



INTRODUCTION TO CABIN

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FRI - Introduction to CABIN
Workshop

Feb. 24th 2021

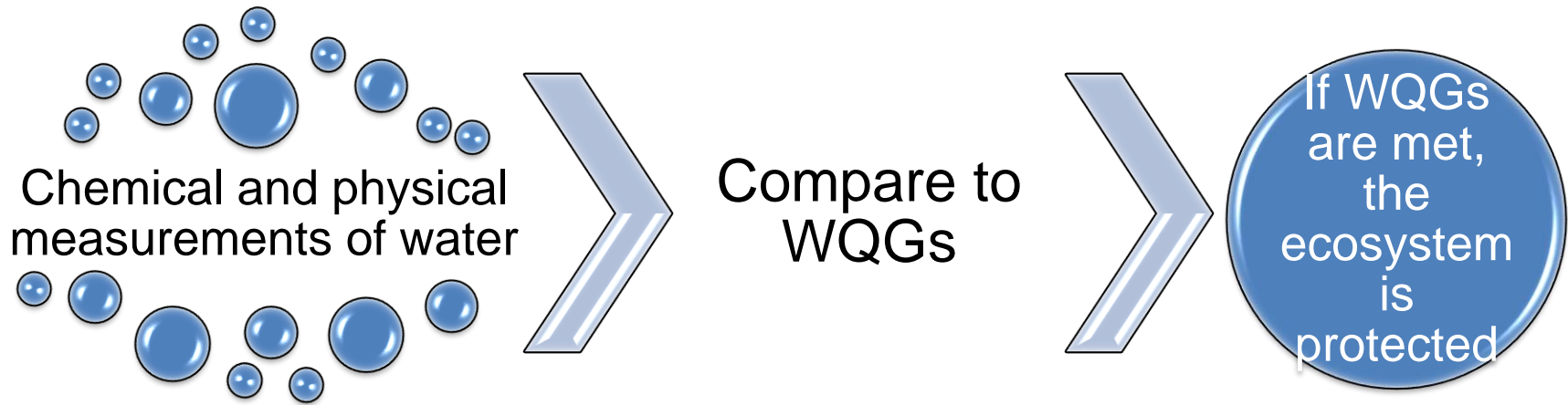


RESPONSIBILITIES FOR ENVIRONMENTAL MONITORING

- **Provinces:** primary responsibility for water management and protection
- **Federal:** conservation and protection of oceans and their resources, fisheries, navigation, transboundary waters, federal lands and territories
- **Canada Water Act:** joint consultation between federal and provincial governments for monitoring of water resources
- **Canada-BC WQ agreement:** established in 1985, operate a WQ monitoring network to report on status and trends in WQ and ecosystem health (i.e. CABIN)



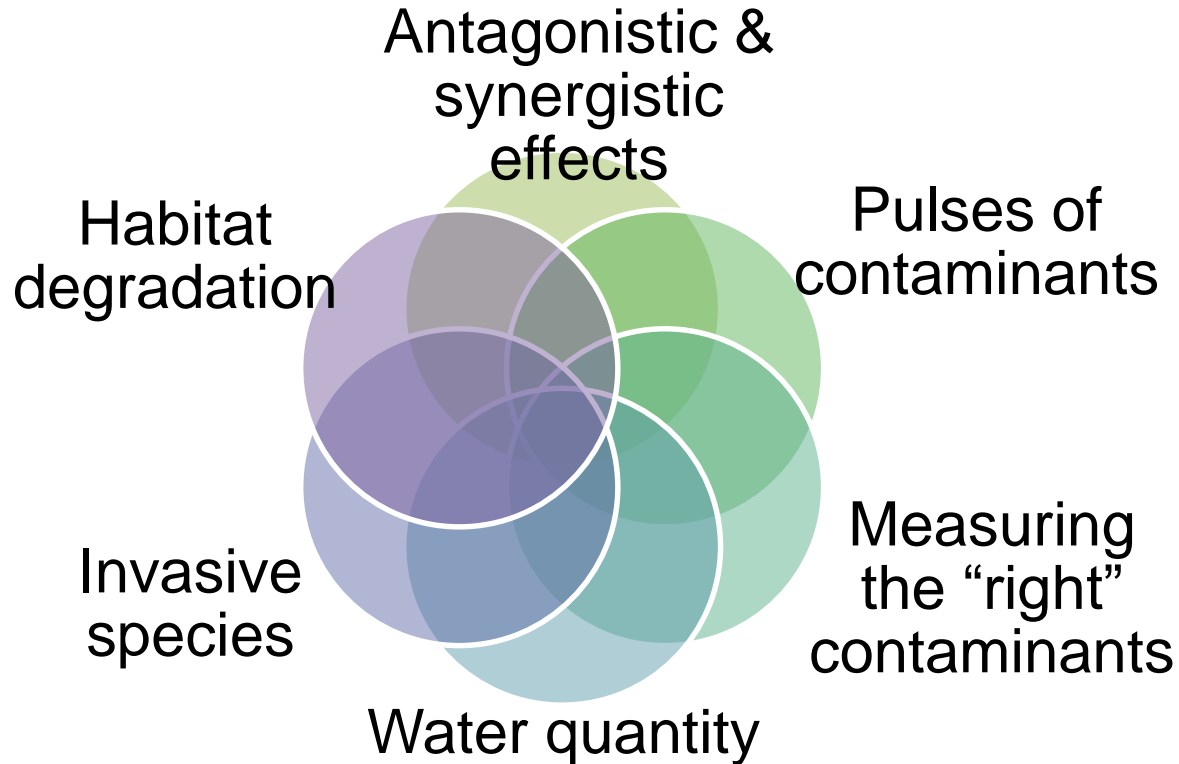
WATER QUALITY MONITORING



Assumption: if all WQGs are met = ecosystem is protected



HOWEVER, AQUATIC ECOSYSTEMS MAY BE AFFECTED BY FACTORS NOT MEASURED BY WQGS....

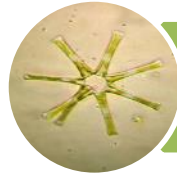


How do we know the ecosystem is protected?



