Supporting reporting through the Global Biodiversity Framework: Generating ecosystem extent and condition statistics

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Statistics Canada, Environment Accounts and Statistics Division, Census of Environment

Statistics Canada Statistique Canada

Canada

Outline

- Context
- Reporting on indicators for GBF Goal A: protect and restore ecosystems
- An ecosystem account workflow
- Ecosystem accounting outputs
- Linear feature dataset improvements
- Current work and challenges

Context

- Environment Canada's Canadian Wildlife Service (CWS) is the lead on Canada's Nature Strategy and coordinates the reporting on the GBF targets and indicators.
- Statistics Canada is the national agency responsible for producing Canada's System of Environmental-Economic Accounting (SEEA) accounts.
- This presentation provides an overview of ecosystem accounting workflows that will supply data for the ecosystem extent and condition accounts, and support reporting on global biodiversity indicators.

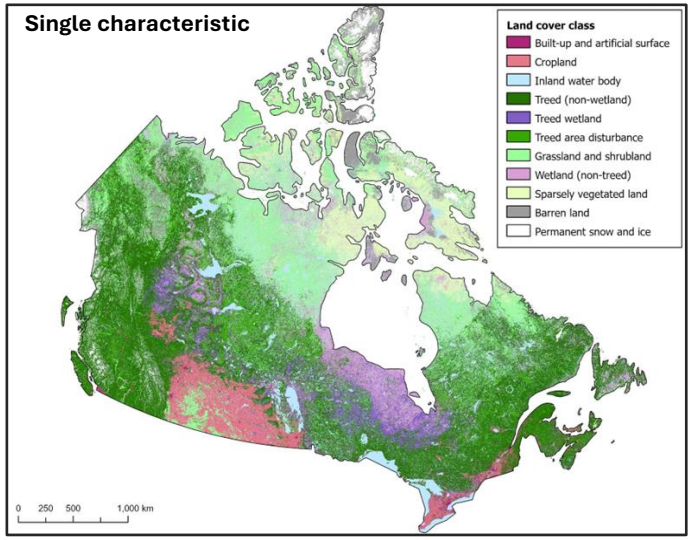
Statistics Canada reporting on GBF Goal A indicators

- Currently Statistics Canada is reporting on GBF indicator A.2 using land cover and land use data
- Statistics Canada is developing a stratified ecosystem dataset for more comprehensive reporting on A.2, the extent of natural ecosystems
- Statistics Canada is collaborating with national and provincial partners on mapping ecosystems in alignment with IUCN GET and national vegetation classifications, which will support reporting Goal A indicators

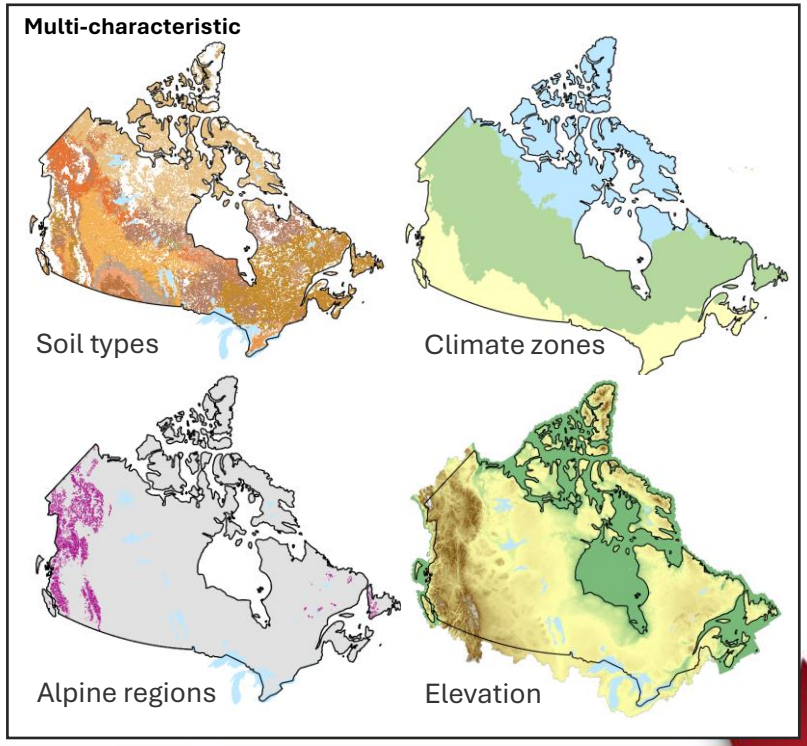
Three approaches for mapping and accounting for ecosystems

