Reconstruction of the history of Canada's forests using Landsat time series: A status report

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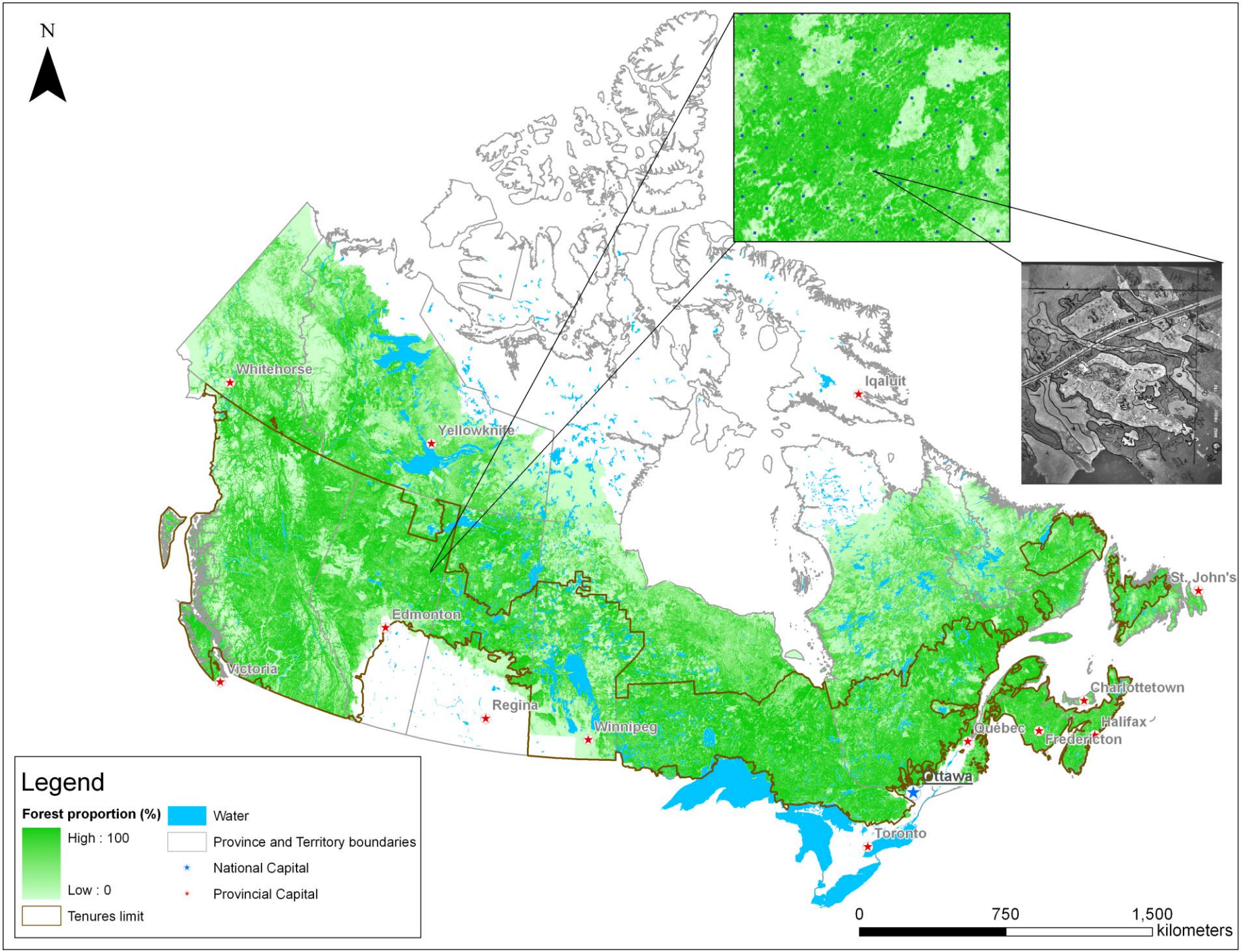
Conclusions

- Change and trends inform cover and structure
- Land cover informed by change and logical transitions
- Lidar-plots used to cal/val national structural estimates
  - Change metrics used in modeling
- Canada-wide image composites and change metrics (1984-2012)
  - have a high spatial resolution, temporally dense, data cube for science questions and data products
  - National disturbance regimes
  - Harvest and recovery regimes
  - Carbon-relevant indicators of change and land cover
- National surface water change
- Incorporation of Sentinel-2 measures
  - Need for interoperability


N
Whitehorse
Yellowknife
Iqaluit
Edmonton
Victoria
Regina
Winnipeg
St. John's
Charlottetown
Halifax
Québec
Fredericton
Ottawa
Toronto
Legend
Forest proportion (%)
High : 100
Low : 0
Tenures limit
Water
Province and Territory boundaries
National Capital
Provincial Capital
0
750
1,500
kilometers

