"Development of a Cross Border Inventories in the Midwest for the US and Canada

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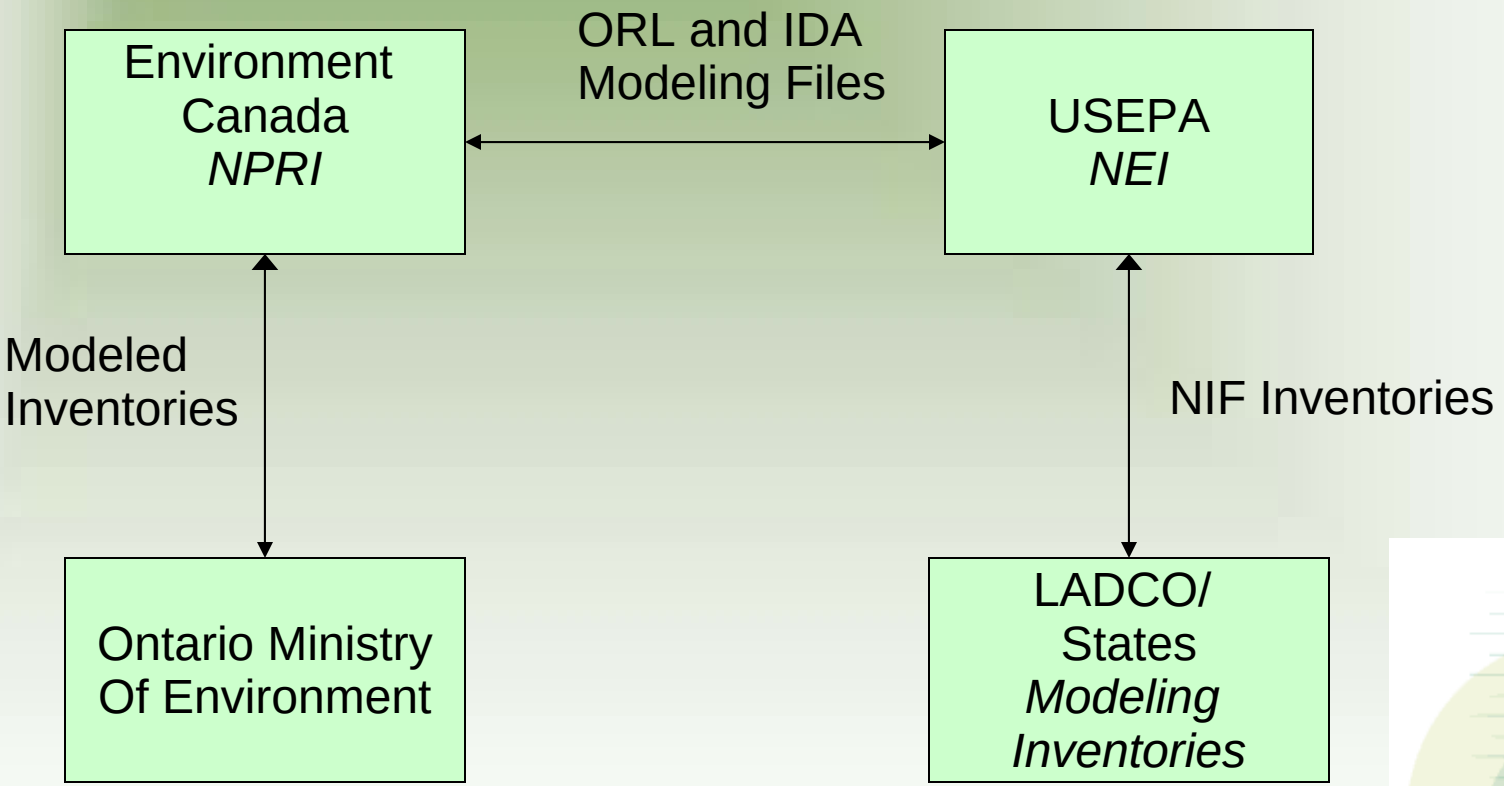
Today's Subjects

- Framework for LADCO work on Canadian Inventories.
- Conversion of NPRI inventory to NIF3.0
- Canadian use of NEI as basis for modeling inventories.
- Where we go from here.

