Traditional Knowledge & Climate Change at Magnetawan First Nation

@MagFNLandsandResources

@species_at_risk_on_the_mag

Environmental Management Biologist:

Cory Kozmik

Species at Risk Biologist:

Alanna Smolarz

Cory Kozmik
Environmental Management Biologist

- Trent University graduate
- MSc. Candidate- Laurentian University
- Previous work includes Toronto Zoo's Adopt-a-Pond wetland conservation program
- 4 years at MFN
  - Project development
  - Site assessment
  - Partnership development
  - Research design and project management

Alanna Smolarz

Species at Risk Biologist & Program Coordinator

- 2015 BSc. McMaster University
- 2017 MSc. McMaster University (Ecohydrology Research Group)
- Worked previously with:
  - Wildlife Preservation Canada: Rattlesnake Translocation
  - Blazing Star Environmental: Snake Technician
  - AECOM: Qualified Biologist on HIWEC

Programs & Projects

Traditional Land-Use & Mapping Study	Capital Plan	Land-Use Plan
Environmental Management Plan	Fish Monitoring • Sturgeon & Walleye assessment	MTO Highway 69 expansion
Henvey Inlet Wind Farm & Transmission Line	AFSAR (7 years)	Indigenous Guardians Network
Community Based Climate Change Monitoring Program		

Programs & Projects

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Community Based Climate Change Monitoring Program

Main Funding Sources

Magnetawan First Nation

Indigenous and Northern Affairs Canada | Affaires autochtones et du Nord Canada

McMaster University SCIENCE

EST. 2017 BWF BOREAL WATER FUTURES

LaurentianUniversity UniversitéLaurentienne

Mount Allison UNIVERSITY

Integrating Traditional Knowledge and Western Science to Monitor the Impacts of **Climate Change** on Culturally Significant and at-risk Ecology of Indigenous Lands

Our Species at Risk Team

We aim to provide learning opportunities for youth and foster research-based work with partners

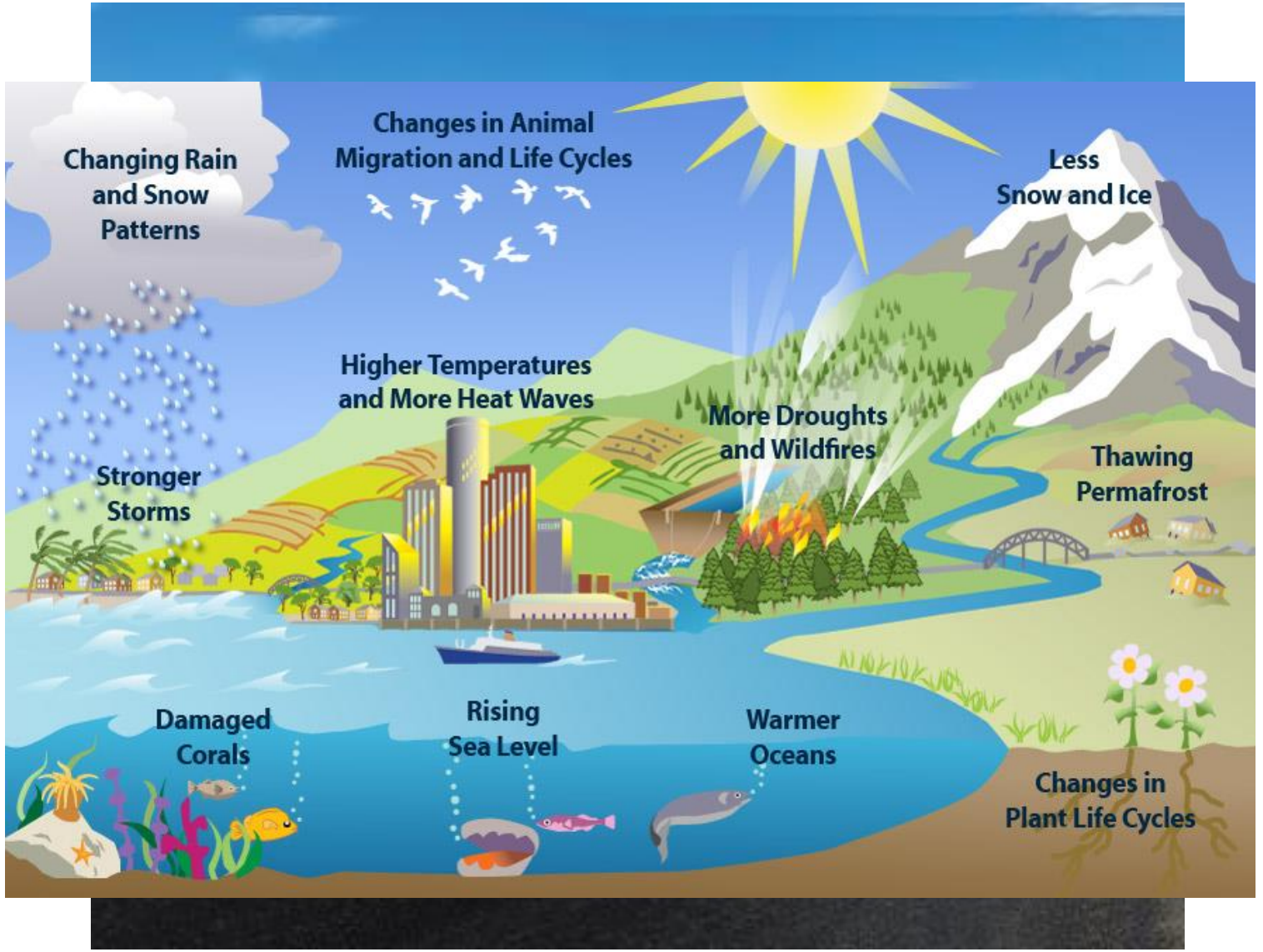
What is Climate Change & Global Warming?

Global Warming

- Since the early 20th century there has been a steady increase in surface temperature on the planet
- Since 1880, Earth's surface temperature has increased by almost 2ºC
- Including the warming of the oceans, land, and atmosphere, our climate is accumulating 4 Hiroshima atomic bombs worth of heat every second.

