
ENVIRONMENTAL DNA

May 3, 2024

Introduction to eDNA

Cod stock reassessment prompts calls from producers to end moratorium



See the latest on the Mud Creek restoration project

CBC News London
3 months ago



Invasive species of turtles pose 'great threat' to native species of turtles, says wildlife coordinator

CBC News Windsor
s ago



Deadly West African heat wave driven by climate change, scientists say

The National
10 days ago



VIDEO

Why it's so hard to end plastic pollution

He runs a business that keeps electronic waste out of the dump – at 15 years old



Your garden's carbon footprint isn't as small as you may think

SECOND OPINION

Why dangerous bird flu is spreading faster and farther than first thought in U.S. cattle



News - Health

Fire season is torching parts of the country. These volunteers in rural Newfoundland are getting



Watch how these owls find their prey under deep snow. It's unlike anything you've ever seen



Canada

Docs

C

Anglers looking for salmon – and some optimism – as concerns grow about the Codroy River



Gord Follett

Canada - Nfld. & Labrador | April 27

Orca's ocean escape from B.C. lagoon will be talked about for generations, says First Nation



News - Canada - British Columbia

What is a healthy ecosystem?



Academia

How can we protect our environment for a healthy population?



Regulators

Are we within regulatory guidelines?
What are our nature impacts?



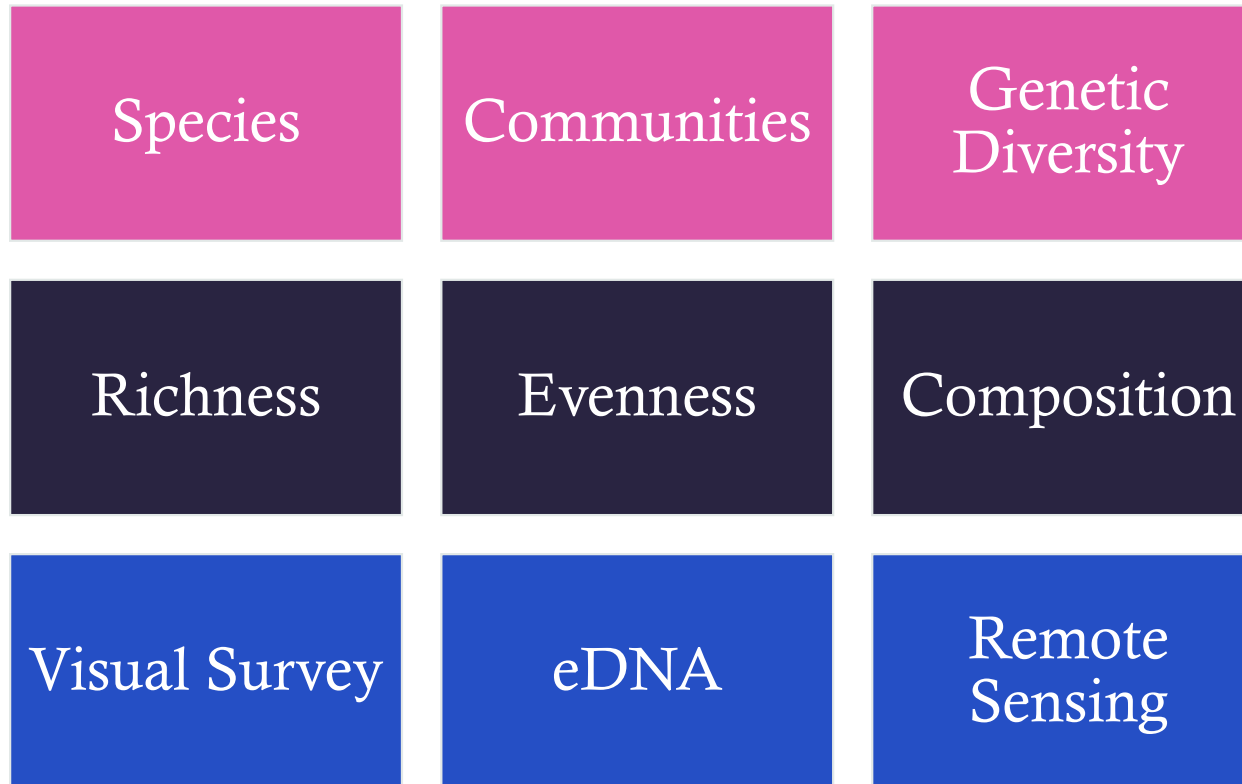
Industry

WHAT IS BIODIVERSITY?

