



# AIRPACT INVENTORY UPDATE – What's New

April 1, 2010

Portland, Oregon

# Airpact Inventory Update

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- Third major update to Airpact.
- Accomplished through the AIRQUEST Data Sharing Workgroup during 2007-2008.
- Update primarily covers the 3-state area and Metro-Vancouver.
- Onroad Mobile Emissions only for Environment Canada. Will eventually need to incorporate other emissions data from EC.

# Inventory Components

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- Emissions (annual, daily, or hourly).
- Spatial allocation to 12-km grids.
- Temporal allocation to hour.
- Chemical speciation.

# What's New

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- Emissions base years.
- Pollutant List.
- Residential wood combustion enhancements.
- Onroad mobile enhancements.
- Possible precipitation adjustment for road dust.
- Offshore marine emissions.
- Newer version of NONROAD model
- Some new spatial, temporal, and chemical profiles and assignments by SCC.
- Detailed comparison with prior EI not available (yet)

# Emissions Base Years

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- Updated emissions base year to 2005-2009.
- Onroad and NONROAD model sources: 2009.
- Point sources: 2005.
- Nonpoint, ships, locomotives, aircraft: 2005-2010.
- Biogenic, fires: estimated real time.
- Border states point and nonpoint: 2002 (no change)

# Pollutants

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- Pollutants were chosen based on model requirements, health, presence of monitoring data for verification, and importance in ozone chemistry.
- The list was finalized after the last AIRQUEST annual meeting in Pullman.
- Diesel PM<sub>2.5</sub>, Gasoline PM<sub>2.5</sub>, and Woodstove PM<sub>2.5</sub> were added as tracers.

# Pollutants

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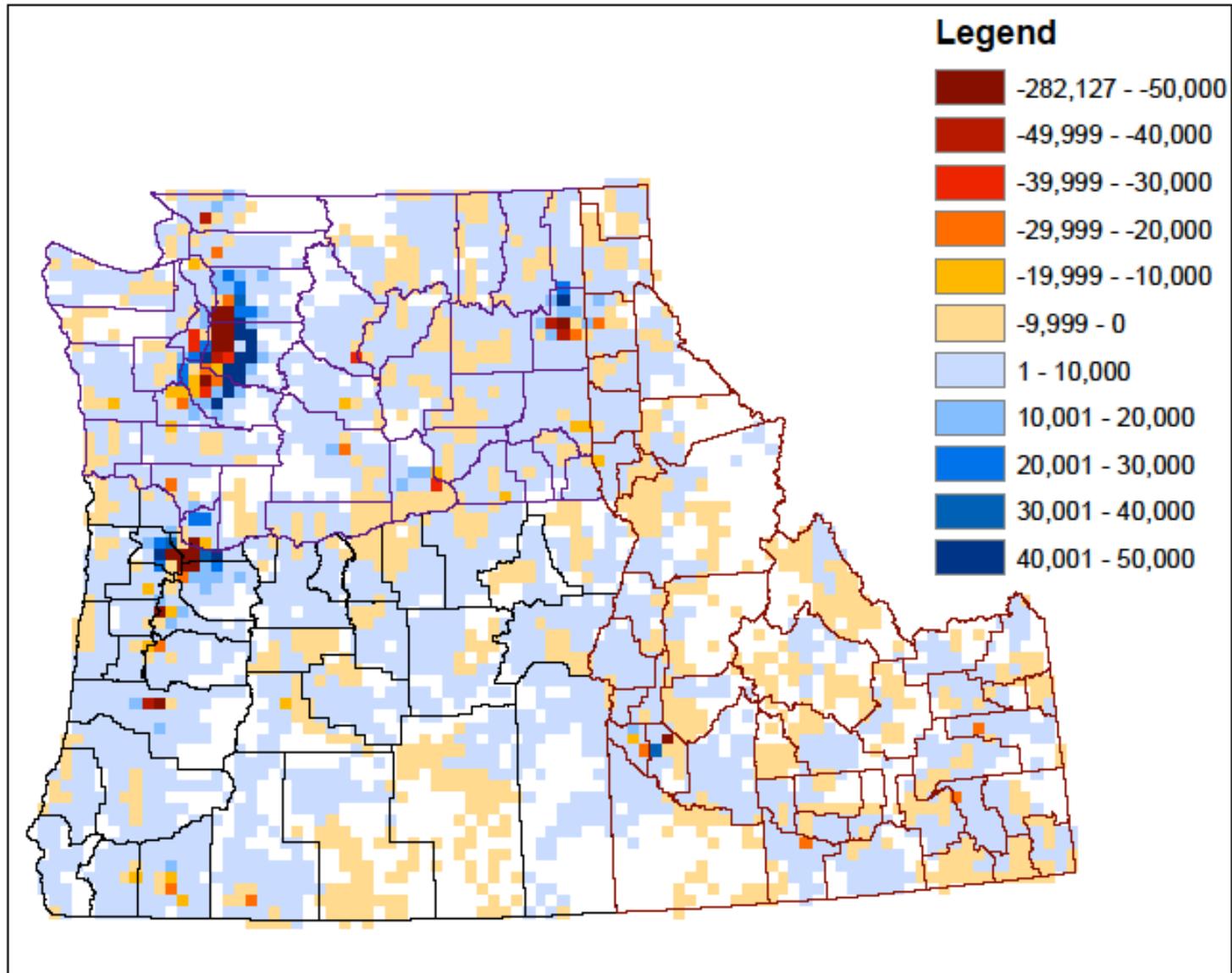
CO	Acetaldehyde	Diesel PM2.5
NH3	Acrolein	Gasoline PM2.5
NO2	Arsenic	Woodsmoke PM2.5
NOx	Benzene	
PM10	1,3-Butadiene	
PM2.5	Chromium & Hexavalent Chromium	
SO2	Dichloromethane/Methylene Chloride	
SOx	Ethylbenzene	
TOG	Formaldehyde	
TOG from Crankcase	Lead	
TOG from Diurnal	Manganese	
TOG from Diurnal and Resting	Mercury	
TOG from Exhaust	Naphthalene	
TOG from Hot Soak	PAH	
TOG from Refueling	Toluene	
TOG from Resting	Xylenes	
TOG from Running		
VOC		

