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## **CES Rivers and Climate Change PowerPoint Presentation Guide**

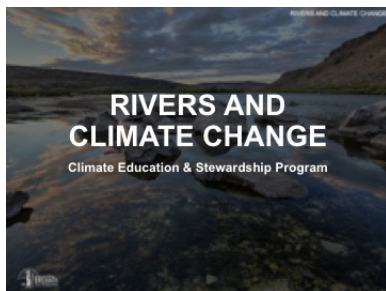
In this document you will find a screenshot of each slide in the Rivers and Climate Change PowerPoint presentation, followed by two sections (where appropriate):

- Example language – outlines the concepts you want to communicate to your audience.
- Presenters notes – helps provide a deeper look at the content, including links to source material where appropriate.

In addition, you will find the “Appendix” section at the end of this document, with facts and links to additional sources to help further understand the subject material and enhance your presentation.

Not all of this information may be needed in your presentation, however it will help guide the discussion for each slide and serve as a resource for you to further elaborate on a concept or cite sources.

Please make the presentation your own and share with us whatever content you find most effective.



### 1. Welcome

Give your name and briefly describe Great Old Broads. Thank your audience for joining you in this conversation about rivers, climate change, and public lands in the Northwest. Share a bit about yourself, especially in the form of an interesting story about your connection/passion for public lands and rivers - but be sure to keep your intro brief.



### 2. Great Old Broads: Who We Are

We are one of the few public land conservation organizations led by women. We are national, but we emphasize local grassroots action. We value and promote women's leadership and experience



### 3. Great Old Broads mission

Founded in 1989 by a few feisty women hikers who were also activists, our founders saw an important voice was missing from the conservation movement—the older woman—impassioned, experienced, and not afraid to speak out in defense of Mother Earth. Today we have members of all ages and genders—and 40 chapters across the US.

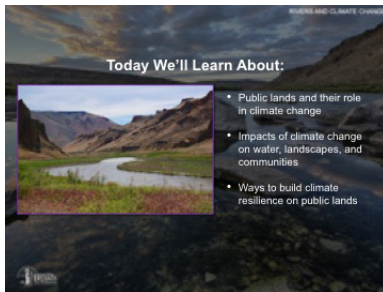
We take a three-pronged approach to what we do:

- Education...on threats to public lands and solutions to protect them including climate change on public lands, and how public land development increases greenhouse gas emissions (that's why we're here today).
- Stewardship...From ecological restoration to trail clearance, tree planting to removing obsolete fencing, wilderness solitude monitoring to documenting illegal off highway vehicle impacts, we do it all. (We'll talk more about that later).



- Advocacy...such as public testimony and comments on public land proposals, speaking out against activities that harm public lands and waters; and support for wilderness bills.

*Presenters Note: You may substitute examples above for specific activities conducted by your Broadband.*



#### 4. Today We'll Learn About:

- Public Lands and their role in climate change.
- Impacts of climate change on water, landscape and communities.
- Ways to build climate resilience on public lands.



#### 5. What are Public Lands?

Broadly speaking, they are lands designated by the US Government that belong to the public. Because the lands are held in trust for the public, these lands are to be managed for the long-term health of the land and the American people. Every American has a say in how these lands are managed.

Public lands have long and challenging histories... (Land acknowledgement statement.)

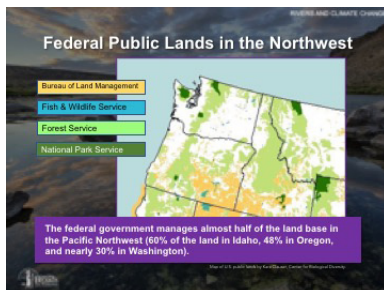
*Presenter Note: Refer to the land acknowledgement planning guide to prepare a statement that is appropriate to your audience and location.*



## 6. Federal, State, and Local Public Lands

Public lands are managed federal, state, county, and municipal governments.

From the smallest local city park all the way to the largest national parks and forests, each government entity manages the lands differently.



## 7. Federal Public Lands in the Northwest

Here in the Northwest, several different agencies manage federal public lands for uses including everything from recreation to clear-cut logging.

Four agencies: (offer an example of each type of public land in your state)

- Bureau of Land Management
- U.S. Forest Service
- Fish and Wildlife Service
- National Park Service

Some lands have special designations that protect them for their cultural significance, wildlife, or the intrinsic value of the ecosystem. Other public lands are used for more intensive commercial uses such as mining, logging, grazing, and energy development.

As you can see, the Bureau of Land Management (which is part of the Department of Interior) and the U.S. Forest Service (part of the Department of Agriculture) manage the most federal lands in the region.

Tribes also play a critical role in public lands management. As sovereign nations, Tribes hold a unique government-to-government role in public lands management decisions. Consultation and coordination is required if a proposed project affects tribal lands, resources or areas of significance.

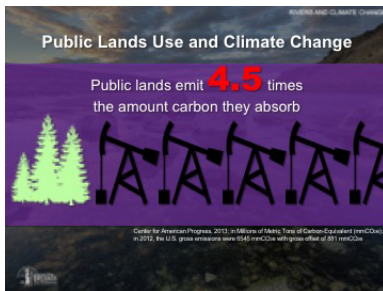


Through treaties with the federal government, many tribes reserved their rights to harvest fish and access other traditional resources in exchange for their land. For example, some treaty tribes are entitled to 50 percent of the harvestable salmon that return to Washington waters.



## 8. How Do Public Lands Contribute to Climate Change?

Before we dive into our main focus, rivers and climate change, let's look at the bigger picture first: What do public lands have to do with climate change?