Climate Change

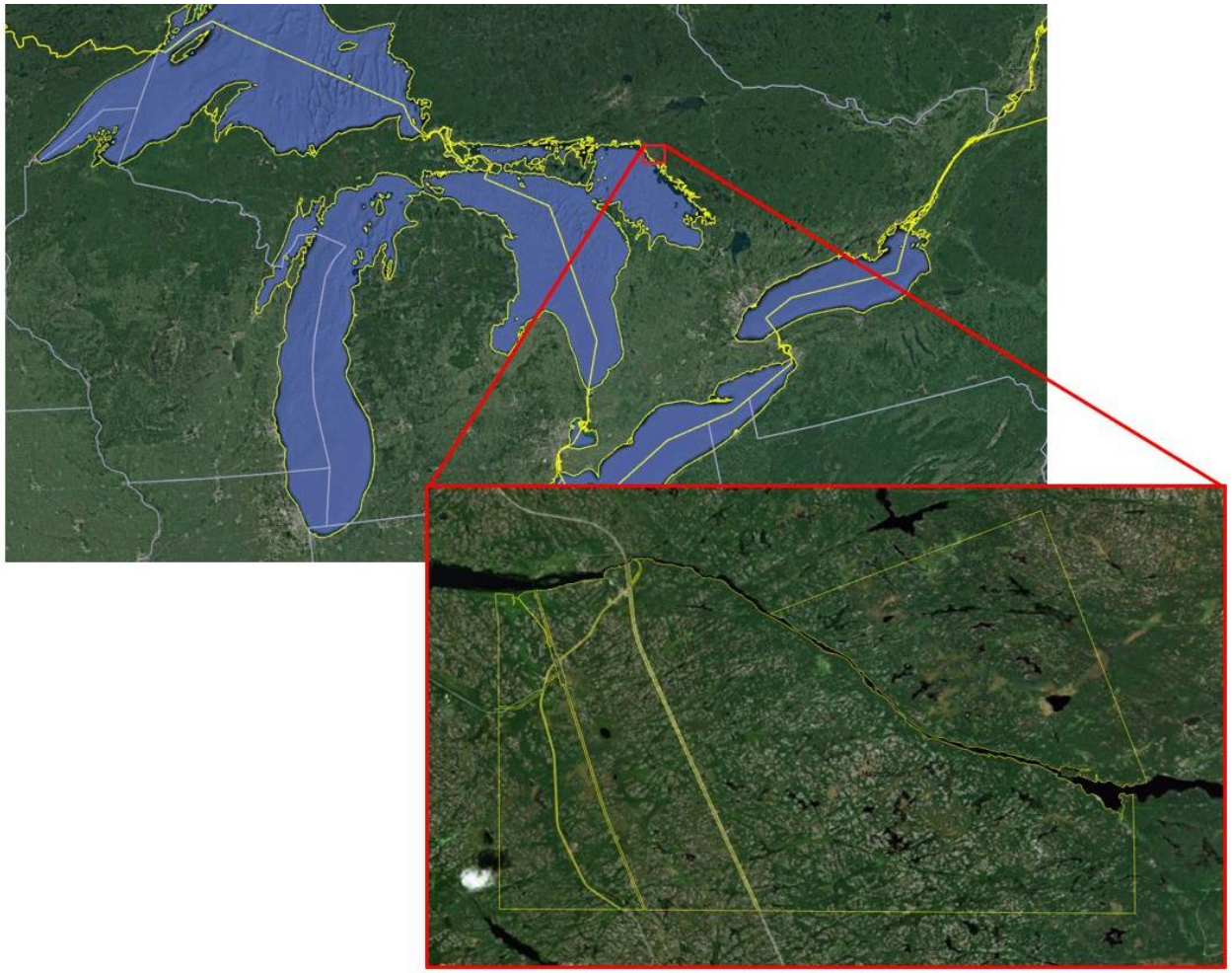
- Heat from fossil fuel emissions trap gasses within Earth's atmosphere
- Creates "Greenhouse" effect
- Earth's response
  - Extreme weather events
    - Forest fires, hurricanes etc.
  - Sea levels rising
  - Seasonal times changing
  - Ice loss of our glacial land masses

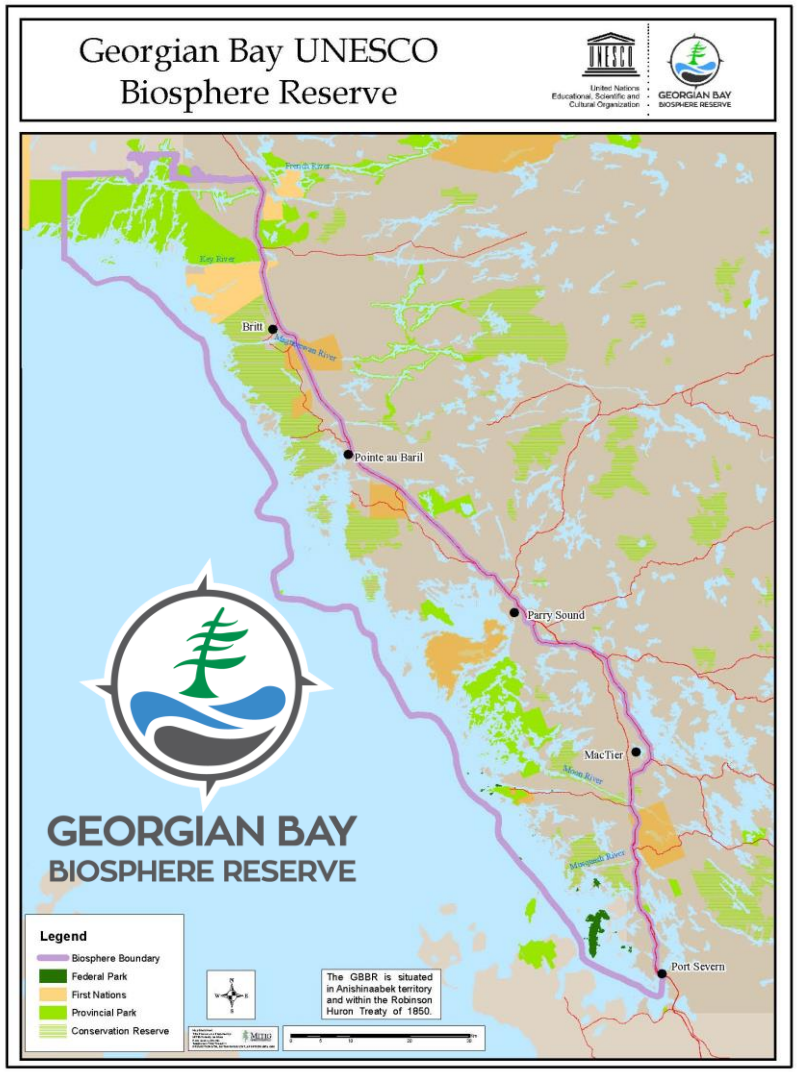



Think
Globally
Act
Locally

Magnetawan First Nation

- 4700 ha
- Within the Georgian Bay Biosphere Reserve





Climate Change
What are we concerned about?

1. Impacts to Resources

- Industrial
  - Contaminants & pollutants
  - River Pollution
- Food sources
  - Traditional fish stocks declining
  - Number and health of Moose
- Traditional Medicines

Climate Change
What are we concerned about?

2. Environment

- Weather
  - Changes in seasonal timelines
  - Longer summers, shorter winters
  - Extreme weather events (flooding, wildfires)
- Invasive species
  - Outcompete native species

Climate Change
What are we concerned about?

3. Impacts to Wildlife

- Invasive Species
  - Sea lamprey, carp
  - Destroy habitat & outcompete native species
- Parasites
  - Increased northern range limits
  - Winter ticks!!!
- Changes in habitat
  - Quality, quantity
- WETLANDS!

Why are Wetlands Important?

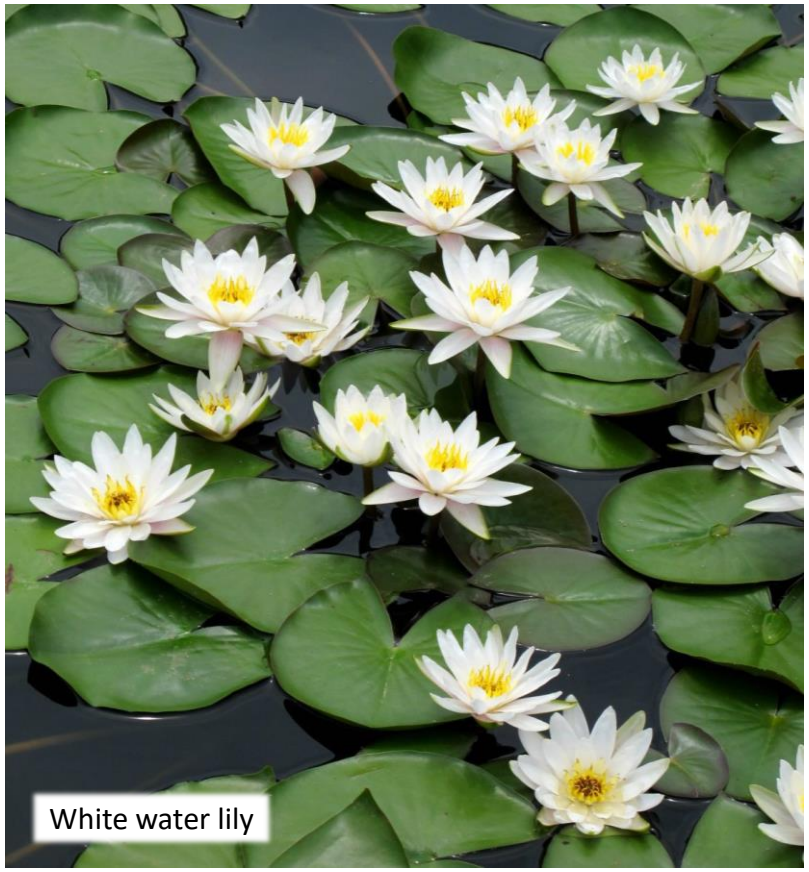
1. Resources

- Hunting
- Trapping
- Food
- Medicines


Wiika (sweet flag)


