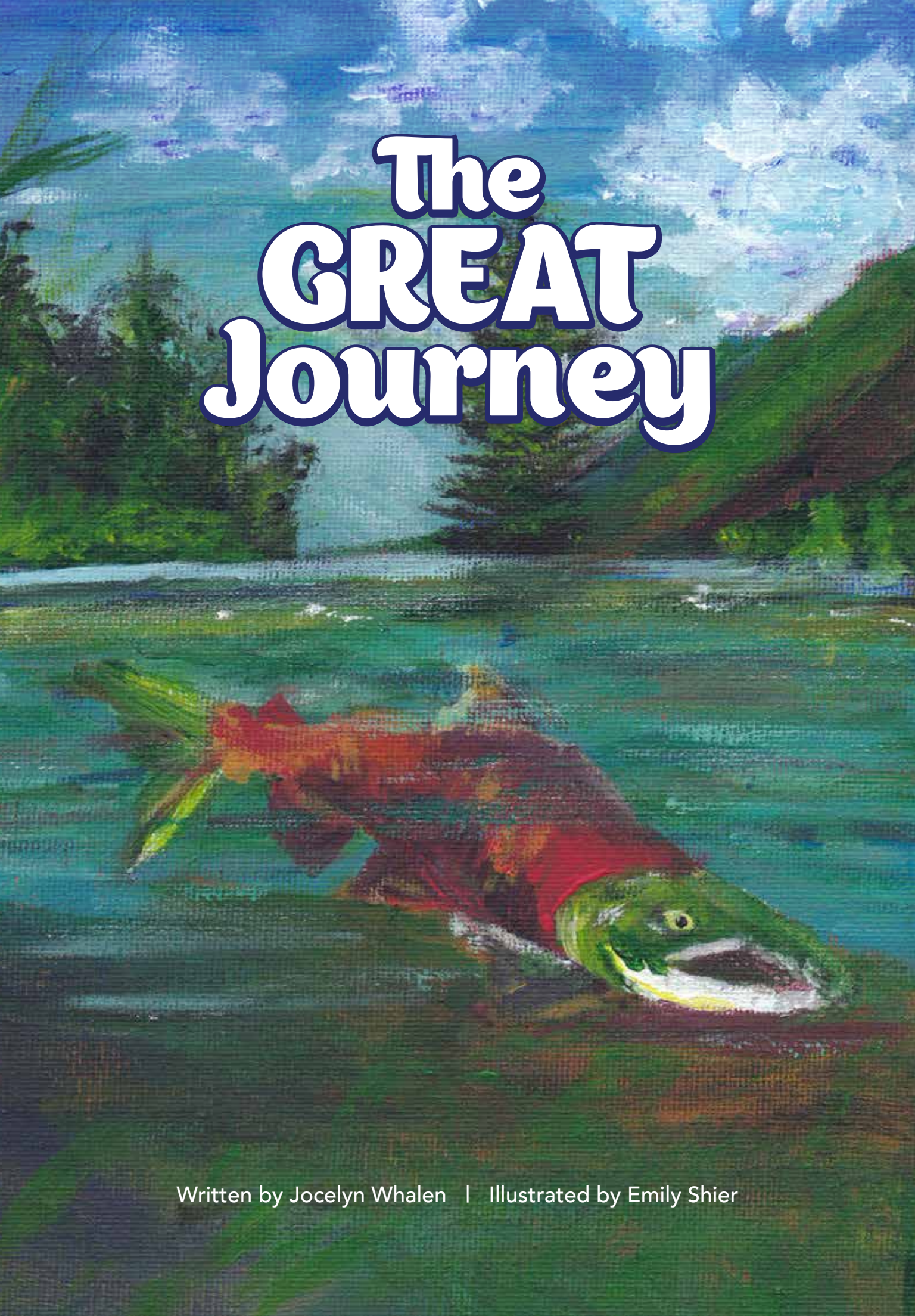
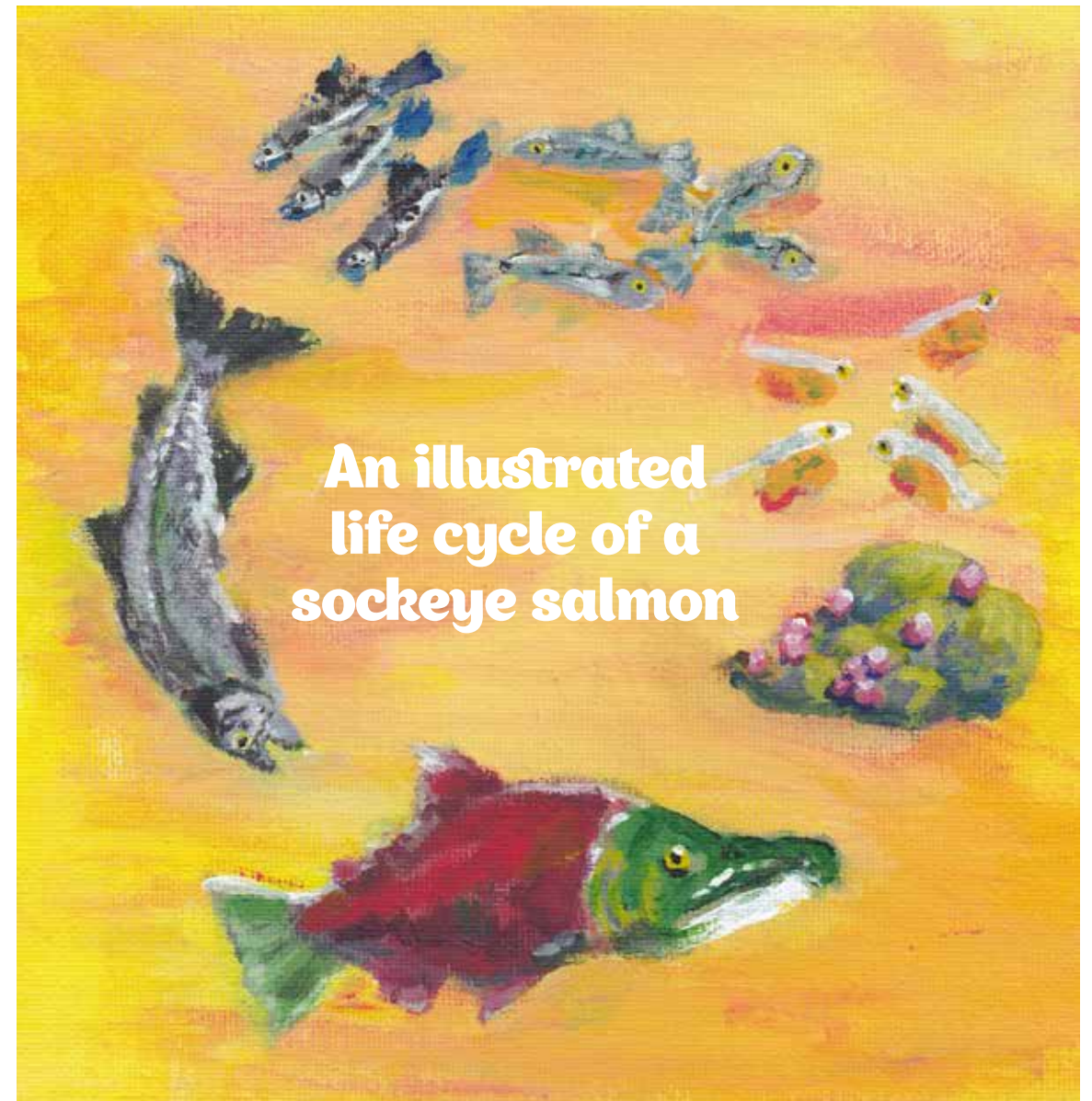