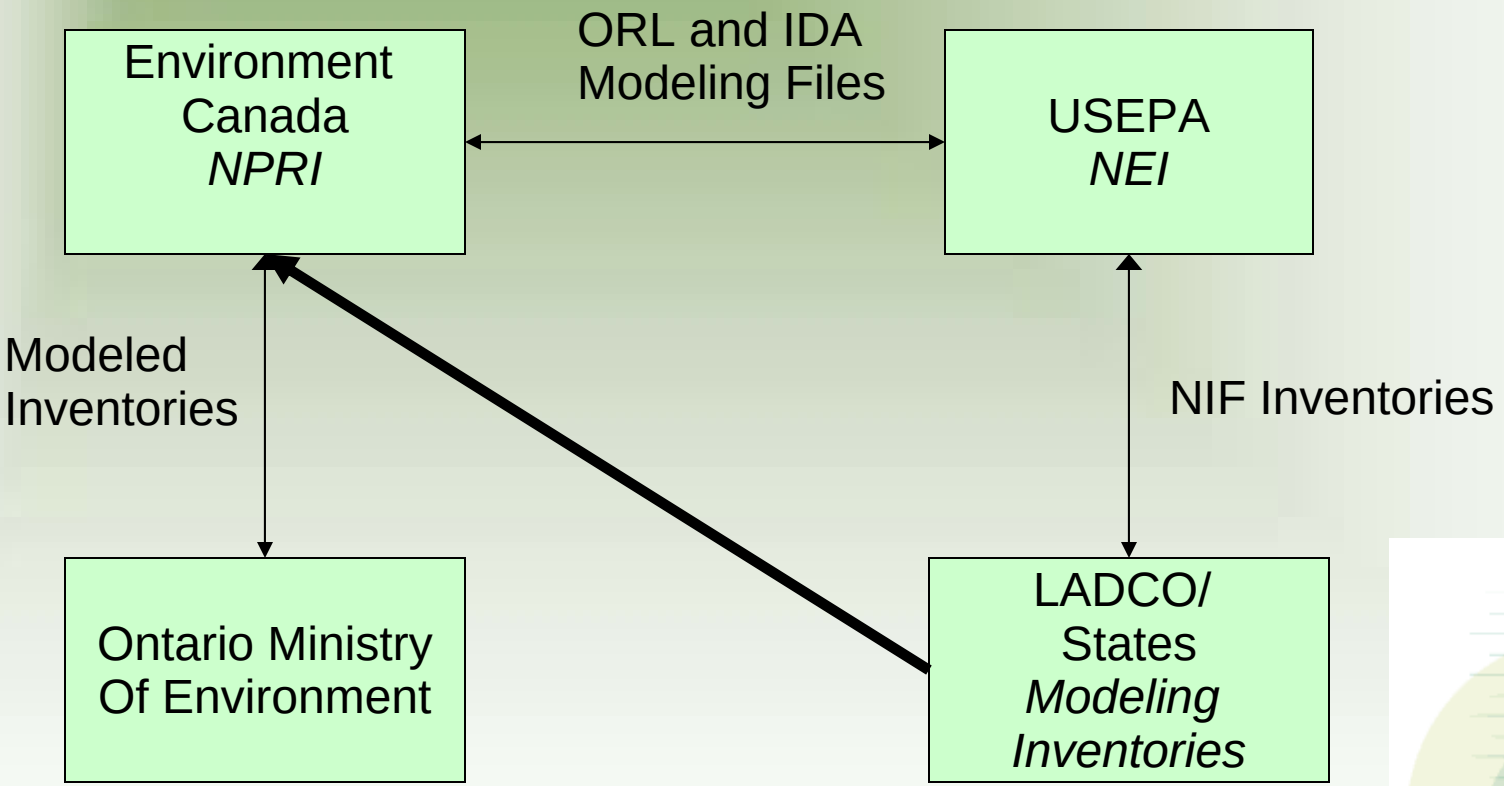
Midwest/Canada Coordination

- Spring 2007 Identification of significant problems in ORL version of Canadian Inventory.
  - HBM&S Flin Flon, INCO Thompson and Sudbury, and Falconbridge.
- Stack parameters missing or set to defaults. Resulted in emissions being lost or put in surface cell for 3 of the top 6 SO2 sources in US/CA
- Fall 2007 Ontario Ministry of Environment and LADCO begin to work together to understand trans boundary issues.

Understanding Data Flow



Understanding Data Flow



Extracting a NIF Point Inventory from the NPRI

- Data Inputs
  - Point Source data from NPRI - Canada_2005_mdb
    - Address
    - ChemList
    - Facility
    - Stacks
    - SubsRele
    - SubsTran

Great Documentation in NPRI

Extracting a NIF Point Inventory from the NPRI

- Data Inputs - continued
  - Geographic Data
    - GEOLocation from NPRI_GEO.mdb
    - Province/Territory default coordinates from GNSS
  - NIF inventory for assigning SCCs to facilities
  - Cross-referenced list of pollutants of interest

Extracting a NIF Point Inventory from the NPRI

- Move Access data to PostgreSQL
  - Create empty tables in PostgreSQL mirroring NPRI and GEO tables for desired subset of fields
  - Connect Access to PostgreSQL via ODBC
