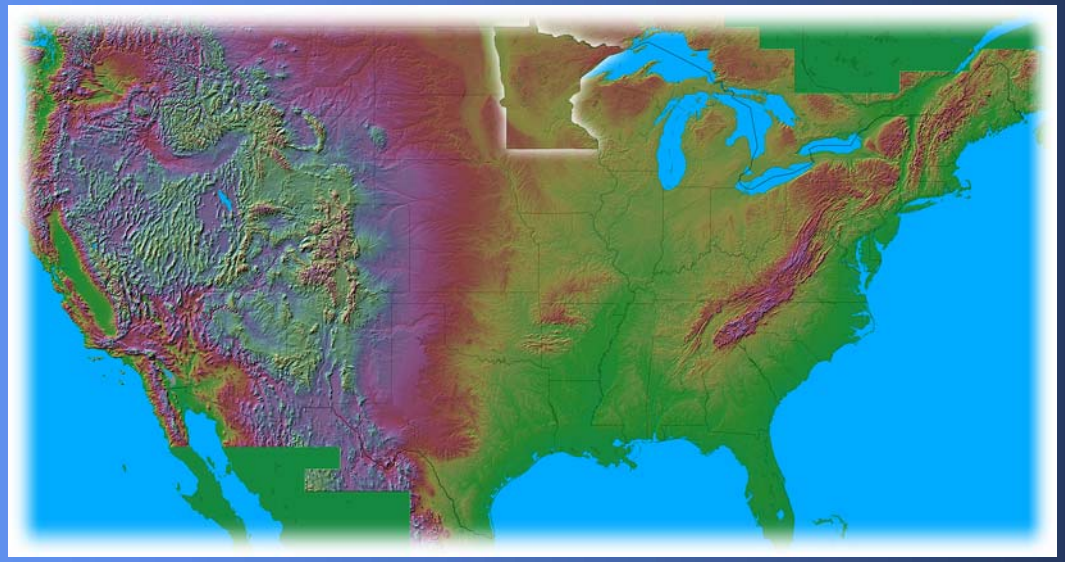
Emissions Inventory for Large-Scale Risk Assessments



Stephen Koo
Lakes Environmental
Clearwater, FL – June 2004

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Overview

- General Introduction
  - Why do it?
- Data “Quality” – Is It…?
  - Where is it coming from?
  - How “good” is it?
  - Interpolation
- Data Collection Quick & Easy
- Down the Road…

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Why Do Risk Assessments?

- Identify the high-risk target groups
- Identify important emissions sources and toxics
- Plan and design facilities to minimize impacts
- Meet regulatory requirements
- Determine residual risk after MACT standard compliance

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Traditional Assessments

- Focused on air toxics from point sources
- Applied to new and expanding facilities
- Time consuming and resource intensive
- Limited by scope

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What Is Large-Scale RA

- All know sources (point, area, mobile, etc.) within the area of interest
- Multi-program/Cross media
- Receptor-based model
- Allocation using census/tract data

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Applied Projects

- Minnesota Pollution Control Agency (MPCA)
  - Multi-source, multi-pathway cumulative risk-assessment study
- New Jersey Department of Environmental Justice (NJDEP)
  - Environmental justice solution

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Inventory + Risk?

- Risk assessments require source data
- Source data is available in facility, county and state inventories
- Use inventory to populate model for assessment

