



# AIRPACT

## Emissions Inventory Workgroup

### Topics:

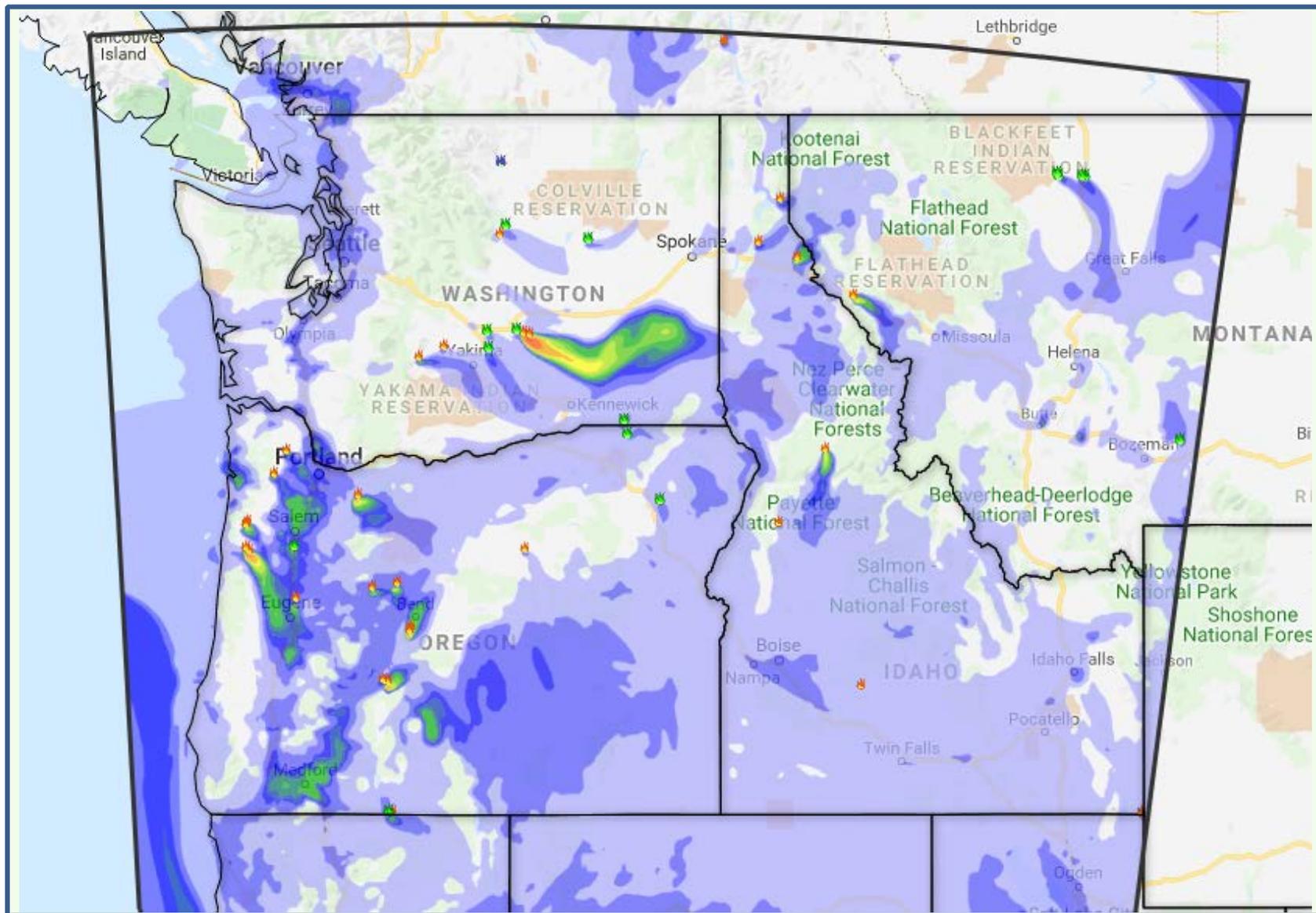
- AIRPACT Fire Processing Summary
- New AIRPACT Emissions Inventory



NW-AIRQUEST Mtg.  
June 15, 2019



# AIRPACT Fire Process



# AIRPACT Fire Process

## Current Setup:

1. 11:40 pm – query SMARTFIRE server for fire activity
2. Divide size by 3 based on Susan O'Neill's suggestion (since SMARTFIRE was built when fewer satellites were used in HMS)
3. Use BlueSky sensitivity analysis results to determine emissions and heat flux (and multiply VOC x 3). This greatly speeds up processing.
4. If September, change all fire types to Wildfire (SMARTFIRE assumes RX in September for HMS-only detects)
5. If RX, convert emissions and heat flux to “pile burn” best guess (reduces emissions)
6. Modify heat flux and virtual area based on Wei Zhang's approach, for improved plume rise (calculated by SMOKE using meteorology and modified heat flux)
7. Convert all data to SMOKE-ready format and run SMOKE
8. Display on web using 3 icons (green for unknown FCCS fuel – likely Ag land; Blue for Rx burn; Red for WF)

Note: If our in-house fire emissions are not ready in time for AIRPACT run, we fall back to USFS AirFire data, and do not modify data.



**Topics:**

- ✓ AIRPACT Fire Processing Summary
- ☐ New AIRPACT Emissions Inventory



# New Emissions Inventory

EPA 2014 NEI v2 used as basis for AIRPACT-6 Emissions Inventory

- Updates to RWC for Idaho based on Regional Haze comments
- No change to RWC for Washington (recently changed in AP5)
- Livestock Waste (Point) carried forward from AIRPACT-5
- MOVES and NONROAD projected to 2019
- We could grab the Montana updates too!

Newer version of SMOKE (4.5)

- Requires (as distributed) Intel nodes
- No change required for domain, so most spatial surrogates will be carried forward (except roads, rail, ports)
- Fixed width format no longer used for inputs or profiles
- New version of SMOKE-MOVES (includes hotelling and new SCCs)
- Continuing to use CB-05 speciation; CB-06 not possible with current implementation of SMOKE-MOVES
- Anthropogenic emissions have been tested in Ecology's EMAQ framework (EMAQ uses BEIS; AIRPACT uses MEGAN)
- Currently porting emissions framework to WSU as AIRPACT-6

# Emissions Comparison

Comparison of Annual Emissions Input Files (Except MOVES; which uses activity data as input)

MOVES Comparison based on actual AIRPACT-5 emissions (from SMOKE report archives) and projected AIRPACT-6 emissions (from WA Performance Measures)

Anthropogenic Emissions Summary Comparison

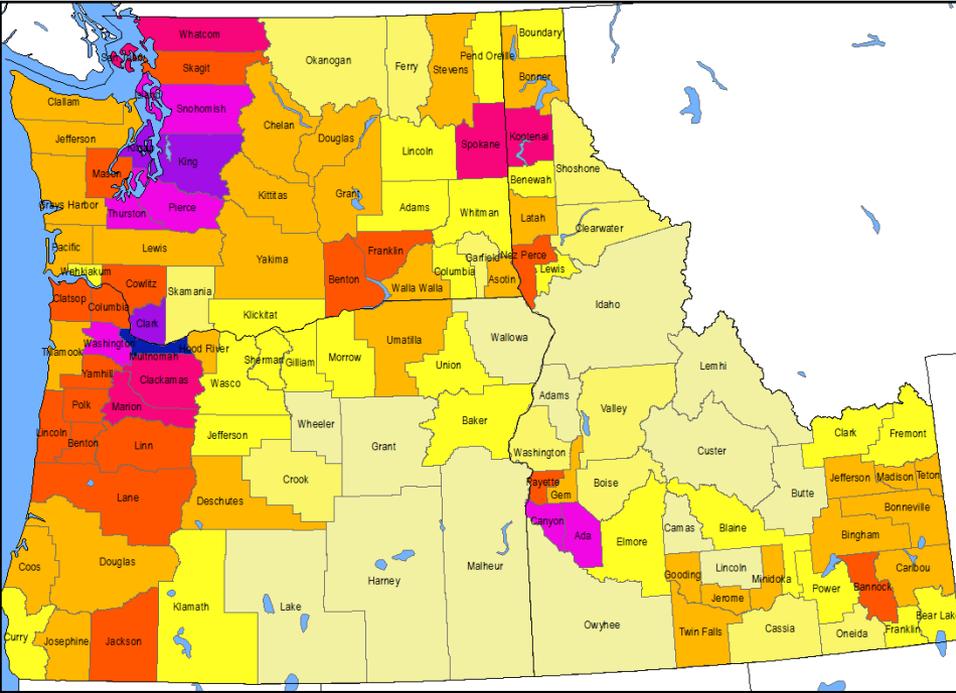
- No Biogenics
- No Wildfires
- No Rx or Ag Fire

