

The ABMI's Land Surface Monitoring Systems

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Fun facts about Alberta



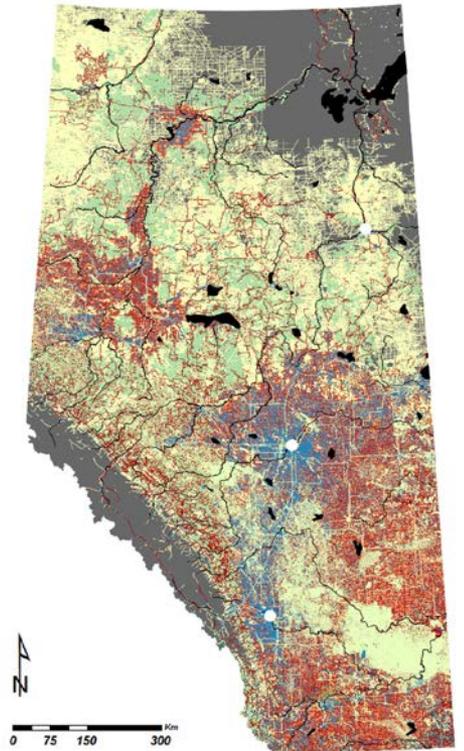
- Alberta's area (661,848 km²) is as large as Afghanistan area AND larger than the total areas of Germany and Italy combined
- Alberta has the highest number of sunny days (312!) in Canada
- More than 80% of Alberta's water supply is found in the northern part of AB, while 80% of the demand is in the 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

