

Clackamas360: Watershed Tour

Lesson 2: Land of the Salmon

Overall goals: This tour introduces the cultural, spiritual, and ecological roles of salmon in the Pacific Northwest, as well as the multiple challenges salmon face as endangered species in forms of a changing climate, wildfire, pollution, and habitat loss – and the work of local organizations to help them survive.

Slide 1: PNW Life Force

Location: Mouth of the Columbia River

<https://clackamas360.glitch.me/1ColumbiaSalmon.html>

Key Theme:

- Salmon have a fundamental role in nourishing the forests, rivers and people of the PNW.

Engagement:

- Introduce yourself
- Introduce CRBC
- Introduce Watershed Health Education Program
- Introduce Clackamas WES/LCEP
- Introduce design/functionality/construction of Clackamas360 Virtual Watershed Tour
 - Introduce scene: Mouth of the Columbia River
 - Scavenger hunt to get used to navigating
 - Body of water to the west?
 - City on the Oregon side of the mouth of the Columbia?
 - Cape with a discouraging name?
 - This is an appetizer to salmon as a life force

Go Beyond: Same place, different times: How would your life be different if you lived in the Clackamas River Basin in different times throughout history? What would you do every day if you lived here in the year:

- a. 1800 (life as a teenager of the Clackamas people)
- b. 1900 (growing up during the European settling of the region)
- c. 2021 (what do you do today and how does it relate to the watershed?)
- d. 2100 (how will life change for kids growing up at the end of the century?)

How would your relationship to the Clackamas River change throughout these different times? What knowledge and skills would you be learning to prepare you for life in the Clackamas River Basin? Make a schedule of what your daily tasks would be for each of these time periods and then write a paragraph about each time period comparing and contrasting what your life would be like in each time period.

Slide 2: Pacific Northwest Salmon

Location: Eagle Creek

<https://clackamas360.glitch.me/2SalmonLife.html>

Key Themes:

- Introduce salmon life stages, salmon species found in the Clackamas watershed and their respective physiological differences.

Engagement:

- Does anyone know what we call a salmon nest?
- Salmon flesh is pink, does anyone know why they are this color?
- Of Oregon's 5 native salmon, which is Oregon's state fish?

Oregon Environmental Literacy Standards: 1) HS.16. Analyze the interconnectedness of physical and human regional systems and their interconnectedness to global communities. Investigate and compare the variation of biodiversity around Earth. EL Strand 2. 2) Research particular places on Earth, or particular species, that demonstrate either protection or loss of biodiversity. Show the causes and effects of these changes from a human perspective. EL Strand 3

Go Beyond: Choose one of the 5 salmon species from the "Salmon of the Pacific Northwest" card and draw it. How can you tell it apart from the other species? Other than the physical appearance, how can you determine which species it is by tracking the time of year it spawns or its distribution in the various watersheds? Why do you think these species have evolved differently?

Slide 3: Salmon and Climate

Location: Mt. Adams

Key Themes:

- Impacts of climate change on weather patterns and ecology.
- Effects of climate change on salmon populations (water temperatures, water availability, changing phenology, ocean acidification, drought, floods and habitat degradation).

Engagement:

- What mountain are we on in this scene? (the other Washington mnt.)
- What mountain is that way over there?
- Does anyone know the acidity of the ocean?
- What are some other impacts of climate change have you experienced?
- Why do you think salmon eggs needs to be at 50 degrees?

Oregon Environmental Literacy Standards: HS.23. Analyze the distribution and characteristics of human settlement patterns.

Go Beyond: Water Temperature is one of the most important factors for healthy salmon habitat. The temperature affects salmon physiological development - even before they hatch from their eggs. Watch this short film about how salmon eggs are affected by changing water temperature:

https://opb.pbslearningmedia.org/resource/nasa09_sci.life.oate.saleggs/warmer-water-kills-salm-on-eggs/.