1. **Single characteristic:**
   - Earth observation-derived land cover as proxy
2. **Multi-characteristic:**
   - Integrating foundational ecosystem characteristics using national datasets
   - A "statistical" ecosystem extent
   - Tool for bridging between approaches (i.e., for mapping IUCN GET ecosystems)
   - Similar approach as World Ecosystem Extent Dynamics project (WEED), World Ecosystems (USGS), ARIES
3. **Comprehensive: IUCN GET**
   - Based on ecosystem function
   - Alignment with Canadian National Vegetation Classification

Global Ecosystem Typology



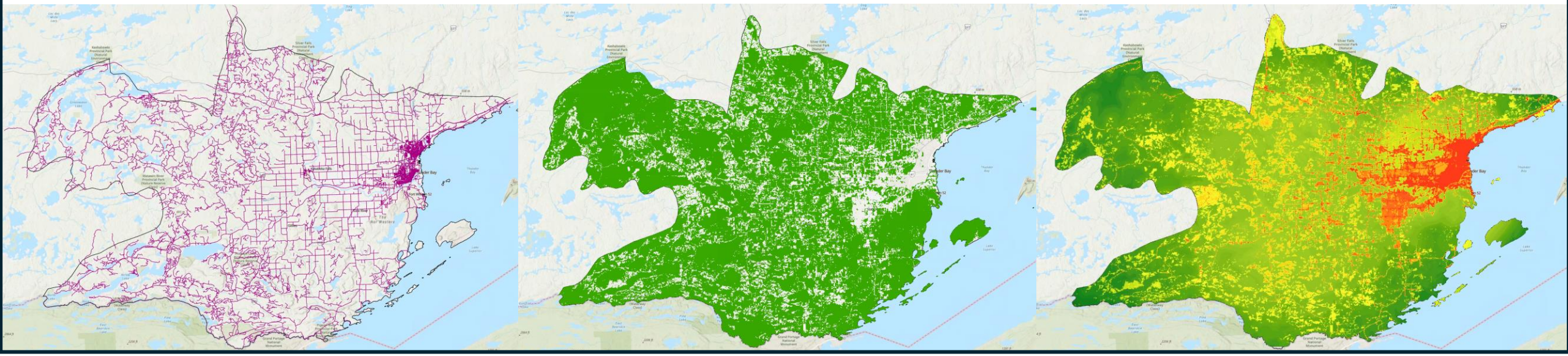
Source: Statistics Canada, Census of Environment Program, (Cat no. 16-510-X).



An ecosystem account workflow

Example: Thunder Bay, Ontario, CAN

Linear features → Fragmentation → Human Landscape Modification Index



Human Landscape Modification Index Formula

1. Linear feature fragmentation index (LFFI)= (LF Density * .5) + (LF Distance *.5)
2. Natural patch fragmentation index (NPFI) = (Natural patch size (avg) *.5) + (Distance to nearest natural patch *.5)
3. Fragmentation index (**FI**) = (LFFI *.5) + (NPFI *.5)
4. Green index (**GI**) = Natural (4), Forest harvest (3), agriculture/softscape (2) and Urban/hardscape (1)
5. **HLMI = (GI *.5) + (FI *.5)**

- ❖ All are re-scaled - 0 to 100

Ecosystem accounting outputs

1. Linear features

- Improve land cover and land use accounts – intensively modified, built-up and anthropogenic classes
- Statistics for ecological and hydrological profiles
- Contribute to improving GBF A.2 Extent of natural ecosystems

2. Fragmentation

- Statistics for ecosystem condition accounts
- Statistics for ecological and hydrological profiles
- Contribute to reporting on GBF A complementary and component indicators

3. Human Landscape Modification Index - ecosystem integrity

- Statistics for ecosystem condition accounts
- Statistics for ecological and hydrological profiles
- Contribute to improving GBF A complementary and component indicators

GBF A reporting possibilities – component and complementary indicators

- Relative Magnitude of Fragmentation
- Ecosystem Intactness Index
- Forest Fragmentation Index
- Forest Landscape Integrity Index
- Intact Wilderness