The GREAT Journey



Written by Jocelyn Whalen | Illustrated by Emily Shier



Sockeye salmon's life cycle.

This book was written within the traditional and treaty territory of the Mississaugas and Chippewas of the Anishinabeg, known today as the Williams Treaties First Nations.

The book was illustrated on the ancestral, traditional, and unceded territories of the Coast Salish Peoples and, in particular, the Kwikwetlem First Nation.

[1]



[2]



[3]



[4]



[5]



Pictured are Pacific salmon [1] Chinook salmon, [2] chum salmon, [3] coho salmon, [4] pink salmon, and [5] sockeye salmon

Salmon, like every other living thing on Earth, are special and unique in their own way.

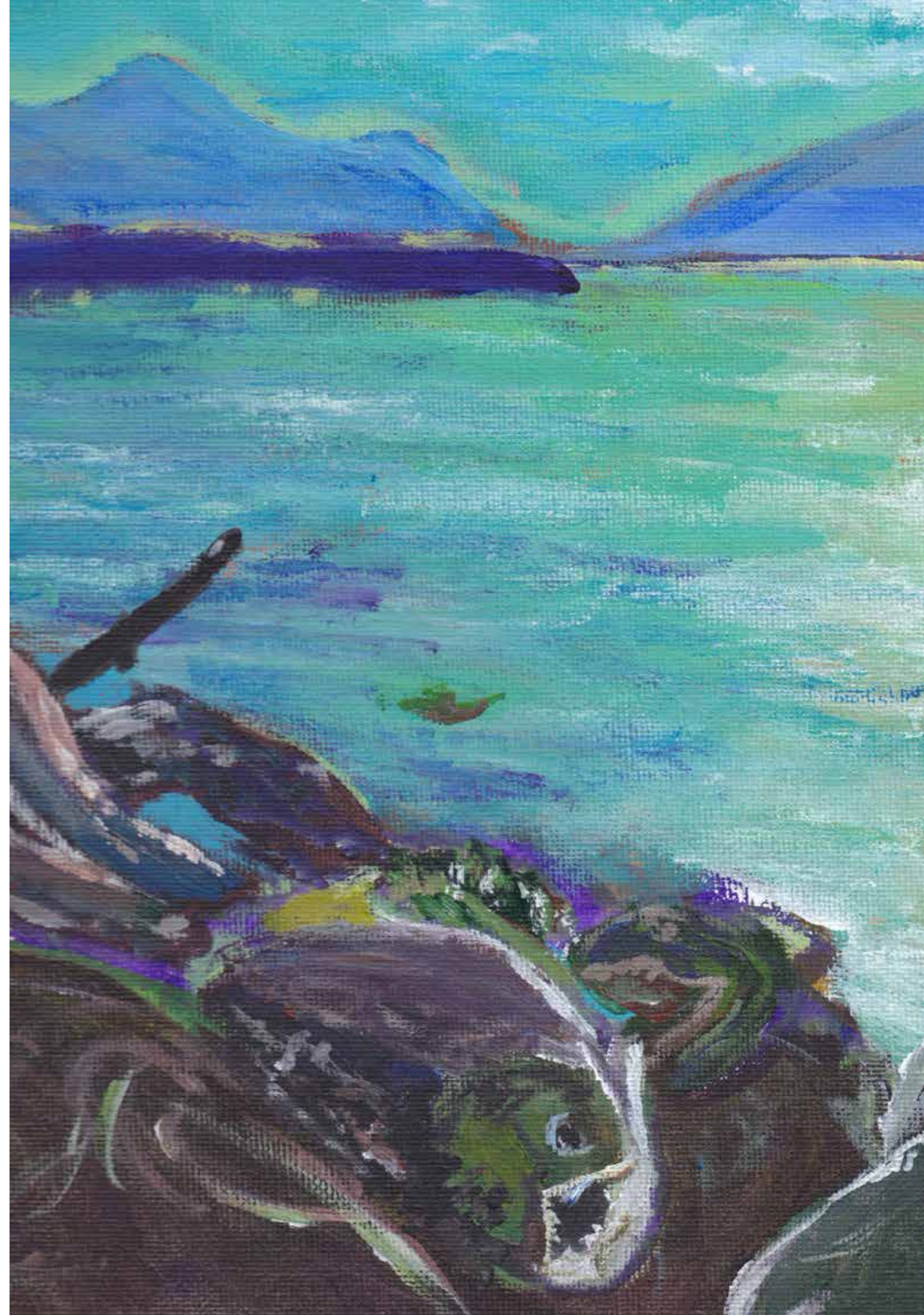
Atlantic salmon¹ live in the northern Atlantic Ocean and the rivers and lakes that flow into it, and Pacific salmon² live in the northern Pacific Ocean and the rivers and lakes that flow into it. There are five species of Pacific salmon in Canada: Chinook, pink, chum, sockeye, and coho.

