Introduction to $PM_{2.5}$ and Arizona's Draft Boundary Recommendations for the 2024 Primary Annual $PM_{2.5}$ NAAQS

August 7, 2024

ADEQ Arizona Department of Environmental Quality

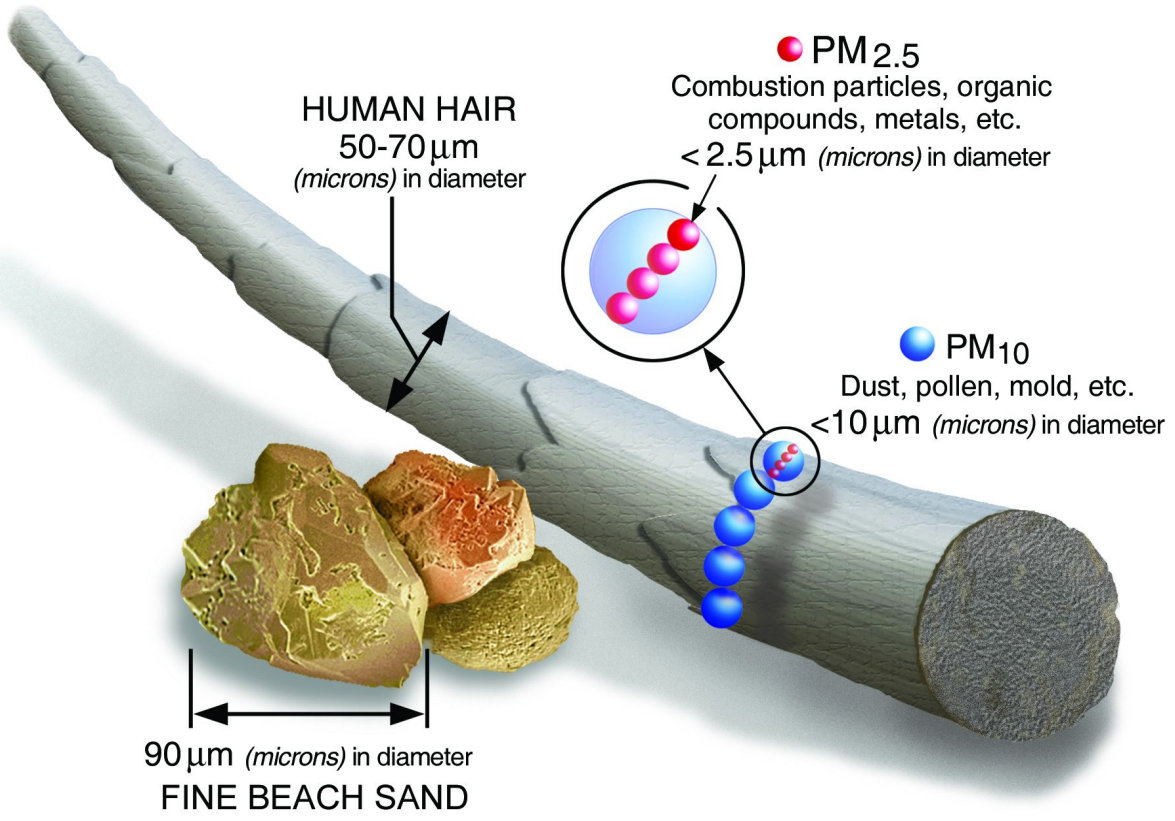
Clean Air, Safe Water, Healthy Land for Everyone

Overview of Presentation

- Revised $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS)
  - $PM_{2.5}$ Defined and the Importance of Size
  - Impact of $PM_{2.5}$ on Public Health
  - Revised Primary Annual $PM_{2.5}$ Standard
- ADEQ Area Designation Timeline
  - Five Factor Analysis
- Pinal County NAA Analysis
- $PM_{2.5}$ GIS Tool
- Contact Information

$PM_{2.5}$ Defined and the Importance of Size

- Particulate Matter (PM) is a complex mixture of small particles found in the air such as dirt, dust, smoke, and liquid droplets.
- Particles with a diameter of 2.5 micrometers or less are referred to as $PM_{2.5}$.
  - The size of particles is directly linked to their potential for causing health problems.
  - Smaller particles pose the greatest adverse health effects, because they can get deep into your lungs, and may even get into your bloodstream.



Source: EPA, Particulate Matter Basics: https://www.epa.gov/pm-pollution/particulate-matter-pm-basics

$PM_{2.5}$ and Public Health

Numerous studies link particle levels to increased hospital admissions and emergency room visits—and even to death from heart or lung diseases. Based on the Global Burden of Disease Project, of all the common air pollutants, $PM_{2.5}$ is associated with the greatest proportion of adverse health effects, both in the U.S. and world-wide.

Short-term $PM_{2.5}$ Exposure (hours or days)

- Can aggravate lung disease, causing asthma attacks and acute bronchitis, and may also increase susceptibility to respiratory infections.
- Has been linked to heart attacks and arrhythmias in people with heart disease.

Long-term $PM_{2.5}$ Exposure (months or years)

- Associated with problems such as reduced lung function and the development of chronic bronchitis—and even premature death.

Revised Primary Annual $PM_{2.5}$ Standard

Pollutant	Standard	Averaging Time	Level
$PM_{2.5}$	Primary	Annual[1]	Lowered level from 12.0 µg/m^3 to 9.0 µg/m^3
$PM_{2.5}$	Secondary	Annual[1]	Retained current level of 15.0 µg/m^3
$PM_{2.5}$	Primary and Secondary	24-hour[2]	Retained current level of 35.0 µg/m^3
PM_{10}	Primary and Secondary	24-hour[2]	Retained current level of 150 µg/m^3

[1] Annual Standard Form is 3-year average of the weighted annual mean $PM_{2.5}$ concentrations

[2] 24-hour Standard Form is 3-year average of the 98th percentile of 24-hour $PM_{2.5}$ concentrations

ADEQ Area Designation Timeline

Projected Timeline

February 7, 2024

Revised PM2.5 NAAQS Promulgated

September/October 2024

Draft boundary recommendations and technical support document posted; public hearing announced and comment period begins

October/November 2024

Comment period ends and public hearing held

January 7, 2025

Final boundary recommendations and response to comments submitted to Governor

February 7, 2025

Governor submits recommendations to EPA

February 7, 2026

EPA designations are made final (may take up to one additional year)

General Area Designation Timeline Cont.

No later than one year after promulgation of NAAQS, the Governor shall submit a list of all areas in the state designating as:

Nonattainment

An area that does not meet the NAAQS or an area that contributes to ambient air quality in a nearby area that does not meet the NAAQS

Unclassifiable

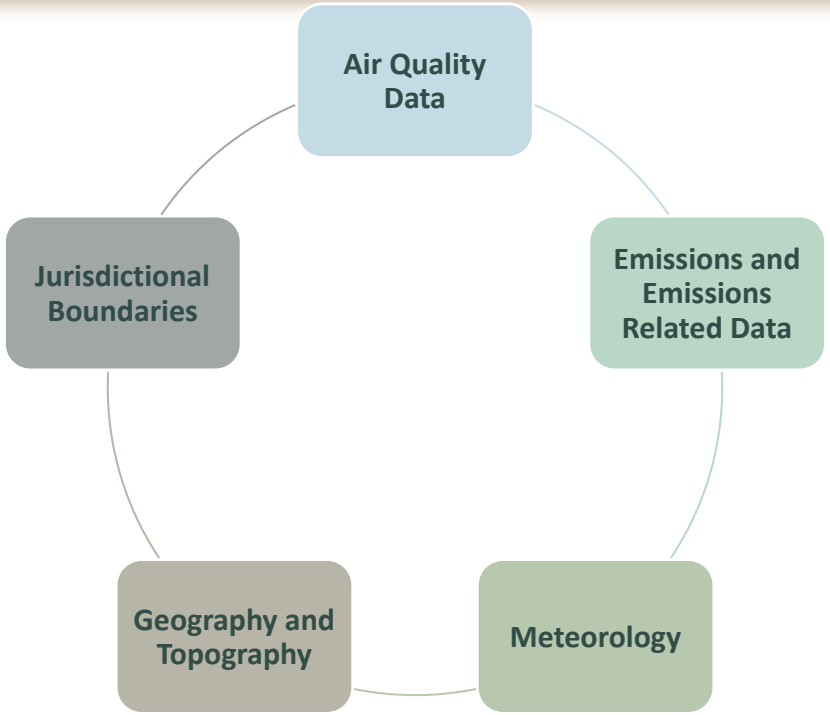
An area that cannot be classified based on available information as meeting or not meeting the NAAQS