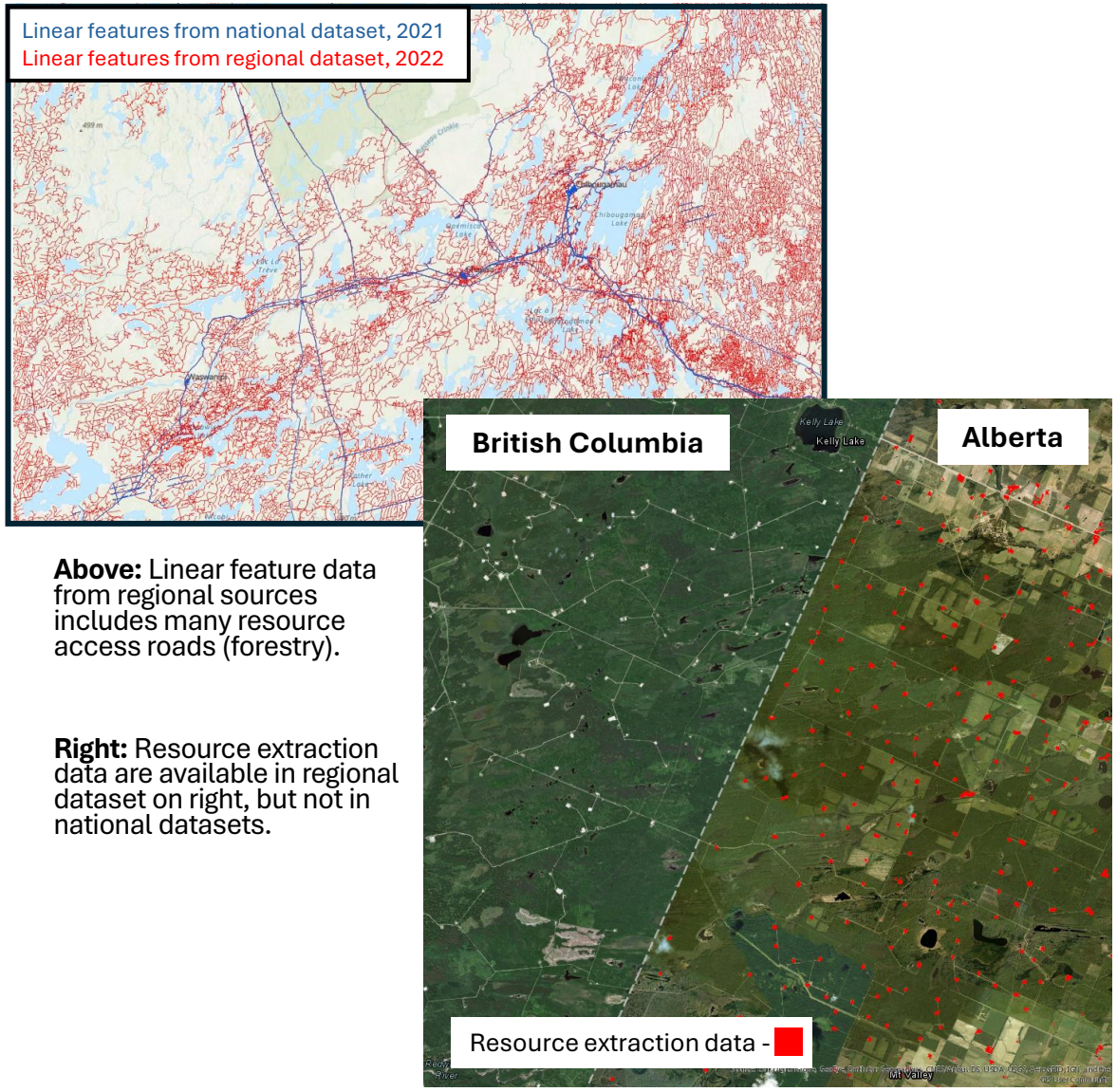
Indicators for the Kunming – Montreal Global Biodiversity Framework | Indicator Repository

Component Indicators - Indicators for the Post 2020 Global Biodiversity Framework | Indicator Repository

Complementary Indicators - Indicators for the Post 2020 Global Biodiversity Framework | Indicator Repository

