Overview of 2022 Ozone Season Data for Austin-Round Rock-Georgetown MSA

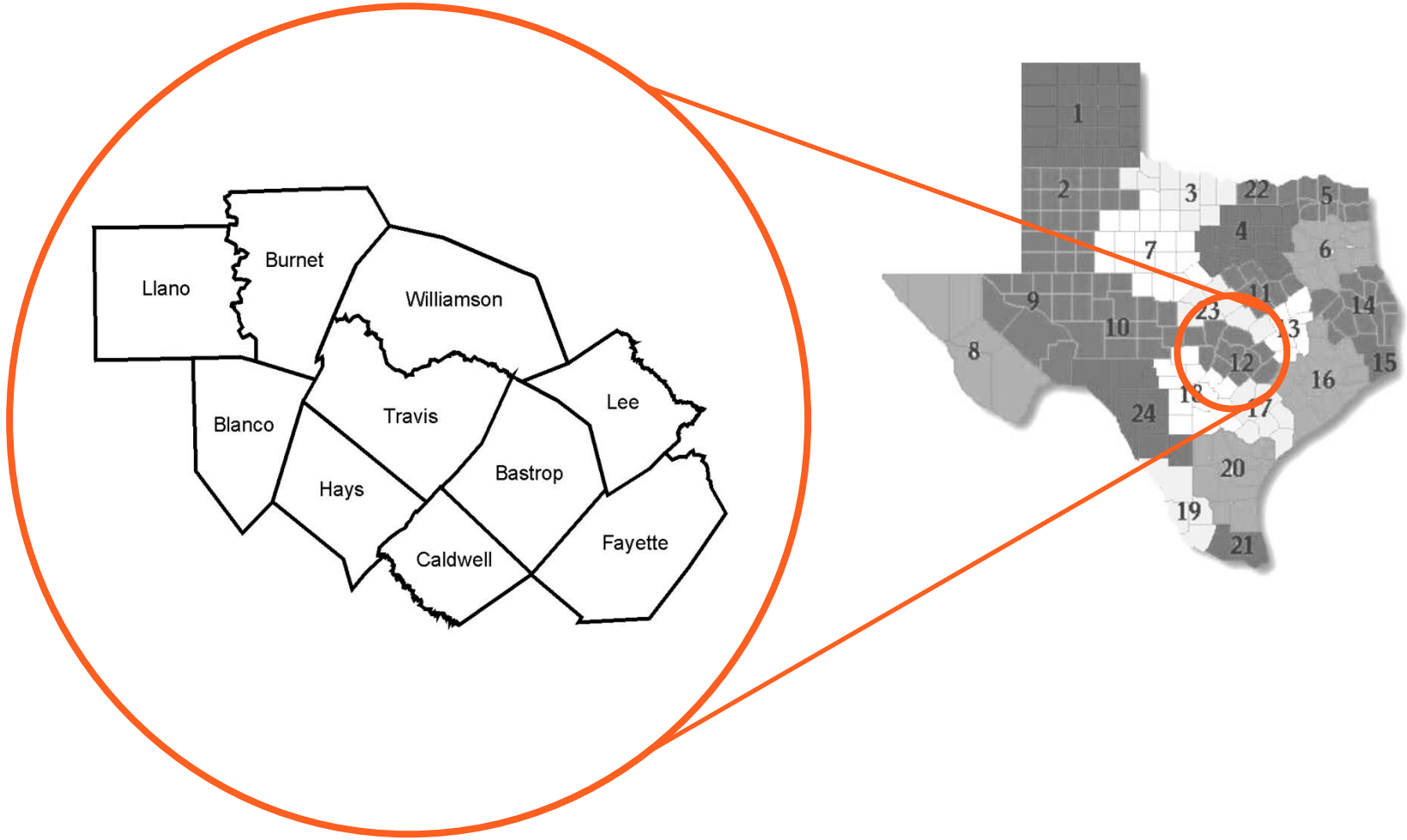
Clean Air Force of Central Texas'
Air Quality Professional's Forum

January 12, 2023

CAPCOG – Regional Planning Commission in Statute; more often called a COG.

- Emergency Communications 9-1-1
- Area Agency on Aging/Aging & Disability Resource Center
- Homeland Security Planning & Training
- Regional Law Enforcement Academy
- Air Quality Planning
- Solid Waste Planning
- Economic Development Analysis & Technical Assistance
- Transportation Planning

Ten – county service area;
State of Texas planning region 12



CAPCOG Executive Committee

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Bastrop County

First Vice Chair
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Brandt Rydell
City of Taylor

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James Oakley
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Central Texas Clean Air Coalition (CAC)

A national leader in pro-active, voluntary efforts to improve air quality and stay in attainment of the standards

- **Goals**: maintaining compliance with the NAAQS, improve air quality, provide guidance
- **Regular members**: Cities and Counties that have made commitments and appointed an elected official to represent them
- **Supporting members**: any type of organization that supports the purpose of the CAC that wishes to participate

Regular Members

Supporting Members

- Austin White Lime
- Capital Area Metropolitan Planning Organization
- Capital Metro
- City of Lago Vista
- City of Sunset Valley
- City of Taylor
- Clean Air Force of Central Texas
- Huston-Tillotson University
- Lower Colorado River Authority
- Lonestar Clean Fuels Alliance
- Public Citizen
- Sierra Club – Lonestar Chapter
- South-central Partnership for Energy Efficiency as a Resource
- St. Edward's University
- Texas Commission on Environmental Quality
- Texas Department of Transportation
- Texas Lehigh Cement Company
- Texas Parks & Wildlife Department
- US Environmental Protection Agency

CAPCOG's Regional Air Quality Plan

2019-2026 Regional Air Quality Plan

- The plan aims to:
  - **Improve outdoor air quality within the MSA**
  - **Reduce the impact of emissions from within the region on nearby areas**
  - **Mitigate the health, environmental, economic, and social impacts regional air pollution.**

Air Central Texas

Air Central Texas (ACT) is an initiative to reduce exposure to air pollution in Central Texas through voluntary actions. Our partners include local governments, regional and state government agencies, non-profit groups, businesses, and institutions.

Our mission

- Provide the public with information about Central Texas Air Quality
- Support existing air quality programs
- Motivate everyone to make decisions that are Air Aware.

Program Funding

Program FY23 Budget: **around $1 million**

1. $310,000 in contributions from 24 local governments
2. $500,000 in TCEQ “Rider 7” local air quality planning grant funding that can only be used for O_3-related monitoring and emissions inventory work
3. $220,000 in EPA Enhanced Air Quality Monitoring for Communities Grant funding

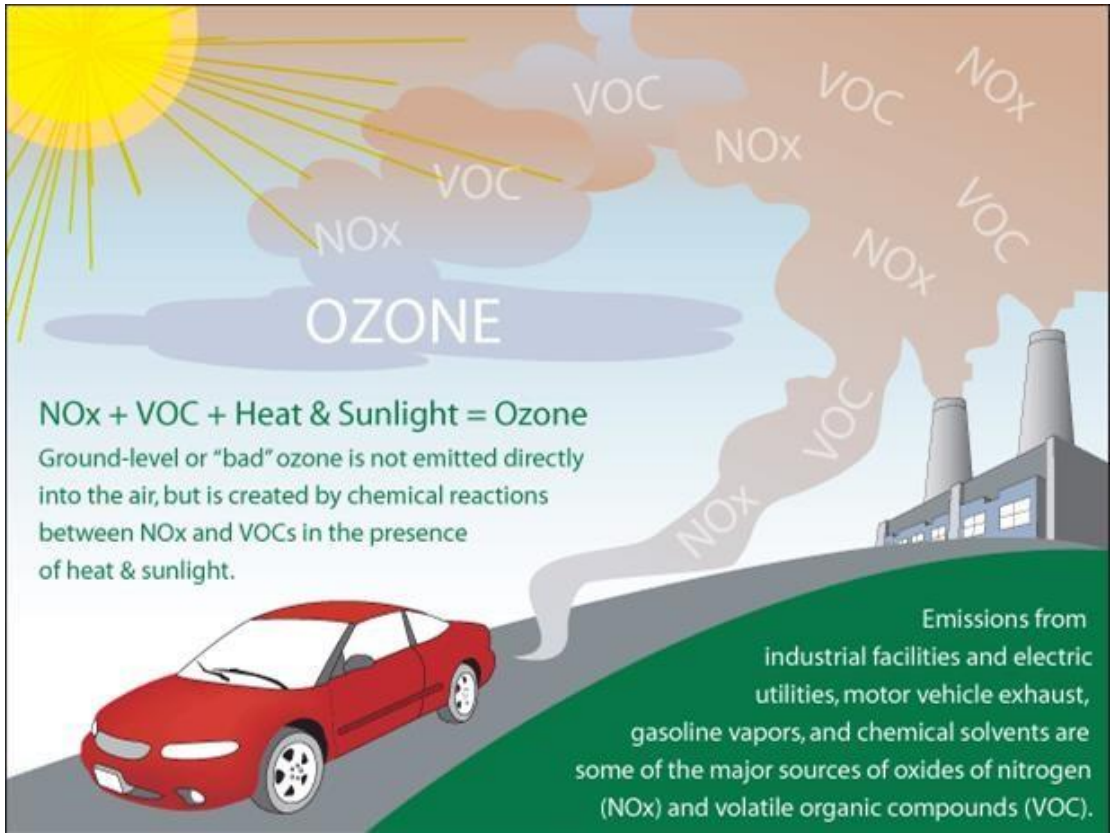
Air Quality Basics

What is Ozone?

WHAT is **GROUND LEVEL OZONE** (O_3)?

