



Emissions Mapping and Information Tool (EMIT)

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"Comprehensive Inventories - Leveraging Technology and Resources"



Background

- In Canada:
 - Comprehensive air pollutant emission data are generally only available at the National or Provincial/Territorial level.
 - The demand from scientists, policy analysts, and the general public for up to date emissions information and emissions maps is increasing.
 - Environment Canada staff needed a tool to navigate through and query emissions data and generate results and maps of emissions data in a consistent and timely manner.



The EMIT Tool

- Emissions Mapping & Information Tool (EMIT).
- Toolbar Extension to ESRI's ArcMap platform.
- Can be used to load, query, map, and report on pre-compiled Canadian and US national emissions inventories at a number of geo-political levels.
- The simple query 'wizard' means no need for advanced knowledge of databases, query language(s), or ArcGIS.



Emissions Inventories

EMIT is currently populated with:

- Canadian 2002 CAC EI by CSD.
- DRAFT Canadian 2005 CAC EI by CSD.
- US 2002 NEI by County.
- Plans to update in future with:
 - EC 2006 (by CSD)
 - US 2005 NEI (by County)
 - Others (e.g., 2000 CAC EI, 1995 CAC EI)



Spatial Resolution

Air pollutant emissions can be queried and mapped to the following levels:

- CANADA
 - PROVINCE
 - CENSUS DIVISION
 - CENSUS SUBDIVISION
- US
 - STATE
 - COUNTY

'Wizard' Paradigm

Drop-down lists auto-populated and inventory dependent...

Example: When a Province is selected, users can compute emission summaries by any one of:

- Province
- Census Division
- Census Subdivision

EMIT

Region/Year/Summation | Pollutants | Sources | Summary

Emission Mapping Inventory Tool (EMIT) Extension
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Country
☒ Canada ☐ United States

Year
2005

Summation Method
- Select a Summation Method -
- Select a Summation Method -
Province
Census Division
Census Subdivision

Cancel << Previous Next >>

RWDI
CONSULTING ENGINEERS
& SCIENTISTS



Pollutants

Canada

The screenshot shows the 'EMIT' software window with the 'Pollutants' tab selected. The 'Select Pollutants' section contains a list of pollutants with checkboxes. The 'All Pollutants' checkbox is selected. The list includes: BBFLUO, BKFLUO, BPYRENE, CD, CO, DIOXIN, HCB, HG, IND123CDP, NH3, NOX, PB, PM10, PM25, SOX, TPM, and VOC. The 'Cancel' button is visible at the bottom left, and a partially visible '<< P' button is at the bottom right.

Pollutant	Selected
All Pollutants	Yes
BBFLUO	No
BKFLUO	No
BPYRENE	No
CD	No
CO	No
DIOXIN	No
HCB	No
HG	No
IND123CDP	No
NH3	No
NOX	No
PB	No
PM10	No
PM25	No
SOX	No
TPM	No
VOC	No

US

The screenshot shows the 'EMIT' software window with the 'Pollutants' tab selected. The 'Select Pollutants' section contains a list of pollutants with checkboxes. The 'All Pollutants' checkbox is selected. The list includes: CO, NH3, NOX, PM10-FIL, PM10-PRI, PM25-FIL, PM25-PRI, PM-CON, SO2, and VOC. The 'Cancel' button is visible at the bottom left, and a partially visible '<< P' button is at the bottom right.