## 9. Public Lands Use and Climate Change

Forests, marshes, wetlands, and grasslands all absorb carbon dioxide from the atmosphere, serving as a carbon sink.

Meanwhile, there is also a great deal of industrial activity on public lands, such as coal, oil, and natural gas extraction.

Because of these activities, we are currently removing and burning far more carbon from the earth beneath these ecosystems than these same ecosystems can absorb. . We are removing 4.5x as much ancient carbon from the ground beneath our public lands as the ecosystems on all 640 million acres of public lands can absorb.

Currently, extractive fossil fuel activities on public lands make up 25% of US emissions. These numbers continue to rise.



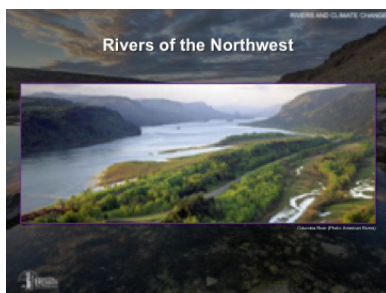


## 10. Greenhouse Effect

Greenhouse gases, including carbon dioxide and methane, naturally make up a small percentage of the gasses in our atmosphere. These gasses act like a blanket that surrounds the earth, keeping our planet at a reasonably comfortable, livable temperature while still allowing excess heat to escape into space.

But when we add more and more greenhouse gasses to this “blanket” in the atmosphere, it’s like thickening the blanket. This thicker blanket traps more heat underneath it and allows far less to escape back into space, increasing the temperature and disrupting the climate worldwide.

98% of climate scientists agree that the human-caused emissions “thickening the blanket” are leading to a rapidly changing climate.

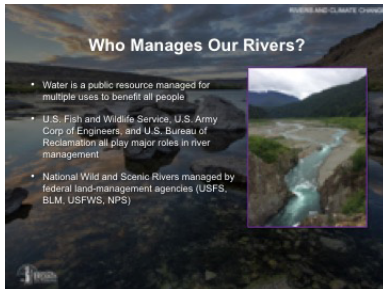


## 11. Rivers of the Northwest

Now that we are familiar with the essential link between public lands and climate change, we can look more closely at rivers on public lands.

Rivers are critically linked to both climate change and our region’s future health. Rivers are the arteries of the Northwest.

All of us rely on these waterways for drinkable water, agriculture, the health of natural systems, and iconic species that are central to our cultures and identities. Ultimately, the health of rivers is an indicator of the land’s health and our communities’ health.



## 12. Who Manages Our Rivers?

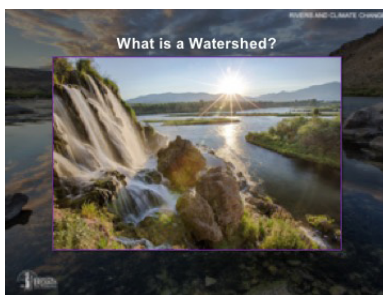
Water is a public resource. Generally, states hold rivers in trust for the public for a wide variety of beneficial uses including navigation, recreation, and wildlife. This is part of the Public Trust Doctrine.

Of all the federal agencies linked to public lands, the US Fish and Wildlife Service plays a most critical role in managing rivers - regulating fishing, hatcheries, and habitat protection and restoration alongside Tribes.

Beyond the four federal agencies we already introduced, The Army Corp of Engineers and Bureau of Reclamation are also important players that manage dams and recreational areas.

Some free-flowing rivers are protected through wild and scenic rivers designations. National Wild and Scenic Rivers are managed by one or more of the four federal land-management agencies listed earlier, while others are state-managed.

*Presenters Note: <http://www.nationalrivers.org/frequently-asked-questions/>*

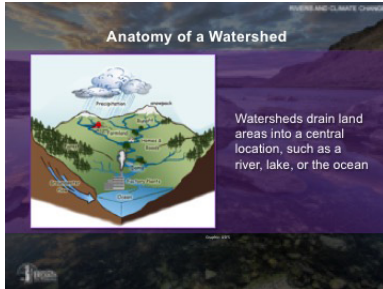


## 13. What is a Watershed?

To better understand our rivers, we have to look to the land that feeds them.

No matter where you live, your home is part of a watershed: a land area that drains to a central location, such as a lake, river, or ocean.

You can think of it as a bowl in the landscape, where the "rim" is a ridge, hill or mountain range.



## 14. Anatomy of a Watershed

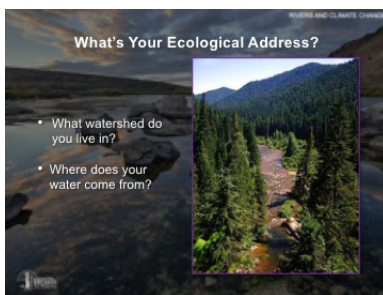
Imagine holding a leaf cupped in the palm of your hand, with the stem sitting on your wrist. Imagine the patterning on the leaf: many small veins, or tributary streams, join together to form one main stem or river flowing into the cup of your hand and down your wrist!

The water in a watershed is composed of two parts: 1) surface water, the portion of freshwater that we can see in rivers, lakes, streams, and wetlands 2) and the part we can't see, groundwater, flowing between rocks, soils and sediments under the ground.

Both play a vital role. Groundwater sources contribute about 40% of all streamflow in the United States. The water that you see dripping down your window, running into a storm drain, or flowing through a river, leads elsewhere. Whether that's a wastewater treatment facility, an underground aquifer, or the ocean. Because of this interconnectivity, what happens in one part of the watershed can impact plants, animals, and people throughout the system.