Yellow water lily


Pitcher plant


White water lily


Cranberry

Wetland Medicines

Large percentage of medicines rely on and grow in wetlands

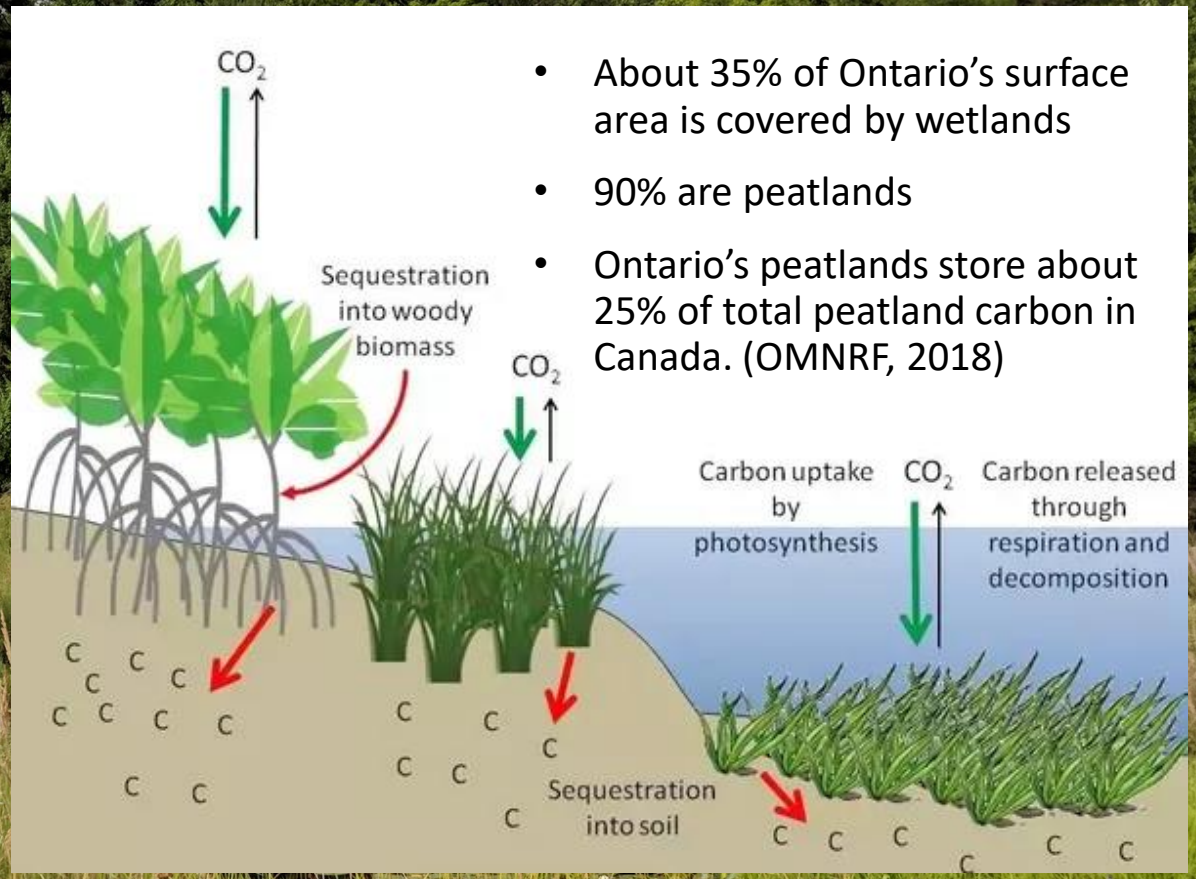
Why are Wetlands Important?

1. Resources

- Hunting
- Trapping
- Food
- Medicines

2. Environment

- Store large percentage of Earth's carbon
- Water filtration
- Flood plains



- About 35% of Ontario's surface area is covered by wetlands
- 90% are peatlands
- Ontario's peatlands store about 25% of total peatland carbon in Canada. (OMNRF, 2018)

Why are Wetlands Important?

1. Resources

- Hunting
- Trapping
- Food
- Medicines

2. Environment

- Store large percentage of Earth's carbon
- Water filtration
- Flood plains

3. Wildlife

- Home for many aquatic species
- Foraging habitat
- Nesting/critical life stages

Wildlife

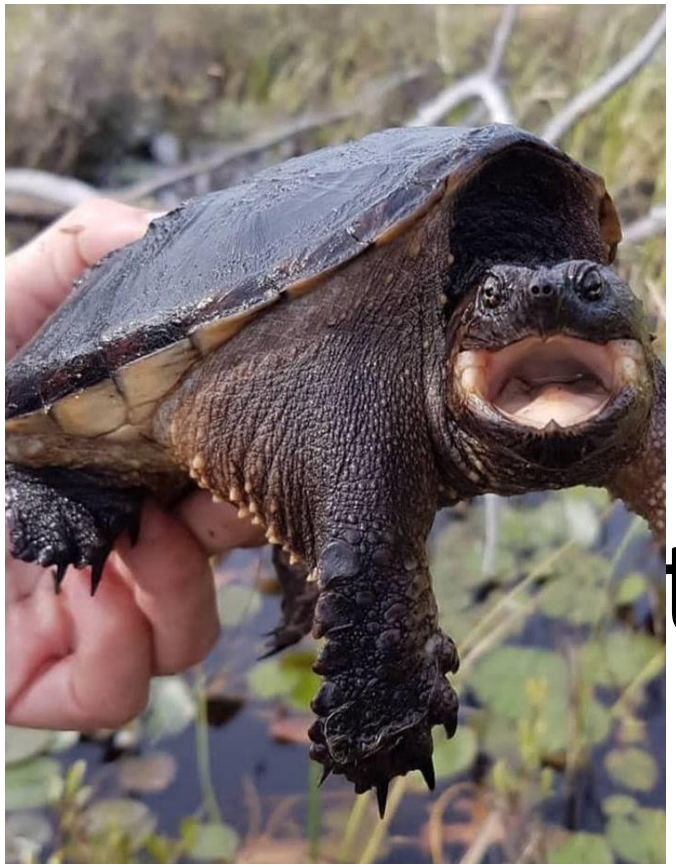
- Food & Foraging
- Travel
- Thermoregulation
- Bathing
- Predator avoidance
- Nesting


Mooz (Moose)


Aamik (Beaver)

