

# OWBs in Minnesota

**Minnesota Pollution Control Agency**

**March 2, 2011**

**John Seltz**



- Background
- Periodic wood use survey
- Initiation of effort to “Improve air quality”
- A few other things



# Background

- Minnesota has trees in the NE 2/3 of the state
- Minnesota is cold in winter
- Minnesota is home to several OWB manufacturers
- The state (and locals) has been concerned with overall wood smoke levels - but at a low level since wood use appeared to be decreasing
- The advent of OWBs 10 years ago changed things



- Over 50% of wood complaints are about OWBs which constitute a much smaller fraction of wood burning appliances
- An OWB may emit more PM<sub>2.5</sub> than many of the permitted sources in the state.
- We have the same problems as other cold wooded midwestern states
- We haven't developed a good response yet



**tallgrass aspen  
parkland**

**coniferous forest**

**prairie grassland**

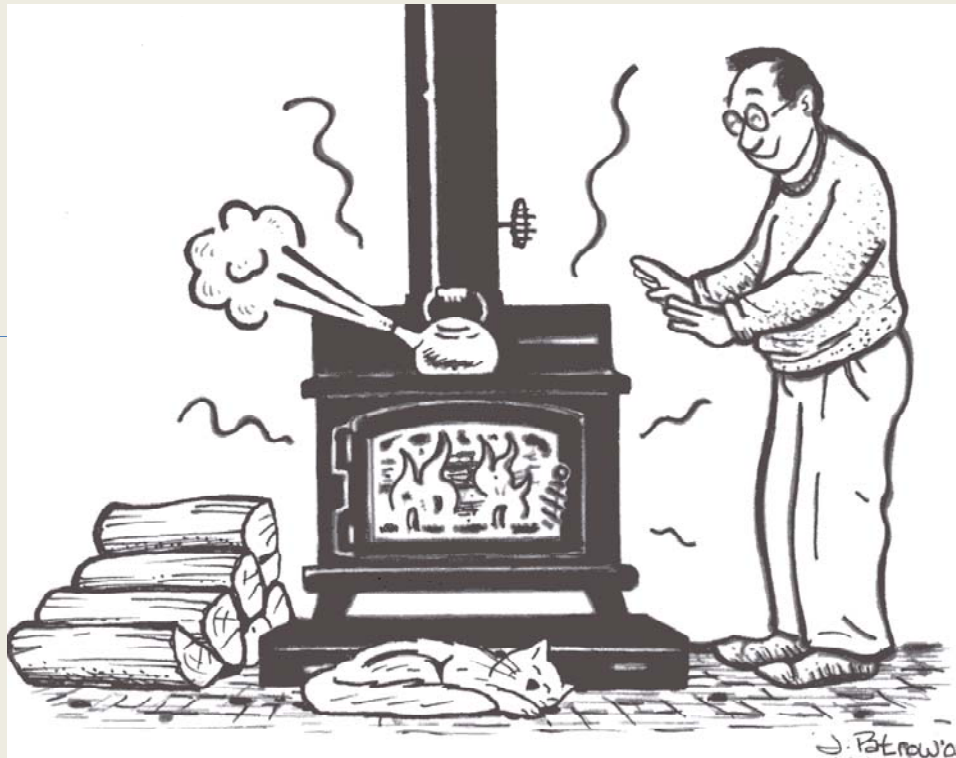
**deciduous forest**



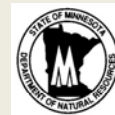
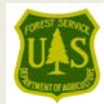
**RESIDENTIAL FUELWOOD  
ASSESSMENT**

**STATE OF MINNESOTA**

**2007 – 2008 Heating Season**



Sponsors:

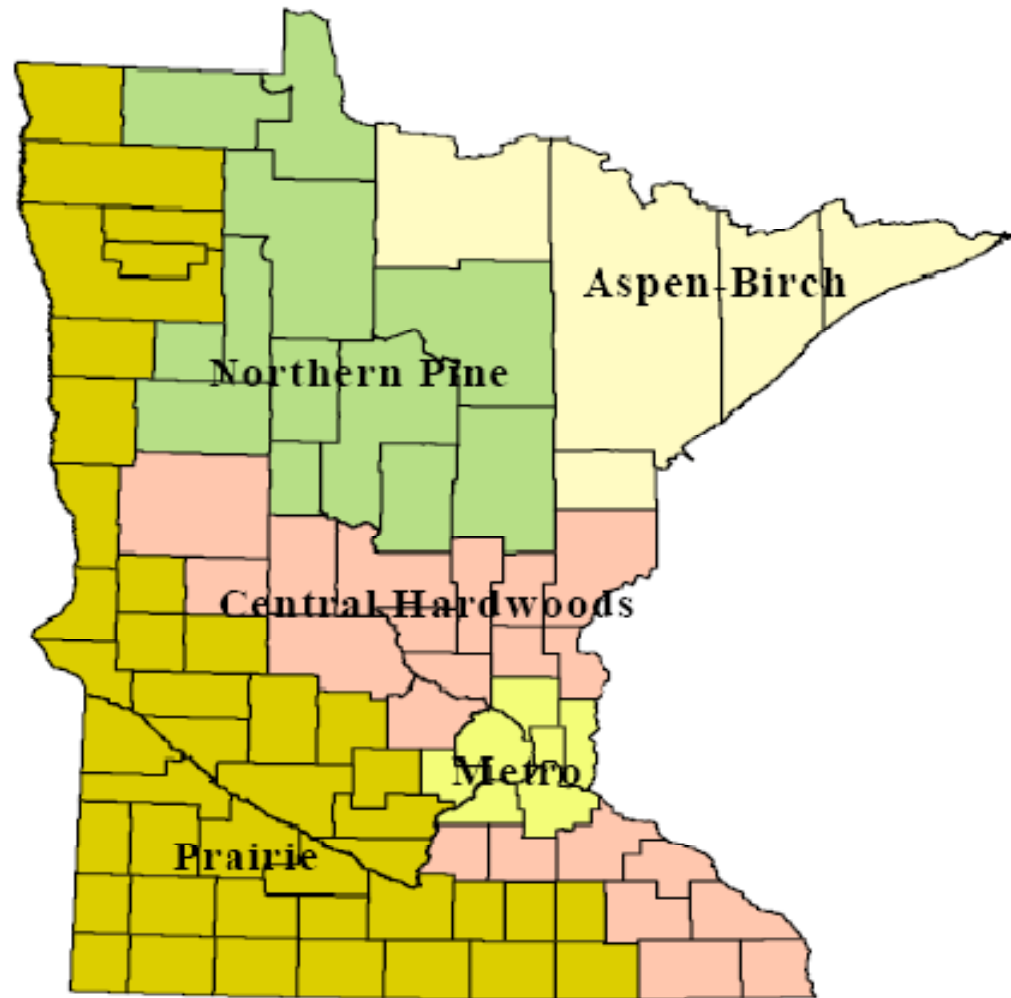


Northern Research Station      Division of Forestry  
Forest Inventory and Analysis