Presenters Note: groundwater/aquifer background info: <https://pubs.usgs.gov/qip/qw/index.html>

*PNW aquifers not faring as poorly as groundwater in other regions: <https://www.opb.org/news/article/study-aquifers-draining-quickly-less-in-pnw/>*



## 15. What's Your Ecological Address?

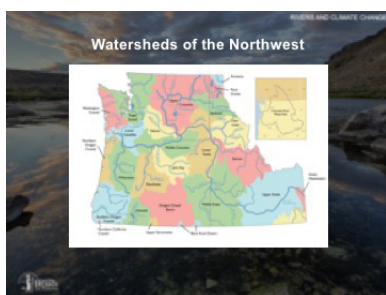
Do you know your ecological address? What watershed do you live in? Where does our water come from? Where does it go next?

*Presenters note: If you are giving the presentation online, ask your audience to type their watershed in the chat. In person, ask your audience to share with the person sitting*





next to them. Research the name of the watershed you are presenting in and where you live beforehand. To find explore your watershed, check out: <https://wikiwatershed.org/model/>



## 16. Watersheds of the Northwest

There are 24 watersheds in WA, OR and ID.

We often slice major watersheds into smaller smaller sections. The Puget Sound area, for example, contains 21 regional watersheds.

The Columbia River Basin is a massive watershed that covers 258,000 square miles. It includes parts of seven states and one Canadian province. In its 1,200 mile course to the ocean, the river flows through four mountain ranges and drains more water to the Pacific Ocean than any other river in North or South America. This watershed contains thousands of miles of streams, lakes, and wetlands.

*Presenters Note: This is a great opportunity to highlight your unique location in this watershed – are you in the upper or lower portion of the watershed? Do you receive a high amount of snow or rain that feeds other regions or is your area in a drought? Consider asking a few participants what makes your watershed unique.*

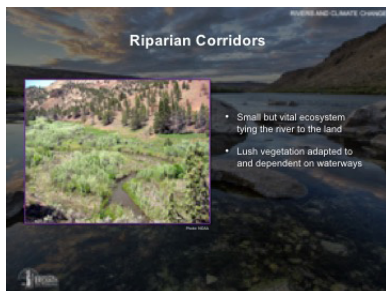


## 17. A Cultural Landscape

This map was generated using the [www.native-land.ca](http://www.native-land.ca), an online database that compiles the best known historical territories of Indigenous groups throughout the continent, although it is not an official historical record. As you can see, the Columbia River Basin is home to diverse Indigenous groups who are the original caretakers of these landscapes. Indigenous communities have shaped the

Columbia River Basin's past, present and future.

*Presenters Note: See Appendix for a list of Tribes in the Columbia River Basin.*



## 18. Riparian Corridors

When we talk about rivers, watersheds, and public lands, there is a small, but very important ecosystem tying the water and the land together.

Riparian corridors are the ribbons of land that serve as the transition between an aquatic ecosystem (the river) and the upland terrestrial ecosystem (the forest, prairie, etc.).

These small but mighty ecosystems are critical to a functioning watershed and contain rich communities of plants adapted to the wet environment.

Wetlands cover only 2% of North America's land base but provide critical habitat for 80% of biodiversity. They provide an incredible variety of unique functions – we will get into these many benefits later on.



## 19. Regional Climate Change Impacts

*Presenters Note: pause to ask your audience what changes they have noticed in the region (or type if using Zoom)? Have they noticed abnormal events in their watershed?*

Climate change is directly impacting the health of our watersheds. Climate impacts also layer on top of other stressors already affecting the watershed, like

deforestation, pollution, or habitat fragmentation. To better understand these impacts, we need to think about how water normally moves through our watershed.



## 20. Winter Snowpack

First, let's think about normal winters, or what we used to call "normal winters."

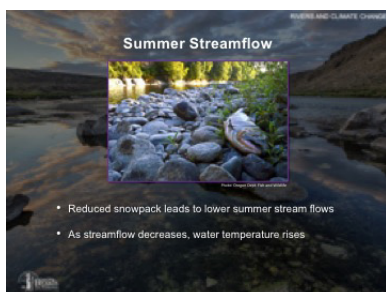
In the northwest, our rivers' headwaters, or the upper portion of the watershed, see a great deal of snow in the winter months.

Normally, this snow acts as a water savings account that gradually melts in spring, providing water for rivers throughout dry summers. About 70% of the streams in the Columbia River Basin come from snowpack in the Rocky and Cascade Mountains. Despite significant man-made infrastructure in the basin, snowpack remains the most significant form of water storage.

However, as precipitation patterns change, snow is shifting towards rain. We can expect to see warmer, wetter winters in the northwest. Entire regions may experience a shift from snow to mostly rain in the next 50 years. What happens without this piggy bank?

We're already seeing a shift in the timing of peak river flows to earlier in the spring. This also means higher winter runoff and flooding events that can have catastrophic impacts to communities.

*Presenters Note: <https://bit.ly/3lsaDdX>*



## 21. Summer Streamflows

What about in the summertime? Reduced snowpack leads to lower summer stream flows because the bank account of cold meltwater runs out earlier.

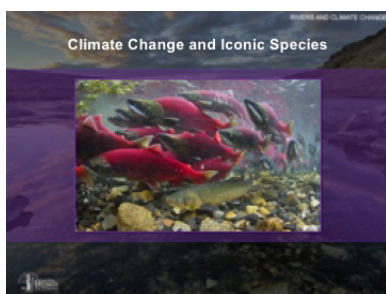
As summer temperatures increase and summer river flows recede, water temperatures in our rivers are heating up.