# Residential Wood Combustion

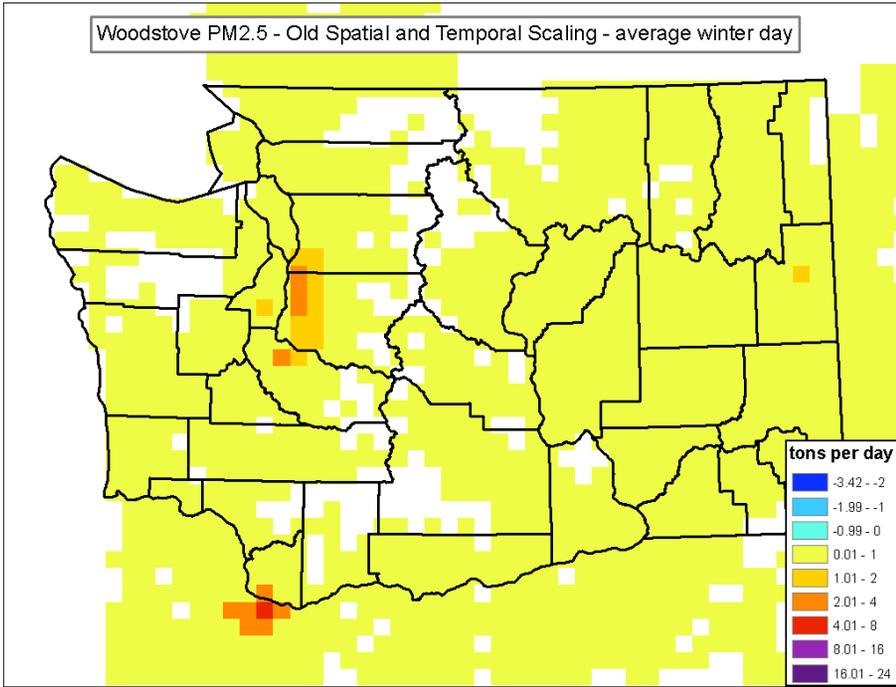
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- ❑ Changed spatial allocation from population to households with wood as primary heat source.
- ❑ WSU developing hourly emissions adjustment processing based on grid temperature.
- ❑ Adjusted when temperature is below 50 degrees.
- ❑ Turned off at temperatures at or above 50 degrees.

