ECOSYSTEM SERVICES STATION

Overview

Ecosystem services refer to the relational benefits among organisms in a specific ecosystem. The goal of this lesson is to introduce students to the idea that relationships in ecosystems are largely mutualistic and not extractive. By reading and sorting relationship statements about local organisms, students will reflect on how organisms contribute to their ecosystems and human well-being. This activity invites students to think critically about how language, relationships, and ecological systems are connected—and how salmon are part of this vital web of life. Relationships are the foundation of life on earth, and the relationships between organisms in local riparian and river ecosystems provide essential services or resources for the land, air, water, and creatures.

Lesson Flow:

This lesson is structured using a four-corner exercise, which can be done indoors or outdoors. Students begin by observing their surroundings and identifying services that plants and animals provide, leading into the concept of ecosystem services. The facilitator will introduce the four categories—provisioning, regulating, cultural, and supporting—using visual aids and discussion. Students will then receive a card representing an organism or service and collaboratively sort their cards into the correct category on a large floor diagram. Special focus will be placed on salmon, prompting students to consider the ecological and cultural roles salmon play in ecosystems. The activity encourages systems thinking and introduces vocabulary to describe interdependent relationships in nature.

Time: 30 Minutes

Suggested Location: *20x20 Open space where students can see the four ecosystem service categories.*

Learning Goals: By the end of the station, students will be able to:

- What: Describe the four categories of ecosystem services
- Who: Categorize functions using the four types of ecosystem services.
- Apply the four types of ecosystem services to understand salmon's key ecological role.

Materials: The Ecosystem Relationship kit includes the following:

- 4 Large Ecosystem Categories signs
- 8 Organism Cards, each with 5 relationship statements

Background Information

For thousands of years, river ecosystems have supported diverse communities of organisms, including humans. The surrounding forests are home to countless organisms whose lives and contributions are deeply interconnected with our own. Relationships are the foundation of life on earth, and the relationships between plants and organisms in local riparian and river ecosystems provide essential services for the land, air, water, and creatures. This lesson introduces students to new language for describing and categorizing these ecological relationships. By naming and understanding the services organisms provide, we shift away from extractive mindsets and toward a more reciprocal and relational understanding of nature. Students will explore the four categories of ecosystem services: provisioning, regulating, supporting, and cultural.

Salmon Culture of the Pacific Northwest Tribes

Salmon have long been a symbol and lifeblood of the people who call the Pacific Northwest home. The Sandy River, Eagle Creek, Salmon River, and the other tributaries to the Willamette and Columbia flow through the ancestral homelands of many Indigenous nations, including the Multnomah, Clackamas, Chinook Peoples, Kalapuya,Wasco, Warm Springs, Nez Perce, Yakama, Umatilla, and other tribes.

The Columbia River Inter-Tribal Fish Commission shares that the tribal cultures of the Columbia River Basin could be called “Wy-kan-ush Pum” or “Salmon People” because of their ancestral relationship to salmon. Salmon remain integral to tribal religion, culture, and subsistence through time immemorial. The continuous stewardship of the rivers and lands supports fish health and populations, which is fundamental to food sovereignty. Some Peoples occupied the Willamette Valley both year round, and seasonally.

In this background information we will be using The Shaphatuiian Language to share just one of the ways that people of the Columbia Basin relate to their first foods. The Sahaptian Language Family encompasses the Indigenous languages historically spoken across the Columbia Plateau region of Washington, Oregon, and Idaho. This family branches into two main divisions:

- Sahaptin (Ichishkíin) - Spoken by peoples including the Yakama, Umatilla, and Warm Springs communities, with numerous local dialects that vary in pronunciation and vocabulary while maintaining mutual intelligibility.
- Nez Perce (Nimíipuutimpt) - Spoken by the Nez Perce people, featuring distinct grammatical structures while sharing roots with Sahaptin.

These languages are characterized by vocabulary deeply connected to the Columbia River ecosystem. While European contact and government policies severely threaten these languages, dedicated community members and linguists are working to document, teach, and revitalize them for future generations.

Each of the plants and animals featured in this lesson include the name in one of these languages or dialects. This is meant to highlight some of the many relationships that people of these lands have rather than be an exhaustive list of the different pronunciation variations or words for these creatures

Ecosystems

An **ecosystem** is a community of living organisms (plants, animals, and microbes) interacting with one another and with their nonliving environment (such as air, water, and soil) in a specific area. According to the U.S. Environmental Protection Agency (EPA), an ecosystem is defined as:

> *"a dynamic complex of plant, animal, and microorganism communities and their nonliving environment interacting as a functional unit."* (EPA, 2023)

Ecosystems can be as small as a riffle in a river or as vast as a forest or watershed. What defines them is not their size, but the interconnections among all their parts. Every component of an ecosystem,whether living (biotic) or nonliving (abiotic),plays a vital role in maintaining the balance and health of the whole system. This complex web of relationships means no part of an ecosystem exists in isolation. A change to one element,such as the introduction of an invasive species, pollution, or the removal of a key organism,can ripple through the system, impacting others in unexpected ways. Healthy ecosystems depend on biodiversity and cooperation among species, as well as the flow of energy and matter.

When we understand ecosystems as living systems of many interconnected parts all in service to one another, we can begin to recognize the value of every organism and process within them. This allows us to consider the role of various creatures around us, such as humans and salmon. What services are salmon providing to the ecosystems they live in?

Ecosystem Services

We can shift our understanding of ecosystems by being intentional about the language we use to describe the organisms that comprise the whole. Every organism contributes to the functioning of its ecosystem in unique and essential ways. Plants, for instance, provide food and oxygen; animals may disperse seeds or fertilize soil; fungi and bacteria break down organic material and recycle nutrients.

These interactions are not random. They are vital contributions to what we call ecosystem services.

Ecosystems provide a range of services both biologic and biogeochemical. As we shift the language used to describe relationships within ecosystems, we can begin to recognize the different services that ecosystems provide to humans and what humans provide back. They are typically grouped into four categories:

- **Provisioning services:** Provisioning services are the physical things that nature provides for us to use and survive—like food, water, and materials. They're the most visible and tangible ecosystem services—what we often think of first when we ask, "What does nature give us?
  Examples: food, water, medicine, and materials.

- **Regulating services:** Regulating services are the functions that ecosystems perform to help keep the environment stable, healthy, and safe—for both humans and wildlife. These services don't give us something we can hold in our hands (like food or water), but they help control and balance the systems we depend on.

Nature as a system of balances. These are the services that are happening right now, photosynthesis, water purification, temperature control.
Examples: balancing systems, temperature, climate control, and disease regulation.

- **Supporting services:** Supporting services are the foundational processes that allow all other ecosystem services to exist. These include nutrient cycling, soil formation, habitat creation. They are the slow, behind-the-scenes processes that keep ecosystems alive and functioning—like building the stage before the play begins. These services don't directly give us food, water, or clean air, but they make everything else possible.
  Examples: nutrient cycling, soil formation, habitat.

