Forest Service Report

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Agricultural Air Quality Task Force
December 5, 2013

Air Quality Programs within Forest Service

- State and Private Forestry / Fire & Aviation Management: Prescribed Fire Smoke Management, Wildfire Air Quality Response, Fire Ecology, Biomass Utilization, Emission Inventory

- National Forest Systems – National Air Program: NEPA, Class 1 impacts, IMPROVE, visibility, regional haze, critical loads, ozone effects, PSD, smoke management assistance, climate change

- Research & Development – Fire & Smoke, Joint Fire Sciences Program

- Climate Change Advisor to the Chief - Agency strategic planning

Addressing Smoke…Forest Health/Sustainability???

Forest Service publishes the Resources Planning Act assessment every decade to examine future trends for forests & rangeland.

- Drivers: climate change and population growth (development)
- Forests sequester 14% of US annual greenhouse gas emissions.
- By 2060, the RPA projects losses of about 21 million acres of forests to developed uses in the South (area the size of Maine).
- Rangeland loss in the Rocky Mts. up to 4.4 million acres.
- By 2030, housing density growth on about 57 million acres of rural forest land (area larger than all of New England).

Climate Change driving:

- Fire seasons now 60-80 days longer
- Annual acreages burned approximately doubled since 70's.
- FS projects acres burned may double again by mid-century.

Cohesive Wildland Fire Management Strategy
National Goals; Collective Solutions

Response to Wildfire
Fire Adapted Communities
Resilient Landscapes
Supported by Science

National Wildland Fire Cohesive Management Strategy

Vision: *"Safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and as a nation, live with wildland fire."*

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National Cohesive Strategy Goals

- **Restore and Maintain Landscapes:** Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.

- **Fire-adapted Communities:** Human populations and infrastructure can withstand a wildfire without loss of life and property.

- **Wildfire Response:** All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.

Cohesive Wildland Fire Management Strategy
National Goals; Collective Solutions

Response to Wildfire
Fire Adapted Communities
Resilient Landscapes
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- Developed in three phases.
  - All Phase I and II reports: <u>forestsandrangelands.gov</u>
  - Phase III report: finalizing the draft report addressing comments from internal and external stakeholders.
  - Phase III report in OMB review phase.
  - Next the Secretaries of Agriculture and Interior will sign the report and deliver to Congress in Spring 2014, in accordance with the FLAME Act requirements
- National Action Plan is being developed with specific actions that are nationally in scope, with an agency/organization lead for each action with timeframe.

- National Cohesive Strategy Site
- www.forestsandrangelands.gov

- Southeastern Regional Strategy Committee
- http://sites.nemac.org/southeastcohesivefire/

- Northeastern Regional Strategy Committee
- http://sites.nemac.org/northeastcohesivefire/

- Western Regional Strategy Committee
- http://sites.nemac.org/westcohesivefire/

Prescribed Fire Smoke Management
USDA –Natural Resources Conservation Service and Forest Service Tech Note

- BSMP's cited in FS policy
- BSMP's cited in NWCG Prescribed Fire Guidance

Basic Smoke Management Practices
October 2011

Fire is an essential ecological disturbance, providing many benefits to the environment in terms of wildlife, water and soil quality, and nutrient cycling. Prescribed burning can also be a means of protecting air quality by mitigating the occurrence of large wildfires and reducing invasive species. However, fire produces smoke which contains particulate matter (PM), ozone precursors, greenhouse gases, and other trace gases. Basic Smoke Management Practices (BSMPs) applied on prescribed burns can mitigate the impacts of smoke to public health, public safety and nuisance, and visibility.

Smoke is not like other air pollution sources--a direct control cannot be put on it such as can be applied to a power plant smoke stack--rather a variety of environmental factors must be taken into account to manage both the burn and the smoke from the burn. BSMPs outlined here offer a suite of options that a fire manager can utilize to reduce the impacts of their smoke. The Smoke Management Guide for Prescribed and Wildland Fire, 2001 edition (http://www.treesearch.fs.fed.us/pubs/5388) and the national smoke
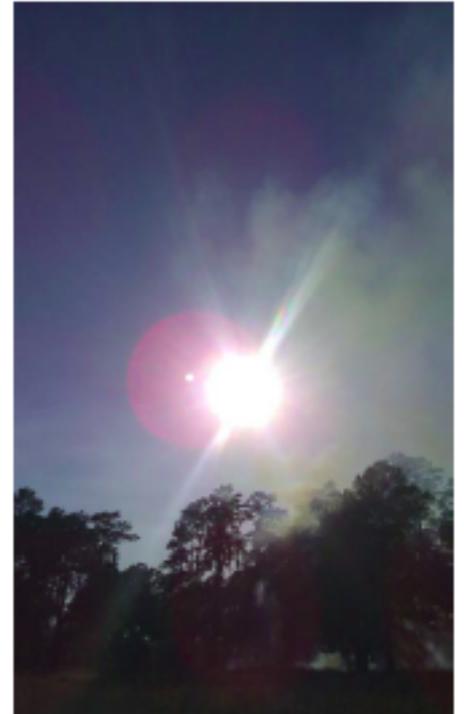
Prescribed Fire Smoke Management