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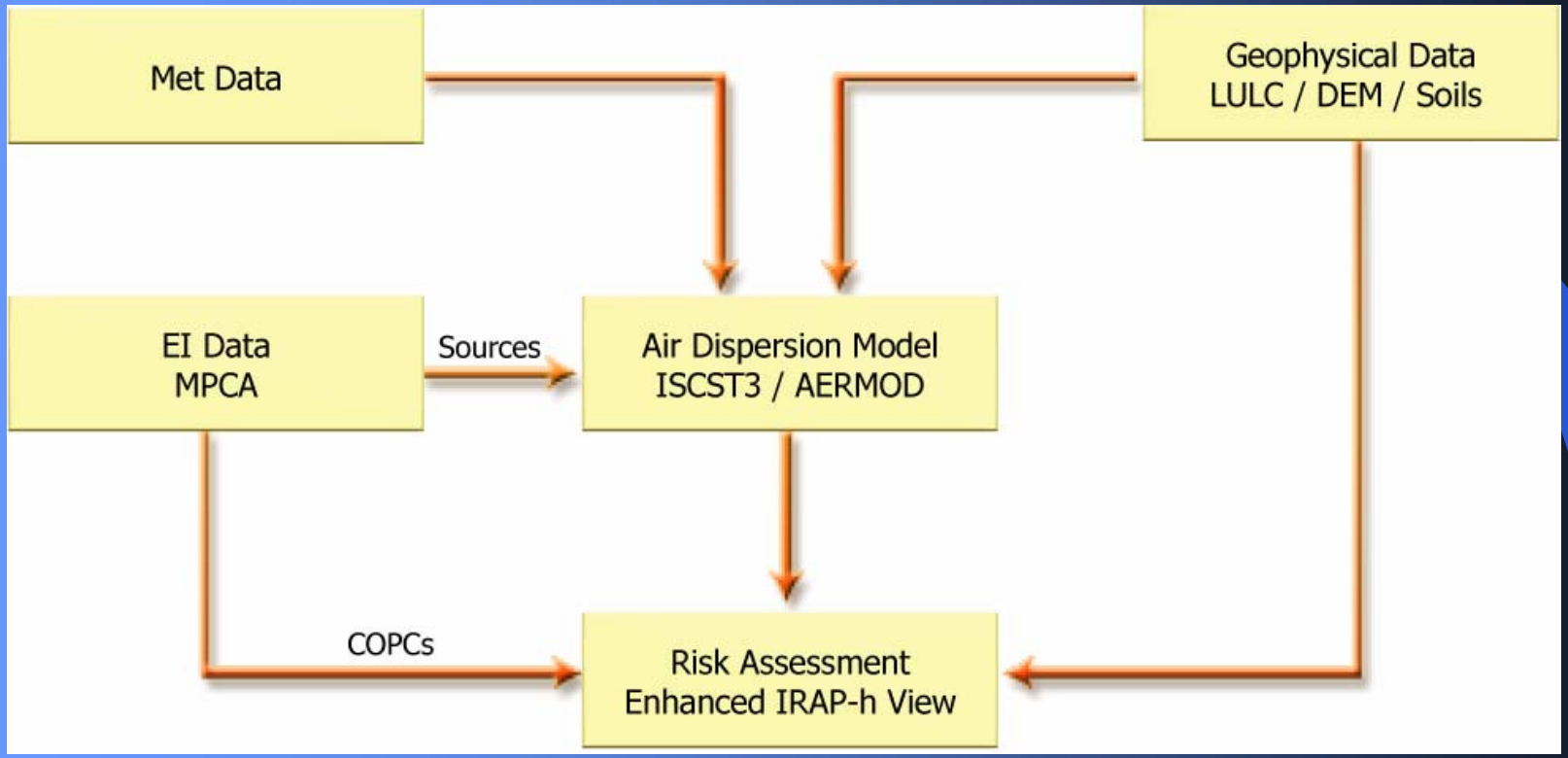
Risk Assessment in a Nutshell



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Air Modeling Source Data

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Emissions Inventory Data Limitations

- Data collected does not consider risk assessment needs as part of the collection schema
- Limited building data (when available)
- Summed emissions for entire sites
- Emissions lumped into a single category (e.g., NMOCs)

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Source Data Needs: Physical

- Stack Source
  - height, base elevation, inside diameter, exit velocity, exit temperature, control devices, location, base elevation
- Fugitive and Mobile Sources
  - area, release height, location, base elevation

