

WILDLAND FIRE AIR QUALITY RESPONSE EFFORTS AND TOOLS IN THE UNITED STATES



**Presented by Pete Lahm
Forest Service
Fire & Aviation Management
Washington Office
202-205-1084 // 602-432-2614 Cell**

Partners in this effort:
USFS, NPS, NOAA NWS, EPA,
State and local agencies

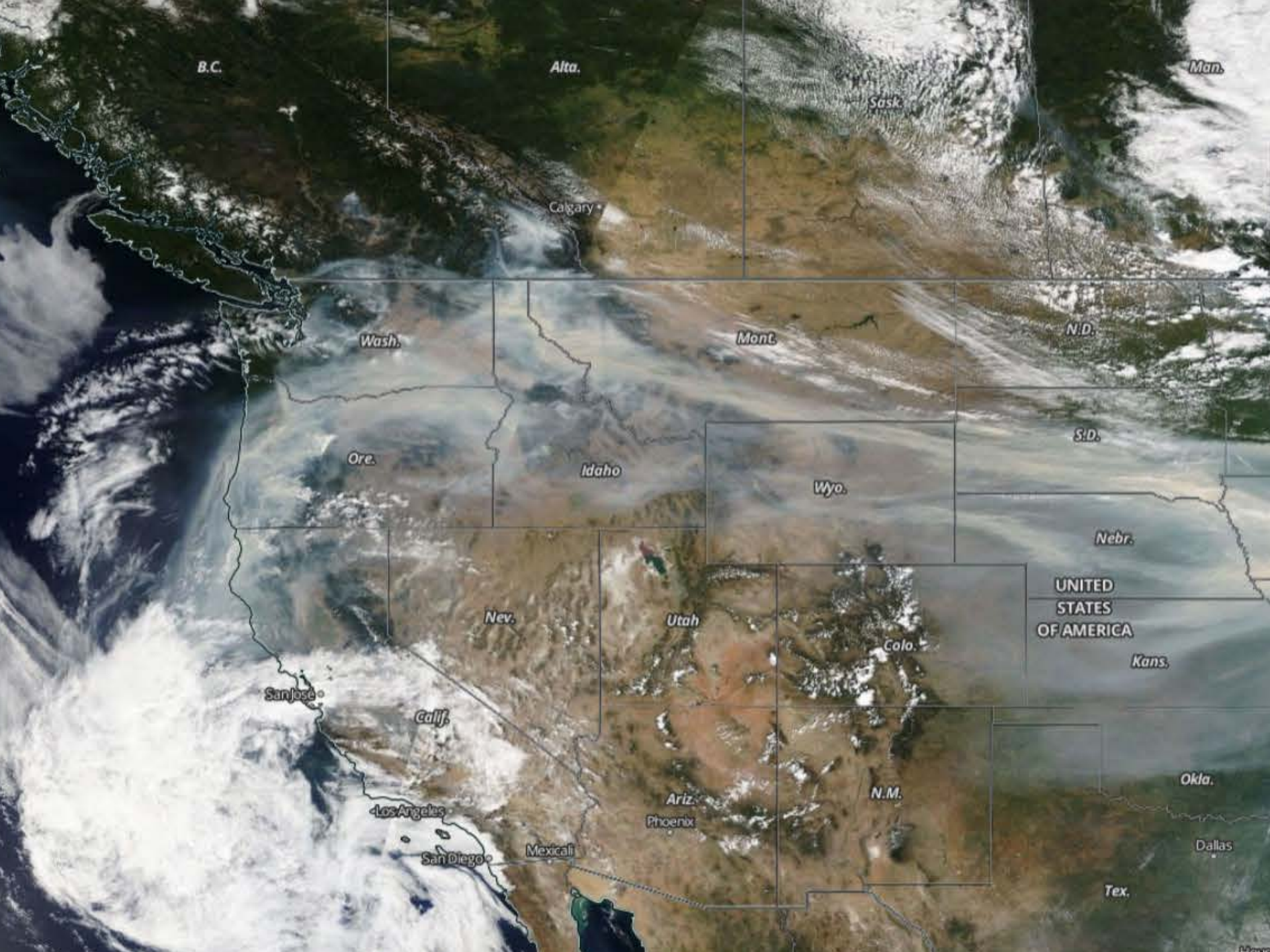


Smoke and Fire

- Wildfires single biggest source of high-level air quality impacts (in U.S.)
- Single wildfires and multiple regional wildfires are known to cause significant impacts to millions
 - Health, Safety, Economics, Disruption of Life, Children/School/Athletics impacts
 - **Long durations** of high levels of pollutants
 - Can contribute to fatal traffic accidents
- **Public** impacts of smoke: 1 in 3 households has someone with respiratory issues, E.g. children with asthma, COPD, emphysema
- Wildland fires contributing to more than 32% of US fine particulate matter (PM2.5) based on the EPA's 2011 National Emission Inventory (40% with new emission factors)

2017 Smoke and Fire

- USDA Forest Service 2017 Fire and Aviation Management Program Talking Points:
 - “We work closely with our cooperators to manage wildfires and *predict and mitigate smoke impacts on individuals and communities during wildfires.*”
- Regulatory Impacts to States and EPA:
 - MT – 296 exceedances, 173 exceedance days to do EER
 - ID – 146 exceedances, 44 exceedance days to do EER
 - WA – 417 measurement days at Unhealthy for Sensitive Groups (AQI) with 137 PM2.5, 14 PM10 and 31 ozone exceedances, 1 EER to do
 - OR – 431 measurement days at Unhealthy for Sensitive Groups (AQI)
 - NV – 3 ozone and 1 PM2.5 exceedances
- The Summer of Smoke – NPR, Washington Post, NY Times – “What to Know Before Buying an Air Purifier to Clear Wildfire Smoke”
- Focus of Congressional Hearing in Fall 2017



B.C.

Alta.

Man.

Sask.

Calgary

Wash.

Mont.

N.D.

Ore.

Idaho

S.D.

Wyo.

Nebr.

UNITED STATES OF AMERICA

Nev.

Utah

Colo.

Kans.

San Jose

Calif.

Los Angeles

San Diego

Mexicali

Ariz.
Phoenix

N.M.

Okla.

Dallas

Tex.

Wildland Fire Air Quality Response Program

- Interagency response (2011-Present)
- Operationally addressing wildfire smoke
 - Public health
 - Transportation safety
 - Fire personnel exposure
- Four components:
 - Modeling
 - Monitoring
 - Messaging / Communication
 - Air Resource Advisors (ARA)
 - Active Coordinated Response
- Integration / coordination
 - EPA, NOAA, NASA, States, and beyond