Multi-year BAP (2009-2011)
L5 and L7

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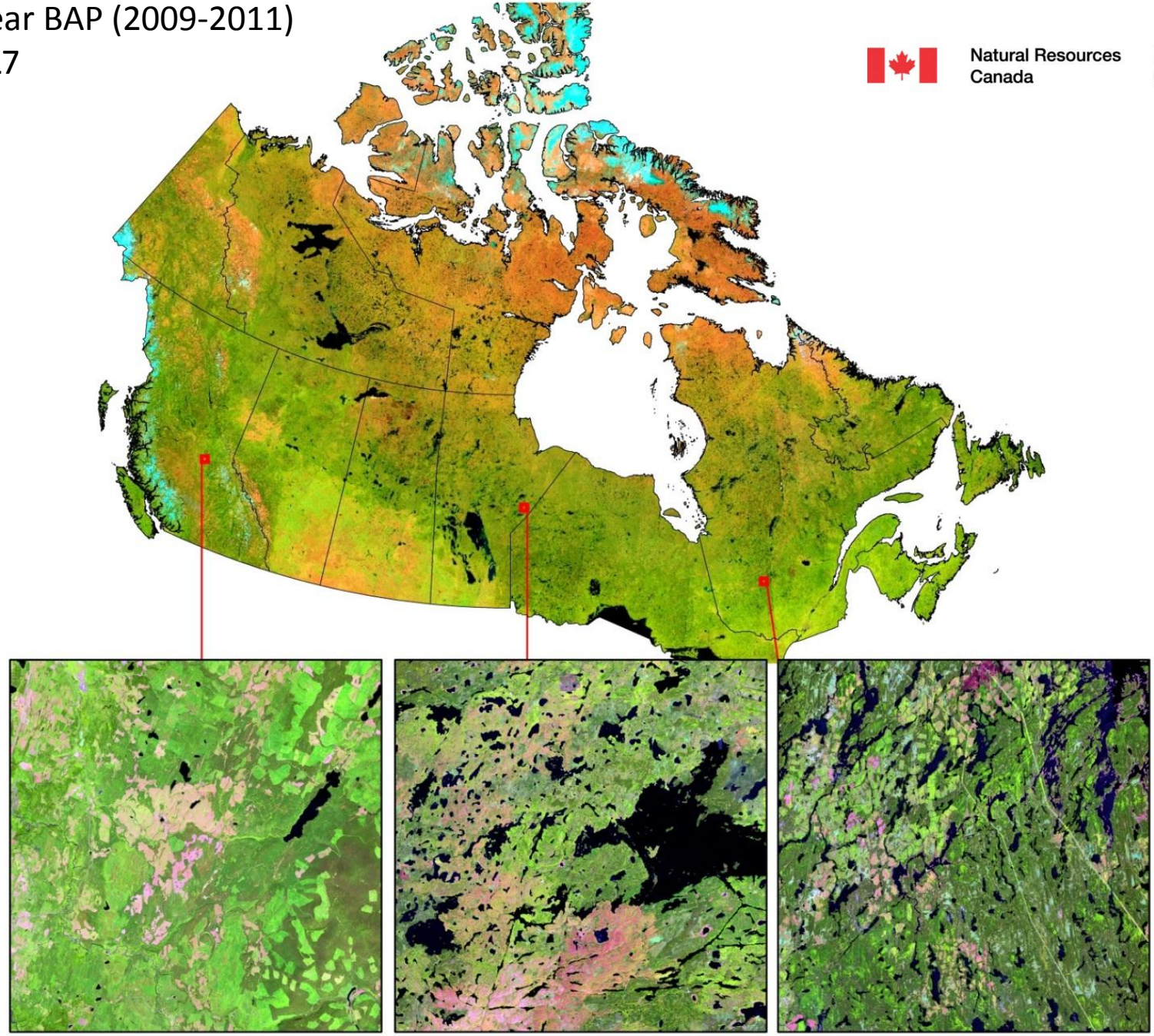
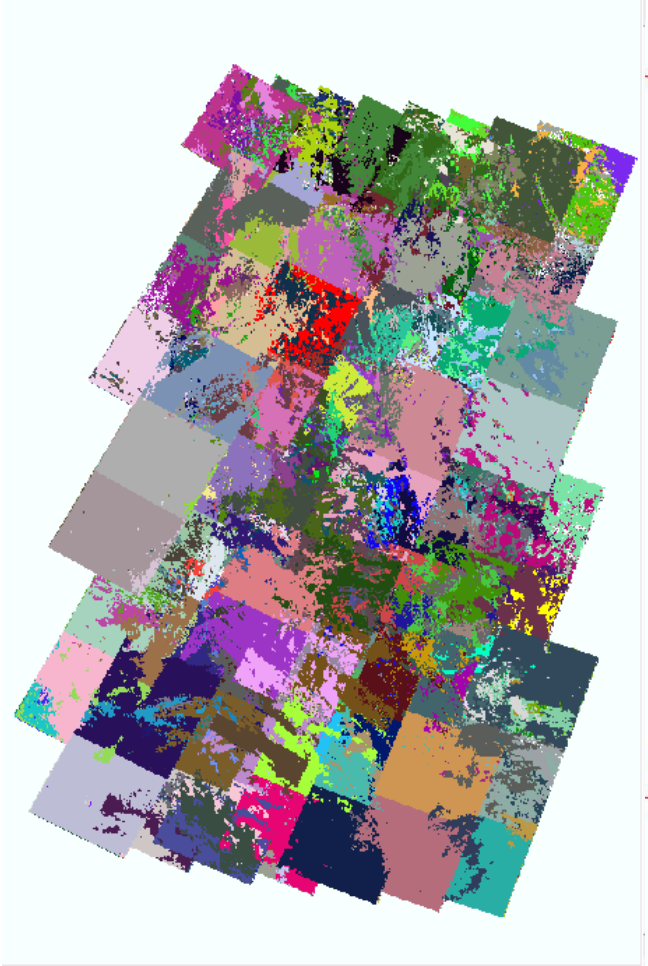
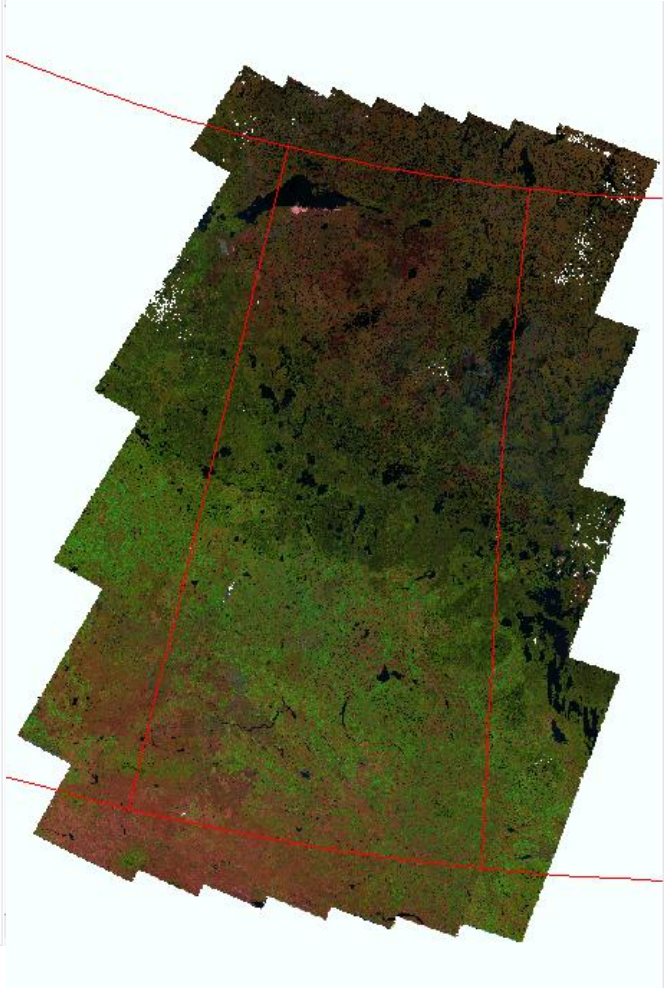