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

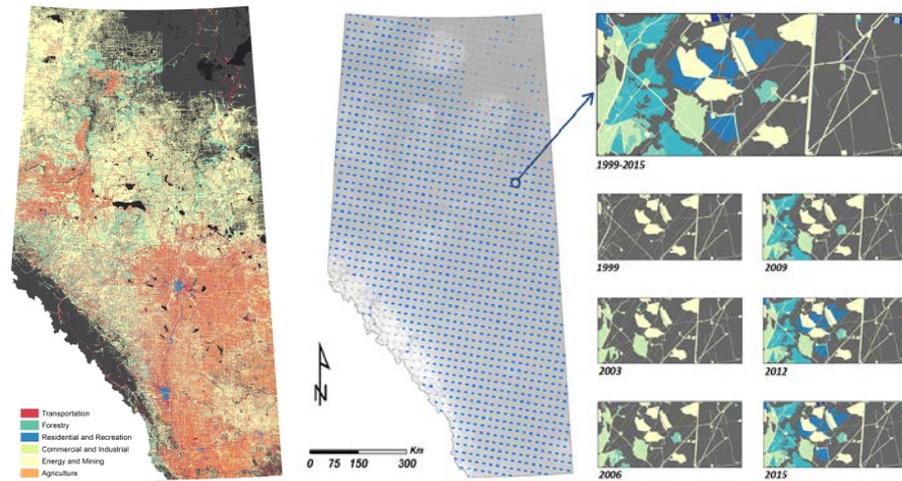


ABMI Geospatial Data



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

Human Footprint and Landcover operational data



- *Province-wide (Wall to wall)*
- *Sample-based (3x7 km sites)*

- **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>

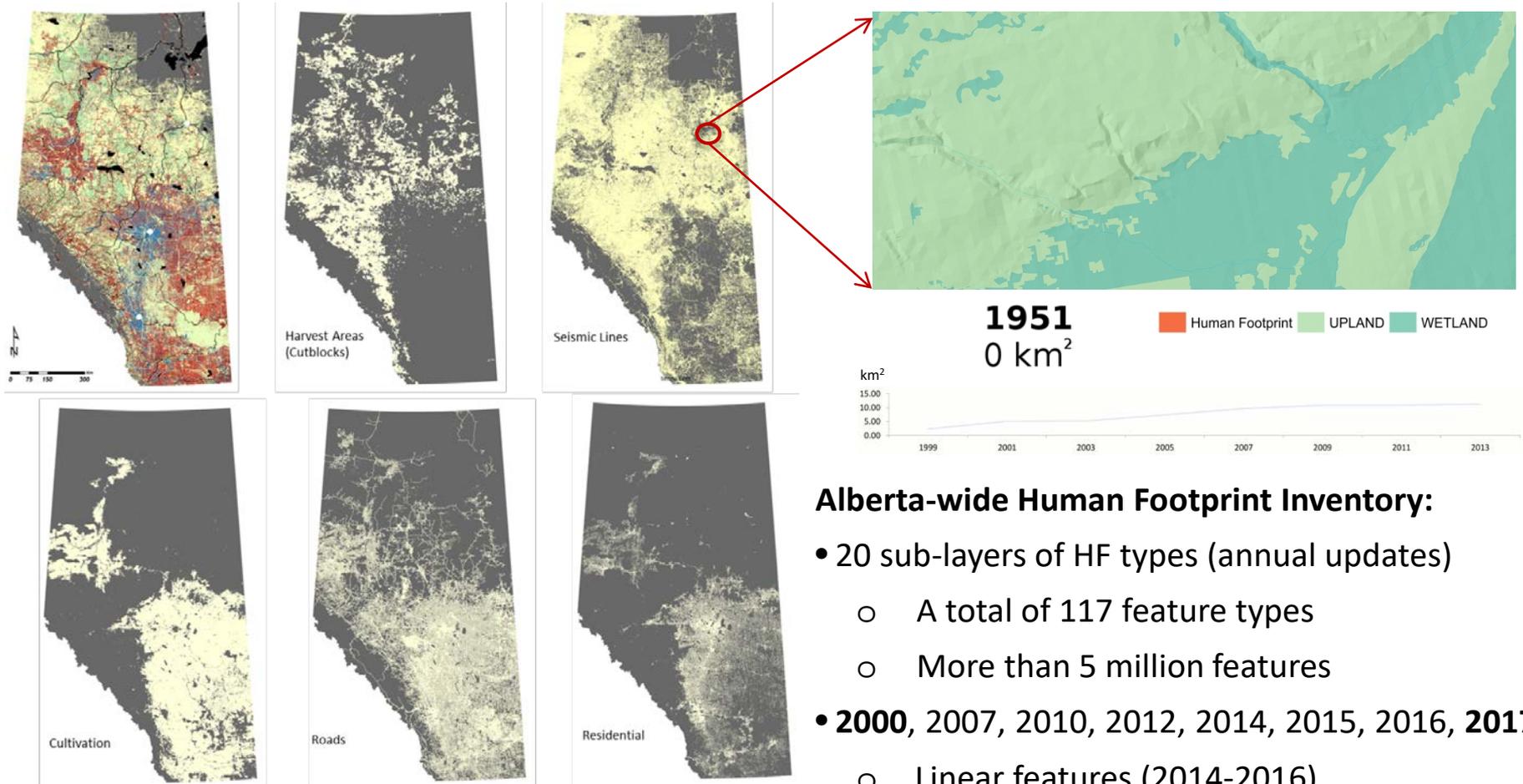
<http://abmi.ca/home/data-analytics/da-top/da-product-overview/GIS-Land-Surface.html>

<http://abmi.ca/home/data-analytics/da-top/da-product-overview/GIS-Land-Surface/HF-inventory.html>

Human Footprint



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
- **2000, 2007, 2010, 2012, 2014, 2015, 2016, 2017**
 - Linear features (2014-2016)