Pollutant	Selected
All Pollutants	Yes
CO	No
NH3	No
NOX	No
PM10-FIL	No
PM10-PRI	No
PM25-FIL	No
PM25-PRI	No
PM-CON	No
SO2	No
VOC	No



Source Sectors

Canada = EC Report

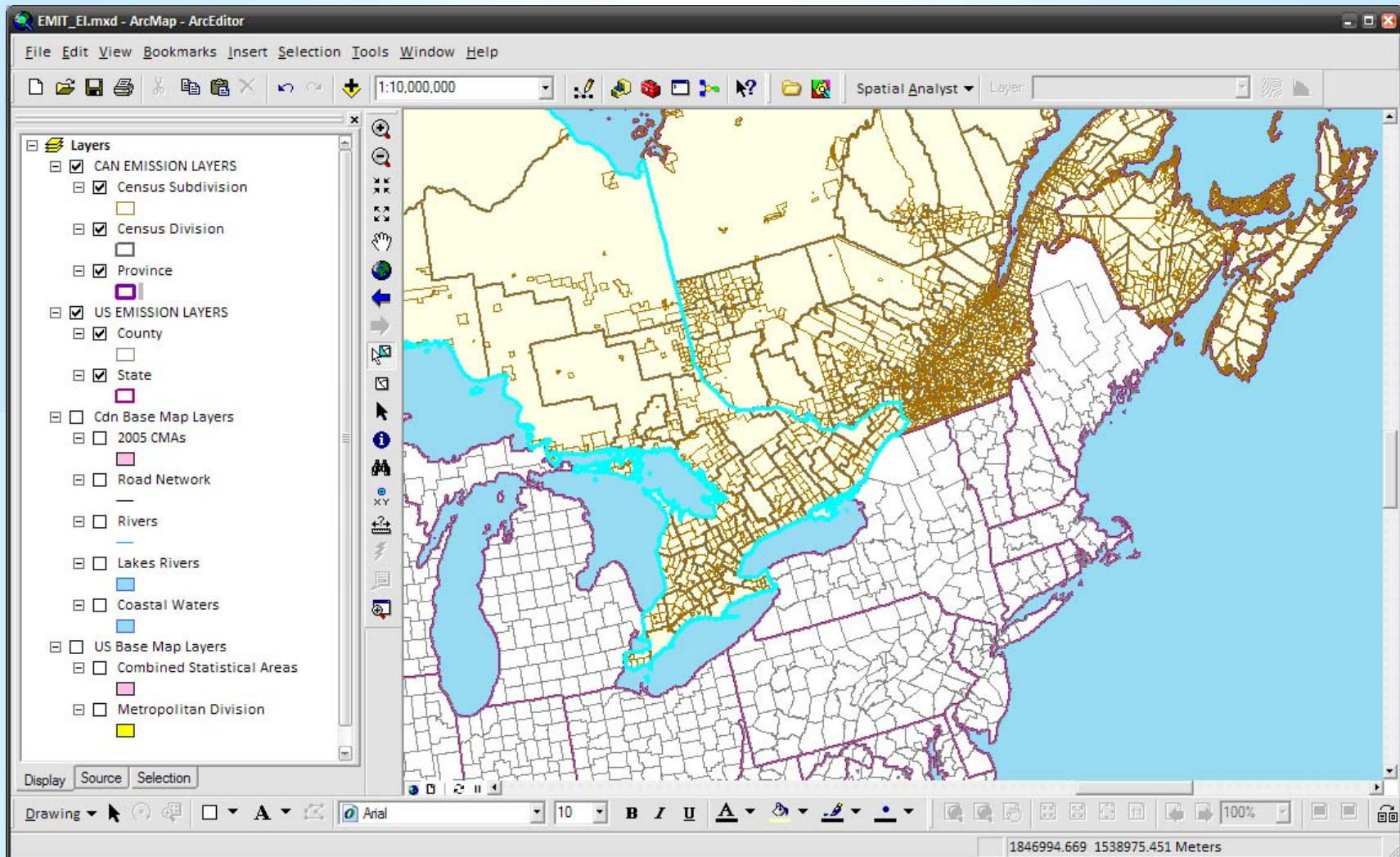
The screenshot shows the 'Select Source Type(s)' dialog in the EMIT software. The 'All Sources' checkbox is selected. The 'Incineration' category is expanded, showing sub-options like CREMATION, INDUSTRIAL & COMMERCIAL INCINERATION, and MUNICIPAL INCINERATION. The 'Industrial Sour' category is also expanded, listing various industries such as ABRASIVES INDUSTRY, ALUMINUM INDUSTRY, and ASPHALT PAVING INDUSTRY. The 'Miscellaneous' category is expanded, showing options like CIGARETTE SMOKING and DRY CLEANING. The dialog has 'Cancel', '<< Previous', and 'Next >>' buttons at the bottom.

