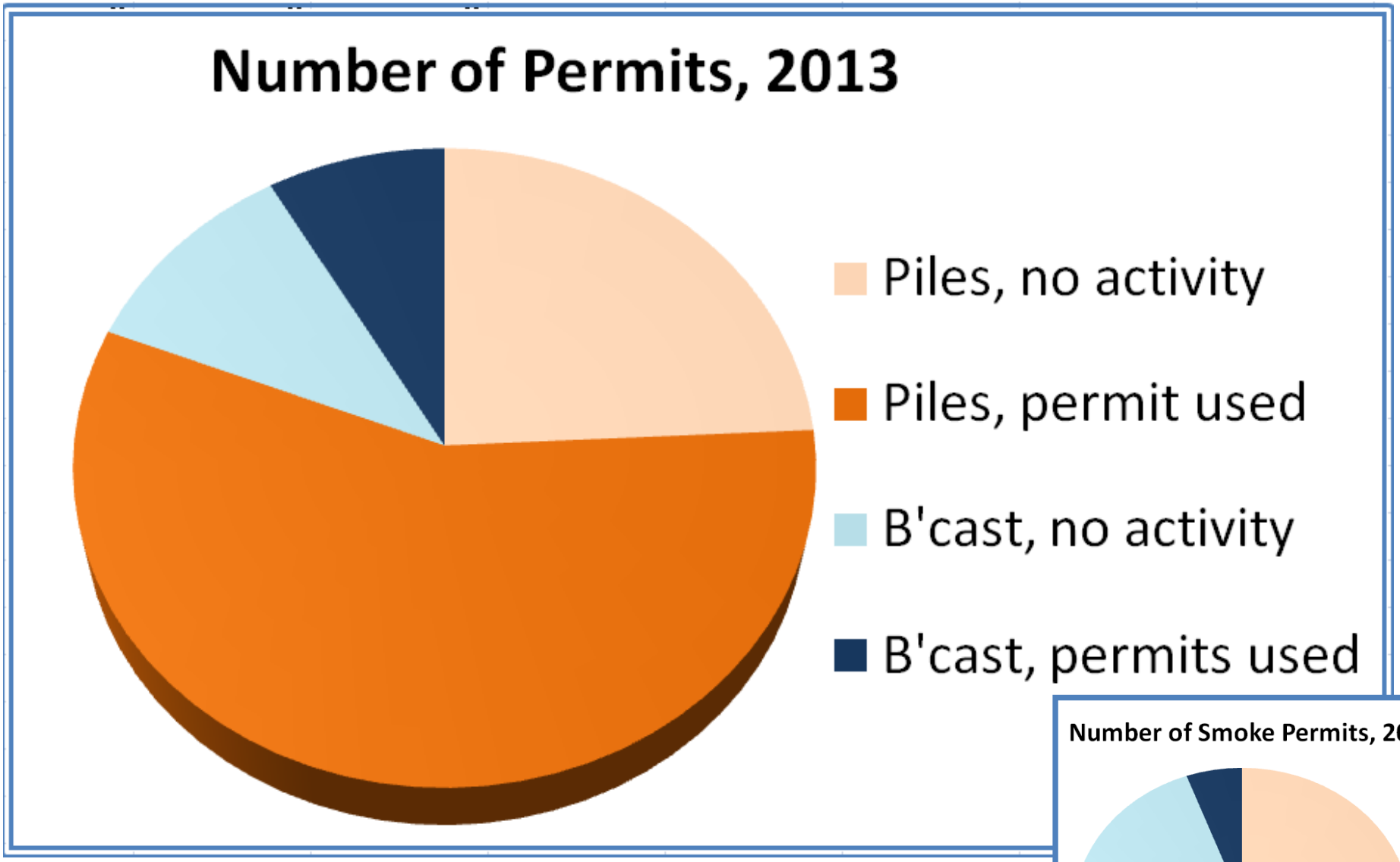
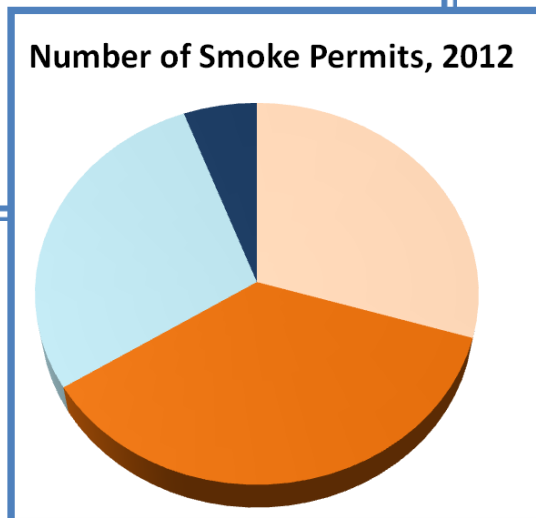