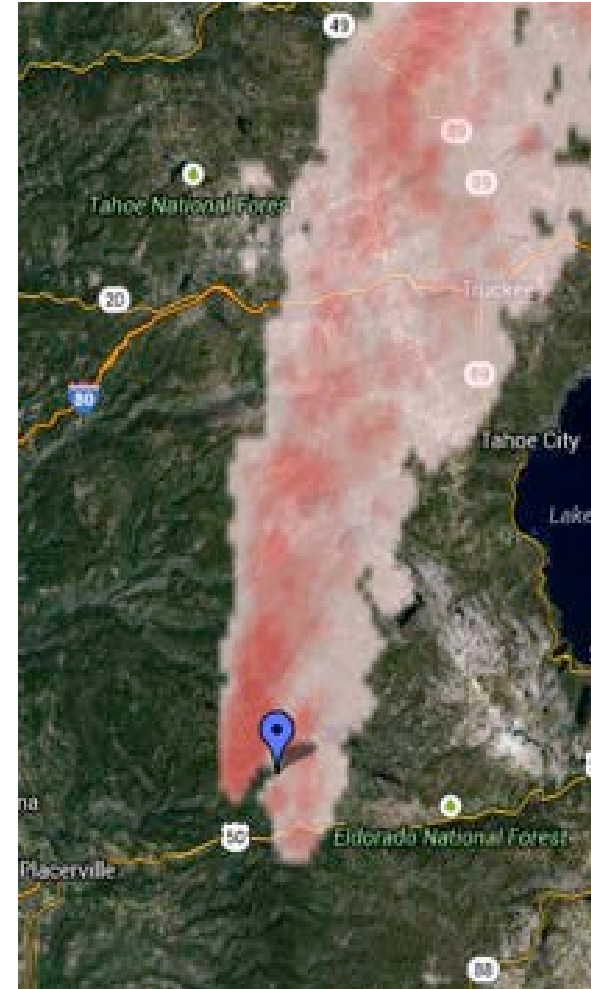
Modeling

- USFS PNW R&D AirFire Team -BlueSky smoke modeling framework
- 20+ daily regional runs to supplement national products
- NWS 1.3-km domains provides vast improved model performance
- New 1.8-km domains OR, AZ, NM and now 3-km CONUS
- On-incident support for high resolution and customization for best performance