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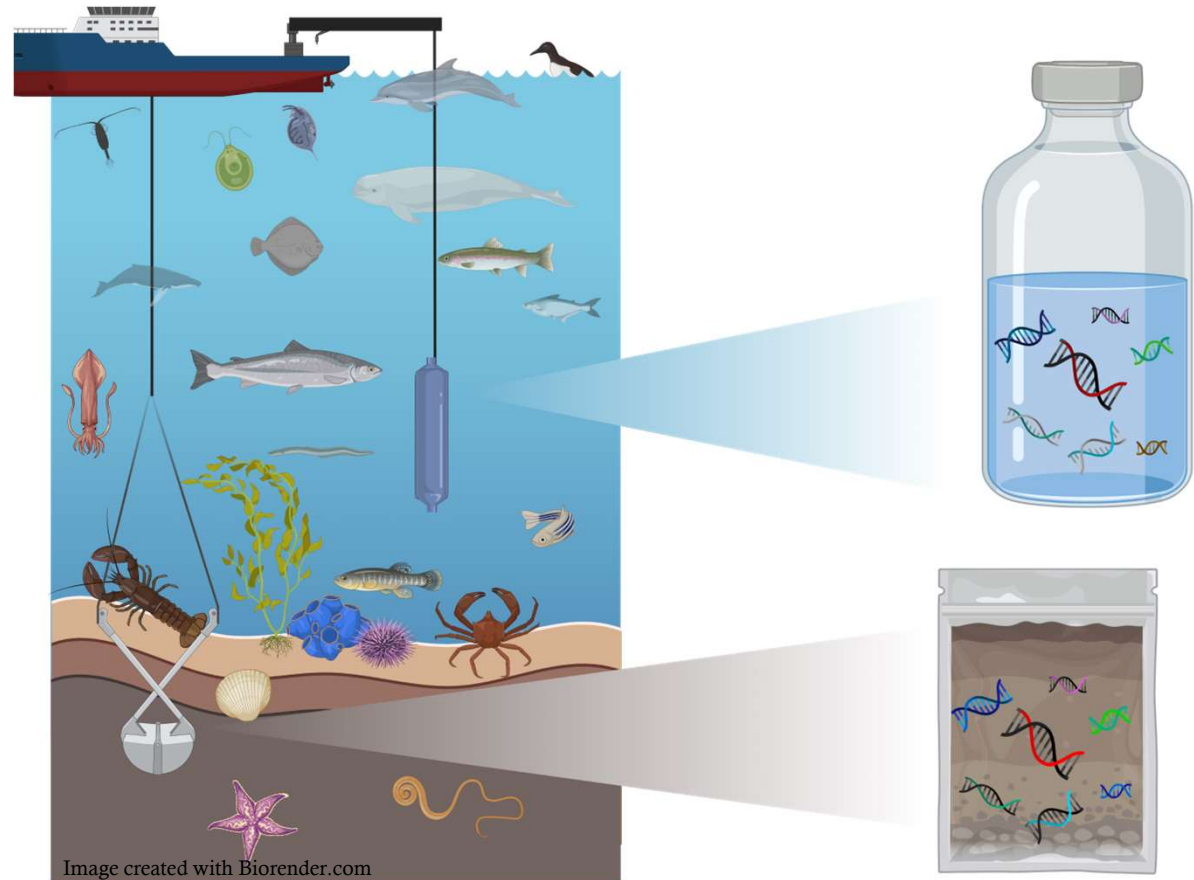


HOW DO WE MEASURE BIODIVERSITY?



