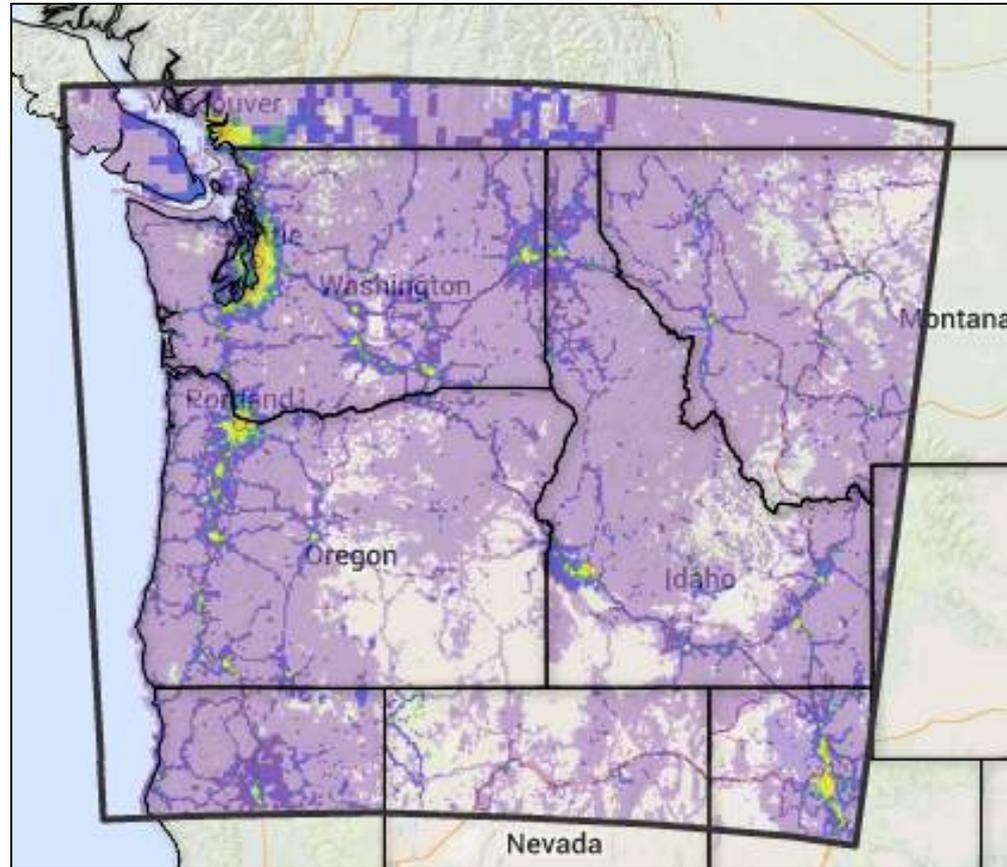


# AIRPACT Emissions Inventory Update



NW-AIRQUEST Annual Meeting

Portland, Oregon June 24-26, 2015

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# Emissions Inventory Update Tasks

Complete

- Develop inventory preparation and quality assurance plan.
- Create and compile emissions estimates for counties and provinces in the modeling domain.

Near completion

- Format data for SMOKE emissions processor.
  - Allocate emissions to 4-km grids by hour.
  - Speciate emissions into model species.
- Design reports and other data outputs.
- Implement quality control/assurance procedures.
- Documentation

# Emissions Inventory Sources

Included in the EI Update

	Emission Source	Examples	Data Provider(s)	Temporal Resolution
	Point	Power Plants, Paper Mills, Refineries, Airports, Seaports, some Livestock Farms	Air Agencies	Annual
	Onroad	Cars, Trucks, etc.	Air Agencies	Daily
				
	Nonroad	Airplanes, Trains, Ships	Air Agencies	Annual
				
	Nonpoint	RWC, WWTPs, Dry Clean, Ag., etc.	Air Agencies	Annual
				
	Biogenic	Trees and Vegetation	WSU-MEGAN w/ MODIS LCLU	Daily
	Large Fires	Wildfire and Prescribed Burns	WSU -SF2/BlueSky	Daily

# Inventory Pollutants

## Model Pollutants

- CO
- NH<sub>3</sub>
- NO<sub>x</sub>
- PM<sub>10</sub>
- PM<sub>2\_5</sub>
- SO<sub>2</sub>
- VOC

## Tracers - CAPs

- DSPM<sub>2\_5</sub>
- GASPM<sub>2\_5</sub>
- WSPM<sub>2\_5</sub>

## Tracers - Toxics

- 1,3-Butadiene
- Acetaldehyde
- Acrolein
- Arsenic
- Benzene
- Chromium
- Dichloromethane
- Ethylbenzene
- Formaldehyde
- Lead
- Manganese
- Mercury
- Naphthalene
- PAH
- Toluene
- Xylene

# Information Sources

- State and local air quality agencies
  - Point, nonpoint, nonroad, onroad inventory data
- State and local transportation agencies
  - Inputs for modeling and spatially resolving onroad emissions
- Environmental Protection Agency
  - National Emissions Inventory and modeling platform files
- Canadian air quality agencies
  - Much of the data via EPA's 2011 modeling platform
  - VMT and vehicle population from BC Ministry of the Environment
- Washington State University
  - Biogenics, wildfires
- Others too!

