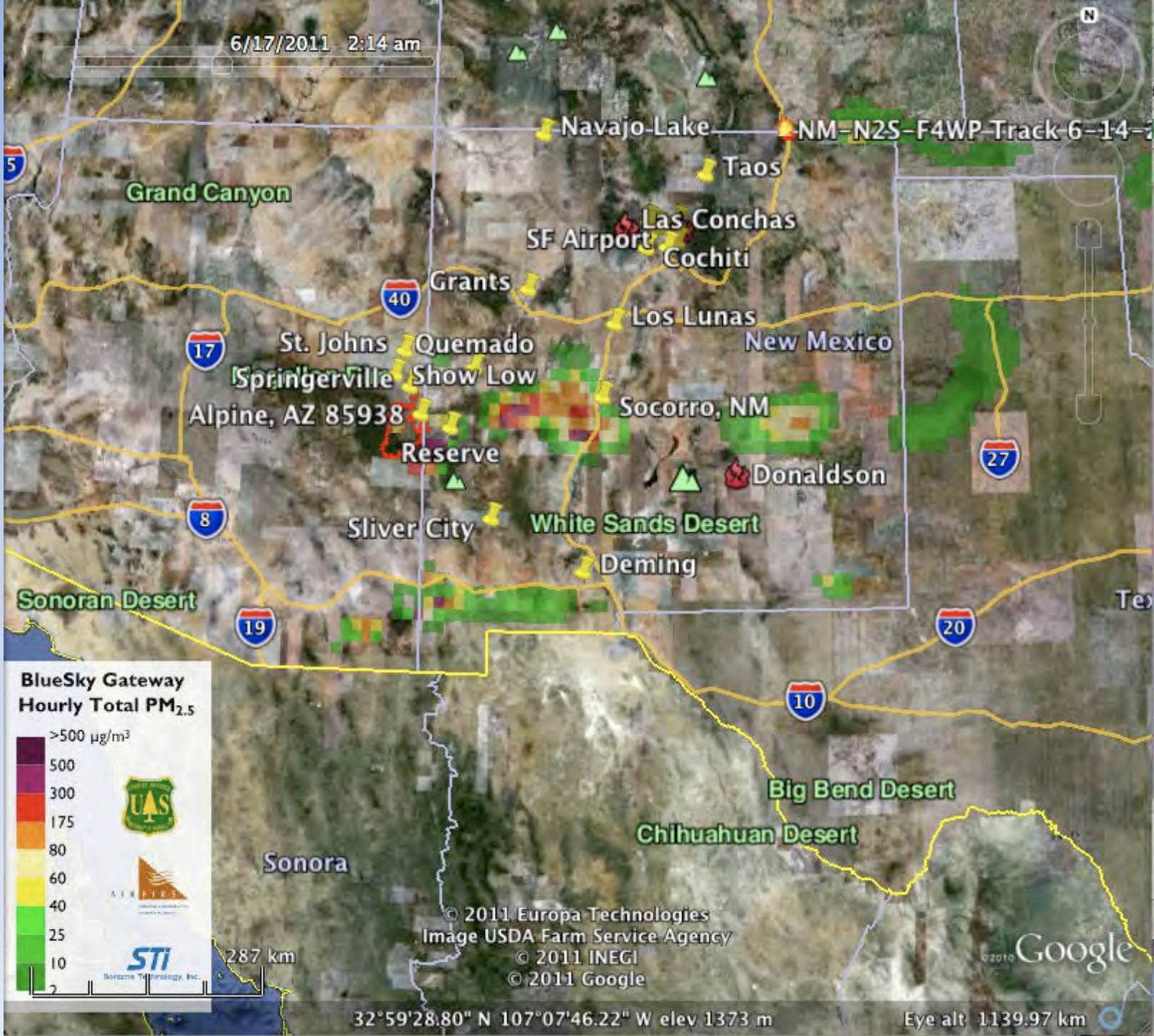
