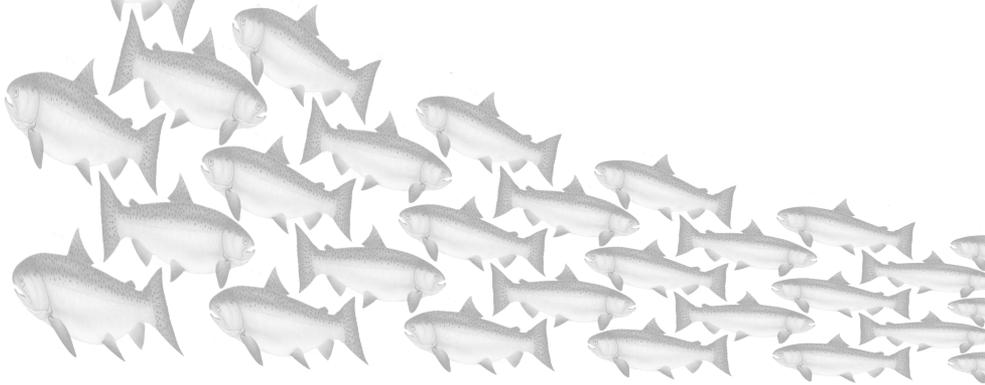


# Bringing Back Spring Chinook & Winter Steelhead in the Calapooia River Basin

A handbook  
for  
improving  
fish habitat  
conditions in  
local streams



**W**illamette River Fish Recovery

# Willamette River Fish Recovery

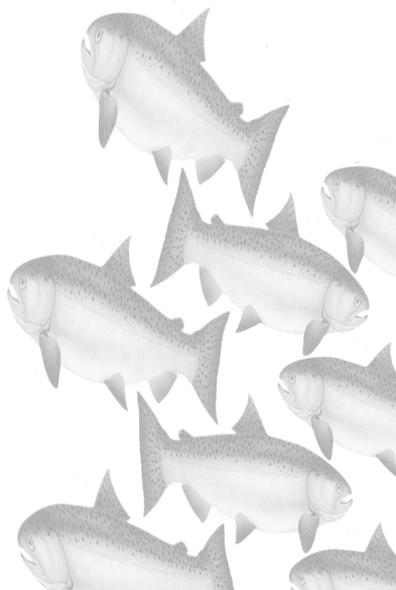
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This handbook provides guidance to help people identify and implement local habitat restoration actions that will aid recovery of spring Chinook salmon and winter steelhead in the Calapooia River Basin.

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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A handbook for improving  
fish habitat conditions in local  
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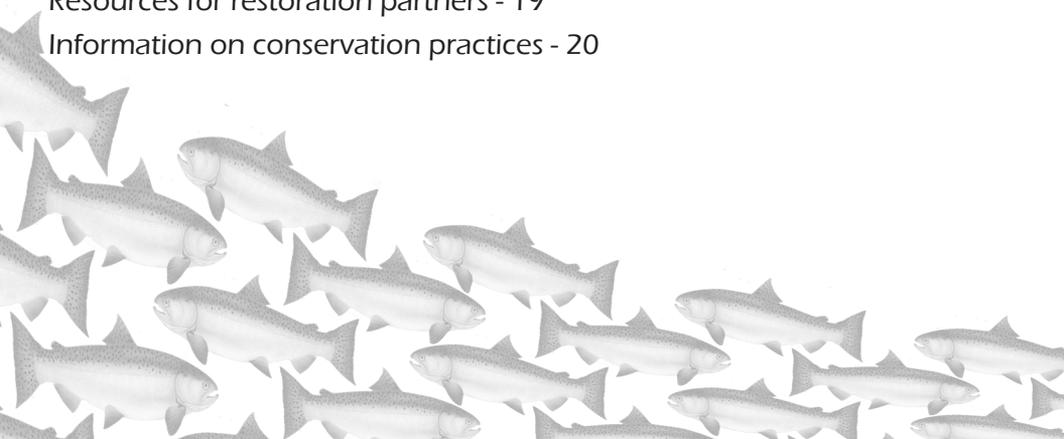
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The fate of Calapooia spring Chinook salmon and winter steelhead lies at a crossroad. Compared to historical levels, very few fish return to spawn in the Calapooia Basin. Both salmon and steelhead runs are listed as threatened under the Endangered Species Act, and are considered at risk of extinction.

