

Idaho Department of Environmental Quality

Idaho Smoke Management Operational Forecasting

Jacob Wolf

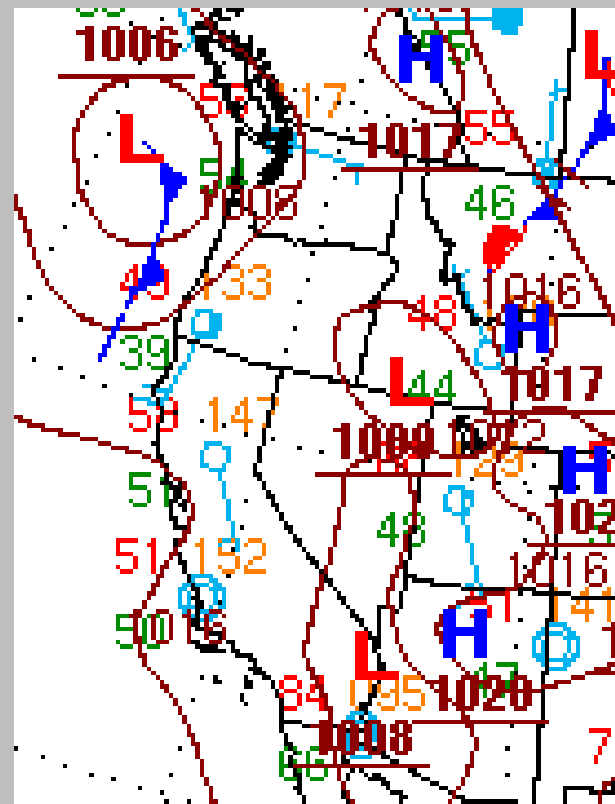


Outline

- Overview of operational smoke forecasting
- Meteorology
- Ag Burning
- Prescribing Burning
- Wildfire
- Review

Assessing Smoke Impacts

- Data Download
- Analysis
 - Met Data
 - AQ Data
 - Fire Data
- Modeling
 - AP5
 - Blue Sky
 - HRRR
 - AQFG
- Products
 - AQ reports
 - Weather and Smoke Dispersion Forecasts



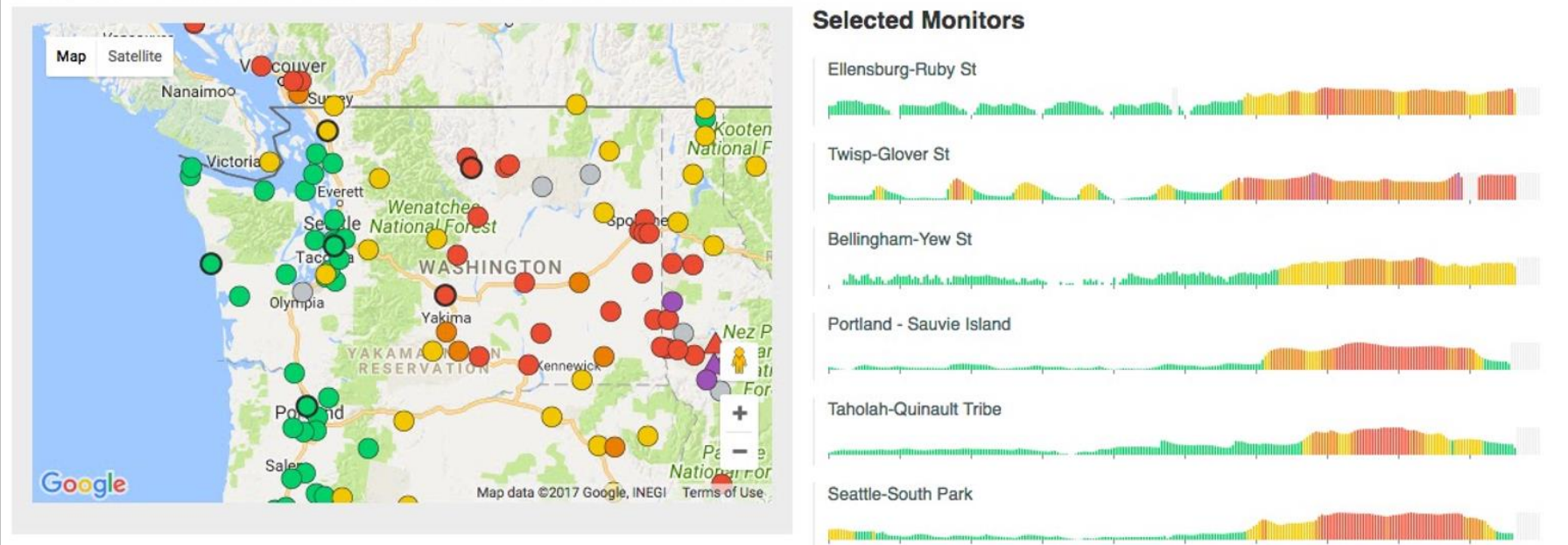
Ag Burning Program

- Permitted agricultural burning program run by IDEQ
 - Rule requires $PM_{2.5}$ and O_3 forecasting for burn call
 - Recent lowering of O_3 standard → rule change → SIP demonstration
 - Only 3 O_3 monitors in state
 - When burns go bad, Post Event Review (Burn Day analysis)
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- Would benefit from near-real time surface and mid-level O_3 for burn day decisions
 - Early morning timing of product availability would be beneficial to operational needs
 - Measurements from areas without monitors would be program-altering