# Sources with Special Processing

- Residential Wood Combustion Temperature Adjustment and Spatial Allocation
  - Using normal annual-to-hourly processing for now.
  - Will experiment with hourly temperature adjustments in the future.
  - Testing different spatial surrogates.
    - Low intensity development + primary wood heating
    - Forested land + rural population
    - Forested land + primary wood heating
    - Forested land + low intensity development + primary wood heating
    - Forested land + low intensity development
    - Portland's new method - anticipated

# Sources with Special Processing

- SMOKE-MOVES for Onroad
  - Emissions calculations based on local fleet, fuels, controls, and activity levels, and forecast hourly meteorology.
- Biogenics
- Wild and Prescribed Fires



Inventory Comparisons:  
Current to New  
Point, Nonpoint, and Nonroad only

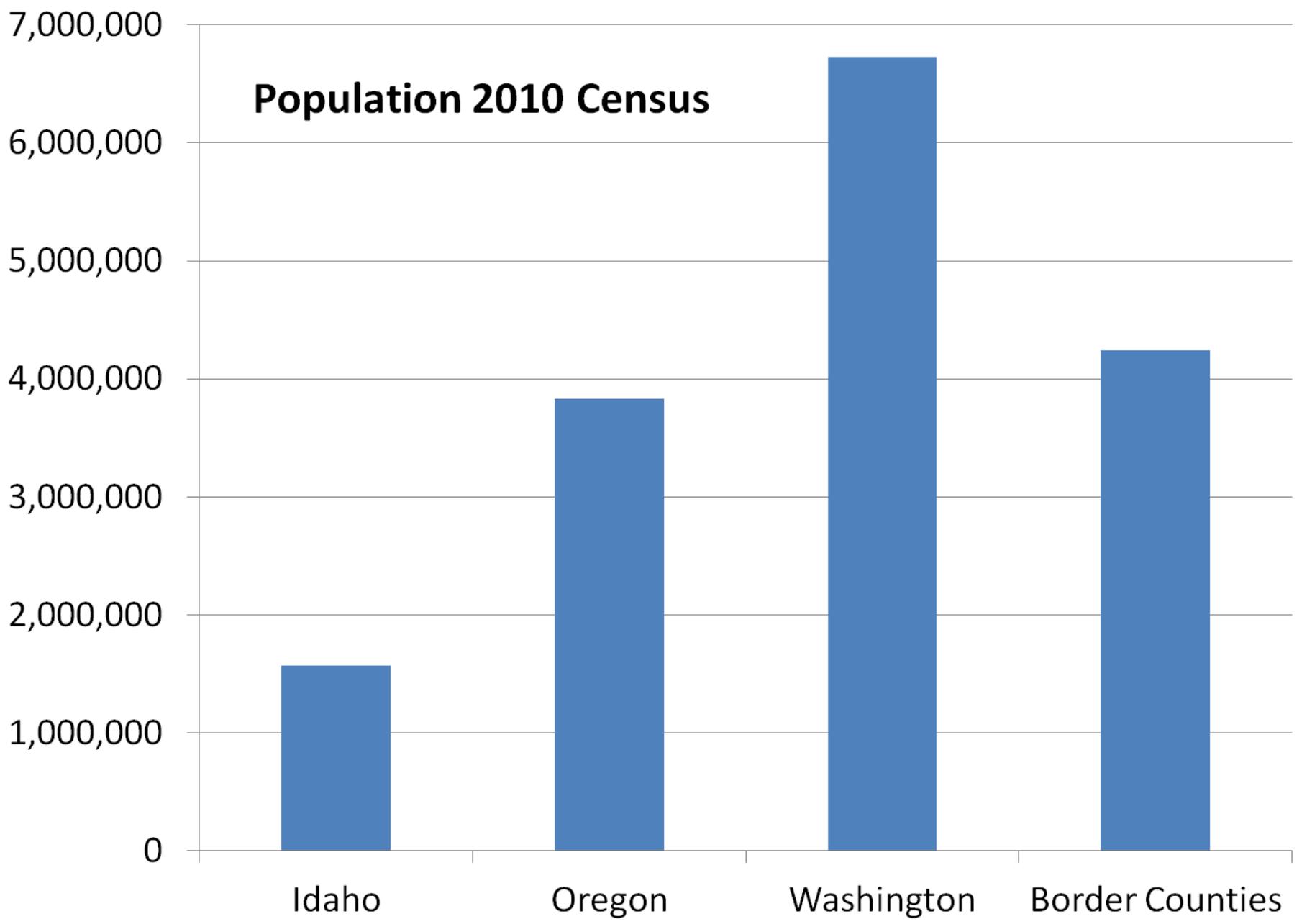
# Inventory Elements: Current and New

Element	Current	New
Domain	ID, OR, WA, southern BC and AB	No change
Grid	First 12-km, later 4-km	4-km
Pollutants	See earlier slide	No change
Speciation	SAPRC99	CB05
Temporal Allocation	EPA CAIR (2001), some local data 1996-2005	EPA 2011v2 platform, some local data 1996 – 2014
Spatial Allocation	Census 2000, LC 1992, VMT 2000-2010, other	Census 2010, LC 2006, FEMA Hazus v2.1 2006, EPA 2003&2010 surrogates, VMT 2002–2014, other
SMOKE Version	Several: 2.7 – 3.5.1	3.5.1