US = EPA Tier III

The screenshot shows the 'Select Source Type(s)' dialog in the EMIT software. The 'All Sources' checkbox is selected. The 'CHEMICAL & ALLIED PRODUCT MFG' category is expanded, showing sub-options like Agricultural Chemical Mfg, Ammonium Nitrate/Urea Mfg, and Inorganic Chemical Mfg. The 'FUEL COMB. ELEC. UTIL.' category is expanded, showing sub-options like Coal, Gas, Internal Combustion, and Oil. The 'FUEL COMB. INDUSTRIAL' category is expanded, showing sub-options like Commercial/Institutional Coal, Commercial/Institutional Gas, and Commercial/Institutional Oil. The 'FUEL COMB. OTHER' category is expanded, showing sub-options like Commercial/Institutional Oil, Misc. Fuel Comb. (Except Residential), and Residential Other. The 'HIGHWAY VEHICLES' category is also expanded. The dialog has 'Cancel', '<< Previous', and 'Next >>' buttons at the bottom.

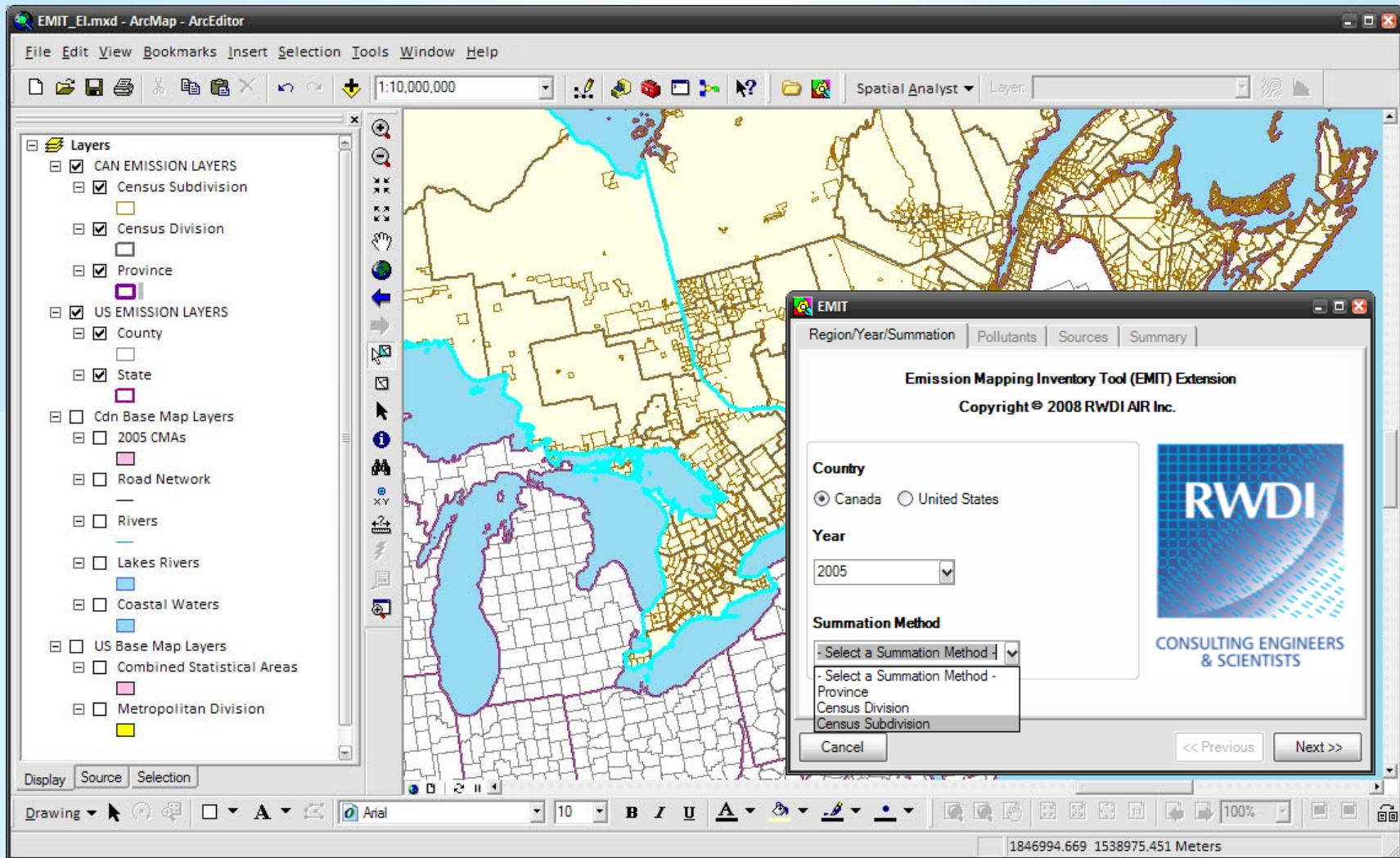
Walk-through

Loading the base map layers & database...



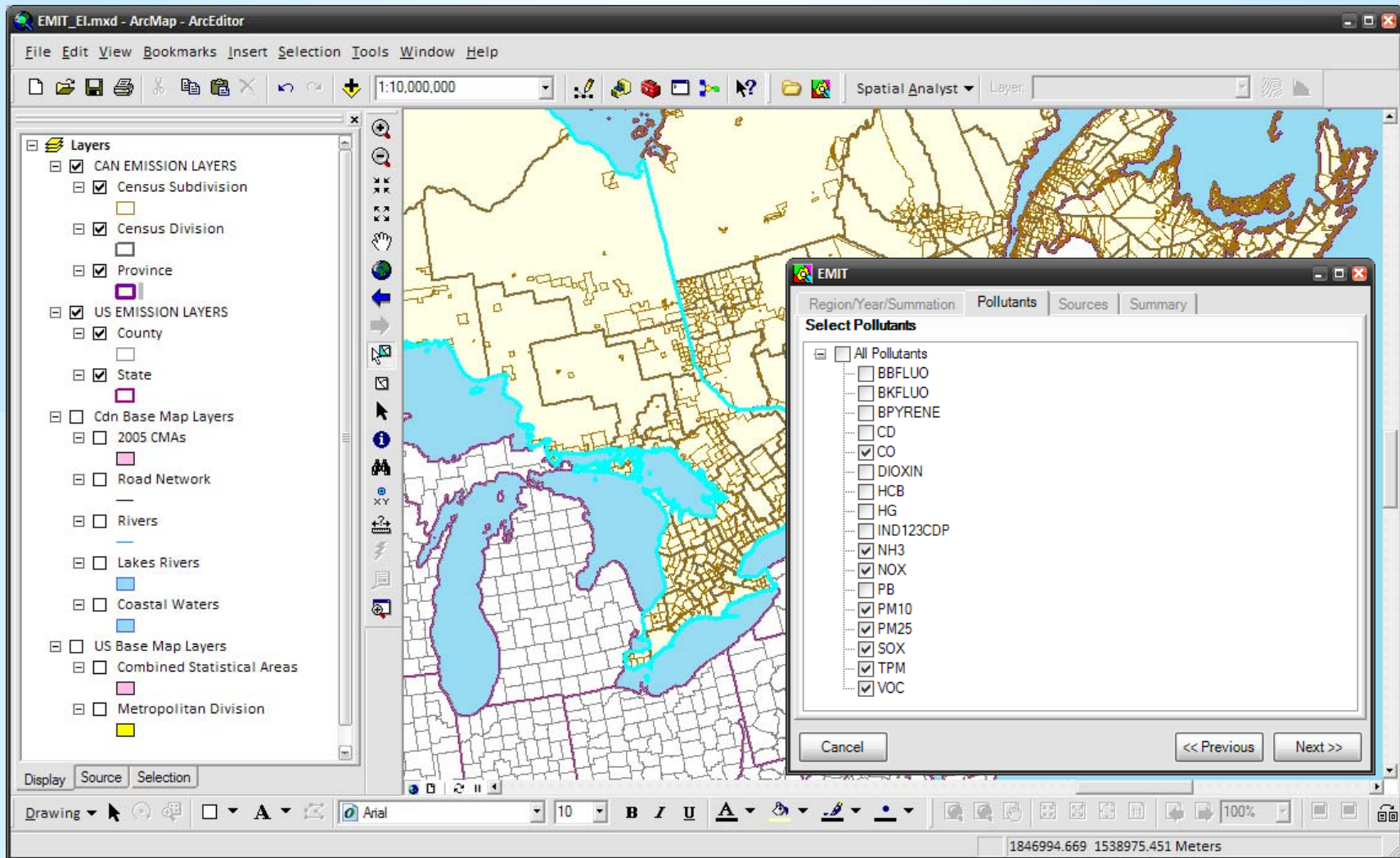
Walk-through (Cont'd)