King Fire 2014

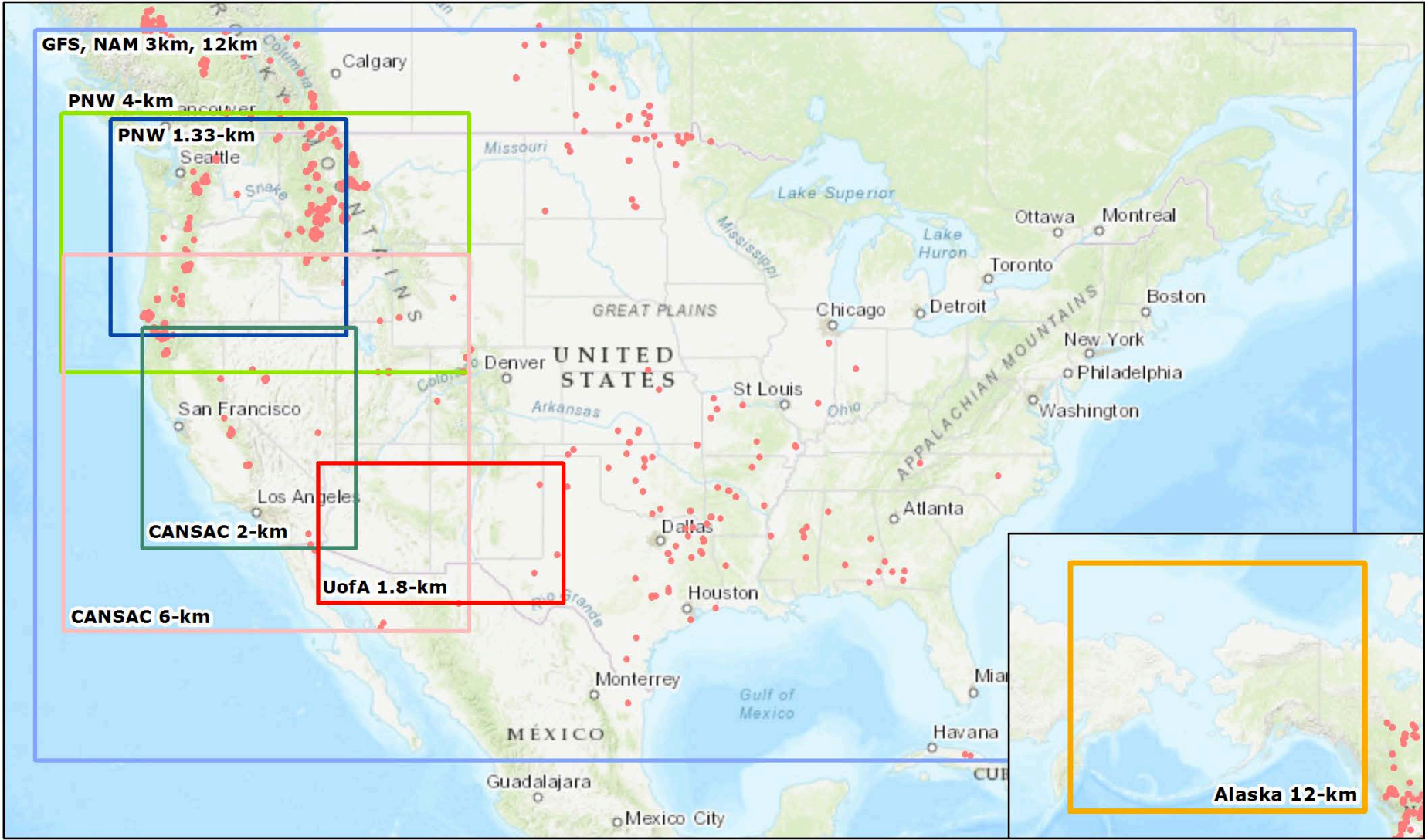


Earth Observatory 9/17/2014



BlueSky Daily Run

BlueSky Production Run Domains

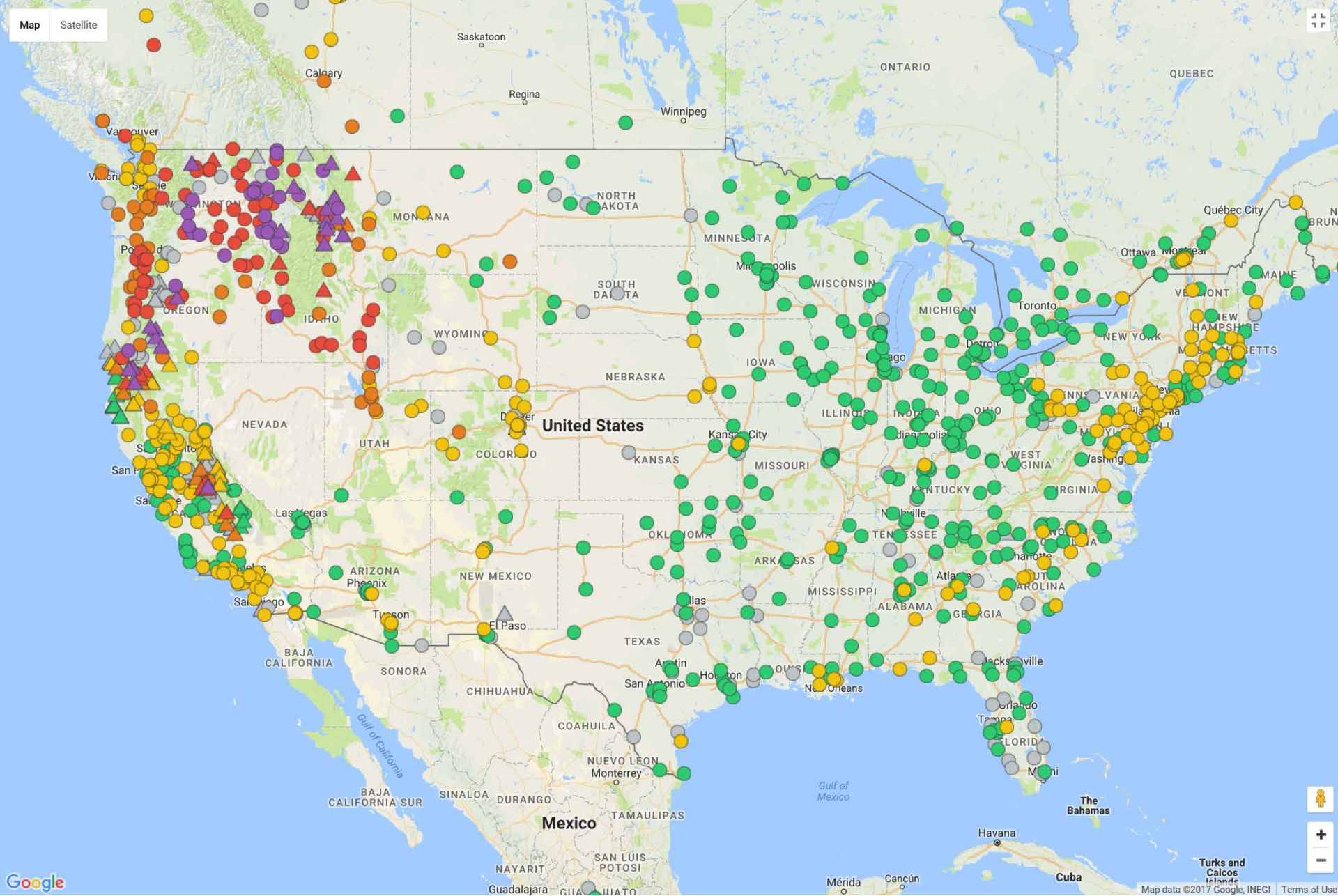




Monitoring

- Cache of 30 non-regulatory PM2.5 monitors
- USFS covered 20 and 10 donated by EPA and FWS
- Ordered through supply on incidents by an Air Resource Advisor and housed at Rocky Mt. National Cache
- Rapid deployment to affected and under-served communities
- Real-time telemetry
- Data available to all interested parties
