

How climate change is shaping fires in our forest and rangelands

Kevin Badik

The Nature Conservancy

Fire regime

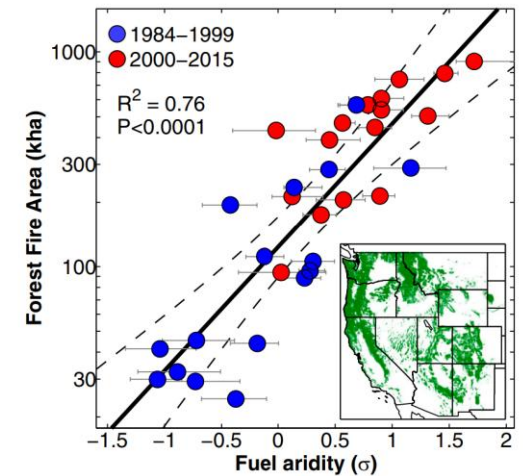
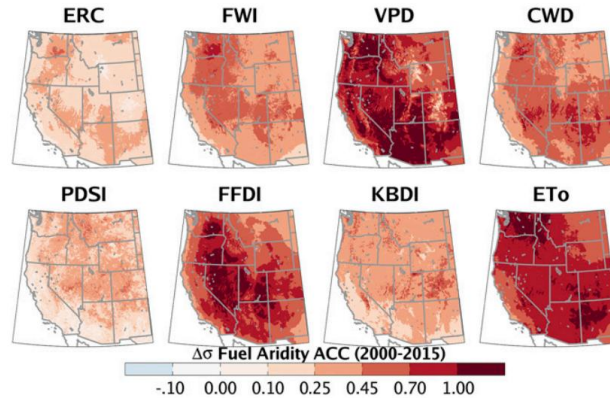
Frequency

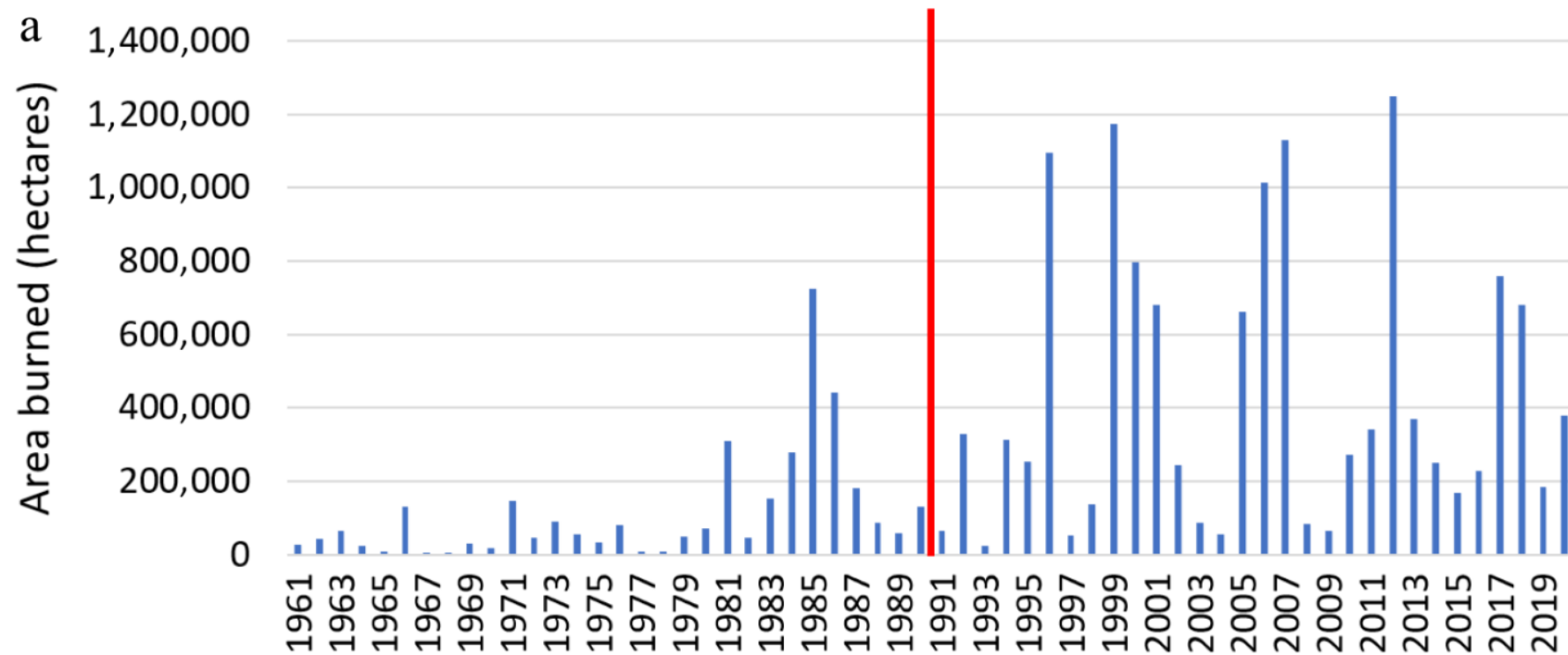
Intensity

Spatial patterns

Timing

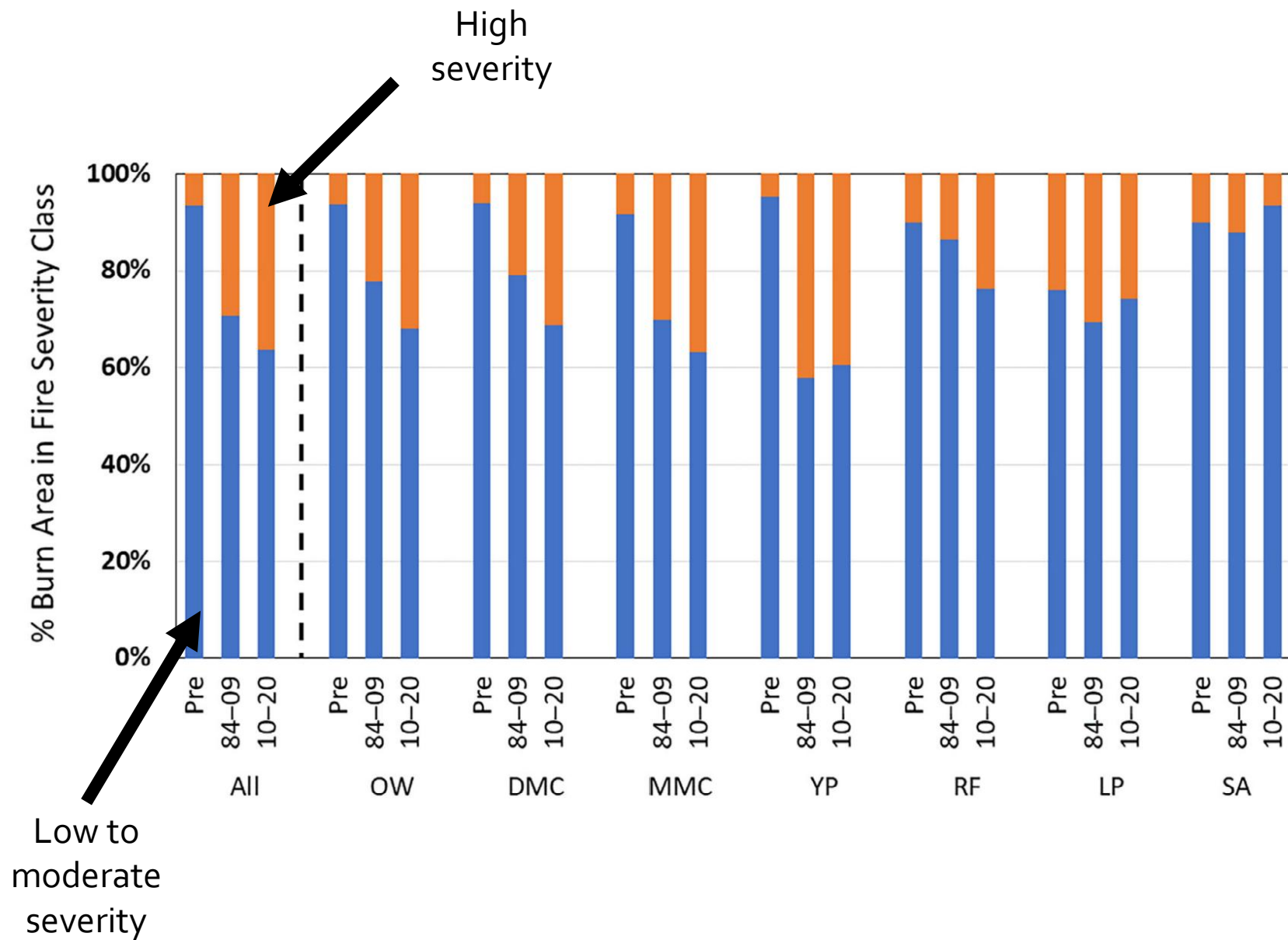
In forests,
increased
aridity leads
to more fire