Most Pacific salmon are anadromous³, meaning they are born in freshwater, spend their adult lives in oceans and return to the rivers or lakes where they were born to spawn.⁴ Pacific salmon are semelparous⁵, meaning they die after they spawn.

Atlantic salmon are iteroparous⁶, meaning they spawn several times over multiple years.

“Psst!...”: Salmon have been around for six million years.

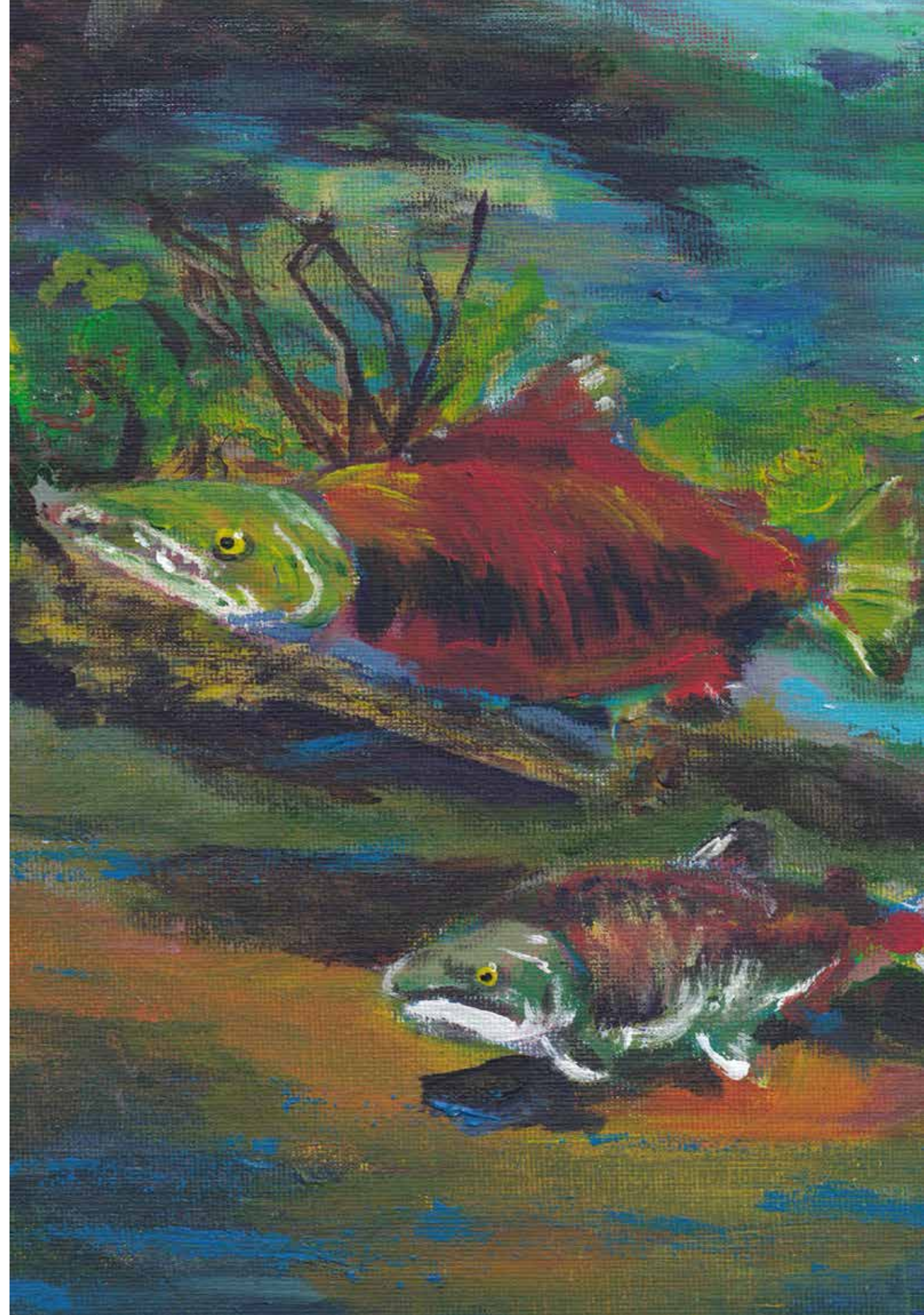
Salmon carcasses at the mouth of the Fraser River, British Columbia.



