



2019 ANNUAL REPORT

Status and Trends
Reporting Project



January 2020

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For more information:
yakamafish-nsn.gov
and
dashboard.yakamafish-star.net

FROM OUR FISH AND WILDLIFE COMMITTEE CHAIRMAN

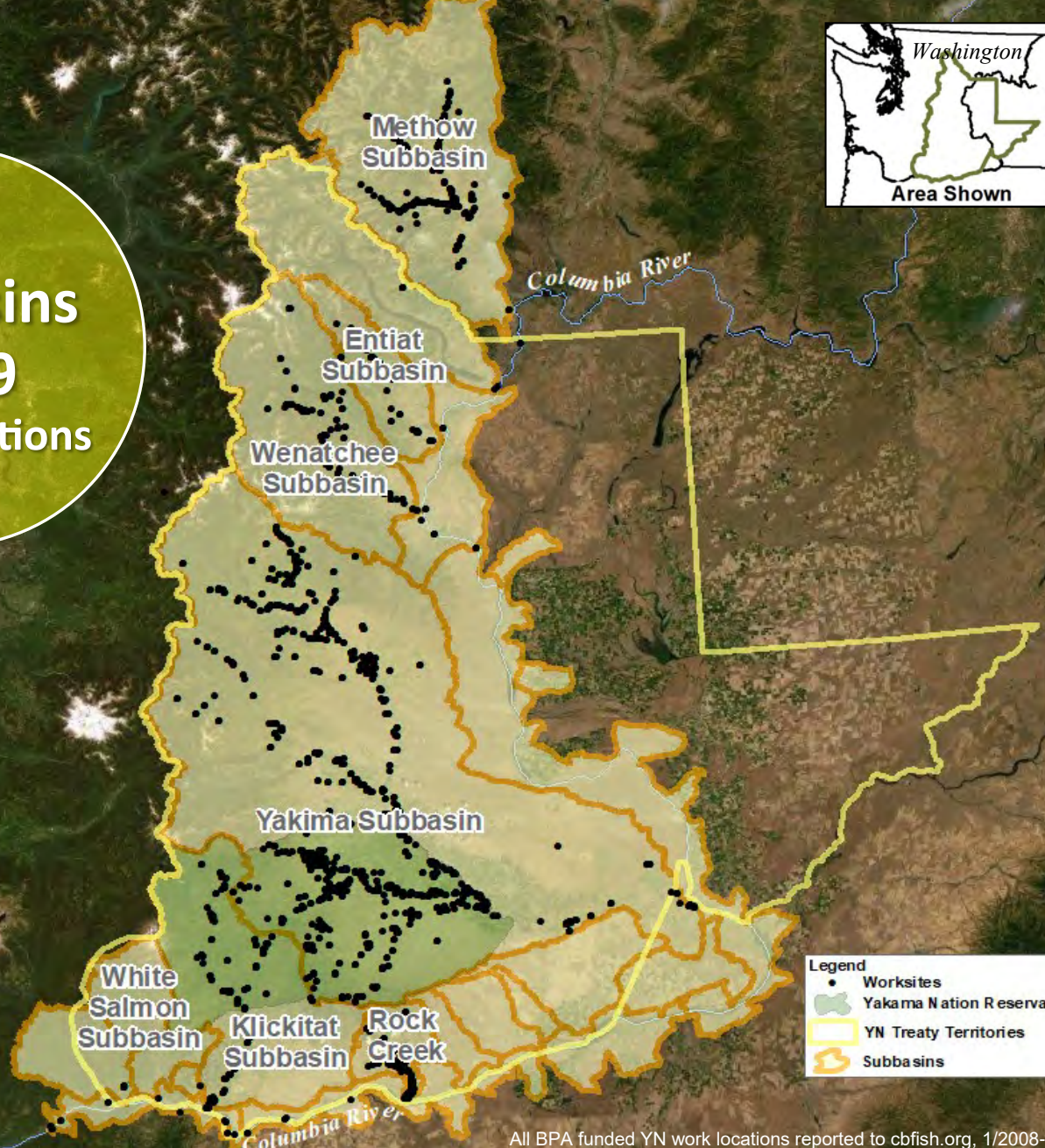


Since 2008 we have greatly increased our work to protect and restore fish resources and their habitats throughout our Treaty Territories, thanks in large part to the Accord Agreement with the Bonneville Power Administration, U.S. Army Corps of Engineers, and U.S. Bureau of Reclamation. This funding addresses the damage to cultural and natural resources caused by federal hydroelectric dams on the Columbia River. Supported by the Accord and other funding sources and working with partners, our efforts continue today as we slowly put back the natural resources that were once plentiful many generations ago. Since much remains to be done, we will continue with our work for as long as is needed, honoring our duty to take care of the natural world for future generations.

**Gerald Lewis, Chairman
Fish and Wildlife Committee
Yakama Nation Tribal Council**

Cover photo: Upper Toppenish Wood Project (YN)

7
Subbasins
1,579
Work Locations



All BPA funded YN work locations reported to cbfish.org, 1/2008-12/2019 .

2008-2019 ACCOMPLISHMENTS



1,376 Miles
 Stream and riparian
 habitat improved,
 treated, or protected



436 Miles
 Habitat made
 accessible to fish



206,178 Acres
 Habitat improved or
 protected



46,999 People
 Educated and informed



Habitat improved for fish and wildlife
2008-2019



298
Miles

Habitat made
accessible to fish

72,560
cfs

Flow kept in
streams

12,166
Acres

Wetland treated
or protected

YAKIMA Subbasin

By the 1970s and 1980s, Yakima River steelhead and salmon populations were either gone or severely depressed. Summer Chinook were extirpated by 1970 and coho were gone by the early 1980s. By the 1980s and 1990s, adult spring Chinook and steelhead returns were less than 3,500 and 1,000, respectively.

To restore these and other species, we are implementing habitat and hatchery projects to improve ecosystems and to provide sustainable and harvestable populations of fish. The actions have been successful as sockeye are once again returning to the subbasin after having been reintroduced by the Yakama Nation. All Chinook runs are experiencing increases in spatial distribution. Extirpated in the 1970s, summer Chinook are once again returning due to our reintroduction program. As a result of our restoration and translocation efforts, Pacific Lamprey populations are also increasing; however, returns vary from year to year.

1,099
Miles

Riparian improved
or protected

109
Miles

Stream improved
or protected

159,605
Acres

Upland treated or
protected

YN metrics reported to cbfish.org (funded by BPA), 1/2008-12/2019 for the Yakima Subbasin.

Photo: YN

YAKIMA Subbasin

Upper Toppenish Creek Wood Project

Date Completed: First reach completed in 2019

Funding Source: Bonneville Power Administration

Focal Species: Yakima steelhead and Pacific lamprey

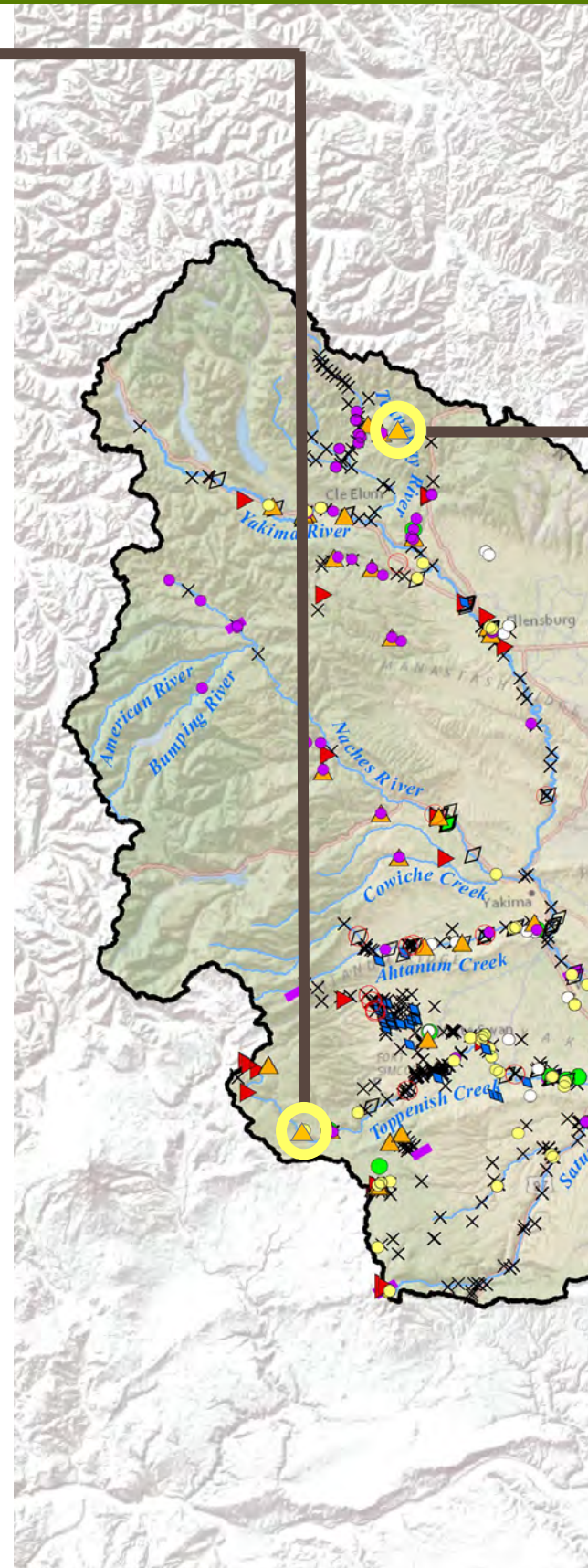
Problem: Toppenish Creek suffers from: 1) channel incision, 2) disconnection of the floodplain, 3) erosion of fine sediments into the stream channel, 3) lack of instream complex habitat, 4) impaired riparian functioning, and 5) lack of large wood.

Restoration Actions: To improve habitat complexity and instream processes, wood was added to Toppenish Creek and its north fork. Working with partners to enhance instream and floodplain habitat, wood was placed in 46 locations using a helicopter.

Accomplishments:

- 4.26 miles of degraded streams replenished with wood
- 805 pieces of wood installed

Benefits: The addition of large wood will create spawning and rearing habitat for steelhead and Pacific lamprey. Our actions will lead to: 1) pool formation, 2) improved food webs, 3) sorting of gravels and cobble, and 4) reconnection of floodplains and side channels. Increased floodplain connectivity is beneficial to riparian vegetation that provides shading and stream-bank stability as well as providing habitat for wildlife.



North Fork Teanaway River Restoration Project (Phase 1)

Date Completed: November 2018

Project Partner: Mid-Columbia Fisheries Enhancement Group

Funding Source: Bonneville Power Administration

Focal Species: Yakima spring Chinook and steelhead, Pacific lamprey

Problem: Designated as “critical habitat” for the recovery of ESA Threatened steelhead, the Teanaway River is considered the most important watershed in the upper Yakima River for salmon and steelhead production. Past land management practices and an extensive road network have: 1) impacted native vegetation, 2) reduced the ability of the watershed to store water and maintain flows, and 3) impaired the quality and availability of habitat.

Restoration Actions: Working with partners to enhance instream and floodplain habitat, wood was placed in seven Yakima River tributaries using a helicopter, as the terrain and vegetation prevented the use of ground-based equipment.

Accomplishments:

- 1.5 miles of degraded stream improved
- 1,222 pieces of wood placed instream

Benefits: Reestablishing wood will help to restore and maintain stream processes. The wood structures help to build spawning habitat, scour deep pools, and increase food availability for fish. Reconnecting streams with their floodplains and side-channels helps to maintain streamflow through the storage and slow release of groundwater.