<http://abmi.ca/home/reports/2018/human-footprint>

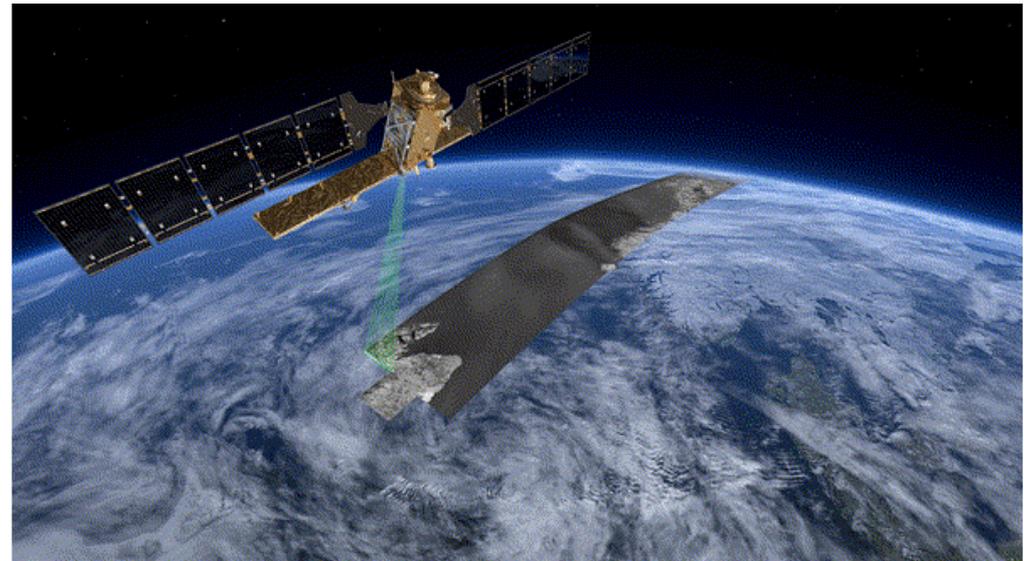
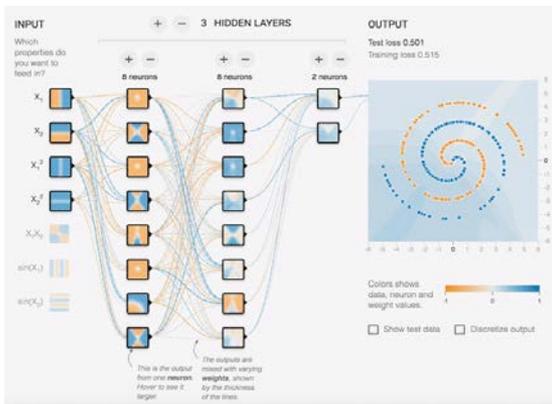
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Advanced Landcover Prediction and Habitat Assessment System (ALPHA)