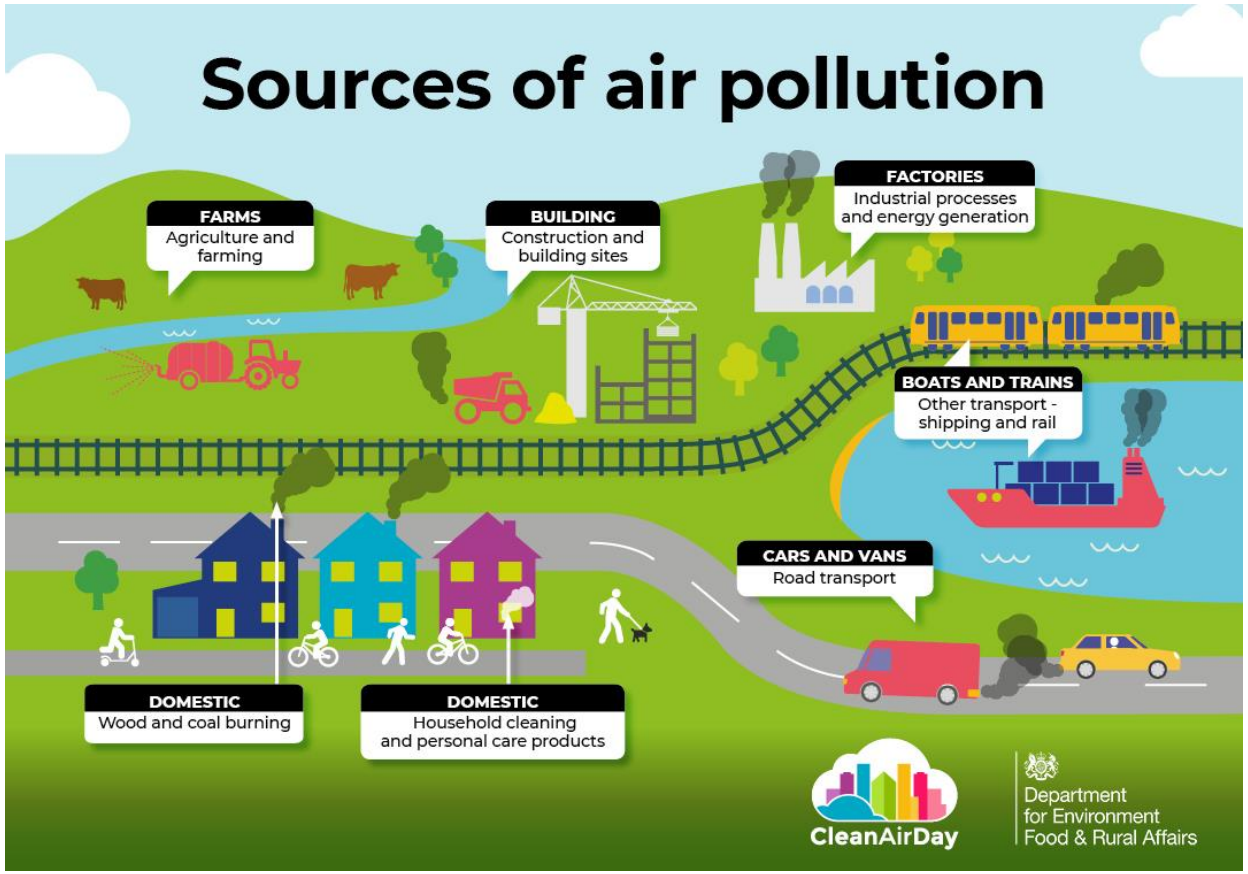
Tropospheric, or ground level, **ozone** is not emitted directly into the air, but is created by photo-chemical reactions between

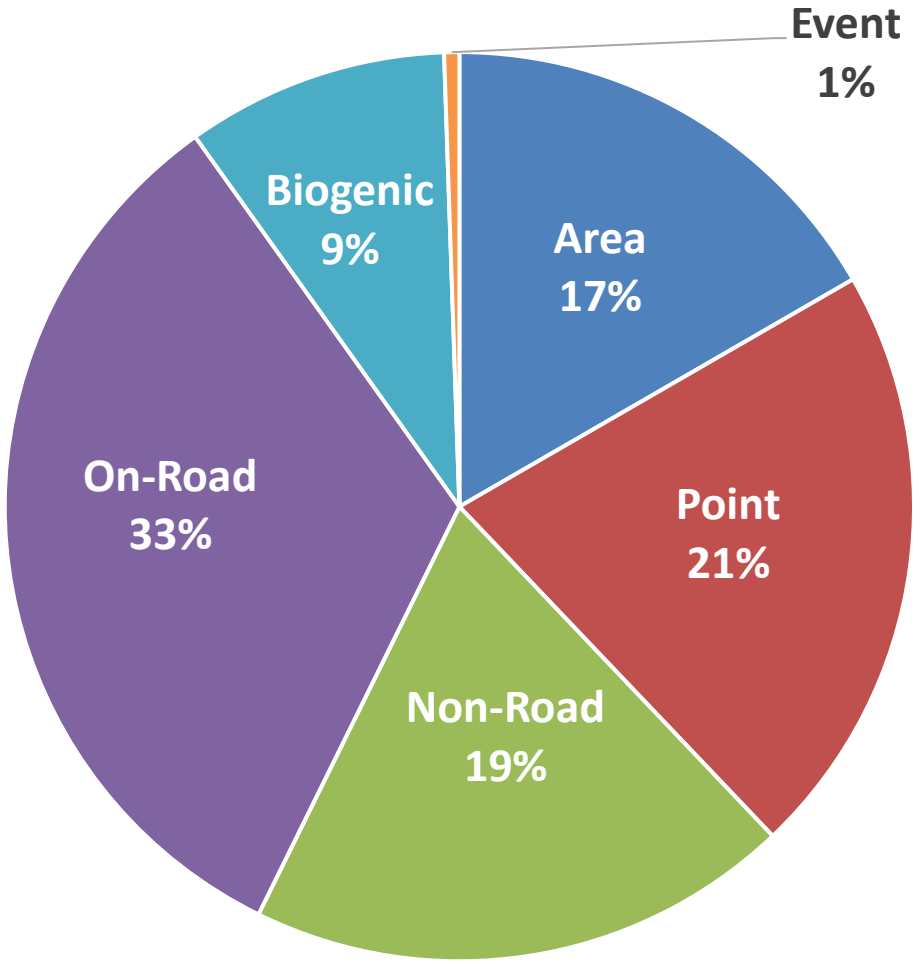
- Nitrogen Oxides (NO_x),
- Volatile Organic Compounds (VOC), and
- Sunlight



https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics

2023 Regional NO_x Emissions





WHAT ARE THE EFFECTS OF **GROUND LEVEL OZONE**

When inhaled, ozone can irritate the respiratory system and cause a variety of health problems, including

- coughing,
- chest pain, and
- shortness of breath.
- can **exacerbate existing respiratory conditions** (asthma and chronic obstructive pulmonary disease).

Some studies have suggested that ozone may weaken the immune system and increase the risk of respiratory infections

EPA's Review of O_3 Health Effects

Effected Areas	O_3 "Causal" or "Likely Causal"	
Respiratory	☑	The effects of ozone exposure on the respiratory system.
Metabolic	☑	include effects on body weight, appetite, body composition, caloric intake, diabetes, glucose, insulin, lipid metabolism, stress responses, and thyroid function
Cardiovascular	☐	Increased risk of cardiovascular morbidity and mortality
Nervous System	☐	The effects of ozone exposure on the nervous system.
Cancer	☐	The risk of cancer due to high ozone exposure
Mortality	☐	The risk of death due to respiratory diseases or disorders

Relationships between O_3 and cardiovascular effects and between O_3 and mortality were downgraded from "likely causal" to "suggestive" in 2020 review

National Ambient Air Quality Standards (NAAQS)

The Clean Air Act imposes various restrictions and requirements to protect air quality

- EPA sets maximum allowable pollution levels for six common pollutants - CO, NO_x, O_3, PM, Pb, and SO_2
- EPA will designate areas violating these standards or contributing to a violation nearby as "nonattainment"
- EPA required to review periodically based on latest scientific information and consult with an independent scientific advisory board

2022 Ozone Design Values (DV)

	4th- highest value					
Monitor	2020	2021	2022*	DV (3-year Average)	2023 Exceedance Level
CAMS 3	46**	66	73	61**	74
CAMS 38	63	65	66	64	82
CAMS 614	66	69	81	**72**	63
CAMS 690	64	65	74	67	74
CAMS 1604	59	63	69	63	81
CAMS 1605	56	57	69	60	87
CAMS 1612	59	64	81	68	68
CAMS 1613	61	63	69	64	81
CAMS 1619	63	62	74	66	77
CAMS 1620	62	59	77	66	77
CAMS 1675	61	63	78	67	72

2023 PM NAAQS Proposal

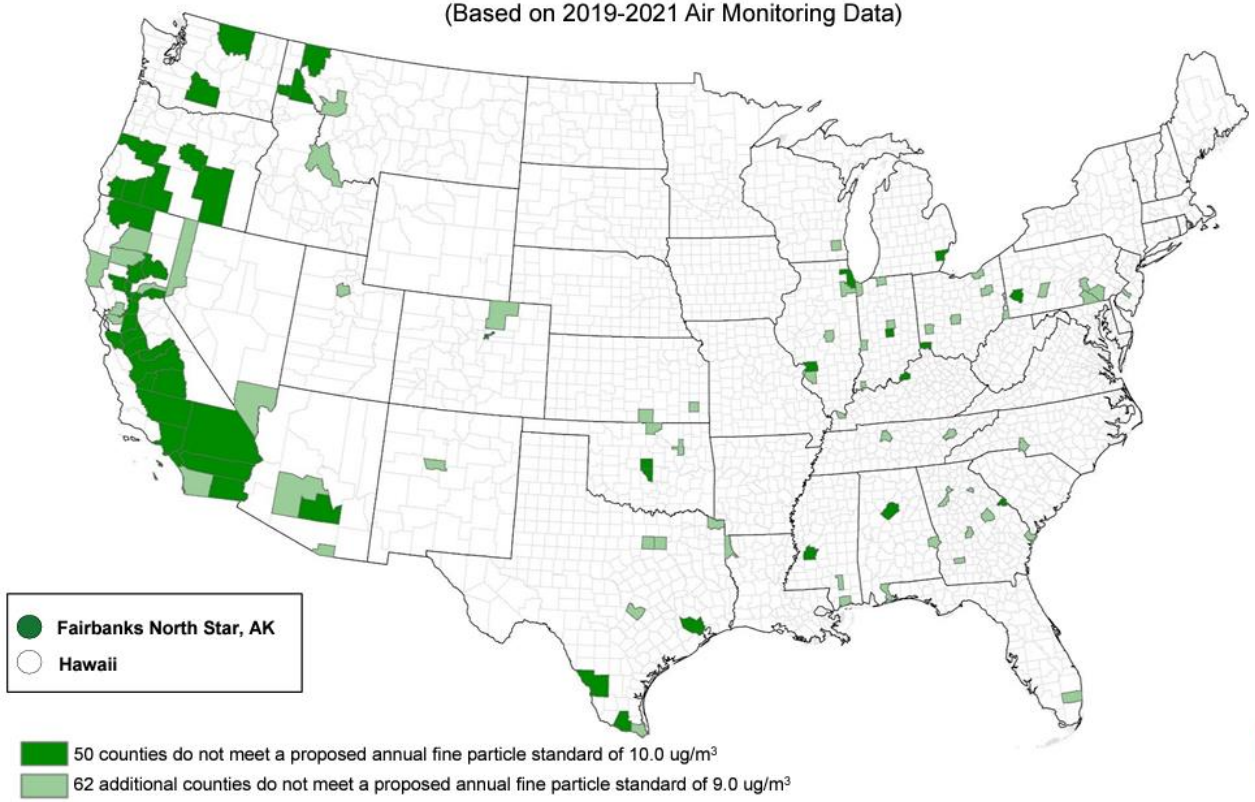
- Last week, EPA released their proposal for the new Particulate Matter (PM) standards.
- On 1/6/23 EPA began a 60-day comment period for this proposal
- EPA hopes to finalize standard this year.

