Preparation of a Base-Year Inventory for Application to Regional Haze in the West

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Presentation Outline

- Introduction
- Inventory Preparation Methodology
  - Information Collection
  - Information Processing
- Results
  - Point Sources
  - Area Sources
- Summary/Recommendations

INTRODUCTION

- EF of WRAP has responsibility to compile base and future year inventories for regional haze analyses in West
- Compile "Best Possible" Base-year Emissions Inventory
  - Focus on Point and Area Sources
  - Based On 1996 NEI (Western States)
    - Point sources thought to be more accurate than area sources
  - Canadian NPRI and Northwestern Mexico inventory data also included (not discussed here)

INTRODUCTION (cont'd)

- NEI Serves as Starting Point for the Effort (1996)
- Features
  - National in Scope (all States, all Counties in West)
  - Includes all Haze Pollutants
  - Developed with *Consistent* Methodologies
- Still Has Weaknesses for Regional Haze Studies
  - Point source data is more precise and current than area source but still has weaknesses
    - sometimes missing activity rates, seasonal operating rates, stack parameters, and location data
  - Area source data has substantial uncertainty due to:
    - point/area source size cutoffs, allocation of activity data to county level, variable control requirements in different jurisdictions

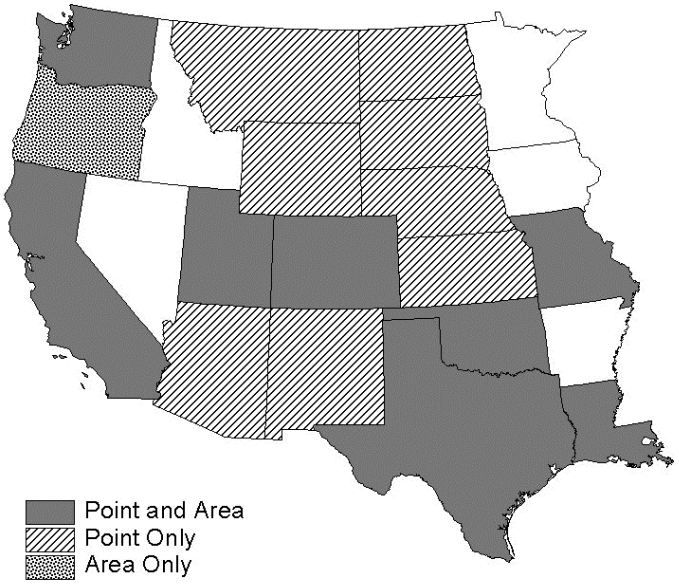
INVENTORY PREPARATION METHODOLGY

- Information Collection
  - Some Western States had already submitted data for 1996 NEI as part of 1996 PEI process
    - WA, CA, OK, TX, MO, LA (point and area) and MT, ND, SD, NE, KS, and CO (point only)
  - Version 3.12 of 1996 NEI obtained and State level files provided in dbf and NIF formats
  - EPA replaces EGU emissions, so 17 Western States given the opportunity to revise EGU emissions and to modify any sources that had changed since PEI submittal
  - QA checks were run on submitted data and data augmentation and gap filling were performed for missing pollutants and important modeling information

DATA SUBMITTALS

STATE	SUBMISSION	ACTION TAKEN
Washington	Minor updates to the earlier submission for 1996 NEI	Incorporated minor corrections
Oregon	Area Source data submitted for some categories	Merged data provided and augmented with selected categories that were not provided from NEI inventory
Idaho	Plant level data for point sources were extracted from AIRS	Plant and point identifiers could not be matched and the data could not be incorporated
Wyoming	Point Source data submitted	Data were incorporated
Utah	Point Source and Area Source data submitted	Incorporated data with minor augmentation
Colorado	Point Source data for utilities, and Area Source data for all sources submitted	Merged data provided to replace the NEI data.
Arizona	Point Source data submitted	Substituted data provided by the State and Maricopa county, and retained NEI data for Pinal, and Pima counties, and major sources on Tribal lands.
New Mexico	Point Source data submitted	Replaced data in NEI file with some minor augmentations

