

SCIENCE SPOTLIGHT



COMMUNITY TO THE RESCUE!

This project was undertaken with the financial support of the Government of Canada.



Community to the Rescue!



Origin Story:

HOW DOES INCREASING WATER TEMPERATURES AFFECT SALMON?

The Fraser River watershed is one of the most productive salmon spawning watersheds in the world. Unprecedented increases in average temperatures because of climate change, combined with intensive development along the banks of the Fraser River, has put salmon species at risk.

Salmon have thermal tolerances, or a range of water temperatures that allow for salmon to grow and thrive. When that thermal tolerance is reached or overshot, salmon are at risk of contracting ailments such as diseases, parasites, or even lose heart and breathing functions! This is worsened by taking away plant life that helps block the sun from the water, such as trees and shrubs. Streams in clearcut forests can increase in temperature by five degrees! Over time, rising temperatures can affect generations of salmon, ultimately resulting in salmon being smaller on average, or reproducing far less.

COMMUNITY-BASED RESTORATION

The ą́íćǎ́y (Katzie) First Nations and other Indigenous communities have used the Fraser River watershed to fish since time immemorial, or beyond the existence of any record or memory of arrival. Precontact the fishers in the community only would have taken what was needed. They were able to support large communities, harvesting fish in sustainable ways. Fifty years ago, members of the ą́íćǎ́y Nation fished fifty-two weeks a year. However, heavy resource extraction and the installation of flood protection infrastructure (such as diking and damming) are among the many things that have decreased salmon populations.

Today, the fishers can only harvest fish six to eight weeks a year because of declining stocks. Sockeye can only be harvested every fourth year now. In between dominant sockeye years, ą́íćǎ́y fish for chinook in August, but their numbers are falling similar to the sockeye. Sockeye salmon are especially important for the ą́íćǎ́y Nation and are considered as family. Because of the loss of critical salmon habitat, sockeye salmon have returned to the Fraser from the ocean in far fewer numbers.

In 2010, approximately thirty million Sockeye came home. In 2014, around fifteen million returned to the Fraser. In 2018, the count was close to ten million. In 2022 it is estimated that only six million returned. The ą́íćǎ́y Creek Restoration project was established to restore riparian zones, or trees and shrubs that surround the banks of a river, to lower the temperatures of the creeks.

This restoration project had three goals:

- 1) Learn to care for salmon by bringing back critical habitats that had been lost to climate change and flood infrastructure;
- 2) Work with community members with a “learning by doing” approach;
- 3) Having both Indigenous community members and non-Indigenous folks build relationships with the Land together over shared concerns about climate change.

A combination of traditional ecological knowledge, or knowledge gained about a local ecosystem over many generations of living within it, history, and stories were incorporated to strengthen community understanding of the project. The restoration project was able to plant one thousand trees to increase the amount of shade in creeks! All the trees that were planted were native species, as planting trees that are non-native could pose a risk to the rest of the ecosystem.



Time for **GENACTION!**

Try This at Home:

PROTECT YOUR STORM DRAINS FROM POLLUTION

Did you that know that one example of a non-native species in this watershed is the Parrot feather, which made its way into the Katzie Slough, which are wetlands on **q̓ícəy** territory? This non-native species arrived because of folks pouring water used in aquariums into drains, which carried the plant all the way to the slough.

Outside of your homes, you may have also noticed drains next to the sidewalks of streets. These are storm drains, which drain excess rainwater from our neighbourhoods and lead directly to local water bodies such as rivers, lakes, or the ocean. However, our streets are made of pavement, a hard surface, and any pollutants that are spilled on our streets will not be able to get absorbed into soil.