- Development of monitoring data analytical tools useful for wildfire smoke by USFS PNW AirFire Team for temporary and fixed stations
 - <https://monitoring.airfire.org/monitoring/v3>
- USFS MTDC, PNW and ARA's to test new devices for program use





September 6, 2017 Monitoring of PM2.5, Hourly updated display at:
<https://monitoring.airfire.org/monitoring/v3/#/?date=LATEST&productType=plotTable&userProfile=simple>

Air Resource Advisors

Smoke specialists deployed as part of an Incident Management Team (THSP in ICS)

Roughly 48 ARA's and 24 trainees

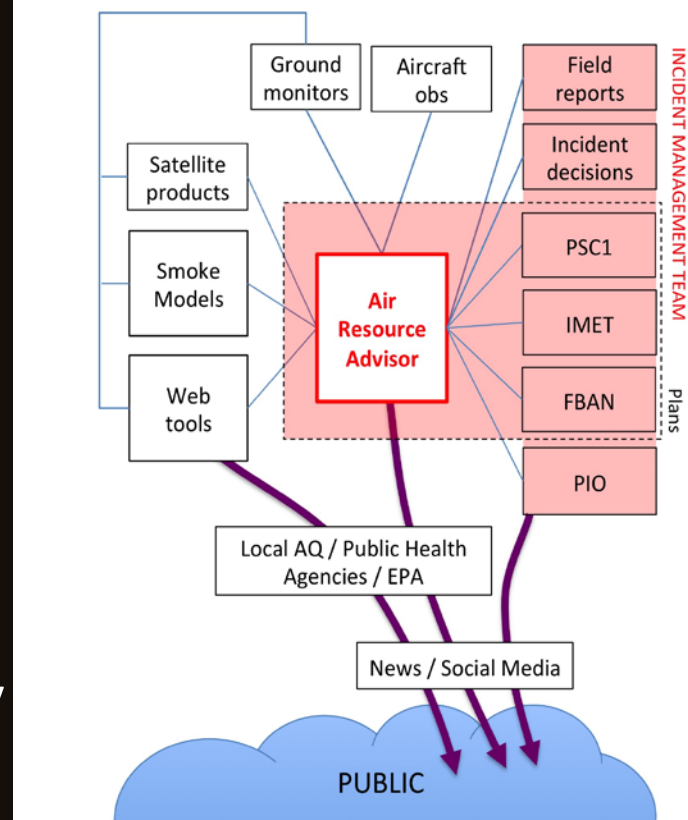