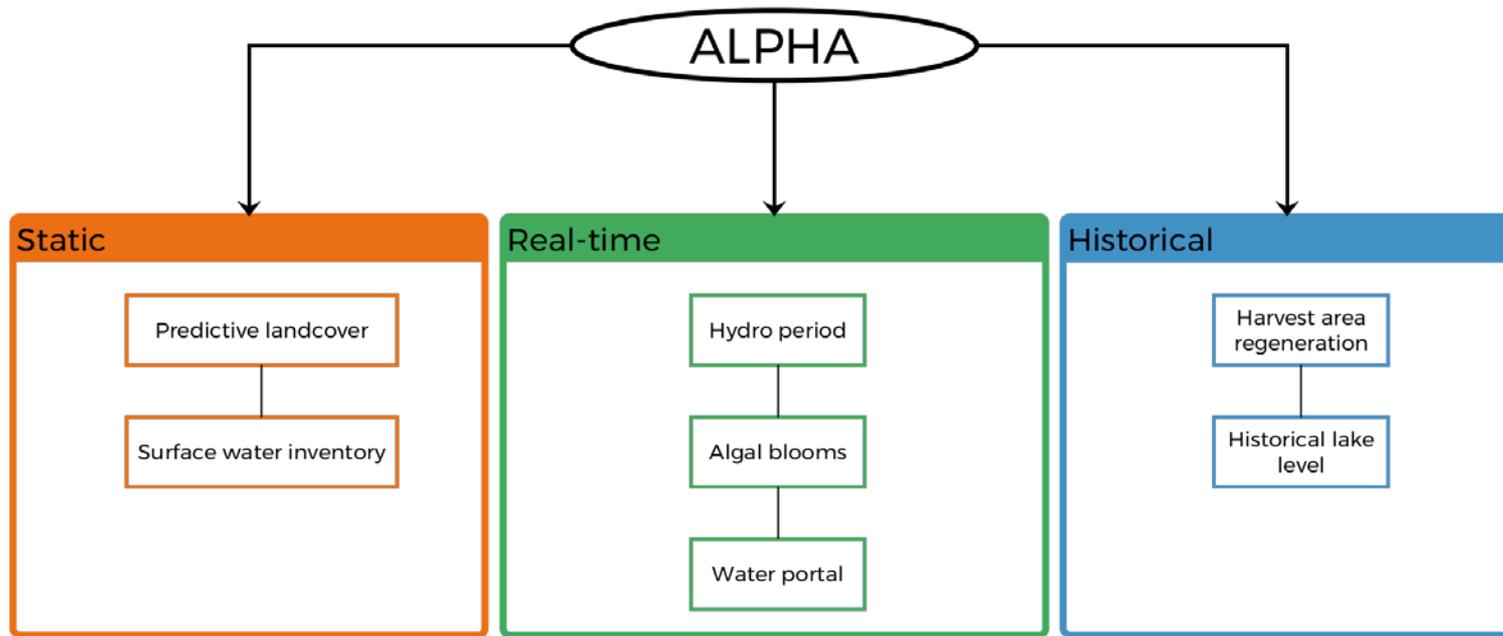


Landcover prediction & classification system

- 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



Advanced Landcover Prediction and Habitat Assessment System (ALPHA)



DeLancey E.R., Kariyeva J., Bried, J., Hird J.N. (2018) "Large-Scale Probabilistic Identification of Peatlands in the Boreal Natural Region of Alberta, Canada using Google Earth Engine, Open-Access Satellite Data, and Machine Learning." *Remote Sensing*.

Hird J.N., DeLancey E.R., McDermid G.J., Kariyeva J. (2017) "Google Earth Engine, Open-Access Satellite Data, and Machine Learning in Support of Large-Area Probabilistic Wetland Mapping." *Remote Sensing*, 9(12): 1315

DeLancey E.R., Kariyeva J., Cranston J., Brisco B. (2018) "Monitoring hydro temporal variability in Alberta, Canada with multi-temporal Sentinel-1 SAR data." *Canadian Journal of Remote Sensing*. 44(1): pp. 1-10

<http://blog.abmi.ca/2019/01/08/seeking-and-finding-alpha/#.XEudvGhKiUm>

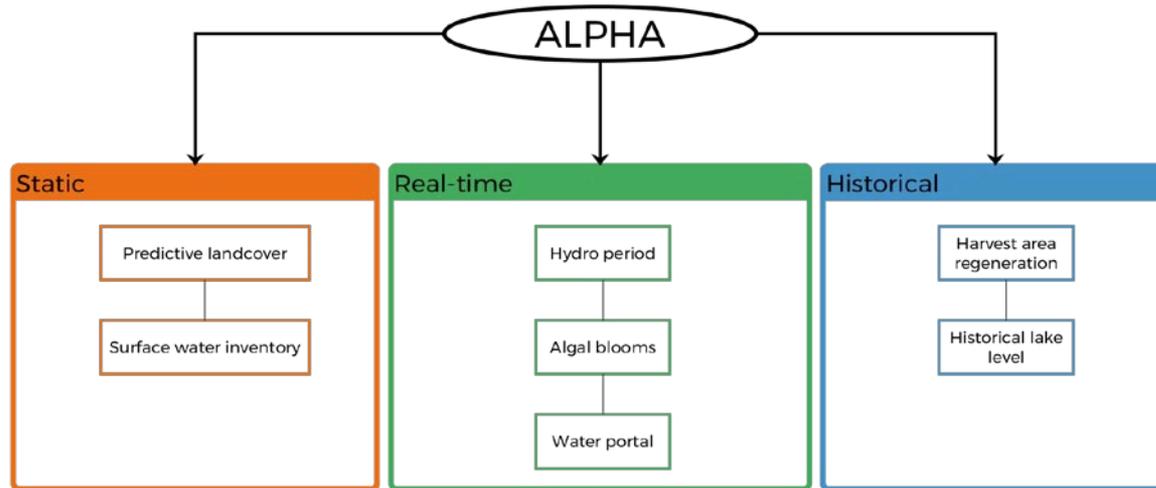
<http://abmi.ca/home/data-analytics/da-top/da-product-overview/GIS-Land-Surface/Predictive-Landcover.html?scroll=true>