Real Time Air Quality

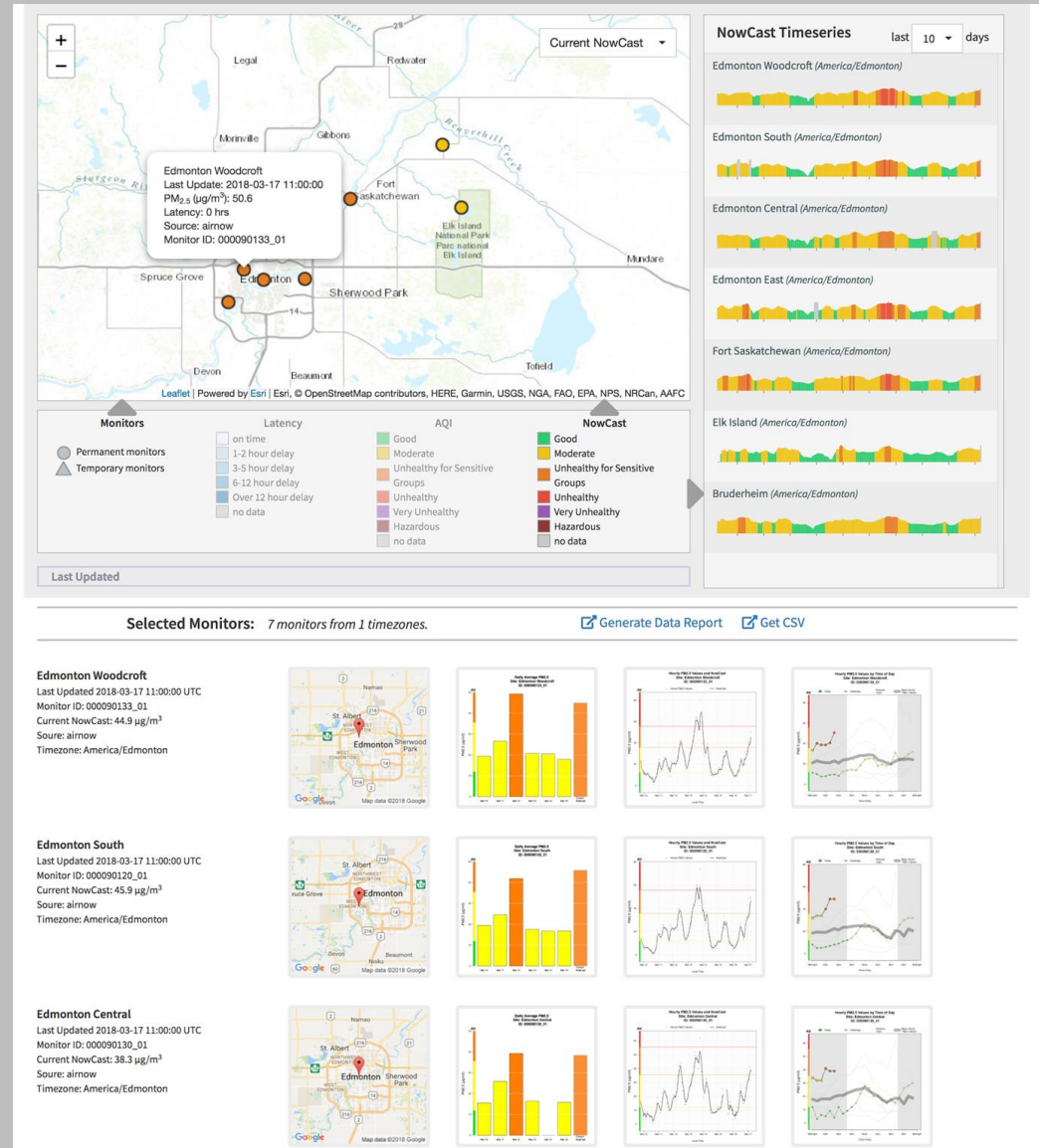
August 05, 2017:

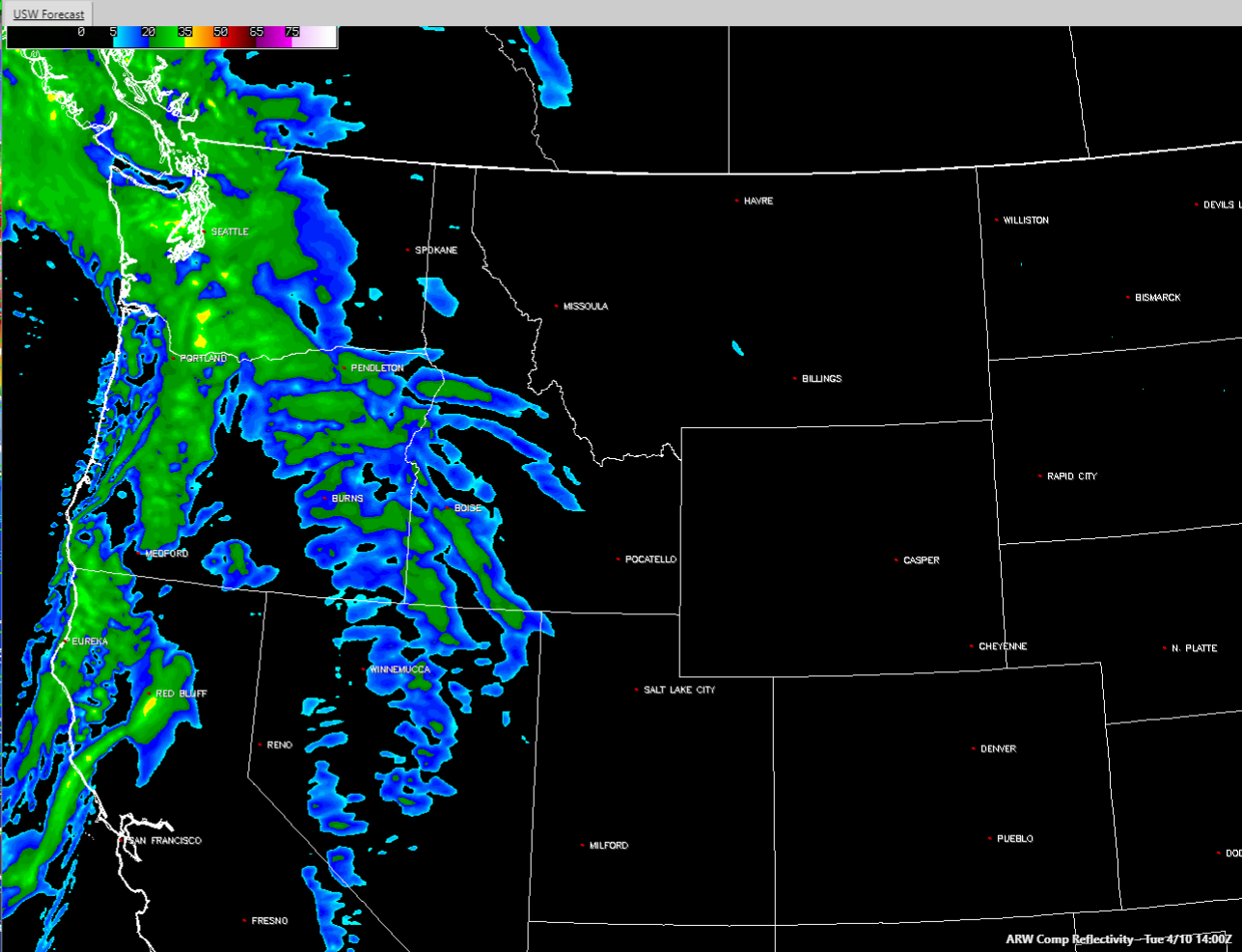
Last Updated **AIRSIS:** 14:21 on 08/05 **WRCC:** 14:31 on 08/05 **AirNow:** 14:01 on 08/05