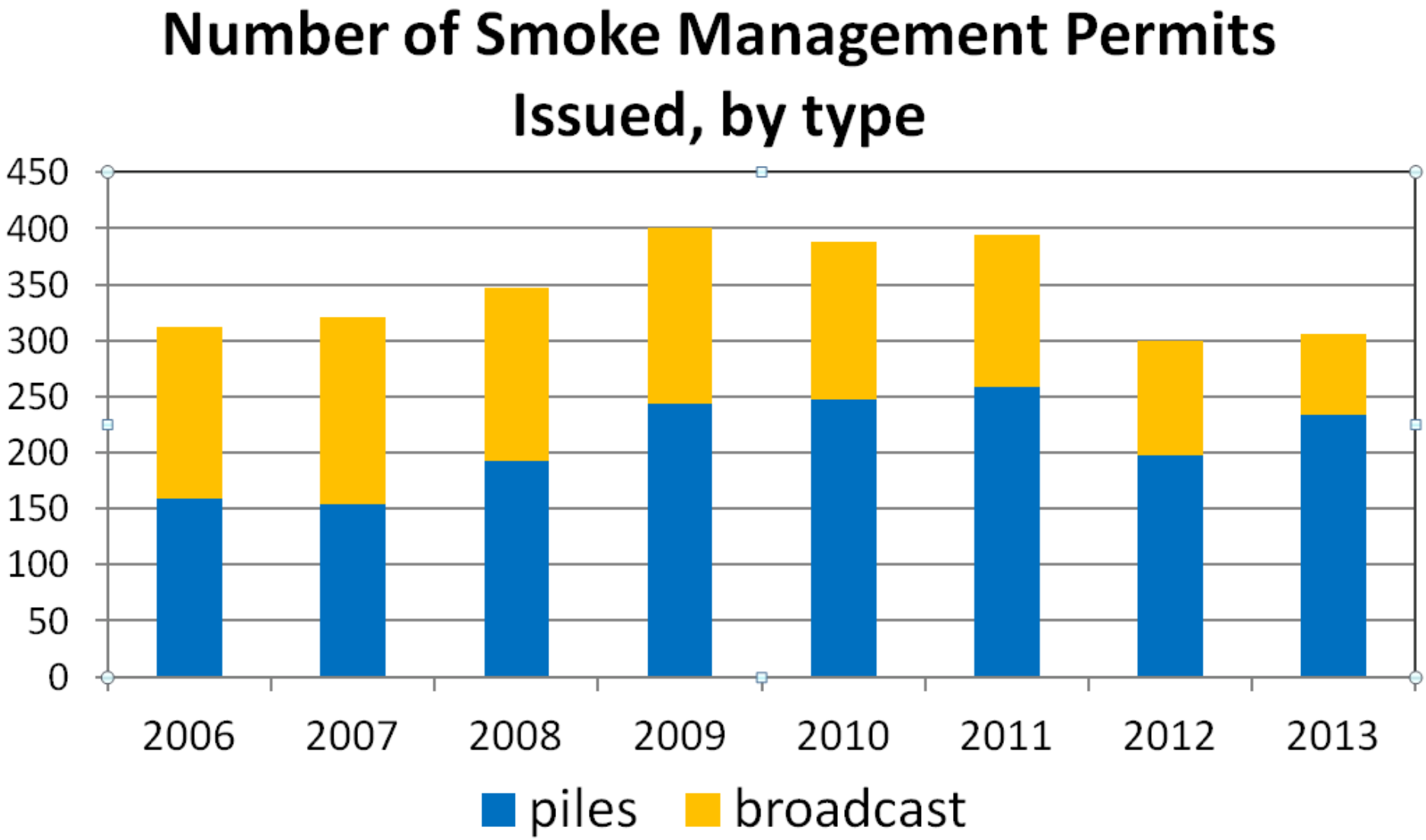
Colorado Smoke Stakeholders Spring 2014

