THE YAKIMA BASIN

A Handbook for Healthier Waters

2020 V.1

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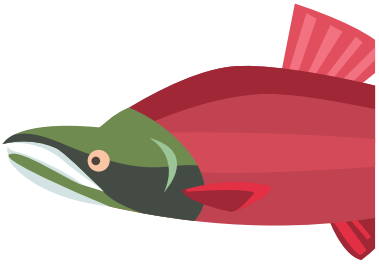


The Yakima Basin encompasses over 6,000 square miles and stretches from alpine meadows to arid shrub-steppe ecosystems. The Basin includes the Yakima River, which is the largest river system starting and ending in Washington and is home to many people, plants, wildlife, and fish.

Today, salmon support tribal, commercial, and recreational fisheries. They are also essential for a healthy ecosystem and provide vital food and nutrients for countless other species. The people of the Yakama Nation and other nearby Native American groups have depended on these resources since time immemorial.

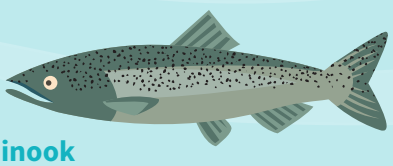
Over time, people intentionally and unintentionally changed the landscape in ways that harmed stream health and, as a result, salmon. Many of these changes were done to extract resources to support the growing number of people living in the basin. Widespread logging, development of roads, management of streamflows, and installation of dams and culverts that blocked fish passage are just some of the alterations that led to significant fish population declines.

Historically, the Yakima River Basin supported between 500,000 and 900,000 spawning adult salmon and steelhead. The lesser-known Pacific lamprey, an eel-like fish, returned from the ocean in the hundreds of thousands. The top predator of the river, bull trout, freely moved up and down the Yakima feeding on juvenile fish and spawning in the headwaters.

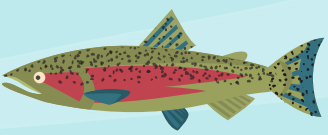
By the 1980s, the situation had become dire. Summer Chinook, coho, and sockeye salmon were extinct within the basin. Spring and fall Chinook, lamprey, and steelhead were barely hanging on with a total of only a thousand fish returning in the worst years. Most bull trout populations were isolated above reservoirs and unable to access their main food source of young salmon.

Fortunately, people saw the need to act. Since the 1980s, tribes, non-profits, private landowners, and local, state and federal agencies have joined together to help the region's streams thrive again.

