

RPO National Work Group Meeting: Presentation Overview

- **Joint Fires Call**
- **WRAP 1996 Wildfire and Prescribed Fire Emission Inventories**
- **WRAP 2018 Emission Projections for Prescribed Fire & Agricultural Burning**
- **WRAP 2002 Fire EI**
- **Pete Lahm – Co-Chair**
WRAP Fire Emissions Joint Forum
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Fires Conf Call (11 /1 / 2002)

- VISTAS Fire Workshop
 - www.vistas-sesarm.org
- MWRPO Fire Study
- CSEM Update (OAQPS & ORD)
 - www.cira.colostate.edu
- WRAP FEJF 1996 & 2018 Fire EI (Lahm)
 - Draft Reports (pete_lahm@compuserve.com)
- Satellite-derived fire event databases
 - www.geomac.usgs.gov
- EPA Report on Fire Emission Estimation
 - http://www.epa.gov/ttn/chief/ap42/ch13/related/fire_rept.pdf
- Tech Issues Scoping Meeting: Winter '03

1996 Inventories & 2018 Projections

- **WF & Rx: Actual activity data (acres or fuel burned)**
- **Calculate emissions.**
- **Plume characteristics**
- **Rx: Predictive model (1995 FEP) provides 50km emissions**
- **Ag: Typical activity data (residue burned per crop per county); calculate emissions.**
- **Refine the data**
 - Realistic fire sizes
 - Temporally
 - Spatially
 - Plume characteristics

Accurate? Can quantify uncertainty.

Reasonable? Representative?

!!!WARNING!!!

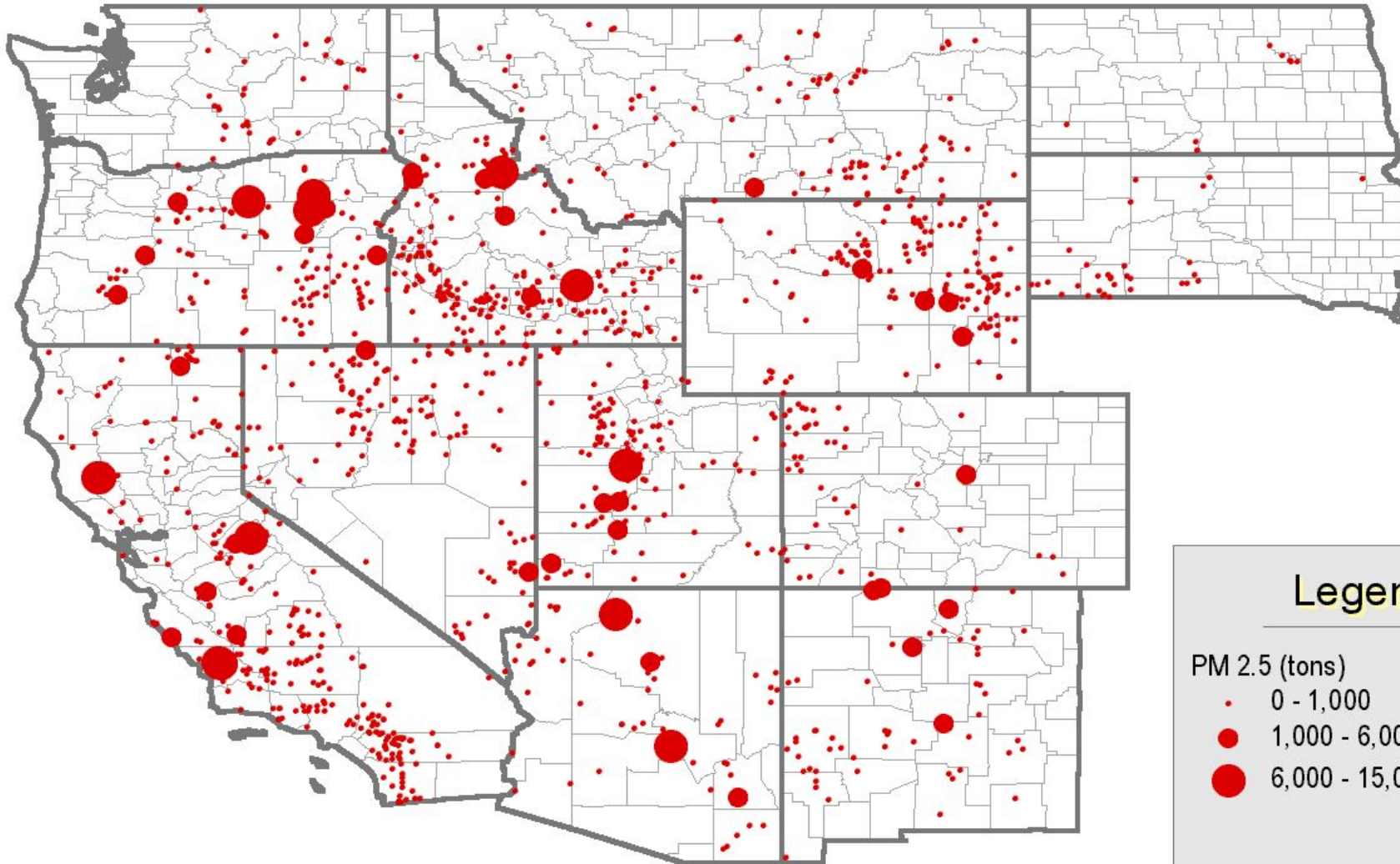
- **1996 FIRE EI'S SHOULD NOT BE COMPARED DIRECTLY WITH 2018 FIRE PROJECTIONS.**
 - Actual data VS. modeled projections
 - 2018 Projections are not GROWN from 1996 data.