DATA SUBMITTALS



INFORMATION PROCESSING

- Information submitted varied by agency
- Data were reviewed and summaries developed
  - by pollutant at both State and county level
  - compared to similar totals from NEI
  - all significant discrepancies investigated
- Other checks included
  - emission summaries from subsets of sources in major categories
  - check of activity rates for fuel use categories
  - ID of missing/erroneous stack parameters or locations

INFORMATION PROCESSING

- Problems encountered:
  - missing major point sources from submittals by State agencies for selected sources that are operated on tribal lands,
  - inclusion of movable sources (e.g., asphalt and concrete batch plants) in point source files without a recognizable county code,
  - missing or inaccurate fuel use or other activity totals, and
  - different totals for some area source categories that arose from differences in point/area source size cutoff assumptions.

INFORMATION PROCESSING

- Problems encountered:
  - PM-2.5 and NH3 missing from virtually all S/L/T submittals
    - PM-2.5 added based on NEI PM-2.5/PM10 ratio x PM10 emissions submitted by S/L/T
    - NH3 added directly from NEI even if S/L/T submitted NH3 estimates
      - treated this way to avoid large differences among States
  - Missing/inaccurate stack parameters filled using default stack parameters
  - Incorrect location information corrected by placing in county centroid
    - flags used to keep track of parameters that were changed
  - Final inventory database delivered to WRAP on 10/26/01.

RESULTS

- Local Point Source Data for 17 of 22 States
- Area Source Data for 9 of 22 States
- Overall Small Changes in Emissions Magnitude
- Large Changes in Some State/Category Combinations

POINT SOURCE SUMMARY

State	SO_2	%	NO_x	%	PM-10	%	PM-2.5	%
Washington	- 1,848	- 1.5	- 2,958	- 5.0	+ 193	+ 1.5	+ 221	+ 2.5
Colorado	- 750	- 0.7	- 1,356	- 1.0	- 1,054	- 5.0	- 690	- 5.5
Wyoming	-26,688	-17.2	-23,109	-14.9	- 935	- 2.8	- 137	- 0.7
Utah	-16,713	-28.6	-12,795	-12.9	-10,426	- 43.3	-12,063	- 65.8
Arizona	-20,716	- 9.6	-43,549	-28.6	-12,755	- 36.5	- 6,837	- 36.9
New Mexico	-19,567	-10.9	- 3,413	- 2.2	- 6,621	- 39.2	- 7,073	- 69.4
Entire Study Area	-86,282	- 2.3	-87,180	- 2.5	-31,598	- 5.8	-26,579	- 8.4

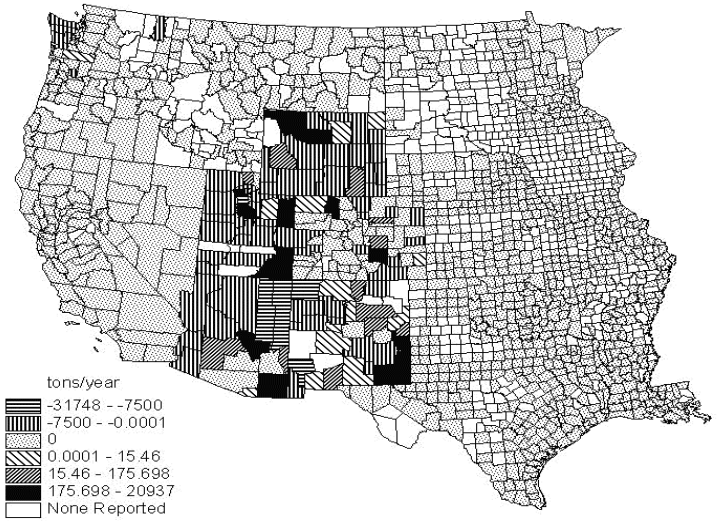
Numbers represent WRAP-NEI so negative values indicate reductions in estimates emissions