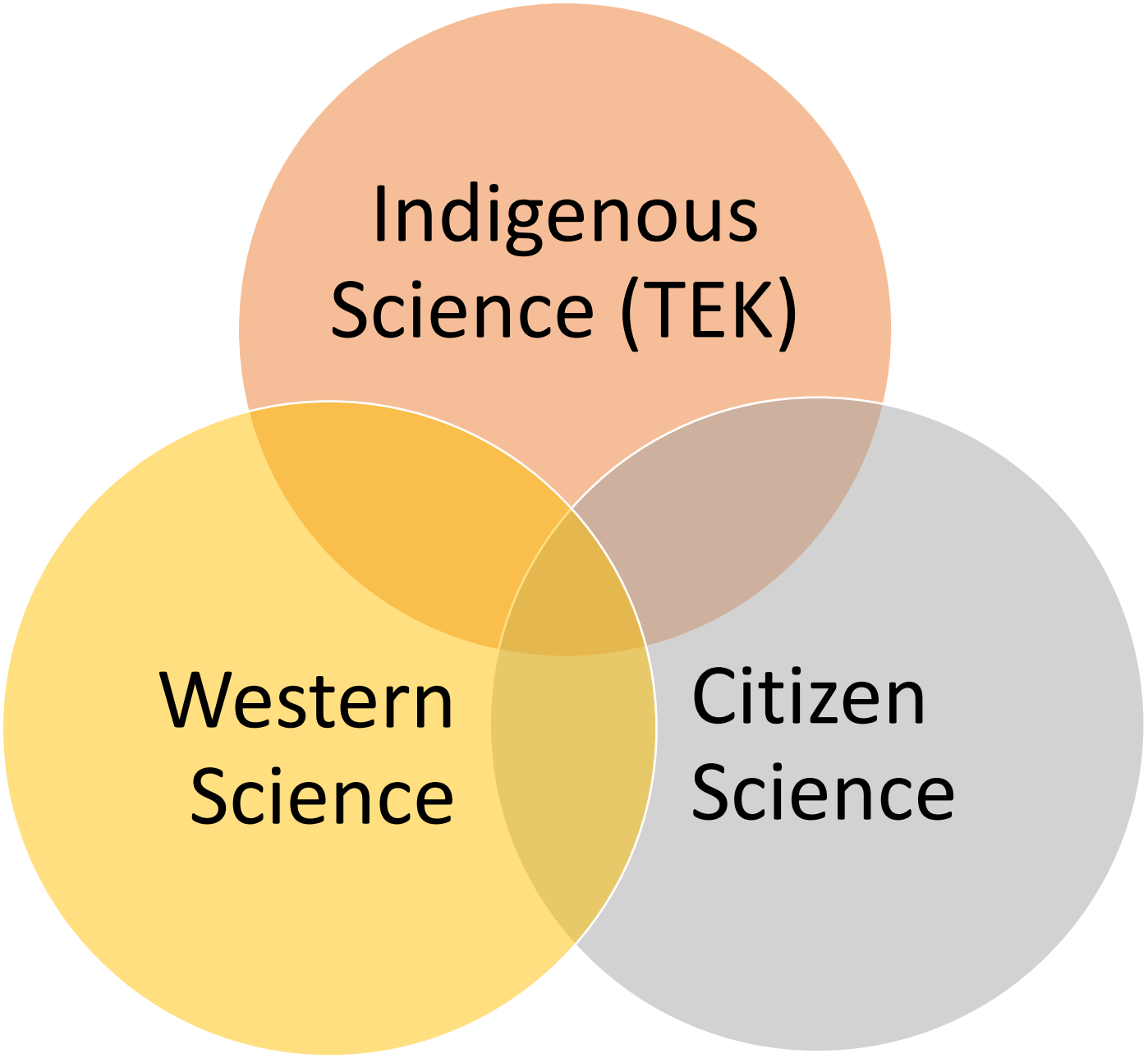

Nika (Goose)

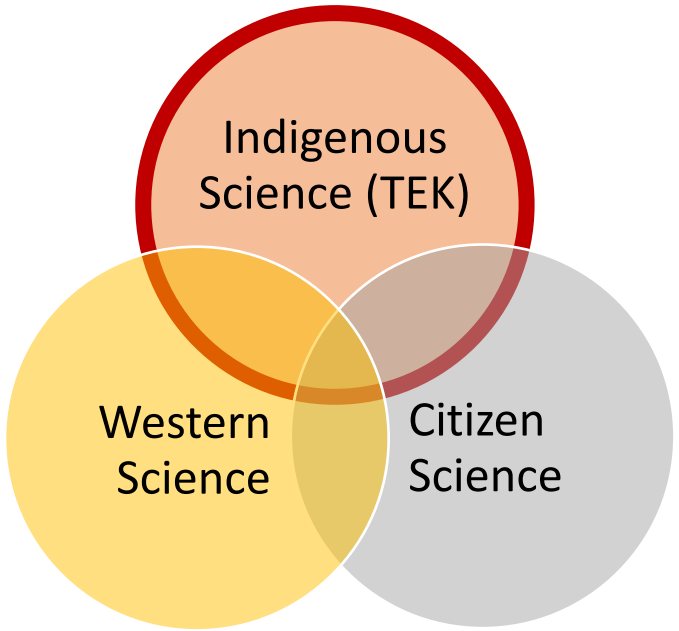

Washashk (Muskrat)

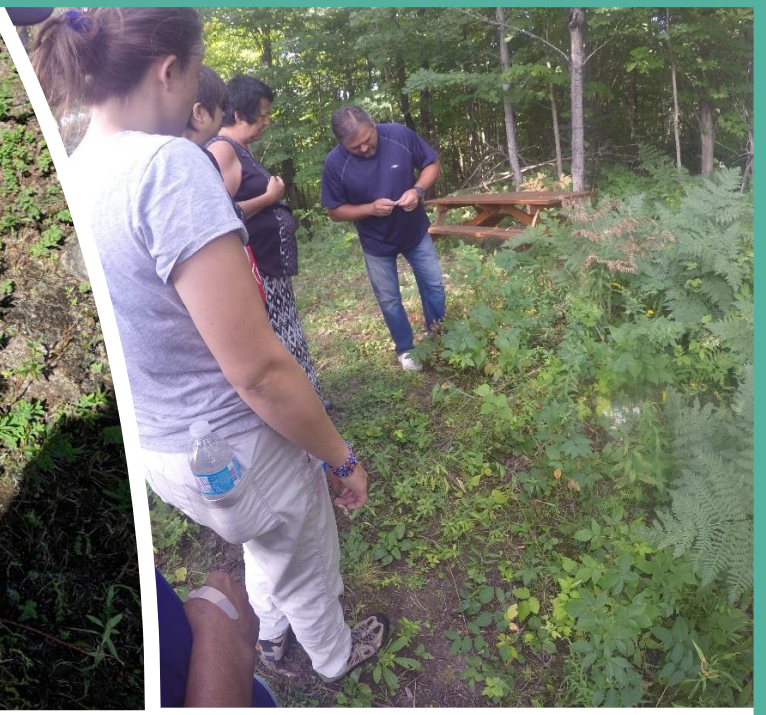


Our Purpose

- Foster collaborations and engagement between Indigenous and academic communities.
- Integrate Traditional Knowledge into planning, research and management
- Build capacity, identify risks to Indigenous communities, lands & resources vulnerable to climate change.
- Adaptation planning
- Enforcing Land code and use


Indigenous Science (TEK)
Western Science
Citizen Science





- Gathering centuries of land-based knowledge reflecting environmental change over time.
- Understanding impacts to environmental and human communities in response to climate change
- Integrating TEK into all aspects of research, management and adaptation planning

Traditional Ecological Knowledge

- TEK interview training for field technicians, youth & community members
- Interview knowledge holders using:
  - Strict ethics guidelines
  - Elders, hunters, youth, land users
  - Youth monitors involved in interviews

- Questions
  - Climate change
  - Traditional ways of life (social/cultural)
  - Land, water & wildlife
    - Moose
    - Resources
    - Reptiles & Amphibians
    - Medicines

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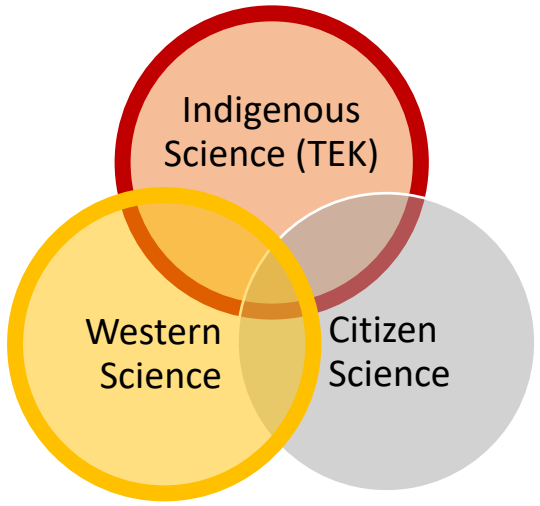
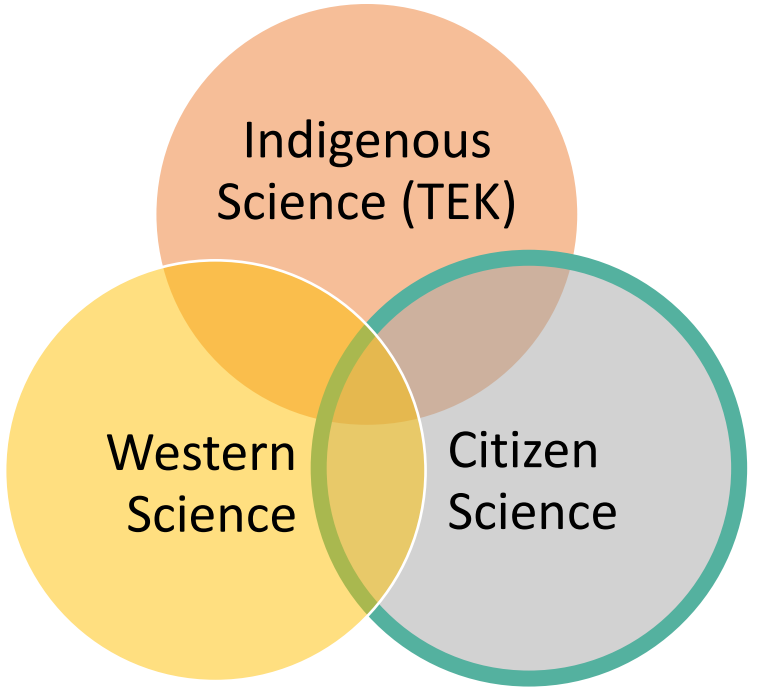
Climate Change and Traditional Knowledge Gathering