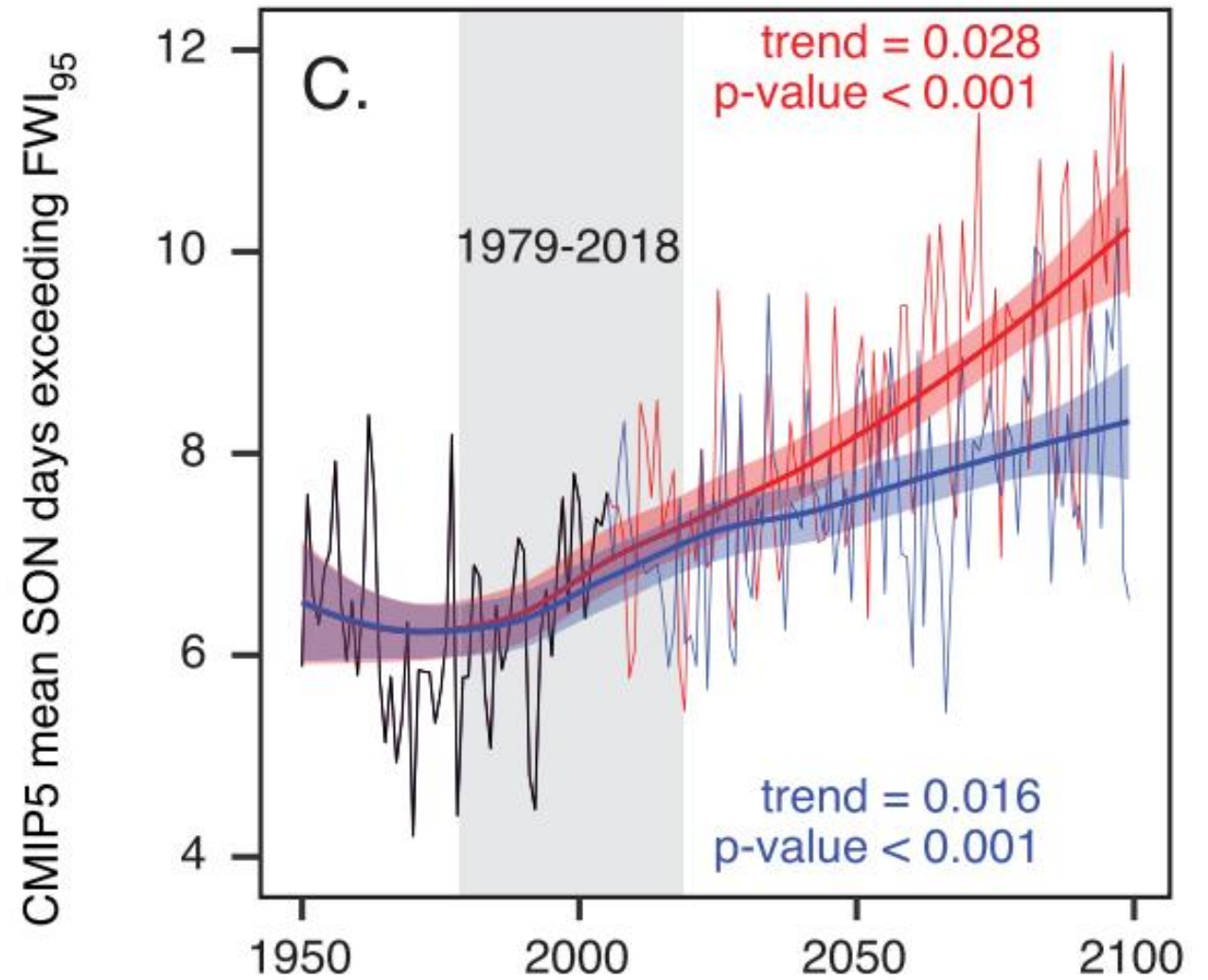


Observed upward increase in the amount of fire in our rangelands

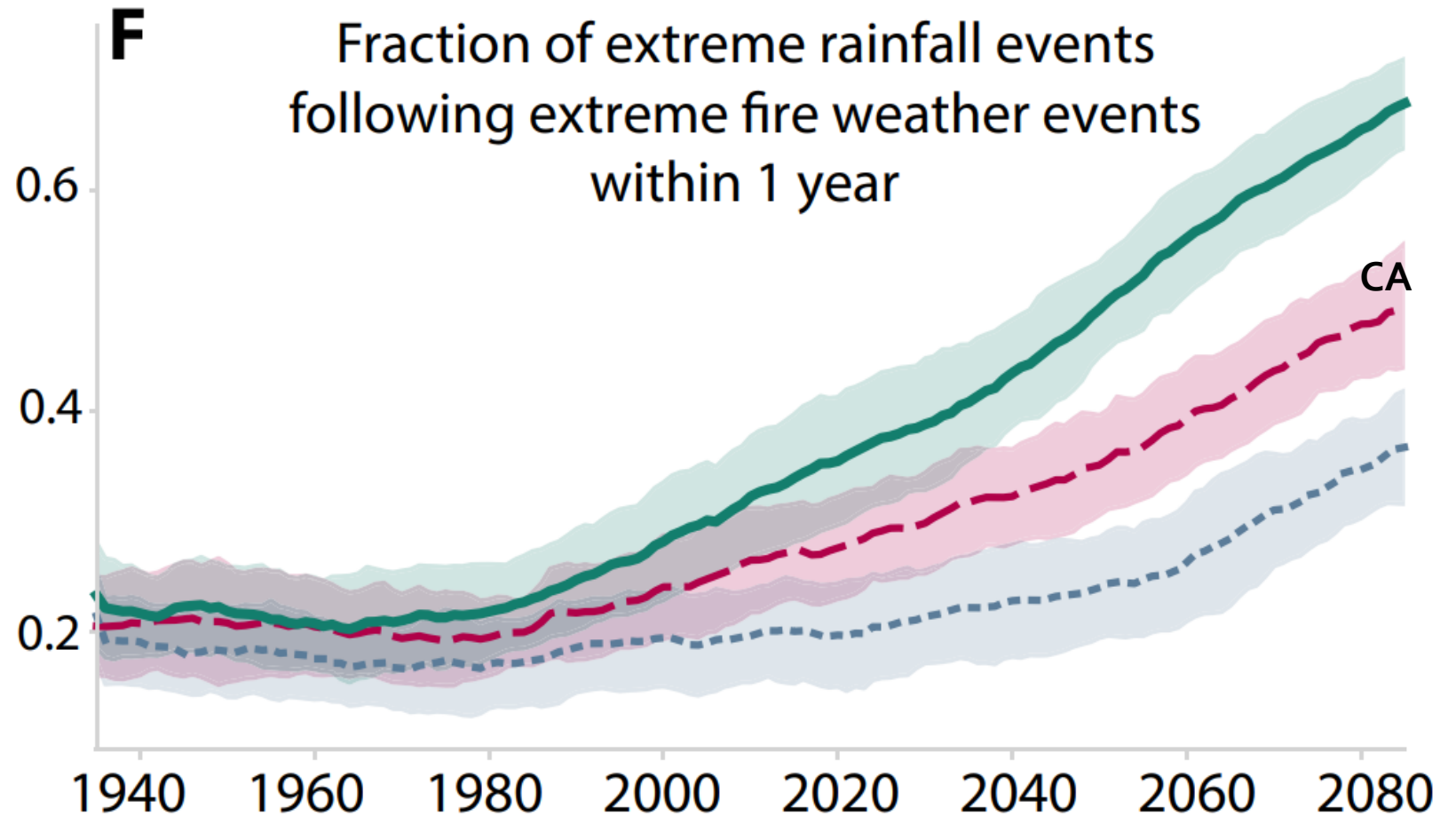
It's not just more acres, but we are seeing other changes like increased severity

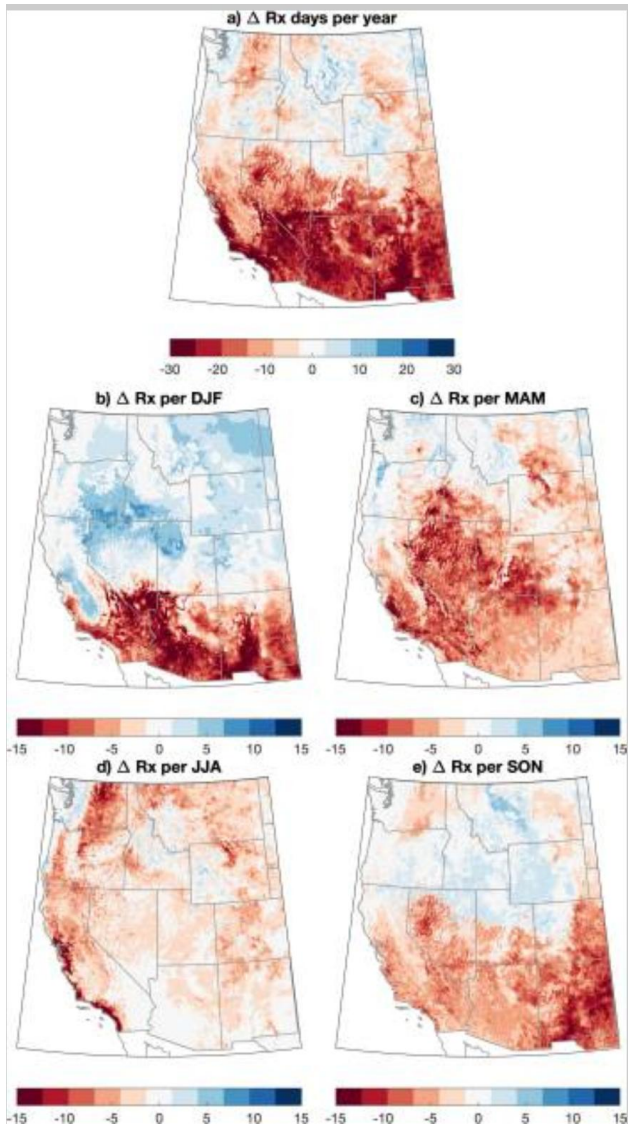


And
increases
in fire
season



Changes not
just to fire but
also extreme
rainfall events





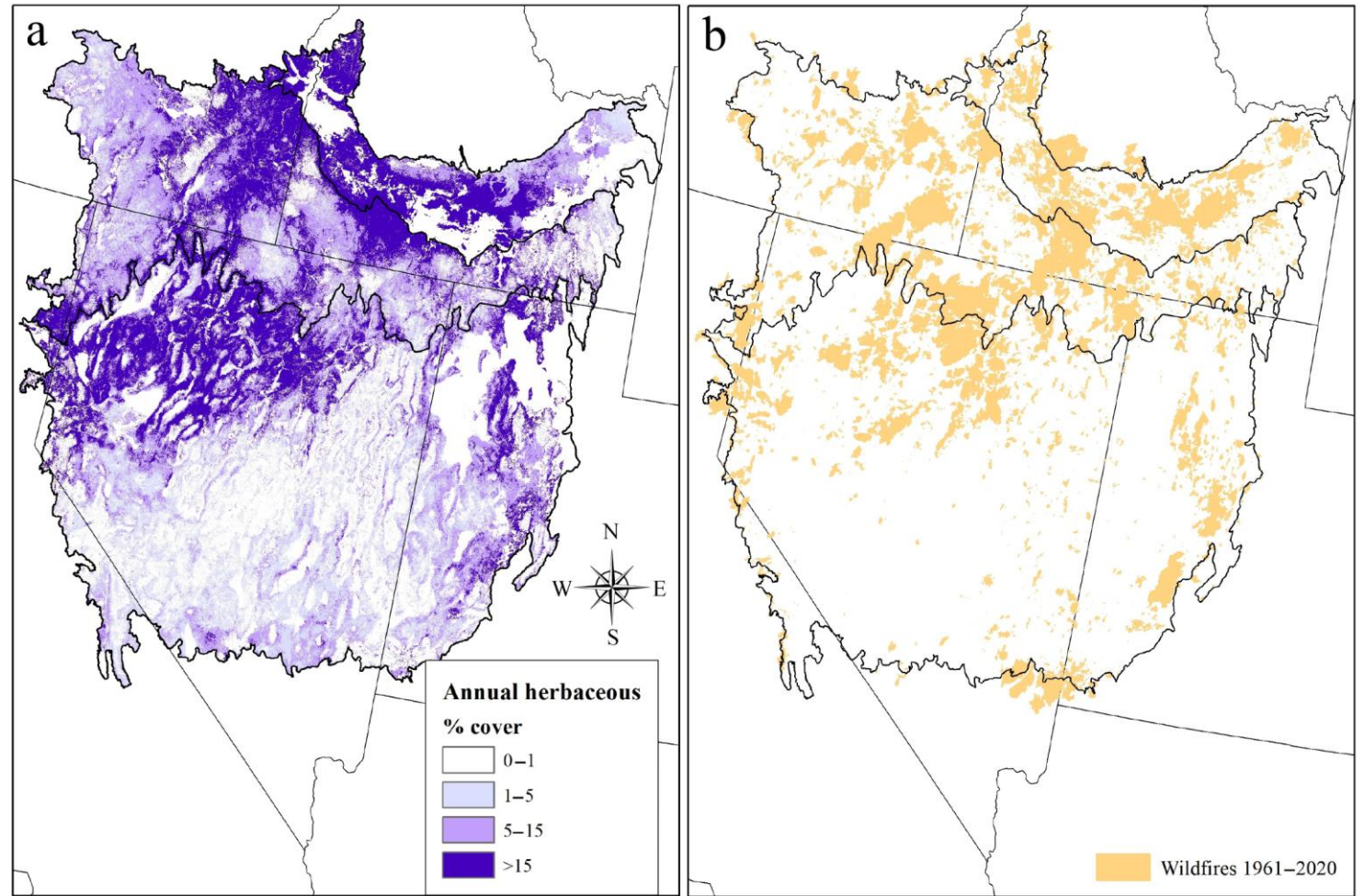
Climate is also impacting how we manage for fire