BIOMONITORING

- Provides a direct measure of ecological condition
- Verify findings OR identify undetected problems
- Many types of biological indicators



Algae



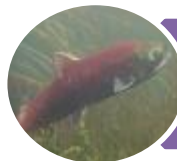
Macrophytes



Zooplankton



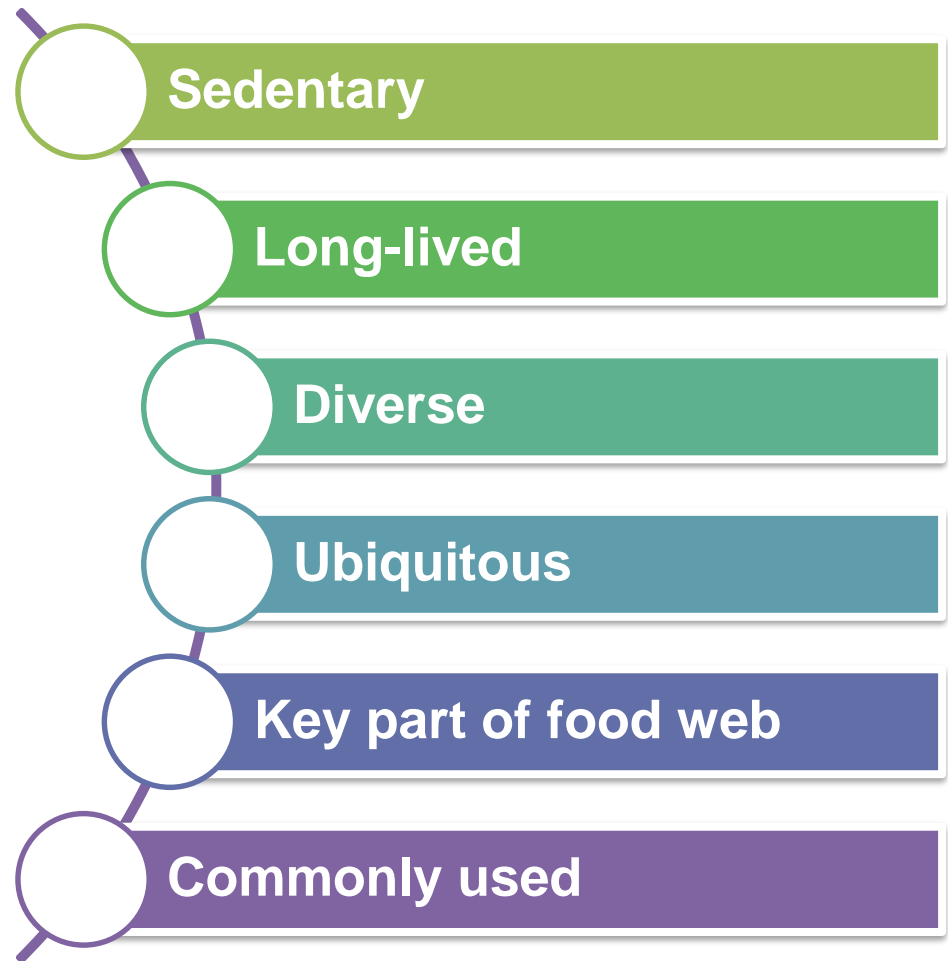
Benthic invertebrates



Fish



BENTHIC INVERTEBRATES



WHAT IS CABIN?

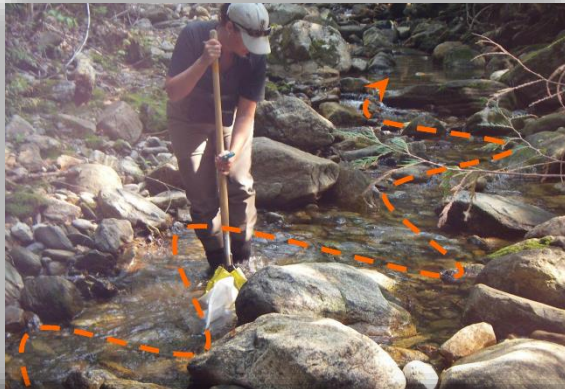
Canadian Aquatic Biomonitoring Network

- Assessment of ecosystem health
- Freshwater invertebrates
- Standardized protocols
- Network of networks
- Online tools
- Training program
- Managed by ECCC
- Constantly growing and evolving
- Subgroups by issue/topic
- External science advisory group



WHY STANDARDIZED PROTOCOLS?

- Standardized protocols = comparable data
- New: Wetlands Protocol, Large River Approach



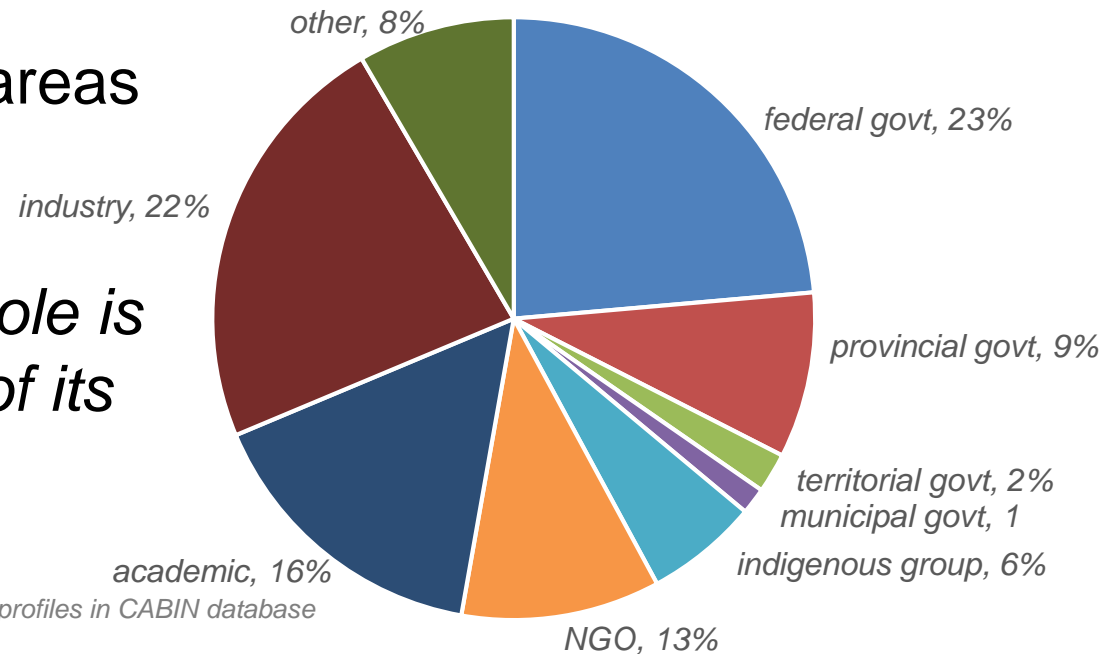
Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

