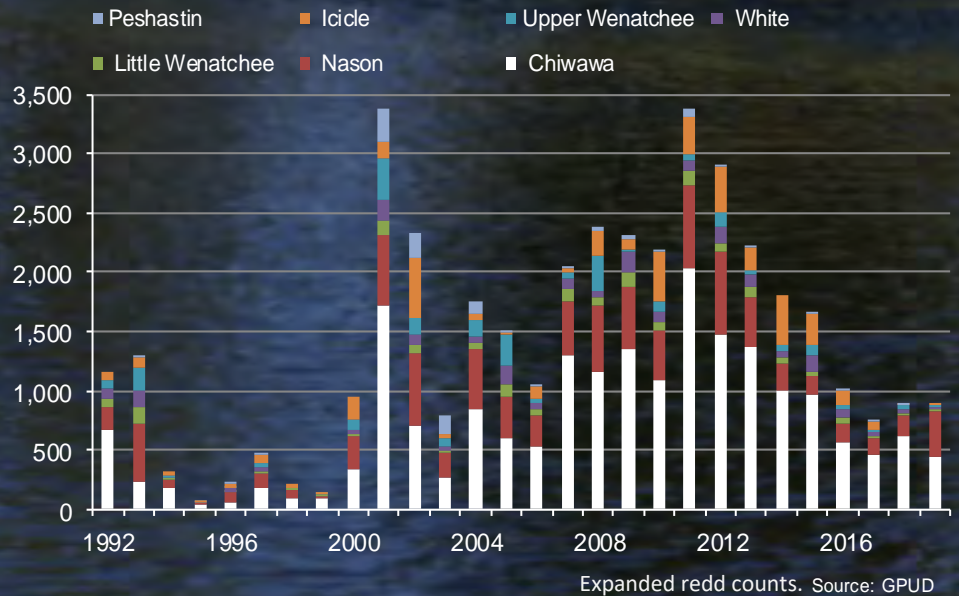
888

Sockeye

8,875

SPECIES Status and Trends

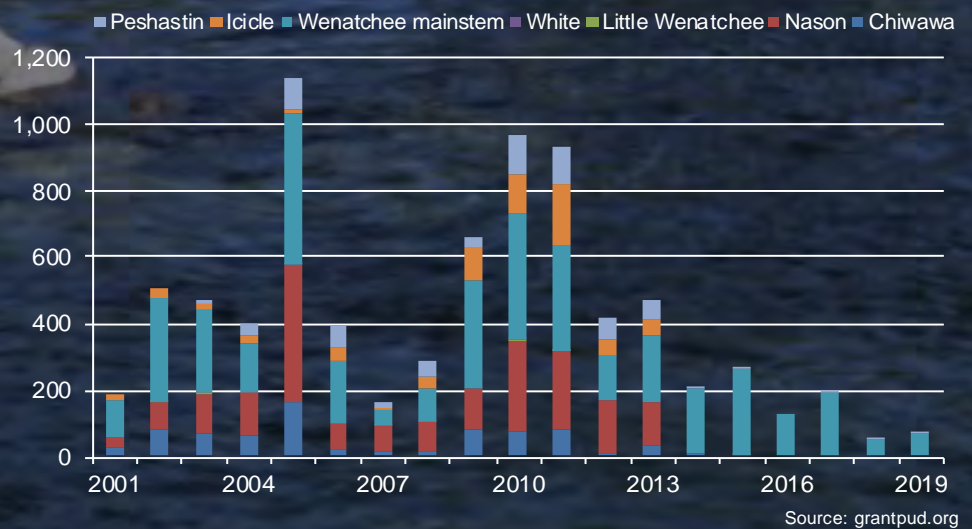
Spring Chinook Escapement Estimate (Natural and Hatchery)



Spring Chinook

- Hatchery releases are GCPUD/CCPUD/USFWS/WDFW mitigation and supplementation efforts
- Collaborative research evaluating homing and habitat use is ongoing through natural acclimation sites within their historic range
- Although not yet reaching recovery goals, numbers are better in recent decades than the lows of the 1990s

Summer Steelhead Redd Counts (Natural and Hatchery)



Summer Steelhead

- Escapement estimate is for upstream of Tumwater Dam
- Most hatchery releases are CCPUD-funded
- Collaborative research ongoing evaluating improving homing through improved acclimation strategies
- Reaching recovery abundance goals in some, but not all, years
- The YN, with partners, is reconditioning kelt in the Upper Columbia to help increase lifetime reproductive success

