

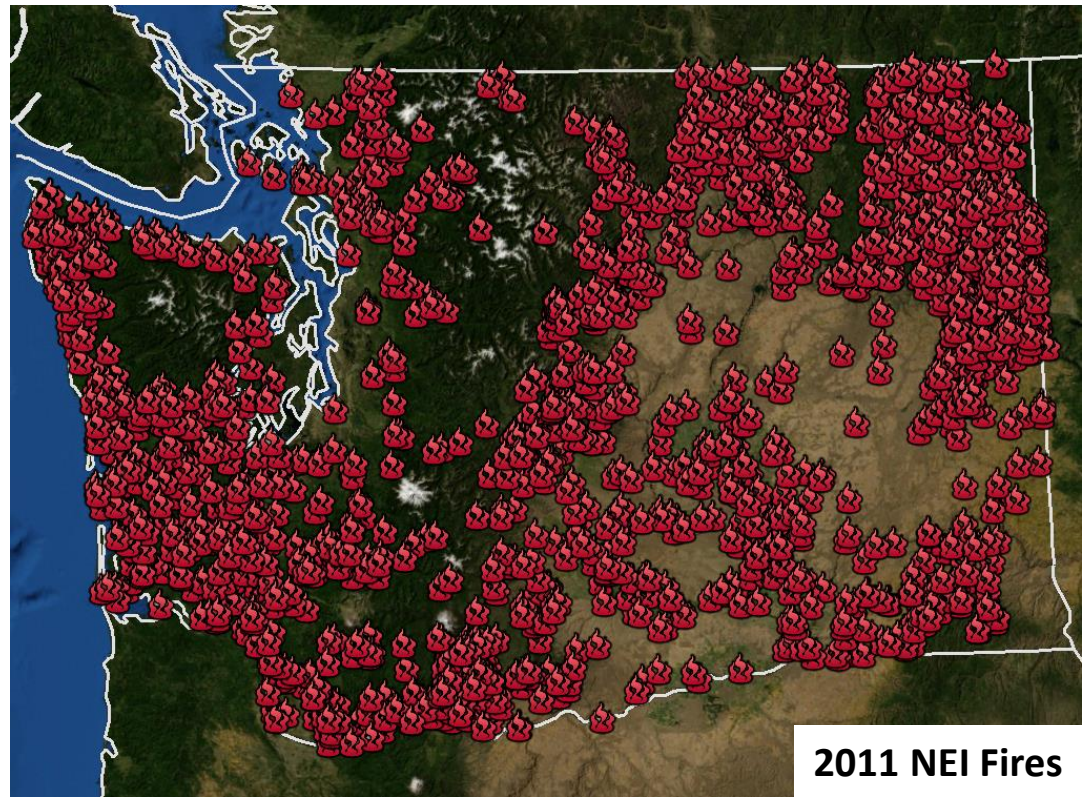
# Washington State Fire Emissions Perspective

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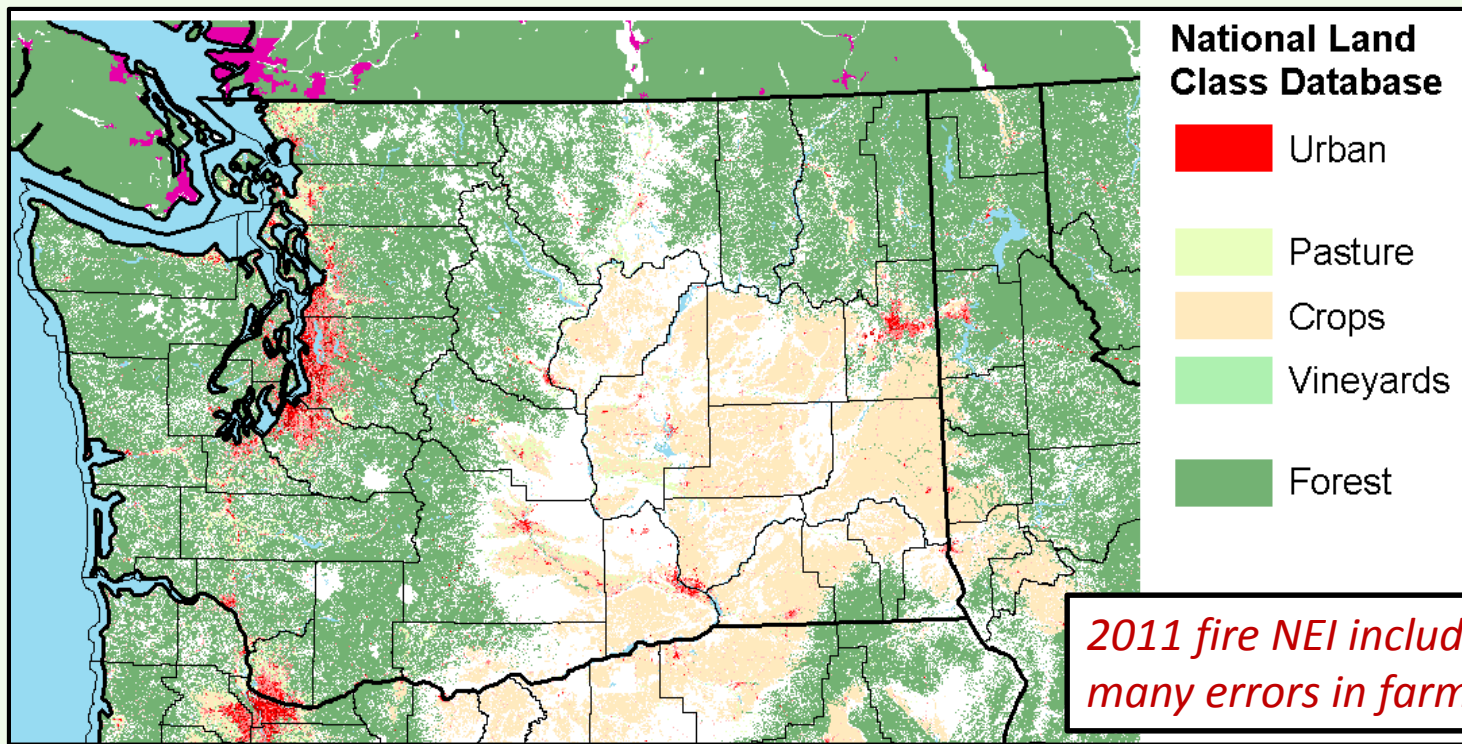