<https://tools.airfire.org/monitoring/v4>

Monitoring v4 -- Advanced Version

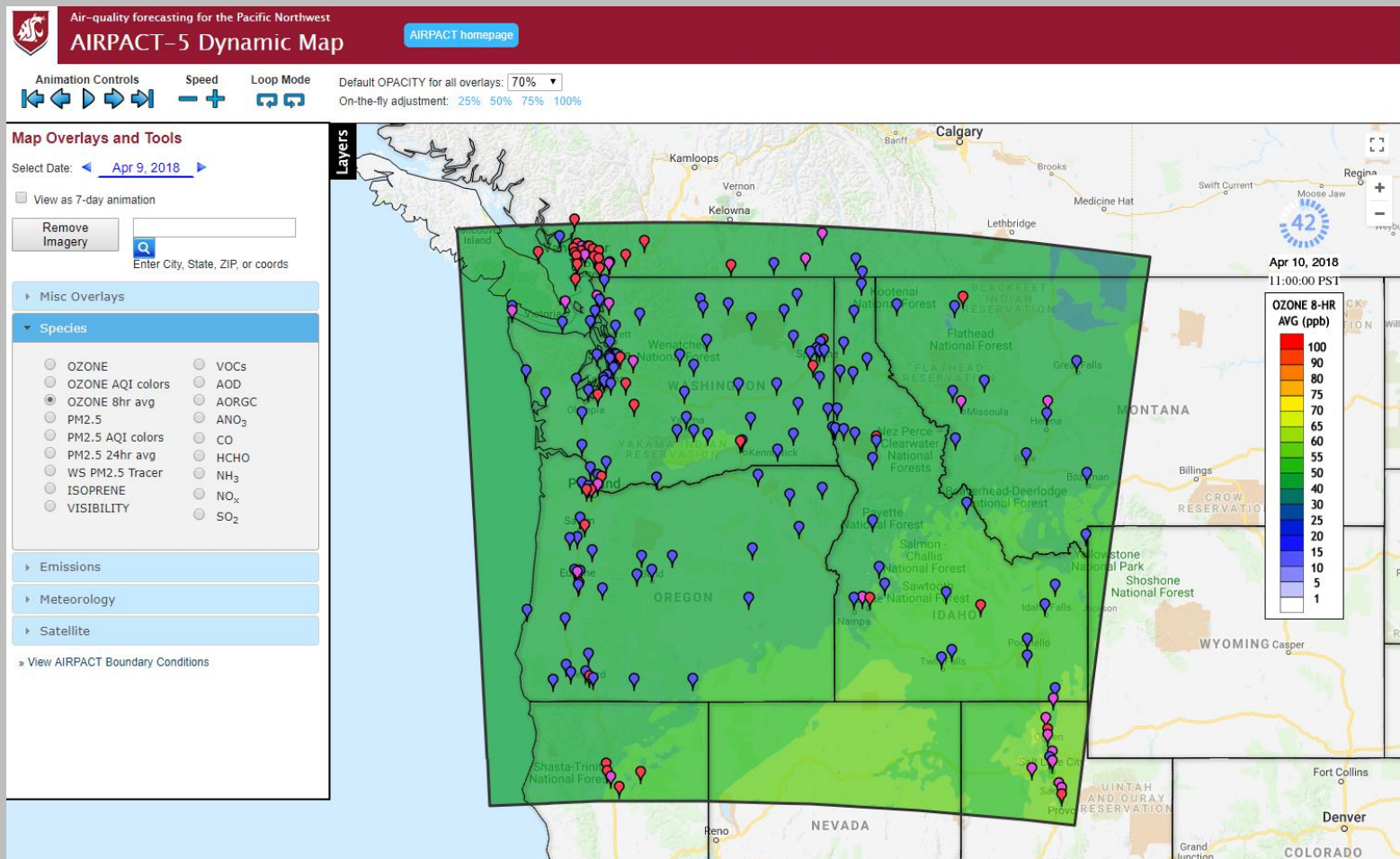




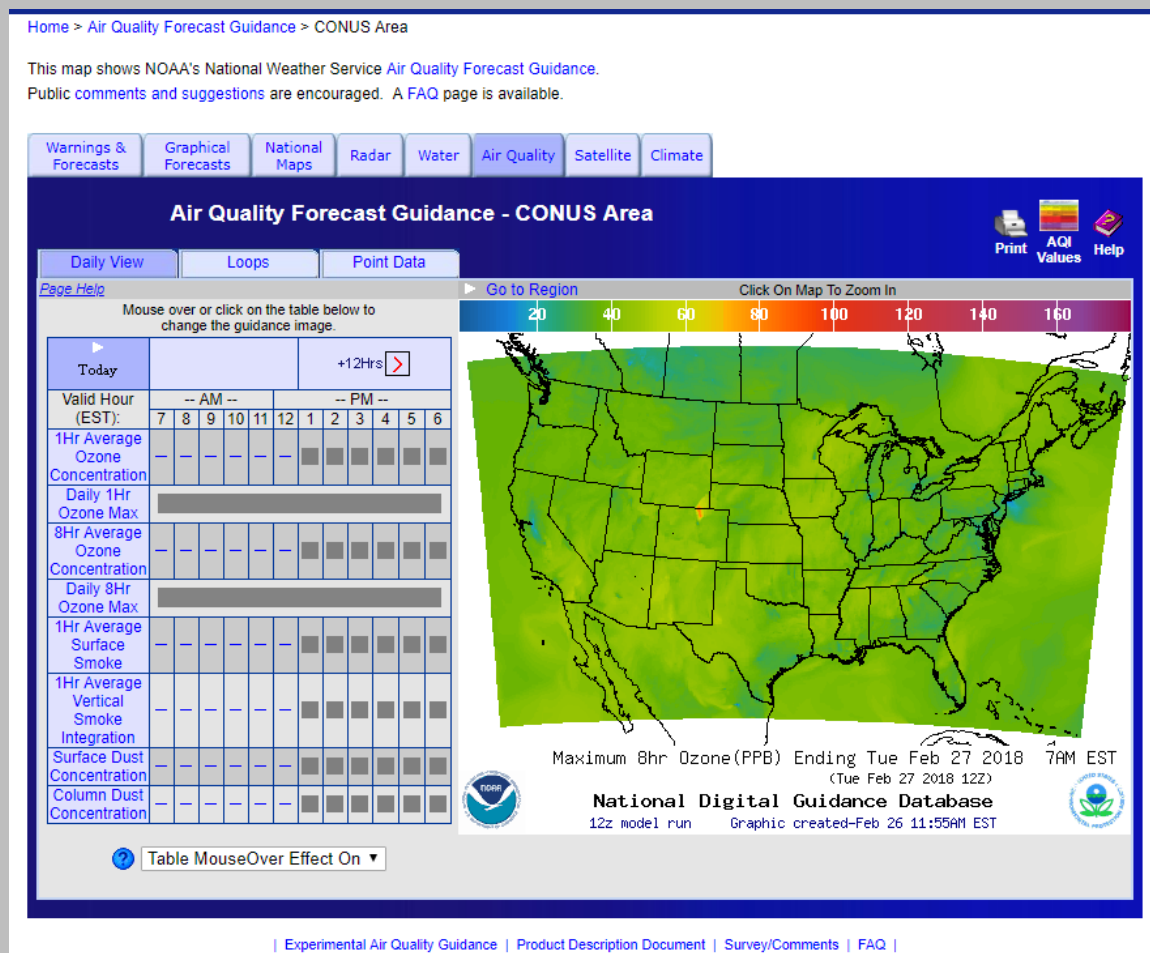
ARW Comp Reflectivity-Tue 4/10 14:00Z

Current: Mon 4/9 7:49:29 AM - 13:49:29Z

Modeling-WSU AIRPACT 5



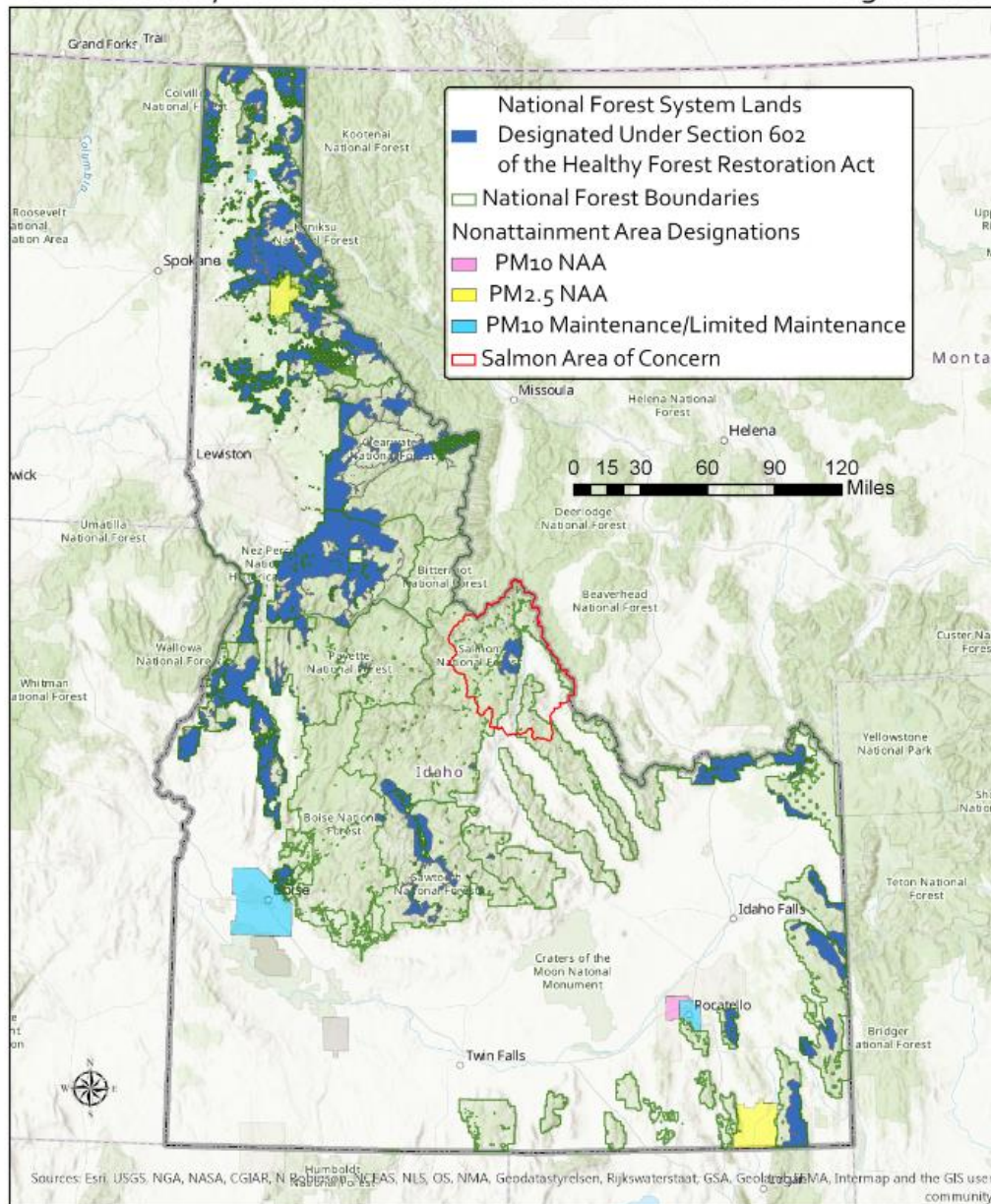
Modeling-NWS Air Quality



- 1hr average Ozone