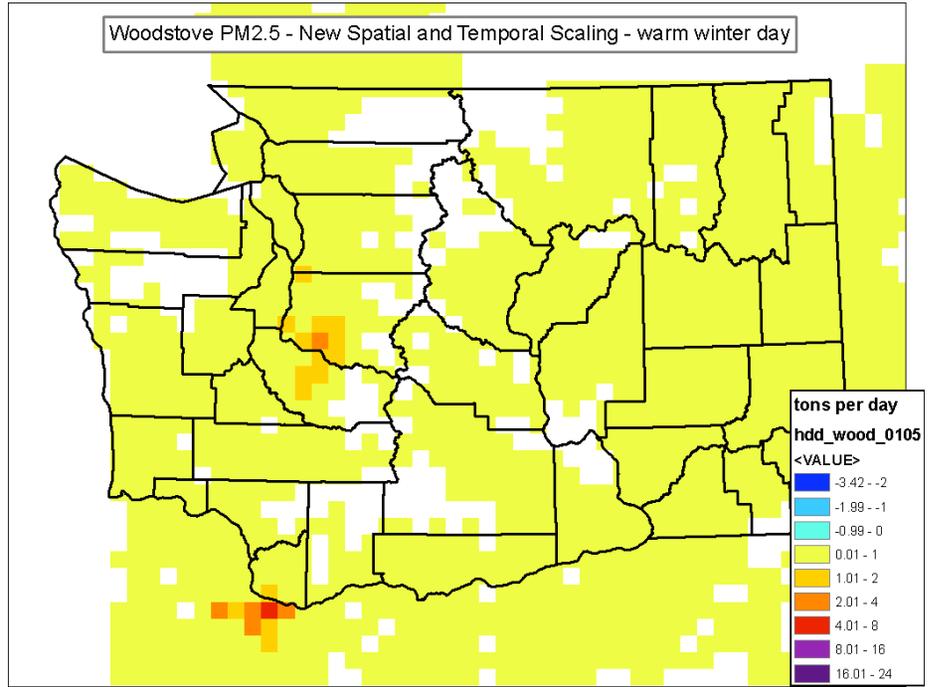
## Grid Allocation Difference with Primary Wood Heat vs Population



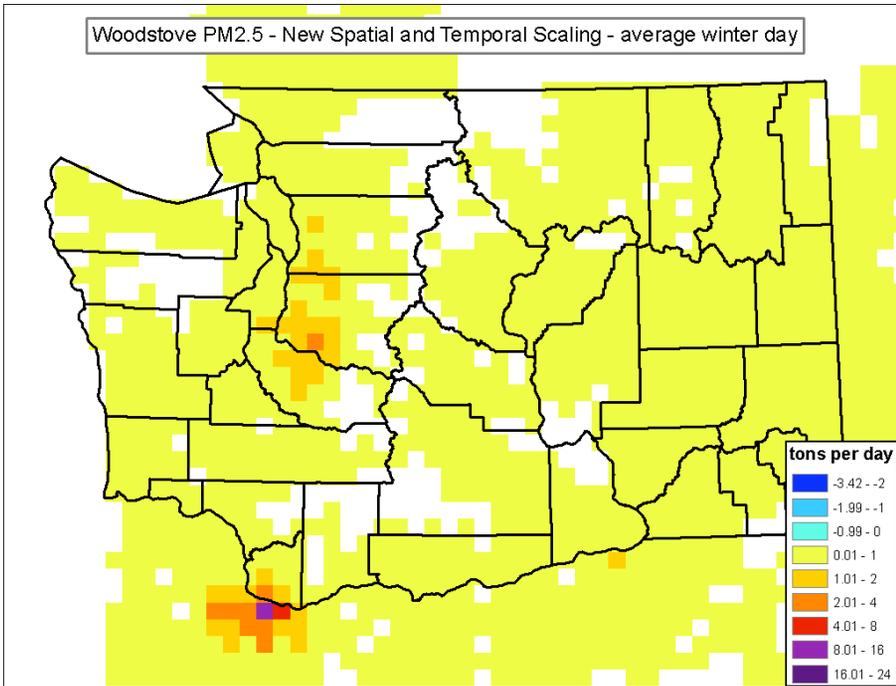
Woodstove PM2.5 - Old Spatial and Temporal Scaling - average winter day



