

Mural Educational Document

Discovering the Story Within the Mural



The Cycle of Life celebrates the fish, wildlife, plants, waterways, and people that are deeply connected to Oregon City and the Willamette River.

At the heart of the mural is the life cycle of salmon. The story begins on the far left side of the wall, where salmon eggs rest beneath the river gravel. As the mural moves across the wall, the salmon hatch, grow, travel toward the ocean, mature, and eventually return to freshwater as spawning adults.

On the right side of the mural, adult salmon return near Willamette Falls, an important gateway on their journey toward freshwater spawning habitat. Their return completes the cycle and begins a new generation.

The mural also includes Pacific lamprey and white sturgeon, two ancient native fish with strong ecological and cultural connections to the Willamette River. Surrounding them are native plants and wildlife that depend on healthy rivers, forests, wetlands, and prairies.

Together, these species tell a larger story about connection. The health of the river affects the fish. The fish nourish the surrounding environment. Plants protect the soil and water. Birds and wildlife depend on the entire system.

Nothing in nature exists alone.

The Salmon of the Mural

Three salmon species appear throughout the mural.

Chinook Salmon

The blue salmon represent Chinook salmon.



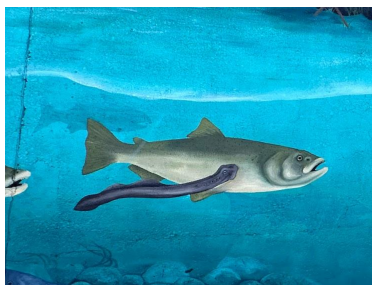
Chinook are the largest species of Pacific salmon and are deeply connected to the Willamette River and Willamette Falls. Upper Willamette River spring Chinook are currently listed as threatened under the federal Endangered Species Act.

Their decline has been connected to the loss and alteration of habitat, dams that block or complicate passage, changing river conditions, reduced genetic diversity, warmer water, and other human-caused pressures.

Protecting Chinook requires protecting the entire journey they make, from cool freshwater spawning streams to estuaries and the Pacific Ocean.

Coho Salmon

The green salmon represent coho salmon.



Coho use portions of the lower Willamette River and surrounding tributaries. However, their history within the upper Willamette River basin is complicated, and not every coho population found within the broader watershed has the same historical or biological origin.

Within the mural, coho represent one part of the wider network of salmon-bearing rivers and streams found throughout western Oregon.

Sockeye Salmon

The red salmon represent sockeye salmon.



Sockeye do not have a regular native spawning run in the Willamette River. Their inclusion is a personal tribute to the artist's home near the Columbia River and to the larger system of waterways that connects communities throughout the Pacific Northwest.

The Columbia and Willamette rivers are separate waterways, but they are part of an interconnected regional ecosystem. Fish, wildlife, water, nutrients, and people move throughout this larger system.

The Salmon Life Cycle

The timing and details of the salmon life cycle vary by species and population, but Pacific salmon generally move through the stages represented in the mural: egg, alevin, fry, parr, smolt, adult, and spawner.

Egg

Every salmon begins as an egg in freshwater.



A female salmon uses her tail to move gravel and create a nest called a **redd**. She deposits her eggs into the redd while a male fertilizes them. The female then moves additional gravel over the eggs, helping protect them as they develop.

The eggs remain beneath the riverbed for weeks or months, depending on the species, water temperature, and surrounding conditions.

Cool, clean, oxygen-rich water is essential during this stage. Water must be able to flow through the spaces between the gravel so the developing eggs receive oxygen.

Excessive sediment can settle into those spaces and reduce water flow. Pollution, low oxygen, unusually warm water, and major changes in river flow can also reduce the eggs' chances of survival.

Protecting salmon begins by protecting the water and gravel where their lives begin.

Alevin

After hatching, the young salmon are called **alevin**.



An alevin remains beneath the gravel with a yolk sac attached to its body. The yolk sac contains nutrients that sustain the young fish while it continues to develop.

At this stage, the alevin is not yet ready to swim freely through the river. It remains protected beneath the gravel until much of the yolk sac has been absorbed.

Although alevin are hidden from view, they are still affected by everything happening in and around the river. Clean water, sufficient oxygen, stable river conditions, and loose gravel remain critical to their survival.

Fry

Once the yolk sac has been absorbed, the young salmon emerges from the gravel as a **fry**.