POINT SOURCES

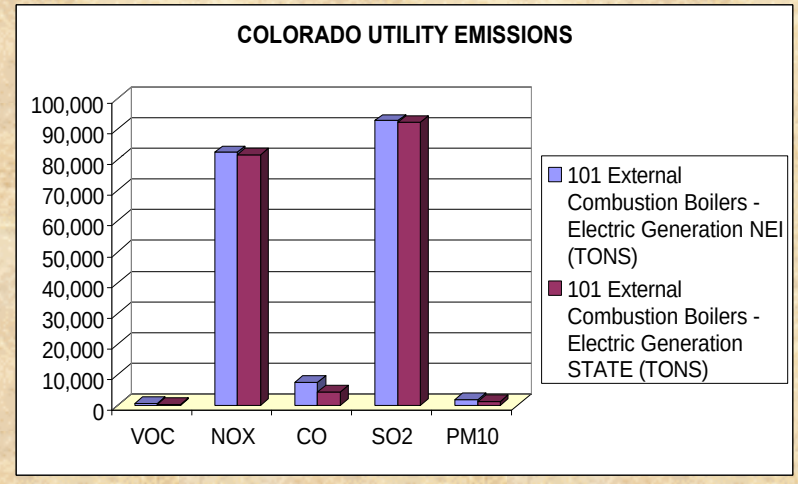
- Total regional change is less than 10% for all pollutants
  - differences are significantly larger for some pollutants in some States
  - significant differences for SO2 and NOx result from plant closures and some fuel switching not reflected in NEI
- Changes for Washington and Colorado the smallest
  - both submitted data as part of the 1996 PEI effort
- County-level changes could be significant
  - primarily due to location changes due to incorrect location information

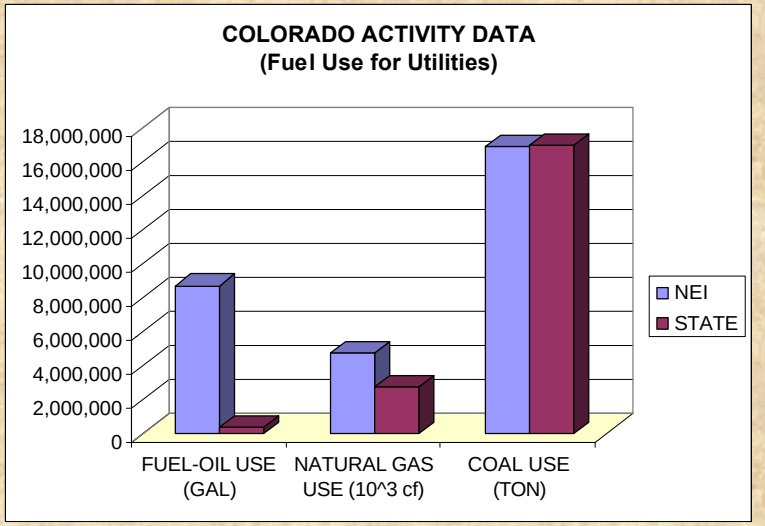
POINT SOURCES

Point Source SO_2 differences in tons/yr (NEI minus WRAP)



Colorado Utilities





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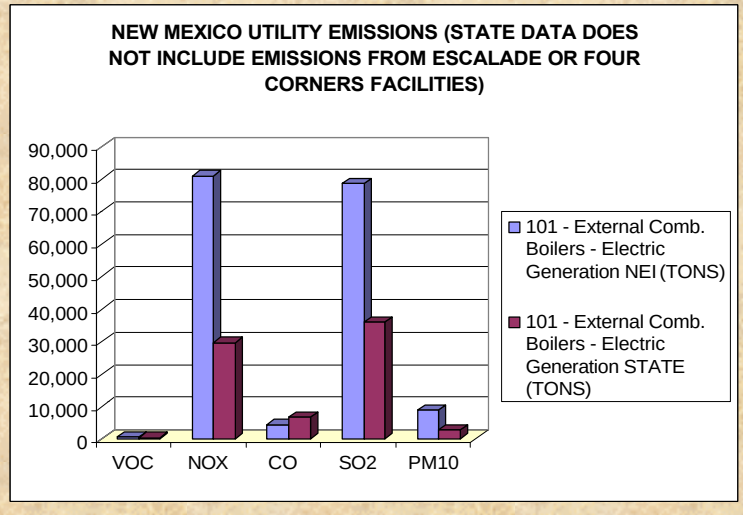
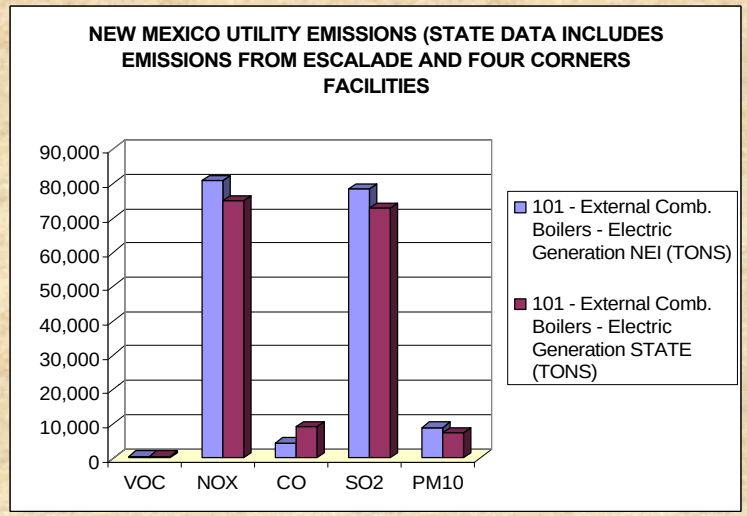
Effect of Tribal Sources