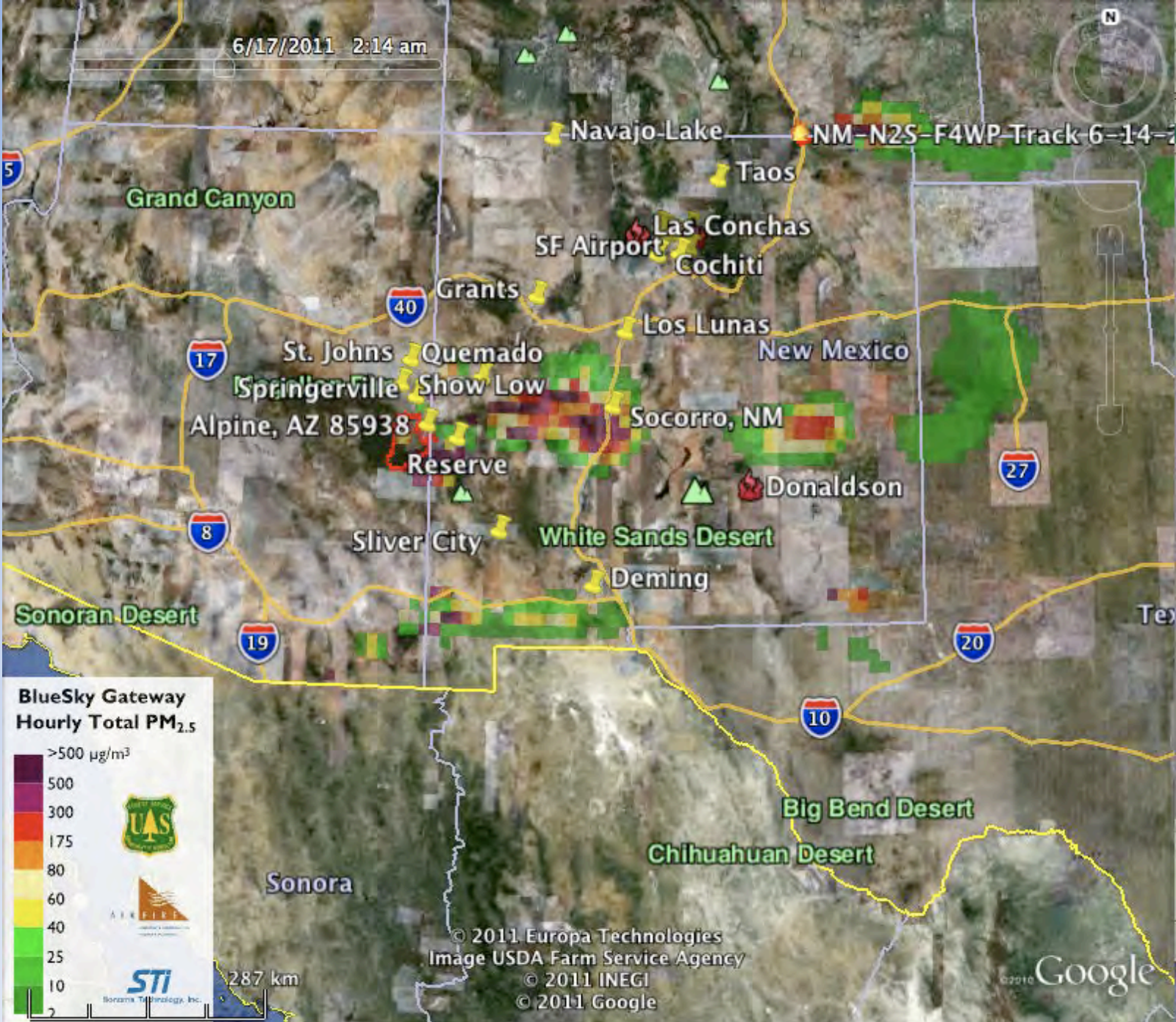