Swain et al. 2023



Climate is not the sole
cause of changing fire
regimes

Increases in non-native species have changed fuel dynamics with our region

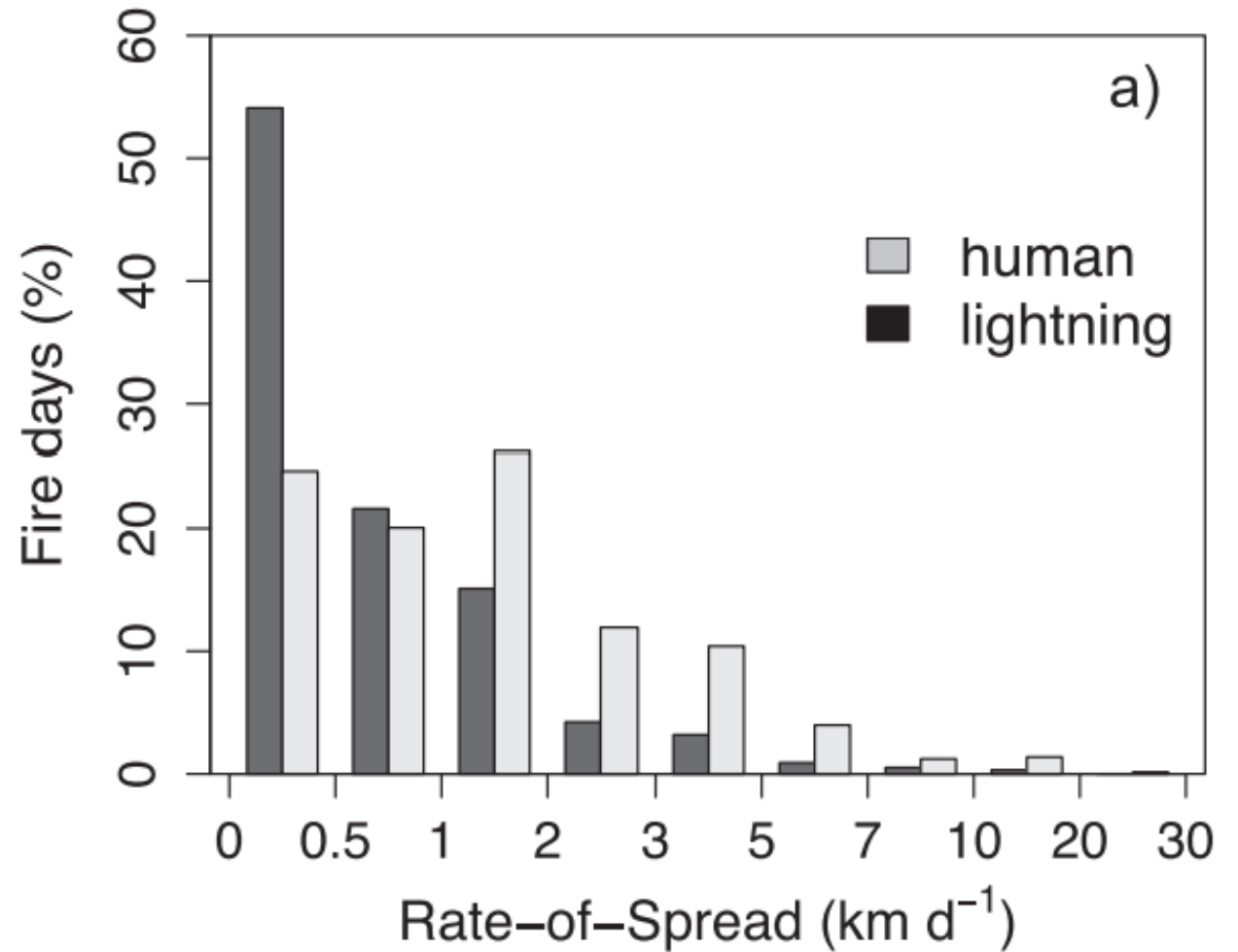


We are seeing more human
caused ignitions in Nevada

Cause	1992-2007	2008-2024
Natural	69%	50%
Human	31%	49%

Data from Headwaters
Economics

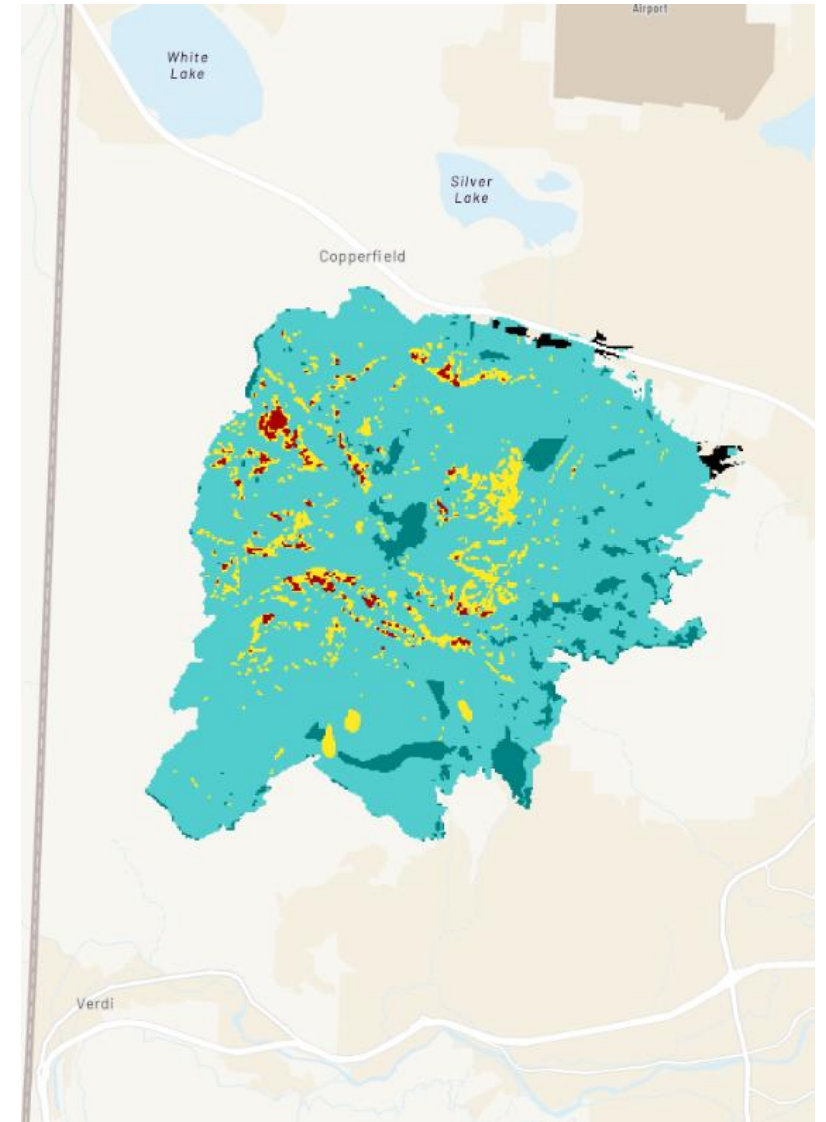
Human caused ignitions are often during more extreme fire weather days



In our backyard

Bug, Stallion, and Hawk Fires of 2026 and Davis Fire of 2024 were all human caused and had high rates of spread

-High spread does not always mean high ecological burn severity



The interaction of a
climate and
anthropogenic factors are
creating new fire regimes
across our region

Reducing Wildfire Risk

- Grants
- Dumpster Program
- Defensible space
- Supporting FireWise Communities
- Outreach & Education
- Community Wildfire Protection Plan



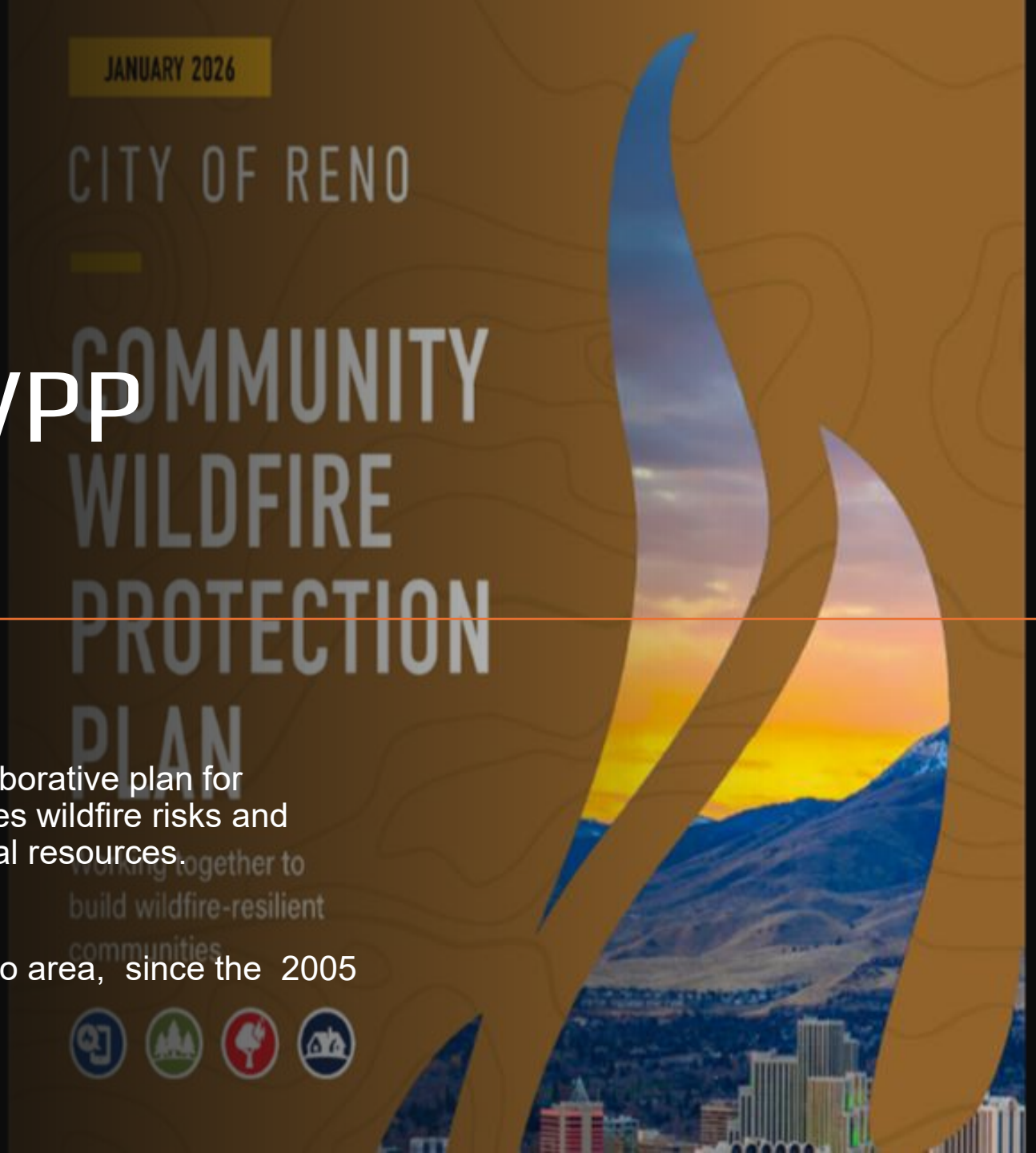
Talina Sky

skyt@reno.gov rfdwui@reno.gov

City of Reno CWPP 2026

A Community Wildfire Protection Plan (CWPP) is a collaborative plan for communities in the wildland–urban interface that identifies wildfire risks and strategies to protect people, property, natural and cultural resources.

