

# Learning from Water and the Life it Carries

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**ChùNet: Enabling a Knowledge Sharing Network**

# Why Should we Care about Climate Change?



**Human activities lead to climate change**

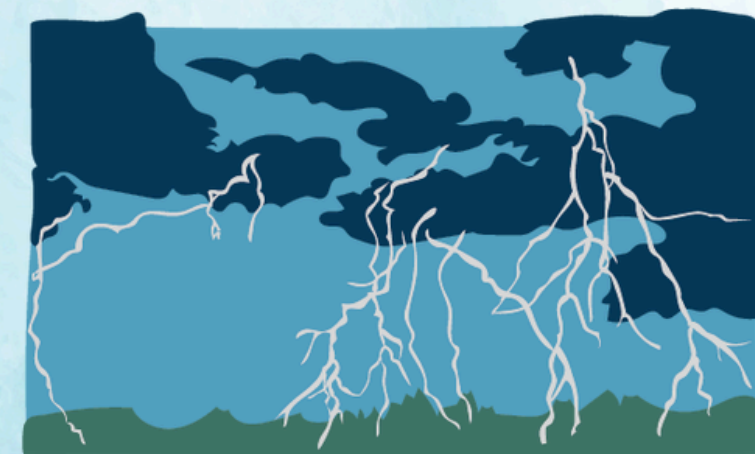
**climate change affects our environment**