Connecting Guardians in a Changing World

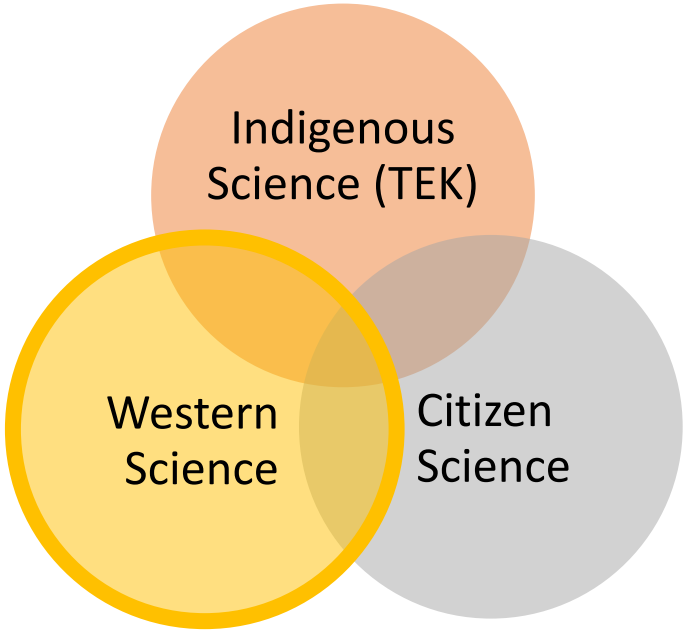


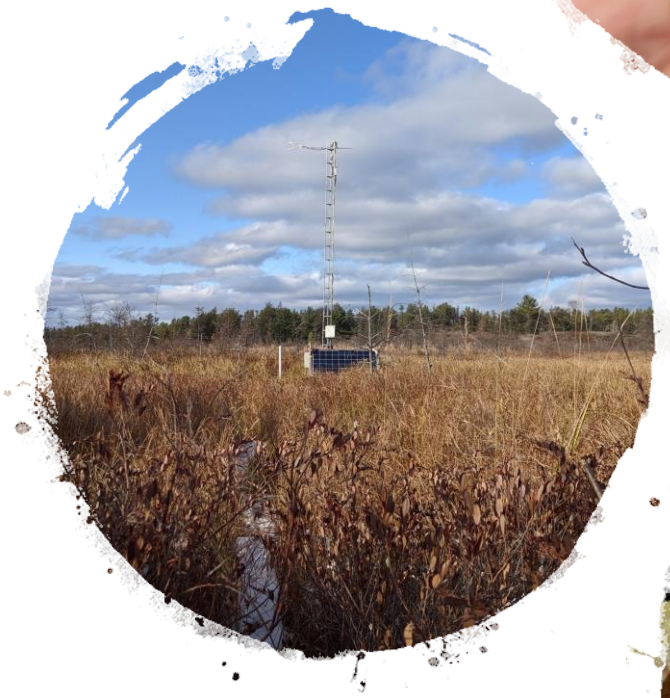


- Teaching days with Elders, Youth & language speakers.
- Community-based monitoring programs
- TEK interview training, job creation and resume development to engage youth and build local capacity.
- Active learning on the land

Citizen Science

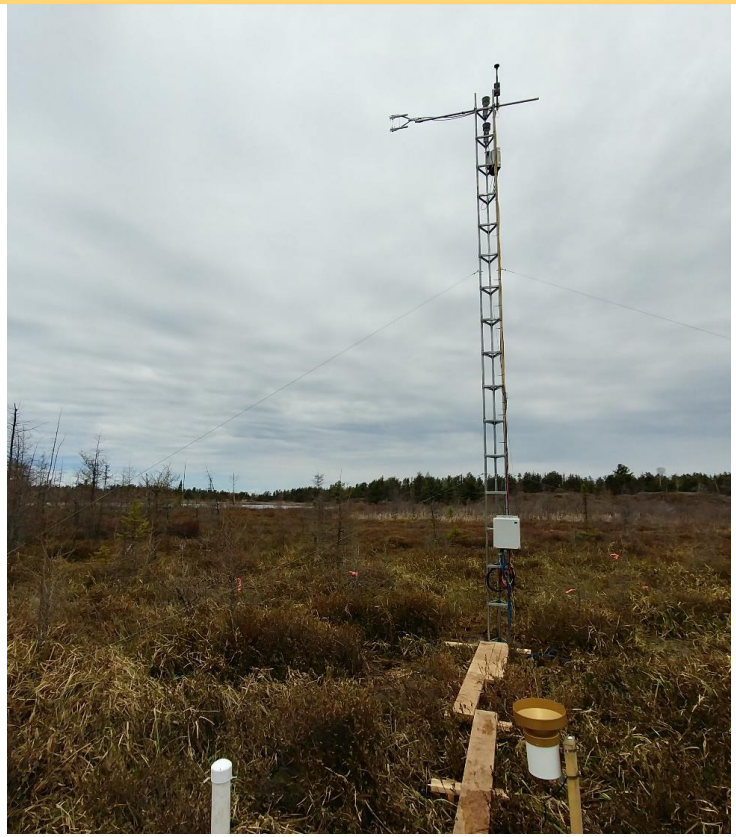
- Community data collection includes:
  - Traditional resource mapping & monitoring
  - Traditional species monitoring
- Bioblitz surveys
  - Community nature walks
  - Medicine walks
  - Traditional land-use
- Developing green initiatives in the community

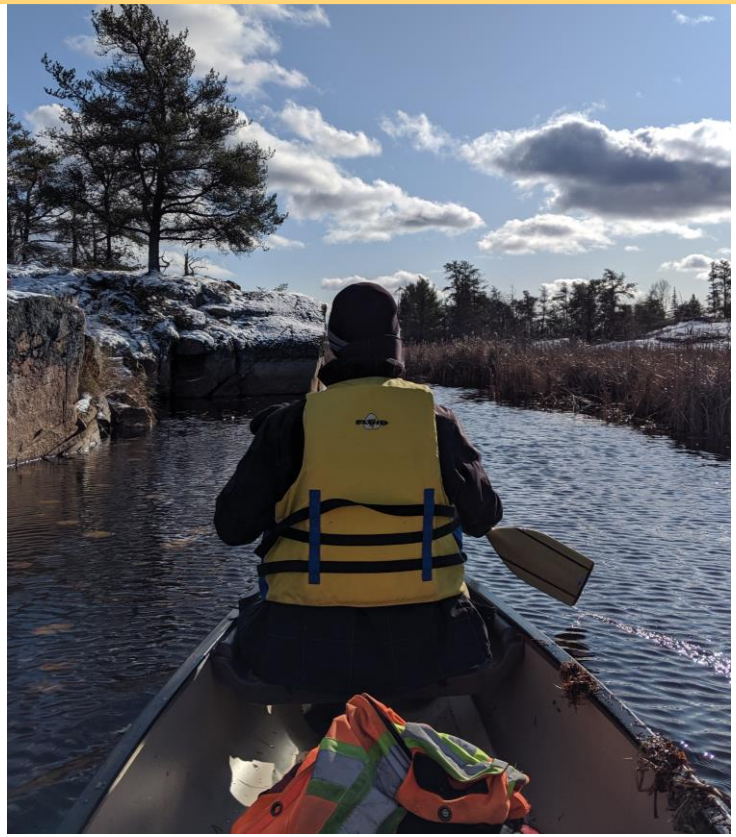




- Continuous collection of micrometeorological data
- Seasonal timing & animal behaviour
- Bioacoustic software (frog call monitoring!)
- Emergence surveys for reptiles
- Critical habitat monitoring
- Birds, bats, insect migration timing (MOTUS Tower)

The list goes on!