Photo: Icicle Creek Tribal fishing platforms, WA Dept. Ecology

Steelhead*

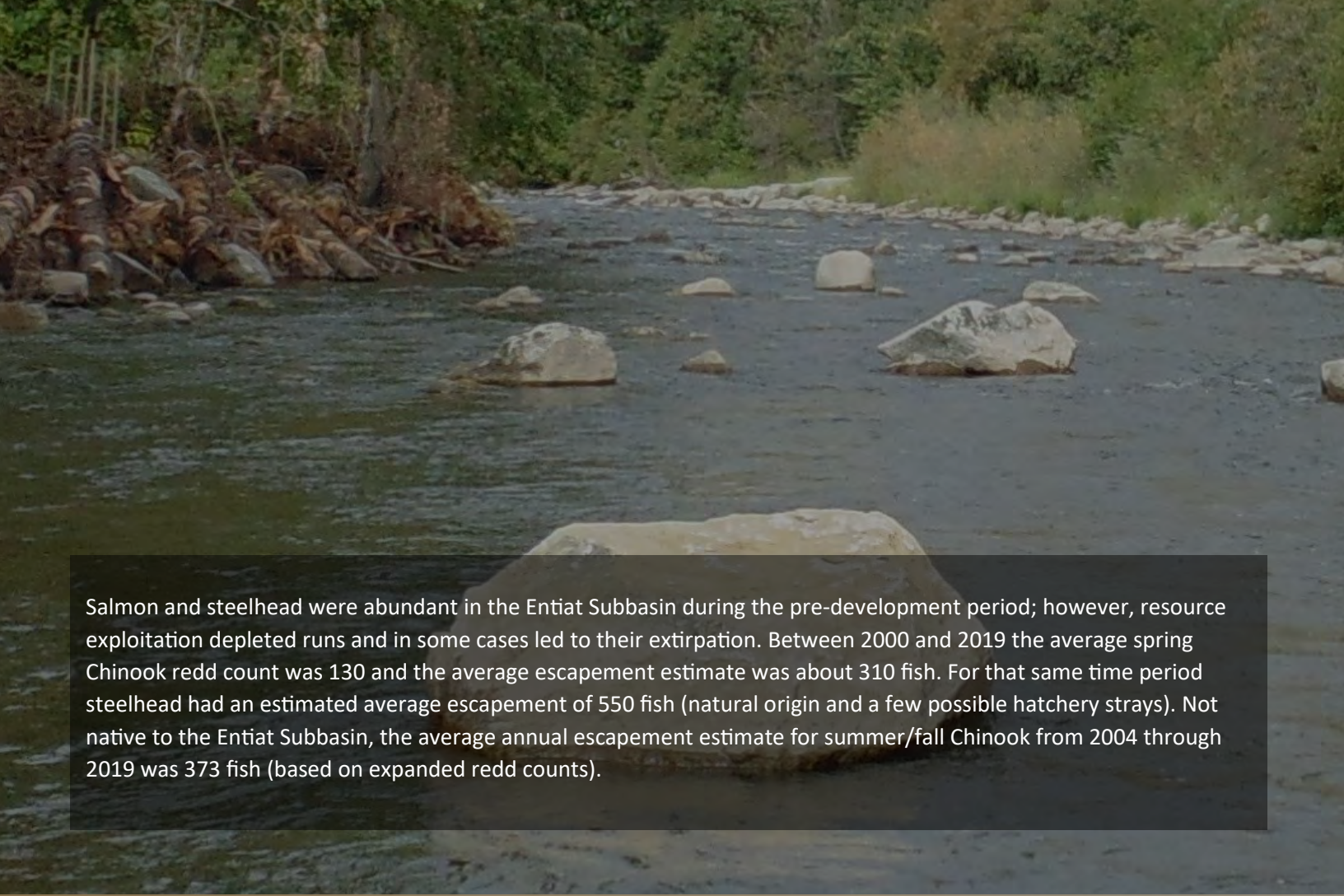
345

Coho*

2,717

This section, all numbers are natural and hatchery origin combined.

*Note: Steelhead estimate for entire subbasin by mark-recapture estimates. Coho estimate for upstream from Tumwater Dam, based on redd counts plus broodstock collected, likely underestimate (YN).



Salmon and steelhead were abundant in the Entiat Subbasin during the pre-development period; however, resource exploitation depleted runs and in some cases led to their extirpation. Between 2000 and 2019 the average spring Chinook redd count was 130 and the average escapement estimate was about 310 fish. For that same time period steelhead had an estimated average escapement of 550 fish (natural origin and a few possible hatchery strays). Not native to the Entiat Subbasin, the average annual escapement estimate for summer/fall Chinook from 2004 through 2019 was 373 fish (based on expanded redd counts).

Habitat improved for fish and wildlife Entiat Subbasin 2008-2020

10.5

Acres

**Aquatic habitats
treated & improved**

119

Acres

**Riparian habitat
treated**

2.4

Miles

**Stream treated with
spawning gravel**

ENTIAT Subbasin

Lack of overwintering habitat has been identified in assessments as one of the more important ecological concerns limiting juvenile salmonids in the Entiat Subbasin. Loss of floodplain connectivity and deteriorated riparian conditions are also flagged as contributing factors. Upland management activities and the construction of flood control dikes have also led to upland erosion and reduced channel/instream complexity. The Yakama Nation is currently implementing projects that help address many of these ecological concerns. Examples include removal of fish passage barriers, restoration treatments to upland and riparian habitats, and the installation of large wood, boulder and rootwad structures to improve instream habitat complexity and hydrological function.

4.3

Miles
Stream with improved
complexity & form

300

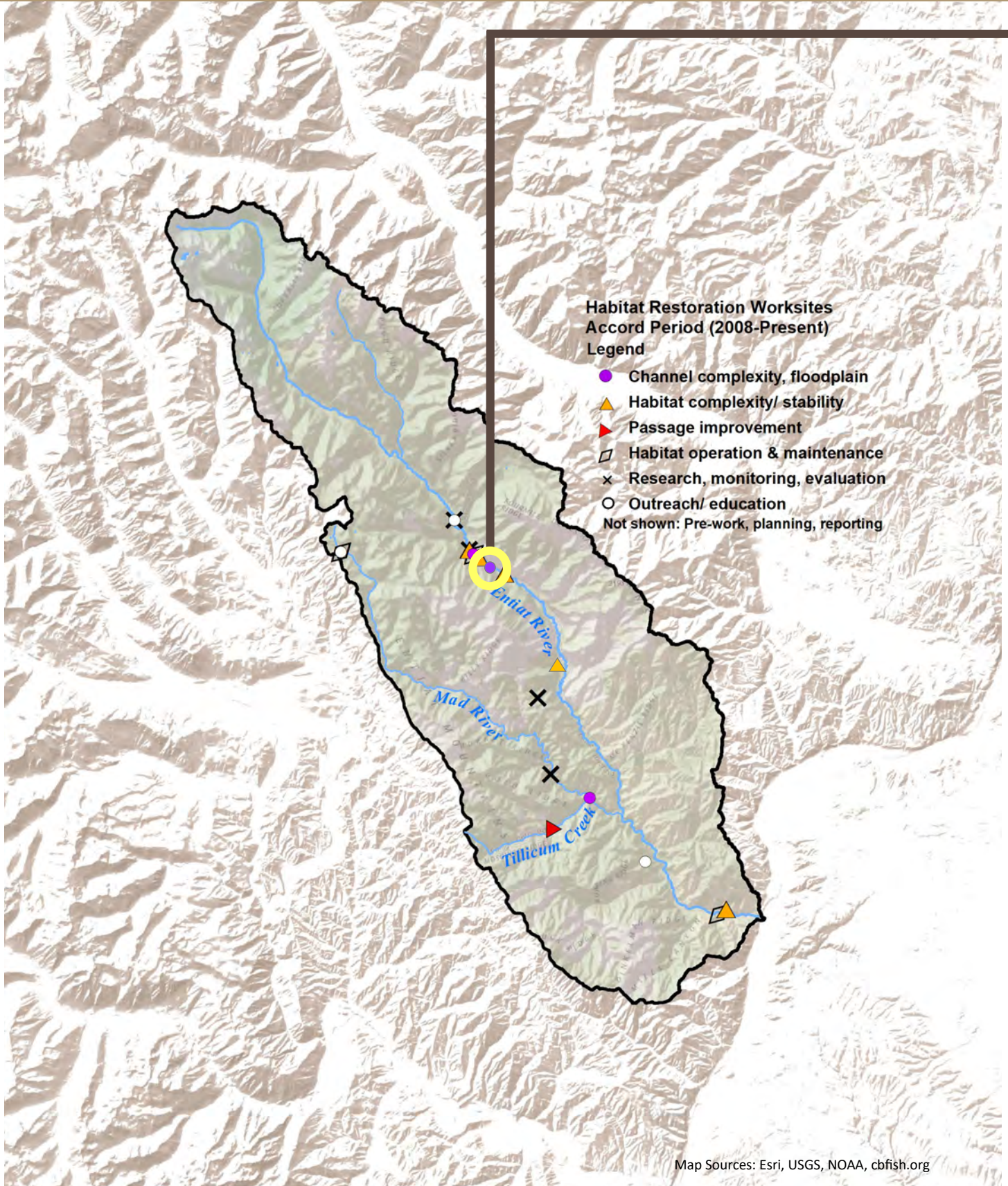
Boulders
Added for
instream habitat
(plus 124 individual logs)