	Current Standard	Proposed Standard	2021 Austin-Round Rock-Georgetown MSA Levels
Annual $PM_{2.5}$	12.0 µg/m^3	Within the range of 9.0 to 10.0 µg/m^3	**9.5** µg/m^3
24-hr $PM_{2.5}$	35 µg/m^3	No change but taking comments on lowering to 25 µg/m^3	22 µg/m^3

Counties Not Meeting $PM_{2.5}$ Proposal

Current Air Monitoring Data Show Some Counties Would Not Meet Proposed Primary Fine Particle Standards

(Based on 2019-2021 Air Monitoring Data)

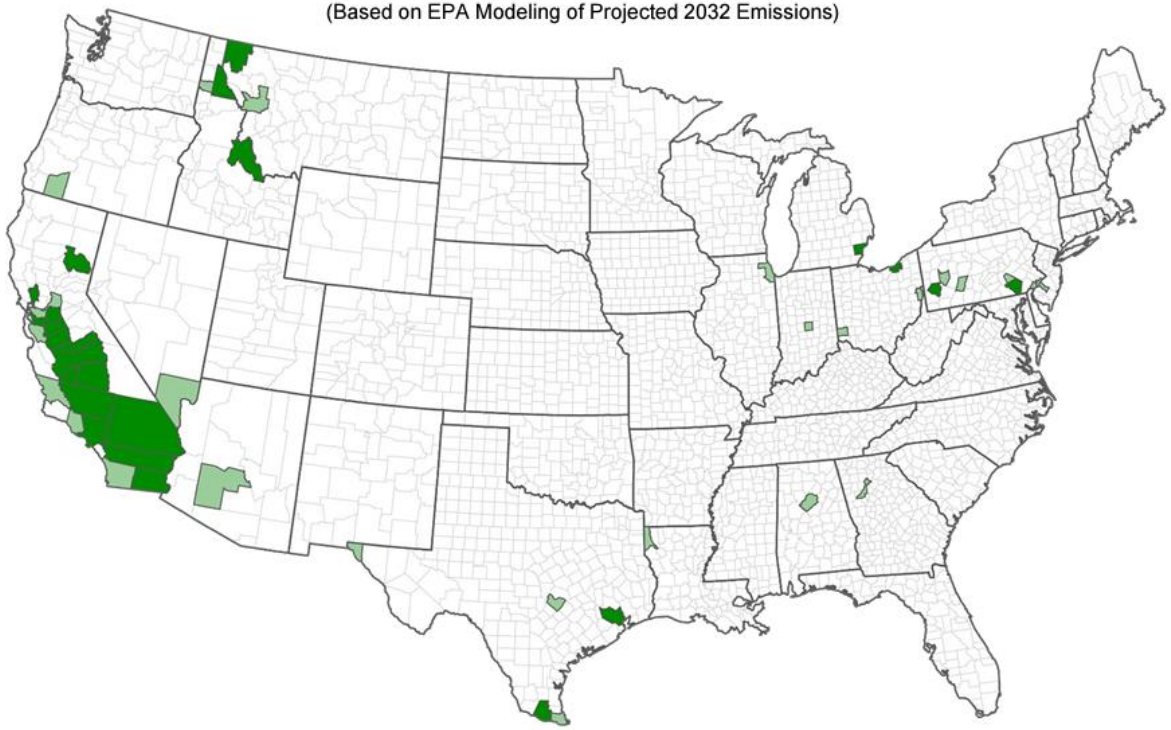


50 counties do not meet a proposed annual fine particle standard of 10.0 ug/m^3

62 additional counties do not meet a proposed annual fine particle standard of 9.0 ug/m^3

EPA Projections Show Most Counties Would Meet the Proposed Primary Fine Particle Standards in 2032

(Based on EPA Modeling of Projected 2032 Emissions)

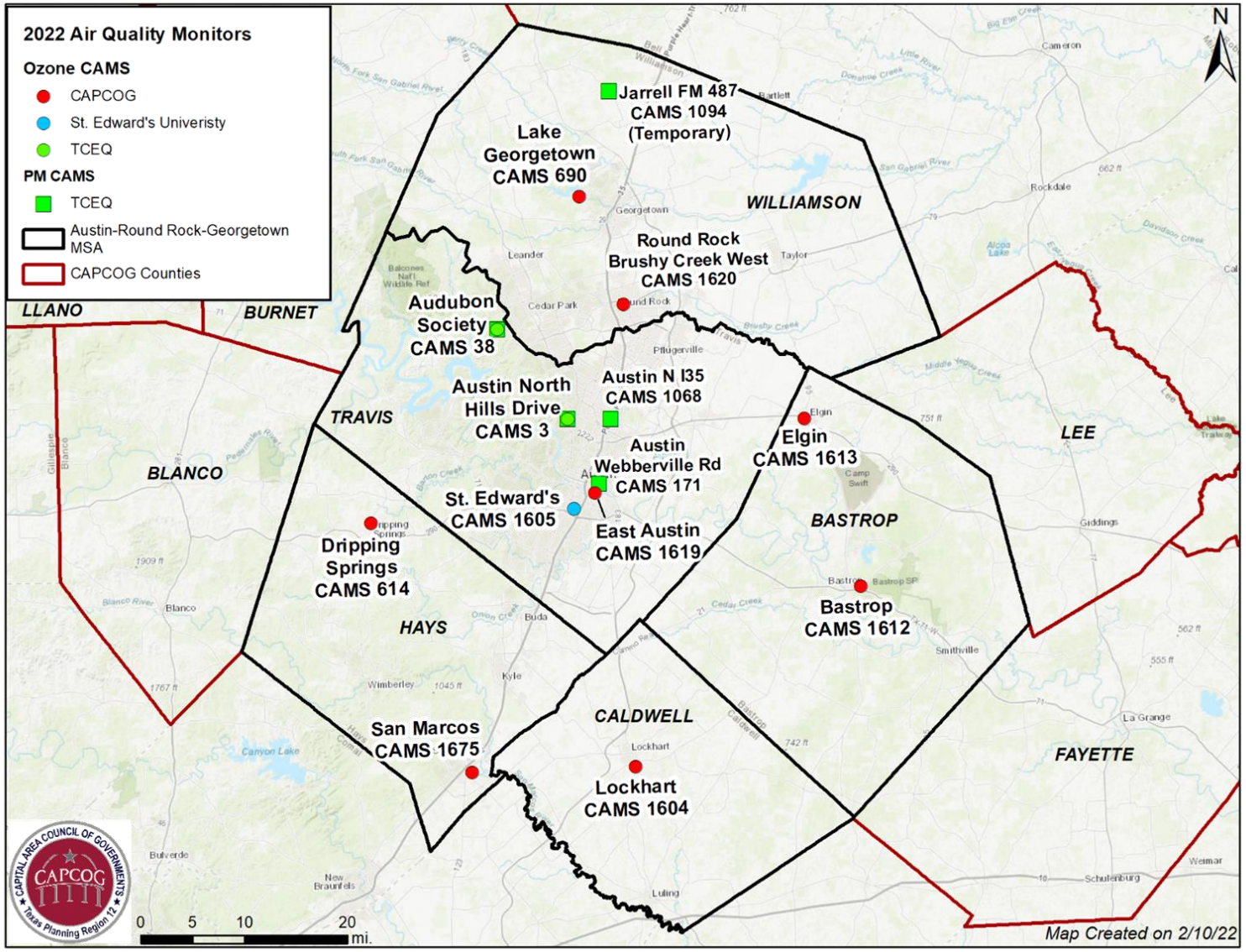


24 counties are projected not to meet a proposed annual fine particle standard of 10.0 ug/m^3 in 2032

27 additional counties are projected not to meet a proposed annual fine particle standard of 9.0 ug/m^3 in 2032

