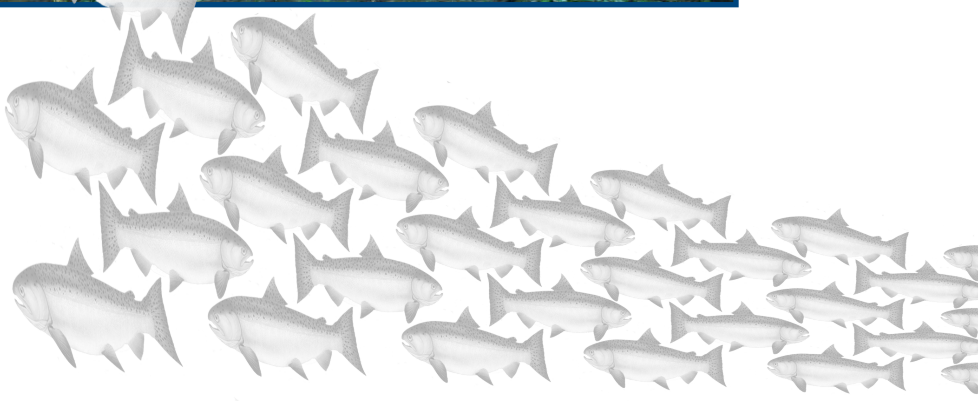
Bringing Back Spring Chinook Salmon in the McKenzie River Basin

A handbook for improving fish habitat conditions in local streams



Willamette River Fish Recovery

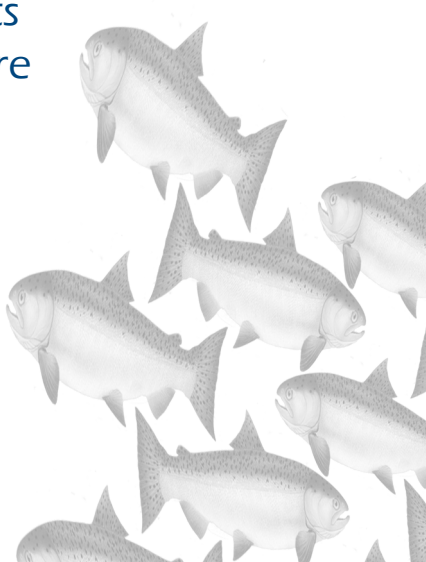
Willamette River Fish Recovery

This handbook provides guidance to help people identify and implement local habitat restoration actions that will aid recovery of spring Chinook salmon in the McKenzie River basin.

It summarizes key direction from the **Upper Willamette River Conservation and Recovery Plan**.

It identifies the types of restoration needed to reach recovery, and describes projects that have already helped restore habitat conditions and habitat-forming processes.

Finally, it lists helpful resources that provide more information on watershed restoration and opportunities to join other partners on projects.



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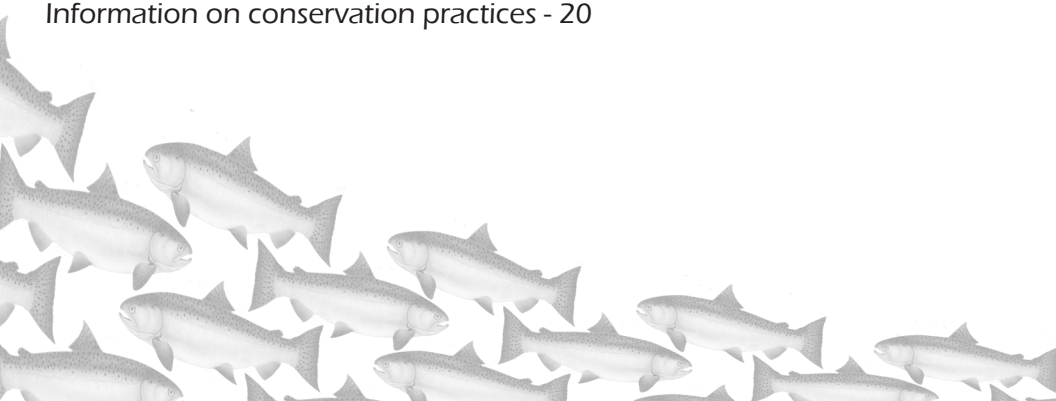
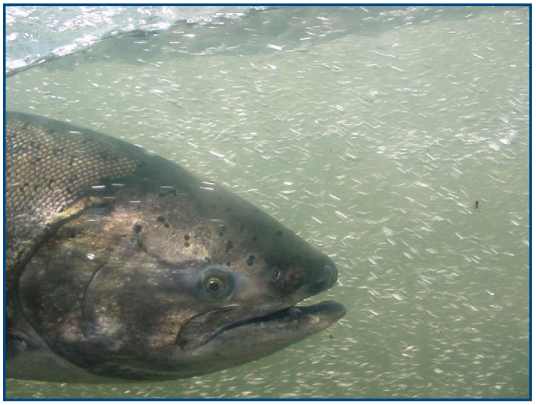
Contents