- **Cultural services**: Cultural services are the non-material benefits we get from nature—like joy, connection, meaning, inspiration, and learning. These services shape who we are, how we relate to the land, and how we build community.
- They include recreation, spiritual and cultural practices, art, stories, and education that come from spending time in and with the natural world.
  Example: spiritual, educational, recreational, and cultural heritage values.

Provisioning services are often most recognizable as the immediate food or sustenance that can be provided by organisms. Regulating services include water purification,nutrient cycling, carbon sequestration, nitrogen fixing, and sediment settling. Supporting services include benefits like pollination, seed dispersal, biodiversity. Cultural ecosystem services are the nonmaterial benefits and relationships that humans have with the environment. This is discussed in more detail below. The diagram from Chan et al. (2012) helps us visualize the relationship between society (our needs and wishes) and the ecosystems (the supply of services). It shows how human well-being and ecosystem health are deeply interconnected and how these relationships change over time.

Our choices, needs, and values shape how we interact with and impact the ecosystems around us. Indigenous communities and others who live in close relationships with the land often hold a deeper understanding of their place within ecological systems—seeing themselves as part of, rather than separate from, the web of life. In contrast, settler-colonial systems have often framed nature in terms of ownership and extraction, where the value of the land and its beings is measured primarily in economic terms. Words like "natural resources" or "land use" are rooted in these one-way, transactional views, emphasizing what can be taken rather than what is shared or reciprocated.

By learning to see and name the services that different organisms provide, we can start to dismantle these harmful relationship structures and begin to appreciate all of the many services that ecosystems provide.

Cultural Ecosystem Services

Cultural ecosystem services (CES) are the nonmaterial benefits that people obtain from an ecosystem through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience (Chan et al., 2012; Milcu et al., 2013; Zhao et al., 2023). These services are often poorly articulated with little integration into management plans due to the over simplified and misstated idea that only economic forms of capital matter. These oversimplifications are problematic both from an ecological and societal view of resource use and the human connection to place. The appreciation of cultural ecosystem services has often depended on the type of ecosystem in addition to its historical role within a given culture (Chan et al., 2012). There are many different types of cultural ecosystem services. The table below describes 8 different categories.

Cultural Ecosystem Services Categories	**Descriptions**
Aesthetics	Many people appreciate the beauty of ecosystems, as seen in support for parks, scenic byways, and housing location preference.
Cultural heritage/diversity	Many societies value the preservation of historically significant landscapes (“cultural landscapes”) and culturally significant species
Education and Knowledge Systems	Ecosystems and their components and processes shape both formal and informal education and influence different cultural knowledge systems..
Inspiration and Art	Ecosystems are a rich source of inspiration for art (photographs, art, structures, etc..) folklore, national symbols, architecture, and advertising.
Recreation and Tourism	Many leisure activities are based on the natural or cultivated features of landscapes.
Sense of Place	Many people value the “sense of place” that comes from familiar environmental features, including aspects of the ecosystem. These features, such as specific soils, topography, climate, biodiversity, and human factors, can shape identity and memory, contributing to a region's unique character and terroir.
Social Relations and Relational Values	Ecosystems shape social relationships in cultures. Fishing societies, for example, differ in many ways from nomadic herding or agricultural societies in terms of social relations.
Spiritual	Many religions attribute spiritual and religious significance in ecosystems and their components.

Note: The categories of Cultural Ecosystem Services listed above are relative to a study in tidal wetlands of Northeastern America. While this list does articulate a strong list of CES, it is important to remember that cultural ecosystem services are relative to the local and historical role of how a specific ecosystem has provided to local culture or community that depends on it. From, “Modelling cultural ecosystem services in agricultural dykelands and tidal wetlands to inform coastal infrastructure decisions: A social media data approach”, by Q. Zhao, Y. Chen, K.P. Gone, E. Wells, K. Margeson, and K. Sherren., (2023). From, Marine Policy, 150, 105533. https://doi.org/10.1016/j.marpol.2023.10553

First Foods

The term "first foods" refers to the traditional foods that Indigenous peoples consumed before settler contact and colonization, and these foods continue to hold significance today. Across the Americas, different Indigenous groups have their unique first foods, reflecting the diversity of cultures and ecosystems, even among those living in similar ecoregions. Each first food carries its origin story and deep cultural significance, yet all share a common importance in sustaining life and fostering a continued relationship with the land. For thousands of years, these staples have supported Indigenous communities and are often celebrated through seasonal ceremonies and practices unique to each community. While many culturally relevant food staples support the people in the area now known as Portland, this lesson will focus on those first foods that have held enduring importance since time immemorial. These include salmon, elk & deer, camas, wapato, and various berries, such as salmonberries, huckleberries, and wild strawberries.

Salmon - Núsux in the Umatilla Shapatin: For thousands of years, salmon have been a cultural and spiritual keystone species for Indigenous peoples of the Columbia River Basin, including the Multnomah, Chinook, Clackamas, Wasco, Nez Perce, Warm Springs, Yakama, and Umatilla tribes. Dip Net & Platform Fishing was used by fishermen standing on platforms over famous fishing sites like Celilo Falls and using long-handled dip nets to scoop salmon from the rushing water. Wooden fish weirs (barriers) were placed in streams to guide salmon into traps. Spears were used to catch large fish in shallow waters. Gillnets, made from natural fibers, were strung across river channels to entangle fish.

Salmon is eaten fresh, often roasted over open fires or steamed in earth ovens. To preserve for winter, salmon is filleted, salted, and dried on wooden racks or smoked over alderwood fires in large smokehouses. Dried salmon was traded extensively along the Columbia River trade networks. Oil is extracted for cooking and medicinal uses, while bones are ground into nutrient-rich powder or used in tools and ornaments.

The Columbia River Basin is home to several species of Pacific salmon, including Chinook, Coho, Sockeye, Chum, Pink salmon, and Steelhead trout (closely related to salmon). These fish are anadromous, meaning they migrate between freshwater and saltwater during their life cycle.

Pacific Lamprey - Ksúya in Umatilla Shapatin

Pacific lamprey is an ancient, jawless fish that has existed for over 450 million years—far older than salmon. These eel-like beings are native to the rivers of the Pacific Northwest and play a critical role in freshwater and marine ecosystems. As adults, lamprey migrate upstream to spawn, where their decaying bodies return vital nutrients to the river, enriching the ecosystem for plants, insects, and fish.

Pacific Lamprey are a First Food and hold deep cultural and spiritual significance for many Indigenous peoples, including the Confederated Tribes of the Umatilla Indian Reservation. For the Cayuse, Walla Walla, and Umatilla people, lamprey are more than food—they are honored relatives, and their return each year to spawn marks an important part of seasonal cycles.

In the ecosystem, larval lamprey (ammocoetes) live buried in riverbeds for several years, where they filter feed and help clean the water, similar to mussels. Adults serve as prey for marine animals and help balance populations by feeding on dead or dying fish.

