



Imperiled Species

A chapter of the 2025 State of the Columbia River Estuary Report



The Lower Columbia Estuary Partnership is a National Estuary Program administered by the U.S. Environmental Protection Agency and supported by the States of Oregon and Washington and the U.S. Congress.

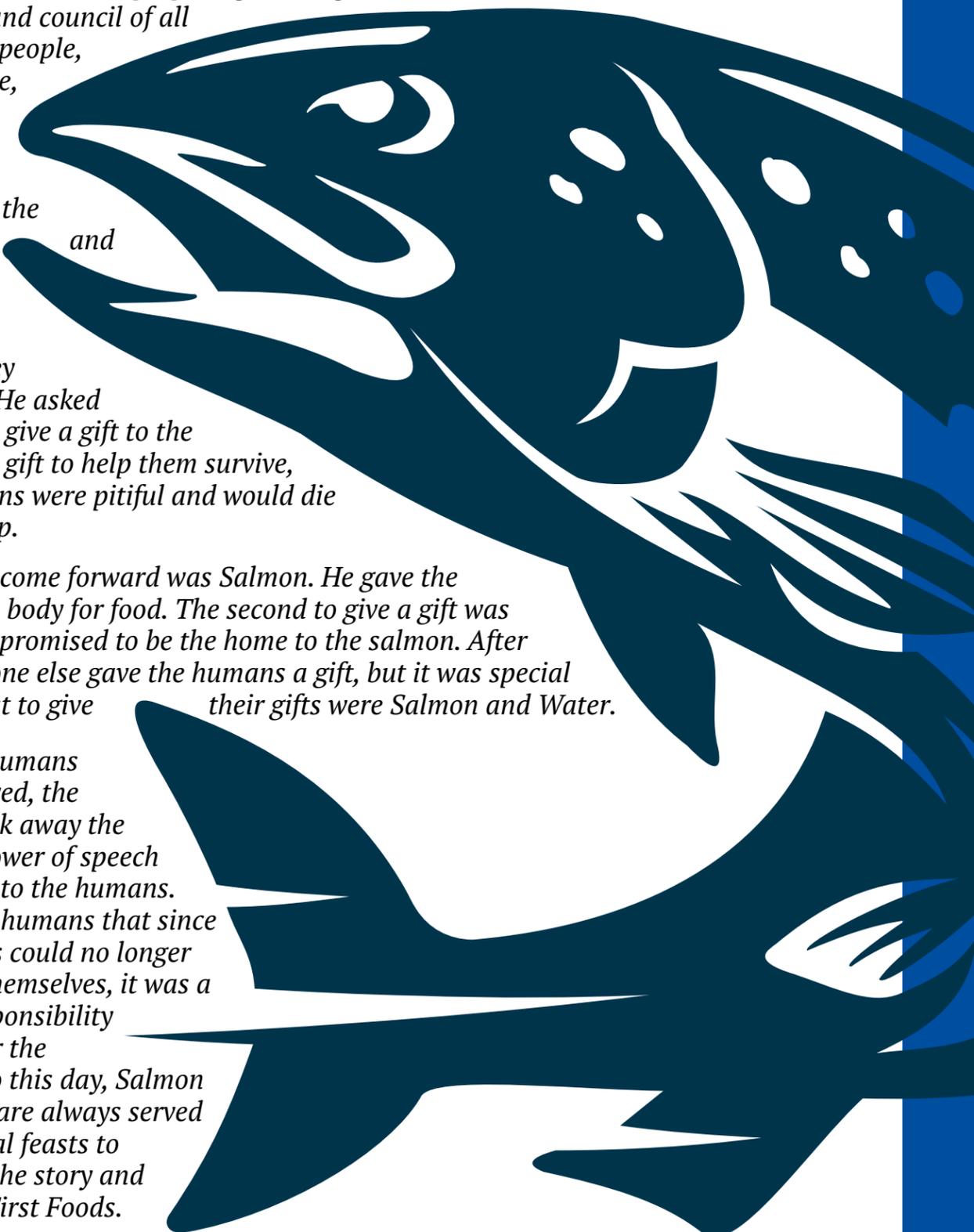
Salmon: A Creation Story

When the Creator was preparing to bring humans onto the earth, He called a grand council of all the animal people, plant people, and everything else. In those days, the animals and plants were more like people because they could talk. He asked each one to give a gift to the humans—a gift to help them survive, since humans were pitiful and would die without help.