This handbook shows where and how you can help restore habitat conditions for Calapooia spring Chinook and winter steelhead. We can work together to make sure the fish populations remain 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](http://www.oregonexplorer.info/willamette).

# Falling on hard times

**A**t one time hundreds of thousands of salmon and steelhead returned to spawn in the Calapooia and other Upper Willamette River tributaries. Over the last 100 years the runs have fallen on hard times.

An alarmingly small number of spring Chinook salmon now spawn here. 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.

Although in better shape, the winter steelhead population is also now at risk. The run has declined from 25,000 historically to about 5,000 today.

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



Oregon Department of Fish and Wildlife



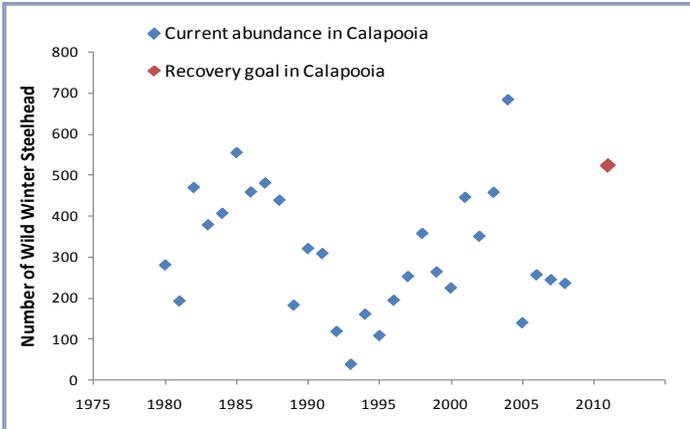
# Why are the fish in trouble?

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

Decades of human activities have hurt the fish. Salmon and steelhead are 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.

## Winter Steelhead



**Winter Steelhead Current Status:**

At **Moderate Risk** of extinction in 100 years.

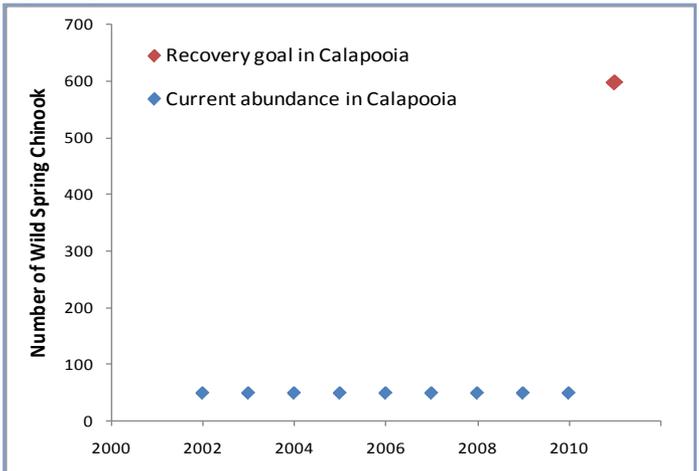
**Recovery Goal:** Maintain population at **Moderate Risk** level

**Spring Chinook Current Status:**

At **Very High risk** of extinction in 100 years.

**Recovery Goal:** Move population to **Moderate Risk**

## Spring Chinook



# What makes Upper Willamette Chinook & Steelhead so unique?

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

Biologists believe Upper Willamette Chinook developed unique character traits because Willamette Falls historically restricted upstream migration into the Upper Willamette during part of the year. Adult Chinook could only ascend the falls in the spring when stream flows were high, and their migration upstream was restricted in summer and fall when flows were low.