Due to dam construction, habitat loss, and water pollution, Pacific Lamprey populations have declined dramatically. This decline threatens the ecological health of rivers and the cultural practices that have honored and depended on lamprey for generations. Efforts to restore lamprey populations are not only ecological restoration—they are acts of cultural healing and responsibility.

Western Pearlshell - siwáala (Freshwater Clam in Shapatin)
Known to be the longest-living freshwater mussel species in the western United States, individual Western Pearlshells (*Margaritifera falcata*) can live for up to 100 years. These bivalves play a vital role in maintaining stream health and biodiversity. By filtering water, they remove excess sediment and algae from the water column. In large populations, they help recycle nutrients back into the aquatic ecosystem and provide both food and habitat for aquatic macroinvertebrates—many of which are essential food sources for juvenile salmon. Western Pearlshells are considered a First Food by members of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), which includes the Cayuse, Walla Walla, and Umatilla peoples. The decline of this species has not only disrupted the ecological balance of rivers and streams but has also impacted the cultural and relational connection that tribal communities maintain with this important being. Their loss reflects the broader consequences of human-driven habitat changes and underscores the need for restoration and protection.

Deer and Elk - tl'álk (deer or elk) in the Yakama Shapatin or ’ímes in Nimíipuutimpt: Deer and Elk are one among the first food for Indigenous peoples of the Columbia River Basin. They would be hunted in upland areas in the late summer alongside berry picking and dried or saved for food in the winter months when berries and other plants were less abundant.

Camas- x̣máaš in Umatilla Shapatin or memes in Nimíipuutimpt: Camas is a perennial plant that thrives in moist prairies, meadows, and along riparian zones in the Pacific Northwest, including the Willamette Valley and areas around the Columbia River. It flowers from late spring to early summer (May to June) with striking blue or purple star-shaped blooms. The bulb is ready for harvest from late summer to fall, when the plant goes dormant.

Camas is a staple carbohydrate for many Indigenous peoples, including the Chinook (Clackamas and Cascade Tribes in Portland), Kalapuya, and other Columbia River tribes. Traditionally, camas bulbs are harvested in late summer when the leaves are yellow. They are dug up using digging sticks (often made from wood or bone). The bulbs are slow-roasted in pits for one to several days, transforming their inulin (type of soluble fiber) content into fructose, making them sweet and digestible. Once cooked, camas could be eaten immediately, dried for later use, or pounded into cakes for storage and trade. From pre-contact onward, camas fields were managed using Traditional Ecological Knowledge, selective harvesting, and controlled burns, ensuring long-term sustainability and abundant harvests.
Over the last four years, Linfield University has celebrated the long-standing significance of camas to the beings of Oregon through a full-day celebration of these beautiful purple plants led by elders to educate all about the importance of and long-standing connection with these plants.

Wapato - stínstins in Umatilla Shapatin: Wapato, also known as arrowhead plant, grows in shallow wetlands, lakes, sloughs, and slow-moving parts of the Columbia River. It produces starchy, tuber-like roots (corms) beneath the water. It flowers in summer (June–August), with tiny white blossoms, and tubers are best harvested in late fall to winter when they store the most nutrients. Indigenous peoples, including the Chinook, Multnomah, and Clackamas, wade into the water and loosen the soil with their feet to release the floating tubers to be collected. Wapato is often boiled, roasted, or dried and stored for winter. The tubers have a mild, potato-like flavor and are eaten alone or with other foods.

Berries: (Salmonberries, Huckleberries, Strawberries)
Salmonberries grow in moist forests, streambanks, and coastal areas, thriving in the wet conditions of the Columbia River Basin. They flower in early spring (March–April) and bear ripe fruit from May to July. The berries range in color from yellow-orange to deep red. Salmonberries are among the earliest berries harvested in spring, signaling the return of warm weather. They are eaten fresh, mixed with fish or meat, or dried for later use. Young shoots are peeled and eaten raw, like asparagus. Their early ripening makes them a harbinger of summer, and they are associated with renewal, abundance, and the return of warmer, longer days.

Huckleberries - **cemíitx** in **Nimíipuutimpt**
Huckleberries grow in high-elevation forests, clearings, and mountain slopes, including Mount Hood and the Cascade foothills. They ripen in late summer to early fall (July–September). Huckleberries are highly prized and often dried into cakes, cooked, or eaten fresh. They were used extensively as a food source throughout the year. Fresh berries were consumed in large quantities or used for fish bait because they closely resemble fish eggs. (Cascadia DOB) Huckleberries were also dried and often into brick-like cakes for later use. Dried berries were stewed and made into sauces or mixed with salmon roe and oil to eat at winter feasts. Large groups would travel to huckleberry fields in late summer, often holding gatherings and ceremonies while harvesting. The berries are seen as a gift from the Creator, and harvesting them is usually tied to spiritual practice and reciprocity.

Western Red cedar - talátat in **Nimíipuutimpt** Western Redcedar (Thuja plicata) is a towering conifer native to the Pacific Northwest, often referred to as the "Tree of Life" by many Indigenous communities. Thriving in moist forest environments, these trees can live for hundreds of years and grow to over 200 feet tall. Western Redcedar plays a crucial ecological role in stabilizing soil, retaining moisture, and providing habitat for countless species—from birds and insects to fungi and amphibians.

For Indigenous peoples across the Pacific Northwest, including the Confederated Tribes of the Umatilla Indian Reservation, Western Redcedar is a sacred plant. It is not just a tree, but a relative. Its bark, roots, and wood have been used for generations to create tools, canoes, baskets, clothing, and homes. The tree is often harvested with ceremony and deep respect, acknowledging the life it gives. Its medicinal properties are used in teas, salves, and spiritual practices.

In the ecosystem, fallen cedar logs nourish the forest floor, and their decay supports fungi and insects, continuing the cycle of life. The aromatic oils in cedar help the tree resist rot, making it a lasting shelter for many organisms.

However, logging, climate change, and habitat fragmentation have impacted the health and range of Western Redcedar. Its decline signals not just ecological imbalance, but the weakening of cultural threads tied to this vital being. Protecting cedar means protecting both the forest and the stories, knowledge, and relationships interwoven with it.

Tule - tk̓ú ʻ in Umatilla Shapatin

Tule (also known as hardstem bulrush) is a wetland plant that grows in dense colonies along the edges of rivers, streams, and marshes. Emerging with fresh green shoots in the spring and producing seed pods in the fall, tule has long held cultural significance for Indigenous communities across the West Coast—from California to Alaska.

Tule stems have been woven into countless tools, including baskets, duck decoys, mats, and even canoes, particularly by Indigenous groups in Northern California. The plant's underground rhizomes are used both as a food source and as a structural component in basket weaving. Its pollen can also be gathered and processed into flour. Beyond its cultural importance, tule plays a critical ecological role. It provides food for wetland birds and is used by muskrats in the construction of their shelters. As a keystone plant in wetland and river ecosystems, rule contributes to water filtration, erosion control, and habitat stability.