  - Execute Access Append Queries to populate tables in PostgresSQL with NPRI and GEOLocation data
- Load reference data into PostgreSQL
  - Pollutant xref
  - Province and Territory data

Extracting a NIF Point Inventory from the NPRI

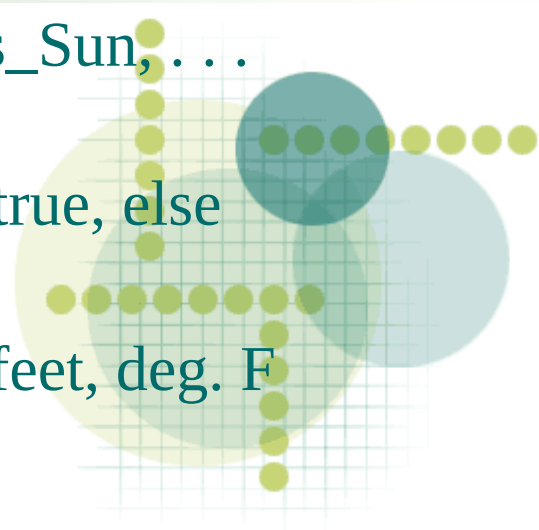
- Load NIF tables SI, EP, EM; build SCC xref from:
  - SCC with max(VOC, PM*) emissions for each NAICS
    - 34.7% of VOC and PM25-PRI
  - SCC with max(VOC, PM*) emissions for each SIC
    - 63.2% of VOC and PM25-PRI
  - SCC most frequently used by facilities for each NAICS
    - 1 / 358347 tons VOC and PM25-PRI
  - SCC most frequently used by facilities for each SIC
    - 1.7% of VOC and PM25-PRI
  - AIRROA_V emissions - SCC 50100401
    - 0.4 % of VOC and PM25-PRI
  - Else SCC = “99999999”
    - 49 / 358347 tons VOC and PM25-PRI

Extracting a NIF Point Inventory from the NPRI

- Processing
  - bash/psql script creates and populates NIF tables
  - Noteworthy conversions/alterations include:
    - SubsTran emissions associated with Stack data
    - AIRSTO_V, AIRFUG_V, AIRSPI_V, AIROTH_V, plus any AIRSTA_V not accounted for in SubsTran aggregated and associated with single, ground level “stack”
    - SCFIPS code choices
      - 2-char abbr, FIPS codes “CA01, ... CA14”, EMS
      - Alberta|AB|48 0|CA01|54.9916666|-114.3766666|NAD83