1996 Emission Inventories

- **Wildfire – From ACTUAL acres burned data**
 - ICS-209 (Paper) (>100 acre incidents–date, loc-TRS)
 - DOI Fire Database – augment/cross reference data
 - USDA-FS Database – same
 - Complexes vs. Incidents = uncertainty
 - Missing data – State Forestry, County, Private/Industrial???
- **Prescribed Fire – Actual acres burned**
 - No size cut-off
 - State AQ, Forestry, FLM's, Gaps = Rangelands!
- **Other EI Inputs**
 - 1 - Site-specific fuel type and loading factors
 - 2 – Default fuel type and loading factors
 - National Fire Danger Rating System (NFDRS) GIS layer used to assign fuel type & loading (FS Research).
 - Emission factors - OAQPS composite (EPA, 2001)

1996 Fire Emission Inventory Summary

	Units	Wildfire		Prescribed Fire		Total	
		Quantity	% of total	Quantity	% of total		
Fire Statistics							
<i>Fire Events</i>	fires	1,348	8%	14,696	92%	16,044	
<i>Fire Duration - mean</i>	days	3.6		1.0			
<i>Fire Days - original</i>	days	4,902	25%	14,696	75%	19,598	
<i>Fire Days - w/ smoldering</i>	days	5,311	24%	16,603	76%	21,914	
<i>Acres Burned</i>	10 ⁶ acres	5.03	90%	0.55	10%	5.58	
<i>Acres Burned per Fire Day - mean</i>	acres	1,026		38			
<i>Fuel Consumed</i>	10 ³ tons	48,085	90%	5,243	10%	53,328	
<i>Fuel Consumed per Fire Day - mean</i>	tons	9,809		357		10,166	
Emissions							
	<i>PM_{2.5}</i>	10 ³ tons	648	94%	44	6%	692
	<i>NO_x</i>	10 ³ tons	167	91%	17	9%	184
	<i>SO₂</i>	10 ³ tons	46	90%	5	10%	51
	<i>NH₃</i>	10 ³ tons	35	95%	2	5%	37



Legend

PM 2.5 (tons)