2011 NEI Fires

***The NEI is used for many projects (and SIPs) in Washington state. So, it is important to accurately represent fire in the NEI.***

***Washington State University projects currently using the 2011 fire NEI:***

- 1) Northwest Advanced Renewables Alliance (NARA) program: biofuel supply chain to produce ***aviation fuels from logging operations*** (residue will be harvested, no Rx burn).
- 2) Evaluating the contribution of fire emissions to ***black carbon deposition onto snow***.





# 2011 Wildfires (Area Burned)

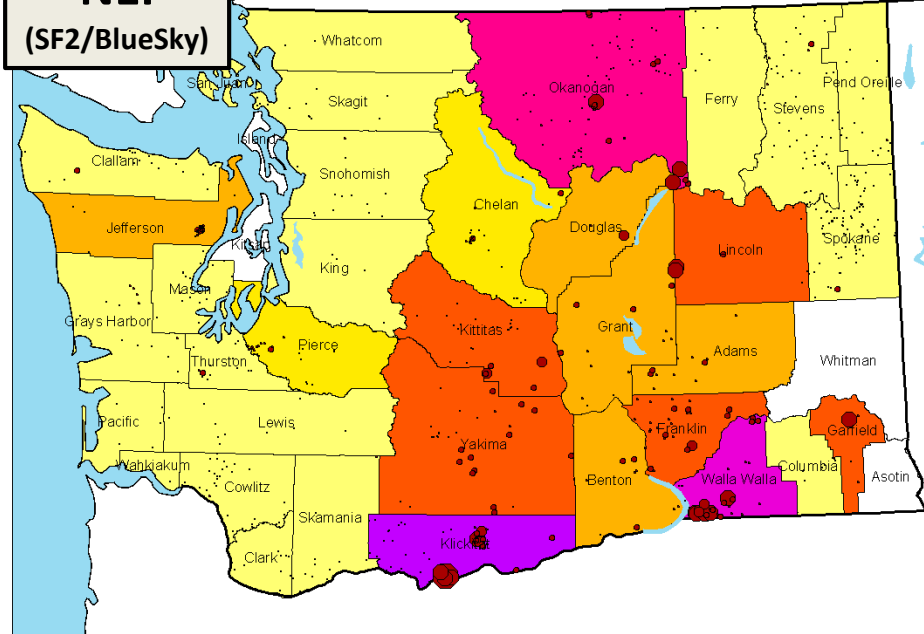
## Fire Area (Acres)

- 0 - 25
- 26 - 100
- 101 - 500
- 501 - 1,000
- 1,001 - 5,000
- 5,001 - 9,010

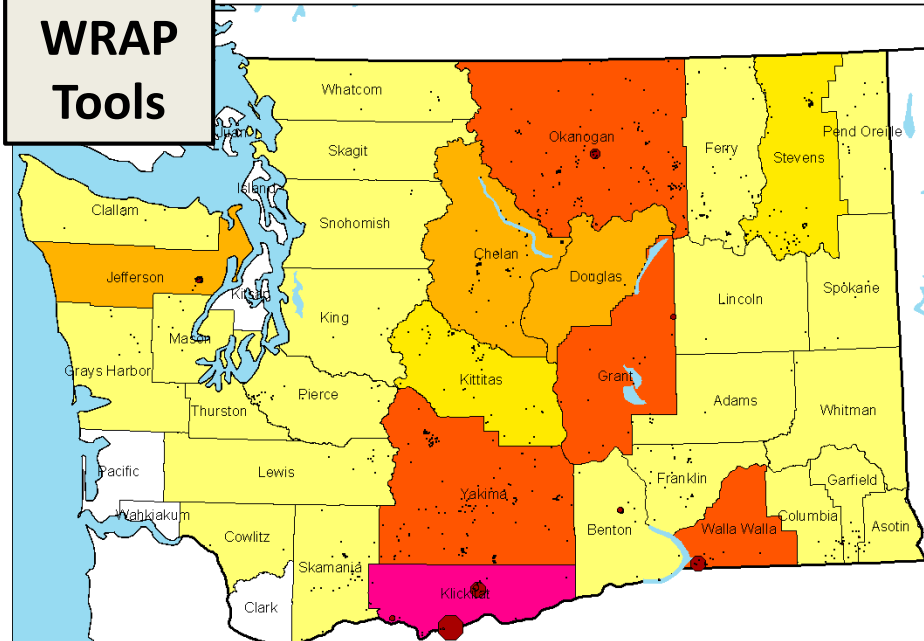
## Area by County (Total Acres)