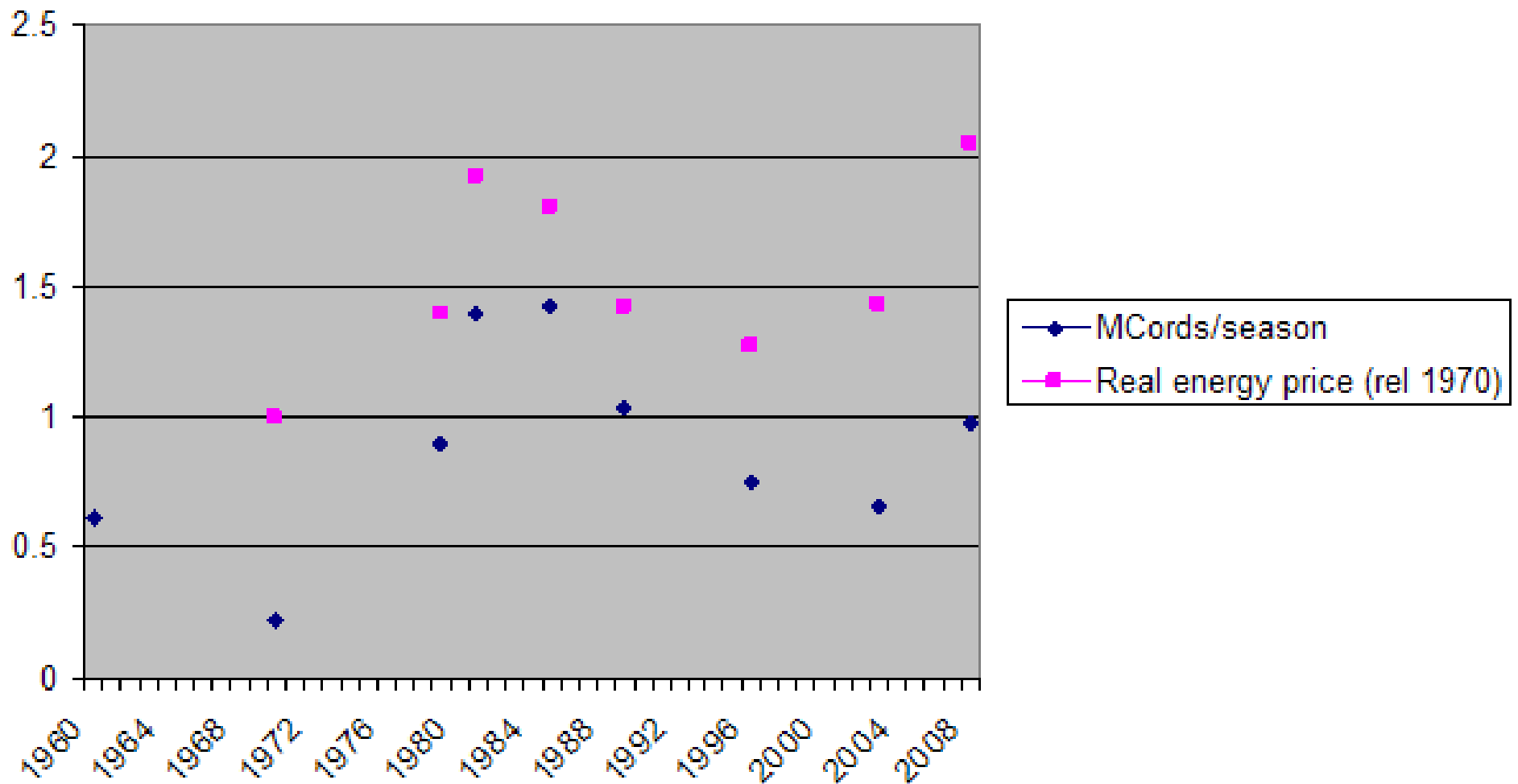
# Assessment of Residential Fuelwood Combustion