Attainment

An area that meets the NAAQS and does not contribute to nonattainment

EPA may modify the list as it deems necessary but must notify the Governor of modifications 120 days before final designations

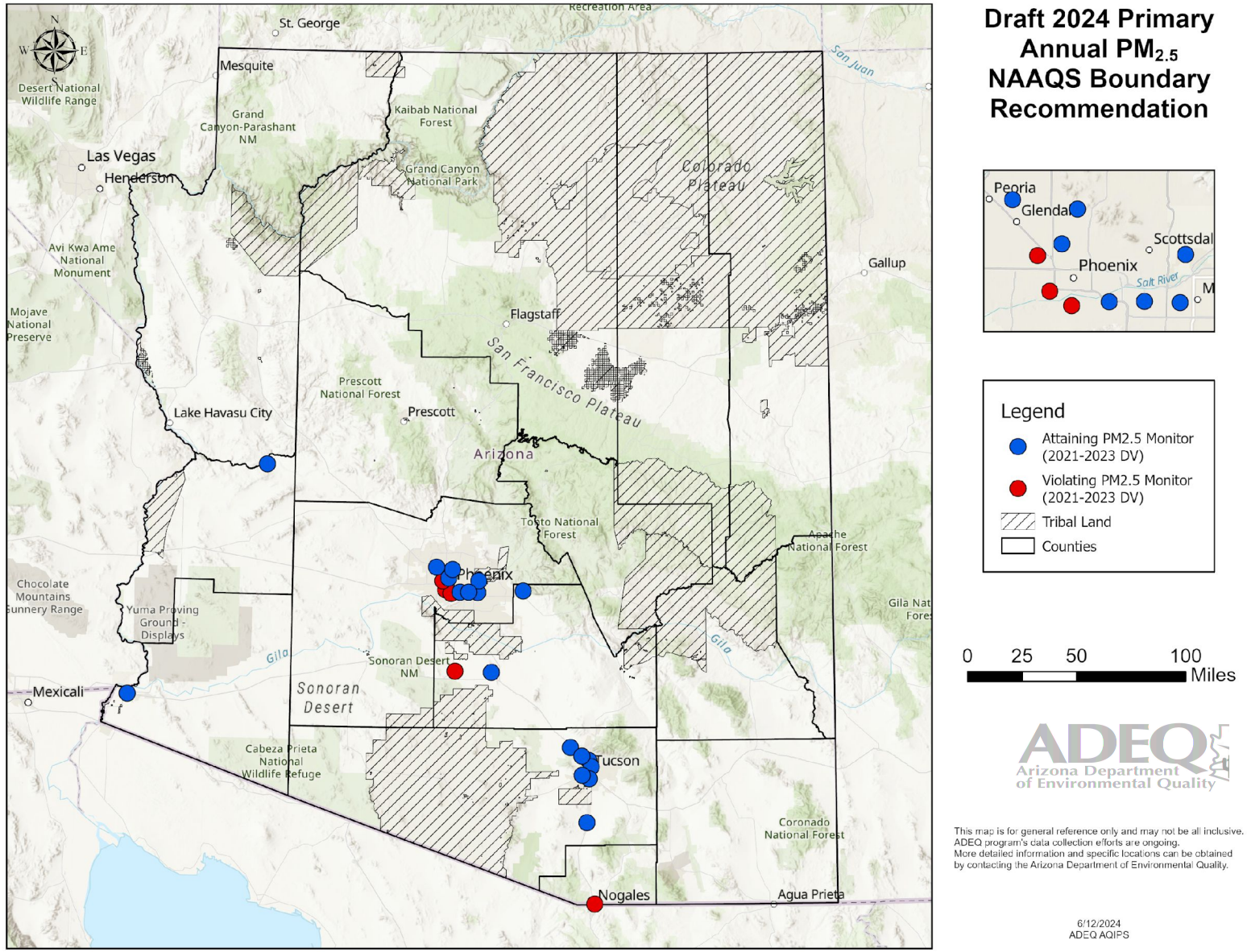
Five Factor Analysis and Weight-of-Evidence



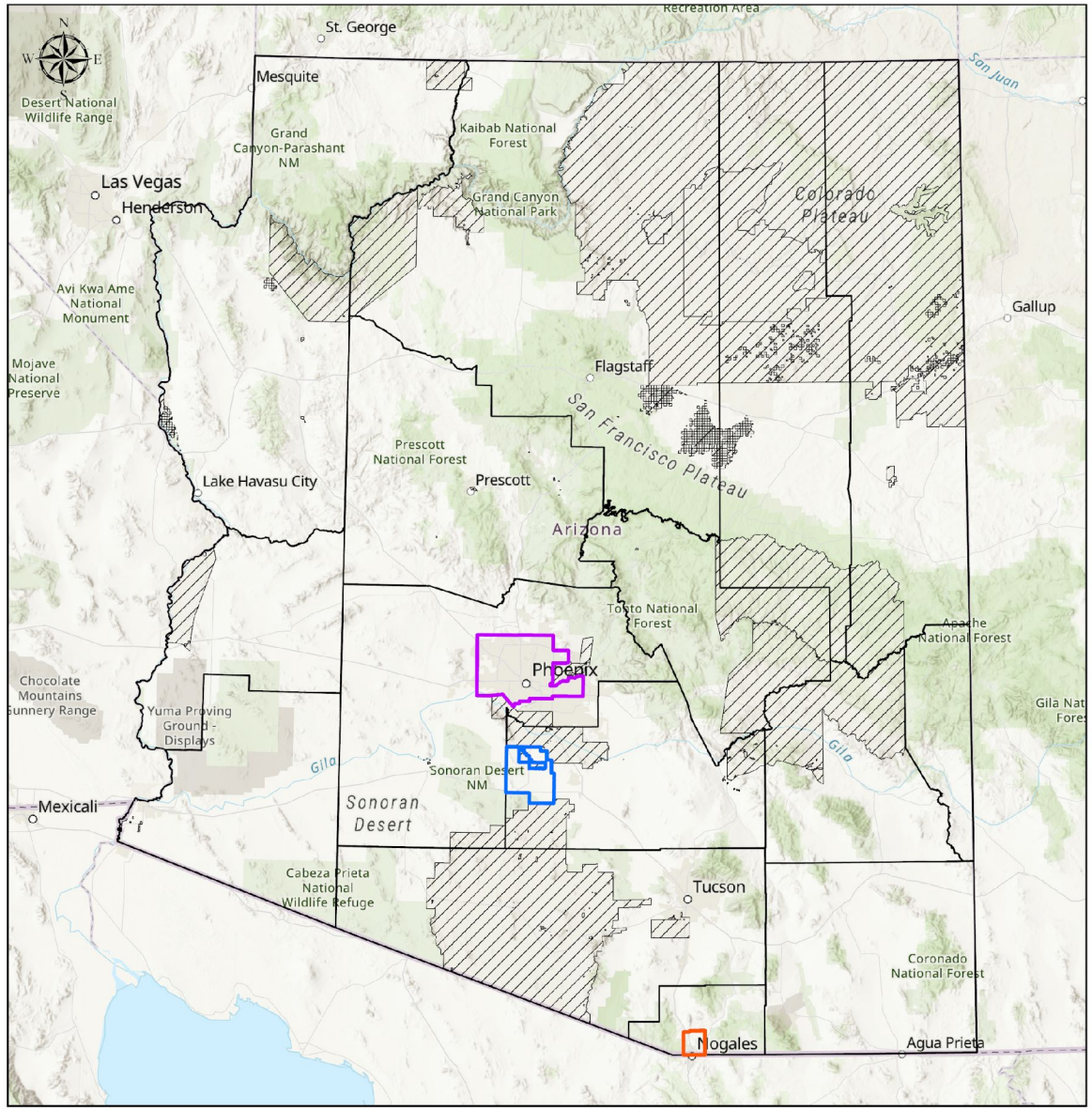
Weight-of-Evidence: Refers to the believability or persuasiveness of evidence for its probative value.