- 0 - 1,000
- 1,000 - 6,000
- 6,000 - 15,000

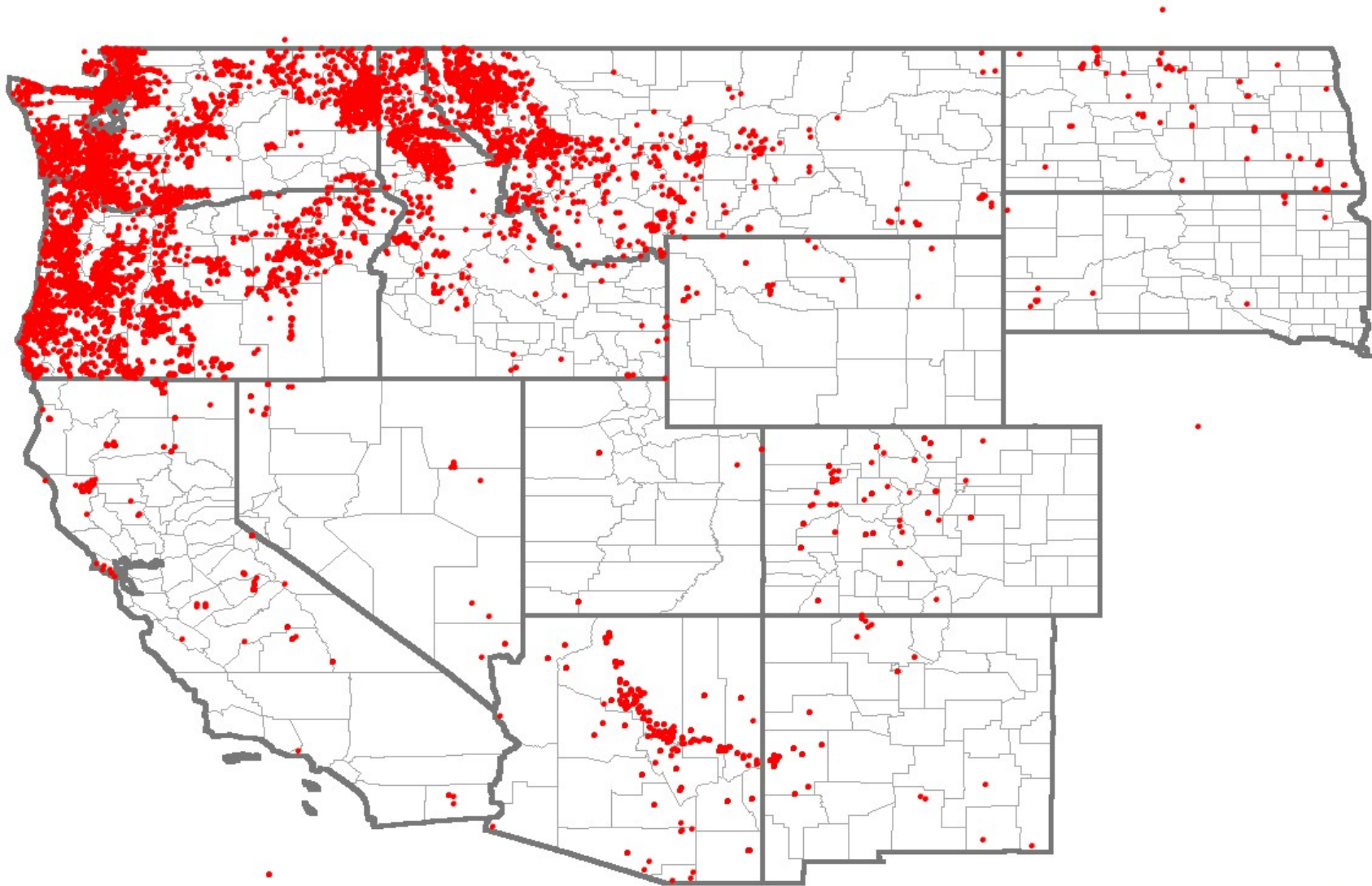


DRAFT - Work in progress.
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WRAP
FEJF-ETT

1996 Prescribed Fire Inventory

Fire Locations



DRAFT - Work in progress.
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1996 Agricultural Burning

- **Actual residue burning data collected by ERG**
 - Data did not meet enough of the data quality requirements to represent an “actual” EI for 1996
 - very little daily info.
 - Gap-filling techniques used (1996-2000 data, land use)
- **No 1996 EI developed, ∴ not used in WRAP’s model performance runs**
- **Used as “no smoke management” scenario for 2018 Ag burning projections**
- **Fuel loading – irrigated vs. dry?**
- **Comprehensive Emission Factor Table by crop-type**

2018 Emission Projections

Types of Fire

Emission Control Scenarios

<i>Rx Fire</i>	<i>Ag Burning</i>	<i>Wildfire</i>
1995 Base Smoke Mgmt.	1996 Base Smoke Mgmt.	Typical Year
Optimal Smoke Management	Optimal Smoke Management	
No Smoke Management	No Smoke Management	

2018 Projections – Methodology

Rx Fire & Ag Burning

Input Data - Gross Activity/Emissions Data

Realistic Event Sizes

Temporal Refinement (daily)

Spatial Refinement (1 km)

