The ABMI’s Land Surface Monitoring Systems

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Fun facts about Alberta

- Alberta’s area (661,848 km2) is as large as Afghanistan area AND larger than the total areas of Germany and Italy combined

- Alberta has the highest number of sunny days (312!) in Canada

- More than 80% of Alberta’s water supply is found in the northern part of AB, while 80% of the demand is in the south

- The world's longest beaver dam is in Wood Buffalo National Park:
  - Measures 850 m long
  - Found on Google Earth in 2007
  - Several generations of beavers worked on it since 1975

It’s Our Nature to Know
Alberta Biodiversity Monitoring Institute
ABMI: What We Do

Full service “research to action” organization for Albertans

- Biodiversity monitoring research and science:
  - Collaborations and partnerships
  - Species habitats’ health
  - Human footprint and landcover

- Knowledge translation to inform land-use and natural resource decision-making

- Collect, evaluate, and share data:
  - Species status and trend
  - Species habitats’ health
  - Human footprint and landcover
It's Our Nature to Know

Alberta Biodiversity Monitoring Institute

ABMI Geospatial Data

The ABMI uses Geospatial science and data to answer:

1. Can we detect and assess changes in biodiversity and species habitats’ health?

2. How is it changing and how land-use (human footprint) drives that change?

3. Can we detect and differentiate naturally-driven (e.g., climate) patterns in land surface dynamics?
ABMI Geospatial Data

Geospatial data created to detect, assess and report on relationships between land-use patterns and biodiversity in AB

Human Footprint and Landcover operational data

- Human Footprint (AHFMP: ABMI and AEP)
- Landcover dynamics (ALPHA)
  1. Partnerships: GoA, Academia, Industry, NGO
  2. Spatially and methodologically consistent
  3. Transparent methods and open access data
  4. Freely sharable on ABMI website and others

- Continuous enhancements and updates of these key Operational products: UofA & UofC Geospatial Centre staff members

http://abmi.ca/home/maps
Human Footprint: driver of biodiversity change (AHFMP partnership)

Alberta-wide Human Footprint Inventory:
- 20 sub-layers of HF types (annual updates)
  - A total of 117 feature types
  - More than 5 million features
  - Linear features (2014-2016)

http://abmi.ca/home/reports/2018/human-footprint
Advanced Landcover Prediction and Habitat Assessment System (ALPHA)

Landcover prediction & classification system

- Near-real time monitoring based on predictive mapping and modeling
  - Dynamic system to account for natural variability vs. human-driven changes
- Taking advantage of newly available datasets and technological advances
  - Cloud computing (GEE)
  - Machine-learning algorithms
  - LiDAR, RADAR and Optical data

Credit: TensorFlow playground
Advanced Landcover Prediction and Habitat Assessment System (ALPHA)


http://blog.abmi.ca/2019/01/08/seeking-and-finding-alpha/#.XEudvGhKiUm
Advanced Landcover Prediction and Habitat Assessment System (ALPHA)

- **Static data sets**: hard copy downloadable products
  - Alberta-wide wetlands extent
  - Permanent water
  - Other landcover classes

- **Real-time & historical data**: web-based applications
  - Real-time water portal and water attributes
  - Historical human footprint regeneration
  - Historical surface water trends and climate

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Geospatial Data Acquisition (GDA)

- Human Footprint mapping
- Vegetation analysis/mapping
- Terrain analysis/mapping
Harvest Areas (and other HF features) regeneration
Leverage recent technological advances (i.e., online cloud computing services) and big geospatial data streams
Enhanced linear features

Attribute with vegetation structure metrics derived from LiDAR as an indicator of functional regeneration (e.g., to prioritize reclamation efforts across caribou ranges)
Advanced Landcover Prediction and Habitat Assessment System (ALPHA)

Reference DEM

Simulate removal and backfilling of roads and railbeds to model unrestricted water flow patterns
Thank you!

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