- 0
- 0.0001 - 500
- 501 - 1,000
- 1,001 - 2,000
- 2,001 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 24,000

**NEI**  
(SF2/BlueSky)



**WRAP**  
**Tools**



WRAP = Western Regional Air Partnership

*Washington accepted the 2011 NEI wildfire emissions, but it does presumably contain many errors, especially in agricultural communities.*



# 2011 Rx Burns (PM2.5 Emissions)

**PM2.5 (Tons)**

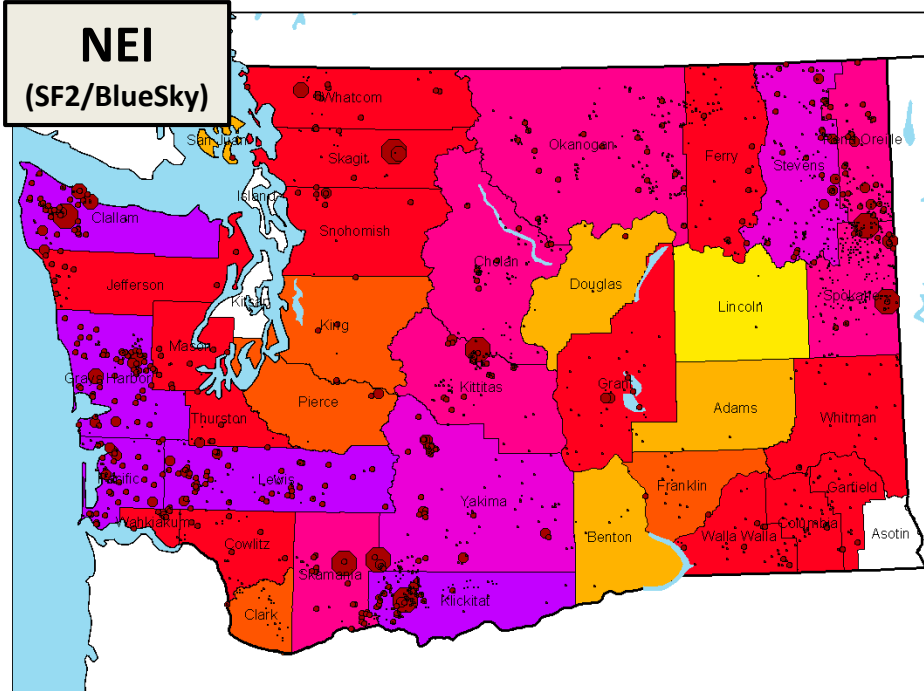
- 0.0001 - 1
- 2 - 10
- 11 - 50
- 51 - 100
- 101 - 150
- 151 - 230

**PM2.5 by County**

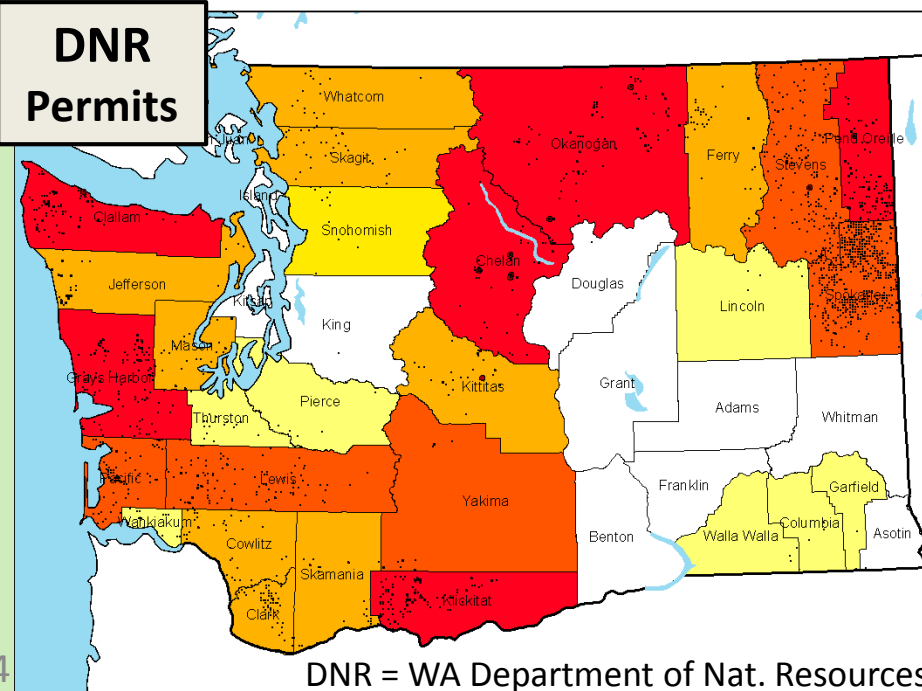
**(Total Tons)**

- 0
- 0.0001 - 5
- 6 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1,000
- 1,001 - 1,500
- 1,501 - 2,020