The same flow conditions at Willamette Falls also served as an isolating mechanism for Upper Willamette steelhead. Most winter steelhead enter the Willamette River in January and February, and ascend to spawning areas in the upper basin in late March or April. This unique run timing reflects the fact that, before construction of a fish ladder at Willamette Falls in the early 1900s, flow conditions allowed steelhead to ascend the falls only during late winter and spring.



Willamette Falls, Salem Library Historic Photo Collection

# The Calapooia in the past

The Calapooia River system once provided highly complex habitat conditions for salmon and steelhead populations.

The river system responded quickly to changes in runoff during the seasons. Streamflows swelled with snowmelt and rain-water, and then spread across the flat lower floodplain through a system of meandering, interconnected channels. The high flows fed wetlands and riparian areas.



Salem Library Historic Photo Collection



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. Braided channels in the lower watershed provided quiet backwaters, alcoves and side channels for fish. Riparian vegetation shaded streams and kept water cool for fish production.

# The Calapooia today

Changes in the Calapooia watershed greatly affect salmon and steelhead today. Many historical grass prairies, oak woodlands, wetlands, and riparian forests were converted for land use, especially to farmland. Stream habitat was modified, leading to the loss of deep pools and large wood from the channels. Several dams built on the Calapooia are being removed, but other artificial barriers still restrict fish migration.



Sodom Dam on the Calapooia River

# Recovering our Salmon & Steelhead

A watershed that supports healthy salmon and steelhead populations 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, making 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 salmon and steelhead populations—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 and steelhead 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 Calapooia 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.

# Using Best Management Practices



**Buffer strips reduce soil erosion and protect water quality**

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.



**Rotating crops minimizes soil disturbance**

**Fencing out livestock allows riparian areas to recover**



# Recovery actions for every stage of the Salmon & Steelhead lifecycle

## Spawning

- Reduce the high pre-spawning mortality of adult salmon holding through the summer
- Improve spawning gravel areas for winter steelhead

## Migrating Adults

- Eliminate poaching of adult spring chinook
- Manage fishing at current lower levels to allow for recovery

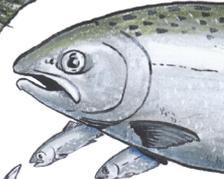
spawners need clean g



Restoration and recovery actions are needed at every stage

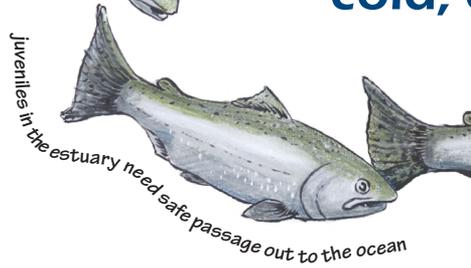


places to rest & hide on the way home



places to hide & eat

Through & steelhead need cold, c



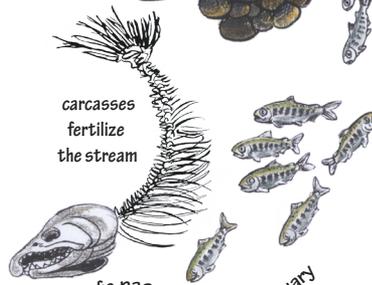
juveniles in the estuary need safe passage out to the ocean

travel & plenty of room to nest



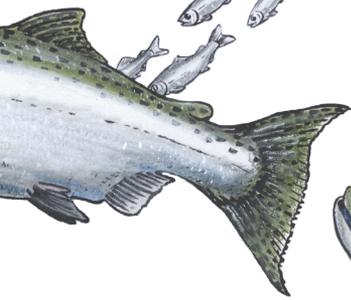
parr need pools, shade, places to hide & lots of bugs to eat

ion  
very  
are  
at  
age.