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Source Data Needs: Emissions

- Contaminant name and CAS number
- Speciated emissions rate(s), g/s

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Characterization of Point Sources

- Location
  - Facility reported, GIS address matching
  - Centroid or front gate of facility
- Source Parameters
  - Regulatory agency files, average facility values, facility reported (where available)
- Source Emissions
  - Getting to that…

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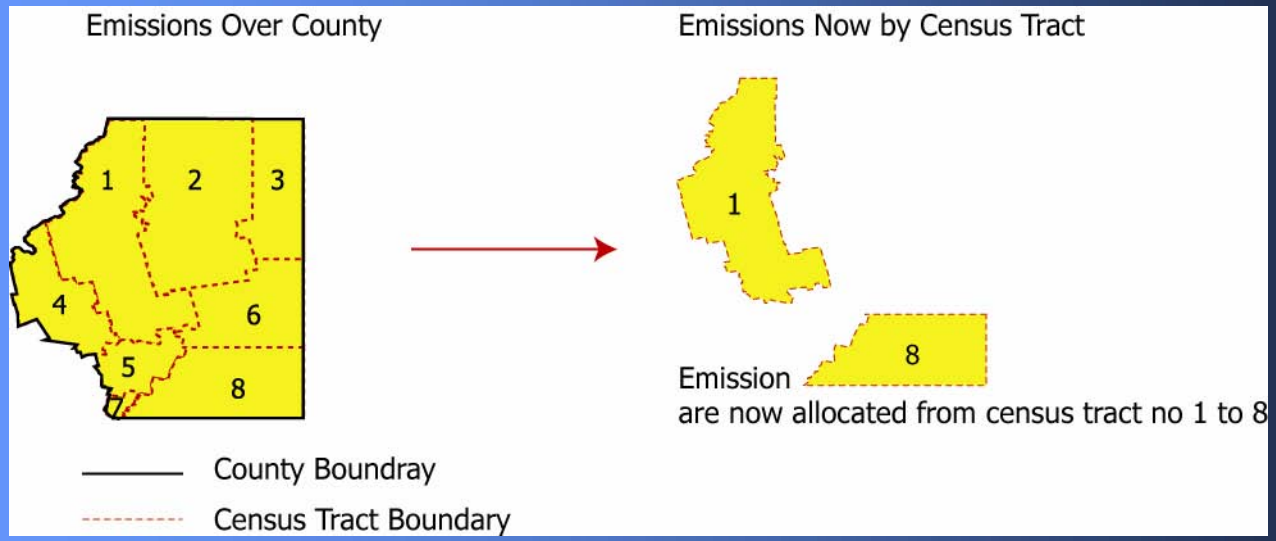
Characterization of Area Sources

- Allocated at the County/Census Tract level using emissions surrogates



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Emissions Data

- Use available emissions inventory data
  - Limited to what is actually reported
- Speciated data limitations
  - Speciate by specific contaminant
  - Speciate by contaminant class
  - Speciate by SCC process profiles

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One Method: Environment Canada

- CAC2003
  - Use available facility reported data (VOCs)
  - Assign SCC(s) and materials used to source
  - Calculate emission using FIRE
  - Speciate VOC results using available SCC process profiles

