SCIENCE GHT





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TEIOKIÉN:TARON Lake Sturgeon



Origin Story: LIVING FOSSILS

Today's sturgeon bear an incredible resemblance to their ancestors which inhabited the Earth more than two hundred million years ago. Lake sturgeon are Ontario's largest freshwater fish, measuring up to two metres long and weighing 180 kilograms—nearly four hundred pounds! Their bodies are not covered in scales but rather bony plates called scutes that protect them like armour, and unlike the other fish in Ontario they have skeletons made of cartilage instead of bones. Sturgeon spawning relies on clean, shallow, fast-flowing water that ranges in temperature from 8 to 21.5 °C.

In Ontario, there are three distinct populations of sturgeon, the Saskatchewan-Nelson River population, the Southern Hudson Bay-James Bay population, and the Great Lakes-St. Lawrence population. Sturgeon are listed as a species at risk in Canada and Ontario due to overharvesting, poor water quality, and disrupted migration routes and habitats caused by the construction of hydro dams.

While commercial and sport fishing of lake sturgeon is banned in Ontario due to its endangered status, the federal government lists sturgeon as threatened, which means they do not have the same protections in all provinces. Just across the border in Quebec the commercial sturgeon fishery is alive and well. These conflicting laws affect the same population of sturgeon, who do not adhere to man-made boundaries like provincial borders, so despite conservation efforts the Great Lakes-St. Lawrence population of lake sturgeon continues to decline.

CONSERVATION MEETS TRADITION

One group working to conserve this special species is Mohawk Council of Akwesasne's (MCA) Environment Division. Akwesasneron have lived alongside the great river— Kaniatarowanenneh—for thousands of years, and have watched the post-colonial decline of their culturally important species like the lake sturgeon. The tradition of sturgeon is to share it with family and community, and the skills to do so are passed down from generation to generation. The practices of sharing smoked sturgeon and using parts of the fish as medicine still continue today.

Projections for the next ten years suggest that threats to the Great Lakes-St. Lawrence population of lake sturgeon include extreme weather events such as droughts, temperate extremes, and flooding. The biggest impacts will be on habitat and spawning of sturgeon which rely on specific temperatures and water levels.

MCA's current research aims to conserve the sturgeon population and traditional practices. Their main upcoming project is funded by the Aboriginal Fund for Species at Risk (AFSAR)

and is called "Understanding Sturgeon To Protect Our Future." The team was excited to share about their upcoming research and said: "This project seeks to deepen our understanding of the sturgeon population and their habitat in the St. Lawrence River. Through this three-year project we aim to establish and oversee restoration efforts to support sturgeon habitat, including spawning beds, breeding habitat, enhancing biodiversity, removing invasives to create more viable habitat for sturgeon and the creatures that they eat. By doing so the project will allow us to reconnect to our roles and responsibilities for protecting and caring for the environment."

Time for GENACTION,

Try This at Home: **SUPERTASTERS**

Did you know that fish have taste buds? Sturgeon are some of the best tasters in the fish world because of how many taste buds they have, and some people are better at tasting than others too! We call these people "supertasters." Supertasters often find foods like broccoli and grapefruit to be bitter, and dislike foods that are too fatty or too sweet. Here is how to figure out if you are a supertaster. 1. Punch a hole in a piece of paper.

2. Place a drop of food colouring on the tip of your tongue, swish it around, and spit it out.

3. Place the paper over the tip of your tongue and have a friend count how many taste buds are inside the hole. If there are more than 30, you are a super taster!

Climate Action: INVERTEBRATE INDICATORS

Sturgeon are benthic feeders—they vacuum up things like invertebrates (animals without backbones) that live in the sediment including mussels, insects, and snails. These tiny creatures are amazing indicators, they can tell about the health of their environment. Try taking an adult to catch and identifying the aquatic invertebrates near you to see how healthy your local water bodies are.

Use your feet to stir up the sediment at the bottom of the water, and swish a kitchen strainer through the cloudy water. Look very closely to see what you have caught—the invertebrates may be very small! A magnifying glass will help if you have one. Try looking for wings or shells, and counting the number of legs or tails you see. Use an identification guide to help you identify what you have caught—scientists use a kind of guide called a dichotomous key!

Dragonfly, stonefly, and caddisfly larvae are very sensitive species and finding them usually means very good water quality. Finding only things like leeches, worms, and side swimmers mean poor quality water.

MEET OUR LOCAL SCIENCE HEROES

They work as researchers for the Mohawk Council of Akwesasne's Environment Division. Kayla Sunday (centre) is the Program Manager, Britney Bourdages (right) works as the Environmental Project Coordinator and Travis Cole (left) is an Environmental Field Technician.



Kayla, what made you want to study sturgeon?

When I was young, I thought sturgeon were a type of local shark due to their colour, skin, and appearance. I remember being super afraid of them! With my father's teachings, time, and growth, I came to appreciate these fish as one of the crown jewels of our area. They are unique to our waterways and have provided my ancestors and community members with sustenance through long winters, ensuring their survival so that I can be here to appreciate each day. Sturgeon keeps well when smoked, in fact smoked fish is one of the smells that is ingrained into my memory and is a sensory experience that I hope we can work towards making popular once again, through reacquainting ourselves with our more than human relations, supporting local knowledge about sturgeon and working towards enhancements of their habitat in my local area.

Britney, what is your favourite part of your job?

Picking a favourite part of my job is very tough because I enjoy so much of it. I would say the best part about my job as a coordinator is that I have the opportunity to develop projects and see them through to the end where we complete the physical project itself.

Travis, what advice do you have for children looking for a future science career?

Pick a field you are passionate about and love everything you know about it. Do not go into something you do not want to do. Stay passionate! Keep the research going.

Photos by Stephany Hildebrand

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.



Climate Change: Past, Present, and Future is based on...Delmotte, Masson, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, et al. 2021. "Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change." Intergovernmental Panel on Climate Change. Cambridge University Press. In Press.