## 5 Survey Regions – 1500 households

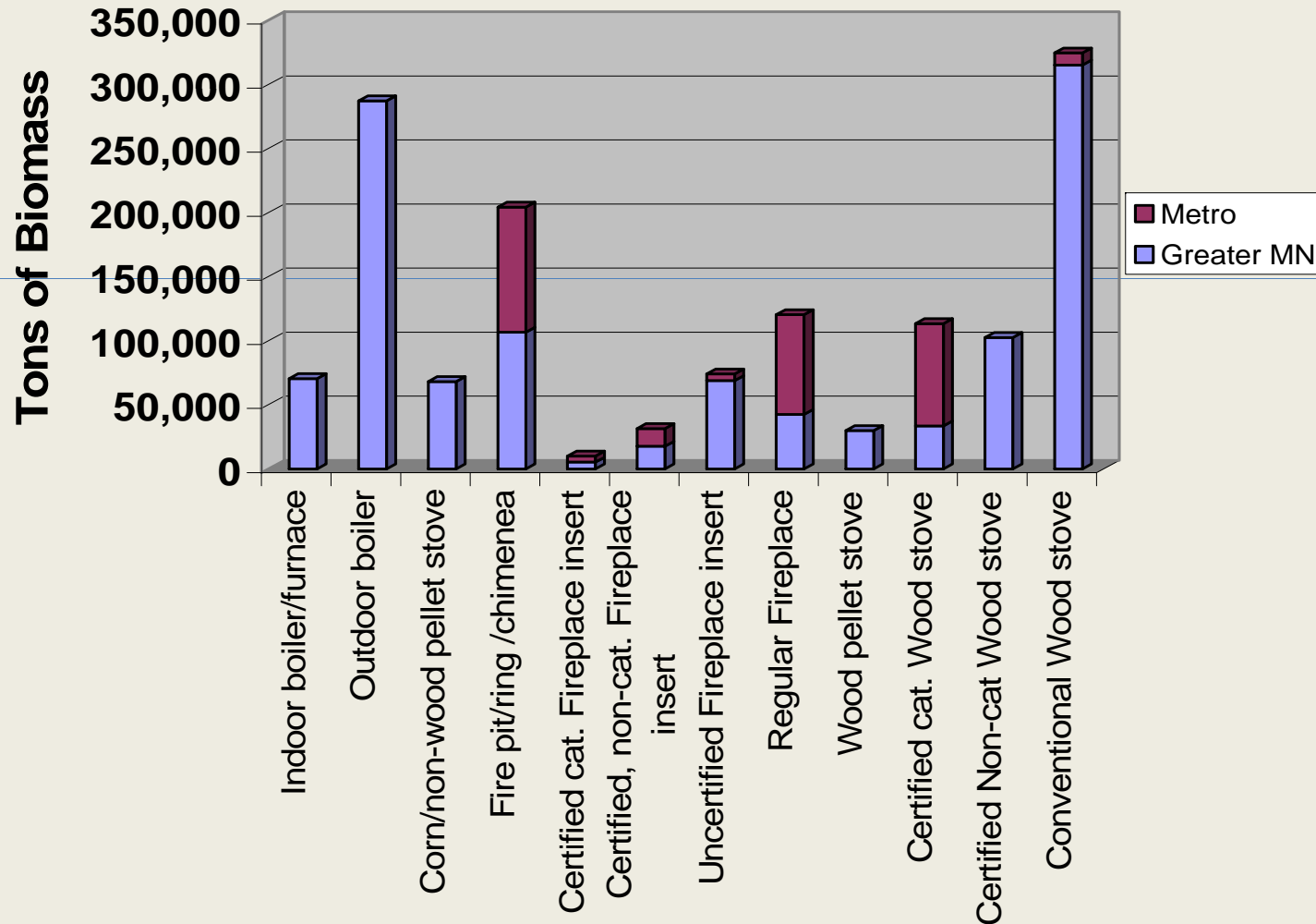


# Wood Use vs. Energy Costs

## Residential Wood Use and Real Energy Prices