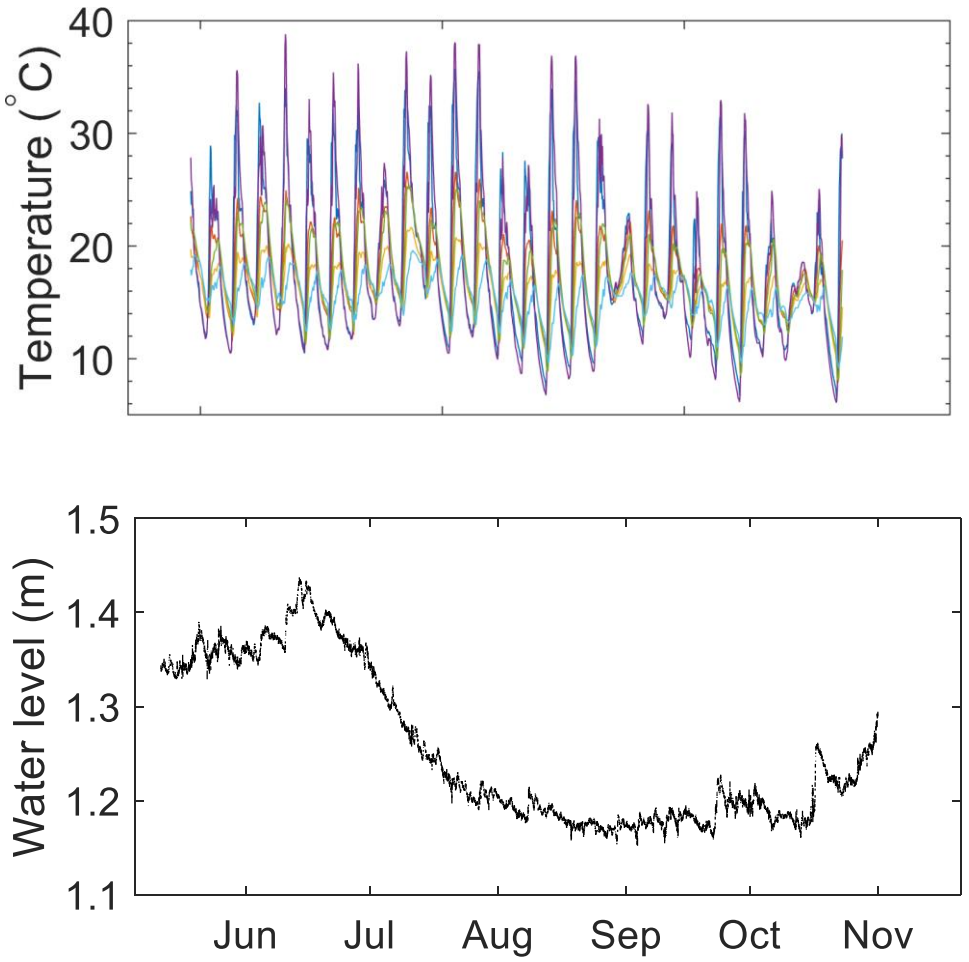


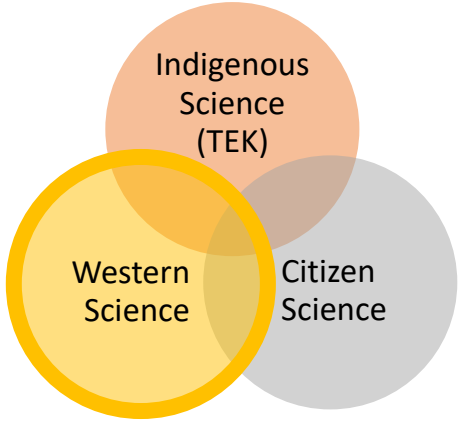


Western Science Partnership

- Partnered with McMaster University Ecohydrology Group
- Integrate TEK and science
- Monitor implications of climate change on culturally significant and at-risk ecology of indigenous resources
- Measuring indicator variables for SAR reptile habitat suitability

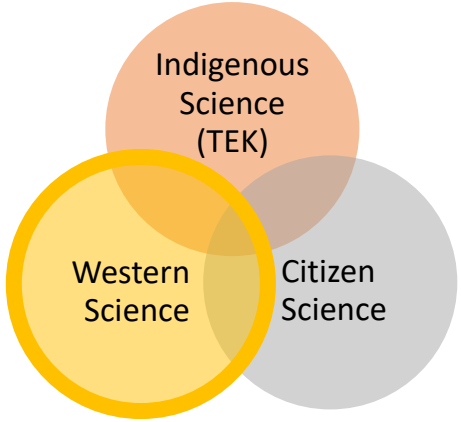
What are we measuring?





- Water level
- Peat soil temperature
- Snow depth
- Seasonal plant development
- Ecosystem fluxes
- These environmental variables are of critical importance to SAR overwintering:
  - Both snake and turtle species are sensitive to large fluctuations in water level

Climate and Land-Use Change



Wetter ⟷ Drier

- With climate or land-use change (e.g. road construction), ecosystems can shift along a wetness gradient depending on how the water balance is affected.
- We can determine if systems are being pushed outside their typical range of optimal performance with long term monitoring

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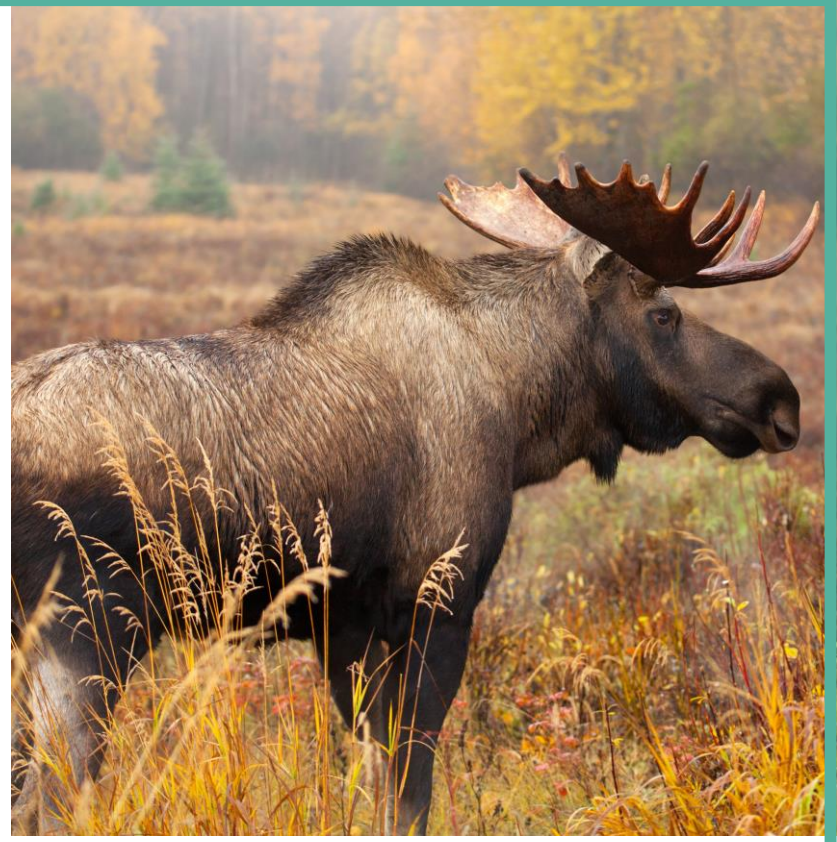
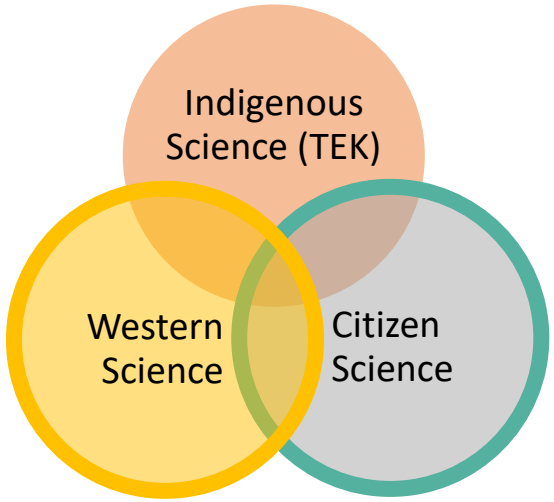
Dr. Jesse Popp



Western Science Partnership

- Identify changes in moose populations and behaviours
- Monitor their resources & habitat
- How these changes impact traditional ways of life
- How does climate change play a role?
- What does this mean for the future?
- How will your community adapt to these changes?