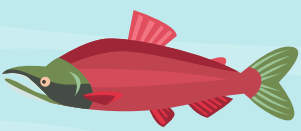
Important Fish of the Yakima Basin



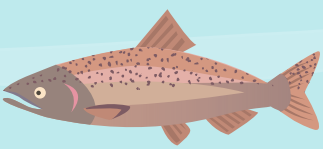
Chinook



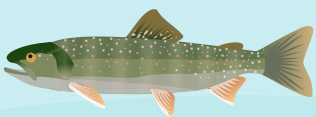
Steelhead / Rainbow Trout



Sockeye

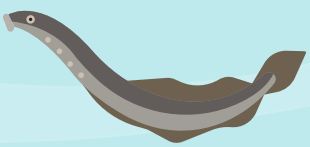


Coho



Bull trout

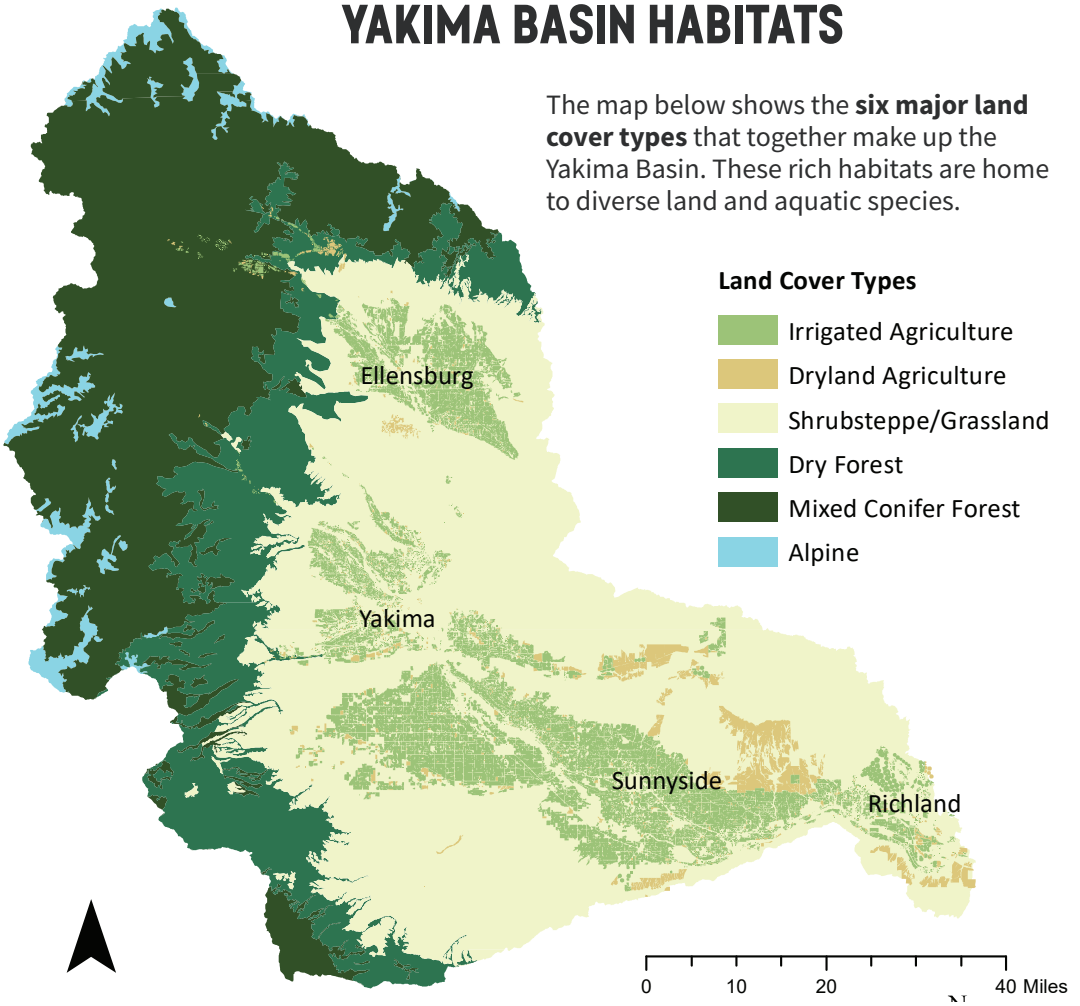
Cutthroat trout

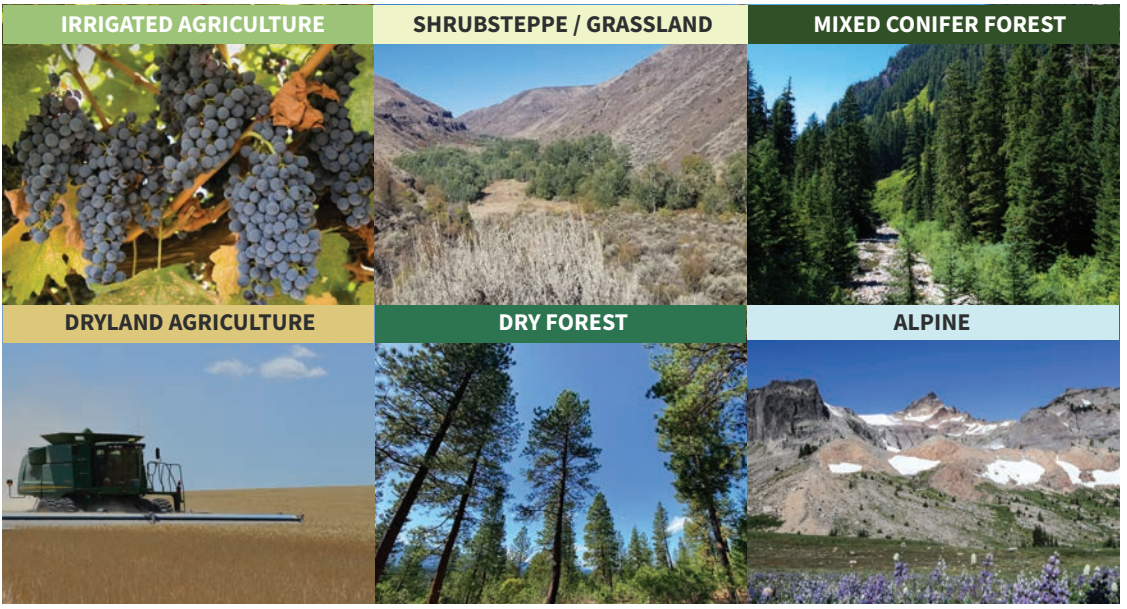


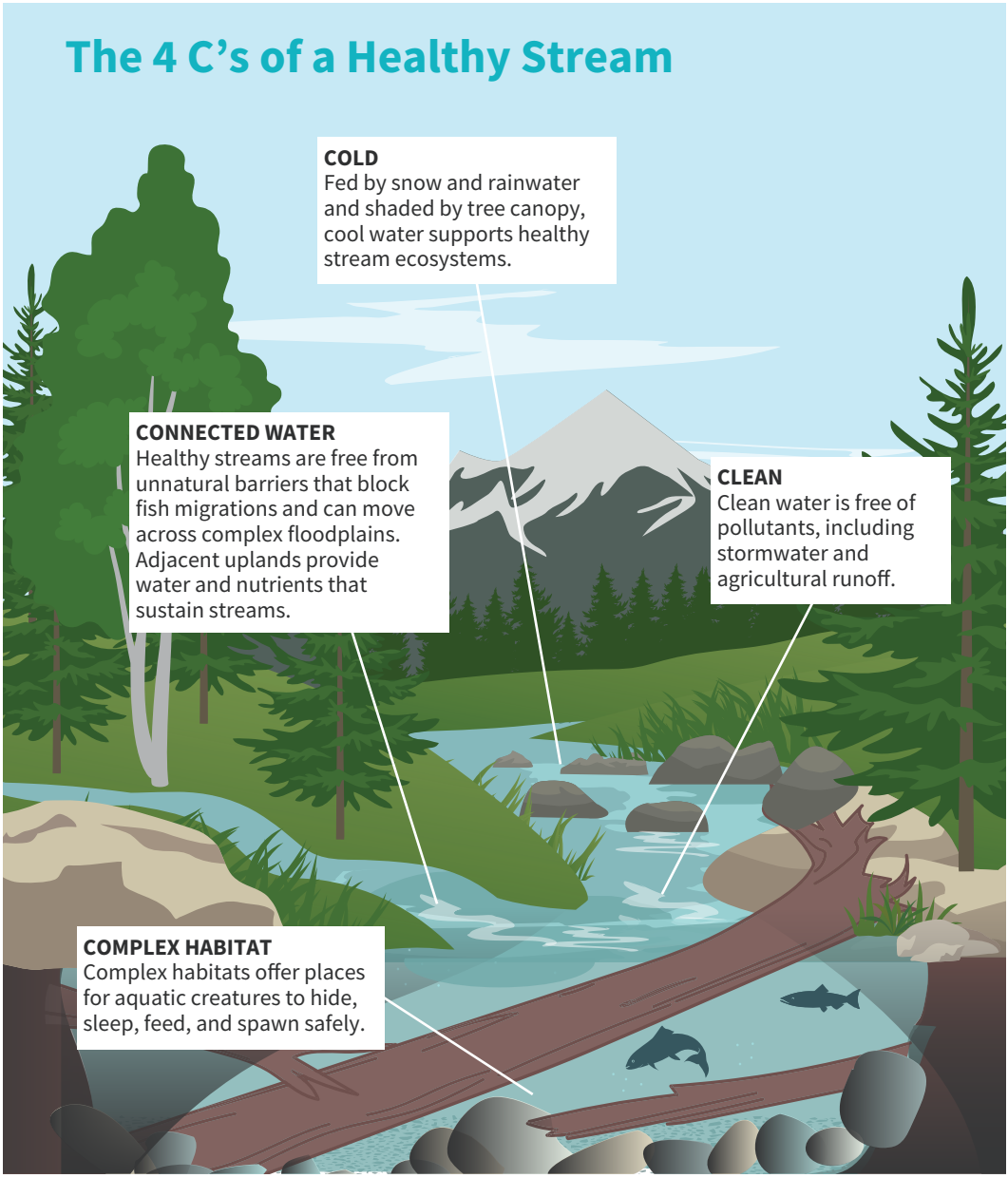
Pacific Lamprey

YAKIMA BASIN HABITATS

The map below shows the **six major land cover types** that together make up the Yakima Basin. These rich habitats are home to diverse land and aquatic species.







WHAT DOES A HEALTHY STREAM LOOK LIKE?

The healthiest streams east of the Cascade Crest have the "four c's" that trout and salmon need to thrive: cold, clean, connected water, and complex habitat.