The most recent wildfire hazard assessment for the Reno area, since the 2005 Washoe County Wildfire Risk/Hazard Assessment .



Collaboration

- The City of Reno contracted SWCA Environmental Consultants in spring 2025 to lead the development of the 2026 CWPP in close collaboration with municipal, state, tribal, and federal partners.
- This plan is designed to fill critical gaps, update risk assessment tools, and deliver a timely, locally relevant roadmap for enhancing wildfire resilience.



RENO FIRE DEPARTMENT IN COLLABORATION WITH:

LOCAL GOVERNMENT AGENCIES



FIRE AGENCIES



TRIBAL ENTITIES



RENO-SPARKS
INDIAN COLONY

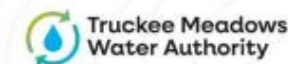
STATE AGENCIES



FEDERAL AGENCIES



NON-GOVERNMENTAL ORGANIZATIONS



Benefits of a CWPP

FIRE ADAPTED COMMUNITIES



People and communities are prepared to receive, respond to and recover from wildfire.

SAFE, EFFECTIVE WILDFIRE RESPONSE



All jurisdictions coordinate to implement safe, effective, risk-based management decisions.

RESILIENT LANDSCAPES



Landscapes are resilient to fire, insect, disease disturbances, regardless of jurisdictional boundaries.

POST-FIRE RECOVERY



Preparing communities for inevitable fire effects, through pre-fire planning for post-fire response.

- **Protects Lives, Property, and Critical Infrastructure**
- **Prioritizes actions that reduce wildfire risk** to homes, neighborhoods, and essential services.
- **Strengthens Community Safety and Preparedness**
- **Engages residents in defensible space, evacuation planning, and risk awareness,** helping communities better prepare for wildfire.
- **Aligns Agencies and Unlocks Funding**
- **Creates a coordinated strategy across agencies** and strengthens access to state and federal wildfire mitigation funding.



CWPP Hub Site

<https://city-of-reno-cwpp-cityofreno.hub.arcgis.com/>

condensed, digital, and interactive companion

For more information on local fires:

Emergency Washoe: <https://www.emergencywashoe.com/>

Wahoe County Sheriff: <https://www.washoesheriff.com/Hawk-Fire-2026.php>

Nevada Fire Info (BLM): <https://www.nevadafireinfo.org/intel>

Perimeter Map: <https://perimetermap.com/>

TMFPD: <https://tmfpd.us/>

Hawk Fire

Acres: 15,085

Start Dates: August 22, 2026

Great Basin Complex Incident Management Team
6

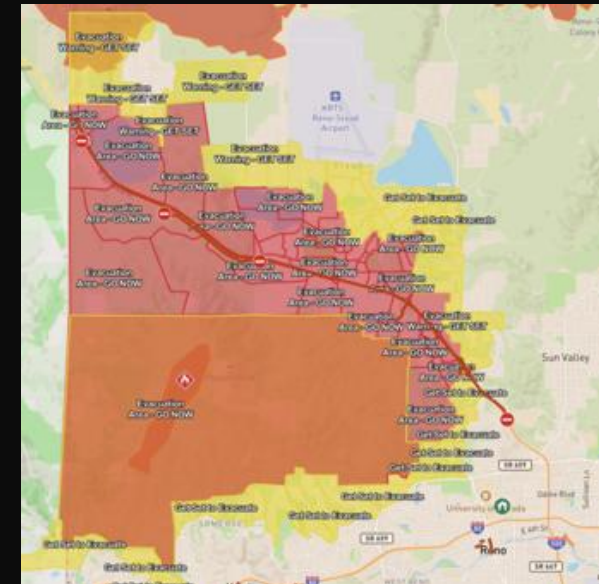


Bug & Stallion Fire

Acres: Bug 93,733 acres / Stallion 40,691 acres

Start Dates: Bug: 8/8/26 Stallion: 8/10/26

Southwest Complex Incident Management Team
1





FIRE ADAPTED NEVADA

What Does It Mean to Be Fire Adapted?

**We can't prevent every wildfire.
We can reduce what wildfire can take.**

The WUI Isn't Just a Place

**The Wildland-Urban Interface Is Where
Risk Meets People**



- The Insurance Conversation



WILDFIRE EXPOSURE



PROPERTY VULNERABILITY



FINANCIAL RISK

What can communities control?

Resilience Isn't a Presentation

Awareness Creates Understanding. Action Creates Resilience.



Homes



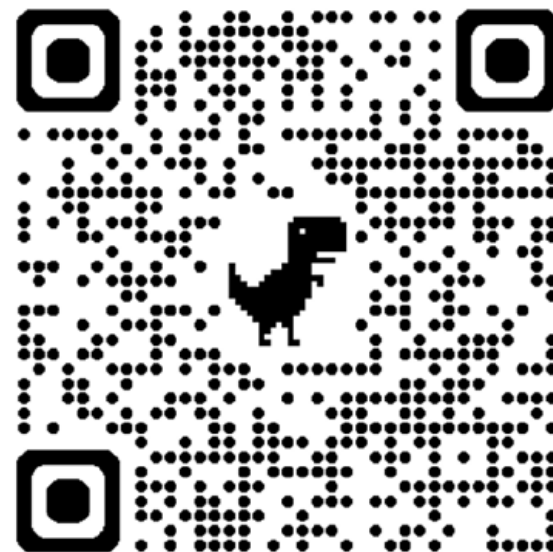
Fuels



People



Partnerships



Living with Fire/FAN

What Does Fire Adaptation Actually Look Like?

HOME

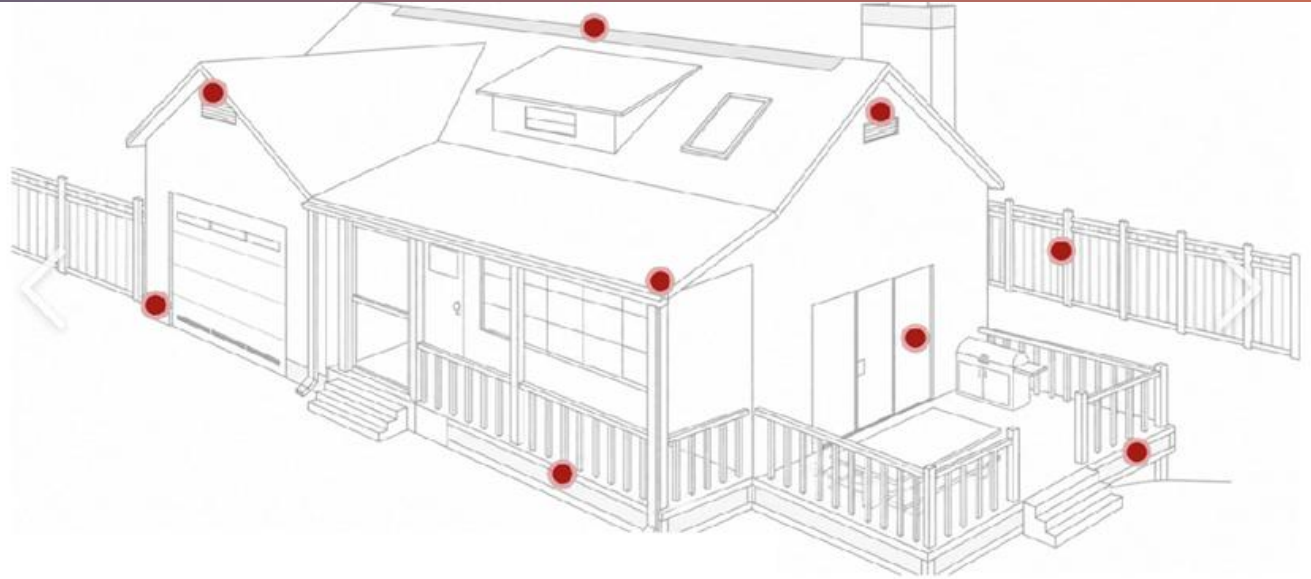
- Defensible space
- Home hardening
- Ember awareness

NEIGHBORHOOD

- Firewise
- Fuels projects
- Vulnerable residents

INDIVIDUAL

- Know your evacuation plan
- Maintain your property
- Take action before fire arrives



FIREWISE USA®
RESIDENTS REDUCING WILDFIRE RISKS

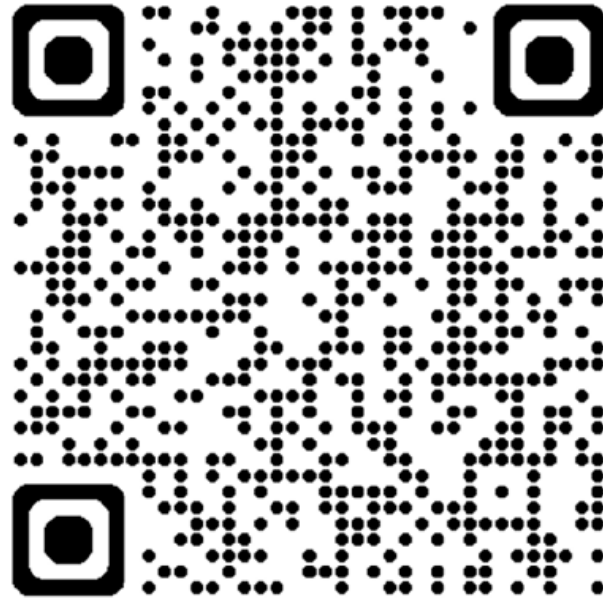


Reduce vulnerability before the fire starts

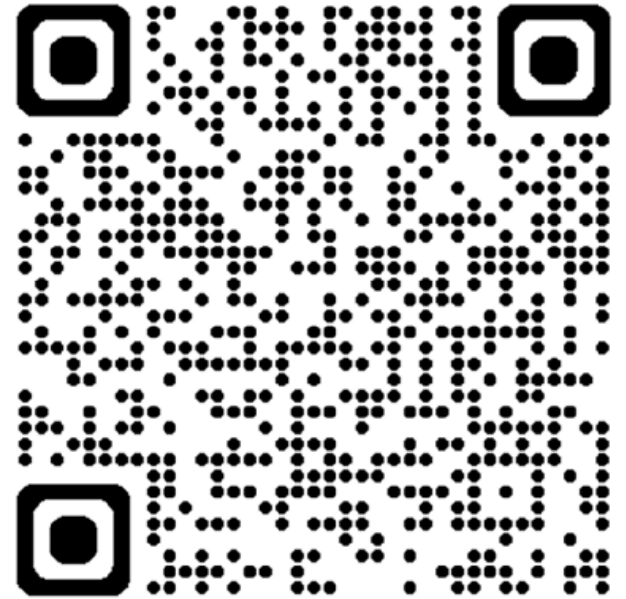
RESOURCES



NV DIVISION OF INSURANCE



FIREWISE USA®



WILDFIRE DEFENSE MESH

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Office 775-684-2511 Cell: 702-807-0704