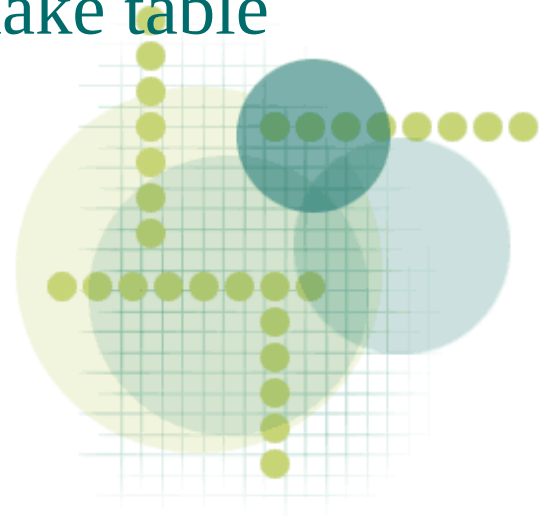
Extracting a NIF Point Inventory from the NPRI

- Processing - continued
  - Noteworthy conversions/alterations - continued
    - Create monthly emissions records where SubsRele (rele_jan + rele_feb + ... + rele_dec) = 100
    - Otherwise create annual emissions and rely on quarterly percentages from Facility
    - Days/week is set to the total of Facility.Days_Sun, . . . Facility.Days_Sat that are set to true
    - Hours are 24/16/08 if Facility.Hours_XX is true, else hours = round(Hours_Ave)
    - Convert metric tons, meters, deg. C to tons, feet, deg. F



Extracting a NIF Point Inventory from the NPRI

- Processing - continued
  - At this point, have a NIF inventory in PostgreSQL
  - Can apply fixes, such as
    - INCO stacks (fixed in latest NPRI)
    - Stack temp > 1250 C.
  - Can create Access database via ODBC make table queries
  - Can generate fixed-width text export