**melting permafrost**



**drought**



**extreme weather**

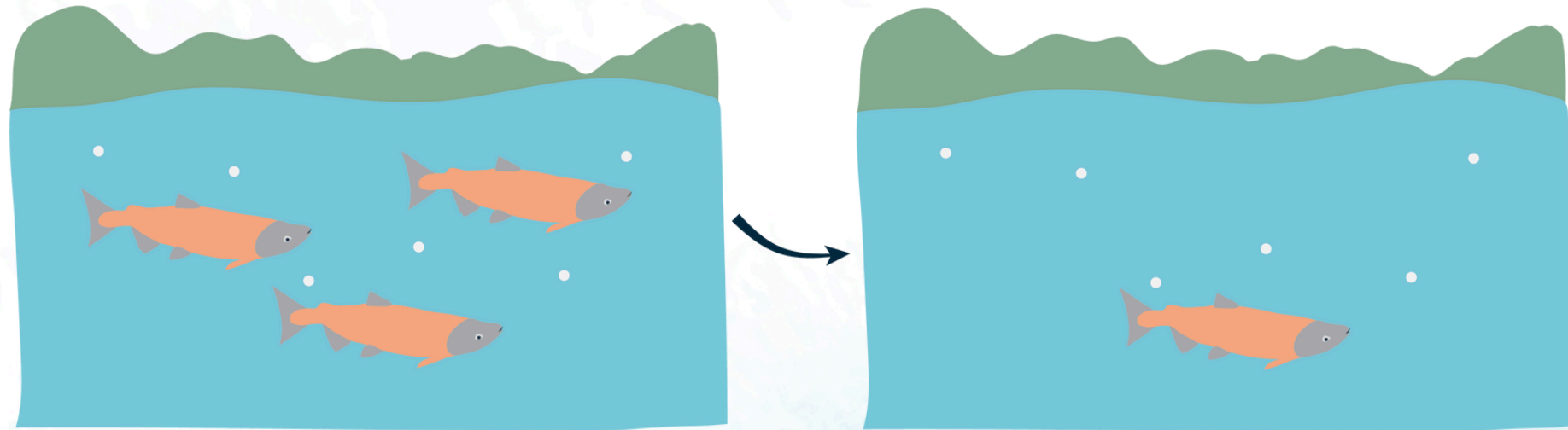


**forest fires**

# Why Should we Care about Climate Change?

...and impacts the interconnected life that our environment supports

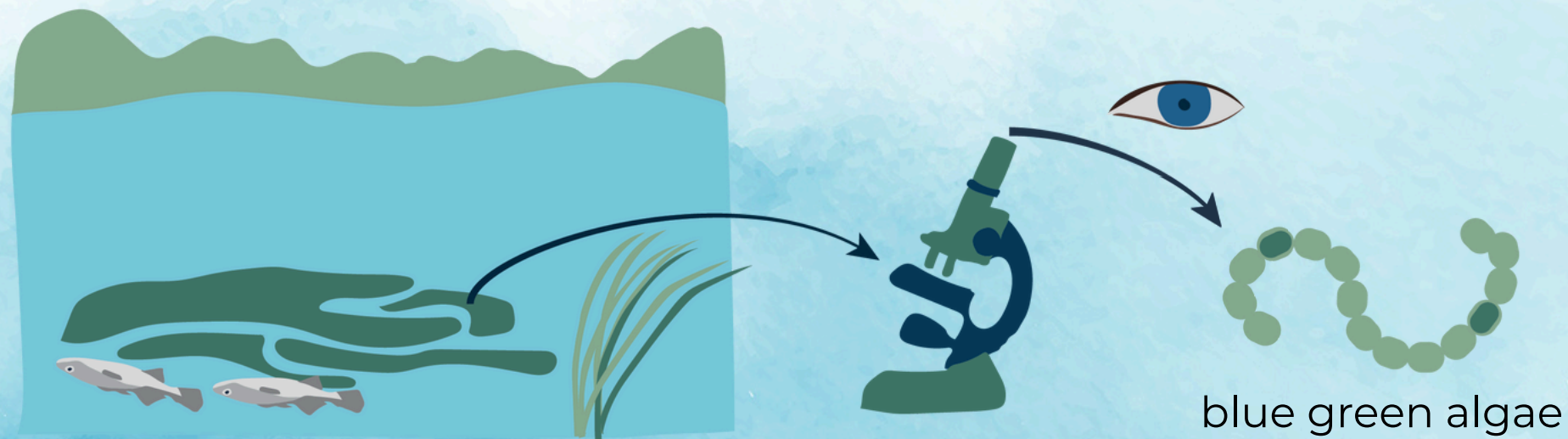
**Changes in distributions of species important for subsistence harvest**



**Increased spread of bird flu (highly pathogenic avian influenza, H5N1)**



**Toxic algal blooms**



**Increases in non-native and invasive species**



# What Can We Do?

Water connects all living things and has many lessons to teach.

When humans, other life and microbes interact with or live in water, they shed their genetic material - the building blocks of life. One way we can learn from water is by examining this genetic material (called environmental DNA or **eDNA**).

**eDNA monitoring can be used to support informed decision making to address community challenges related to climate change.**

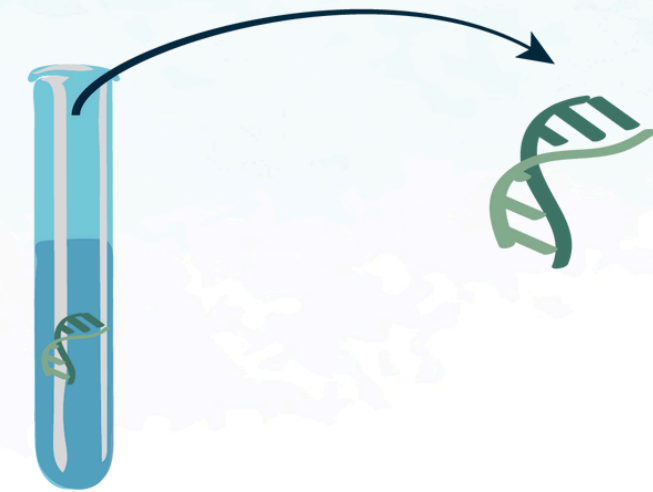


# How Does eDNA Monitoring Work?

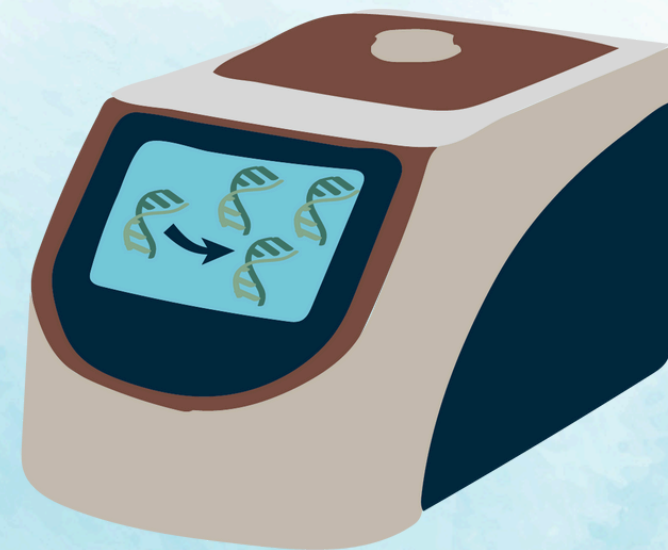
**First the community selects what it would like to monitor (types of animals, microbes, etc.) based on local priorities, then...**