PURPOSE

- ▶ Collaborate to promote healthier, more resilient forests on the Sierraville and Truckee districts of the Tahoe National Forest within the Middle Truckee River Watershed
- ▶ Identify forest restoration and fuels reduction projects on Forest Service lands within and surrounding the Middle Truckee River Watershed
- ▶ Coordinate with private landowners and stakeholders to promote collaboration and efficiencies

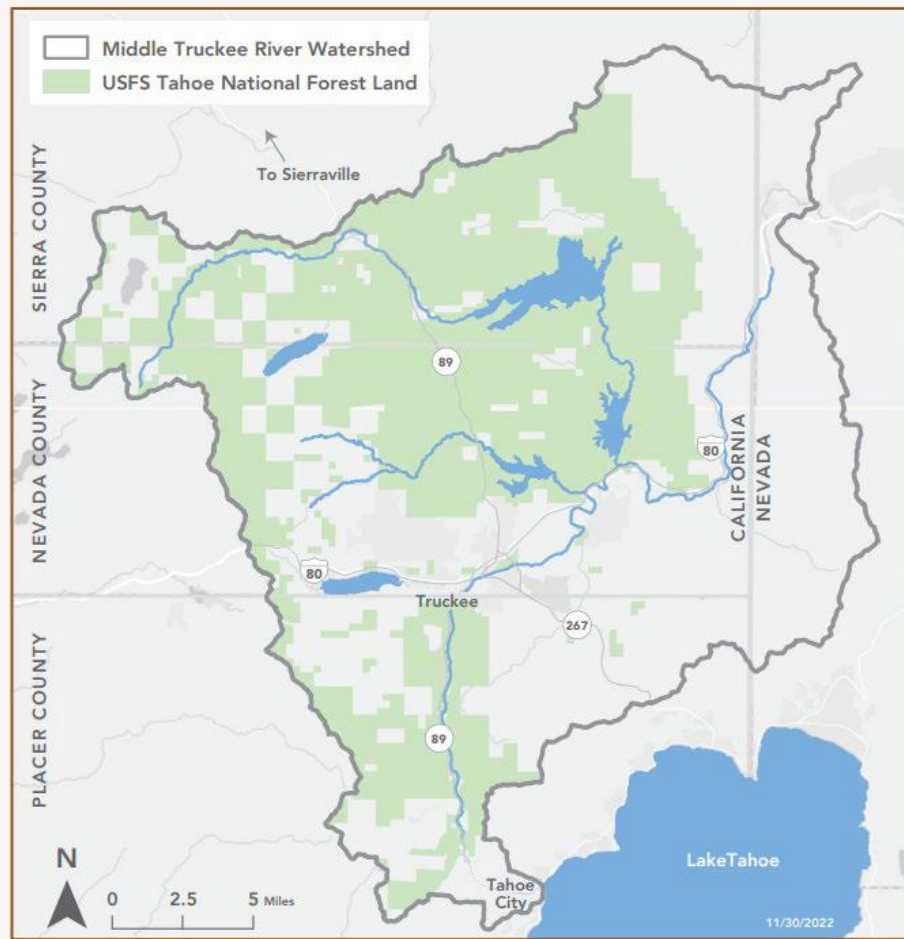
PARTNERSHIP OVERVIEW

CORE TEAM

- ▶ US Forest Service – Tahoe National Forest
- ▶ The Nature Conservancy
- ▶ National Forest Foundation
- ▶ Truckee River Watershed Council
- ▶ Truckee Meadows Water Authority

STAKEHOLDERS

Public and private landowners, tribes, counties, NGOs



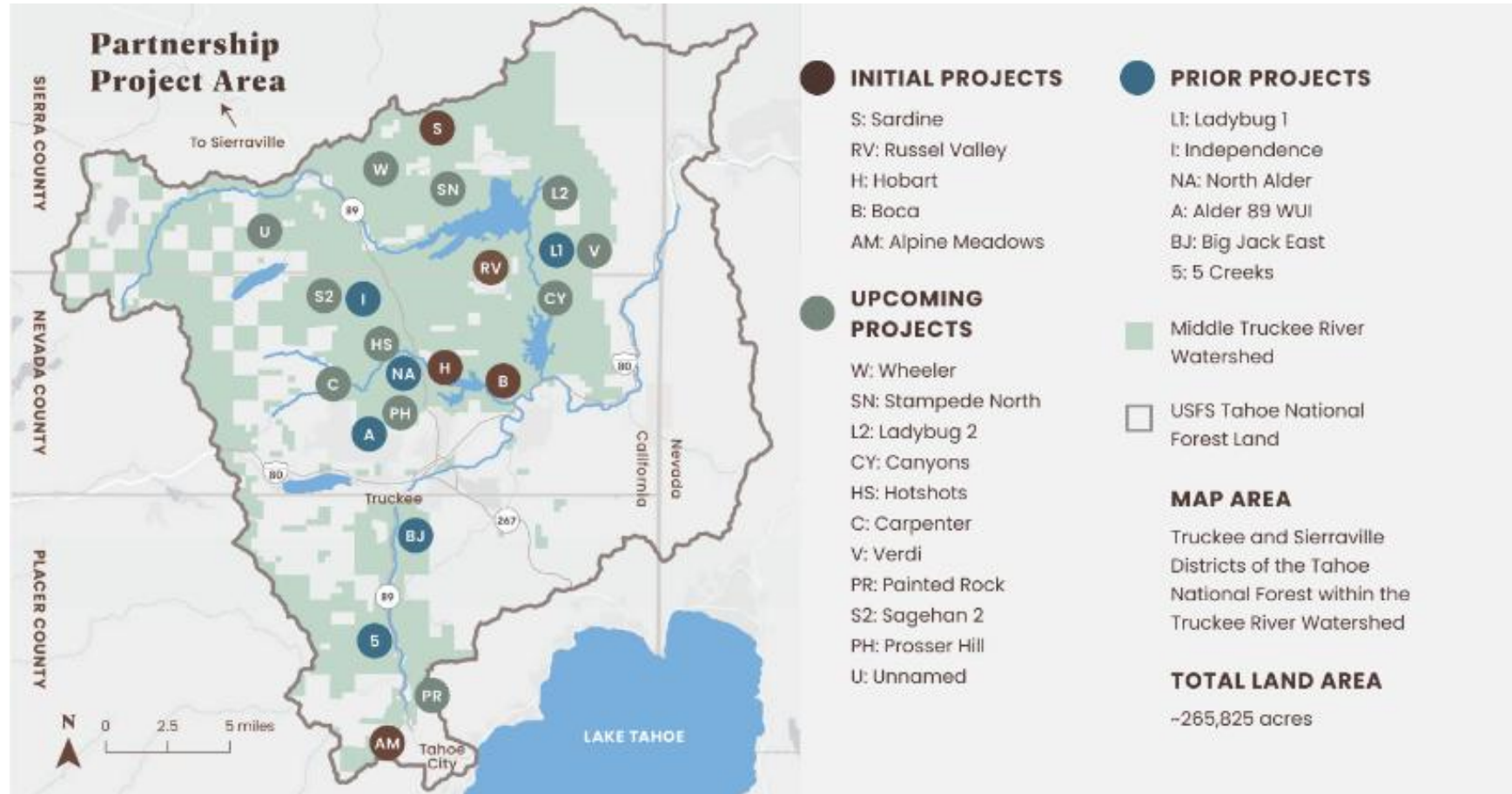
GOALS



- ▶ Improve and restore forest health and resilience
- ▶ Reduce the risk of high severity wildfire
- ▶ Protect communities from wildfire impacts
- ▶ Protect and secure water supplies and infrastructure
- ▶ Identify and augment resource gaps to achieve implementation at an increased pace and scale

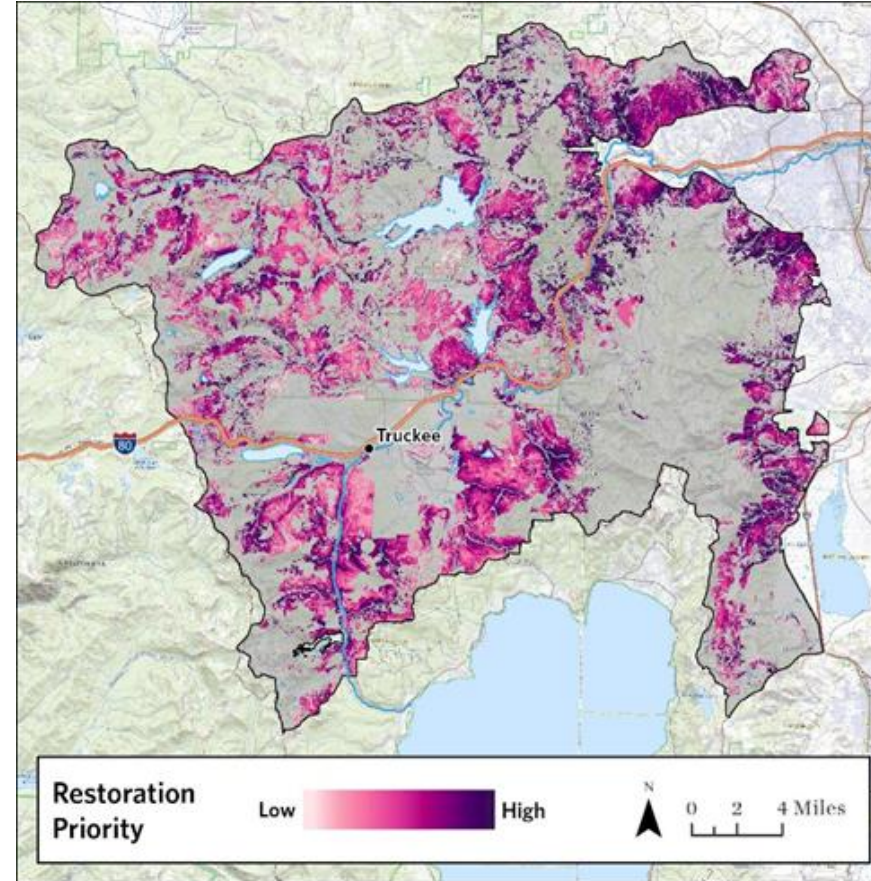
10-YEAR STRATEGY

- Goal is to treat approximately 62,000 acres over the next 10 years



PROJECT SELECTION

- ▶ Objectives:
 - Forest Resilience
 - Fire Dynamics
 - Water Security
 - Biodiversity/Conservation
- ▶ Three Models
 - Landscape Conservation Forecasting (TNC)
 - MTRW Forest Health Assessment
 - Water Security
- ▶ Efficiency Considerations
 - Accessibility
 - Project adjacencies



