ABMI: Looking Backwards

January 30, 2019

It's Our Nature *to Know*

Alberta Biodiversity Monitoring Institute

History of the ABMI

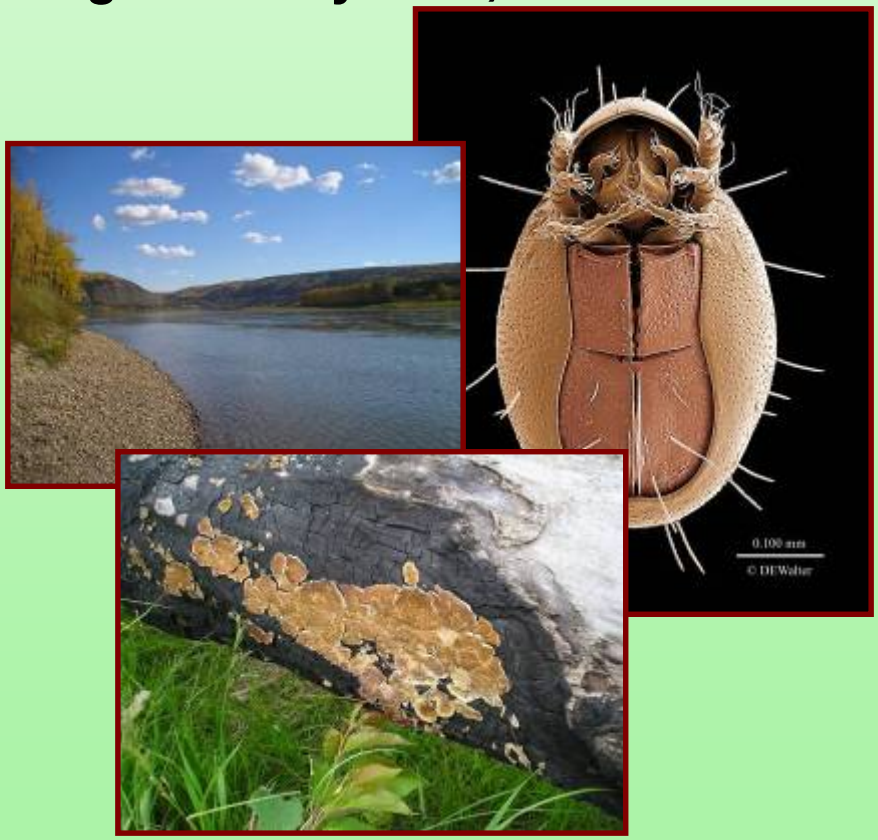
Designed to monitor cumulative effects over time

- 1997: Idea of the ABMI was born
- 1998-2002: Development phase
- 2003-2006: Prototype phase
- 2007: Incorporation as a non-profit scientific organization
- 2010: Creation of the ABMI Application Centre
- 2012: Creation of the Geospatial Centre
- 2017: 10 year program review
- 2018: Major adjustments begin

What Is Biodiversity?

Biodiversity is the variety of life on Earth including the thousands of species that live in a drop of water - to the vast wildlife that depends on Alberta's largest ecosystem, the boreal forest.

No feature of Earth is more complex, dynamic, and varied than biodiversity.



Why Bother?

Because Alberta needs it:

– >45 statutory and policy commitments monitor biodiversity

- Water for Life
- Convention on Biodiversity
- EPEA

It's a business issue:

– natural feedstock and productivity base

– Access to:

- Markets (sell products)
- Capital (investment in industries and communities)
- Access to resources (social license)

You Manage What You Measure

The Challenge of Monitoring Biodiversity

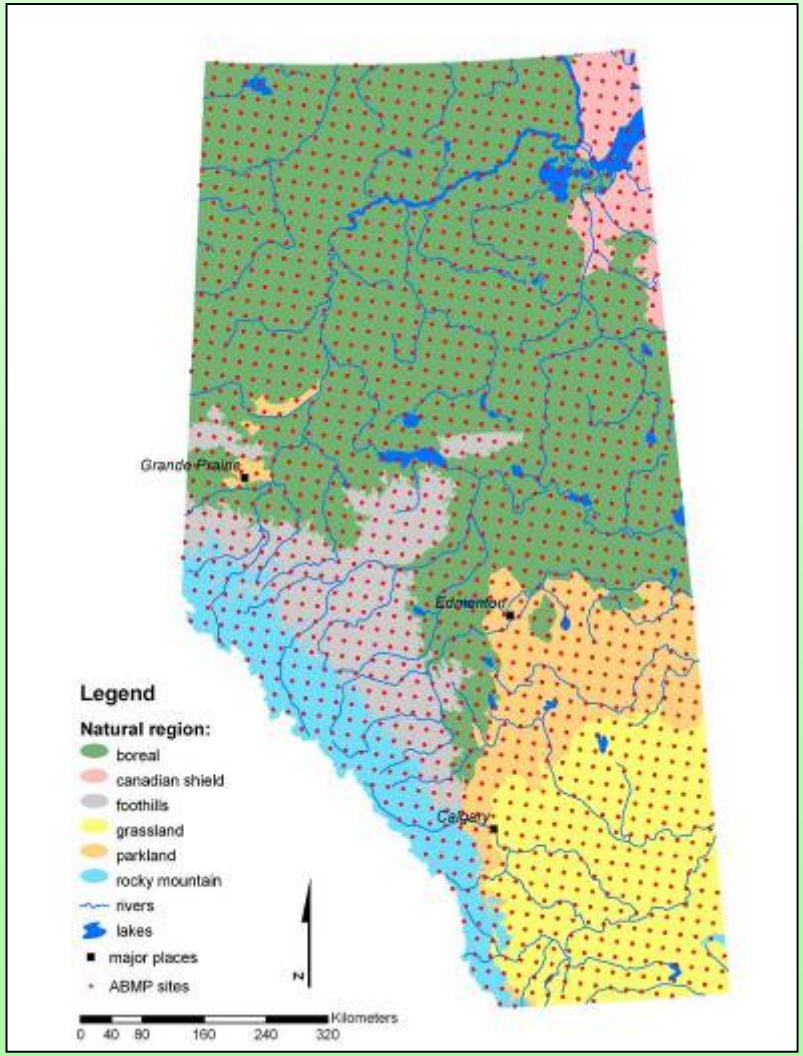
- Biodiversity is BIG
- It is not well represented by single species indicators
- Multiple small-scale datasets cannot be “roll-up” to describe biodiversity

There are no short-cuts

- **to know what is “out there” we need to measure it empirically**

Survey Design

- Grid with a 20 km spacing
  - 1656 sites
- Return interval of 5 years
- 340 sites annually
- Designed to detect change @ 3%/yr



What we are Looking At

Emphasis on “species assemblages”

- with > 2000 species surveyed expect that some will respond to each type of ecological change

Vascular Plants
Mosses
Lichens
~~**Fungi**~~
Birds
Mammals
~~**Fish**~~

~~**Phytoplankton**~~
~~**Zooplankton**~~
~~**Algae**~~
~~**Springtails**~~
Mites
Aquatic Invertebrates
Beetles

Habitat Features

- Terrestrial habitat conditions
  - *Vegetation & structure*
- Aquatic habitat conditions
  - *Lakes and rivers, water chemistry, wetlands*
- Landscape conditions
  - *vegetation composition and pattern, human disturbance*

Our Business Today

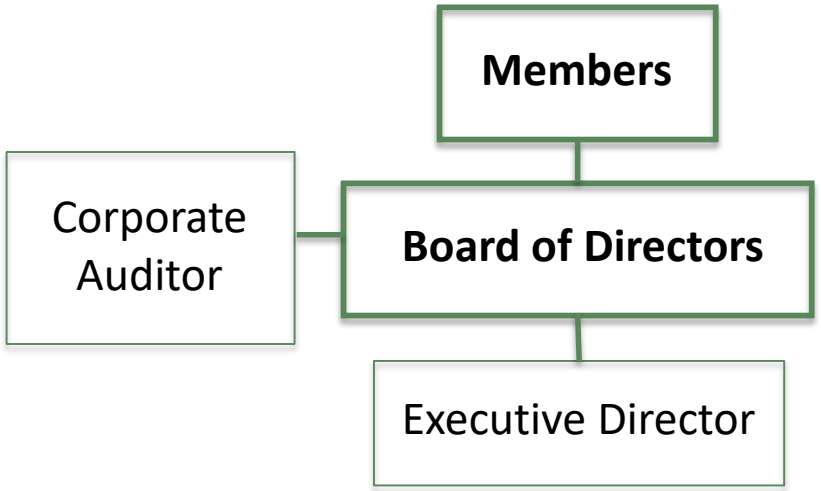
Mission

We track changes in Alberta's wildlife and their habitats from border to border. For Alberta's land-use decision makers. For Albertans.