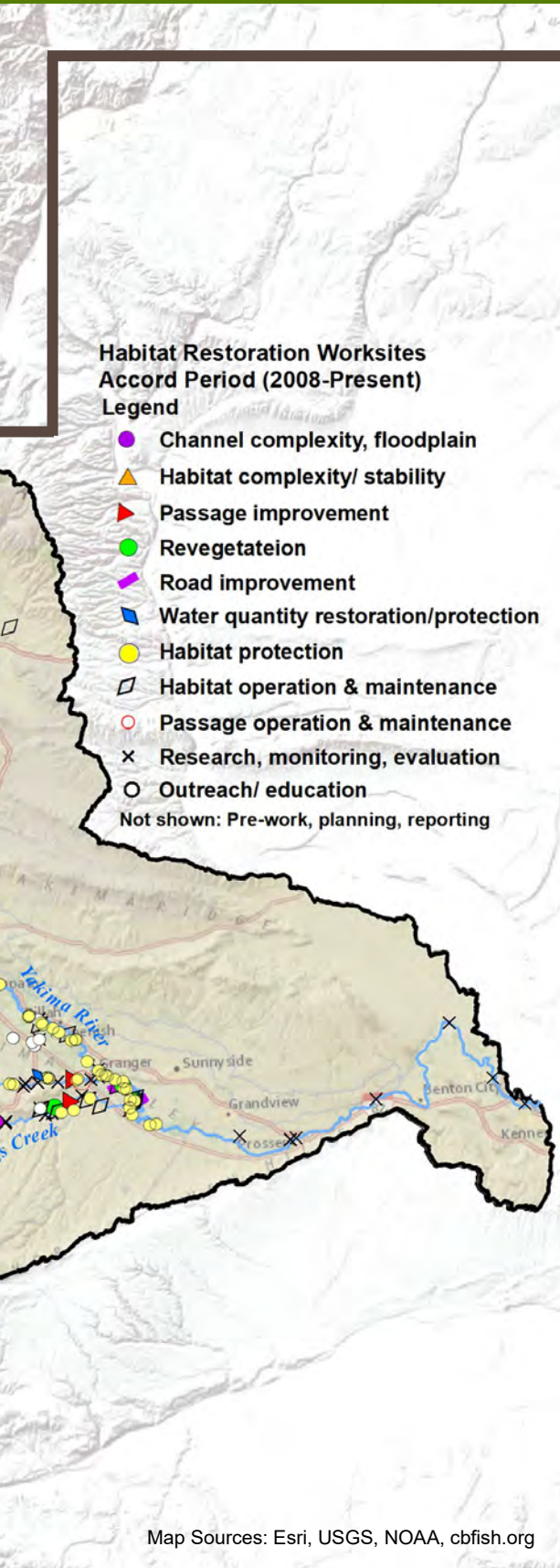


Photo: YN

Larval/Juvenile Lamprey Rescue

Date Completed: Ongoing

Funding Sources: Bonneville Power Administration and Bureau of Reclamation

Landowners/ Partners: BOR, WDFW, and various irrigation districts

Focal Species: Pacific lamprey, Western brook lamprey, and freshwater mussels

Problem: The decline of lamprey is problematic as they are vital to the ecosystem and important to our culture as a traditional medicine and food source. Factors contributing to their decline include entrainment and stranding in irrigation diversions during routine dewatering and maintenance. Larval lamprey are attracted to the slow water and fine sediments, therefore hundreds to tens of thousands of larval and juvenile lamprey can be found in diversion structures in the Yakima and Wenatchee subbasins.

Rescue Activities: In addition to investigating methods to reduce rates of entrainment and mortality associated with diversions, we have been rescuing lampreys from diversions that have been dewatered or dredged in the Yakima Subbasin.

- 101,978 lamprey removed from diversions since 2011
- 11,706 to 46,775 lamprey have been captured annually (2015-2018) from up to 20 diversions
- On average, 68% of the lamprey mortalities are primarily due to desiccation
- Wapato and Sunnyside diversions make up 47% and 23% of the overall number of lampreys rescued annually within the Yakima Subbasin



Potential Solutions:

- A slower dewatering rate (< 2-4 inches/hour) can reduce stranding and mortality
- Sprinkler systems can reduce mortality during dewatering activities (see photo above)
- Increasing sweeping velocity at headgates and fish screens may reduce entrainment (currently being evaluated)

Photo at left: Desiccated stranded lamprey (YN)



Juvenile lamprey trapped on dewatered bank at Wapatox Diversion. (Photo: YN)



Sprinkler system used in dewatered irrigation diversions to keep juvenile lampreys wet. (Photo: YN)



Stranded lamprey being rescued by YN biologist Tyler Beals in Sunnyside Diversion. (Photo: YN)



Melvin R. Sampson Coho Facility

Date Completed: May/June 2020

Funding Source: Bonneville Power Administration

Objective: Re-establish naturally spawning coho populations in the Yakima Subbasin that will provide tribal harvest opportunities.

Background: Annually, 44,000 to 150,000 coho returned to the Yakima Subbasin. By the mid-1980s they were extinct. Habitat loss and overharvest are factors that led to the extinction. The fish's cultural significance combined with U.S. v. Oregon objectives to restore salmon to upriver areas resulted in the release of hatchery fish (raised outside the subbasin) beginning in the mid-1980s.

Eliminating the Release of Fish Raised Outside the Basin: Since 1996, we have: 1) evaluated the feasibility of establishing a self-sustaining coho population that would not affect other species, 2) increased the number of coho spawning in tributaries, 3) discontinued the use of out-of-basin broodstock, and 4) tested the effectiveness of new acclimation techniques.



Groundbreaking: Daniel Brownlee (Hatchery Manager) and Tribal elders Melvin R. Sampson and Davis Yellowash Washines (Photo: Daily Record)

Melvin R. Sampson Coho Facility:

In 2018, construction began on our new hatchery named in honor of Mel Sampson, a respected elder and former Yakama Nation Tribal Council chairman. The state-of-the-art facility is designed for highly efficient water use. When completed, 700,000 smolts/parr will be produced per year for release in the subbasin (first release in 2021). These juvenile fish will be offspring from locally-adapted parents collected at Roza Dam. The long-term goal of the program is for an average annual return of 20,000 adults, with the first adult return to be in 2024.



Aerial view of the hatchery site near Ellensburg WA during construction. (Photo: YN)

YAKIMA Subbasin

Adults Counted at Prosser Dam in 2019

Spring Chinook

1,602

Summer Chinook

258

Fall Chinook

692

Sockeye

113

Coho

2,558

Pacific Lamprey

432

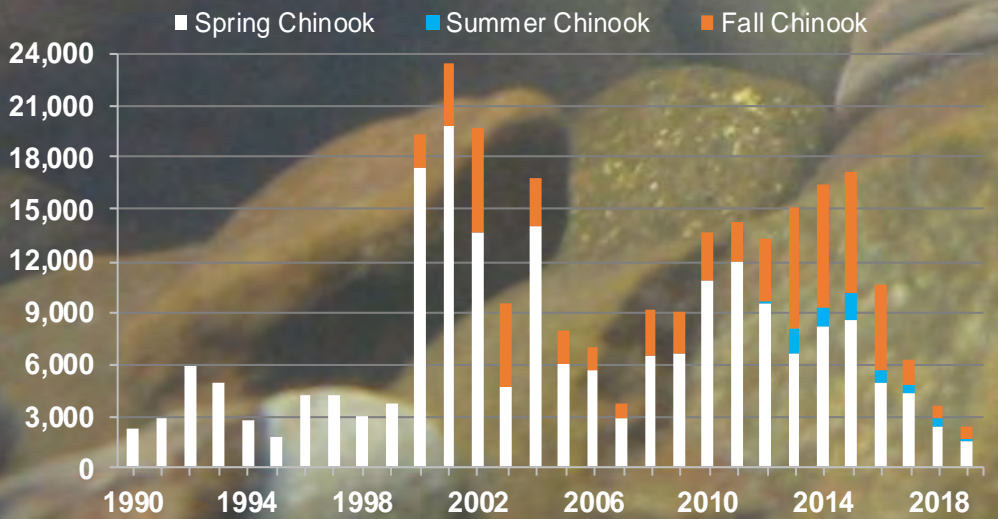
Note: Lamprey passage estimate based on PIT tag study due to low visual count detection.

Adult Pacific Lamprey Counted at Prosser Dam



*2018 and 2019 counts based on PIT tag study due to low window count detection efficiencies.

Adult Chinook Counted at Prosser Dam



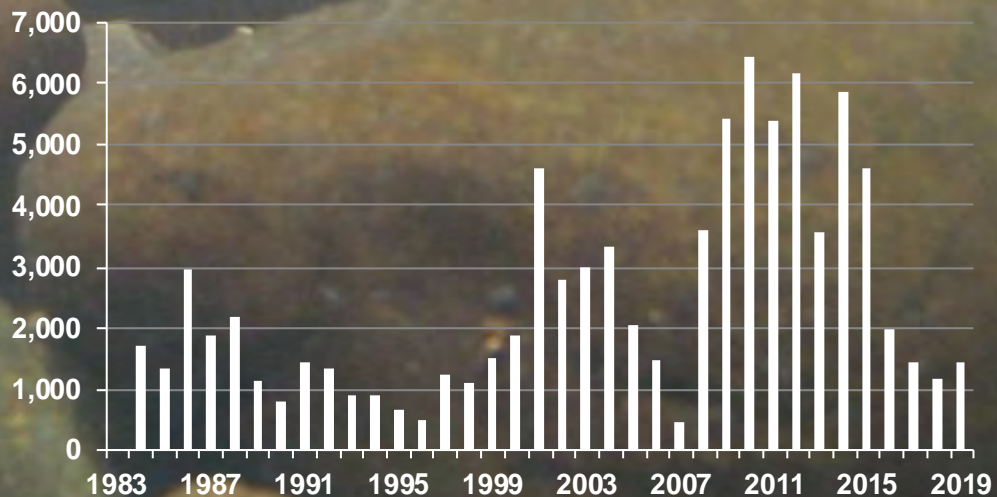
*Runs are combined prior to 2000.

Adult Sockeye Counted at Prosser Dam




*Severe drought 2015. Source: YN

Adult Summer Steelhead Counted at Prosser Dam (Natural and Hatchery)



Source: YN

Photo: USFWS



Habitat improved for fish and wildlife
2008-2019

134

Miles

**Habitat made
accessible to fish**

12,100

People

**Informed and
educated**

255

Features

**Added for
instream habitat**

(Plus 80 individual logs)

KLICKITAT Subbasin

Prior to the 1920s, there was a large spring Chinook run and a significant Tribal fishery at Lyle Falls on the Klickitat River. From 1977 to 2003, returns decreased to an average of 1,900 fish. The subbasin supports native winter and summer steelhead and historically provided a significant steelhead fishery. From 1987 to 2003, average escapement of steelhead was fewer than 300 fish.

To restore these species, we are improving habitat and restoring watershed function to improve flows as well as conducting research and monitoring fish populations to evaluate their needs. To mitigate for lost harvest, hatchery-produced coho and fall Chinook are released. These releases result in substantial adult returns providing harvest opportunities for traditional fisheries at Lyle Falls. Also, our efforts are leading to steelhead becoming more spatially diverse with spawning now occurring in the lower and middle sections of the subbasin.

