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Measuring ecosystems goods and services (MEGS): A statistical perspective

CIRANO Seminar: Accounting for the Environment in a System of National Accounts

Michael Bordt, EASD Statistics Canada

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Outline

- Why ecosystem accounts?
- What is MEGS?
- Why a statistical agency?
- What doesn't exist?
- Our vision of ecosystem accounts
- International standards and frameworks
- International issues being discussed
- Some progress in Canada

Why ecosystem accounts?

- Coherent framework for spatial and biophysical data
  - Ensure interoperability of information
  - Coherence of indicators
- Consistent and defensible means of including value of ecosystem services in economic decisions
  - Enhance credibility of ecosystem valuation
  - Ensure values are non-zero
- Coordination of multidisciplinary work on ecosystems (spatial, biophysical, economic...)

What is MEGS?

- $2.25M in funding for Statistics Canada over 3 years to develop prototype ecosystem accounts to support policy needs of:
  - Environment Canada
  - Agriculture and Agrifood Canada
  - Fisheries and Oceans Canada
  - Natural Resources Canada
- Focus on:
  - building statistical infrastructure
  - establishing common protocols (definitions and standards)
  - common and **coherent** spatial and biophysical data
  - agreed approach to valuation
  - “showcase” project on wetlands

Why a statistical agency?

- **What StatCan does *vis à vis* Environment Statistics**
  - 30+ year history and 45 FTEs
  - Conduct nine surveys (business and households)
  - Produce accounts for natural resource stocks (energy, minerals, timber, land, water) and materials and energy flows (energy, GHGs, water)
  - Produce annual and quarterly publications (*Human Activity and the Environment*, *EnviroStats*)
  - Canadian focal point for international environmental classifications and standards via London Group (UN-SEEA), OECD Statistics Committee; World Bank;

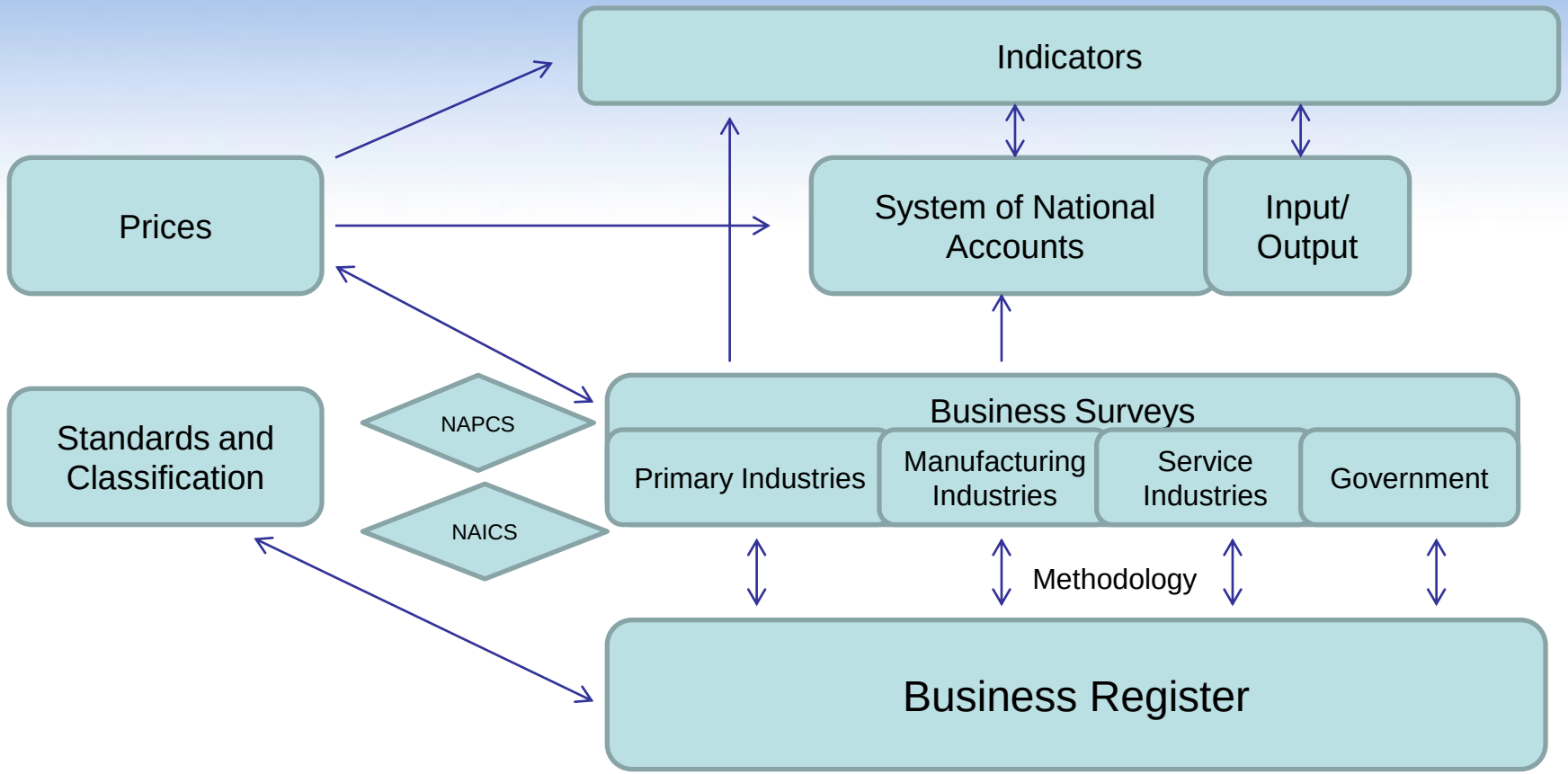
Why a statistical agency?

- Existing expertise in natural resource valuation
- Spatial infrastructure with links to socio-economic information (e.g., settlements)
- Links to SNA (including I/O) to understand economic value of ecosystem services
- Expertise with standards and classifications
  - NAICS, SGC, NAPCS (product classification), NOC (occupation),
  - Statistics Canada has internal standard for drainage areas
- Adherence to statistical quality standards
  - e.g., fitness for use; trends; representivity
- *Impartial and long-term perspective*

What doesn't exist?

