REPUTATION RESOURCES RESULTS

Ongoing Development of a Multi-User Emission Inventory GIS-Based Tool (EIGIS)

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Background

- Environment Canada commissioned the development of a multi-agency GIS solution to enhance air quality management

Stakeholders:

- Environment Canada:
  - Pacific & Yukon Region,
  - Pollution Data Division
- Greater Vancouver Regional District
- British Columbia Ministry of Environment

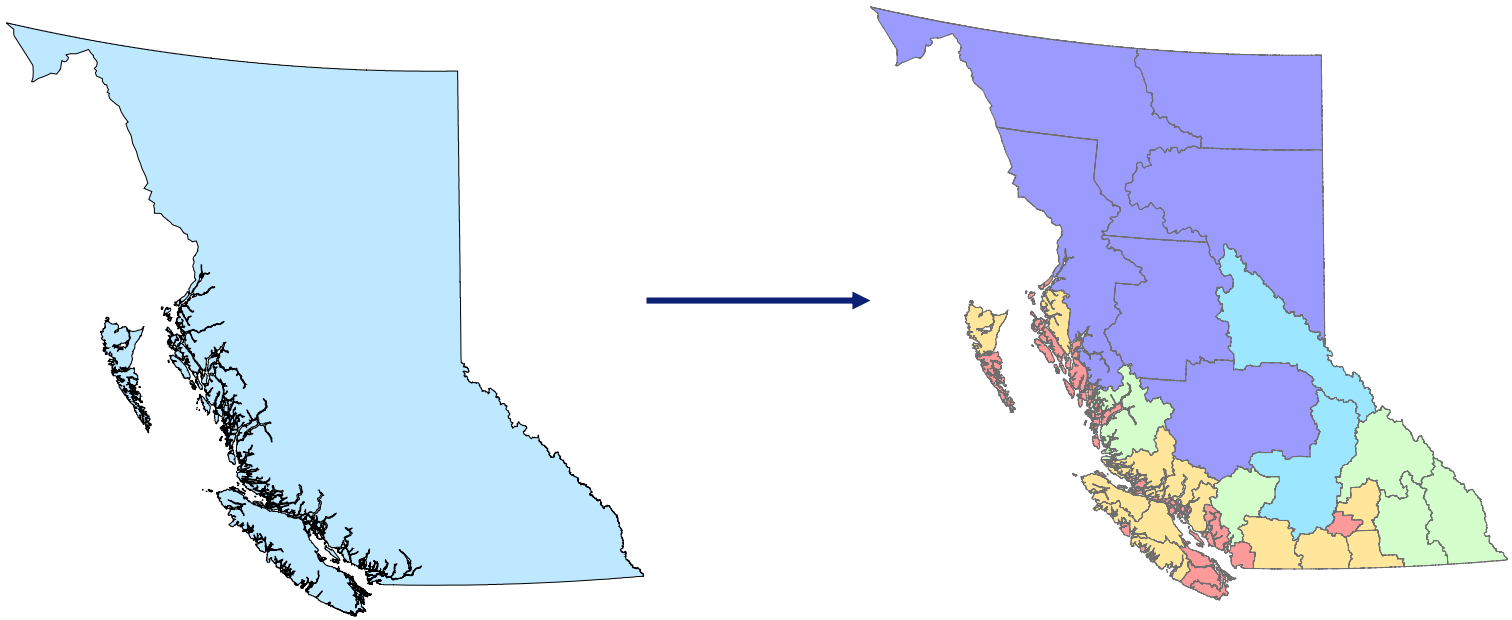
Background
Why?