The fate of McKenzie spring Chinook lies at a crossroad. Compared to historical levels, few Chinook return to spawn in the McKenzie River Basin. The salmon run is listed as threatened under the Endangered Species Act, and is considered at risk for extinction.

This handbook shows where and how you can help restore habitat conditions for McKenzie spring Chinook. We can work together to make sure the fish population remains healthy for future generations.



The full list of recovery actions for the fish is provided in the recently completed Upper Willamette River Conservation and Recovery Plan, available at: www.oregonexplorer.info/willamette.

Photos: Lance Kruzic

Falling on hard times

At one time hundreds of thousands of Chinook salmon returned to spawn in the McKenzie and other Upper Willamette River tributaries.

Over the last 100 years the runs have fallen on hard times. A small number of spring Chinook now spawn in Upper Willamette areas compared to historic levels. In 1800, approximately 300,000 spring Chinook returned to the Upper Willamette basin. By 1940, only 40,000 spring Chinook returned each year. By 2008 the number had declined to less than 5,000 wild spring Chinook.

Today the McKenzie watershed is one of the only areas in the Upper Willamette Basin where significant natural production of spring Chinook occurs. Still, the watershed remains capable of much more. Actions that improve habitat conditions, restore fish passage, reduce hatchery influences and otherwise increase the McKenzie spring Chinook population's performance will allow the population to play a major role in protecting the Upper Willamette spring Chinook run from extinction.

These salmon are part of our natural heritage, symbolizing the health of this special place we live in. We do not want to lose this special heritage.

Oregon Department of Fish and Wildlife

Why are the fish in trouble?

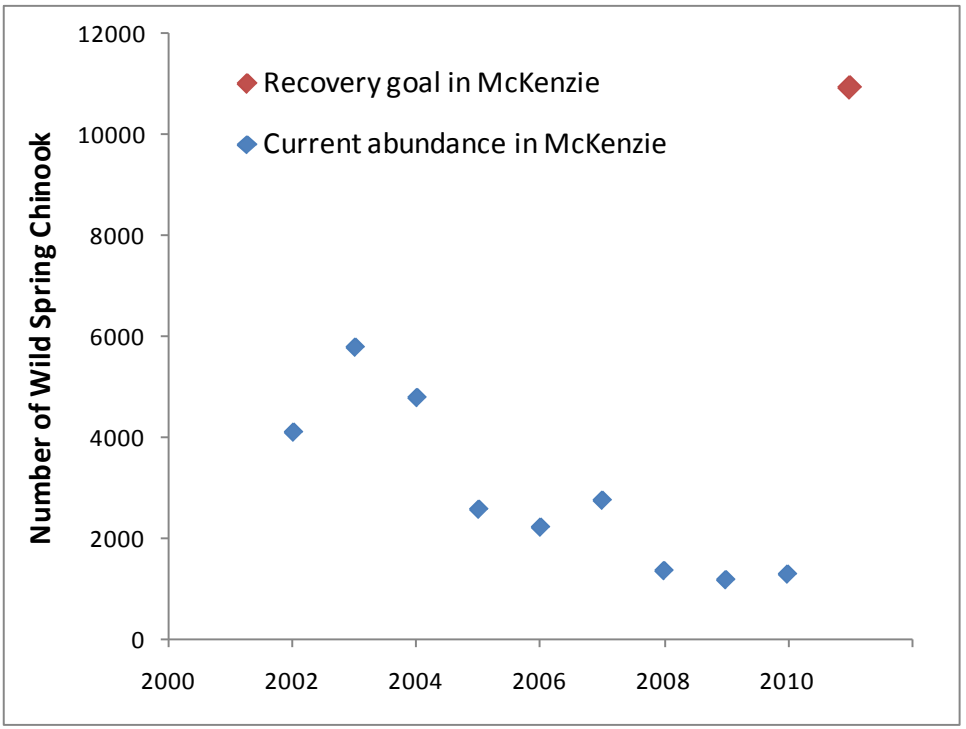
Salmon face many risks during their complex, wide-ranging life cycle. They are anadromous, moving from the McKenzie to the Willamette and Columbia rivers, the ocean, and then back.