Plant Relationships and Reciprocity:

For Indigenous people of the Columbia Basin, these plants are not just food; they are part of cultural, spiritual, and ecological practices. Traditional harvesting was done with care and reciprocity, ensuring plant populations remained healthy. Plants were often managed through burning, selective harvesting, and seasonal gathering practices. For Columbia River tribes feasts are the main practice of gratitude, connecting tribal people to the land and ancestry. Annually before open fishing can commence, First Salmon Feasts are held to thank and honor both salmon and water who gave themselves as a gift to support the existence of humans in tribal creation stories of the Columbia River Basin. The first fish ceremony centers the inherent role that salmon and water play in the health of Columbia Basin tribes. Indigenous knowledge ensures sustainability, and food sovereignty efforts today aim to restore access to traditional foods and cultural practices rooted in relationships.

Lesson Plan - Ecosystem Relationships

Objective: Students will develop an understanding of the ecosystem services that different organisms in the ecosystem provide. Students will learn how to describe relationships between organisms, including Salmon, in an ecosystem using new ecosystem service terms.

Introduction (7 Minutes)

1. Introduce yourself to the group and the station.
2. **Tell students:** Today, we are going to investigate the services that organisms in the ecosystem provide.
3. **Ask students:** Take a moment to look around, notice the plants, river, animals. What essential things do specific plants do or provide?
    a. Encourage a mix of responses (clean air, provide food, release oxygen, beauty, etc.)
4. Introduce the term **ecosystem services**.
    a. Ecosystem services are the benefits humans and other organisms receive from healthy, functioning ecosystems.
    b. Ecosystem services include: (student ideas) provide essential resources like food and water, regulating natural processes like climate and chemical cycles, and supporting cultural and spiritual values.
    c. These services are categorized into four main types: provisioning, regulating, supporting, and cultural.
5. **Goal for the lesson**
    a. **Tell students:** Today, our goal is to explore the relationships between organisms in an ecosystem using new language. Each of you will get a card that describes a service or relationship provided by an organism in this ecosystem., You will decide which of the four categories it fits into:Provisioning, Regulating, Cultural, and Supporting.

Four Types of Ecosystem Services (3 Minutes)

1. Place the four large ecosystem service category cards on the floor, explaining that each card represents a quadrant.Each quadrant corresponds to one of the four service categories: Provisioning, Regulating, Cultural, and Supporting.
2. Invite students to describe the image on the large service cards. This will help them begin to understand what each type of ecosystem service is.
    b. Provisioning **Service**: Images of food, building materials, clothing,
        i. *Provisioning services are the physical things that nature provides for us to use and survive—like food, water, and materials. They're the most visible and tangible ecosystem services—what we often think of first when we ask, "What does nature give us?*
    c. **Regulating Services**: Images of balance, temperature, water purification, nitrogen cycle
        i. *Regulating services are the functions that ecosystems perform to help keep the environment stable, healthy, and safe—for both humans and wildlife. These services don't give us something we can hold in our hands (like food or water), but they help control and balance the systems we depend on.*
        ii. *Nature as a system of balances. These are the services that are happening right now, photosynthesis, water purification, temperature control*
    d. **Cultural Services**: Images of celebration, creating art, or engaging in outdoor activities.

i. *Cultural services are the non-material benefits we get from nature—like joy, connection, meaning, inspiration, and learning. These services shape who we are, how we relate to the land, and how we build community.*
ii. *They include recreation, spiritual and cultural practices, art, stories, and education that come from spending time in and with the natural world.*

e. **Supporting Services**: Images of bricks describe the foundation of the ecosystem.
i. *Supporting services are the foundational processes that allow all other ecosystem services to exist. These include nutrient cycling, soil formation, habitat creation. They are the slow, behind-the-scenes processes that keep ecosystems alive and functioning—like building the stage before the play begins. These services don't directly give us food, water, or clean air, but they make everything else possible.*
ii. *Soil formation, nutrient cycling, habitat.*

Salmon and their Ecosystem Services (10 Minutes)

1. Begin by passing out one organism card to each student following the order below depending on group size.
   a. Group size 1-5: Camas, Stinging Nettle, Western Red Cedar, Western Pearlshell Mussel, Wapato
   b. Group size of 6: Stinging Nettle, cedar, Western Pearlshell, Deer, Lamprey, Huckleberry
   c. Group size of 7: Camas, Stinging Nettle, Cedar, Mussel, Wapato, Deer, Huckleberry
   d. Group size of 8: Stinging Nettle, Cedar, Mussel, Deer, Lamprey, Huckleberry, Tule, Red Admiral
   e. Group size of 9: Camas, Stinging Nettle, Cedar, Mussel, Wapato, Deer, Lamprey, Huckleberry, Tule,
   f. Group Size of 10: Camas, Stinging Nettle, Cedar, Mussel, Wapato, Deer, Lamprey, Huckleberry, Tule, Red Admiral

   Note: The list isn't cumulative — each group size has its own specific set of organisms, curated to keep a balance of ecosystem service types for each round.

2. Tell students to read the salmon side of their organism card. Give students 2 minutes to read about the services that salmon provide. Tell them that each of the 4 statements on their card correlates to a type of ecosystem service that their creature provides to the ecosystem. Your organisms provide hundreds of relationships and services, but you have four examples in front of you.
3. Guided Service Sort – **Statement A (Provisioning)**
   a. Ask a student to read Statement A aloud:
   "I am a primary food source for many Tribal Nations across the Columbia River Basin. For generations, I have nourished families and sustained communities."
   b. Ask:
      i. What clues do you hear in the statement?
      ii. Which type of service do you think this is? Why?
   c. Have the group go to the service they think it is.
   d. Walk the group to the **Provisioning Service Area**.
   e. Read the definition out loud:
   Provisioning services are the physical things that nature provides for us to use and survive—like food, water, and materials. They're the most visible and tangible ecosystem services—what we often think of first when we ask, "What does nature give us?