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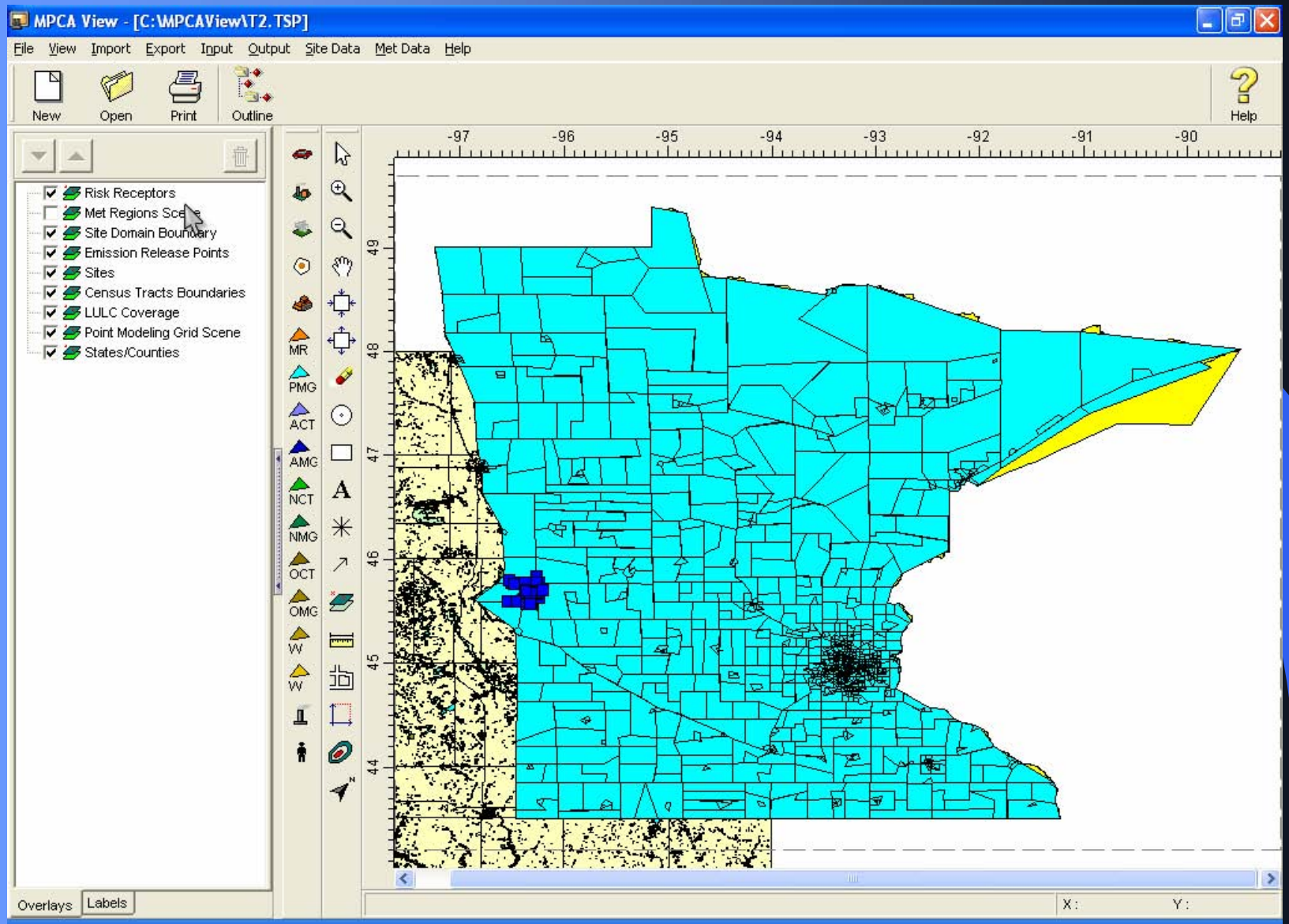
Data Collection: Emissions View