53

**Log Structures
& Pools**
Added for
instream habitat

YN metrics reported to cbfish.org (funded by BPA), 1/2008-12/2019 for the Entiat Subbasin, although some may be redundant with the Wenatchee and Methow. *Photo: Entiat River Habitat Enhancement Project (YN)*

ENTIAT Subbasin



Upper Burns Fish Enhancement Project

Planned Implementation: 2021

Funding: Source Bonneville Power Administration

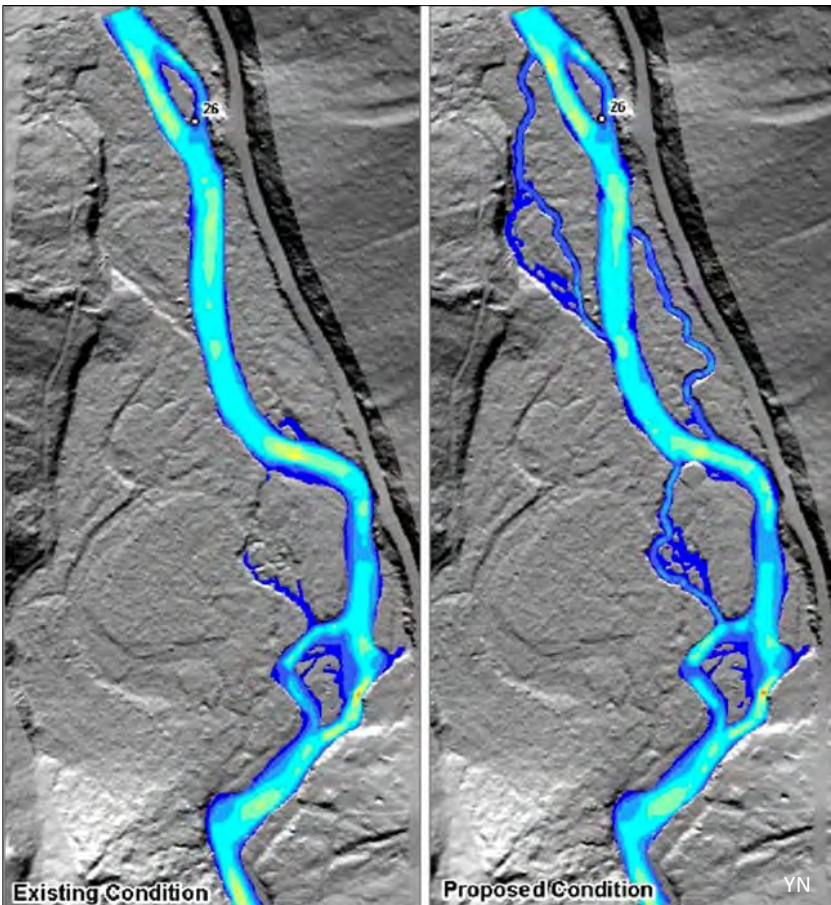
Landowners & Partners: U.S. Forest Service, Entiat Ranger District, Okanogan-Wenatchee National Forest

Focal Species: Upper Columbia spring Chinook and steelhead

Problem: In the Upper Columbia Biological Strategy for Recovery Plan implementation, (prepared by the UC Salmon Recovery Board's Regional Technical Team in 2013), poor large woody debris recruitment and retention, and the impacts of roads both alongside the Entiat River and in managed forests upstream, have been identified as factors contributing to degraded habitats and depressed salmon returns. In addition, straightening of the river channel, levees and rip-rapped banks have contributed to degraded salmonid habitats.



Above: Aerial photo of one side channel restoration area at the Upper Burns site. A new apex wood structure and new perennial channel will be created at the lower right-hand corner of the image.



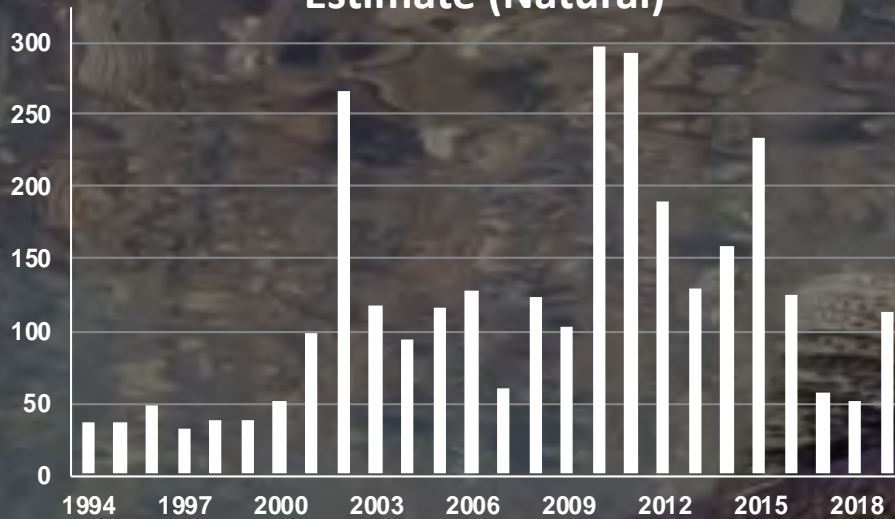
Planned Restoration Actions: Creating 2,400 feet of new perennial side channels in a disconnected floodplain zone along the Entiat River, and increasing the main channel habitat complexity through the creation of new instream engineered wood structures.

