

Why do salmon need

Macro-Invertebrates?



Because they're delicious! When young alevin absorb their yolk sacs, they become "free-feeding fry" and begin to hunt for food. **Aquatic macro-invertebrates are the main food source of juvenile salmon in freshwater streams.** Some salmon species, such as Coho, spend up to a year in freshwater streams before heading to the ocean for the free seafood buffet.

Some macro-invertebrates can only live in clean water, and can be used as bio-indicators of water quality.

Why do salmon need
Woody Debris?



A successful wood placement project on Taneum Creek in the Yakima River basin

Adding logs and woody debris to rivers is one of the oldest and most common measures to improve fish habitat. More than 2,000 projects since 1980 have added woody debris to the Columbia River Basin to **improve salmon habitat** by:

- **Increasing the frequency and depth of pools**
- **Providing cover**, especially for juvenile fish
- **Retaining organic material and spawning gravel**
- **Creating new channels** that provide additional refuge

Most wood structures placed in rivers and streams remain in place and provide benefits for a decade or more.

https://www.nwfsc.noaa.gov/news/features/woody_debris/index.cfm

Why do salmon need

Rapids and Riffles?



Rapids and riffles are areas where water moves very quickly over rocks, logs, or other obstructions. These are a key part of salmon habitat because **they help to oxygenate the water.**

Riffles also **provide habitat for insects and other invertebrates that salmon eat in streams.**

Why do salmon need
Gravel Substrate?

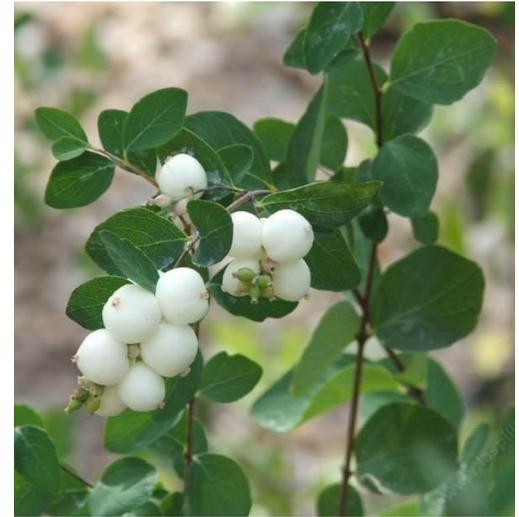
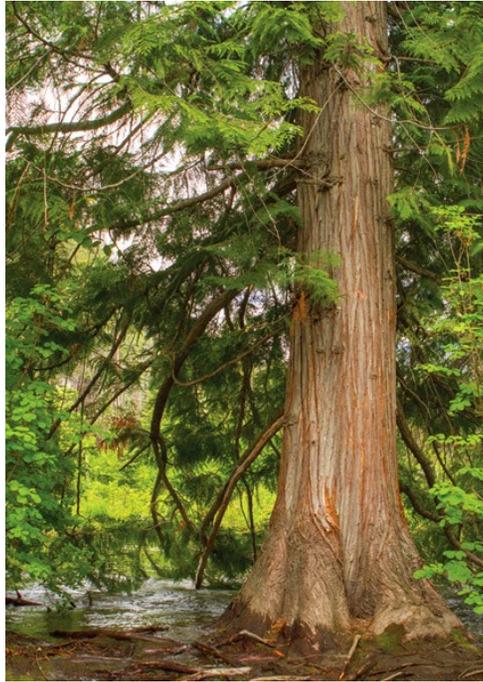


Spawning salmon lay their eggs in gravel nests called redds. Salmon use their caudal (tail) fin to build their redds, which people can see as a light patch on the streambed. Salmon eggs need a lot of dissolved oxygen, and **water flows through the gravel to aerate the eggs.** Too much mud or silt can suffocate the eggs.

Why do salmon need

Riparian Buffers?