- Ecosystem accounts
  - Requires statistical infrastructure (standards, classifications, data methods, etc.)
- Standard land cover or ecosystem classification
  - Have systematic ecological classification "Ecozones of Canada" at "landscape" level
- Standard, measurable ecosystem services classification
  - CICES a start but needs work
- Focus for federal valuation research, EG&S standards and classifications
- Links between current EG&S work and economic statistics (i.e., SNA)

Business Statistics Infrastructure (partial)



Our vision of an ecosystem account

Physical and monetary stocks and flows based on:

1. Spatially-referenced land/water cover data
   - Various times in past and as close to present as possible
   - As detailed as possible (30m-250m)
   - Include terrestrial, freshwater, coasts, wetlands and marine ecosystems
   - Classified according to a common standard for ecosystems
2. Coherent biophysical data to assess ecosystem quality linked to services
   - Such as air quality, water quality, species diversity, ecosystem productivity, land cover, climate maintenance, pollination, water management, etc.
3. Methodology and standards for assigning monetary values to ecosystems
   - Value what can be valued; measure changes in quality for rest

International standards and frameworks

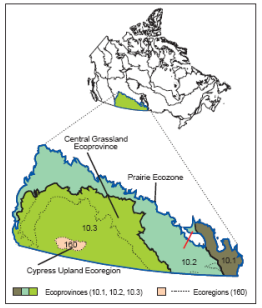
- UN System of Integrated Environmental-Economic Accounts (SEEA)
  - 1993, 2003, revision 2012
  - Focuses on natural resources and land
    - Also guidelines for water, energy, fisheries
  - Process initiated in 2011 to develop guidelines for Experimental Ecosystem Accounts for publication in 2013
    - In collaboration with EEA and World Bank
    - Likely will focus on “why” and “what” rather than “how” to encourage experiments
    - Background papers available on: http://unstats.un.org/unsd/envaccounting

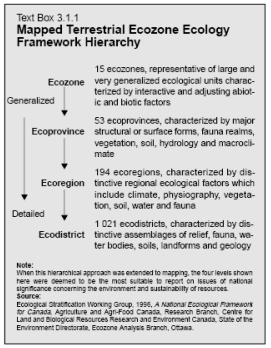
International issues

1. Policy applications of ecosystem accounts
   - New approaches for integrating environmental and economic decisions; new perspectives on sustainability; land use decisions, health, security, production, culture, heritage,
2. Structure of accounts
   - **Physical and monetary stock and flow**
   - Who owns the production function? (economy or ecosystem)
3. Land cover, ecosystems and statistical unit
   - Base core **statistical unit** on land cover
   - What else? How to classify?

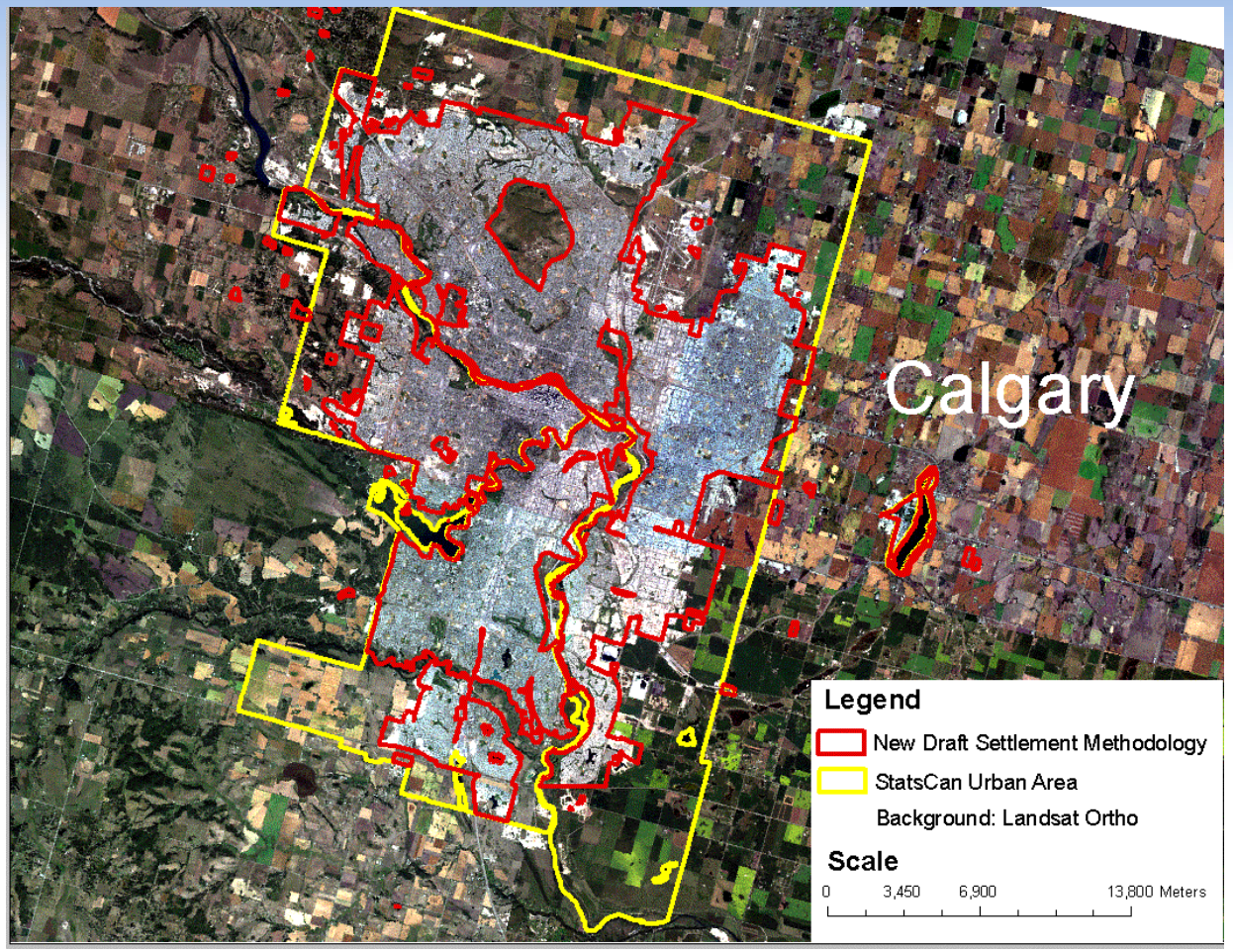
Right scale of classification national analysis