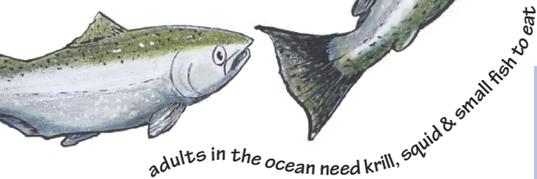


carcasses  
fertilize  
the stream

smolts need fast, safe passage to the estuary



gh life, salmon  
thead always  
l abundant,  
clean water.



adults in the ocean need krill, squid & small fish to eat

### Incubation

- Reduce fine sediment loads that impair incubation gravels

### Juvenile Migration

- Improve survival of rearing juvenile fish by improving riparian and stream habitat
- Keep adequate levels of water in the stream throughout the summer

### Estuary

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

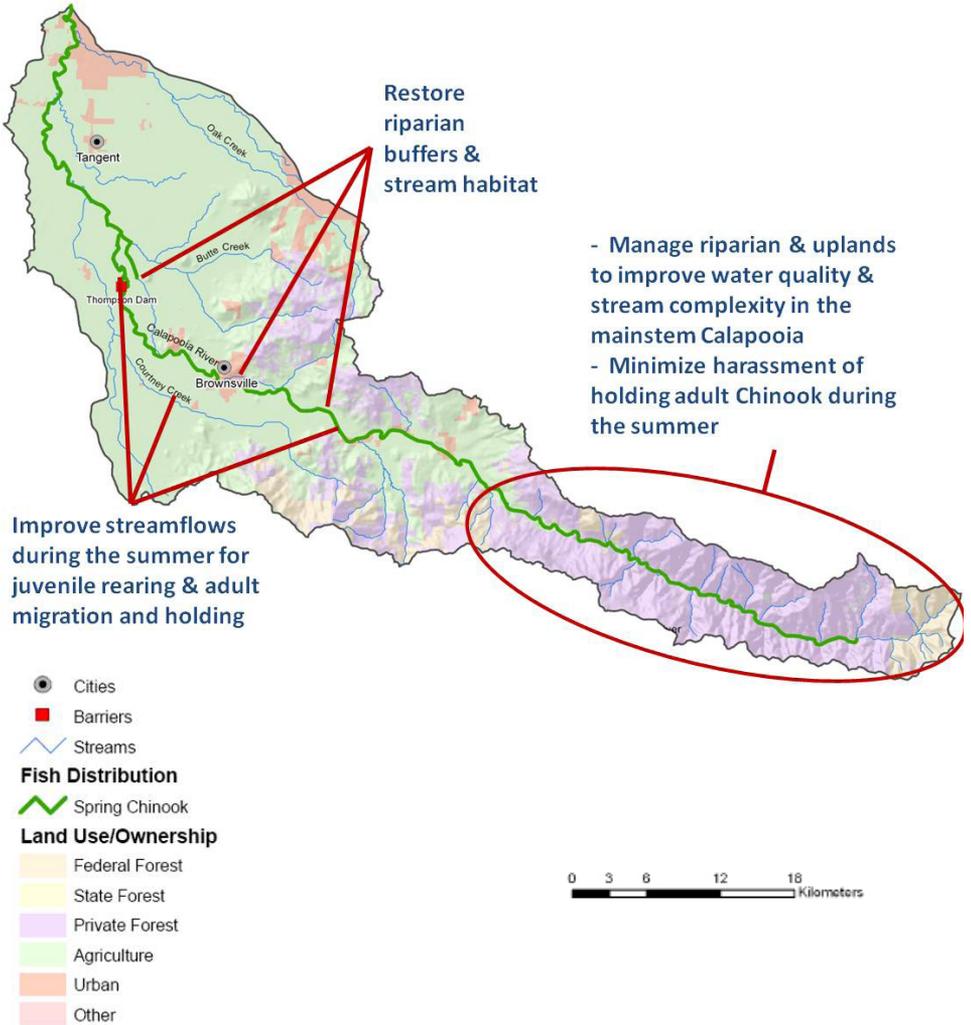
### Ocean

- Manage fishing at levels to allow for recovery

Illustration by Blane Bellerud

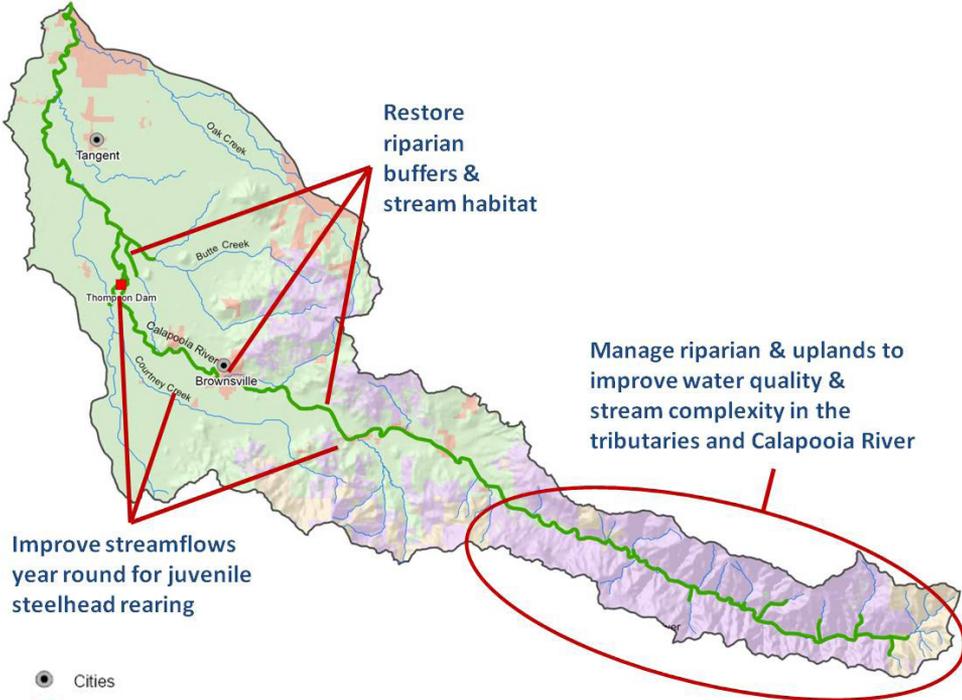
# Recovery actions for Chinook Salmon

## Calapooia Spring Chinook Protection and Restoration Actions



# & Steelhead in the Calapooia Basin

## Calapooia Winter Steelhead Protection and Restoration Actions



- Cities
- Barriers
- ~ Streams
- Fish Distribution**
- Winter Steelhead
- Land Use/Ownership**
- Federal Forest
- State Forest
- Private Forest
- Agriculture
- Urban
- Other



# Recovery Actions for Chinook Salmon & Steelhead in the Calapooia Basin

Problems	Solutions	
<ul style="list-style-type: none"> <li>Core fish habitat needed to support recovery remains vulnerable to future degradation</li> </ul>	<ul style="list-style-type: none"> <li>Identify core functioning habitats that need greater protection to support recovery.</li> <li>Protect core sites through management, acquisition and conservation.</li> <li>Develop cooperative agreements with appropriate landowners and stakeholders.</li> <li>Increase education and outreach.</li> </ul>	
<ul style="list-style-type: none"> <li>Degraded riparian areas and conditions</li> </ul>	<ul style="list-style-type: none"> <li>Protect healthy riparian buffers in core spawning and rearing areas.</li> <li>Restore native riparian vegetation communities.</li> <li>Develop Habitat Conservation Plans with landowners and stakeholders.</li> <li>Apply Best Management Practices.</li> </ul>	
