

# Riparian areas, wetlands, and climate change in the Northwest









## What is a riparian area?

Riparian areas are the areas next to streams, rivers, lakes, and ponds.

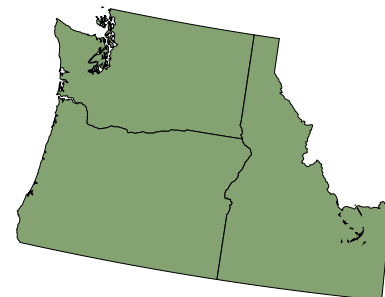
## What is a wetland?

Freshwater wetlands are areas that are saturated with water for long periods. Because of this, they develop soil that has no oxygen in the upper layers, where only plants adapted to these conditions survive.

## Some benefits of healthy riparian areas and wetlands include:

-  Reducing pollution by capturing excess nutrients such as nitrogen
-  Reducing floods
-  Lowering and maintaining water temperatures
-  Providing habitat, food, and water to wildlife, fish, and pollinators
-  Stabilizing streambanks and reducing erosion
-  Capturing and storing carbon in the soil and vegetation
-  Supplying water to aquifers
-  Providing places to recreate and find solace

## How will the climate change in the Northwest?

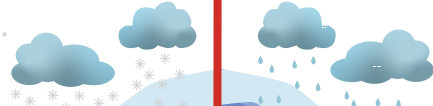


- » Temperatures in the Northwest may increase between 5.5 to 9.5 °F by 2100.
- » There will be slight increases in average annual precipitation, with most increases in winter.
- » Intense rainfall events will likely become more frequent during the winter.
- » Increased temperatures will make more precipitation fall as rain rather than snow.
- » Increases in temperature will lead to lower snowpack and earlier snowmelt, especially at mid and lower elevations.

# How will riparian areas and wetlands be affected by climate change?

Before Climate Change

With Climate Change



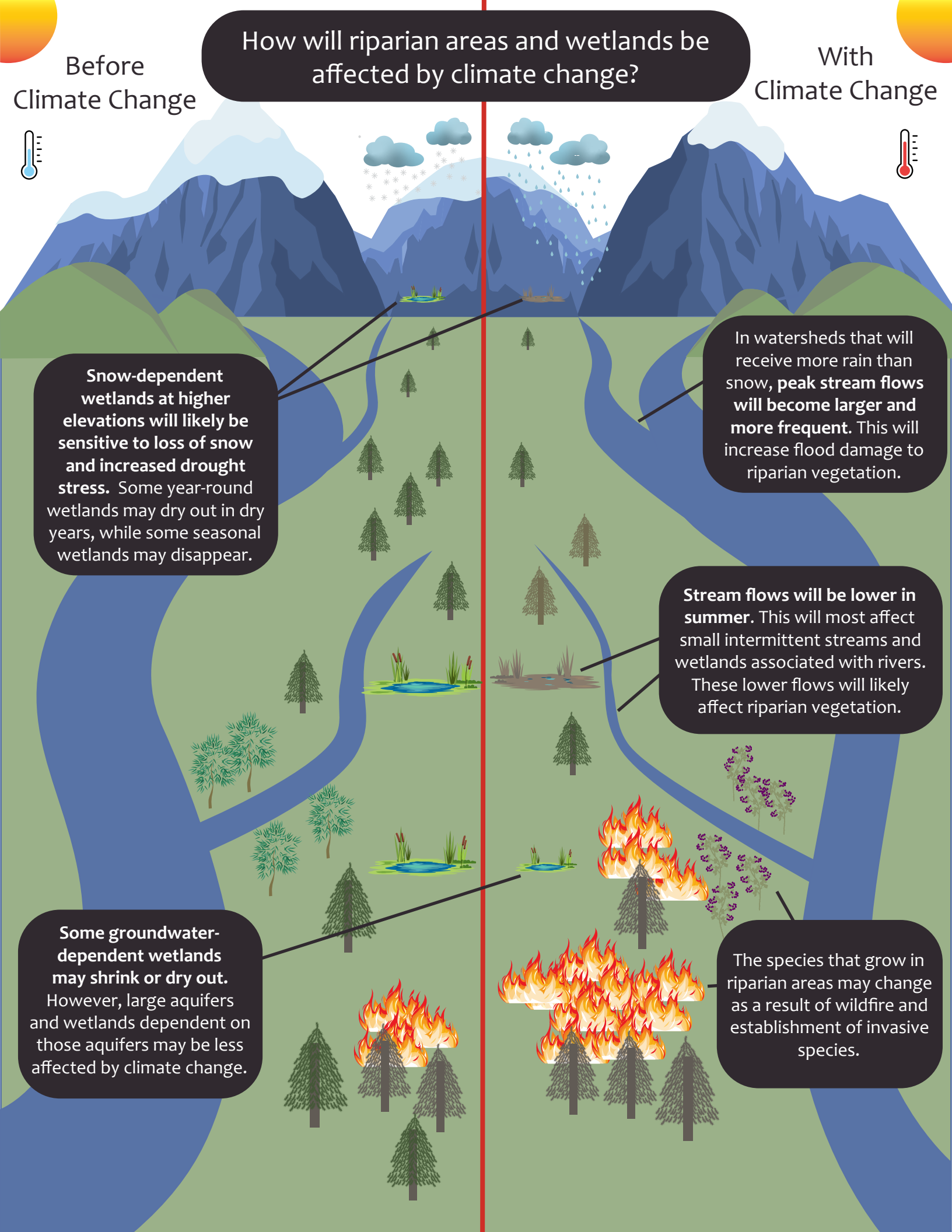
**Snow-dependent wetlands at higher elevations will likely be sensitive to loss of snow and increased drought stress.** Some year-round wetlands may dry out in dry years, while some seasonal wetlands may disappear.