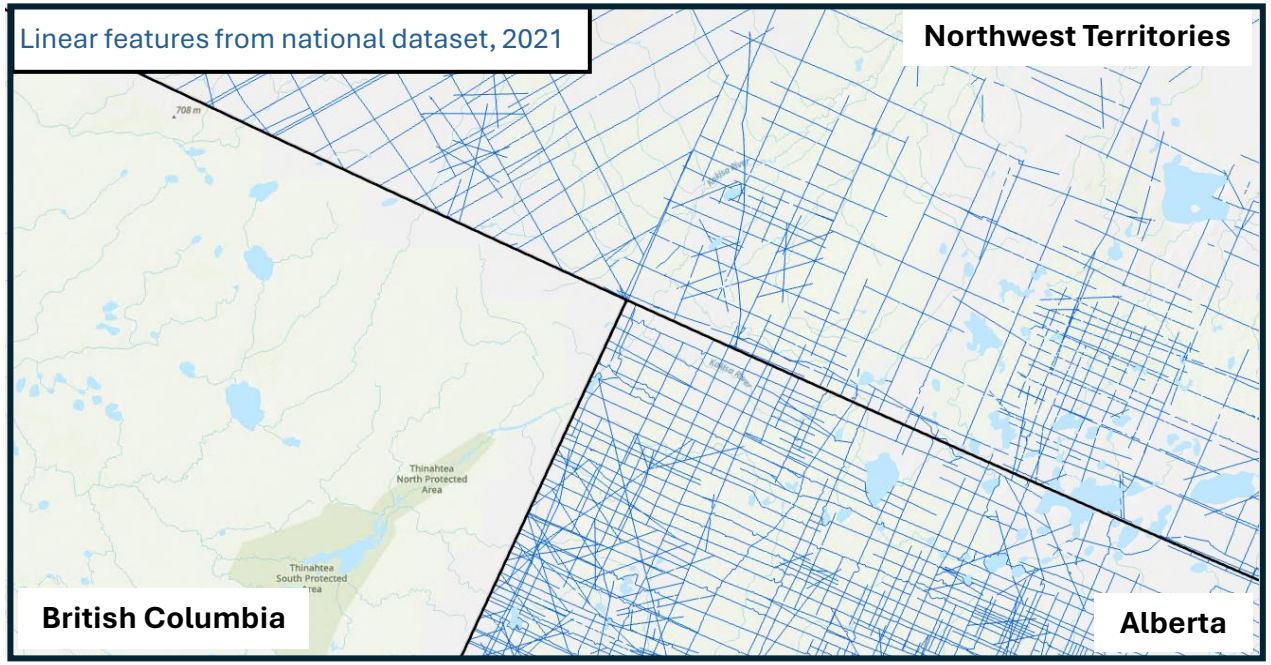
Linear feature dataset improvements

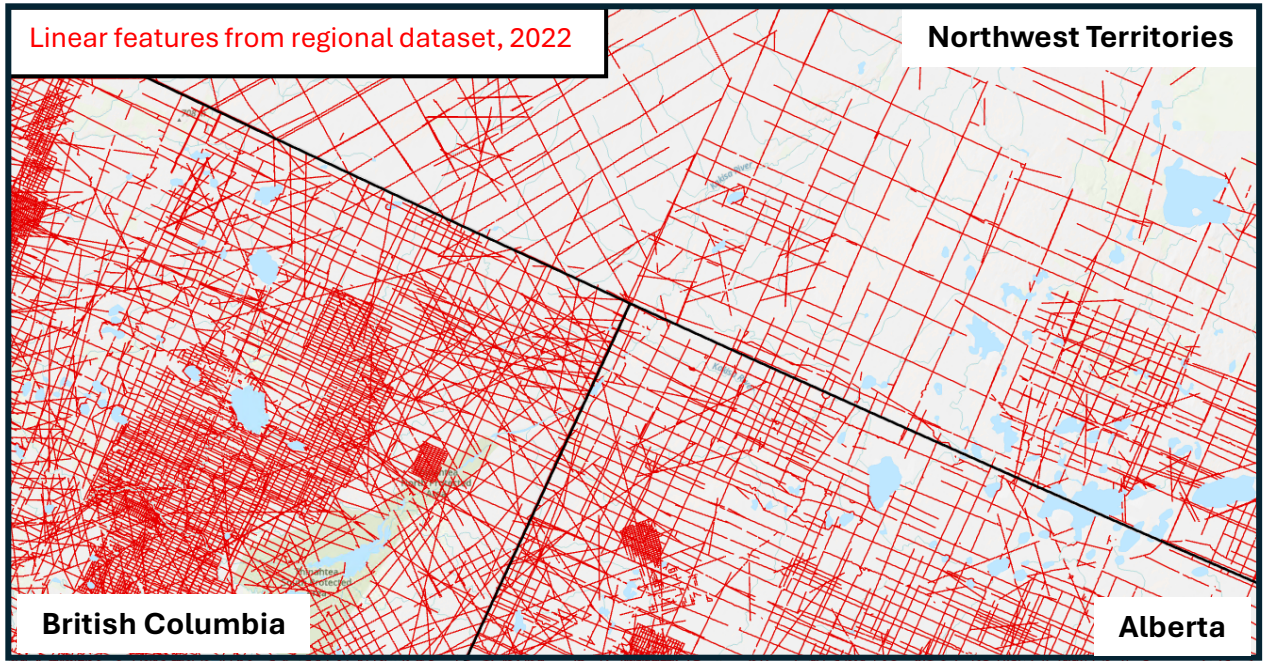
North-central Québec, Canada



Above: Linear feature data from regional sources includes many resource access roads (forestry).

Right: Resource extraction data are available in regional dataset on right, but not in national datasets.





Current work and challenges

- Statistics Canada is currently researching design-based methods for reporting on land cover, land use and ecosystem change, which will support reporting on various indicators including GBF A.2.
- Research and development is ongoing. Key data challenges include:
  - Limited access to national resource feature and pipeline datasets.
  - An absence of consistent time series data representing linear features, fragmentation and ecosystem integrity to effectively monitor change.
- Metadata is not yet fully developed for GBF indicators, particularly for component and complementary indicators. Some relationships between Goal A headline, component and complementary indicators are unclear, highlighting the need for continued international and interdepartmental collaboration.

Questions?