Totals, Colo Rx Fire

2012		2013
4,254	Acres burned	18,544
16,800,000	Ft^3 of piles burned	24,400,000
36,135	count of piles burned	40,193
300	permits issued	306
139	permits with activity	188

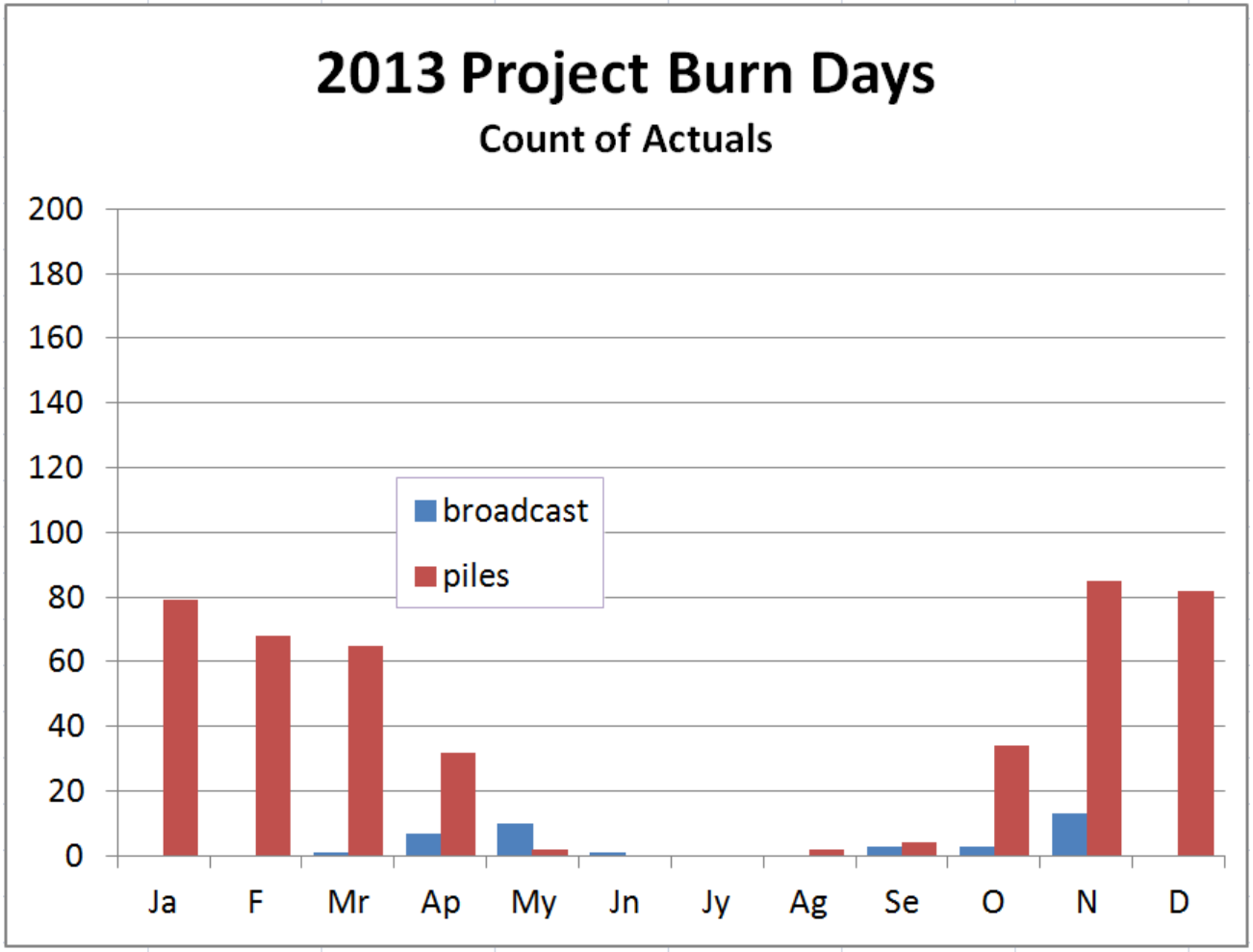

Number of Permits, 2013
Piles, no activity
Piles, permit used
B'cast, no activity
B'cast, permits used

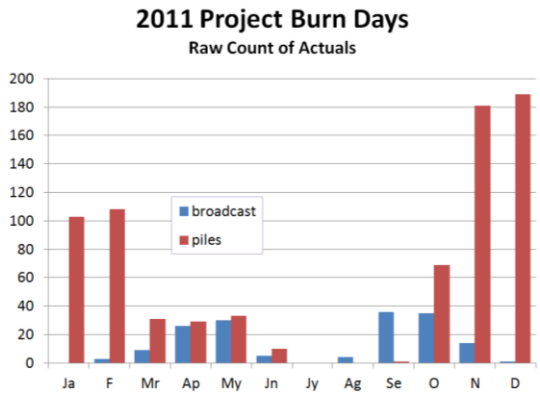

Number of Smoke Permits, 2012

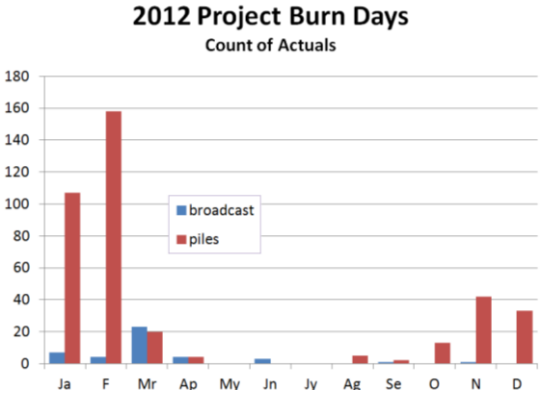

Number of Smoke Management Permits Issued, by type
450
400
350
300
250
200
150
100
50
0
2006
2007
2008
2009
2010
2011
2012
2013
piles
broadcast

Colorado Smoke Permits, **2013**

Agency	# Broadcast Permits	# Pile Permits	Acres Burned	Pile ft3 Consumed
Army/other military	4	2	13,043	167,000
Bureau Land Mgt	11	26	337	1,205,000
Local Government	4	12		3,000
Misc. fed & non-profit	1	11		200,000
Multiple Agencies	3		1,300	
National Park Service	2	11		209,000
Private Land	2	21		7,335,000
US Fish & Wildlife Svc	5	3	938	<1,000
US Forest Service	40	148	2,926	15,200,000