- 1hr Daily Max Ozone
- 8hr average Ozone
- 8hr Daily Max Ozone
- 1hr Average Surface Smoke
- 1hr Average Vertical Smoke Integration
- Surface Dust Concentration
- Column Dust Concentration

Prescribed burning

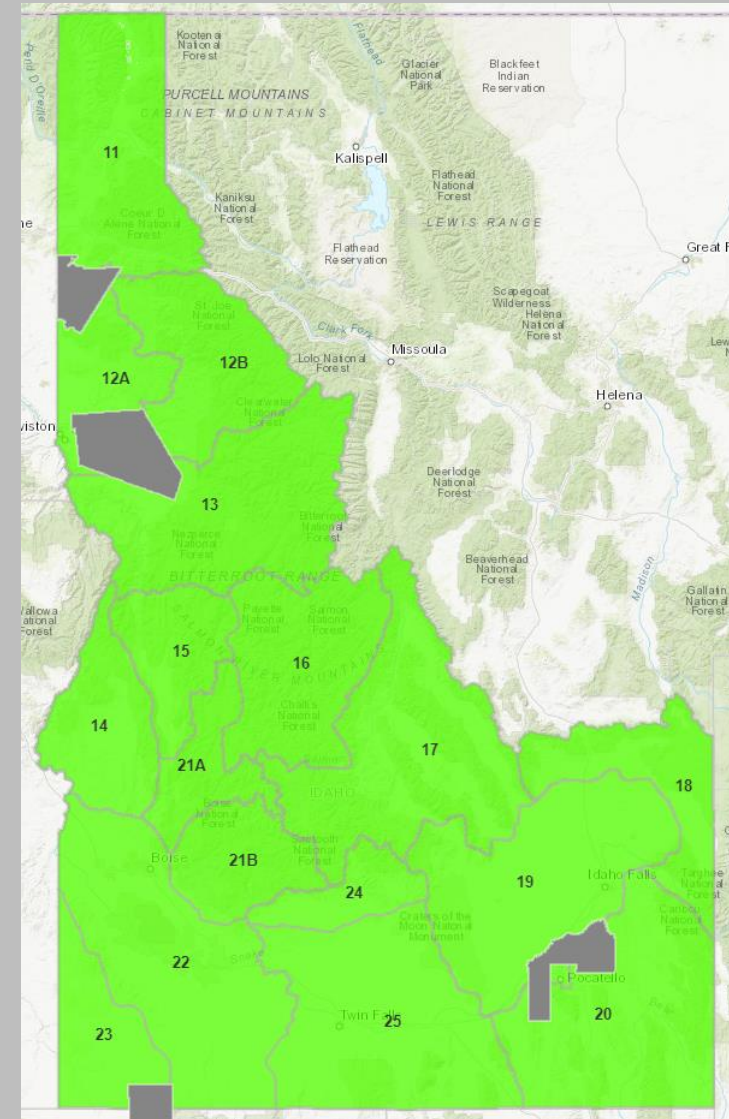
National Forest System Lands Designated Under Section 602 of the Healthy Forest Restoration Act in Idaho with AQ Designations