*Presenter Note: Consider offering an example in your watershed of water temperature data.*



Unfortunately, lower, smaller streams heat up far faster than bigger rivers. Climate change has proven its ability to heat up vast bodies of water, even the earth's oceans. We can expect particularly harsh impacts in warming, snow-fed rivers.

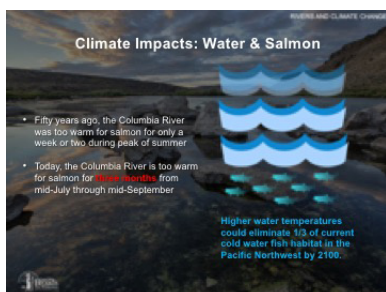
Climate change will not paint everything the same, we will see different impacts in different areas of our watershed depending on the characteristics and health of the landscape. For instance, streams that have been severely degraded by clear-cut logging will heat up far more quickly than streams that are shaded by native vegetation. (We will explore this idea in more detail later in this talk...)



## 22. Climate Change and Iconic Species

Salmon are woven throughout the identity of this region. They define the culture, identities and livelihoods of indigenous and other communities in the Northwest. Many species— Orcas and over one hundred others—also rely on salmon for their survival. They are called a keystone species because they hold the whole system together. More than 137 species eat salmon as eggs, young or adult fish.

Let's look more closely at the climate impacts ...

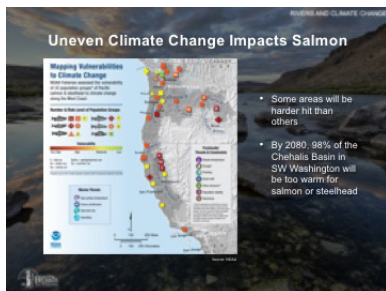


## 23. Climate Impacts: Water & Salmon

*Presenters Note: Quiz your audience: What temperature do you think is the maximum water temperature that salmon can survive?*

68 degrees is considered the maximum temperature threshold for salmon.

What happens? Adult salmon struggle to swim upstream, they become lethargic, often dying from stress and disease before they can return to their home streams to spawn. Warm water alters entire food webs as warm water fish species expand their territory in the watershed, eating juvenile salmon.



## 24. Uneven Climate Change Impacts Salmon

Just as the climate impacts to the water cycle are not the same across a watershed, neither are the impacts to salmon populations.

Some areas will be harder hit: Climate models predict that by 2080, 98% of the Chehalis basin in Southwest Washington will have water temperatures that rise to levels unsafe for salmon or steelhead.



## 25. Impacts to Communities

Just as climate impacts are uneven across a watershed or a species' habitat, climate change is already hitting some human communities much harder than others. Communities who are more vulnerable to climate impacts for a variety of reasons are often referred to as frontline communities.

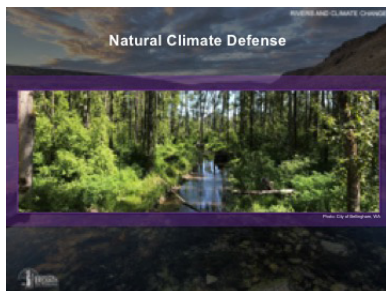
Frontline communities include children, older adults, low income communities, indigenous communities, people of color. The climate impacts that we've described often hit these communities the hardest, such as: *(Presenter Note: choose one of these to offer a local example, share a specific brief story)*

- Water quality degradation due to temperature rise that threatens human health.
- Increasing conflict/demands on water resources.
- More frequent and intense droughts.
- More severe and frequent flood events, many are ill equipped due to lack of flood insurance, inability to relocate.
- Declining availability and quality of subsistence foods.
- Premature deaths due to severe wildfire smoke and extreme heat.

These climate impacts carry significant cultural and economic consequences.

*Presenters Note: <https://www.oregonlive.com/environment/2019/09/climate-change-threatens-health-in-pacific-northwest.html>*

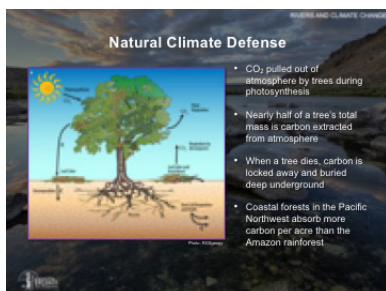




## 26. Natural Climate Defense

Presenter Note: Ask your audience what comes to mind when they think of climate change solutions – is nature one of them?

Intact ecosystems offer an abundance of natural climate solutions that are often overlooked. The first example that comes to mind for many is probably absorbing carbon.



## 27. Natural Climate Defense

The Pacific Northwest is an incredible carbon sink. Per acre, it absorbs more carbon than the Amazon tropical rainforest.

In fact, the Douglas fir forests of Oregon and the hemlock and cedar forests of Alaska store about twice as much carbon per acre as the Amazon. How does this work?

Carbon is pulled out of the air through the process of photosynthesis. During photosynthesis, in which trees convert carbon dioxide and sunlight into energy, trees literally suck carbon dioxide out of the atmosphere—storing it in their leaves, needles, branches, trunks, and roots—while releasing oxygen back into the atmosphere as a “waste” product.

Around HALF of a tree’s total mass is made up of carbon that’s been pulled out of the atmosphere. When a tree dies and breaks down, this stored carbon sinks down into the soil and is eventually buried deep in the earth.