Collect a sample from water that carries genetic material (DNA or RNA) left behind by animals or microbes



Separate the genetic material from the water so that it can be analyzed

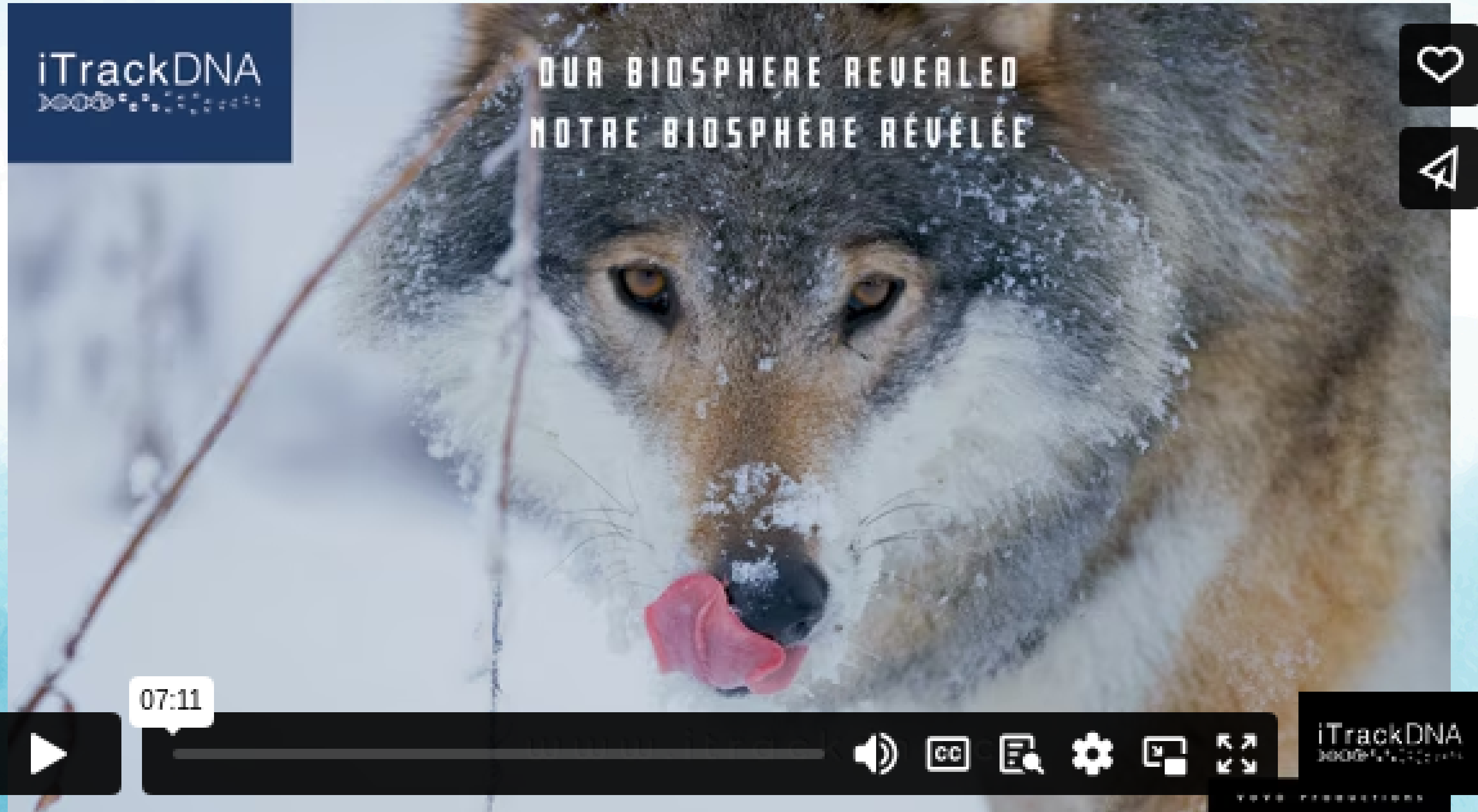


Use a machine in a lab to make many copies of the genetic material. This makes it easier to detect and identify the species that it came from.