- 614.02.a Whenever a permit or plan is not required by the Department of Lands, U.S.D.A. Forest Service, or any other state or federal agency responsible for land management, any person who conducts or allows prescribed burning shall meet all conditions set forth in a Smoke Management Plan for Prescribed Burning.
- 614.02.b The Department will develop and put into effect a Smoke Management Plan for Prescribed Burning consistent with the purpose of Sections 600 through 616.
- A “Plan” or any part of a plan on its own cannot be enforceable as law.

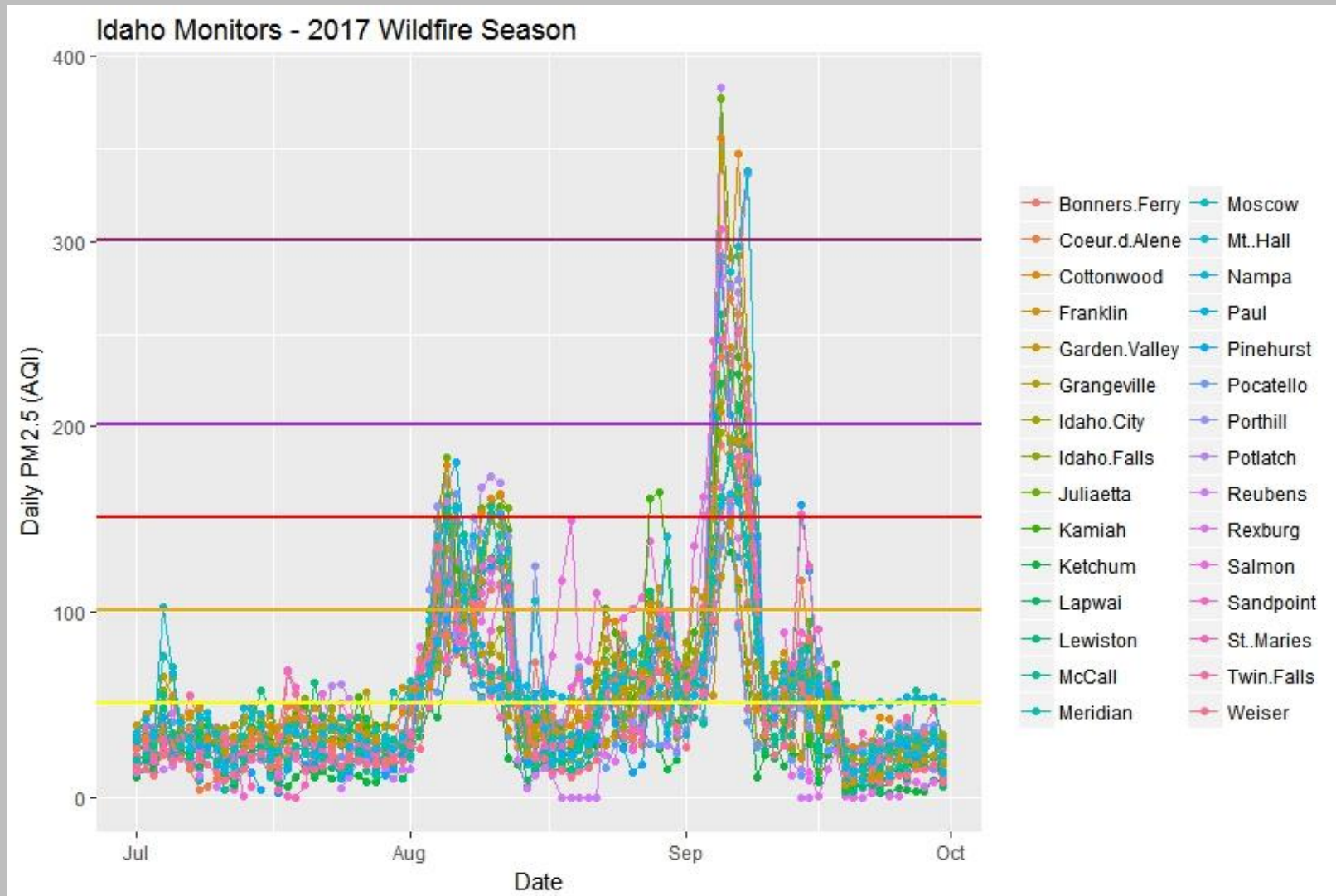
Prescribed Burning-Cont.

- 17 distinct airshed forecasts
- Forecast made for next day burn operations
- Relies heavily on model data
- Better analysis validation/verification could improve confidence in model output



Wildfire Response

- Rapid nature
 - Dynamic in scale
 - Major goals
 - Coordination with other agencies (USFS, ARA, Tribal partners, Health Department, NWS)
 - Public messaging via IDsmokeblog, NWS, DEQ Wildfire page
 - Daily Product
 - Monitoring
 - Fire activity
 - Weather forecast
 - Smoke forecast
 - Coordination call
 - Sara's remote sensing products (Available in the afternoon)
-
- Products now are heavily qualitative.
 - Would benefit from a more quantitative approach.



The Lolo Peak fire, taken from the Fire Lab at the Missoula Airport.