Highly diverse group: FS, BLM, NPS, FWS, EPA, State Forestry, Tribes, NRCS...must be qualified and able to be in ROSS/interagency fire dispatch system

Backgrounds: Wildland Fire, Air Quality, meteorology

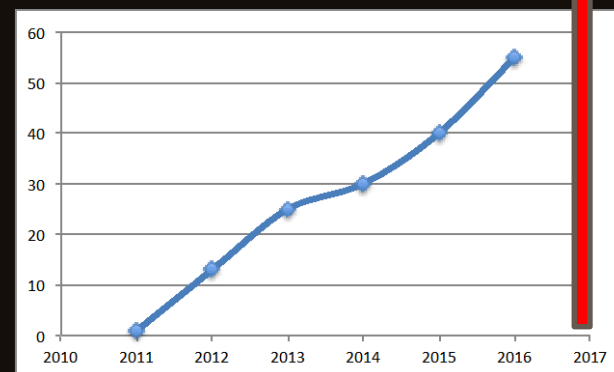
Training: 2013-2017, 2018 planned

Enables: Reduction of exposure through behavior modification (public or personnel)

- Allows incident information to be made available for modeling, etc...to develop smoke outlooks and other documents for communications
- Works with state/tribal/local air quality regulatory agencies and public health departments, impacted communities