FUELS TREATMENT EXAMPLE



Forest thinning completed in Dog Valley

Photo Credit: Mickey Hazelwood, The Nature Conservancy

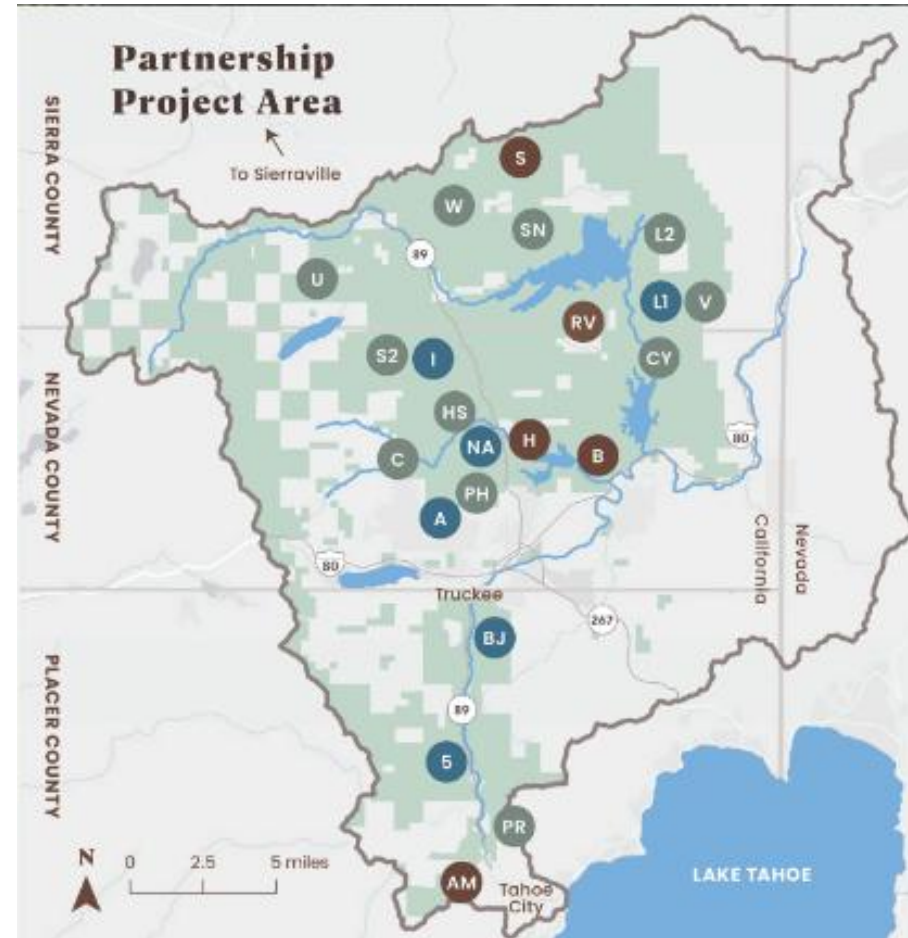


Same location; thinning not yet completed on opposite side of road

Photo Credit: Mickey Hazelwood, The Nature Conservancy

10-YEAR FUNDING STRATEGY

- ▶ Preliminary estimates: \$120-\$140 million
- ▶ Includes planning and implementation
- ▶ So far, have raised over \$20M in federal, State of CA, and corporate dollars



Nevada Climate Forum Panel Presentation

September 16, 2026



together**forbetter**

NORTHERN NEVADA
Public Health



NEVADA DIVISION OF
**ENVIRONMENTAL
PROTECTION**

Air Quality Programs in Nevada

Air Quality Agencies in Nevada

Northern Nevada Public Health

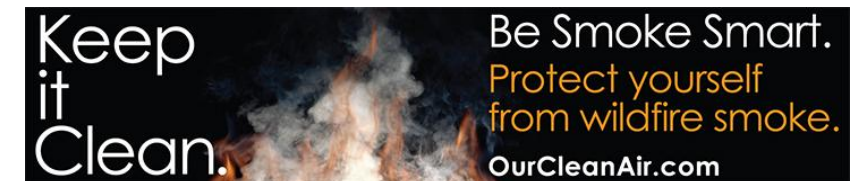
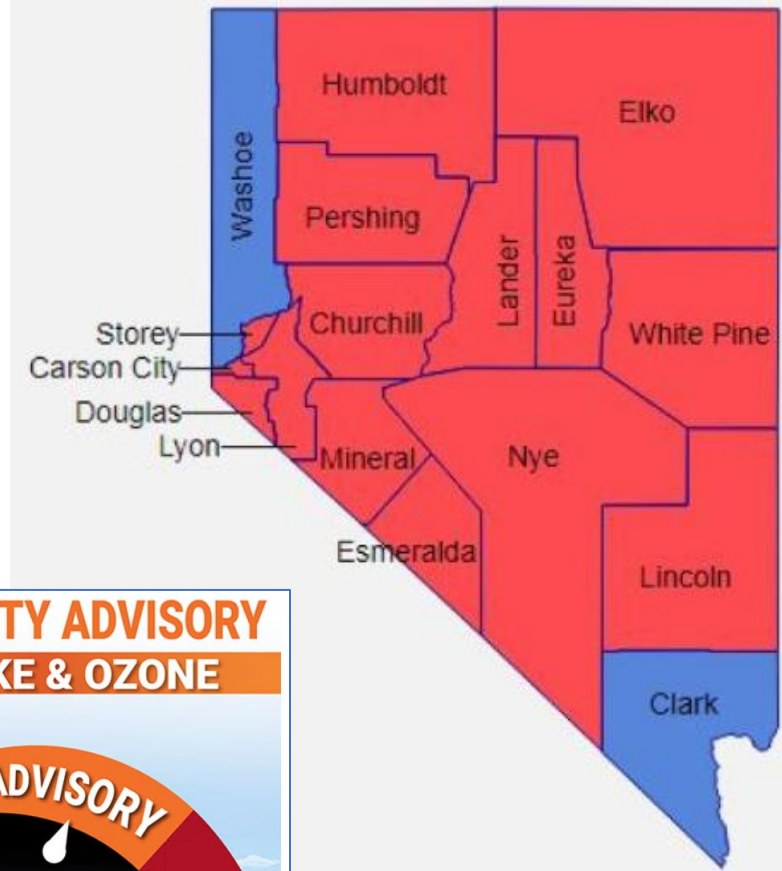
Clark County Department of Environment and Sustainability

Nevada Division of Environmental Protection

Tribal Programs

Air Program Operations Include

- Air Monitoring
- Public Outreach
- Source Permitting and Compliance
- Clean Air Act Regulatory Compliance

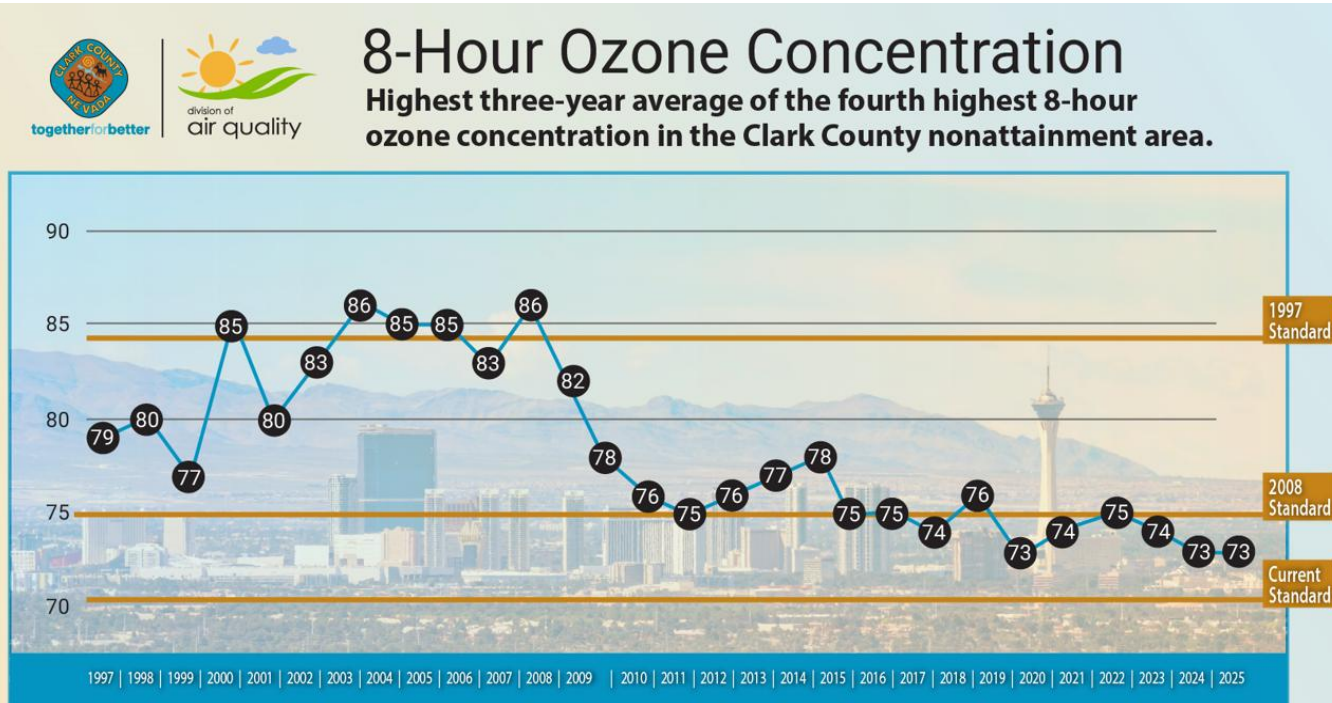


Air Quality in Southern Nevada

Forecasting and AQI – Forecast produced daily

Public Outreach: Multimedia

Monitoring and Trends



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Air Quality in Southern Nevada (continued)

Ground Level Ozone

National Ambient Air Quality Standards (NAAQS): 8-Hour Average

Serious Non-Attainment

State Implementation Plan (SIP)