<http://abmi.ca/home/data-analytics/da-top/da-product-overview/GIS-Land-Surface/Boreal-Fen-Probability.html>

<http://abmi.ca/home/data-analytics/da-top/da-product-overview/GIS-Land-Surface/Hydro-Temporal-Variability.html>

<http://abmi.ca/home/data-analytics/da-top/da-product-overview/GIS-Land-Surface/Boreal-Surface-Water-Inventory.html>

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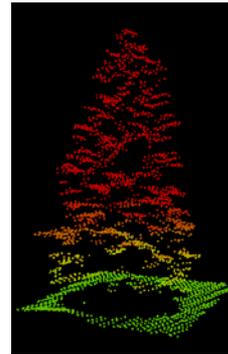
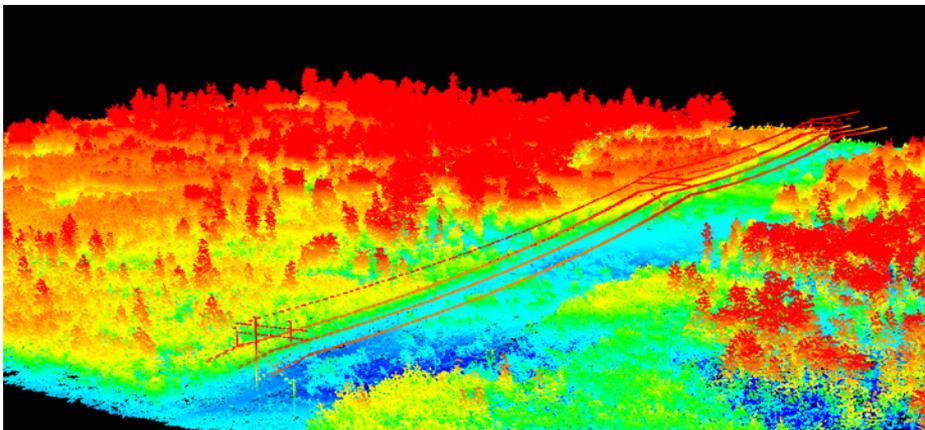
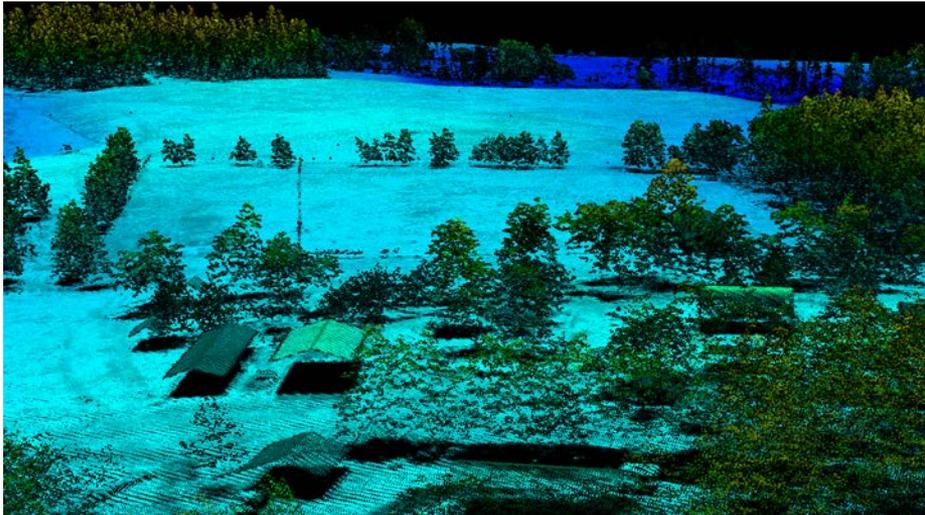


- **Static data sets: hard copy downloadable products**
 - Alberta-wide wetlands extent
 - Permanent water
 - Other landcover classes
- **Real-time & historical data: web-based applications**
 - Real-time water portal and water attributes
 - Historical human footprint regeneration
 - Historical surface water trends and climate