- **FS Annual Burn Boss Refresher Course requires covering air quality**

- **New video on FS Smoke Management**
  http://www.youtube.com/playlist?list=PLNsZX2SBTlVnYQ1OKnrDqpZAZf qEiWO-k

- **Most stringent Prescribed Fire Boss smoke management training**

- **Leadership of NWCG Smoke Committee**

- **Invest into research of models & tools**
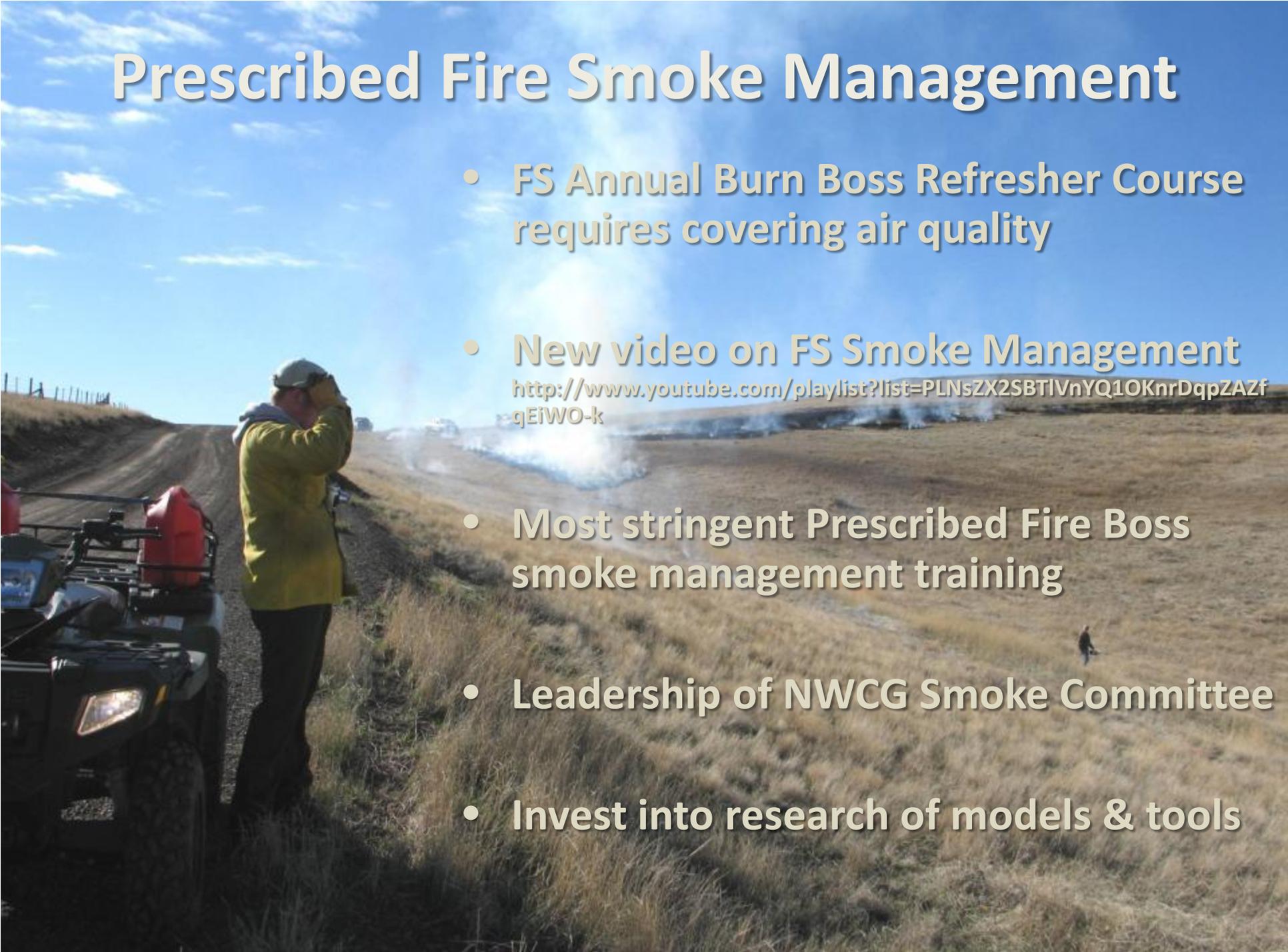
Joint Fire Sciences Program:
Sponsoring applied research and tools for analyzing air quality impacts from smoke

- Example Project: DEASCO$_3$ Case Studies
- 19 Case Studies from around the United States
- Fire Events from 2002 – 2008
- Large wildfire events
- Managed burning

The following examples are pulled directly from the project website

Interactive results accessible at
http://deasco3.wraptools.org

McNally Wildfire, 2002

Central CA summer Wildfire inside an Ozone Nonattainment Area

- Modeling showed fire contributions to ozone >30% [red bars in figure]
- Consistent signature of fire ozone impacts over several weeks
- Several days where modeling estimate fire caused NAAQS exceedance