Canada 

WHY NETWORK?

- Enables collaboration & data sharing
- Working together has many benefits
- Create efficiencies in areas of common interests
- Collaboration - *the whole is greater than the sum of its parts*



*User distribution by sector Sept 2019 where N=884 complete profiles in CABIN database



WHY SHARED DATABASE?

- Database vs warehouse/portal
 - Participants do not need resources for a data management system
 - Time and money savings for most people
 - Advantage of built in analytical and reporting tools in CABIN
 - Easier to extract and compile data from varied sources



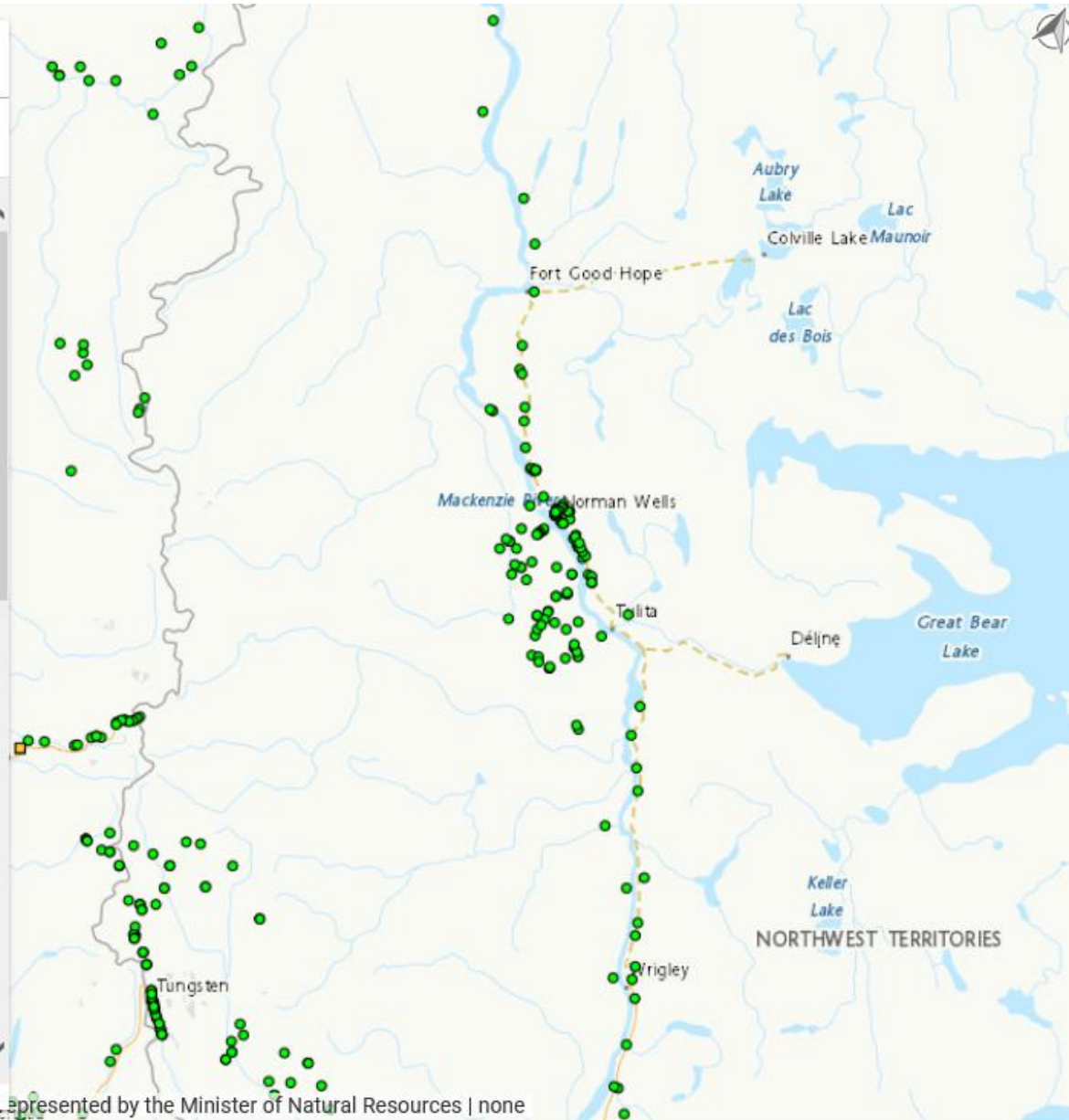
Details



CABIN



Major Drainage Basin/Bassin Majeur de Drainage	10
Waterbody Type/Type de Plan d'eau	River
Authority	Provincial/Territorial
Study Name/Nom de l'étude	CIMP Northwest Territories
Study Description/Description de l'étude	CABIN samples collected in the Mackenzie Delta and the Bosworth Creek watersheds.;
Site Code/Le code du site	SAH-09
ENVIRODAT Code/Le code du ENVIRODAT	
Site Description/Description du site	



WHY TRAINING?