Tri-State comparison only

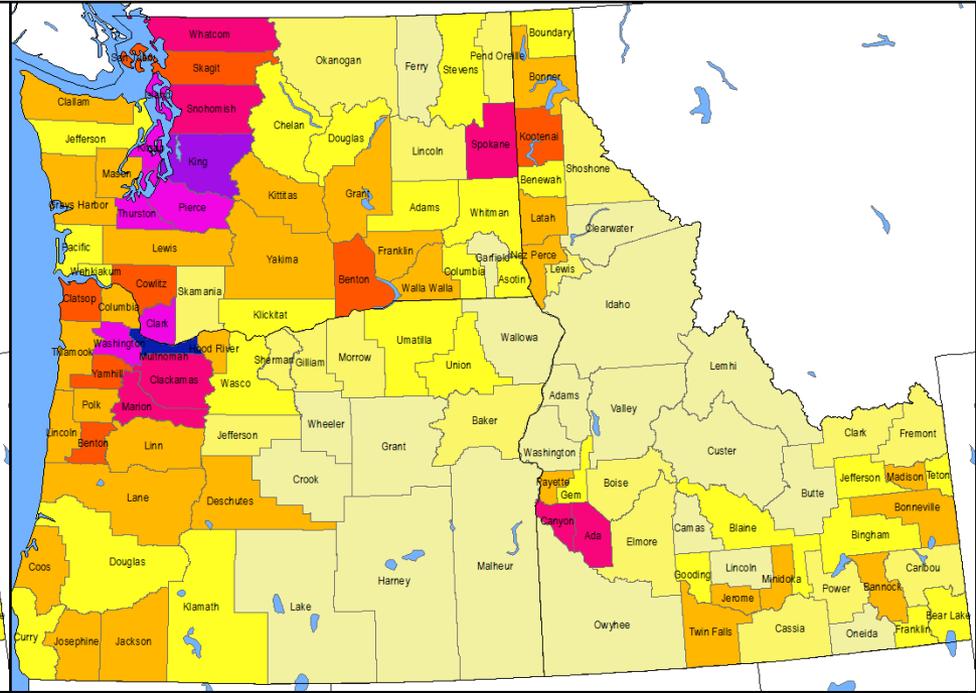
- No updates to Canada (still 2010) except for conversion to new MOVES SCCs
- Border states inventory taken directly from 2014 NEI v2

