

# Agricultural Burning Activity Data in the WRAP Region

---

**National Fire Emissions Technical Workshop**

**New Orleans, LA**

**May 4, 2004**

*Presented by:*

Paula G. Fields

ERG, Inc.

Sacramento, CA

# WRAP Project: Non-Burning Management Alternatives

---

- **Task 1: Crop Production and Agricultural Burning Activity**
- **Task 2: Non-Burning Alternatives Impacts Analysis**
- **Task 3: Accountability Mechanisms**
- **Task 4: Non-Statutory Administrative Barriers**
- **Task 5: Implementation Plan**

# Case Study Overview

---

- Scope and Objectives
- Data Collection Procedure
- Data Sources & Characteristics
- Results
- Uncertainty

# Task 1 Scope

---

- Develop county-level statistics for crops grown (acres) and residues burned (tons)
- Include entire WRAP region (15 states)
- Year = 1996
- Determine days, months, seasons of burning

# Agricultural Burn Data: Objectives and Data Sources

---

- Objectives:
  - Provide a basis for assessing non-burning alternatives
  - Provide activity data for 1996 emissions inventory:

$$\textit{Acres Burned} \times \textit{Residue Loading Factor} = \textit{Residue Burned}$$

- Data Sources:
  - Burn permits
  - Emission inventories
  - Anecdotal information from surveys

# Agricultural Burn Data: General Procedure

---

- Compiled available data into a database:
  - Inconsistent fuel types in “agricultural” category
  - Varying level of temporal and spatial resolution
  - Levels of accuracy (permits versus anecdotal)
- Calculated % burned by state to compare to USDA/AQTF study (1997)
- Calculated % burned by crop to gap fill
- Draft database => Comments => Final database
- Final database => Air Sciences for 2018 EI

# Ag Burn Data Sources

State	Year(s)	Anecdotal Info				Air Agency EI	Burn Permits	Growers	Gap-Filled
		FEJF WRAP/ WRAP/	WESTAR	NRCS	Air Agency				
AZ	2000, 01						•		
CA	1996, 97, 99	•					•		
CO	Avg			•					
HI	1996	•	•					•	
ID	1996					•			
MT	1996				•				
ND	Avg				•				•
NM	1996, Avg			•					•
NV	1998					•			
OR	1996					•			
SD	Avg			•	•				•
UT	1996			•	•	•			
WA	1999						•		
WY	1996, 97	•			•			•	

# *Residue Loading Factors*

<b>Fuel Type</b>	<b>Residue Loading (tons/acre)</b>	<b>Source</b>
Barley	1.7	AP-42
Hay	0.8	AP-42
Wheat (spring, irrigated)	4.0	Sharkoff, 2002 (CO only)
Wheat	1.5	Shaver, 2002 (NM only)
Wheat	1.9	AP-42
Orchard prunings, unspecified.	1.7	AP-42
Orchard removal, unspecified	15.0	Jenkins, 2002
Apple	2.3	AP-42
Apple	0.8-1.0	Beyer, 2002 (CA only)
Seeds, KBG and unspecified	2.0	IDEQ, 2001
CRP	2.6	AP-42 (grasslands)
Ditches, fenceline	1.6	Gabrielson, 2002 (AZ only)
Ditches, fenceline	0.75	Goodrich, 2002 (UT only)
Ditches, fenceline	3.2	AP-42 (weeds)

# Calculations

---

## Residues Burned

- Acres Burned (AB)
- Residue Loading (RL)
- Residue Burned (RB)