Decades of human activities have hurt the fish. Salmon remain vulnerable to a variety of threats, from those in headwater streams to the open ocean.

Today, the three largest threats to Upper Willamette River salmon and steelhead are hydropower/flood control, habitat alteration and competition with hatchery fish. Additionally, climate change, disease, predation and past overfishing play a role.

Spring Chinook Current Status:
Population is at **Low Risk** of extinction in 100 years.

Recovery goal:
Move population to **Very Low Risk**



What makes Upper Willamette Chinook Salmon so unique?

Chinook salmon in the McKenzie and other Upper Willamette River subbasins hold genetic characteristics that set them apart from other species of salmon.

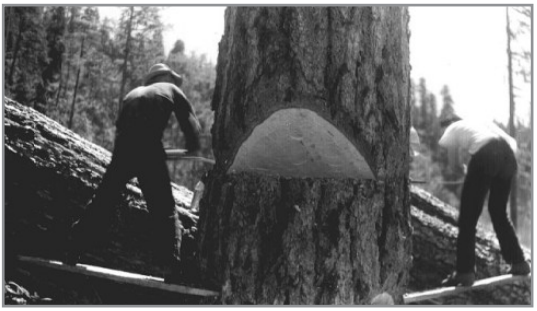
Historically, Upper Willamette Chinook salmon developed a unique run time and other attributes compared to their relatives in the lower Willamette and Columbia rivers. Willamette Falls historically restricted upstream migration during part of the year, and adult Chinook could only ascend the falls in the spring when stream flows were high. The falls restricted upstream migration in summer and fall when flows were low. The spring Chinook spawned and reared in the McKenzie and other Upper Willamette basin tributaries that flow from the snowfields of the Cascade Mountains.

Willamette Falls, Salem Library Historic Photo Collection

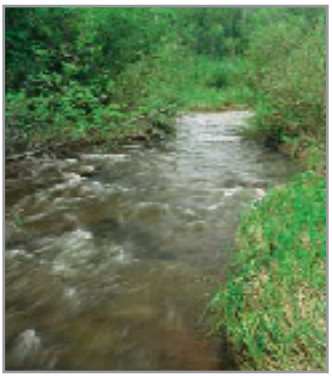
The McKenzie in the past

The McKenzie River system once provided highly complex habitat conditions for Chinook salmon.

The river begins high in the Cascade Mountain Range where springs and snowmelt provide a steady year-round supply of clear, cold water. Flows in streams draining the middle and lower wateshed, such as the Mohawk River, fluctuated more frequently with changes in the season. Low lying reaches in these stream systems flooded reguarly, creating a complex system of interconnected channels across the floodplain.



Salem Library Historic Photo Collection



Thick bands of mature forests buffered the river system and covered much of the upper watershed. The trees contributed large quantities of wood to stream channels, forming pools and creating hiding and feeding cover for adult and juvenile fish. The lower watershed's braided channels provided quiet backwaters, alcoves and side channels for fish use.