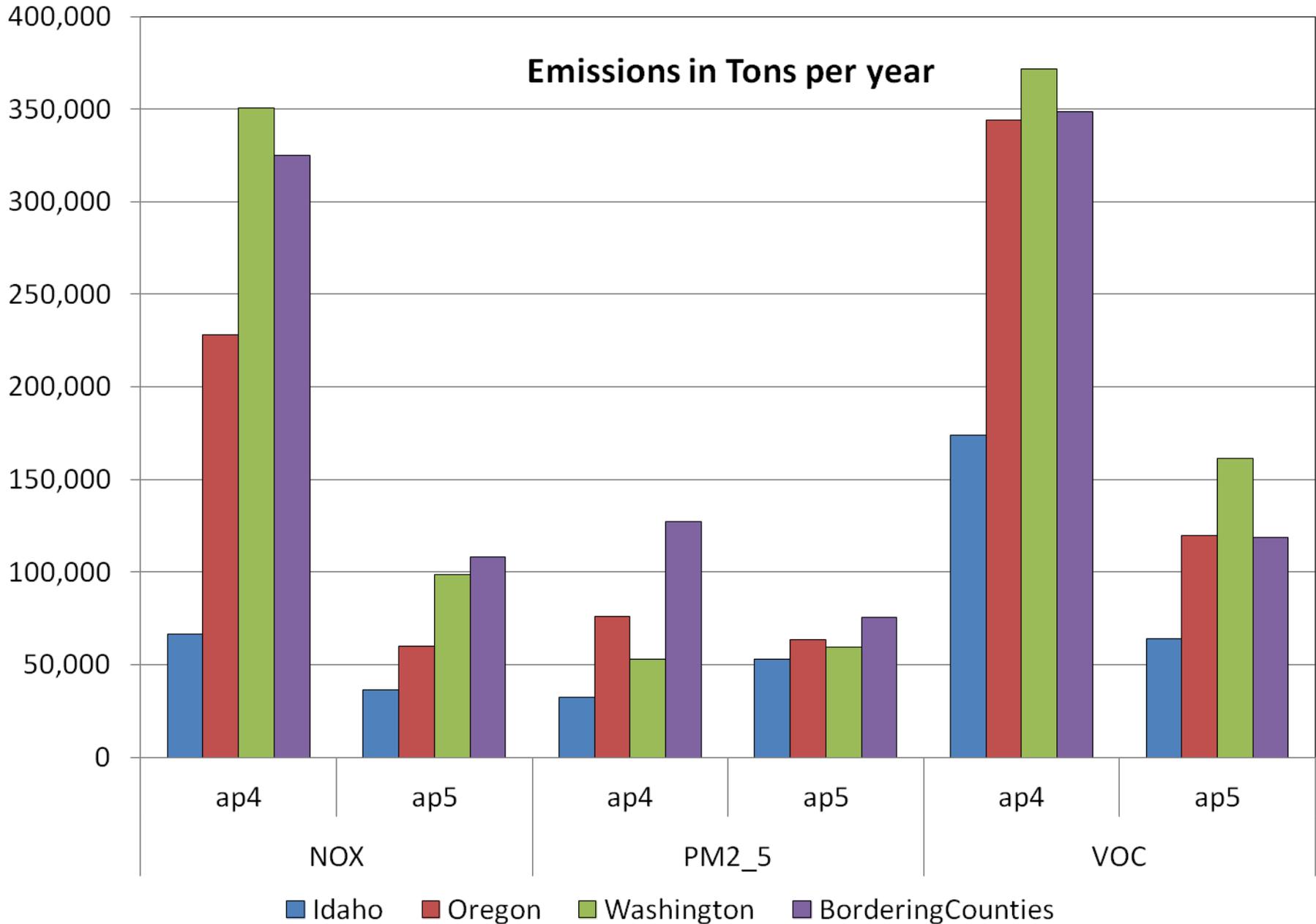
# Emissions Estimates: Current and New

Category	Current	New
Point	2007 – WA 2005 – other areas	2011 – USA 2010 – Canada Major updates since 2011 included for ID, OR, WA
Onroad	2009 – MOBILE6.2	2014 – MOVES2010
Nonroad	2009 – NONROAD2005	2014 – NONROAD2008
Nonpoint	2009 – OR 2005 – other areas	2011 – USA 2010 – Canada More categories incl.
Biogenic	WSU-MEGAN2.04 w/ MODIS LCLU	WSU-MEGAN2.10 w/ MODIS LCLU
Large Fires	WSU -SF2/BlueSky for USA	WSU -SF2/BlueSky for USA and Canada