## 28. Intact Ecosystems & Climate Resilience

Beyond just storing carbon, these ecosystems, especially riparian ecosystems, are critical to weathering a changing climate. Riparian ecosystems perform a whole bunch of essential functions in a changing climate...



- Trap moisture like a sponge, reducing flooding.
- Allow heavy winter rains to soak into the soil instead of running into the stream, causing flooding.
- recharge groundwater.
- Absorb excess water and slowly release it throughout dry summer months.



## 29. Nature's Water Treatment Plants

These natural systems also keep waterways clean:

- Shade rivers from rising temperatures.
- Trap sediment, slowing runoff to prevent erosion.
- Microbes in the soil can break down chemical pollutants that would enter rivers, like hydrocarbons.
- Pollutants bonded to the soil are also removed from the water—80% of phosphorous and nitrogen (found in fertilizers) is removed by the natural forest filter before reaching a stream.
- This can prevent harmful algae growth in downstream waters. One mature tree in a riparian area can filter as much as 200 pounds of nitrate runoff per year.

*Presenters Note:* <https://allaboutwatersheds.org/library/kyw-poster-files-and-links/riparian-zone>  
<https://www.neefusa.org/nature/water/lesson-1-watershed-basics>



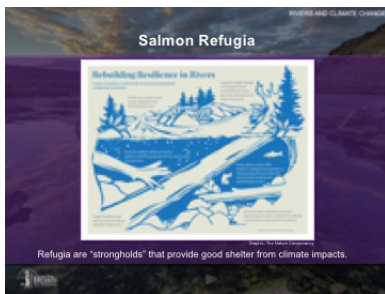
## 30. Wildlife Corridors: Headwaters to Ocean

Riparian ecosystems are vital corridors for wildlife, from our headwaters to the ocean. Wildlife is more dependent upon riparian ecosystems than any other form of habitat. In fact, this is why we are required to camp 100 feet away from bodies of water while camping, in order to avoid disturbing the wildlife that depend on lakes and rivers. (Offer an example...)

*Presenters Note:* Ask your audience to recall examples of wildlife they saw near a body of water while exploring public lands.

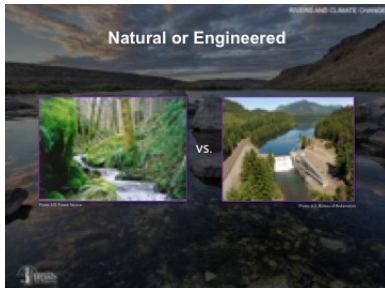


A variety of birds, ranging in size from hummingbirds to bald eagles, find food, cover, and nesting sites in riparian areas. Rapidly growing riparian vegetation produces a multi-storied habitat important for a diverse bird population. Mammals often visit and live in riparian areas. Beaver, otter, and mink depend on riparian zones for food and cover. Trees and shrubs provide cover for deer and elk.



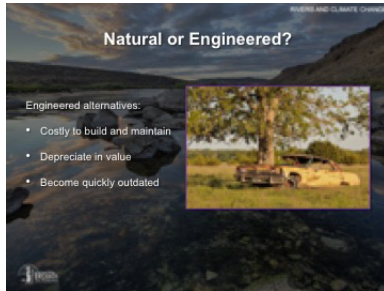
### 31. Salmon Refugia

Healthy ecosystems on public lands act as “refugia,” shelters, “strong holds” or particularly good habitat for salmon to shelter from climate impacts. We can look for characteristics like complex, braided rivers with diverse nearby trees, shrubs, and down logs in the stream channel. These factors all increase biodiversity by providing fish and wildlife habitat - and all the while improving water quality.



### 32. Nature or Engineered

How do these benefits of natural systems stack up to human-made engineered alternatives?

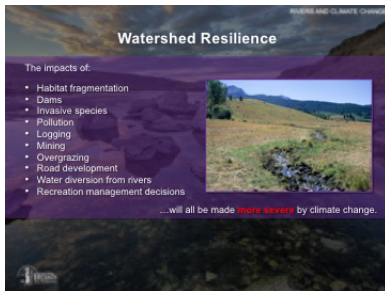


### 33. Natural or Engineered?

Engineered alternatives, such as water treatment plants, dams, and storm sewers, tend to be costly to build, costly to maintain, and they tend to depreciate in value and become quickly outdated - then requiring even more costly replacements.

Riparian ecosystems are not costly at all, if left intact, and actually create more benefits as they age

In fact, wetlands remove pollutants from water so effectively that this function is valued at \$11,000 per acre per year.

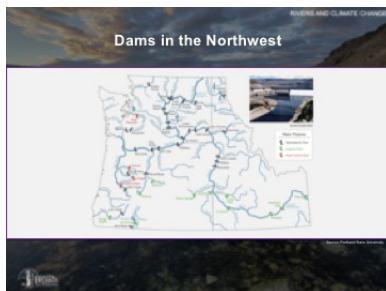


### 34. Watershed Resilience

Watersheds on public lands play a vital role in an era of climate change. These lands contain countless waterways that are responsible for the quantity and quality of water available for downstream communities. But are these public lands reaching their full climate-defense potential?

Unfortunately, climate impacts make existing impacts worse. Each of these factors limit these ecosystems' abilities to withstand climate impacts – let's take a closer look at a few of these issues.