ENVIRONMENTAL DNA

1. Every living thing has DNA.
2. Every contact leaves a trace.

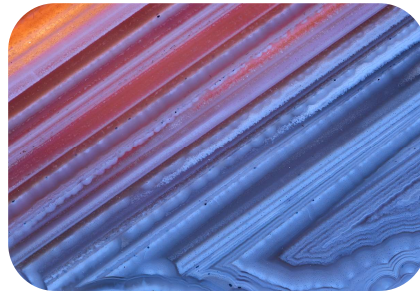




Water



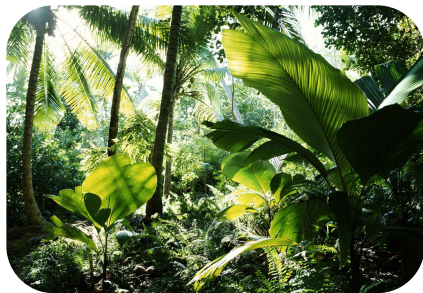
Soil



Sediment



Air



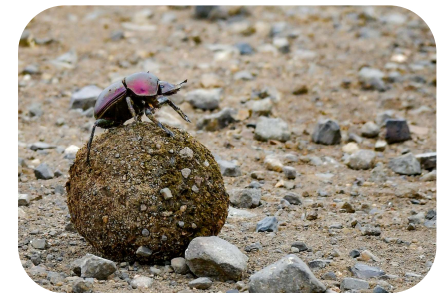
Canopy



Traps



Filters



Gut/Feces

About Us

We are the International Barcode of Life Consortium

iBOL is working to establish an Earth observation system that will discover species, reveal their interactions, and establish biodiversity baselines. We are tracking ecosystems across the planet and exploring symbiomes – the distinct fungal, plant, and animal species associated with host organisms. Our goal is to complete this research and establish baseline data for science and society's benefit.

READ MORE

BIOSCAN: Meet the biodiversity researchers

Co-applicant
BUNTIKA BUTCHER
Chulalongkorn University

Watch on YouTube

THE UNFORGETTABLE MARATHON
CHULALONGKORN UNIVERSITY
MARATHON BANGKOK 2018
TOYOTA

BARCODE OF LIFE DATA SYSTEM ^{v4}

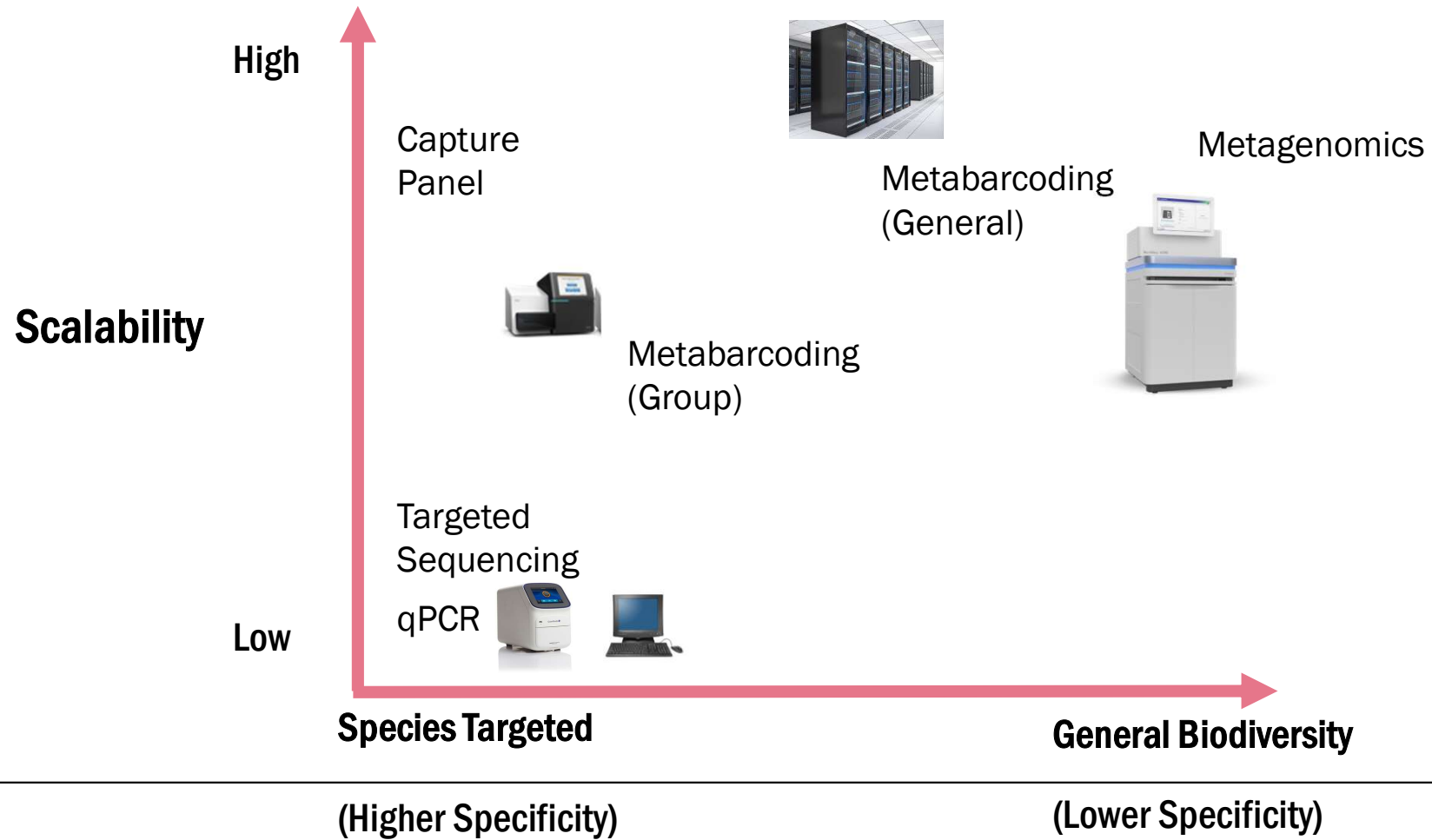
Advancing biodiversity science through DNA-based species identification.