90
Miles

**Riparian improved
or protected**

18
Miles

**Stream improved
or created**

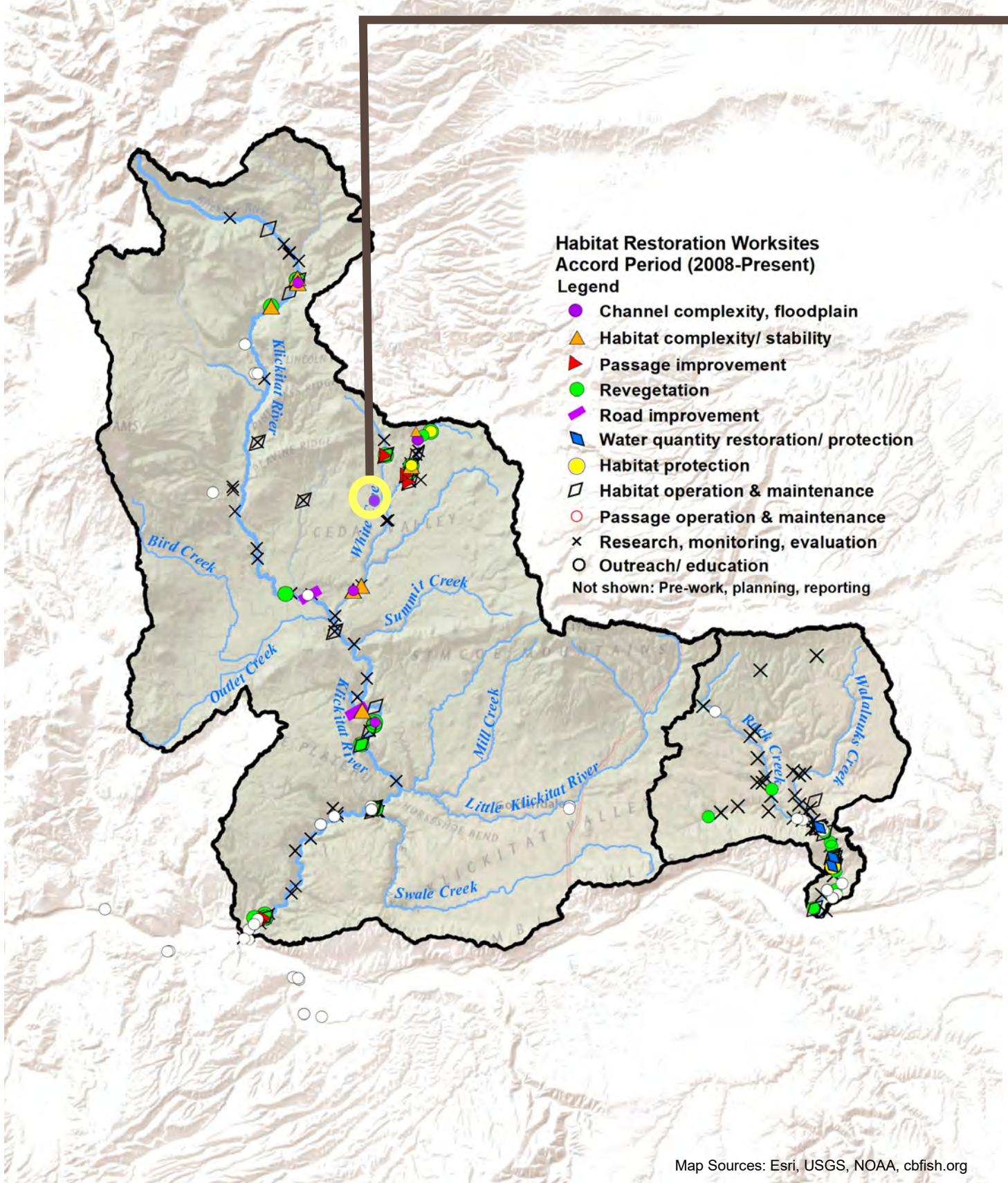
150
Acres

**Upland treated or
improved**

YN metrics reported to cbfish.org (funded by BPA), plus projects with combined PCSRF/BPA funding, 1/2008-12/2019 for the Klickitat Subbasin.

Photo: YN

KLICKITAT Subbasin



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

White Creek 191 Meadows Enhancement Project

Date Completed: In progress

Funding Source: Bonneville Power Administration (logs donated by the Yakama Nation)

Focal Species: Middle Columbia steelhead

Problem: White Creek is classified as “critical habitat” for ESA Threatened steelhead as it provides habitat for 13-31% of all steelhead spawning in the subbasin. Despite providing good spawning substrate, land management activities have degraded the aquatic habitat. Impacts include channel incision, low channel complexity, non-native vegetation, and decreased water storage.

Restoration Actions: To increase wetland and instream habitat, wood jams were placed at eroding meander bends and inflections. Wood was also installed in wetland areas to provide resiliency and roughness for vegetation.

Accomplishments:

- 0.77 acres of floodplain reconnected
- 5 pools deepened
- 5 log jams installed at meander bends
- 1 mile of fence built to exclude cattle

Benefits: Adding wood and reconnecting floodplains will improve spawning and rearing habitat. Our actions will lead to: 1) increased habitat complexity and quality providing refuges during high flows, 2) improved stream flows, and 3) reduced sediment inputs that smother eggs. Planting native vegetation will provide cover, shade, and wood recruitment.



Stream disconnected from floodplain and downcut.
(Photo: YN)



Floodplain reconnected and large wood installed (“after” photo taken before re-watering post-construction).
(Photo: YN)



Photo: YN

KLICKITAT Subbasin

Adults Counted at Lyle Falls Trap in 2019

Spring Chinook

287

Summer Chinook

8

Fall Chinook

1,198

Steelhead

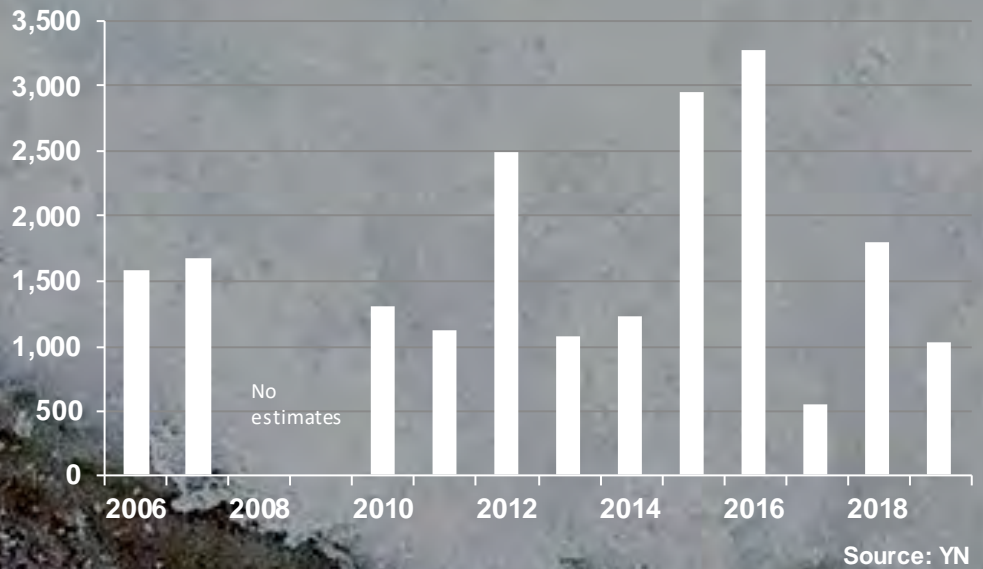
635

Coho

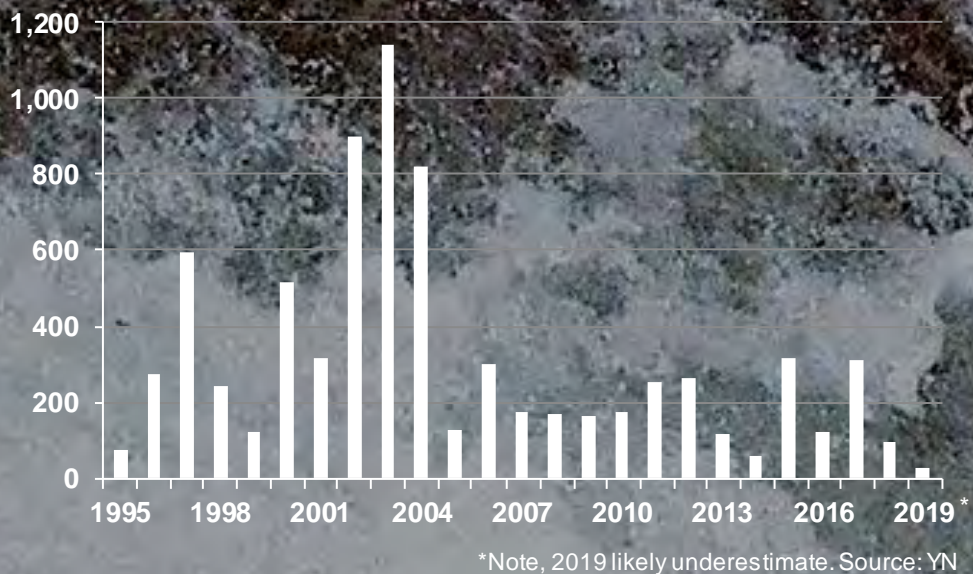
562

Note: Lyle Falls trap counts only represent a subsample of the total run.

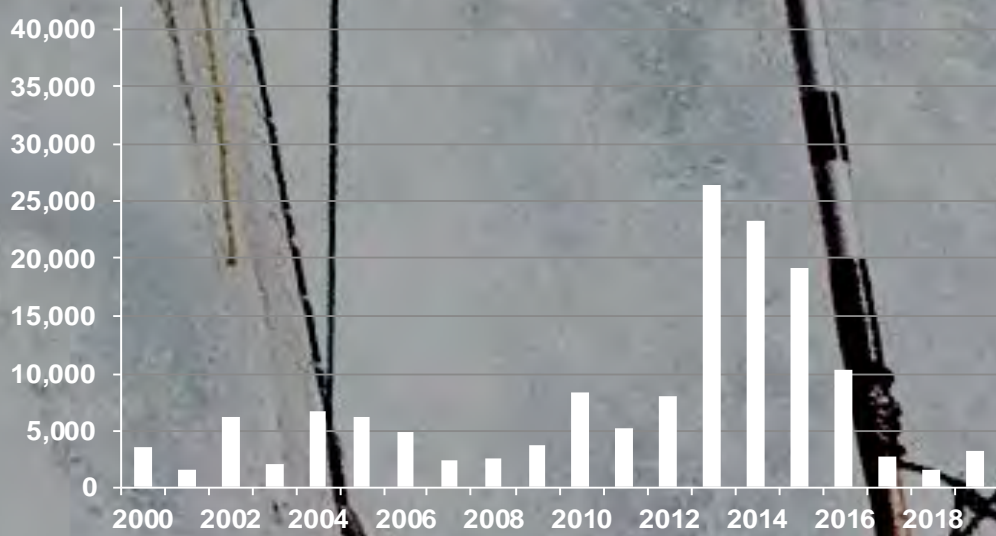
Natural Summer/Winter Steelhead Population Estimate



