

Integration of Western Smoke Management Programs, Air Quality, and F3

NASA Wildland Fire Applications Meeting

WRAP TOOLS

Tom Moore, WESTAR

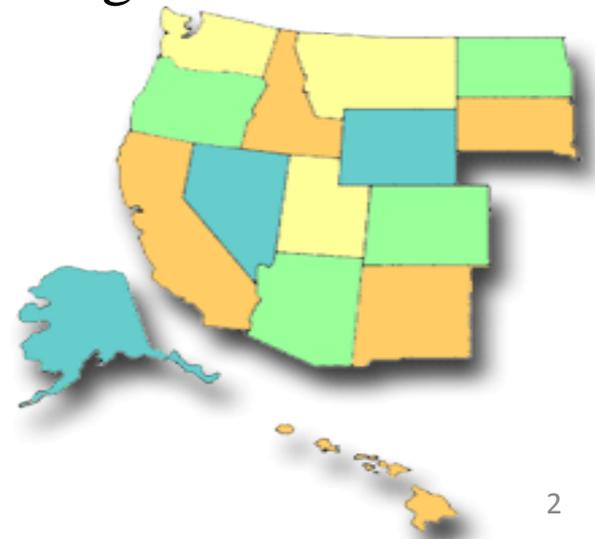
WRAP Air Quality Program Manager

March 1, 2017



Origins of WESTAR-WRAP's Focus on Fire

- States-Tribes-Local air agencies have authority to regulate air quality, including smoke
 - operational Smoke Mgmt. Programs with involvement from federal and state land managers, and private burners
- In the WESTAR-WRAP region, the Regional Haze Rule requirements were analyzed for the 118 Class I areas across the West, and a consensus policy was adopted to track all types of fire to achieve goals set by State/Tribal/Local air agencies' SMPs
 - Natural vs. Anthropogenic fire
 - Emission Reduction Techniques
 - Annual Emission Goals
- Applications beyond RHR
 - Nonattainment Area impacts management
 - Inter-agency coordination



Fire Tracking, Smoke Management, and Analysis

- State-Tribal-Local Agencies' Smoke Management Programs/Systems are designed to provide decision support, accountability, activity data, and *accurate* information about fuels and consumption
- WRAP's Fire Emissions Tracking System collects data from these systems (and more!) to create and support regionally/nationally coherent fire EIs
- The WRAPTools system combines these data with air quality monitoring, modeling, and other supporting information to help with fire planning, SIPs, and Exceptional Event determinations

Elements from selected operational western SMPs

<i>FETS/WRAPTools</i>	WA	Benton Co.	ID	OR	UT	AZ	Maricopa Co.	WY	CO
<i>Date</i>	DNR is burn date, ECY is permit date	Permit date, including fires that may never have happened.	YES	YES	YES	YES	YES	YES	YES
<i>Location (Lat/Lon)</i>	Lat/Lon	No	Lat/Lon	PLSS	Lat/Lon	Lat/Lon	Lat/Lon	Lat/Lon	Lat/Lon
<i>Burn Type (B, P)</i>	YES	No	YES	YES	YES	YES	YES	YES	YES
<i>Acres [#piles/vol]</i>	Yes but pile counts just assumed to be 3 tons	Acres or number of tons provided, no pile numbers	Only Acres, even for pile burns	Only Acres, even for pile burns	YES	Data is provided as a tons/acre avg duff depth	YES	Only total Volume provided	YES
<i>Agency</i>	Sort of	Implied			NO	NO	YES	NO	YES
<i>Notes</i>	RX, Ag		RX, Ag	RX, WF	Only planned listed, not all were executed	RX; Broadcast and Piles stored differently	RX, WF	RX, WF	NO Ag, no federal, state or tribal burning

Example: EPA Region 9 Efforts in Smoke Management

- federal air regulator role: interfacing with state & local air agencies, state forestry, & other federal agencies
- EPA R9 Air Resources Advisor Program participation
 - An emerging effort of the USFS trainings since 2013
 - A Technical Specialist, usually under the Planning Section
 - Many supporting organizations serve as ARAs: NPS, BLM, NRCS, State Forestry, Tribal (1), EPA (5)
 - Examples presented of EPA R9 ARA participation from ISS2 workshop:
 - Soberanes Fire
 - Fulton Fire
 - Three key areas of focus: 3Ms – modeling, monitoring, messaging
 - Improving how air quality is considered on incidents and decisions
 - Providing information to public and fire personnel
 - Provide information to supporting partners

WRAPTools Data Inventory

Data set	Availability*	Update Cycle
 Reported fire activity data for WRAP region agencies	2008–Present	Continued participation by Smoke Mgmt. Programs
 Satellite-detected fire activity data	2004–Present	Daily feed from NOAA
 Fire perimeter data (MTBS)	1984–2012	Annual from RSAC GTAC (USFS)
 Air quality planning-grade fire EIs	2008, 2011, 2014	Data processing for 2014 part of regional modeling efforts
 Fire climatology data	2004–2012	Data processing prioritized based on need and funding
 CAMx Modeling results	2008, 2011	Intermountain West Data Warehouse – Western Air Quality Study adds 2014
 Research-grade secondary PM modeling results	2011	
 Air quality monitoring data	Period of Record in AQS	Accessed via FED

* - increasing length of consistent data periods of record improve emissions projections' capabilities for air quality planning under CAA

Hysplit Run [\[Create New\]](#)