- Access to CABIN database and tools
- Enable all CABIN participants to collect scientifically credible data and contribute to same rigorous assessment
- Online modules + 2 day field
- Hands-on deepens understanding
- Step towards ensuring comparable and consistent data
- Constantly improving delivery



Small Streams

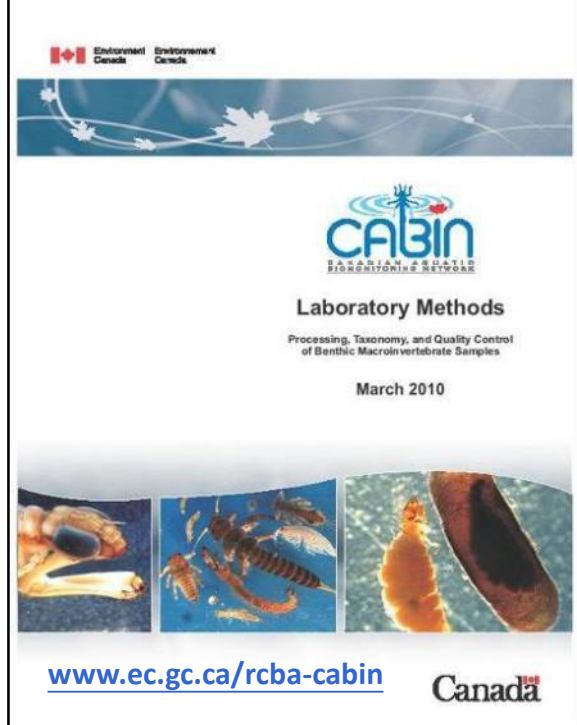
Site length = 6x bankfull width



Habitat Variables – field collected



No streamside processing



SFS certification

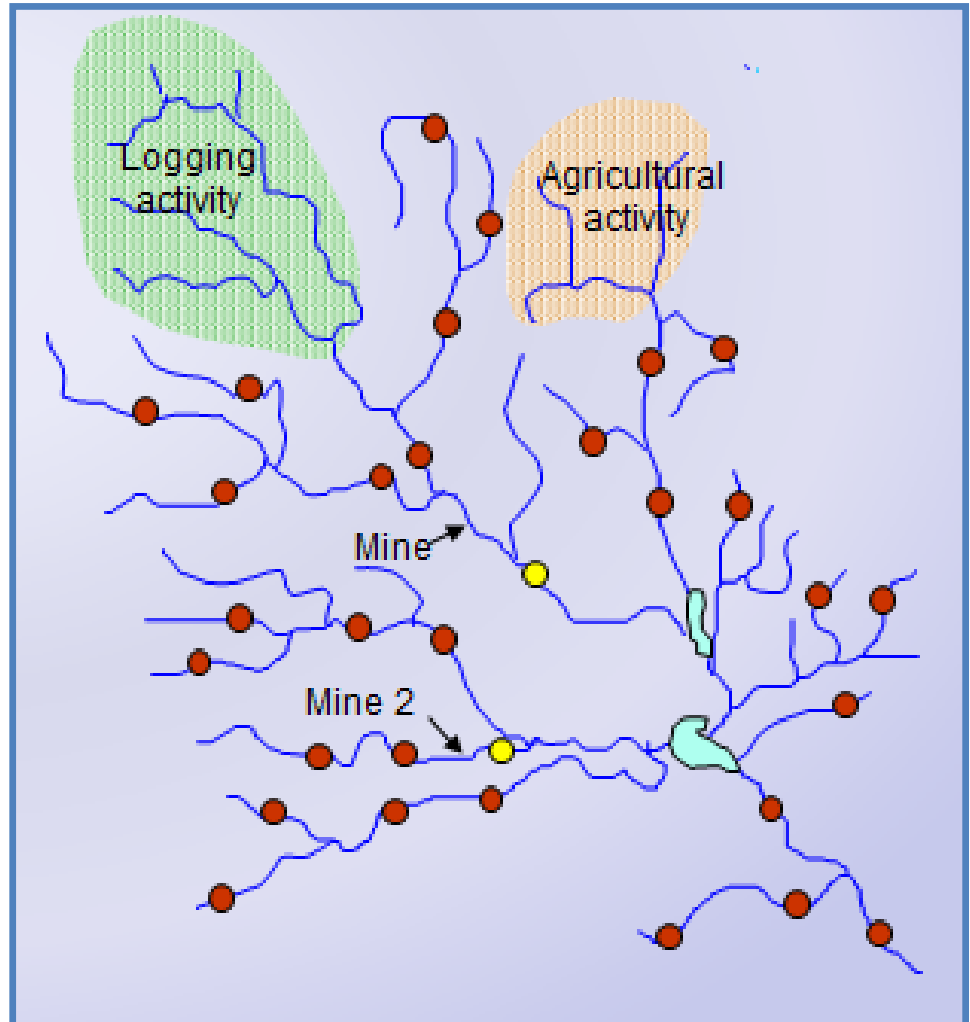


**300 organism subsample
using Marchant Box**



RCA STUDY DESIGN

- Avoid problems with BACI (i.e. pseudoreplication, appropriate before/control sites)
- Numerous reference sites define natural variability to define empirical relationship between biota and habitat
- Initial high cost but useable over time by everyone making it very efficient and cost effective