ARA Deployments by Year




Communications

- **Create Smoke Outlooks and Impact Summaries**
 - **WFAQRP Programmatic Goal: Reduce exposure through behavior modification**
- Work closely with public health agencies
- Sync communications across impacted areas, and incident commands
- Provide critical additional information:
 - Monitor data
 - Fire activity and burnout operations
 - Fire behavior predictions
 - Meteorology
 - Incident command decisions
- PIO info and posting on net, Inciweb, blogs, social media
- Coordinate with partners on traffic smoke impact response efforts



SOUTHWEST COORDINATION CENTER
(SWCC)



"Cooperation Through Coordination"

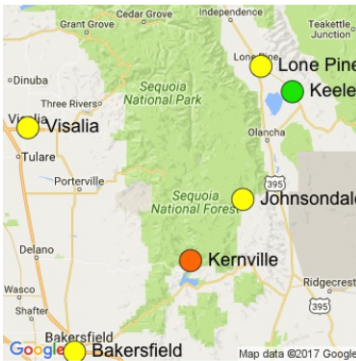
June 18, 2011

The air quality for northern, central, and southwest New Mexico and in eastern Arizona is expected to become unhealthy for sensitive groups.

Weather will be unhealthy for sensitive groups, which will create hazardous conditions for those who are sensitive to air quality.

Air Quality Report -- Cedar Fire

Issued Aug 23, 2016 by Josh Hall



Fire: Fire was moderately active yesterday afternoon, with slight growth along the perimeter and continued heat in the interior as heavier fuels are consumed. The fire grew to 22,739 acres and is 10% contained. With warmer drier conditions forecasted today and over the next several days, fire activity is expected to pick up. Firefighters have begun some defensive firing along containment lines in order to secure those lines before the expected increase in fire activity.

Air Quality Today: Localized unhealthy conditions are again expected in the Kern Valley north of Kernville this morning and persisting through late afternoon. Smoke is expected to be transported towards the east with moderate impacts expected in Kennedy Meadows, Ridgecrest, and possibly extending into Lone Pine and Keele late this afternoon and early evening diminishing overnight. USG to unhealthy impacts are expected in areas near the fire in Kernville and Wofford Heights.

Air Quality Tomorrow: Similar impacts as today, with smoke impacting large portions of southern Inyo County.

Past 30 hours	Yesterday	Station	Comment for Today (Tue, Aug 23)	Predicted Daily AQI	
				Today	Tomorrow
		Kernville	Unhealthy, 4pm-8pm		
		Johnsondale	USG, 7pm-10pm		
		Visalia	Moderate all day		
		Bakersfield	Moderate all day		
		Keele	Moderate, 4pm-8pm		
		Lone Pine	Moderate, 4pm-8pm		

Disclaimer: Conditions may change quickly, these projections are based on anticipated weather and fire activity. Sensitive groups including individuals with Asthma, lung or heart disease, children, older adults, and pregnant women should take precautions to avoid exposure to smoke. If you feel as though you are having health effects from smoke see your doctor or health professional as needed. In some cases your eyes are your best tools, if it is smoky outside you are being impacted. Use caution when driving in or around smoky areas.

Air Quality Index (AQI)	Actions to Protect Yourself
Good	None
Moderate	Unusually sensitive individuals should consider limiting prolonged or heavy exertion.
USG	People within Sensitive Groups* should reduce prolonged or heavy outdoor exertion.
Unhealthy	People within Sensitive Groups* should avoid all physical outdoor activity.
Very Unhealthy	Everyone should avoid prolonged or heavy exertion.
Hazardous	Everyone should avoid any outdoor activity.

2017 WFAQRP Efforts

- Over 100 ARA deployments
- More than 1100 Smoke Outlooks issued
- Covering most of the western United States in 2017
- Outlook coordination with EPA's AQI and Nowcast
- Many state regulatory agencies very engaged in 2017
- Much greater health department engagement
- Challenges in message consistency (1 hr impacts vs Nowcast)
- See wildandfiresmoke.net
- Contact: Pete Lahm
plahm@fs.fed.us

ARA Deployment Map