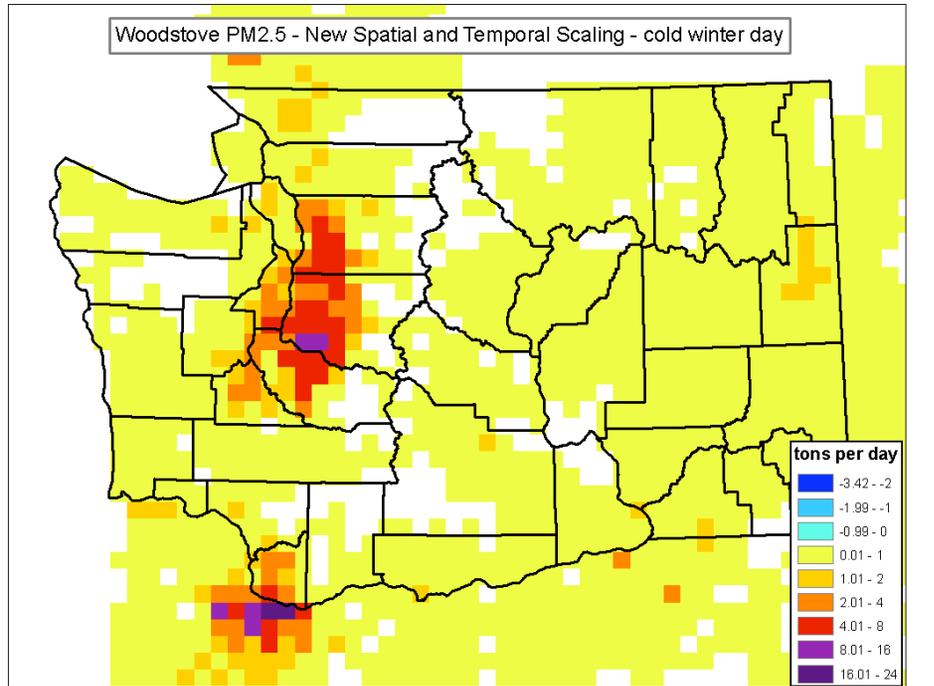
Woodstove PM2.5 - New Spatial and Temporal Scaling - warm winter day



Woodstove PM2.5 - New Spatial and Temporal Scaling - average winter day



Woodstove PM2.5 - New Spatial and Temporal Scaling - cold winter day



# Onroad Mobile

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- Permeation emissions from ethanol fuels were increased using CARB data.
  - ▣ Increases total fleet VOC 4-5% in summer
  - ▣ 100% E10 in OR, 46% E10 in WA
  - ▣ No E10 in ID or Canada
- Calculated standard MOBILE toxics, and additional toxics as fractions of VOC or PM.
- Diurnal emissions were added with a new temporal profile derived from hourly MOBILE emission rates. Diurnals are 3-6% of total fleet VOC in summer.

# Winter Road Dust

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- Exploring turning road dust emissions off during periods of winter rain.