Operating Principles

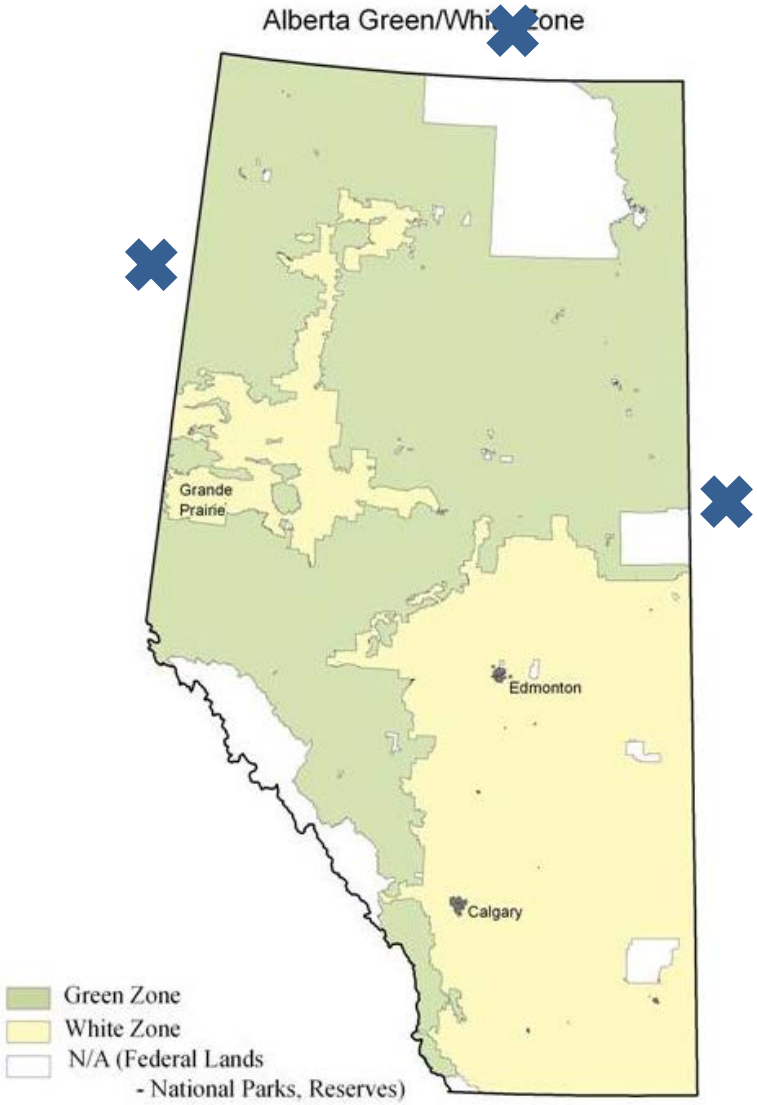
- Independent
- Scientifically credible
- Relevant and Accessible
- Transparent

ABMI Governance



John Kolk	Ag. Industry
Simon Dyer	ENGO
Vacant	GoA
Krista Phillips	Energy Industry
Kim Rymer	Forest Industry
Michelle Hiltz	Research Community
Stan Blade	Academic
Dave Pryce	Director at Large
Stephen Lougheed	Executive Director

Alberta



4 million people

Primarily in White Zone

Authority

- Gov Canada – 12%
- Gov Alberta – 60%
- Private – 28%

Some work beyond our boarders

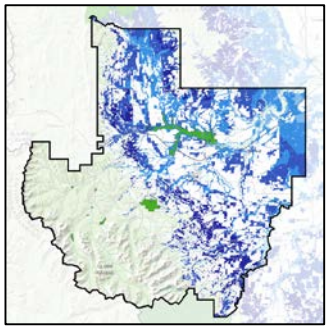
Major Adjustments

Moving Forward:

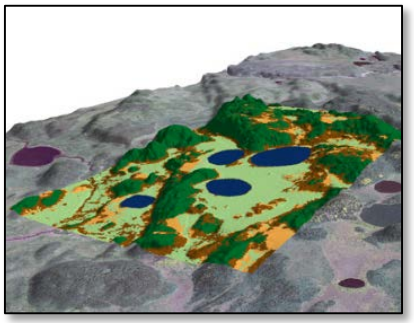
1. Increase local relevance; Align Oil Sands investment with objectives
2. Increase Knowledge Coordination; WildTrax & Biodiversity Query Tool (lease-level guidance)
3. Geospatial Initiatives
    - Enhance land use (footprint) data
    - Complete wetland and build upland information (ALPHA)
    - Geospatial Data Acquisition (GDA)
4. Expand knowledge translation and stakeholder engagement
5. Continue publishing (science foundation)
6. Enhanced collaboration and cooperation

The ABMI: Looking Forward

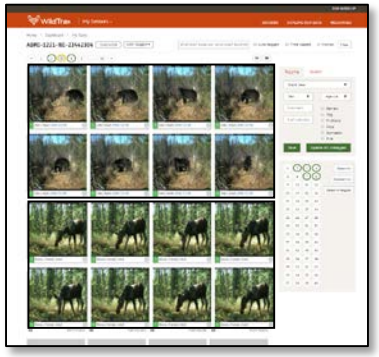
Species Monitoring



Application Programs

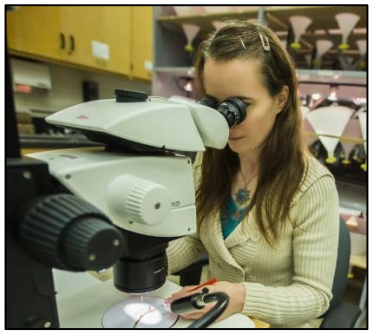


Geospatial and Machine Learning



Information Systems

Knowledge Translation



Taxonomic Research

ABMI: Looking Forward

An ABMI Road Map Part I

ABMI Information Forum
January 30, 2019

It's Our Nature *to Know*
Alberta Biodiversity Monitoring Institute

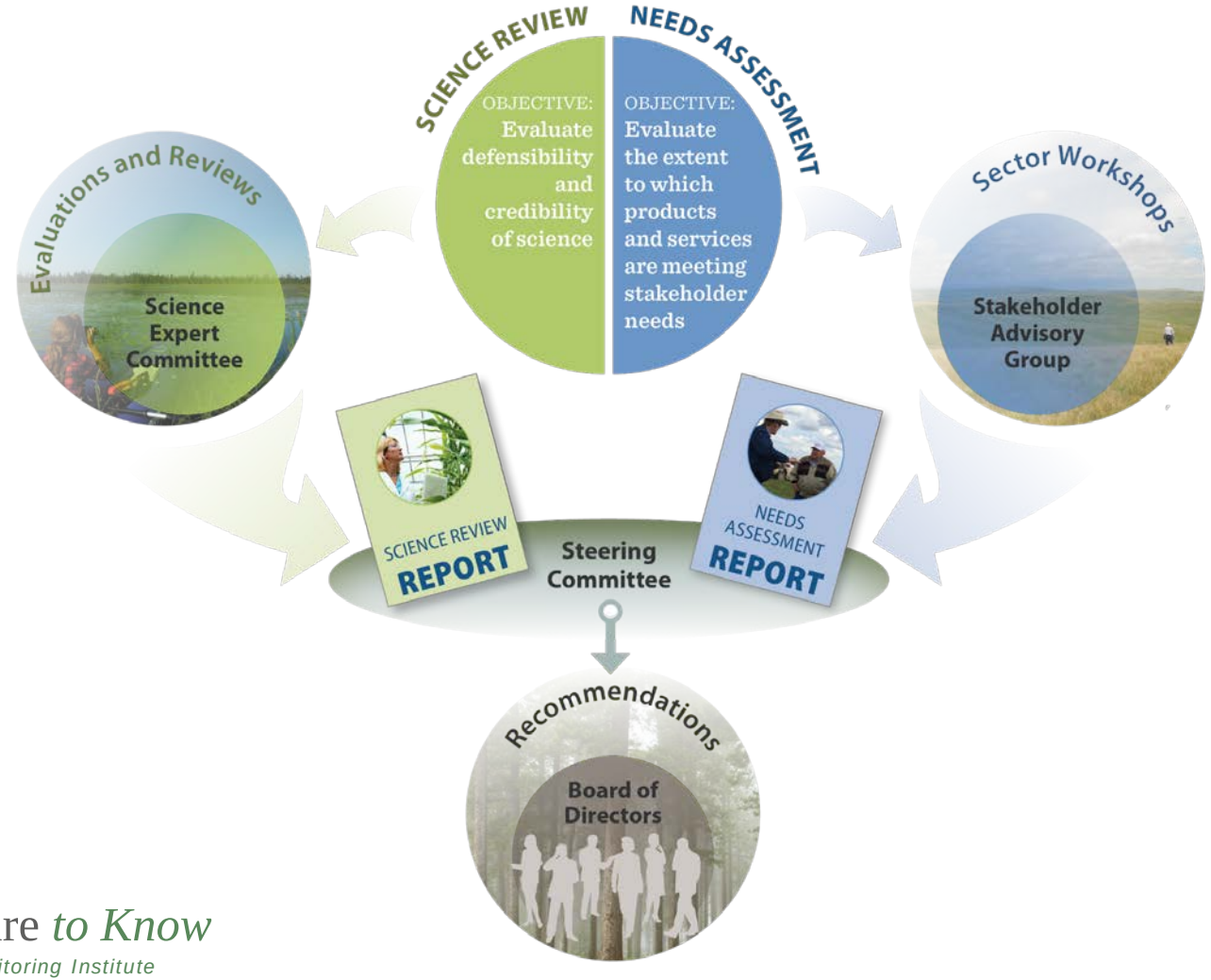
Motivation for a 10-Year Science & Program Review

10 years—a good opportunity to:

- Evaluate the Institute's scientific framework and its success in delivering on its initial scientific objectives
- Assess the range of products and services provided by the ABMI and how they meet stakeholder needs

➔Use Review outcomes to guide ABMI Operations going forward

10-Year Science & Program Review



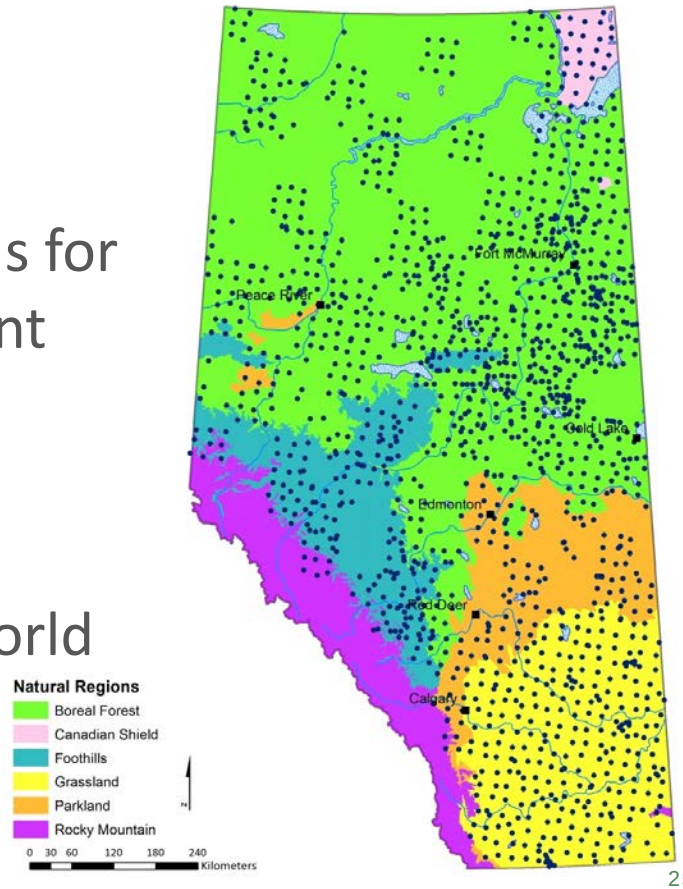
Science Review

ABMI Science Goal:

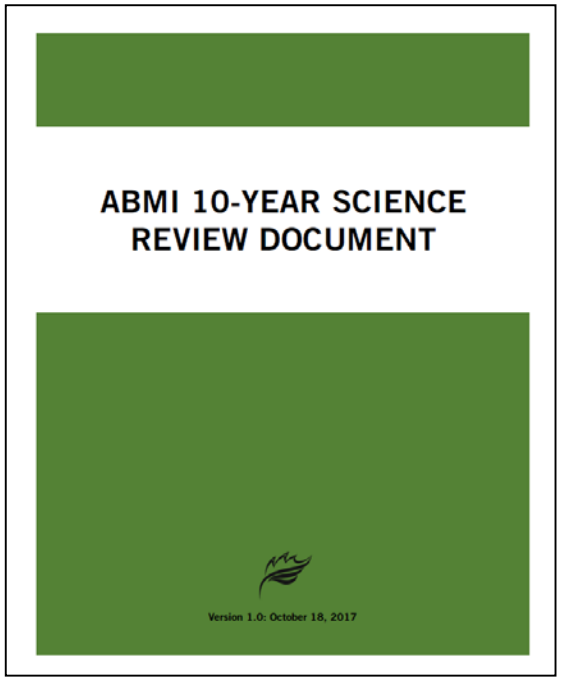
Monitor status (distribution and abundance) and trend (change over time) of biodiversity throughout Alberta

Analyses:

1. Has ABMI achieved its monitoring goals for species, land cover, and human footprint elements?
2. Statistical power of ABMI analyses
3. Comparison of ABMI's monitoring with comparable jurisdictions around the world

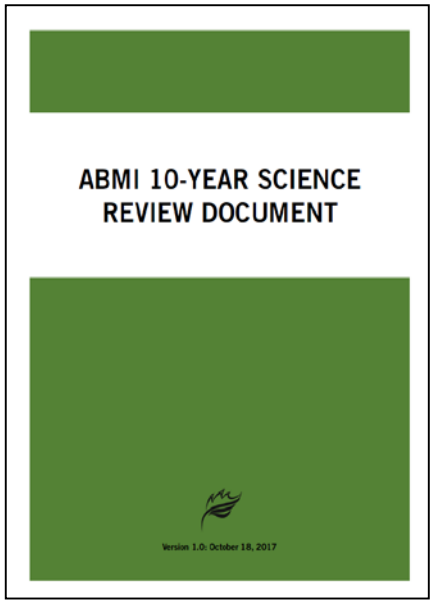


Science Review



Plus more than 30 technical reports

Science Review



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Science Expert Committee:

- **Kirsten de Beurs,** University of Oklahoma
- **Rob Brooks,** Pennsylvania State University
- **Rob Rempel,** Centre for Northern Forest Ecosystem Research
- **Tom Givnish,** University of Wisconsin
- **Tom Nudds,** University of Guelph

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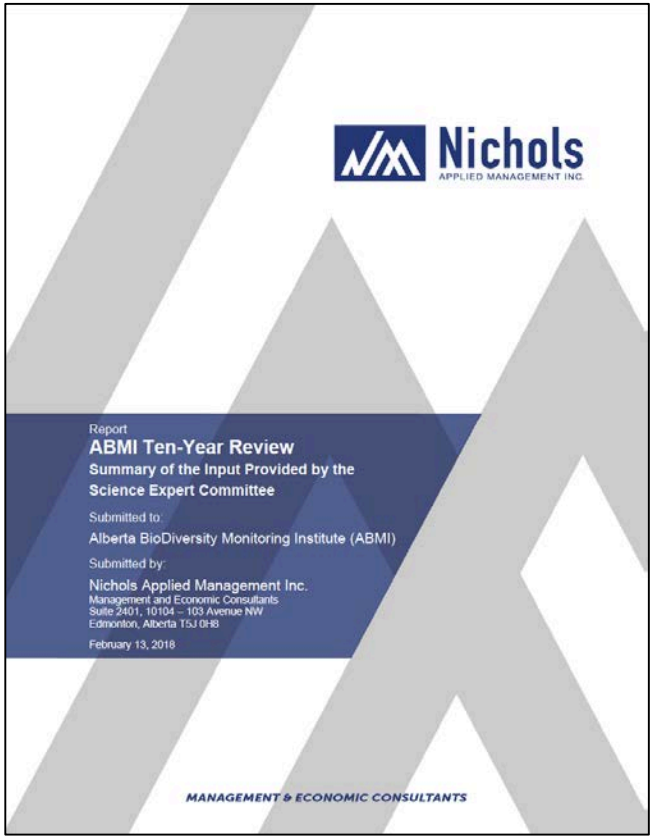

Science Review

Science Expert Committee:

- **Kirster**
- **Rob Br**
- **Rob Re**
  Ecosys
- **Tom G**
- **Tom N**

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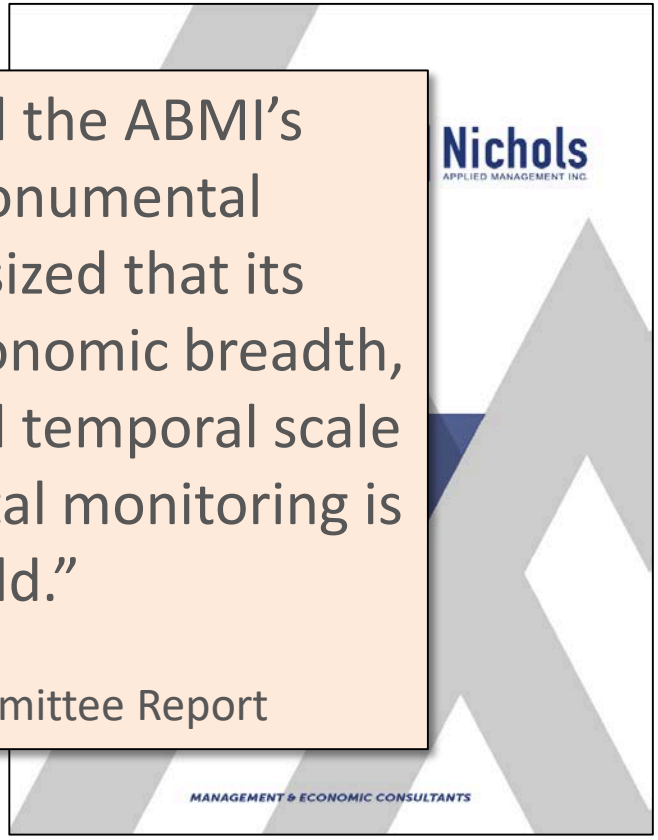
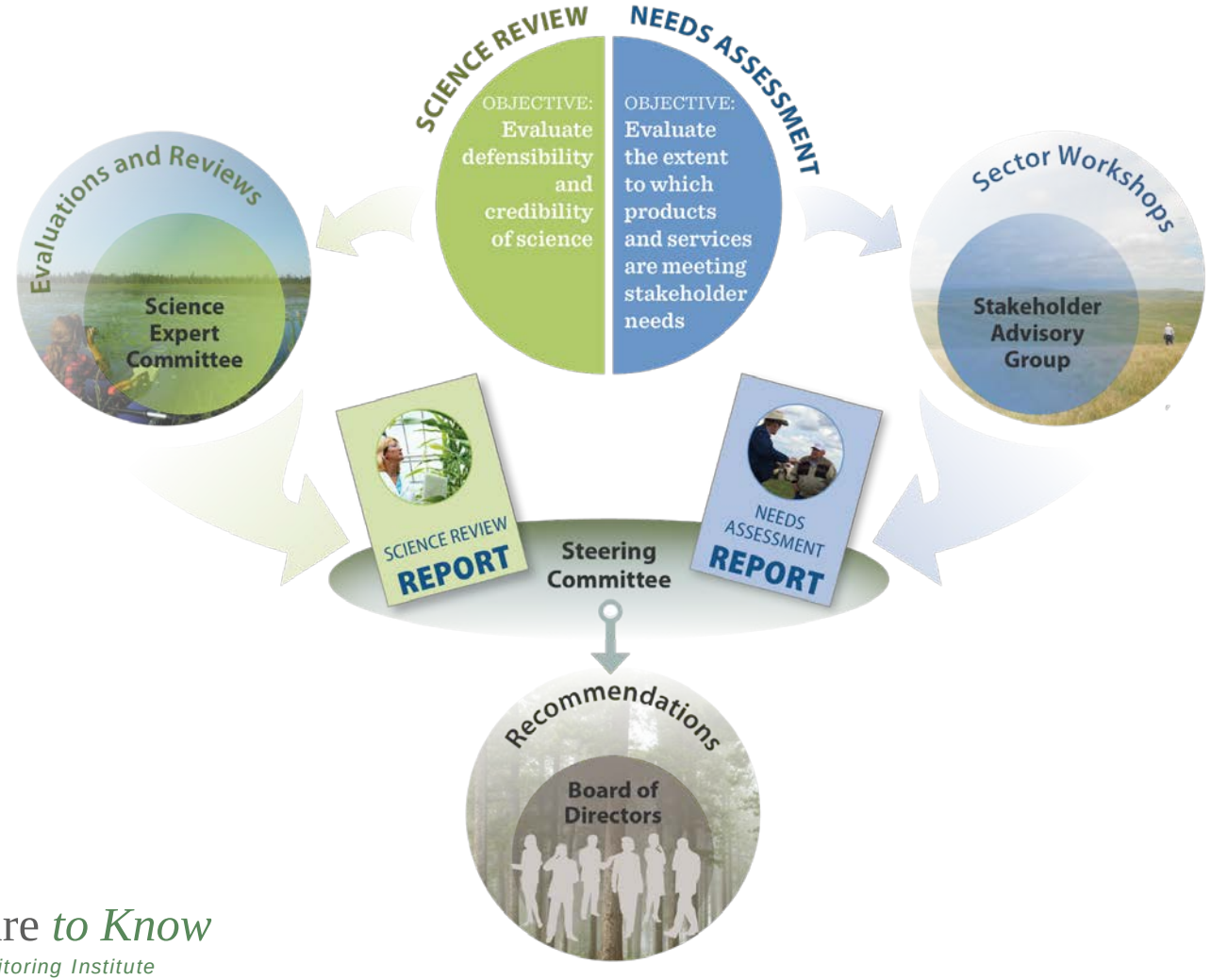
Jeff Bellinger, Science Expert Committee Report