Are you surprised that a change of just 3 degrees F can make life or death for the salmon eggs? What other organisms do you think would be endangered by a 3 degree F rise in environmental temperature, and why?

How would you test the hypothesis that climate change is the reason for the problems with the salmon reproduction? What would you have to know beforehand and what data would you have to collect?

Slide 4: Wildfires

Location: Riverside on Clackamas River

<https://clackamas360.glitch.me/4Wildfires.html>

Key Themes:

- Climate change with human development has caused wildfires to become a part of life in the PNW
- Fire ecology and how salmon and other species are impacted by “normal” wildfire vs. fires intensified by human activity and climate change.

Engagement:

- The Clackamas River has several dams, do you recognize this one?
- When fires are occurring in the forest and we live in the city, its hard to imagine the ways these not so far off fires impact us. What impacts do you all think fires might have on us, so far away?

Oregon Environmental Literacy Standards: HS-LS2-6. Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

Go Beyond:

- What is your climate story? We need to mobilize great efforts to address climate change. Sharing your story of experiencing climate change helps convey the urgency to act and is important to convince policy makers and big CO2 polluters to take action on climate change.
- Write about your experience during the Riverside fire, or another experience you have directly facing climate change.

Slide 5: Managing for Salmon

Location: Carli Creek

<https://clackamas360.glitch.me/5Pollution.html>

Key Themes:

- Restoration activities and Treatment Wetlands can improve water quality and watershed health.
- Preventing water runoff from entering our water supply.

Engagement:

- Can anyone find Carli Creek in this slide?
- Which watershed do you live in?
- How many people do you think get their water from the Clackamas River?
- What resources do we get from the Clackamas River?
- What do you think we can do to protect our drinking water?

Oregon Environmental Literacy Standards: EL Strand 2 Where does your water come from?
EL Strand 4 Do a personal reflection of the value of natural resources and how that may affect your consumer choices.

Go Beyond: How's My Waterway?

- a. Enter your address into the Environmental Protection Agency's "How's My Waterway" website: <https://mywaterway.epa.gov/>
- b. What watershed(s) are you in? Have you ever visited the creek or river that the EPA lists you live within? What is the Condition of your Waterbody? What aspects are "Good," which are "Impaired," and how does it say you can help improve the situation?

Slide 6: Salmon Habitat**Location: Eagle Creek Project**

<https://clackamas360.glitch.me/6Restoration.html>

Key Themes:

- Ecological features of dynamic rivers vs. rivers impacted by human activity and development.
- Loss of dynamic features leads to static rivers. Humans can recreate some feature loss through restoration activities.

Engagement:

- What do you think humans can do to mitigate the loss of dynamic features on the river?

Oregon Environmental Literacy Standards: EL Strand 4 Do a personal reflection of the value of natural resources and how that may affect your consumer choices.

Go Beyond: What resources do you get from the Clackamas River Basin?

- a. Make a list of the types of resources you get from your watershed. Include physical things like timber products and farmed food, but also think about intangibles like electricity and recreation.

- b. Do you get most of what you need to survive from your watershed? What do you need from other places? Considering the population of Clackamas County is projected to increase % by 2032, how does that make you feel about the availability of resources in the Clackamas Basin? What can you do to be more sustainable?

Slide 7: Spawning: Life & Death

Location: Eagle Creek

<https://clackamas360.glitch.me/7Spawning.html>

Key Themes:

- For salmon, spawning is a one way journey.

Engagement:

- What is something that you learned today?

Oregon Environmental Literacy Standards: HS.20. Analyze the impact on physical and human systems of resource development, use, and management, and evaluate the issues of sustainability.

Go Beyond: Go to the Clackamas River Water Providers Indoor Water Conservation Art

Project: <https://www.clackamasproviders.org/indoor-water-conservation-tips/>

- a. Create signs to put up around your house to remind yourself and your family of water conservation tips.
- b. How do the actions of people upstream of you affect you? How do your actions affect those downstream of you?