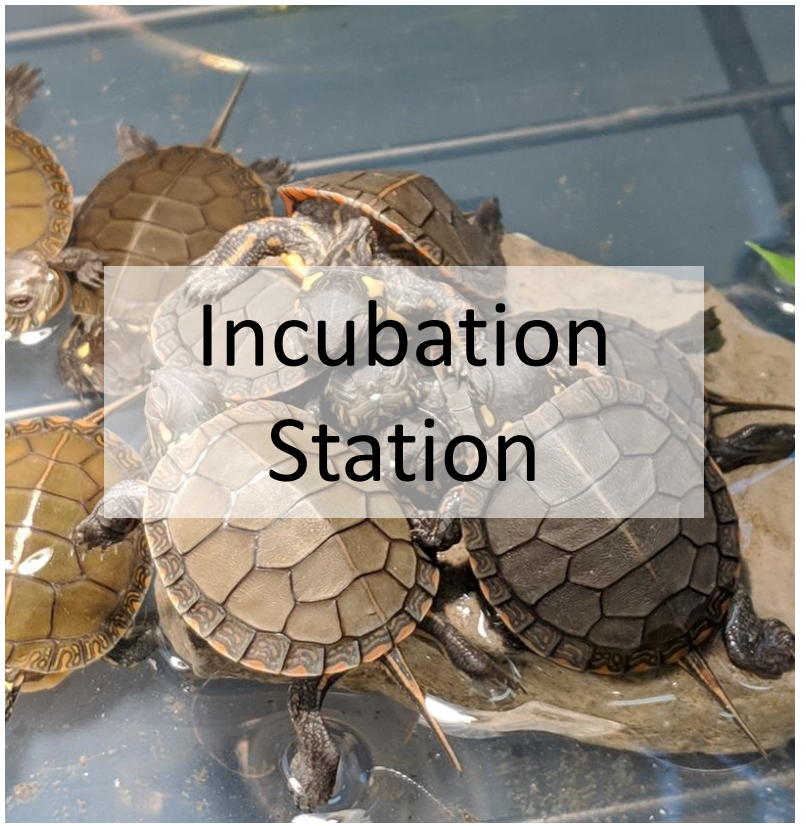
Bioacoustics

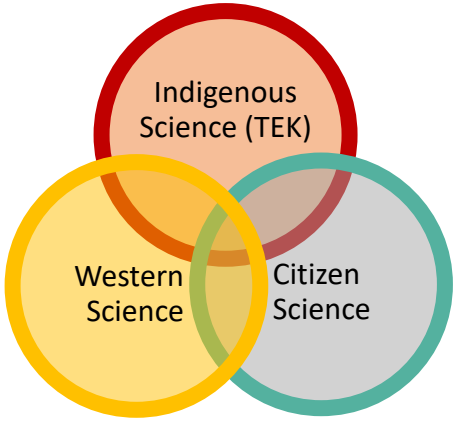
- Recording frog call times, frequency and species presence
- Air temperature
- Wetland water temperature

- Bat monitoring
  - Acoustics
  - MOTUS tower
  - Tracking


Photo: Tianna Burke

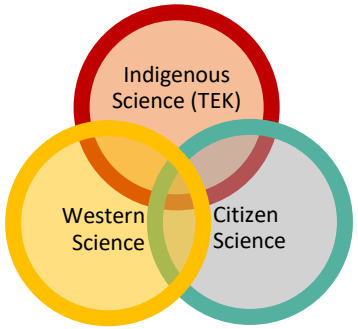

Photo: Tianna Burke





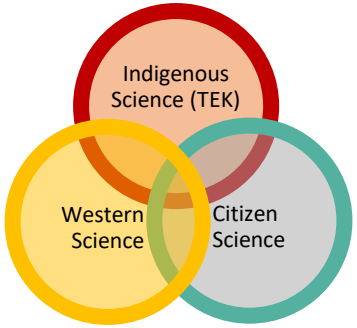
Reptile SAR Project

Road Ecology



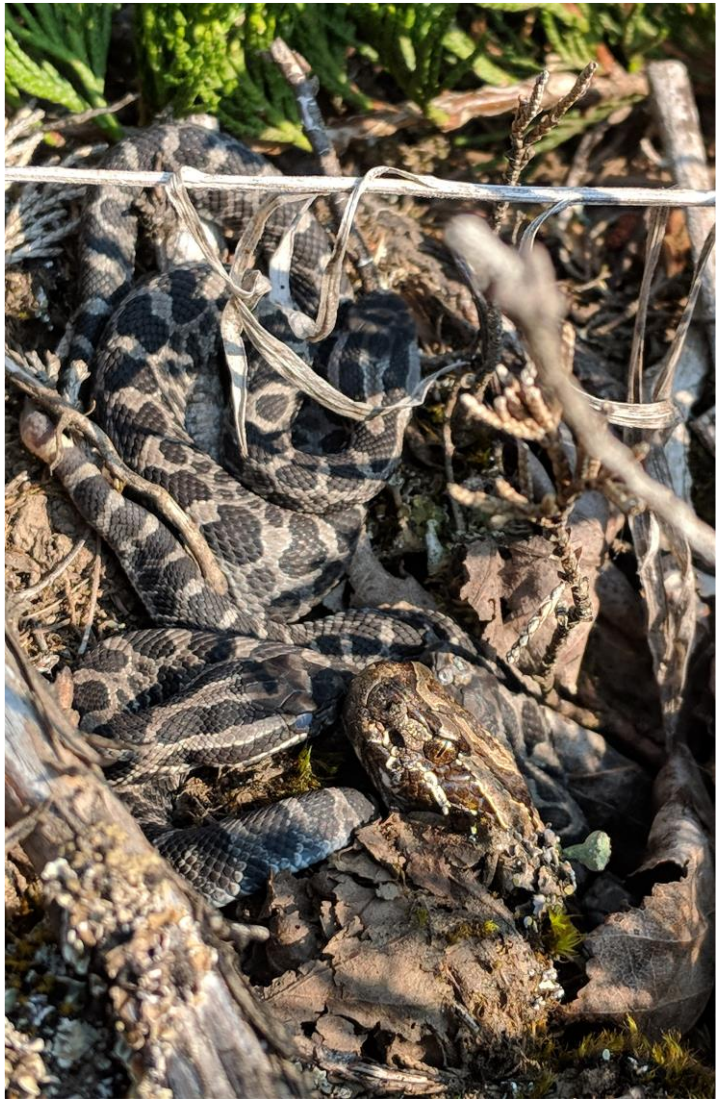
- Interaction of reptiles with roads
- Habitat corridors (mortality hotspots)
- Movement patterns influenced by:
  - Climate change
  - Development
  - Land-use changes
- Community observations extremely valuable

Population Monitoring



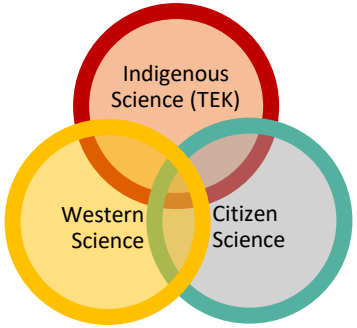
Snakes

- Massasaugas give live birth
- Need the perfect location to thermoregulate
  - Will stay in one spot all summer
  - High fidelity to these sites
  - Return every 2 years (short summers)
- Gestation surveys allow us to understand changes in the use of gestation sites, which we pair with climate data (temperature, weather etc.)
- Monitor individual's growth, health, and movement patterns…