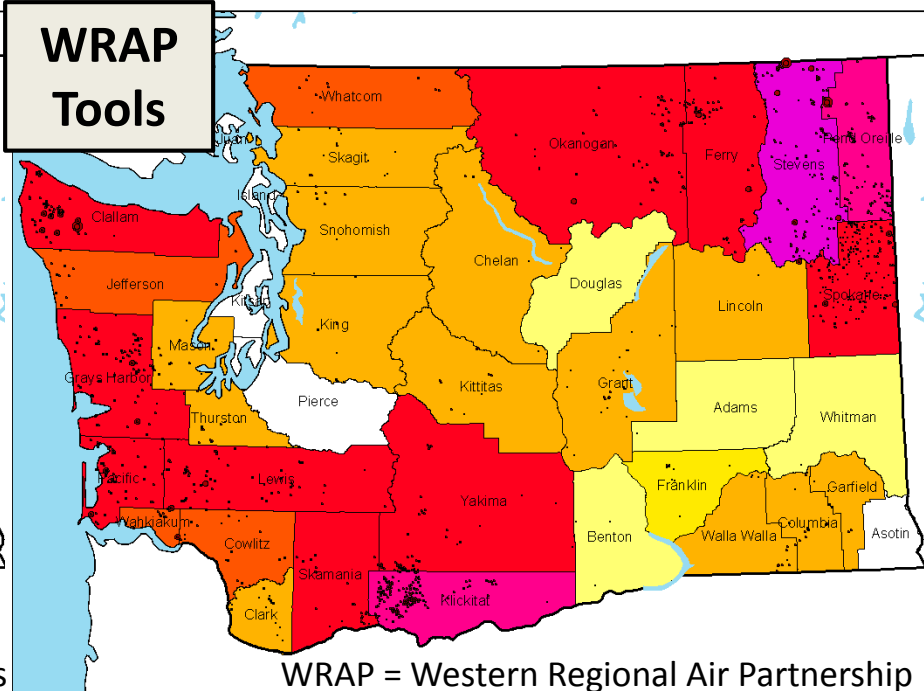
**NEI**  
**(SF2/BlueSky)**



**DNR**  
**Permits**



**WRAP**  
**Tools**



DNR = WA Department of Nat. Resources

WRAP = Western Regional Air Partnership

# 2011 NEI Fire Types

Most of Washington is forested land, with many WF/Rx burns. However, farm communities use fire as part of their seasonal crop management. Also, fires are used for orchard tear-outs, irrigation and road ditches, residential land clearing, and other open burns.

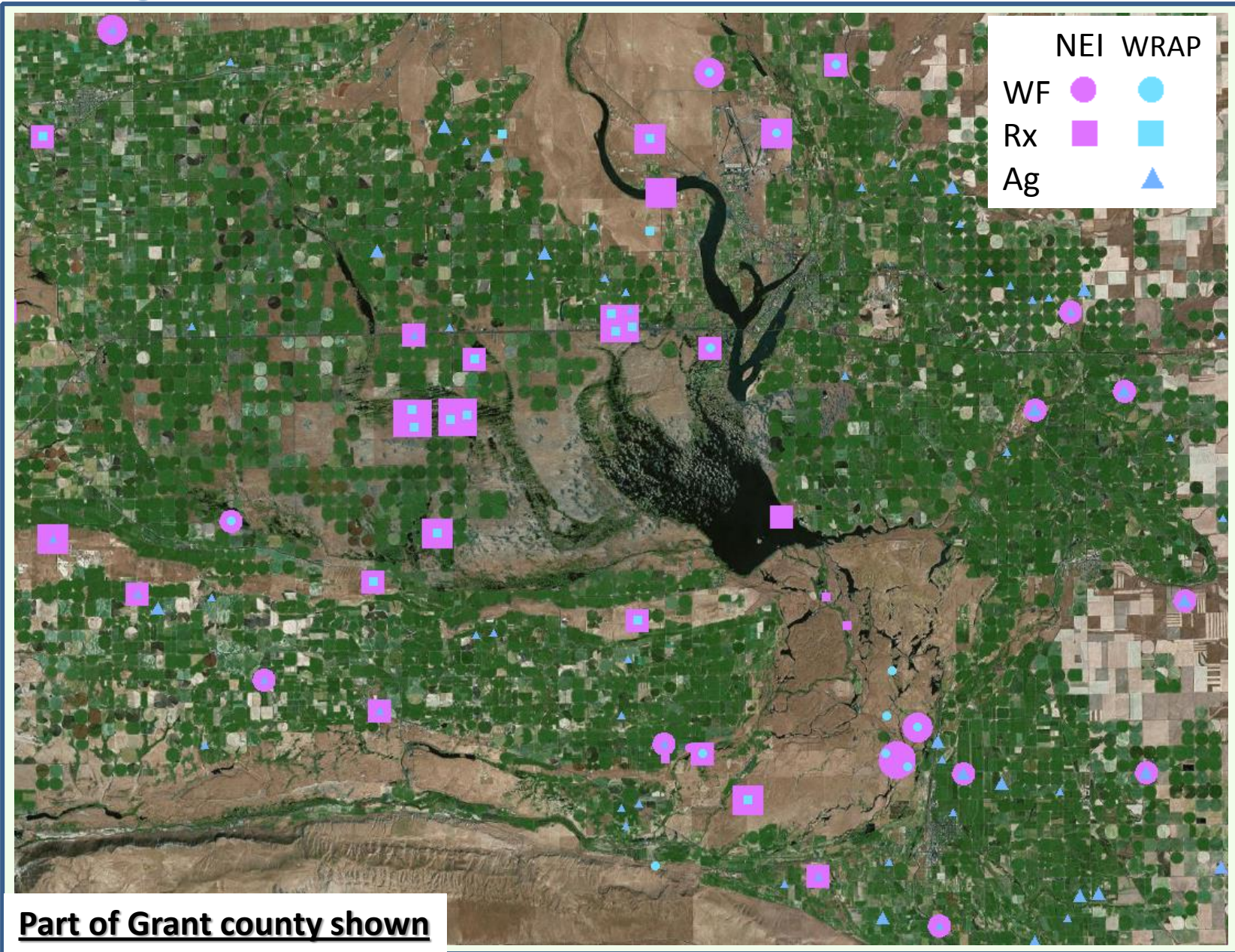
The only real Rx burns in farm communities are in rangelands, with small area (20-80 acres) and fuel loading (e.g. sparse shrubland).