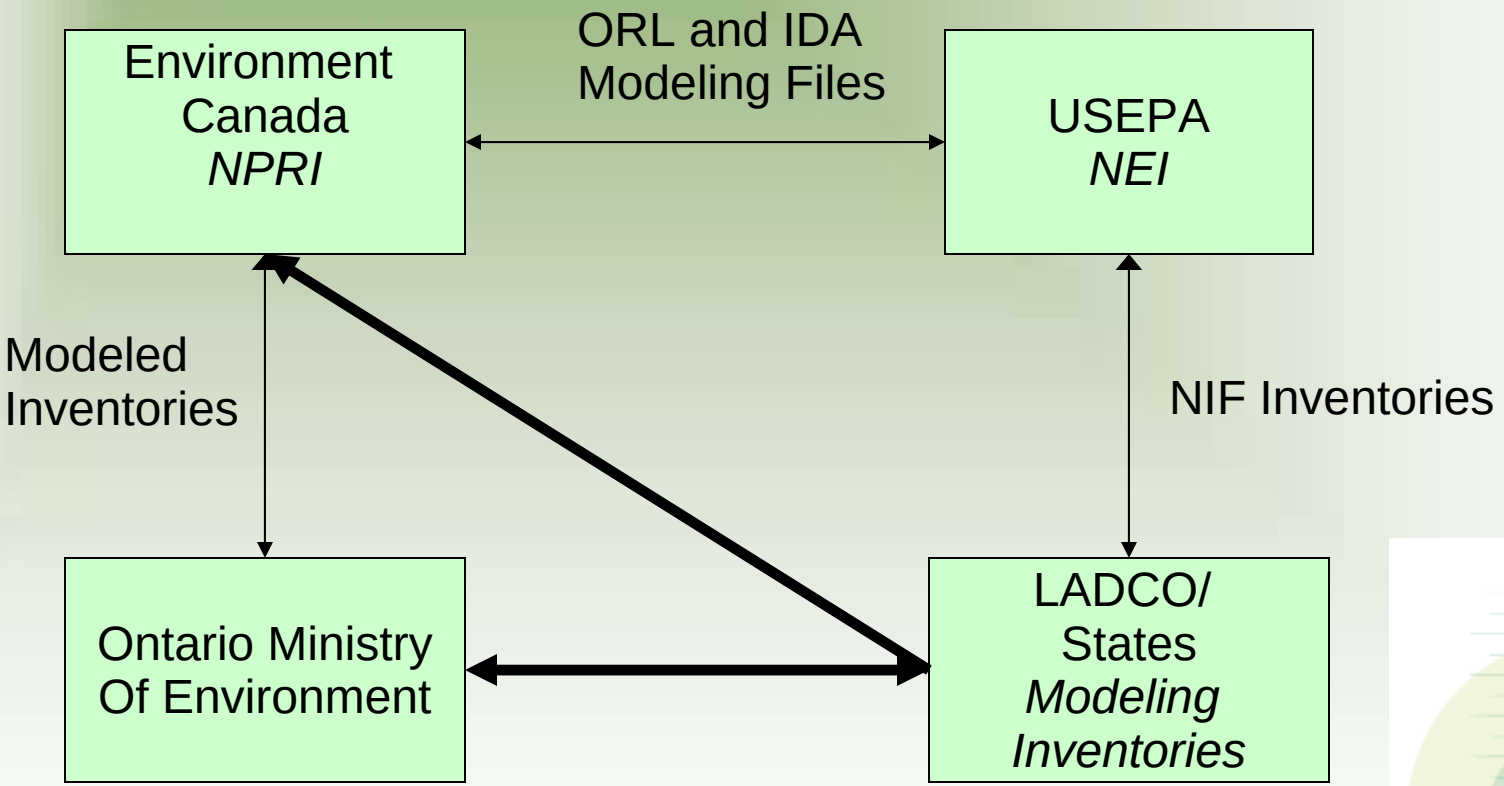
Extracting a NIF Point Inventory from the NPRI

- Advantages
  - Better temporal and vertical resolution over ORL files
  - Can use NIF-based diagnostic and processing tools
  - Iterability
    - Can easily regenerate entire inventory as NPRI is updated
    - Can incorporate fix sets at head or tail of process
    - Fixes can be easily documented/reverted

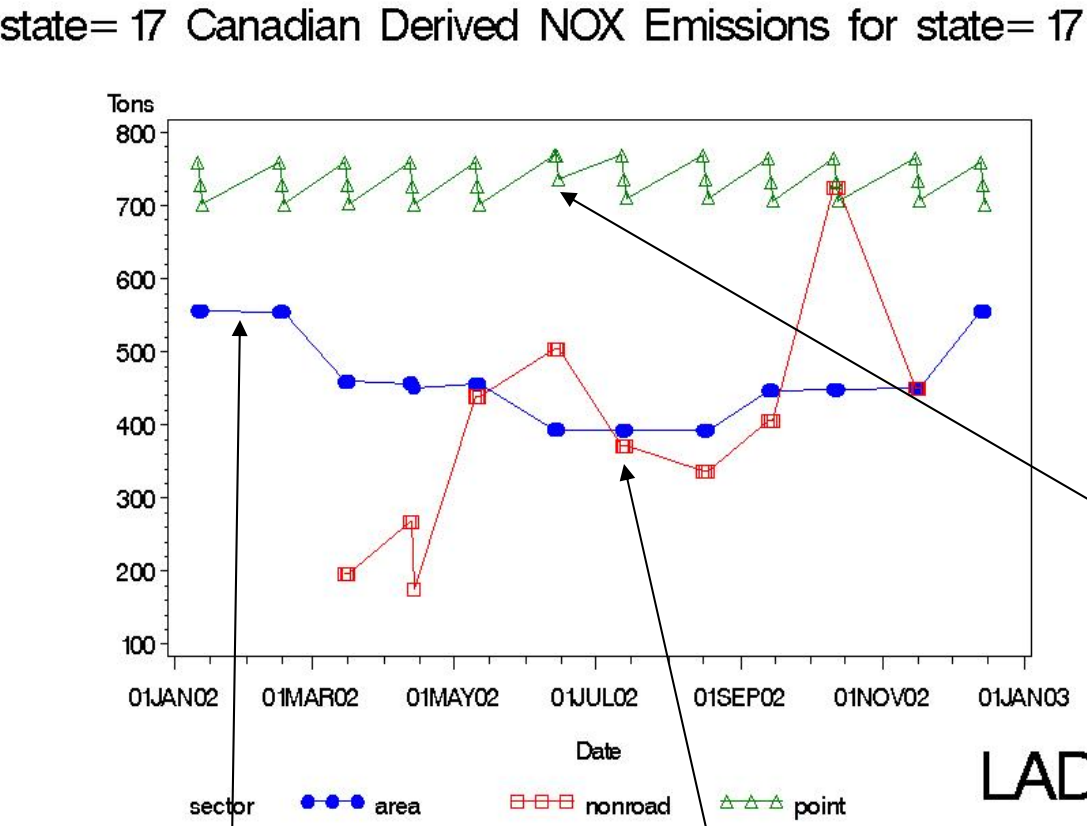
Extracting a NIF Point Inventory from the NPRI