Fry begin swimming freely and feeding on tiny aquatic organisms, including insects and other small sources of food. At this size, they are vulnerable to predators, sudden changes in water flow, warm temperatures, pollution, and the loss of shelter.

Young salmon need complex river habitat. Logs, branches, rocks, shaded banks, side channels, wetlands, and streamside plants create places where they can rest, hide, and feed.

Trees and plants growing along the river also help cool the water by providing shade. Their roots hold soil in place and reduce the amount of sediment washing into the river.

A healthy river is not simply a channel of moving water. It is a living habitat with places for young fish to find food, shelter, and safety.

Parr

As young salmon grow, many enter the **parr** stage.



Parr are often recognized by the dark oval or vertical markings along their sides, known as parr marks. These markings help camouflage them among shadows, plants, rocks, and pieces of wood in the river.

Depending on the salmon species and population, parr may remain in freshwater for weeks, months, or longer. During this time, they continue feeding, growing, and preparing for the next stage of their journey.

Healthy tributaries, wetlands, floodplains, and side channels are especially important during this stage. These slower and more protected areas can provide food and refuge when the main river becomes fast, warm, or dangerous.

Smolt

Before entering saltwater, young salmon experience a major transformation called **smoltification**.



During this process, their bodies change so they can survive the transition from freshwater to the salty environment of the ocean. Their appearance often becomes more silvery, and their internal systems adjust to regulate salt and water differently.

The young fish, now called **smolts**, begin migrating downstream.

Their journey may carry them through streams, rivers, reservoirs, dams, urban areas, industrial areas, and estuaries before they reach the Pacific Ocean.

Estuaries, where freshwater and saltwater meet, provide important places for smolts to feed, grow, rest, and gradually adjust before entering the ocean.

Every part of this downstream route must remain connected enough for young salmon to complete their migration.

Adult

Salmon spend the adult portion of their lives feeding and growing in the Pacific Ocean.



The amount of time they spend in the ocean depends on the species and population. During this period, they become significantly larger and stronger.

Adult salmon are also part of the ocean food web. They consume smaller organisms and provide food for larger fish, marine mammals, and other wildlife.

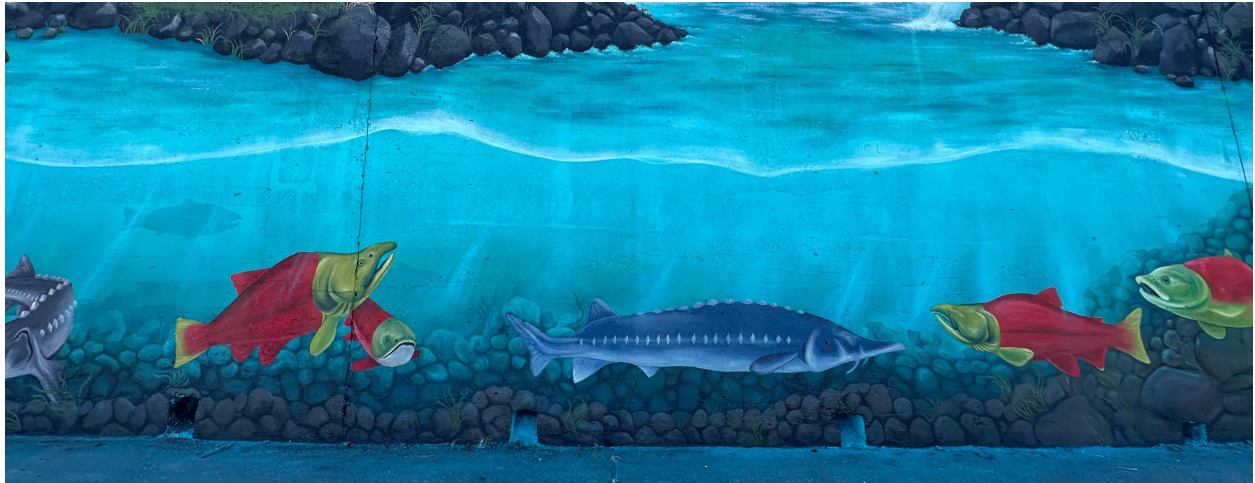
When it is time to reproduce, salmon begin their journey back toward freshwater.

Scientists have found that salmon use a combination of natural cues to navigate. Earth's magnetic field is believed to help with broad ocean navigation, while their highly developed sense of smell helps them recognize the chemical characteristics of their home watershed as they return.