The first to come forward was Salmon. He gave the humans his body for food. The second to give a gift was Water. She promised to be the home to the salmon. After that, everyone else gave the humans a gift, but it was special that the first to give their gifts were Salmon and Water.

When the humans finally arrived, the Creator took away the animals' power of speech and gave it to the humans. He told the humans that since the animals could no longer speak for themselves, it was a human responsibility to speak for the animals. To this day, Salmon and Water are always served first at tribal feasts to remember the story and honor the First Foods.

From the [Columbia River Inter-Tribal Fish Commission](#)



Imperiled Species along the lower Columbia

Sixty-seven species of birds, fish, and wildlife that rely on the lower Columbia River for at least part their life cycle are imperiled. Species can be listed as “threatened” or “endangered” under the Endangered Species Act (ESA), are candidate species for listing under the ESA, or are listed as species of concern whereby other management actions are being undertaken.

Changes in 2025 largely involve species where new distribution information helped determine if a species was less or more in need of conservation, or where pervasive issues threaten species populations including as chytrid disease in amphibians, white nose syndrome in bats, and pesticide and herbicide use for insects and songbirds.

For our previous State of the Estuary reports in [2015](#) and [2020](#), we summarized research that described large global declines in songbird, insect, amphibian, bat, pollinator, and [plant](#) (including fungi) populations. This trend is continuing. We know human activities that reduce the amount and degrade the quality of species habitat, degrade water and air quality, interrupt migratory and flight patterns, and upset natural food webs are causing a mass extinction, exacerbated by rapidly changing climate conditions.

Much of the investment in species recovery focuses on Pacific salmon and steelhead, Columbian white-tailed deer, lamprey, and waterfowl. Some of these efforts are showing success (see Columbian white-tailed deer on page 6), while many other native species continue to decline in numbers because of habitat loss, sea level rise, increasing temperatures, changes in precipitation patterns and flooding, toxic contaminants, and invasive species.



Success Story: Bald Eagles

Bald eagles are a shining success story of endangered species protection in the United States. These birds were delisted from the ESA in 2007 after decades of work to reduce pesticides, specifically DDT, and other toxic contaminants that threatened them. Bald eagle populations in the [Pacific Northwest](#) and around the U.S. have rebounded since DDT and other organochlorine compounds were banned in the 1970s.

The most recent estimate of bald eagle populations was provided by the U.S. Fish and Wildlife Service (USFWS) in 2020. For the entire lower 48 states, bald eagle populations totaled 316,700 individuals, including 71,467 occupied nests. When the bald eagle was deemed successfully recovered and removed from ESA protection in 2007, there were 9,789 breeding pairs across the country. The 2007 estimate was a dramatic increase from the known all-time low of 417 breeding pairs in 1963.

The last survey of bald eagle nesting and egg production in the lower Columbia River was performed in 2010, showing an increase from previous surveys.

Studies show decreased levels of these contaminants within eagle populations, but toxic contaminant studies for the lower Columbia River still find [DDT](#) and organochlorines in the sediments within the river’s lowest sections, such as near Astoria.

There is still work we need to do to reduce new sources of contaminants and clean up “legacy” contaminants throughout the Columbia Basin so they do not end up in the estuary.

The bald eagle is protected under three federal laws: the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, and the Lacey Act.



Success Story: White-Tailed Deer

First listed in 1968, the [Columbian white-tailed deer](#) is another ESA success story. Thanks to concerted efforts by the U.S. Fish and Wildlife Service and regional partners, the species was downgraded from endangered to threatened in 2016. In 2025, USFWS proposed removing Columbian white-tailed deer from the federal ESA list.