10-Year Science & Program Review



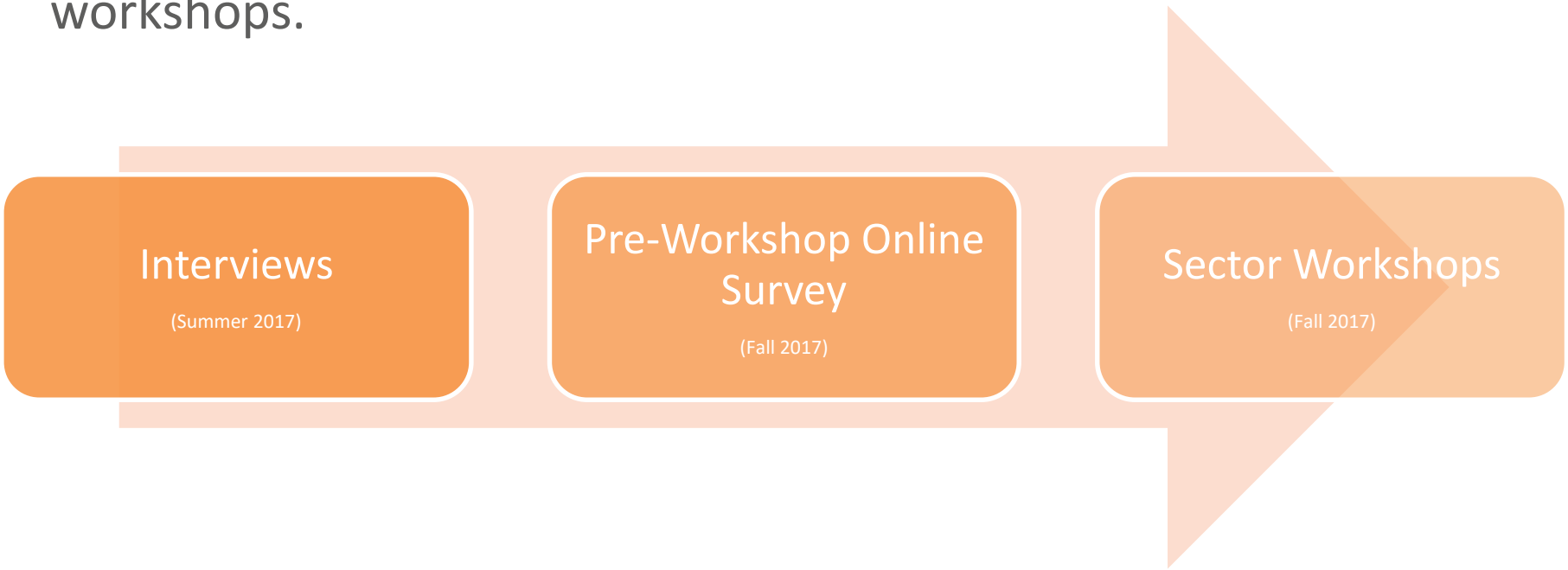
Stakeholder Needs Assessment

Process designed to determine if the ABMI had met the following objectives:

- Create data and products relevant to stakeholders;
- Engage stakeholders to determine whether ABMI data and information products meet business needs, and mobilize feedback received into the product development process.

Stakeholder Needs Assessment

The Stakeholder Needs Assessment process included a series of confidential interviews with advisory committee members, a pre-workshop online survey, and a series of sector specific workshops.



Stakeholder Advisory Group

- Tara Narwani (Chair), Director, ABMI Information Centre
- **Dr. Shannon White**, Planning Branch, AEP
- **Dr. Anne Hubbs**, Regional Resource Management, AEP
- **Craig Harding**, Conservation Science and Planning, Nature Conservancy of Canada
- **Dr. Elston Dzus**, Environmental Sciences, Alberta-Pacific Forest Industries Inc.
- **Lori Neufeld**, Land Use and Biodiversity, Imperial Oil Ltd.
- **Dr. Samantha Song**, Wildlife and Habitat Assessment Section, Canadian Wildlife Service, ECCC
- **Carol Bettac**, Executive Director, Alberta Innovates
- **Grant Pearsell**, Parks and Biodiversity, City of Edmonton
- **Ted Nason**, Formerly of Alberta Environment and Parks
- **Matthew Whitehead**, Woodland Cree Nation
- **Dr. James F. Cahill**, Professor, University of Alberta
- **Tasha Blumenthal**, Alberta Association of Municipal Districts and Counties
- **Fiona Briody**, Crop Sector Working Group

Stakeholder Advisory Group

- Tara
- **Dr. S**
- **Dr. A**
- **Crai**
- **Dr. E**
- **Lori**
- **Dr. S**
  Serv
- **Carc**
- **Grar**
- **Ted**
- **Mat**
- **Dr. J**
- **Tash**
- **Fior**

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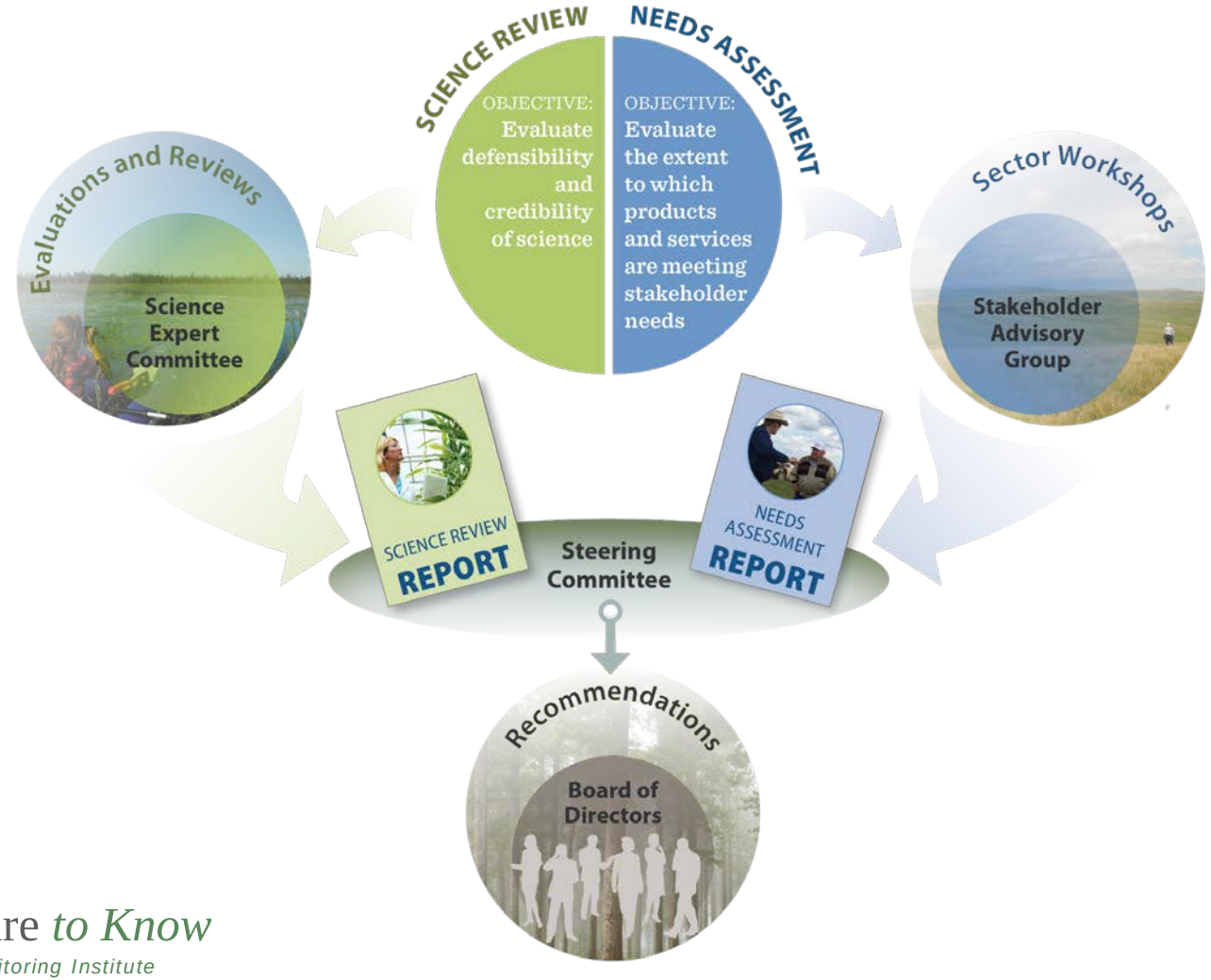
"The ABMI's willingness to take risks in developing new information products was appreciated and it was suggested that some of the ABMI ancillary products put it on the cutting edge of environmental monitoring."