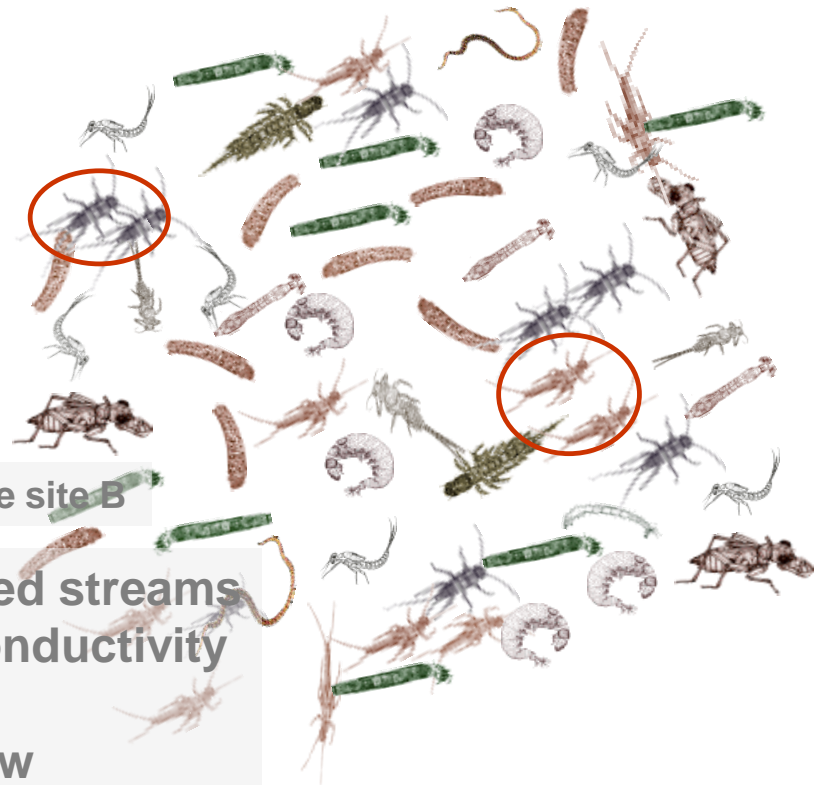
ASSESSMENT HOW?

- *Reference condition predictive models*
- *Observed vs expected taxa*



Reference site A

Headwater streams
Low conductivity
Shallow
Low flow



Reference site B

Mid-sized streams
High conductivity
Deep
Fast flow



ASSESSMENT HOW?

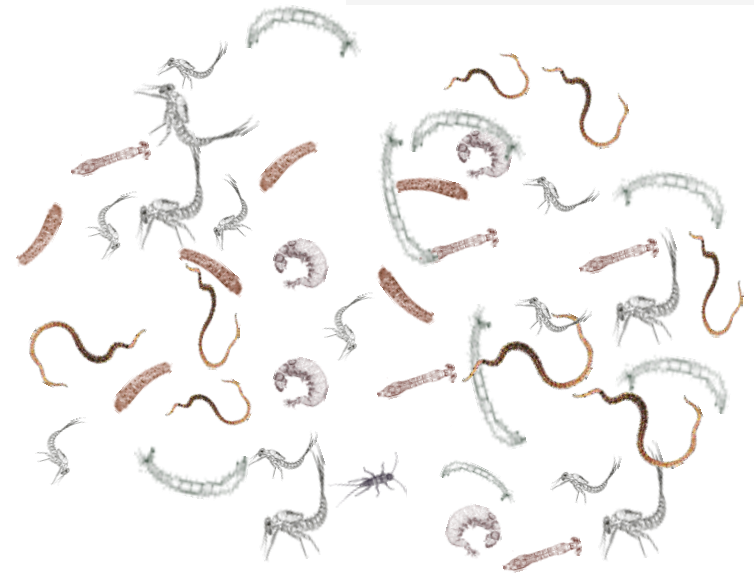
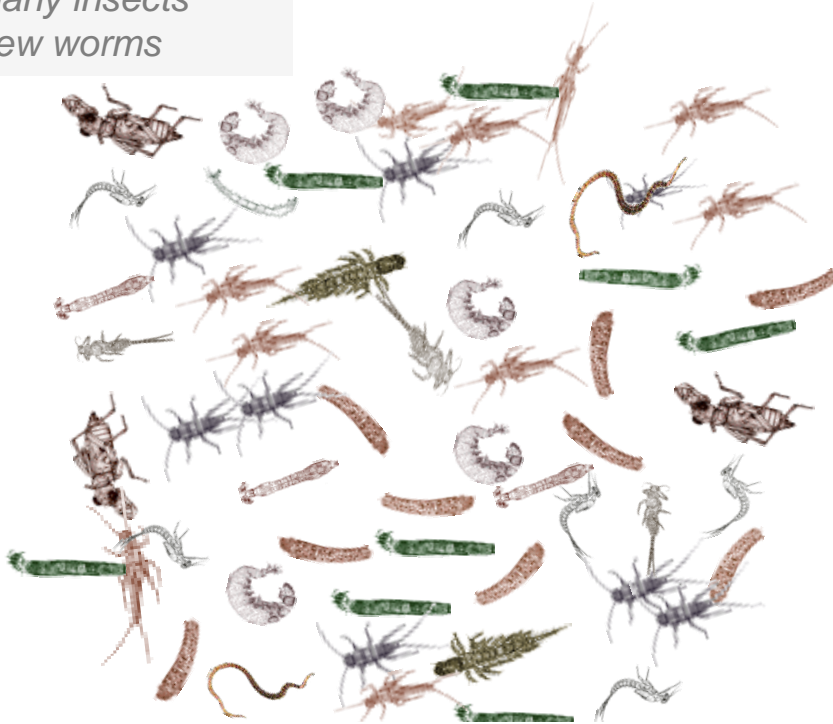
- ***Descriptive Community Metrics***
- ***Similarity measures***

Upstream site:

