SCIENCE SPOTLIGHT

KEEPING UP WITH THE WHOOPING CRANE

GEN ACTION

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Canada

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Keeping up with the Whooping Crane

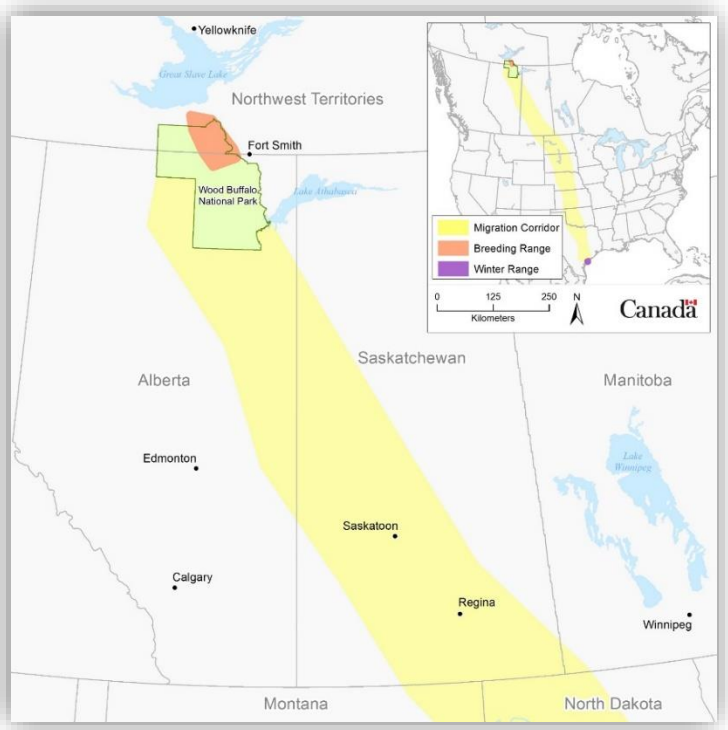
Origin Story:
BACK FROM THE BRINK

North America's tallest bird is also one of its rarest. The iconic **whooping crane**, *Grus americana*, stands five feet tall and is a key species in its wetland ecosystem. The largest wild, and only natural, population migrates between Wood Buffalo National Park and Texas each year.

In 1941 there were only twenty-one whooping cranes on the planet, that is fewer than the number of students in a classroom! As of today, due to remarkable collaborative work by organizations in Canada and the US, like the Wilder Institute/Calgary Zoo and the International Crane Foundation, there are over six hundred of these graceful birds in the wild. But there is still much work to be done. Scientists predict that threats from climate change due to higher carbon dioxide levels, such as shrinking wetlands, and more storms, will put these birds in great danger.

The magic number is one thousand, according to conservation researchers. They estimate that if the population of wild whooping cranes can reach this number, the species should be able to handle the threats they face.

So what is the best way to build up the population of whooping cranes?



Map of migration route of Aransas-Wood Buffalo population (AWBP) of whooping cranes showing the summer breeding grounds in Wood Buffalo National Park. Adapted from Zooniverse. "Whooping Cranes!" Last modified, January 6, 2022. www.zooniverse.org/projects/whcr-cr/whooping-cranes/about/research

The Origin Story was written based on Matthew Butler, Kristine Metzger, and Grant Harris, Are whooping cranes destined for extinction? Climate change imperils recruitment and population growth. Ecol Evol. 2017; 7: 2821– 2834. https://doi.org/10.1002/ece3.2892

Building Resilience

Helping a Population Thrive

The work to recover whooping cranes is a huge collaboration with many partners across Canada and the USA – the two countries lucky enough to be along the path of the whooping crane migration route. One of those partners, the Wilder Institute/Calgary Zoo, is located in Alberta. Conservation researchers here contribute to two strategies to help boost the whooping crane population to at least one thousand wild individuals: evaluating nest success and conservation translocation.

EVALUATING NEST SUCCESS

As part of a collaborative ongoing study, in May 2022, conservation researchers from Wilder Institute/Calgary Zoo worked with partners in Wood Buffalo National Park to install camera traps, water level loggers and audio recording units in whooping crane breeding grounds. Their goal is to study what makes a nest successful, and what makes it fail. The camera traps will take pictures of how whooping crane nest and how many predators are around. The water level loggers will give data on changes in water levels that might be impacting whooping cranes as a result of climate change. The audio recorders will capture sounds of whooping crane pairs and their behavior.