# Residential Biomass Fuel Burned During 2007-2008 Heating Season





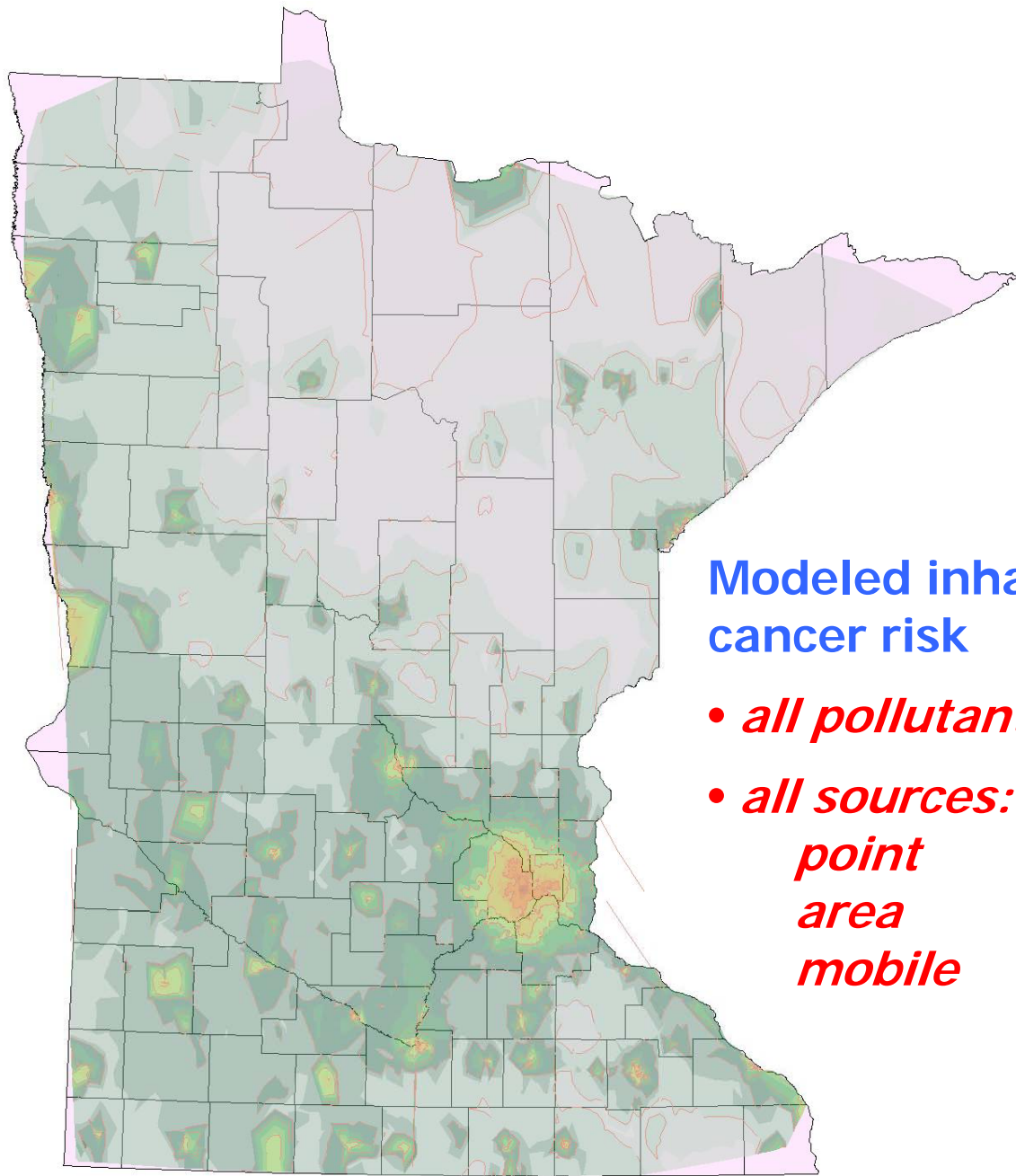
# “Improve Air Quality” Strategic Objective