Best-Available Pixel (BAP) Composite for Saskatchewan

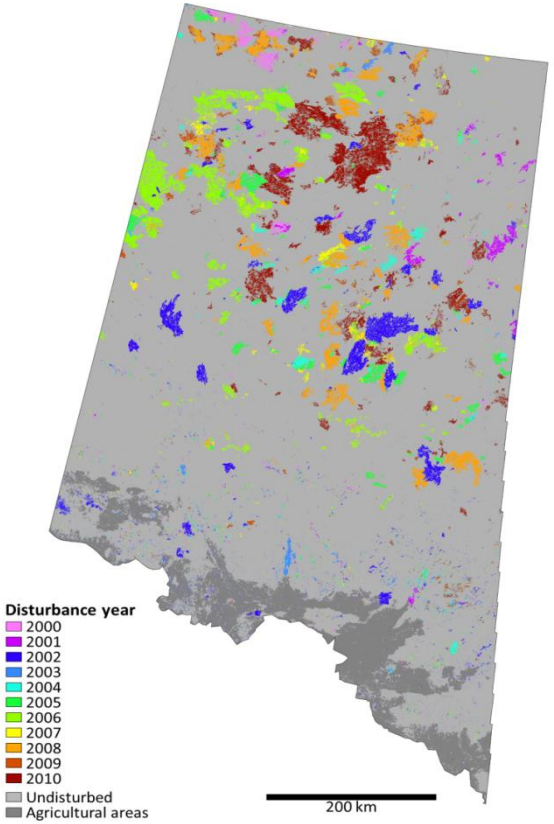
2010 source images



2010 BAP composite



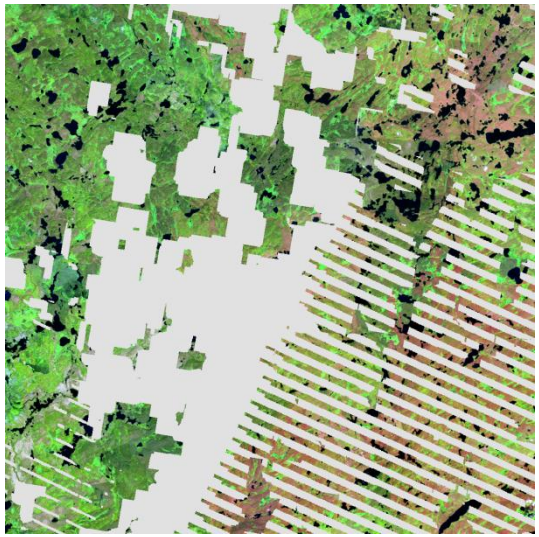
Disturbance history 2000-2010



Issue to address

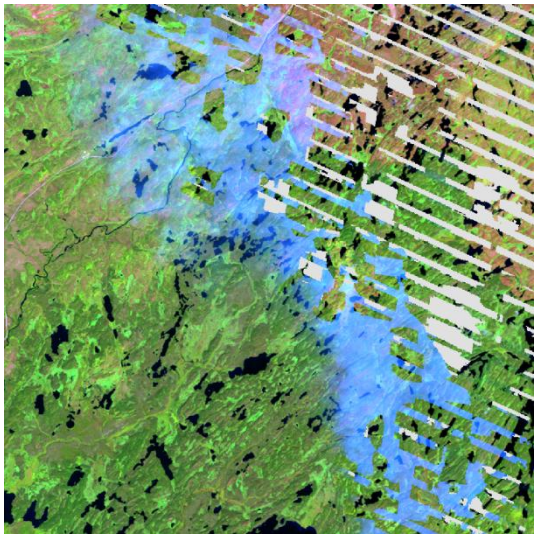
Limitations

No *best* pixel = data gaps



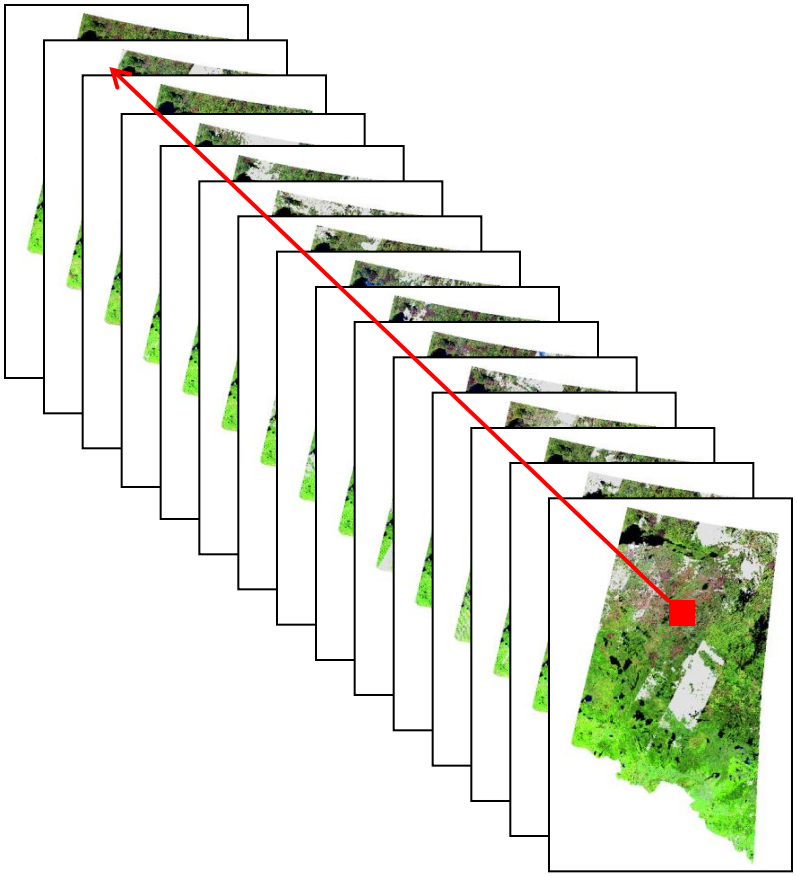
Undetected clouds and shadows

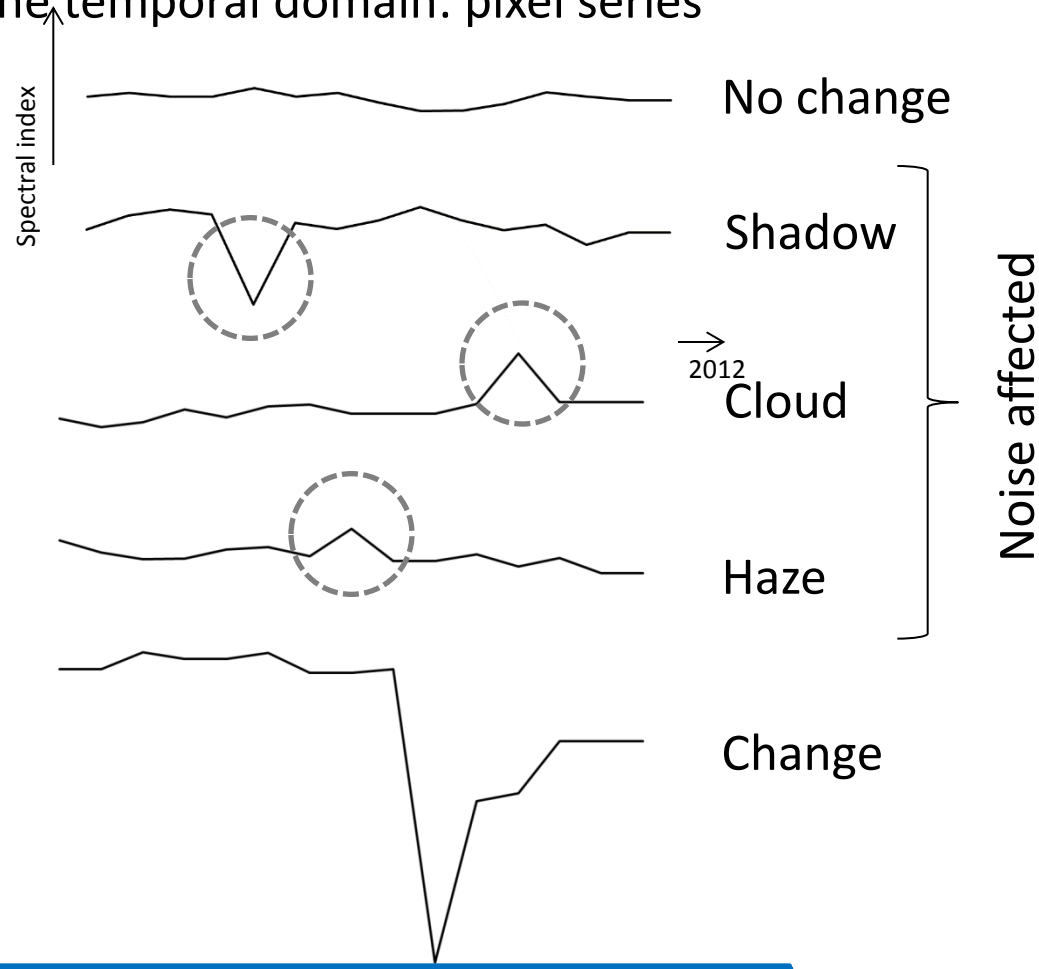