# CO County Emissions

AIRPACT-5



AIRPACT-6

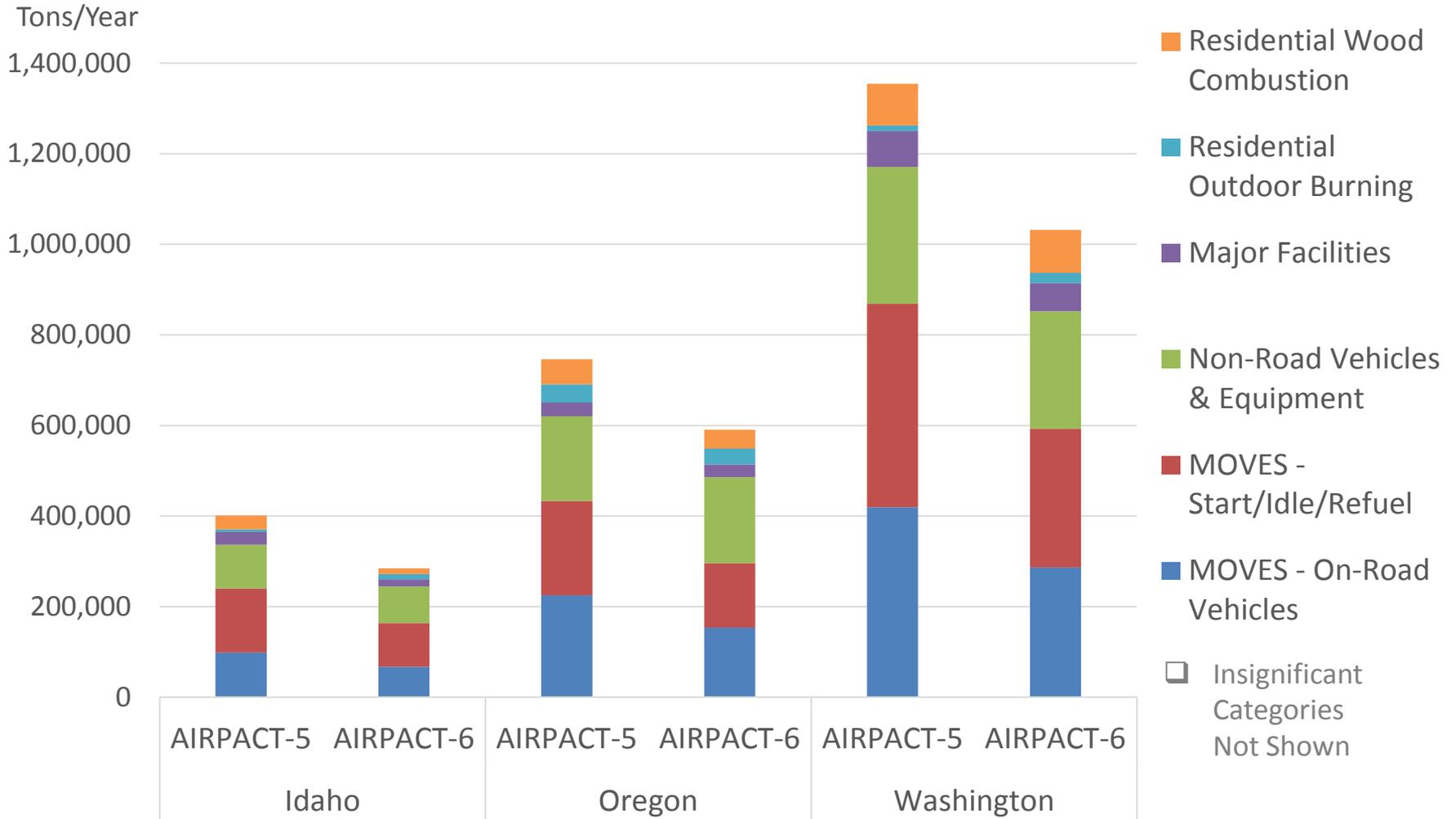


\*Map shows county emissions normalized by county land area



\* nonlinear scale

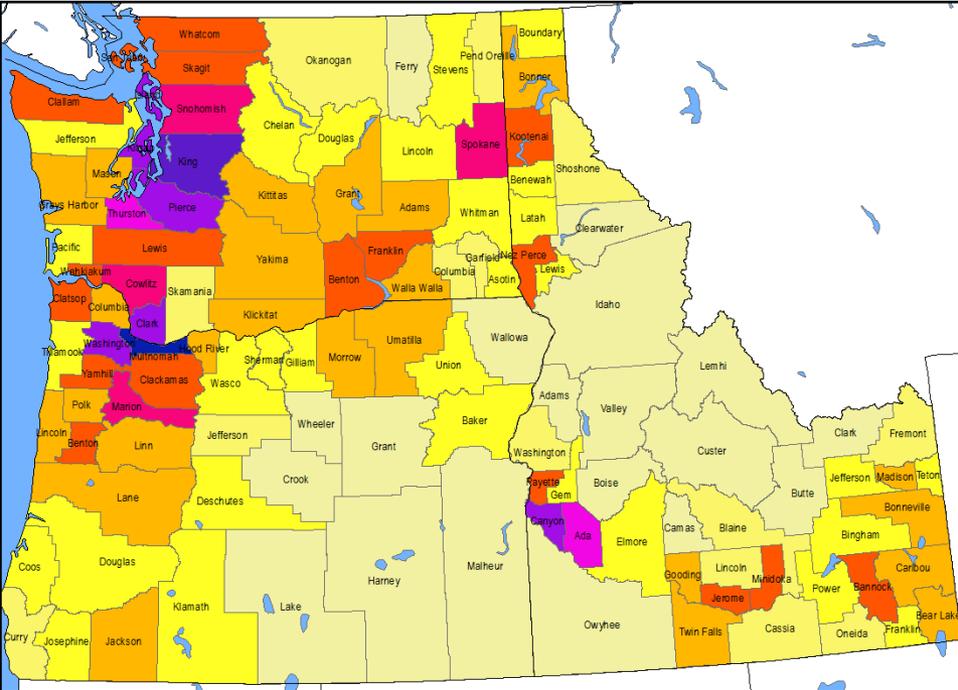
# CO Annual Emissions



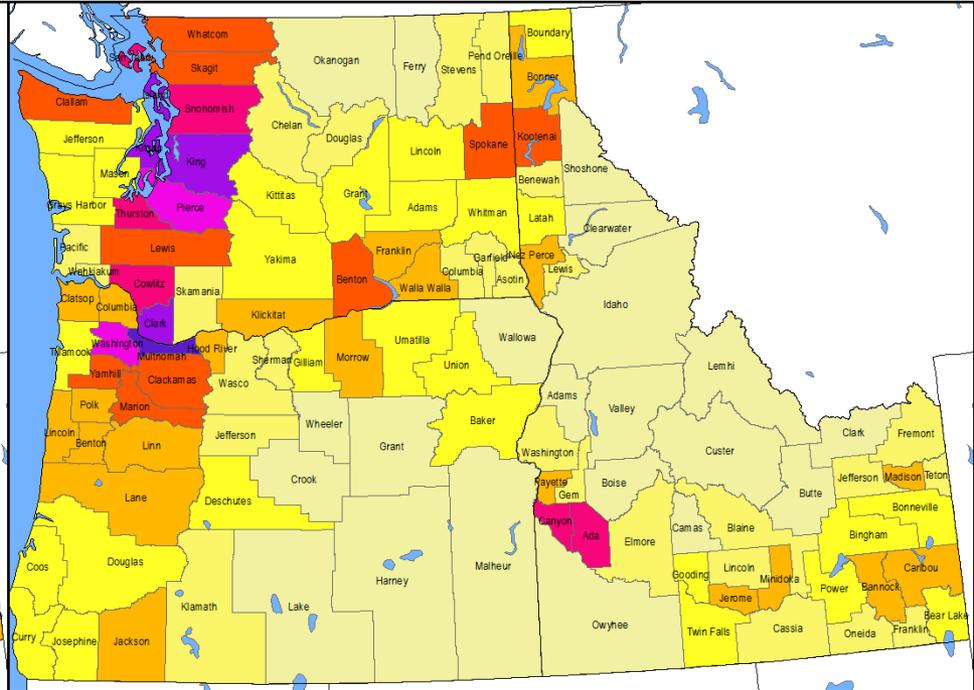
\* AIRPACT-6 "MOVES" emissions are best guess

# NOx County Emissions

AIRPACT-5



AIRPACT-6



\*Map shows county emissions normalized by county land area

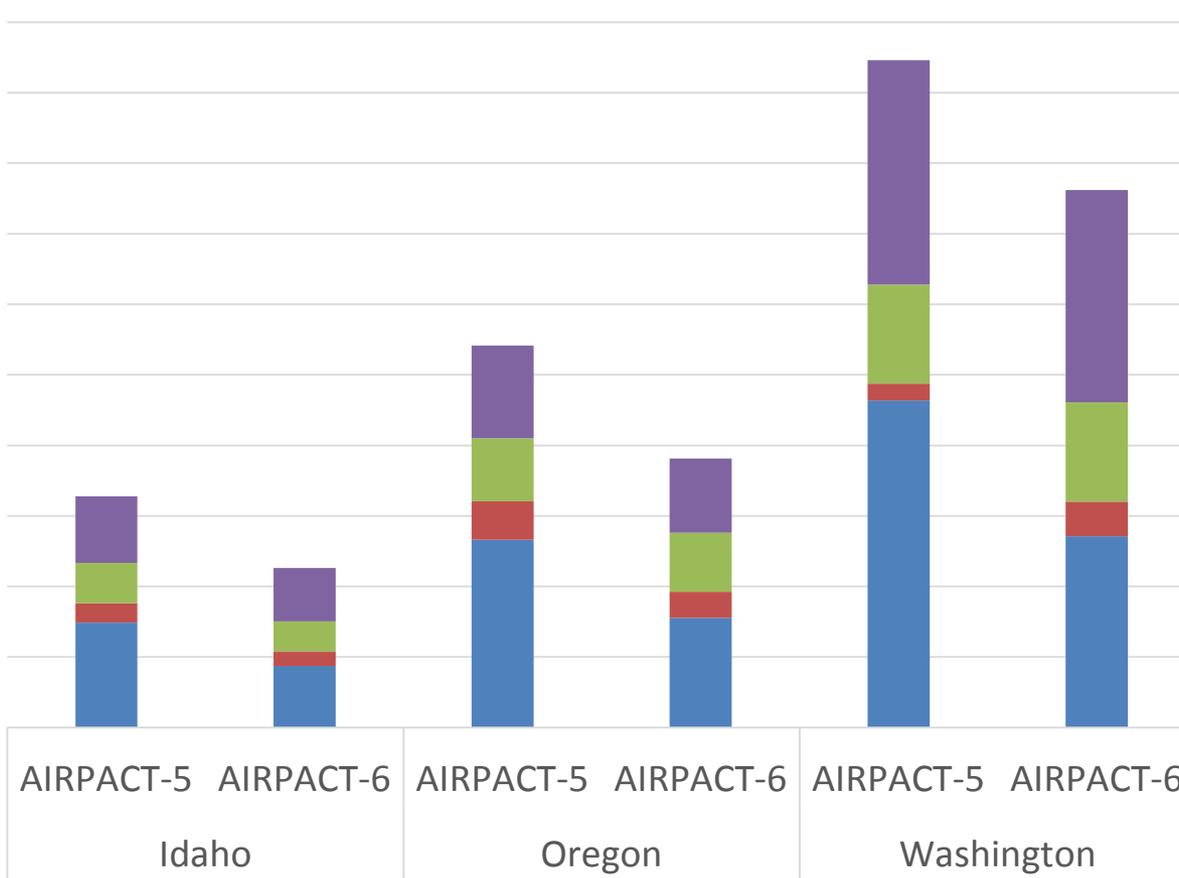


\* nonlinear scale

# NOx Annual Emissions

Tons/Year

200,000  
180,000  
160,000  
140,000  
120,000  
100,000  
80,000  
60,000  
40,000  
20,000  
0