Natural Spring Chinook Escapement Estimate

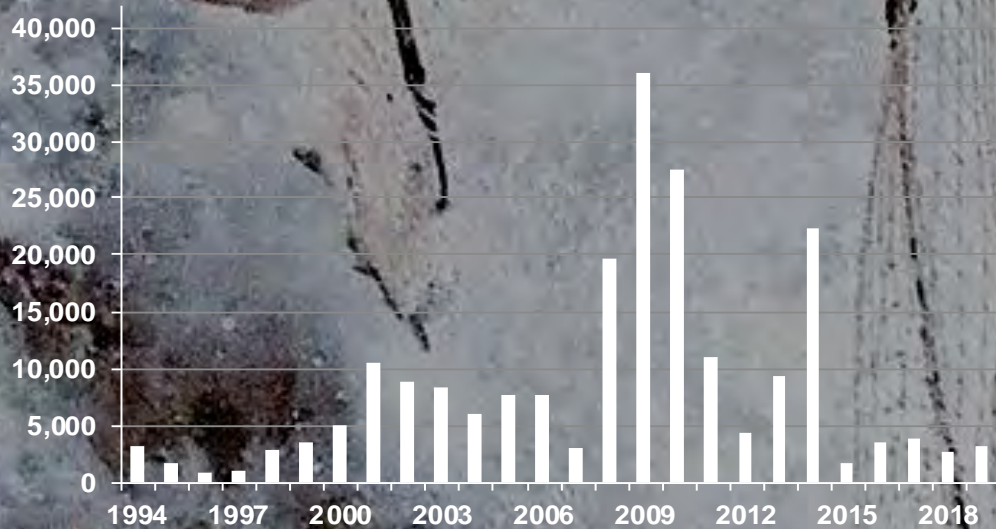


Yakama Nation Fall Chinook Harvest



Source: YN

Yakama Nation Coho Harvest



Source: YN

Photo: CRITFC



Habitat improved for fish and wildlife

0.5
Miles

Habitat made
accessible to fish

35
cfs

Flow kept in
streams

3
Acres

Wetland improved
or protected

WENATCHEE Subbasin

During the pre-treaty era, salmonids were abundant in the Wenatchee Subbasin. Although exploitation and habitat degradation have depleted runs and some populations are ESA protected, the subbasin still has the greatest diversity and overall abundance of fish amongst upper Columbia River subbasins. Past forest management, mining, and development have led to a decline in habitat quality and quantity for fish. We are currently implementing habitat restoration projects to address some of these impacts.

From low numbers in the 1990s that prompted species protections, fish numbers have increased in recent decades. However, abundance for spring Chinook and summer steelhead does fluctuate, as they are still not reaching recovery goals. Work to restore fish abundance and distribution is ongoing. Coho, extirpated by the 1930s, have recently been reintroduced by the Yakama Nation and are now reproducing in the wild.

7,100
People

Informed and
educated

19
Miles

Stream improved
or created

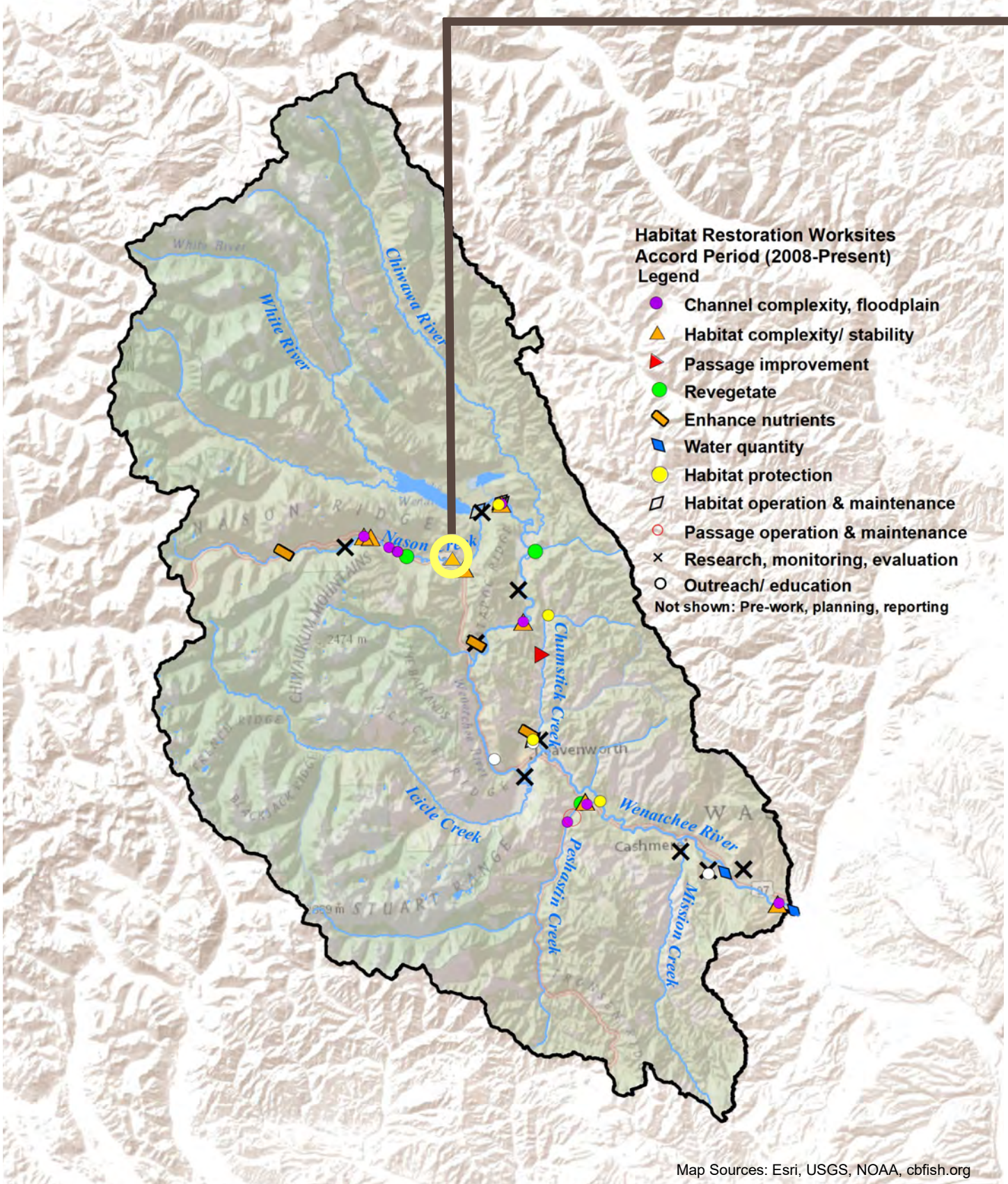
126
Features

Added for
instream habitat

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: YN

WENATCHEE Subbasin



Nason Creek Upper Kahler Project

Date Completed: 2019

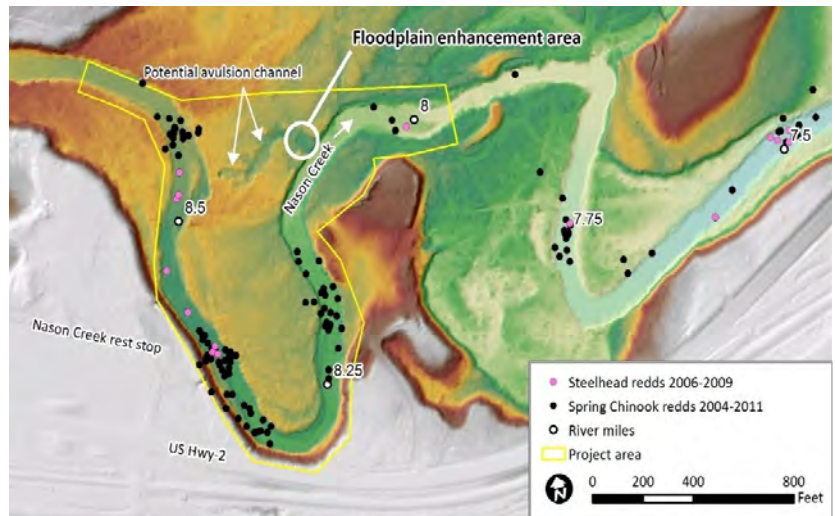
Funding Sources: Bonneville Power Administration, Regional Public Utility District HCP Tributary Committees, and the Yakama Nation

Landowners: Private

Focal Species: Upper Columbia spring Chinook and steelhead

Problem: Transportation, powerline, and residential development have caused historic meander bends of the main creek channel to become cut off. These cutoffs have decreased sinuosity and habitat complexity, while increasing the channel's gradient. The project site represents a remnant high sinuosity meander bend where lower stream gradient promoted spawning gravel retention and hydraulic refuge habitats. Recent landuse practices threatened to provoke channel avulsion (migration to a new channel) which would have reduced spawning and rearing habitat quality.

Restoration Actions: Wood structures were installed to enhance existing juvenile rearing habitat while protecting against channel avulsion.



Map of Upper Kahler meander bend and associated spawning data.



Wood structures buried along the streambank at the project site. (Photo: YN)

Accomplishments:

- 2 wood structures installed to protect against channel avulsion and improve rearing habitats
- 3 pools created to create instream habitat complexity and help fill the avulsion channel
- 1 log weir buried to reduce risk of future avulsion and help fill the avulsion channel
- 2 wood structures installed to enhance juvenile fish habitat

Benefits: This project protected at least 0.75 miles of existing spawning habitat from being lost to unnatural channel avulsion. In addition, adult overhead and holding cover and hydraulic complexity were added to the main channel, improving rearing conditions for juvenile salmonids.

WENATCHEE Subbasin

Adult Spawning Escapement Estimate 2018

Spring Chinook

890

Summer Chinook

3,473

Sockeye

13,960

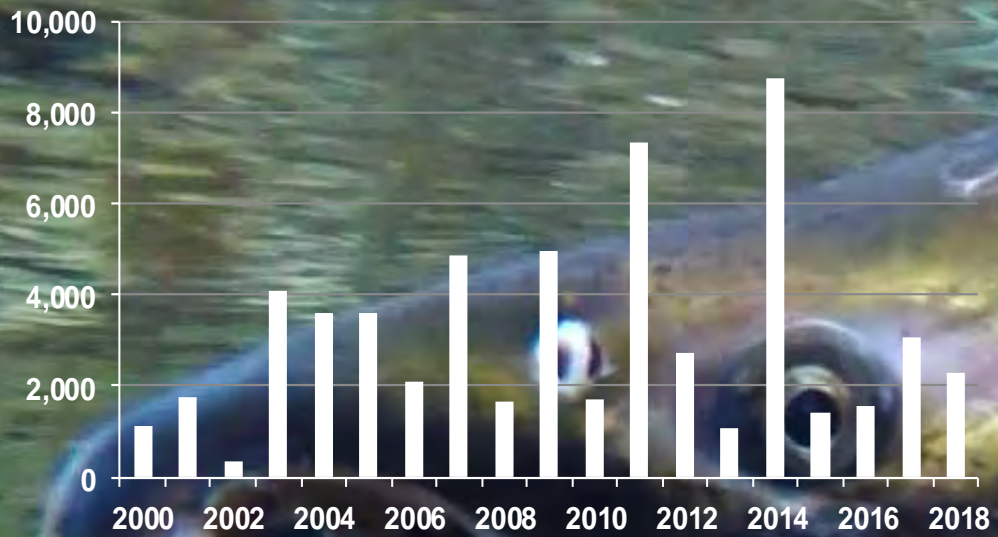
Steelhead

223

Coho

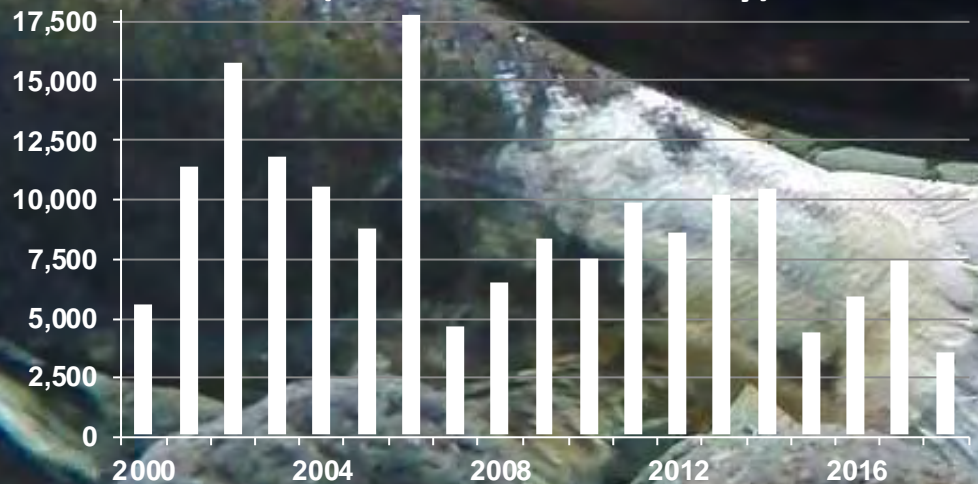
2,285

Coho Escapement Estimate
(Natural and Hatchery)