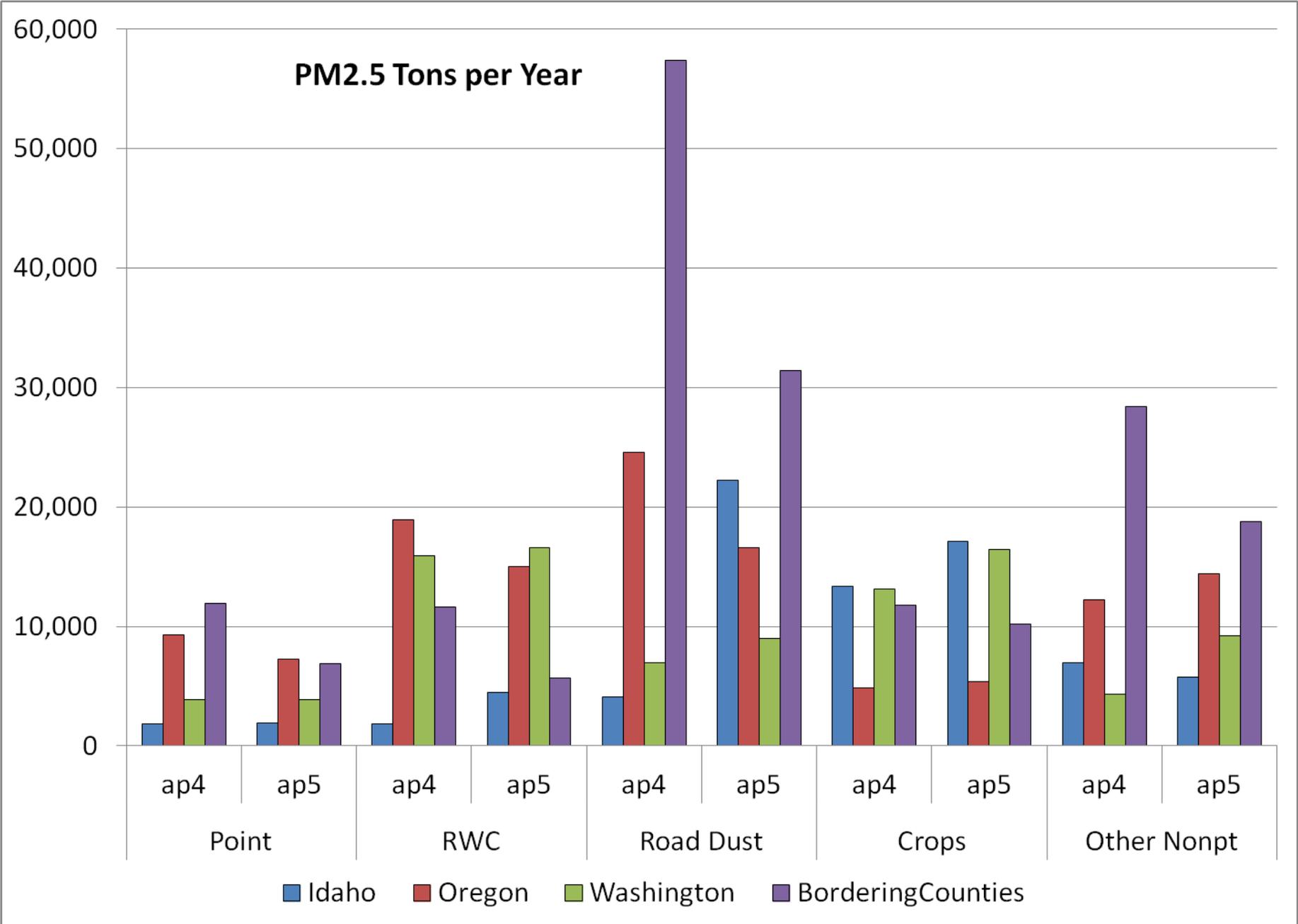
## Population 2010 Census



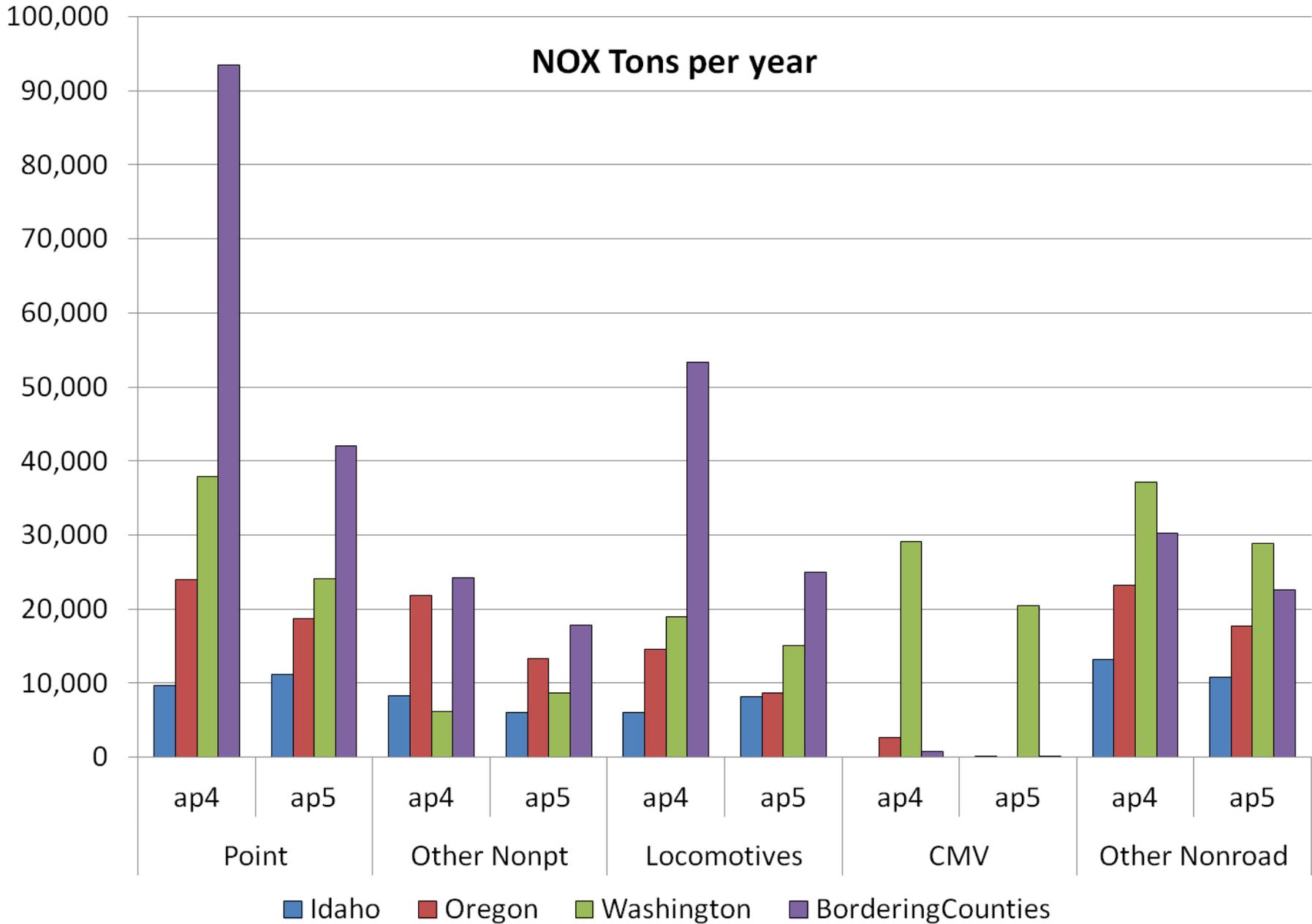
### Emissions in Tons per year



