

Small Fires Sensitivity Analysis

Fire Emissions Joint Forum Meeting
Spokane, WA
Day 1 – 845a

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Outline

- What have we (FEJF and RMC) done so far?
- What are the threshold questions to ask?
- Do the data help us to answer the threshold question(s)?
- Can we agree on certain (any?) conclusions?

What have we done so far?

Illustration of Approach

Visibility
Impact of
Small Fires

=

CMAQ
Result with
All Fires

minus

CMAQ
Result with
Small Fires
Removed

Emissions removed in Sensitivity Case

- 2002 Base case scenario included all fire emissions.
- Sensitivity case included the following fire:
 - all wild and Rx fires and prescribed larger than 100 acres in timber and larger than 300 acres in grass lands
 - used a list of large fires provided to RMC by Dave Randall
 - all agricultural burning
 - non federal range land fires
- Fire excluded in the sensitivity case were the wild and prescribed fires not included in the Air Sciences' list.

Approach

- Process emissions for sensitivity case by excluding small fires.
- Perform CMAQ sensitivity simulation using the 12-km model for July and November:
 - July has fewer small fires
 - November has more small fires, related to Rx burning.
- Compare Base Case minus fire sensitivity:
 - positive concentration indicate the effects of small fires.
- Determine significance of results.

Large/Small Fire Data Summary

-- Number of Fire Events --

large	MONTH	STATE	Total		
large	7	AZ	27.0		
		CA	92.0		
		CO	74.0		
		ID	52.0		
		MT	14.0		
		ND	15.0		
		NM	16.0		
		NV	48.0		
		OR	308.0		
		SD	11.0		
		UT	78.0		
		WA	28.0		
		WY	63.0		
		7 Total			826.0
		large	11	AZ	116.0
				CA	75.0
				ID	67.0
MT	205.0				
NV	2.0				
OR	26.0				
SD	1.0				
WA	4.0				
WY	6.0				
11 Total				502.0	
large Total			1,328.0		

small	7	AZ	77.0		
		CA	215.0		
		CO	43.0		
		ID	103.0		
		MT	50.0		
		ND	9.0		
		NM	26.0		
		NV	52.0		
		OR	174.0		
		SD	70.0		
		UT	194.0		
		WA	43.0		
		WY	125.0		
		7 Total			1,181.0
		small	11	AZ	255.0
				CA	114.0
				CO	34.0
ID	456.0				
MT	1,400.0				
ND	10.0				
NM	5.0				
NV	9.0				
OR	2,011.0				
SD	2.0				
UT	9.0				
WA	855.0				
WY	35.0				
11 Total			5,195.0		
small Total			6,376.0		
Grand Total			7,704.0		

**59% of
July
events**

**91% of
Nov
events**

Large/Small Fire Data Summary

-- PM2.5 Emissions --

PM 2.5					
large	MONTH	STATE	Total		
large	7	AZ	3,797.2		
		CA	27,349.1		
		CO	22,259.0		
		ID	1,063.9		
		MT	964.5		
		ND	2,883.5		
		NM	5,486.3		
		NV	4,497.5		
		OR	107,067.5		
		SD	599.8		
		UT	15,500.9		
	WA	2,910.4			
	WY	20,120.0			
	7 Total		214,499.7		
	11	AZ	4,593.2		
		CA	4,753.9		
		ID	1,686.1		
		MT	2,297.6		
		NV	30.4		
		OR	490.5		
		SD	28.3		
		WA	142.5		
		WY	90.7		
			11 Total		14,113.3
		large Total			228,613.0

small	7	AZ	295.7
		CA	789.7
		CO	245.3
		ID	413.8
		MT	91.7
		ND	7.7
		NM	128.9
	NV	193.0	
	OR	1,439.7	
	SD	126.4	
	UT	521.6	
	WA	103.5	
	WY	480.6	
	7 Total		4,837.6
	11	AZ	1,953.7
		CA	376.9
		CO	59.7
		ID	688.3
		MT	1,971.1
		ND	10.0
		NM	14.4
		NV	12.4
		OR	2,911.3
		SD	1.2
		UT	8.4
	WA	543.5	
	WY	60.8	
	11 Total		8,611.7
small Total			13,449.3
Grand Total			242,062.3

**2% of
July
PM2.5**

**38% of
Nov
PM2.5**

Threshold Questions

- Should Land Managers and Air Agencies track all Rx (planned) fire events?
- Should Land Managers and Air Agencies only track WF (unplanned) fire events larger than 100/300 acres?