<ul style="list-style-type: none"> <li>Floodplains and side channels are not connected to streams</li> </ul>	<ul style="list-style-type: none"> <li>Reconnect side channel, wetland, confluence and off-channel habitats to stream channel.</li> <li>Enhance/restore seasonal wetlands.</li> <li>Apply Best Management Practices.</li> </ul>	
<ul style="list-style-type: none"> <li>Stream habitat lacks complexity</li> </ul>	<ul style="list-style-type: none"> <li>Increase holding pools for adult Chinook.</li> <li>Restore natural channel form and bank stability.</li> <li>Add stable wood and other large debris.</li> <li>Apply Best Management Practices on upslope lands to reduce damage to stream habitat.</li> </ul>	
<ul style="list-style-type: none"> <li>Degraded water quality (high water temps, pollutants, fine sediment)</li> </ul>	<ul style="list-style-type: none"> <li>Protect and expand cool water zones. especially for adult Chinook and juvenile steelhead</li> <li>Restore native riparian forests and vegetation</li> <li>Apply Best Management Practices to upslope land management.</li> </ul>	
<ul style="list-style-type: none"> <li>Altered flows restrict habitat use, increase water temperatures</li> </ul>	<ul style="list-style-type: none"> <li>Implement water conservation measures.</li> <li>Acquire/lease water rights.</li> <li>Improve irrigation conveyance, efficiency.</li> <li>Restore headwater sources of cool, clean water.</li> </ul>	
<ul style="list-style-type: none"> <li>Culverts, diversions and other barriers block/impair access to historical habitat</li> </ul>	<ul style="list-style-type: none"> <li>Remove/replace barriers, especially in wadeable stream reaches.</li> <li>Screen irrigation diversions.</li> </ul>	