i. *They're what we eat, drink, build with, and hold in our hands.*

4. **Statement B (Regulating)**
    a. Read or have a student read **Statement B:**
    I migrate great distances to the ocean and back. Like a nutrient shuttle, I carry marine nutrients upriver. After I spawn and die, my body releases essential nutrients into freshwater ecosystems, feeding plants, insects, and the land. (R)
    b. Ask:
        i. What clues do you hear in the statement?
        ii. Which type of service do you think this is? Why?
    c. Have the group go to the service they think it is.
    d. Ask the group to reflect:
        i. What are salmon providing in this service?
        ii. We can think of this as: harvest, gather, catch, consume
    e. Educators move to the **Regulating Service Area**.
    f. Share the definition: ***Regulating services*** *are the functions that ecosystems perform to help keep the environment stable, healthy, and safe—for both humans and wildlife. These services don't give us something we can hold in our hands (like food or water), but they help control and balance the systems we depend on.*
5. **Statement C (Cultural)**
    a. Have a student read Statement C aloud:
    "I am part of the creation stories of many Indigenous peoples. Each year, when I return from the ocean, I am honored in the First Fish Ceremony—a celebration of gratitude and connection."
    b. Ask:
        i. What clues do you hear in the statement?
        ii. Which service category feels like the best fit for this one?
        iii. What clues do you hear that help you decide on this category?
    c. Have the group go to the service they think it is.
    d. Move to the **Cultural Service Area**.
    e. Read aloud the definition: ***Cultural services*** *are the non-material benefits we get from nature—like joy, connection, meaning, inspiration, and learning. These services shape who we are, how we relate to the land, and how we build community.*
    f. *They include <u>recreation, spiritual and cultural practices, art, stories, and education</u> that come from spending time in and with the natural world.*
    g. Ask Students:
        i. *What other cultural service might salmon or fish in general provide?*
        ii. *What do humans enjoy doing with salmon/fish? (*Fishing or recreation)
6. **Statement D (Supporting)**
    a. Read or have a student read **Statement D**:
    "I am a vital part of the food web. Bears, birds, foxes, and marine mammals all depend on me. I help support the entire ecosystem, even in death."
        i. Ask: *Which category fits this final service?*
    b. Move to the **Supporting Service Area**.

c. Share the definition: *Supporting services are the foundations of all other ecosystem services. They include the slow, behind-the-scenes processes that keep ecosystems alive and functioning—like building the stage before the play begins. These services don't directly give us food, water, or clean air, but they make* ***everything else possible.***
    i. Ask: *What other supporting services can you think of?*

Sorting into Ecosystem Services (10 Minutes)

1. Tell students: Now that we've looked closely at salmon, it's time to explore your own organism card. Each of you has a species that is part of this same ecosystem. We will do four rounds and you will read one statement each round in order they are listed (A–D), you will then decide which ecosystem service it provides and stand in that quadrant.

2. **Round 1:** Read statement A, then move to the ecosystem service type that best matches the relationship described by your organism.
    a. As students are thinking through their choices, you can support them with the following questions:
        i. Provisioning: Does this organism give something others can eat, build with, or use?
        ii. Regulating: Does it help keep balance in nature (like controlling temperature, water, or air)
        iii. Cultural: Does it hold meaning, connect us to traditions, inspire people, or describe how people enjoy this creature?
        iv. Supporting: Is it something that helps everything else work, like soil or pollination?
    b. Once they have found their group, have students describe in their own words how their organism fulfills the ecosystem service they are standing at.
    c. Ask the students to discuss the following questions with one another.
        i. What words or ideas helped you figure out the type of ecosystem service it was?
        ii. Is there anyone who wants to change which category they think their service is?
    d. **Resorting**: Give students a chance to resort if they feel that their statement doesn't fit that ecosystem service type.
        i. If you changed groups, describe in your own words how your organisms fulfills the ecosystem service that you are standing at.
    e. **Group Meaning-Making:** Help students see the collective role of organisms in their category.
        i. What do these services have in common?
        ii. What do these services provide/why are they important?
        iii. How would this ecosystem change if these organisms were removed or stopped doing these things?
3. **Round 2 - 5:** Walk students through the same procedure above now reading the next statement on their organism cards. Repeat these steps for statements B through E

Wrap Up: Connecting to Relationships (5 minutes)

1. **Tell Students:** Flip their organism card to the salmon side and find the colored dot in the corner. Find another student with the same color dot—this is your reflection partner.
    a. Read through the services that your two organisms provide and discuss the following:

i. What's something your two organisms' or their services have in common?
What's something different or unexpected about these two organisms or their services?
ii. Which type of ecosystem service do you think people notice the most? Which ones might we not see, but that keeps everything running? (Provisioning, Cultural, Regulating, Supporting)
iii. How do the services your organisms provide support salmon—or benefit from salmon?

b. Ask each student group to share one insights from the conversations they had today or answer one of the following questions:
   i. What did this activity teach you about the roles of organisms in an ecosystem?
   ii. How are all the organisms in this ecosystem connected?
   iii. Why is it important to recognize that organisms provide multiple services—not just one job?
   iv. Did anything surprise you while sorting or comparing your organism with a partner's?
   v. Why is it important to understand the different kinds of ways organisms help ecosystems thrive?

2. **Read closing statement:**
   a. Everything in nature is connected. No part of the ecosystem stands alone, and every species contributes in ways both big and small, visible and invisible.
   b. When we understand those relationships, we begin to see nature not as a collection of things—but as a community we're part of.
   c. We live and are a part of the salmon ecosystem no matter where we stand here (site) or in Portland, Vancouver, school's location

Appendix: Definition

Cultural Ecosystem Services: Cultural ecosystem services (CES) are the nonmaterial benefits that people obtain from an ecosystem through joy, connection, meaning, inspiration, and learning. These services shape who we are, how we relate to the land, and how we build community. They include recreation, spiritual and cultural practices, art, stories, and education that come from spending time in and with the natural world.

Think: Meaning, tradition, memory, relationship

- Practicing ceremonies or traditions connected to the land.
- Going hiking, fishing, or kayaking in natural areas.
- Painting landscapes or writing poems inspired by natural places.

Ecosystem Services: Ecosystem services are the benefits that humans and other organisms receive from healthy, functioning ecosystems. These services are typically grouped into four categories:

Provisioning Ecosystem Services: Provisioning services are the physical things that nature provides for us to use and survive—like food, water, and materials. They're the most visible and tangible ecosystem services—what we often think of first when we ask, "What does nature give us?", but it can also be what other creatures receive.

Think: Harvest, gather, catch, consume

- Salmon as food (for people, bears, orcas)
- Clean drinking water from forested watershed
- Wood and plant materials used to build with from riparian forests
- Medicinal plants gathered from wetlands or forests

Regulating Ecosystem Services: Regulating services are the functions that ecosystems perform to help keep the environment stable, healthy, and safe—for both humans and wildlife. These services don't give us something we can hold in our hands (like food or water), but they help control and balance the systems we depend on.

Think: Clean, protect, buffer, regulate

- Trees balance greenhouse gasses by absorbing carbon dioxide and releasing oxygen.
- Wetlands filter water, removing pollutants before they reach rivers.
- Forests reduce flooding by soaking up rainwater.
- Beavers build dams that slow water flow and create wetlands.

Supporting Ecosystem Services: porting services are the foundations of all other ecosystem services. They include the slow, behind-the-scenes processes that keep ecosystems alive and functioning—like building the stage before the play begins. These services don't directly give us food, water, or clean air, but they make everything else possible.

Think: build, sustain, nourish, enable

- Soil formation that allows plants to grow.
- Photosynthesis, which creates oxygen and fuels food chains.
- Cellular respiration that produces carbon dioxide which fuels plant food chains.
- Nutrient cycling, where decomposers break down waste and dead things to feed the soil.
- Habitats, which provide homes for animals, insects, and plants.