The McKenzie today

Changes in the McKenzie watershed greatly affect Chinook salmon today. Six dams now limit fish passage and influence downstream flow and temperature patterns. They also limit sediment, bedload and large wood delivery to lower reaches. Many lower stream reaches are no longer connected to floodplain and off-channel areas. Only fragments remain of the mature riparian forests that were once extensive along the lower McKenzie and Mohawk rivers.

Cougar Dam

Recovering our Salmon

A watershed that supports a healthy salmon population is one of the most important gifts we can pass on to future generations.

The health of our salmon populations reflects the health of our watersheds. A healthy watershed can improve water quality, help reduce storm runoff, attract wildlife, and increase a landowners options for managing their lands. It makes a community a better place to live and work. So improving conditions for fish health also benefits our local communities.

When we restore our salmon runs, we also improve the health of our rivers, lands, communities and economies.

John McMIllian

Lance Kruzic

Ways you can help to restore a healthy watershed

Recovering the Chinook salmon population—and maintaining this recovery for future generations—requires hard work and commitment by local communities and landowners.

The fish are very sensitive to changes in their ecosystems. They need streams with:

- abundant cold water,
- plenty of clean gravel,
- pools where they can find shelter and food,
- unhindered access to spawning and rearing areas.

Their health depends greatly on how lands and waters are managed.

People can aid salmon recovery with good stewardship of land, using water wisely, and by implementing projects that will improve habitat conditions.

Types of Habitat Restoration

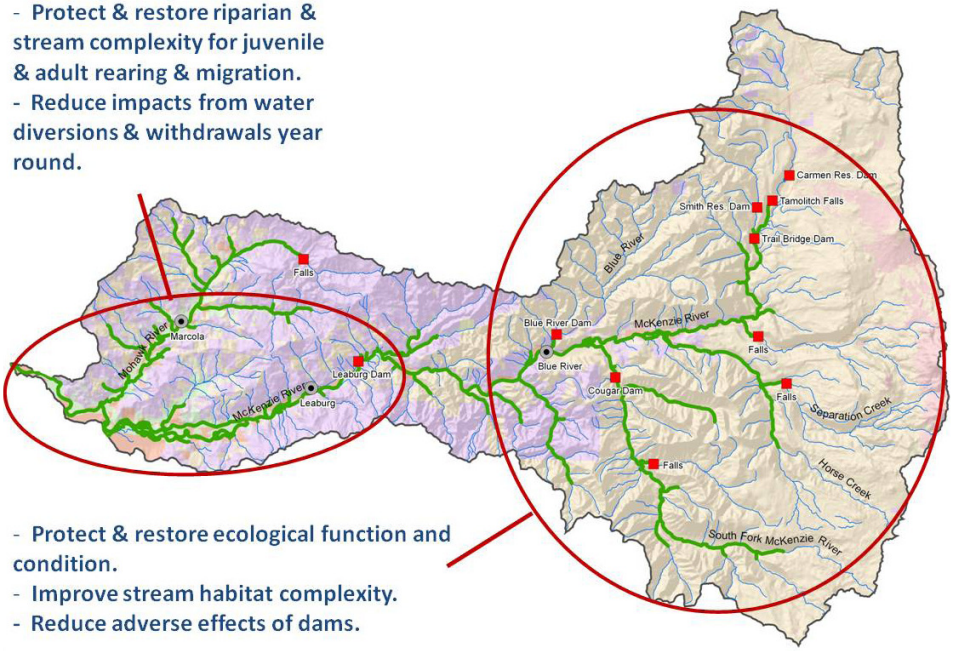
Actions needed to repair habitat conditions in the McKenzie watershed fall into six general categories:

1. Restoring riparian areas and vegetation communities,
2. Restoring floodplains and reconnecting side channels and wetlands,
3. Improving stream habitat complexity and stability,
4. Increasing stream flow,
5. Improving water quality,
6. Removing or replacing culverts and other structures that block fish passage.