"The [committee] felt that although there had been some engagement from the ABMI in developing products to meet stakeholder business needs, the engagement did not meet expectations."

Andrew Fehr, Stakeholder Advisory Group Report

10-Year Science & Program Review



Steering Committee Recommendations

Unanimous agreement on high level direction:

- Maintain the program's strong science foundation
- Optimize the program's value through prioritization and refinement
- Seek opportunities to increase the impact of the program

Steering Committee Recommendations

Optimize the Program's value:

➔Leverage existing species-level dataset

➔Enhance and adjust field data collection to meet stakeholder needs

➔Develop next generation geospatial science applications

Increase the Program's Impact:

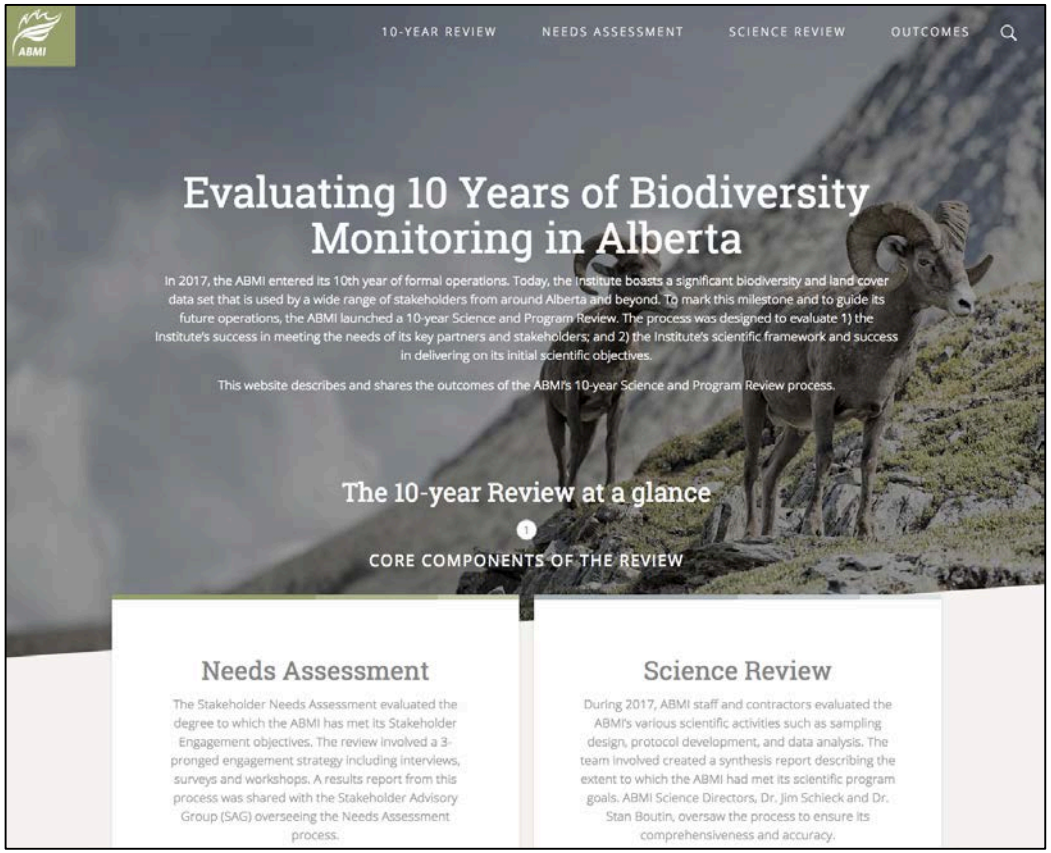
➔Implement ongoing cross-cutting stakeholder engagement activities

➔Deepen and expand collaborations

➔Deliver data valorization platforms

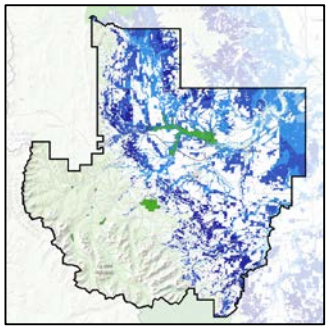
10-year Science & Program Review Website

Available at https://abmi10years.ca/



The ABMI: Looking Forward

Species Monitoring



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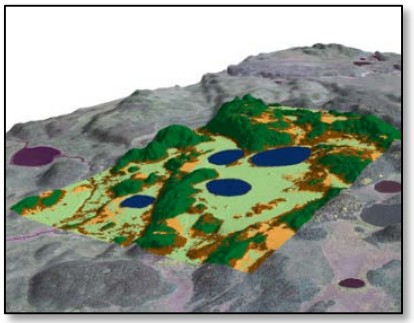

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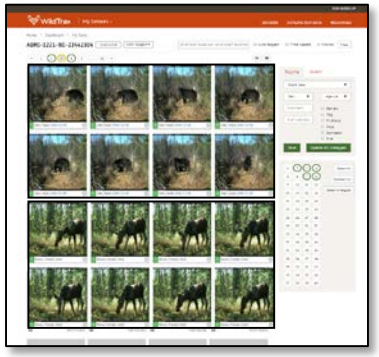
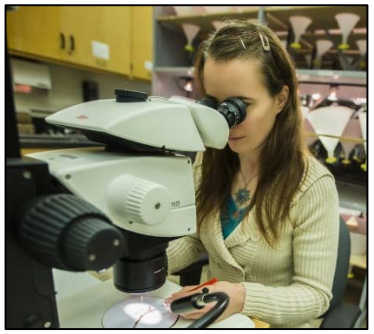


Information Systems

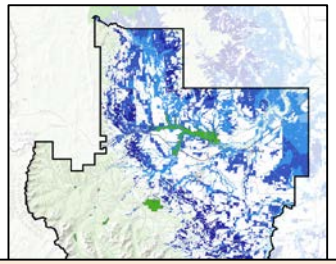
Knowledge Translation

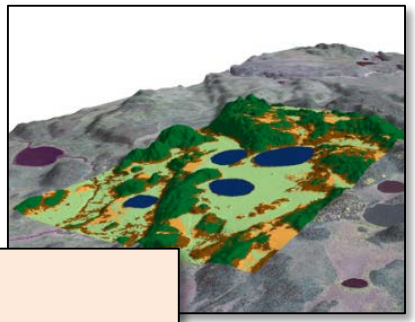


Taxonomic Research

The ABMI: Looking Forward

Species Mon





atial and
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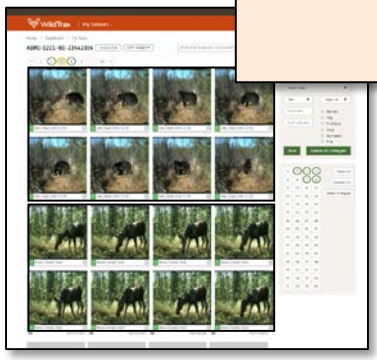
Stakeholder Engagement



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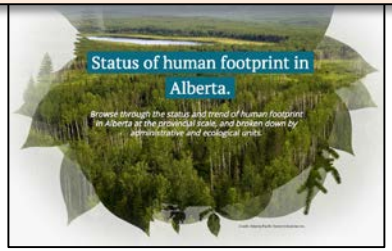
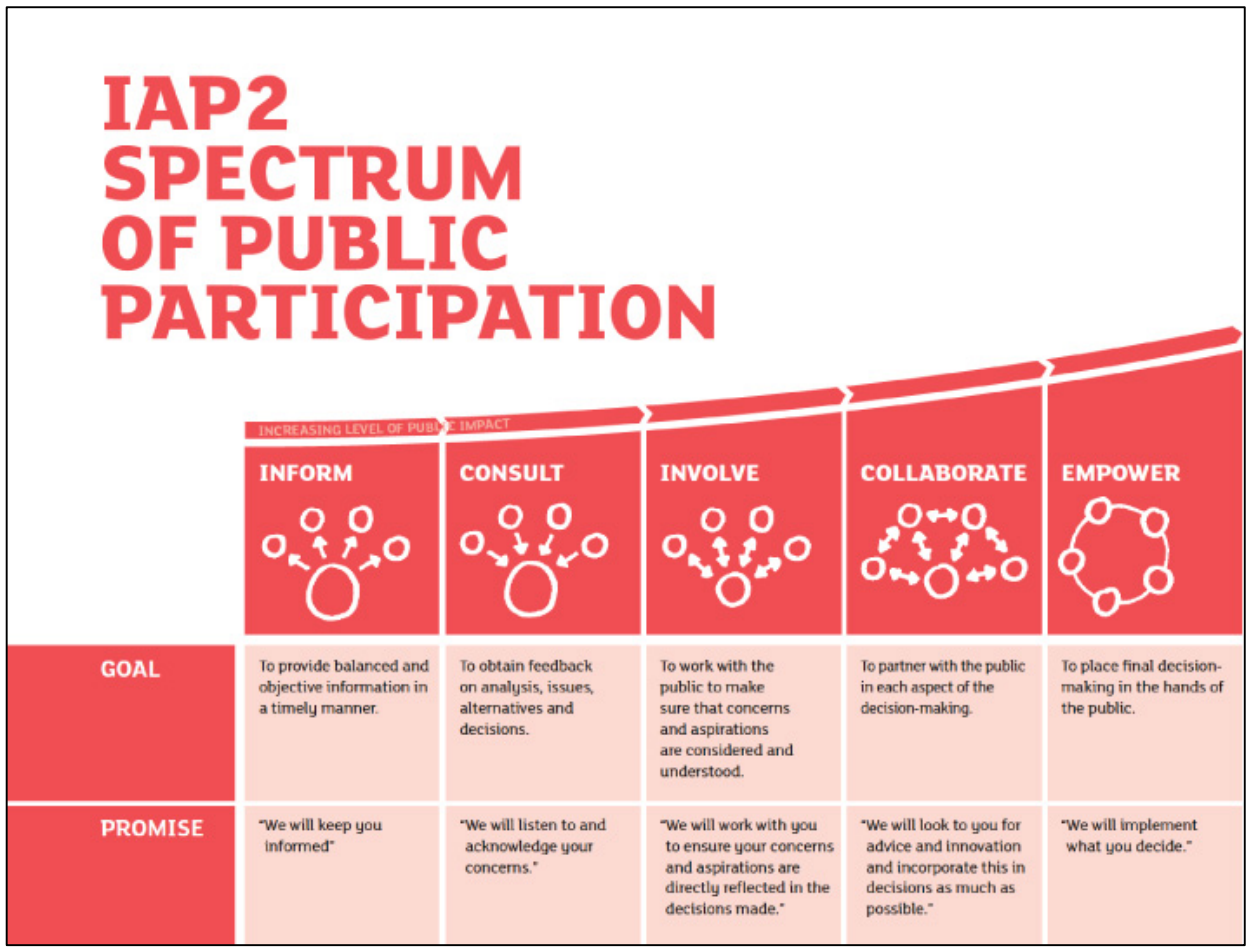


Knowledge Translation

Taxonomic Research

Stakeholder Engagement Spectrum



Example of “Involve”

Goal: “To work with the public to make sure that concerns and aspirations are considered and understood.”