- Spatial extent of analysis will determine scale / resolution of data
- Relies on available data, MEGS initially will be looking at national datasets





Land Accounts: New conceptual framework for defining “settled” areas in Canada



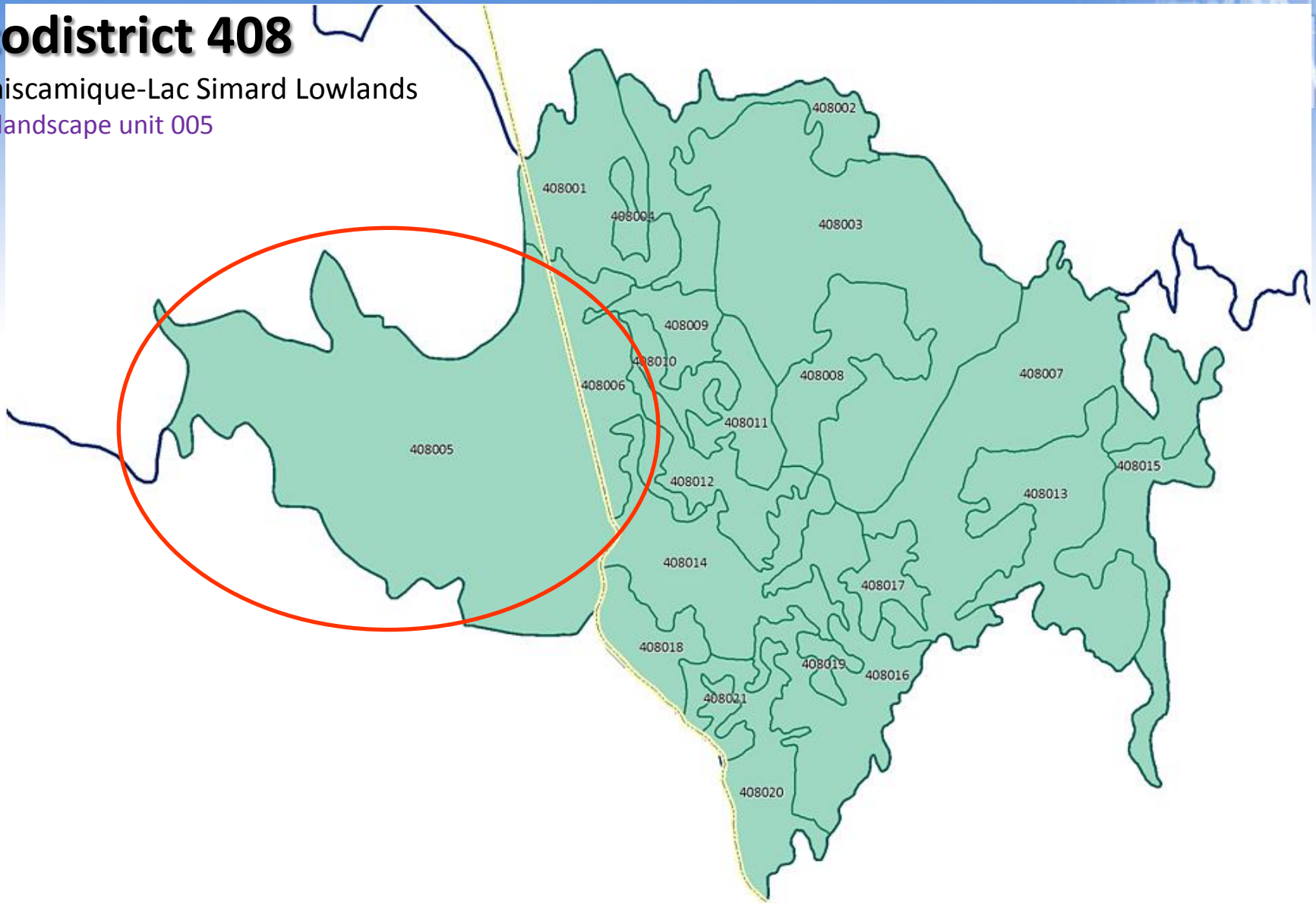
Methodology:

- **Based on the census block (CB)**
- **Breadth: national**
- **Depth: CB – the most detailed unit available**
- **Improved delineation of settled areas in Canada**