PM10 – Wind Blown Dust

NAAQS: 24-Hour Average

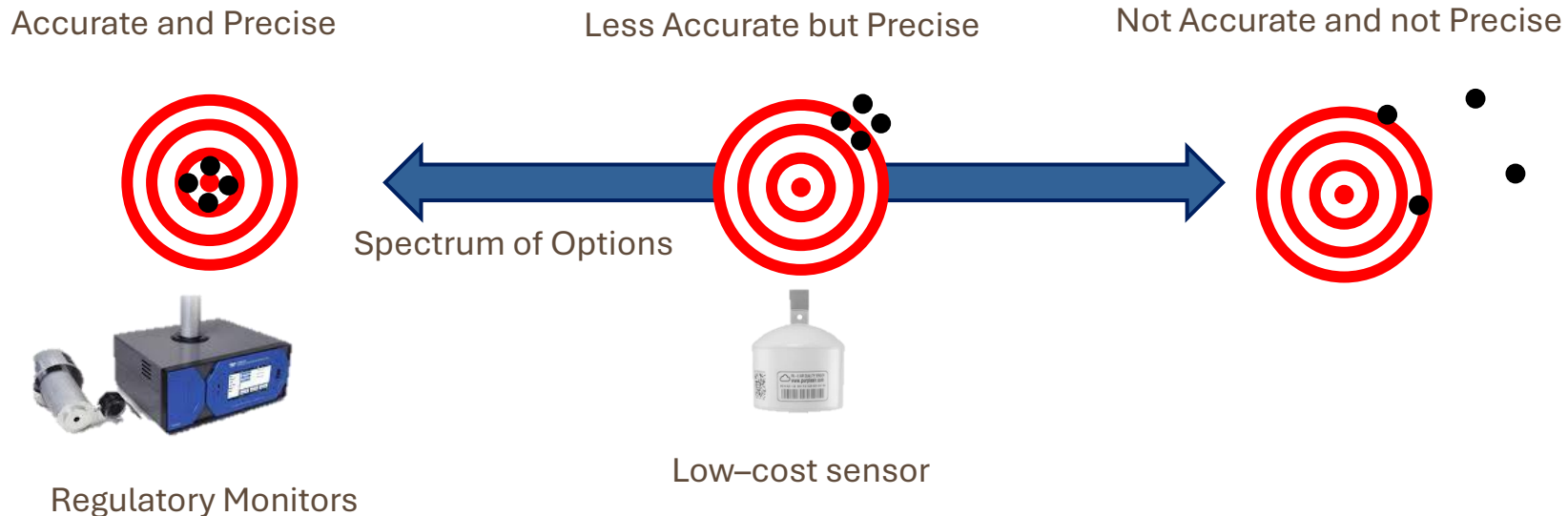
Attainment/Maintenance



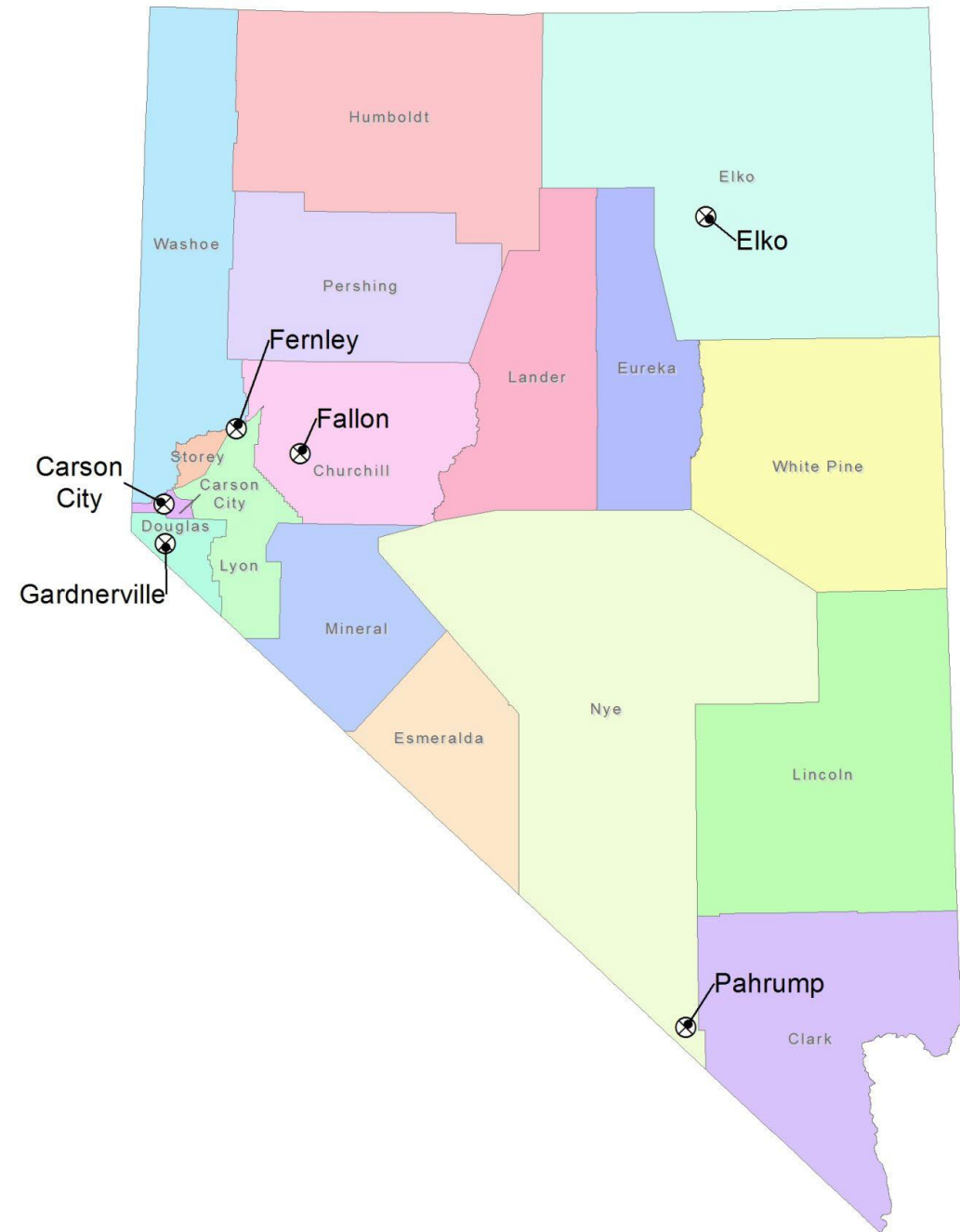
Measuring Air Quality

The accuracy and precision of monitors and sensors vary by type, cost, brand, models, location, and maintenance provided.

- *Accuracy is how close we are to the 'true' concentration*
- *Precision is how measurements are close to each other*



Where are
NDEP monitors
located?



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PROTECTION**

AQI Basics for Ozone and Particle Pollution

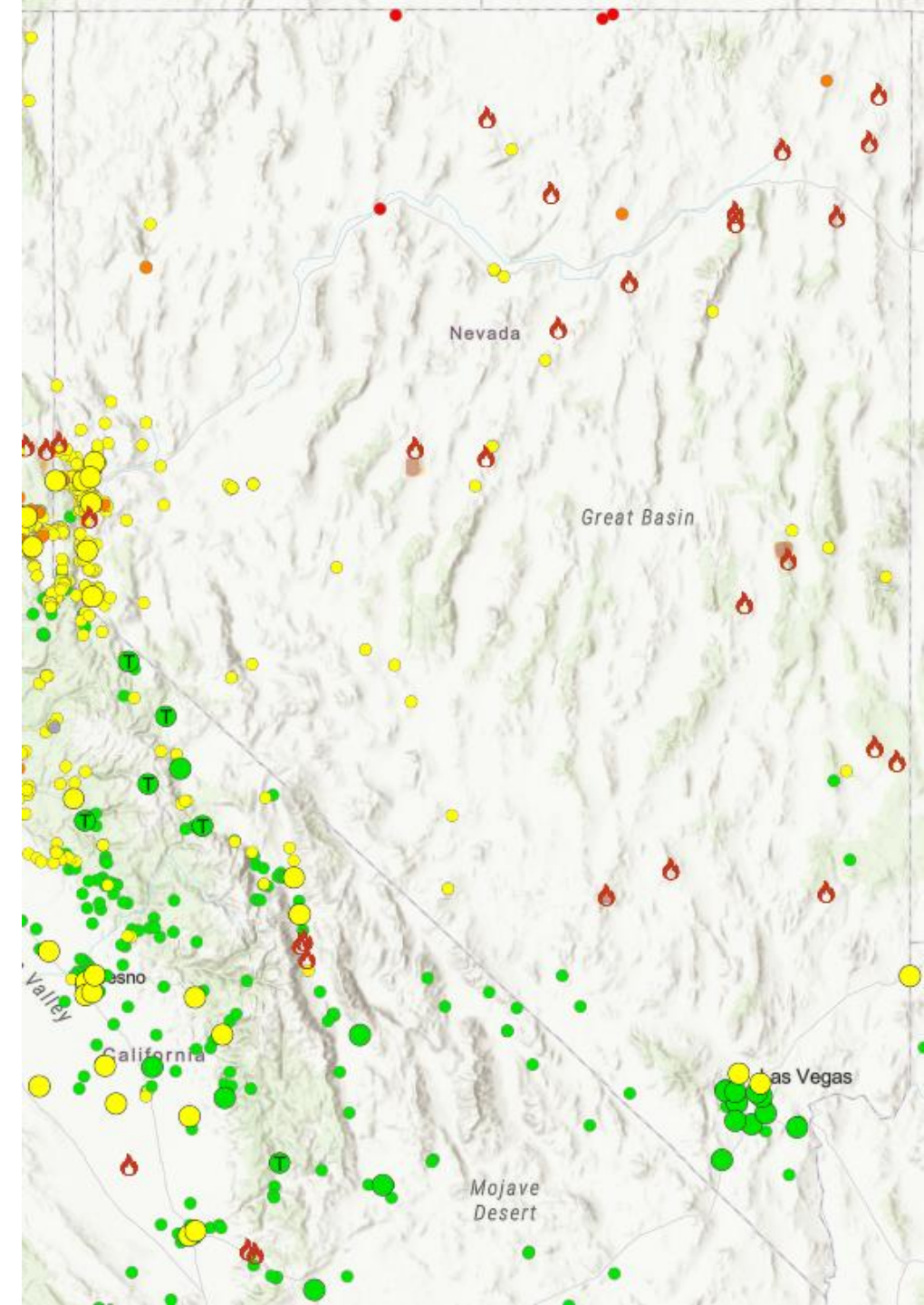
Daily AQI Color	Levels of Concern	Values of Index	Description of Air Quality
Green	Good	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually 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.

Fire.airnow.gov

- Sensors placed at ALERTWest stations operated by the Nevada Seismological Laboratory
- If you're an organization that would like to host sensors, contact AirMonitoring@ndep.nv.gov



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**ENVIRONMENTAL
PROTECTION**



Health Effects of Particulate Matter

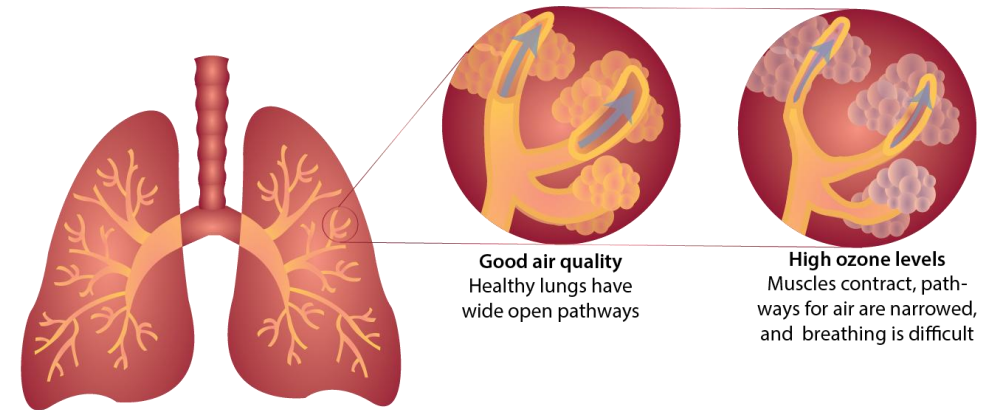
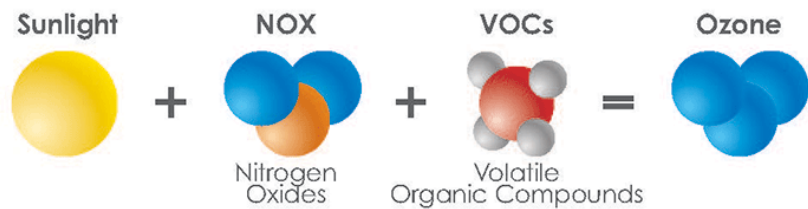
- Coughing, wheezing, shortness of breath
- Aggravates heart and lung diseases
- Lung damage
- Low birth weight infants
- Suppresses immune response
- Heart attacks
- Cancer
- Premature death