Haze, smoke, etcetera

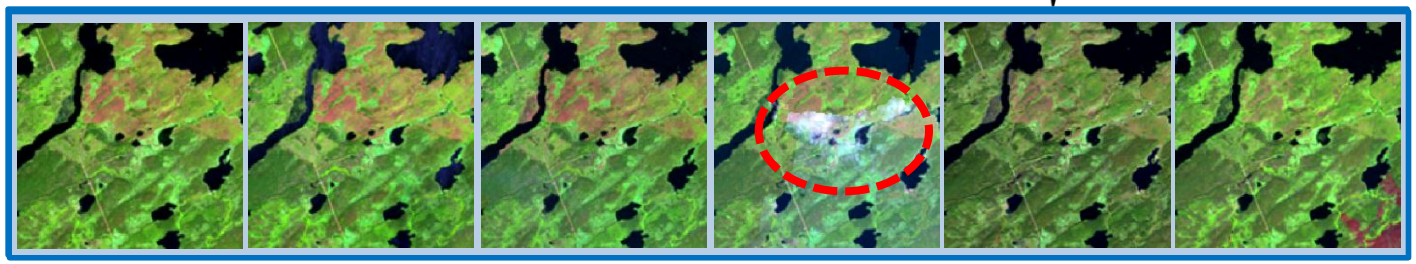


Methods | Pixel-series analysis

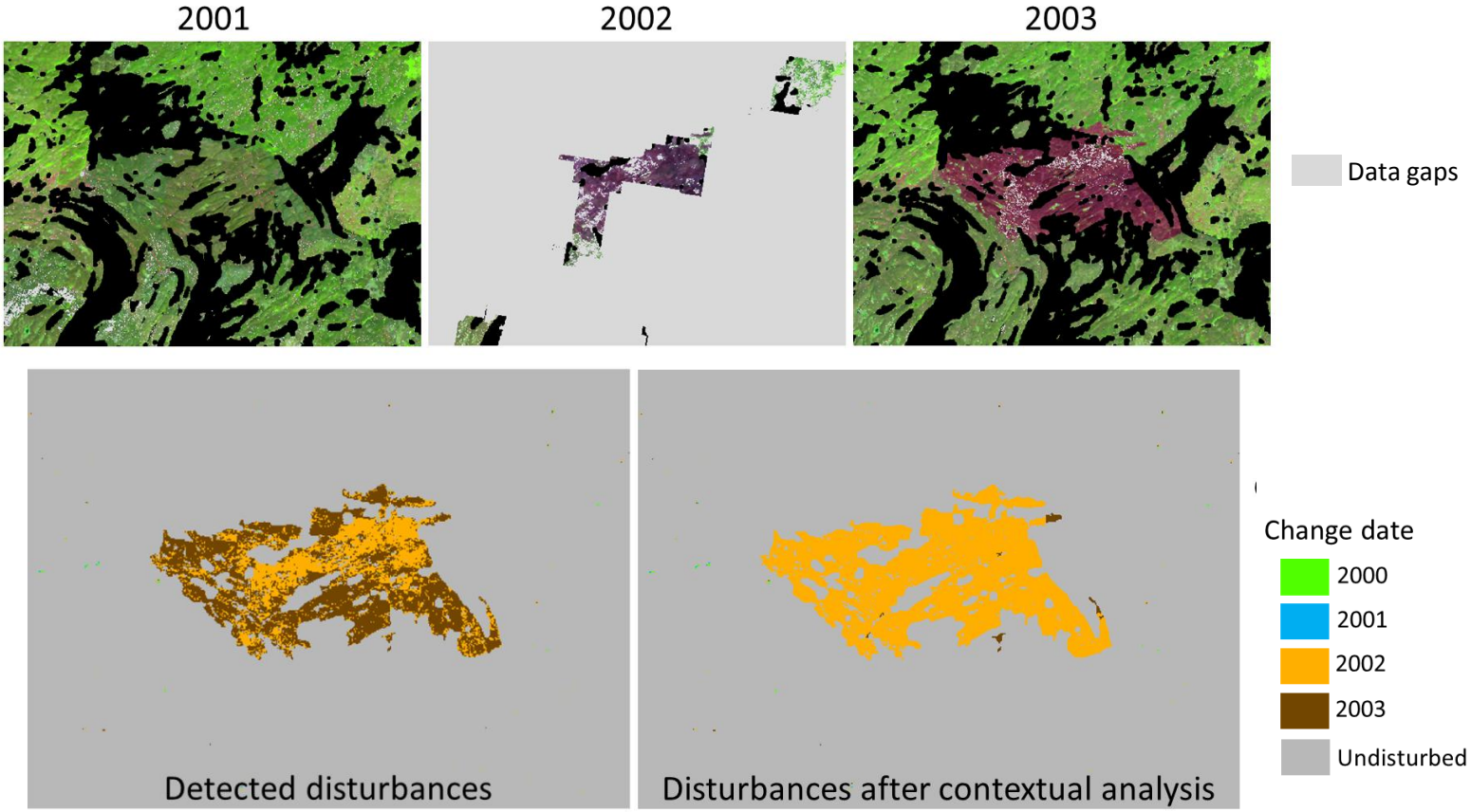
Analysis of the spectral values in the temporal domain: pixel series





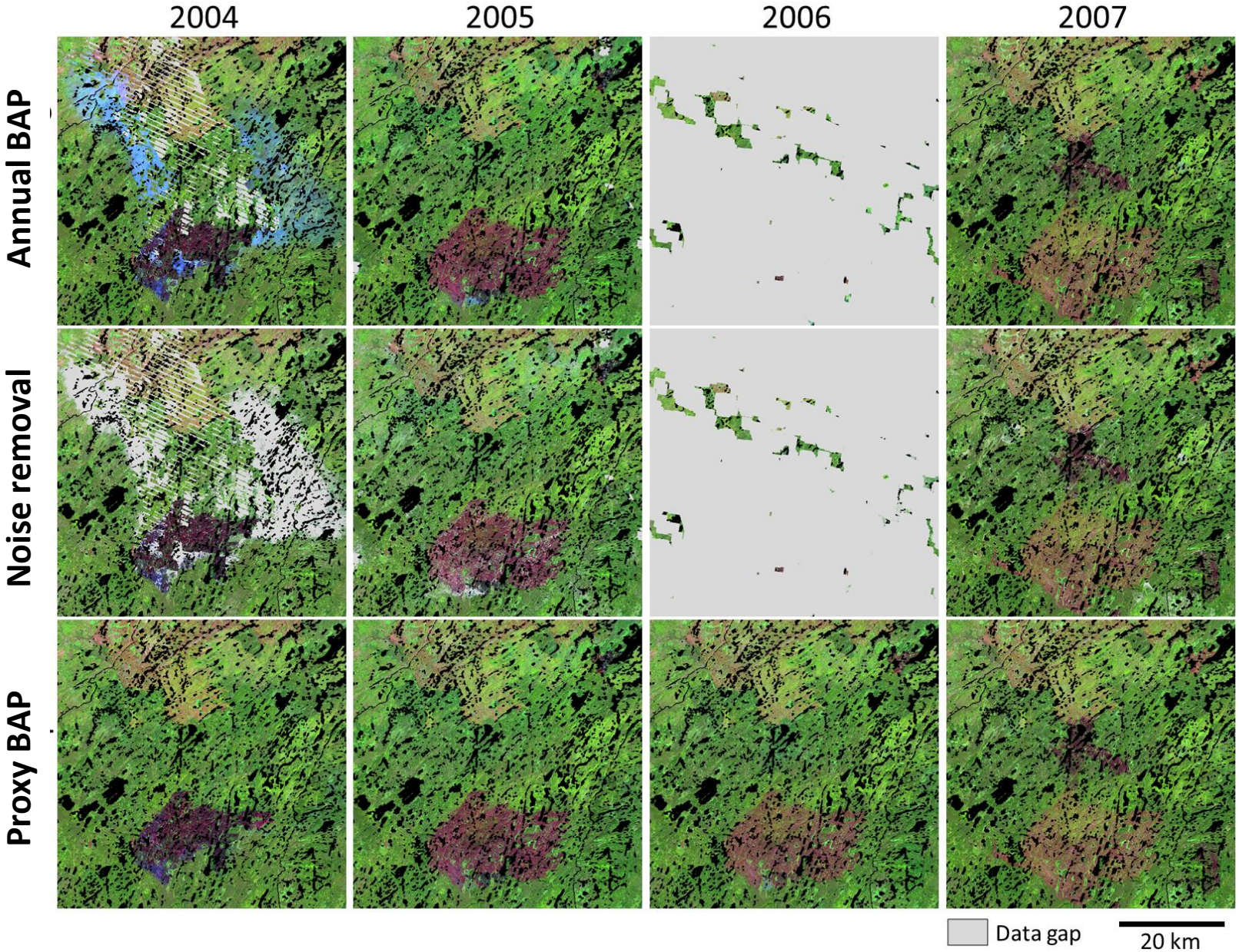


Methods | Contextual analysis



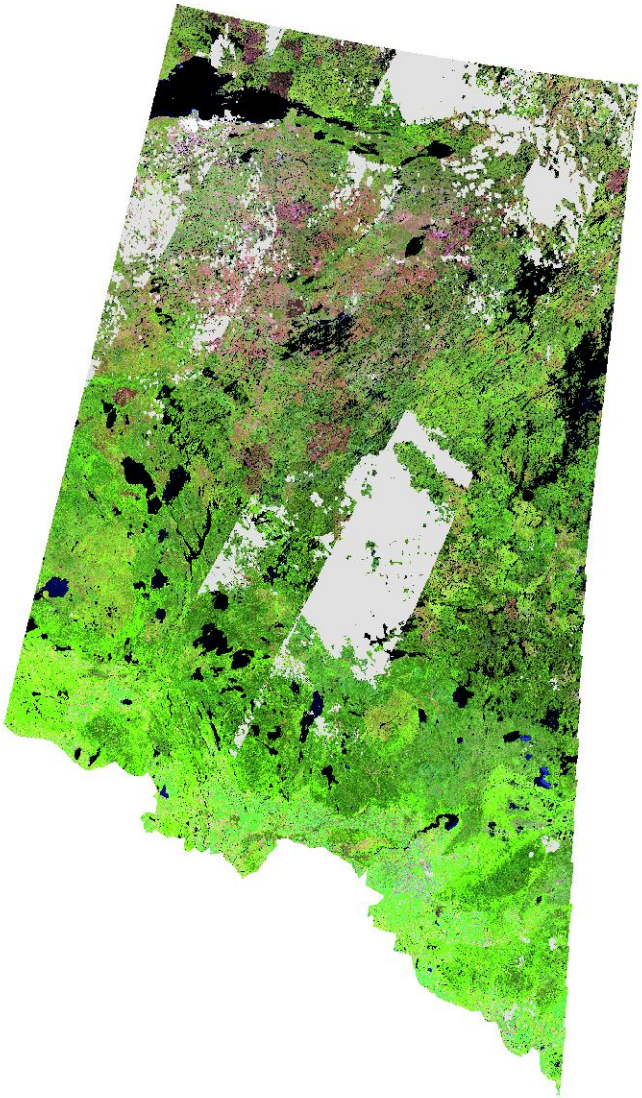
- Detected changes may show **spatial inconsistencies**
- Object based contextual analysis of the changes