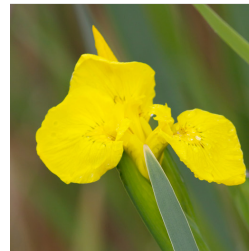
These spills on pavement will instead eventually be carried into the storm drains by rainfall! Some examples of pollutants include many common household items, such as paint, fertilizers, pesticides, or used car motor oil, which can all have devastating effects on aquatic habitats. Typically, these storm drains come with small signs that attempt to stop neighbourhood residents from dumping polluted water or other substances. However, these signs may not be very visible or informative of where exactly the drain connects to. You can create better signage yourself to help your neighbours understand what kinds of ecosystems they can harm by not preventing pollutants flowing into storm drains. Get creative! This could look like a drawing or list of fish species that live in your local rivers, lakes, or oceans.

Climate Action **THE POWER OF VOLUNTEERS**

Never underestimate the power of plants, especially ones that are considered invasive! An invasive plant is a species that is growing in a region that is outside of its natural range. Because there are no natural predatory species that will control the population of this species, these plants can grow without limit.

Invasive species have a large impact on salmon habitat in the Fraser River Basin watershed. The yellow flag iris is an important invasive species to note, as it invades wetlands and stream systems by having a large underwater root system that can block waterways and other native species.

However, there is also a lot of power in the work of volunteers, and local organizations such as the Watershed Watch Salmon Society helps organize volunteers to pull invasive species, as well as monitor overall water quality in salmon-rearing waterways.



Yellow Flag Iris

By learning to recognize invasive species, you can help notify local organizations about their presence, an important step in ensuring healthy salmon habitat. Check out other incredible work being done by Watershed Watch Salmon Society (watershedwatch.ca) or become one of their volunteers!

Climate Change

Past, Present, and Future

Earth is the only planet in the solar system known to support life. What makes our home so special? Earth has an atmosphere, a layer of gases between our planet and space. Some of these gases, like carbon dioxide, are called **greenhouse gases**. They are crucial parts of our atmosphere; they trap in the heat of the sun, similar to how heat is trapped in a greenhouse, or in a car on a hot day. This process, called the **greenhouse effect**, keeps Earth's temperature warm enough for living things to thrive.

The sun's rays hit our round, tilted planet unevenly. This uneven heating of Earth's surface leads to differences in temperature, which drives weather patterns. We call the patterns in temperature and weather over long periods of time **climate**. Different parts of the world have vastly different climates; it depends on how much heat they receive, as well as what landscape features are nearby. Water, mountains, ocean currents, and forests all impact our climate. In turn, living things around the world have adapted to the climate they live in.

Something, though, is changing. Over the past two hundred years, humans have been burning fossil fuels, such as coal and oil, to make energy to power our daily lives. Fossil fuels are made from decomposed plant matter and microscopic life millions of years old. This matter is full of carbon, and, burning it releases, or emits, billions of tonnes of **carbon dioxide** gas into the atmosphere every year. When too much carbon dioxide is emitted, the delicate balance of greenhouse gases maintaining

Earth's climate is upset. More and more heat is trapped, causing the planet to warm. Weather patterns change, water levels rise, storms get worse.

Climate has changed many times throughout Earth's history, from ice ages to periods much hotter than today. So why is this time any different? Scientists agree on two things. One, temperatures are rising faster than they ever have in documented climate history. Two, this climate change is driven by human activities, due primarily to greenhouse gas emissions.

Climate change is already impacting people's ways of life all over the world. Powerful storms, droughts, forest fires, and floods are threatening people's access to food, water, and safe homes.

The most important step we can take to prevent serious climate change is to reduce greenhouse gas emissions. Incredibly brave and caring people around the world are finding new ways to reduce emissions and make our communities climate resilient every single day. And you can join them! These Science Spotlights are here to help us learn more about climate change and how you can take action.

Our Commitment to the Decolonization of Science

Institutions of GenAction initiative respect and affirm the inherent and Treaty Rights of all Indigenous Peoples across what we now know as Canada. We give thanks to the Indigenous Peoples who care for this land since time immemorial and pay respect to their traditions and ways of knowing. We acknowledge their many contributions to innovations in Science, Technology, Engineering, and Mathematics, past and present, and are committed to deepening engagement and collaborating with Indigenous Peoples as partners in order to advance truth and reconciliation and the decolonization of science.

