

# Methow River Habitat Restoration Guide



Developed by the Methow  
Salmon Recovery Foundation

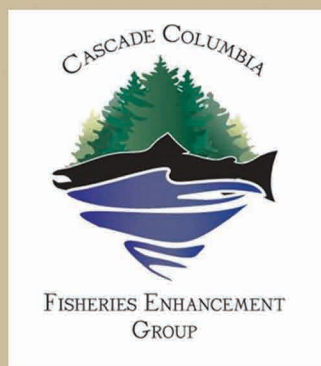
**This guide was made possible through funding from the  
Upper Columbia Salmon Recovery Board.**



**For more information about salmon recovery activities in Okanogan  
County visit [www.ucsr.org](http://www.ucsr.org).**

A number of different groups work on stream restoration throughout the valley and the county, including Methow Salmon Recovery Foundation, Cascade Columbia Fisheries Enhancement Group, U.S. Bureau of Reclamation, Methow Conservancy, U.S. Forest Service, Trout Unlimited, Okanogan Conservation District, Yakama Nation, and the Confederated Tribes of the Colville Reservation. Any of these groups can provide recommendations and resources for private landowners who are interested in allowing restoration or protection of their properties. For more information visit [www.methowsalmon.org](http://www.methowsalmon.org) and [www.ccfeg.org](http://www.ccfeg.org).

**Additional partners for this guide include:**





## Why Habitat Restoration?

Salmon are an icon of the Pacific Northwest representing important social and recreational values for humans. Salmon have been an integral part of cultural heritage for Native Americans for millennia. Yet over the past century, numerous salmon runs in the Columbia River Basin, including those in the Methow River, have declined to drastically low levels. Several populations have gone extinct, and many others have been listed as threatened or endangered.

Reversing the decline of salmon in the Columbia River is an important challenge facing communities in the Pacific Northwest. Without any action salmon runs will continue to disappear along with the cultural values they embody. Many factors contributed to the declines in salmon populations thus a variety of actions will be necessary to reverse the declining trends. Today we have a better understanding of the role healthy rivers and forests play in maintaining sustainable fisheries and this understanding is being put to use to benefit our salmon populations.

Habitat restoration and protection actions are underway to assist the recovery of listed fish populations. Most actions are designed to improve habitat factors that limit fish growth and survival. In the Methow, these "limiting factors" include low instream flow, reduced stream habitat complexity, loss of floodplain connectivity, degraded water quality, and a lack of riparian vegetation.

Many streams in the Methow have been studied to determine the types of limiting factors present. Once the problems have been identified, appropriate restoration projects can be developed to improve conditions for fish. In many cases, several issues are present at the same location, which calls for projects designed to address multiple limiting factors.



***Floodplain and side channel habitat, like this area near Winthrop, provides valuable habitat for fish.***



## What Makes Good Fish Habitat?

In order to thrive, salmon, trout, and other native fish need habitat that represents the four "C's":

- **Cold** – salmon have evolved to live in cold water and prefer temperatures between 45-53 degrees. If streams become too warm fish health will decline.
- **Clean** – salmon need water that is free from excessive fine sediment that can smother eggs, and chemical pollutants that can harm their health.
- **Complex** – salmon use a variety of habitats that vary during their lifetime. Important habitats include small rocks and boulders, deep pools, tangles of tree roots along riverbanks, downed trees, and log jams. Salmon use these habitats in main channels, side channels, as well as wetlands and ponds.
- **Connected** – for salmon to access the variety of habitats needed during different seasons and life stages, they need to be connected at all streamflow levels.



*The cold clean waters of the Methow provide rearing habitat for young Chinook salmon in the restored habitat of the Silver Side Channel.*

## Types of Habitat Restoration Projects

Human actions have diminished the extent and quality of stream habitat in the Methow. This has contributed to declines in the growth and survival of our fish. Habitat restoration is underway to help improve the four C's. The following are descriptions of some of the more common types of habitat restoration projects happening in the Methow.





## Large Wood Installation

For decades, people removed wood from rivers because it was believed to increase flooding and limit fish movement. Today, we understand that instream wood provides many critical benefits to fish and stream health.

As a result of streamside tree clearing and development, there are fewer opportunities for large trees to fall into the river, so engineered log jams are constructed to mimic historical log jams while streamside forests regrow. Engineered log jams can be observed at several locations in the Methow. These complexes of interwoven logs increase fish cover, create pools, and ensure water velocity diversity, with areas of both fast and slow current. These structures create places for fish to avoid predators, find food, and seek refuge from the fast water currents of spring runoff.

Several thousand logs have been installed in the Methow at more than twenty locations. Monitoring of these structures has revealed extensive use by a variety of fish species, including Chinook and coho salmon and steelhead. Juvenile fish are especially attracted to the jams and use the small, tight spaces inside the structure for feeding and safety.



***An example of an engineered large wood jam at the Whitefish Island project area south of Winthrop.***



## Culvert Renovation

Culverts are pipes that are installed to pass water under roads. However, if they are improperly sized, culverts create barriers to fish movement. The downstream end of the culvert may be too far above the water to allow fish access, or water flow through the culvert may be too swift or too low to allow safe passage for fish.

Culverts that are too small can become plugged with debris during high water, causing large pools to form upstream. This can undermine the culvert and is a primary reason for road washouts in the Methow, which can contribute large amounts of fine sediment, reducing habitat quality for fish.