None

Start date

2012-07-15

End date

2012-08-15



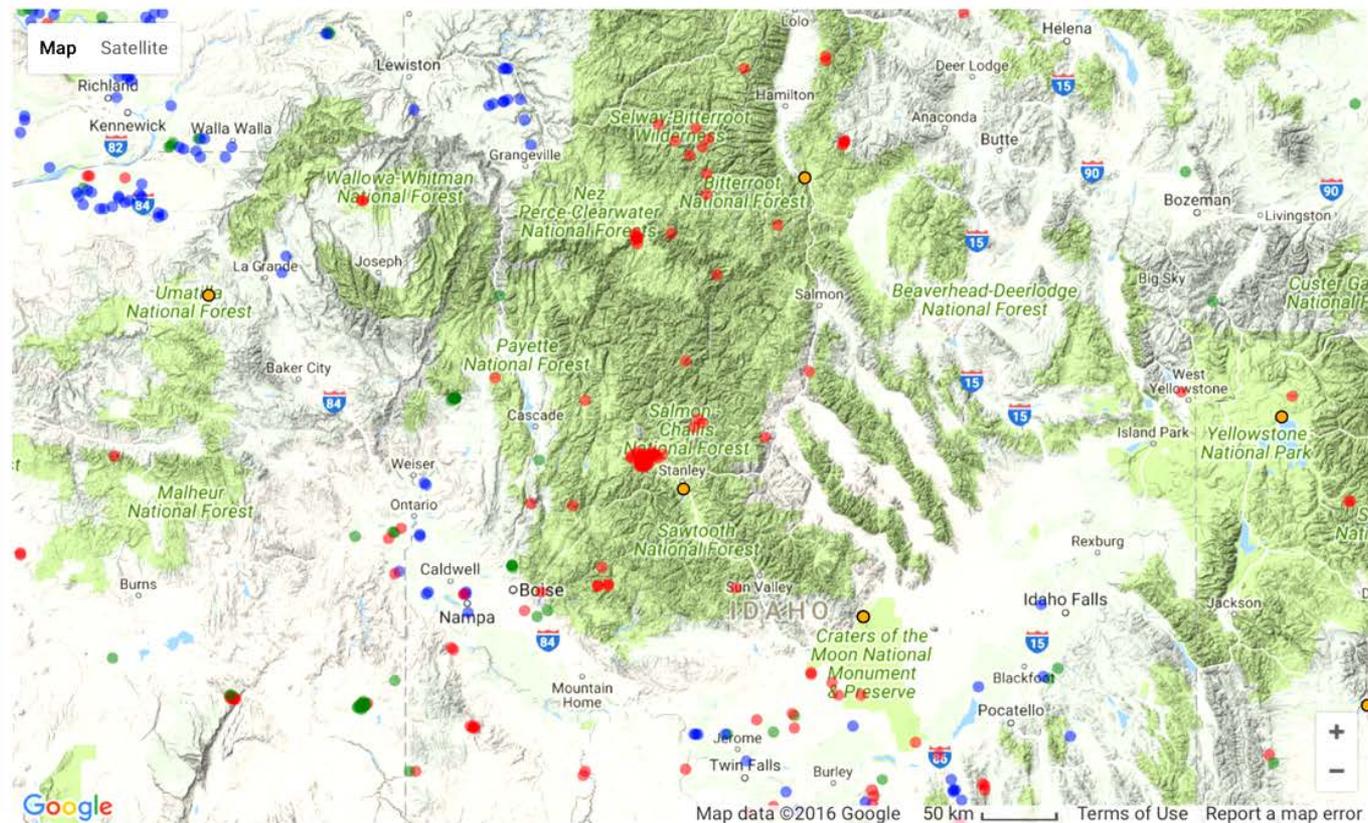
Monitor Type

IMPROVE

Plot Preference

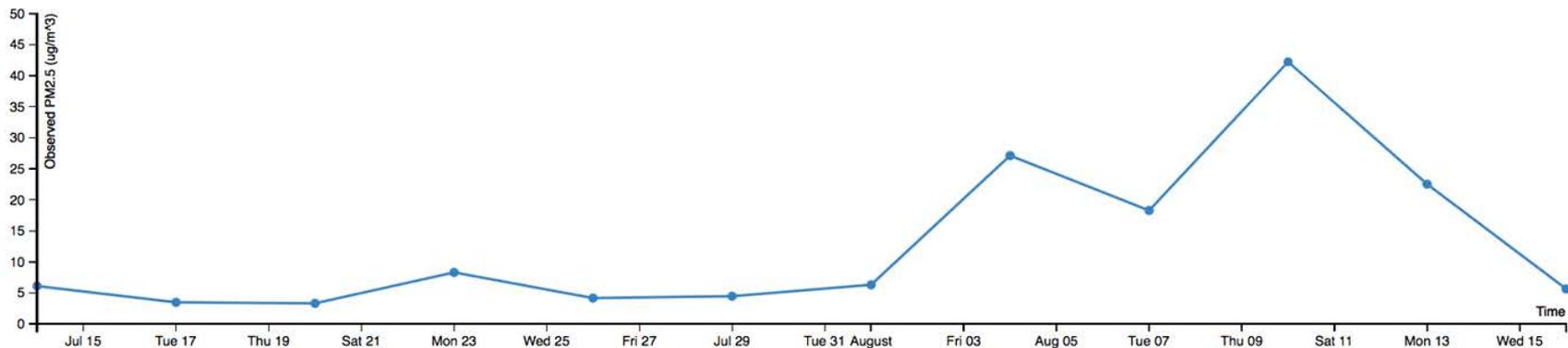
PM

Submit



Monitoring stations are shown with a black border; tan markers are ozone-only, yellow have both ozone and PM, and orange are PM-only. Unclassified fire activity is shown in black; known fires have a larger marker and are colored: blue (agriculture), green (prescribed) and red (wildfires). Roll over map features to see more information and click on monitoring sites to reveal timeseries plots of observed values.