Benefits: These habitat enhancements will greatly expand the coverage and accessibility of complex channel margin and wetland habitats throughout floodway in this 0.5 mile stretch of the Entiat River, increasing the available quality and quantity of habitats for salmonid spawning and rearing, and for peak flow attenuation. In addition, the supplementation of large wood to the stream reach helps to restore the ecosystem by providing habitats and substrates to enhance primary productivity, and thus enhance the fish food base.

Left: One year flood return interval inundation modeling of project area comparing existing conditions (left) to proposed conditions (right). Note the extensive presence of wetted side channels in the proposed condition.

ENTIAT Subbasin

Summer Steelhead Escapement Estimate (Natural)

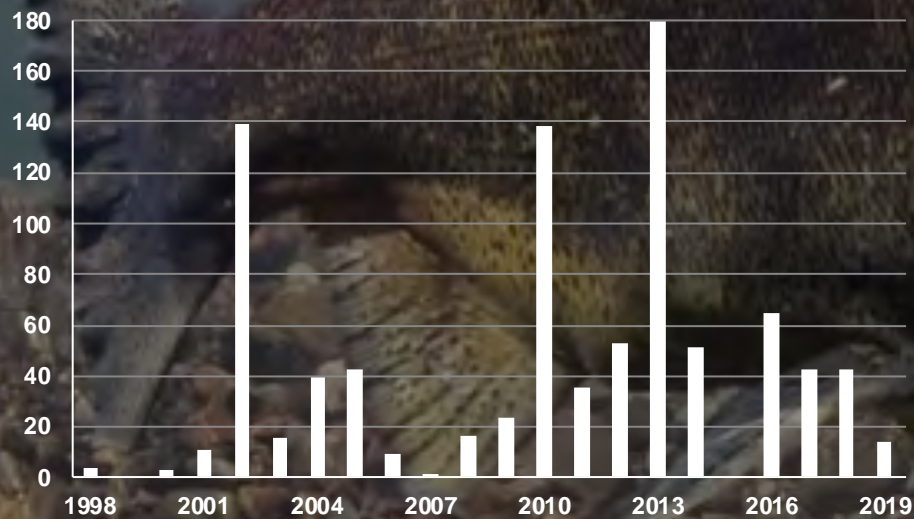


Apportioned dam counts. Note: 2019 Data preliminary. Source; WDFW

Summer Steelhead

- Historical abundance has been estimated at around 500 fish
- Population numbers have increased more than most other Upper Columbia steelhead populations in recent decades
- Considered a reference population, hatchery releases have ceased, but there are still some strays from other subbasins

Sockeye Redd Counts



Source; USFWS

Sockeye

- Not native to the subbasin
- Introduced in 1943 and 1944 from Lake Quinault and Lake Whatcom stocks
- Is now a mix of both natural-origin and out-of-basin hatchery strays

Adult Spawning Escapement Estimate 2019*

Steelhead

112

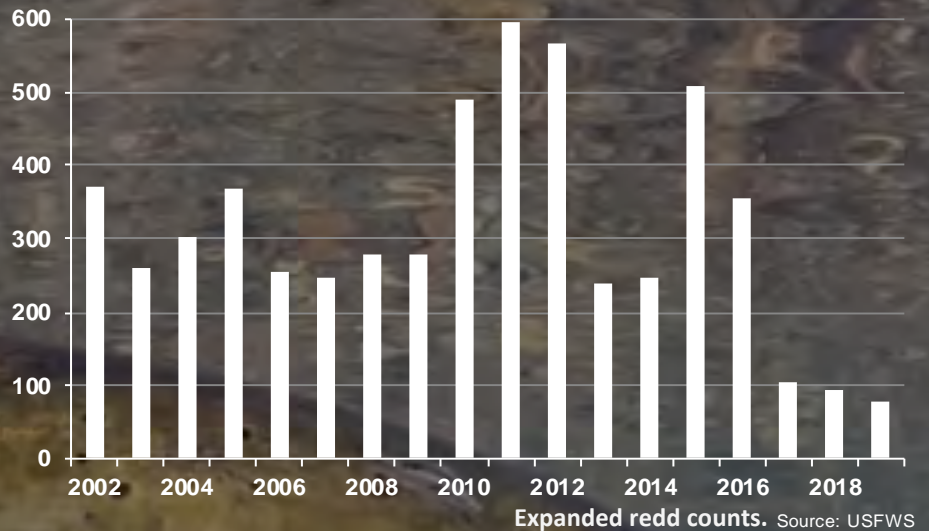
Sockeye

13
(redd counts)

Spring Chinook

- Hatchery supplementation started in 1942, but ended in 2008 due to hatchery reform recommendations
- After low numbers in the 1990s, greater escapement has been observed since 2001, but still is not reaching viability threshold for recovery

Spring Chinook Escapement Estimate (Natural and Hatchery)



Summer Chinook

- Not native to the subbasin
- Hatchery releases initiated in 2011
- Purpose of releases is to increase harvest opportunities as mitigation for Grand Coulee Dam impacts
- Hatchery returns are segregated from natural spawning populations

Summer Chinook Escapement Estimate (Natural and Hatchery)