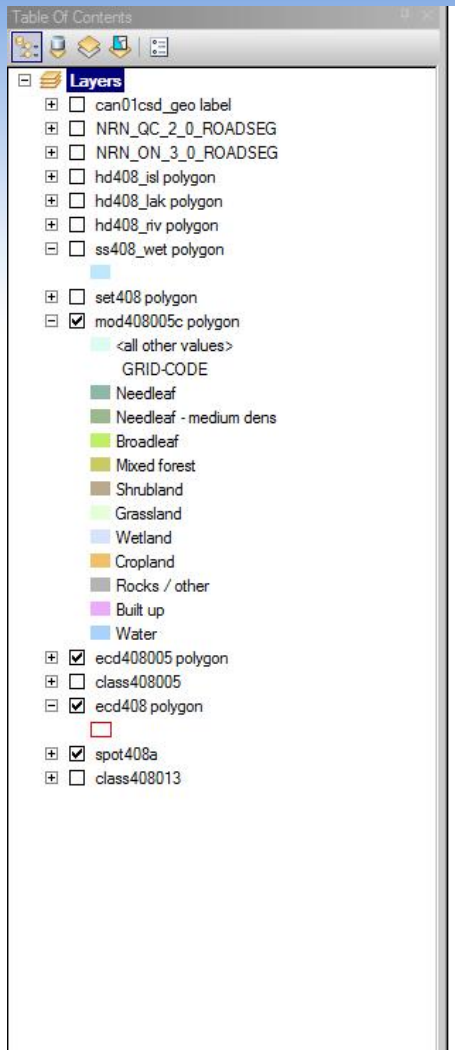
Ecodistrict 408

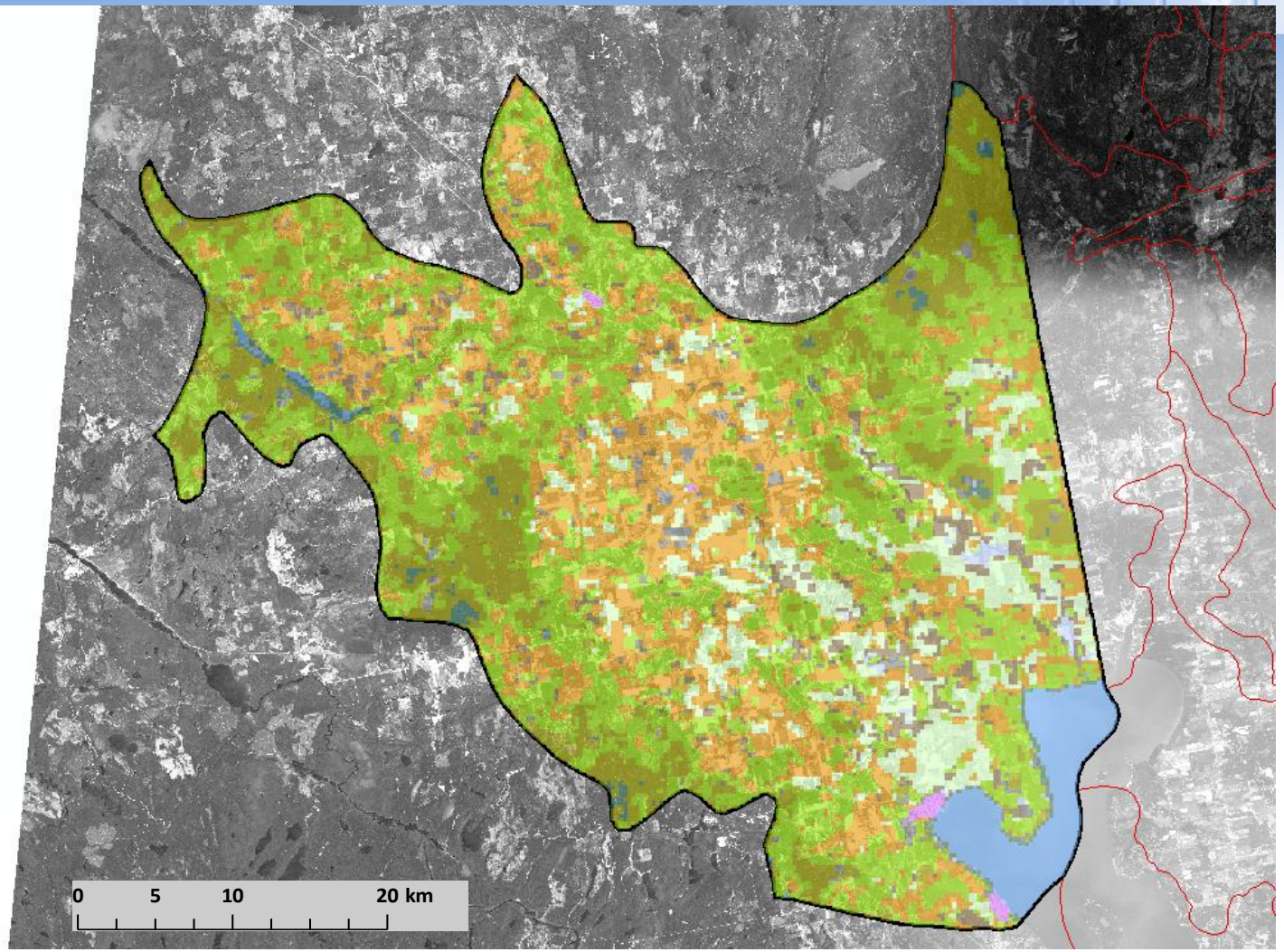
Temiscamique-Lac Simard Lowlands

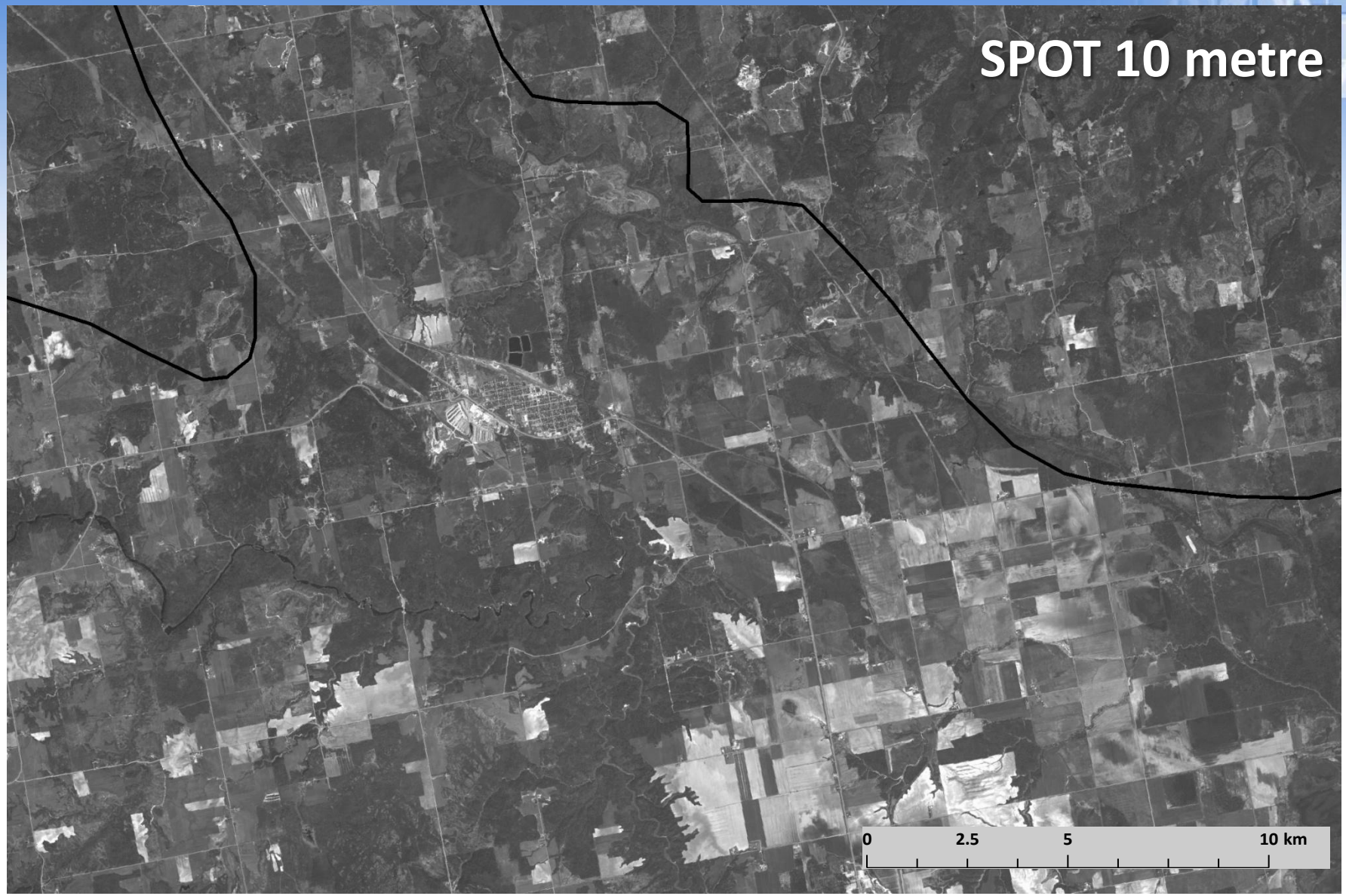