There are seven stages in a salmon's life cycle: egg, alevin⁷, fry⁸, parr⁹, smolt¹⁰, adult, and spawner.

The salmon life cycle begins and ends in freshwater. The female chooses a spot for her nest, called a redd¹¹, and builds it in the gravel with her tail. Then she lays her eggs into the nest and one or more males fertilize the eggs. The female then covers the eggs with gravel and repeats the process. Adult salmon guard the redd site until their death.

A sockeye salmon couple protecting their redd site.



In late winter, eggs hatch from the redds. Young alevin live off the nutritious yolk sac from the eggs for up to four months. When they have developed enough, they swim up from the gravel to start feeding on live prey. Some species of salmon head straight to the ocean as fry, while others remain in the stream for another year.



Alevin (salmon young) hatching from their eggs.

After this, the young salmon swim downstream and go through major changes while getting used to saltwater, which is called smoltification.¹² Some female salmon grow in the abdominal area and their snout gets longer. Some male salmon get a fleshy hump by their dorsal fin¹³, their snout becomes longer and hooked, and their upper jaw grows out.

School of smolting salmon.



"Psst!...": The largest salmon runs in rivers in British Columbia occur in the Fraser, Skeena, Nass, Somass, Thompson and Adams.



Adult male sockeye salmon. Colour changes occur as well. For example, the backs of the sockeye salmon change to a bright red colour.

Once in the ocean, salmon typically travel in schools.¹⁴ After one to seven years, depending on the type of salmon, they return to their home rivers to spawn where they had hatched. It is a struggle for salmon to swim upstream to find their natal stream.

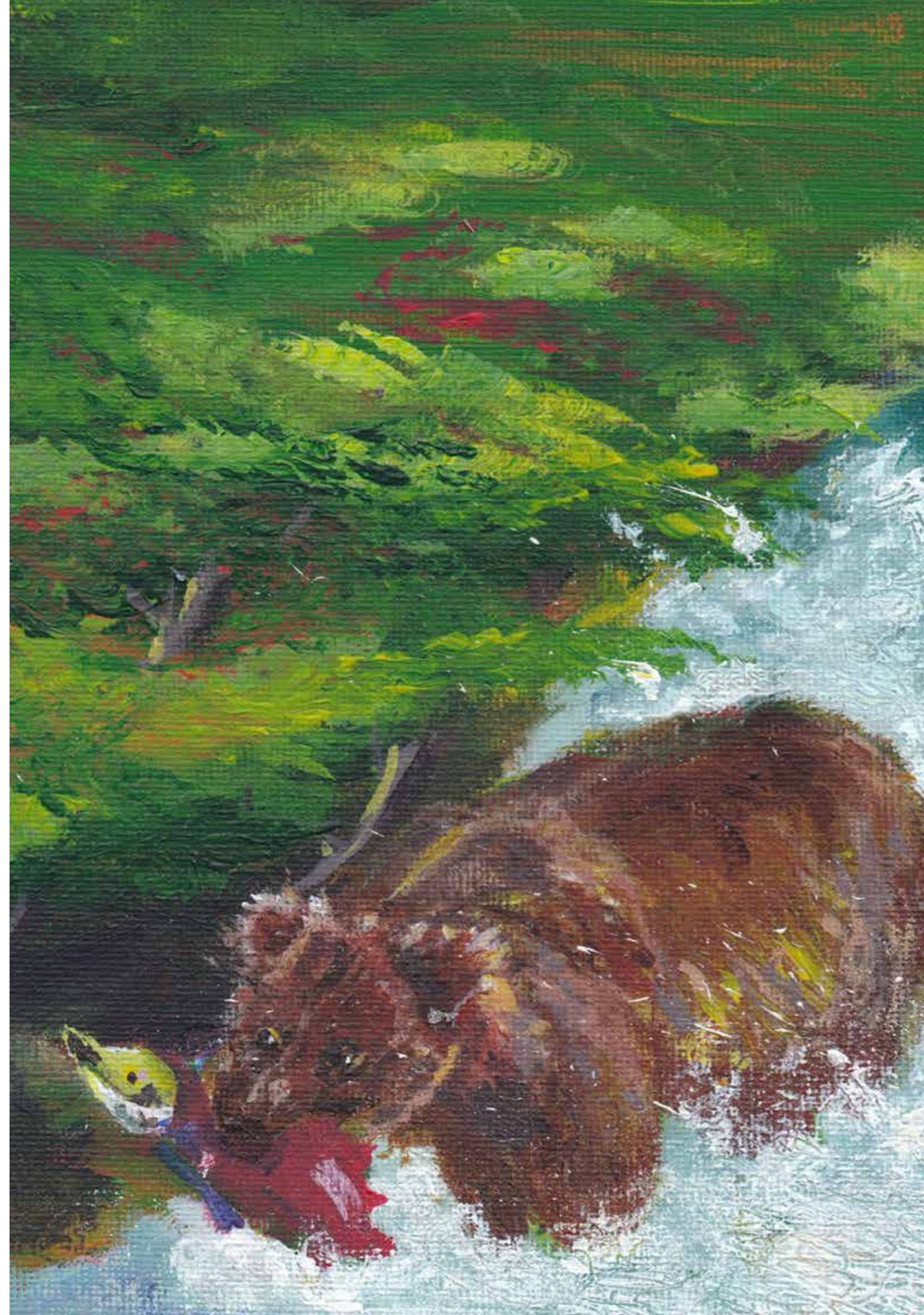


Adult salmon schools swimming in the ocean.