Selecting a region...



Walk-through (Cont'd)

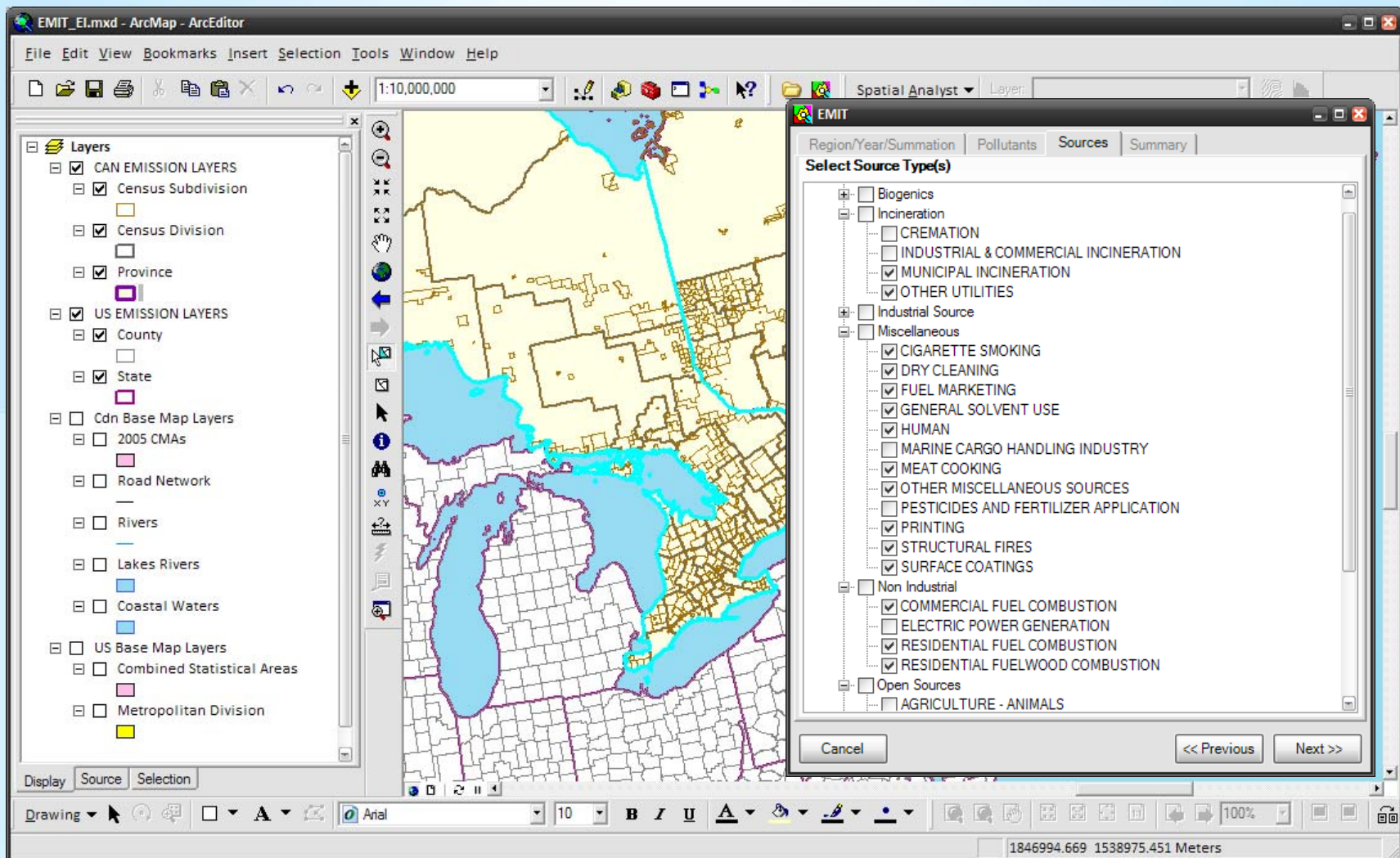
Selecting pollutants...