AREA SOURCES

- Absolute magnitude of emissions changes is small (except for NOx in CO)
- Patterns of changes for PM are also interesting
  - OR showed an increase in emissions with significant decreases for CO and UT
    - OR increase due to RWC - have detailed studies showing activity data significantly different than NEI
    - much of CO reduction due to cutoff of 2 tons/yr for point sources which moves many sources from area into point component of inventory
- Harder to draw conclusions about area source differences compared to the NEI since only 3 States submitted updated information

AREA SOURCE SUMMARY

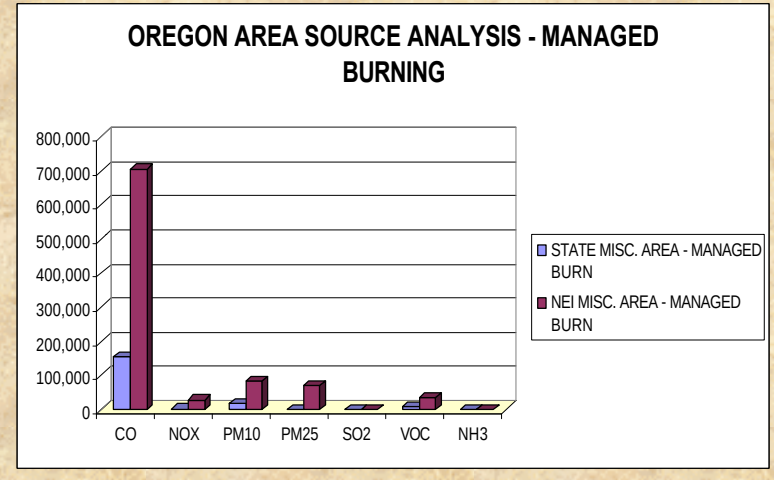
State	SO_2	%	NO_x	%	PM-10	%	PM-2.5	%
Oregon	- 15,735	- 87.5	+ 5,982	+ 65.6	+ 35,648	+ 23.3	+ 34,363	+ 71.2
Colorado	- 2,593	- 57.5	- 41,579	- 79.1	- 44,466	- 17.1	- 15,796	- 26.1
Utah	- 2,968	- 26.7	- 13,412	- 72.6	- 23,892	- 36.5	- 5,393	- 30.1
Entire Study Area	- 21,296	- 6.0	- 49,009	- 6.6	- 32,710	- 0.6	+ 13,174	+ 1.0