2022 Ozone Season Monitoring Review

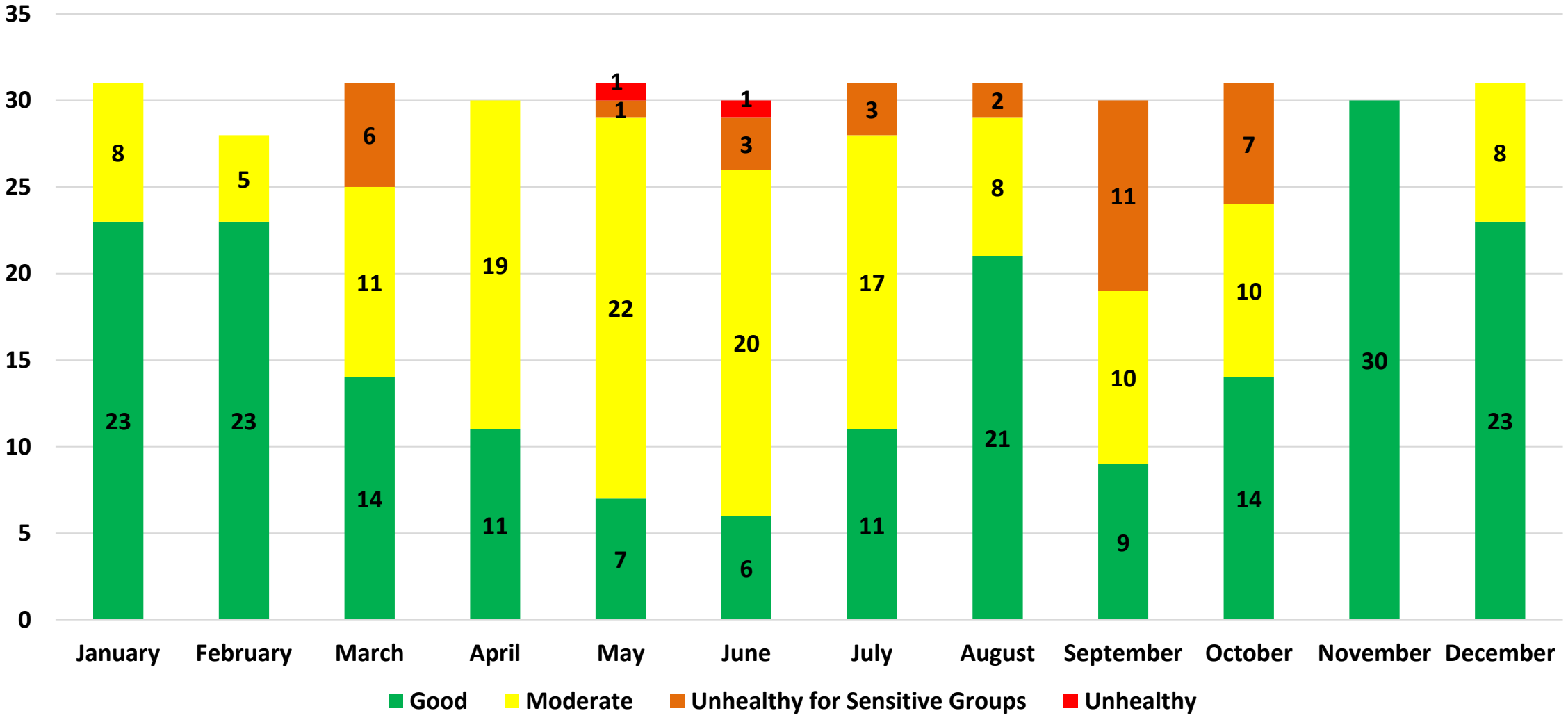
O_3 and $PM_{2.5}$ 2022 Monitoring Locations



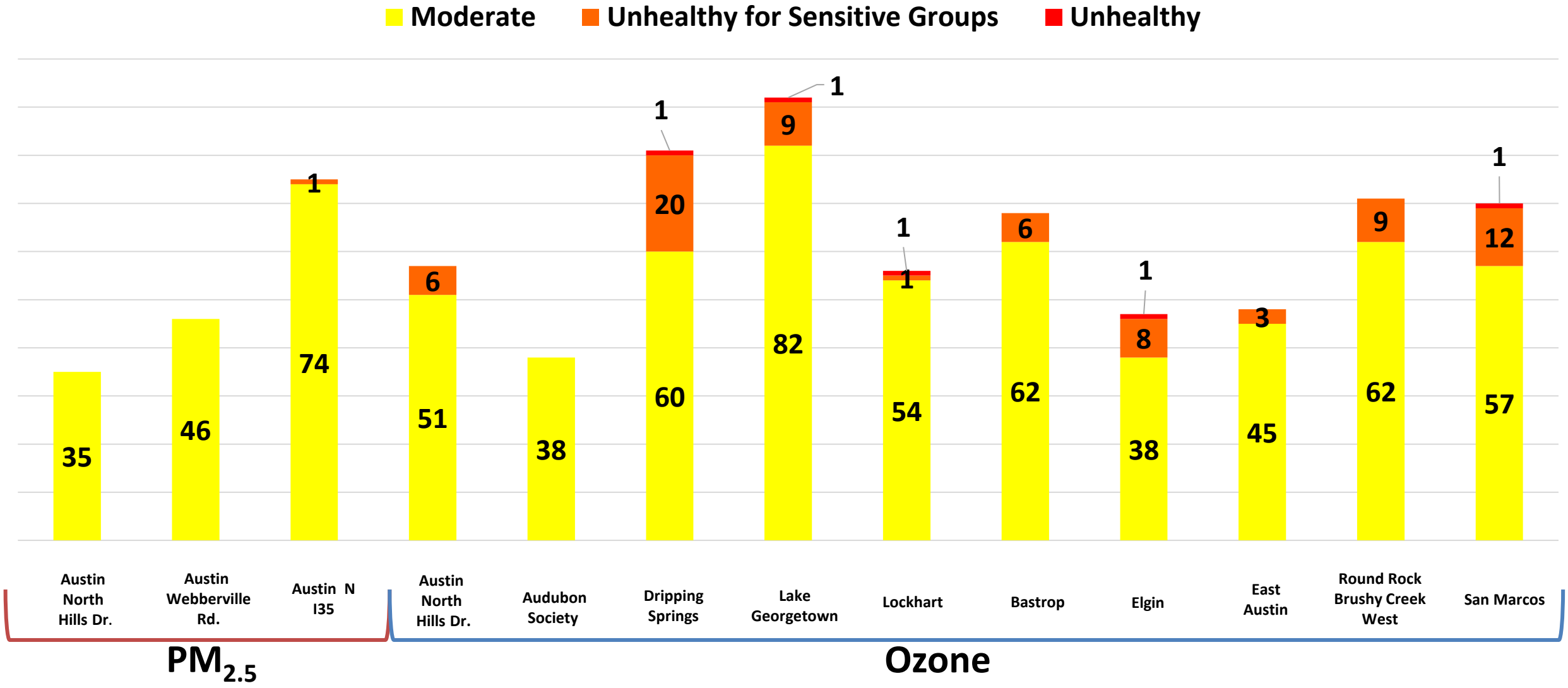
Air Quality Index (AQI)

Daily AQI Color	Levels of Concern	Values of Index	Description of Air Quality
Green	Good	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Orange	Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Red	Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Purple	Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Maroon	Hazardous	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.