*Presenters Note: take a moment to ask your audience to imagine which of these impacts they expect might have the greatest impact on climate resilience.*

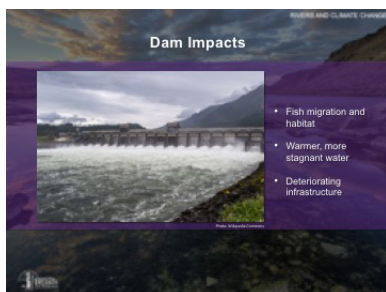


### 35. Dams in the Northwest

(Poll your audience: How many dams are currently in the Columbia River Basin?)

Today, the Columbia River Basin contains 211 dams. Fourteen dams block the main Columbia River, 13 in the Snake, 58 on tributaries of the Columbia, and another 78 in the greater Columbia Basin.

*Presenters Note: Include your state's total number (Oregon: 905, California: 674, Idaho: 523)*



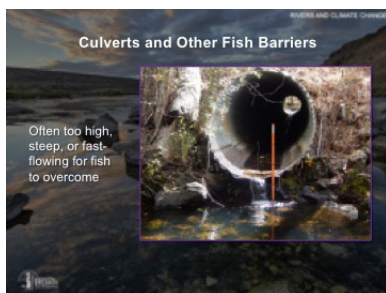
### 36. Dam Impacts

Among the many dams in the Columbia River Basin, the Grand Coulee Dam in 1941 and Chief Joseph Dam in 1950 essentially blocked movement of salmon to the entire upper watershed.

This fragmentation of the river limits spawning and turns miles of habitat into stagnant reservoirs. It takes 7 to 15 times as long for fish to move between points in the river today than under free flowing conditions - exposing them to greater stress and predators. Wider, stagnant rivers capture far more heat from the sun than narrow and deep cold water reservoirs upstream. The EPA estimated that if the lower Snake River were free-flowing, it would be within state temperature limits, even in August. These stagnant, warm water cause harmful algae blooms & a drop in oxygen levels that can harm both people and wildlife. Deteriorating, old infrastructure is not prepared for changing water cycles caused by climate impacts. The average age of dams in the US is nearly 60 years. 15,500 dams in the US classified as having a high hazard potential for failure due to increasingly frequent and severe flooding.

Extreme rainfall events, when coupled with more precipitation overall, can literally saturate the watershed and overwhelm dams that are not designed for these shifting weather patterns.





### 37. Culverts and Other Fish Barriers

Culverts are pipes and other structures that channel streams under roads.

These structures, that few of us bother to notice, can entirely eliminate watershed connectivity. They may be too high for fish to reach or too steep or fast flowing for fish to swim through.

In Washington state there are 20,000 known barriers to salmon and steelhead across the state.

*Presenters note: In 2001, the western Washington tribes sued Washington State for its failure to correct fish-blocking culverts, saying it damaged their treaty rights to fish. In 2013, the U.S. District Court ruled in favor of the tribes, requiring four state agencies to correct barriers at an estimated cost exceeding \$3.6 billion. The U.S. Supreme Court affirmed this decision in 2018. Combined, the four agencies have corrected more than 330 barriers to date, potentially opening 1,042 miles of upstream habitat.*



### 38. Grazing and Riparian Areas

Livestock grazing affects far more acreage of BLM and FS lands than roads, timber harvest, and wildfires combined (source) - over 70% of lands managed by the Bureau of Land Management and US Forest Service.

Livestock play a significant role in the cycling of carbon on public lands.

Globally, livestock contribute an estimated 18% of total man-made greenhouse gas (GHG) emissions. But very few studies have specifically examined livestock on public lands.

Scientists have determined that the interior Columbia River Basin is already severely affected by combined overgrazing and climate change impacts. As of 2014, 29 percent of allotted BLM land failed to meet agency standards



due to livestock impacts, including watershed conditions, water quality, soil health, habitat for at-risk species, and other variables.

What do grazing impacts look like? (Offer an example if you are familiar with an area nearby where overgrazing has been scientifically documented)

- Degradation of soils can prevent water from entering soils to recharge groundwater
- Declining water quality
- Limited wildlife habitat
- Destabilized streambanks

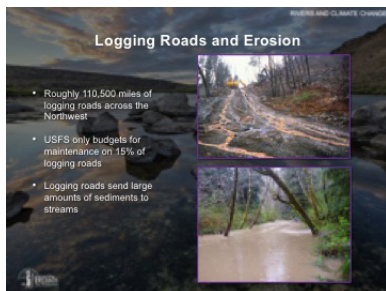


### 39. Healthy Rivers and Healthy Trees

Studies have recorded 50% reductions in summer streamflow in logged areas. About 59 percent of the forested landscape has been managed for production of timber and other resources - logging has an enormous impact on the movement of water throughout the watershed.

Logging near rivers: When logging ramped up in 1800's, low land near the banks of rivers was targeted for high-quality timber and accessible to river transport. Today there is almost no old-growth forest left by riverbanks in Oregon and Washington.

The Quinault River in Washington serves as an example of a river completely falling apart without trees to hold the banks, dissolving into a web of shallow streams and rivulets



#### 40. Logging Roads and Erosion

The U.S. Forest Service records suggest that there are roughly 110,500 miles of “forest roads” across the Northwest.

In 2015, a Forest Service study found a remarkable percentage of the forest roads were causing ecological damage.

In Mt. Baker-Snoqualmie National Forest, 41% of roads were categorized as “medium-to-high” concern for wildlife and habitat. Many are overgrown, rutted, dangerous.

At current funding capacity, the USFS can only maintain 15% of these roads.