- Areas to be improved
  - Not taking advantage of speciation/SCC assignment
  - Upstream Oil and Gas

Incorporating US RPO data into Canadian Process



EC: We are not in a position to decide between competing inventories.



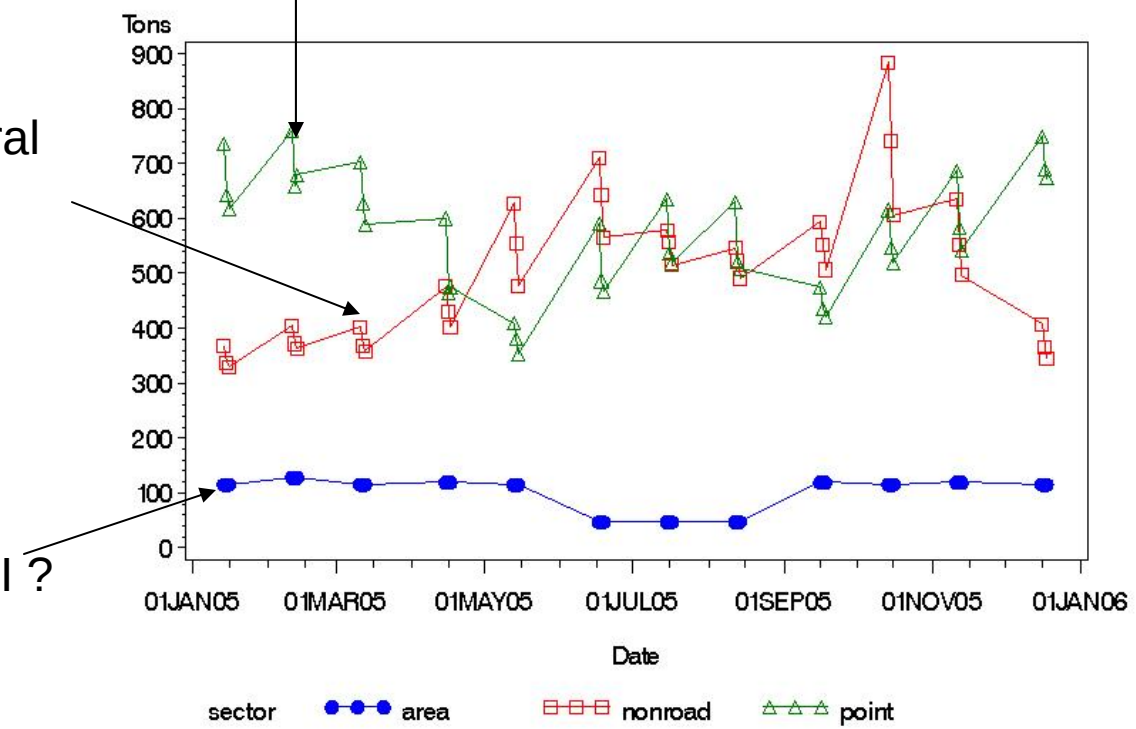
Comparison of Canada Derived Illinois NOX.