2022 AQI Days by Month

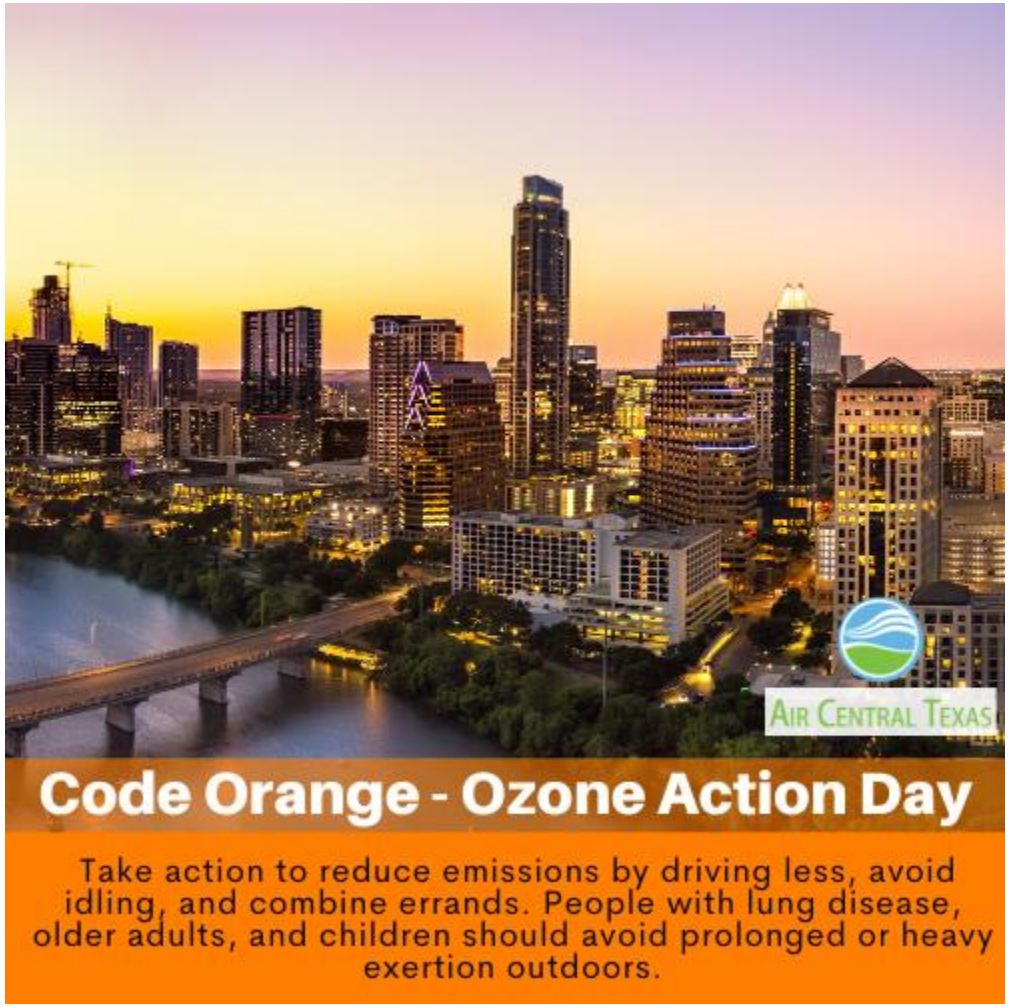


2022 Moderate or Worse AQI Days by Monitor



High O_3 Days in 2022

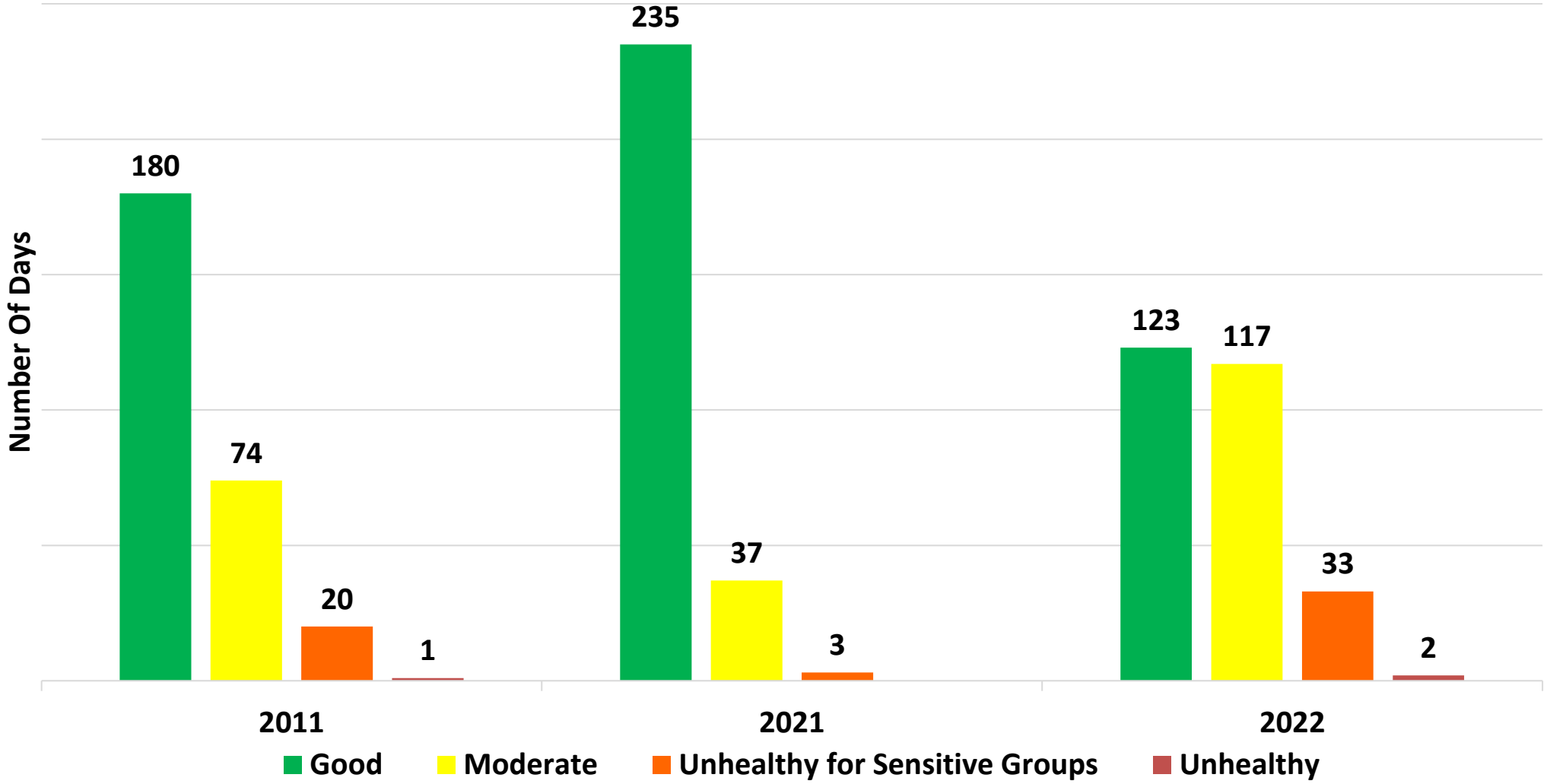
- There have been **33 days that exceeded 70 ppb** or “unhealthy for some” this year
- **All monitors have recorded high O_3** except CAMS 38 (monitor used for DV)
- **Two days have exceeded 85 ppb** or “unhealthy” this year
  - last time this occurred was 2013
- **Five monitors** have recorded levels that **exceeded 85 ppb** or “unhealthy”
  - last time with multiple monitors was 2011



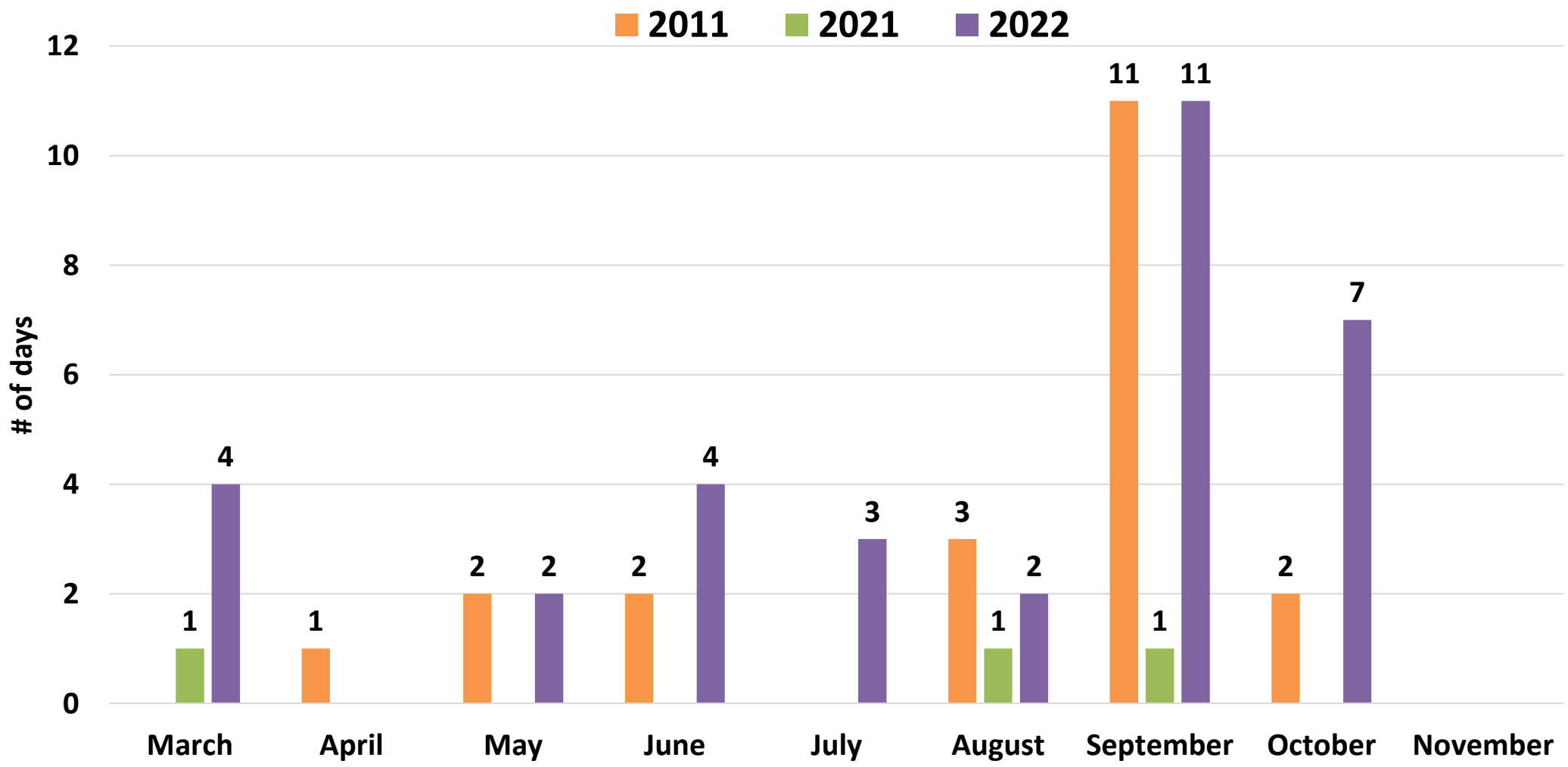
Unpacking the 2022 Ozone Season

- **Methodology**
  - Testing for conditional differences from other years (2011 & 2021)
    - Temporal analysis
    - Meteorological conditions
      - Analysis the hours of 12 pm to 4 pm as these are the hours O_3 typically peaks
    - Emissions generation reductions