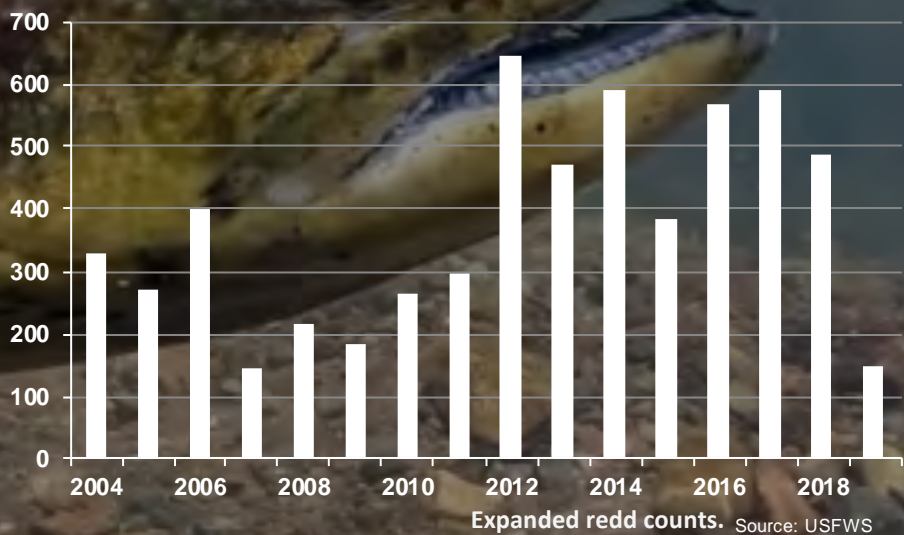


Photo: Morgan Bond, Univ. WA

Summer Chinook

145

Spring Chinook

75

*Includes natural- and hatchery-origin

Industrial development of the Columbia River, agricultural, forestry, and private development of the Methow Subbasin, combined with historically intensive fishing, have led to declines of wild salmonid populations. By the 1930s, only 200 to 400 adult spring Chinook returned to the subbasin. There have been large fluctuations in redd counts from the 1950s through the 1990s. For summer Chinook, the run size averaged approximately 1,000 adults from 1980 to the 1990s. Although the Methow Subbasin was once a productive steelhead system, the population has in recent years only sustained itself at a threshold population level.

Extirpated in the early-1900s, hatchery-reared coho are being reintroduced into the subbasin by the Yakama Nation with a goal of establishing naturally spawning populations. With an emphasis on local adaptation and the use of key historical habitat areas, the transition to local broodstock was complete in 2005. In addition, the Yakama Nation is acclimating steelhead and spring Chinook in natural ponds within their historical habitats in order to encourage long-term sustainability and natural spawning. Of the salmonids in the subbasin, steelhead are unique in that they possess the ability to repeat spawn. The artificial reconditioning of post-spawn steelhead (kelts) is important for Upper Columbia River steelhead that experience high post-spawn mortality rates. The Yakama Nation initiated a kelt reconditioning project in 2012 to test whether the abundance of naturally-produced Upper Columbia River steelhead on natural spawning grounds can be increased through the use of long-term kelt reconditioning methods, and it is proving a success.

Habitat improved for fish and wildlife Methow Subbasin 2008-2020

221

Acres

**Aquatic habitats
treated & improved**

318

Acres

**Riparian habitats
treated & protected**

35,850

Pounds

**Salmon carcasses
added for nutrients**

METHOW Subbasin

Municipal and agricultural development have impaired stream and floodplain functions in the middle and lower portions of the Methow Subbasin. Such development has reduced stream channel and floodplain functions, leading to impaired stream complexity, wood and gravel recruitment, impaired floodwater retention, and water quality problems. The restoration of Chinook and steelhead populations in the Methow Subbasin will be partially dependent on improvements to habitat conditions. The Yakama Nation has begun to address many of these ecological concerns through the implementation of restoration projects and habitat protections. Examples include restoring fish passage, protecting and restoring wetland, riparian and upland habitats, protecting instream flows, installing instream large wood structures and pool habitats, and creating or reconnecting historic side-channels. In addition, with partners, we have been reintroducing beavers who serve as “natural stream engineers” by adding complexity and helping to restore degraded habitats.