Columbian white-tailed deer once roamed over 13 million acres of western Washington and Oregon, but their modern range has shrunk to less than 350,000 acres. Their recovery has depended on suitable habitat: protecting remaining areas and restoring other areas, as well as protecting the deer living in low-lying areas from flooding with the increasing threats of sea level rise and more intense storm events. Much of the current population of Columbian white-tailed deer now resides on protected public or other conservation lands. Private lands and the willingness of landowners to protect deer habitat on their lands are still vital to maintaining the health of the population.

Their recovery plan, developed by USFWS in 1983, recommended numbers greater than 400 deer across the Columbia River Distinct Population Segment (DPS) in three viable subpopulations. Previously, two subpopulations on Tenasillahe Island and Puget Island met the definition of being viable (minimum population of 50 individuals) and secure (free from human disturbance and safe from natural perturbations). Relocation efforts in 2013 and 2014 when [USFWS translocated 88 deer](#) from Julia Butler Hanson National Wildlife Refuge to Ridgefield National Wildlife Refuge were a huge success. A series of more recent translocations between 2020 and 2022, moved deer from Tenasillahe Island to Columbia Stock Ranch to create another subpopulation.

In 2016 USFWS was able to reclassify the deer from endangered to threatened, and as of 2019, there were approximately 1,300 animals in the lower Columbia River population. In 2025, the population estimate is about 1,354 deer.

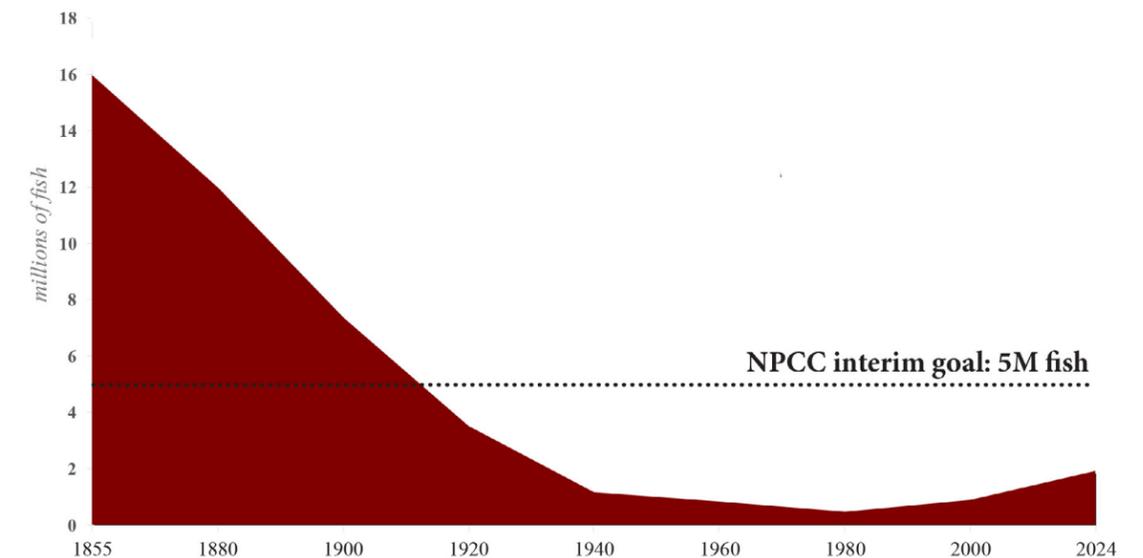
Additionally, of the 10 subpopulations within the DPS, eight are considered viable (50+ individuals). Those eight are the Julia Butler Hansen mainland, Puget Island, Tenasillahe Island, Westport/Wallace, Lord/Dibblee, Cottonwood, Willow Grove, and Ridgefield, and three of these are deemed secure habitat.

Their continued recovery depends on maintaining suitable habitat so there is still work to be done.