A look at the data to answer the threshold questions.

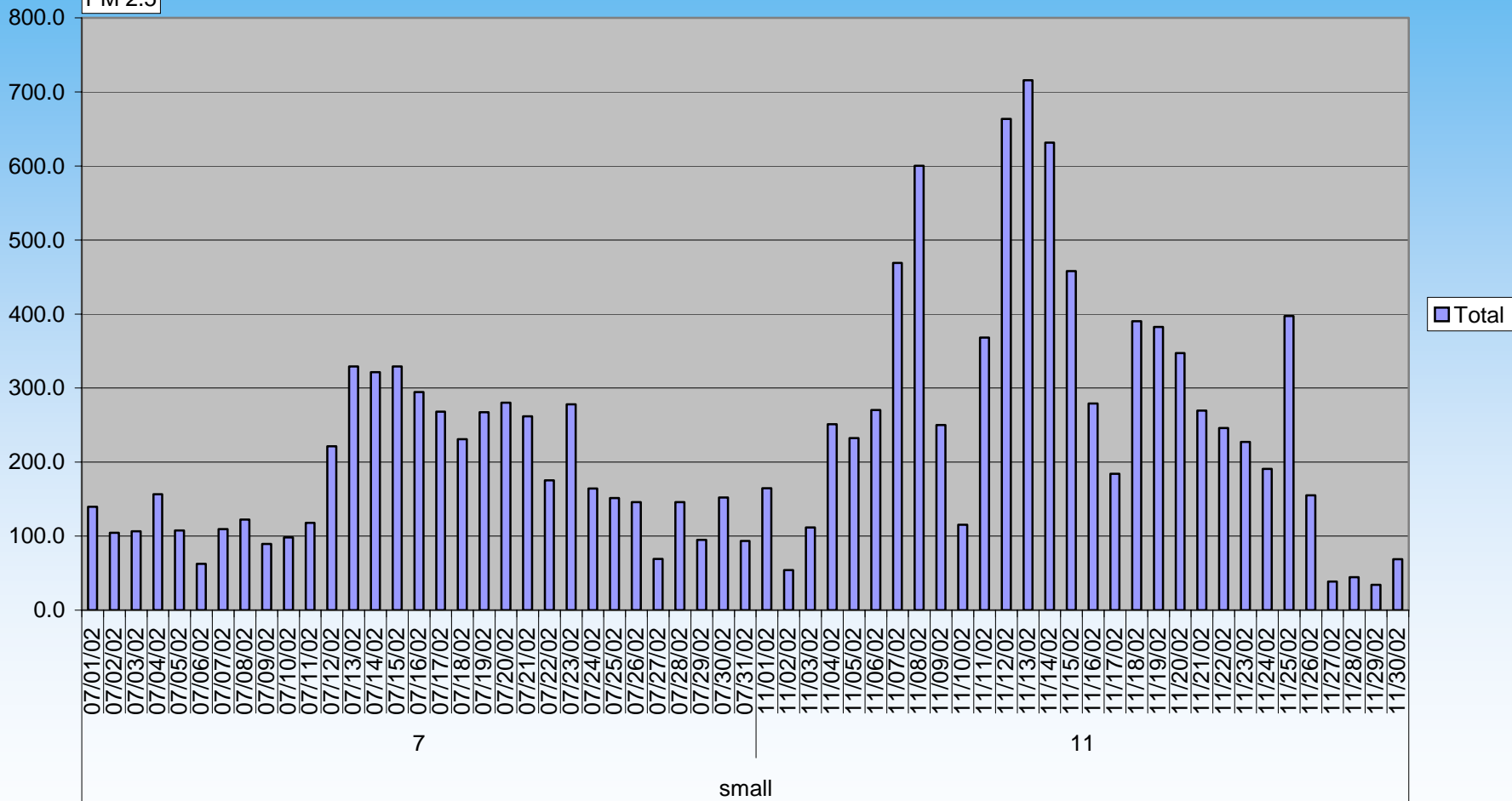
- D. Randall and M. Fitch have re-looked at all (at least most) of the RMC modeling results.
- We've focused on a couple series of modeling results data to investigate whether the data suggest answers to the threshold questions.