35

Miles

Improved stream complexity & form

119

Pools

Added for instream habitat

106

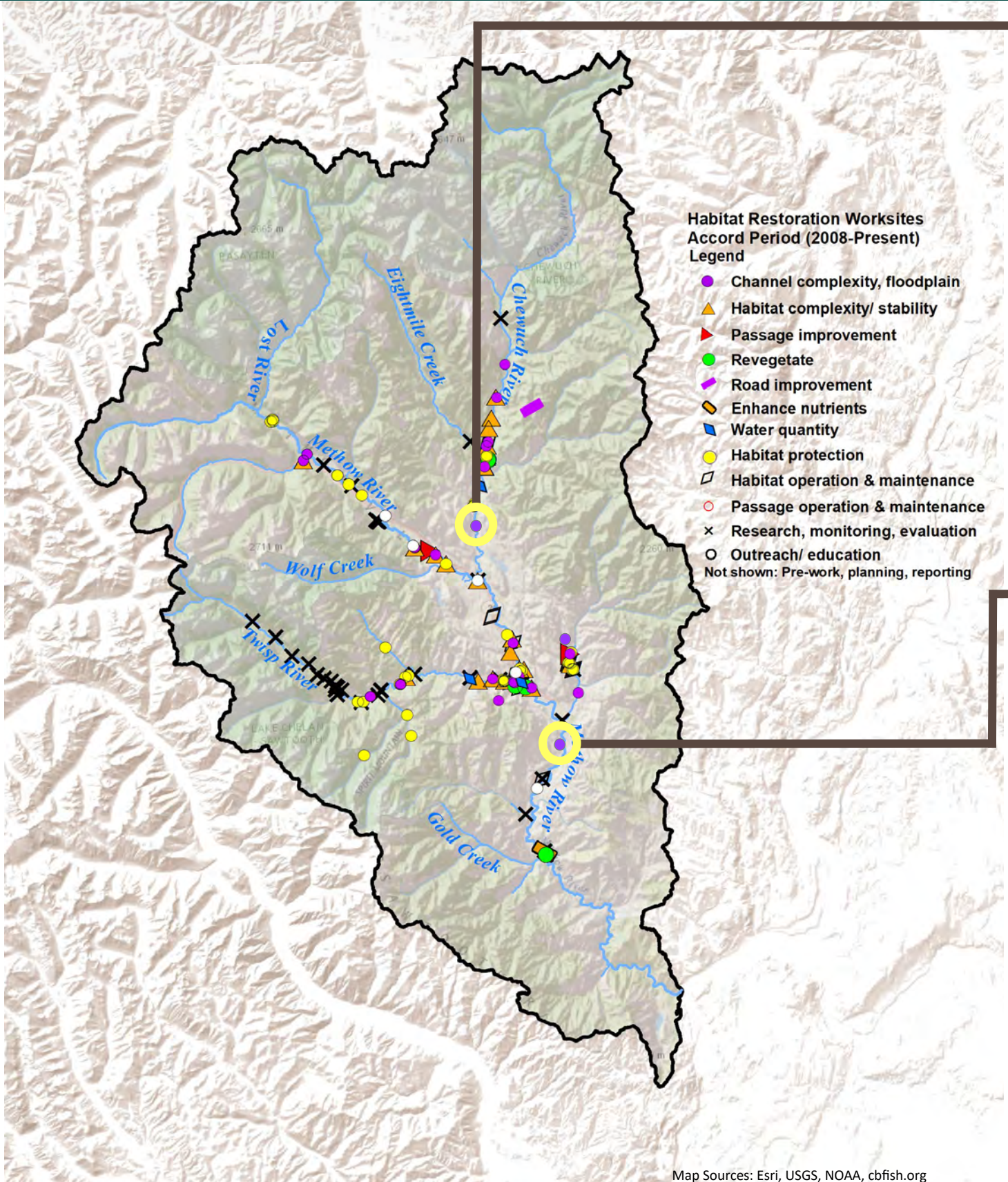
Log Structures

Added for instream habitat

(plus unanchored logs)

YN metrics reported to cbfish.org (funded by BPA), 1/2008-12/2019 for the Methow Subbasin, although some may be redundant with the Wenatchee and Entiat. *Photo: Middle Twisp Reach (YN)*

METHOW Subbasin



Map Sources: Esri, USGS, NOAA, cbfish.org

Chewuch RM 4.2 Fish Enhancement Project

Planned Implementation: 2021

Funding Source: Bonneville Power Administration

Landowner and Project Partner: WDFW

Focal Species: Upper Columbia spring Chinook and steelhead

Problem: In the Lower Chewuch Reach Assessment, floodplain connectivity, lack of complex side-channels, degraded stream bank habitats and lack of instream complexity were identified as limiting to salmon and steelhead. Elevated water temperatures and low instream flows during the summer were also identified to be of concern.

Planned Restoration Actions: Create a new 2,000 foot long perennial side-channel within a currently disconnected floodplain zone along the Chewuch River.

Benefits: Reconnection of side-channels helps to restore natural, self-maintaining bio-physical process that help to create and maintain improved habitat conditions long-term. They also help to attenuate runoff rates to increase baseflow through storage and groundwater connection, and increase the availability of rearing, forage, and refuge habitats for salmonids.



Above: Proposed New Channel Alignment

Alder Creek Floodplain Enhancement Project

Planned Implementation: 2021

Funding Source: Bonneville Power Administration

Landowner and Partner: WDFW

Focal Species: Upper Columbia spring Chinook and steelhead

Problem: Alder Creek is a tributary to the middle section of the Methow River, where scientific assessments have concluded that residential development is affecting riparian and floodplain condition by decreasing habitat quantity and diversity, and that low flows and elevated temperatures may be impacting juvenile salmonid survival.

Planned Restoration Actions: Create a new perennial side-channel connected to the existing Alder Creek channel, within the active floodplain zone of the Methow River.

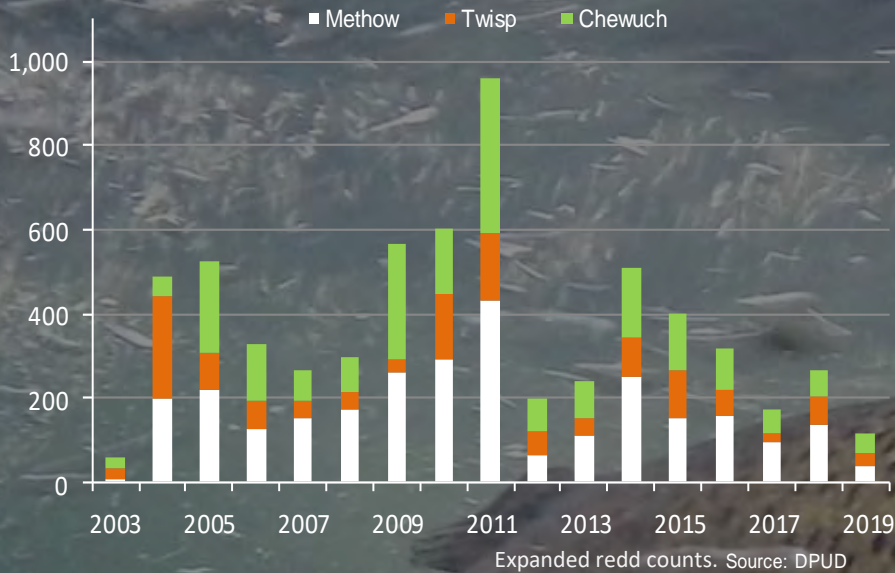
Benefits: Expanding juvenile salmonid access into Alder Creek and expanding coverage of complex channel margin and wetland areas across the floodplain area will increase the availability of complex spawning and rearing habitats and provide opportunities for water storage and shading, providing refuge from adverse flow and temperature conditions.



Above: Existing condition of project site (top photo) and anticipated enhanced condition (bottom photo).

METHOW Subbasin

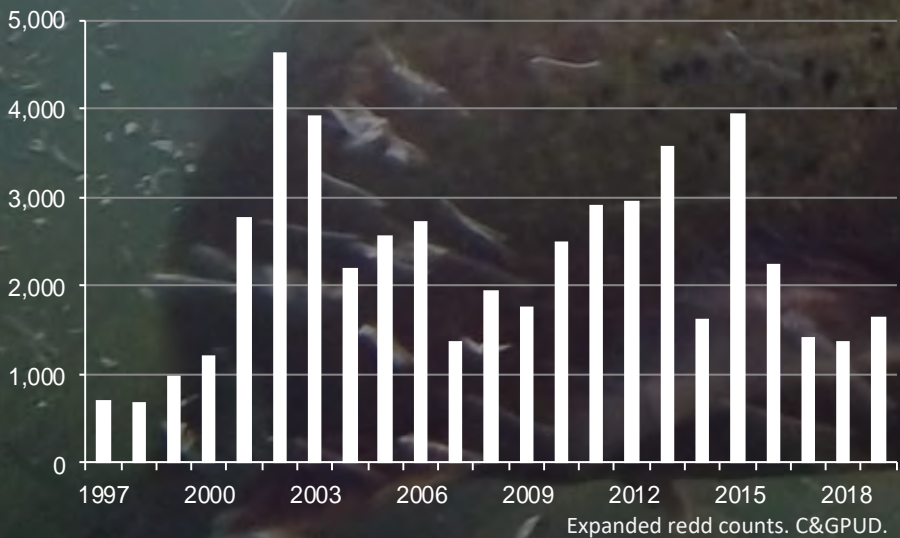
Spring Chinook Escapement Estimate (Natural)