Salmon & Steelhead Struggle for Survival

Most Columbia Basin salmon and steelhead persist at a fraction of their historic abundance and geographic distribution. Thirteen species of salmon and steelhead that use the lower Columbia River are listed under the ESA. From 2000 to 2019, roughly 2.3 million salmon and steelhead returned to the Columbia River annually, and two-thirds of these were hatchery-origin fish. This low rate of return remained essentially the same through 2024, while 75% to over 90% of returns for spring Chinook, summer Chinook, and coho salmon were hatchery-origin. This means that **the present-day return of wild salmon and steelhead remains consistently lower than 10% (some as low as 1%) of their historic numbers**—estimated between 10 million to 16 million during the mid-1800s.



Returning Columbia River salmon in 20-year snapshots, 1855-2024. 1855 data from NPCC historical run estimates; 1880-1920 data points extrapolated from Columbia River cannery output; 1940-present: dam counts & river mouth estimates

credit: ["Fish Facts: Columbia Basin Salmon, Steelhead, and Other Native Fish in Crisis."](#)
Columbia River Inter-Tribal Fish Commission

While most reports combine hatchery-origin and wild fish returns, this combination disguises the low abundance and declines in wild stocks. Hatchery production is important for allowing harvest of salmon, critically important culturally and economically, but hatchery fish do not have the full genetic and geographic diversity of wild stocks.

Threats to Salmonids are Widespread

All anadromous salmonid populations within the Columbia River Basin use the estuary as a critical migration corridor. The estuary provides juvenile salmon a productive feeding area, refuge from high flows to rest and grow, and a transition zone where fish can gradually acclimate to saltwater.

Since the 1880s, the lower Columbia River has lost 50% of its [native habitats](#) from impacts such as diking and conversion of land for agriculture, industry, and urban development. Additional issues affecting salmon returns are:

- More than **30 dams and smaller flow control structures** on the mainstem and tributaries for hydropower, flood control, irrigation and transportation. [This CRITFC website](#) includes a video that shows the time sequence of dam construction and resulting reduction in salmon habitat throughout the Basin.
- Introduction and wide-spread expansion of **non-native, invasive species**, which result in altered food webs and increased competition for limited resources by native plant, fish, and wildlife species.
- **Toxic contaminants** from industry, agriculture, and urban development, widespread throughout the Basin.
- Warmer water temperatures; longer, drier, hotter summers; more intense and frequent storms; earlier starts to the growing season; and more precipitation falling as rain rather than mountain snow, resulting in **higher winter and lower summer river flows**. While research has shown that salmonids are adapting to these changes by shifting migration patterns, these shifts are stressful to them. Importantly, ocean conditions such as thermal heatwaves (e.g., [The Blob](#)) change the oceanic food web resulting in added stresses to salmon and steelhead.

Much of the habitat restoration and conservation in the lower Columbia River is focused on reconnecting and improving floodplain habitats, historically used by juvenile salmon as they outmigrate. Not only do these habitats provide critical habitat for juvenile salmon to tuck in to rest, eat, and grow as they move through the lower river, but flushing of these habitats through tidal exchange or precipitation provide important food resources (e.g., small insects) to those fish passing through the mainstem without stopping.



Species to Watch: Bats

Bats are a vital part of the lower Columbia River ecosystem and provide a highly beneficial service as natural pest control. Where swallows and other birds prey on insects during the day, bats are predators of night-flying insects, including mosquitoes. An adult bat eats about 1,000 insects every hour, and an individual bat may consume as much as its body weight in insects each night.

Nine species of bats found in western Oregon and Washington. In addition to habitat loss, shifting ecological conditions, and reductions in insect prey, bat populations across the U.S. are declining because of the fungus that causes white-nose syndrome. It is estimated that the disease has killed millions of bats in eastern North America since 2007 and can kill up to 100% of bats in a colony during hibernation.

The fungus can grow on the nose, wings, and ears of an infected bat during winter hibernation, and it can invade deep skin tissues and cause extensive damage. Affected bats awake more often during hibernation which causes them to use crucial fat reserves, leading to possible starvation and death. The fungus also can lead to wing damage, inability to regulate body temperature, breathing disruptions, and dehydration.