24-hour Observed PM_{2.5} (MF) 07/12/2012 to 08/18/2012 Custer County, ID - SAWT1



Hysplit Run [\[Create New\]](#)

2012-08-10:: BKWD :: 44. ▾

Start date

2012-08-07

End date

2012-08-10



Google Map Data Terms of Use

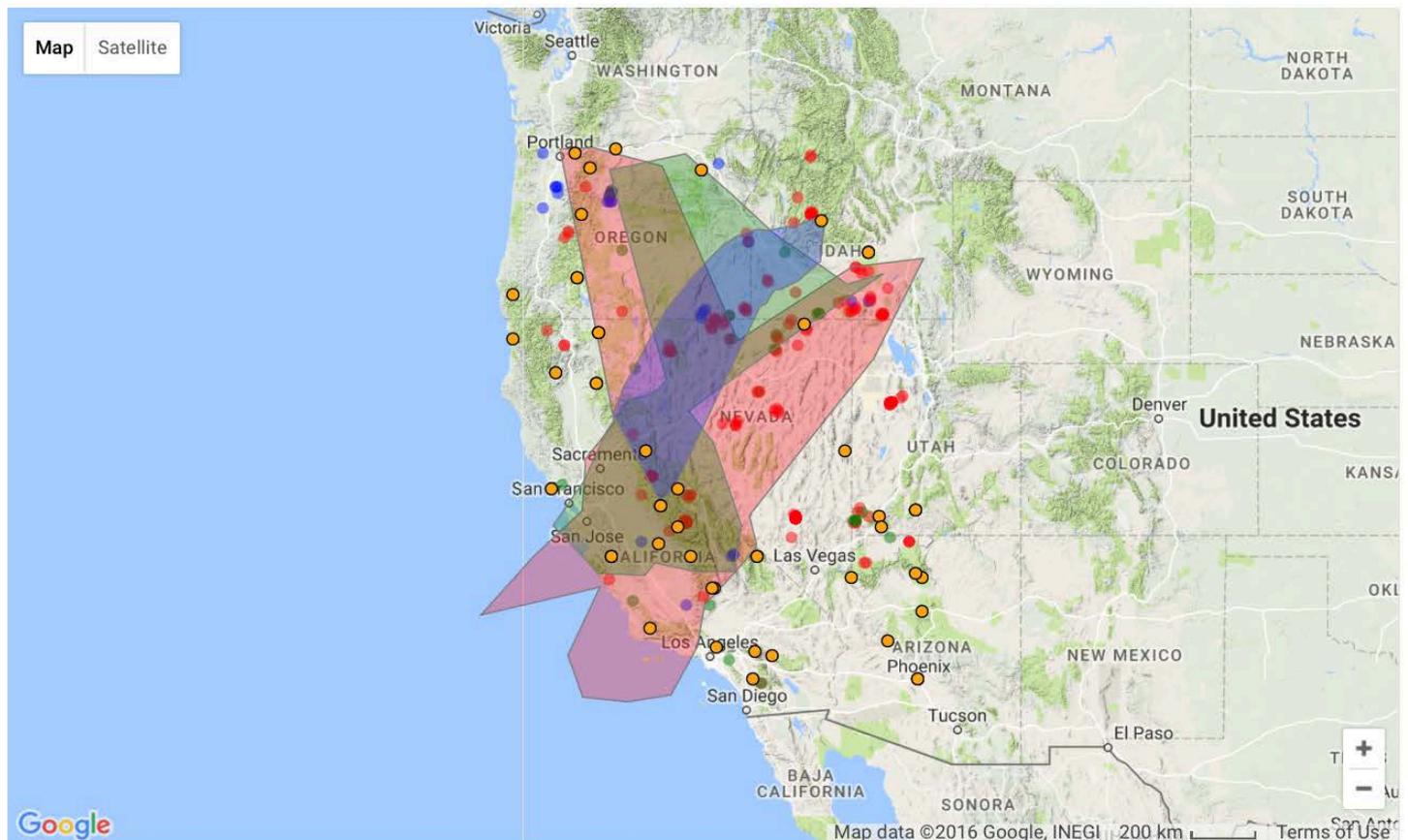
Monitor Type

IMPROVE ▾

Plot Preference

Ozone ▾

Submit



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- HYSPLIT envelopes **one**, **two** and **three** days upwind
- Result is permanently stored for later retrieval
- Map adjusts dates and bounds to envelopes
- Only three inputs needed:
 - Origin
 - Start Date
 - Back- or forward-trajectory

Hysplit Run [\[Create New\]](#)