- Generate EIs with higher spatial resolution
- Automate and simplify the process of creating EIs
- To produce EIs quickly and efficiently
- Generate maps, backcasts/forecasts and reports
- Produce emissions data for modelling systems
- Use the power of ESRI's ArcGIS software system

Updated GIS Approach

Traditional Method: “Top-Down”

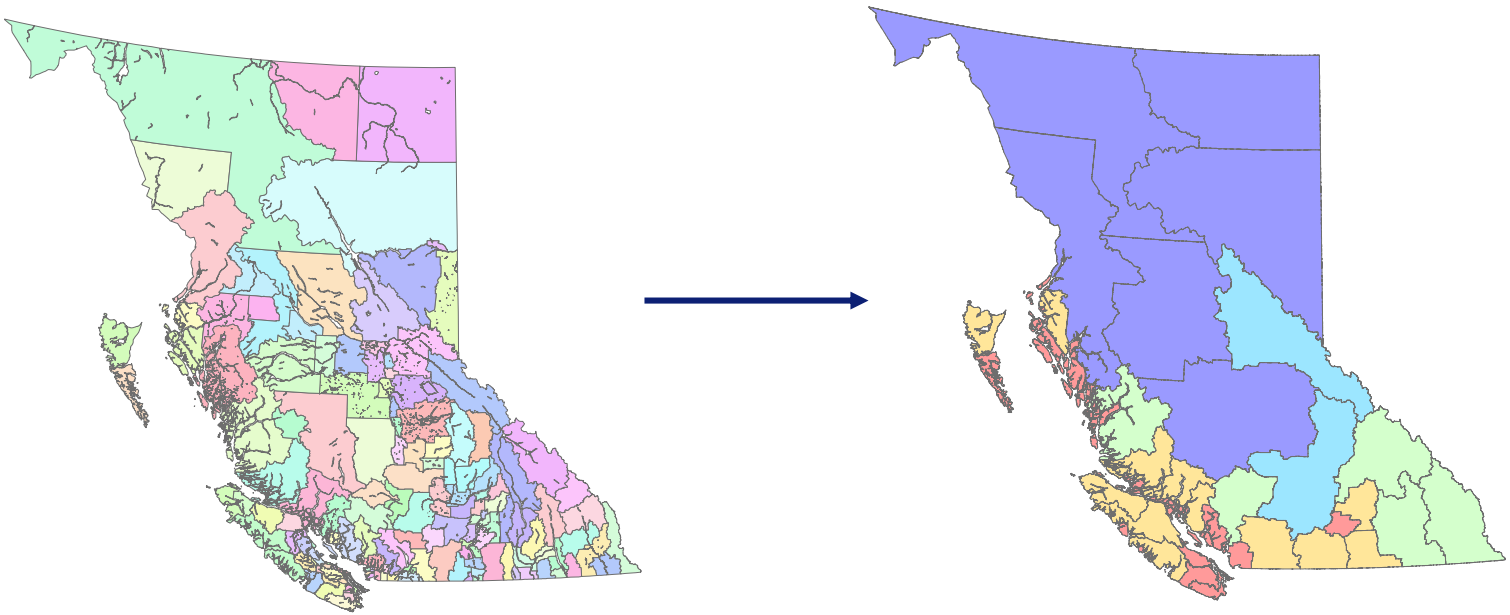
- National EIs are typically generated using a “top-down” approach



Updated GIS Approach

EIGIS Approach: “Bottom-Up”

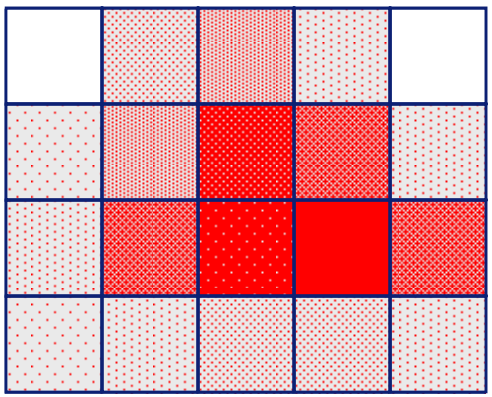
- EIGIS is designed using a “bottom-up” approach