Results | Image composites



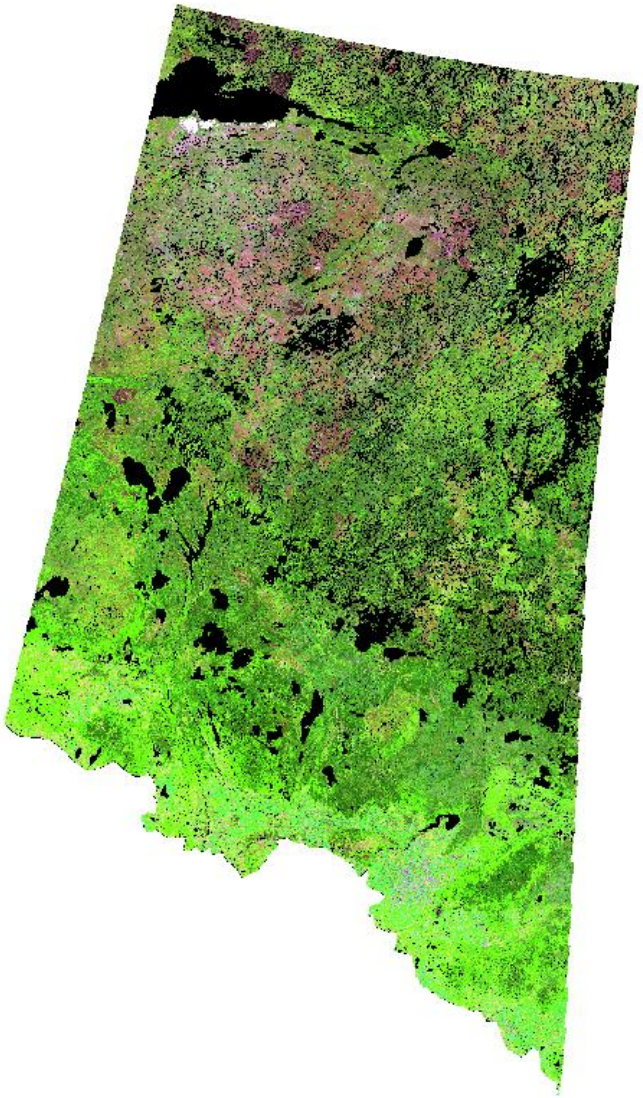
Results | Image composites

Annual BAP composites

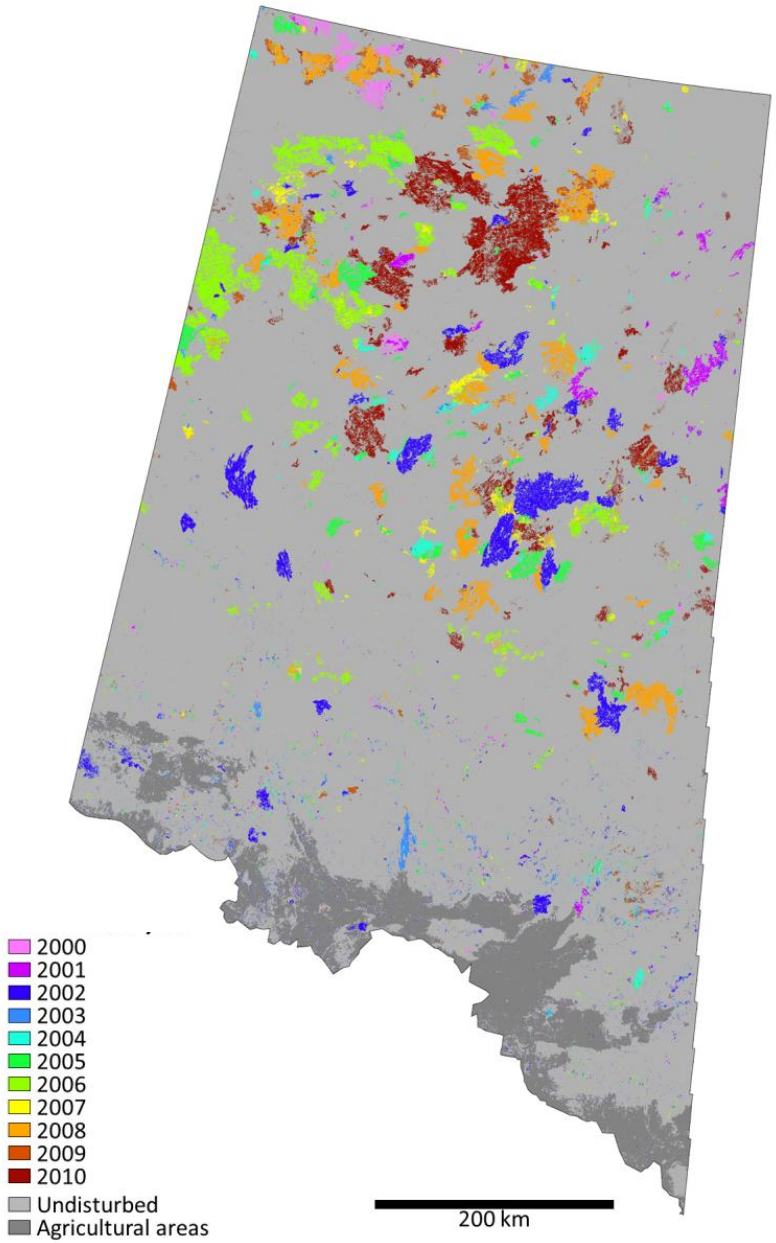


2000

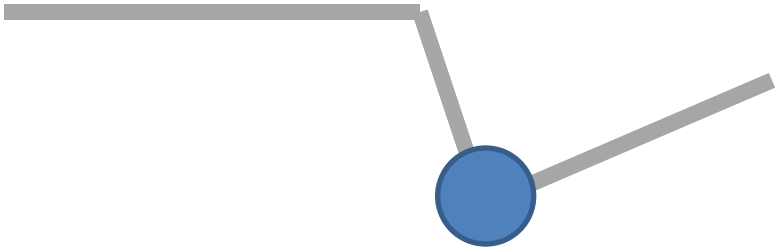
Proxy BAP composites



Results | Change detection outputs



	Metric
Pre-change	Pre-change magnitude variation
	Pre-change persistence
	Pre-change evolution rate
Change	Change year
	Change persistence
	Change magnitude variation
	Change rate
Post-change	Post-change magnitude variation
	Post-change persistence
	Post-change evolution rate