2018 Projections – Methodology

Rx Fire & Ag Burning

Plume Characteristics

Diurnal (hourly) profile

PT (text) model-ready files

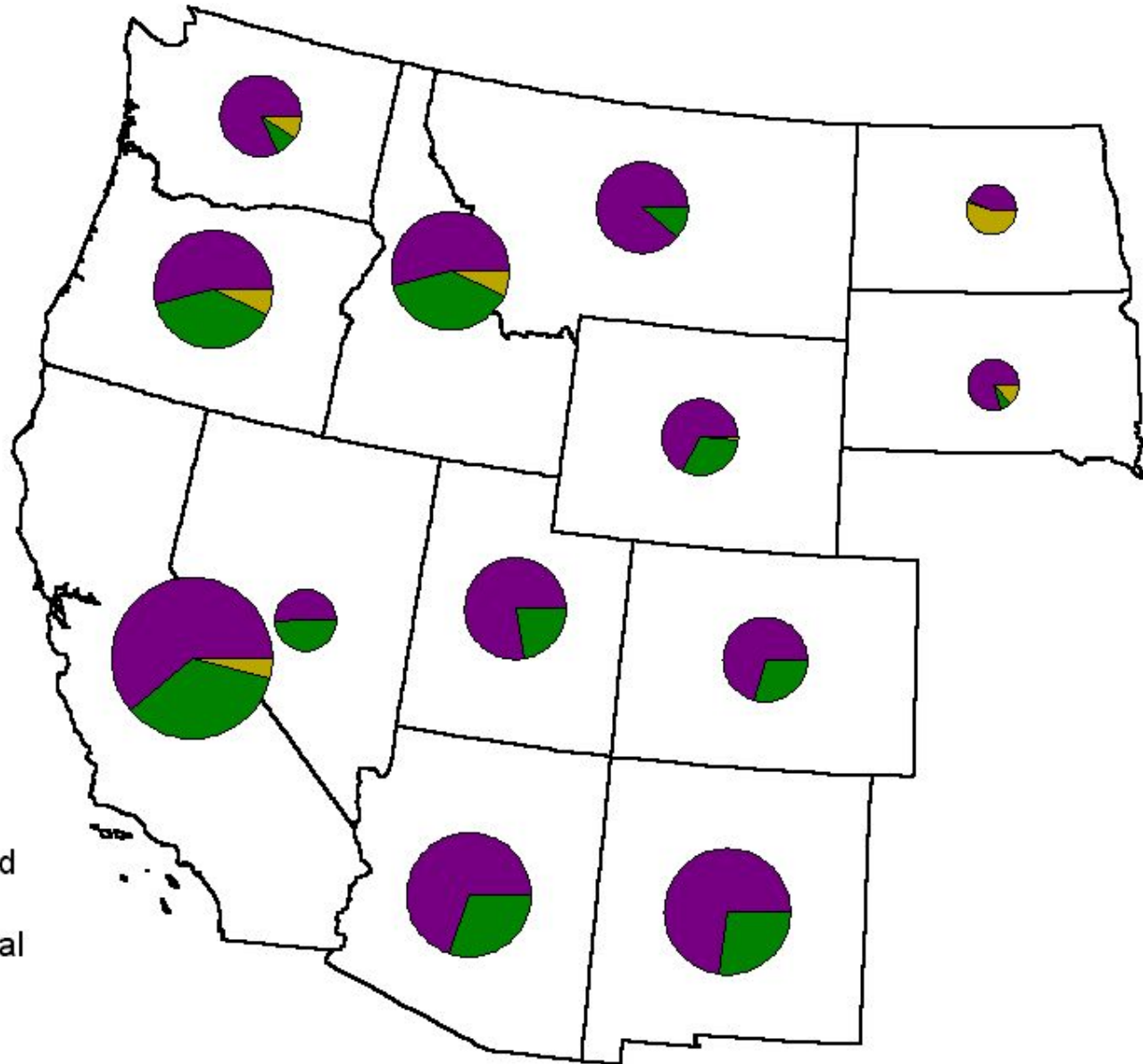
2018 Projections – Wildfire (“typical” year)

- Wildfire acres in the 1996 emission inventory (1996 EI) were compared to the 19-year average over '71-'90
 - The 19-year average was extracted from the US Forest Service Wildfire Statistics Database
- The ratio of the 1996 EI acres over the '71-'90 mean acres will be used to scale the 1996 EI fire sizes for each state:

$$\text{Adjusted fire size} = \text{Reported fire size} * \frac{(\text{'71-'90 total acres})}{(\text{1996 EI total acres})}$$

1996 was a drought year.

USE the most recent data for “typical.”



Legend

- Prescribed
- Wildfire
- Agricultural