Gray outline is fire perimeter
Dark circles are O$_3$ monitors impacted by fire
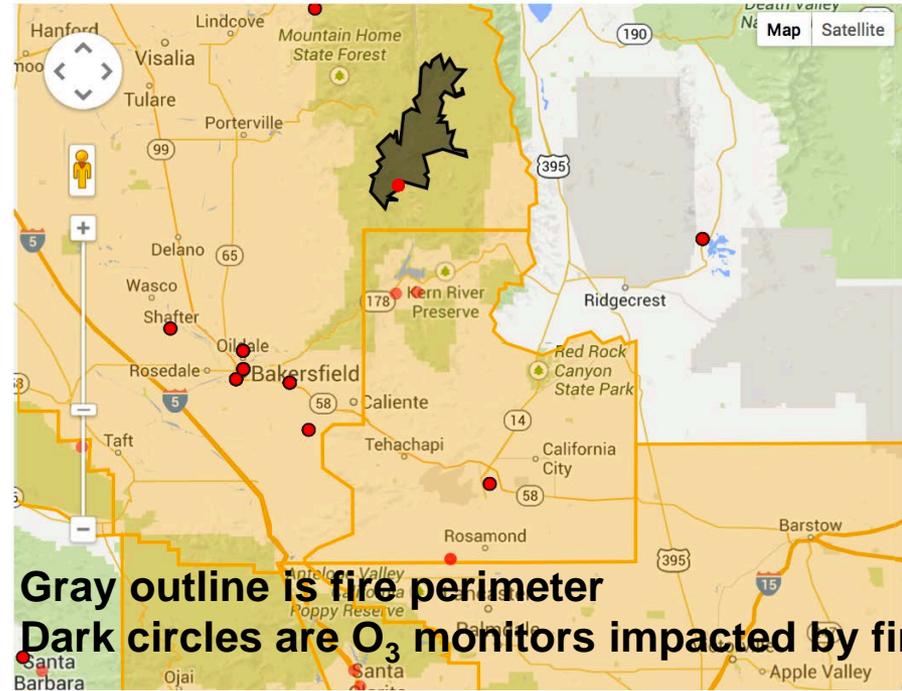
Observed Ozone paired with modeled max 8-hour fire contribution 07/21/2002 to 08/29/2002

Tulare County, CA - SEK402

[blue time series is observed O$_3$]

[gray shading indicates current 8-hr NAAQS]
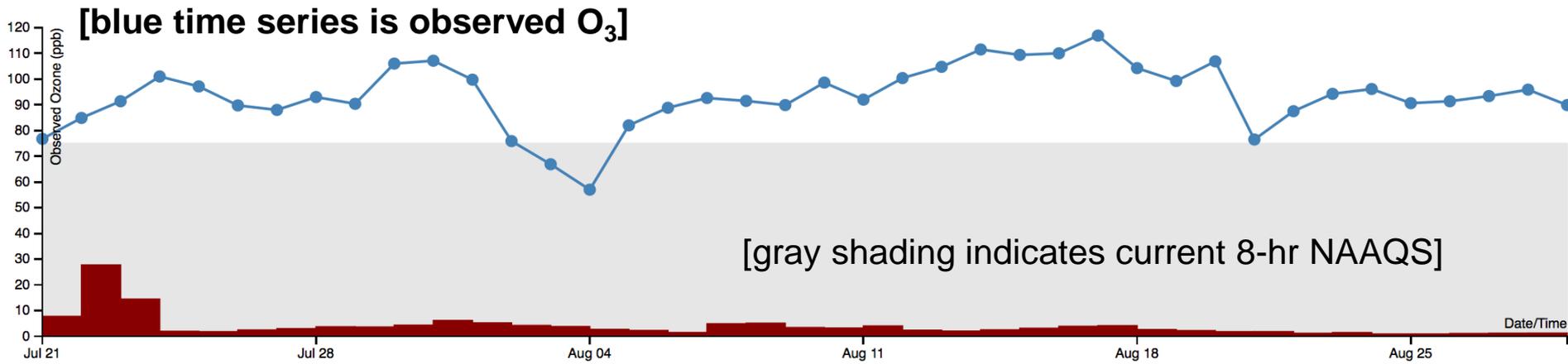
Nor Cal Wildfires, 2008

Large complex of wildfires starting June 2008
- Modeling results show significant (>50ppb) ozone formation from fire
- Comparing June 2007 to 2008 observed O_3 shows statistical spike during peak burning
- Several days in NorCal exceeded NAAQS, modeling estimates that fire is the cause in some cases