Scientists documented white-nose syndrome in the Pacific Northwest for the first time in 2016 in a little brown bat (*Myotis lucifugus*) near North Bend in King County, Washington. Since that time, the disease has spread, and as of the 2020 State of the Estuary report, 46 cases of the disease had been detected in four bat species in the state. In 2025, the disease was detected by the U.S. Geological Survey in guano collected from the Lewis and Clark National Historical Park in Oregon.

Though the disease has devastated bat populations in eastern North America, we do not yet know how it will impact western bats. The fungus spreads primarily through bat-to-bat contact during hibernation. Because bats in the Pacific Northwest generally do not hibernate in large groups like eastern North American bats, the spread of the disease may be different here.

Humans can cause the spread of white-nose syndrome through contaminated clothing, gear, and equipment after recreating in or near caves. Therefore, decontaminating your gear is essential in helping to reduce this threat to bats.

For more information on Pacific Northwest bats and the history and impacts of white-nose syndrome, see this website from [Washington Department of Fish and Wildlife](#), and this [U.S. Geological Survey storymap](#).



Species to Watch: Amphibians

Worldwide, amphibians such as frogs and salamanders are in trouble because of habitat loss, pollution, pesticides, shifting ecological conditions, diseases, the pet trade, and competition from invasive species such as bullfrogs. Many of the native species of amphibians that reside in the lower Columbia are imperiled. A good overview of the threats to frogs can be viewed in this [Oregon Field Guide piece](#).

Amphibian populations continue to be at risk from another fungal disease—[chytrid fungus](#). Outbreaks of *Batrachochytrium dendrobatidis*, also known as Bd or the chytrid fungus, were first observed in the 1990s in Australia and Central America, but the disease has rapidly spread to locations around the world, [including the Pacific Northwest](#), where it has become widespread. The fungus attacks the parts of amphibian skin that contain keratin, interfering with their ability to breathe and take up water. Affected animals can experience weight loss, lethargy, altered behavior, sloughing of skin, and death.

To stop the spread of amphibian diseases, do not release pets or other animals like amphibians, reptiles, or fish into the wild. Additionally, thoroughly clean and dry all wet or muddy footwear before travelling elsewhere, as amphibian chytrid fungus may be transported in mud or water.