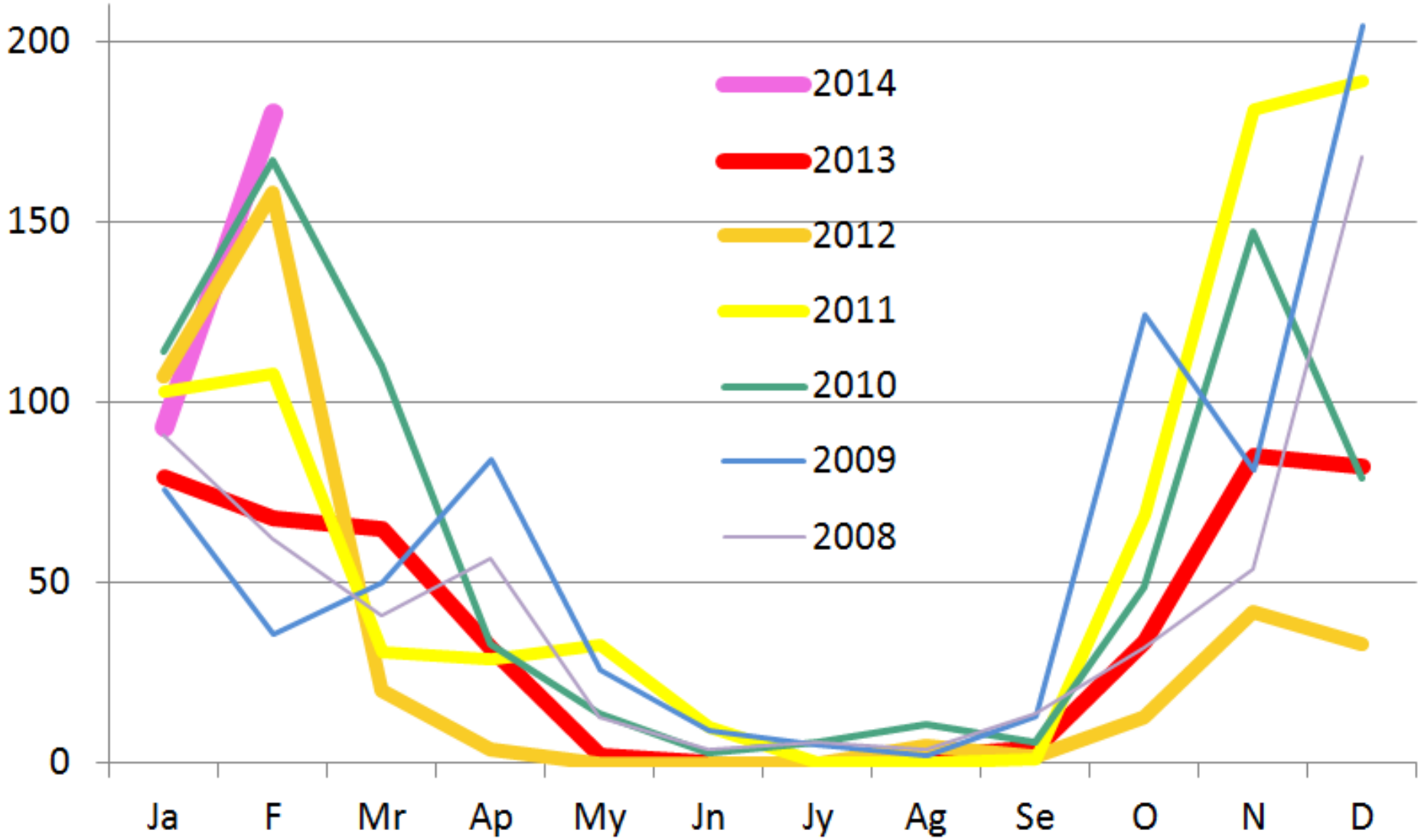

2013 Project Burn Days
Count of Actuals
200
180
160
140
120
100
80
60
40
20
0
broadcast
piles
Ja
F
Mr
Ap
My
Jn
Jy
Ag
Se
O
N
D

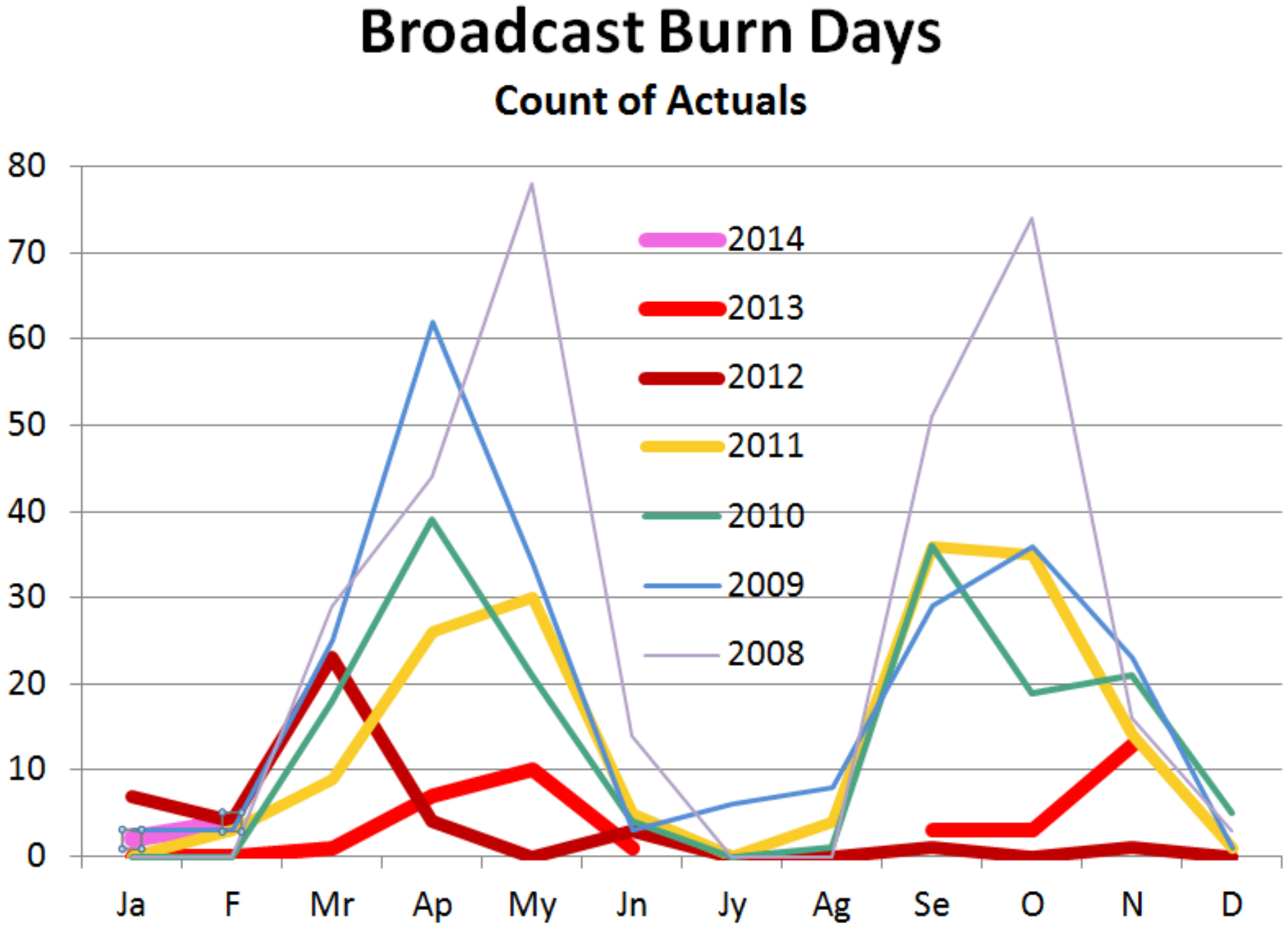

2011 Project Burn Days
Raw Count of Actuals
200
180
160
140
120
100
80
60
40
20
0
broadcast
piles
Ja
F
Mr
Ap
My
Jn
Jy
Ag
Se
O
N
D