- High level agency strategy started 2 years ago and now a focus of agency efforts
- Target reductions in statewide risk from air toxics by ***developing strategies*** to reduce emissions and concentrations of identified risk drivers by end of 2010
- Reduce man-made (combustion) emissions of PM<sub>2.5</sub> and precursors (NO<sub>x</sub> and SO<sub>2</sub>) to PM<sub>2.5</sub>
- Not directly tied to AQ standard violations



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100000 150000 200000 250000 300000 350000 400000 450000 500000 550000 600000 650000 700000 750000 800000



## Modeled inhalation cancer risk

- *all pollutants*
- *all sources:  
point  
area  
mobile*

Inhalation Risk / Inhalation Cancer Risk / Resident Adult



- Process:
- Identify pollutants
- Identify sources of these pollutants
- Internal team prioritize sources according to chosen criteria (emissions, risk, feasibility of control, etc.)

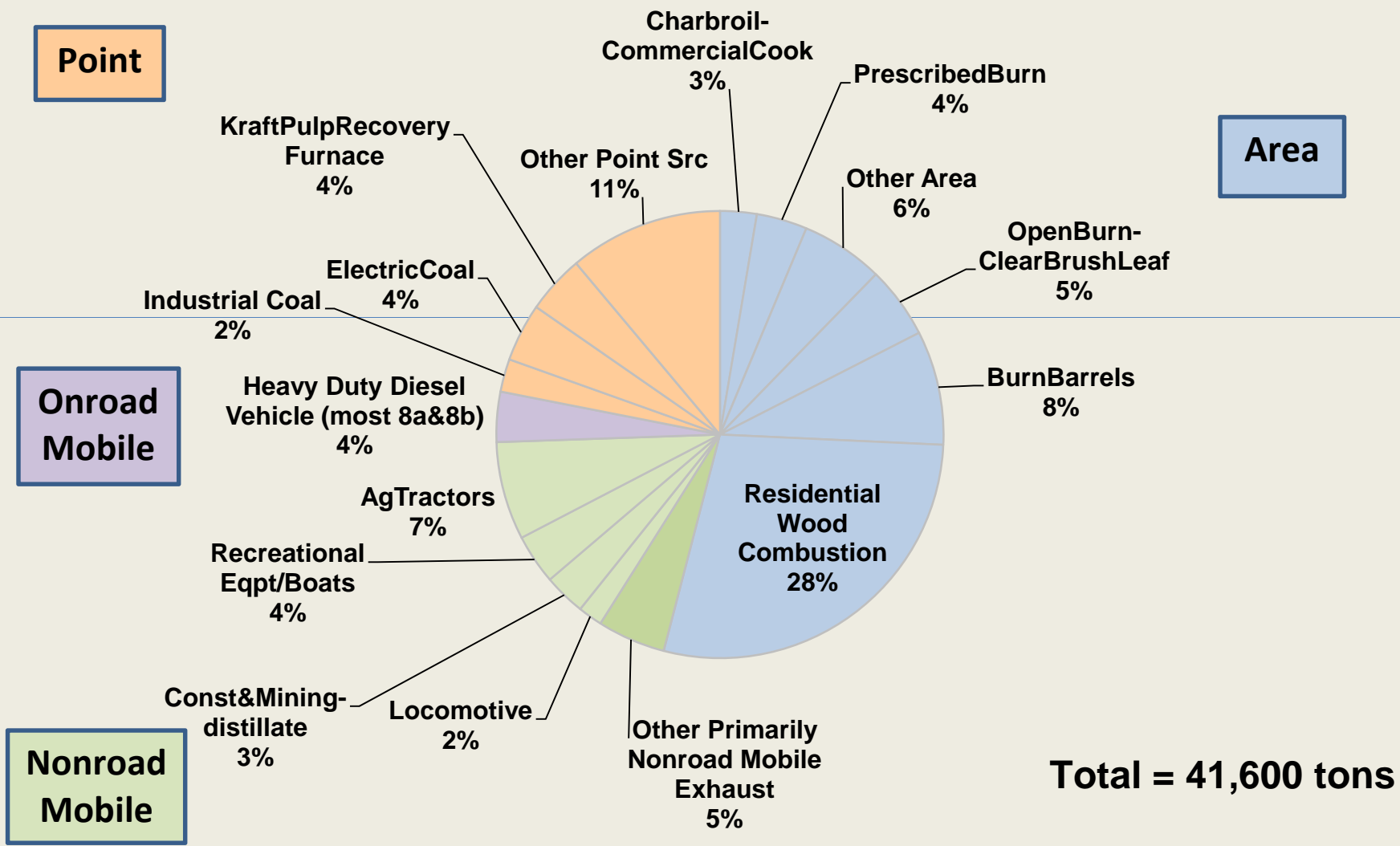


## Pollutants affecting many people – likely the most important air pollutants affecting human health

- Acrolein
- Diesel PM
- Dioxins/Furans
- Formaldehyde
- PAHs
- PM<sub>2.5</sub>

# MN Statewide 2005 Direct PM2.5 Emissions

(Excluding Most Non-Combustion Sources)