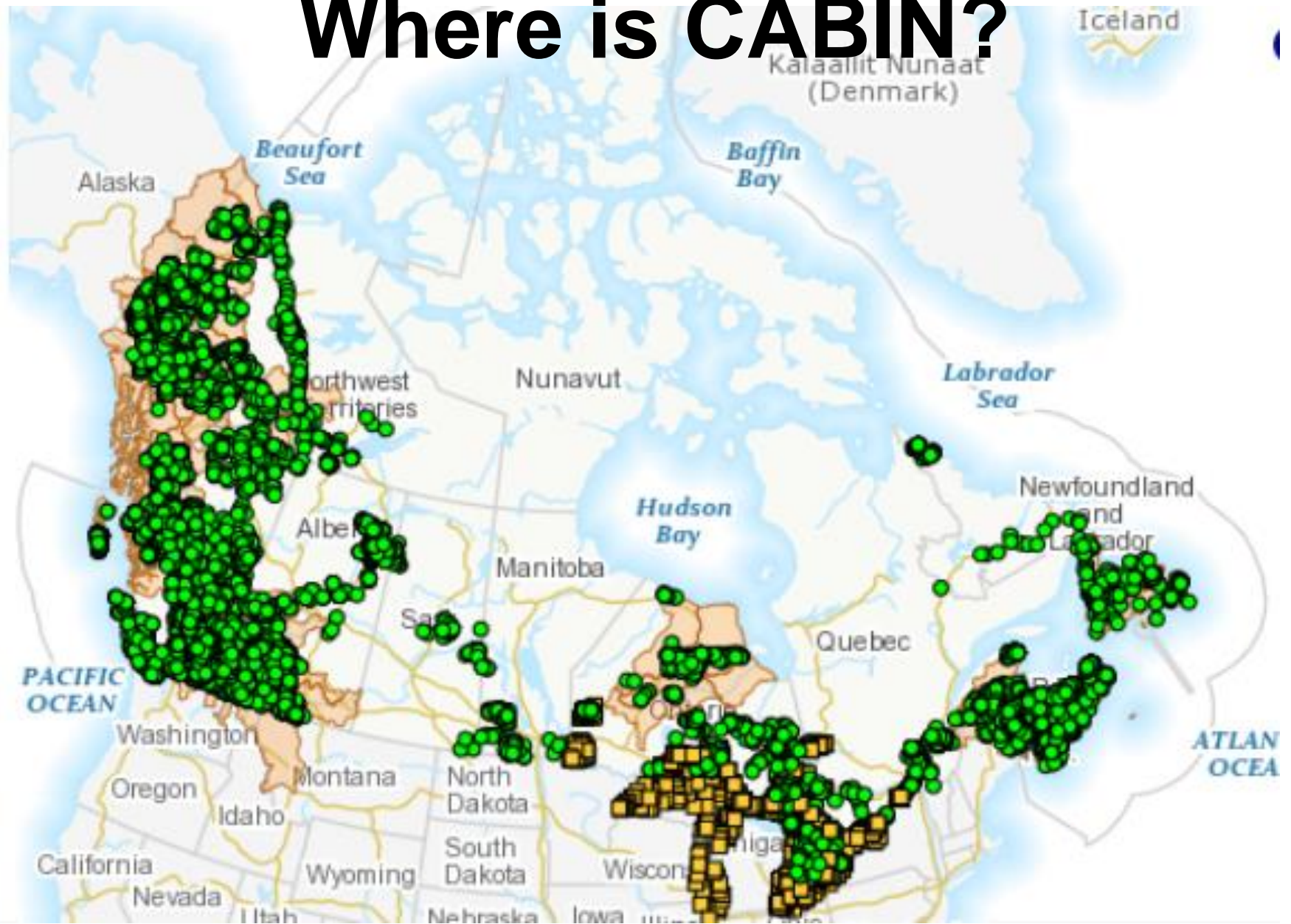
*High abundance
High diversity
Many insects
Few worms*

Downstream site:

*Low abundance
Low diversity
Few insects
Many worms*

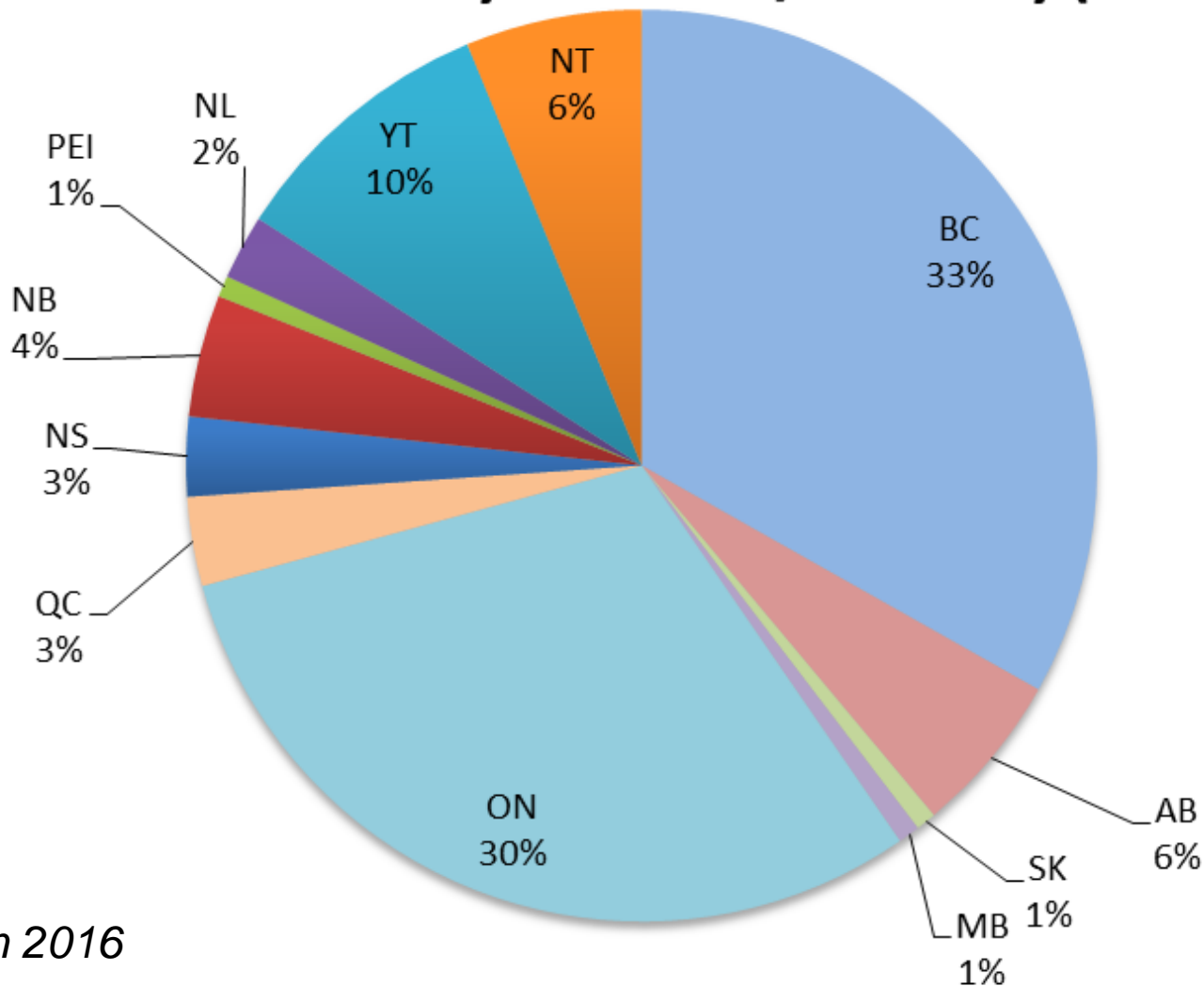


Where is CABIN?