Their ability to travel through the ocean and later find their way back to freshwater is one of the most remarkable migrations in the natural world.

Spawner

Adult salmon return from the ocean and travel upstream toward suitable spawning habitat.



Willamette Falls is an important natural feature along this journey. Salmon traveling into the upper Willamette River system must pass the Falls before continuing toward tributaries and gravel-bottomed areas where spawning occurs.

The journey is physically demanding. Salmon may face strong currents, warmer water, predators, dams, altered habitat, disease, and other obstacles.

After reaching suitable habitat, females create redds and deposit their eggs while males fertilize them. This begins the next generation.

Most Pacific salmon die after spawning. Their bodies remain an essential part of the ecosystem, returning nutrients from the ocean to rivers, forests, insects, birds, and other animals.

Even after a salmon's life ends, it continues supporting new life.

The cycle begins again.



Why Salmon Matter

Salmon connect the ocean, rivers, forests, wildlife, and human communities.

During their lives, they carry energy and nutrients between freshwater and marine environments. When adult salmon return and eventually die after spawning, their bodies provide food and nutrients for insects, birds, mammals, aquatic organisms, and plants.

Young salmon also serve as prey for other fish and wildlife. Adults support larger predators and have sustained human communities throughout the Pacific Northwest since time immemorial.

Salmon are culturally important to Tribal peoples, ecologically important to watersheds, and economically important to communities throughout the region.

Their survival depends on an entire system of healthy habitats. They need clean and cool water, accessible migration routes, healthy estuaries, functioning floodplains, protected tributaries, suitable spawning gravel, and a healthy ocean.

When salmon populations struggle, it often tells us that the larger ecosystem is also under stress.

Protecting salmon means protecting the rivers and communities that depend on them.

Pacific Lamprey



An Ancient and Essential Native Fish

Pacific lamprey belong to an ancient group of jawless fishes whose ancestors existed long before salmon. Although lamprey resemble eels, they are not eels.

They are native to the Pacific Northwest and have a remarkable life cycle that connects freshwater rivers with the ocean.

Adult Pacific lamprey return from the ocean to freshwater, where they eventually spawn. After the eggs hatch, young lamprey drift toward slower sections of the river with fine sand and sediment.

There, the larvae burrow into the river bottom.

They may remain buried for several years, living as filter feeders and consuming algae, microscopic organisms, and organic material carried through the water.

As they develop, lamprey undergo a major transformation. They develop eyes and a circular, sucker-like mouth before migrating toward the ocean.

In the ocean, they attach to fish and marine mammals to feed. They later return to freshwater to spawn, completing their life cycle.

Like salmon, adult Pacific lamprey generally die after spawning.



Why Pacific Lamprey Matter

Pacific lamprey are important members of freshwater and ocean ecosystems.

Their larvae help process organic material within river sediment. Juveniles and adults provide food for fish, birds, and mammals. Adults returning from the ocean also carry marine nutrients into freshwater environments.

Pacific lamprey hold profound cultural importance for many Tribal peoples throughout the Pacific Northwest. They have provided food, medicine, ceremonial value, and cultural connection since time immemorial.

Lamprey populations have declined in many areas because of dams and passage barriers, habitat loss, water-quality problems, changing river flows, warm water, and other environmental pressures.

Protecting lamprey requires people to look beyond appearance and recognize the essential role each native species plays.

A healthy river must support more than the species that are most familiar or celebrated. It must also protect ancient and often misunderstood animals like Pacific lamprey.

Sturgeon



Living Giants of the River

Sturgeon are among the oldest fish species still living on Earth, with ancestors dating back more than 150 million years. Often called "living fossils," they have survived multiple mass extinctions and remained remarkably unchanged over millions of years.

These ancient fish are easily recognized by their long bodies, flattened snouts, whisker-like barbels near their mouths, and rows of hard, bony plates called **scutes** instead of scales.

Sturgeon are bottom feeders, using their sensitive barbels to locate food hidden in river sediments. Their diet includes worms, shellfish, insects, crustaceans, and smaller fish, making them an important part of the river ecosystem.

Many sturgeon species grow slowly, mature later in life than most fish, and may live for many decades. Some individuals can even live for more than a century. Because they reproduce slowly, their populations can take many years to recover if they decline.

Several species of sturgeon are found throughout the Northern Hemisphere, but the species most commonly associated with the Columbia and Willamette river systems is the white sturgeon, the largest freshwater fish in North America.