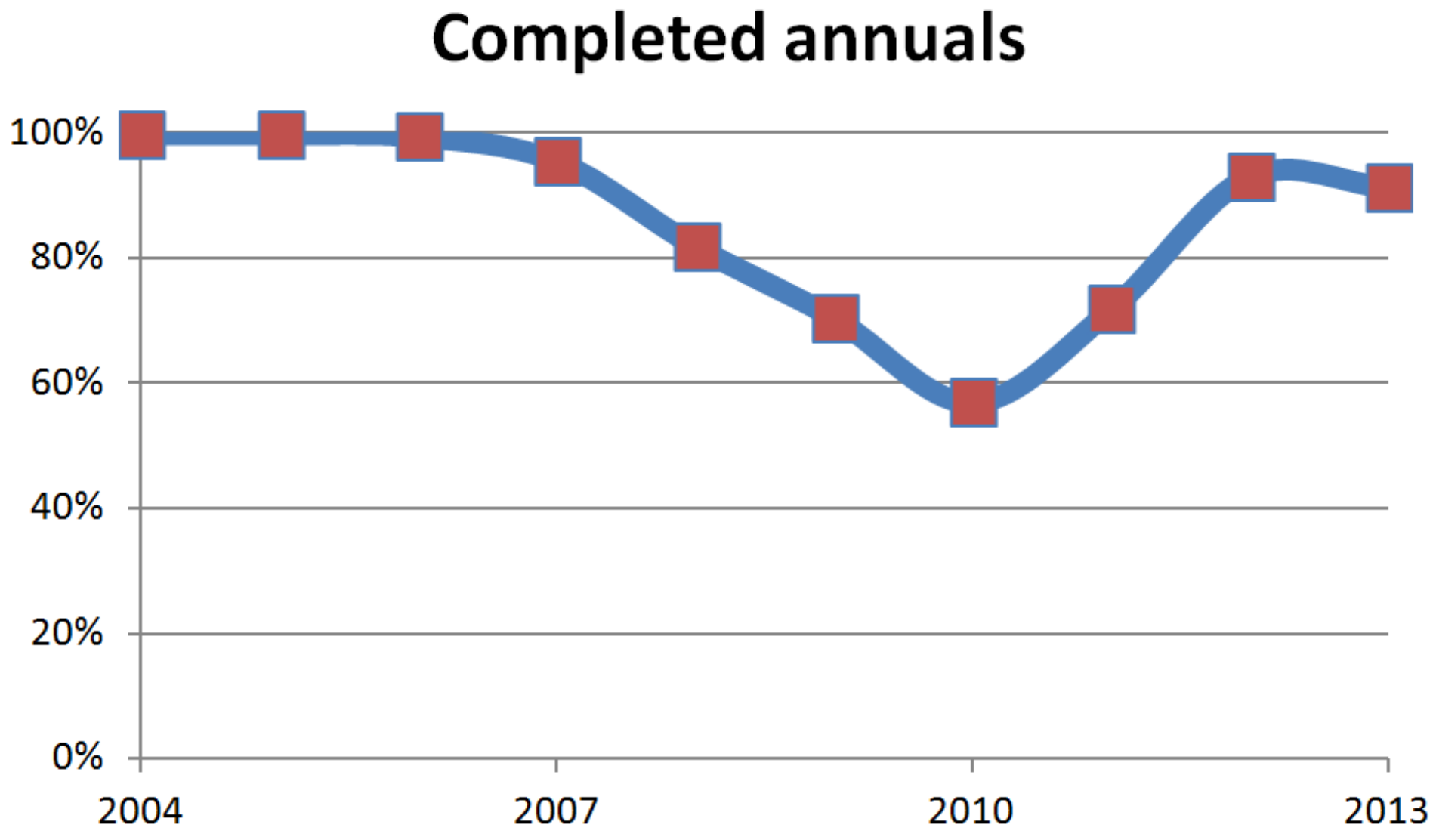

2012 Project Burn Days
Count of Actuals
180
160
140
120
100
80
60
40
20
0
broadcast
piles
Ja
F
Mr
Ap
My
Jn
Jy
Ag
Se
O
N
D