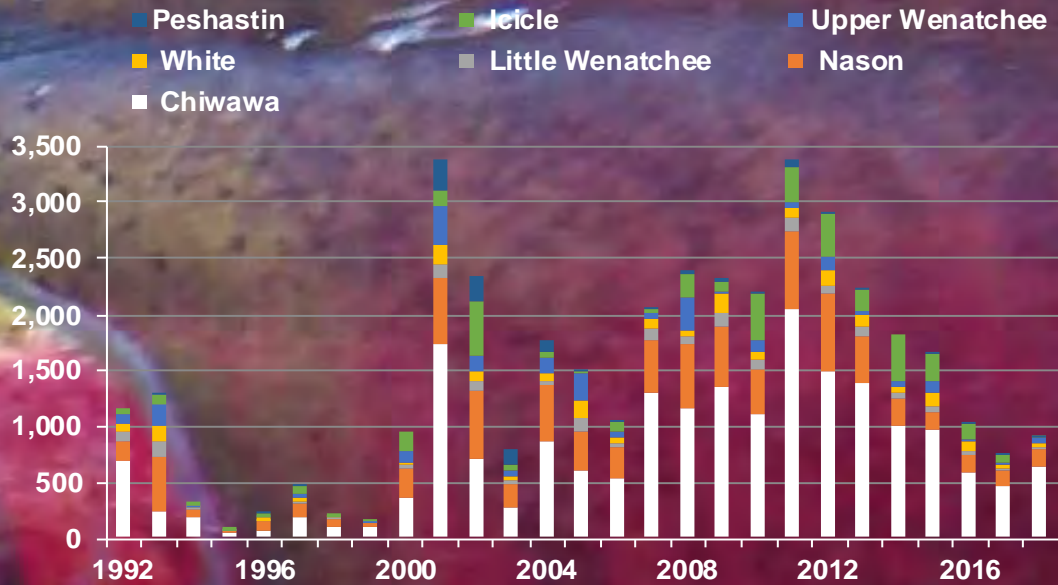
Source: YN

Summer Chinook Escapement Estimate
(Natural and Hatchery)



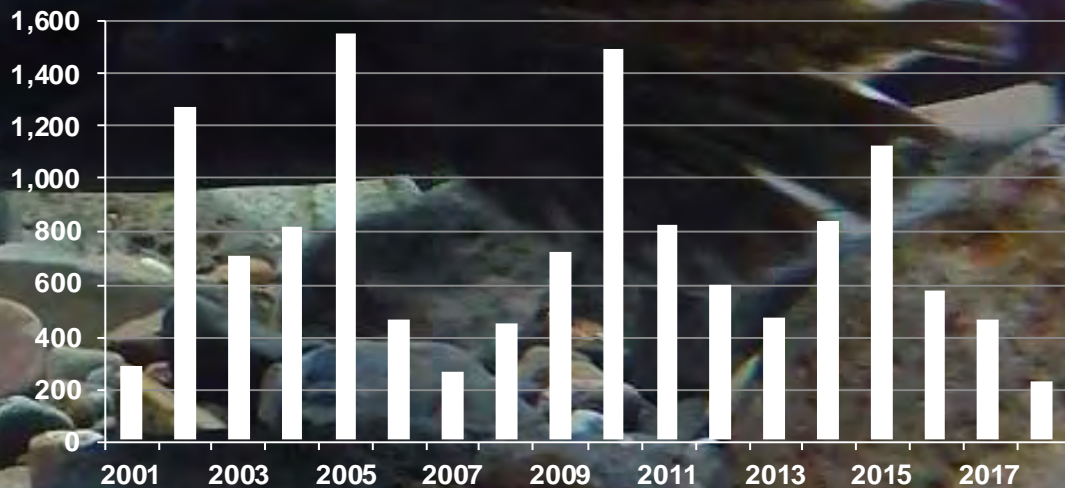
Source GPUD

Spring Chinook Escapement Estimate (Natural and Hatchery)



Source: GPUD

Summer Steelhead Escapement Estimate (Natural and Hatchery)



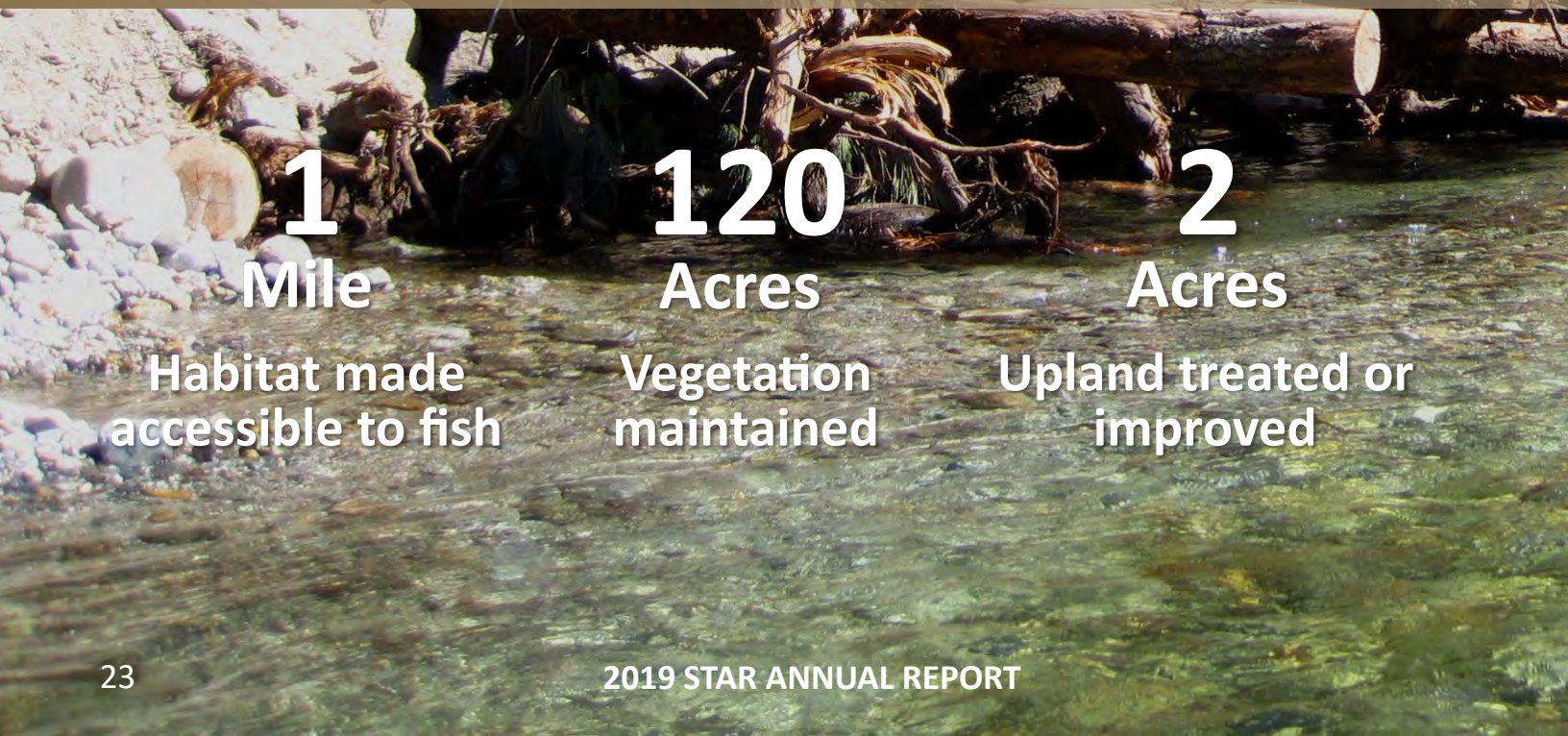
Note: Estimate for upstream from Tumwater Dam. Source: GPUD

Photo: BLM



Habitat improved for fish and wildlife

2008-2019



1

Mile

Habitat made accessible to fish

120

Acres

Vegetation maintained

2

Acres

Upland treated or improved

ENTIAT Subbasin

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. In addition to other factors, past land management practices such as mining, logging, diversions, and flood control structures have contributed to habitat degradation, erosion, and loss of habitat complexity and diversity. These habitats are needed by fish for essential spawning, rearing, and resting areas throughout their lives. Working with others, we are restoring habitat to help restore fish populations. Although there has been some improvement in fish abundance in recent decades, populations still need to improve before they can be considered a viable resource.