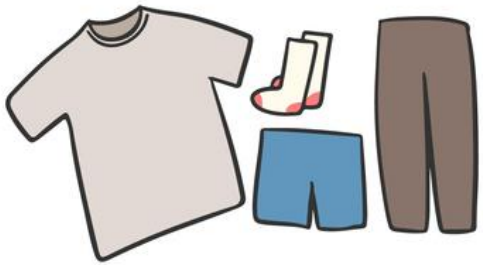
Ecosystem Sorting Activity - Key

1. Begin by passing out one organism card to each student following the order below depending on group size.
    a. **Group size 1-5:** Camas, Stinging Nettle, Western Red Cedar, Western Pearlshell, Wapato
    b. **Group size of 6:** Stinging Nettle, Cedar, Western Pearlshell, Deer, Lampry, Huckleberry
    c. **Group size of 7:** Camas, Stinging Nettle, Cedar, Western Pearlshell, Wapato, Deer, Huckleberry
    d. **Group size of 8:** Stinging Nettle, Cedar, Western Pearlshell, Deer, Lamprey, Huckleberry, Tule, Human
    e. **Group size of 9:** Camas, Stinging Nettle, Cedar, Western Pearlshell, Wapato, Deer, Lamprey, Huckleberry, Tule,
    f. **Group Size of 10:** Camas, Stinging Nettle, Cedar, Western Pearlshell, Wapato, Deer, Lamprey, Huckleberry, Tule, Human

Answer Key

	Provisioning Services	**Regulating Services**	**Cultural Services**	**Supporting Services**
Round 1	Stinging Nettle Western Red cedar Wapato Tule	Camas Western Pearlshell Lampry	Huckleberry White Tailed Deer Human	
Round 2		White Tailed Deer Huckleberry Human	Western Pearlshell Western Red cedar	Camas Stinging Nettle Wapato Lamprey Tule
Round 3	Camas Lamprey White Tailed Deer Human	Stinging Nettle Wapato Huckelberry Tule		Western Pearlshell Western Red cedar
Round 4	Western Pearlshell White Tailed Deer	Western Red cedar Huckleberry Tule	Camas Stinging Nettle Lamprey Wapato	Human
Round 5	Stinging Nettle Wapato Huckleberry	Western Pearlshell Lamprey	Camas Tule	Western Red cedar White Tailed Deer Human

Provisioning Services

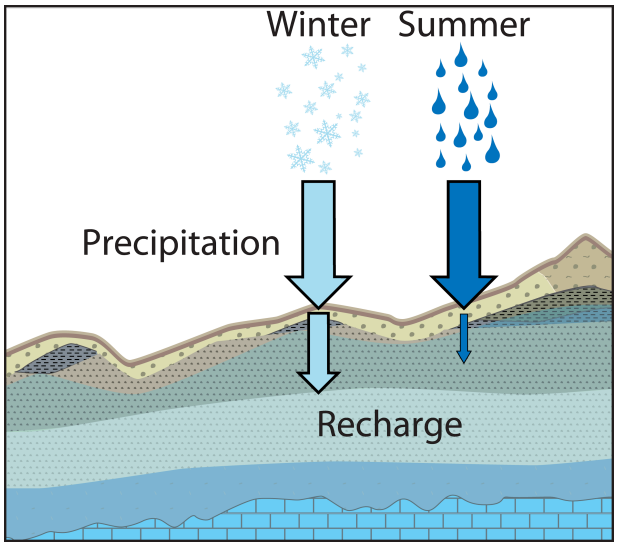


Cultural Services

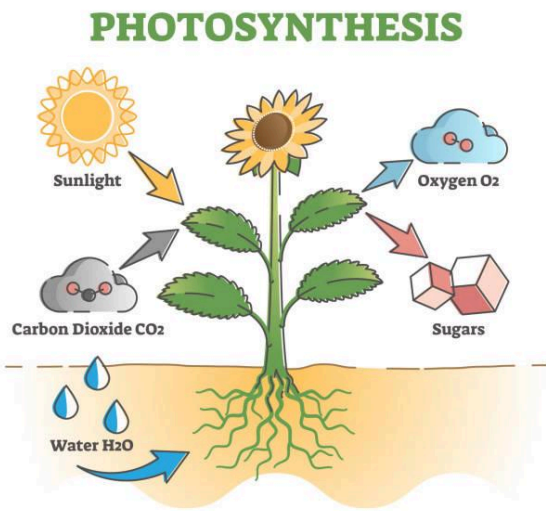
Salmon being roasted the traditional way over an alder wood fire.

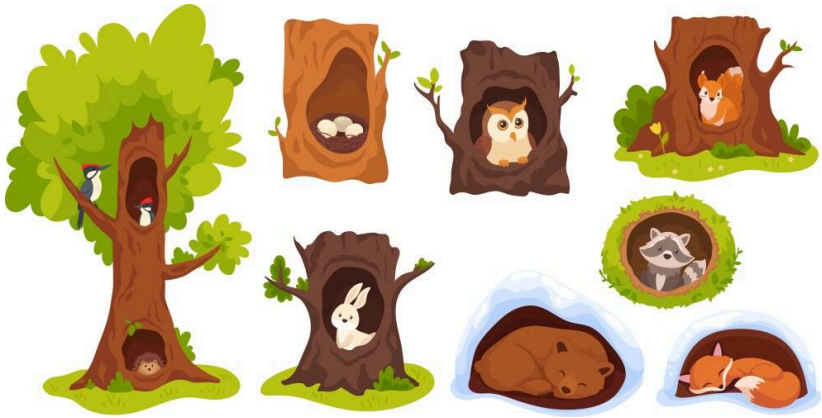
Salmon fishing has been a part of Indian culture in the Pacific Northwest for thousands of years.

Regulating Services



Supporting Services





Camas: I am a flowering plant with star-shaped blossoms. I grow in open meadows and wet prairies. My parts include bright purple flowers, tall green stems, and white bulbs with underground roots. When harvested carefully, I return year after year—nourishing people, animals, and the land. I am known as x̣máaš to the Umatilla People.

A. I grow well in wet soils and help meadows retain water. I can recharge the groundwater supplies.

B. From April to June, my purple flowers bloom, producing nectar and pollen. I support bees and pollinators that are essential for food webs and agriculture.

C. My bulbs continue to be a staple food source for many Indigenous People of PNW.

D. Harvesting and preparing me as food is deeply rooted in the traditions, stories, and seasonal practices of Indigenous communities like the Nez Perce, Kalapuya, and Coast Salish.

E. In late summer, people may dig for and cook my bulbs. This is often a communal activity that brings people together and maintains intergenerational connections and community.

Stinging Nettle: I am a tall, leafy plant growing in damp, sunny places like forest edges and rivers. My parts include jagged green leaves, hollow stems, and tiny hairs that can sting your skin. But don't let that fool you—I'm full of gifts. People have used my leaves for food, medicine, and fiber. My deep roots help build healthy soil, and I provide food and shelter for many insects and animals.