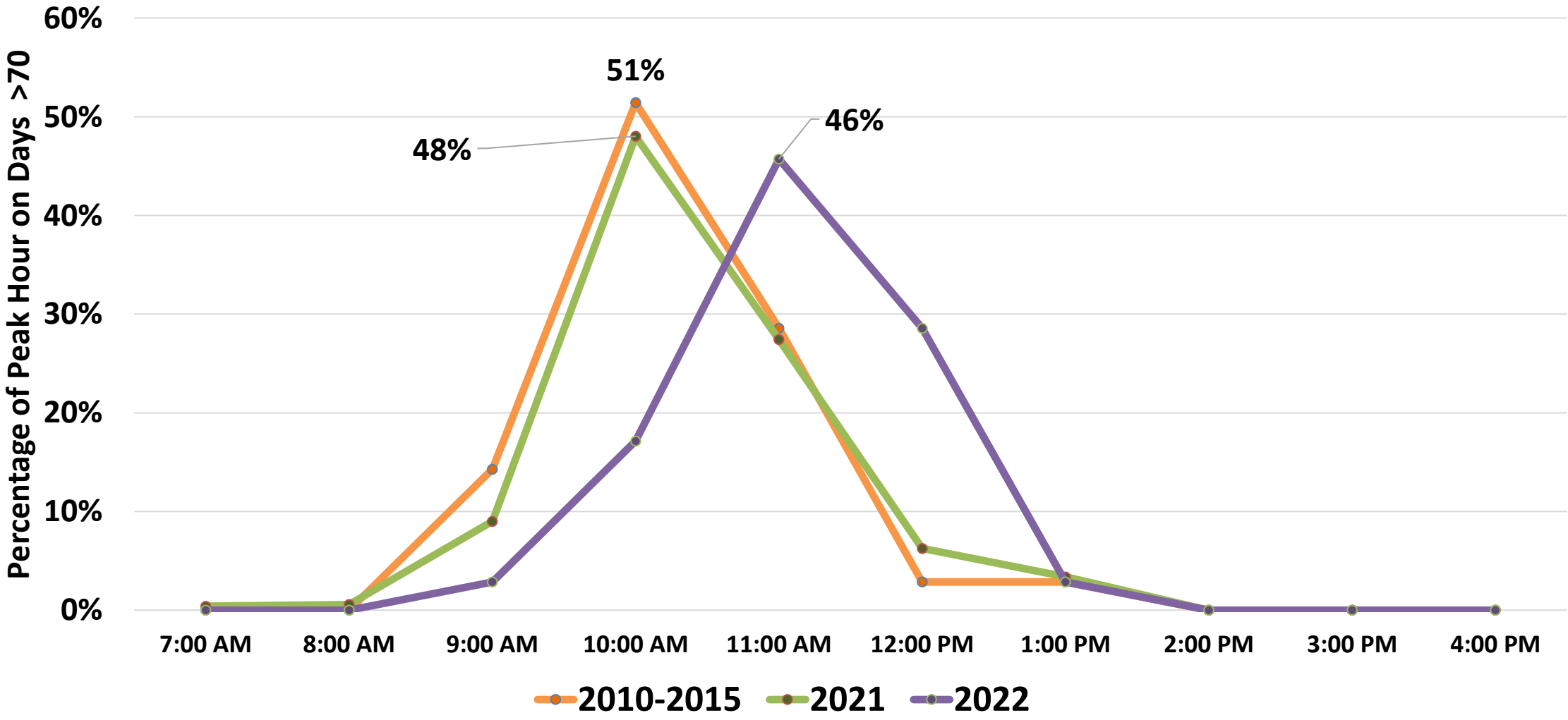
O_3 Ozone Season AQI



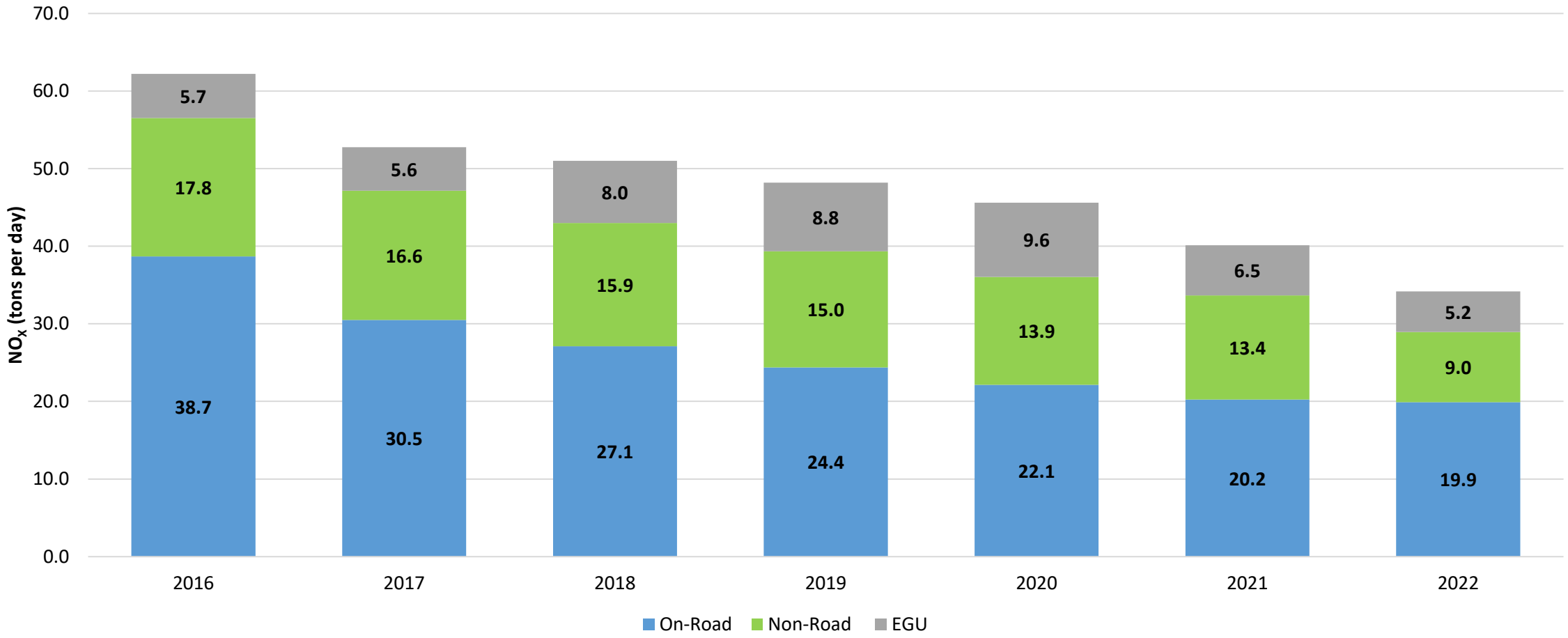
High O_3 Days per month Trend



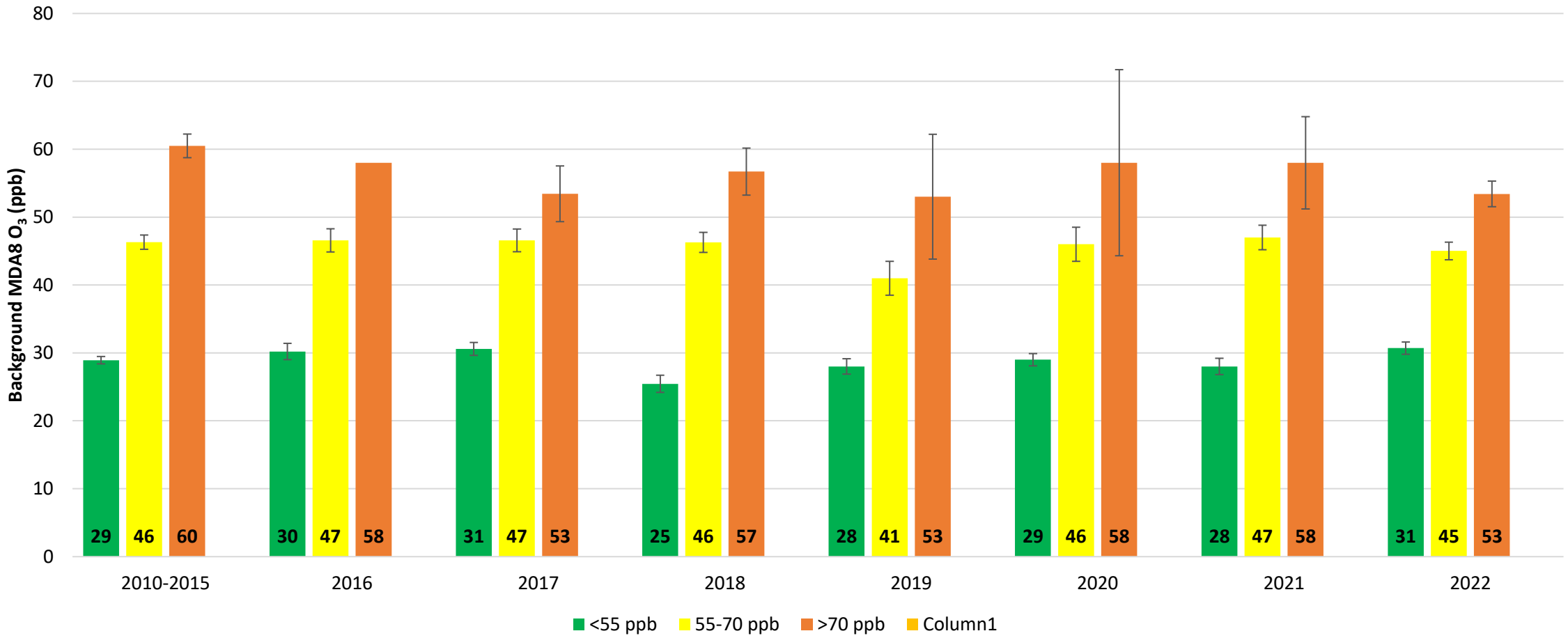
Peak Start-Hour on High O_3 days



NO_x Emissions Trend



Background Concentrations



2022 Daily O_3 Reading Rankings

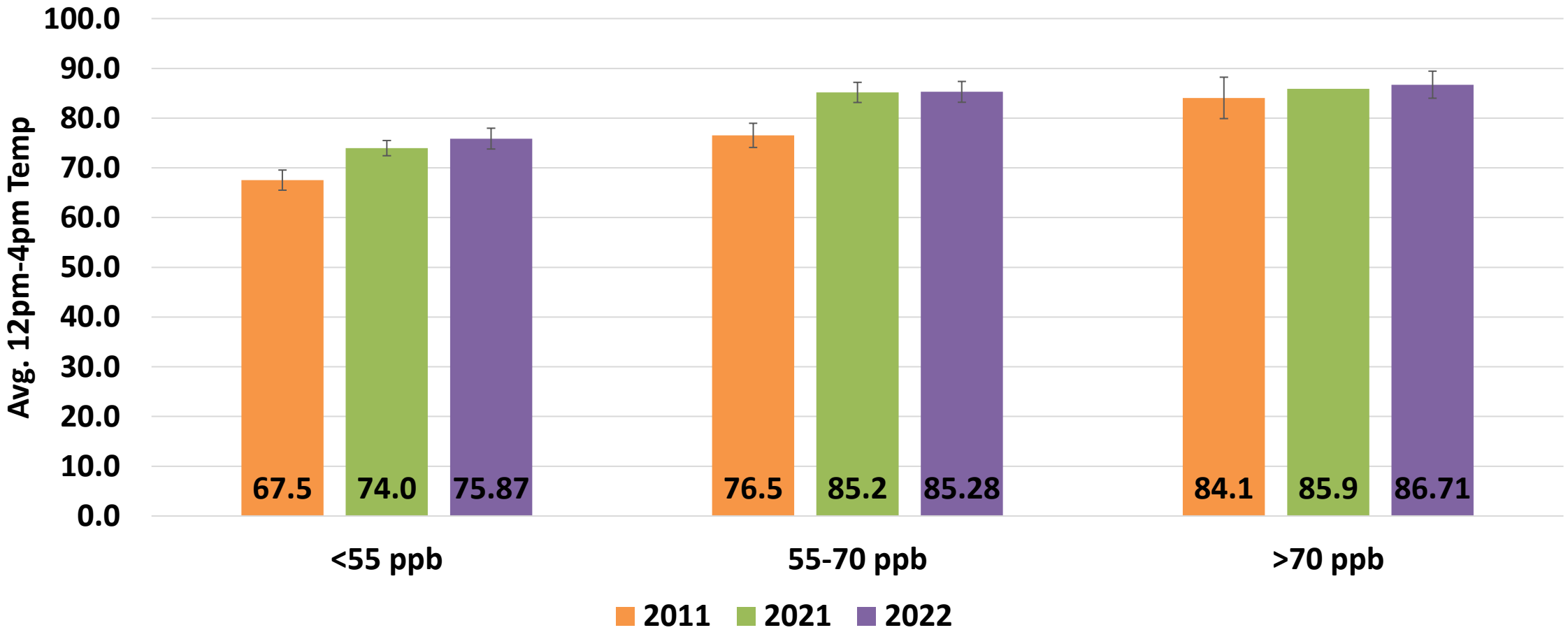
Highest Ozone Reading of the Day

RANK	CAMS	#
1	**Lake Georgetown** *(CAMS 690)*	108
2	**Dripping Springs** *(CAMS 614)*	76
3	**San Marcos** *(CAM 1675)*	20
4	**Lockhart** *(CAMS 1604)*	14
5	**Austin North Hills** *(CAMS 3)*	13
5	**Bastrop** *(CAMS 1612)*	13
7	**Round Rock** *(CAMS 1620)*	12
8	**Elgin** *(CAMS 1613)*	11
9	**East Austin** *(CAMS 1619)*	5
10	**Audubon** *(CAMS 38)*	3