5,500
People

**Educated and
Informed**

6.25
Miles

**Stream habitat
treated or
improved**

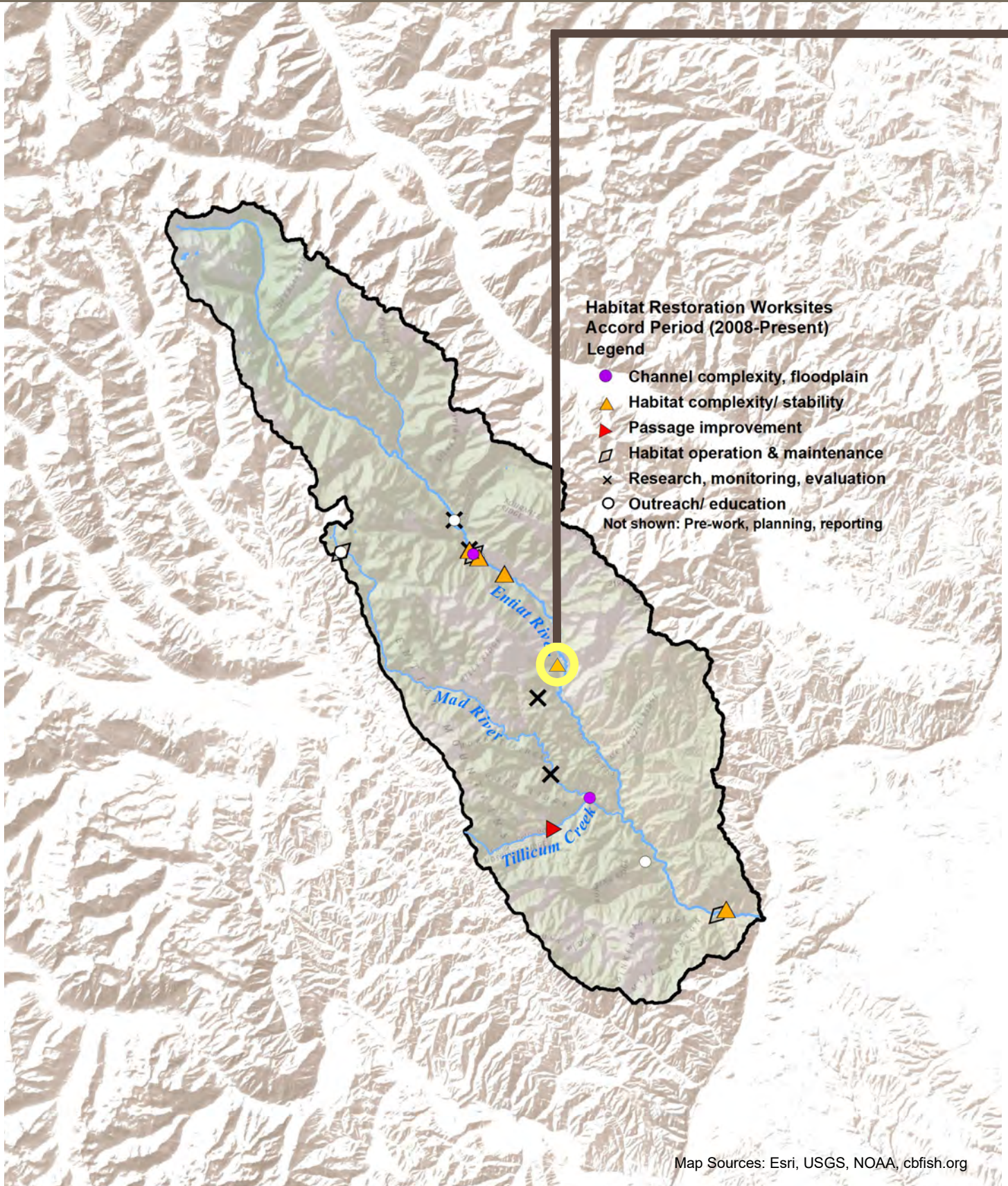
3.25
Miles

**Riparian habitat
treated or
improved**

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: YN

ENTIAT Subbasin



Stormy A Project

Date Completed: 2019

Funding Sources: Bonneville Power Administration, Regional Public Utility District HCP Tributary Committees, and Priest Rapids Committee

Landowners: U.S. Forest Service and the Chelan Douglas Land Trust

Focal Species: Upper Columbia spring Chinook and steelhead

Problem: Although the project area contained spawning and rearing habitat for spring Chinook and steelhead, habitat was degraded due to land clearing and historic instream wood removal. These activities resulted in a simplified channel and disconnected floodplain that reduced the quality and quantity of fish habitat while also disrupting natural flow patterns.

Accomplishments:

- 1 mile stream restoration
- 0.5 miles of perennial side channel restored
- 20 acres of floodplain reconnected
- 19 wood structures installed instream, consisting of hundreds of pieces of wood
- 11 pools created
- 5,000+ native trees/shrubs and 13,000 wetland plugs installed

Benefits: Perennial side channel habitat provides rearing salmon and steelhead a refuge from high flows. Reconnecting the floodplains will reduce the energy of peak flows while allowing water to slowly leach out over a long period of time which will help to maintain flows during drought conditions. The addition of instream wood will provide 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.



Log structure during construction. (Photo: YN)



Project in progress, with temporary bridge in place. (Photo: YN)

Adult Spawning Escapement Estimate 2018

Spring Chinook

92

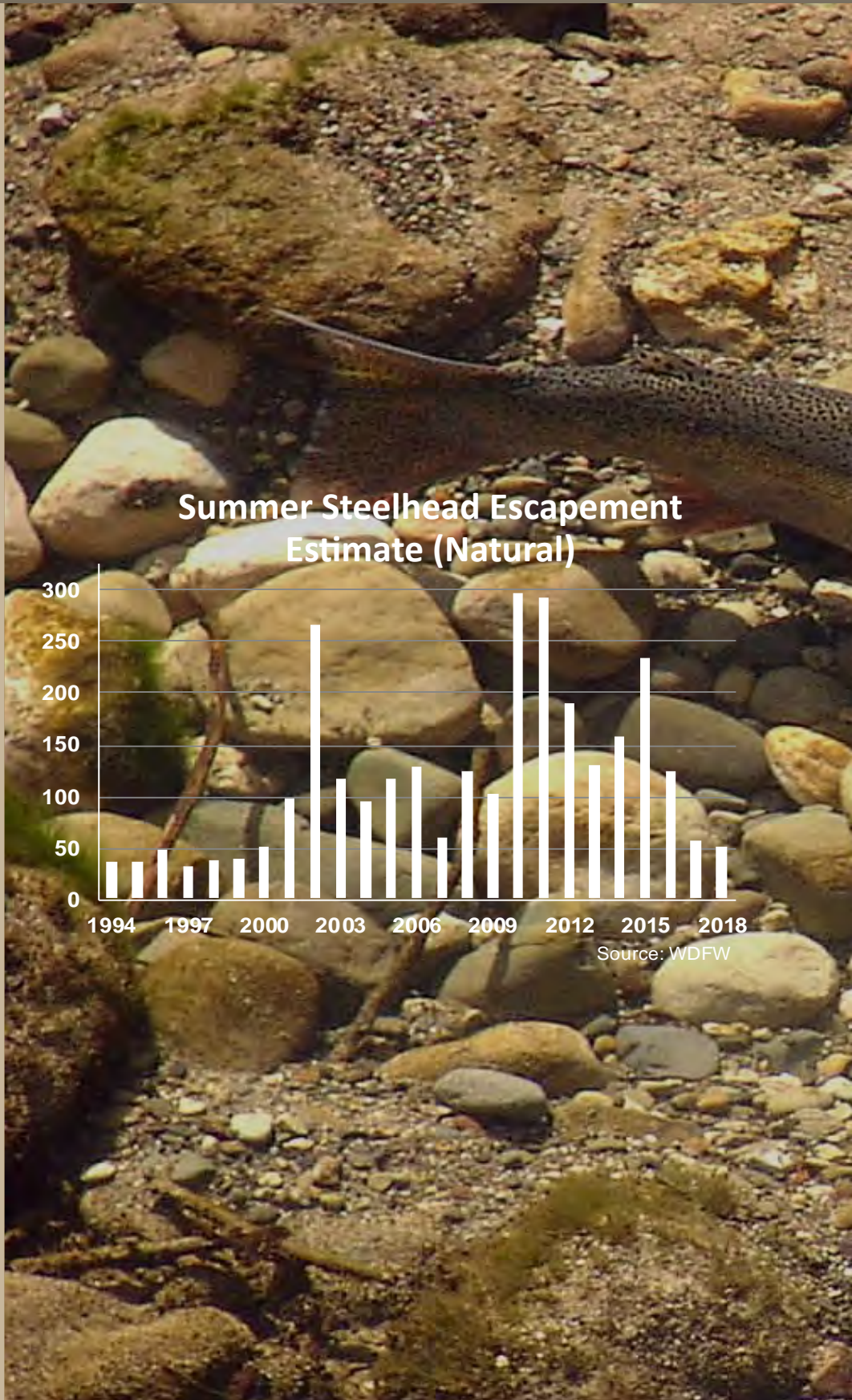
Summer Chinook

486

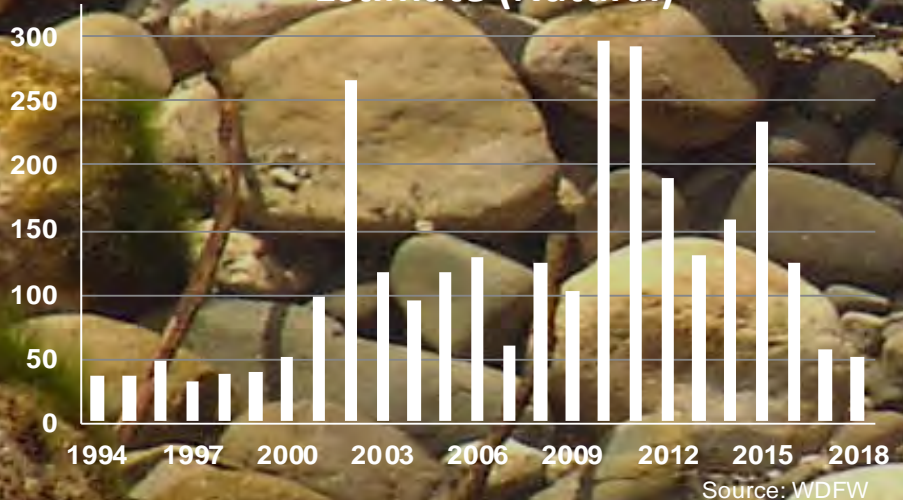
Steelhead

160

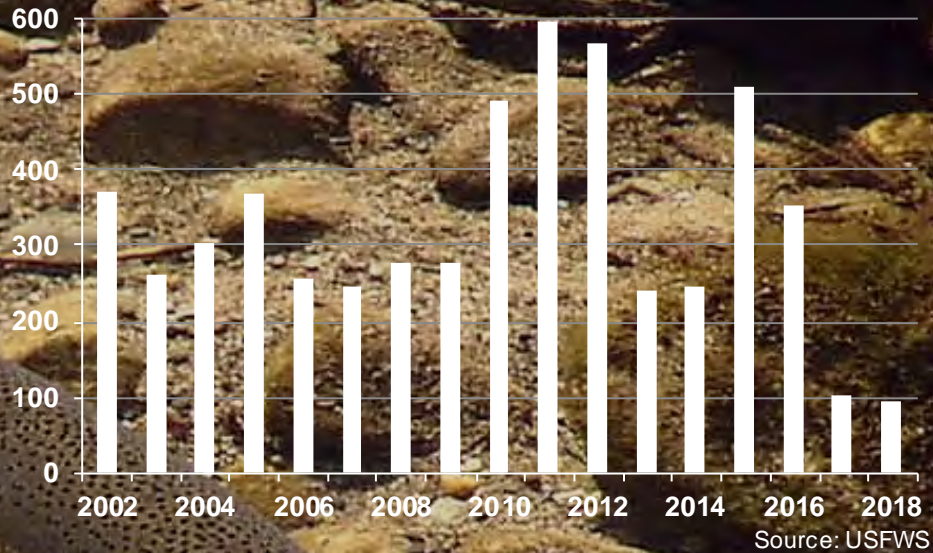
Includes natural- and hatchery-origin



Summer Steelhead Escapement Estimate (Natural)



Spring Chinook Escapement Estimate (Natural and Hatchery)



Summer Chinook Escapement Estimate (Natural and Hatchery)



Photo: USFWS



Habitat improved for fish and wildlife 2008-2019

2

Miles

**Habitat made
accessible to fish**

195

Acres

**Wetland habitat
treated or
protected**

198

Acres

**Upland improved
or protected**

METHOW Subbasin

Industrial development of the Columbia River, mining, water diversions, forestry, and private development in the Methow Subbasin, combined with historically intensive fishing, have led to declines of wild salmonid populations. Most of the habitat degradation is located in the mid-to-lower portions of the subbasin.

Of all the fish species in the Methow, spring Chinook is one whose population numbers are of most concern. By the 1930s, only 200 to 400 adult spring Chinook returned to the Methow. There have been large fluctuations in redd counts from the 1950s through the 1990s, and they are still not reaching minimum thresholds for viability. Summer Chinook, which is now supplemented, averaged a run-size of about 1,000 adults from 1980 to the 1990s, but now is seeing greater returns and harvest in the mainstem Columbia River. Although steelhead were once abundant, the population now sustains itself only at a threshold population size. Coho were extirpated in the early-1900s; however, through our reintroduction efforts, natural reproduction is now occurring.