Spring Chinook

- Hatchery releases represent CCPUD/DCPUD/USFWS mitigation and supplementation efforts
- The Yakama Nation is participating in disperse acclimation to improve homing to locations with better habitats within their native range
- Population estimates, however, are still not reaching the minimum threshold of a natural spawner abundance of 2,000 fish

Summer Chinook Escapement Estimate (Natural and Hatchery)



Summer Chinook

- Once an important tribal and non-tribal fishery in the Upper Columbia
- Depleted by fishing in the early 1900s, as well as damming, and habitat degradation
- Purpose of GCPUD/WDFW hatchery releases is to increase harvest opportunities
- Hatchery returns are segregated from natural spawning populations

Total Spawning Escapement Estimate 2019*

Spring Chinook

453 (2020)

Summer Chinook

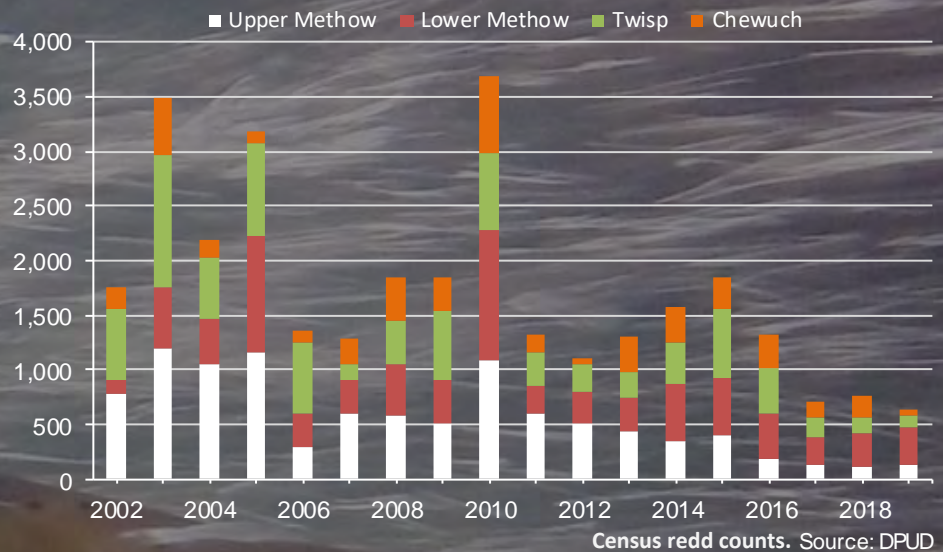
1,638

SPECIES Status and Trends

Steelhead

- Natural spawner abundance has reached the minimum viability threshold in some of the recent years
- The Yakama Nation began the Upper Columbia kelt conditioning program in 2012
- Working with partner WDFW, YN has proven that the kelt conditioning project is successful in the Twisp River, by improving lifetime reproductive success and by contributing to steelhead populations in the wild

Steelhead Escapement Estimate (Natural and Hatchery)



Coho

- Yakama Nation began reintroductions in 1997
- Transitioned to local broodstock
- Acclimation sites expanded to increase natural origin productivity within historic coho spawning areas
- Targeted acclimation areas include the Twisp and Chewuch Subbasins, and the Upper Methow
- Plan to reduce releases after 3 years

Coho Escapement Estimate* (Natural and Hatchery)

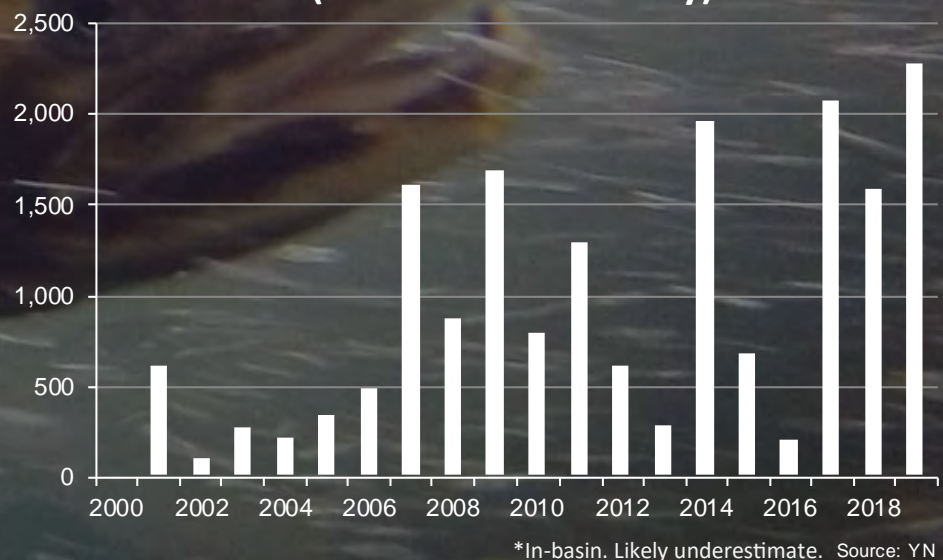


Photo: California Sea Grant

Coho
2,273

Steelhead
639

*Natural and hatchery. Note: Coho numbers are likely underestimates due to survey conditions, and only counts in-basin escapement. Spring Chinook are census redd counts, 2.2 fish x redd; summer Chinook and steelhead are expanded redd counts.