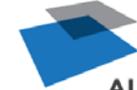
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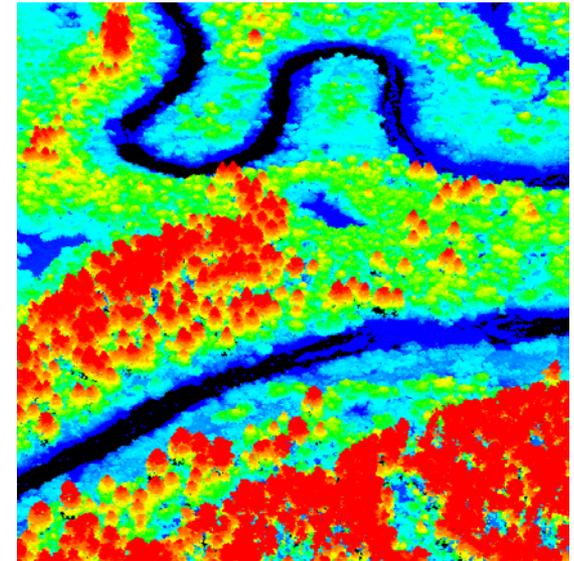
Geospatial Data Acquisition (GDA)



GDA Partnership



ALBERTA DATA
PARTNERSHIPS



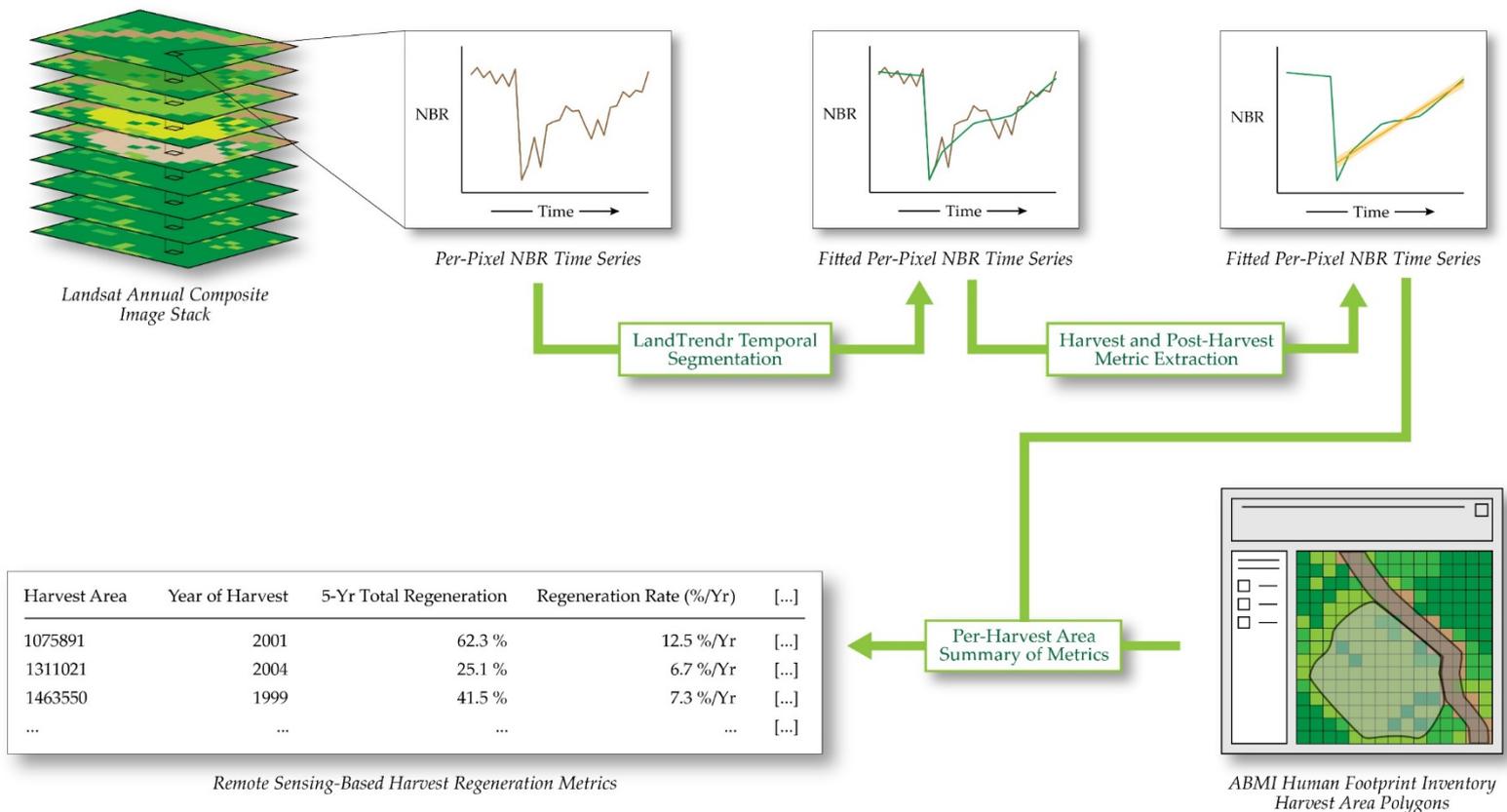
- Human Footprint mapping
- Vegetation analysis/mapping
- Terrain analysis/mapping