5,510
People

37
Miles

31
Miles

**Informed and
educated**

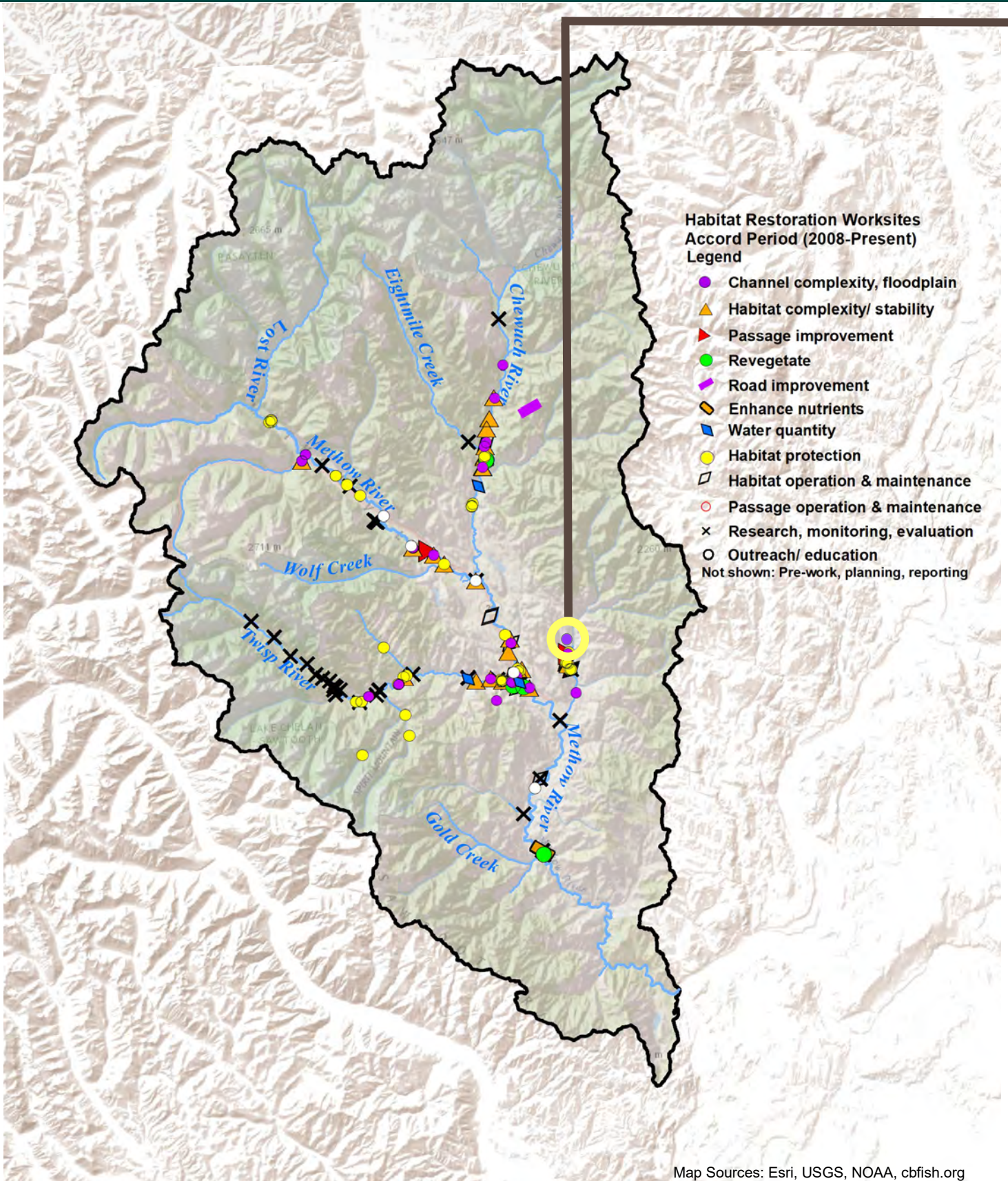
**Stream improved
or protected**

**Riparian improved
or protected**

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: YN

METHOW Subbasin



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

Beaver Creek Reach 5

Date Completed: 2019

Funding Source: Bonneville Power Administration

Focal Species: Upper Columbia spring Chinook and steelhead

Problem: Beaver Creek has been identified as a high-value area to restore habitat for federally-listed spring Chinook, steelhead, bull trout, and non-listed fish. Fish habitat in the drainage has been degraded by development, natural resource extraction, and wildfires. The lower sections of the creek have been straightened and disconnected from their floodplains and can become dewatered during the irrigation season. Restoration priorities include: 1) restoring spawning and rearing habitats, 2) improving geomorphic conditions that maintain those habitats, and 3) restoring perennial flow.

Accomplishments:

- 2 mile-long stream restoration effort
- 500 logs placed instream
- 500-foot perennial side channel created
- 1 alluvial fan with hydrologic restoration

Benefits: Logs placed instream are benefiting salmonids by: 1) sorting sediment for spawning, 2) creating new scour pools, 3) inundating floodplains, and 4) providing cover. Restored side-channels and alluvial fans provide off-channel habitats that are important to juvenile fish. Increased floodplain inundation will support groundwater recharge, which helps to provide sustained flow during the dry season.



Completed new side channel. (Photo: YN)



Channel-spanning and habitat forming logs, sourced from adjacent hillslope. (Photos: YN)

METHOW Subbasin

Adult Spawning Escapement Estimate 2018

Spring Chinook

594

Summer Chinook

1,367

Coho

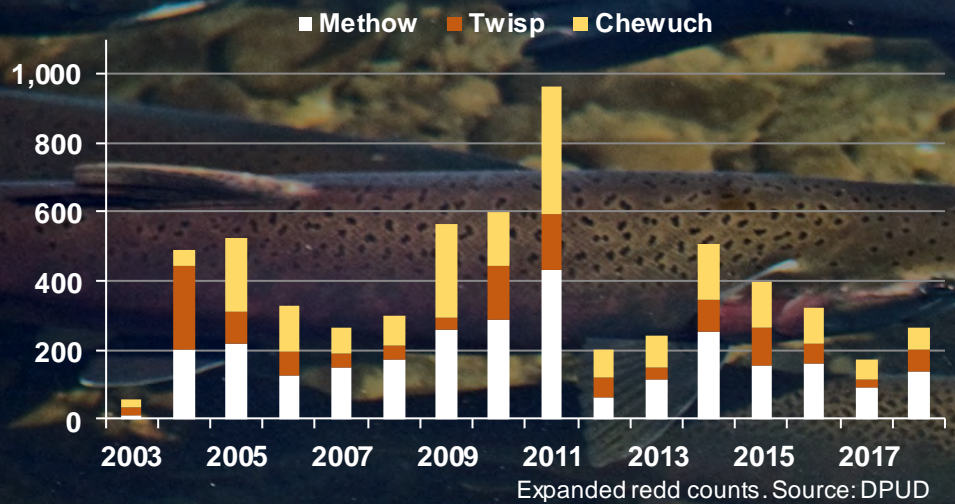
3,498

Steelhead

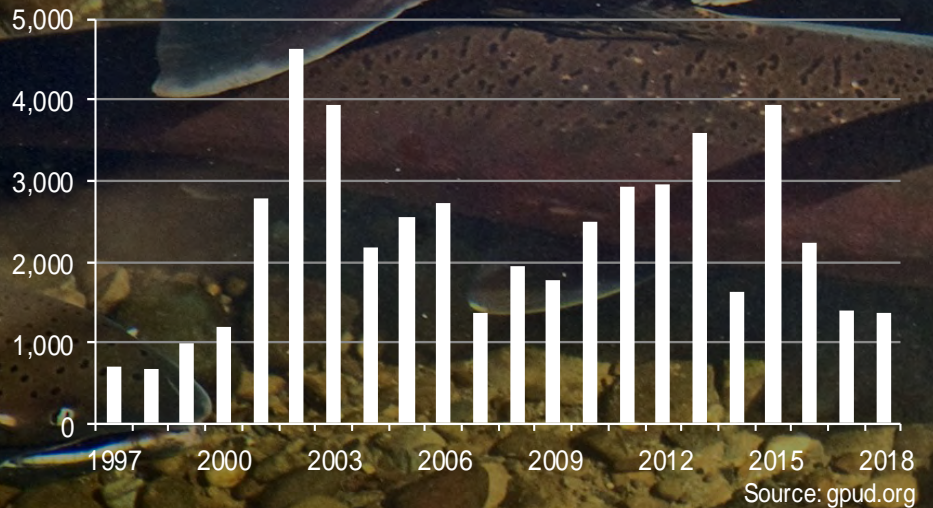
1,342

Includes natural- and hatchery-origin

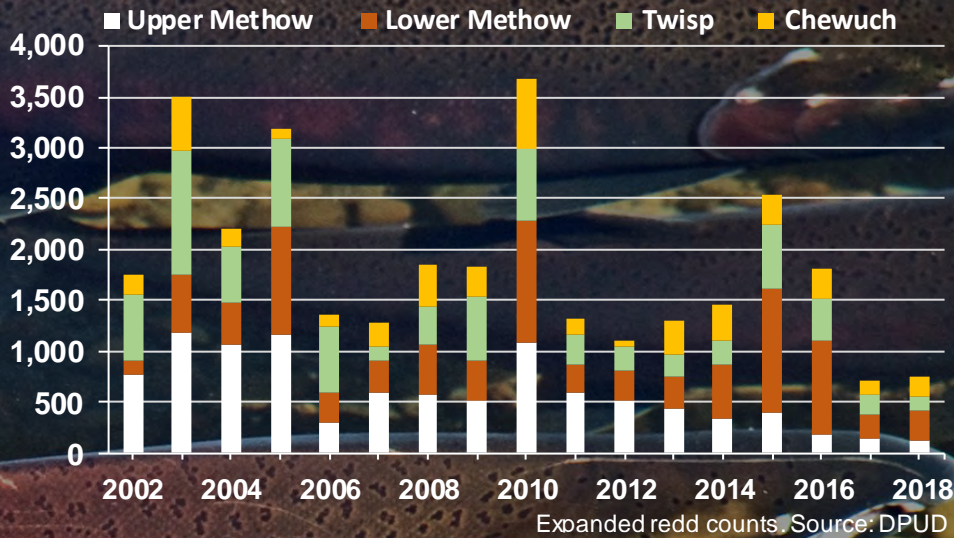
Spring Chinook Escapement Estimate (Natural)



Summer Chinook Escapement Estimate (Natural and Hatchery)



Steelhead Escapement Estimate (Natural and Hatchery)



Coho Escapement Estimate (Natural and Hatchery)