(aka Native Plants)



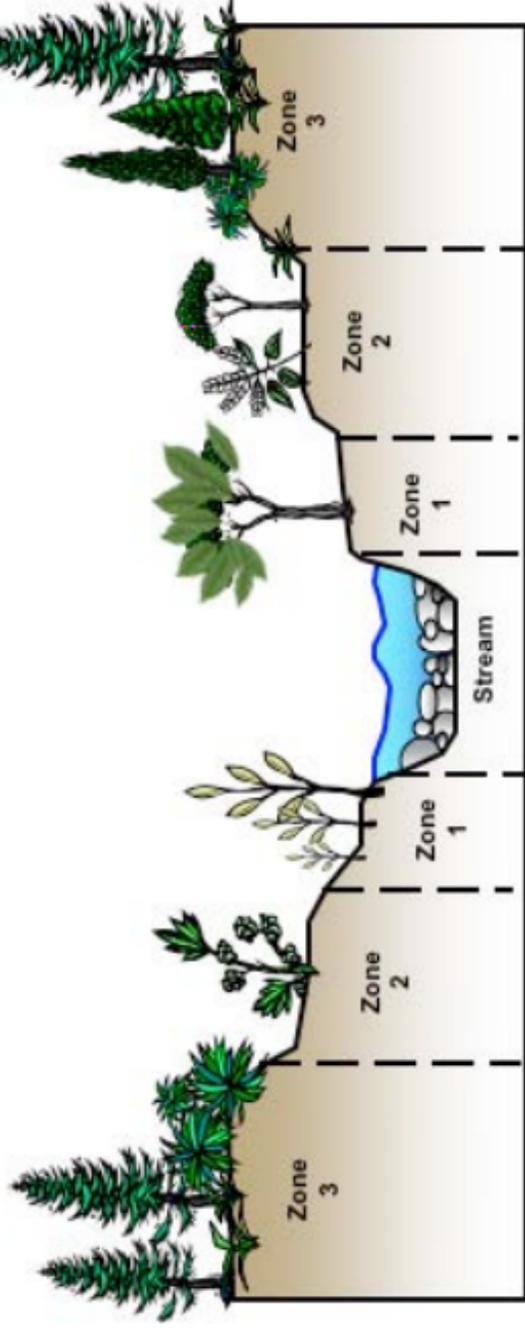
Riparian buffers are the plants and trees next to streams. They improve salmon habitat by:

- . Providing shade, keeping temperatures cool**
- . Cleaning the water, by absorbing runoff before it enters our streams.**

Riparian buffers in urban areas are often damaged or built on. The natural landscape is replaced with hard surfaces such as driveways, roofs and parking lots. When stormwater runoff sweeps across these surfaces, it picks up pollutants (chemicals, fertilizers, oil, and eroded soil) and washes them directly into our waterways. Native plants along a streambank act like a sponge, absorbing pollutants and sediment.

The table below describes how to identify the three riparian zones and gives examples of native vegetation appropriate for planting by zone.

Zone	Description	Examples of native vegetation
1	Zone 1 includes the stream channel and stream banks and floods at least part of every winter. The soil is often rocky and clay-like. Plants in this zone should be drought tolerant.	<ul style="list-style-type: none"> • red-osier dogwood • Sitka willow • Pacific willow or other upland willows • salmonberry and deer fern for forested areas with no soil disturbance • fruited bulrush and slough sedge for small streams
2	Zone 2 includes the upper banks and floodplain. The soil is less moist than Zone 1. Plants in this zone should be medium flood tolerant.	<ul style="list-style-type: none"> • Pacific ninebark • salmonberry • snowberry • swamp rose • spiraea • Western red cedar • Oregon ash • red alder - typically along streams • black cottonwood - typically along rivers
3	Zone 3 includes the upper terrace and uplands located next to the streambank. Plants that thrive in this area are those that are drought tolerant but do not tolerate flooding.	<ul style="list-style-type: none"> • Douglas fir • Western hemlock • Oregon oak • sword fern • thimbleberry • common snowberry



← Flood tolerance decreases Soil moisture increases →