Focus – Small Rx

QUALITY|ei

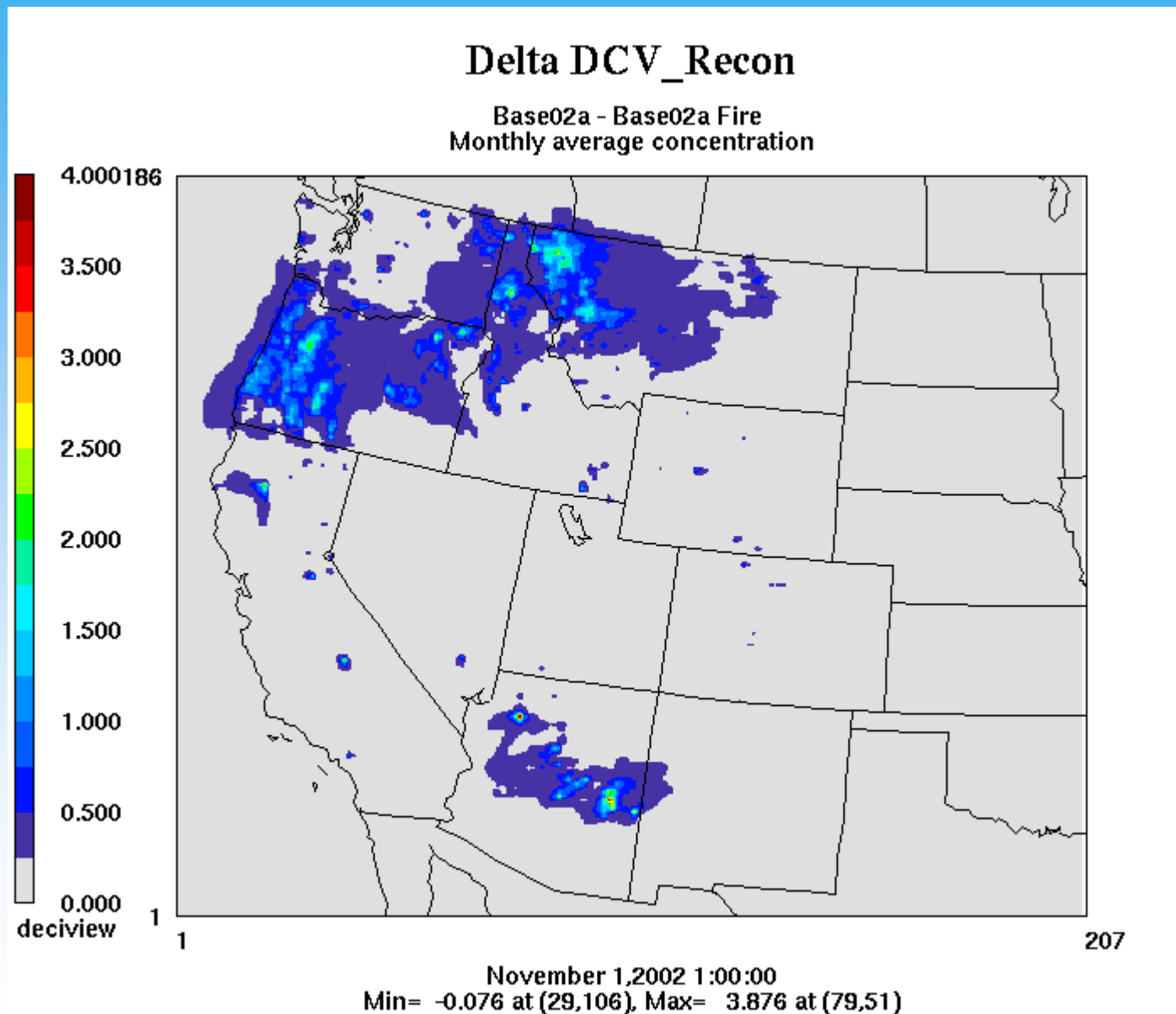
Total

PM 2.5



large MONTH|DATE|SLSH