Pile Burn Days

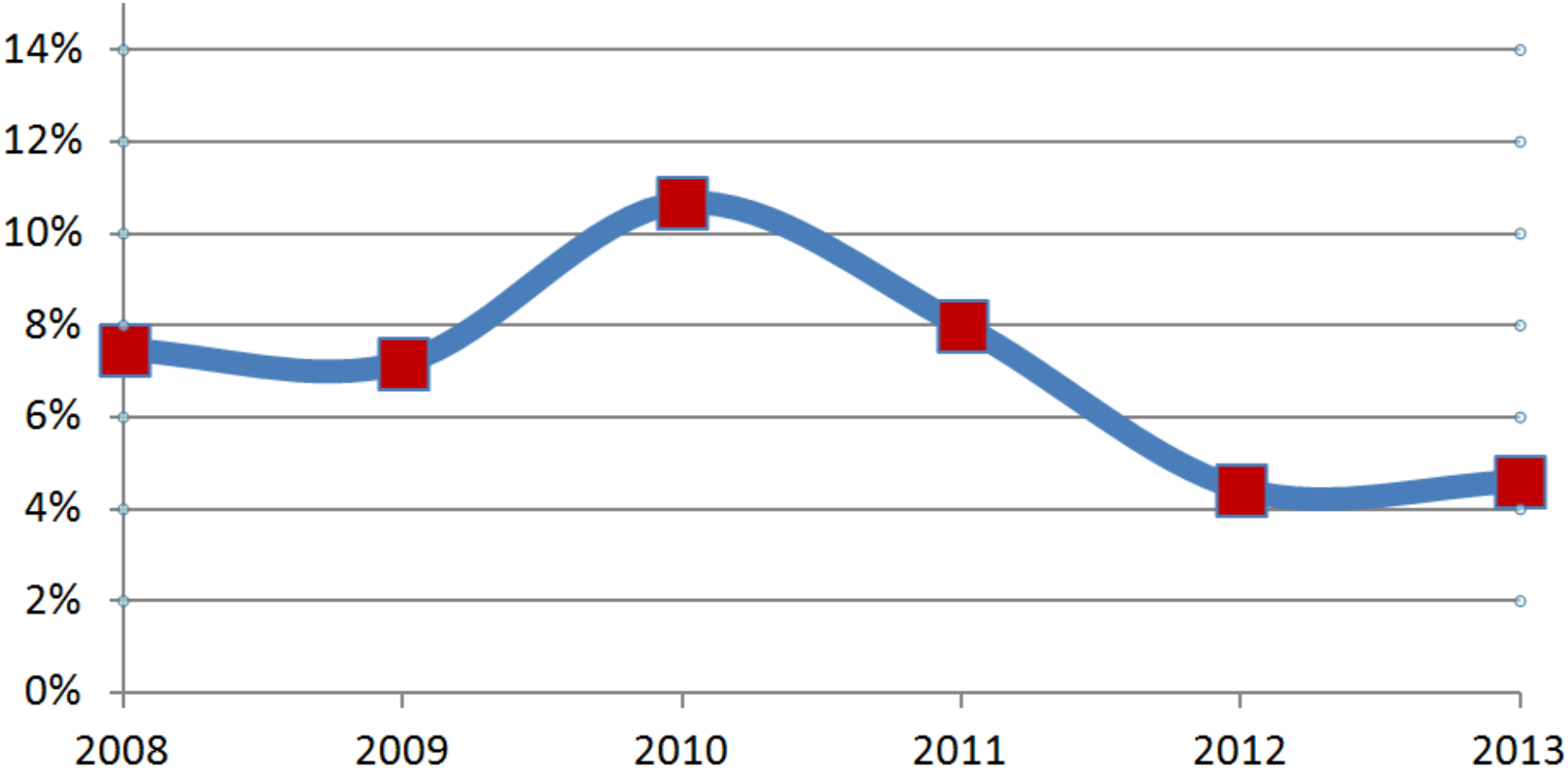
Count of Actuals




Broadcast Burn Days
Count of Actuals
80
70
60
50
40
30
20
10
0
2014
2013
2012
2011
2010
2009
2008
Ja
F
Mr
Ap
My
Jn
Jy
Ag
Se
O
N
D