2015-07-01:: FWD :: 44.280

Start date

2015-07-01

End date

2015-07-04



Google Map Data Terms of Use

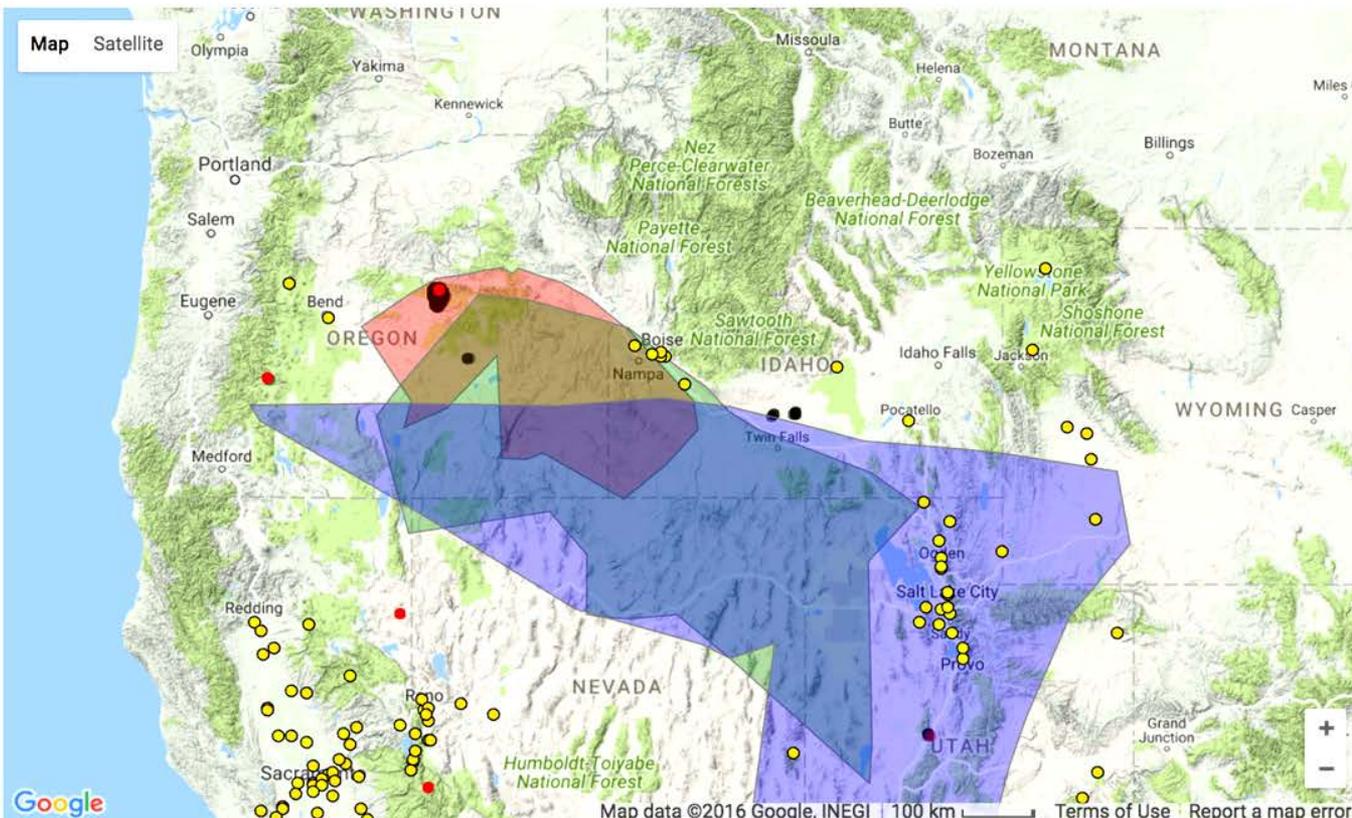
Monitor Type

Ozone-only

Plot Preference

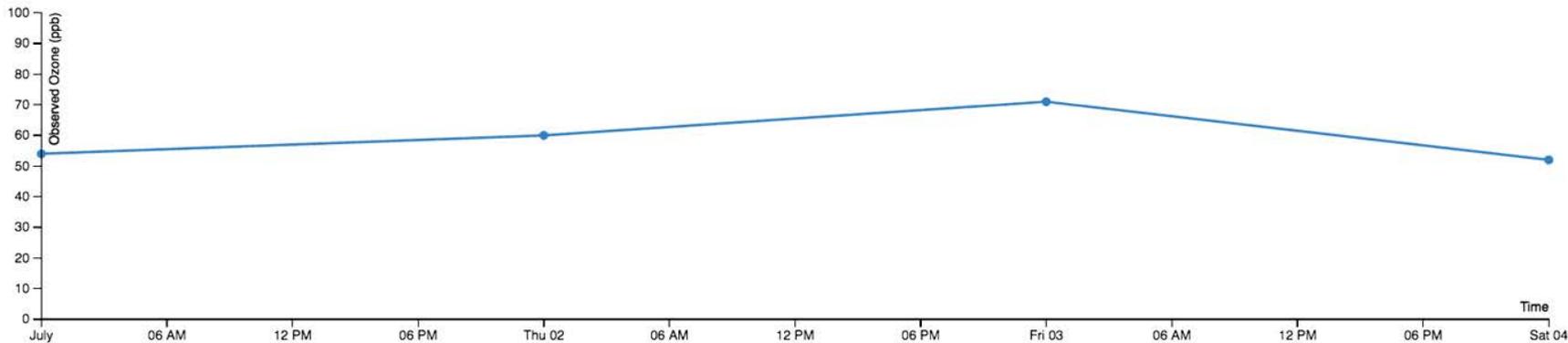
Ozone

Submit



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Max 8-hour Observed Ozone 07/01/2015 to 07/04/2015
Deschutes County, OR - 410170122



Hysplit Run [\[Create New\]](#)