Soil landscape unit 005



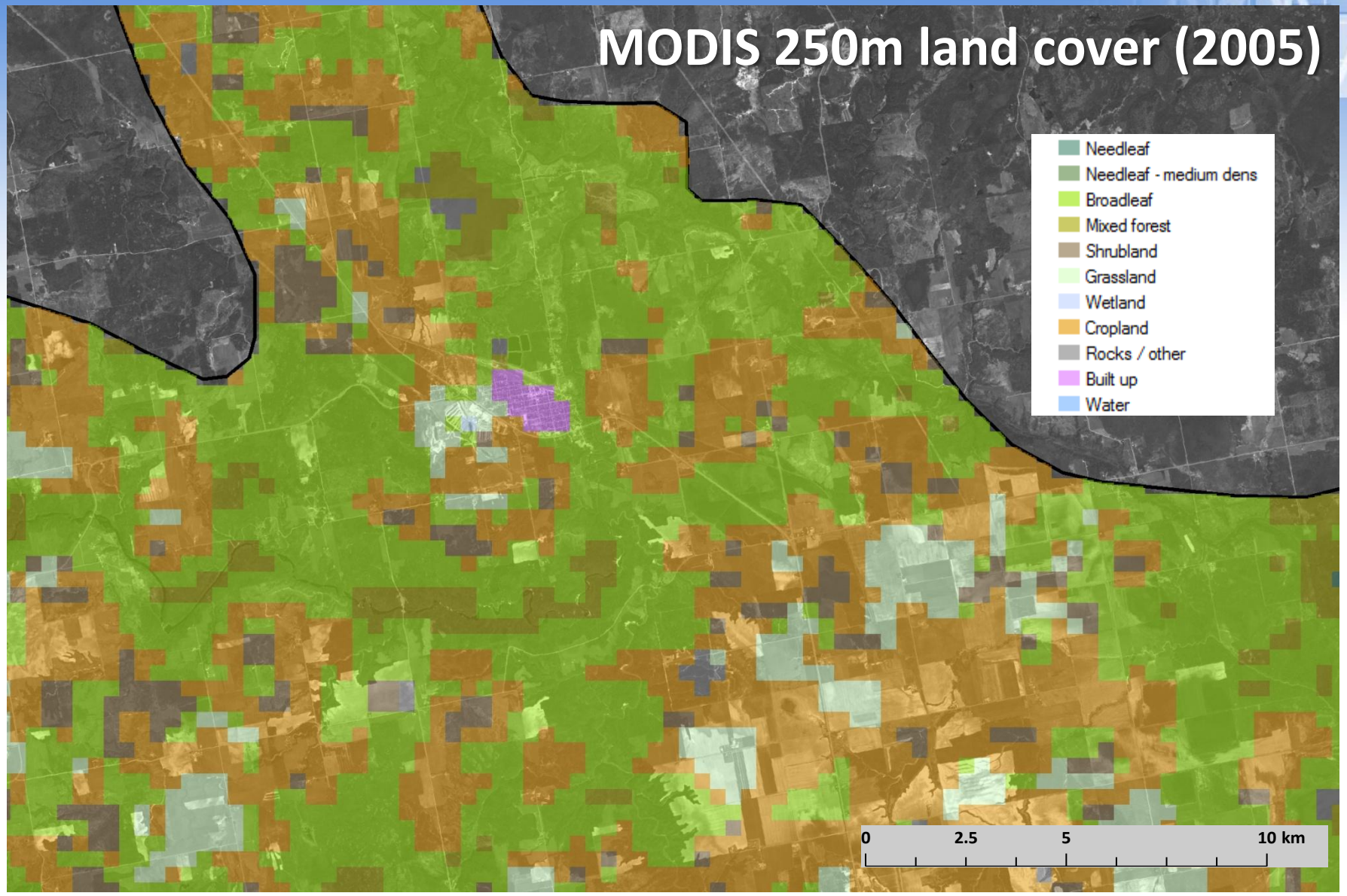
Ecodistrict 408 - Soil landscape unit 005 Temiscamique-Lac Simard Lowlands