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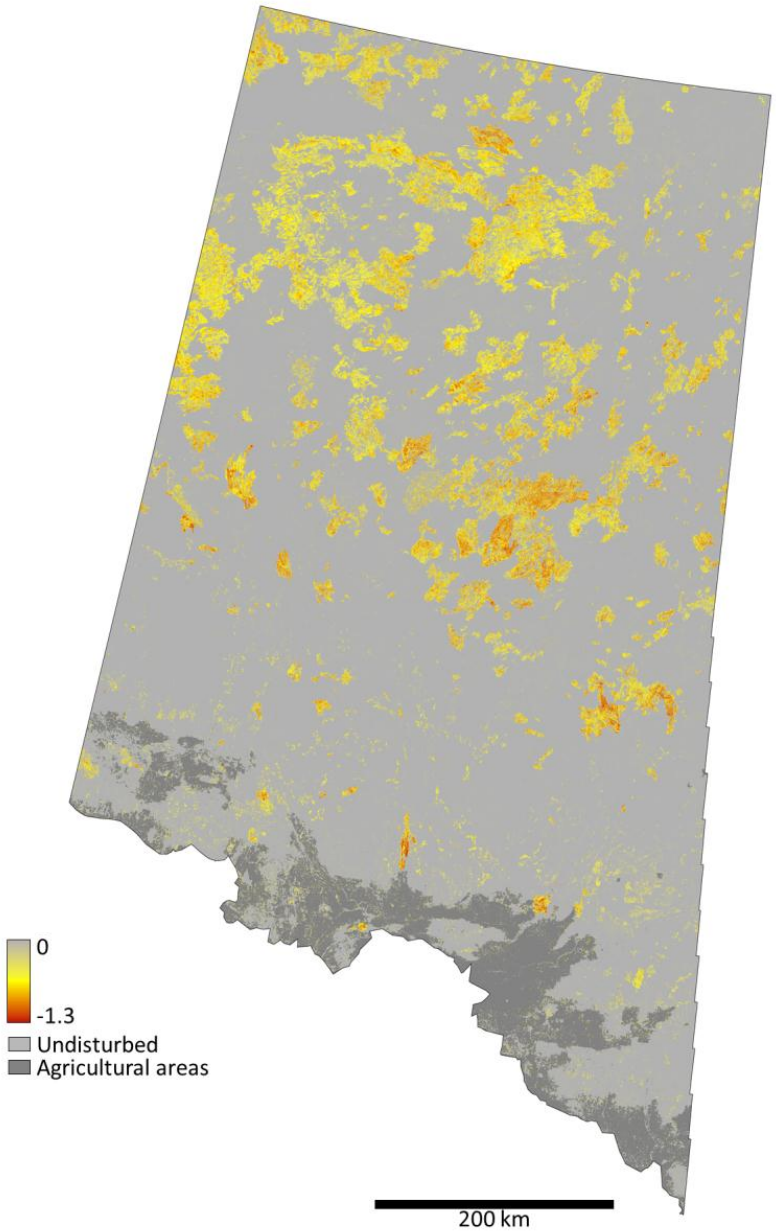

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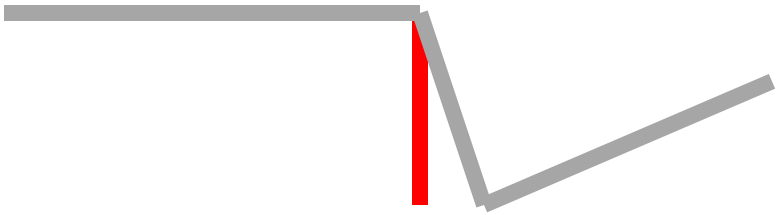
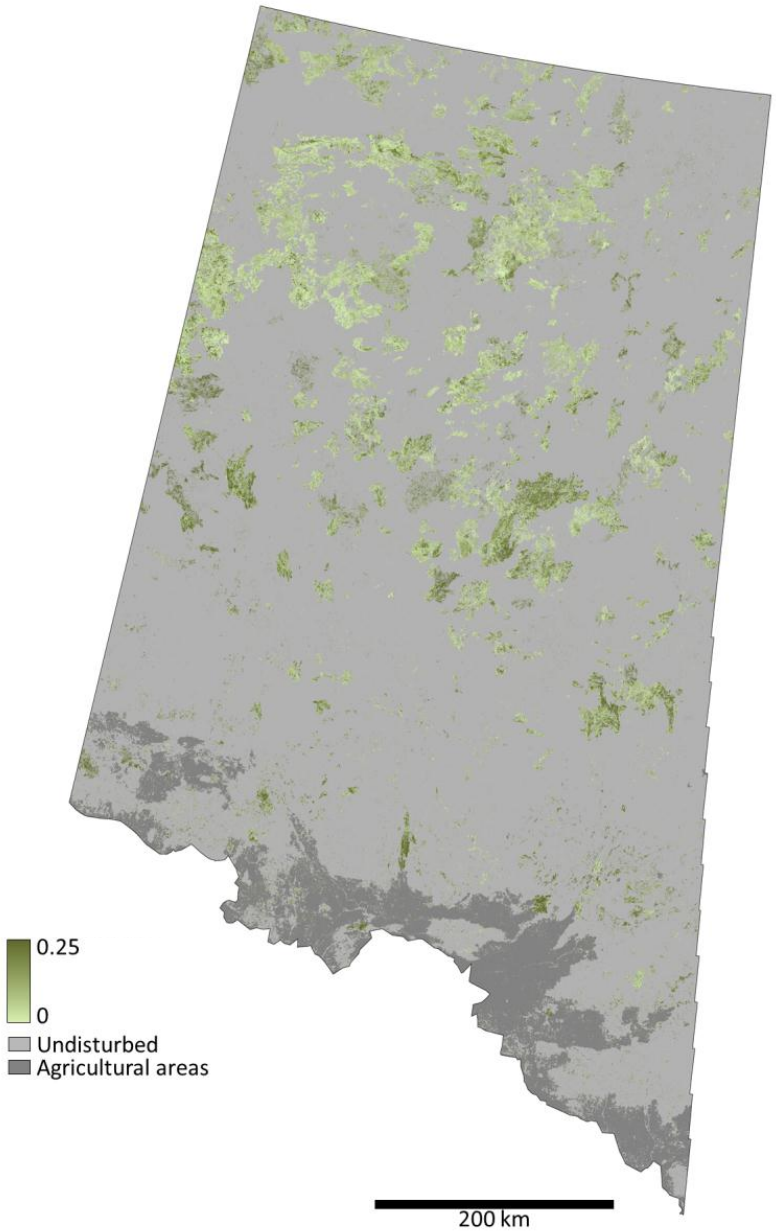


Results | Change detection outputs



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Change	Change year
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	Change rate
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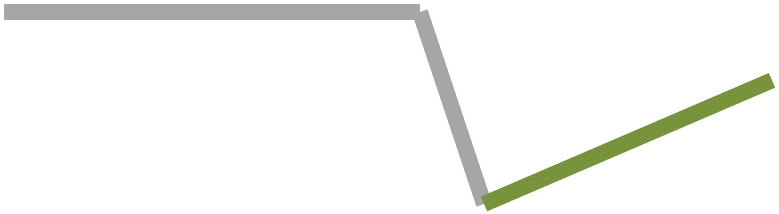
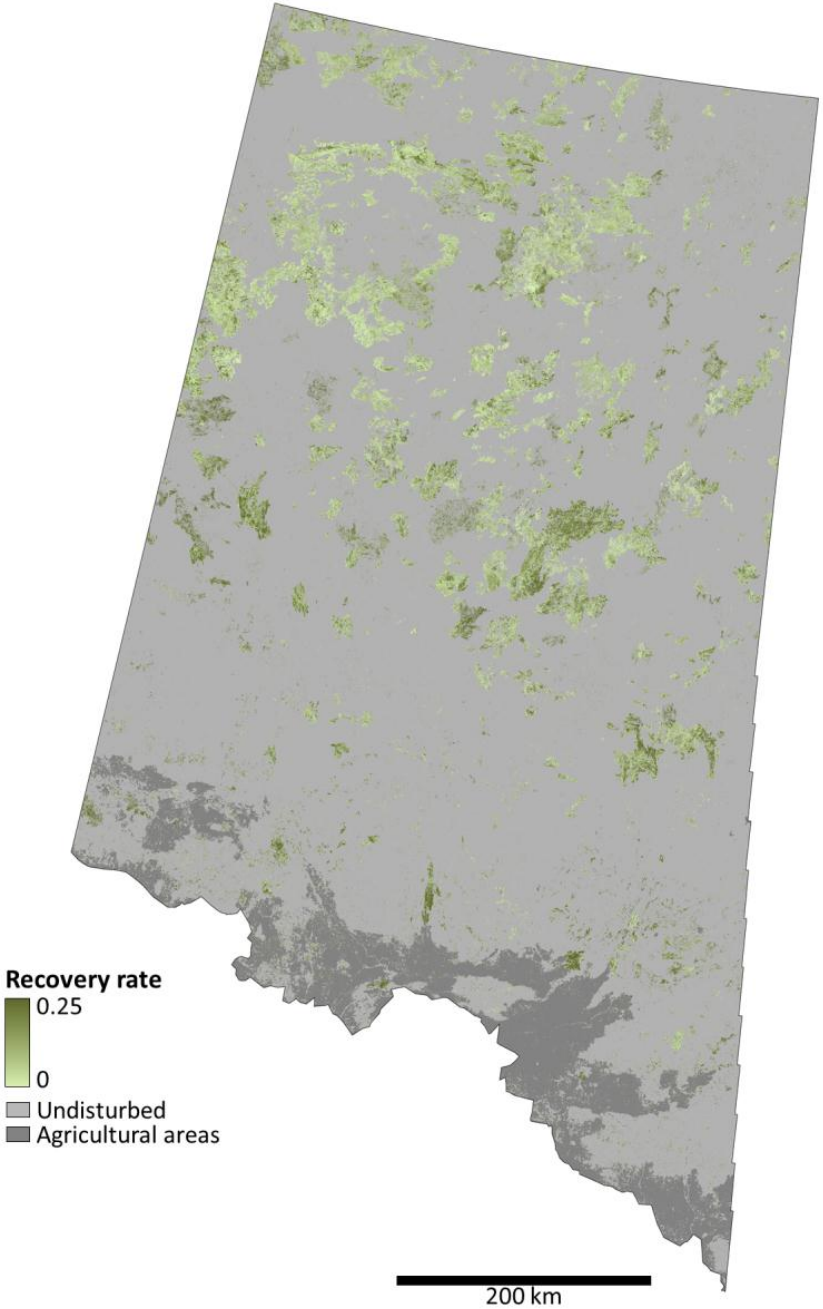
	Post-change persistence
	Post-change evolution rate