Why Sturgeon Matter

Sturgeon have survived for millions of years, but they are not immune to modern environmental challenges.

Habitat loss, pollution, changing river flows, dams, warming water temperatures, and barriers to migration all threaten sturgeon populations around the world. Because these fish grow slowly and reproduce infrequently, recovering from population declines can take decades.

Sturgeon are an important part of healthy river ecosystems and have long held cultural significance for Indigenous communities throughout the Pacific Northwest. Their continued presence reflects the health and resilience of our waterways.

Protecting sturgeon means protecting the rivers they call home. By restoring habitat, improving water quality, maintaining connected waterways, and supporting conservation efforts, we help ensure these remarkable fish continue to thrive for generations to come.

The story of the sturgeon reminds us that surviving for millions of years does not guarantee a future. Like so many native species, their survival now depends on the choices we make today.

Willamette Falls and Indigenous Stewardship

Long before the establishment of Oregon City, Willamette Falls was a major fishing, gathering, trading, and cultural center for Indigenous peoples.

The Falls and the surrounding area are within the ancestral homelands of Indigenous communities including the Clackamas and Clowewalla peoples. Tribal people gathered at the Falls to fish, trade, maintain relationships, share knowledge, and participate in cultural practices.

Salmon and Pacific lamprey were particularly important foods harvested at the Falls.

The Falls were not simply a source of food. They were and remain a place of cultural connection, responsibility, identity, ceremony, and community.

The history of this place did not begin with Oregon City, industry, or settlement. Indigenous peoples have maintained relationships with these lands and waters since time immemorial.

The Confederated Tribes of Grand Ronde

The Confederated Tribes of the Grand Ronde Community of Oregon includes descendants of more than 30 Tribes and bands whose ancestral homelands extend across western Oregon, southwestern Washington, and northern California.

These communities include descendants of peoples with deep connections to the Willamette Valley and Willamette Falls.

During the 1800s, the United States government forced Indigenous peoples from their homelands and relocated many of them to the Grand Ronde Reservation. This removal disrupted access to traditional fishing places, foods, medicines, cultural practices, and community relationships.

Despite these injustices, Tribal peoples continued protecting their knowledge, identities, traditions, and connections to their ancestral homelands.

The Confederated Tribes of Grand Ronde continue to care for natural resources, restore habitat, preserve cultural knowledge, and maintain its relationship with Willamette Falls today.

The Fishing Platform



The mural includes a fishing platform inspired by the long history of Indigenous fishing at Willamette Falls.

This part of the mural was developed with guidance from the Confederated Tribes of Grand Ronde so that the imagery could respectfully recognize the Tribe's enduring connection to the Falls.

In 2018, the Confederated Tribes of Grand Ronde received a permit to construct a modern fishing scaffold at Willamette Falls. The scaffold allows Tribal fishers to safely harvest ceremonial fish during the time of year when their ancestors historically took the first fish from the Falls.

The platform represented in the mural is more than a historical object. It represents a living relationship between Tribal people, the river, the fish, and the Falls.

The inclusion of this imagery reminds viewers that Indigenous stewardship is not something that exists only in the past.

The Confederated Tribes of Grand Ronde and other Tribal Nations continue to protect cultural resources, advocate for healthy waterways, restore native species, and carry traditional knowledge forward.

Honoring this history means more than acknowledging it. It also means listening to Tribal communities, respecting Tribal sovereignty, supporting the continuation of cultural practices, and recognizing Indigenous peoples as present-day leaders in environmental stewardship.

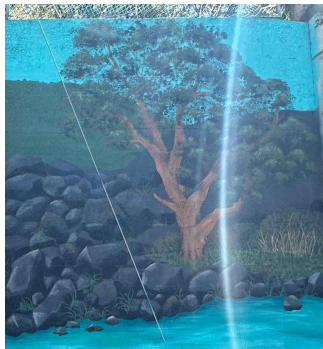
Native Plants and Trees

The plants represented in the mural are not simply decorative. They provide food, shelter, shade, erosion control, nesting material, and habitat for insects, fish, birds, and other wildlife.

Native plants have developed relationships with the land, climate, wildlife, and people of this region over thousands of years.

Protecting native plant communities helps protect the larger ecosystem.

Pacific Madrone



Pacific madrone is a native evergreen tree found throughout western Oregon and other parts of the Pacific Coast.

