Agricultural Burn Forecasting

Nez Perce Tribe ERWM Air Quality Program

Federal Clean Air Act

- Federal Clean Air Act of 1970
  - US Environmental Protection Agency (EPA) establishes national air quality standards and federal emission standards for sources
  - States and Tribes can develop implementation plans and take delegation for federal standards
- 1990 Clean Air Act Amendments
  - Added language clarifying the role of Indian tribes in implementing the Clean Air Act
- 1998 Tribal Authority Rule
  - Described the provisions of the Clean Air Act for which it is appropriate for EPA to treat Indian tribes in the same manner as states.
  - Tribes may develop Clean Air Act programs, including rules to control air pollution.

Federal Air Rules for Reservations (FARR)

- Set of air quality regulations established under the Clean Air Act
- Federal Implementation Plan (FIP)
- Effective June 7, 2005
- Specific to EPA Region 10
  - Reservations in Idaho, Oregon and Washington
- Addresses regulatory gap
- Make air quality standards on reservations consistent with standards off
- Applies to all residents

FARR on the Nez Perce Reservation

- Nez Perce Tribe's Delegation Agreement effective June 27, 2005
- The Nez Perce Tribe administers specific provisions of the FARR, including
  - Open Burning Rule
  - Burn Permitting Programs (Ag, Forestry, Open)
  - Burn Bans & Air Pollution Episodes
- Delegates day-to-day FARR activities, including smoke management program
  - Issue burn permits for agricultural, forestry, open burning
  - Daily burn decisions for agricultural, forestry and open burning
  - Authorize ignition of fires under permit
  - Shut down burns when necessary
  - Coordinate with other jurisdictions
  - Compliance assistance and outreach
  - Complaint response and investigations

FARR on the Nez Perce Reservation

- All burning within the Nez Perce Reservation is permitted and burned only during approved burn durations
  - Recreational and cultural burns are exempt
- FARR does not exempt/excuse compliance with other applicable fire safety laws and ordinances

Agricultural Burning on the Nez Perce Reservation: 10-Yr Acreage Trends

Year	Total Acres	Bluegrass	Other
2019	39,471	20,869	18,602
2018	34,637	20,069	14,568
2017	32,520	15,830	16,690
2016	37,590	13,836	23,754
2015	35,440	13,709	21,731
2014	36,350	11,332	25,018
2013	40,527	11,595	28,932
2012	40,629	13,334	27,295
2011	47,528	14,710	32,818
2010	45,922	15,990	29,932
10yr Avg	39,061	15,127	23,934

What makes Agricultural Burning so Challenging?

What's in an Agricultural Forecast?

- Look for…
  - Timing of Weather Systems
  - Lifting and Sinking of Air Parcels
  - Planetary Boundary Layer Heights, Temperatures, & Winds
  - Wind Speed and Direction
  - Precipitation
  - Current and Forecasted Ambient Air Concentrations
  - Other Airshed Burning

Initials:_____ Date:_____

Burn/No-Burn Decision Checklist for the Nez Perce Reservation in the Clearwater Airshed

Revised 18July2018

Small Open Burn Decision	Burn Time, Restrictions, Notes:	**4:00pm Prelim. Burn Statement** ☐ PassWord, Inc msg.; Time_____ ☐ Email to Request List Listserve; Time_____ ☐ Burn Ban/APE Checklist (if applicable); Time _____	**10:00am Final Burn Statement** ☐ NPT AQ Hotline msg.; Time_____ ☐ PassWord, Inc msg. ; Time_____ ☐ Email to Request List w/no names; Time _____ ☐ Email to Request List w/names; Time _____ ☐ Post Burn Decision to Database; Time _____ ☐ Upload Burn Locations to FETS; Time_____ ☐ Burn Ban Checklist (if applicable); Time _____
Large Open Burn Decision	Preliminary: Notes:		Final: Notes:
Forestry Burn Decision	Preliminary: Notes:		Final: Notes:

Agricultural Burn Decision	**NPT Burn Decision**		**IDEQ Meteorologist Recommendation**			**IDEQ Acres/Times**
	Burn	No Burn	B	C	NB	ID:_____
Preliminary Burn Decision (comments)	Time: Notes:					CW:_____ NP:_____ LAT:_____
	Burn	No Burn	B	C	NB	ID:_____
Final Burn Decision (comments)	Time: Notes:					CW:_____ NP:_____ LAT:_____
Conf. Call Participants						

AQ Data/Wildfires/ Observations	**Preliminary Burn Decision**				**Final Burn Decision**			
AQI	G	M	USG	UH	G	M	USG	UH
Source of Data	☐ Manual Dial (TREX) ☐ AirNow ☐ IDEQ Website				☐ Manual Dial (TREX) ☐ AirNow ☐ IDEQ Website			
Current 1-hr $PM_{2.5}$ Value (pg 3)	KAM _____ LAP _____ RBN _____ NP _____ ORO _____ GVL _____ LEW_____				KAM _____ LAP _____ RBN _____ NP _____ ORO _____ GVL _____ LEW_____			
Current 24-hr $PM_{2.5}$ Value (pg 3)	KAM _____ LAP _____ RBN _____ NP _____ ORO _____ GVL _____ LEW_____				KAM _____ LAP _____ RBN _____ NP _____ ORO _____ GVL _____ LEW_____			
☐ AQ Advisory ☐ Burn Ban ☐ Air Poll. Episode								
Visibility Conditions								
Wildfires/Wildfire Smoke Present								
Fire Safety Restrictions								
Prescribed Burning in Airshed								
Satellite Observations								

NOTE: Information displayed on this checklist is based on forecasted and/or preliminary data. Data has not been 100% quality assured.

Initials:_____ Date:_____

Forecasting Tools: Preliminary Burn Decision

MM5 (NAM/WRF) 4/3, 4km or 12km 00 UTC or 12 UTC	G: good, M: marginal, P: poor, VP: very poor												Comments
	10	11	12	1	2	3	4	5	6	7	8	9	
Vent. Index													
Surface Winds													5 kts = 5.75 mph, 10 kts = 11.5 mph, 15 kts = 17.25 mph
Winds/Boundary Layer Mixing													
850mb (~5000 ft)													
Precipitation													
Nezperce Sounding													
Lapwai Sounding													
AIRPACT Model:													

	Kamiah	Lapwai	Reubens	Nezperce	Orofino	Other
National Weather Service Forecast						

Forecasting Tools: Final Burn Decision

MM5 (NAM/WRF) 4/3, 4km or 12km 00 UTC or 12 UTC	G: good, M: marginal, P: poor, VP: very poor												Comments
	10	11	12	1	2	3	4	5	6	7	8	9	
Vent. Index													
Surface Winds													5 kts = 5.75 mph, 10 kts = 11.5 mph, 15 kts = 17.25 mph
Winds/Boundary Layer Mixing													
850mb (~5000 ft)													
Precipitation													
Nezperce Sounding													
Lapwai Sounding													
AIRPACT Model:													