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6/17/2011 2:14 am



**BlueSky Gateway**  
**Hourly Total PM<sub>2.5</sub>**

>500 µg/m<sup>3</sup>  
500  
300  
175  
80  
60  
40  
25  
10  
2

287 km

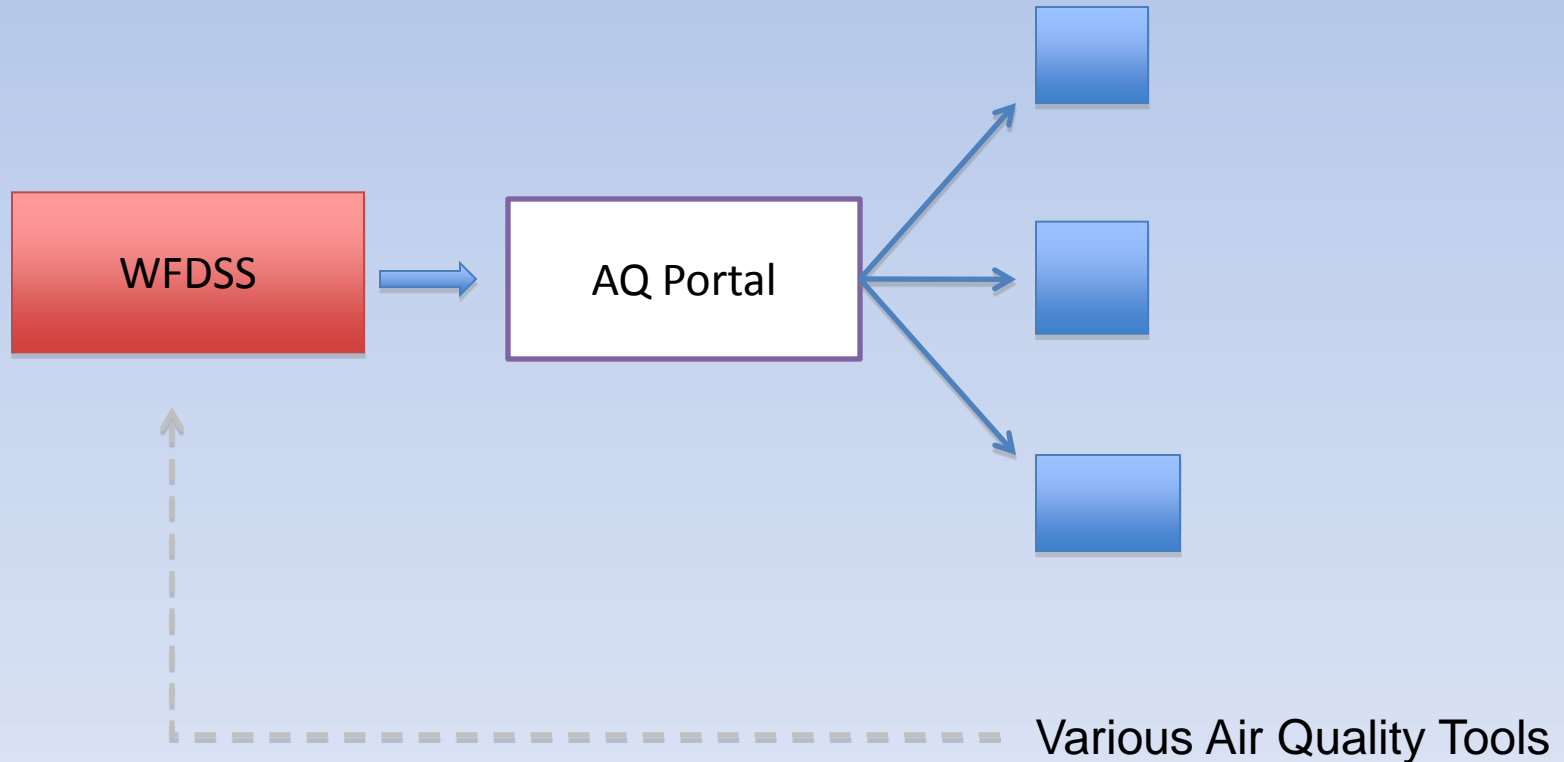
© 2011 Europa Technologies  
Image USDA Farm Service Agency  
© 2011 INEGI  
© 2011 Google

32°59'28.80" N 107°07'46.22" W elev 1373 m  
Eye alt 1139.97 km

# WFDSS Air Quality Tools Integration

<http://firesmoke.us>

Developed for use in wildfire decision-making process



<http://firesmoke.us>

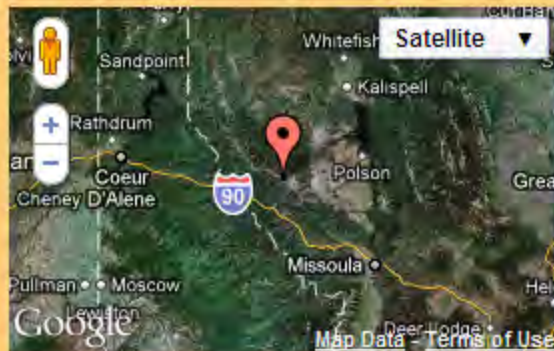
# Wildland Fire Air Quality Tools

## WFDSS Integrated Tools v1.0 (Beta Test)

STATUS: Updated 10/25; 8 of 8 tools linked and running. Help pages online. Products now open to all users. WFDSS table fixed. Some additional development work occurring. See notes below each tool for more information.