Contribution to CAMx Daily Max 8-Hour Ozone
All Fires
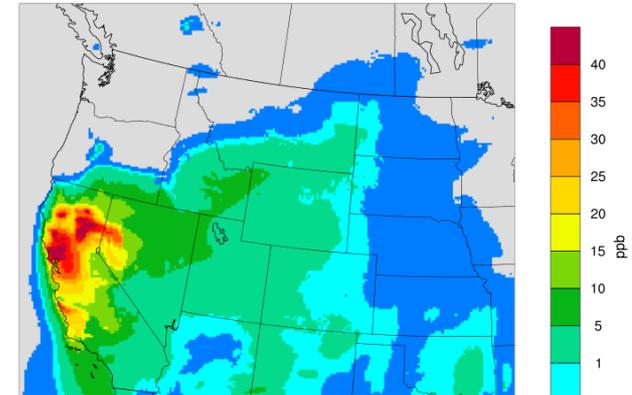
Observed Ozone by Month, 04/01/2007 to 10/31/2007
Shasta County, CA - 060890007
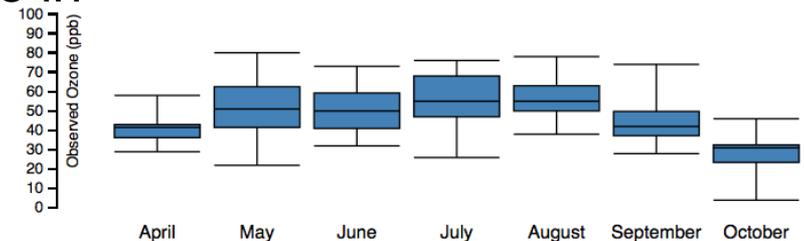
Observed Ozone paired with modeled max 8-hour fire contribution 06/20/2008 to 08/31/2008
Shasta County, CA - 06_089_0007
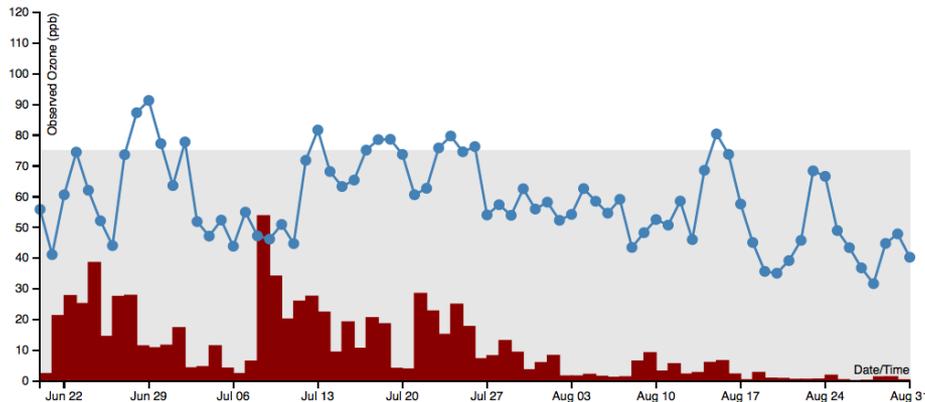
Observed Ozone by Month, 04/01/2008 to 10/31/2008
Shasta County, CA - 060890007
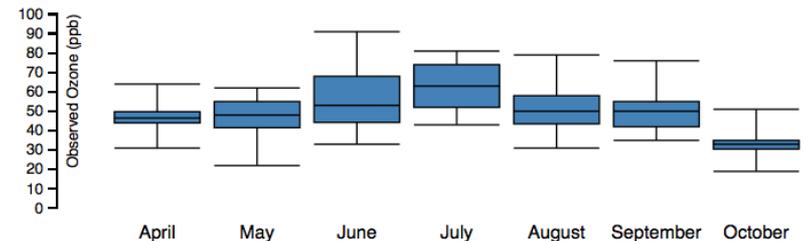
Managed fire in Louisiana, 2008

Early fall ozone episode near Baton Rouge Nonattainment Area (at or near 8-hr NAAQS)

- Fire stats for the region show fire activity dominated by prescribed burning
- Model source apportionment shows O_3 impact from Canadian wildfire on 9/27, otherwise Rx burning
- Similar data for other years shows consistent fire & O_3 signature

FETS Summary Fire Statistics 09/27/2008 to 09/30/2008

Emissions Totals Tons

Total NOx: 79.7	Total VOC: 90.1	Total PM2.5: 225.5

	Tons Consumed	Acres Burned	Tons NOx	Tons PM2.5
Wildfire	606	58	1.9	3.9
Prescribed Fire	23,003	2,390	71.4	205.2
Agricultural Fire	2,063	650	6.4	16.3

Modeled max 8-hour fire contribution by fire type, 09/18/2008 to 10/07/2008
Lafourche Parish, LA - 22_057_0004

[scale 0-10 ppb]

Ag: blue — Agriculture
Rx: green — Prescribed
WF: red — Wildfires

Prescribed Fire Councils

Why Councils?