Walk-through (Cont'd)

Selecting source sectors...





Walk-through (Cont'd)

Metadata entry and QA/QC...

The screenshot displays the ArcMap interface with the EMIT metadata entry window open. The window is titled "EMIT" and has tabs for "Region/Year/Summation", "Pollutants", "Sources", and "Summary". The "Summary" tab is active, showing the following information:

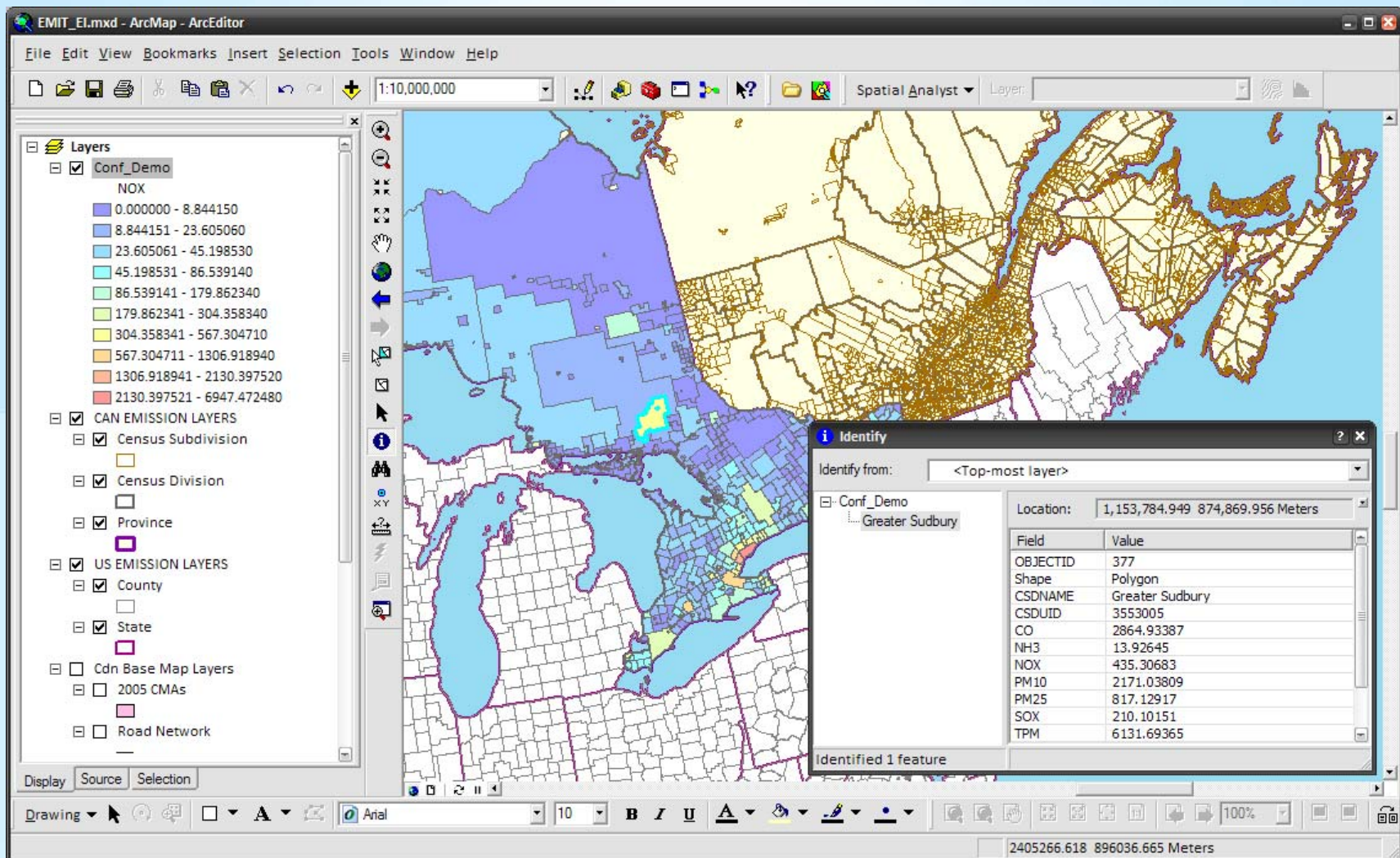
- Region:** Canada
- Year:** 2005
- Summation Method:** Census Subdivision
- Pollutants:** CO, NH3, NOX, PM10, PM25, SOX, TPM, VOC
- Source Type(s):**
 - Incineration - MUNICIPAL INCINERATION
 - Incineration - OTHER UTILITIES
 - Miscellaneous - CIGARETTE SMOKING
 - Miscellaneous - DRY CLEANING
 - Miscellaneous - FUEL MARKETING
 - Miscellaneous - GENERAL SOLVENT USE
 - Miscellaneous - HUMAN
 - Miscellaneous - MEAT COOKING
 - Miscellaneous - OTHER MISCELLANEOUS SOURCES
 - Miscellaneous - PRINTING
 - Miscellaneous - STRUCTURAL FIRES
 - Miscellaneous - SURFACE COATINGS
 - Non Industrial - COMMERCIAL FUEL COMBUSTION
 - Non Industrial - RESIDENTIAL FUEL COMBUSTION
 - Non Industrial - RESIDENTIAL FUELWOOD COMBUSTION
 - Open Sources - CONSTRUCTION
- Description:** Demonstration file for US EPA EI Conference
CAC Emissions from municipalities by CSD for Ontario
(no mobile sources)
- Output File:** C:\EMIT_TEST\Conf_Demo.mdb

The window also includes "Cancel", "<< Previous", and "Execute" buttons. The background map shows a geographical area with various layers visible in the "Layers" panel on the left, including "CAN EMISSION LAYERS", "US EMISSION LAYERS", and "Cdn Base Map Layers".