Technology can also help study the best conditions inside a nest. Crane researchers use **data-logging eggs** to measure what happens to an egg when it is in the nest. These robotic eggs are made to look exactly like a whooping crane egg so when they are placed in a nest, the parents will treat it like their egg. It collects information on temperature and humidity and how often the parents turn the egg.

CONSERVATION TRANSLOCATION

In September 2022, two whooping cranes born at the Wilder Institute/Calgary Zoo in 2021—Kali and Daya—were sent to the US in the hopes that they will join the wild cranes in migration!

This is **conservation translocation**—moving members of a species to help it survive. For whooping crane recovery, this strategy starts with conservation breeding. In addition to the six hundred and sixty whooping cranes in the wild, there are about one hundred and thirty under human care in settings like zoos and sanctuaries. These birds and their chicks help build up the wild population with the help of human researchers and care-givers.

Whooping cranes usually lay two eggs, but in the wild, often only one chick survives. Under human care, researchers can remove that second egg and find another way to help it hatch. Sometimes that help can be from an artificial incubator—a machine that keeps the egg at the best conditions based on what the data-logging eggs have found. Sometimes a pair of sandhill cranes (a cousin of the whooping crane) will act as foster parents and look after it as they would their own egg.

When those young cranes are ready—like Kali and Daya—they may be reintroduced into the wild, increasing the population.

By studying what makes nests successful and breeding healthy whooping cranes to be released, this collaboration of scientists is working to build a thriving wild population—one that will be resilient enough to survive the threats of climate change.

This Science Spotlight was written based on Hannah Edwards, Sarah Converse, Kelly Swan, and Axel Moehrenschlager, "Trading off hatching success and cost in the captive breeding of Whooping Cranes," Animal Conservation 25, no. 1 (February 2022) 101-109. https://doi.org/10.1111/acv.12722 and the ongoing work of collaboration of partners including the Wilder Institute/Calgary Zoo. Find out more here: wilderinstitute.org/conservation/whooping-crane/

Time for GENACTION!

Try This at Home:
NESTS FROM SPACE

Partners in Whooping Crane conservation, the Canadian Wildlife Service and Parks Canada have set up an amazing citizen science experience.

Head over to Zooniverse website (www.zooniverse.org/projects/whcr-cr/whooping-cranes) to help researchers find nesting whooping cranes in satellite images of Wood Buffalo National Park. After an informative tutorial, you will become an expert in identifying the circular one-to-two-metre nests in their wetland environment. Three thousand volunteers have already helped monitor the population of this incredible species!

Climate Action:
SHORELINE CLEAN-UP

As our science hero, Allison Scovil, says, protecting the wetlands in our backyard can help animals like the whooping crane. These spectacular birds may seem really far away, but remember that everything is connected. We can clean-up our local wetlands and make a difference for wetlands in northern Alberta.

Unite your community to remove trash from the area in and around your local waterways and wetlands. While you have the community gathered, share individual actions—putting trash where it belongs, reducing fertilizers, turning off the tap when you brush your teeth, treating water as our relative, not a resource—they can each take to keep the waterways clean.

The best part? Wetlands are carbon sinks -- their plants and soil hold carbon rather than releasing it into the atmosphere. So, by keeping wetlands healthy, we are also minimizing carbon dioxide from building up in the atmosphere!

MEET OUR LOCAL SCIENCE HERO:

Allison Scovil is a Science Communicator

It takes many different science heroes to help save a species. **Science Communicators** help bring science information to the public. They are able to understand complex scientific concepts and explain them in a way that non-scientists can understand too. They help us care and be curious about the natural world and learn about actions we can take to make a positive difference for our planet.

Allison Scovil to do all of this for the Wilder Institute/Calgary Zoo! She integrates information on conservation projects, including whooping crane recovery, into engaging and accurate stories for diverse audiences. She inspires us to help and educates us on how we can!

What do you love about your job?

"I love that I get to tell stories about animals, people and how they are interconnected. I get to capture the thrill of science and share that in fun and creative ways!"

Favourite fact about whooping cranes?

"I think it is incredible that this big, magnificent bird takes a migratory journey of nearly four thousand kilometres twice a year!"

Favourite climate action?

"Protecting the wetlands in our own backyard."

Allison Scovil
Wilder Institute/Calgary Zoo

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.