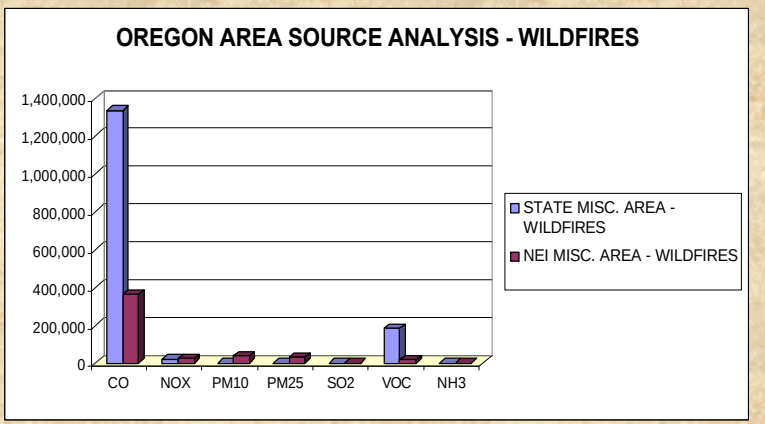
Numbers represent WRAP-NEI so negative values indicate reductions in estimates emissions

CHANGES TO SPECIFIC AREA SOURCE CATEGORIES

Source Category	Pollutant Species	Utah		Colorado		Oregon	
		Emissions, tpy		Emissions, tpy		Emissions, tpy	
		NEI Data	State Data	NEI Data	State Data	NEI Data	State Data
Residential Wood Combustion	PM-2.5	1,747	3,860	4,724	9,037	20,764	50,352
	NO_x	179	356	485	725	2,130	5,467
	VOC	2,803	10,140	7,581	41,050	33,319	127,325
	SO_2	26	54	69	115	304	743
Open Burning	PM-2.5	787	0	1,757	0	0	5,723
	NO_x	224	0	499	0	0	493
	VOC	1,179	0	2,635	0	0	3,928
	SO_2	32	0	71	0	0	82
Area Source Fuel Use	PM-2.5	443	1,893	541	315	903	2
	NO_x	17,968	4,707	51,445	10,266	6804	8652
	VOC	304	4,796	646	149	719	241
	SO_2	10,991	8,094	4,291	1,800	17635	948

Oregon Area Sources





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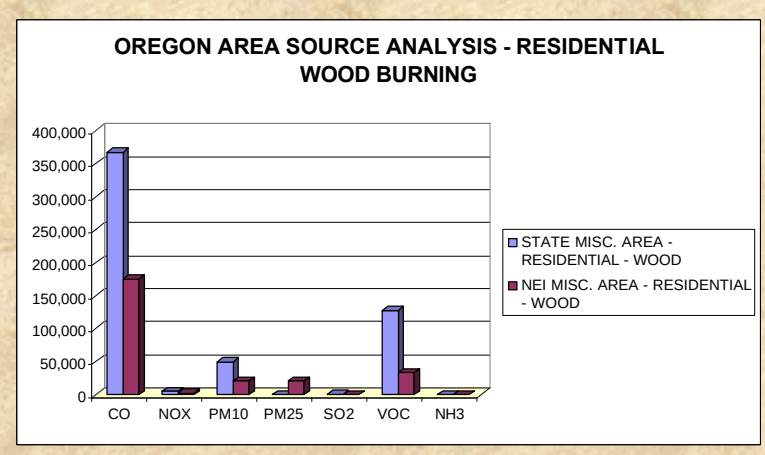
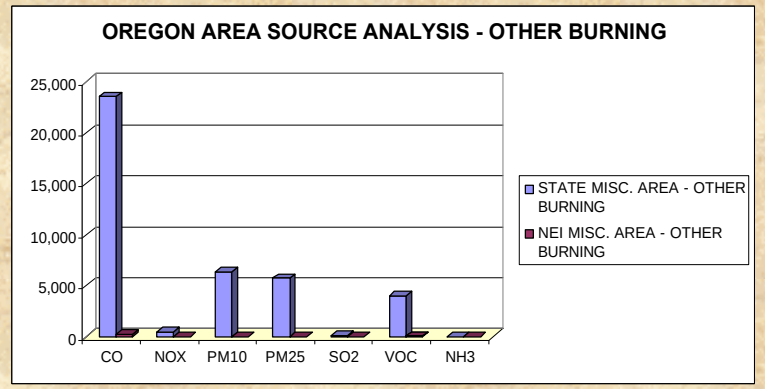
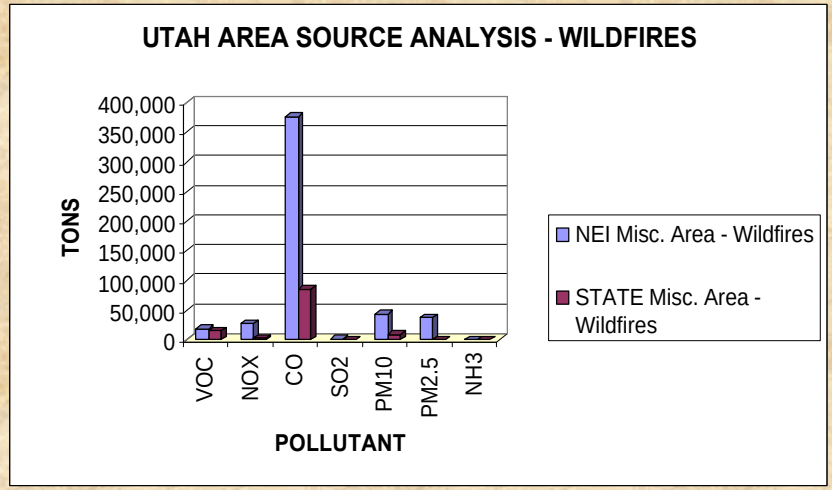
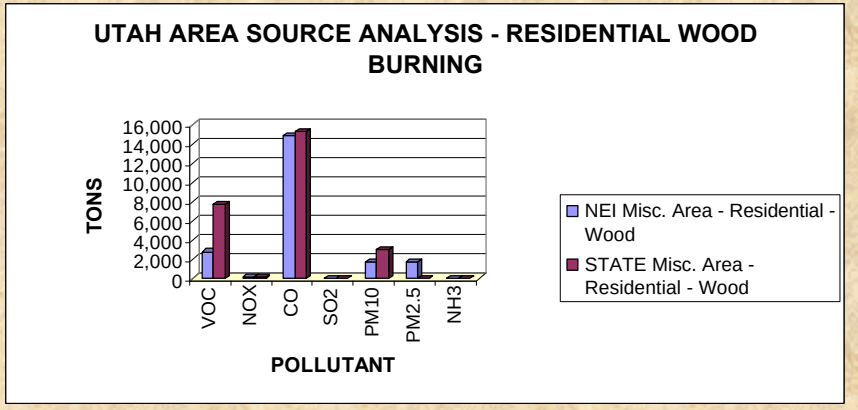
Oregon Area Sources