In watersheds that will receive more rain than snow, **peak stream flows will become larger and more frequent.** This will increase flood damage to riparian vegetation.

**Stream flows will be lower in summer.** This will most affect small intermittent streams and wetlands associated with rivers. These lower flows will likely affect riparian vegetation.

**Some groundwater-dependent wetlands may shrink or dry out.** However, large aquifers and wetlands dependent on those aquifers may be less affected by climate change.

The species that grow in riparian areas may change as a result of wildfire and establishment of invasive species.



## Other considerations for climate change impacts

- » The hydrology of the stream and floodplain will determine how riparian areas and wetlands are affected.
- » Plant water stress and changes in riparian vegetation will likely be caused by:
  - » Shifts in the timing of stream flows (to earlier in the spring).
  - » A longer summer draw-down period.
  - » Higher temperatures and drought decreasing soil water availability.
- » Historical land use and actions that altered the flow of water in streams (e.g., dams) can increase the vulnerability of riparian vegetation to climate change effects. For example, riparian plants are more likely to dry out in the summer where historical land use resulted in stream channel incision (resulting in the stream being disconnected from the floodplain).
- » Wetland plant species are very sensitive to changes in water table elevation. Changes in plant species will likely occur where water tables decline.

## What can I do to reduce negative effects of climate change on riparian areas and wetlands?



### Avoid removing trees and shrubs, and plant trees in riparian areas

This will increase shade over streams, minimizing stream temperature increases. This, in turn, will help aquatic plants and animals that are sensitive to temperature changes.



### In fire-prone ecosystems, reduce fuels in nearby upland vegetation

In places such as dry forests east of the Cascade Mountains, this will be crucial. This can help by reducing the risk of high-severity fire in riparian areas and wetlands. Along small streams in dry forests, consider fuel treatments in riparian areas.



### Restore streams

Stream restoration will improve stream channel stability and complexity, which will slow water movement and increase water storage. Restored streams increase resilience to both low and high flows as well as improve aquatic habitat.



### Reduce flooding intensity

This can be done by:

- » Reconnecting stream channels to floodplains.
- » Maintaining native plant species in riparian areas and wetlands.



### Reduce existing, non-climatic stressors in riparian areas and wetlands

This is likely to help them better withstand the effects of climate change. For example, managing livestock and recreation use will reduce stress on riparian areas and wetlands.