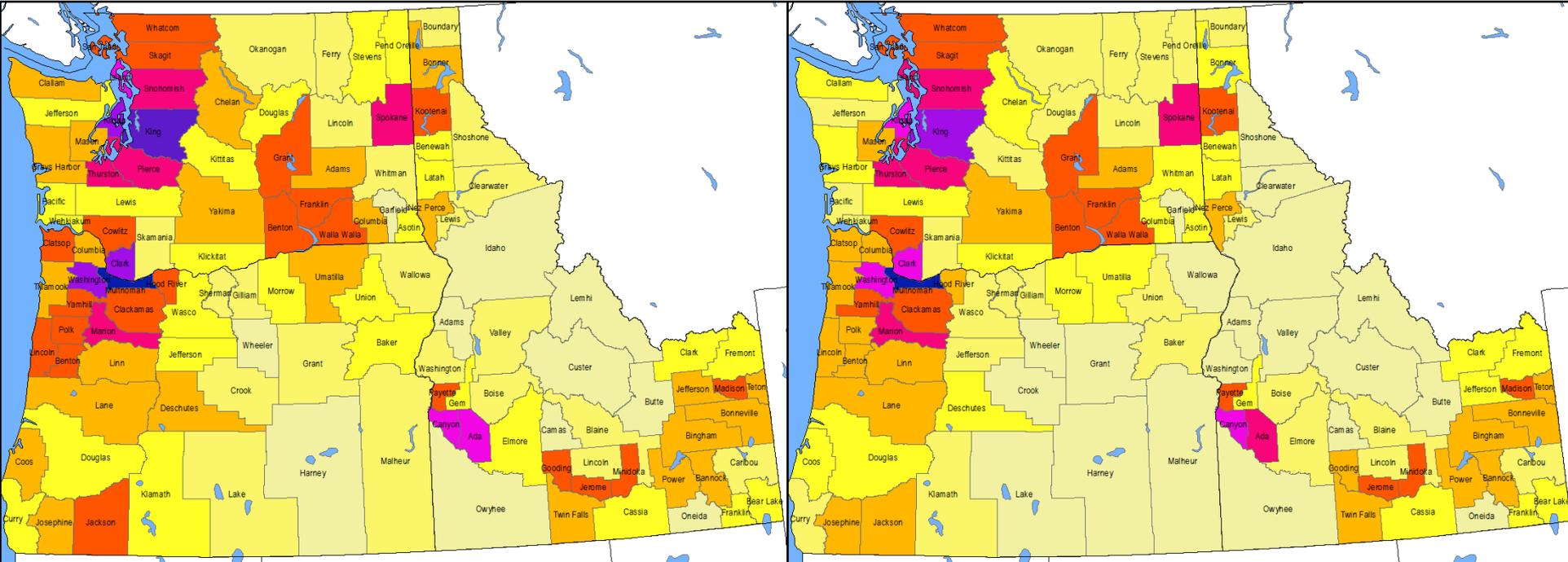
- Non-Road Vehicles & Equipment
- Major Facilities
- Fuel Combustion
- MOVES - On-Road Vehicles
- Insignificant Categories Not Shown