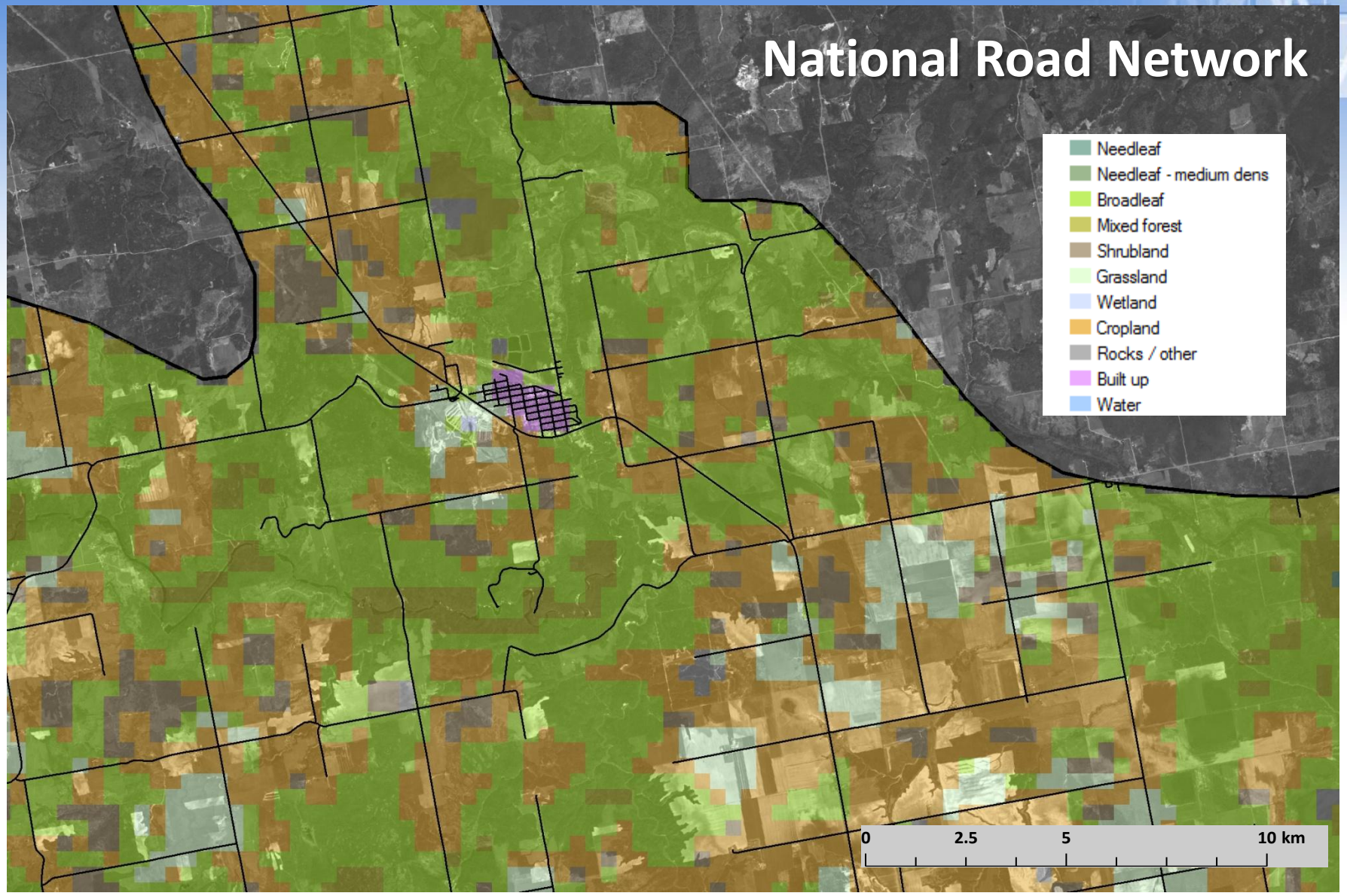



SPOT 10 metre
0
2.5
5
10 km

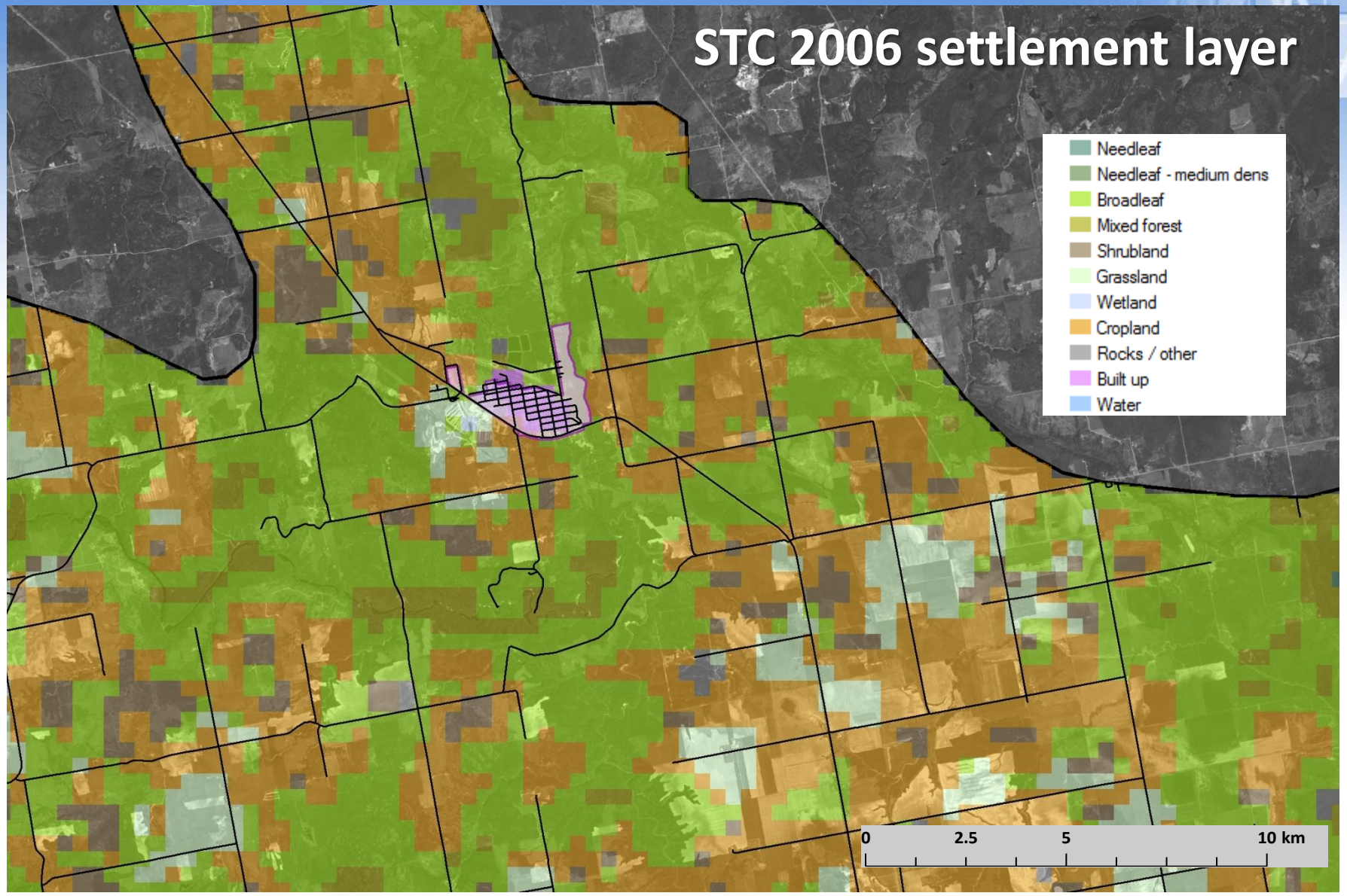
MODIS 250m land cover (2005)