Recovering Chinook Salmon in the McKenzie River Basin

Protection and Restoration Actions

- Protect & restore riparian & stream complexity for juvenile & adult rearing & migration.
- Reduce impacts from water diversions & withdrawals year round.



- Protect & restore ecological function and condition.
- Improve stream habitat complexity.
- Reduce adverse effects of dams.

Cities
Barriers
Streams

Fish Distribution

Spring Chinook

Land Use/Ownership

Federal Forest
State Forest
Private Forest
Agriculture
Urban
Other

0 3 6 12 18 Kilometers

Recovery Actions for every stage of the Salmon Lifecycle

Spawning

- Reduce prespawing mortality of adult salmon holding through the summer
- Improve Chinook access into historical habitat above large water control dams
- Operate Trail Bridge Dam to reduce downstream effects from ramping
- Manage the hatchery fish spawning in the wild to low levels

Migrating Adults

- Improve Chinook access into historical habitat above large water control dams
- Establish effective upstream passage of migrating adult fish through all dams and reservoirs
- Manage fishing at current lower levels to allow for recovery

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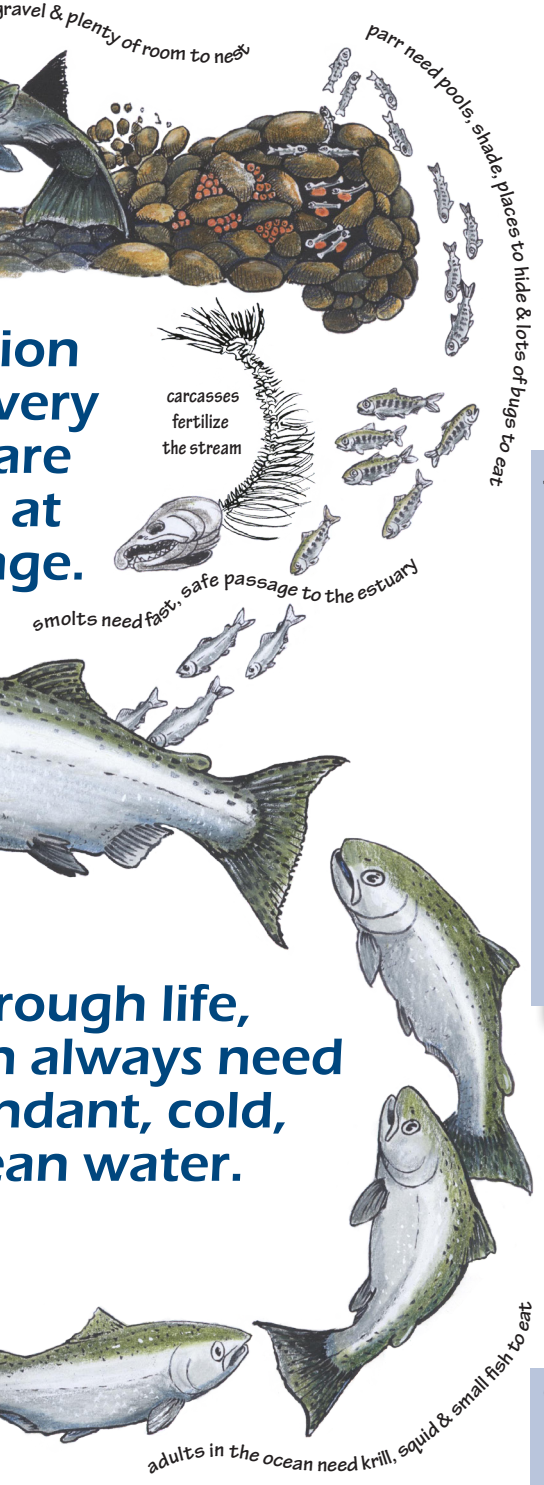

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Incubation

- Reduce impacts from altered water temperature below dams during egg incubation
- Increase gravel supplies and reduce fine sediment loads that impair incubation gravels