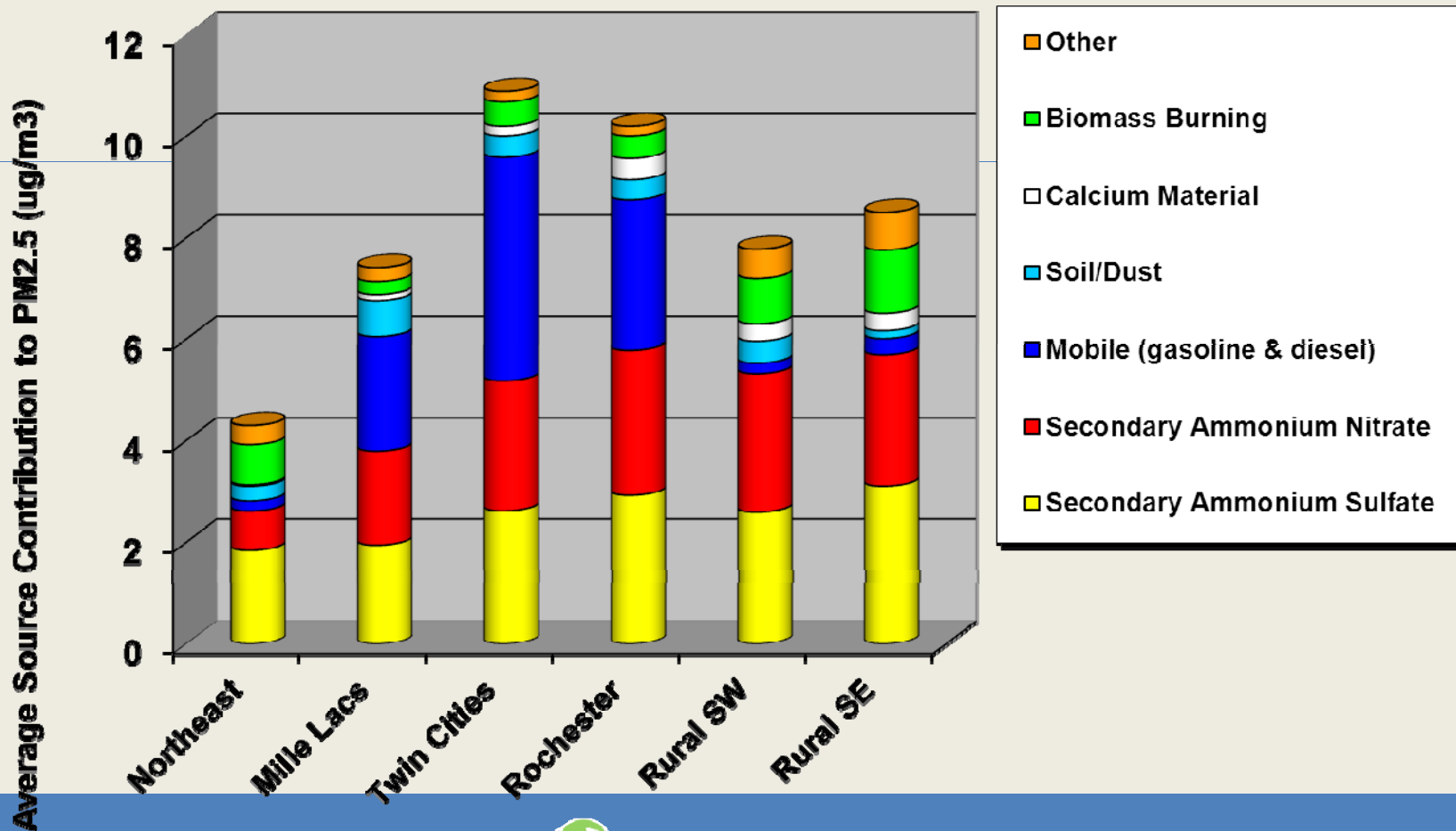


**Total = 41,600 tons**

# Receptor Modeling Source Apportionment

## Initial Estimate - Sources of Ambient PM<sub>2.5</sub>

(adapted from MN PM<sub>2.5</sub> Source Apportionment Study by Desert Research Institute  
average of 2 models )



# Source Selection Process

Used group ranking process considering

- Health impacts
- Cobenefits
- Ease of implementation
- Actions (regulatory or otherwise) that will likely impact pollutant levels



	Health & Cobenefits	Implementation	
	Heavy Duty Diesel Vehicles (HDDV) Class 8A & 8B (semi-trailers), Class 6&7 (delivery trucks, buses, etc)	Electric coal	
	Electric coal	External Combustion Boilers (wood bark waste)	
	Gasoline light duty vehicles & trucks 1 - 4	Taconite induration processes	
	Residential Wood Combustion	Pulp and Paper and Wood Products Sulfate (Kraft) Pulping	
	Waste disposal - residential garbage burning	Heavy Duty Diesel Vehicles (HDDV) Class 8A & 8B (semi-trailers), Class 6&7 (delivery trucks, buses, etc)	
	Stationary Source Fuel Combustion - Commercial/Institutional & Industrial - distillate oil / IC engines & gas	petroleum & petroleum product storage - gas stations	
	Taconite induration processes	Waste disposal - residential garbage burning	
	Prescribed Forest Burning	Stationary Source Fuel Combustion - Commercial/Institutional & Industrial - distillate oil / IC engines & gas	
	External Combustion Boilers (wood bark waste)	Residential Wood Combustion	
	Recreational equipment - boats & snowmobiles	Natural Gas Transmission (internal combustion)	
	Locomotive total	Gasoline light duty vehicles & trucks 1 - 4	
	Construction & Mining Equipment	Construction & Mining Equipment	
	Agricultural equipment (tractors & combines)	Locomotive total	
	petroleum & petroleum product storage - gas stations	Ag - Livestock	
	Ag - Livestock	Prescribed Forest Burning	
	Pulp and Paper and Wood Products Sulfate (Kraft) Pulping	Recreational equipment - boats & snowmobiles	
	Natural Gas Transmission (internal combustion)	Agricultural equipment (tractors & combines)	
	Ag - Crops - Fertilizer	Ag - Commercial Pesticide Application	
	Ag - Commercial Pesticide Application	Ag - Crops - Fertilizer	