“Psst!...”: A Chinook salmon may travel up to 3000 kilometres before spawning.

Salmon are an important food source for many living things on Earth, including other fish, snakes and birds when they're fry. In the ocean, salmon are prey¹⁵ to whales, dolphins, seals, sea lions, other fish and humans. Bears and birds often eat spawning salmon. Through the life cycle of salmon, when they die, the nutrients from their bodies transfer into the surrounding coastal forests.

Bear eating a spawning sockeye salmon.

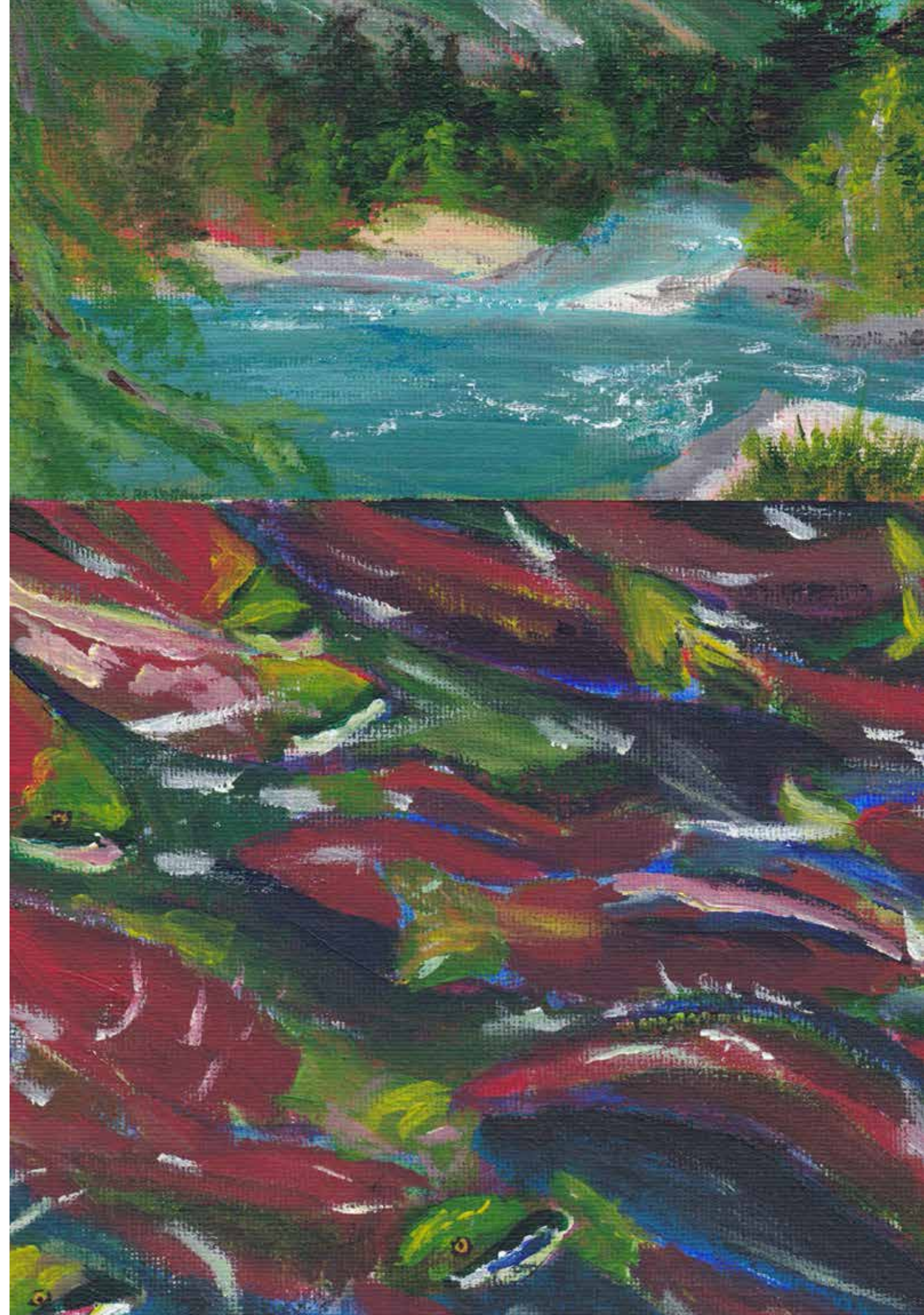


To avoid predation during spawning, salmon look for deep areas to swim into. Salmon swim in schools in the ocean for protection and to confuse predators¹⁶ with their flashy sides.