The fire NEI would benefit by including all relevant fire types.

In Fire NEI?	SCC	Category	Short Name	Note
Yes	2810001000	Event	Forest Wildfires - Wildfires - Unspecified	
Yes	2811005001	Event	Managed Burning, Slash (Logging Debris) Pile Burning	retired SCC
Yes	2811015000	Event	Prescribed Forest Burning - Unspecified	
No	2810001001	Event	Forest Wildfires - Wildland Fire use - Unspecified	Possible?
No	2811020000	Event	Prescribed Rangeland Burning - Unspecified	Needed
No	2811090000	Event	Open Fire - Not categorized	Needed
No	281150xxxx	Event	Fires - Agricultural Field Burning	retired SCCs

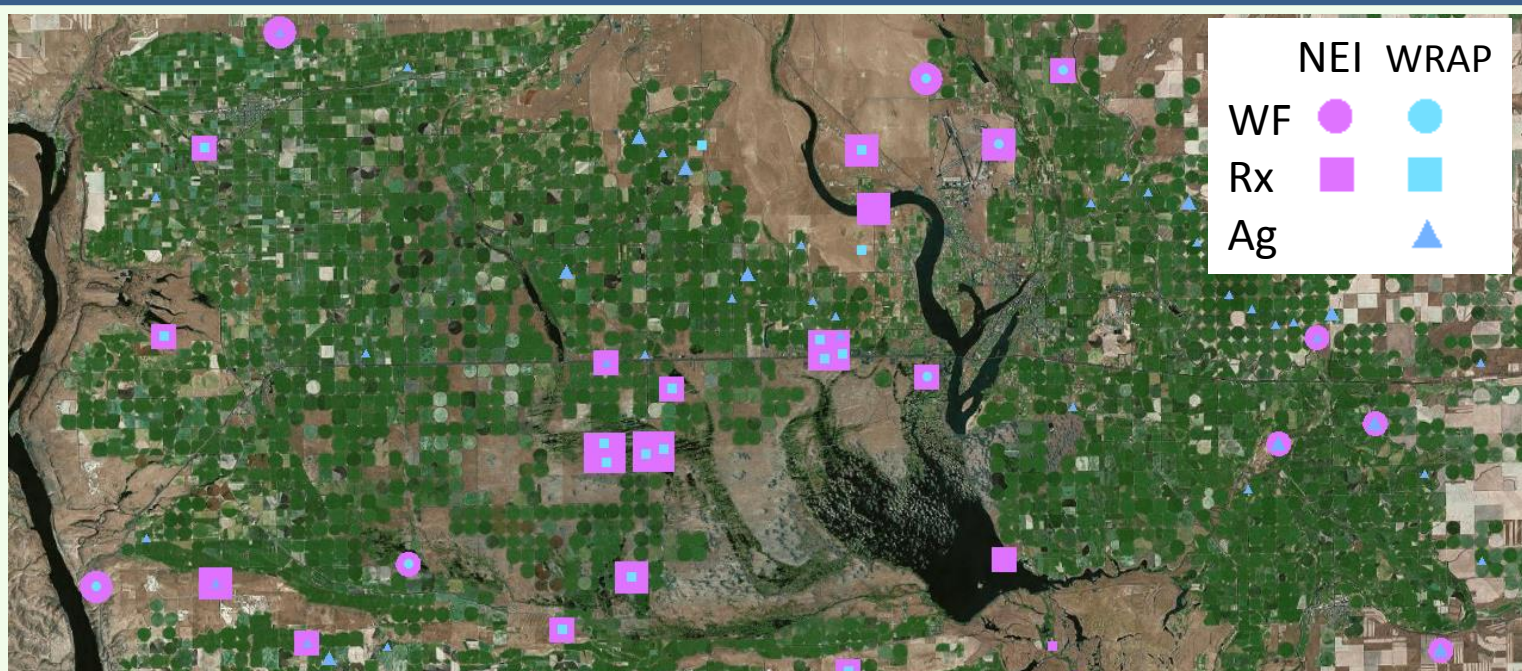


# 2011 Fire Size/Type Examples





# 2011 Fire Types Example



**NEI RX Burns w/ matches in the WRAP Tools database** (*Grant/Franklin counties*)

Matches (#)	Fuel Type (FCCS)	Avg. PM2.5 (Tons/Acre)		Avg. PM2.5 (Tons)		Avg. Area (Acres)		Fire Type (WRAP)		
		NEI	WRAP	NEI	WRAP	NEI	WRAP	RX	WF	AG
1	Water	<b>0.20</b>	<i>0.00</i>	<b>19.9</b>	<i>0.1</i>	<b>100</b>	<b>20</b>	100%		
11	Urban	<b>0.05</b>	<i>0.03</i>	<b>4.9</b>	<i>0.7</i>	<b>100</b>	<b>27</b>	27%	18%	55%
3	Forest	<b>0.17</b>	<i>0.29</i>	<b>52.8</b>	<i>9.1</i>	<b>300</b>	<b>33</b>	67%	33%	
22	Shrubland	<b>0.01</b>	<i>0.02</i>	<b>1.5</b>	<i>0.7</i>	<b>205</b>	<b>27</b>	64%	23%	14%