	Kamiah	Lapwai	Reubens	Nezperce	Orofino	Other
National Weather Service Forecast						

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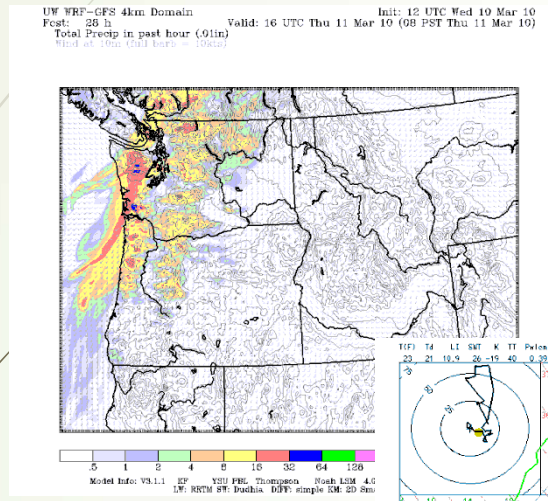
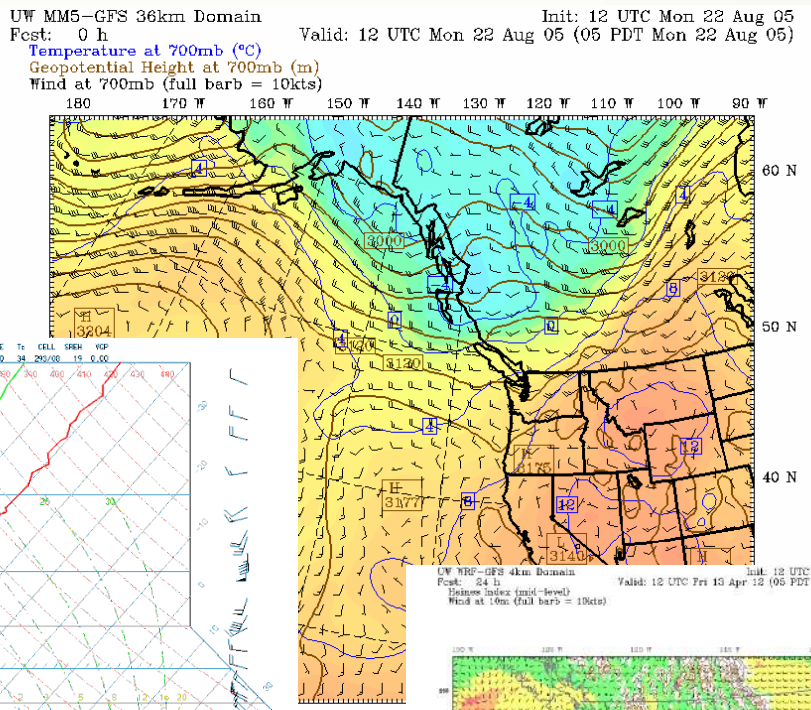
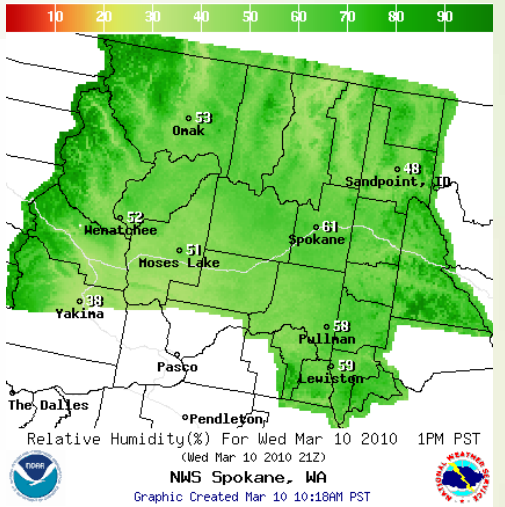
How Do We Get There?

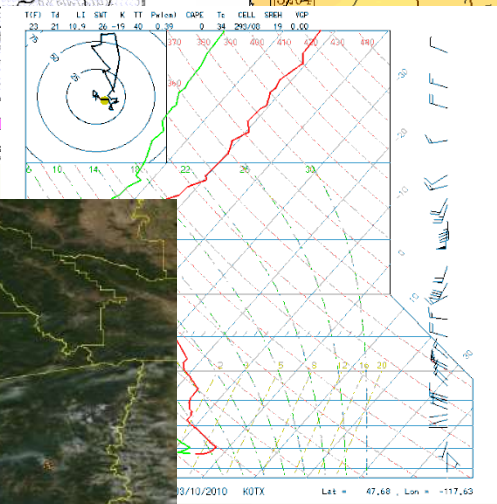
- Common Forecasting Tools
  - Ambient Monitoring - AirFire
  - Pacific Northwest Environmental Forecasts and Observations (WRF-GFS, MM5-NAM, 4-km Ensembles)
  - National Weather Service
  - AIRPACT
  - HRRR-Smoke
  - National Interagency Fire Center
  - Satellite Imagery & Maps
  - Fire Emissions Tracking System (FETS)
  - **Program Restrictions**
- Unique Forecasting Tools
  - Field Staff/Field Logs
  - Special Equipment (Pibal weather balloons, sodar, Kestrels, crackle test)
  - Regional Coordination
    - IDEQ Forecasts
    - IDEQ Decision Support System
    - MT/ID Airshed Group
    - Research Projects (RARE)
  - Idaho Smoke and Fire Blogs
  - Familiarity with local terrain and microclimates
  - Local Contacts