\* AIRPACT-6 "MOVES" emissions are best guess

# VOC County Emissions

AIRPACT-5

AIRPACT-6

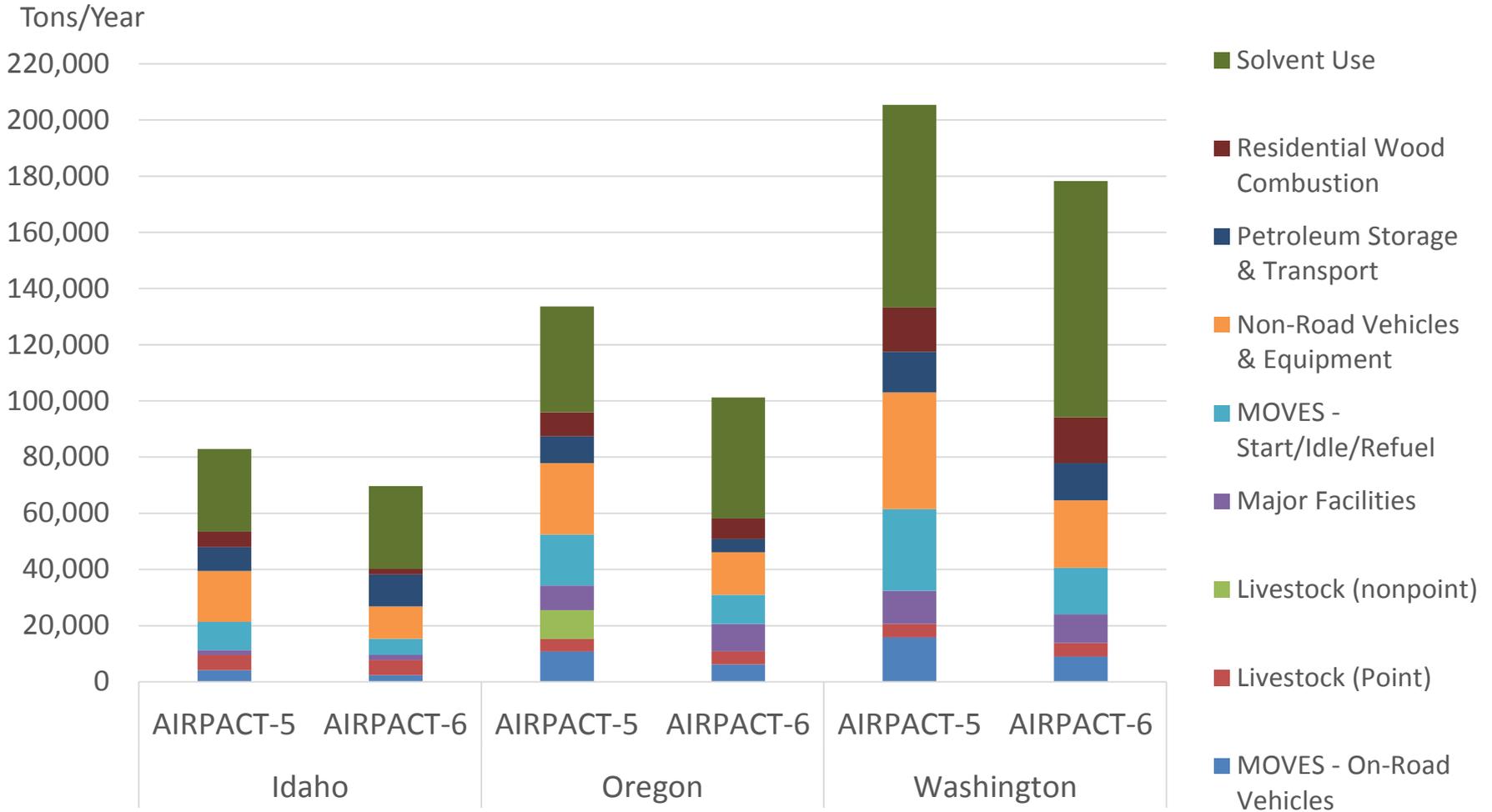


\*Map shows county emissions normalized by county land area



\* nonlinear scale

# VOC Annual Emissions

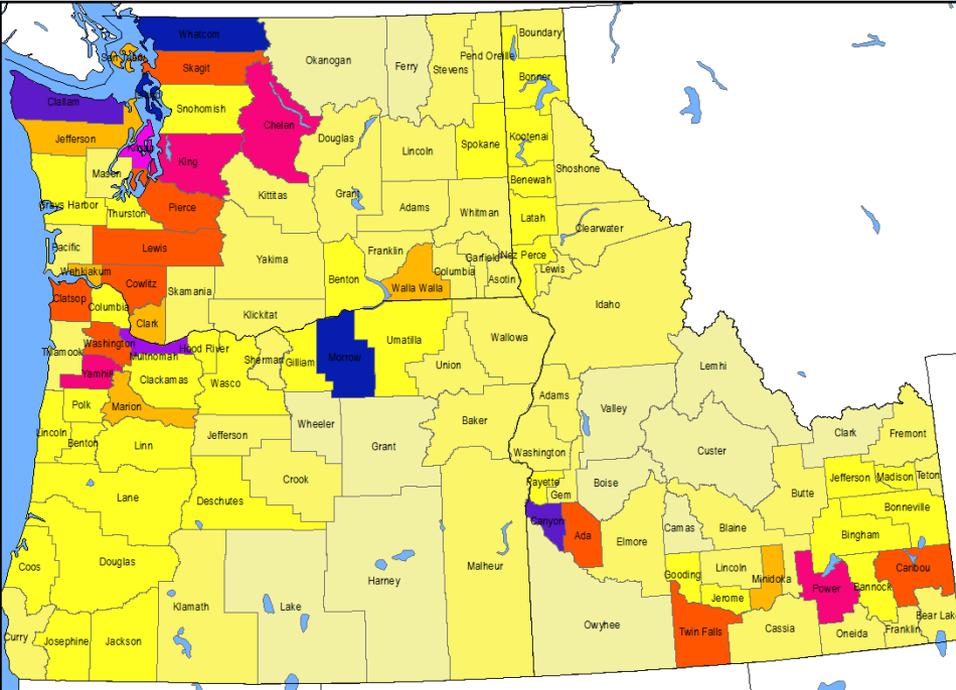


\* AIRPACT-6 “MOVES” emissions are best guess

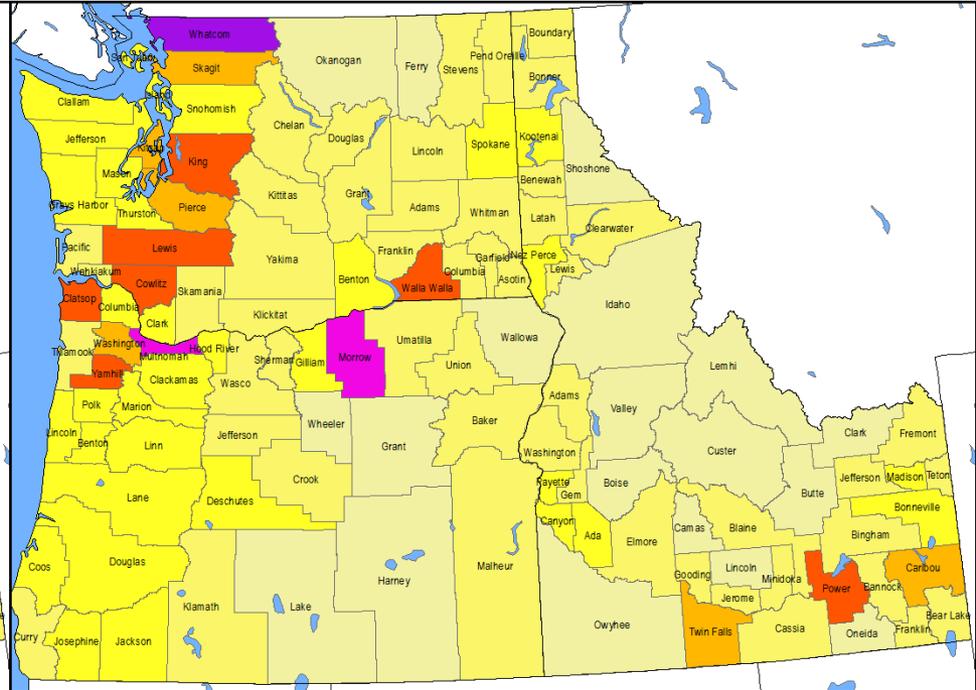
\* AIRPACT-5 “Livestock (nonpoint)” for Oregon includes VOC

# SO<sub>2</sub> County Emissions

AIRPACT-5



AIRPACT-6



\*Map shows county emissions normalized by county land area



\* nonlinear scale

# SO<sub>2</sub> Annual Emissions

Tons/Year

30,000

25,000

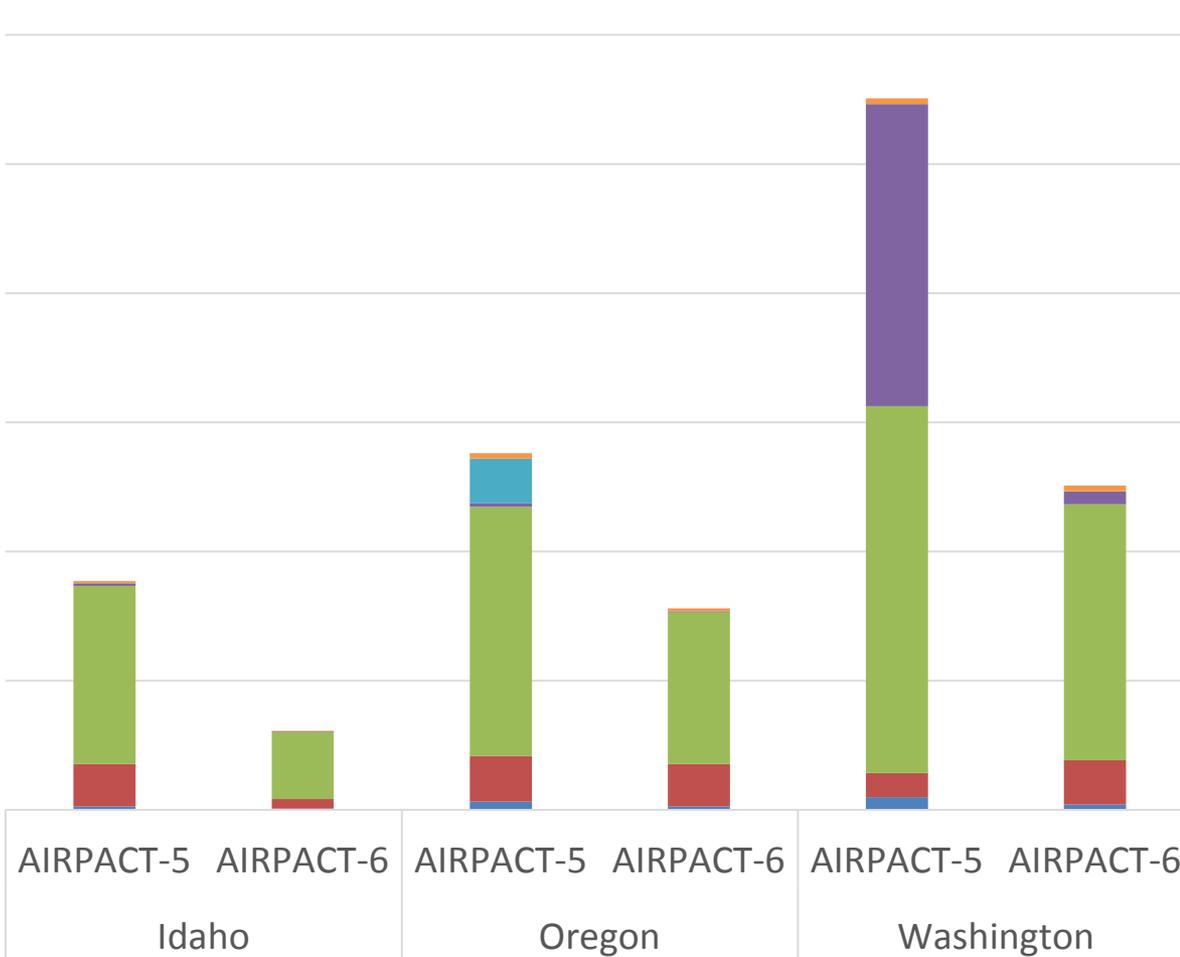
20,000

15,000

10,000

5,000

0



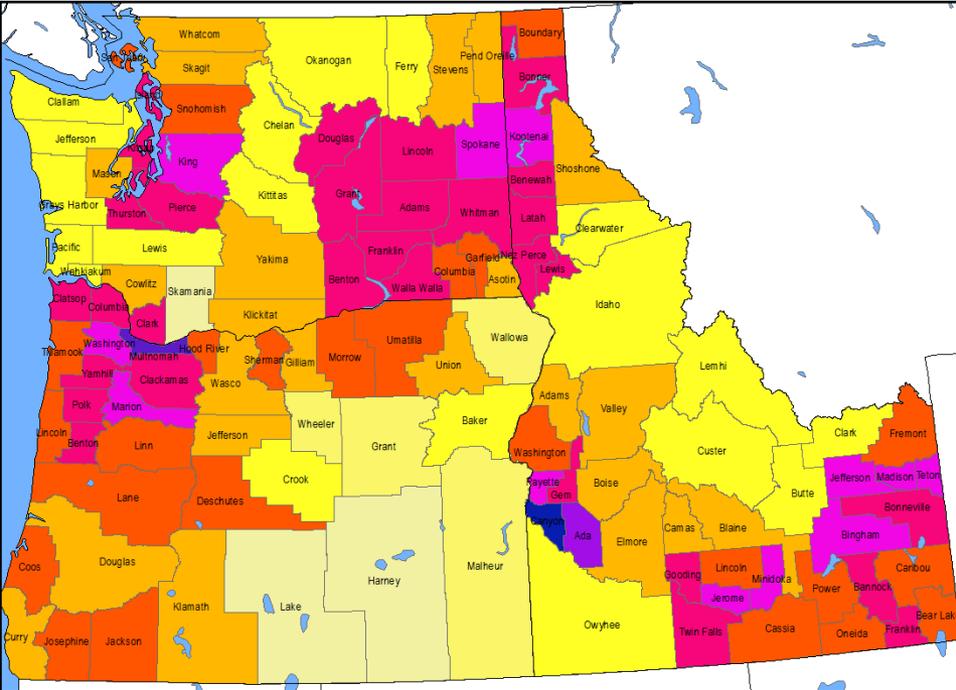
- Residential Wood Combustion
- Other
- Non-Road Vehicles & Equipment
- Major Facilities
- Fuel Combustion
- MOVES - On-Road Vehicles
- Insignificant Categories Not Shown