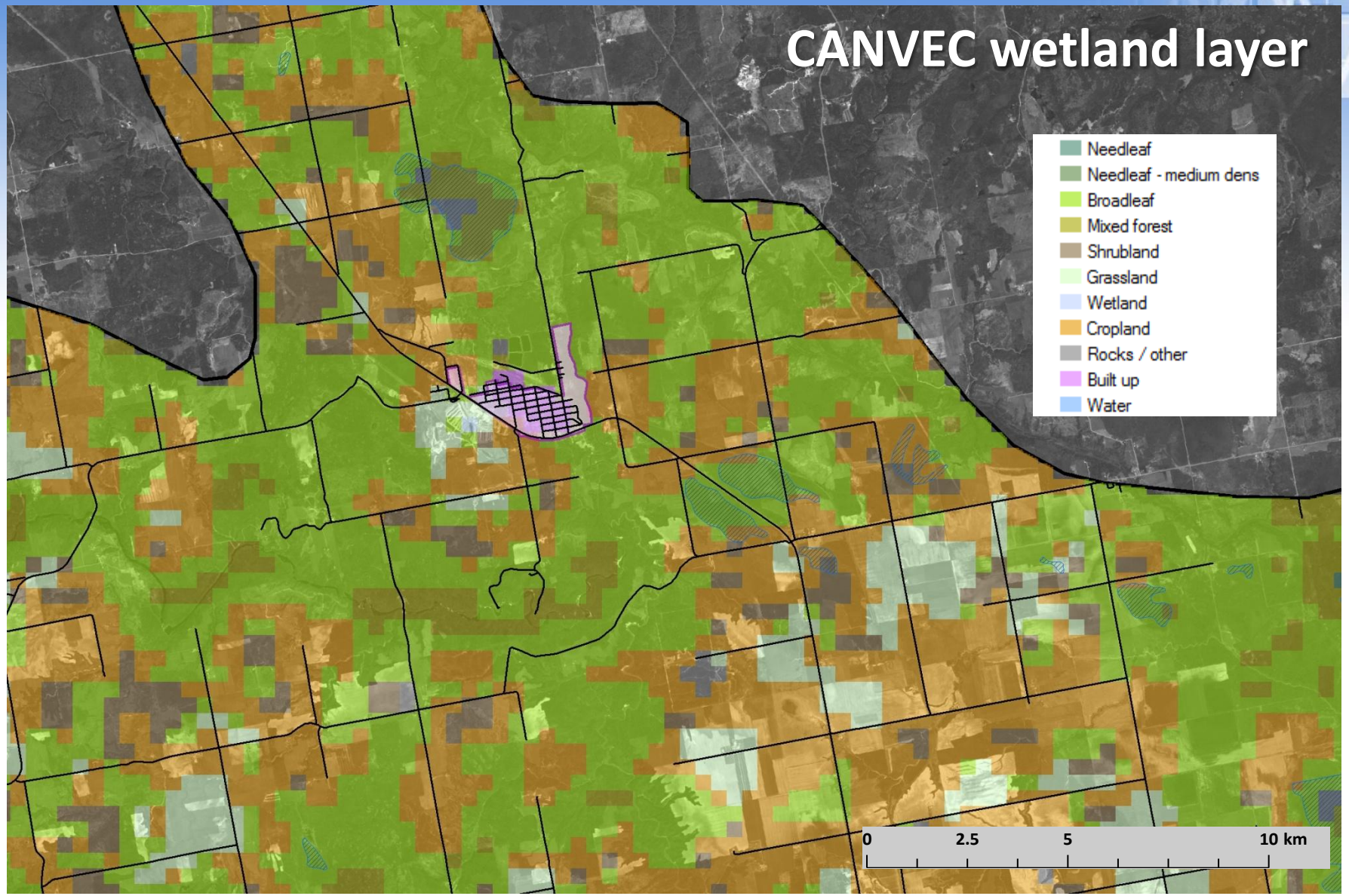
National Road Network

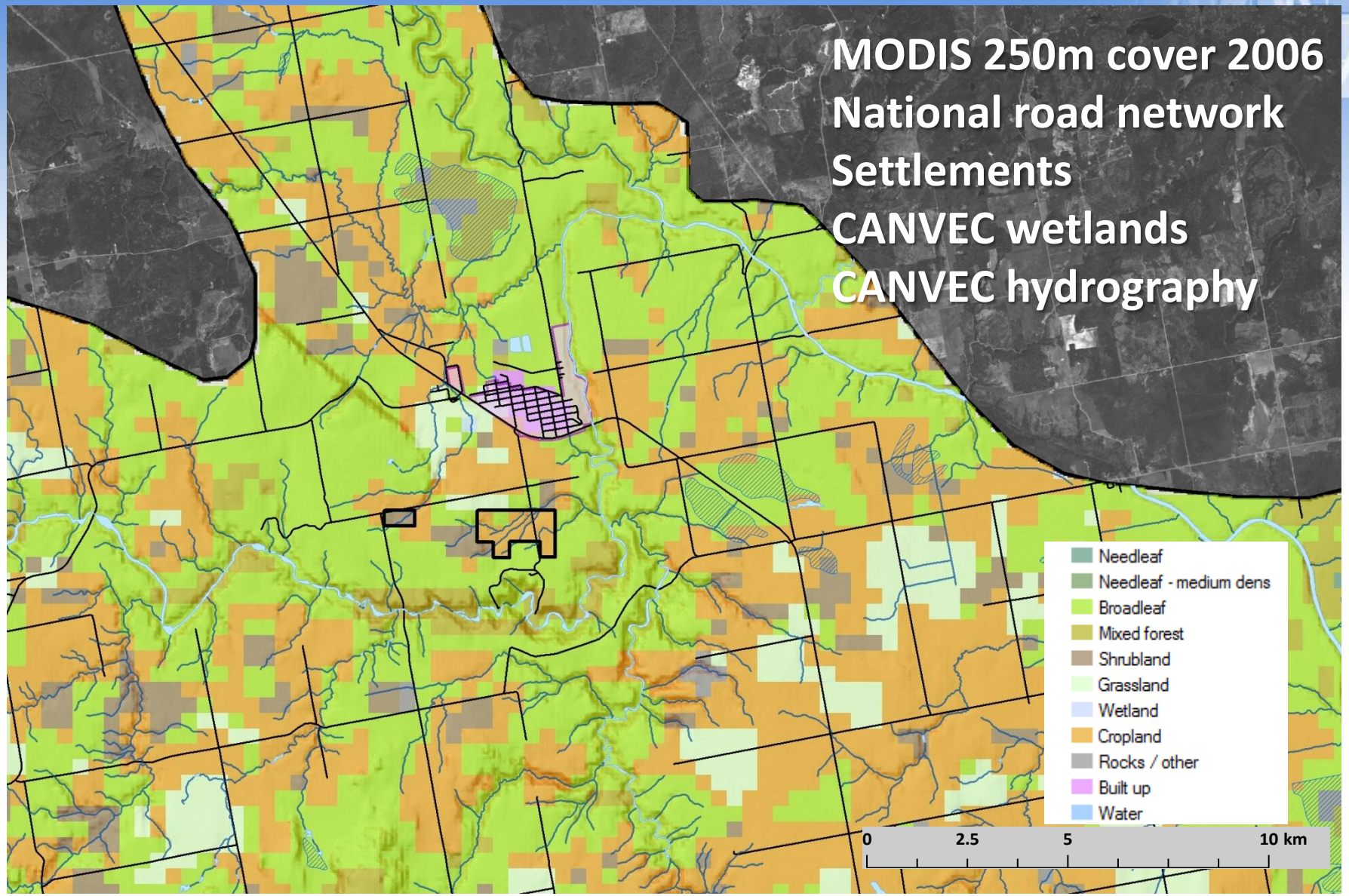


STC 2006 settlement layer



CANVEC wetland layer




MODIS 250m cover 2006
National road network
Settlements
CANVEC wetlands
CANVEC hydrography
Needleaf
Needleaf - medium dens
Broadleaf
Mixed forest
Shrubland
Grassland
Wetland
Cropland
Rocks / other
Built up
Water
0
2.5
5
10 km

International issues

4. Carbon accounts, nitrogen, phosphorous and soil
   - Is there a single indicator of quality?
5. Landscape accounts, landscape ecological potential
   - Are there broad indicators of ecosystem potential?
6. Biodiversity accounts and indexes
   - Is there a single indicator of quality?

International issues

7. Ecosystem health
   - Is there a single indicator of quality?
8. Classification of ecosystem services
   - CICES proposed as broad set of categories
   - What about temporal and spatial scale of services?
   - Need better “model” of ecosystem as unit of production
9. Prioritization of ecosystem services
   - Which to value first? Which are most important?
10. Principles of monetary valuation
   - How to mix market and non-market approaches?
   - Value services or view services as natural subsidies?

Some progress in Canada

- Collaborating on developing standard delineation of wetlands at national level
  - Selecting wetland case study areas for detailed analysis
- Validation of land cover-based statistical unit
- Reviewing ecosystem quality measures
- Analysis of economic dependence on coastal resources
- Issue papers on valuation (Jack Ruitenbeek)

Thank you!

- Comments?
- Questions?
- Suggestions?

Michael.Bordt@statcan.gc.ca