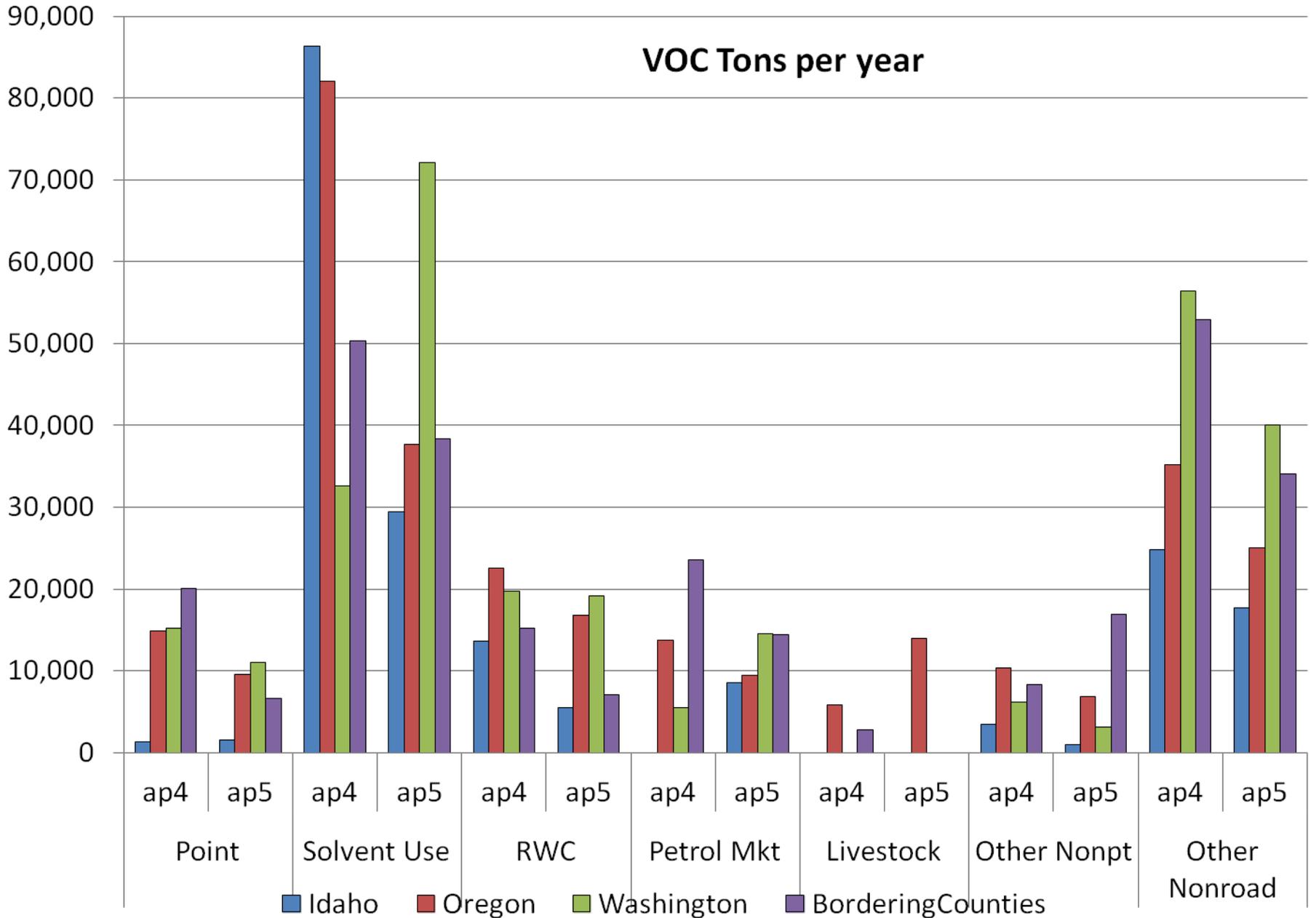
# PM2.5 Tons per Year



# NOX Tons per year



# VOC Tons per year

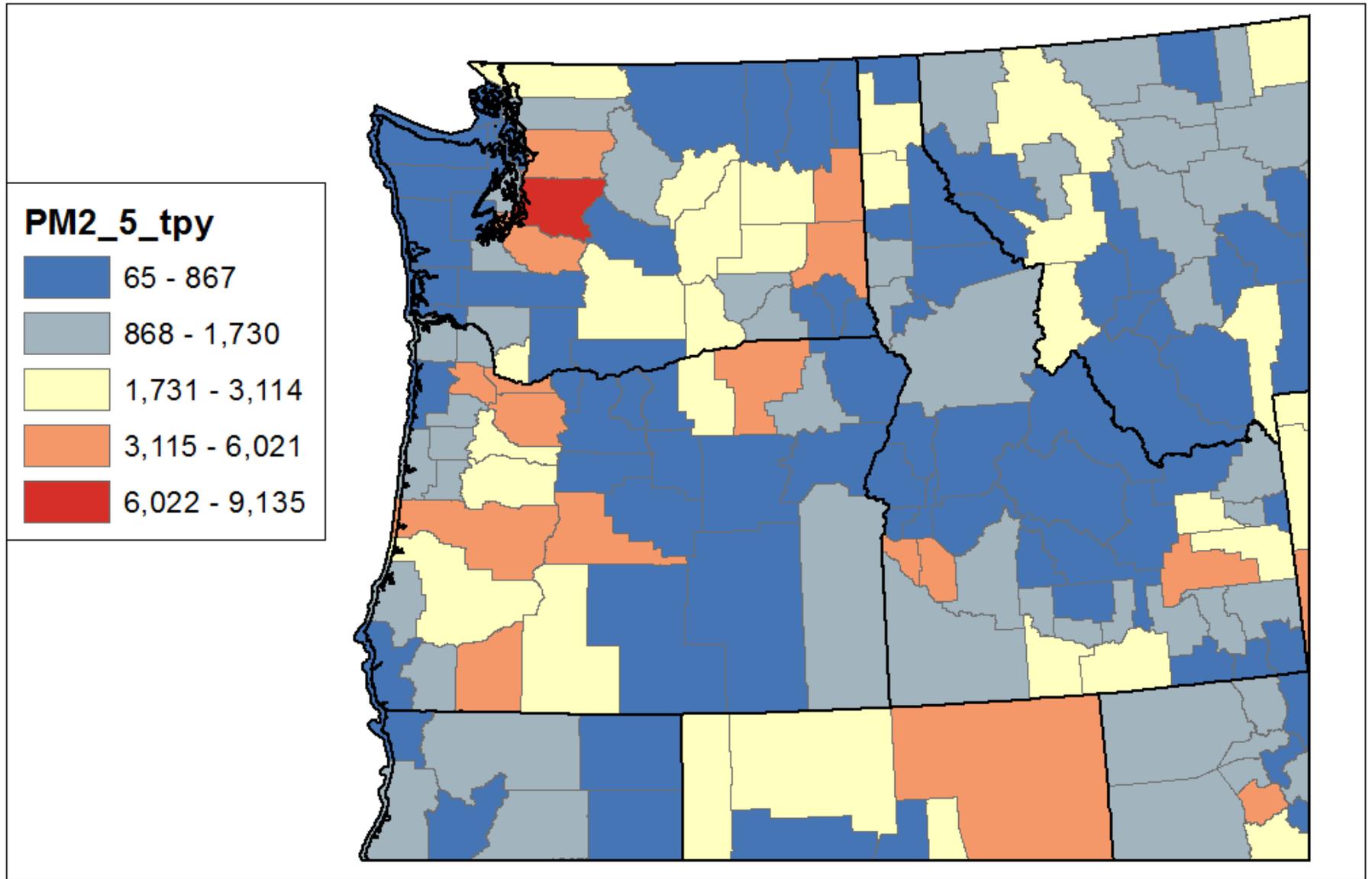