Credit: Forrest Brem

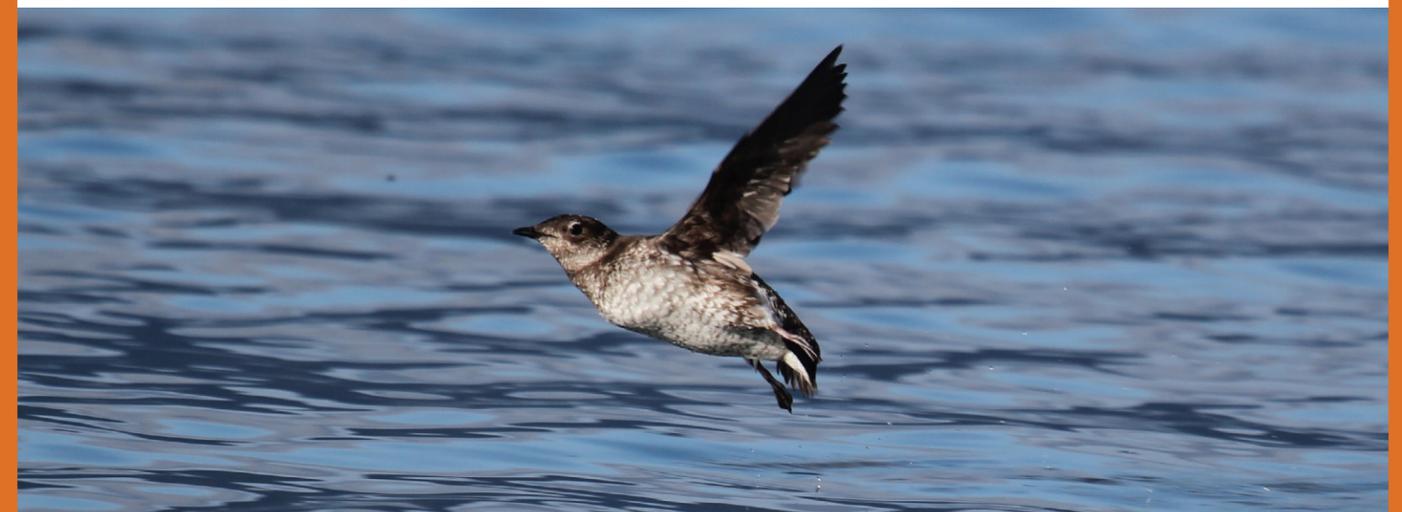


Species to Watch: Birds

A [2019 landmark study published in Science](#) documented a reduction of nearly 3 billion in bird populations across North America with more than 1 in 4 birds having disappeared in the last 50 years. The steep, long-term losses cross [virtually all groups of birds in the U.S. and Canada](#), and more than 90% of the losses (over 2.5 billion birds) come from just 12 families of birds, including sparrows, blackbirds, warblers, and finches. A [2025 State of the Birds report by American Bird Conservancy](#) reports that this trend is continuing today.

[Shifting ecological conditions](#), habitat loss, pesticide use, and disease are some of the primary threats to species. [Neonicotinoid pesticides](#) (Neonics) are one reason for these declines. Birds migrating through farmlands that eat treated seeds immediately lose weight, forcing them to delay their journey and decreasing their chances of surviving and reproducing. Spring bird migration typically occurs when farmers are planting, and most crops in the U.S. are grown with neonicotinoid-treated seeds. Insect-eating birds are also declining because of the [widespread decline in insect populations](#), in part due to insecticides like neonicotinoids.

Additionally, every spring and fall, billions of birds migrate through the U.S., mostly under the cover of darkness, and the Columbia River is located directly on the Pacific Flyway. This mass movement of birds must contend with a dramatically increasing threat: [light pollution](#). Light pollution attracts and disorients migrating birds, confusing and exhausting them and making them vulnerable to collisions with buildings and other threats like cats. An estimated 365 - 988 million birds die in collisions with buildings annually according to a study published in the [Annual Review of Ecology, Evolution, and Systematics](#).



Imperiled Invertebrate Highlight: Freshwater Mussels

Few species are as easy to overlook as freshwater mussels. These benthic animals are often cryptic, blending into the rocks or burrowed into soft sediments along stream bottoms. Although they may be difficult to spot by the untrained eye, they can occur in “beds” with thousands of individuals. Freshwater mussels live in permanently inundated habitats, such as perennial rivers, streams, and ponds, and require burrowing substrates, making them vulnerable to changes in water levels, scouring flows, and shifting substrates.



Although they may seem solitary, these animals are intertwined with other species around them. Their complicated life cycles include a stage where early larvae must attach to fish host species for up to a few weeks before burrowing into sediments to mature. Mussels found in the Pacific Northwest can be long-lived - western pearlshell can live up to 100 years, the western ridged up to 30 years, and floaters between 10 to 20 years. As filter-feeders, they remove impurities, suspended solids, and bacteria such as E. coli, creating clean water for all species that share the same rivers. Mussels themselves serve as an energy-rich food source for birds, otters, racoons, and other wildlife, and are recognized by Tribes as a “first food” of important cultural significance.



Freshwater mussels are imperiled by many of the same impacts that affect salmonids and other species. Loss of and impacts to aquatic habitats, construction of dams that alter river flows, and warming waters decrease suitability of existing habitats. These species are often forgotten, but their contributions to the ecosystems they inhabit are necessary for the survival of other freshwater species.



Additional information can be found at the [Xerces Society for Invertebrate Conservation](#).