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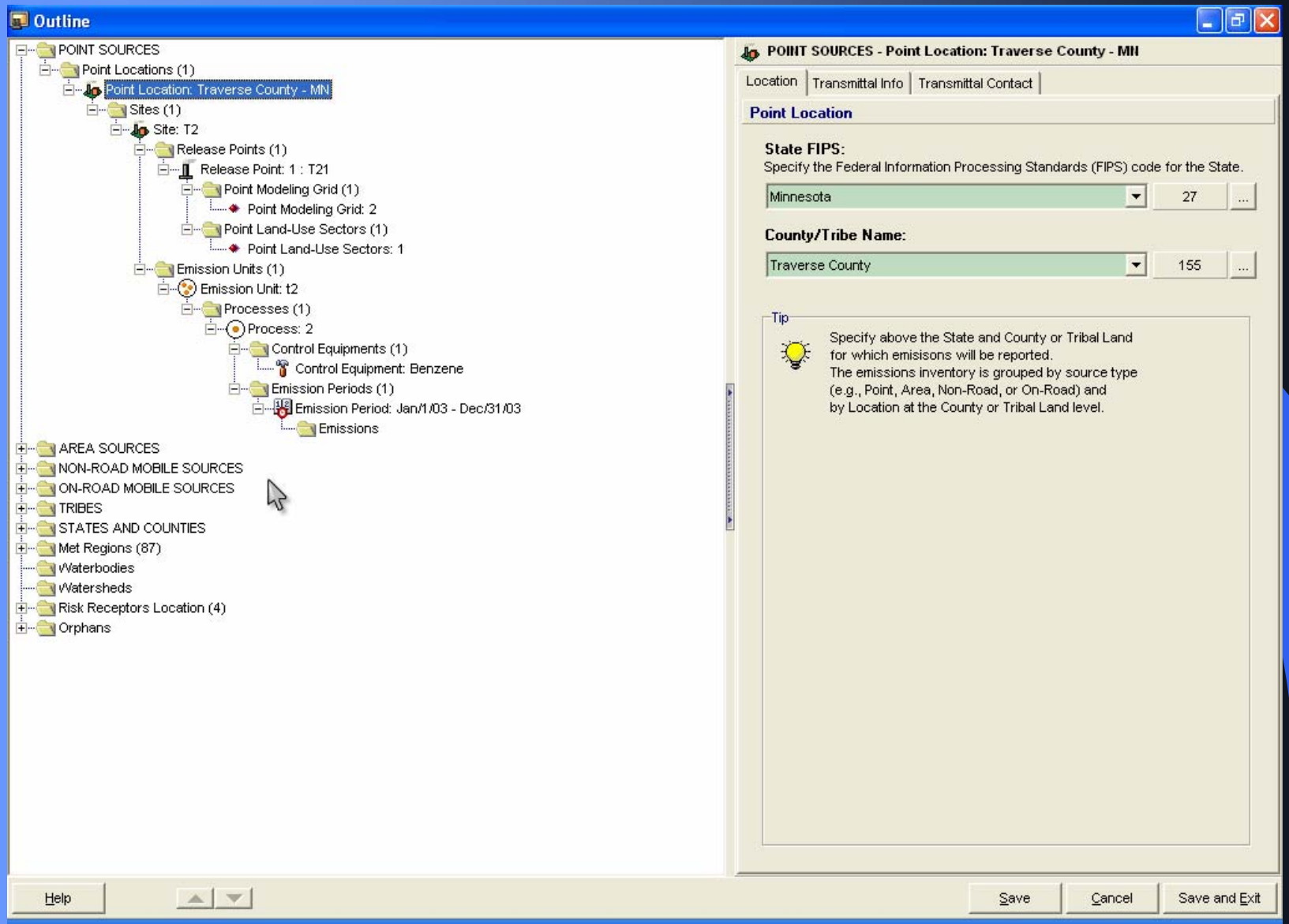
Data Collection: Emissions View