Typically, juvenile salmon eat zooplankton¹⁷, and larval¹⁸ and adult invertebrates.¹⁹ In the ocean, salmon eat smaller fish, such as herring²⁰, amphipods²¹ and krill.²²

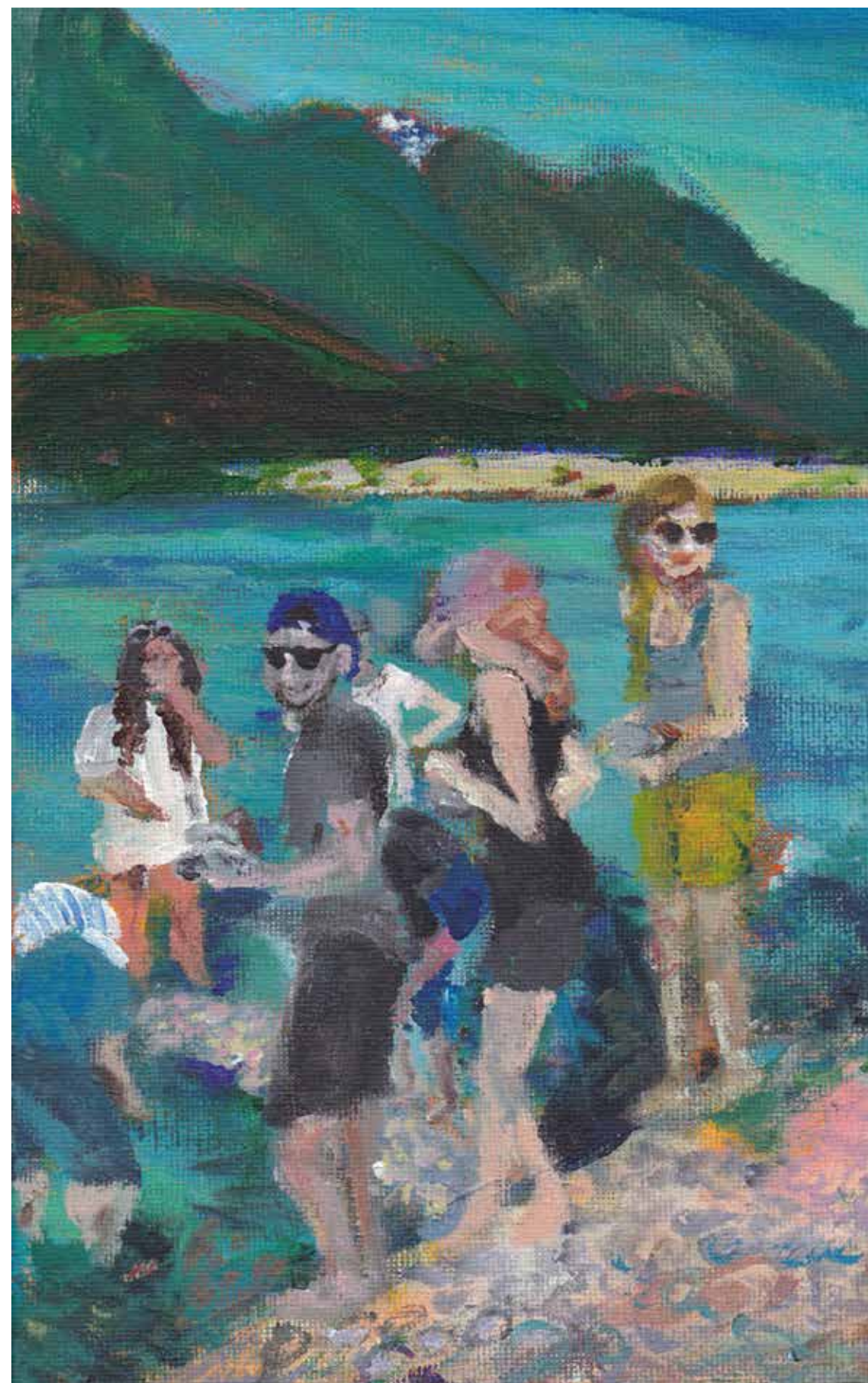
“Psst!...”: This is called a food chain²³, which is the movement of energy (or food) from one living thing to another.

Spawning sockeye salmon swimming in a school to avoid predation in a river.



Salmon are the base of many Indigenous cultures. There are songs, dances, art, and stories based on the lives of salmon. In British Columbia, uu-chah-nulth (Nootka), Nuxalk (Bella Coola) and Tlingit are some of the nations that rely on salmon as a primary source of food.

Ocean Bridge Youth learning about a traditional Squamish Nation fishing technique from a Traditional Indigenous Knowledge Keeper.



"Psst!... Less than 2% of salmon live long enough to spawn."

Farmed salmon are raised in large undersea cages known as net-pens²⁴ off the coast of British Columbia. Some salmon are farmed on land, indoors, and in systems that recirculate water much like a regular fish tank. Atlantic salmon are the most farmed salmon. Farming salmon is a common type of aquaculture²⁵ which involves raising plants, fish, and invertebrates in aquatic environments for food. They are fed fishmeal pellets for about two and a half years until they are harvested.

There are three common techniques for commercial fishing²⁶: seining²⁷, gillnetting²⁸ and trolling.²⁹ Seining involves setting nets to encircle schools of fish. Once a catch is made, the net is drawn up and brought aboard. Gill netting involves dropping a large nylon net in the ocean like a mesh wall, with orange bobs to keep it afloat, and then scooping up the catch. Trolling involves dragging a series of lines and baited hooks that are attached to long poles that extend from the boat. Overfishing³⁰ has led to a decline in salmon populations.