Measuring Impact & Effectiveness

Formal Metrics:
- Affecting policy
- State recognition
- Burner liability
- Meetings
  - Attendance
- Training
- Burner "Certification"
- Address air issues

GEORGIA
PRESCRIBED FIRE
COUNCIL

GEORGIA
Prescribed
Fire Council

Prescribed Fire
A prescription for healthy forests and reduced wildfire risks in Georgia

State of Georgia
Counties with Resolutions
Supporting the Use of Prescribed Fire

RESOLUTION PASSED

19 September 2008
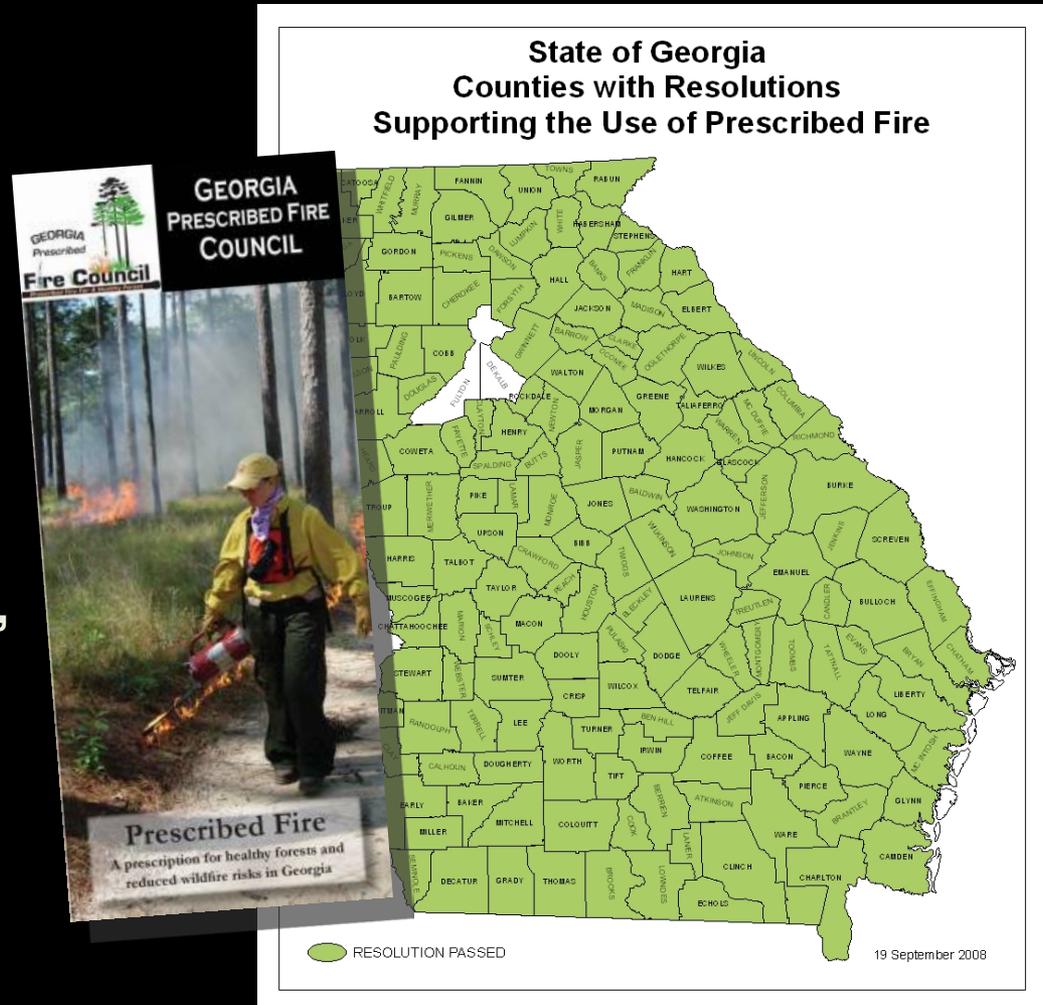
Spread of Prescribed Fire Councils
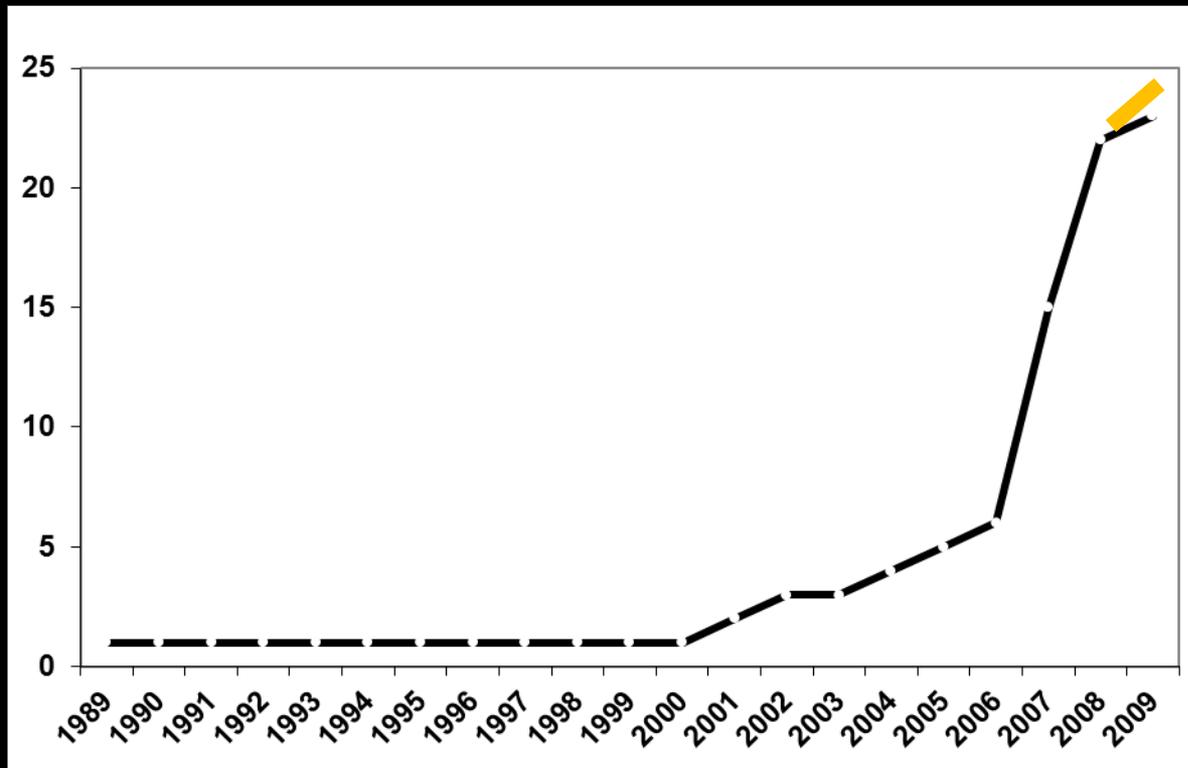
Current Status