It is recognized by its smooth reddish-orange bark, twisting branches, clusters of white flowers, and bright berries.

Madrone flowers provide resources for pollinators, while the berries are eaten by birds and mammals. Older trees may also provide cavities and shelter for wildlife.

Pacific madrone is well adapted to dry summers and often grows on sunny slopes, rocky ground, woodland edges, and within mixed forests.

Madrone trees can be sensitive to construction damage, soil compaction, excessive watering, and major changes around their roots.

Protecting mature native trees helps preserve food, shelter, and habitat that may take many years to replace.

Camas



Camas is a native flowering plant with clusters of blue or purple flowers that appear in prairies and wet meadows during the spring.

Its flowers provide resources for pollinators, while camas prairies support a wide variety of plants, insects, birds, and other animals.

Camas is also a culturally significant First Food for Indigenous peoples throughout the Pacific Northwest.

The bulbs were traditionally harvested, carefully prepared, and cooked. Knowledge about where, when, and how to harvest camas was passed through generations.

In the Willamette Valley, Indigenous communities, particularly Kalapuya peoples, actively cared for camas prairies. Stewardship practices included careful harvesting, cultivation, and cultural burning.

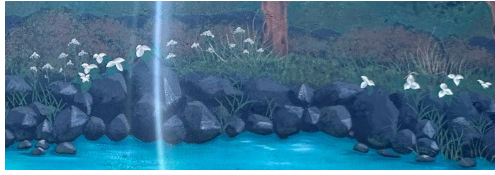
Cultural burning helped maintain open prairie landscapes, reduce the growth of competing plants, renew habitat, and support culturally important foods.

These landscapes were not untouched wilderness. They were actively cared for by knowledgeable people whose practices supported both human communities and biodiversity.

Today, many native prairies have been lost to development, agriculture, invasive plants, and the suppression of traditional land-care practices.

Protecting and restoring camas prairies supports pollinators, wildlife, plant diversity, cultural heritage, and the continuation of Indigenous First Foods.

Trillium



Trilliums are native woodland wildflowers commonly associated with the shaded forests of the Pacific Northwest.

Their three leaves and three-petaled flowers make them easy to recognize. Their flowers may appear white before gradually fading to pink or purple as they age.

Trilliums grow slowly and may take several years to mature enough to flower.

Because of this slow growth, wild trilliums can be easily damaged. Picking the flower and leaves may prevent the plant from gathering the energy it needs to survive. Digging up wild trilliums can destroy plants that took years to become established.

Trilliums remind us that forests grow according to their own timelines.

A woodland cannot be fully replaced simply by planting a few new trees. Healthy forest communities develop over many years through relationships among soil, fungi, water, plants, insects, birds, and wildlife.

Admiring native flowers without removing them is one small way people can protect these delicate ecosystems.

Birds of the Mural

Birds connect the river, forest, prairie, and sky.

Some rely on fish from the river. Others depend on insects, seeds, berries, native plants, open grasslands, or mature trees.

Their presence reminds us that protecting one habitat often protects many species at once.

Western Meadowlark



The western meadowlark is Oregon's state bird.

It is known for its bright yellow chest, dark chest marking, and clear musical song.

Western meadowlarks live in open habitats such as grasslands, prairies, pastures, and fields. They nest on or near the ground and feed on insects, seeds, and other small food sources.

Native prairie and grassland habitats are among the most heavily altered ecosystems in the Willamette Valley. Development, changes in land use, invasive plants, pesticides, and the loss of diverse native vegetation can reduce the places meadowlarks need to feed and raise their young.

Protecting grasslands and restoring native prairie plants helps meadowlarks while also supporting pollinators, small mammals, reptiles, and many other birds.

The meadowlark's song is a reminder that open landscapes are living ecosystems worthy of protection.

Osprey



Ospreys are large raptors commonly seen near rivers, lakes, wetlands, and estuaries.

They are exceptionally skilled at catching fish and have physical adaptations that help them hunt over water. Their feet have strong, curved talons, and their toes help them grip slippery prey.

Because ospreys rely heavily on fish, their lives are closely connected to the health and productivity of aquatic ecosystems.

They need sufficient fish populations, safe nesting locations, and waterways where they can successfully hunt.

Osprey populations were once seriously harmed by the pesticide DDT, which caused their eggshells to become dangerously thin. Their recovery following restrictions on DDT became an important example of how environmental protections can help wildlife rebound.