In these streams, dense riparian vegetation grows on the banks of channels. Wood falls from the riparian zone and creates logjams that form deep pools. Flood flows frequently overtop stream banks, onto the floodplain, or the low-lying land next to a river. Accessible, well-vegetated streams that are connected to their floodplains provide the "four c's" for salmon and trout.

RESTORING HABITAT

Today, government agencies, tribes, non-profits, and communities are teaming up to restore streams and improve habitat for native fish species.

Restoration projects all start with a landowner – a public or a private property owner. Although a restoration project might seem simple, they often take months to years to complete because of the complexity of permitting, funding, and other factors.

There are lots of options and opportunities for private property owners to work with non-profits, conservation districts, tribes, and governmental agencies to restore streams. After learning more about the goals and ideas for your property, they can provide technical guidance and work to get necessary project approvals and funding to implement a project.

While no two restoration projects look alike, they all provide benefits for people, fish, wildlife, and plants. The pages that follow show some of the types of restoration work that can be done to create healthier habitat.

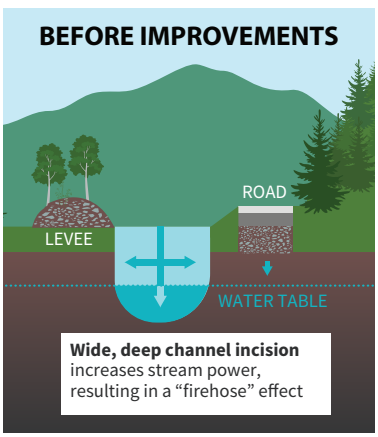
FLOODPLAIN RECONNECTION

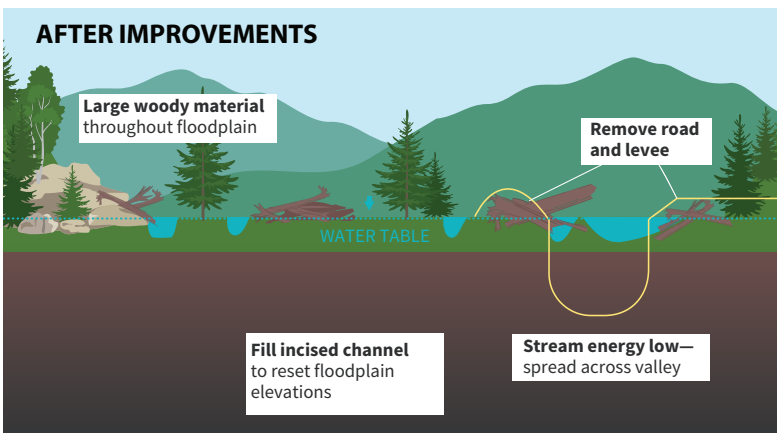
Floodplains are the low-lying areas adjacent to streams and rivers. When flood events occur, water overtops stream banks and spreads out across the floodplain. As water spreads out over a larger area, it moves slower and sediment is allowed to settle. Acting like a sponge, the floodplain also soaks up water which raises the water table, where water moves underground through soil and rocks. This groundwater replenishes the stream throughout the year. A connected floodplain ultimately improves water quality and reduces flood hazard risk for downstream neighbors.