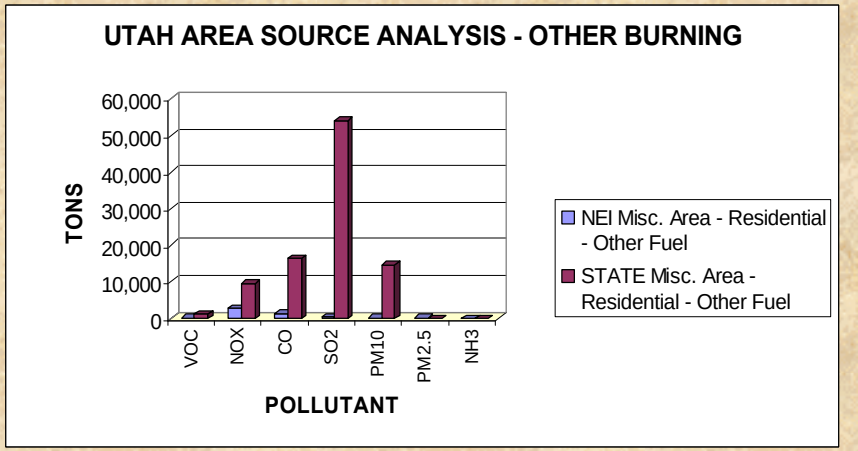




Utah Area Sources







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FUTURE NEEDS

- Point Sources
  - Attention to Physical Information
  - Consistent Size Cutoffs
  - Verify Retired and New Facilities
  - Updates for Facilities on Tribal Land, and for Areas Under Local Jurisdiction

FUTURE NEEDS

- Area Sources
  - More State, Tribal, Local Data Needed
  - Consistency in Assumptions, Methods
  - Allocation and Spatial Resolution
  - Treatment of Dust and Fire Sources