2015-07-01:: FWD :: 44.280 ↓

Start date
2015-07-01

End date
2015-07-04

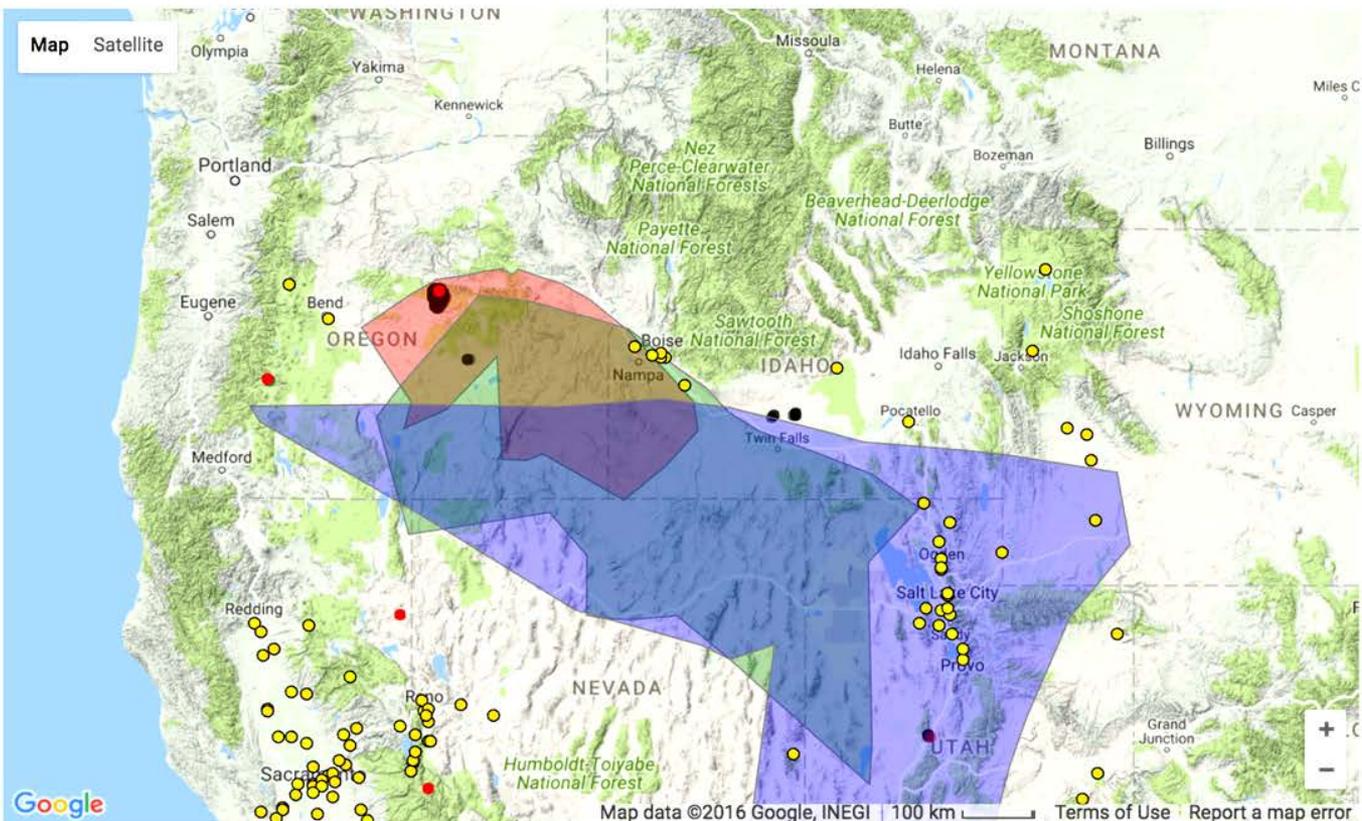


Google Map Data Terms of Use

Monitor Type
Ozone-only ↓

Plot Preference
Ozone ↓

Submit



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Example from July 2015

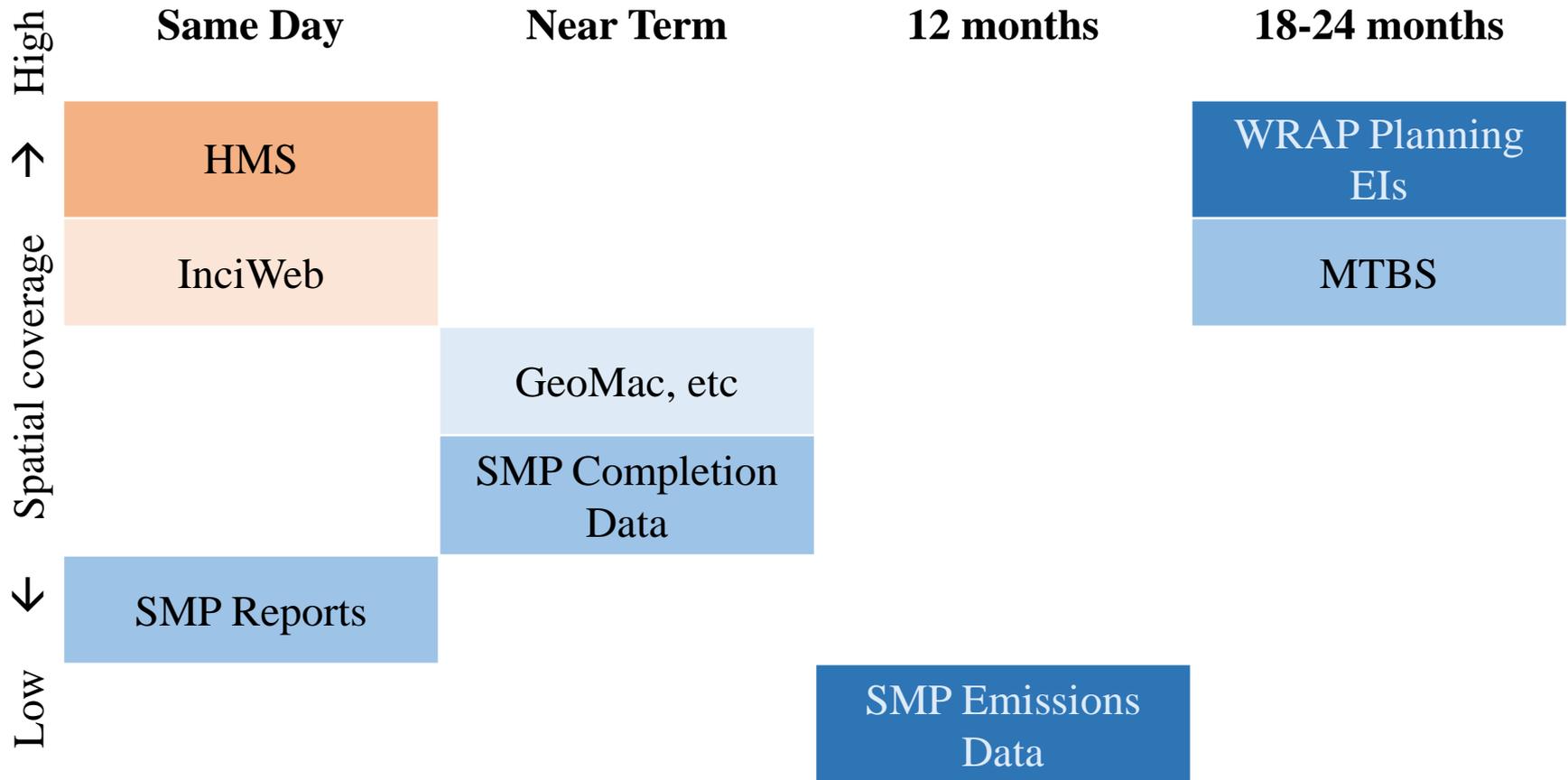
Forward trajectory

From one large wildfire in Oregon

Ozone in Bend spikes on 7/3

Behavior of HYSPLIT shows possible influence from the fire event

Availability of Relevant Fire Datasets



*Color indicates data quality/completeness

Hysplit Run [\[Create New\]](#)