2017 Idaho Monitors Daily AQI

Credit: Mike McGown

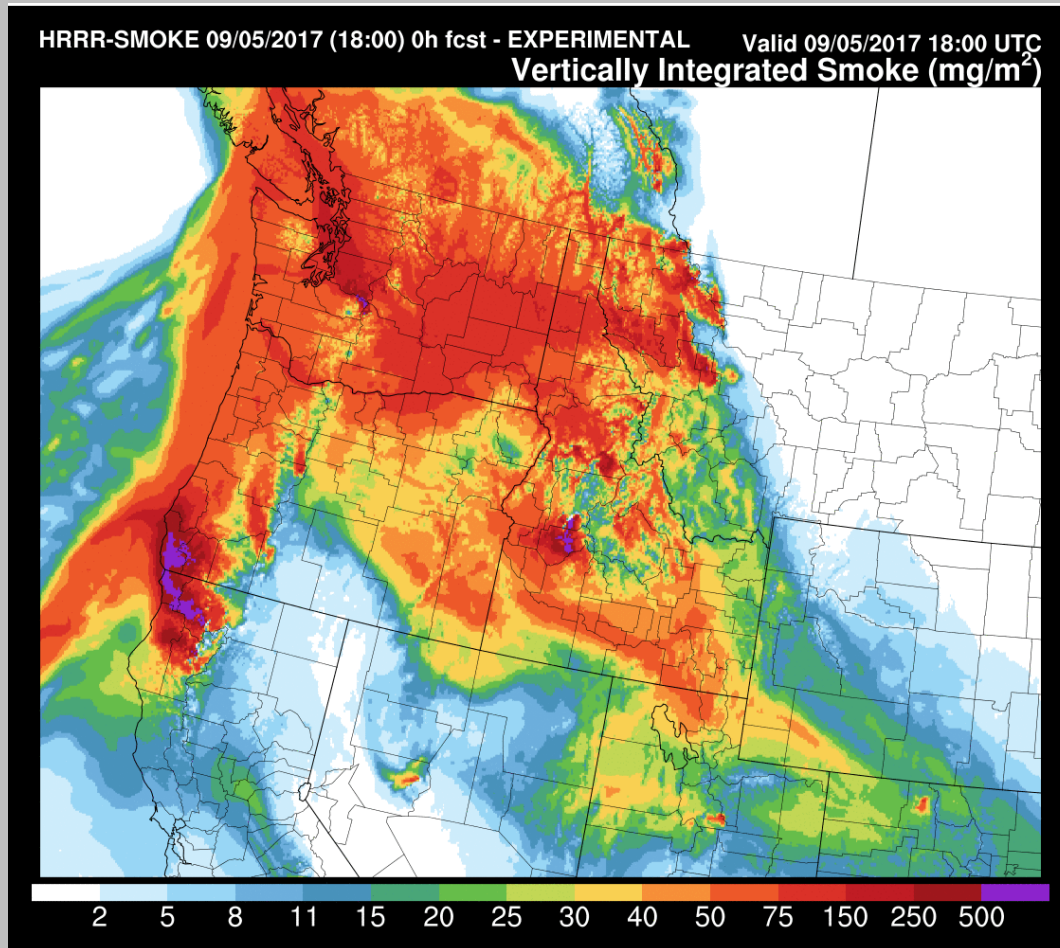
Credit: Sara Strachan

Local Impacts

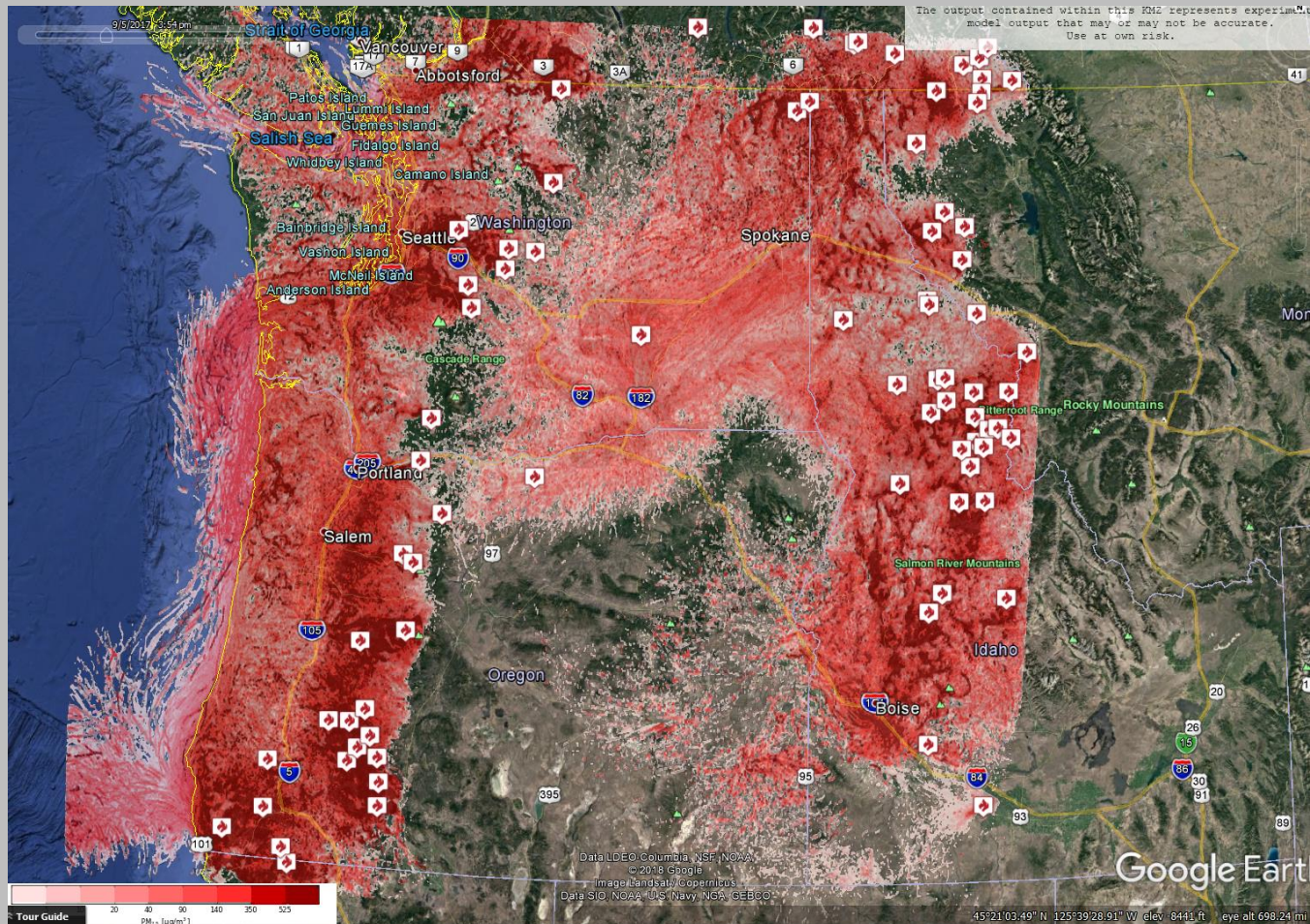
- August 25th, 2012
- Diurnal processes are the primary driver
- Can be rapid in nature, both smoke into and out of the area.
- Timing of smoke movement is difficult but critical
- High resolution modeling can improve, but needs initialization validation.