Species to Watch: Lampreys

An important food source for west coast tribal communities, Pacific lampreys are prized for their medicinal and nutrient-rich meat. Lampreys provide high energy foods to tribal communities over the winter months, as well as for marine mammals.



Similar to salmon, [Pacific lampreys](#) are anadromous, with both freshwater and saltwater stages during their life cycle. They begin as eyeless, toothless larvae that burrow into soft silt in freshwater and filter-feed and grow. After at least three years of rearing in freshwater, they transform into eyed, sharp-toothed juveniles, where they then migrate to the estuary and then the ocean where they parasitize a number of fish and mammals, including halibut, salmon, walleye pollock, and humpback and sperm whales. They return as adults to freshwater to spawn and die.

Pacific lampreys were once widespread; however, their abundance has declined due to habitat loss, being caught as bycatch in fisheries, exposure to toxic contaminants from their hosts and in the water columns and sediments; and changing climate conditions. Water temperatures in the lower Columbia have been increasing, and this can cause reduced larvae growth, low quality offspring, earlier hatching, and earlier development periods.

In 2008 the [Pacific Lamprey Conservation Initiative \(PLCI\)](#) was formed as a collaboration between Tribes; Federal, State, and local agencies; and non-governmental agencies to conserve the Pacific lamprey throughout its range in California, Oregon, Washington, Idaho, and Alaska. These natural resource partners signed a [Conservation Agreement](#) in 2012 to cooperatively work together for the recovery of the species. The Agreement supported the development of regional implementation plans, implementation of conservation actions, promotion of scientific research, and monitoring and evaluation of those actions. In 2022, the Agreement was revised and recommitted to with over 60 partners committing to work together to recover Pacific lampreys.

USFWS recently developed a [toolbox for restoration practitioners](#) to use in designing habitat restoration projects to benefit lampreys, including improving the design of fish passage structures at barriers.



Species to Watch: Insects

A large group of studies have been documenting global declines in insect populations, including pollinators such as wild bees and honeybees. Insect species are rapidly declining as a result of habitat loss, pesticides, and shifting ecological conditions. [A 2025 study published in *Ecology*](#) found these changes to be a [major factor to insect declines](#) in areas without large scale human impacts, whereas a previous [2019 study in *Biological Conservation*](#) documented that 40% of insect species face extinction as a result of widespread conversion of habitat to agriculture and the use of agrochemicals such as [neonicotinoids](#). Bees are only one type of [threatened invertebrate](#).

Insects are critically important to ecosystems and serve as essential food sources for many fish and wildlife species including Pacific salmon and steelhead, bats, amphibians, and birds. Their population declines have a cascading effect on many of the species listed in this chapter of the State of the Estuary report.



Oregon Ash: A New Threat Emerges

The Pacific Northwest is home to magnificent trees, though most people would be unable to identify one of the most common species in the Willamette Valley—the Oregon ash tree (*Fraxinus latifolia*). While it is the only ash tree native to the Pacific Northwest and an easily overlooked species, it comprises a large portion of riparian and bottomland forests in the Willamette Valley. Ash trees thrive in wet areas with poorly drained soils, areas where most other native trees cannot survive. Ash are prolific seeders and can produce over 10,000 seeds per pound which are high-quality food for insects and birds. The wood, twigs, and leaves are also important building materials and browse for beavers, deer, and elk. Tribal communities utilized all parts of the trees for medicines, basketry, tools, and fuel.



The range of the Oregon ash extends from the Central Valley of California into the Willamette Valley and Puget Lowlands. Ash make up a huge component of forested bottomland swamps and mid-successional riparian forests. These habitats were once extensive within the Willamette Valley, now greatly reduced because of land conversion.

This species is now under a new threat; the Emerald Ash Borer beetle (*Agrilus planipennis*), commonly referred to as EAB, was initially detected in Washington County Oregon in 2022. By 2025, detections have expanded to five Oregon counties as well as British Columbia. Despite their tiny size—less than a half inch long—EAB have decimated hundreds of millions of ash trees native to the Eastern and Central United States and Canada since their initial detection in 2002. The USDA has called them “the most destructive and costly insect ever to invade North America.”