Focus – Small Rx

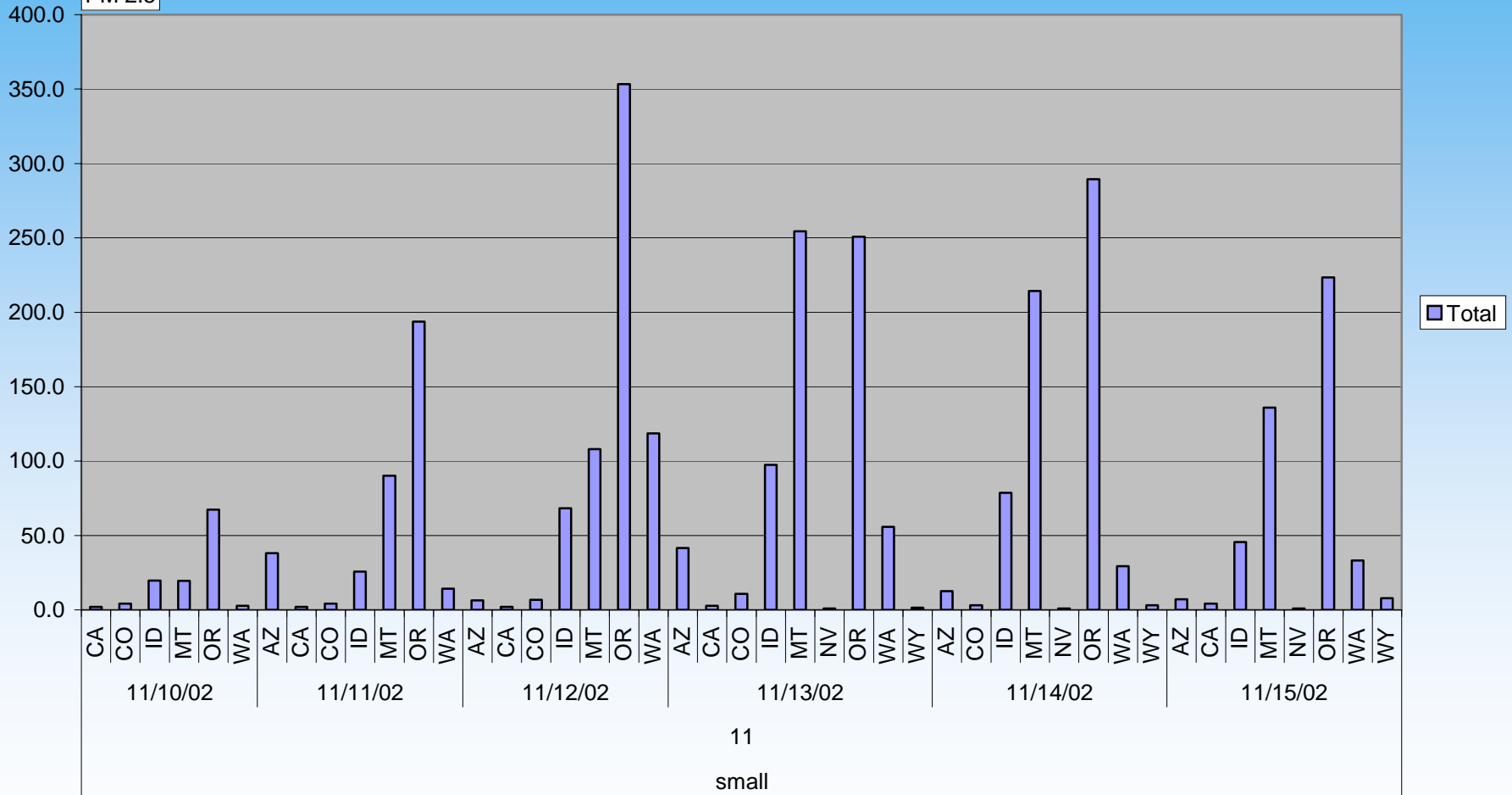


Focus – Small Rx

QUALITY|ei

Total

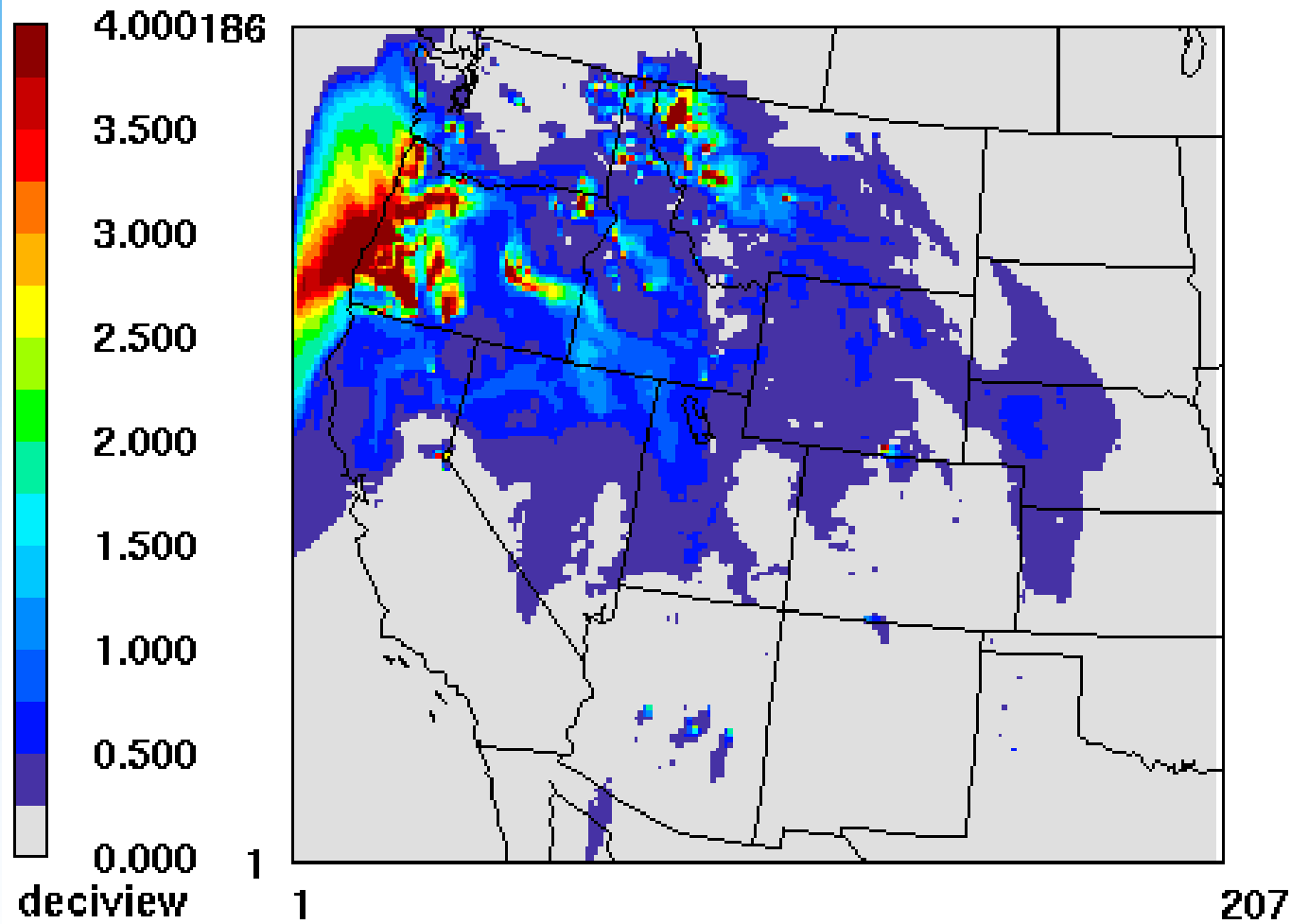