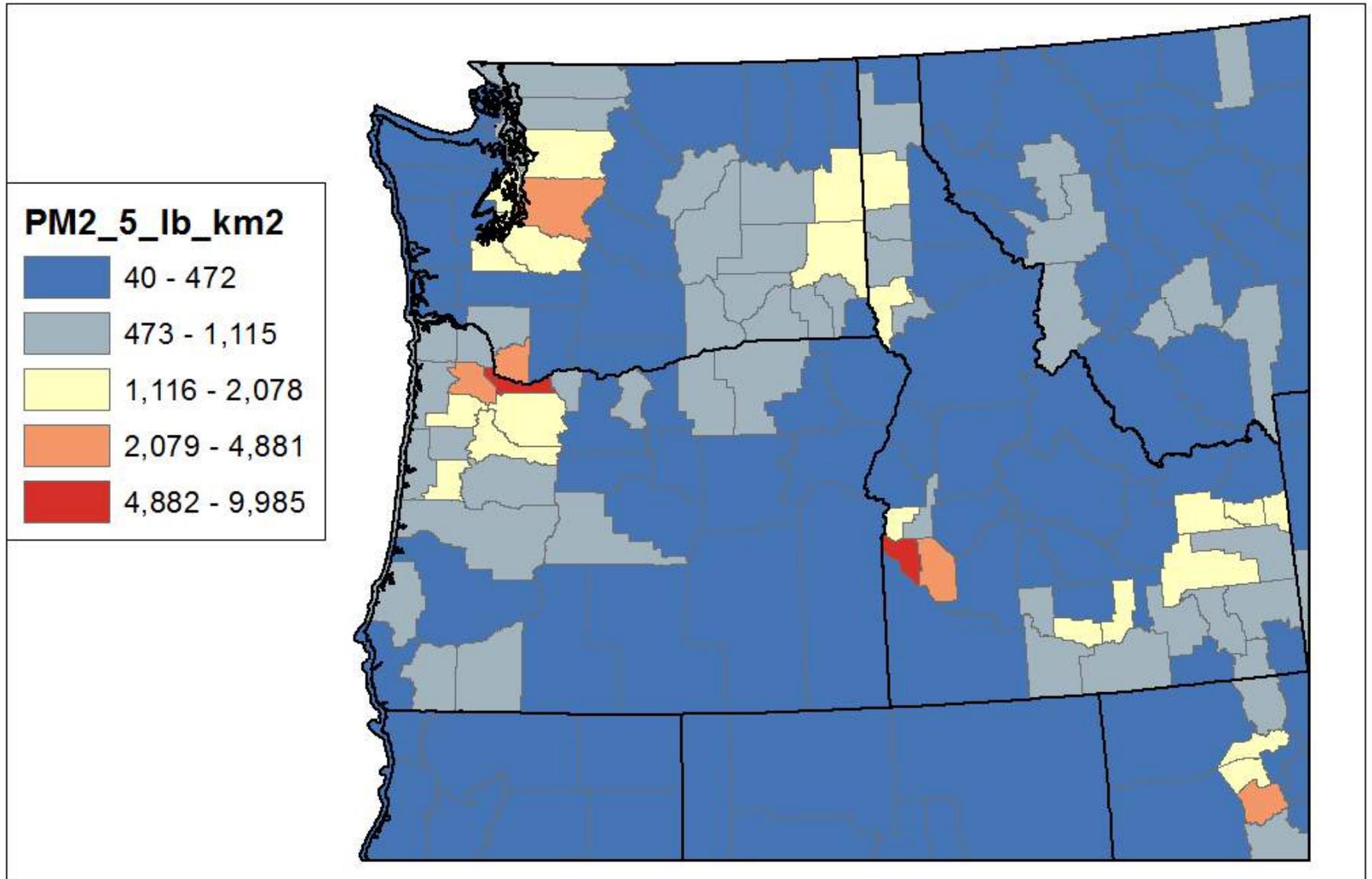
# AIRPACT-5 Inventory Maps

## Point, Nonpoint, and Nonroad only

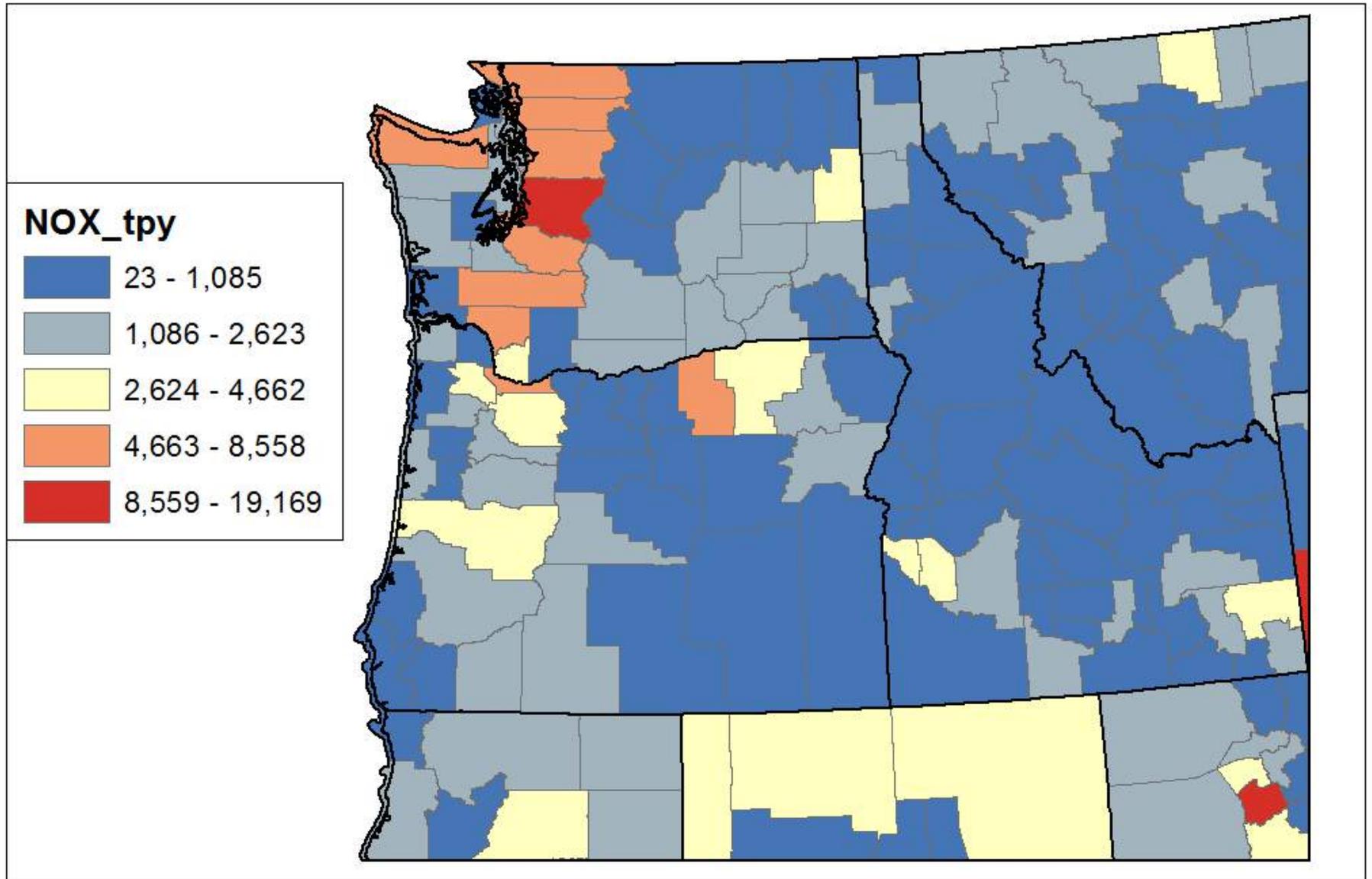