- No Current Status
- Established
- Developing
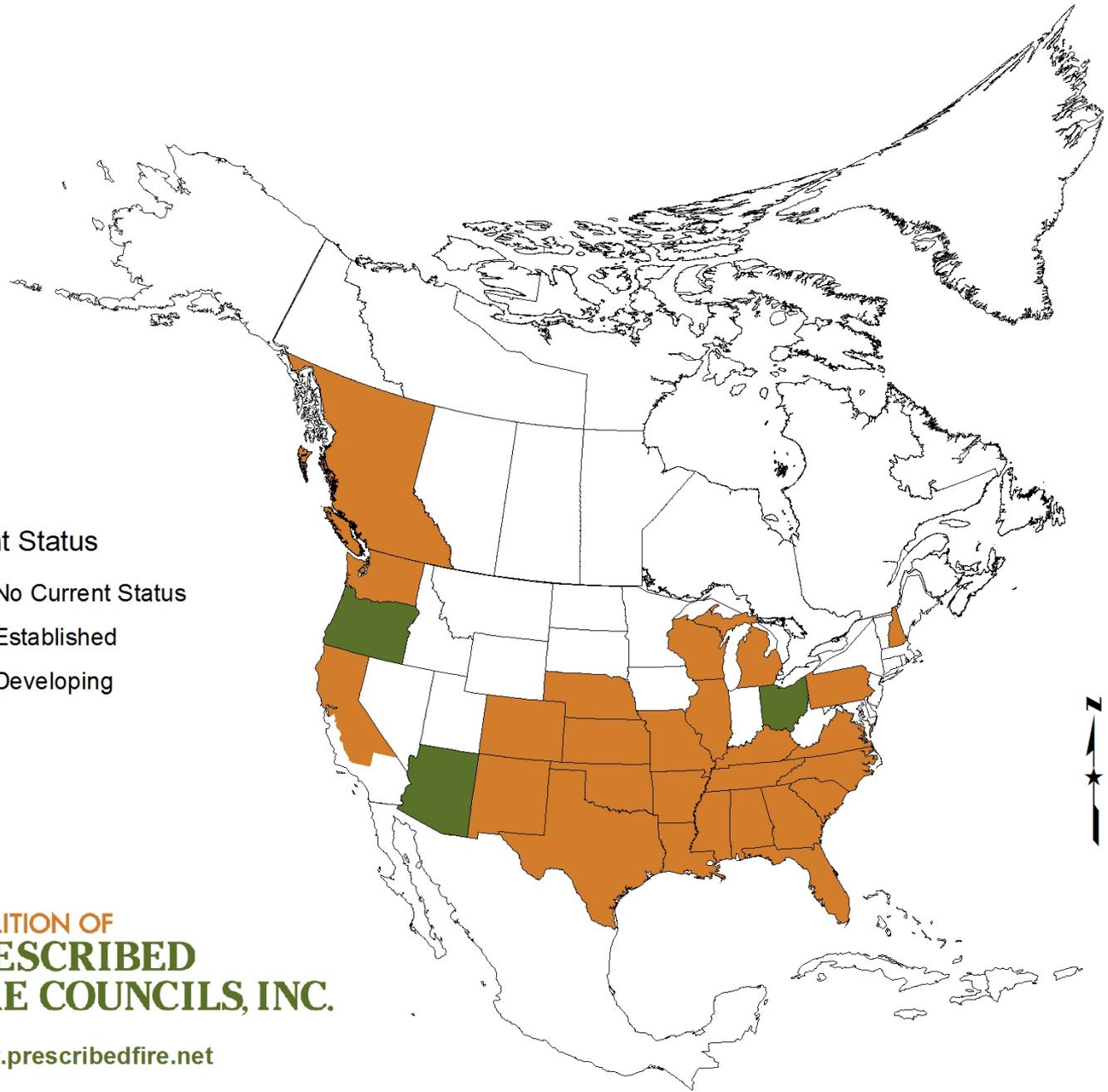
COALITION OF
PRESCRIBED
FIRE COUNCILS, INC.