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Adult beetles lay their eggs on ash bark, and the hatched larvae burrow below into the delicate cambium of trees where water and nutrients are passed from the roots to the canopy. As they grow and feed, their burrows (called galleries) wind through this delicate tissue, severing the passage of nutrients and eventually killing the tree. Infected trees lose most of their canopy

within 2 years of infestation and die within 3-4 years, with a mortality rate close to 99%.

The loss of the Oregon ash would mean the loss of a suite of ecological services vitally important for salmonid recovery. A reduction in canopy cover in riparian forests impacts stream shading, contributing to increased stream temperatures. These trees also provide bank stabilization and nutrient filtration. Their leaves serve as a vital food source for macroinvertebrates that make up a large source of juvenile salmonid diets.



Even though the future may look grim, there is potential to conserve this species rather than dooming it to extinction. Scientists have collected seeds from throughout its range, as a preemptive measure to preserve local genetics. Insecticide injections have proven useful to save individual trees, and bio-controls are being released to minimize the spread of beetles and save small pockets. We can learn from the impacts to the Eastern deciduous forests and interplant early, even though no other native species quite fills the same niche as the Oregon ash. Over the next decade, this loss will become apparent as Oregon ash are among the first leaves to change in the fall. Perhaps unnoticed before, we'll notice the loss of the golden hued leaves; bare branches left in place as skeletons reminding us of their existence.



Challenges and Opportunities

Shifting Ecological Conditions and Other Challenges

For every species like bald eagles and Columbian white-tailed deer that are recovering, dozens of other species are endangered or threatened and are still declining in numbers. Many overlapping factors are responsible: recurring extreme weather events, warming temperatures, sea level rise, changing precipitation patterns, loss of habitat from human development, toxic contaminants in the environment, and invasive species.

Dramatic and unrelenting shifts in climate conditions in particular are probably the greatest threat to biodiversity along the lower Columbia River and across the world. These are already altering the timing of important life events like breeding, migration, and flowering, and it is shifting the range of where and when species can survive. Small changes like the timing of plants can have ecosystem-wide effects, like when plants flower before pollinators emerge they produce less seeds, putting following generations at risk.



Credit: Neil Schulman

Few measures will reverse the massive decline of many species, short of a significant shift in governmental policies. However, in 2019, the Trump administration issued rollbacks to the Endangered Species Act that make it more difficult to list species for protection and reduces the protection for species listed as threatened. The new rules also allow regulators to take economic assessments into account—like estimates of lost timber revenue from logging restrictions—when determining whether a species needs protection.

What We Can Do

Besides significant public intervention, there are a few opportunities to mitigate problems faced by imperiled species. In the lower Columbia River, for example, the Estuary Partnership and other groups are working to document and improve [cold water refuges](#) that are used by salmonids as they migrate during the summer months, when mainstem temperatures get too warm.

Elsewhere in Washington State, new [wildlife crossings](#) allow species like coyotes and elk to cross over or under Interstate



Gold Creek Wildlife Undercrossing, just east of Snoqualmie Pass, from above. Credit: Matt Johnson

90. Oregon still [lags behind most states](#) in wildlife crossings.

There are also localized efforts to support particular populations. Fishers, cat-sized carnivores pictured at right, have been [reintroduced in areas of Washington state](#), and have been documented in [Gifford Pinchot National Forest](#). Volunteers in the Linnton neighborhood of Portland have been [shuttling northern red-legged frogs](#) across busy Highway 30 during their mating season since 2014, saving hundreds of frogs each season.



There are also small steps individuals can take, like planting native pollinator-friendly plants, avoiding or limiting pesticide and herbicide use, and [leaving the leaves](#) to create better habitat for insects in their yard.

But to truly give many endangered species a chance at recovery, public focus must shift from protecting small-scale habitat or species-specific support to policy changes that protect ecosystems and prioritize changes that curb increasing changes in temperature, precipitation, sea level rise and other climatic indicators.