There are plenty of examples in the Yakima Basin of negative floods impacts. Flooding is a natural event that is necessary for healthy streams but large flood events can cause real problems when people and infrastructure are located in the floodplain.

Historically, people built infrastructure like levees to allow development in floodplains without experiencing flood events. Levees confine streams, preventing flood waters from reaching the floodplain and create higher and faster flows for downstream neighbors. Levee setback projects provide more room for water to inundate floodplains, naturally reducing flooding risks downstream, while still protecting infrastructure.

Floodplains also become disconnected through controlled flows and the removal of vegetation. Placing large wood in the river and connecting historic side channels are ways to improve this connection and provide benefits to both fish and communities.





What You Can Do

- **Call your local restoration specialists** at Kittitas Conservation Trust, Mid-Columbia Fisheries Enhancement Group, and Yakama Nation Fisheries.
- **If you live next to a stream, plan for flooding** and locate development as far from the stream as possible.
- **Reach out to your county's floodplain managers** for information about your flood risk, and possible restoration projects.

LARGE WOOD RESTORATION

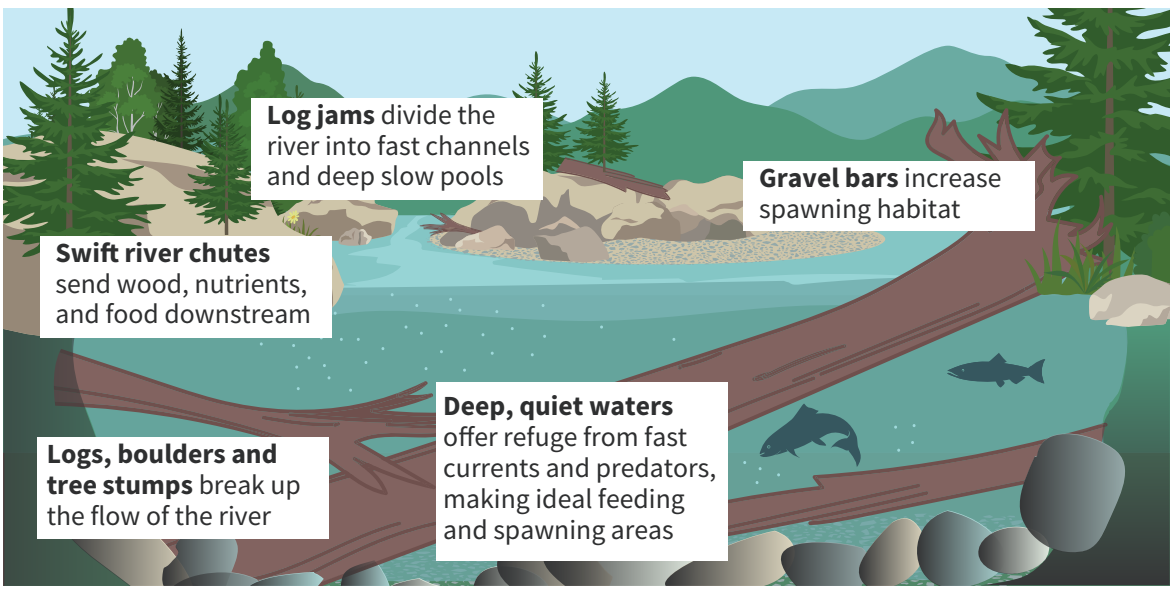
Large wood from fallen trees plays a critical role in healthy streams in the eastern Cascades. Wood collects gravel deposits that fish use for spawning, forms deep pools, attracts food for insects and fish, and provides places for fish to hide and rest.

Wood was removed from streams with the idea that it would improve the movement of water and goods, and with the idea that removing wood was good for fish. But over time we have learned that removing wood channelizes streams, which can be bad for both fish and our communities.