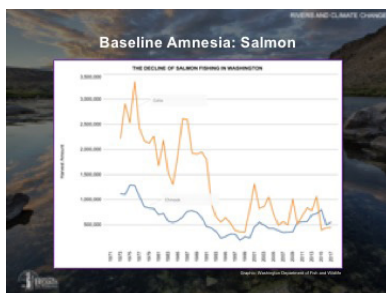
Dirt—while you may think of it as part of the ecosystem - too much of it can erode from the nearby land and stir up in the water column. Logging roads and logging activity cause large amounts of sediment to pulse into the stream, changing the function of the system.

When sediments deposit in pools in the river, the pools become more shallow and the water is more cloudy, harming fish.

An estimated 1.5 billion tons of soil enter the nation’s waters each year from roads! Roads allow water to move across the ground much faster, increasing the stream energy, eroding channel banks, scouring the channel and can increasing the likelihood of flooding downstream.

Roads also cause habitat fragmentation - in many studies, the density of wildlife is closely linked with road density.

*Presenters Note: <https://www.conservationnw.org/our-work/wildlands/sustainable-forest-roads/>*



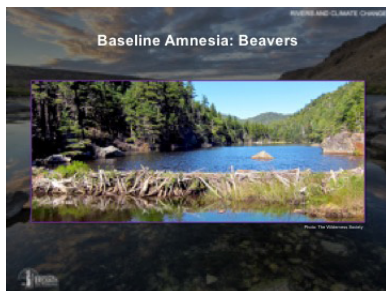
#### 41. Baseline Amnesia: Salmon

It can be hard to imagine just how different our watersheds look today compared to just a century ago. It can be challenging to imagine the scale of these impacts. Taking a closer look at the decline of keystone species, like salmon and beaver, offers us a glimpse into these transformations.

The Columbia River once produced the largest salmon runs on earth, with returns often exceeding 30 million salmon per year. But by 1991, the federal government declared the first salmon in the Pacific Northwest endangered under the Endangered Species Act.

By the end of the decade, wild salmon had disappeared from about 40 percent of their historic breeding ranges in Washington, Oregon, Idaho, and California.

In Washington, the numbers had dwindled so much that salmon, steelhead, and bull trout were listed as threatened or endangered in nearly three-fourths of the state. Salmon fishing in Washington has decreased dramatically since the early 1970s, affecting treaty tribes, recreational anglers, and the commercial fishing industry. The drop in fishing is the direct result of the long-term decline in salmon caused by a variety of factors, such as habitat loss, dams, hatcheries, over fishing, predation, and invasive species, all exacerbated by climate change.



## 42. Baseline Amnesia: Beavers

Much like salmon, we have forgotten the keystone role that beaver also played in our watersheds.

There were between 60 and 400 million beaver in North America before colonization

*Presenters note: "Eager: The Surprising, Secret Life of Beavers and Why They Matter," provides a far deeper look into the fascinating role of beavers in our watersheds.*

In Northern California, there are estimated to be only 1/1000th of the original beaver population remaining

Today, we see channelized rivers, with few dead trees allowing for stream complexity. Our watersheds are now a far cry from their historic appearance. California once had 5 million acres of wetlands, 91 percent of which are now filled in. Idaho has lost 56% of its wetlands, Oregon 38% and Washington 31%.



## 43. Rebuilding Watershed Resiliency

Many riparian zones in the Pacific Northwest have excellent potential for enhancement.

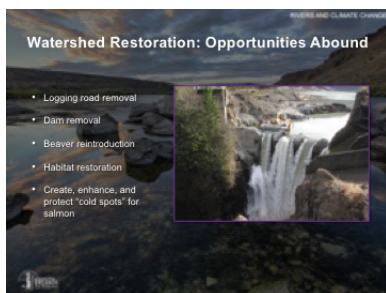
We can act to keep our rivers and streams filled with cool, clean, oxygen-rich water by:

- Planting native trees and protecting mature forests.
- Enhancing streamside forests.
- Establishing corridors along stream banks that will shade and stabilize streams and streambanks.

Nature has incredible resilience if we take away barriers to recovery.

*Presenters Note: Offer a local example of a restored riparian area—for example, the Sandy River Delta.*





#### 44. Watershed Restoration: Opportunities Aboard

Logging road removal and replanting.

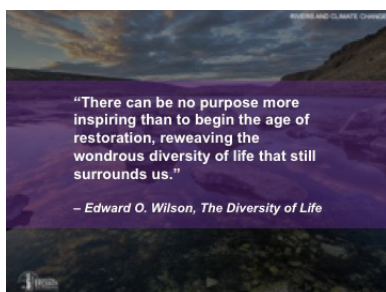
Dam removal—over the last 20 years, more than 900 dams have been taken down across the nation.

Beaver dam analogues and beaver reintroduction. Beaver reintroduction takes advantage of an unpaid ecological engineer, who allows us to slow down flooding and filter the flow of water while recharging aquifers by reconnecting rivers with the floodplain. Beaver dam analogues allow us to help jumpstart the recovery process when streams are severely degraded by reintroducing wood into river systems, providing benefits to streambed and salmon spawning.

We can create, enhance, and protect cold spots in streams by reintroducing log jams in streams to catch and trap sediment and make deep, complex pools and side channels filled with cool, clean water.