Closing the disturbance loop

- Characterization of post-disturbance recovery.
  - Classification (herb to shrub)
  - Regeneration success
  - Biomass uptake

Thank you

Contact Information:

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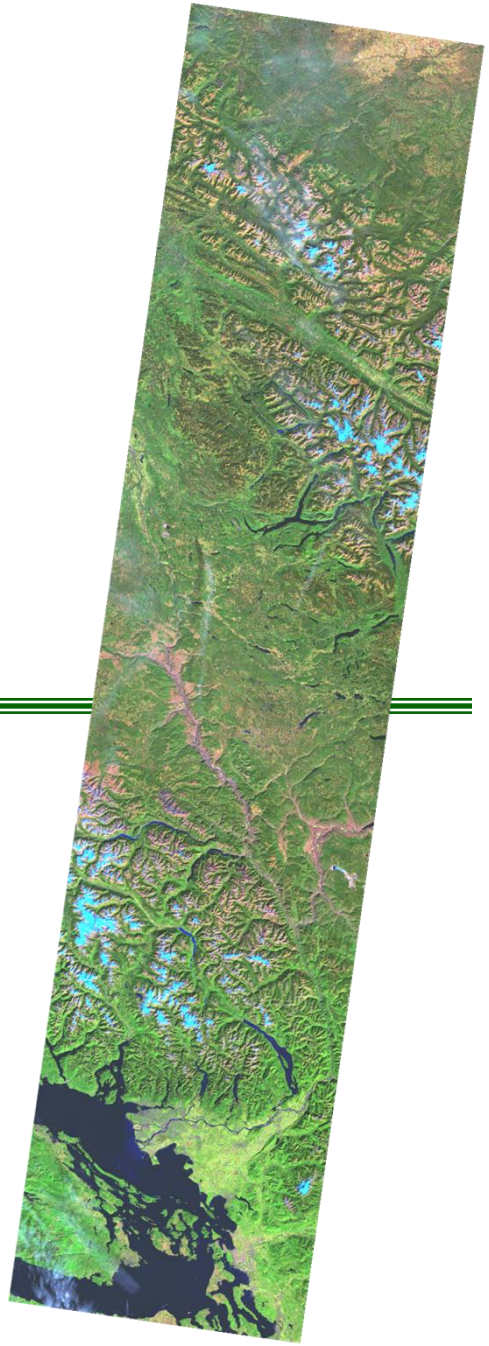
Canada

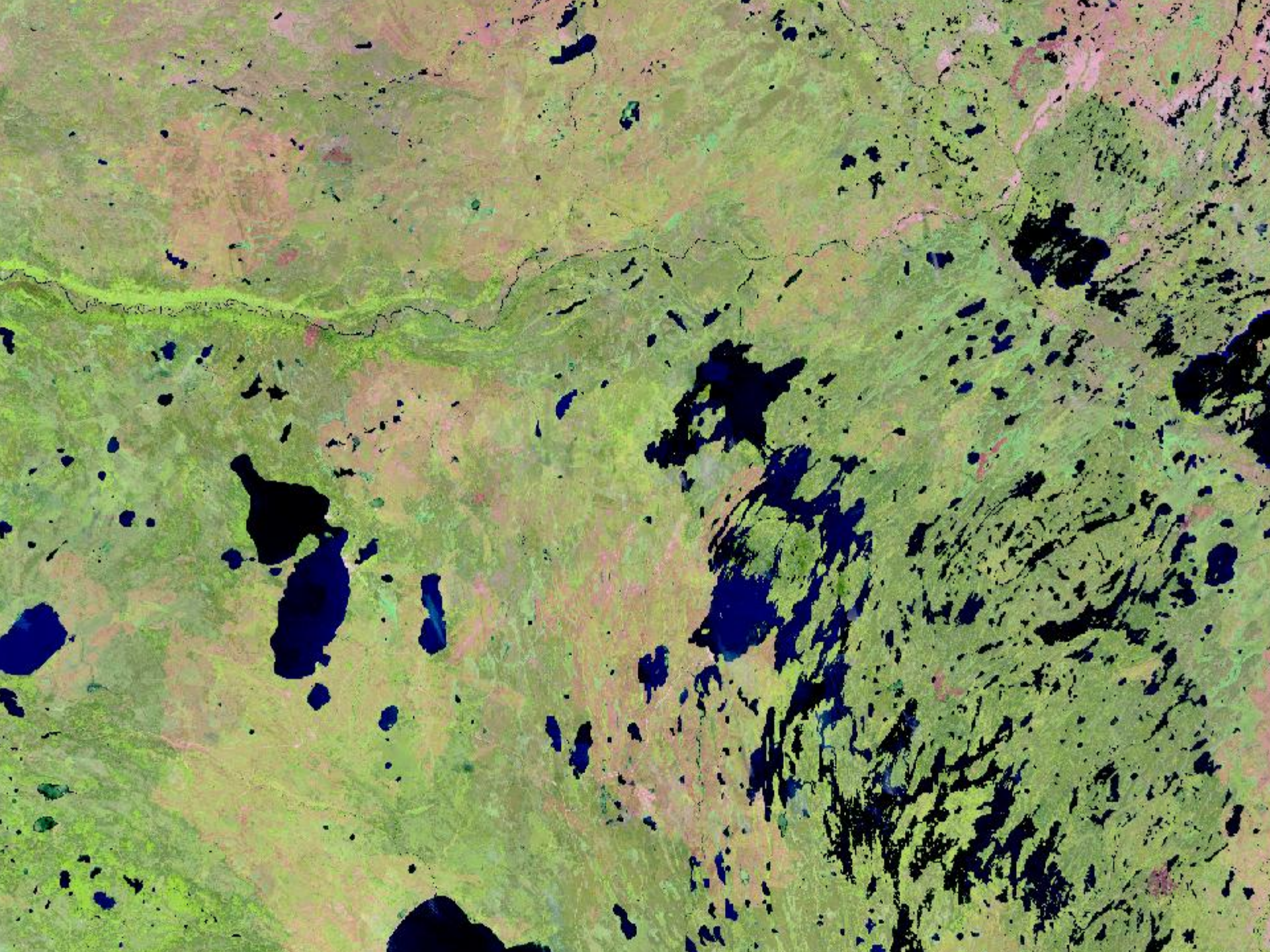
Natural Resources Canada | Ressources naturelles Canada