Juvenile Migration

- Improve survival of rearing juvenile fish by improving riparian and stream habitat
- Increase the occurrence of peak flows that create and maintain habitat.
- Restore water quality to reduce exposure to toxins
- Establish effective downstream passage of juvenile fish through all dams and reservoirs

Estuary

- Restore habitat and water quality in the estuary
- Reduce unnaturally high bird predation on juvenile salmon

Ocean

- Manage fishing at levels to allow for recovery

Illustration by Blane Bellerud

Using Best Management Practices

Best management practices (BMPs) reduce the footprint of land use activities that can damage the environment. Landowners benefit from using sound conservation practices because healthy soil and good water quality are two of their most valuable assets.

BMPs include conservation practices or combinations of practices and management measures that:

- Distribute livestock so areas are not damaged by overuse,
- Reduce animal waste, toxins, and sediment,
- Protect trees and vegetation in sensitive areas,
- Minimize soil disturbance and maintain vegetative cover on uplands,
- Prevent adverse impacts to surface and ground water,
- Employ proper use of chemical herbicides within critical areas.

Buffer strips reduce soil erosion and protect water quality

Fencing out livestock allows riparian areas to recover

Key Recovery Actions for Chinook Salmon in the McKenzie River Basin

Problems	Solutions
• Core fish habitat needed to support recovery remains vulnerable to future degradation	• Identify core functioning habitats that need greater protection to support recovery. • Protect core sites through management, acquisition and conservation. • Develop cooperative agreements with appropriate landowners and stakeholders. • Increase education and outreach.
• Degraded riparian areas and conditions	• Protect healthy riparian buffers in core spawning and rearing areas. • Restore native riparian vegetation communities. • Develop Habitat Conservation Plans with landowners and stakeholders. • Apply Best Management Practices.
• Floodplains and side channels are not connected to streams	• Reconnect side channel, wetland, confluence and off-channel habitats to stream channel. • Enhance/restore seasonal wetlands. • Apply Best Management Practices.
• Stream habitat lacks complexity	• Increase holding pools for adult Chinook. • Restore natural channel form and bank stability. • Add stable wood and other large debris. • Apply Best Management Practices on upslope lands to reduce damage to stream habitat.
• Degraded water quality (high water temps, pollutants, fine sediment)	• Protect and expand cool water zones in summer, especially for adult Chinook • Restore native riparian forests and vegetation • Apply Best Management Practices to upslope land management.
• Altered flows restrict habitat use, increase water temperatures	• Implement water conservation measures. • Acquire/lease water rights. • Improve irrigation conveyance, efficiency. • Restore headwater sources of cool, clean water. • Release flows from dam to meet targets.
• Dams, culverts, diversions and other barriers block/impair access to historical habitat	• Improve adult access to areas above dams. • Improve downstream passage in reservoir. • Remove/replace barriers, especially in wadeable stream reaches. • Screen irrigation diversions.
• Adverse effects from hatchery fish on population traits and productivity	• Reduce hatchery fish in spawning areas. • Promote wild zone above Leaburg Dam. • Promote hatchery conservation strategy. • Mark all hatchery fish.