Sources with potentially high health impacts that emit several pollutants of concern	Diesel (mobile) Semi-trailers, delivery trucks, buses, etc Construction & mining Equipment
	Gasoline light duty vehicles & trucks
	Residential Wood Combustion
	Waste disposal - residential garbage & land clearing debris
	Stationary Source Fuel Combustion - Commercial/Institutional & Industrial - distillate oil / IC engines & gas
Important sources of multiple pollutants but other mechanisms will address	Electric coal
	Taconite induration processes
Important PM2.5 precursor sources requiring more research	Ag - Livestock
	Ag - Crops - Fertilizer
Lower Priority (Potentially important sources of one or more priority pollutants or precursors but hold for later potential reduction efforts)	External Combustion Boilers (wood bark waste)
	Pulp and Paper and Wood Products Sulfate (Kraft) Pulping
	Natural Gas Transmission (internal combustion)
	Recreational equipment - boats & snowmobiles
	Locomotive
	Agricultural equipment (tractors & combines)
	petroleum & petroleum product storage - gas stations
	Ag - Commercial Pesticide Application
Prescribed Forest Burning	

**% of total statewide emissions from this source**

## **Residential Wood Combustion**

<b>PM2.5</b>	<b>Dioxins/Furans (TEF)</b>	<b>PAHs (BaP)</b>	<b>Acrolein</b>	<b>VOCs</b>
<b>28</b>	<b>4</b>	<b>54</b>	<b>12</b>	<b>11</b>



## Sources with potentially high health impacts that emit several pollutants of concern

### Diesel (mobile)

- Semi-trailers, delivery trucks, buses, etc
- Construction & mining equipment

### Gasoline light duty vehicles & trucks

### Residential Wood Combustion

### Residential garbage & land clearing debris

### Stationary Source Fuel Combustion

(distillate oil / IC engines)

- Commercial/Institutional
- Industrial



# Next Steps

- Develop additional technical details
- Investigate partnerships
- Adjust advisory structure
- Develop and implement reduction strategies



# Other MPCA Actions

- Website
- Advice to locals – many cities have adopted OWB and backyard fire restrictions
- Very limited enforcement from MPCA
- Hopeful that EPA will adopt regs to close the barn door on dirty OWBs – if not we may act
- Working with LADCO to better assess OWB impacts and develop tools to help us and locals address existing problems



END



# Ranking Criteria

## Health impacts

- Source affects a large number of people
- Effects could be severe
- Source could disproportionately impact more vulnerable populations
- Could result in very high exposure concentrations at some receptors



# Ranking Criteria

## Cobenefits

- Addressing this source for the priority pollutants (6 kaizen pollutants, precursors & ozone) could benefit climate change or reduce energy use
- Source emits significant amounts of multiple priority pollutants (6 Kaizen pollutants, precursors & ozone)



# Ranking Criteria

## Implementation

- Controls and/or mitigations are available & feasible
- MPCA has primary authority/responsibility
- Programs / staff already in place
- Willing partners may exist



# Ranking Criteria

## Likelihood of future reductions

- Sources are not likely to be addressed through future regulation or existing or future programs
  - existing sources
  - new sources



**% of total statewide emissions from this source**

**Residential garbage burning (& land clearing debris)**

<b>PM2.5</b>	<b>Dioxins/Furans (TEF)</b>	<b>PAHs (BaP)</b>	<b>Formaldehyde</b>
<b>13</b>	<b>67</b>	<b>22</b>	<b>5</b>



# Link to RWC Fuel use Survey

- [http://files.dnr.state.mn.us/forestry/um/residentialfuelwoodassessment07\\_08.pdf](http://files.dnr.state.mn.us/forestry/um/residentialfuelwoodassessment07_08.pdf)