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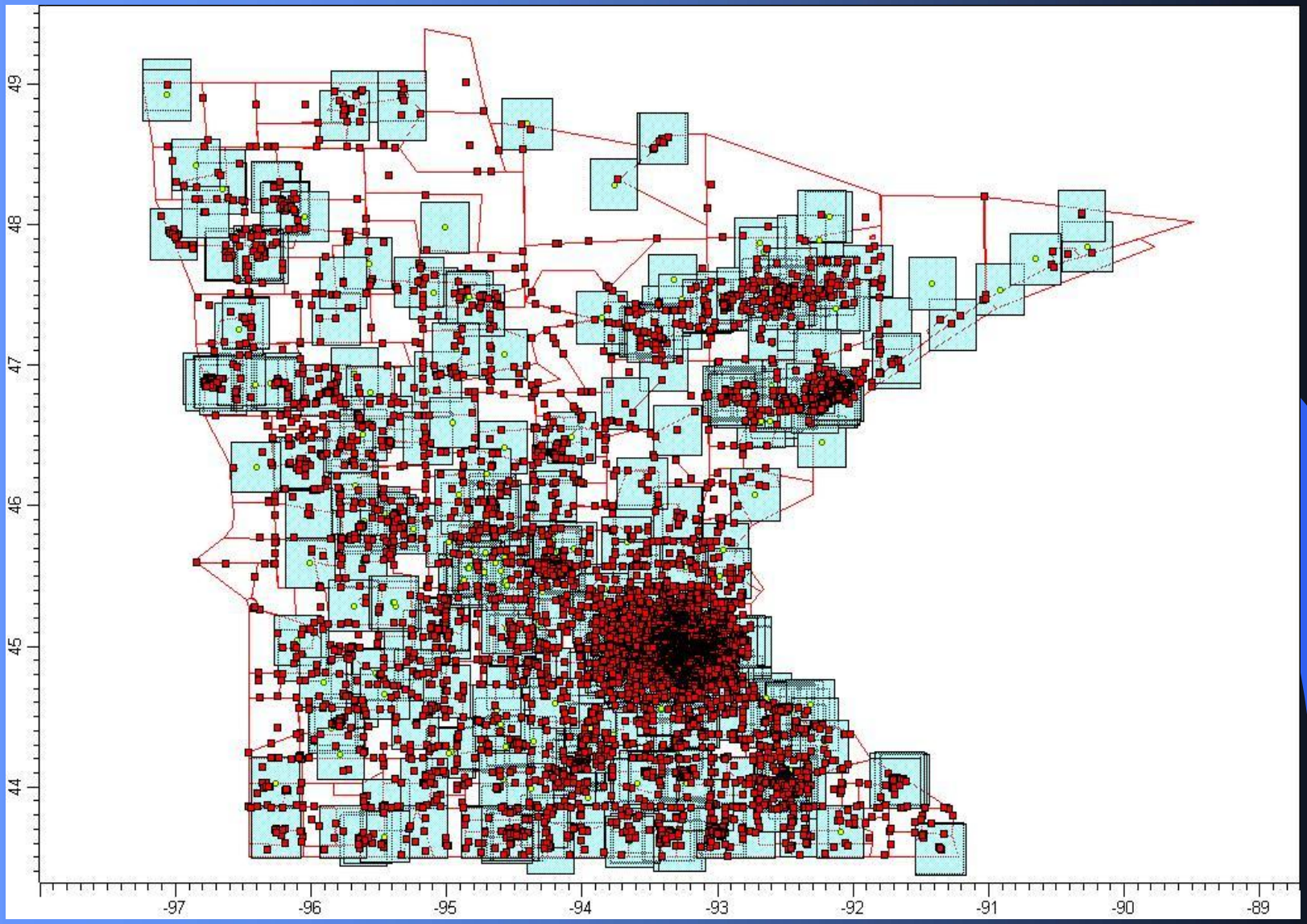
Risk Model: Visualization



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Advantages of LSRA

- Impact studies account for as many background pollutants as possible
- Vulnerable groups/areas are identifiable
- Critical pollutants that are of major concern are placed into context
- Multi-pathway, thousands of sources
- Traceable allowing for evaluation and implementation of solutions

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What Else?

- Background concentrations
  - Multi-year analysis
- Temporal influence
- Surround buildings
  - Building downwash effects
- Improvements in inventory collection
  - Implicitly defined individual sources

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Questions?

Got any…?

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