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2017 workshop evaluation of the ABMI Mapping Portal:

1. Is this tool useful to you and your work activities?
2. How would you modify this tool to better meet your information needs?
3. What do you see as the primary barrier to using this tool?

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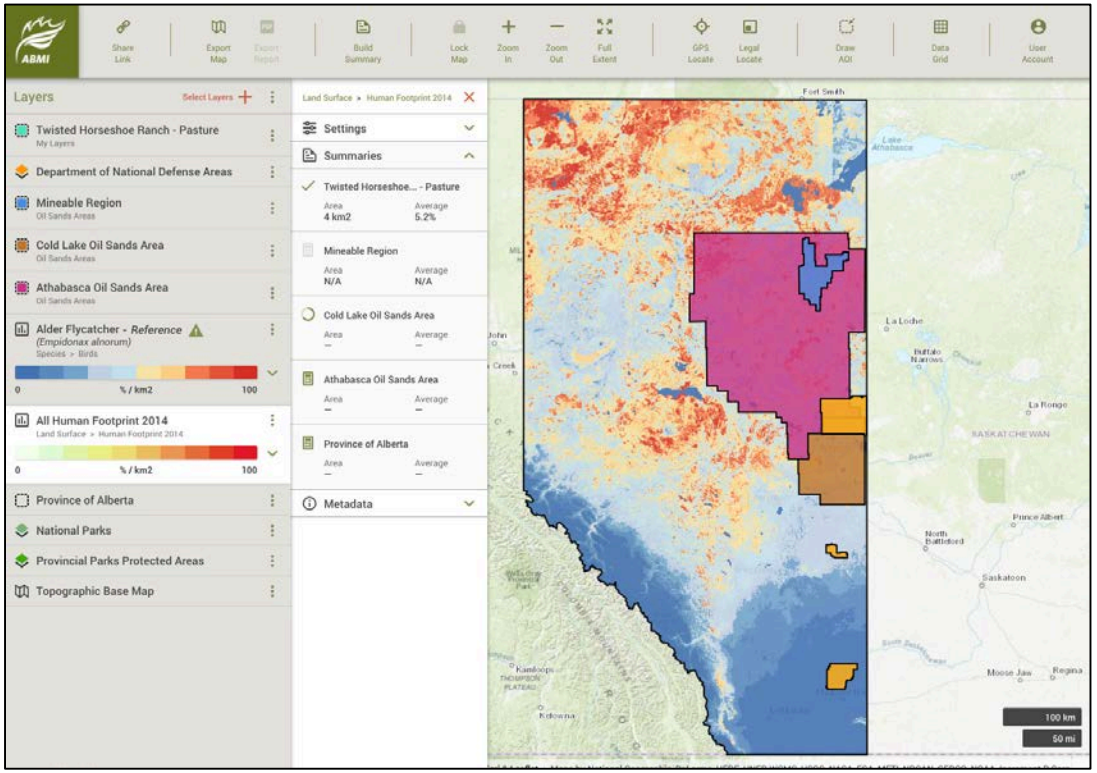

ABMI Engagement Activities

- Stakeholder engagement working group
- Webinars, lunch and learns, targeted e-news content
- Job shadows, interviews
- Workshops, forums, requests for review by subject matter experts and/or end users
- Project co-design

ABMI: Looking Forward

An ABMI Road Map Part II

Shannon White
Co-Director, ABMI Science Centre
Senior Research Scientist, Innotech Alberta

ABMI Information Forum
January 30, 2019

It's Our Nature *to Know*
Alberta Biodiversity Monitoring Institute

Science Expert Committee

Positive endorsement

- is doing a “very good to excellent job” fulfilling its goals and objectives;
- has “exceeded the expectations it set out for itself ten years ago” and
- is a “great example” of a long-term biodiversity monitoring program

> “The Committee described the ABMI’s progress to date as a “monumental achievement” and emphasized that its comprehensive approach (taxonomic breadth, spatial scale of monitoring and temporal scale of monitoring) to environmental monitoring is unique in the world.”
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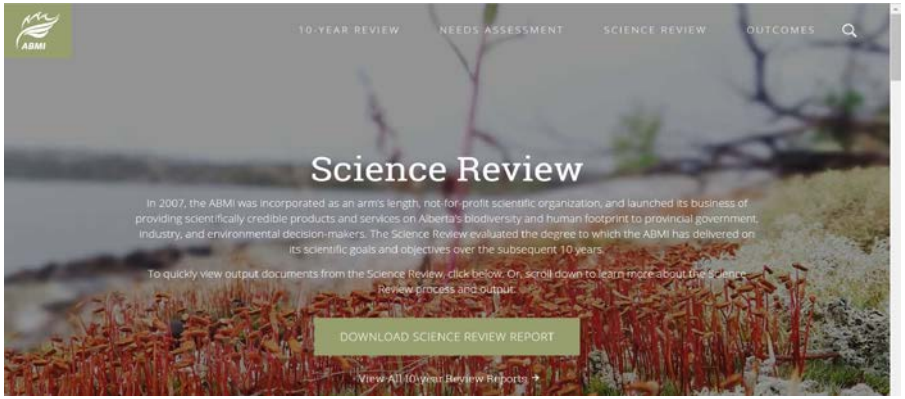
Science Expert Committee

- Identified areas where the ABMI may want to modify its program design
- Better engage stakeholders in decision-making and management
- Consider enhancement in ABMI's activities beyond original goals
- Explore ways to increase uptake of ABMI information by managers and researchers



Science Expert Committee

Program design

- Completing baseline sampling at all sites needs to be a priority
- Re-visits to assess trend could be altered
- Consider targeted sampling in areas of concern due to chronic stressors
- Some species groups could be sampled at a higher frequency

Science Expert Committee

Currently actioning:

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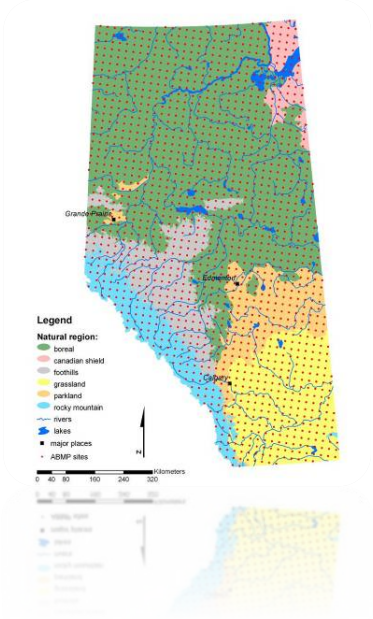

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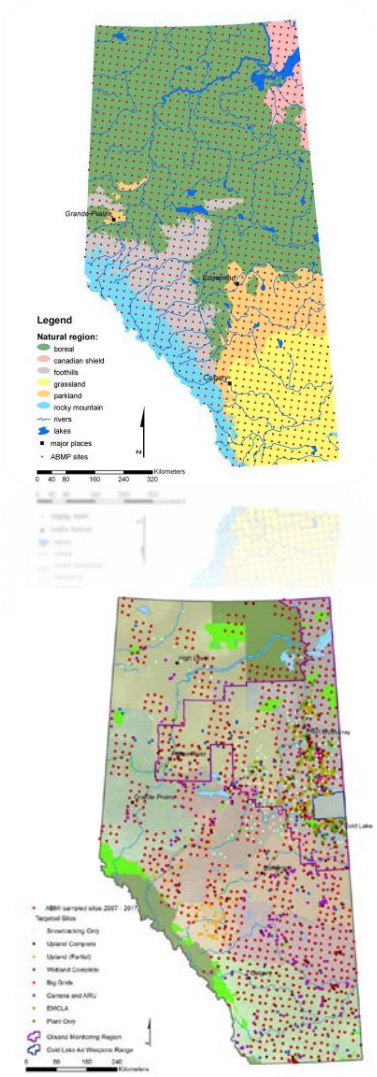
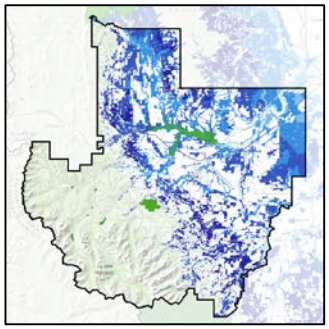


The ABMI: Looking Forward

Species Monitoring



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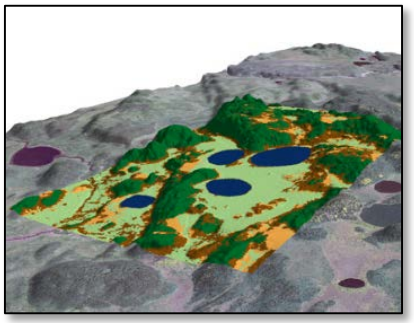