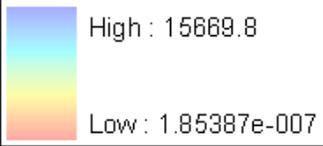
# Offshore Emissions

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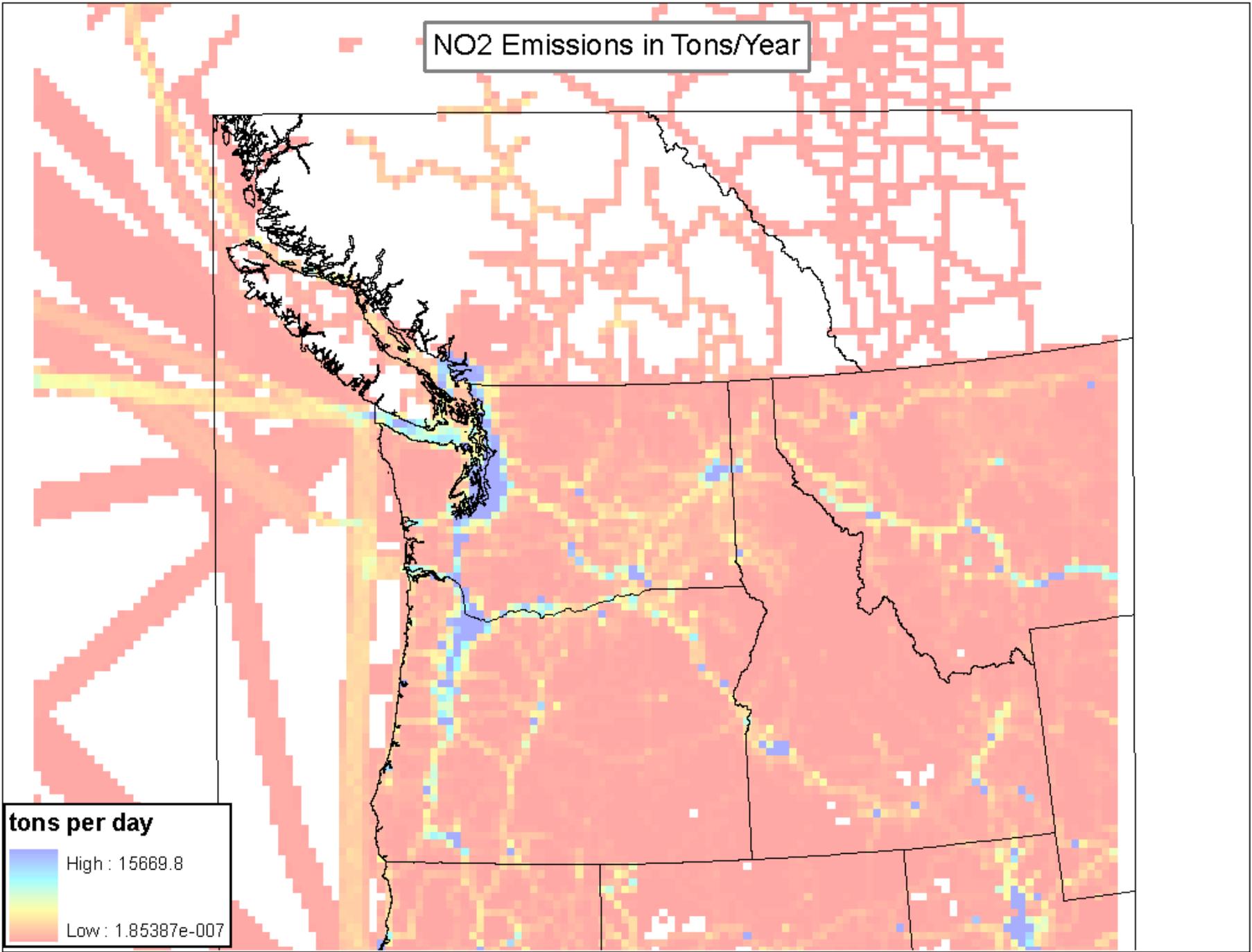
- Sulfur Emissions Control Area (SECA) emissions estimates
- 2010 Emissions by SECA grid
- Converted to Airpact grid

NO2 Emissions in Tons/Year

tons per day



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# Spatial Allocation

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- Several new spatial surrogates were developed.
- Households with wood as primary heat source.
- Updated VMT/VKT by link.
- Puget Sound Maritime Inventory (2005) waters.
- Updated Columbia, Lower Willamette, and Snake Rivers.
- Offshore marine emissions from SECA study.

# Temporal Allocation

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- EPA CAIR profiles available on CHIEFS formed core of profiles
- New profiles included:
  - ▣ WA 2005 Permanent traffic recorders for month, day, hour profiles
  - ▣ EPA NONROAD model seasonal allocations

# Chemical Speciation

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- Not many changes.
- Some new formatting for newer version of SMOKE.