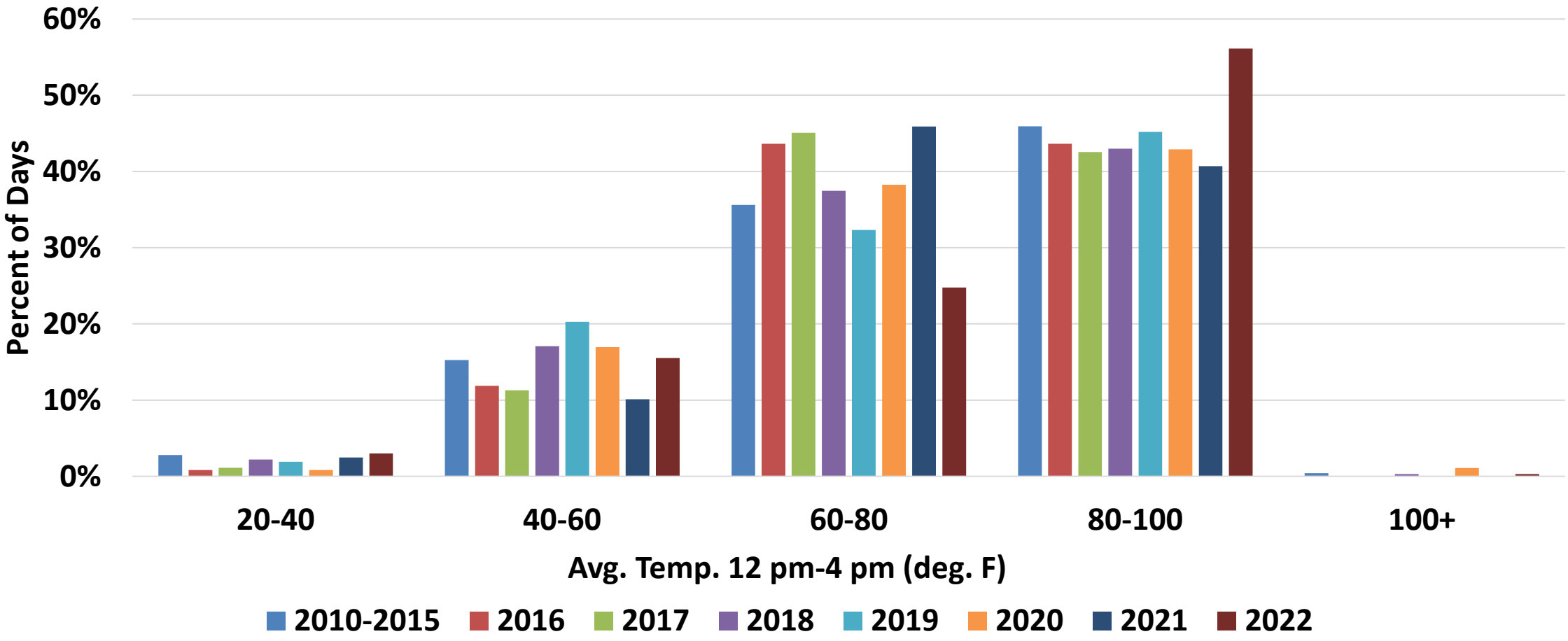
Lowest Ozone Reading of the Day

RANK	CAMS	#
1	**Audubon** *(CAMS 38)*	107
2	**Bastrop** *(CAMS 1612)*	45
3	**Lockhart** *(CAMS 1604)*	44
4	**Elgin** *(CAMS 1613)*	22
5	**East Austin** *(CAMS 1619)*	16
6	**Austin North Hills** *(CAMS 3)*	13
7	**Dripping Springs** *(CAMS 614)*	10
8	**Lake Georgetown** *(CAMS 690)*	9
9	**San Marcos** *(CAM 1675)*	8
10	**Round Rock** *(CAMS 1620)*	1