Stinging Nettles from OSU

Nettles Collected in a Basket.
Photo by Danita Macy

A. My new nettle leaves are highly nutritious and have been harvested for food and medicine for centuries, rich in vitamins A, C, iron, and calcium.

B. I am the primary host plant for Red admiral butterflies, meaning that female butterflies lay their eggs on my leaves. When the caterpillars hatch, they eat my leaves so that they can grow. I am important in supporting insect biodiversity.

C. As I grow, my stems and leaves take in minerals like nitrogen, iron, and calcium. I am important because I return these nutrients to the soil when I die and decompose.

D. I am a culturally significant plant for many peoples and can be used for medicine, for ceremonies! My leaves can be woven into fabrics or rope and I am very important for medicine.

E. People across the planet have a deep knowledge of my medical benefits. People across many cultures use me to treat arthritis, anemia, and allergies, reflecting deep knowledge systems.

Salmon: I am a fish that begins life in the freshwater rivers and streams in the Pacific Northwest. Once I grow strong enough to survive in saltwater, I leave the stream and head out to the ocean, where I live for 4 to 8 years. When it's time to reproduce, I make the incredible journey back to the very river where I was born. I am known as Núsux to the Umatilla People.

Chinook Salmon from Freshwater Illustrated

A. I am a primary food source for many Tribal Nations across the Columbia River Basin. For generations, I have nourished families and sustained communities. I am also eaten by many different people all across the world!

B. I migrate great distances to the ocean and back. Like a nutrient shuttle, I carry marine nutrients upriver. After I spawn and die, my body releases essential nutrients into freshwater ecosystems, feeding plants, insects, and the land.

C. I am part of the creation stories of many Indigenous peoples. Each year, when I return from the ocean, I am honored in the First Fish Ceremony—a celebration of gratitude and connection.

D. I am a vital part of the food web. Bears, birds, foxes, and marine mammals all depend on me. I help support the entire ecosystem, even in death.

Salmon: I am a fish that begins life in the freshwater rivers and streams around Portland. Once I grow strong enough to survive in saltwater, I leave the stream and head out to the ocean, where I live for 4 to 8 years. When it's time to reproduce, I make the incredible journey back to the very river where I was born. I am known as Núsux to the Umatilla People.

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Western Red Cedar: I am a tall, evergreen tree with reddish-brown bark that peels in long, thin strips. My flat, scale-like leaves stay green all year, giving off a strong, fresh smell. I can grow for hundreds of years and reach high into the forest canopy. You'll find me in cool, moist forests across the Pacific Northwest, where my wide trunk and spreading branches create shade and shelter for many creatures. I am known as x̣máaš to the Umatilla People.

A. I am a slow-growing coniferous tree that grows strong and durable wood. All types of people have long used me for building materials, including cedar plank houses, canoes, tools, fences, siding, and more.

B. Western red cedar is a sacred tree for many Northwest Coast tribes. I am used in ceremonies, naming rituals, cleansing practices, and spiritual protection.

C. I help to maintain watershed health by slowing runoff, stabilizing soil, and filtering rainwater through forest systems. I keep the waters clear from eroded dirt and soils so many species can thrive.

D. Like other large coniferous trees, I help to absorb carbon dioxide and release oxygen, playing a role in mitigating climate change.

E. When I grow and mature, I provide habitat for birds, insects, mosses, and fungi, my fallen logs nourish forest floors and support biodiversity.

Western Pearlshell- (Freshwater Mussel) I am a small, hard-shelled animal that lives on the bottom of clean, cool rivers and streams. My dark shell can be smooth, ridged, and shaped like a rounded oval. I spend most of my life buried in the gravel, with just a part of my shell showing. I open and close my shell to filter water and breathe. I can live for decades—sometimes over 60 years—quietly resting in the riverbed as water flows all around me. I am known as siwáala by People who speak the Shapatin language.

Western Pearlshell- Photo from the Confederated Tribes of Umitilla Indian Reservation

Akimi King U.S.F.W.

A. I live at the bottom of riverbeds, tucked into rocks and sediment. As rivers flow, my body helps hold that sediment in place. This prevents erosion and helps keep the stream stable and the water clear.

B. I am honored as a *First Food* by the Confederated Tribes of the Umatilla Indian Reservation. I nourish bodies and traditions. Mussels like me are part of ceremonies, feasts, and teachings that connect people to the land, their ancestors, and the responsibility to care for the river.

C. When many of us gather together, we form a *mussel bed.* These beds create shelter and hiding spots for aquatic insects, macroinvertebrates, and even young fish like salmon!

D. I am food for many river animals—like otters, raccoons, and some fish—and people have eaten mussels like me across the Willamette Valley for thousands of years.

E. I filter gallons of water daily, removing tiny bits of algae, dirt, and pollution. This keeps the water cleaner for animals and people relying on the river for drinking, farming, and recreation.

Salmon: I am a fish that begins life in the freshwater rivers and streams around Portland. Once I grow strong enough to survive in saltwater, I leave the stream and head out to the ocean, where I live for 4 to 8 years. When it's time to reproduce, I make the incredible journey back to the very river where I was born. I am known as Núsux to the Umatilla People.

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Wapato: I am an aquatic plant that grows in shallow water, stream edges, marshes, or ponds. I have long, heart-shaped leaves and grow large tuber- or potato-like bulbs in my roots. I am known as stínstins by the Umatilla People.

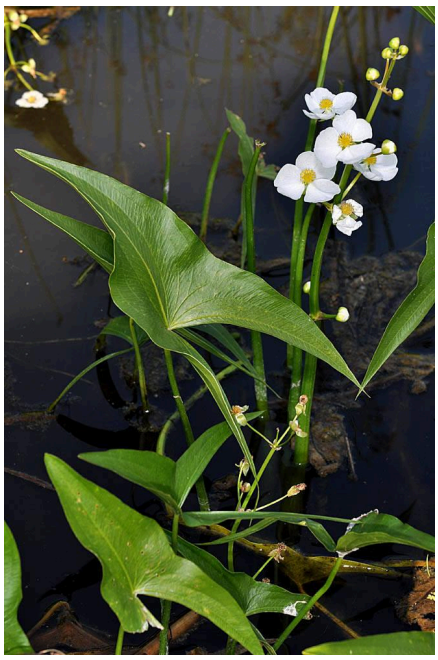

Photo by Natalie Balkam of USFWS

A. Various animals, including ducks, geese, muskrats, and beavers, eat my tubers, seeds, and leaves. I am an important food source for the river ecosystems I grow in.

B. I provide shelter and breeding habitats for aquatic invertebrates and amphibians, supporting the complexity of food webs.

C. I help to purify water by absorbing excess nutrients and slowing water to help sediments settle to the bottom of the river bed

D. I am featured in oral histories and place names throughout the Pacific Northwest, such as Wapato Island (Sauvie Island). People continue to name places after me, showing the cultural significance.

E. My tubers are a traditional food for many Indigenous peoples, including the Chinook and Kalapuya. These tubers are harvested from wetlands and cooked or dried for storage to be eaten during winter seasons.