Completed annuals
100%
80%
60%
40%
20%
0%
2004
2007
2010
2013

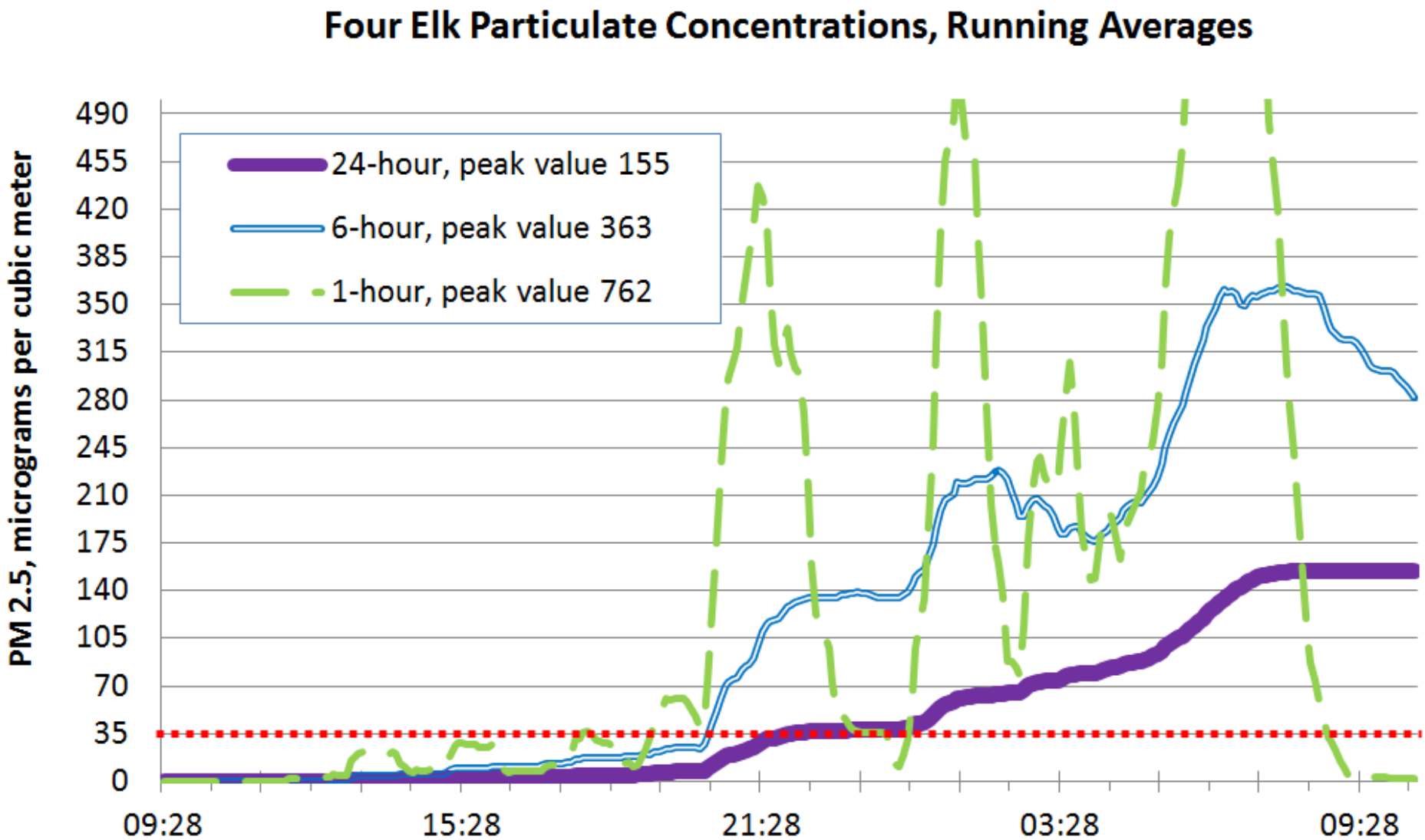
Missing Accomplishment Reports



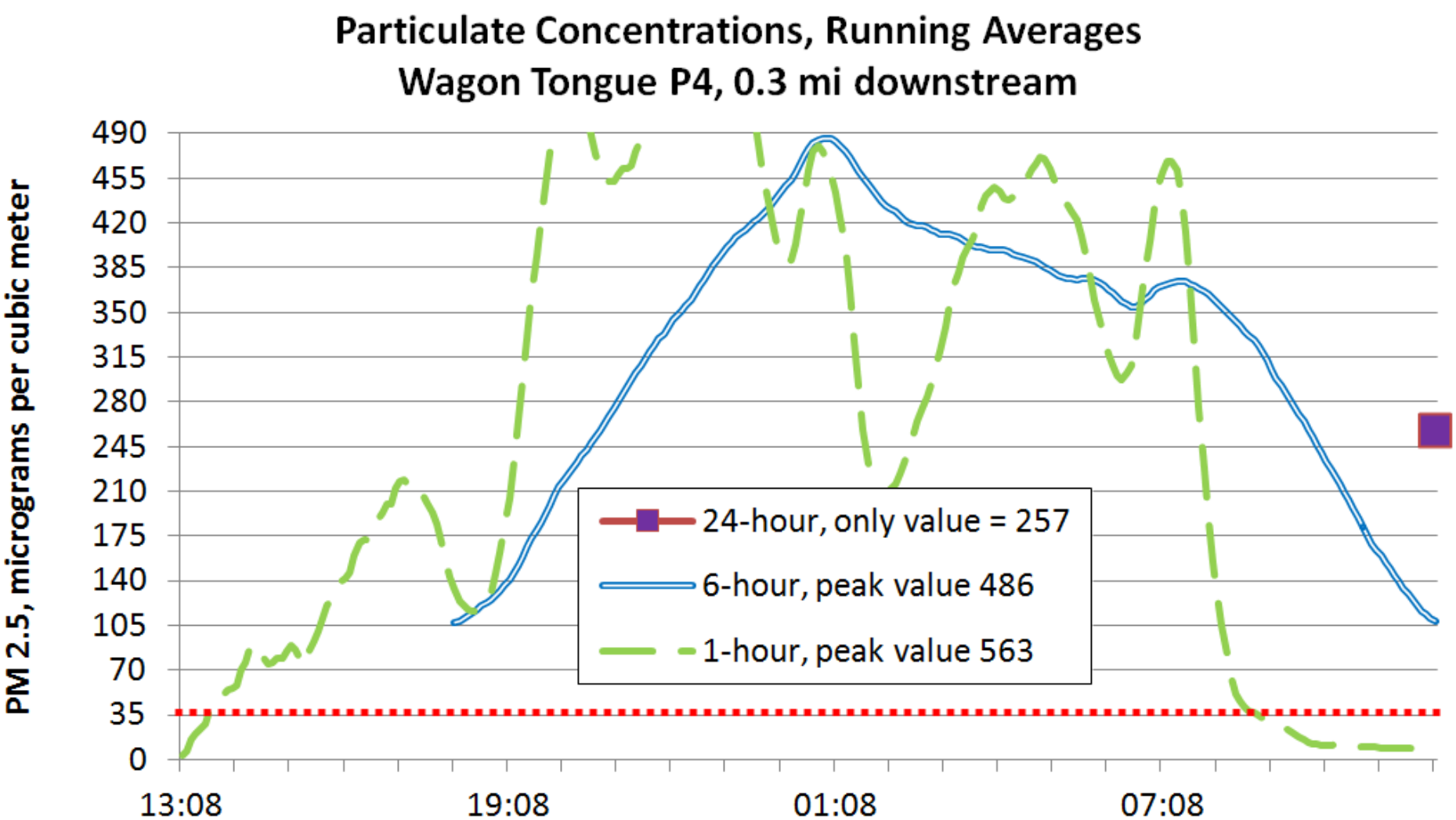
Broadcast PM Data

- Trying to instrument more, as USFS requested.
- Conditions for understory burns near homes have been focus of greatest contention.
- Instrumented 2 burns in November
  - Normal fuels for Colorado
  - Half as many acres / day as standard conditions
  - **24-hour PM2.5 WAY over level of NAAQS**

Ex.1: north of Buena Vista



Ex.2: south of Lake George



High PM at Two Fall Broadcast Units

- Distances from fireline measured:
  - (Buena Vista) home ~150’
  - (Lake George) 0.3 miles = median for 3c rural
- APCD staff were surprised!
  - Had thought a few big burns slightly over NAAQS
- Anticipate more instrumentation in spring