Priority Locations	Results
<ul style="list-style-type: none"> <li>• Upper watershed</li> </ul>	<ul style="list-style-type: none"> <li>• Protects and conserves core fish habitats</li> <li>• Improves egg-to-smolt survival, reduces prespawning mortality, increases spawning escapement</li> </ul>
<ul style="list-style-type: none"> <li>• Middle reaches of Calapooia River; Brush and Courtney subbasins; upper watershed</li> </ul>	<ul style="list-style-type: none"> <li>• Protects and improves stream health and complexity, and water quality</li> <li>• Improves egg-to-smolt survival, increases habitat access, reduces prespawning mortality, increases spawning escapement</li> </ul>
<ul style="list-style-type: none"> <li>• Middle reaches of Calapooia River; Brush and Courtney subbasins; former wetlands near remnant stream channels</li> </ul>	<ul style="list-style-type: none"> <li>• Improves stream health and flow</li> <li>• Restores off-channel, overwintering areas</li> <li>• Improves egg-to-smolt survival, increases habitat access, reduces prespawning mortality</li> </ul>
<ul style="list-style-type: none"> <li>• Upper Calapooia River (upstream of Hands Cr.); Brush Creek subbasin</li> </ul>	<ul style="list-style-type: none"> <li>• Improves quality and depth of pools</li> <li>• Increases braided channels, diversity</li> <li>• Improves egg-to-smolt survival, reduces prespawning mortality, increases spawning escapement</li> </ul>
<ul style="list-style-type: none"> <li>• Middle reaches of Calapooia River; Brush and Courtney subbasins; Oak Creek; upper Calapooia River</li> </ul>	<ul style="list-style-type: none"> <li>• Reduces summer water temperatures</li> <li>• Improves watershed functions</li> <li>• Improves egg-to-smolt survival, increases habitat access, reduces prespawning mortality, increases spawning escapement</li> </ul>
<ul style="list-style-type: none"> <li>• Middle reaches of Calapooia River; Courtney subbasin; especially areas that are used by oversummering Chinook.</li> </ul>	<ul style="list-style-type: none"> <li>• Provides minimum flows for passage</li> <li>• Improves summer flows</li> <li>• Improves egg-to-smolt survival, increases habitat access, reduces prespawning mortality, increases spawning escapement</li> </ul>
<ul style="list-style-type: none"> <li>• Middle Calapooia subbasin</li> </ul>	<ul style="list-style-type: none"> <li>• Restores use of historical habitat</li> <li>• Improves egg-to-smolt survival, increases habitat access, reduces prespawning mortality, increases spawning escapement</li> </ul>

# Examples of successful restoration

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

## Improved fish passage on Calapooia

### Challenge:

Brownsville Dam on the Calapooia River restricted salmon and steelhead access to historical habitats above the dam.