Image courtesy of the U.S. EPA

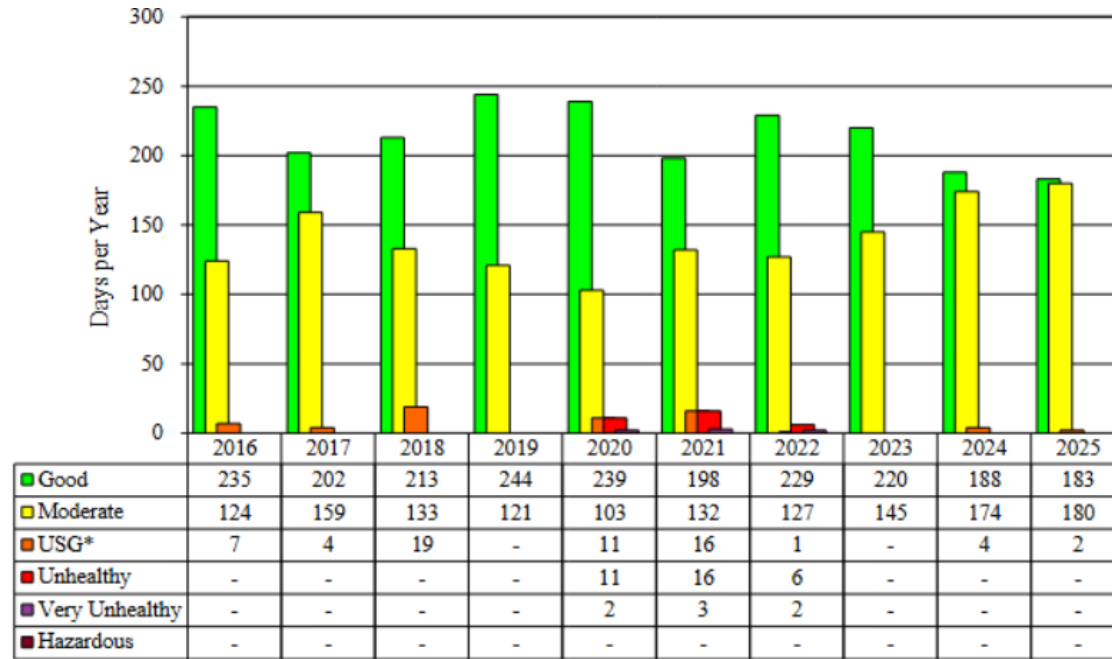
Health Effects of Ground-level Ozone

- Coughing, shortness of breath
- Throat irritation
- Chest pain and tightness
- Permanent lung damage, scar tissue
- Aggravates asthma and other lung diseases

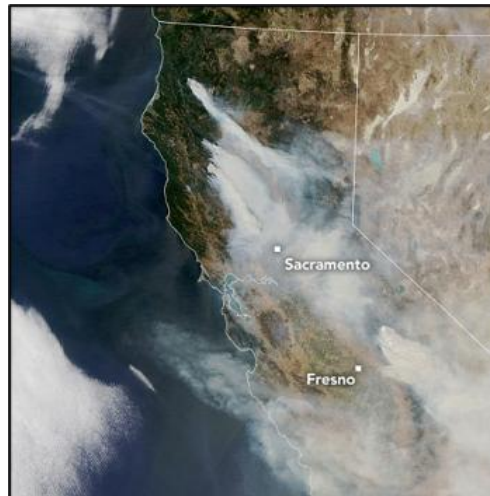


Wildfire Smoke in Washoe County

The top 10 worst 24-hour AQIs in the last 60 years in Washoe County all occurred in 2020-2022 due to the Caldor, Dixie, North Complex, and Mosquito Fires.



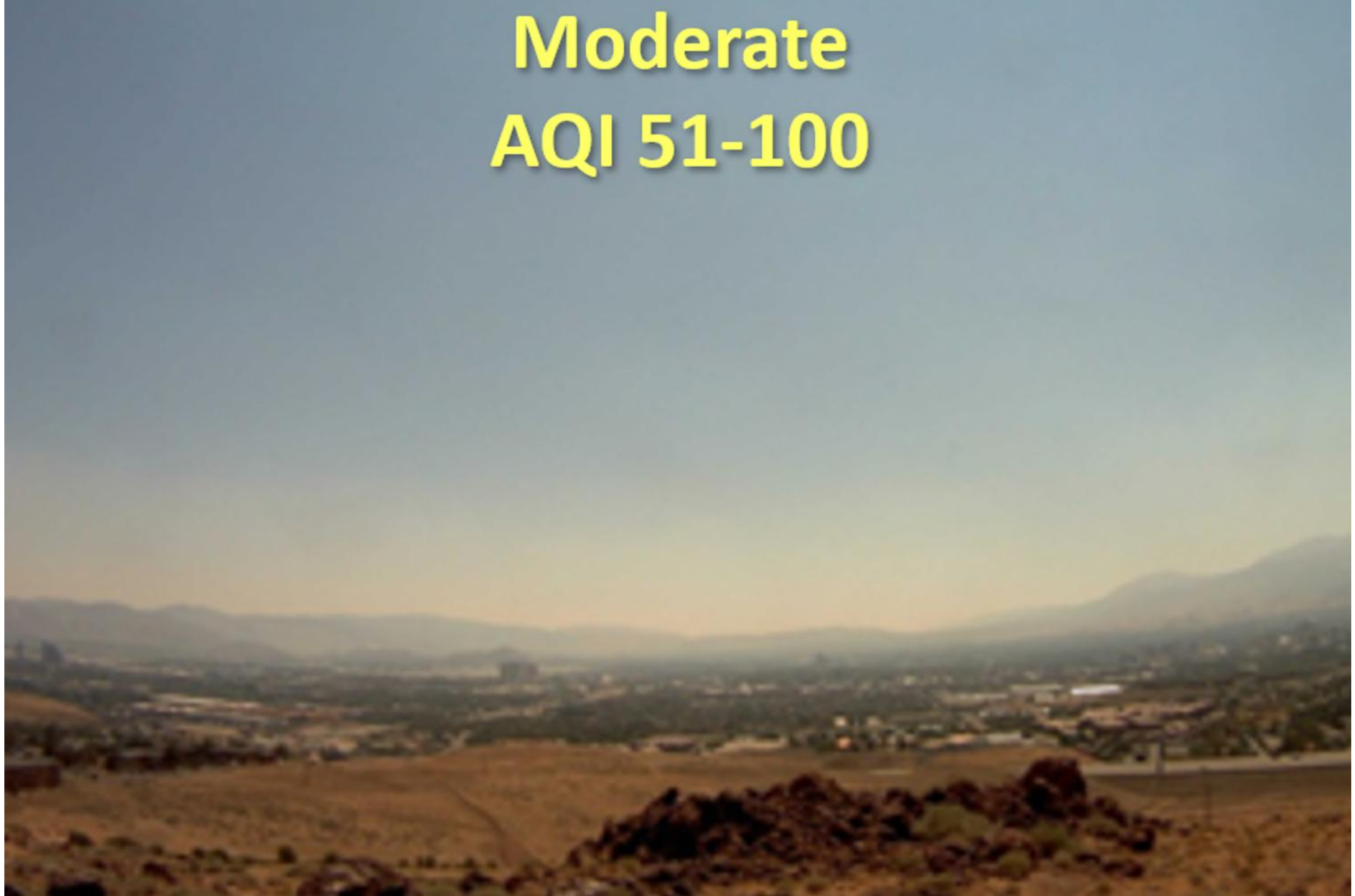
* Unhealthy for Sensitive Groups



Good
AQI 0-50



Moderate
AQI 51-100



Unhealthy for Sensitive Groups

AQI 101-150



Unhealthy
AQI 151-200

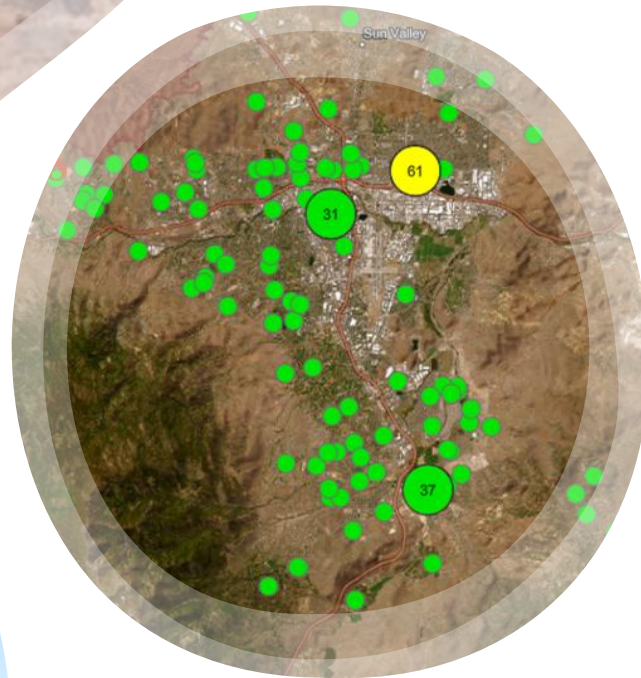


Very Unhealthy
AQI 201-300



Hazardous
AQI 301-500





What is AQMD doing to help?

- Monitor the air 24/7/365 at our seven State or Local Air Monitoring Stations (SLAMS), updating AirNow every hour to alert the public.
- Applied for and was awarded a \$250k federal grant to establish Verdi SLAMS.
- Located 25+ PurpleAir sensors around Washoe County partnering with WCSD, Libraries, City of Sparks, Truckee Meadows Park Foundation, National Weather Service, and Washoe County.
- AQMD's smoke management program allows for land managers from local, state, and federal fire agencies in our jurisdiction to use prescribed fire to make healthier, more resilient forests.
- Donated meteorological instrumentation towers to the ALERTWildfire camera network.
- Do as many media interviews as we can.
- Be Smoke Smart.
- Aid Research.

The goal of Be Smoke Smart is to educate the public on what to do to protect yourself from wildfire smoke. The ten ways to protect yourself from wildfire smoke include:

1. Reduce or stop outdoor activity and stay inside.
2. Keep AC on if available, filter clean, and windows closed. Air out home when air quality improves.
3. Pay attention to the current air quality and the Fire and Smoke Map on [AirNow.gov](https://www.airnow.gov).
4. Follow the advice of your doctor especially those with heart or lung disease.
5. Wet or dry cloth, dust, or surgical masks do not protect you from ozone or fine particulates.
6. If you are a healthy adult, NIOSH N95 or P100 respirators can provide some protection from fine particulates if you must be outside.
7. Stay hydrated.
8. Keep indoor air clean; don't burn candles, vacuum, or smoke tobacco products.
9. Use a portable air purifier. Create a clean air room in your home.
10. Consider relocating temporarily.



Research

- DRI/Renown Studies (Kiser et al 2020, Kiser et al 2021)
- UNR Cooperative Extension Living With Fire: Living With Smoke Factsheet (2021)
- University of Washing Technical Note (Jaffe et al 2022)
- EPA ORD 3-year Wildfire Study (2020-2022)
- AQMD is collaborating with DRI on various research projects.



Fig. 2: SARS-CoV-2 tests, PM2.5, and temperature over time.