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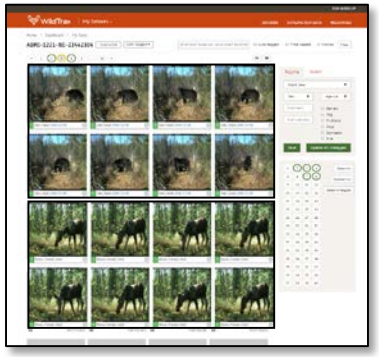

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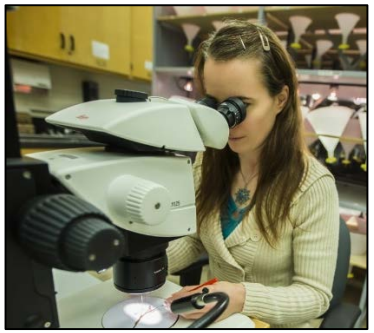


Taxonomic Research

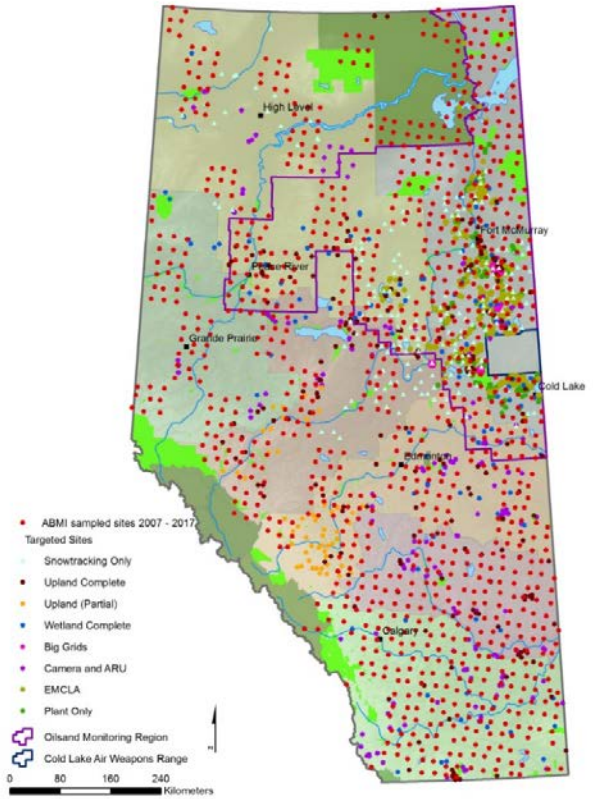
Species Monitoring

3 programs

- Ecosystem Health Program
  - "Major check up"
    - 28 protocols
  - Low frequency (15 years)

- Focal Species Program
  - "Rapid check-up"
    - Birds, mammals, plants, invertebrates
  - High frequency (1-2 years)

- Targeted Species Monitoring Programs
  - Local



Ecosystem Health Program

Major Check-up

Design:

- 1656 sites
- Systematic-random design
- Repeated measures (15 year)
- 40 sites per year (once baseline complete)

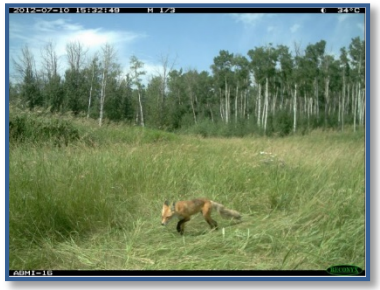
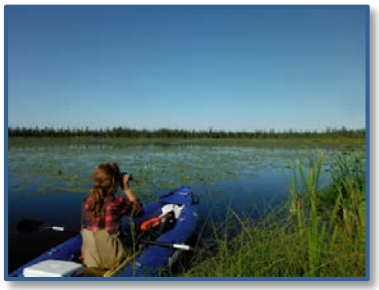
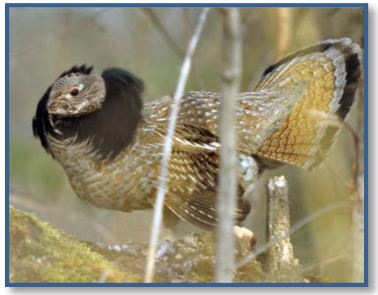
Status:

- Baseline significantly complete

Informs:

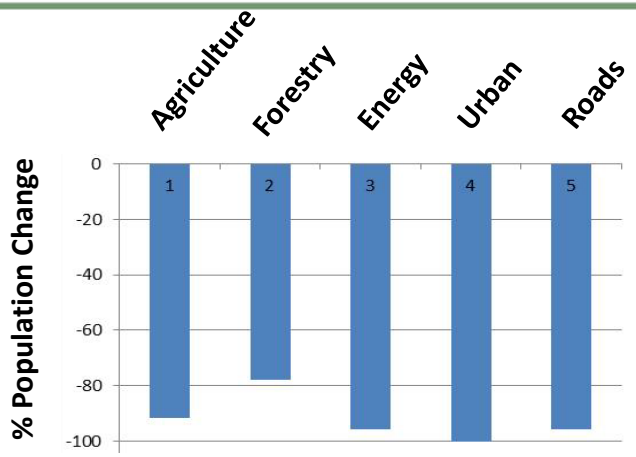
- SOE Reporting
- Attribution of impacts to natural and human activities



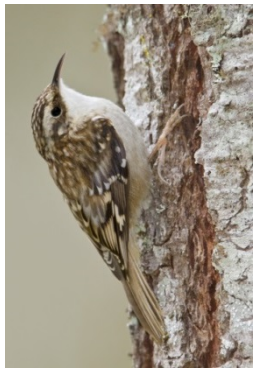





Support for Management

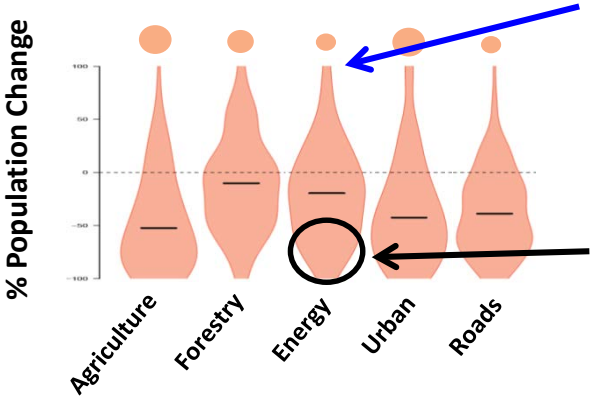
(species response to disturbance in the Oil Sands)



Brown Creeper



All Birds



6 Species ↑ >100%

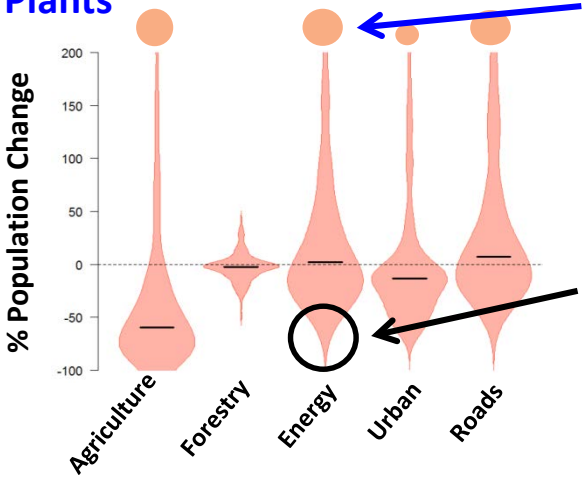
Shrubby & open-country birds
eg. White-crowned Sparrow
Grackle
Vesper Sparrow

31 Species ↓ >50%

Top 10

- Brown Creeper
- Black-throated Green Warbler
- Bay-breasted Warbler
- Golden-crowned Kinglet
- Cap-may Warbler
- Ovenbird
- Canada Warbler
- Western Tanager
- Ruby-crowned Kinglet
- Boreal Chickadee
- Red Crossbill

All Plants



32 Species ↑ >200%

eg. Yellow Rattle
Tufted Hair Grass
~ ½ are exotic species
eg. Hawk's Beard, Creeping Thistle

10 Species ↓ >50%

Top 10

- Northern Comendra
- Bishop's Cap
- One-sided Wintergreen
- Saskatoon
- Three-leaf Solomon's-seal
- Bog Cranberry
- White Violet
- Dugle
- Starflower

Focal Areas Program

Rapid Check-up (2-4 protocols)

Alignment:

- Identifying drivers of change and impacts
- Attributing impacts to OS Industry activities
- Avoid/minimize/mitigate

Design:

- 1000's of sites
- Stratified design
- Repeated measures (1-2 years)
- Major cooperation required

Status:

- Early stages of development

Targeted Species Programs

Focused on detecting changes in the local abundance of a species (stressor-response, sector, operator, site-specific)

Alignment

- Identifying drivers of change and impacts
- Avoid/minimize/mitigate

Design

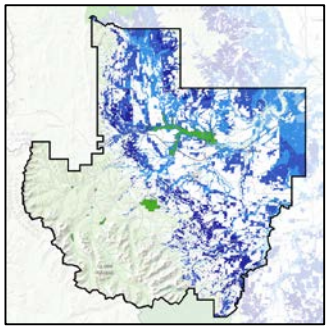
- Custom designs
- Efficiencies in cooperation required