- EPA recommends that States evaluate the five factors together and use a weight-of-evidence approach for this analysis.
- "The guiding principle for this evaluation is to include within the boundaries of the nonattainment area, any nearby areas with emissions of $PM_{2.5}$ or $PM_{2.5}$ precursors that have the potential to be transported to the violating monitor."

Current Arizona $PM_{2.5}$ Monitoring Data



Draft 2024 Primary Annual $PM_{2.5}$ NAA Boundaries



Draft 2024 Primary Annual $PM_{2.5}$ NAAQS Boundary Recommendation

Legend
- Maricopa Proposal
- Pinal Proposal
- Santa Cruz Proposal
- Tribal Land
- Counties

0 25 50 100 Miles

ADEQ Arizona Department of Environmental Quality

This map is for general reference only and may not be all inclusive. ADEQ program's data collection efforts are ongoing. More detailed information and specific locations can be obtained by contacting the Arizona Department of Environmental Quality.

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Pinal County NAA – Contingency Based Rec.

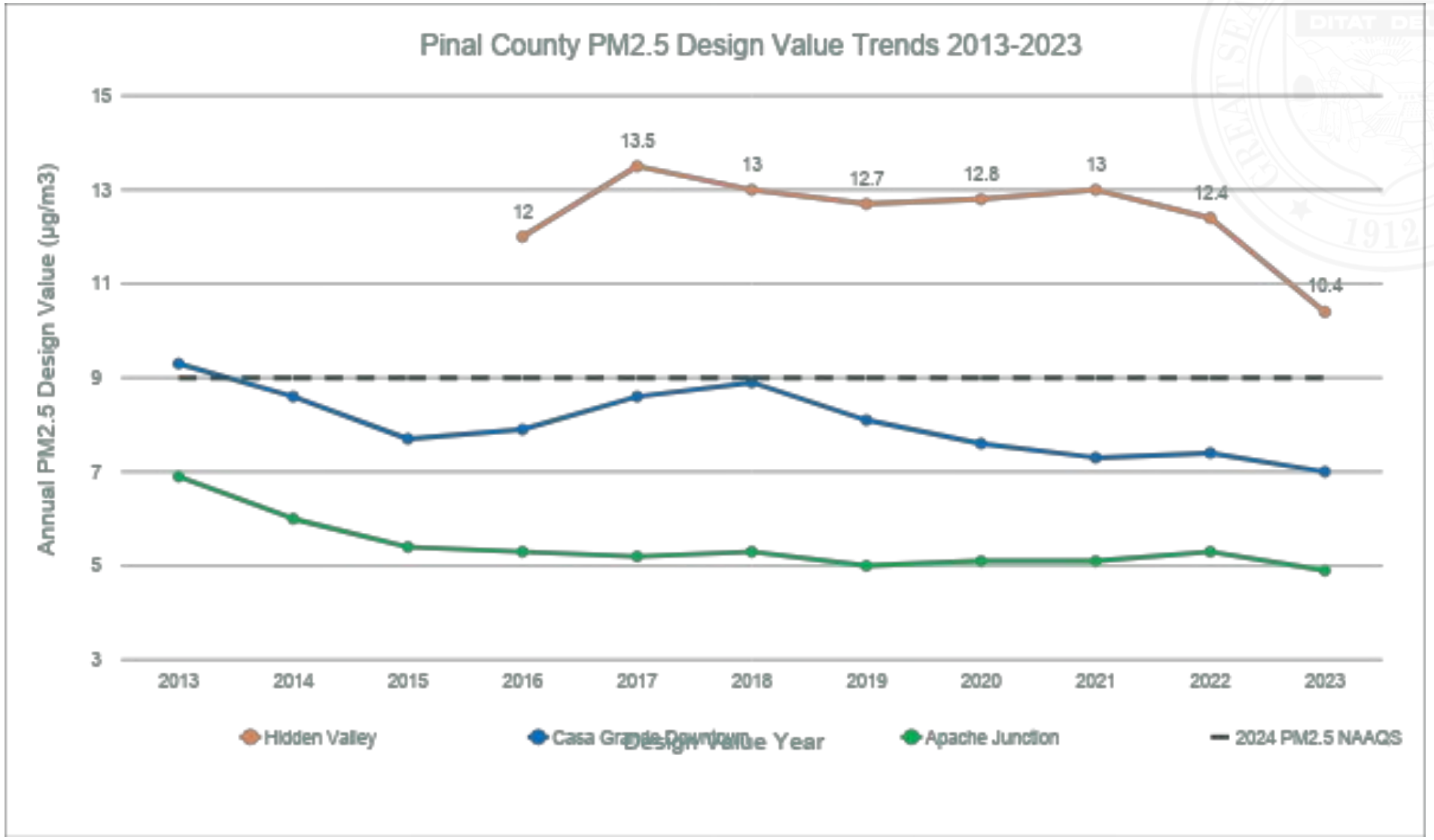
- 40 CFR § 58.30: "$PM_{2.5}$ measurement data from monitors that are not representative of area-wide air quality but rather of relatively unique micro-scale, or localized hot spot, or unique **middle-scale** impact sites are not eligible for comparison to the annual $PM_{2.5}$ NAAQS."

- PCAQCD is making the request to EPA in their 2024 Air Monitoring Network Plan to exclude the Hidden Valley site from comparison to the Annual $PM_{2.5}$ NAAQS. (Public Hearing on June 11, 2024)