In channelized rivers and creeks, streamflow is concentrated like a firehose. This firehose effect cuts down into the streambed until the channel becomes straighter and deeper. These simplified streams do not provide the types of habitat that fish need. They are like a home with only hallways and no rooms. Just like humans, fish need different "rooms" or areas to feed and rest.

Channelized streams cause problems for people too. As a stream becomes channelized, the water table drops. This can make it difficult for crops or other vegetation to access water during summer months. This can turn once productive farmlands into dry, weed-infested fields.

Partners in the Yakima River Basin are currently working to put large wood back into streams. These wood projects benefit streams and fish by slowing down and spreading out floodwaters, and creating diverse habitats for fish to feed, rest, and spawn. Similarly, these projects help reduce channelization, by capturing sediment, and raising the water table to a level where vegetation can access it.



Adapted from a TNC conceptual infographic by Erica Simek Sloniker.

What You Can Do

- **Learn** more about why wood in rivers is so important for fish and wildlife. http://bit.ly/woodydebris

Case Study: Swauk Creek

Swauk Creek, between Ellensburg and Cle Elum, is a major spawning tributary for steelhead and is also home to Spring Chinook and Coho Salmon and many other native fish species. Swauk Creek has experienced legacy impacts from unregulated railroad logging, agriculture, and mining. Yakama Nation Fisheries worked with private landowners to place large wood in the lower 3.5 miles of Swauk Creek, improving natural stream processes, floodplain connection and instream habitat for native fish species.

BEAVERS AND BEAVER DAM ANALOGS

Beavers are great at building habitat for salmon and trout. These river engineers construct porous dams that create deep pools which fish use for cold-water refuge. This also helps vegetation flourish, replenishes the groundwater table, and creates thriving wetland habitat.

Beaver dams improve water quality by trapping and storing both carbon and pollutants and can decrease the power of high spring flows.

Partners are working to mimic natural beaver dams by building Beaver Dam Analogs (BDA's) to restore streams. These are constructed by driving wooden posts in a line spanning the stream, and then weaving in willows and other vegetation.

NATURAL BEAVER DAM

BEAVER DAM ANALOG

What You Can Do

- **Talk to your local habitat biologist** at Washington Department of Fish and Wildlife to learn more about what assistance is available to landowners.
- **Learn more** about beavers and how to avoid conflicts on your property. http://bit.ly/WAbeavers

PLANTING BY STREAMS

The vegetation that grows immediately next to a stream, known as the riparian area, plays an important role in healthy streams. Trees and large shrubs can provide a source of woody debris and create shade, which helps keep water temperatures from rising. This is critical for fish survival during warm summer months. Healthy vegetation in these areas stabilizes banks, slows down overbank flows and improves water quality by filtering out pollutants and sediment. Native trees and shrubs also provide habitat for birds and animals.

Many funding opportunities can help with the cost of implementation and sometimes even a year or two of maintenance.

What You Can Do

- Projects on your own property can be some of the easiest to undertake and can often be completed on your own with no required permits. **Work with your local conservation district** in Benton County , Kittitas County, and North Yakima.
- You can also **work with riparian planting experts** at Mid-Columbia Fisheries Enhancement Group, WDFW Habitat Program, and Yakama Nation Fisheries.
- Create **backyard riparian buffers** to enhance fish and wildlife habitat and the aesthetics of your landscape. http://bit.ly/backyardbuffers

WORKING WITH CONSERVATION DISTRICTS

Conservation Districts work with landowners across the Yakima Basin to find solutions that benefit both fish and people.

In the upper Yakima Basin, Kittitas County Conservation District works with landowners to implement multi-benefit projects like installing fish screens and converting rill irrigated fields to more efficient sprinkler systems. Fish screens keep fish from getting stranded in ditches and fields, while upgrading to more efficient irrigation infrastructure can reduce the amount of water diverted, minimize soil erosion and improve water quality.