Analyze the genetic material on a computer to learn which and how many animals/microbes were present in the water

# How Does eDNA Monitoring Work?



# How Can eDNA Monitoring Help Communities Address Challenges (Example)



Community members discuss ways to remove algae from the water with scientists and each other, then make an informed decision (e.g. implementing UV light treatment to kill the algae)



The community shares information on how to protect the health of its residents (e.g. avoid swimming in the affected body of water and eating the organs of fish caught from the water)

**If a toxic algal bloom is detected:**



The community makes a prevention plan to limit algal growth in the future (e.g. plant trees to shade the body of water and stop erosion)

# How Can eDNA Monitoring Help Communities Address Challenges (Example)

**If avian influenza (H5N1, HPAI) is detected:**



Local public health is notified and community members who might have been exposed to the virus are monitored for symptoms so they can receive rapid, customized treatment if needed.

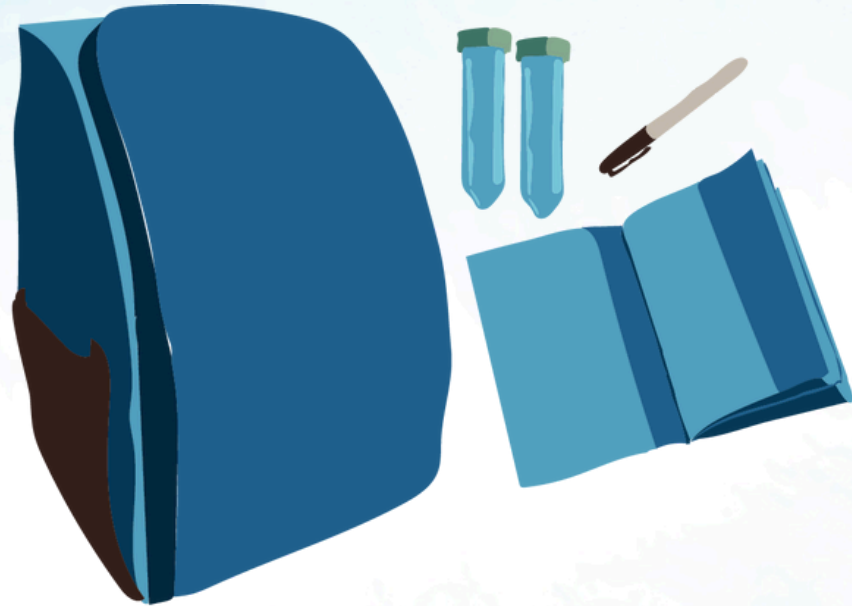


The community shares information on how to protect the health of its residents (e.g. avoid entering wetlands where samples were collected pending further investigation, avoid hunting and consuming migratory birds)



The community watches local animals that are susceptible to the virus for signs of illness that could be spread to humans or other animals

# What will ChùNet Provide?



**Training package containing materials to collect water samples containing eDNA and instructions for use**



**Hands-on training to equip community members with the skills to independently collect their own samples**



**Sample analysis and interpretation to detect species that are of interest to the community**



**Return of results to the community in the format that the community prefers to inform decision making**

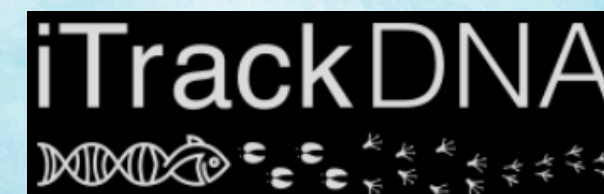
# Questions?

# Acknowledgements

## People

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## Our Funders and Collaborators



# Thank You

**Màhsi' choo**

*Màhsi' cho*

Sógá sénlá'

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Gùnètchīsh

**Gunatçhîsh**

*Tsin'ij choh*

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čěεhaθεč

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Kwukstam'x kawx

**Walus**

Lim Limt

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