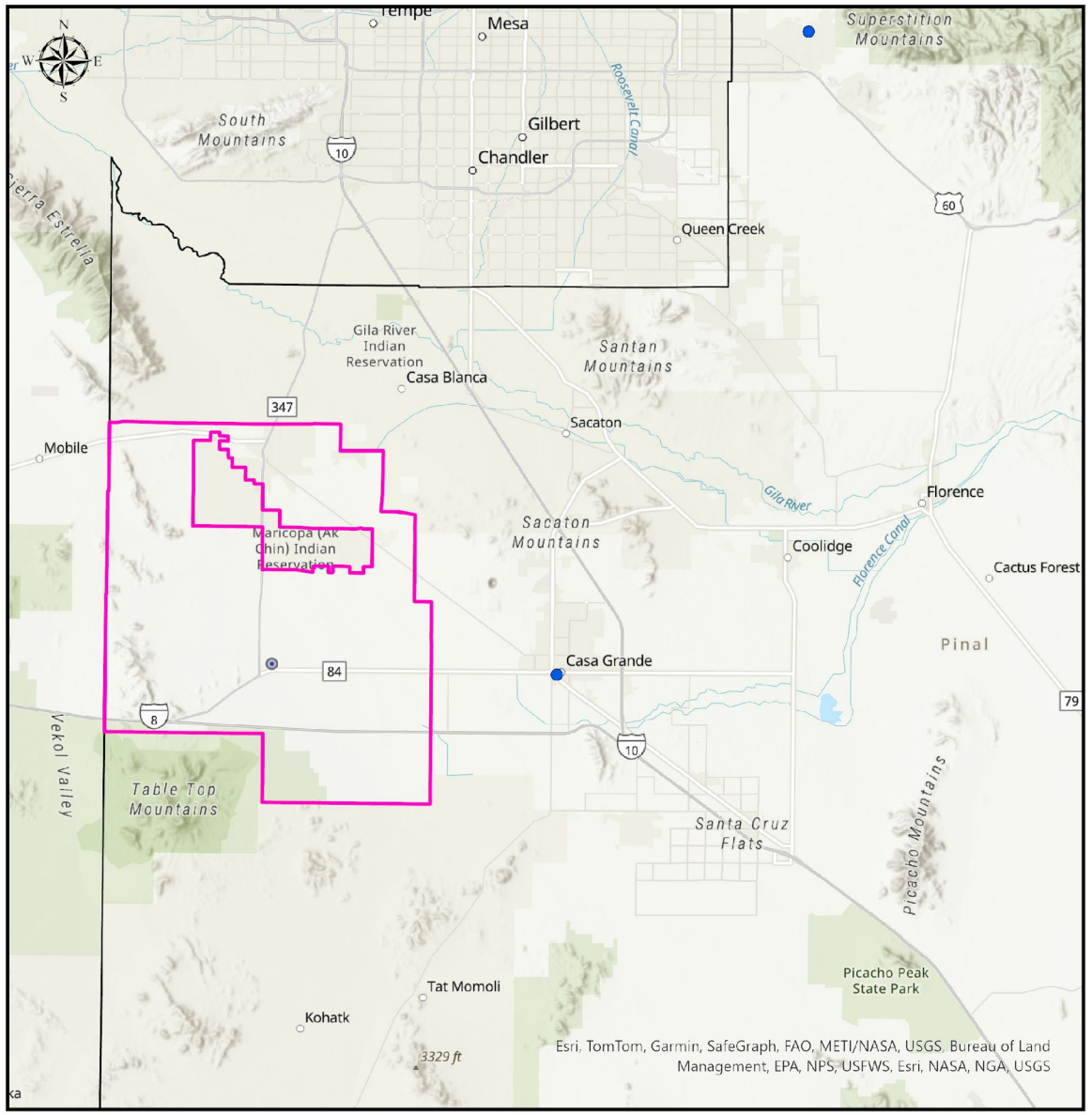
- ADEQ to recommend to designate Pinal County as attainment if EPA approves the § 58.30 request, or recommend retaining the existing 2006 West Central Pinal PM2.5 NAA boundary if EPA does not approve the request.

Pinal County
Nonattainment Area Analysis

Pinal County NAA – Air Quality Data



Pinal County NAA – Monitor Spatial Scale



Draft 2024 Primary Annual $PM_{2.5}$ NAAQS Boundary Recommendation Pinal County

Legend

- Pinal Recommendation
- Violating $PM_{2.5}$ Monitor
- Attaining $PM_{2.5}$ Monitor
- Middle Scale Buffer (0.5km)
- Counties

0 4 8 16 Miles

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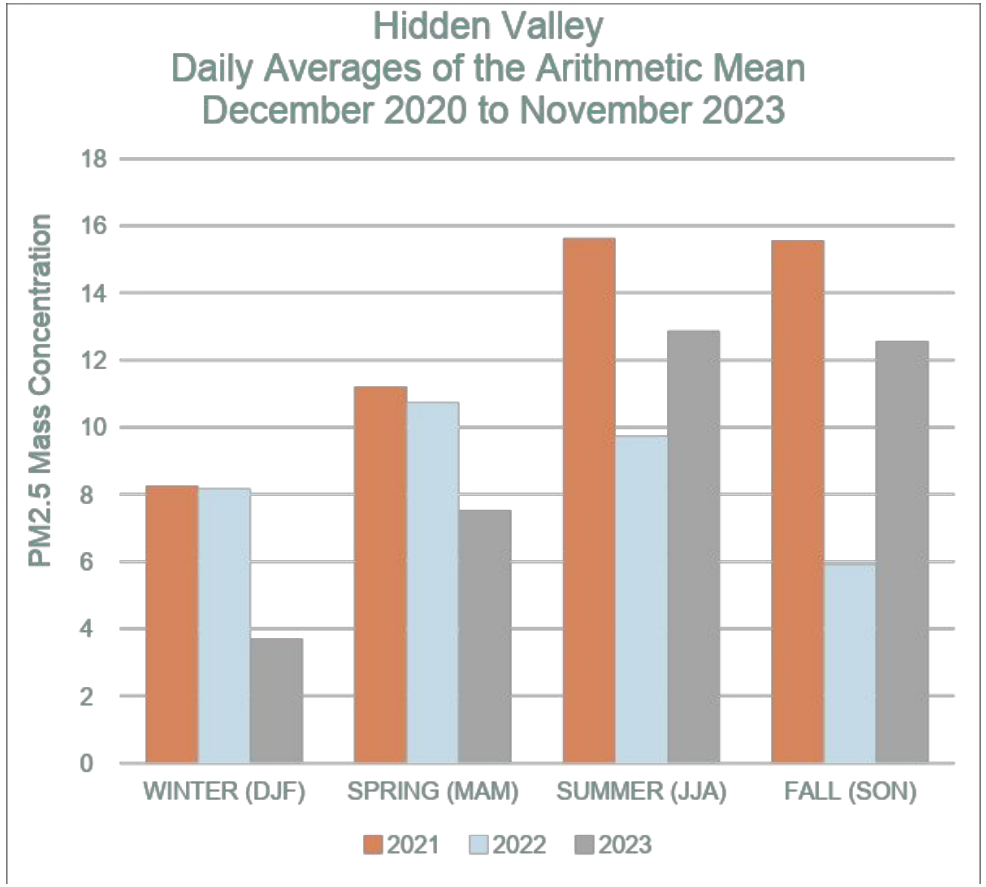
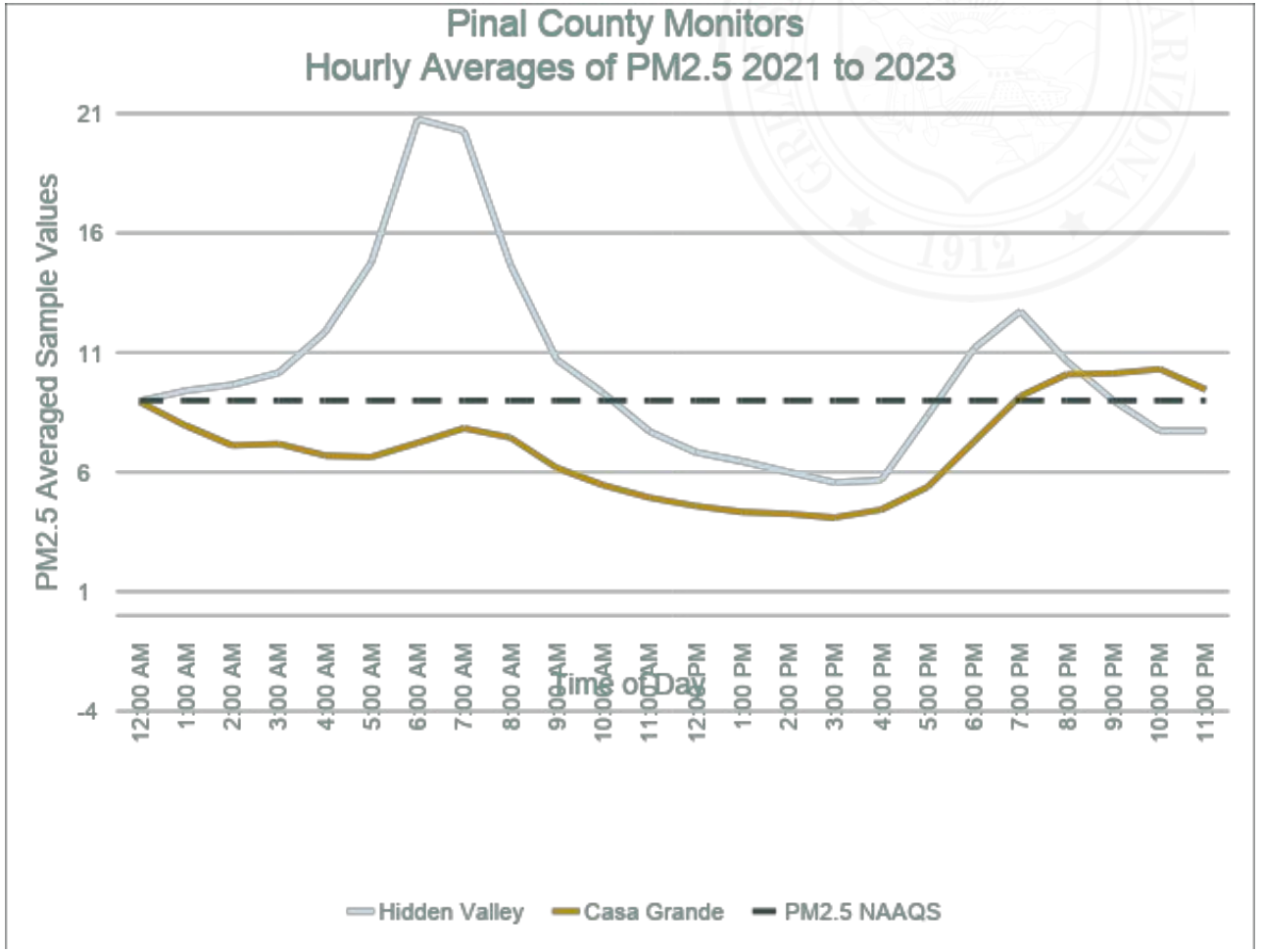
Pinal County NAA – Air Quality Data