Lamprey: I am a jawless fish with a long, smooth body shaped like an eel. My mouth is round like a suction cup, lined with tiny teeth that help me attach to other fish in the ocean. I hatch in freshwater rivers and live in the soft mud as a larva for several years before swimming to the ocean. When it's time to reproduce, I return to the river like salmon. My body is strong and flexible, helping me climb waterfalls and swim upstream. I am known as Ksúya to the Umatilla People.

Pacific lamprey. Photos Jeremy Monroe, Freshwaters Illustrated, USFWS.

A. I am similar to salmon migrating long distances to get to the ocean and back. Like salmon, I bring marine nutrients upriver. After spawning and dying, my decomposing body benefits freshwater river ecosystems with essential nutrients.

B. I am a food source for various predators, including birds, marine mammals, and larger fish like sturgeon. I play a critical role in aquatic food webs.

C. I have been an important traditional food for many Columbia River Basin Indigenous peoples and beyond. I am rich in fat and nutrients and still caught today at Willamette Falls.

D. I am honored by stories, songs, ceremonies, and First Foods traditions. The return of lamprey to ancestral harvesting sites is deeply connected to Indigenous identity, rights, and resurgence.

E. As a larva, I live many years burrowed in river sediment. During these early years of my life, I filter organic matter from the water and play an important role in improving the water quality.

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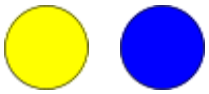

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Huckleberry: I am a small, bushy shrub that grows in mountain forests and sunny clearings. My leaves are oval and green, and in late summer, I grow sweet, dark purple berries that animals and people love. My berries grow close to the stem, and I can live for many years, sprouting new stems from my roots. I grow slowly but return each year with flowers, fruit, and color. I am known as cemíitx by Nimiipuu People.

Berries in Glifferd Pincho National Forest Josephine Woolington

A. Huckleberry gathering is central to the cultural practices and seasonal harvest of many tribes (such as the Yakama and Confederated Tribes of Warm Springs). I am a first food for tribes across the Columbia River Basin, and my berries are included in many first foods ceremonies and communal picking trips.

B. I am a native plant that grows well in the understory of cedar and fir forests. I contribute to forest carbon cycling by capturing and storing carbon through photosynthesis.

C. My roots help to hold and stabilize soil, preventing erosion in the Pacific Northwest's rainy environments.

D. In the spring, when my flowers bloom, they bloom and attract native bees and other pollinators, supporting reproduction not only of huckleberries but also of nearby plant species.

E. My berries are an important traditional and contemporary food, harvested by many different people for fresh eating, drying, and preserving.

White Tailed Deer: I am a graceful, fast-moving animal with long legs, large ears, and a reddish-brown coat that turns gray in the winter. My most famous feature is the bright white underside of my tail, which I raise like a flag when I run. I live in forests and meadows, eating plants, leaves, berries, and bark. I'm most active at dawn and dusk and always listen for sounds around me. I am known as tl'álk by Yakama People in the Shapatinn language or ʻímes by Nimiipuu People.

Oregon Department of Fish & Wildlife

A. Deer and elk are central to the stories, ceremonies, hunting traditions, and spiritual practices of many Indigenous peoples, symbolizing respect, abundance, and kinship with the land.

B. As large herbivores, I help manage plant growth by grazing, which can influence forest regeneration and maintain open meadow ecosystems.

C. Deer and elk have long been essential sources of meat, hides, and tools for all types of peoples. Hunting is a form of subsistence living and recreation for many people.

D. My antlers, bones, and hides are traditionally used for tools, sewing materials, clothing, drums, and regalia.

E. Deer and elk are key prey species for predators like wolves, cougars, and bears, supporting ecosystem balance.

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Tule: I am a tall, grass-like wetland plant that grows in shallow water along rivers, lakes, and marshes. My round, green stems can grow taller than you! I don't have showy flowers, but I play an important role in the ecosystem. I am known as tk̓ú ʻ by Umatilla People in the Shapatin language.

Tule also known as soft-stem bulrush.

Photo by Bruce N. Newhouse

Rex Buck from Wanapum, Priest Rapids standing with members of his family outside a tule longhouse at the old village at Priest Rapids in the late 1930's. (OHS, OrHi 95610, 2014)

A. My seeds and roots provide food for birds like ducks, geese, and other wetland animals.

B. When there is a lot of me growing in one place, it is called a Tule bed. My tule beds offer critical habitat for fish, amphibians, nesting birds, and insects. They also serve as shelter, breeding areas, and protective cover.

C. I help to filter pollutants and excess nutrients from the water I grow in. I play a key role in maintaining good water quality that many other organisms, like macroinvertebrates, salmon, and birds, need.

D. Like many wetland plants, I absorb carbon dioxide and store carbon in my roots and sediment. I help regulate climate systems by storing carbon in my cells, lessening the amount of greenhouse gases in the atmosphere.

E. Tule structures and crafts are deeply embedded in the social and ceremonial life of Nations and Tribes in the Columbia River basin. . Materials made from tule are used in seasonal preparations, gathering sites, and even rituals related to First Foods like salmon or community events.

Human: I am a social creature that lives in communities all across the planet. My ability to use tools, feel empathy, and work with my hands allows me to build relationships, shape environments, and care for the beings I share the Earth with.

Volunteers tending to sweetgrass at the NAYA community garden.
Photo by Mark Graves

Students learning about macroinvertebrates on a Salmon Watch field trip.

A. I can create songs, stories, ceremonies, and art that connect people to the plan and teach others to care for earth and its beings.

B. I can learn to care for ecosystems through practices like cultural burning, which reduces wildfire risk and supports the health of forests and grasslands.

C. I can grow food, gather seeds, and share this with others in my family and community. I can cultivate traditional crops or local organisms and care for animals in ways that support both people and the land.

D. I can learn to care for native plants like camas by removing harmful look-alikes, such as death camas. This helps the edible camas grow strong and healthy, making sure it can bloom, return, and continue feeding both people and the land.

E. I can design systems like rain gardens, traditional irrigation channels, and fish ladders to support the natural movement of water and wildlife. I can use my curiosity to ask questions, observe nature deeply, and learn how to support ecosystems more thoughtfully.

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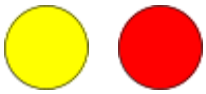
C. I am part of the creation stories of many Indigenous peoples. Each year, when I return from the ocean, I am honored in the First Fish Ceremony—a celebration of gratitude and connection.

D. I am a vital part of the food web. Bears, birds, foxes, and marine mammals all depend on me. I help support the entire ecosystem, even in death.

Salmon: I am a fish that begins life in the freshwater rivers and streams around Portland. Once I grow strong enough to survive in saltwater, I leave the stream and head out to the ocean, where I live for 4 to 8 years. When it's time to reproduce, I make the incredible journey back to the very river where I was born .I am known as Núsux to the Umatilla People.

Chinook Salmon from Freshwater Illustrated



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