PM 2.5



large|MONTH|DATE|SLSH|STATE

Delta DCV_Recon

Base02a - Base02a Fire
Daily average concentration



November 15, 2002 0:00:00

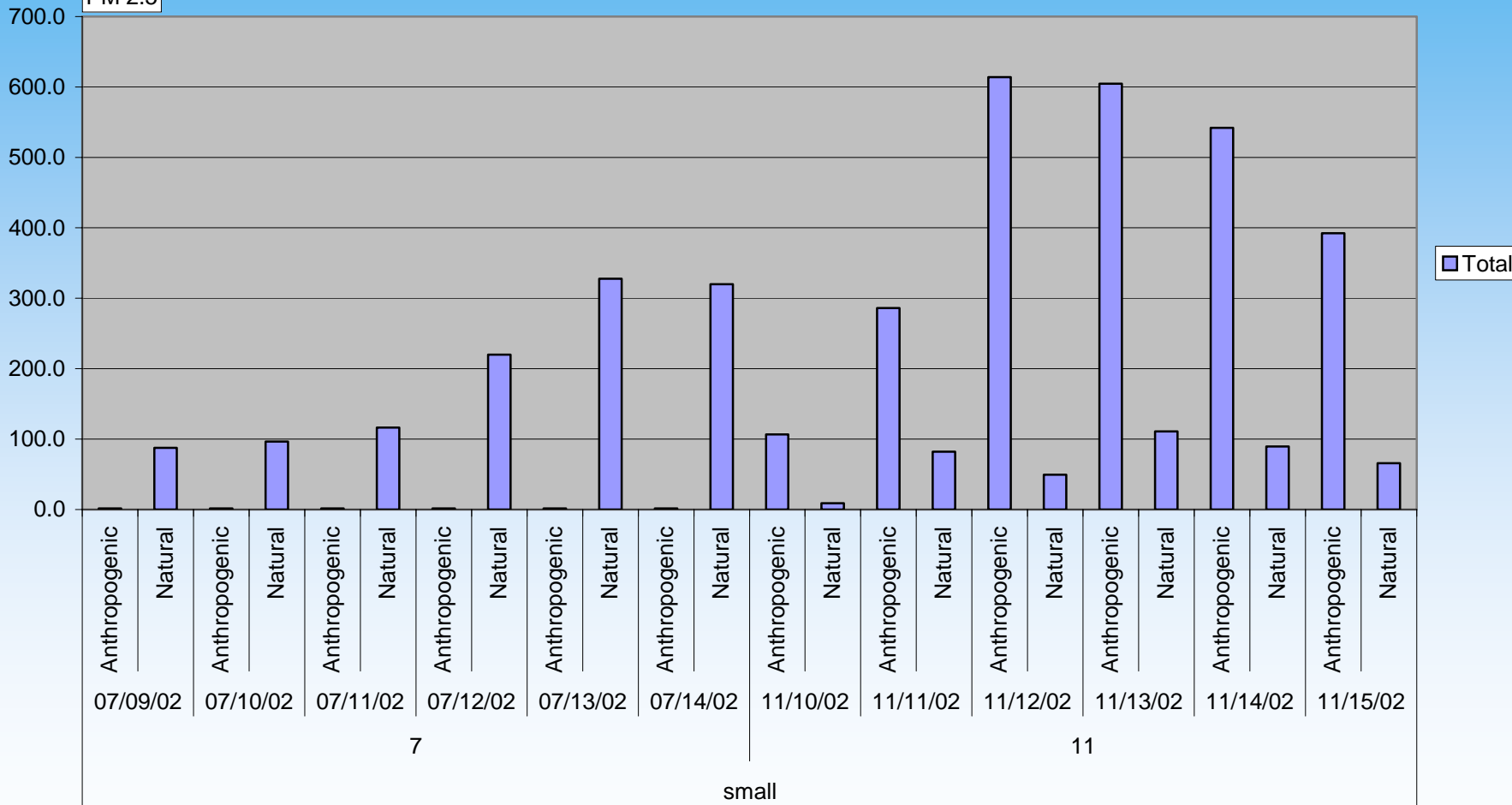
Min= -0.337 at (160,144), Max= 12.492 at (65,146)