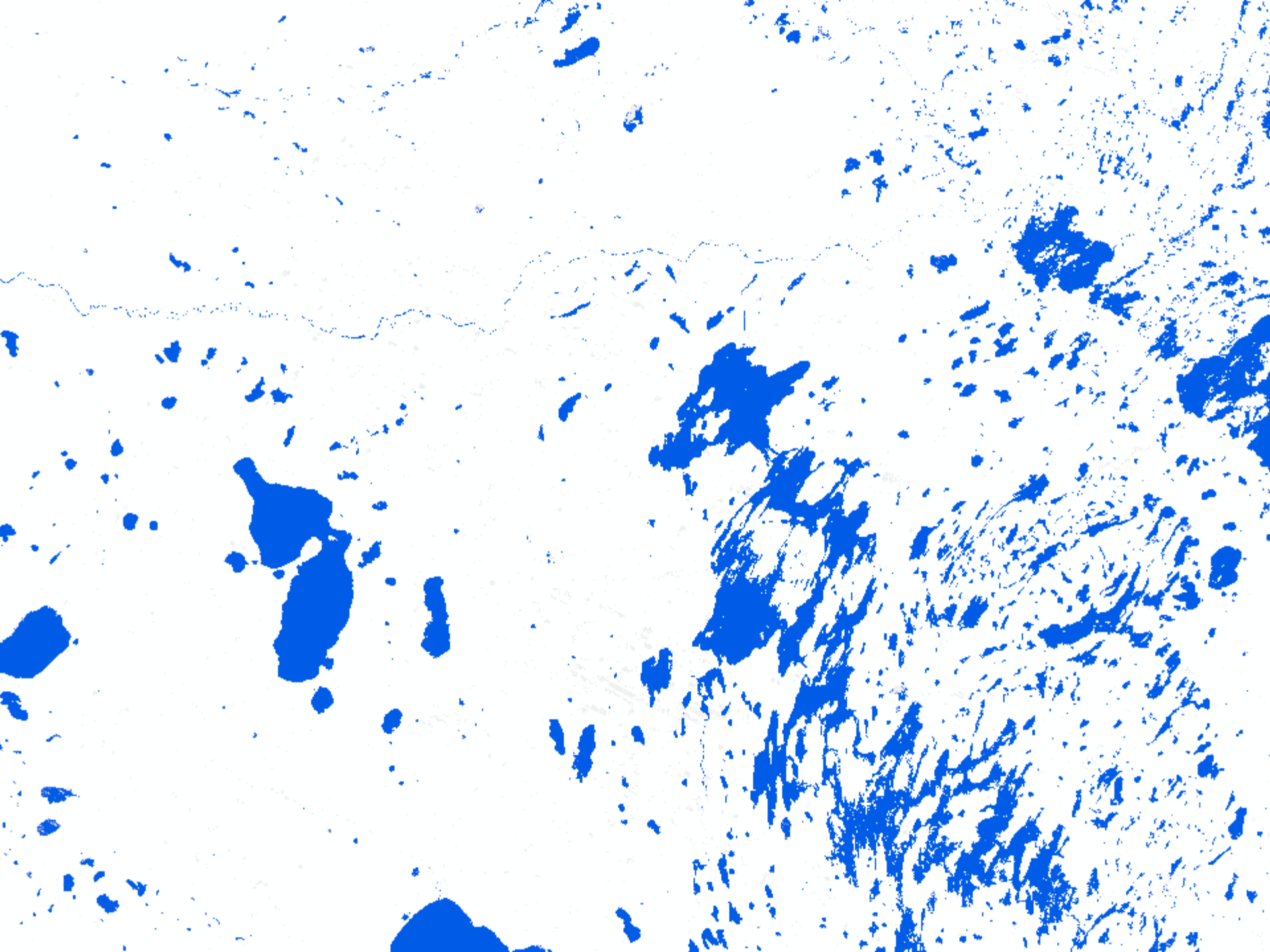
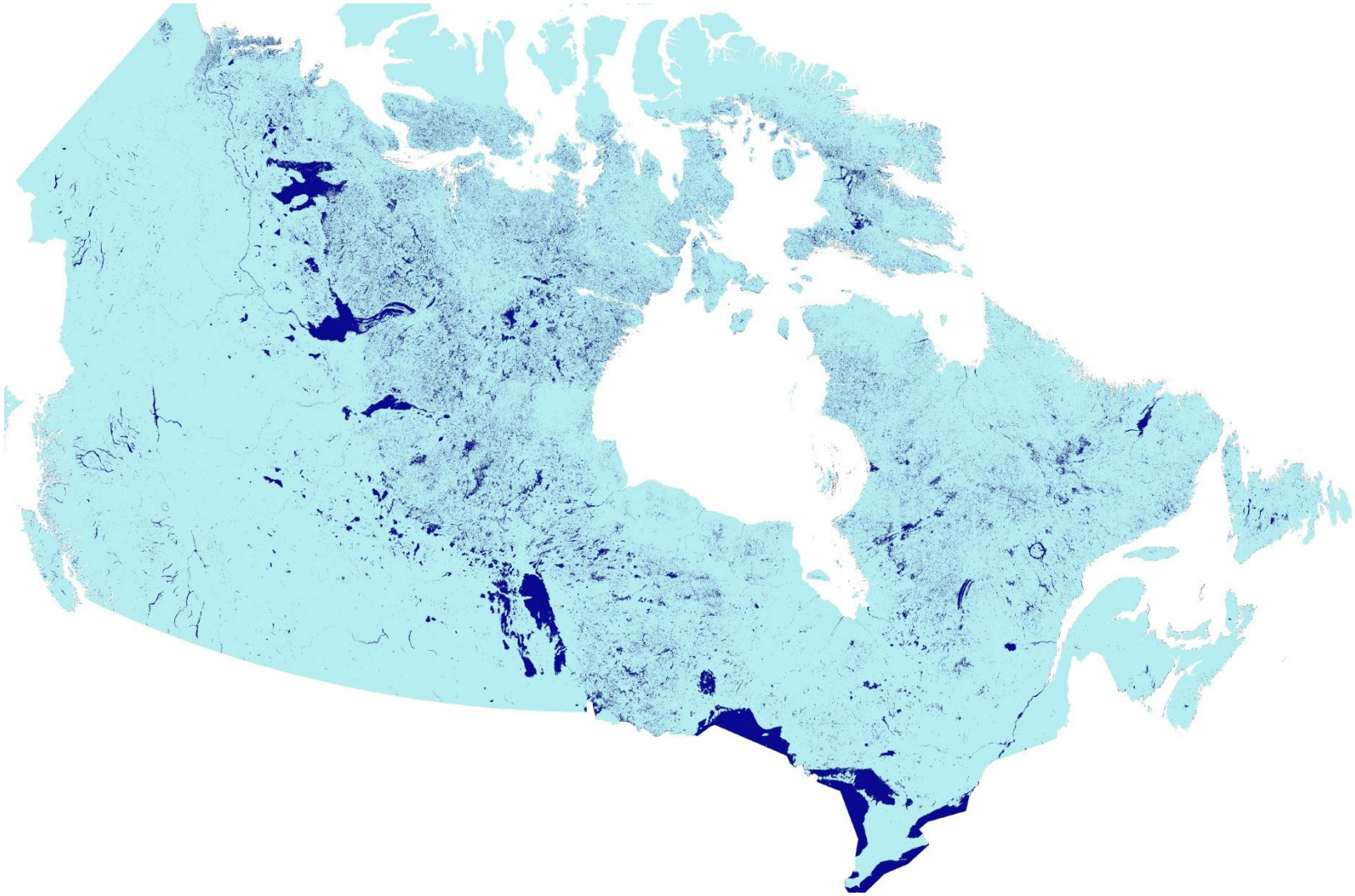
Canadian Forest Service | Service canadien des forêts



Publications:

http://cfs.nrcan.gc.ca/publications/authors/read/11091





Land surface water ca. 2010