The deep pools created by these obstructions in the river provide sheltered zones for salmon. Two-thirds of deep pools are estimated to have disappeared from Puget Sound Rivers in the last 150 years

*Presenters Note: Source—Montgomery, David R. King of Fish: the Thousand-year Run of Salmon. Boulder, CO: Westview, 2003. 18.*



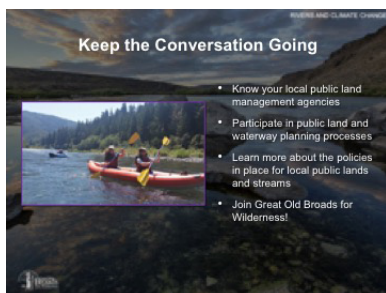
#### 45. E. O. Wilson Quote

(Extend an invitation to participate. Anyone can participate in public lands stewardship in ways big or small that benefit all of us.)



#### 46. Public Lands Stewardship

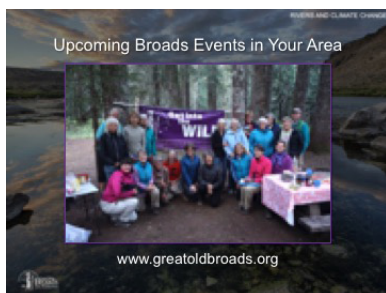
There's no panacea—but all restoration projects, large and small, add up to significant changes and a more resilient watershed.



#### 47. Keep the Conversation Going

There are plenty of other valuable ways to get involved:

- Become more educated about the public lands in your watershed and the forces that are impacting them. There are many ways to spread this knowledge with others - Keep informed, and keep a dialogue going.
- Get to know the local, state, and federal agencies that manage the public lands in the area. The Department of Fish and Wildlife co-manages with treaty Indian tribes salmon fishing and hatcheries. Fish and Wildlife also work to restore and protect habitat, and participates in programs to remove barriers to fish passage in streams. Local governments and watershed councils are great places to engage in these conversations as well. Stay in contact with your elected officials at all levels of government and make sure they're aware of the issues facing your watershed. Getting involved in these conversations can help lead to the decisions that aid watershed recovery.
- Participate in the public lands planning process. Attend and take an active part in meetings, and volunteer to serve on advisory boards and committees. Be heard!
- Get to know and understand the policies already in place for local public lands. Ask if these policies go far enough to protect waterways and riparian ecosystems.
- Join your local Broadband!



#### 48. Upcoming Broads Events in Your Area

If you're interested and want to learn more, we have some great upcoming events in this area you might be interested in...(discuss upcoming events)



#### 49. Capital Campaign

A grant helped us start this program and develop the curriculum to educate communities in the Pacific Northwest about public lands and climate change. While that grant got us started, for the program to continue and expand to other parts of the country, we need your help.

If you enjoyed, and learned from today's presentation, please consider making a tax-deductible donation to Great Old Broads for Wilderness, which is a 501(c)3 organization.

You can give us a check today (point out who in the room will take checks) or donate online at [greatoldbroads.org](http://greatoldbroads.org).

Questions?

**Appendix:**

Eight sovereign tribes from the Columbia River Basin, each with a vast history and enrolled members who continue to maintain cultural, economic and environmental connections to their homelands.

**Chinook Indian Nation**

Consists of five tribes—Lower Chinook, Clatsop, Kathlamet, Wahkiakum, and Willapa. The Tansy Point Treaty of 1855 was never ratified by Congress and the Chinook Nation is therefore not federally recognized.

<https://www.chinooknation.org>

**Confederated Tribes of Grand Ronde**

The Confederated Tribes of the Grand Ronde Community of Oregon includes over 30 tribes and bands from western Oregon, northern California, and southwest Washington.

<https://www.grandronde.org/>

**Cowlitz Indian Tribe**

The Tribe consists of Upper Cowlitz who speak Sahaptin and Lower Cowlitz who speak Salish

<https://www.cowlitz.org/>

**Confederated Tribes of Warm Springs**

The Confederated Tribes of Warm Springs is made up of the Wasco, Warm Springs, and Paiute tribes, recognized by treaty in 1855.

<https://warmsprings-nsn.gov/>

**Confederated Tribes of the Umatilla Indian Reservation**

The Confederated Tribes of the Umatilla Indian Reservation is comprised of the Cayuse, Umatilla, and Walla Walla peoples. The Umatilla River and Grande Ronde rivers have been the focus of the tribe's fish restoration activities for several decades. Under the tribe's leadership, salmon were reintroduced in the Umatilla River in the early 1980s.

<https://ctuir.org/>



### **Yakama Nation**

The Yakama Nation is a confederation of 14 tribes including the Yakama, Klickitat, and Walla Walla, located in Toppenish, Washington. Some of the Yakama Nation work regarding wildlife and conservation includes collaborating with the Hanford nuclear site to turn abandoned intake settler ponds into fish acclimatization pools and working on sage-grouse reintroduction.

<http://www.yakamanation-nsn.gov/>

### **Wanapum**

The Wanapum work closely with Grant County PUD in preserving the natural and cultural resources of the area, a relationship created by the construction of the Priest Rapids Dam in 1962 and Wanapum Dam in 1966.

<https://wanapum.org/>

### **Nez Perce Tribe**

Originally, the Nimiipuu people occupied an area that included parts of present-day Idaho, Oregon, and Washington. They moved throughout this region and parts of what is now Montana and Wyoming to fish, hunt, and trade.

<http://www.nezperce.org/>

### **Additional Resources:**

<https://fwee.org/environment/what-makes-the-columbia-river-basin-unique-and-how-we-benefit/>

[https://www.nwcouncil.org/sites/default/files/2007\\_5.pdf](https://www.nwcouncil.org/sites/default/files/2007_5.pdf)

<https://www.columbiariverkeeper.org/columbia/tribal-nations>