**as of Jan 2016*

Number of Sites by Province/Territory (n=9757)

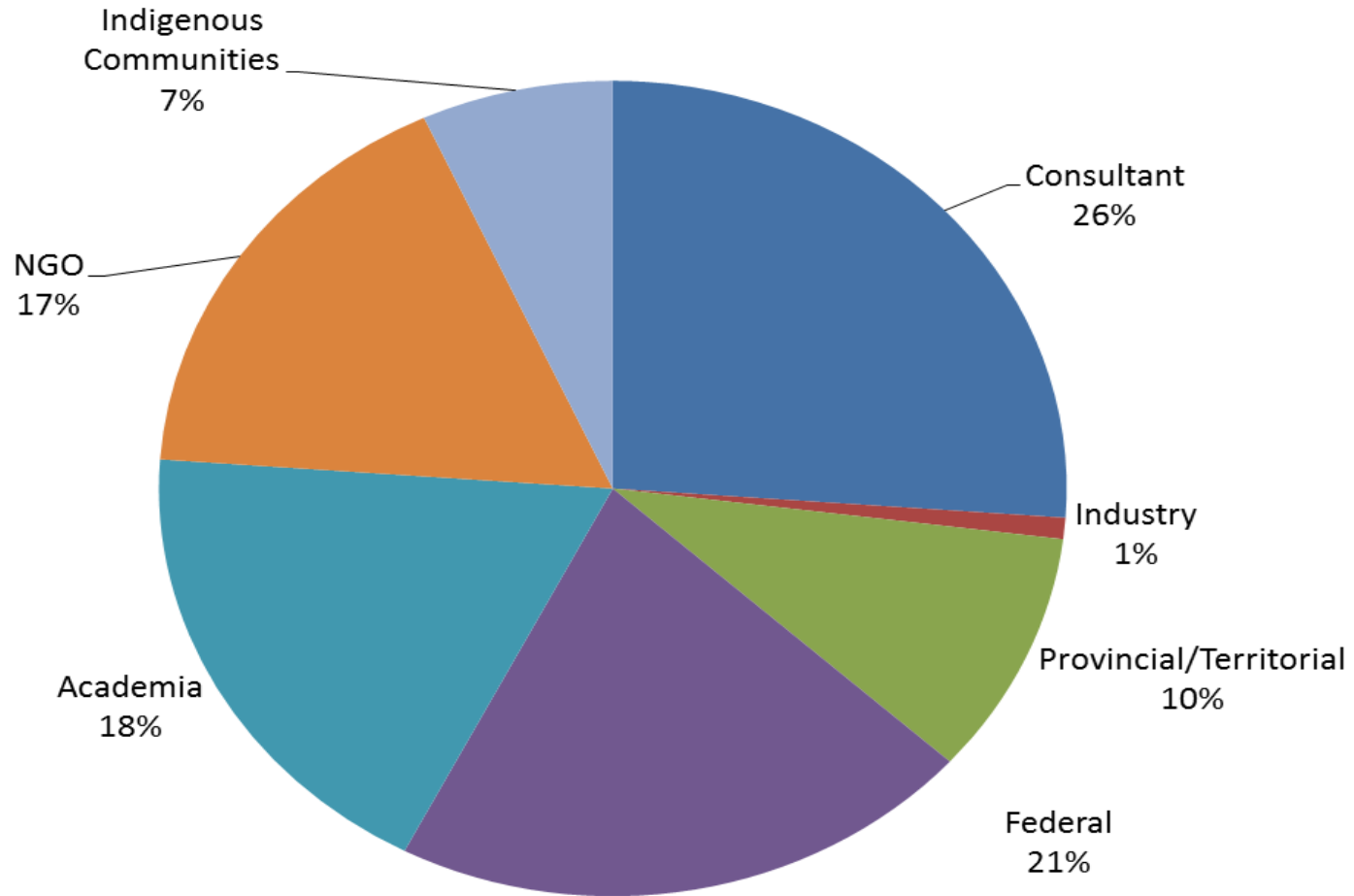


**as of Jan 2016*



Who uses CABIN?