EXPLORE THE DATA

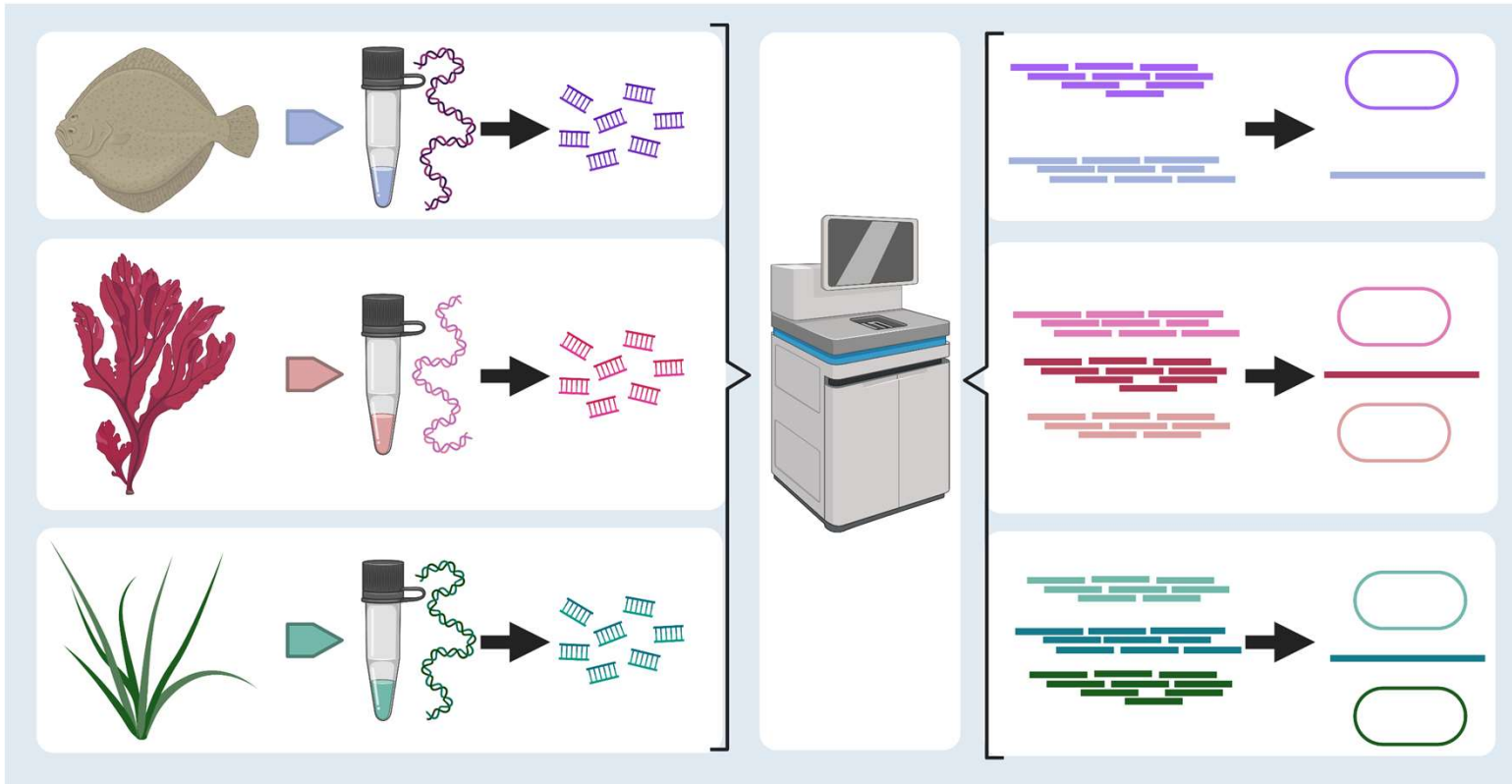
DESIGNED TO SUPPORT THE GENERATION & APPLICATION OF DNA BARCODE DATA

BOLD is a cloud-based data storage and analysis platform developed at the Centre for Biodiversity Genomics in Canada. It consists of four main modules, a data portal, an educational portal, a registry of BINs (putative species), and a data collection and analysis workbench.

ENVIRONMENTAL SAMPLE ANALYSIS



GENOME SKIMMING FOR REFERENCE SPECIMENS eDNA^{TEC}



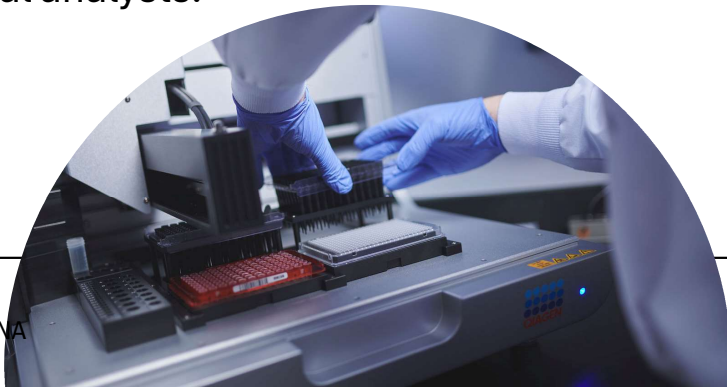
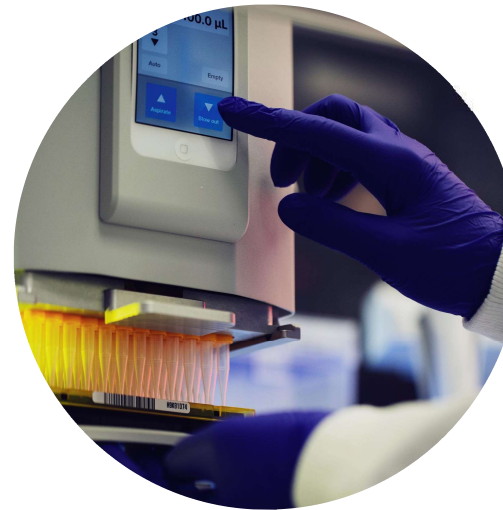
- Full length sequences for high copy number genomic regions (e.g., cpDNA, mtDNA, and rDNA)
- Many DNA markers recovered simultaneously from single library prep and sequencing effort
- Error correction during alignment and assembly

Created with BioRender.com

ENVIRONMENTAL DNA IN PRACTICE

eDNAtec COGA

- Dedicated environmental genomics facility at eDNAtec's headquarters in St. John's, NL, Canada
- In-house technology development and molecular assay design
- High throughput sample processing services
- Scientific team of 19 genomics experts, research technologists, field ecologists, bioinformaticians, and ecological analysts.