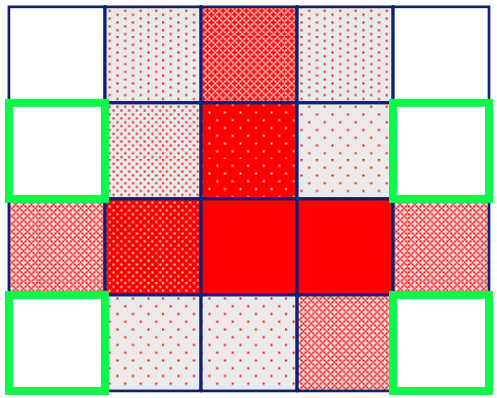
Updated GIS Approach

Example: Gridding Road Emissions

Traditional Gridding

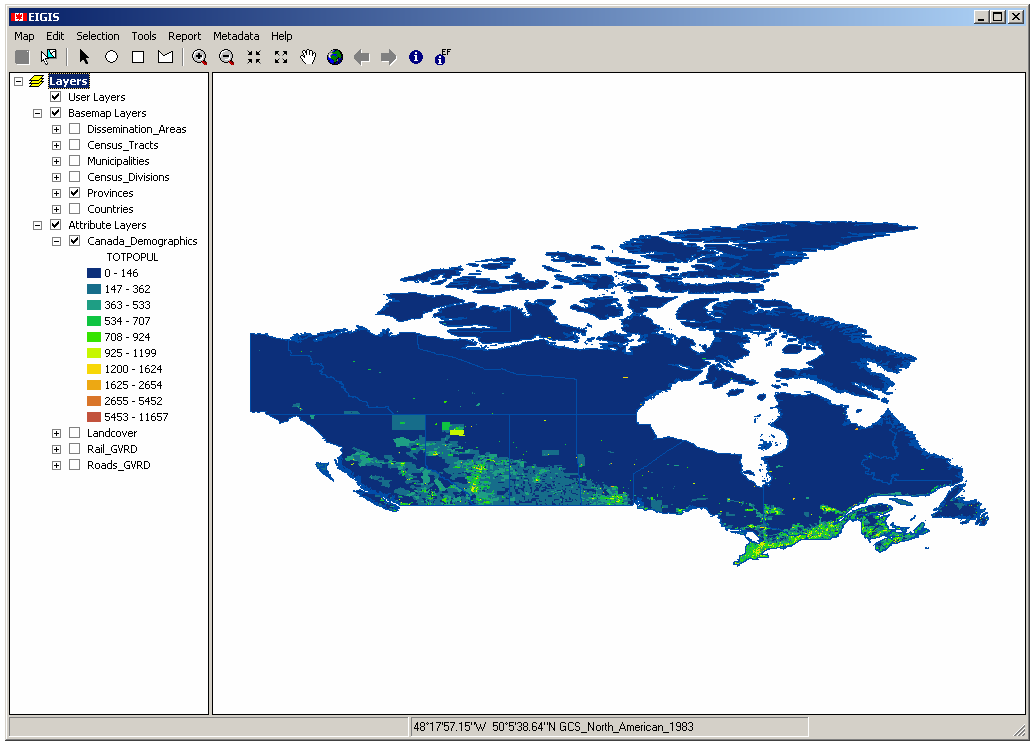


EIGIS Gridding



Note: Total emissions are the same in each case…

Current Software Features



- Define EFs and create EIs at “feature level”
- SMOKE emission & high resolution surrogate files
- Edit/Search/Define SCCs, Pollutants, Units, etc.
- Export EIs (gridded emissions, text files, etc.)

Current Software Features

- Emission mapping
- EF defined at feature level
- Multi-attribute, multi-layer Activities
- Coincident line segment handling
- Allow users to add their own GIS layers
- Automatic unit conversion system
- Selectively compute emissions
- And much more…

GIS Emission Computation

For a given:

- Pollutant
- Source (SCC)
- Feature (location)

Emission Estimate = Emission Factor x Activity

EE = EF x A

New Multi-layer Activity
Combinations

- Single Layer, Single Attribute

  Example: Number of People

- Single Layer, Multi-Attribute

  Example: [Number of People] / [Number of Houses]

- Multi-Layer, Multi-Attribute

  Example: [# Cattle in County] in [Rangeland Land Use]