	Priority Locations	Results
	• Population-wide	• Protects and conserves core fish habitats • Improves egg-to-smolt survival, reduces prespawning mortality, increases spawning escapement
	• McKenzie River below Vida and down to the McKenzie-Willamette Confluence; Camp Creek, Cedar Creek and Mohawk River watersheds; Blue River watershed	• Protects and improves stream health and complexity, and water quality • Improves egg-to-smolt survival, increases habitat access, reduces prespawning mortality, increases spawning escapement
	• McKenzie-Willamette Confluence; McKenzie River downstream from I-5 bridge and north end of city of Springfield; Mohawk, Walterville, Camp Creek, Cedar Creek areas; historically complex lower reaches, including below Deerhorn Park and Hayden to Hendricks Bridge.	• Improves stream health and flow • Restores off-channel, overwintering areas • Improves egg-to-smolt survival, increases habitat access, reduces prespawning mortality
	• Same as above and upper watershed	• Improves quality and depth of pools • Increases braided channels, diversity • Improves egg-to-smolt survival, reduces prespawning mortality, increases spawning escapement
	• Lower McKenzie River Valley and tributary streams, especially in the Springfield area, Mohawk watershed; along with Cedar Creek, Camp Creek, and Walterville area	• Reduces summer water temperatures • Improves watershed functions • Improves egg-to-smolt survival, increases habitat access, reduces prespawning mortality, increases spawning escapement
	• Lower McKenzie River below dams; Mohawk watershed; Cedar Creek	• Provides minimum flows for passage • Improves summer flows • Improves egg-to-smolt survival, increases habitat access, reduces prespawning mortality, increases spawning escapement
	• Cougar and Trail Bridge dams and reservoirs; Leaburg Diversion; Mohawk watershed	• Restores use of historical habitat • Improves egg-to-smolt survival, increases habitat access, reduces prespawning mortality, increases spawning escapement
	• Population-wide	• Helps protect genetic diversity • Improves egg-to-smolt survival, increases habitat access, reduces prespawning mortality, increases spawning escapement

Examples of Successful Restoration

Many restoration efforts are already underway in the McKenzie watershed. The McKenzie Watershed Council, local schools, landowners, various organizations, and individual volunteers are working together to repair fish habitats and increase watershed health. The following examples illustrate how such efforts are working.

Restoring a McKenzie side channel

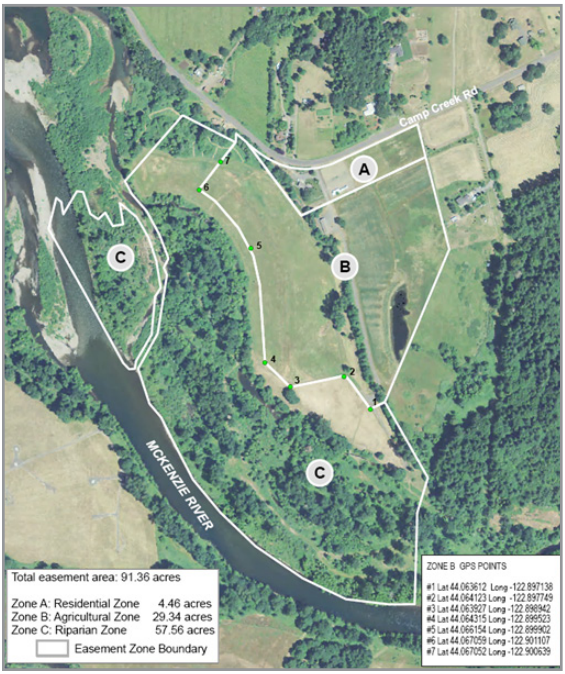
Challenge:
More off-channel and side channel habitat is needed along the middle McKenzie River to support spawning and rearing Chinook. Existing side channels, like the channel shown here, often lack complex instream habitat.

Solution:
The McKenzie Watershed Council partnered with the U.S. Forest Service to add large woody material to side channels in this reach of the McKenzie River.

Results:
The added large woody material is increasing habitat complexity in side channels of the middle McKenzie River. The areas will provide refuge for Chinook and other fish during high flows, and improve the diversity of rearing and holding habitats.

Berggren watershed restoration

Challenge:
Floodplain habitat along the lower McKenzie River provides refuge habitat for juvenile Chinook and many wildlife species. While some reaches show scars from past land use practices, many reaches remain in good shape and provide core functioning habitat for Chinook recovery. The area was vulnerable to future degradation.



Solution:
The Berggren Watershed Conservation Area was created in 2010 through efforts by the watershed council, McKenzie River Trust, EWEB, Oregon Department of Fish and Wildlife, and Bonneville Power Administration. The McKenzie River Trust purchased the 92-acre floodplain property. The watershed council is restoring the floodplain forests. Others are working to develop a sustainable floodplain farm on 30 acres of the property showcasing low-impact farm practices.