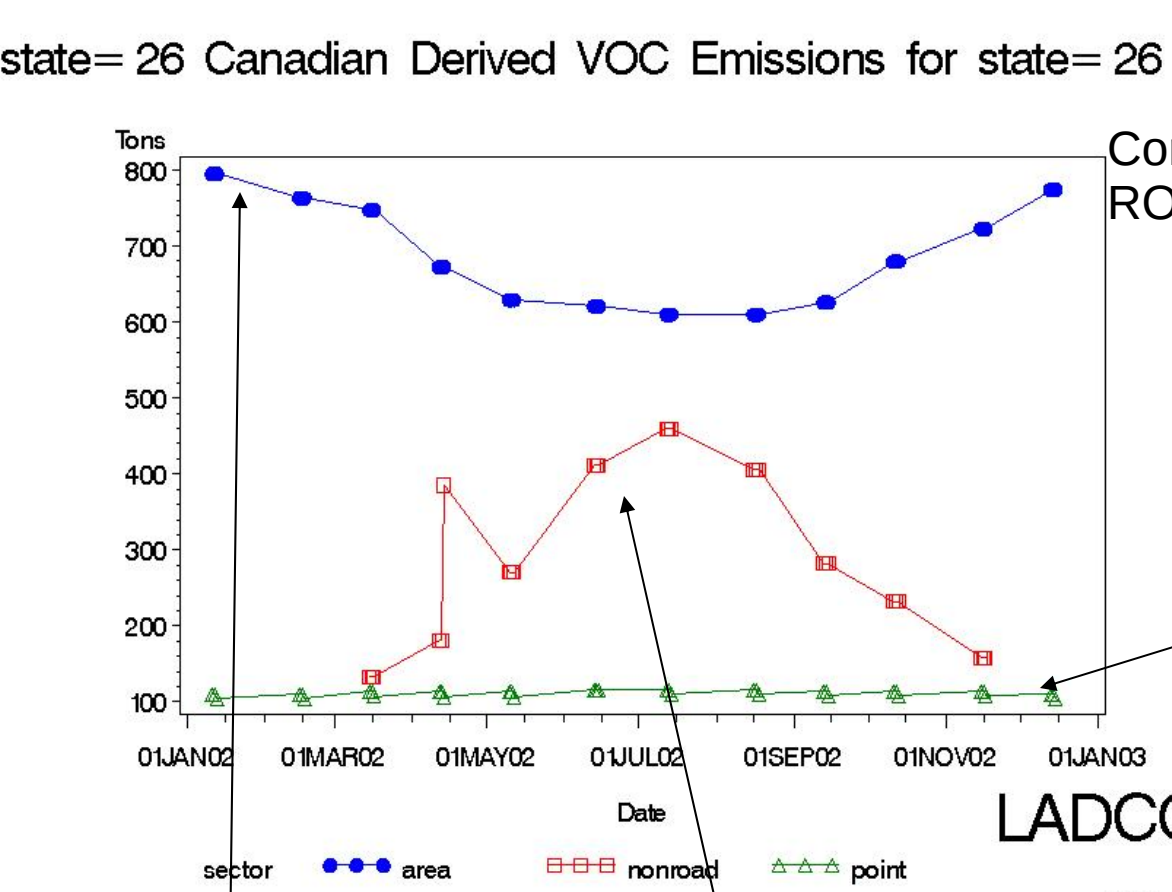
Biogenics and Onroad Not included because methods vary too much to make a reasonable Comparison

EGU Emissions lack CEM temporal

Nonroad Temporal (Ag Equipment)

Area Source Augmentation IN 2002 NEI ?