www.prescribedfire.net

October 2013

Wildfire Air Quality Response Program 2013

- **Cohesive interagency effort to respond to smoke impacts from wildfire (Wildfire decisions now risk-based)**

  - **Public Health Impacts**

  - **Transportation Safety Impacts**

  - **Firefighters/Incident Management and Base Camp Personnel <u>Health</u> and Safety Impacts**

- **Deployment of <u>Air Resource Advisors</u> (25 assignments)**

  - **Incidents**

  - **Decision Support Centers**

  - **State Smoke Programs**

  - **Geographic Area Coordination Centers**

Air Resource Advisors - Role

Highly variable assignments dependent on incident needs

1) Monitoring

    1) Deployment

    2) Data Collection

2) Modeling

    1) Fire growth intelligence

    2) Impact prediction

3) Messaging

    1) Interagency coordinated message for public, incident…

1Hr Surface Smoke (micrograms/m^3) Thu Jun 16 2011 3AM EDT
(Thu Jun 16 2011 07Z)
National Digital Guidance Database
06z model run   Graphic created-Jun 15 7:52AM EDT
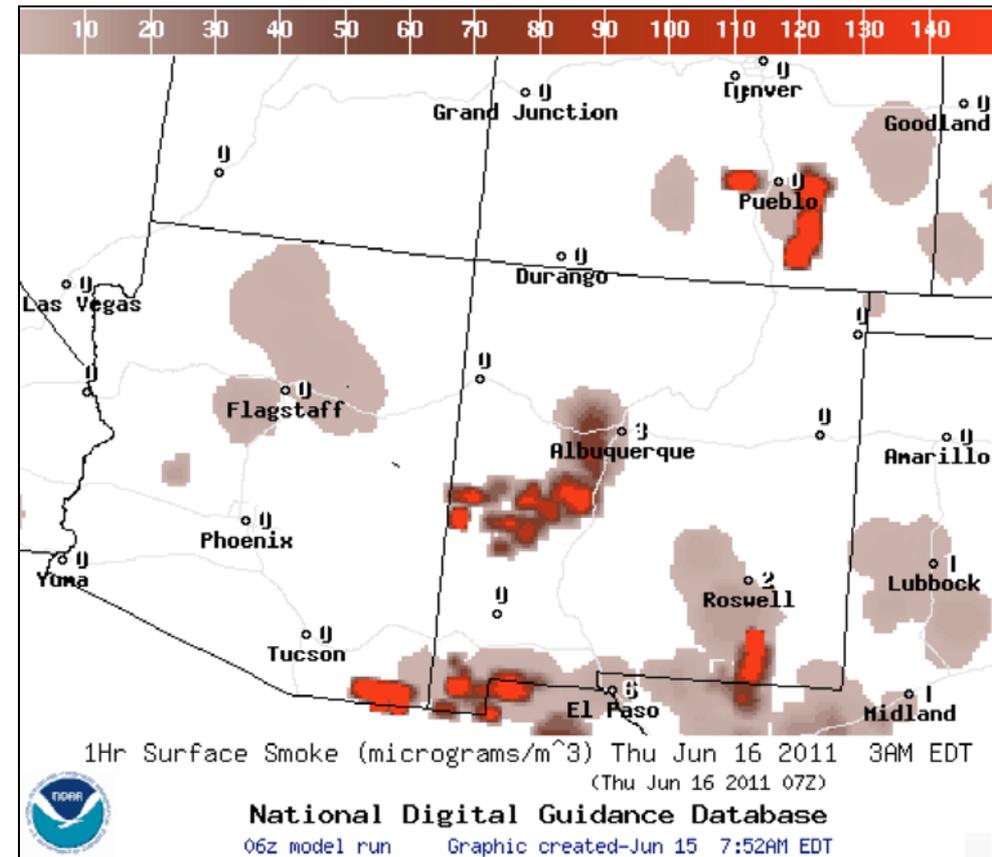
Air Resource Advisors

- Managed out of Forest Service FAM
  - 15 ARAs and 8 ARA Trainees
  - Federal (FS, BLM, FWS, NPS) and state forestry (NC, FL)
  - Casual Hire ARA's also utilized
  - ARA Training Workshop was held in March 2013 assisted by a Joint Fire Science Program grant and facilitated by PNW Research Station's AirFire Team
  - 2014 Training Workshop planned