# 2011 NEI Effort

## ***Implications of Hazard Mapping System (HMS) detects in SMARTFIRE2 when no other source of information is available:***

WF Seasons for HMS-only detects



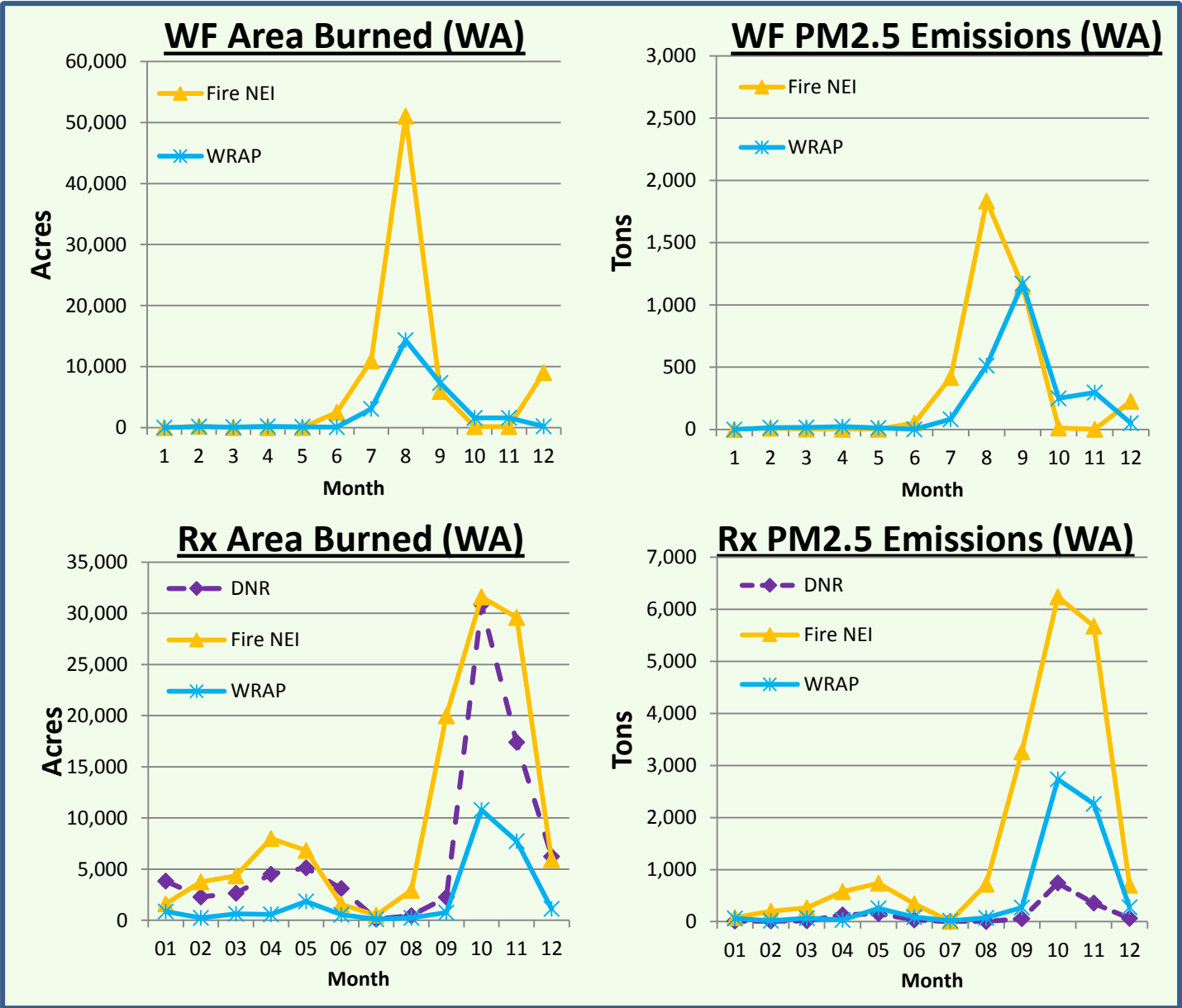
(Other months set as Rx burn)



- Assumed size is often too large
- Assumes most fires are Rx or WF
  - misclassified type (by month)
  - BlueSky emissions vary by type
    - duff and canopy consumption
  - poor treatment of “urban” fires
    - probably AG/ditch/open burns
  - fires in water
    - sun-glint false detects?
- Inconsistencies along borders
  - adversely affects regional analyses



# 2011 Fires by Month



# Summary

## ***2011 Fire NEI General Findings for Washington:***

- Robust fire location dataset
  - more fires than other sources of data
- Some obvious errors:
  - large “Rx burns” in barren, lakes, and urban areas
  - Wishram II Fire (9005 acres) duplicated in December?
- Some complicated errors:
  - misclassified AG burns and ditch burns (irrigation/roads)
    - farm lands have very large Rx burn discrepancies
  - often overestimates fire size and consumption for “unnamed” (HMS) fires.
  - occasionally combines HMS detects that are too far apart
  - seasonal WF/Rx bias due to “WF Seasons”