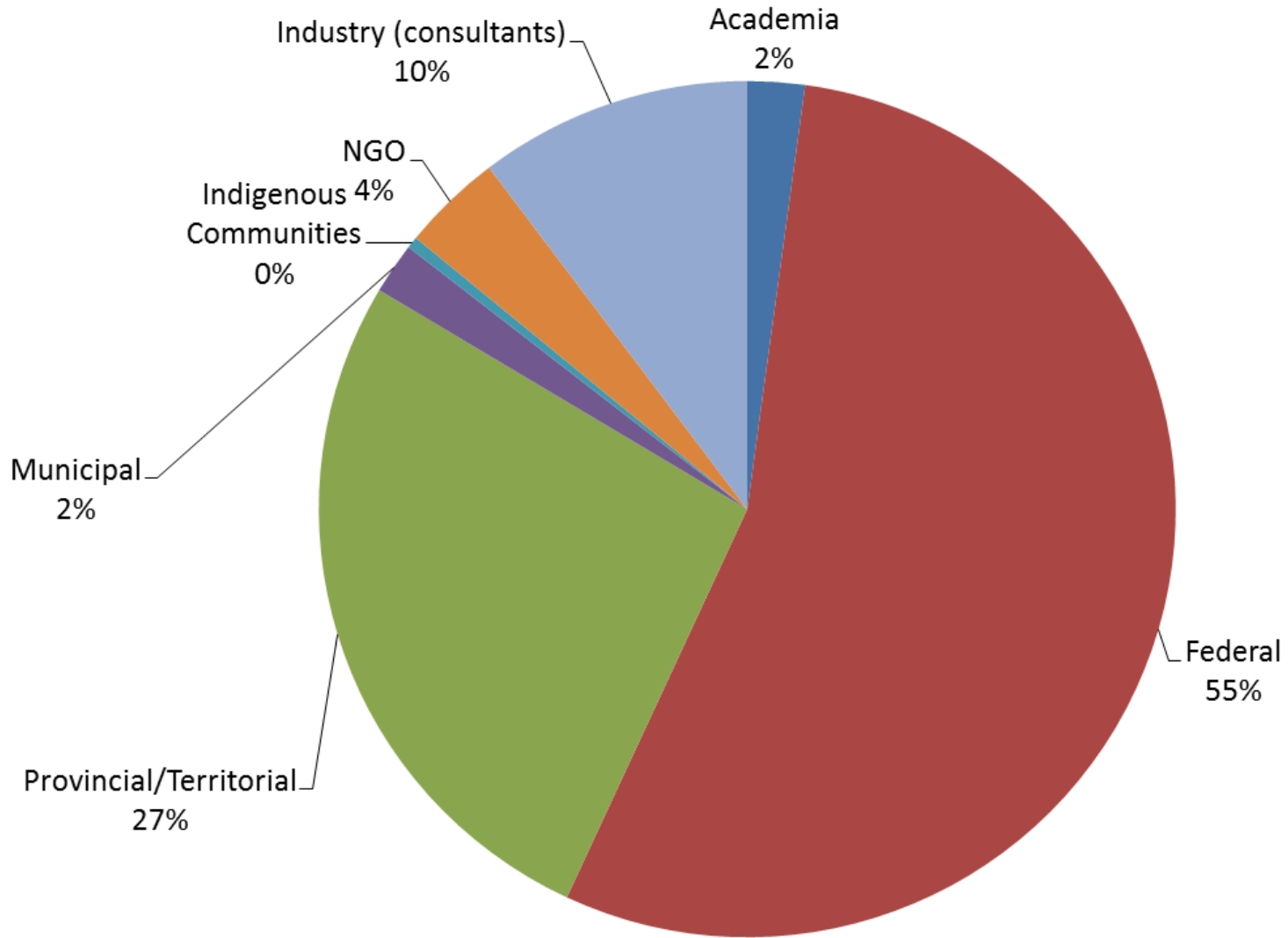
Trained CABIN users (n=1196)



**as of Jan 2016*



Contribution of sites to CABIN by affiliation



**as of Jan 2016*

RESULTS WHERE?

- Metadata: CABIN website activities map
- Data: available data.gc.ca
- Results: depends why the assessment is done
 - Government reports – moving towards web-based
 - Communities/NGO – local news, websites, presentations
 - Industry – usually private
 - Academic – varied
 - Some published
 - Some private



SWAMP

Canada



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

Canada

EXTERNAL INVOLVEMENT?

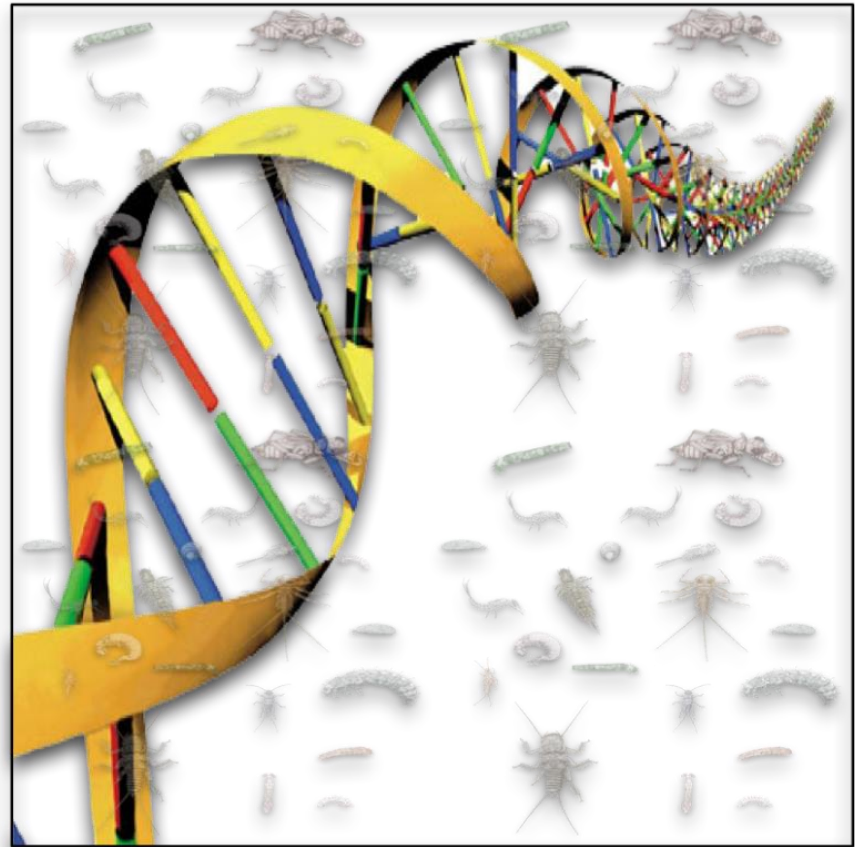
More than data collection:


- Science Team – scientific advancement
- Territorial/Provincial-Federal WQ agreements – integrated ecosystem health assessment and reporting
- Canadian River Institute/ University of New Brunswick - training
- Other Government Departments (e.g. DFO, Parks) – model development



RESEARCH AND DEVELOPMENT

- Wetland protocol
- Large River Protocol
- GIS standardized guidelines
- New modeling and assessment approaches
- DNA barcoding





Can I
call you
back?
I'm watching
a live
stream..

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<https://www.canada.ca/en/environment-climate-change/services/canadian-aquatic-biomonitoring-network.html>