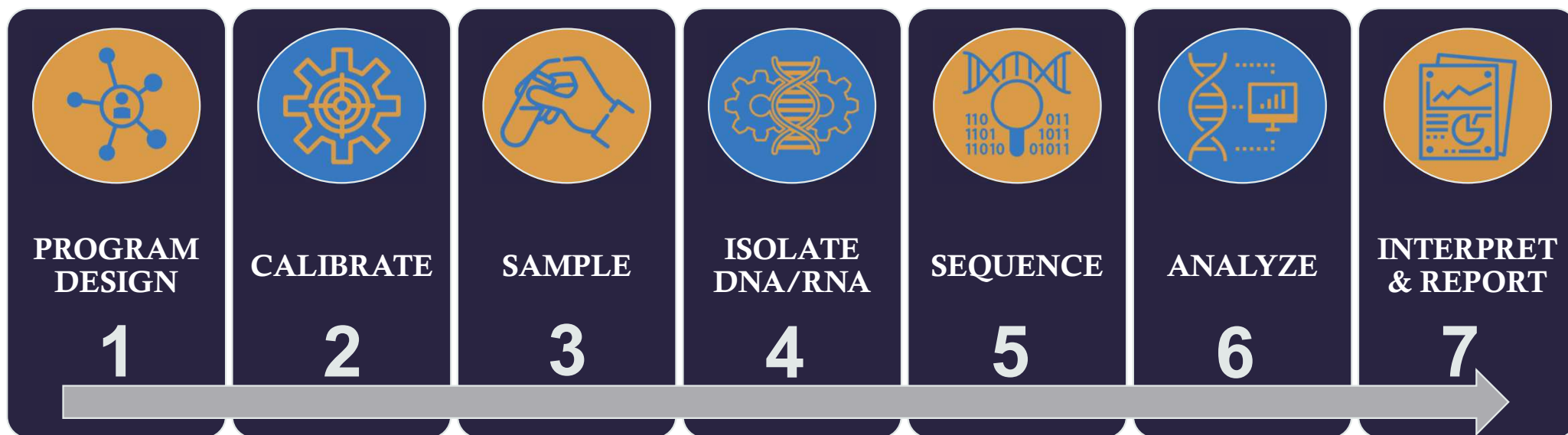
Seven standard steps that yield reproducible and accurate results

ISO 9001 Quality Management System

- **Comprehensive:** Adds value throughout our entire operation
- **Continuous Improvement:** A commitment to providing quality services
- **Flexible:** QMS framework is compatible with a new, developing technology

ISO 9001: 2015 Certification since 2021





Recovery. Resolution. Annotation.

The Yellowhead Copper Project is located in the Thompson Nicola region of British Columbia. It is an advanced-stage project that Taseko is focused on entering into the Environmental Assessment (EA) process following an important phase of engagement and cooperative planning with Indigenous people.

While the Yellowhead project has been the focus of considerable geological, engineering, environmental and socioeconomic study over the years, Taseko continues to augment its environmental database in anticipation of entering the EA process. This work includes cutting-edge environmental DNA (eDNA) analysis conducted in the summer of 2022.

eDNA analysis has been employed successfully over the past decade to assess the presence or absence of aquatic animals (such as fish and amphibians) by extracting DNA

from water samples. However, it has not typically been used to assess the presence or absence of terrestrial animals.

Terrestrial vertebrates can be challenging to survey over large areas by traditional methods. However, all animals shed hair and skin cells to the environment, which are then washed off the landscape and report to local streams. The streams act as aggregators of genetic material, and stream water provides a medium from which it can be relatively easily collected.

Recent scientific developments in the sensitivity of eDNA sampling methods, as well as promising results from a study undertaken by the World Wildlife Fund in the South Chilcotin Mountains, comparing terrestrial wildlife camera trapping with mammalian DNA collected from streams and rivers, led Taseko to test this method at its Yellowhead project to enhance baseline data for the site.

Taseko worked with eDNATec Inc., a firm specializing in DNA analysis, to collect 22 water samples from streams within and proximal to the Yellowhead property. The samples were filtered and analyzed in a laboratory.

In total, 35 species from vertebrate classes – including mammals, birds, fish and amphibians – were identified based on currently available reference sequences. Seventeen mammals were identified at the species-level, with three additional mammals identified at the genus-level. Mammals were detected from all body sizes and all lifestyles.

Taseko has proposed further sampling and eDNA analysis at the Yellowhead project site for the fall of 2023 to compare DNA recovery before and after snowfall, and further develop this novel sampling and assessment technique.



Coyote