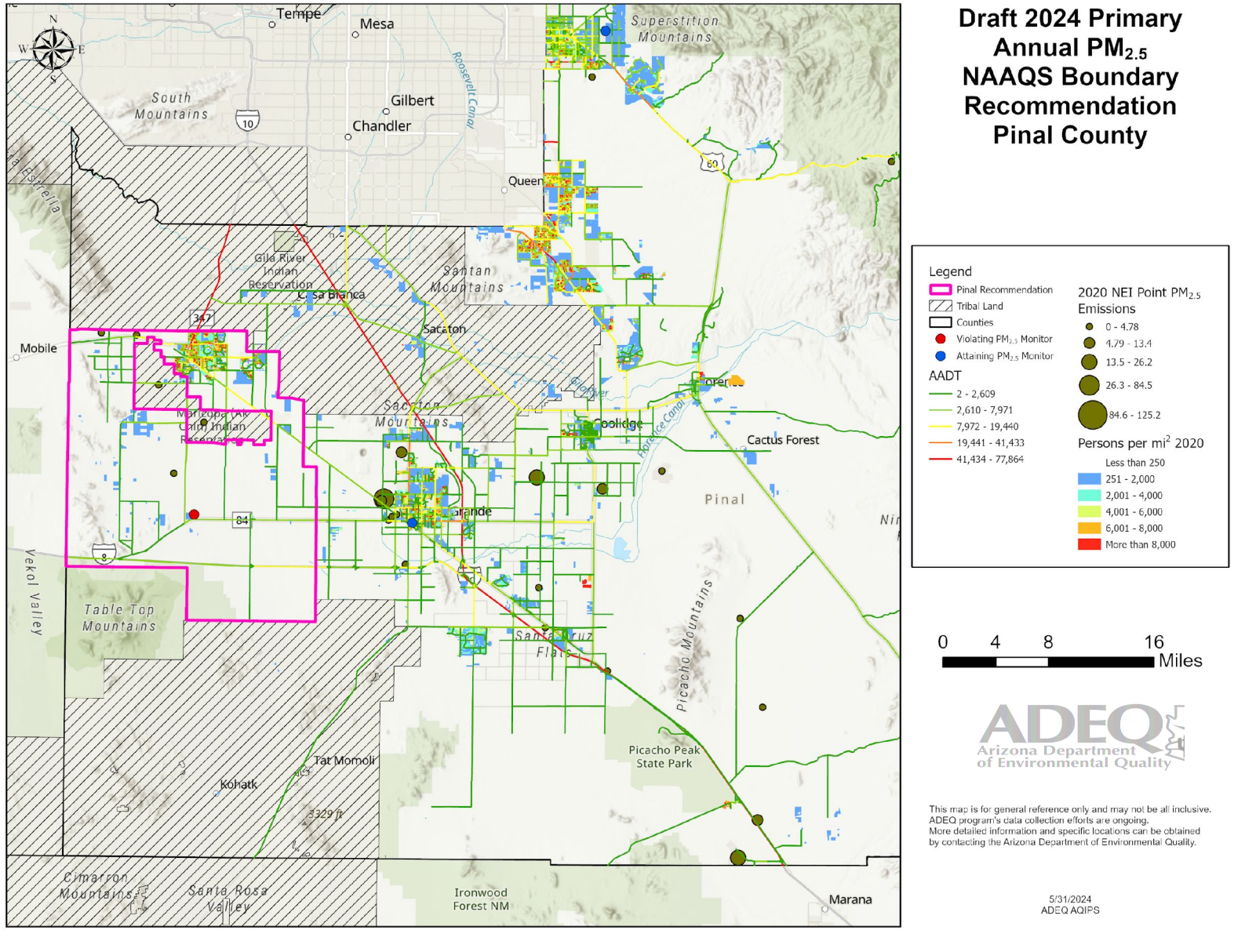


Pinal County – Emissions

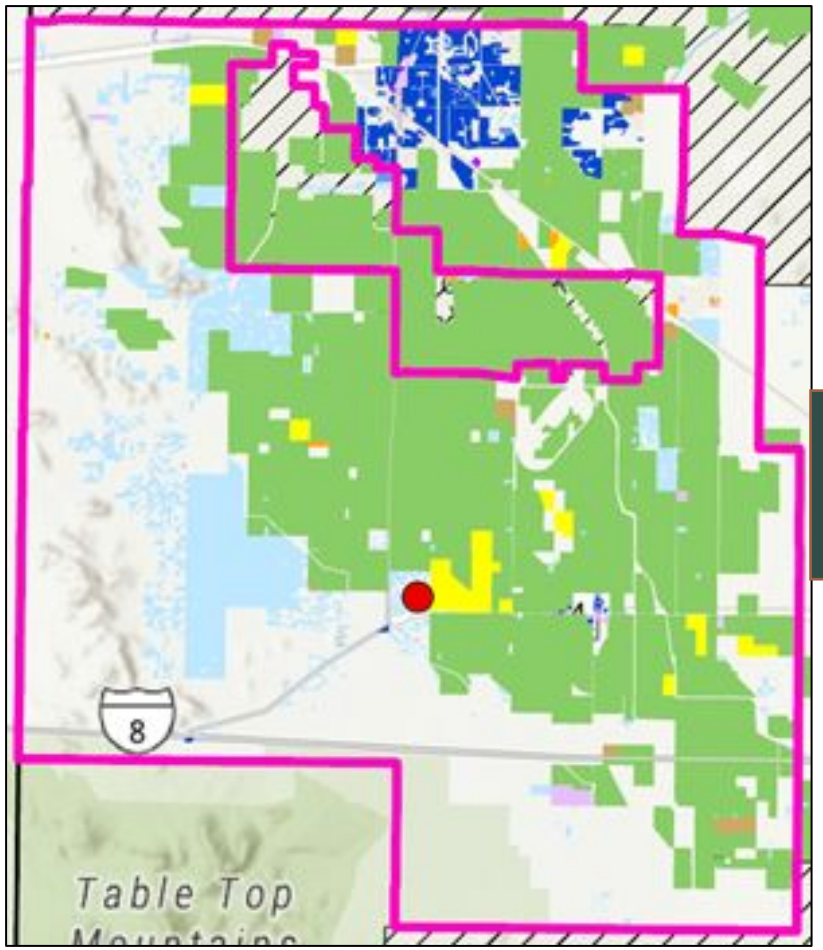
Pinal County Primary $PM_{2.5}$ Source Sector Emissions from the 2020 NEI

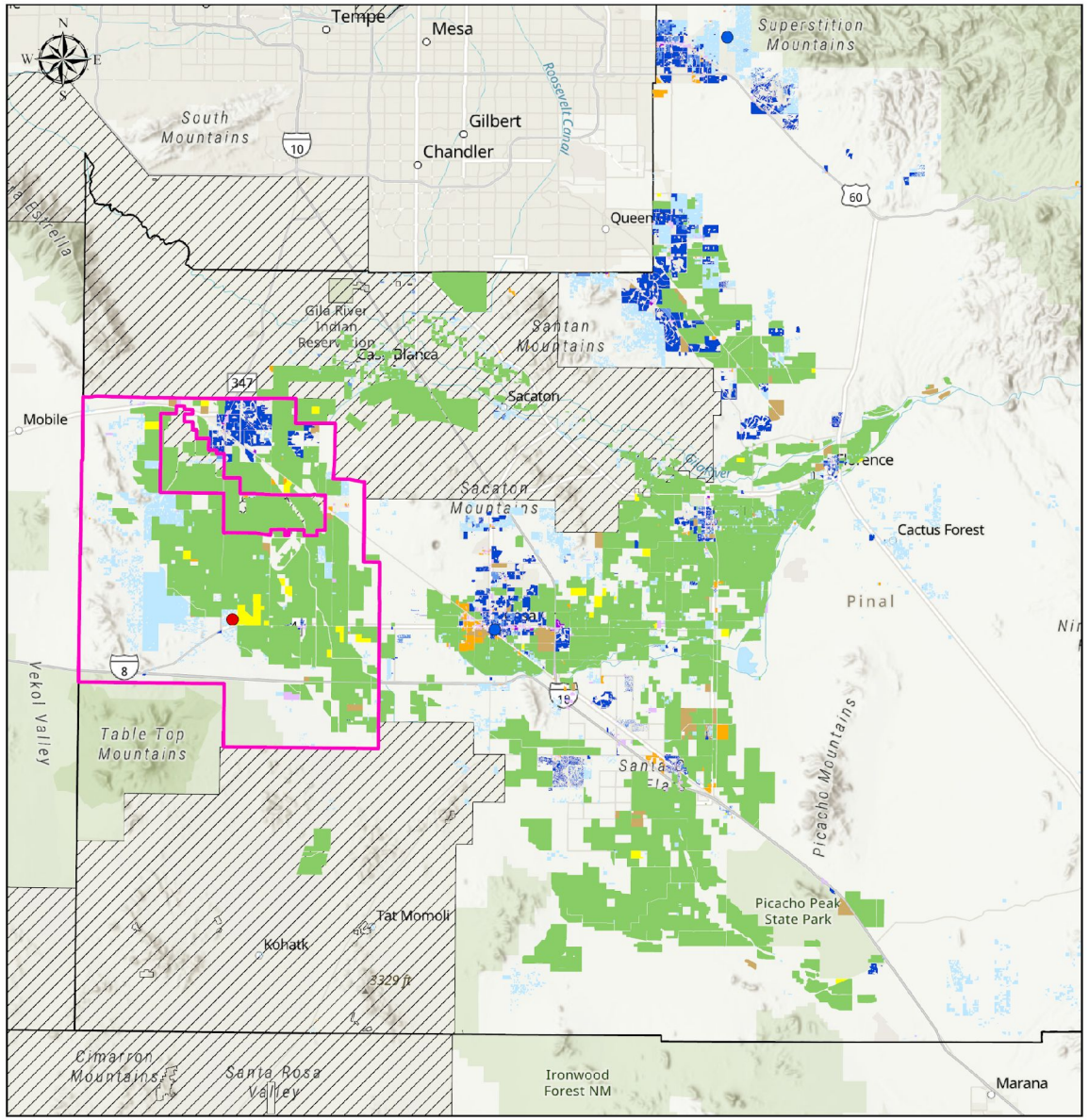
Source	Source Sector Category	Emissions (tpy)	% of Total PM 2.5 Emissions
Nonpoint = 94.3%			
	Wildfires	3,104.0	50%
	Crops & Livestock Dust	1,220.2	20%
	Construction Dust	464.6	7%
	Waste Disposal	270.3	4%
	Residential Wood Burning	212.7	3%
	Commercial Cooking	151.0	2%
	Mining	135.5	2%
	Unpaved Road Dust	119.5	2%
	Agricultural Field Burning	89.2	1%
	Paved Road Dust	52.3	1%
	Locomotives	20.5	0%
	Misc. Area Sources	14.2	0%
	Misc. Industrial & Comm/Institutional Processes	3.8	0%
Point = 2.4%			
	Miscellaneous Point Sources	148.0	2%
Nonroad = 1.2%			
	Equipment - Diesel	51.9	1%
	Equipment - Gasoline	24.4	0%
	Equipment - Other	0.5	0%
Onroad = 2.1%			
	Diesel Vehicles	94.3	2%
	Non-Diesel Vehicles	37.9	1%
Total		**6,214.9**	**100%**

Pinal NAA – Emissions (Traffic, 2020 NEI, Population)