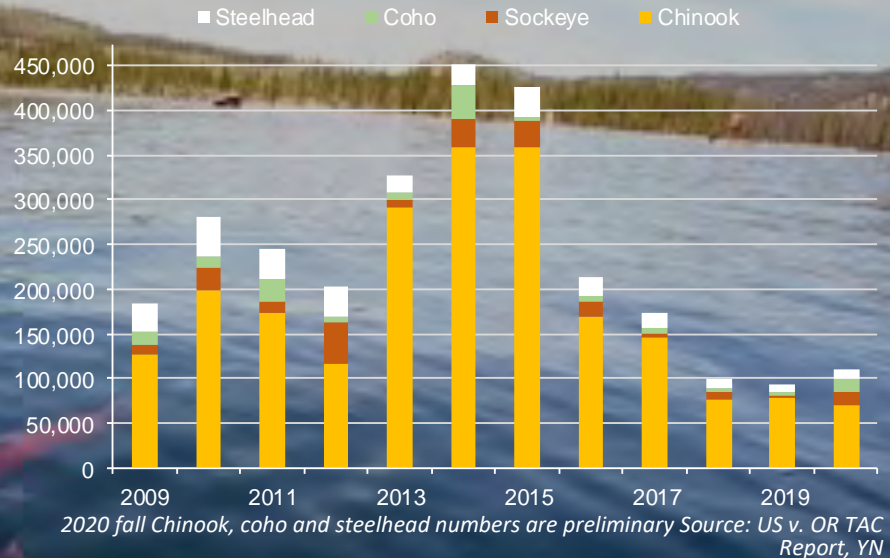
HARVEST

Background

In the Treaty of June 9, 1855 with the United States of America, the Yakama Nation reserved the right to maintain its culture and the natural resources on which its way of life depends, including rights to water, land, and natural foods and medicines at all usual and accustomed places. Subsequent Federal court rulings affirmed the Yakama Nation's and the other Columbia River Treaty Tribes' right to self-regulation of their 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 Zone 6 area, the Columbia River running between McNary and Bonneville Dams, is reserved for Columbia River Treaty Tribes to share harvest and management authority. There are also special tribal permitting and regulations for other traditional fishing locations, species, and methods in place.

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

Treaty Harvest—Columbia River Zone 6



YN Spring Chinook Tributary Harvest

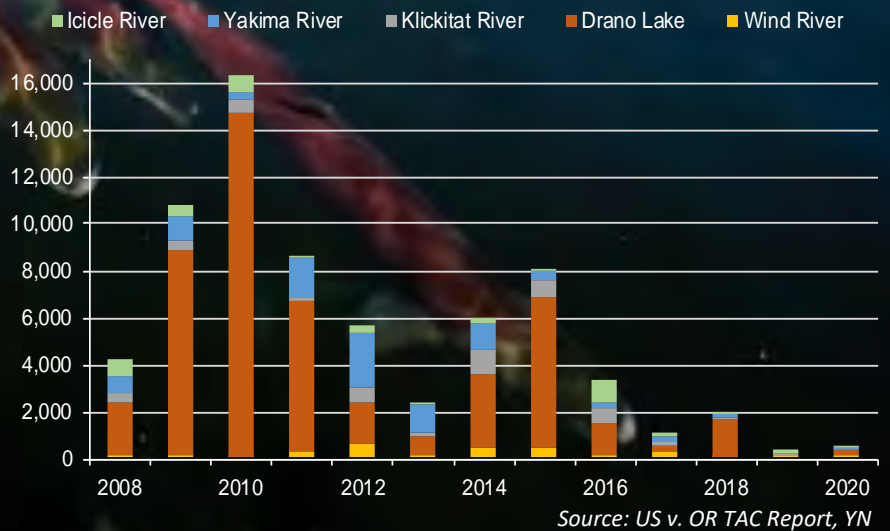


Photo: Columbia Basin Bulletin

Columbia River Zone 6 Treaty Harvest 2020

Sockeye
15,258

Coho*
15,015

Steelhead*
11,122

Chinook*
69,176

**Note: 2020 fall Chinook, coho and steelhead numbers are preliminary.*

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- Yakima** Prosser Dam counts: http://dashboard.yakamafish-star.net/DataQuery/adult_passage_counts
- Klickitat** Summer/winter steelhead and spring Chinook population estimates: Joe Zendt, YKFP Fisheries biologist, personal communication, 2020.
- Lyle Falls fish trap counts: http://dashboard.yakamafish-star.net/DataQuery/adult_passage_counts
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- Wenatchee** Coho escapement estimates: Cory Kamphaus, YN Fisheries, personal communication, 2020.
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- All other species: Hillman, T., et al. 2020. Monitoring and evaluation of the Chelan and Grant County PUDs hatchery programs: 2019 Annual PUD Report. (www.gcpud.org)
- Entiat** Chinook escapement estimates: Fraser, G. S. and M. R. Cooper. 2020. Chinook salmon spawning ground surveys on the Entiat River, 2019. U. S. Fish and Wildlife Service, Leavenworth, WA.
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- Methow** Spring Chinook and steelhead escapement estimates: Snow, C., C. Frady, D. Grundy, B. Goodman, and A. Haukenes. 2020. Monitoring and evaluation of the Wells Hatchery and Methow Hatchery programs: 2019 annual report. Report to Douglas PUD, Grant PUD, Chelan PUD, and the Wells and Rocky Reach HCP Hatchery Committees, and the Priest Rapids Hatchery Subcommittees, East Wenatchee, WA.
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- Coho escapement estimates: Cory Kamphaus, YN Fisheries biologist, personal communication, 2020.
- Habitat Metrics, Summaries** BPA contract reporting site (<https://www.cbfish.org>); categorized and summarized by the STAR Project. PCSRF metrics from Pacific Coastal Salmon Recovery Fund Project and Performance Metrics Database (webapps.nwfsc.noaa.gov)
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- Material for project spotlights: Personal communication with respective project implementation managers and habitat biologists (YN), annual reports, reach assessments, and news releases.
- Tribal Harvest** Tribal harvest numbers: Megan Begay, YN Assistant Harvest Manager, personal communication, 2020 and 2020 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). US v. OR Technical Advisory Committee BA tables and Policy Committee
- Bosch, Bill. (2020). Run Size Forecast for Yakima River: Adult Spring Chinook, 2021. [white paper]. YKFP. November 20, 2020.
- 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.



HONOR. PROTECT. RESTORE.

BONNEVILLE
POWER ADMINISTRATION



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