Population Monitoring

Snakes



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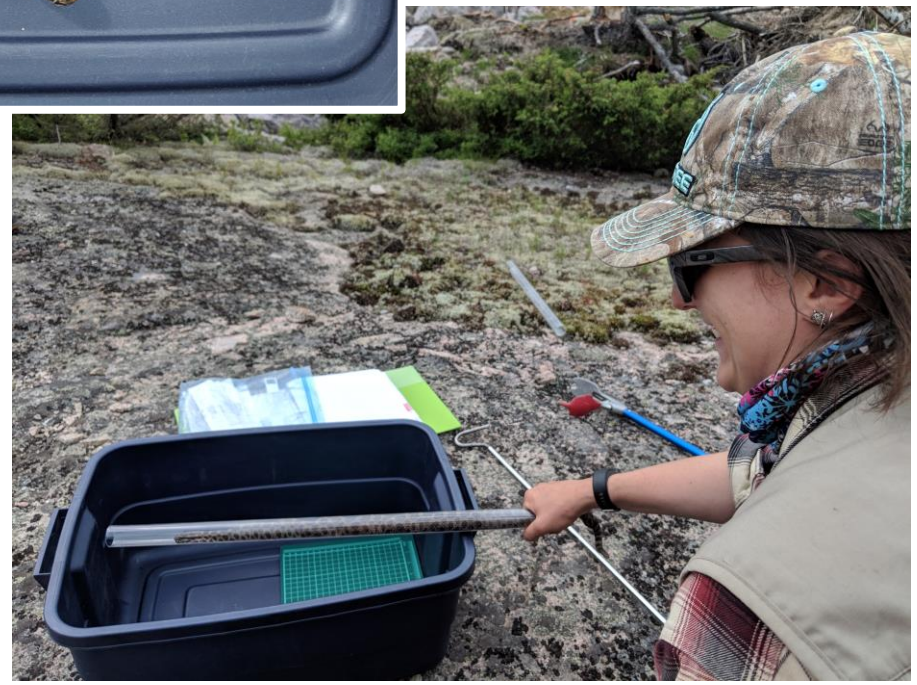
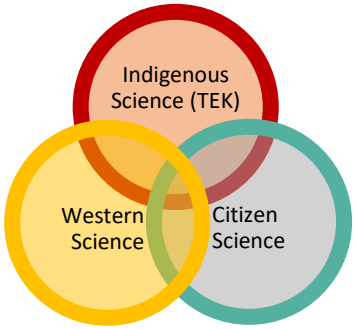
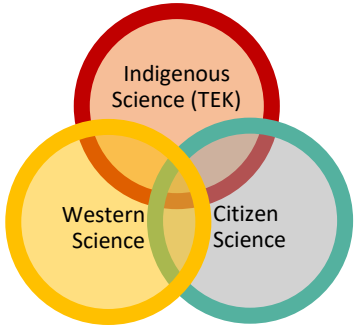


Snakes in Culture



- Healers, helpers & protectors
- Clan animal
- Associated with water and women
- Protectors of medicine
- Venoms contribute to scientific medicines (copperheads-breast cancer)
    - Snakes ARE medicines
- Snakes were one of the most common representations on petroglyphs and petroforms
- The Anishnawbek saw their benefits to the ecosystem and humans, as snakes eat pests that carry disease or decimate crops

Population Monitoring



Turtles

- Monitoring turtle behaviour in identified habitats (telemetry)
- Paired behavioural & climate data to observe relationship between climate change and:
  - Emergence times
  - Habitat changes
  - Behavioral changes
- TEK
  - What do these animals mean to our communities?
  - How do these seasonal changes impact how they observe these animal behaviours?

Why are Turtles Important to Wetlands & Ecosystems?

- Maintain the health of wetlands, keeping water clean
- Manage the food web within wetlands
- Propagate seeds & fungus between wetlands
- Cultural significance
- Generally awesome

- We ALL rely on wetlands and the plants & animals that inhabit them!!!

Turtle Incubation Station on Magnetawan First Nation!

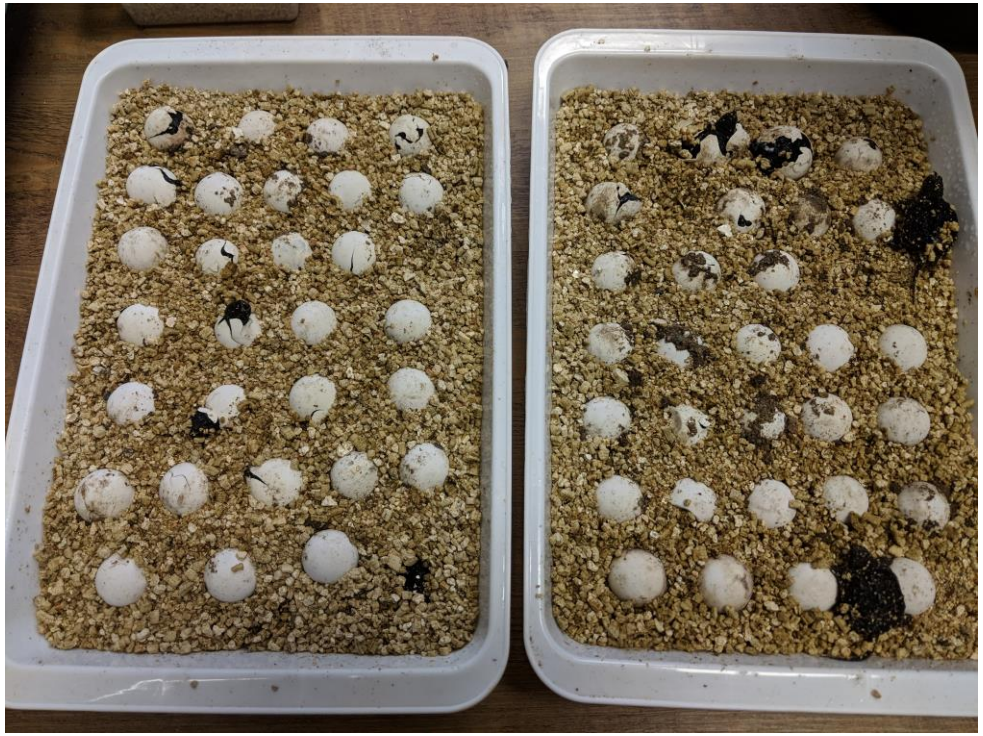
Nesting Surveys

Turtle Incubation Station on Magnetawan First Nation!

Egg Excavation

Turtle Incubation Station on Magnetawan First Nation!

Egg Incubation



Turtle Incubation Station on Magnetawan First Nation!

Turtle Release!

	# released
total	762
on mag	494
off mag	268

ANISHINABEK NEWS .ca
The voice of the Anishinabek Nation

Magnetawan First Nation holds successful Turtle Release initiative

By Curtis Avery

Local law enforcement, Magnetawan First Nation Elder and staff from the Lands and Resource department during a turtle release in September 2019. – Photo supplied

MAGNETAWAN FIRST NATION— On September 12, 2019, the Anishinabek Nation was invited to participate in a Turtle Release initiative held by Magnetawan First Nation (MFN). The event was one of many that took place throughout September as part of the First Nation's Species at Risk (SAR) Program.

It is to no surprise that now, all eight of Ontario's turtle species are at risk of disappearing from the province. Characterised by their slow growing and late maturing life history strategies, their populations can be greatly impacted by mortalities. One of the greatest threats currently facing turtles are roadways. A great number of turtles are killed on the roadway every year, this is exacerbated by the fact that roadside shoulders often encourage the migration of female turtles to nest in these granular substrates. In some cases, like the Blanding Turtle, these nests are virtually impossible to detect, and are thus susceptible to mortality during the road construction and maintenance season. These newly hatched turtles face the massive threat of traffic, in addition to natural predators. This can be detrimental to turtle populations considering that the turtle nesting season often

Significance

- Allows us to re-define how we view contemporary scientific methodology, and elaborates on existing techniques that measure impacts of climate change that are integral to strengthening future management practices.

Questions!

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