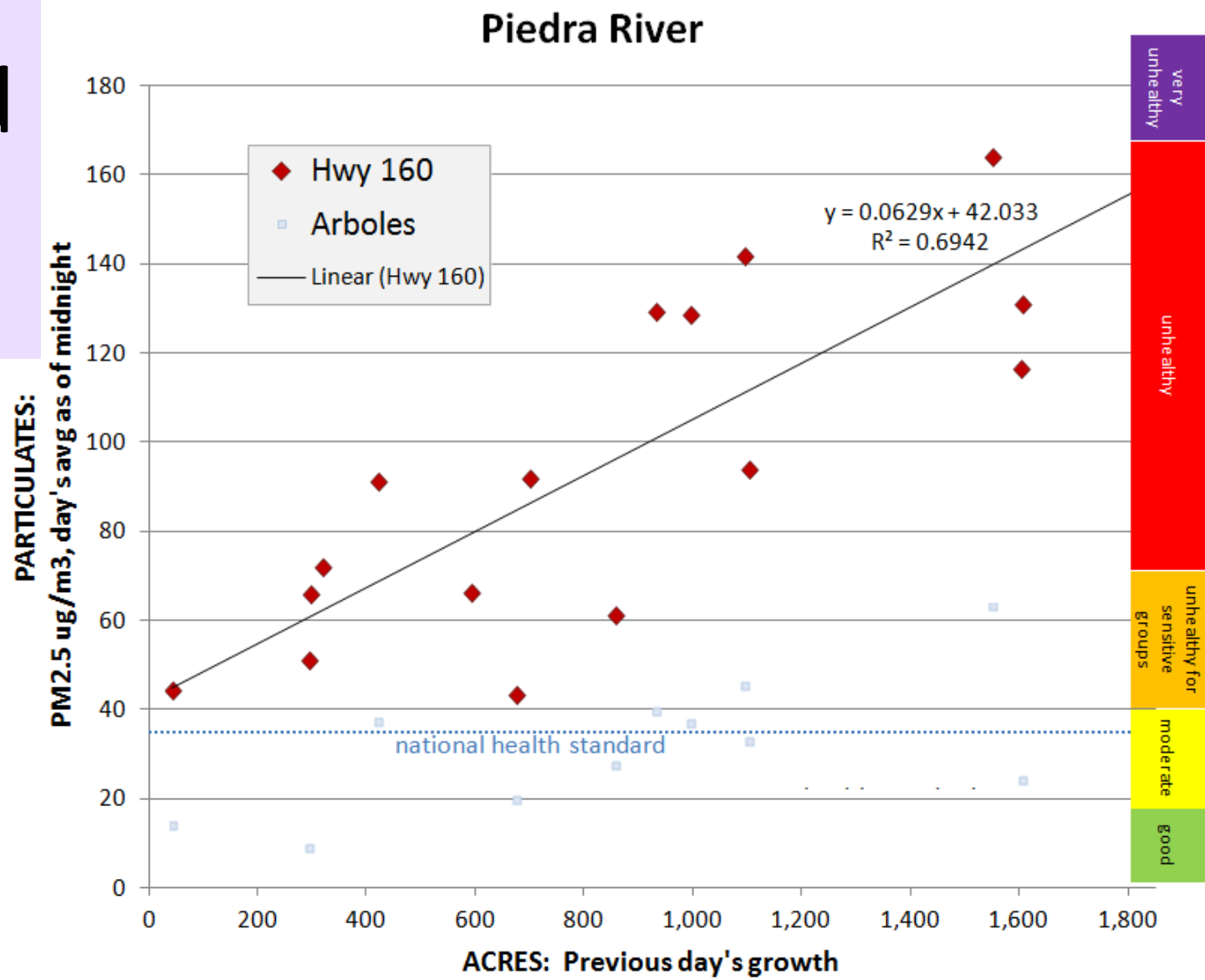
Why We Believe the High Reads

- Good field instruments, recently calibrated
- Comparing field visit photos to Denver hourly photos with measured PM (not included)
- Little Sand fire near Pagosa, mostly not suppressed, had very high PM (below)
- National monitoring data from fires, some prescribed, also high (below)

Little Sand Fire Use

- USFS Pagosa Springs District did all the monitoring work, voluntarily.
- District's overall management of Little Sand smoke was careful & highly responsible.
- Air in 'unhealthy' range for weeks
- Monitor in drainage 10(!) miles from fire
- Daily acres similar to 3a standard conditions

Little Sand data



- Instrument: NIFC cache eSampler; k-factor applied
- Highly favorable summer ventilation throughout

NIFC Monitors

- Cache monitors available to fed. land managers
- Data posted via satellite to a public website
- Examined non-summer days with low initial PM, *probably* prescribed rather than wildfire
- Data includes many days with readings well over level of the NAAQS

NIFC Monitors, PM2.5 Data

Location	Min. 24-hr avg	Full day of data?	Max. hour	Data date	Monitor ID
New York	**58**	n	1177	11/6/13	R9-17
Idaho	**60**	y	364	4/26/13	Smoke #13
Kentucky	**14**	n	77	4/3/13	Smoke #17
Alabama	**62**	n	321	4/24/13	Smoke #68
“	**33**	n	308	4/9/13	“
“	**38**	n	202	2/18/13	“

- Source: www.wrcc.dri.edu. The website has no data days for most states.
- .89 k-factor for eSamplers for smoke applied to all PM2.5 data; units are ug/m3
- Fuel types, acres per day, etc. unknown.
- 24-hr minimum averages assume 0 PM for all hours without data.

New Working Hypotheses

- A significant minority of burns create PM at homes above level of NAAQS.
  - 10% of understory burn days is a blind guess.
- We continue to think even large burns in brush and grass stay below NAAQS.
- Piles are even harder to guess about.
- Likely true nationwide

New Working Hypotheses, con't.

- Even little broadcast understory burns (>50 ac??) can generate PM over NAAQS level.

- If true, **it can't be solved by tweaking permits**.
  - Would have to cut standard acres by 92%

Three **Critical Questions**

1. What are the legal boundaries on APCD discretion to permit potentially high-PM burns?

2. If NAAQS aren't the upper limit, what is?

3. What must be said to residents about potential health impacts, by whom?