Results:
The conservation area will protect core Chinook habitat. It will help sustain and enhance the processes that create a dynamic,healthy river with intricate side channels, subsurface gravel deposits, large wood deposits, beaver ponds, and a connected floodplain.

Simmonds Creek fish passage improvement

Challenge:

Two old, undersized culverts on Simmonds Creek prevented the passage of spring Chinook and several types of resident trout to 3 miles of habitat. The area provides important habitat for spring Chinook in the lower Blue River area downstream of Blue River Dam.

Solution:

The McKenzie Watershed Council partnered with the U.S. Forest Service and others to remove the culverts from the site and replace them with a concrete span bridge.

Results:

The project restored fish passage for spring Chinook and trout in Simmonds Creek and Blue River. It also improved the natural function of the channel and restored movement of gravel and other substrate material to the lower stream channel.

Watershed restoration partners & resources

For more information on watershed issues and restoration opportunities in the McKenzie Watershed, visit the following links:

McKenzie Watershed Council: The council works with landowners to address watershed problems in the McKenzie Basin. http://www.mckenziewc.org/

Bureau of Land Managmenet, Eugene District: The BLM partners on habitat restoration projects. http://www.blm.gov/or/districts/eugene/index.php

City of Eugene: The lower McKenzie runs through this large municipality. http://www.eugene-or.gov/

City of Springfield: The city lies in the lower McKenzie watershed. http://www.ci.springfield.or.us/

Eugene Water and Electric Board: EWEB manages several dams in the watershed and partners on projects. http://www.eweb.org

EPA Watersheds Page: More information on watershed basics. http://water.epa.gov/type/watersheds/index.cfm

Lane Council of Governments: The agency provides planning, design and restoration experience. http://www.lcog.org

Lane County: For more information on Lane County programs. http://www.co.lane.or.us/

McKenzie River Trust: The McKenzie River Trust has been a key player in protecting habitat in the McKenzie watershed.

Oregon Department of Fish and Wildlife's South Willamette Watershed Page: ODFW is an important partner in habitat restoration. http://www.dfw.state.or.us/swwd.html

Oregon Watershed Enhancement Board: Provides information on watersheds and funding. http://www.oregon.gov/OWEB/

Upper Willamette Soil and Water Conservation District: The SWCD helps McKenzie growers restore parts of their land, and obtain funding for projects. upperwillamette.swcd@oacd.org

Willamette Basin Explorer: Make your own maps of local watersheds. http://willametteexplorer.info/index.aspx

Willamette National Forest: The national forest partners on habitat restoration projects. http://www.fs.fed.us/r6/willamette/

Information on conservation practices

The following organizations provide help and information on conservation practices that protect and restore habitat.

USDA Natural Resource Conservation Service (NRCS) in Oregon provides free conservation planning assistance and offers grants for solving natural resource problems.: http://www.or.urcs.usda.gov/

Oregon Conservation Reserve Enhancement Program (CREP) is a cooperative venture between the State of Oregon and the USDA Farm Service Agency with support from local soil and water conservation districts. http://www.oregon.gov/OWEB/CREP.shtml.

Alberta Riparian Habitat Management Society, also known as 'Cows and Fish', provides advice for improving grazing and other uses of riparian areas to enhance landscape health. http://www.cowsandfish.org/

Salmon-Safe works with farmers to encourage the adoption of sustainable agricultural practices that protect water quality and native salmon. Operations endorsed by its independent professional certifiers are promoted with the Salmon-Safe label. http://salmonsafe.org

The Oregon Department of Forestry identified BMPs for private forest practices. http://www.oregon.gov/ODF/privateforests/fpaBMP.shtml.

Willamette River Fish Recovery

Dave Jepsen

To learn more about Salmon and Steelhead recovery in the Willamette Basin, visit: oregonexplorer.info/willamette/WillametteRecoveryPlanning

To learn more about how you can help with Chinook salmon recovery in the McKenzie Basin, contact the local watershed council:

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PO Box 70166
Eugene, OR 97401

Phone: 541-687-9076
www.mckenziewc.org
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