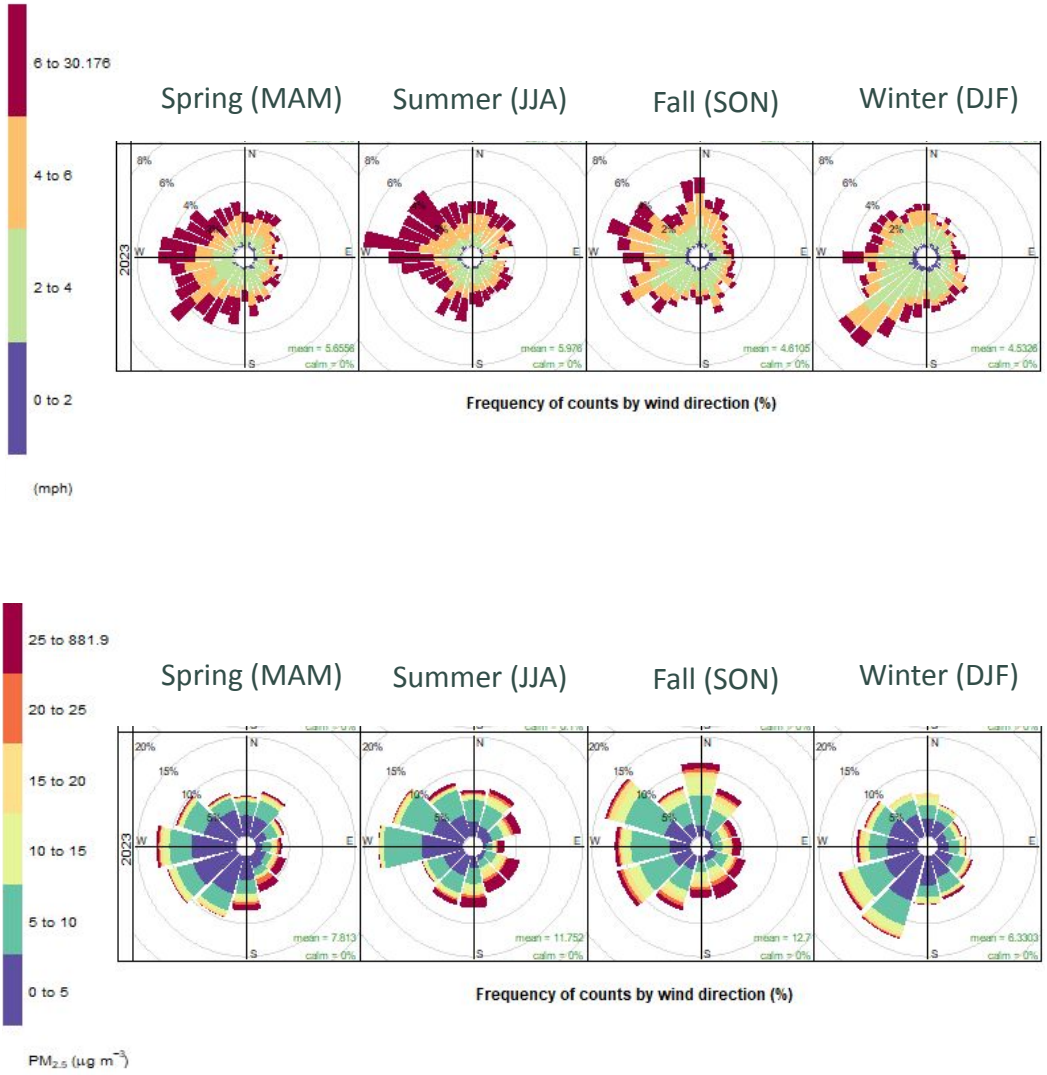


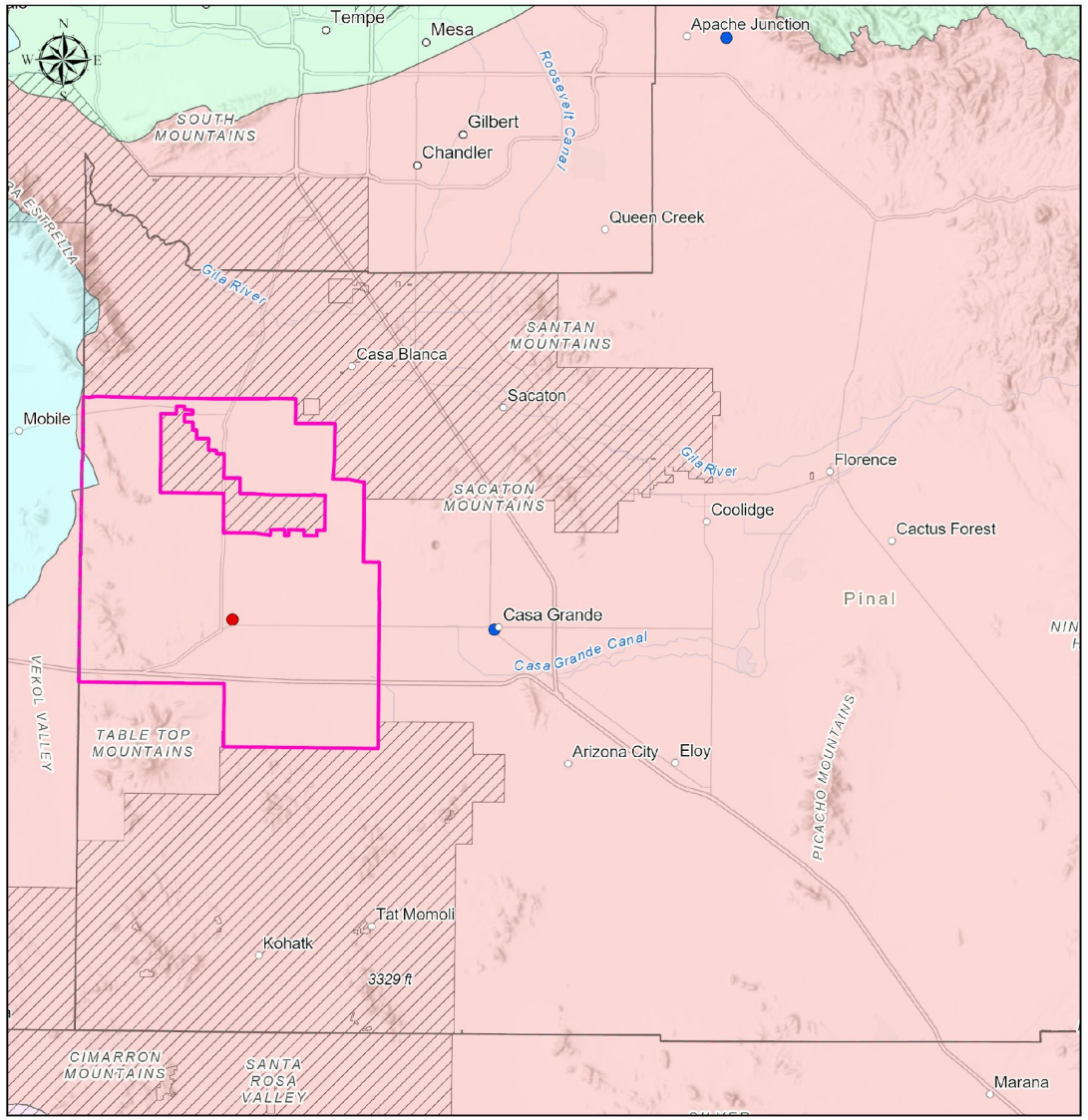
Pinal County NAA – Emissions (Land Use)





Pinal NAA – Meteorology, Geography/Topography





Draft 2024 Primary Annual $PM_{2.5}$ NAAQS Boundary Recommendation Pinal County

Legend
- Pinal Recommendation
- Tribal Land
- Counties
- Violating $PM_{2.5}$ Monitor
- Attaining $PM_{2.5}$ Monitor

NAME
- Colorado River Airshed
- Colorado River\Mexico Airshed
- Gila River Airshed
- Gila River Basin Airshed
- Little Colorado River Airshed
- Lower Colorado Airshed
- Lower Salt River Airshed
- Mexico Drainage Airshed
- Upper Colorado River Airshed
- Upper Gila River Airshed
- Verde River Airshed