Status

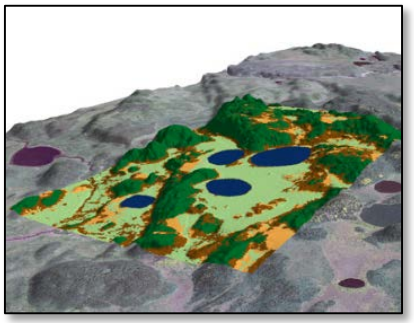
- Early stages of development

The ABMI: Looking Forward

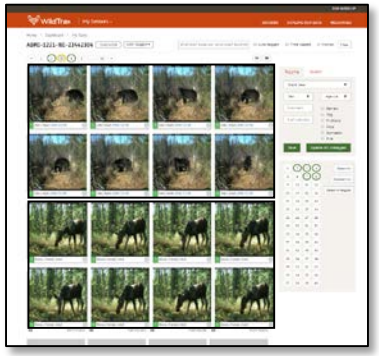
Species Monitoring



Application Programs

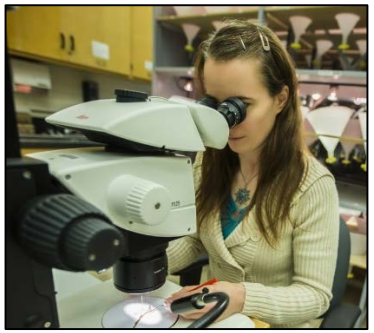


Geospatial and Machine Learning



Information Systems

Knowledge Translation



Taxonomic Research

Application Programs

Caribou Monitoring

Community Based Monitoring (Support)

Regional Planning

Caribou Monitoring Unit

Supports woodland caribou recovery in western Canada

Research

- Human footprint, climate, densities

Restoration

- Prioritization, goals, tracking

Testing Recovery Options

- Restoration efficacy, maternity pens, exclosures

CMU | CARIBOU MONITORING UNIT

ABMI IT'S OUR NATURE TO KNOW

PARTNERS

cosia CANADA'S OIL SANDS INNOVATION ALLIANCE

RICC | Regional Industry Caribou Collaboration

FWCP Fish & Wildlife COMPENSATION PROGRAM

UNIVERSITY OF ALBERTA

InnoTech ALBERTA

UNIVERSITY OF SASKATCHEWAN

Alberta Government

HABITAT CONSERVATION TRUST FOUNDATION

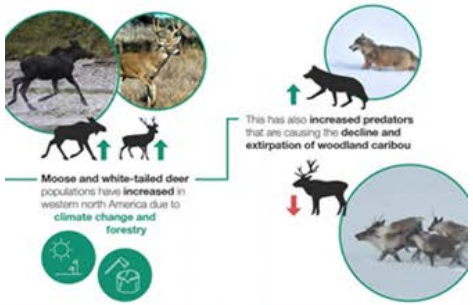
BRITISH COLUMBIA

BC OGRIS
BC Oil and Gas Research and Innovation Society

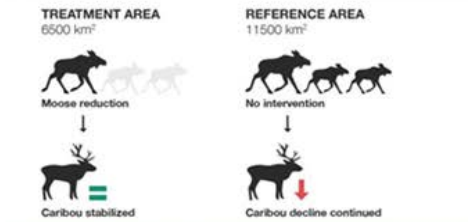
Government of Northwest Territories | Gouvernement des Territoires du Nord-Ouest

EXPERIMENTAL MOOSE REDUCTION LOWERS WOLF DENSITY AND STOPS DECLINE OF ENDANGERED CARIBOU

INTRODUCTION



METHODS



RESULTS

Following the moose reduction, **the largest caribou population stabilized**, whereas in the reference area caribou populations continued to decline.

CONCLUSION

Reducing primary prey (moose or deer) can be a **viable tool to recover caribou populations**, without having to conduct intensive and continuous wolf control.

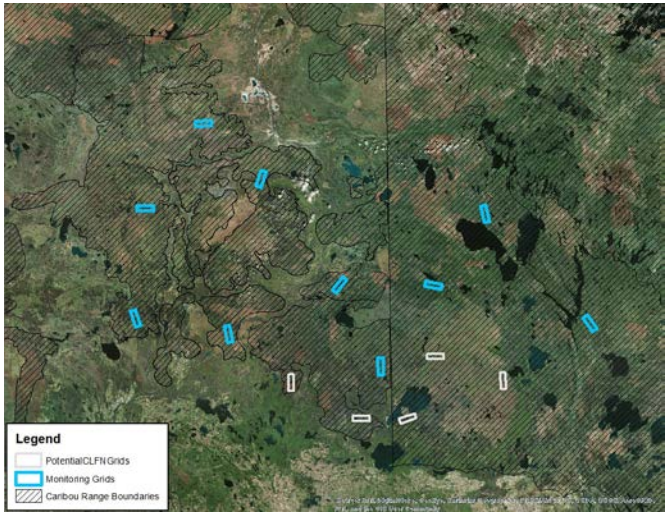
The result is promising, but **insufficient to achieve recovery**, suggesting that multiple limiting factors and corresponding management tools must be addressed simultaneously to achieve recovery for woodland caribou.

RECOVERY TOOLS CAN INCLUDE:

Community-Based Monitoring Projects

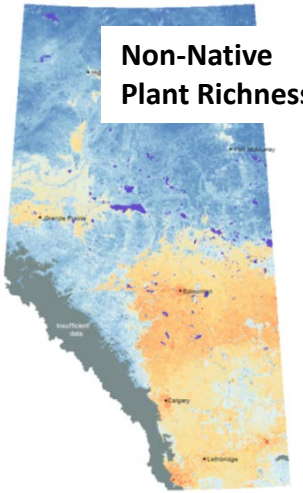
Driving Principles:

- Motivation: to address community questions or concerns
- Co-designed sampling design
- Emphasis on community capacity building (e.g. camera deployment, data processing)
- ABMI often a service provider on project workplan

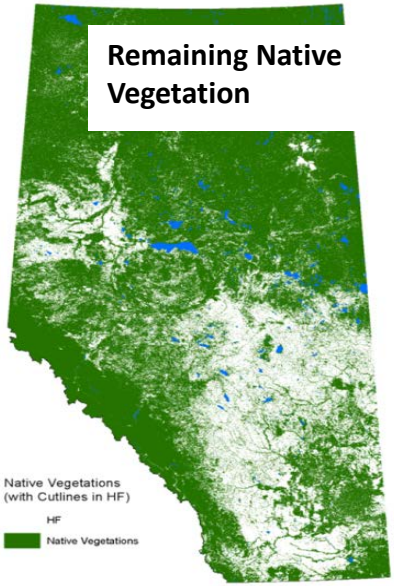


Supporting LUF / BMF

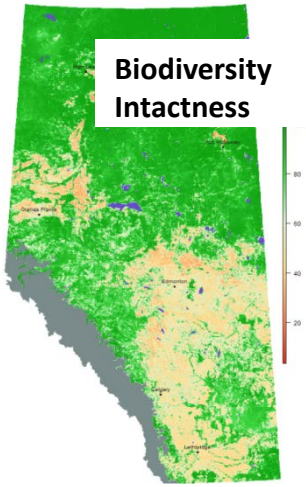
Information to Support Biodiversity Management In Land-Use Framework Regions



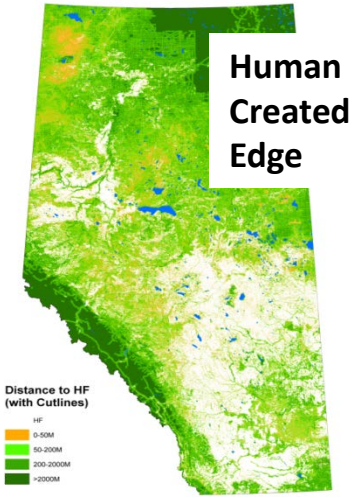
Non-Native Plant Richness`



Remaining Native Vegetation



Biodiversity Intactness



Human Created Edge

Caribou Monitoring Unit

Supports woodland caribou recovery in western Canada

Research

- Human footprint, climate, densities

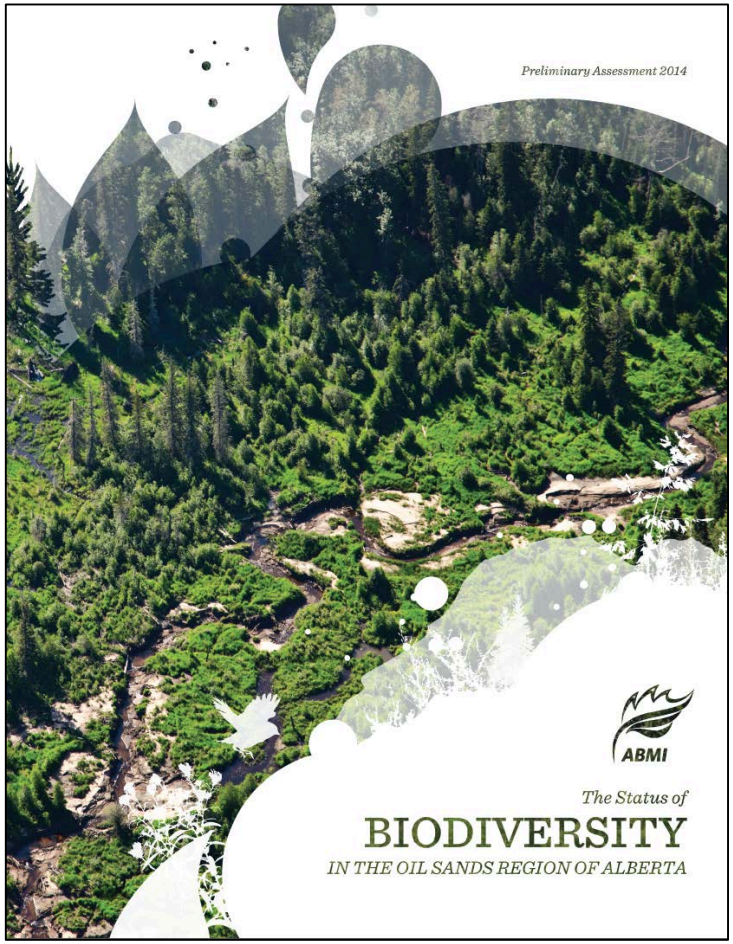
Restoration

- Prioritization, goals, tracking

Testing Recovery Options

- Restoration efficacy, maternity pens, exclosures

Discussion


Preliminary Assessment 2014
ABMI
The Status of
BIODIVERSITY
IN THE OIL SANDS REGION OF ALBERTA