\* AIRPACT-5 “Non-Road” for Washington mostly ships/ports

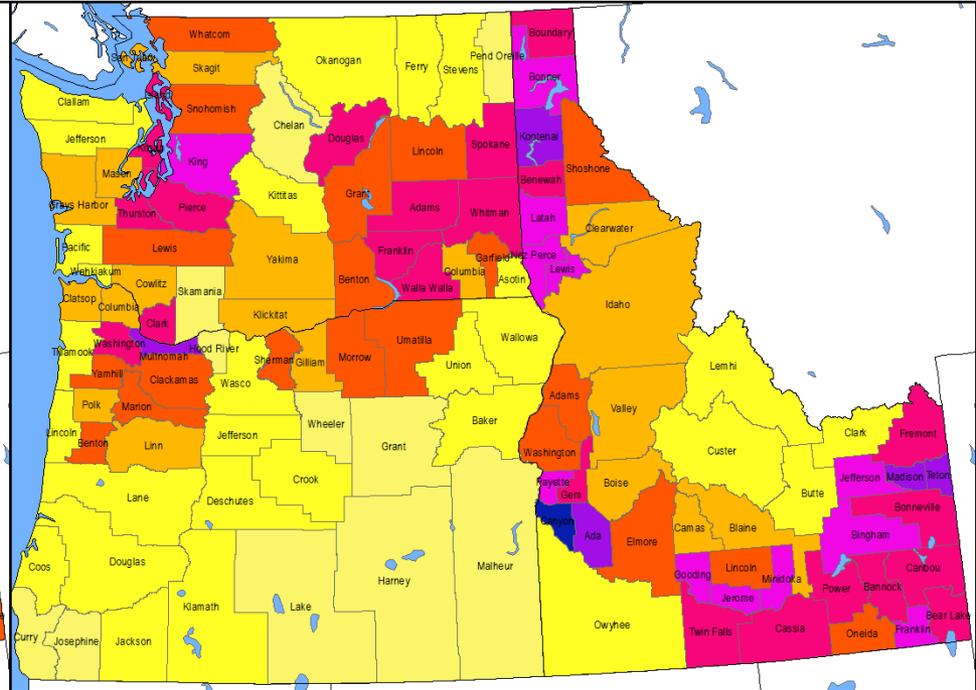
\* AIRPACT-5 “Other” for Oregon mostly orchard heaters