- Challenge for 2014-Build more resources: EPA, State Regulatory Agencies and Forestry, NWS

Wildfire Response Resource and Tools

- National Interagency Fire Center (NIFC) Smoke Monitoring Kit.
  - 20 Easy-to-use smoke monitors for dispatch
  - Add to a state network
  - Fire camp
  - Along roads
  - Data web accessible

http://www.myfirecommunity.net/NeighborhoodPublic/Neighborhood279/FY12_ordering_instructions_ESAMPLERS.pdf

Wildfire Response Resource and Tools

- Specialized modeling runs to predict smoke impacts using fire growth models

- Develop public messaging on impacts
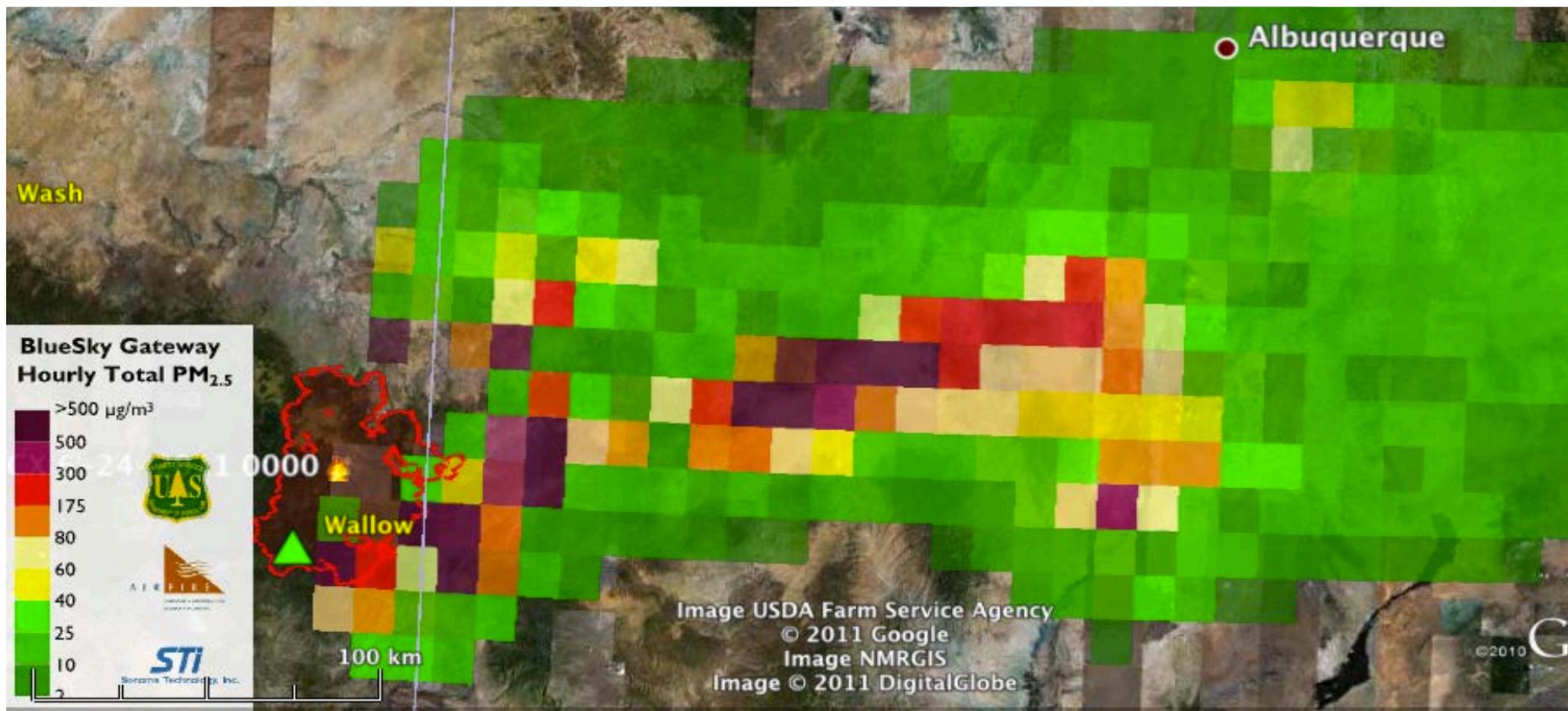
IAWF International Smoke Symposium
October 21-24, 2013

- Keynote Speakers: Robert Bonnie, ALA, Academia, JFSP, EPA
- Wildland Fire and Air Quality Response
- Fire Emissions and Air Quality Modeling
- Smoke and Climate Change
- Fuels and Fire Emissions
- Fire Activity and Emission Inventory
- Smoke and Populations – Health

No coverage of Next Generation (Personal)Air Monitoring

All available on-line for the next year

http://www.iawfonline.org/2013SmokeSymposium

More information:

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