Shoreline development destroys salmon habitat making it difficult for adult salmon to get to spawning grounds and for young salmon to return to the open ocean. Logging³¹ activity, dams³², homes and businesses built along the shoreline can be problematic for salmon. Human impacts like shoreline development have led to a decline in salmon populations across Canada.

Climate change³³ negatively impacts salmon populations in Canada. Rising temperatures across the globe, drought³⁴, lower water levels and higher water temperature lead to eutrophication³⁵ and low dissolved oxygen levels.³⁶ These impacts combined can make it virtually impossible for salmon to swim upstream to spawn.

Efforts have been made across the country to re-establish salmon populations. Streams and rivers are stocked with salmon eggs from hatcheries and shoreline restoration³⁷ projects take place across the country. Planting native trees and cleaning up litter around shorelines can greatly reduce harmful pressures on salmon that die off.



Spawning salmon.

Glossary of Terms

1. **Atlantic salmon:** fish in the family Salmonidae found in the North Atlantic Ocean and in lakes and rivers that flow into it
2. **Pacific salmon:** fish in the family Salmonidae found in the Pacific Ocean and in lakes and rivers that flow into it. There are five species of Pacific salmon found in Canada: chinook, pink, chum, sockeye and coho salmon
3. **Anadromous:** fish, such as the salmon, who migrate up rivers from the ocean to spawn
4. **Spawning:** to release or deposit eggs and fertilize them
5. **Semelparous:** species that reproduce once before death
6. **Iteroparous:** a species that reproduces offspring several times in multiple years
7. **Alevin:** newly spawned salmon or trout that are still carrying the yolk
8. **Fry:** small salmon that are just beginning to come out of their gravel nest
9. **Parr:** fry develop into parr with vertical stripes and spots for camouflage
10. **Smolt:** a young salmon that migrates from rivers and streams to the ocean and undergoes changes to survive in salty water
11. **Redd:** a spawning nest made by a fish, especially a salmon or trout
12. **Smoltification:** the changes that a young salmon undergoes while migrating from freshwater to the ocean to be able to survive in salt water
13. **Dorsal fin:** the fin on the back of a fish, whale, dolphin or porpoise
14. **School:** a group of fish that swim together for protection from predators
15. **Prey:** an animal that is hunted and killed by another animal for food
16. **Predator:** an animal that hunts and eats animals for food
17. **Zooplankton:** small floating or swimming animals that drift with water currents
18. **Larva:** the active immature form of an insect
19. **Invertebrate:** a cold-blooded animal without a backbone
20. **Herring:** small fish that are important prey to many other animals. They are found in the North Pacific and North Atlantic Oceans, including the Baltic Sea, as well as off the west coast of South America
21. **Amphipod:** a type of small planktonic crustacean
22. **Krill:** a type of small planktonic crustacean
23. **Food chain:** the transfer of energy in the form of food from one organism to another
24. **Net pen:** large cages that are suspended in the ocean
25. **Aquaculture:** breeding, raising, and harvesting fish, shellfish, and aquatic plants
26. **Commercial fishing:** the activity of catching fish and other seafood for profit
27. **Seine fishing:** a method of fishing that uses a large rectangular net, called a seine, that hangs in the water supported by floats. Seine nets can be used close to shore as a beach seine, or from a boat.
28. **Gillnetting:** a fishing method that uses panels of mesh nets, that hang along a floating line on the surface of the water or are sunk to the seafloor using small weights
29. **Trolling:** is a method of fishing where one or more fishing lines, baited with lures or bait fish, are drawn through the water behind a moving boat
30. **Overfishing:** removing too many animals too quickly. This leads to the species not being able to replenish their population fast enough to replace the individuals taken by fishing.
31. **Logging:** the process of cutting, processing, and moving trees to a location for transport
32. **Dam:** a barrier that stops or restricts the flow of water or underground streams
33. **Climate change:** includes both global warming, which is caused by greenhouse gases, and shifting weather patterns
34. **Drought:** when an area or region receives below-normal amounts of precipitation
35. **Eutrophication:** when there are too many minerals and nutrients in the water, which leads to algae growth
36. **Dissolved oxygen:** the amount of oxygen that is present in water. Many living things in the water need dissolved oxygen to survive.
37. **Shoreline restoration:** returning a shoreline back to its former state or condition

Educational Resources

Vancouver Aquarium's 'Aquafacts - Pacific Salmon,' vanaqua.org/education/aquafacts/salmon
AquaFacts is a compilation of the most frequently asked queries, answered by our biologists and other reputable sources.

The Canadian Wildlife Federation, cwf-fcf.org/en/about-cwf/?src=menu

The Canadian Wildlife Federation's mission is to conserve and inspire the conservation of Canada's wildlife and habitats for the use and enjoyment of all.

Pacific Salmon Foundation, www.psf.ca/

The Pacific Salmon Foundation is a federally incorporated non-profit charitable organization dedicated to the conservation and restoration of wild Pacific salmon and their natural habitats in British Columbia and the Yukon.

Watershed Watch Salmon Society, watershedwatch.ca/

Watershed Watch Salmon Society is a science-based charity working to defend and rebuild B.C.'s wild salmon.

Swim Drink Fish, swimdrinkfish.ca/

Swim Drink Fish is a nonprofit organization working to connect people with water. They use citizen science and communications technology to inspire people to know and safeguard local waters.