# AIRPACT-5 Point, Nonpoint, and Nonroad Emissions



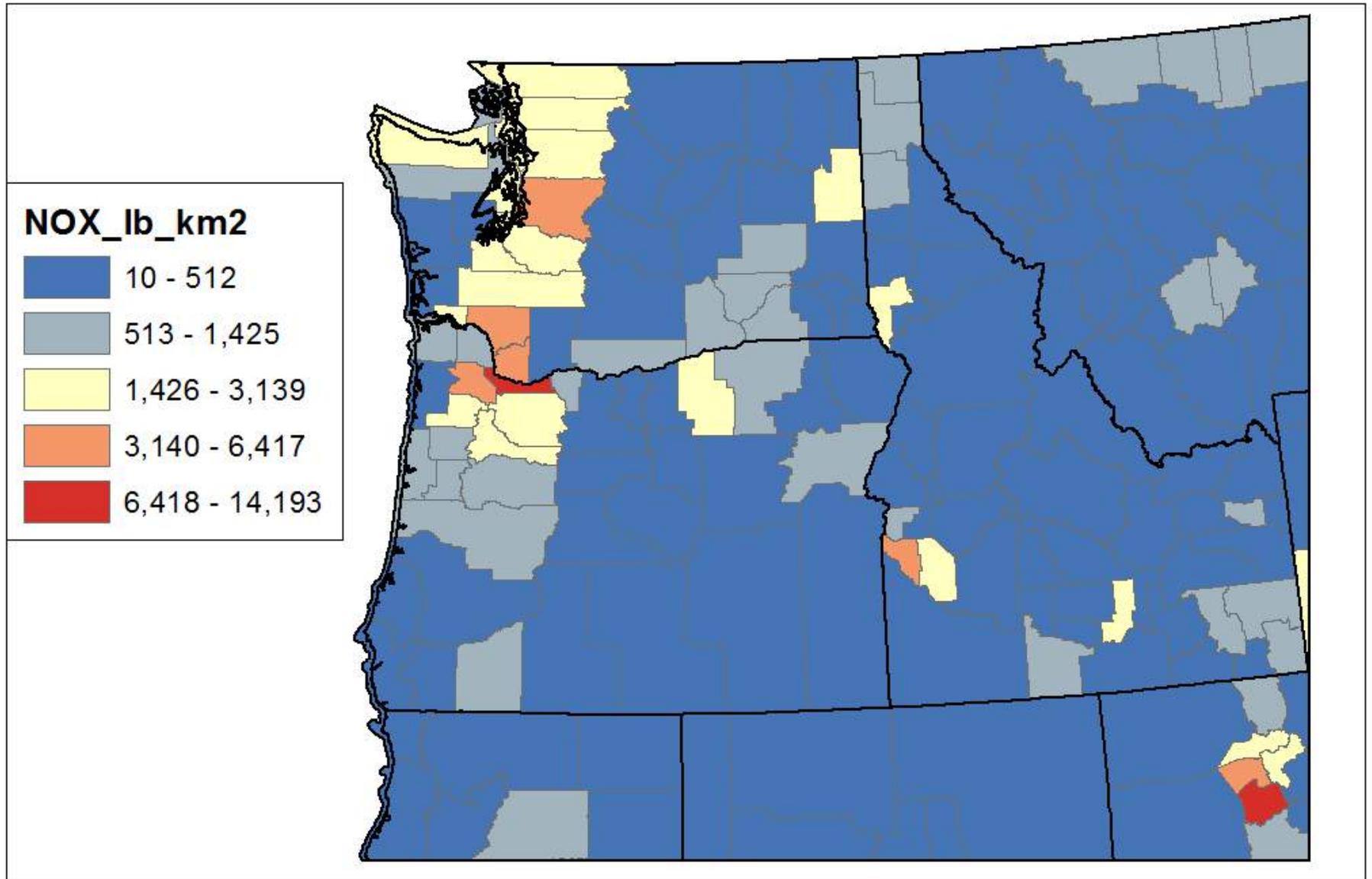
# AIRPACT-5 Point, Nonpoint, and Nonroad Emissions