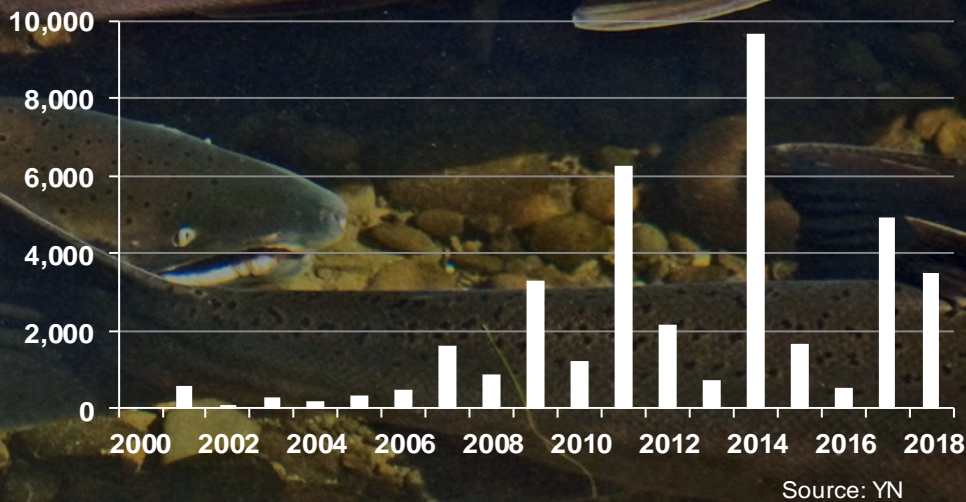


Photo: USFWS

HARVEST

Columbia River Zone 6 Tribal Harvest 2019

Chinook

78,470

Steelhead

7,340

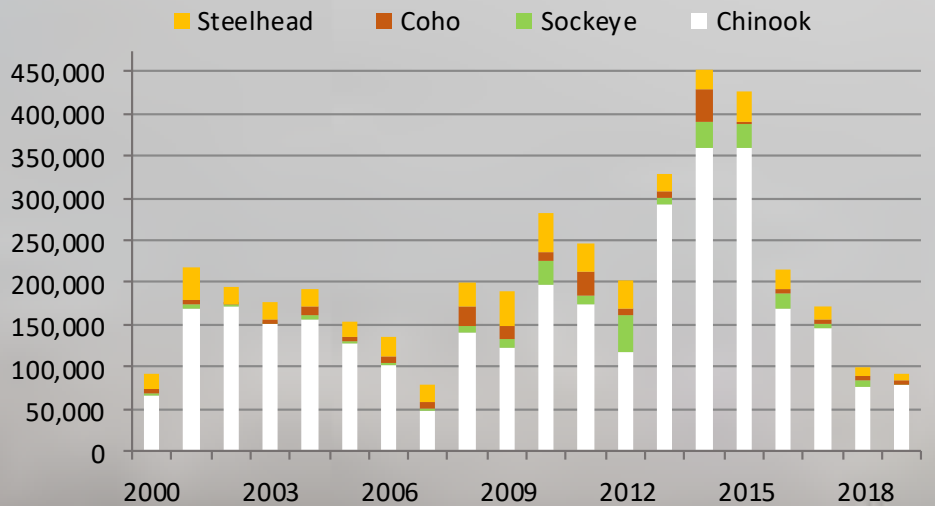
Coho

5,060

Sockeye

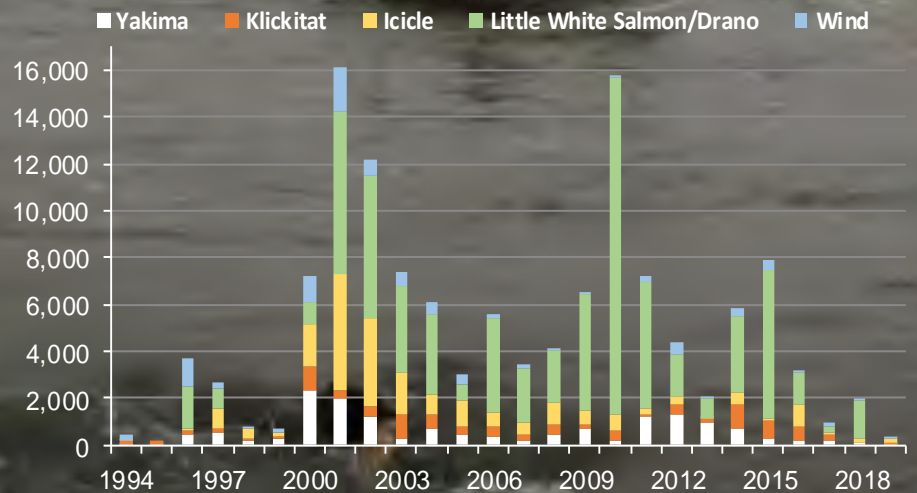
1,118

Tribal Harvest By Species - Columbia River Zone 6



Source: US v. OR TAC Documents (2010-2018) WDFW Joint Staff Reports (2000-2009)

Yakama Nation Spring Chinook Tributary Harvest



Source: YN

NATIONAL RECOGNITION

Tribal Accomplishment Award

In 2019 the Yakama Nation received the *National Rise to the Future Award* from the U.S. Forest Service for excellence and leadership in fisheries, hydrology, soil science, or air programs. Since 1983, we have been working to honor, protect, and restore Nch'í Wána (the Columbia River), its tributaries, and its resources for the benefit of current and future generations of the Yakama people. Through our Upper Columbia Habitat Restoration Project, we have collaborated with USFS staff from the Methow Valley, Entiat, and Wenatchee Ranger Districts to collect baseline data while also completing projects that: 1) increase large wood habitat, 2) restore riparian and floodplain habitat, 3) create and reconnect side channels, and 4) provide for improved passage for aquatic organisms. During the last 5 years we have helped the USFS restore more than 10 miles of stream habitat and over 25 acres of riparian habitat important to steelhead and spring Chinook salmon.



Hans Smith (left) and Brandon Rogers, in Washington D.C. at the USDA Jamie L. Whitten Building, accepting the Tribal Accomplishment Award from the USFS (Award shown above). (Photos: YN)

Example of restoration work completed through the Historic 1890's Side Channel Project in the Methow Subbasin. (Photo: YN)



REFERENCES

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>)

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, 2019.

Lyle Falls fish trap counts: http://dashboard.yakamafish-star.net/DataQuery/adult_passage_counts

Fall Chinook and coho harvest: Megan Begay, YN Fisheries, personal communication, 2019.

Wenatchee

Coho escapement estimates: Cory Kamphaus, YN Fisheries, personal communication, 2019.

Historical coho occurrence: Mullan, J.W. 1984. Overview of artificial and natural propagation of coho salmon (*Oncorhynchus kisutch*) on the mid-Columbia River. Rept. No. FRI/FAO-84-4. USFWS, Leavenworth, WA.

All other species: Hillman, T., et al. 2019. Monitoring and evaluation of the Chelan and Grant County PUDs hatchery programs: 2018 Annual PUD Report. (www.gcpud.org)

Entiat

Chinook escapement estimates: Fraser, G. S. and M. R. Cooper. 2019. Chinook salmon spawning ground surveys on the Entiat River, 2018. U. S. Fish and Wildlife Service, Leavenworth, WA. (www.fws.gov)

Steelhead escapement estimate: WDFW's "The Score" online fish population site: https://fortress.wa.gov/dfw/score/score/species/population_details.jsp?stockId=6903

Methow

Spring Chinook and steelhead escapement estimates: Snow, C., C. Frady, D. Grundy, B. Goodman, and A. Haukenes. 2019. Monitoring and evaluation of the Wells Hatchery and Methow Hatchery programs: 2018 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.

Summer Chinook: Hillman, T., et al. 2019. Monitoring and evaluation of the Chelan and Grant County PUDs hatchery programs: 2018 Annual PUD Report. (www.gcpud.org)

Coho escapement estimates: Cory Kamphaus, YN Fisheries biologist, personal communication, 2019.

Habitat Metrics, Summaries

BPA contract reporting site (<https://www.cbfish.org>); categorized and summarized by the STAR Project. PCSRF metrics for the Klickitat Subbasin from D. Lindley, YN Fisheries, personal communication, 2019.

Subbasin description sources: Subbasin plans, reach assessments, hatchery reform documents, etc.

RTT (Regional Technical Team). 2014. A biological strategy to protect and restore salmonid habitat in the Upper Columbia Region. A Report to the Upper Columbia Salmon Recovery Board from the Upper Columbia Regional Technical Team (www.ucsr.org).

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, 2019 and 2019 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)

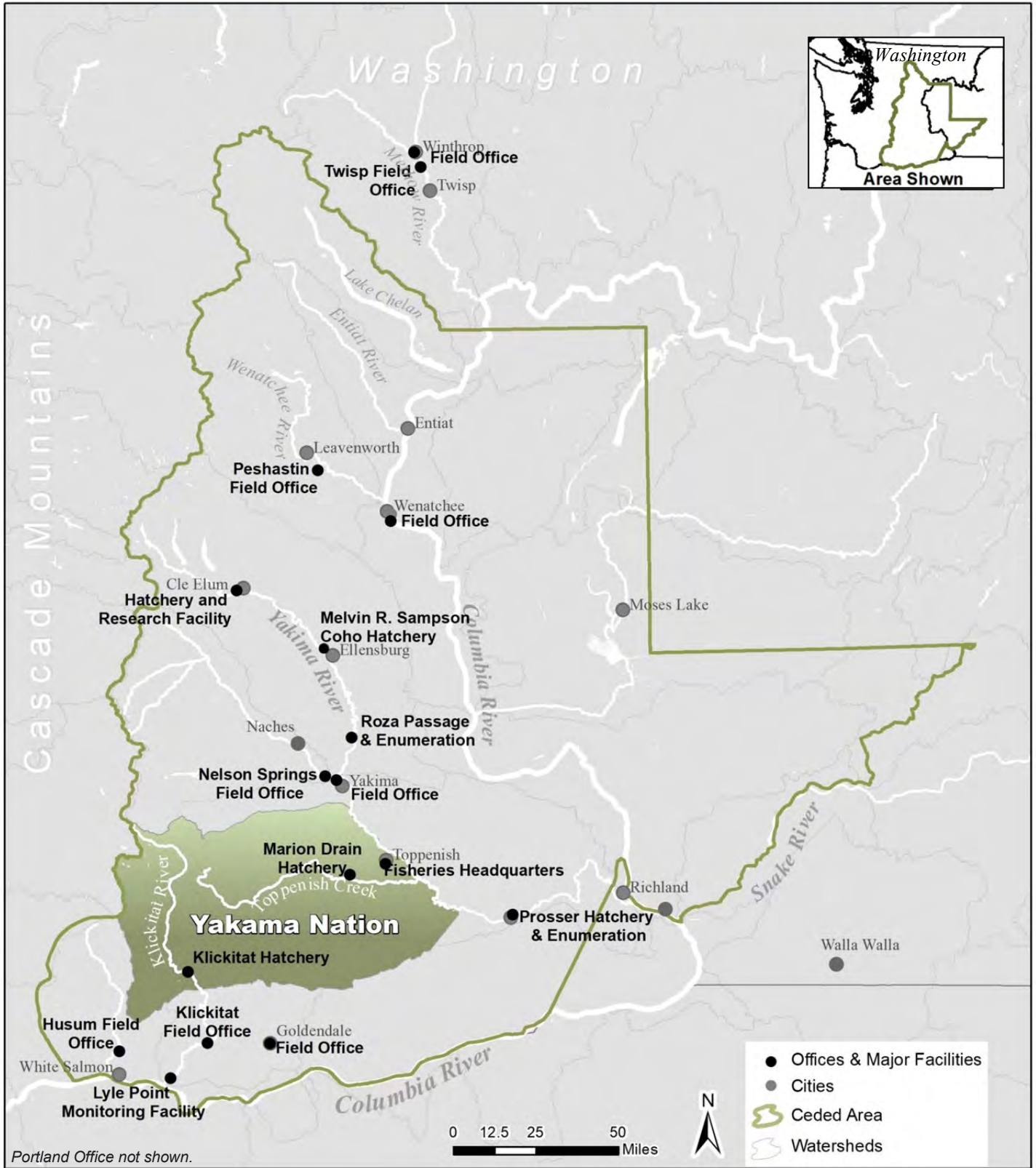
Bosch, Bill. (2019). Run Size Forecast for Yakima River: Adult Spring Chinook, 2020. [white paper]. YKFP. November 22, 2019.

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 Offices & Facilities





HONOR. PROTECT. RESTORE



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