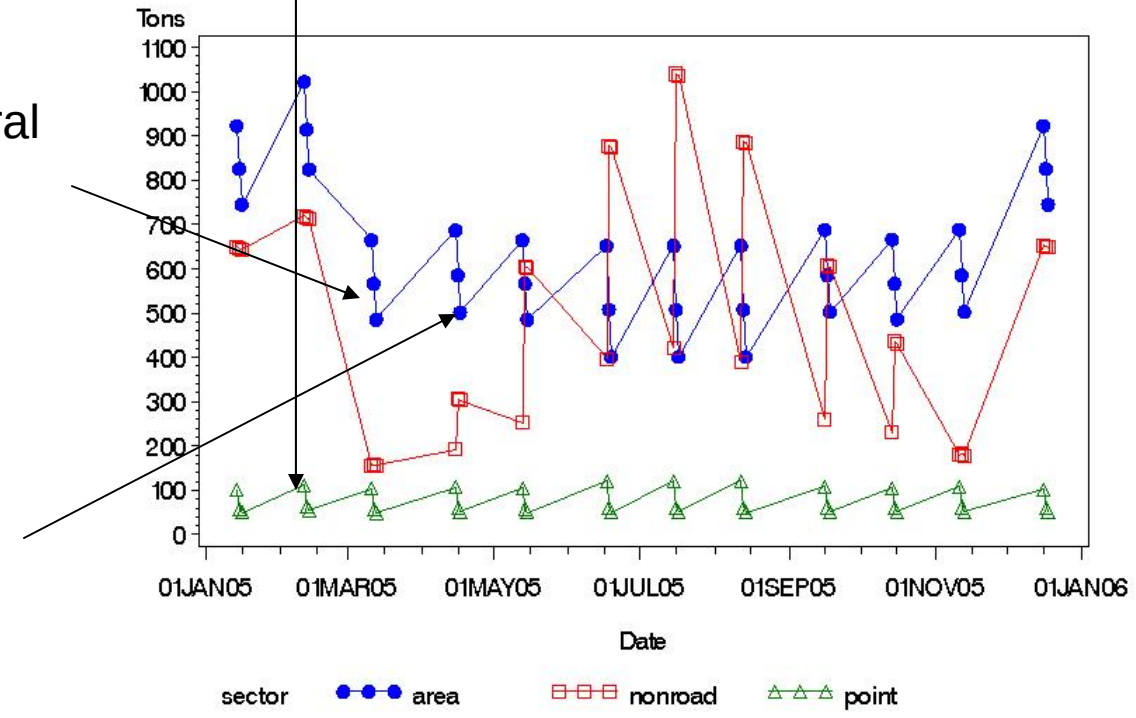


Comparison of Canada Derived Michigan ROG.

NPRI Point Speciation Problem?

Nonroad Temporal (REC Marine)

Less Augmentation, Difference greater than Point?



Differences Examined

Emissions in Thousands of Tons/Year

Category	Pollutant	Canada	LADCO
Cattle	NH3	177	60
Dairy	NH3	0	45
Poultry	NH3	54	37
Swine	NH3	135	33
Fertilizer	NH3	177	15
POTW	NH3	.2	15
Large Bore Diesel Engines	NOX	36	0
Aircraft	NOX	57	10
Dust(LADCO Adds Transport Fractions)	PM2.5	145	.2
Solvent Categories joined in Canada, Do they match the US list?	VOC		
Graphic Arts	VOC	0	6
Beef Cattle	VOC	327	0
Pesticides(2805002000)	VOC	264	64
Ag Equipment (SO2/NOX) ratio lower than US	SO2		

Where We Go From Here?

- LADCO will continue to use NPRI derived Inventory.
- Process stalled over EC/OME use of NEI based modeling inventory.
- Unlikely that new NEI process will fix temporal problems.