### Solution:

In August 2007, the Calapooia Watershed Council worked with dam owners, Brownsville community members and others to remove the dam. The photo to the right shows community members removing the dam's flashboards for the last time. The flashboards were used previously to raise the dam's height by five feet and divert flow into the Brownsville Canal. The dam's abutments



were left in place after dam removal to provide bank protection.

### Results:

Removing the dam significantly improved Chinook and steelhead access to mainstem and tributary headwaters habitat on the Calapooia.

# Calapooia River restoration



## Challenge:

The banks of the middle Calapooia River near Brownsville were unprotected and eroding. The reach lacked good habitat complexity for wildlife and to support Chinook and steelhead.

## Solution:

In 2004 the landowner partnered with the Natural Resource Conservation Service to fix the problem. With funding from the Wildlife Habitat Incentives Program, they reshaped the river banks, added logs and other structure, and planted native riparian vegetation.



## Results:

Today this section of the Calapooia River is narrower and more stable. The reach is better connected to its floodplain, providing quiet areas and food for fish. Healthy riparian buffers protect adjacent lands from erosion and support fish and wildlife.

# West Brush Creek riparian restoration

## Challenge:

Streambanks and riparian vegetation along this stretch of West Brush Creek had been damaged by past livestock grazing. The resulting erosion and loss of riparian buffer were affecting potential steelhead habitat and reducing water quality.



## Solution:

In 2008, the Calapooia Watershed Council partnered with the landowner to restore the riparian area along the stream reach. They fenced the area to keep cattle away and allow the area to recover. They also replanted the area with native riparian vegetation.



## Results:

The area is recovering. As healthy riparian buffers take root, the stream is becoming more connected with its floodplain and off-channel areas. The reach is less susceptible to erosion and water quality is improving. The watershed council and landowner continue to maintain the area during its recovery.

# Watershed Restoration Partners & Resources

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

**Calapooia Watershed Council:** The Calapooia Watershed Council brings partners together on watershed restoration projects and helps find funding for restoration work. <http://www.calapooia.org/>

**City of Albany:** The city works with Calapooia Watershed Council on projects in the lower basin. <http://www.ci.albany.or.us/index.php>

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

**Greenbelt Land Trust:** The land trust works with individuals and organizations to protect farmland, forest, meadowland, and riparian areas in the mid-Willamette Valley. <http://www.greenbeltlandtrust.org/>

**Linn County:** For more information on Linn County, including user-friendly mapping tools. <http://www.co.linn.or.us/>

**Linn Soil and Water Conservation District:** The SWCD provides technical assistance to help landowners address soil and water quality issues on their land. The watershed council works closely with the SWCD on projects. <http://www.linnswwcd.oacd.org/>

**North Santiam Watershed Council :** A Calapooia Watershed Council's neighbor to the north, and partner on many projects. <http://www.nisantiamwatershed.org/>

**South Santiam Watershed Council:** The Calapooia Watershed Council's neighbor to the north and a partner on many projects. <http://www.sswc.org/>

**Oregon Department of Fish and Wildlife's South Willamette Watershed Page:** ODFW partners with the watershed council to restore habitat.. <http://www.dfw.state.or.us/swwd.html>

**Oregon Watershed Enhancement Board:** For more information on Oregon watersheds and grant programs. <http://www.oregon.gov/OWEB/>

**The Nature Conservancy:** Partners with the Calapooia Watershed Council on several projects. <http://www.nature.org/>

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

Willamette National Forest: The national forest works with others to protect and restore habitat. <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

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Dave Jepsen

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

To learn more about how you can help with salmon and steelhead recovery in the Calapooia River Basin, contact the local watershed council:



**Calapooia Watershed Council**

**Phone: 541-812-7622**

**[www.calapooia.org](http://www.calapooia.org)**

**Email: [calapooia@peak.org](mailto:calapooia@peak.org)**



**Credits:**

Written by Lance Kruzic & Barbara Taylor

Graphics & Illustration: Blane Bellerud & Merlin Alix Smith