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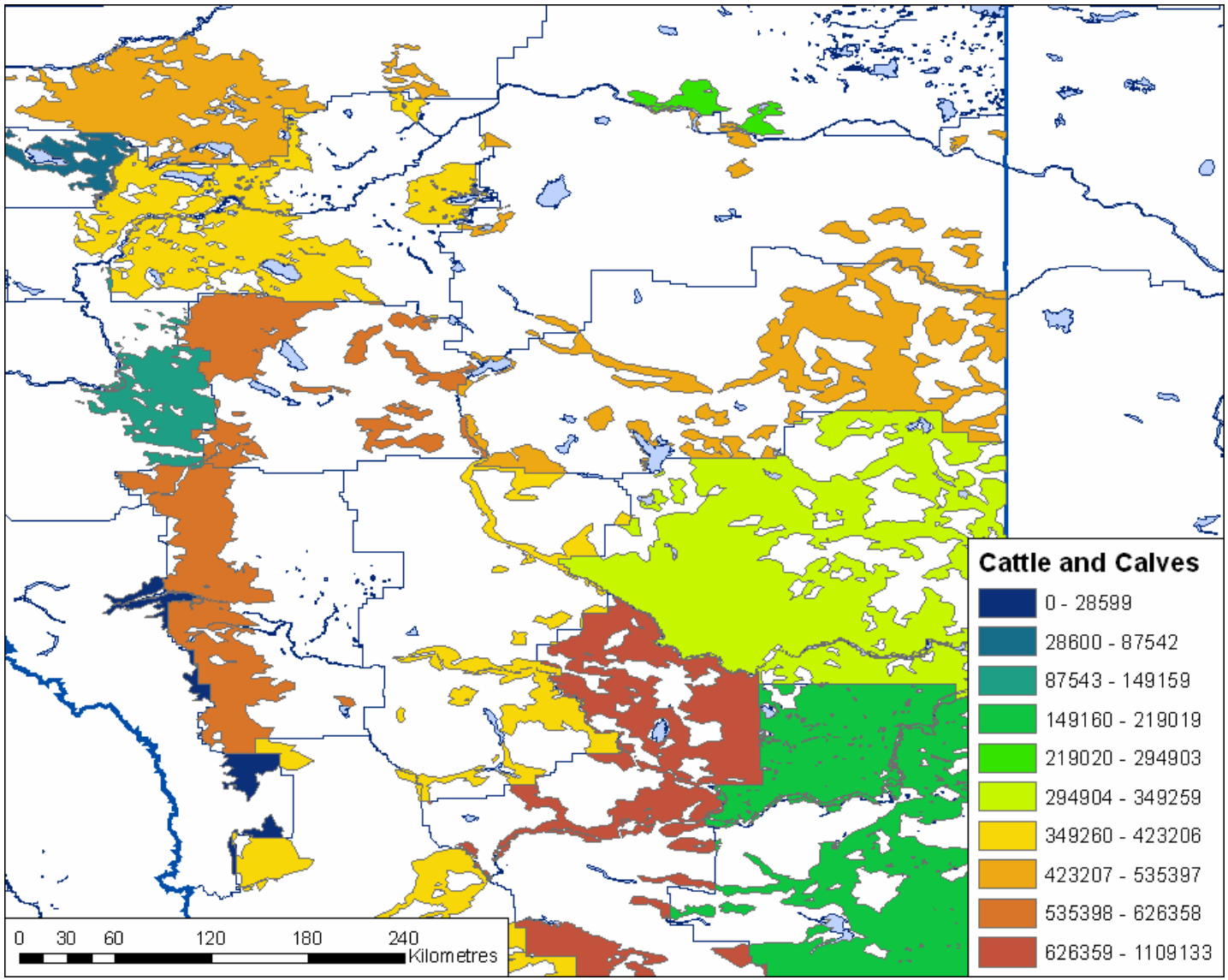
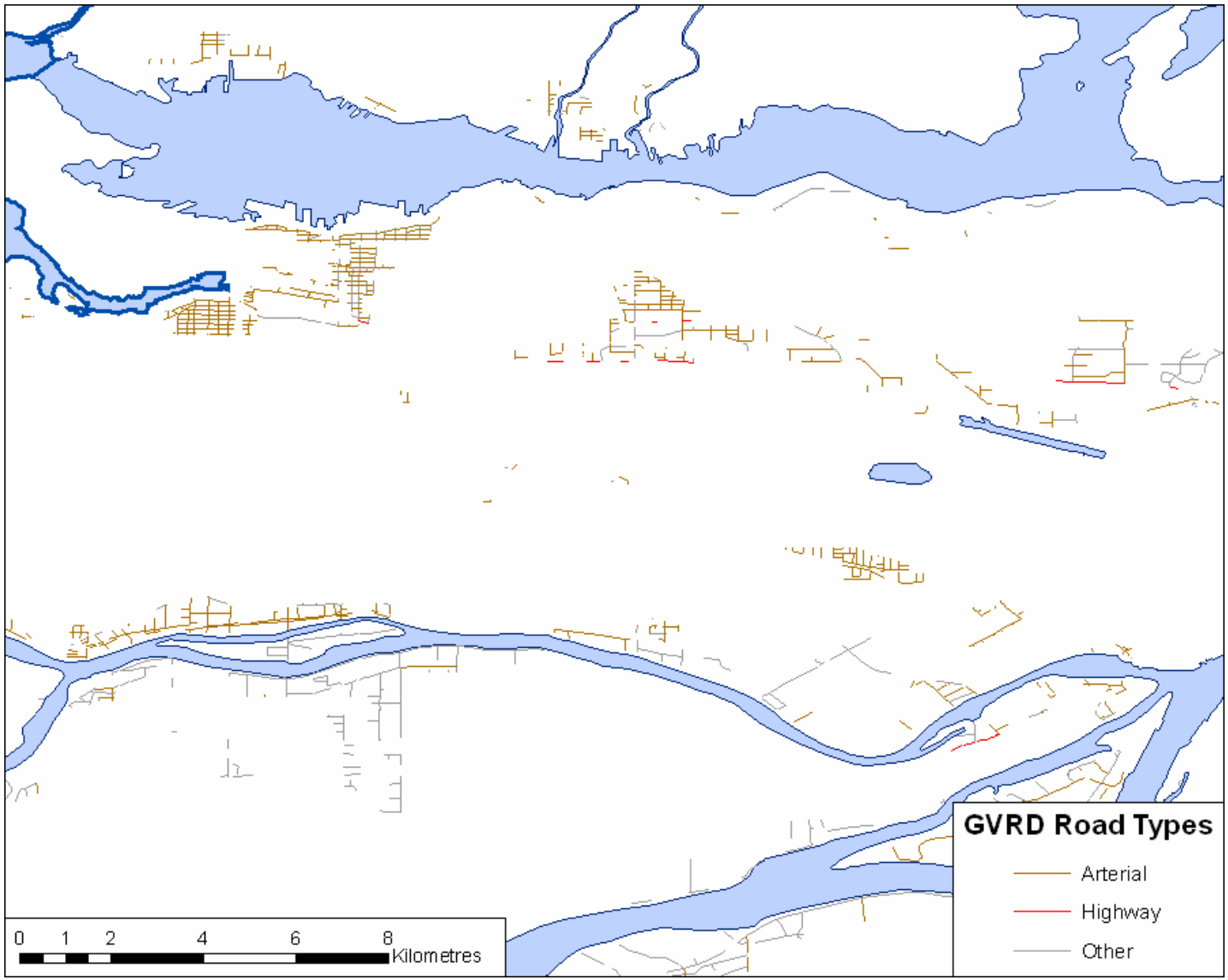
Multi-Layer, Multi-Attribute Activity



Multi-Layer, Multi-Attribute Activity



New Multi-layer Activity

Possible Uses

- Generate spatially resolved activities that more accurately represent real-world emission sources
- Qualifying census-based information with high-resolution land use data
- Emissions from residential space heating

  (Housing layer with Degree Days layer)
- Road Dust with snow cover

  (Road layer with Snow Cover layer)
- Limited only by the user's imagination (and available data)

Closing

Beta Testing and Beyond:

- Stakeholder beta testing (next month)
- Version control and scenario management
- Location independent, simultaneous multi-user access
- Backcast / forecast functionalities
- Advanced metadata and QA/QC tools

US EPA Pilot Project for Detroit getting underway

REPUTATION RESOURCES RESULTS

Acknowledgments

- ESRI Canada
- Environment Canada, Pollution Data Division
- Environment Canada, Pacific & Yukon Region
- Greater Vancouver Regional District
- BC Ministry of Environment
- U.S. EPA, Emission Inventory Group

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