$$AB \times RL = RB \text{ (tons)}$$

- Exceptions:
  - OR, CA/SJV, WA

## Gap Filling

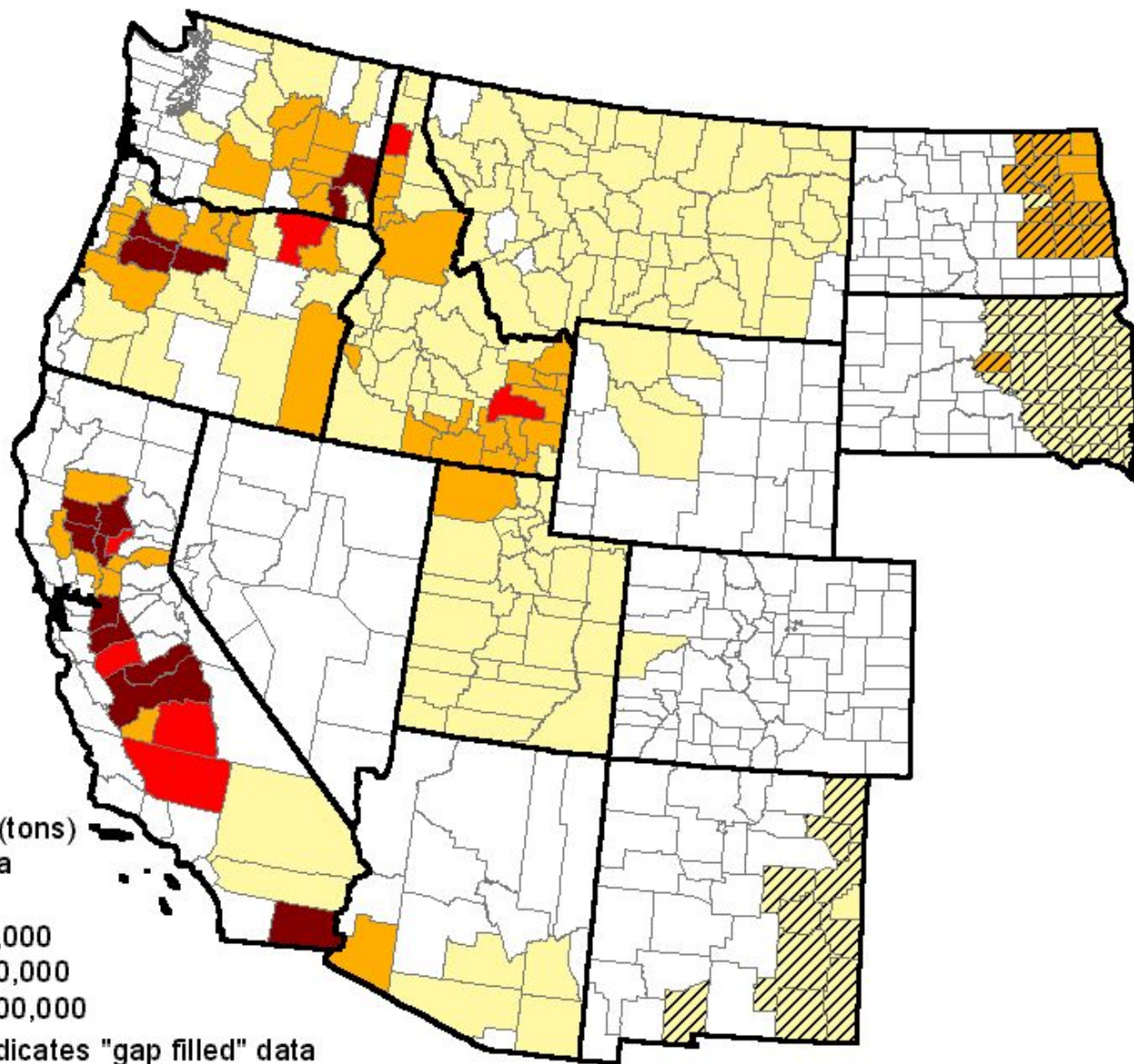
(Wheat and Barley)

- AB and AH as reported by county

$$AB/AH = \text{avg. \% burned}$$

- For ND, SD, NM:

$$AB = AH_{ND,SD,NM} \times \% \text{ burned}$$



### Legend

#### Residue Loading (tons)

- 0 or No Data
- 1 - 10,000
- 10,000 - 50,000
- 50,000 - 100,000
- 100,000 - 300,000

Crosshatching indicates "gap filled" data



# Average % Burned (Includes Gap Filled States)

Crop	Acres Harvested 10 <sup>3</sup>	Acres Burned 10 <sup>3</sup>	Average % Acres Burned
Wheat	31,619	906	2.9 %
Rice	500	255	50.9
Corn	5,766	11	0.2
Barley	5,697	138	2.4
Sugarcane	43	30	69.9
Orchards (Trees, Bushes, Vines)	2,498	530	21.2
Grasses, Seeds	900	394	43.8
Ditches, Fenceline		63	N/a
CRP	286	29	10.1

# Conclusions

---

- Objectives were met
- Assessed availability/unavailability of data
- Agricultural burning database uncertainty:
  - No QA/QC of some source data
  - Combination of years of data (1996-2001)
  - Inconsistent definition of agricultural residues
  - Crop-specific residue loading factors do not consider yield

# Recommendations

---

- Develop a mechanism to compile burn activity data by states/counties, tribes, stakeholders
  - Define “agricultural” residues
  - Establish data quality objectives
  - Assign priority to data sources
  - Facilitate peer review
  - Ensure regular updates
- Conduct research to determine geographically specific RL factors
- Incorporate the impact of irrigated/nonirrigated land

# Thank You!

---

For more information contact:

[www.wrapair.org](http://www.wrapair.org)

Fire Emissions Joint Forum

[paula.fields@erg.com](mailto:paula.fields@erg.com)

916-361-6751