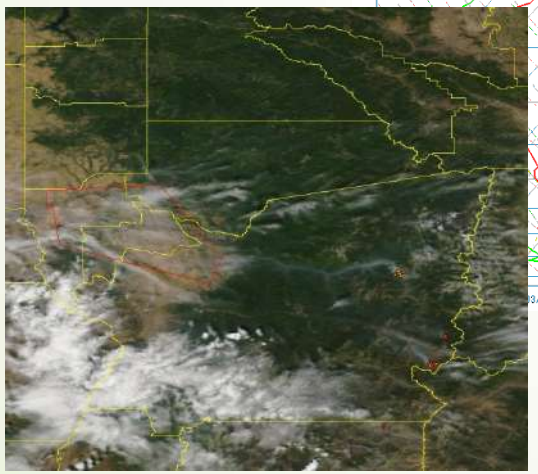
Forecasting Tools

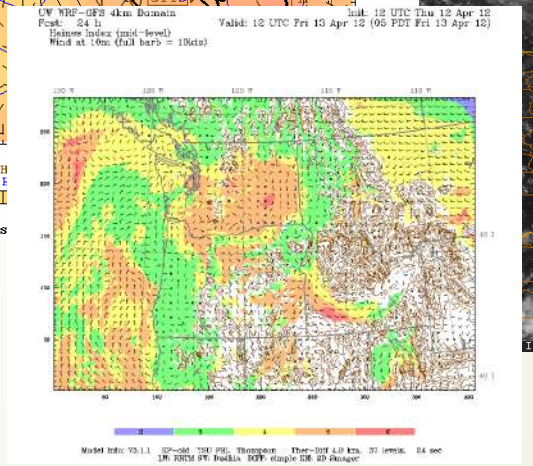


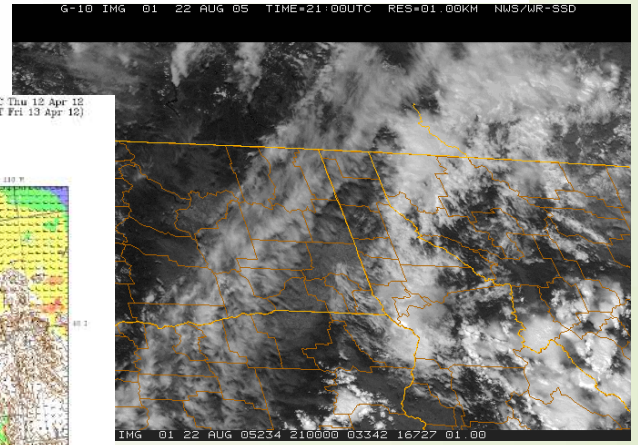




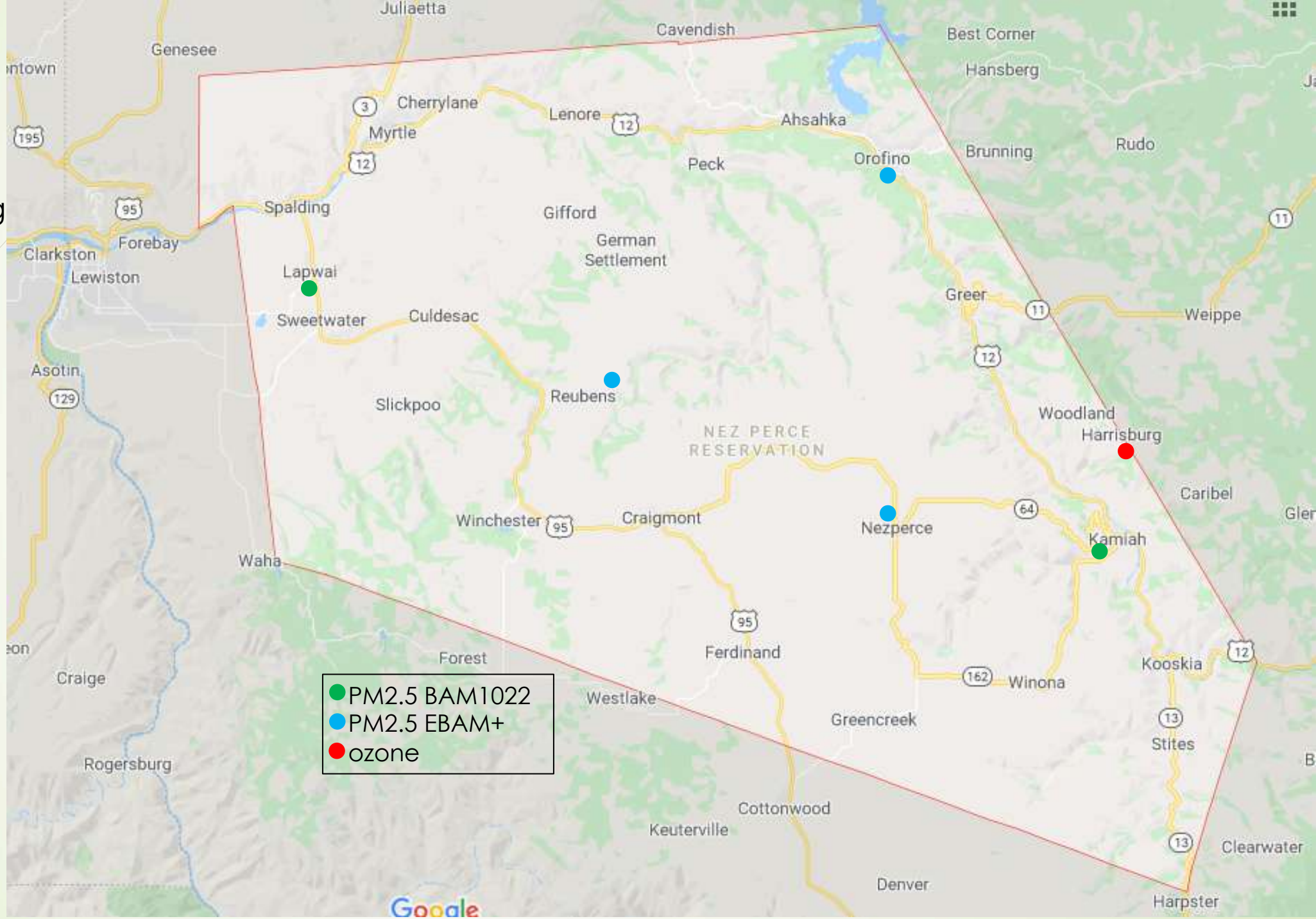






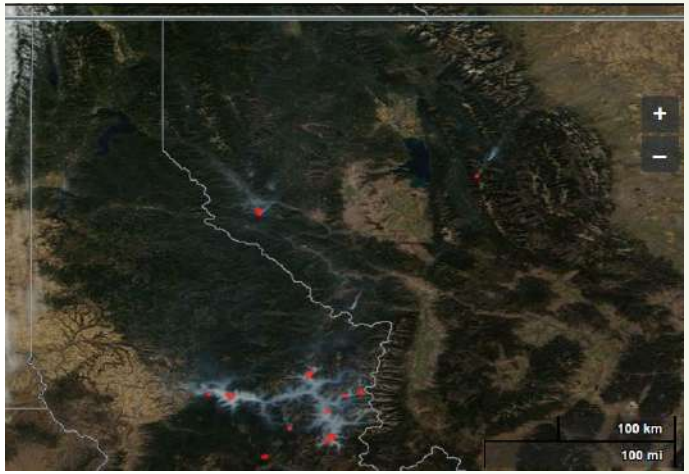


Ambient Monitoring



Challenges Caused by Wildfires & Prescribed Burning

- Varies from year-to-year
- Depends upon proximity



Johnson Bar Fire: Kamiah Monitoring Station

August 12, 2014
PM2.5 = 200 ug/m3

September 4, 2014
PM2.5 = 4 ug/m3

What We've Learned

- Being familiar with the airshed is vital
  - Local wind patterns
  - Effects of terrain/topography
  - Historical burn patterns in certain areas
- On site observations are irreplaceable
- Difficult to make an informed decision based on one model or one parameter
- Mistakes do happen – learn from them









Contact Information

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