Benton Conservation District, in the lower Yakima Basin, assists homeowners with identifying and implementing actions that both further goals for their property and make habitat improvements. Projects like landscaping with native plants or xeriscaping with drought-tolerant vegetation can conserve water while also reducing time and money spent on lawn maintenance."

Conservation districts in your area assist with planning, funding, and implementation for these and other project types! Reach out to your local conservation district to talk more about improvements that can be made on your property.

www.scc.wa.gov/conservation-district-map

INSTREAM FLOW AND WATER QUALITY

Longer and hotter summers with more frequent droughts are occurring in the Yakima Basin. When stream flows are low, fish become stressed from high water temperatures and low oxygen levels. When streams go dry, there is nowhere for fish and other aquatic species to go.

There are things we can do to keep our streams flowing. Some programs pay landowners to leave more water in-stream or simply divert less water during low flow years. Irrigators can also work with their local conservation district and other partners to improve their irrigation systems; installing buried pipelines for water delivery and converting to sprinklers are just some of the ways to use water more efficiently.

These projects provide multiple benefits for streams and landowners. They reduce the amount of water diverted and can improve instream flow conditions. In addition, they reduce soil erosion and improve water quality.

What You Can Do

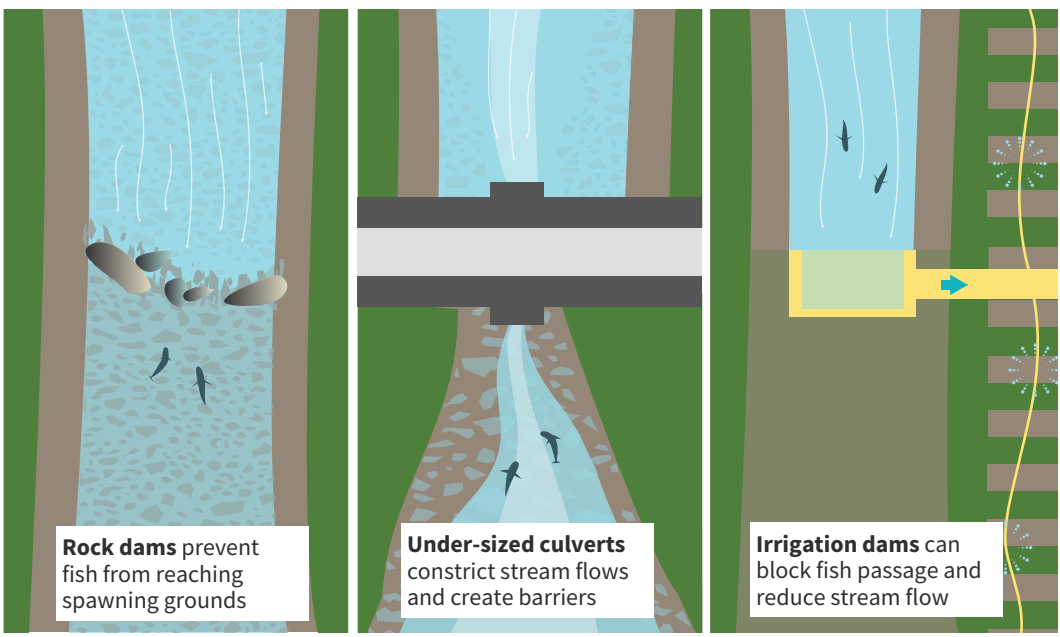
- **Work with your local conservation district** in Benton County , Kittitas County, and North Yakima.
- **Installing effective fish screens** keeps fish where they belong. www.washingtonrcd.org/ytahp
- **Contact the Department of Ecology**, **Trout Unlimited**, or **Washington Water Trust** to learn how to keep more water in-stream.
- **Utilize Heritage Gardens of the Columbia Basin**, which has resources for water-smart native landscaping.

FISH PASSAGE IMPROVEMENTS

Culverts, irrigation diversions, and other infrastructure can create barriers that block fish from reaching important spawning and rearing habitat. These structures can be modified or replaced to allow fish passage.