# PM<sub>10</sub> County Emissions

AIRPACT-5



AIRPACT-6

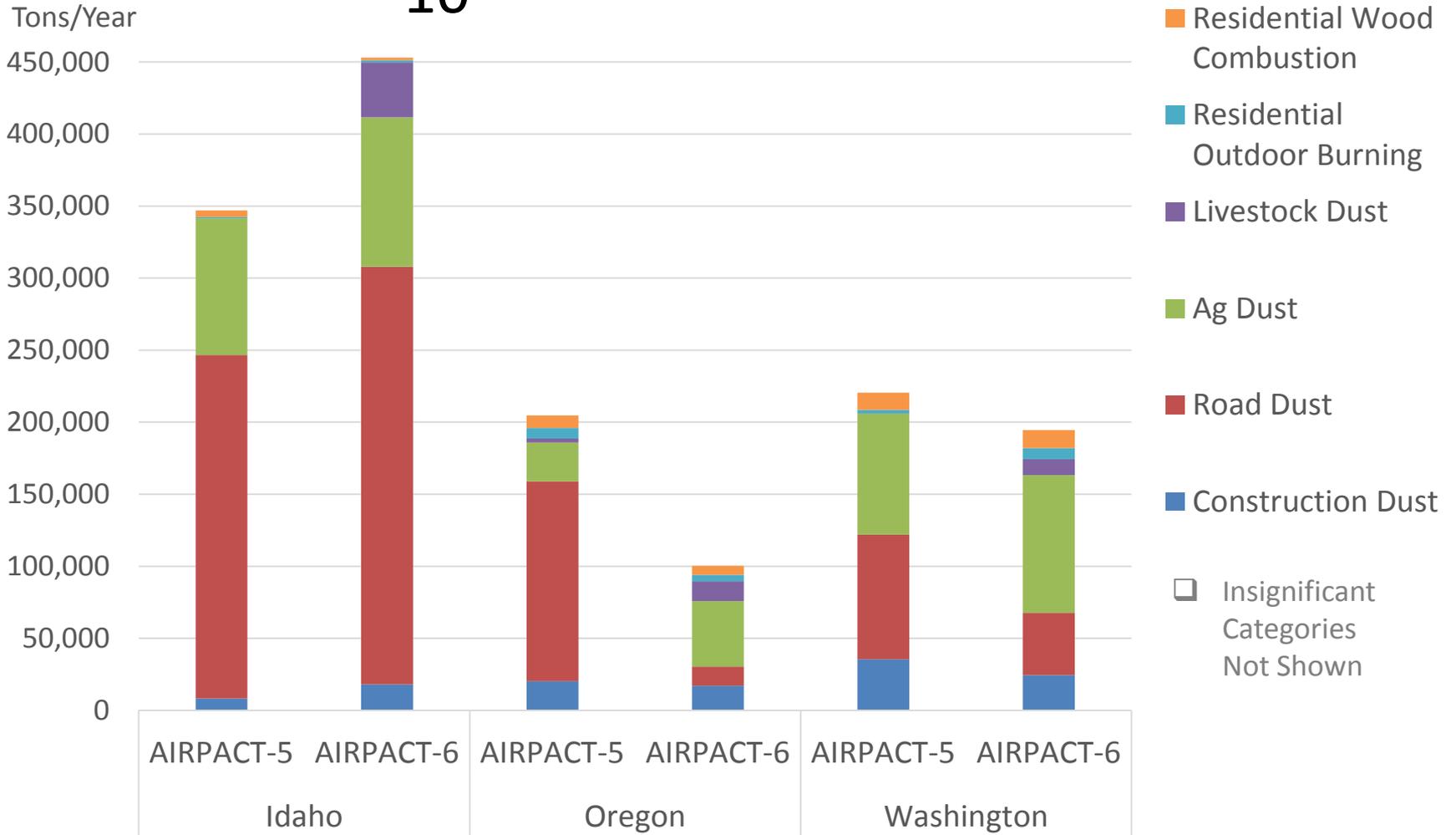


\*Map shows county emissions normalized by county land area



\* nonlinear scale

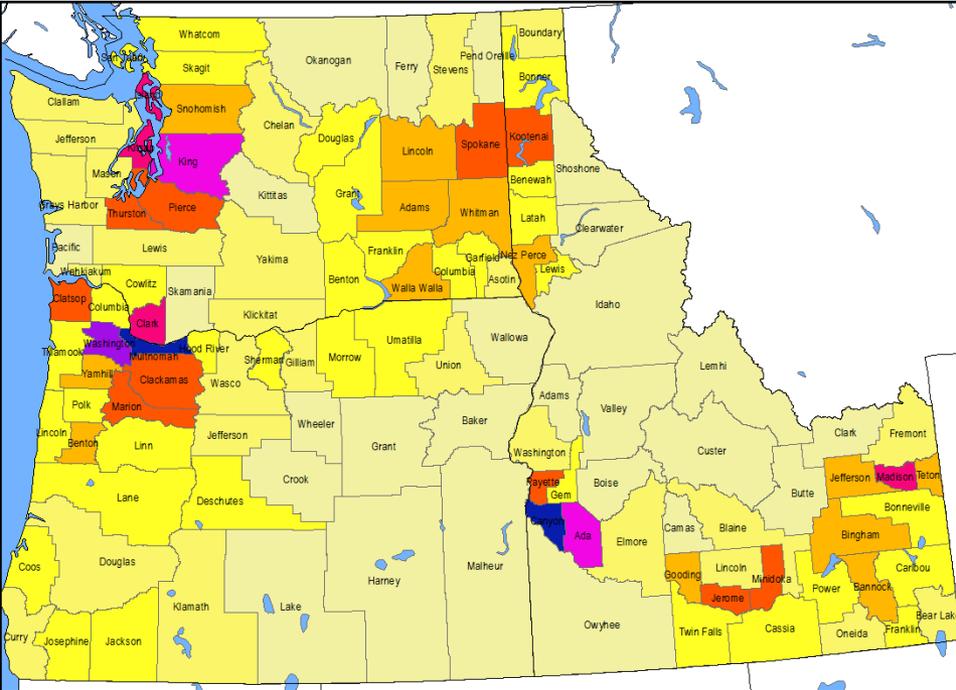
# PM<sub>10</sub> Annual Emissions



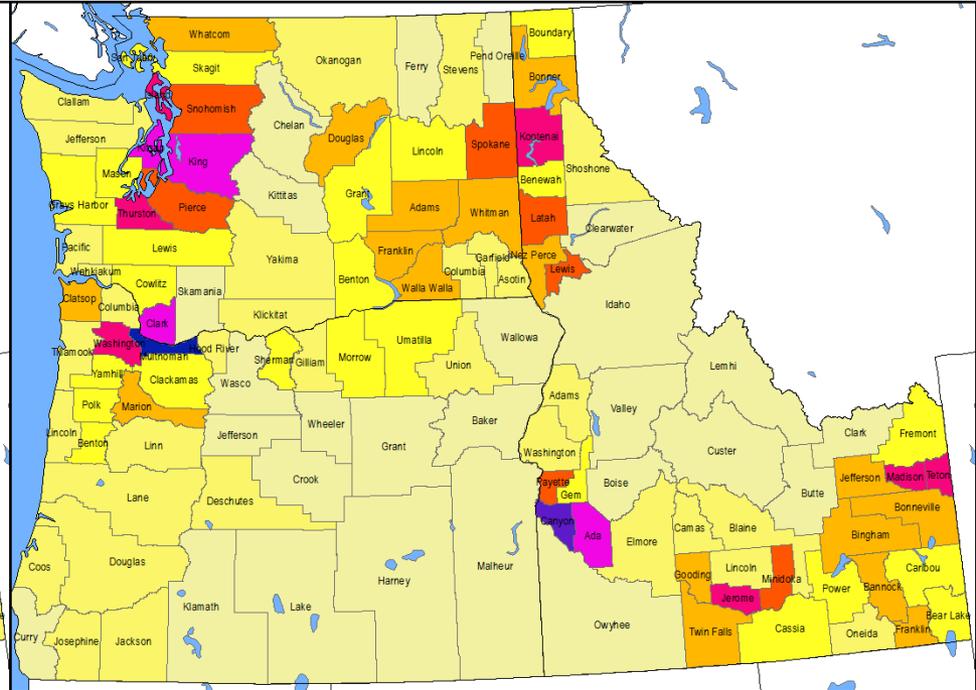
\* AIRPACT-5 "Livestock Dust" included for Oregon

# PM<sub>2.5</sub> County Emissions

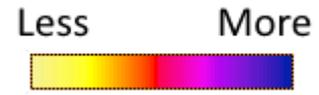
AIRPACT-5



AIRPACT-6



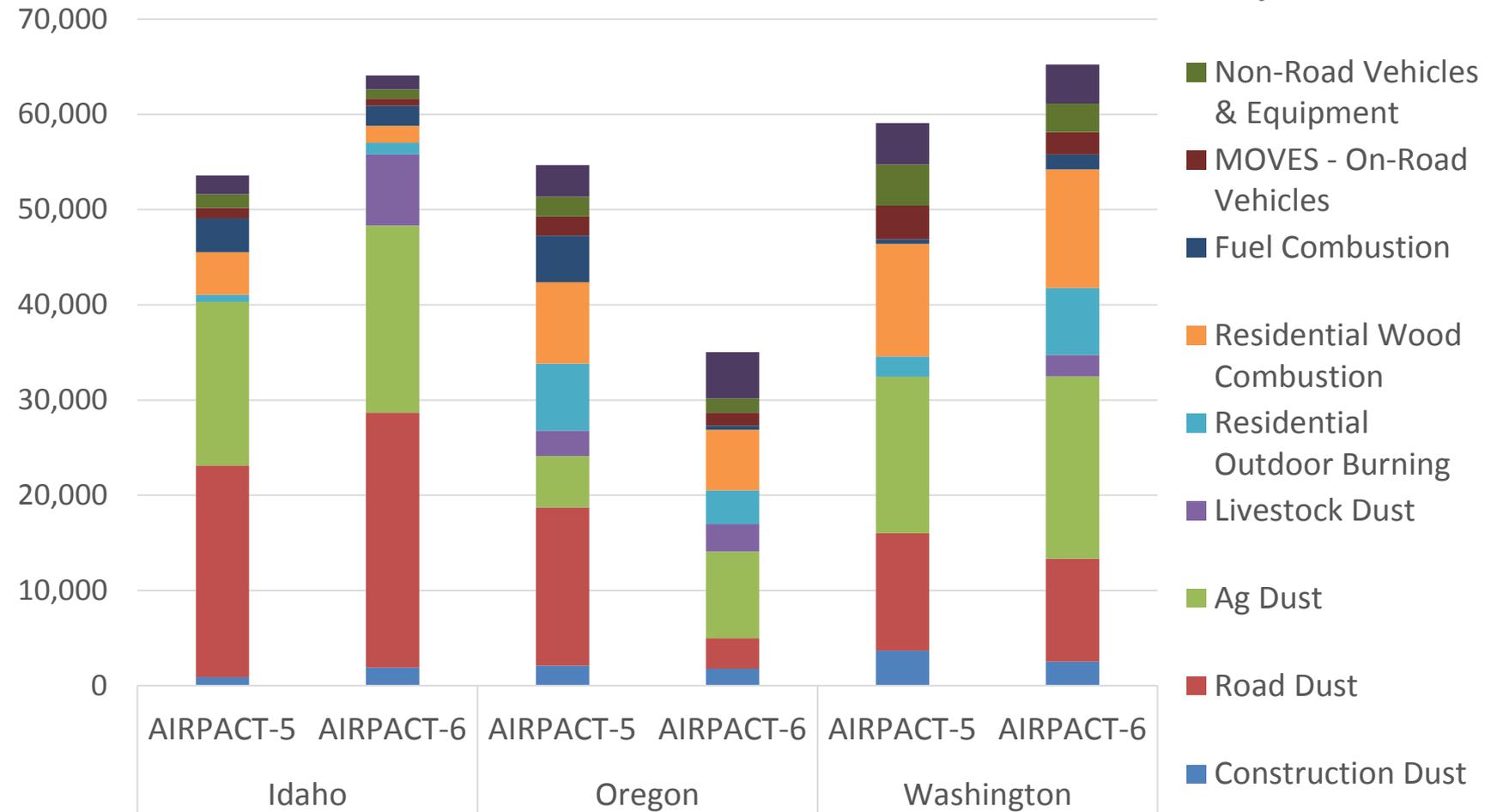
\*Map shows county emissions normalized by county land area