None

Start date
2012-11-07

End date
2012-11-08

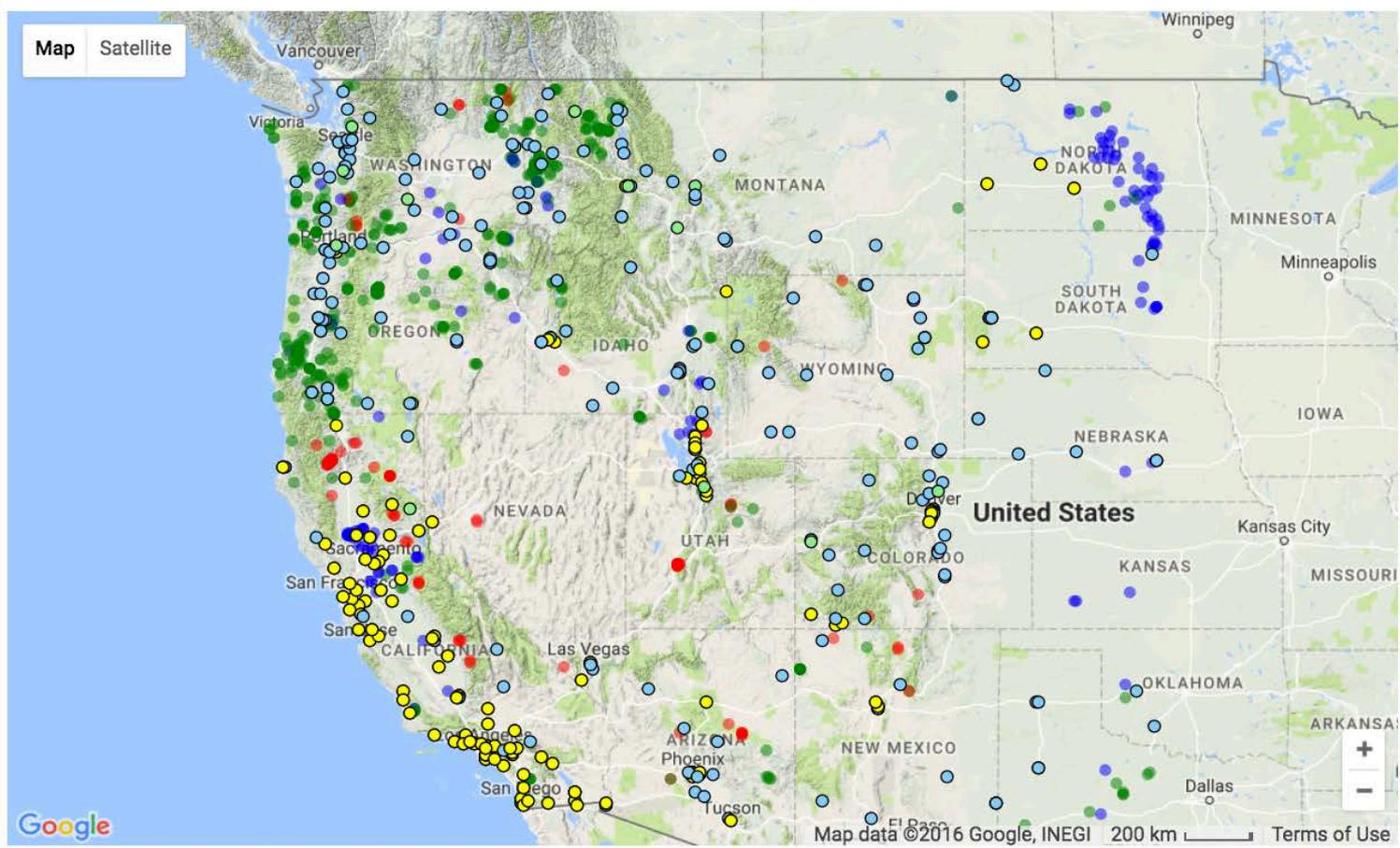


Map data ©2016 [Terms of Use](#)

Monitor Type
FRM

Plot Preference
PM

[Submit](#)



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2012, 2015, and 2016 on the same two days

Shows differences in available data:

“Black” are unclassified fire events of unknown size