However, ospreys still face risks from habitat loss, entanglement in fishing line, disturbance around nests, pollution, and unsafe human-made structures.

Protecting waterways and nesting areas gives these remarkable birds a better chance to thrive.

Steller's Jay



The dark blue bird included in the mural is a Steller's jay.

Steller's jays are native to western North America and are commonly found in forests, wooded neighborhoods, parks, and campgrounds throughout the Pacific Northwest.

They should not be confused with the blue jay, which is a different species more commonly associated with eastern and central North America.

Steller's jays are intelligent, curious, and highly adaptable. They eat a wide range of foods, including insects, berries, seeds, nuts, eggs, and other available food.

They also hide seeds and nuts in scattered locations to eat later. Some forgotten seeds may eventually germinate, allowing the birds to make a small contribution to the movement and renewal of plant life.

Steller's jays also serve as prey, predators, seed carriers, and participants in the complicated food web of the forest.

Even familiar animals play important roles in the ecosystems around us.

Why This Ecosystem Must Be Protected

The Willamette River is more than water moving through a city.

It is a migration route, nursery, food source, cultural landscape, habitat, and gathering place.

Its health affects fish beneath the surface, birds flying overhead, plants growing along the banks, animals living within the watershed, and people throughout the region.

Many of the pressures affecting salmon, lamprey, sturgeon, birds, and native plants come from the same sources:

- Habitat loss
- Pollution
- Warmer water
- Climate change
- Dams and migration barriers
- Disconnected floodplains
- Invasive species
- Pesticides
- Loss of native vegetation
- Industrial contamination
- Development near sensitive habitat
- The disruption of Indigenous stewardship practices

Protecting the ecosystem requires more than focusing on one species.

A salmon cannot survive without clean water and a connected habitat. An osprey cannot thrive without fish. A meadowlark cannot nest without open grassland. A lamprey cannot complete its migration if it cannot pass river barriers.

Every part of the system is connected.

Environmental Protection Is Community Protection

Healthy ecosystems support healthy human communities.

Rivers provide drinking water, food, recreation, transportation, cultural connection, and relief from extreme heat. Wetlands reduce flooding and filter water. Trees create shade and store



carbon. Native plants support pollinators. Fish and wildlife contribute to the identity, culture, and economy of the region.

When these systems are damaged, the consequences do not fall equally on everyone.

Tribal communities, low-income communities, communities of color, people who depend on fishing, and people living near polluted or industrial areas may experience environmental harm more directly.

Environmental protection must therefore include fairness, accountability, and respect for the communities most connected to and affected by the land and water.

Caring for the environment is not separate from caring for people.

Ways to Help Protect the Watershed

Large environmental challenges can feel overwhelming, but individual choices, community action, public policy, habitat restoration, and Tribal leadership all contribute to meaningful change.

People can help by:



- Keeping litter, paint, chemicals, oil, and other pollutants out of storm drains and waterways
- Reducing or avoiding pesticides and herbicides that can enter streams
- Planting native trees, flowers, and shrubs
- Protecting mature trees and streamside vegetation
- Keeping pets away from sensitive nesting and restoration areas
- Respecting fishing regulations and seasonal habitat closures
- Properly disposing of fishing line and other materials that can entangle wildlife
- Supporting organizations restoring rivers, wetlands, forests, and native prairies
- Learning about Tribal history, sovereignty, cultural practices, and present-day environmental work
- Supporting Tribal-led restoration and stewardship programs
- Advocating for clean water, connected habitat, responsible development, and climate action
- Sharing what you learn with others

Environmental protection is not achieved through one perfect action. It happens through continued choices, cooperation, education, restoration, and advocacy.

A Shared Responsibility

Every species represented in *The Cycle of Life* carries part of a much larger story.

Salmon connect rivers to the ocean.

Lamprey connects ancient history to the present.

Sturgeon remind us that even long-surviving species remain vulnerable.



Native plants hold soil, feed wildlife, and preserve cultural knowledge.

Birds connect the water, land, forests, grasslands, and sky.

Indigenous communities remind us that these places have been known, cared for, harvested from, and protected since time immemorial.

The mural invites viewers to see the environment not as scenery, but as a living network of relationships.

It also asks us to consider our own place within that network.

We have inherited extraordinary rivers, forests, plants, fish, and wildlife. We have also inherited the responsibility to protect them.

The cycle of life continues only when each generation chooses to care for what the next generation will need.