Modeling HRRR-Smoke (3km)



Modeling-Bluesky daily (1.33km)

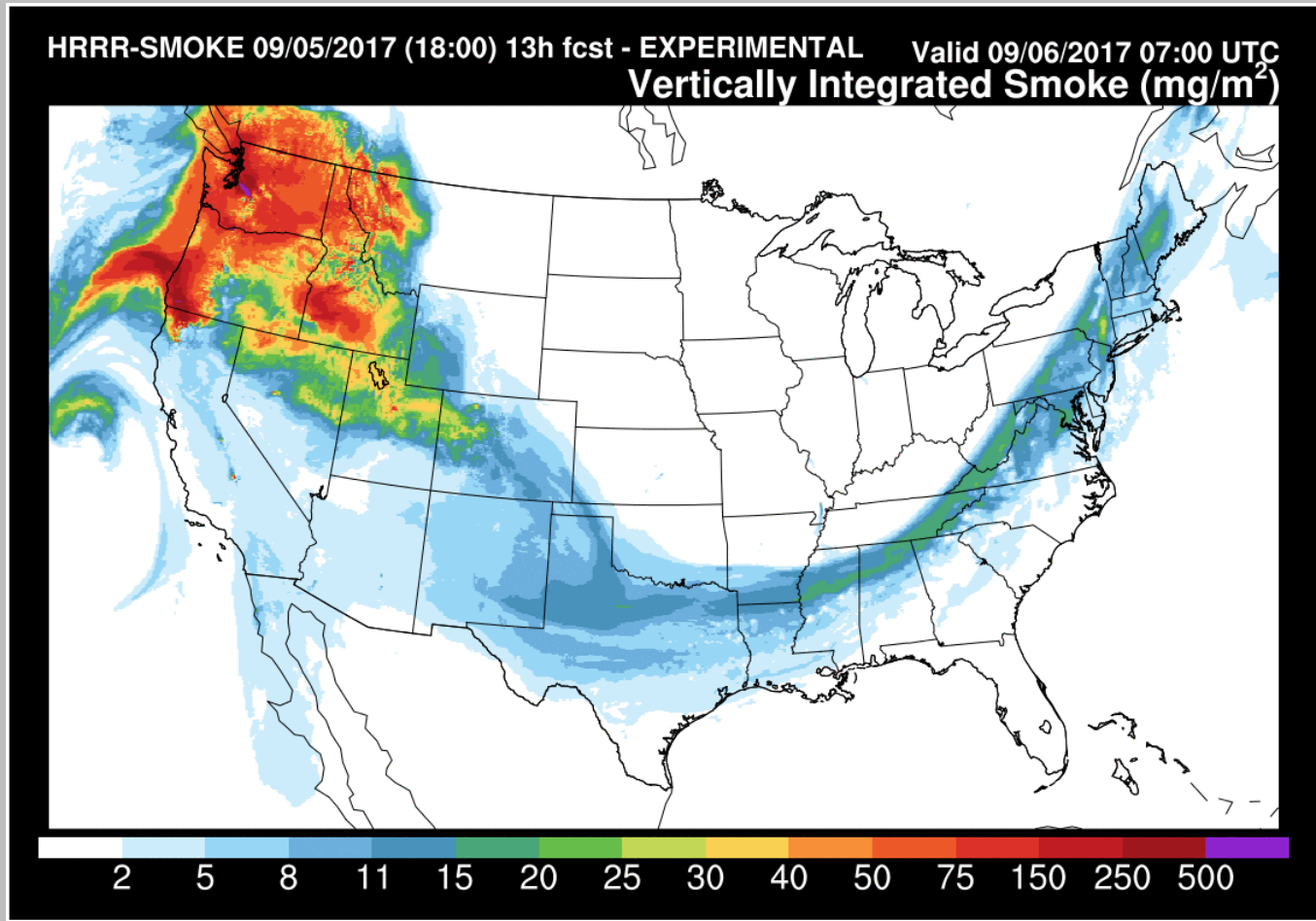


Regional Impacts

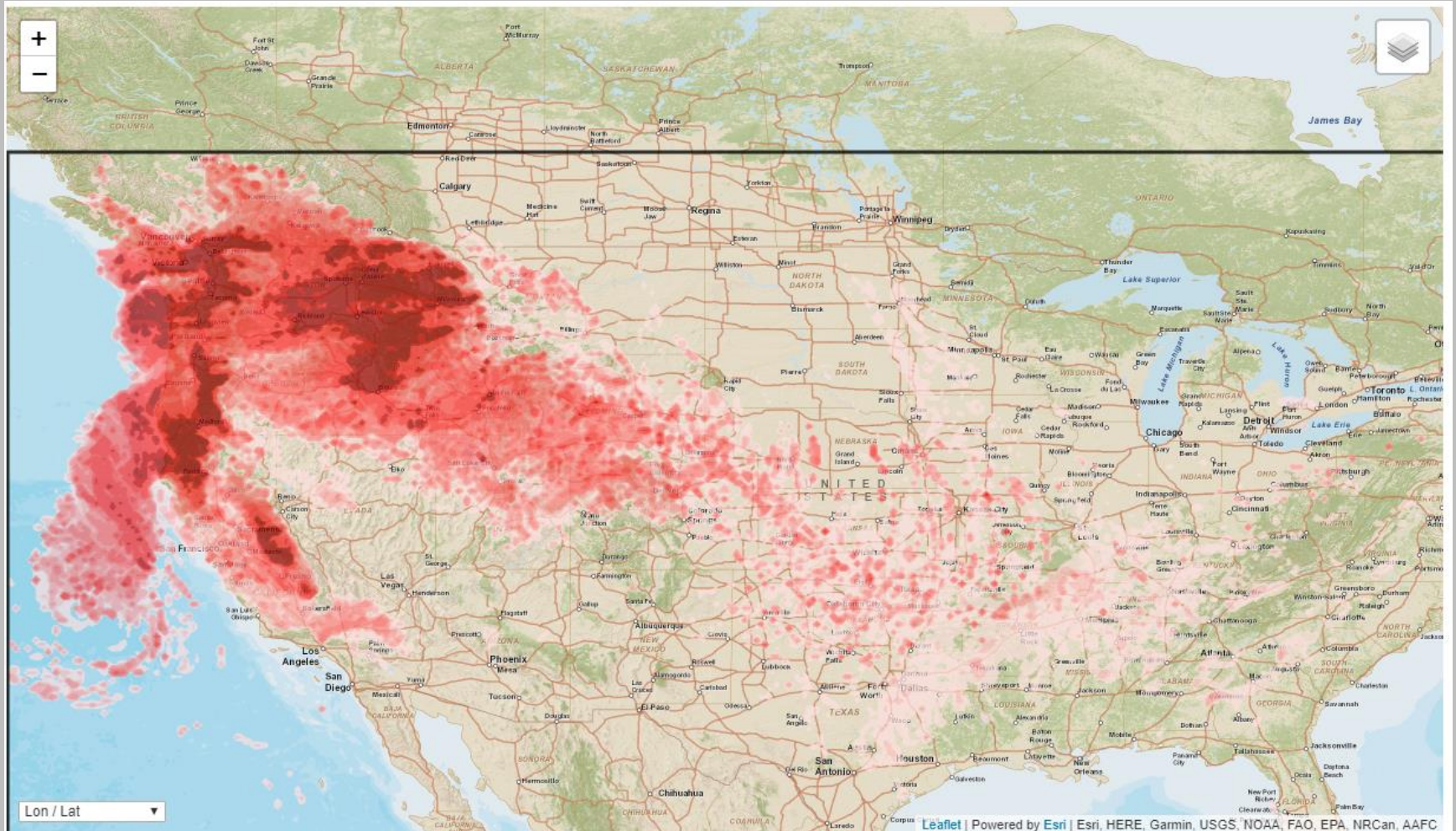


- September 5th, 2017
- Pacific Northwest afternoon imagery (~1:30pm Local)
- Regional fires from PNW, BC, CA
- High pressure ridge over the PNW
- Snapshots allow us to ‘ground truth’ our models
- Limited temporal resolution
- Timing can be an issue

Modeling HRRR-Smoke (3km)

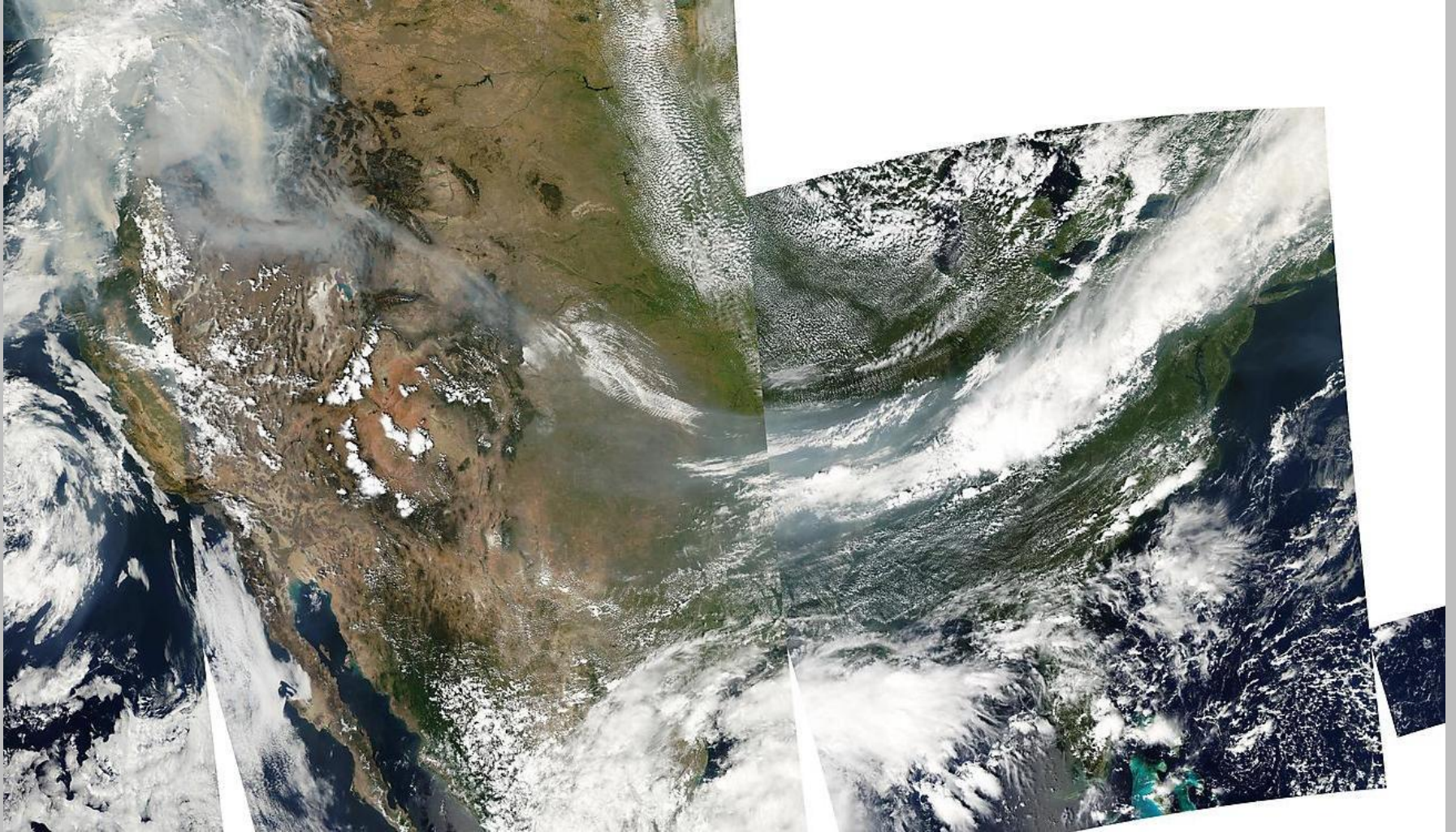


Modeling-Bluesky daily (12km)



Information provided for research purposes only. Modeling may be inaccurate for a variety of reasons. Use at own risk. Contact local public health agencies for air quality alerts.

National Impacts



Idaho Department of Environmental Quality

Areas for expansion with TEMPO

- Increases in quantitative data
- Expanded coverage for areas without monitors (O_3) (for WF/RX/Ag)
- Better understanding of the O_3 cycle for WF
- Increased spatial/temporal coverage (vs MODIS snapshots)
- Earlier timing of product availability

Acknowledgments/Questions

Jacob Wolf

Jacob.Wolf@deq.idaho.gov

(208)-373-0480

- Thanks to:
 - Mike McGown, EPA Region 10-Idaho Operations Office
 - Sara Strachan, Idaho DEQ