The Lake Ontario Atlantic Salmon Restoration Program, bringbackthesalmon.ca/

The Lake Ontario Atlantic Salmon Restoration Program, also known as Bring Back the Salmon, has four components: fish production and stocking, water quality and habitat enhancement, outreach and education, and research and monitoring.

The Okanagan Nation Alliance's Fisheries, syilx.org/fisheries/

The conservation, protection, restoration, and enhancement of indigenous fisheries (anadromous and resident) and aquatic resources within Okanagan Nation Territory.

Thank You and Acknowledgments

We would like to thank the Ocean Wise community for their ongoing support and leadership.

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About Ocean Wise & Ocean Bridge

Ocean Bridge connects Canadian youth and young professionals from coast to coast to coast empowering them to take action for ocean conservation. Each year youth ages 18-30 form a national team engaged for eleven months in co-creating and delivering ocean and waterway service projects for their home communities.

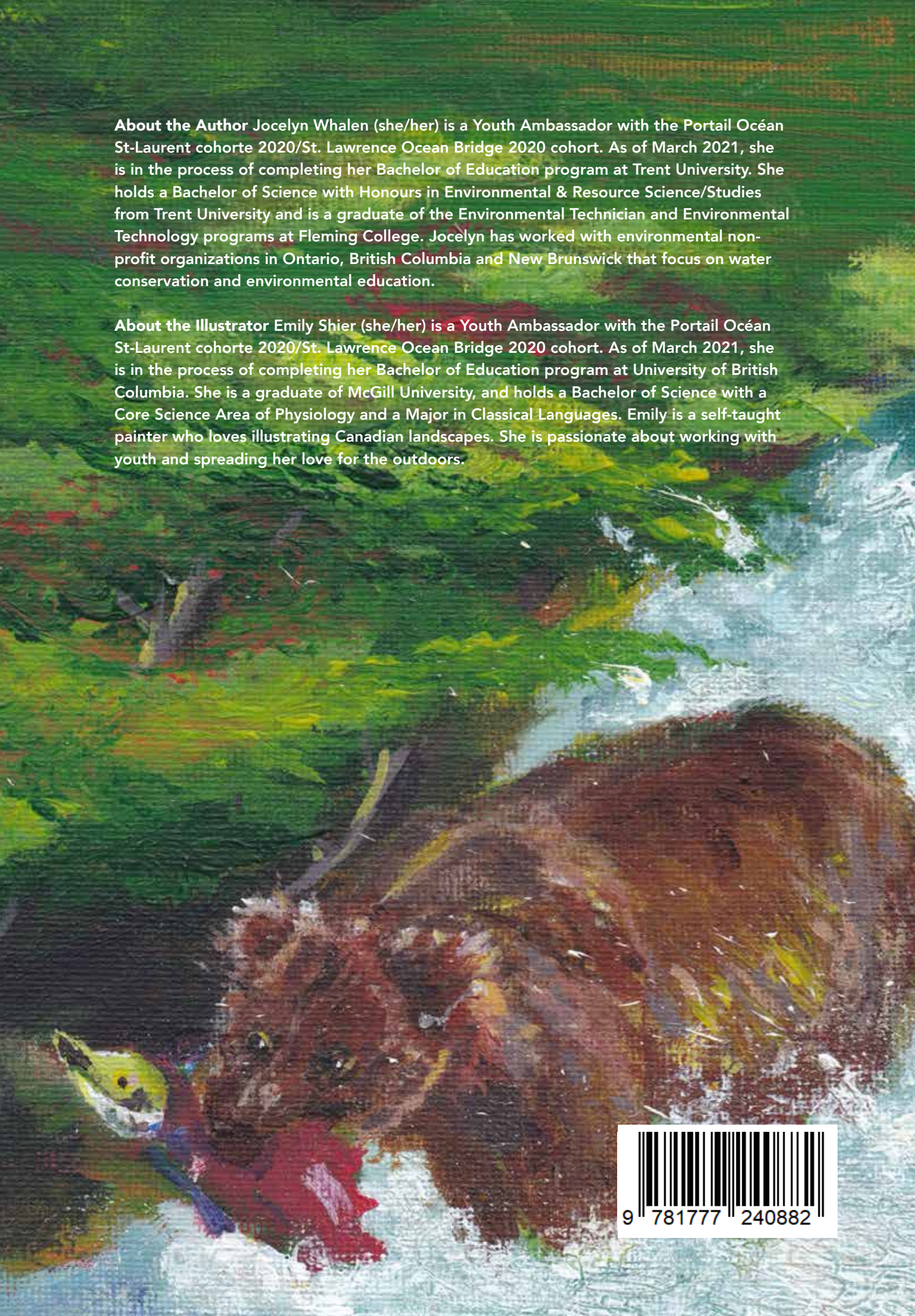
Ocean Wise is a not-for-profit organization whose vision is a world in which oceans are healthy and flourishing. Ocean Wise aims to inspire people in every corner of the planet to help protect our oceans by increasing understanding, wonder and appreciation for our blue planet.



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About the Author Jocelyn Whalen (she/her) is a Youth Ambassador with the Portail Océan St-Laurent cohorte 2020/St. Lawrence Ocean Bridge 2020 cohort. As of March 2021, she is in the process of completing her Bachelor of Education program at Trent University. She holds a Bachelor of Science with Honours in Environmental & Resource Science/Studies from Trent University and is a graduate of the Environmental Technician and Environmental Technology programs at Fleming College. Jocelyn has worked with environmental non-profit organizations in Ontario, British Columbia and New Brunswick that focus on water conservation and environmental education.

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