Focus – Small Rx

QUALITY | ei

Total

PM 2.5



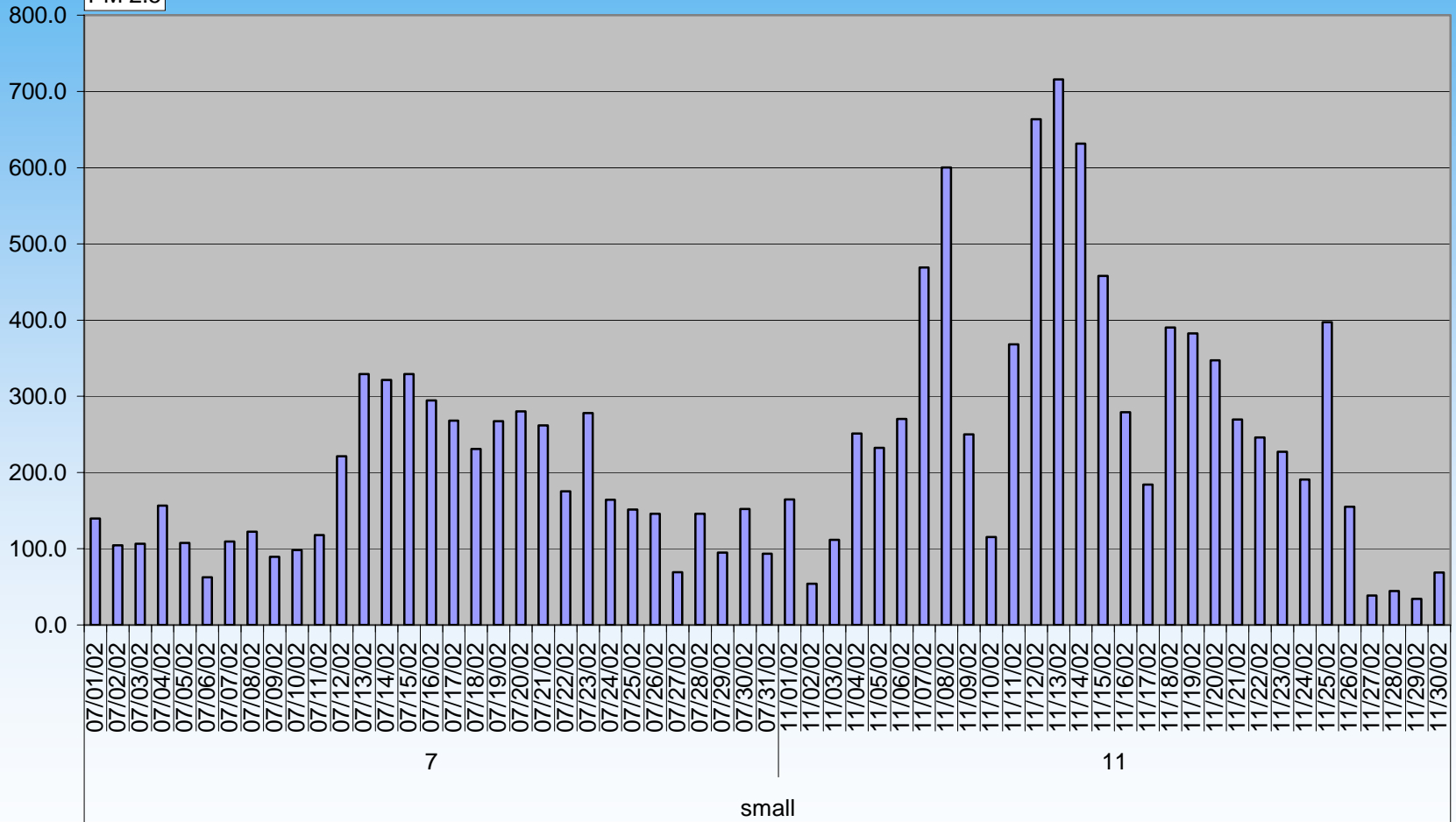
large | MONTH | DATE | SL | SH | NAT | ANTHRO