### STEP 1

#### Set your fire location:



*location used for tailored products.*

Latitude  °N

Longitude  °E

Click on map or type location.

### STEP 2

#### Select Your Tool:

- ▶ Smoke Guidance Point Forecast
- ▶ Smoke Guidance Regional Maps
- ▶ Diurnal Surface Wind Pattern Analysis
- ▶ Climatological Ventilation Index Point Statistics
- ▶ Current Air Quality Conditions Map
- ▶ Fire Information & Smoke Trajectories
- ▶ Customized Fuels, Consumption, & Smoke Modeling
- ▶ Probabilistic Smoke Impacts based on Past Weather

See below for tool description, attributes, and other details.

### Filter by:

#### ATTRIBUTE

- [\[any\]](#)

## Tool List

Current filter applied: none (viewing all products)

### Smoke Guidance Point Forecast

localized text summary of atmospheric conditions affecting smoke

## About this site

Increasingly air quality impacts from wildland fire are a matter of public concern and regulatory interest. The meteorological and air quality tools provided here are intended to support wildland fire decision making and integration of air quality assessments. This site integrates these tools with the Wildland Fire Decision Support System (WFDSS) in order to enable easy workflow with WFDSS. This integration is still in development and ongoing.

## Types of tools

Tools available include predictions from **meteorological models** that predict atmospheric conditions important for smoke transport and dispersion, smoke **trajectory models** that follow the predicted transport of a smoke parcel emitted by a fire, and smoke **dispersion models** that try to let smoke disperse realistically and can predict ground concentrations. Various tools also differ in the degree to which they are **customizable** - showing highly tailored output for your fire - or **regional** - showing cumulative impacts from all known fires in a region. Typically the more customizable a tool is the less information from other fires can be integrated into the output. The tools selected here are primarily designed for instant or very rapid (few second) access times. Only a few require longer delay times.

Set your fire location:

Latitude  °N

Longitude  °E



location used for tailored products

## WFDSS Integrated Tools

Filter by:

- [INSTANT ACCESS](#) | [EASY TO USE](#) | [LOCALIZED](#) | [TEXT-BASED](#) | [GRAPHICAL](#) | [INTERACTIVE](#)
- [USES CLIMATOLOGICAL DATA](#) | [SHOWS CURRENT CONDITIONS](#) | [1 DAY+ FORECAST](#) | [3 DAY+ FORECAST](#) | [7 DAY+ FORECAST](#)

## Smoke Guidance Point Forecast

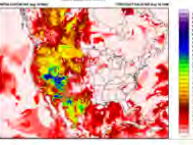
localized text summary of atmospheric conditions affecting smoke  
produced by: National FCAMMS

National FCAMMS Smoke Dispersion Forecast Guidance GFS Forecast Initialization Time: 06/07/2009 12UTC		Predicted conditions at your location affecting fire and smoke.	ATTRIBUTES INSTANT ACCESS EASY TO USE LOCALIZED text ATMOSPHERIC CONDITIONS
Forecast date/time (UTC)	06/07 12 06/08 00 06/08 12		
Mixing height (ft-agl)	334 338 835	<ul style="list-style-type: none"> <li>• Mixing Height</li> <li>• Transport Winds</li> <li>• Ventilations Index</li> <li>• Haines Index</li> </ul>	
Mixing height wind speed (kt)	3 4 7	<ul style="list-style-type: none"> <li>• National Scope</li> <li>• 7 day Point Location Forecast</li> <li>• Uses National Weather Service NAM and GFS weather predictions</li> </ul>	
Mixing height wind direction	150 109 123		
Visibility min (ft)	1151 1454 5883		
Haines Low	3 3 3		
Haines Medium	3 3 3		
Haines High	2 2 2		
PM2.5 surface (ug/m <sup>3</sup> )	-999 -999 -999		

[learn more](#)

## Smoke Guidance Regional Maps

maps of atmospheric conditions and predicted smoke concentrations  
produced by: National FCAMMS