Colored fires are classified, of known size, with at least a first-order emissions estimate.

Hysplit Run [\[Create New\]](#)

None

Start date
2015-11-07

End date
2015-11-08

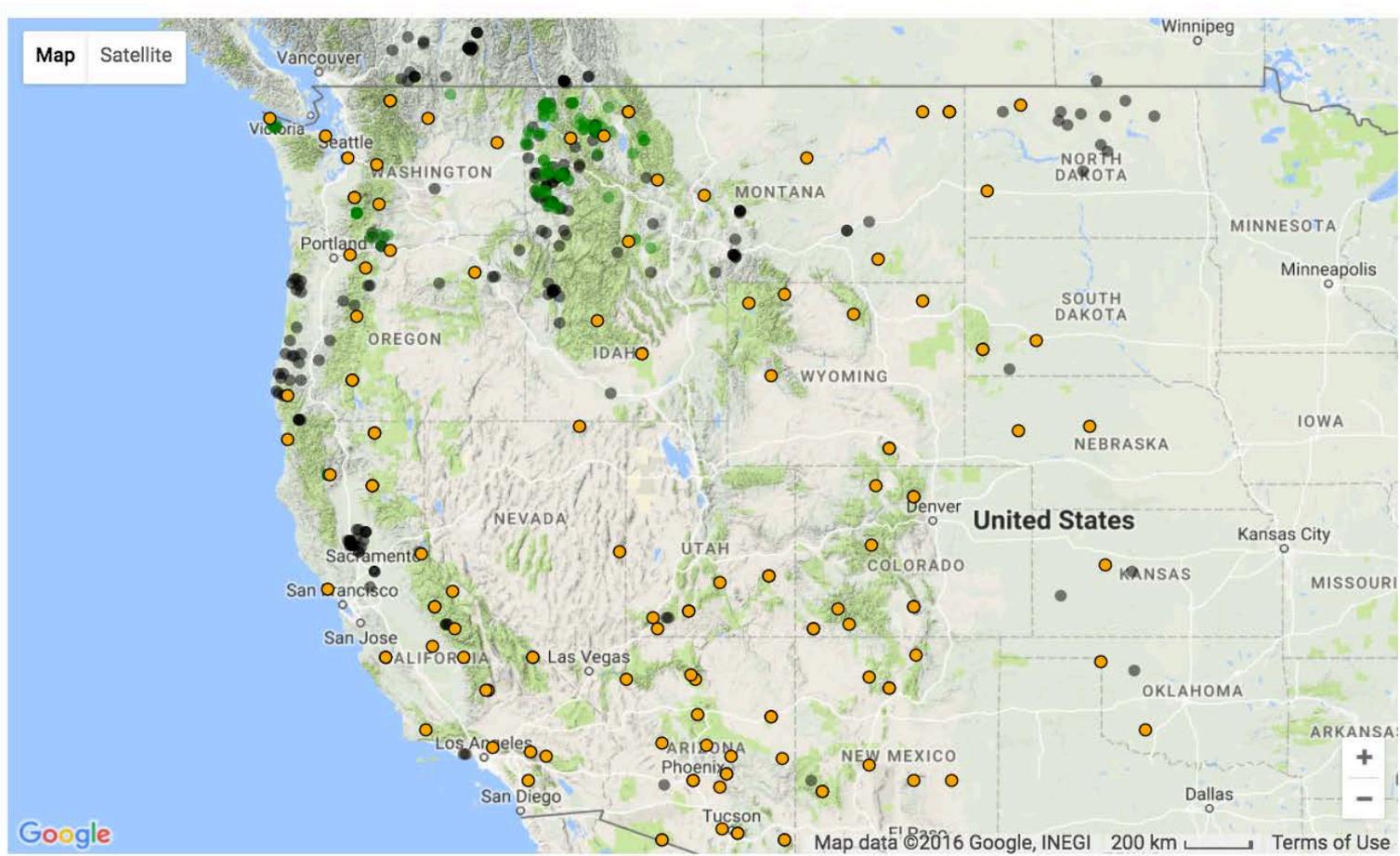


Map data ©2016 Terms of Use

Monitor Type
IMPROVE

Plot Preference
PM

Submit



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Hysplit Run [\[Create New\]](#)