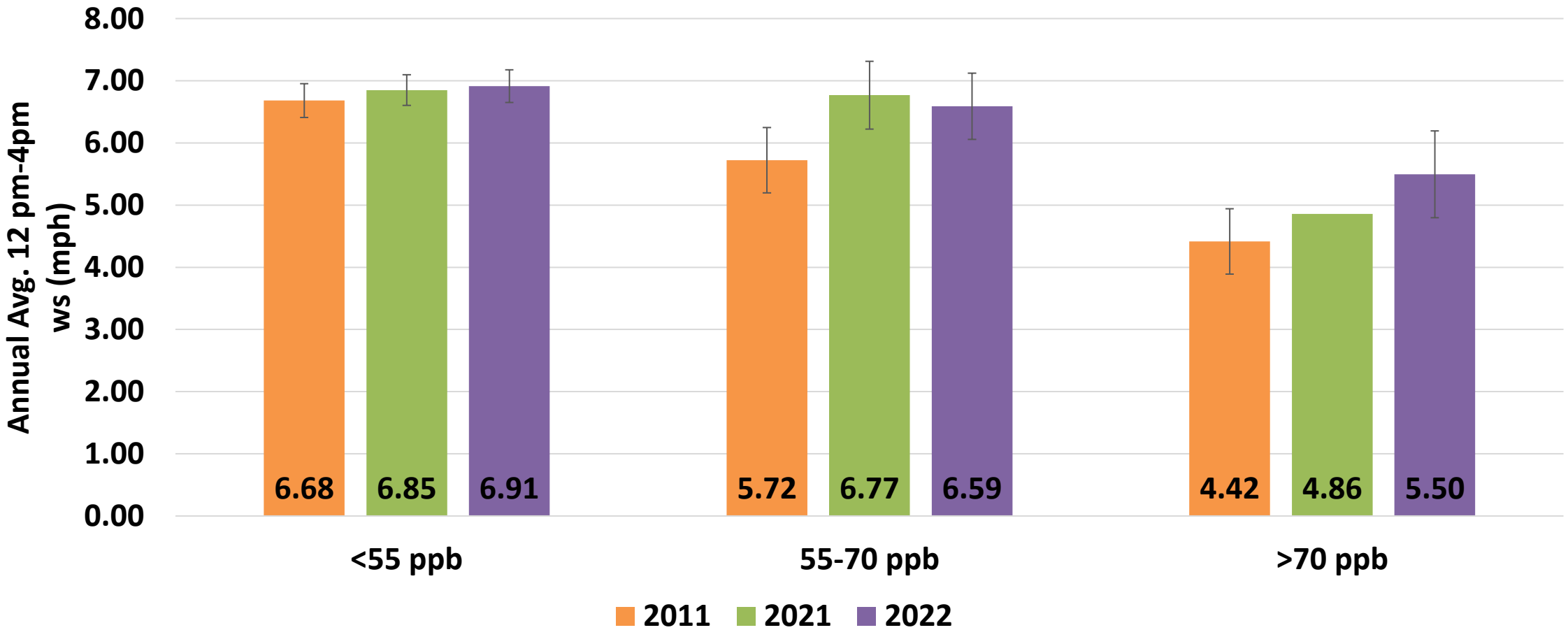
Temperature Correlation at C3



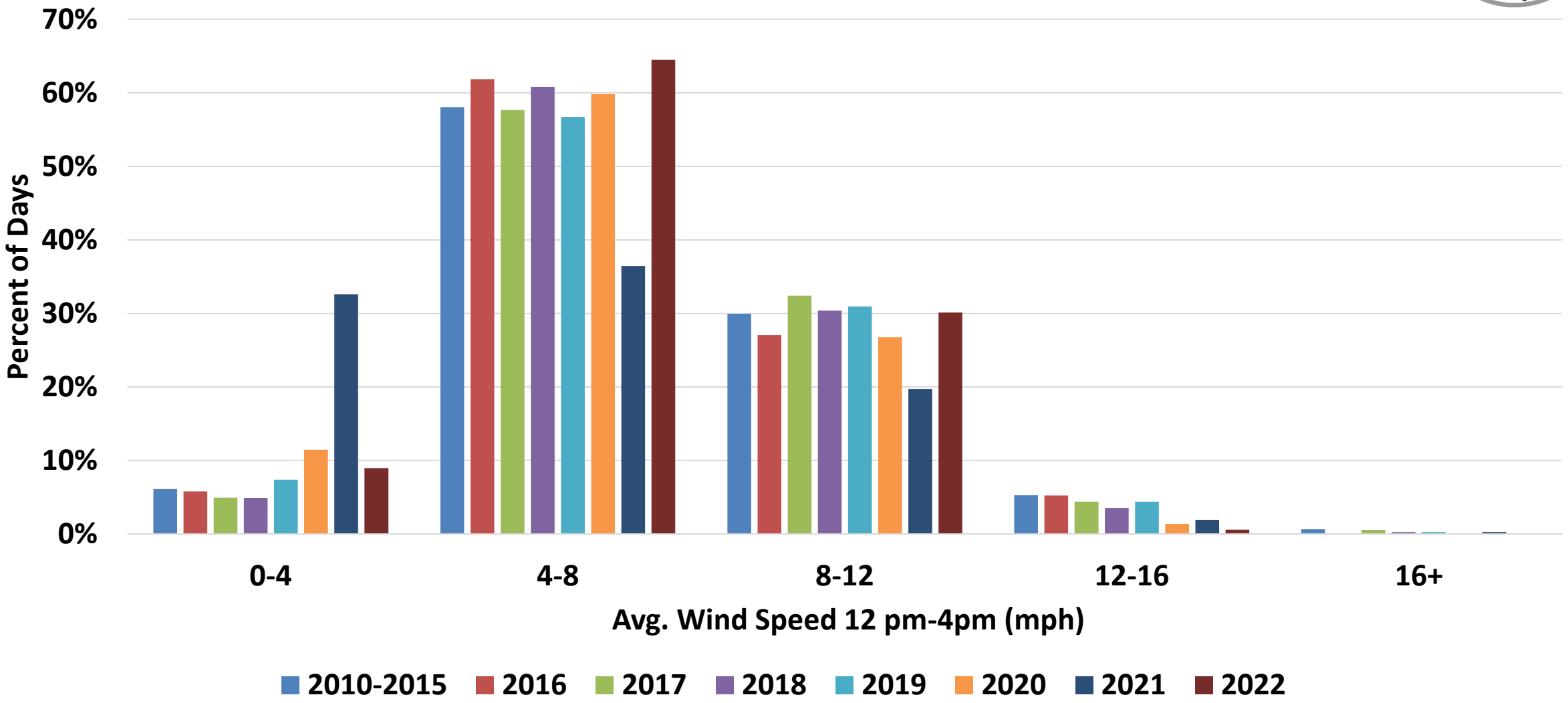
Average Temperature



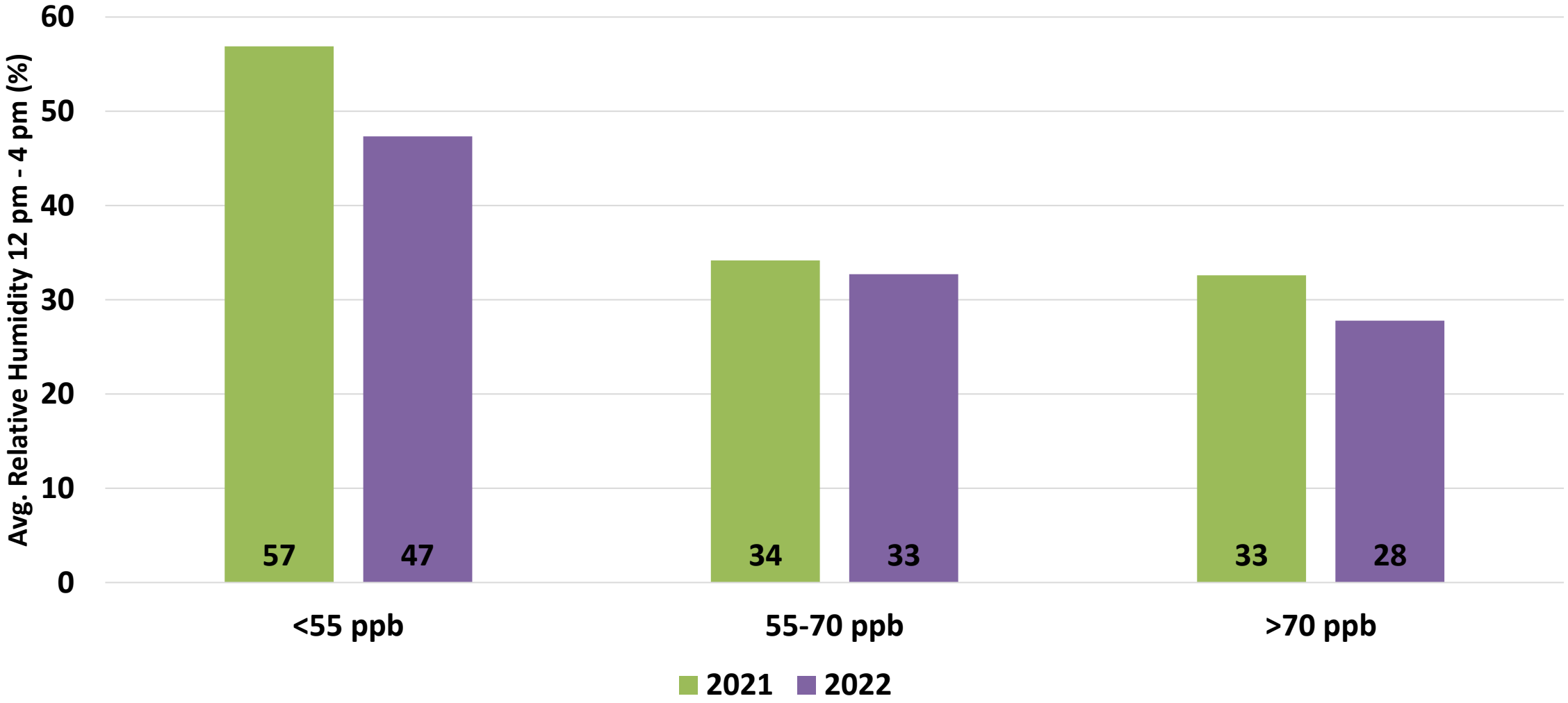
Wind Speed Correlation at C3



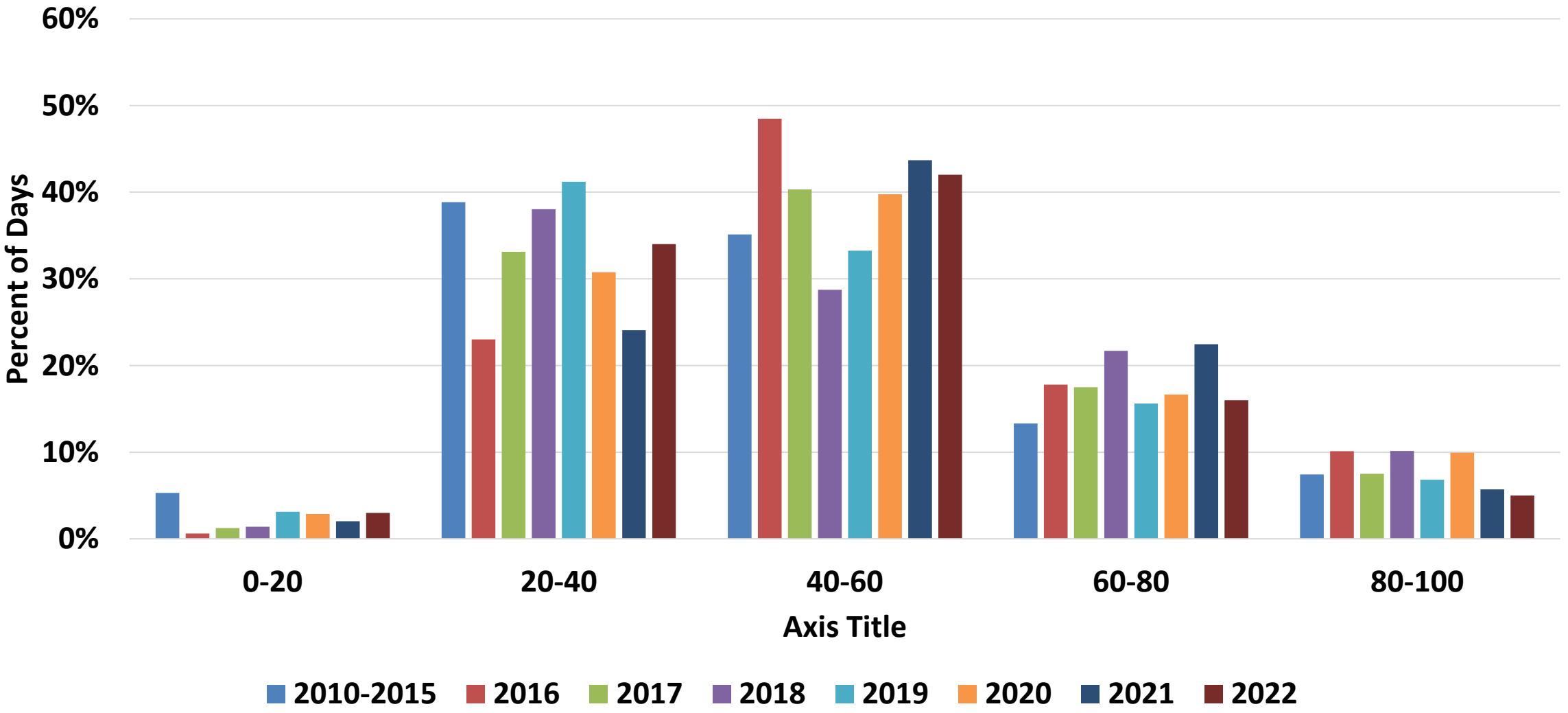
Average Wind Speed



Relative Humidity Correlation at C614



Average 12 pm-4 pm Relative Humidity



Summary of Findings

- Emissions continue to decrease in the region
- The Ozone season may be expanding
- Meteorological trends were consistent with previous years
  - However, condition suitable for high ozone may be more prevalent
- Drippings Springs continues to be a hotspot
- Additional analysis needed

Questions/Discussion

- Check out our Upcoming Events
  - **EV Readiness Webinar – How to Increase the Efficiency of your EV's Batteries**
    - Thu. Jan. 19, 2022 – 12:00 pm – 12:45 pm
  - **Clean Air Coalition Advisory Committee Meeting**
    - Thu. Jan. 19, 2022 – 1:30 pm – 3:00 pm
  - **Air Quality 101 Webinar**
    - Thu. Feb. 23, 2022 – 10:00 am – 11:00 am
  - **Zero Emission Vehicle Showcase**
    - Tues. Mar 7, 2022 – 10:00 am – 4:00 pm

Thank You

Capital Area Council of Governments

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