National FCAMMS Smoke Dispersion Forecast Guidance GFS Forecast Initialization Time: 06/07/2009 12UTC		Predictions of ground smoke concentrations and atmospheric conditions affecting smoke using weather model data and smoke dispersion models. National scope.	ATTRIBUTES INSTANT ACCESS EASY TO USE REGIONAL graphics ATMOSPHERIC CONDITIONS SMOKE CONCENTRATIONS
			
<ul style="list-style-type: none"> <li>• Ground Smoke Concentrations (PM2.5)</li> <li>• Mixing Height</li> <li>• Transport Winds</li> <li>• Ventilation Index</li> </ul>		<ul style="list-style-type: none"> <li>• National Scope</li> <li>• 3 &amp; 7 day forecasts</li> <li>• Uses National Weather Service NAM and GFS weather predictions</li> <li>• 12km resolution (3-day) / 30-km resolution (7-day)</li> </ul>	

[learn more](#)

## Diurnal Surface Wind Pattern Analysis

RAWS based day and night windroses for nearest site  
produced by: CEFA/DRI

Analysis of historic RAWS data for the nearest site to your fire location

# Goals:

- To provide “one-stop” portal access to the most useful and relevant air quality tools
- To use data from WFDSS to drill-down into existing tools for relevant information
- To modify tools as necessary to better serve WFDSS needs
- To avoid the need for duplicate entry of information
- To provide help and how-to-use instructions

# 8 Tools Identified

- Includes climatologies, current conditions and forecasts
- Many give fire-specific, customized information
- More can be added

# Tools

National FCAMMS Smoke Dispersion Forecast Guidance  
GES Forecast Initialization Time: 08/07/2009 12UTC

NAM MIXING HEIGHT  
INITIALIZATION 00Z Aug 18 2009 FORECAST VALID 09Z Aug 18 2009

Wind Rose – AM – Jan – N 35°31.25' W 109°58.75'

Jan, AM – N 35°31.25' W 109°58.75'

Daily Variability Annual Variability

Fire Size

The screenshot shows the BlueSky Gateway Beta website interface. At the top, there are navigation tabs for Smoke, Fire, Downloads, Framework, Tools, and FAQ. Below this is a search bar and a user login area. The main content area features a 'Fire Information' form with fields for Size (5000 acres), Location (Longitude: -114.96, Latitude: 45.46), Ignition Date (20090526), and Ignition Time (10 AM PST). There are also 'Advanced Options' for Fuel Load (FCCS), Fuel Consumption (CONSUME), Emissions (FEPS), Plume Rise (FEPS), and Dispersion (CALPUFF). A map of the United States is displayed with a red pin indicating the location. The website is powered by Google.

- Smoke Guidance Point Forecast
- Smoke Guidance Maps
- RAWS Wind-roses
- Current Air Quality Monitoring Data
- Climatological Ventilation / Mixing Height Statistics
- Probabilistic Smoke Impacts based on Climatology
- Custom While-you-wait Trajectories
- Custom While-you-wait Fuels, Fire Consumption, and Smoke Impact Modeling
- Each Tool briefly explained on website
- What is this? & How can I use it? information provided for each tool
- Tools labeled and searchable based on characteristics to help quickly identify what you are looking for
- Tools provided by USFS AirFire, DRI/CEFA, FCAMMS, STI

Fire Information Fuels Consumption Emissions Plume Rise Smoke Dispersion Results

Fire Information

Size:

1000 acres

Fire Type:

- Wildfire
- Prescribed Pile Burn

Location:

Longitude: Latitude: Decimal Degrees

-120.89 46.74

Date:

Select date:

20110309

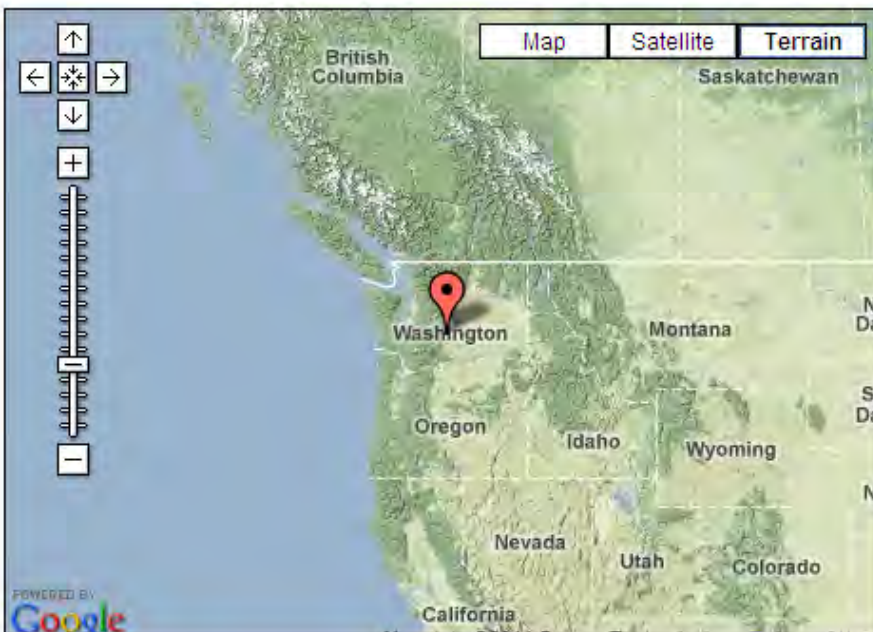
Fuel Moisture:

Moisture Level: 1-hr: 10-hr: 100-hr: 1000-hr: Live:

Dry 6 7 11 12 60

Duff:

90 %



Meteorological Data Source:

- National, 40-km, long-term archive and forecast
- National, 12-km, short-term archive and forecast
- Pacific Northwest, 4-km, short-term archive and forecast
- User-specified meteorology (simplified modeling)

Quick Run

- Fuels: FCCS
- Consumption: CONSUME
- Emissions: FEPS
- Plume Rise: FEPS
- Smoke Dispersion: HYSPLIT

Results

# BlueSky Playground Redevelopment

- Better support for prescribed burn planning and operations
  - Higher-resolution meteorology
  - Simplified dispersion
  - Support for broadcast burns by section
  - Support for pile burns
- Automated report generation
- Improved infrastructure to support more simultaneous users (especially during training)
- Redesigned interface for a better user experience
- Additional new features



# 2012 Development Plan

- **Making sure smoke information is fully operational on a 24/7 basis.**
  - Hardening of existing tools; Fix items identified by user feedback (Playground higher resolution & Rx fire choices, etc...); Specific operations person to be tasked.
- **Development of new help resources (experts) and training materials.**
  - Emphasis on mentoring; trying to get a specific lead mentor with operational expertise.
- **Development of a new, simple, text based smoke forecast guidance report product.**
  - Suitable for non-experts
- **Beginning development of more integrated smoke modeling system.**
  - Advanced development work with benefits in 2012.

# Model output can be found at:

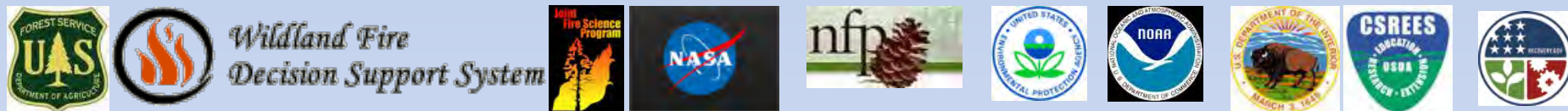
(Not a complete list)

- <http://firesmoke.us>
- <http://www.getbluesky.org> (login/password)
- <http://today.airfire.org/pnw4/> (Pacific Northwest 4-km output)
- <http://airquality.weather.gov/sectors/conusLoop.php#tabs> (NWS-NOAA air quality)
- <http://ready.arl.noaa.gov/HYSPLIT.php> (NOAA HYSPLIT)



# Thank you

<http://firesmoke.us>



Funding: F&AM, WFDSS, JFSP, NASA, NFP, EPA, ARRA, others

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206-732-7849



# Scenario #1

Using your North Creek case study, and assuming you are planning a burn for tomorrow (37.896, -111.771):

- Where would smoke typically go this time of year?
- Where is the smoke likely to go tomorrow?
- What  $PM_{2.5}$  concentrations would you expect ?
- Other considerations?

# Scenario #2

Use a lat/long of 34.24, -78.18 and planning a burn for today:

- What fuels will you use?
- What are the dispersion conditions?
- Which direction will the wind carry the smoke?
- What might happen with smoke tonight after the burn?
- Other considerations?



Directions

to, NY

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