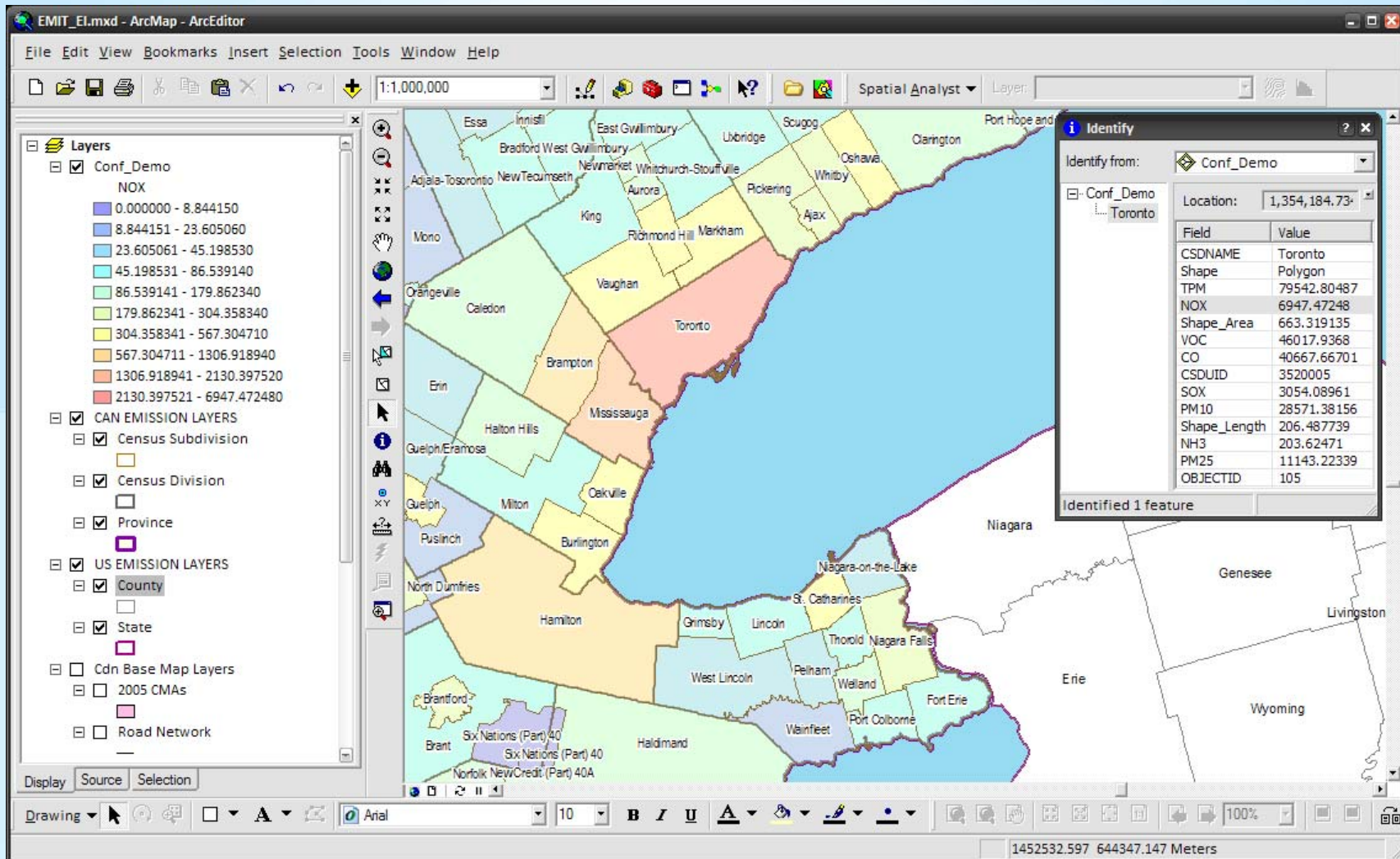
Walk-through (Cont'd)

Mapping the results...



Walk-through (Cont'd)

Mapping the results...





Next steps

- Feature enhancements (e.g., auto-compute emissions per unit area, tabular outputs, more robust error-checking, etc.)
- Include additional functionality and more inventory years (including projections) for Canada and the U.S. so that trends and forecasts can also be assessed.
- Update Canadian inventories to reconcile change in census boundaries (2006 vs 2001)



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