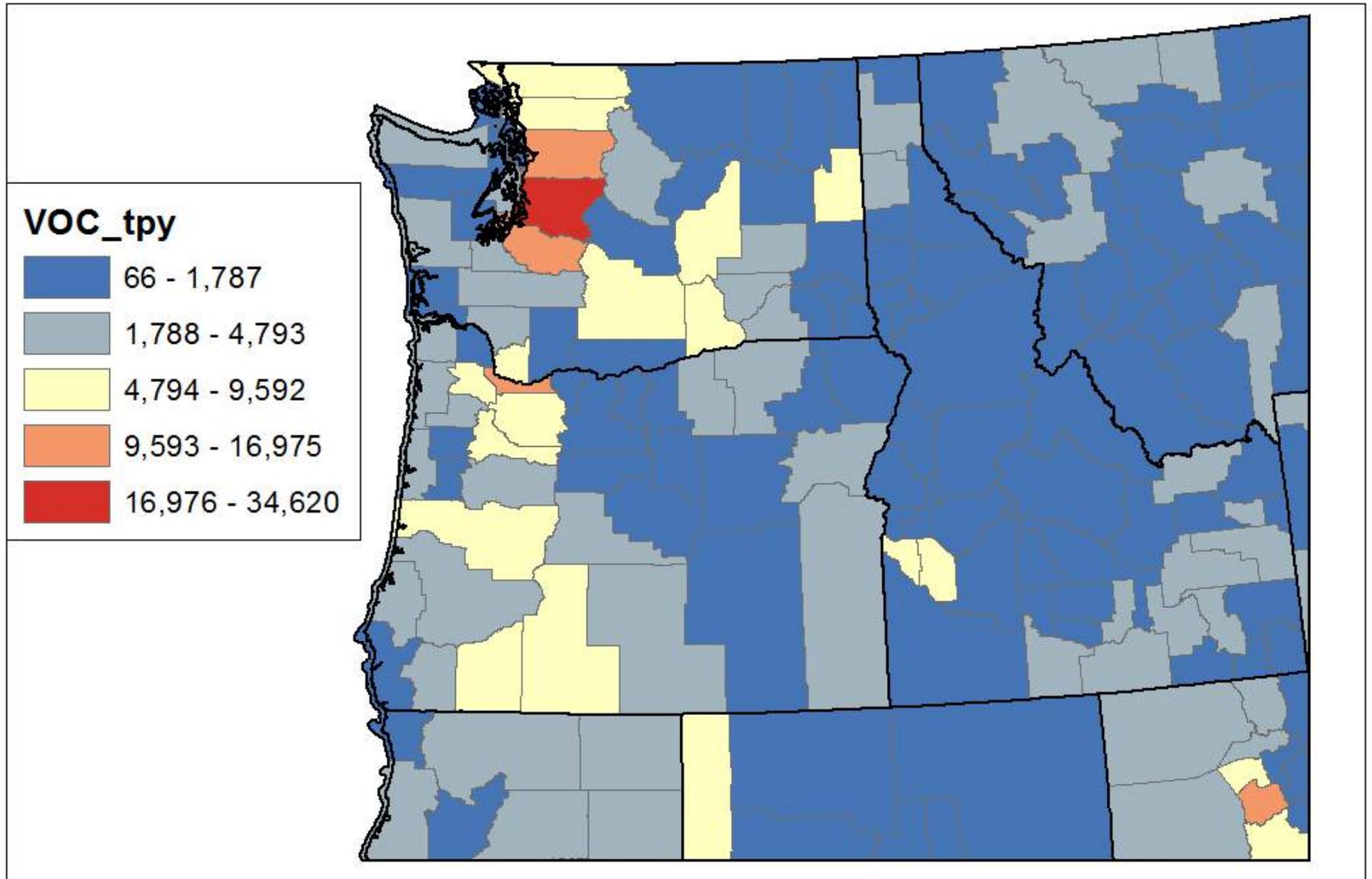
# AIRPACT-5 Point, Nonpoint, and Nonroad Emissions



# AIRPACT-5 Point, Nonpoint, and Nonroad Emissions



# AIRPACT-5 Point, Nonpoint, and Nonroad Emissions



# AIRPACT-5 Point, Nonpoint, and Nonroad Emissions