## ***Changes to HMS-only detects in SMARTFIRE2?***

- Check with states/regions for known Rx burns
- Treat water/urban/roads/farm locations appropriately
  - smaller size assumptions
  - eliminate static “WF Seasons” (just flag as “unknown” type)

## ***Changes to BlueSky framework methodology?***

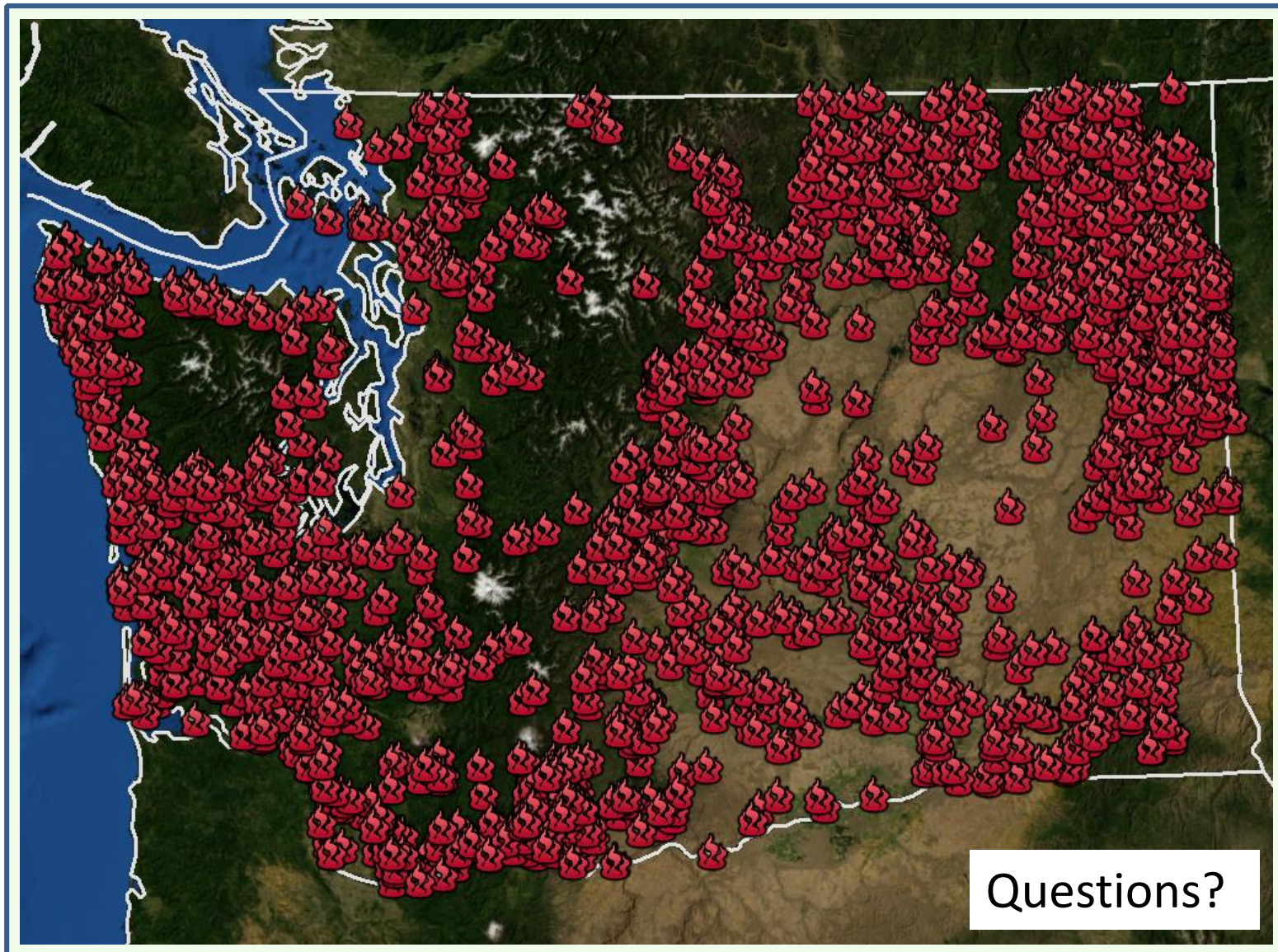
- QC for obvious errors
  - large WF in December? Rx burns in barren/water/towns?
- Decrease fuel consumption for Rx burns (consider them managed)
  - consider that fuels/moisture vary by season
  - use state-reported fuel loading and size where available
  - realistic model pathway for pile burns
- Controlled burns (e.g. ditches, piles, AG) need consideration
  - let states determine fire type for “unknowns”
  - use State info so AG fuels vary by county and month

## ***More interaction with states!***

- Guidance is needed for reviewing SF2/BSF fires
- Would welcome an intermediary (e.g. WRAP)
- States could provide fire-type defaults by location as shape-files