More than 60 culvert renovation projects have been completed in the Methow. Many are replaced with a channel-spanning arch or bridge, which are sized to pass flood flows and debris, and greatly improve fish passage by allowing unimpeded access both up and downstream to many miles of stream habitat that was previously blocked.



***Undersized and/or perched culverts can be a barrier to fish passage. Replacing these with channel-spanning arches or bridges greatly improves fish passage and opens access to upstream habitats. Prior to renovation, this culvert on Antoine Creek near Tonasket blocked fish passage.***





Some funding sources, such as the Family Forest and Fish Passage Program, provide funding for culverts to be replaced on private land at no cost to the owner.



***Antoine Creek culvert post-restoration. Replacement of inadequate culverts with bridges can help facilitate fish passage to and from spawning and rearing habitat, as well as allow natural movement of habitat forming rocks and wood.***



***Juvenile fish, like this young coho salmon, benefit from connected habitats that allow for up and downstream passage.***





## Floodplain and Side Channel Reconnection

Floodplains and side channels provide areas for fish spawning, feeding, and juvenile rearing. These off-channel areas are especially important during periods of high water, acting as slow-water refuge from the fast and turbid waters of the main channel. Floodplains act as a relief valve for flooding rivers, slowing velocities and allowing sediment and wood to drop out of the main flow. They also provide feeding opportunities for fish not found elsewhere.

In many locations in the Methow, levees and riprapped banks were constructed to prevent flood waters from inundating developed land. The levees block access to important side channel and floodplain habitat, and also prevent the flooded river from spreading out and slowing down. Instead the levees pass along fast-moving, erosive current to downstream streambanks along the properties of neighboring landowners.

Levee and riprap removal projects have been implemented in the Methow over the past few years, including several between Twisp and Winthrop. Post-project monitoring has documented extensive use by fish, with fish density in restored areas much higher than in adjacent unrestored areas.



***Breaching the levee that was preventing flow into the Elbow Coulée side channel on the Twisp River has provided valuable habitat for a variety of fish species.***







K. Kirkby

**Before restoration the Silver Side Channel downstream of Twisp had been modified, resulting in a wide, shallow channel with warm water.**



K. Kirkby

**Restoration efforts narrowed the Silver Side Channel, added wood, and planted riparian vegetation. Post-project monitoring has revealed extensive use of the restored area by fish.**





## Riparian Vegetation Planting

Riparian, or streamside, forests provide many benefits to streams. They create shade, which helps keep water temperatures cool, and they provide bank stability through extensive root networks. Instream habitat is created when streamside trees fall into the channel, and the leaves and bugs that fall off the trees into the stream provide important sources of food and nutrients to the stream ecosystem.

In the Methow, a large percentage of the riparian forests were cleared for development. Although little riparian clearing continues today, the effects of past clearing remain. Re-establishing riparian forests with locally-sourced native plants is a widespread and important restoration treatment. Over 100 acres along ten miles of stream have been planted with more than 25,000 plants! These plantings require several years of watering and maintenance to become fully established, but will provide benefits for generations to come.



***Plantings of native riparian plants can add shade and cover to streams, sometimes in just a few years. This photo shows a historical cottonwood forest in the background, a cleared agricultural field in the foreground, and a four-year old revegetated plot in the middle.***





## **Instream Flow**

Human consumption of water, through residential, municipal, and agricultural uses, directly reduces the water available for fish. Most of the year there is enough water for both fish and people, but during periods of low water (such as in a drought or late in summer) streams can drop to levels which limit instream habitat for fish.

Irrigation efficiencies, such as piping, water conserving sprinklers and pivots, and devoting surplus agricultural water to instream flows are examples of projects that have been implemented to boost flows to benefit fish while ensuring human water needs are met. Numerous projects have been completed and include both private water users, irrigation districts, and towns.



***Updating irrigation methods with more efficient systems, such as the center pivot pictured above, can reduce water waste, improve efficiency, and help to increase streamflows. Numerous irrigation efficiency projects have been completed in the Methow over the past decade and have helped to bolster late season instream flows that benefit fish and wildlife.***



# Methow River Habitat Restoration Guide

Humans shaped the landscape of the Methow to fit a diverse set of needs. Yet, some of the changes that were carried out to benefit people have reduced the quantity and quality of habitat available for fish resulting in declines in fish populations. Many factors contributed to these declines which began more than a century ago, before people understood the connection between healthy rivers and forests and healthy fish populations. Activities once considered harmless - like log drives down the river, riparian logging, or suction dredge mining - are now limited to protect salmon and the health of their ecosystem.

In the Methow, fish habitat improvement efforts are guided by the *Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan*. The plan is overseen by the Upper Columbia Salmon Recovery Board and a diverse set of federal, state, county, tribal, and non-profit groups. This unique partnership works together to identify and implement projects to benefit fish and local communities.

Fish recovery efforts include both habitat protection and restoration. While habitat protection aims to preserve remaining high-quality habitat, restoration is focused on improving the condition of areas that have been altered and no longer function properly from a stream health perspective. Both approaches are necessary and important, considering the large size of the watershed and the range in habitat conditions that vary from nearly pristine to degraded.



***Salmon habitat restoration projects in the Methow, such as this engineered log jam, are providing habitat for a variety of fish including ESA-listed spring Chinook salmon, steelhead, and bull trout.***