0 4 8 16 Miles

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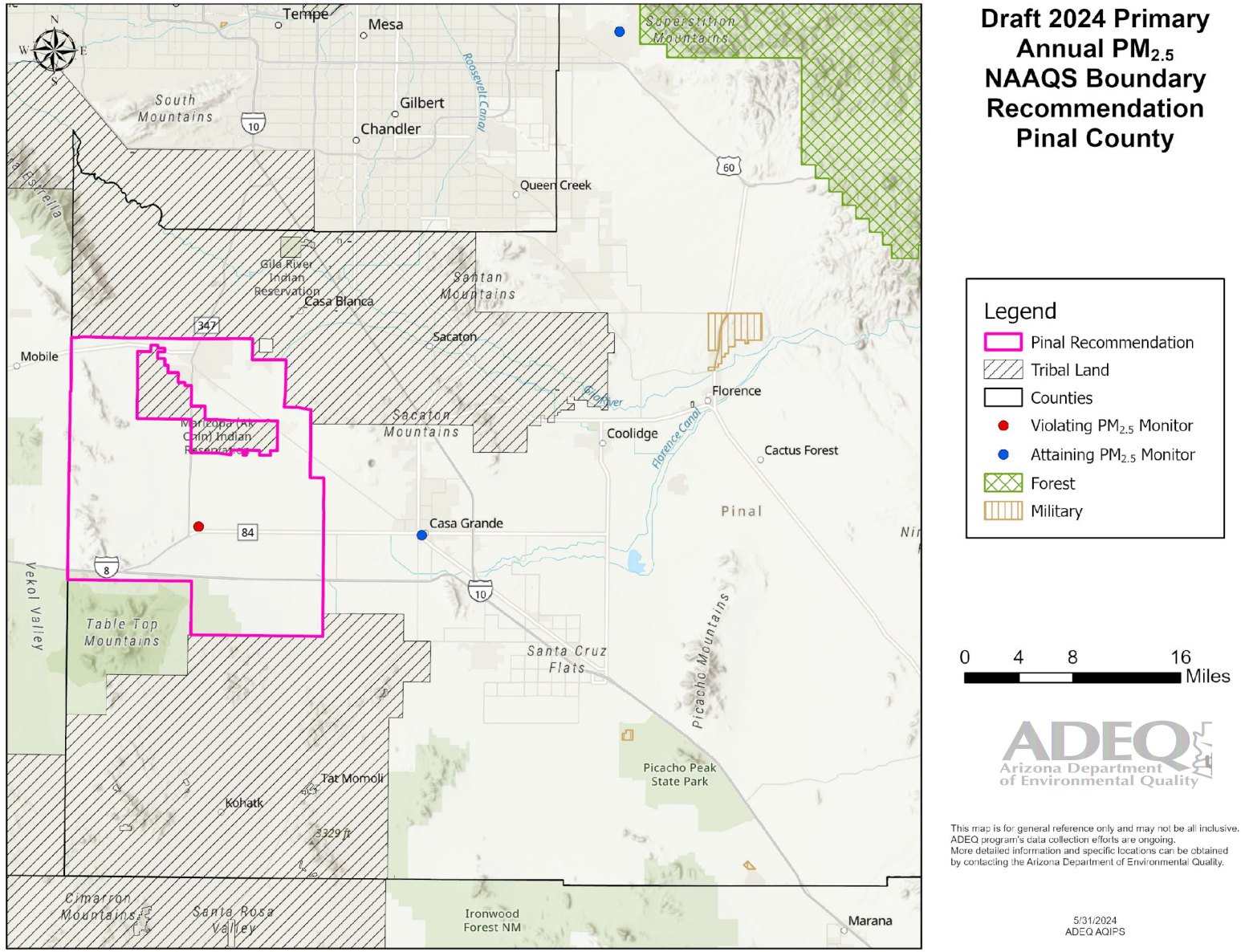
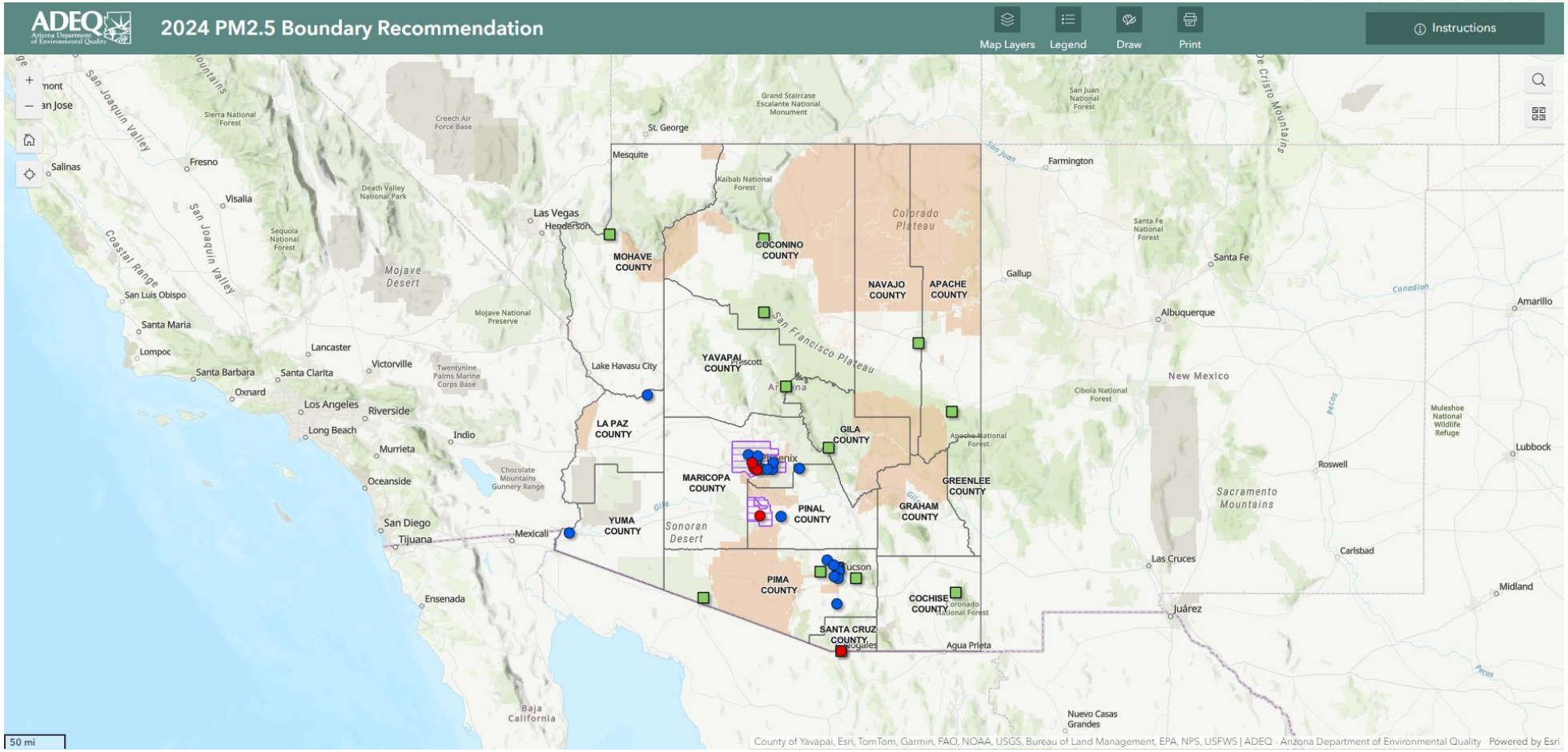
Pinal County NAA – Jurisdictional Boundaries



$PM_{2.5}$ GIS Tool

ADEQ 2024 PM2.5 Boundary Recommendation GIS Tool



https://experience.arcgis.com/experience/4535299d516041679e68f4af44a0c81b/page/Read-Only/

Thank you. Questions?

To receive information and updates about the boundary designation process, including meeting opportunities, subscribe to ADEQ's $PM_{2.5}$ Boundary Designations email list at:

bit.ly/SubscribePM25

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