# Thank you!



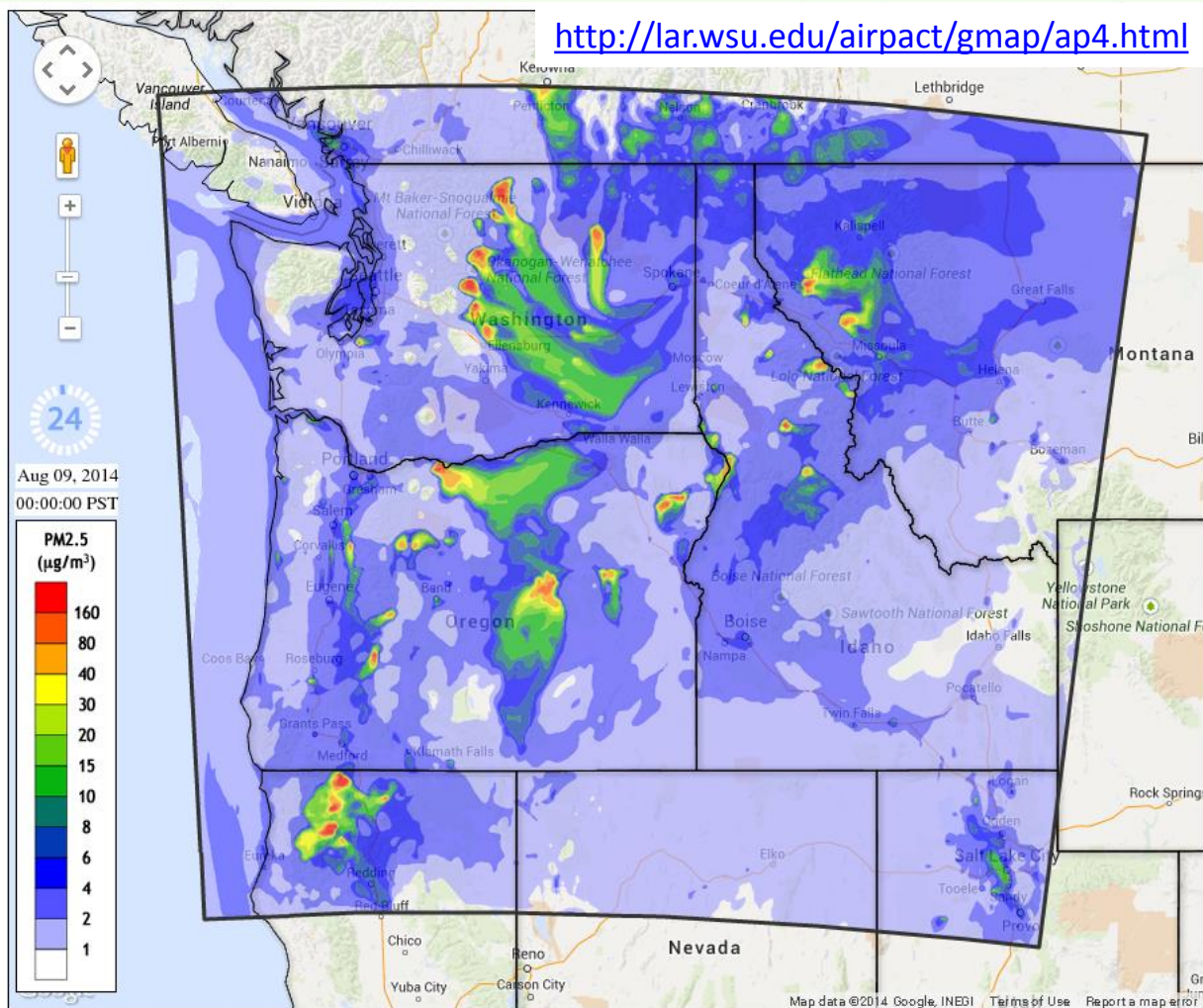


# Extra Slide

## AIRPACT-4 gives daily 48-hr forecasts of criteria and precursor pollutants

- *Forecasts use near real-time BlueSky info.*

- *NEI is used for SIPs and other analyses in the tri-state region*



## Comments to EPA on 2011 NEI for WA fires:

Includes many misclassified WF in agricultural areas (e.g. in Lincoln, Walla Walla, Benton, Franklin, Adams, and Kittitas county). See the National Land Class Database (NLCD) for agricultural land in WA state.

Includes many misclassified WF that should be prescribed burns (e.g. in Stevens, Spokane, and Pend Oreille counties). These counties had no known wildfires.

Includes many misclassified Rx burns in agricultural areas (e.g. Grant, Douglas, Benton, Franklin, Walla Walla, Adams, Columbia, Garfield, and Whitman county). See the National Land Class Database (NLCD) for agricultural land in WA state.

Correctly classified Rx burns in forested regions of WA (e.g. Clallam, Jefferson, Mason, Grays Harbor, Thurston, Pacific, Lewis, Cowlitz, Skamania, Snohomish, Skagit, Whatcom, Oganogan, Chelan, Kittitas, Yakima, Klickitat, Ferry, Stevens, Pend Oreille, and Spokane county) have large overestimates of the fuel loading that is consumed, resulting in ~4 times the emissions than what WA state estimates. This discrepancy is likely due to BlueSky consuming most available fuels which is not realistic for Rx burns in WA because they are managed by firefighters (usually as pile burns) to limit consumption of large woody fuels during forest fuels management.

Includes incorrectly duplicated WF in Klickitat county (Wishram II fire, 9005 acres, 226 tons PM2.5) for December 31. There are no known WF in WA during winter months.

Includes many fires classified as WF and Rx burns in urban and water locations that likely overestimate emissions and for which we have no record. Many of these fires are HMS-only detects without a confirmed ground report and are "Unnamed" with no verified area/emissions.

*Washington state asked EPA to replace BlueSky-generated Rx burn emissions with state estimates provided by the Department of Natural Resources (DNR).*

*Thus, comments specific to Rx burns are not relevant for the final version of the 2011 NEI, which should include DNR Rx burn emissions instead of BlueSky.*