None

Start date
2016-11-07

End date
2016-11-08

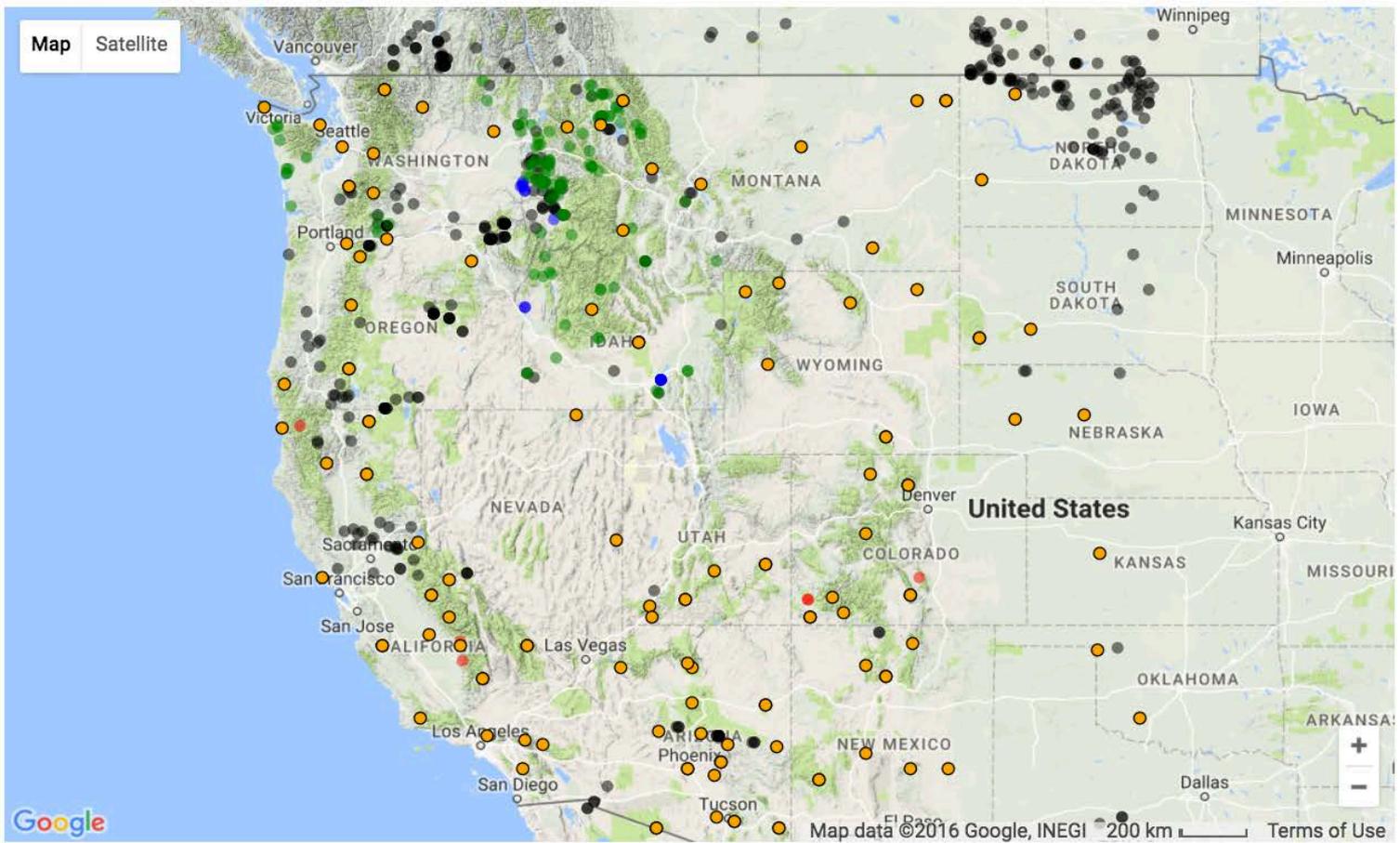


Map data ©2016 Terms of Use

Monitor Type
IMPROVE

Plot Preference
PM

Submit



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A Century of Wildland Fire Research: How Can We Apply What We've Learned?

Monday, March 27, 2017
8:30 am – 12:30 pm EST
Washington, DC
Registration opens at 7:45 am

Wildland fire management is becoming increasingly difficult for federal, regional, and local authorities due to a variety of challenges, including drier conditions in some areas of the country and the expansion of the urban-wildland interface. Developing long-term wildland fire management approaches informed by wildland fire science can lead to more strategic and cost-effective planning and management strategies for living with wildland fire. Join this half day workshop in Washington, DC, and also by webcast to discuss what has been learned from the wildland fire research that the U.S. Forest Service, other federal agencies, and research organizations have conducted and supported over the past century and how it might be applied toward more effective planning and management.

#WildlandFire

[Register Now »](#)

WRAP Tools:

WRAP FETS

Explore current fire activity in the WRAP region.

DEASCO₃

Learn about fires' contribution to Ozone (O₃).

PMDetail

Learn about fires' contribution to Particulate Matter (PM).

wraptools.org

Western Regional Air Partnership
Joint Fire Science Program



FIRESCIENCE.GOV
Research Supporting Sound Decisions

<https://www.wraptools.org/>

2nd International Smoke Symposium - Nov. 14th training workshop on EPA programs, FLM mgmt., and WRAP Tools