Culverts may be removed if they no longer serve a purpose or replaced with a large culvert or a bridge to allow rivers to move through them more naturally. Upgrading undersized culverts, which can't handle high flows, to larger culverts and bridges can be very beneficial to our communities. Projects that size culverts and bridges appropriately reduce costly long-term maintenance and the need for repairs.

In addition, work with irrigators to modify private diversion dams and screen diversions has been ongoing for two decades in the Basin. To improve instream fish passage, gravity diversions can be converted to pump diversions so that the dam may be removed or dams can be modified to include passage structures or a fish ladder. Poorly screened diversions can also cause fish to get stranded in ditches and fields, so properly screening diversions is important to eliminate this potential for mortality. Installing a fish screen that meets state and federal criteria keeps fish in the river and reduces landowners' liabilities under the Endangered Species Act.



What You Can Do

- **Remove rock dams** when found in streams and recreate responsibly.
- **Reach out to your local habitat biologists** at Washington Department of Fish and Wildlife and your local Conservation District for free assistance.

MANAGING ROAD IMPACTS

Roads provide access for recreation, forestry, fire management, agriculture and more. However, poorly placed or unmaintained roads can have negative impacts on our watersheds. During storms and snowmelt, water often flows rapidly down road beds and ditches instead of soaking into the ground. This causes erosion and flooding, and pours silt into streams. In addition, as noted earlier, poorly designed road culverts and bridges can block fish from moving up a stream and disconnect streams from their floodplains.

Improved road maintenance and new culverts and bridges can often solve these problems, but can be expensive. When a road is no longer needed and in poor condition, it can make sense to decommission the road. Coming up with the right solution for problem roads is challenging and requires carefully weighing the needs of road users and the costs and benefits of different actions.

What You Can Do

- You can **participate in forums** like the Kittitas County Public Lands Advisory Committee or WDFW/WDNR Green Dot Road Management Meetings to ensure your voice is heard.
- You can **work with partners** to assess the condition of roads on your property and fix problem roads.
- You can also **be a responsible user of public forest roads**, and avoid off-road driving in meadows, wetlands, streams and other sensitive areas.

UPLAND HABITATS

Beyond a stream's riparian zone lie the uplands —forests, shrub steppe grasslands, prairies, and montane habitats. The uplands provide food and shelter for native mammals, reptiles, butterflies, and birds.

The uplands are connected to streams—what impacts one habitat will impact the others. These connections mean everyone can do their part in their own backyard to positively impact our native habitats.

Farmers and ranchers can do conservation projects that can be beneficial for working lands and support native wildlife and ecosystems. There are also resources for property owners that help minimize negative impacts of new construction on the watershed. Forest landowners can work with agencies such as WA Department of Natural Resources to plan and implement thinning projects that benefit landowners and firewise their property.

Homeowners can also use native plants in their landscaping. Native plants enhance the beauty of your property, require less water and maintenance, and provide habitat for wildlife and pollinators.

What You Can Do

- **Reach out to your local habitat biologist at Washington Department of Fish and Wildlife** to see what programs and funding might be available to you.
- **Work with your local Natural Resources Conservation Service office**; there is both financial and technical assistance available for agricultural lands.
- **Contact your local Washington Department of Natural Resources office** regarding forest management.
- **Utilize Heritage Gardens of the Columbia Basin**, which has resources for native landscaping.

ADDITIONAL RESOURCES

Restoration helps ensure a better future for everyone, and your help is critical. Everyone is different and there are a variety of ways for you to become involved. Visit **www.ybfwrb.org** for more.

VOLUNTEER

- **Certify your property** as a wildlife-friendly sanctuary.
- **Connect with WDFW biologists** who can give free advice to homeowners on additional actions.
- **Learn more and participate** in voluntary stewardship programs. https://scc.wa.gov/vsp

CONSERVATION DISTRICTS

Benton Conservation District
www.bentoncd.org

Kittitas County Conservation District
www.kccd.net

North Yakima Conservation District
northyakimacd.wordpress.com

South Yakima Conservation District
www.sycd.us

For more information on our partners and the work they do, visit

ybfwrb.org/outreach/the-yakima-basin