\* nonlinear scale

# PM<sub>2.5</sub> Annual Emissions

Tons/Year



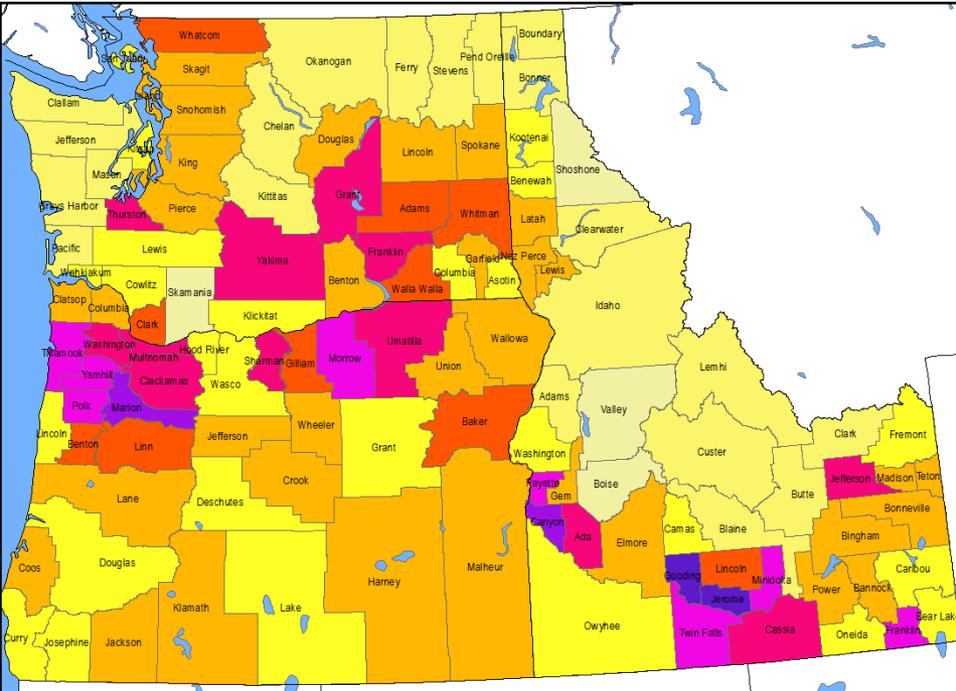
\* AIRPACT-6 "MOVES" emissions are best guess

\* AIRPACT-6 "RWC" for Oregon from NEI

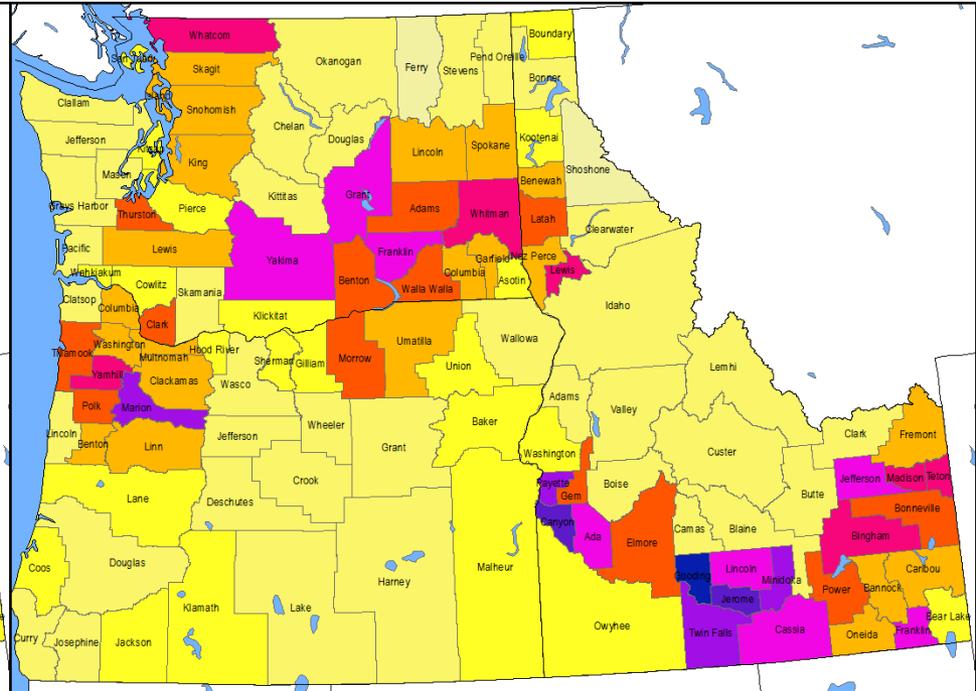
□ Insignificant Categories Not Shown

# NH<sub>3</sub> County Emissions

AIRPACT-5



AIRPACT-6

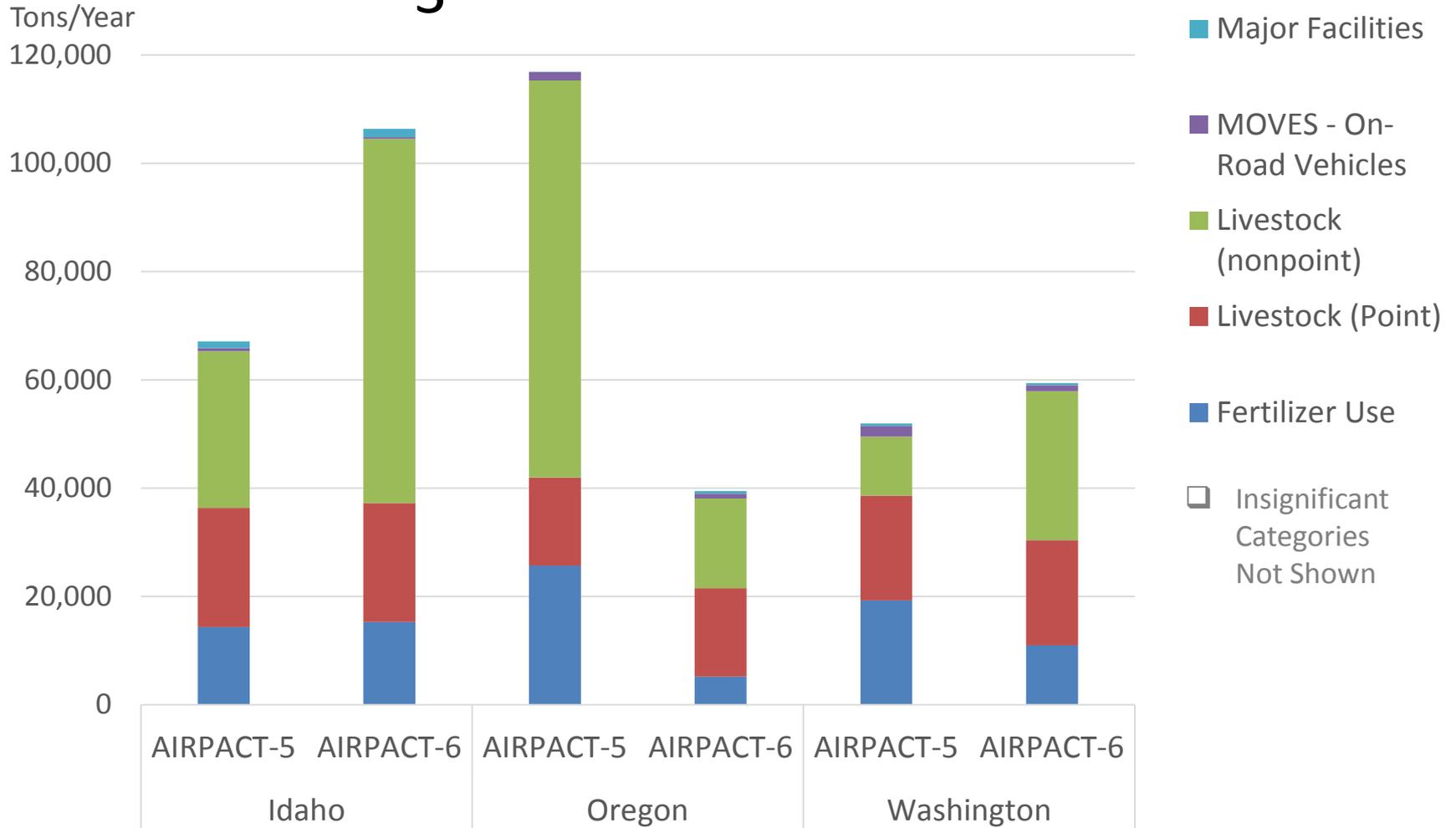


\*Map shows county emissions normalized by county land area



\* nonlinear scale

# NH<sub>3</sub> Annual Emissions



\* Livestock (nonpoint) does not include beef/dairies (except land application)



# Questions?

## Topics:

- ✓ AIRPACT Fire Processing Summary
- ✓ New AIRPACT Emissions Inventory