Advanced Landcover Prediction and Habitat Assessment System (ALPHA)



Harvest Areas (and other HF features) regeneration

Leverage recent technological advances (i.e., online cloud computing services) and big geospatial data streams

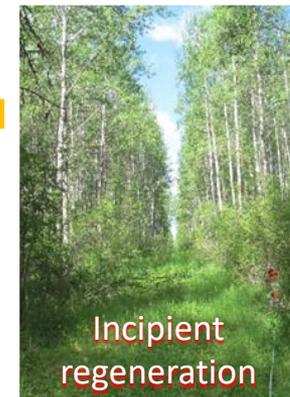
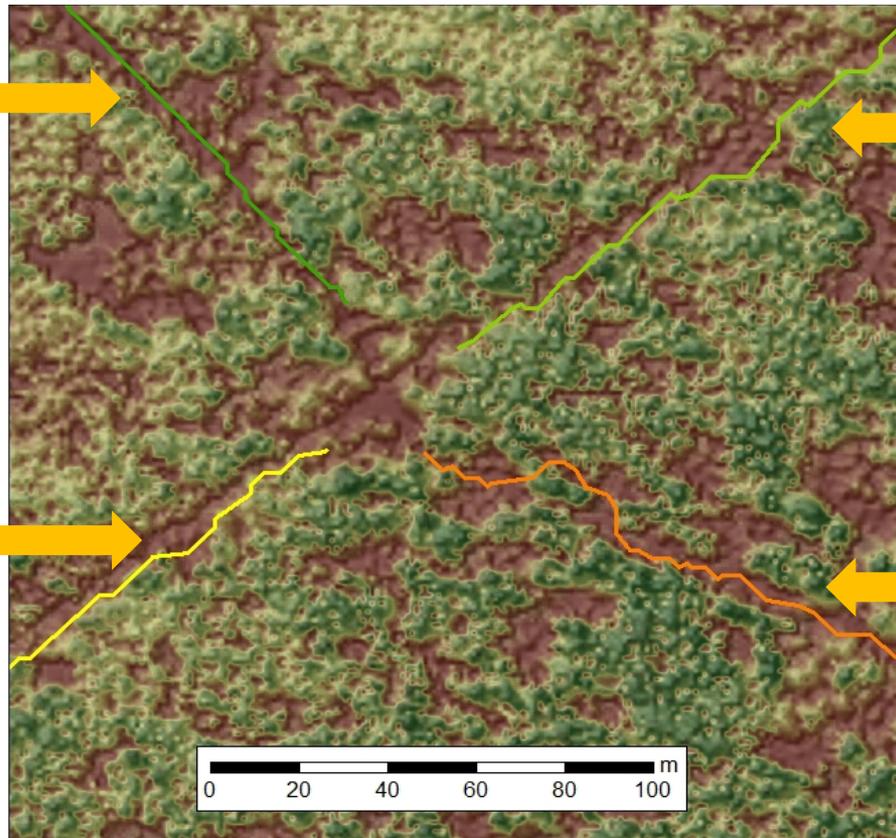


Advanced Landcover Prediction and Habitat Assessment System (ALPHA)



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