Focus – Large WF

QUALITY|ei

Total

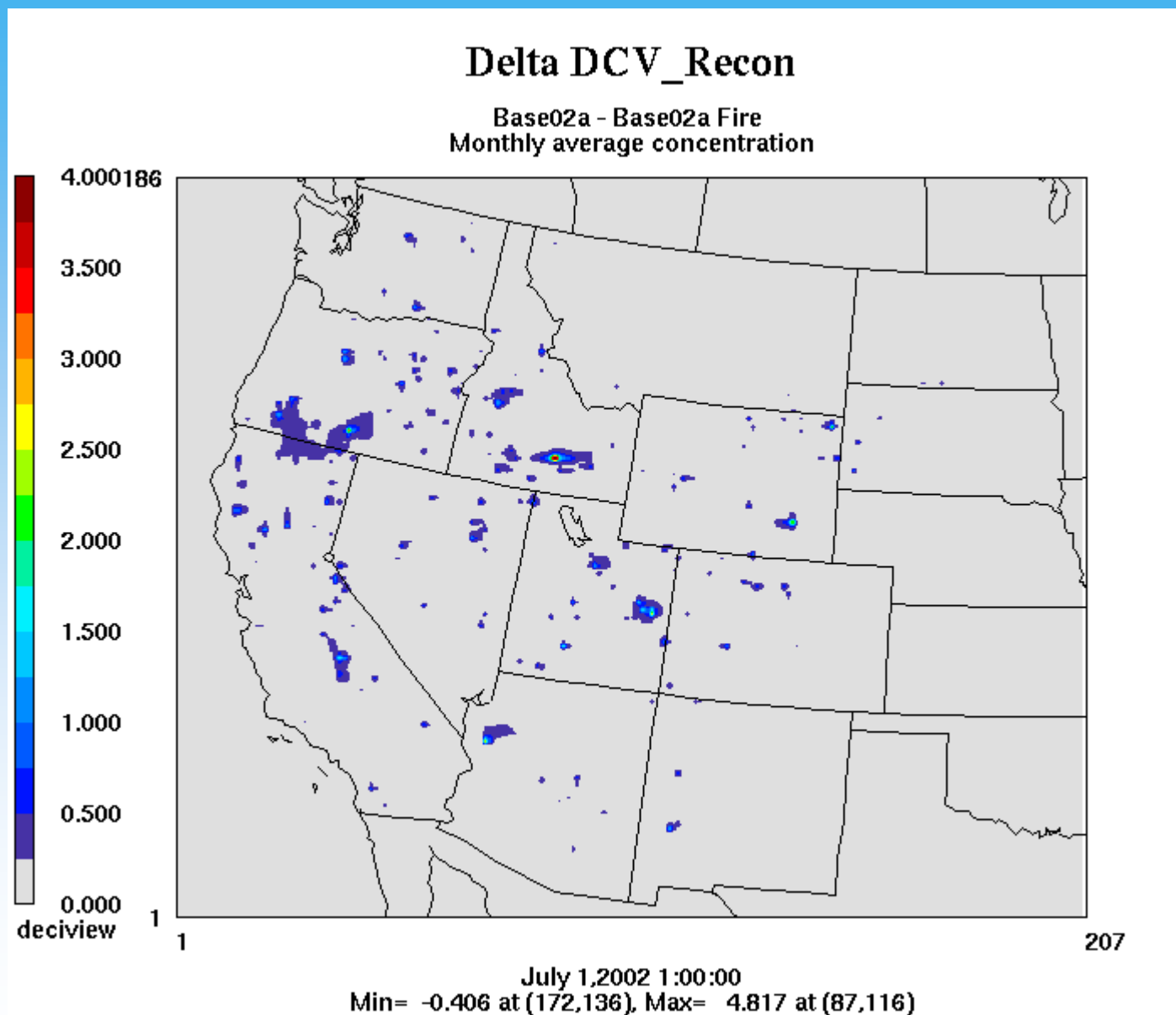
PM 2.5



Total

large MONTH|DATE|SLSH

Focus – Large WF

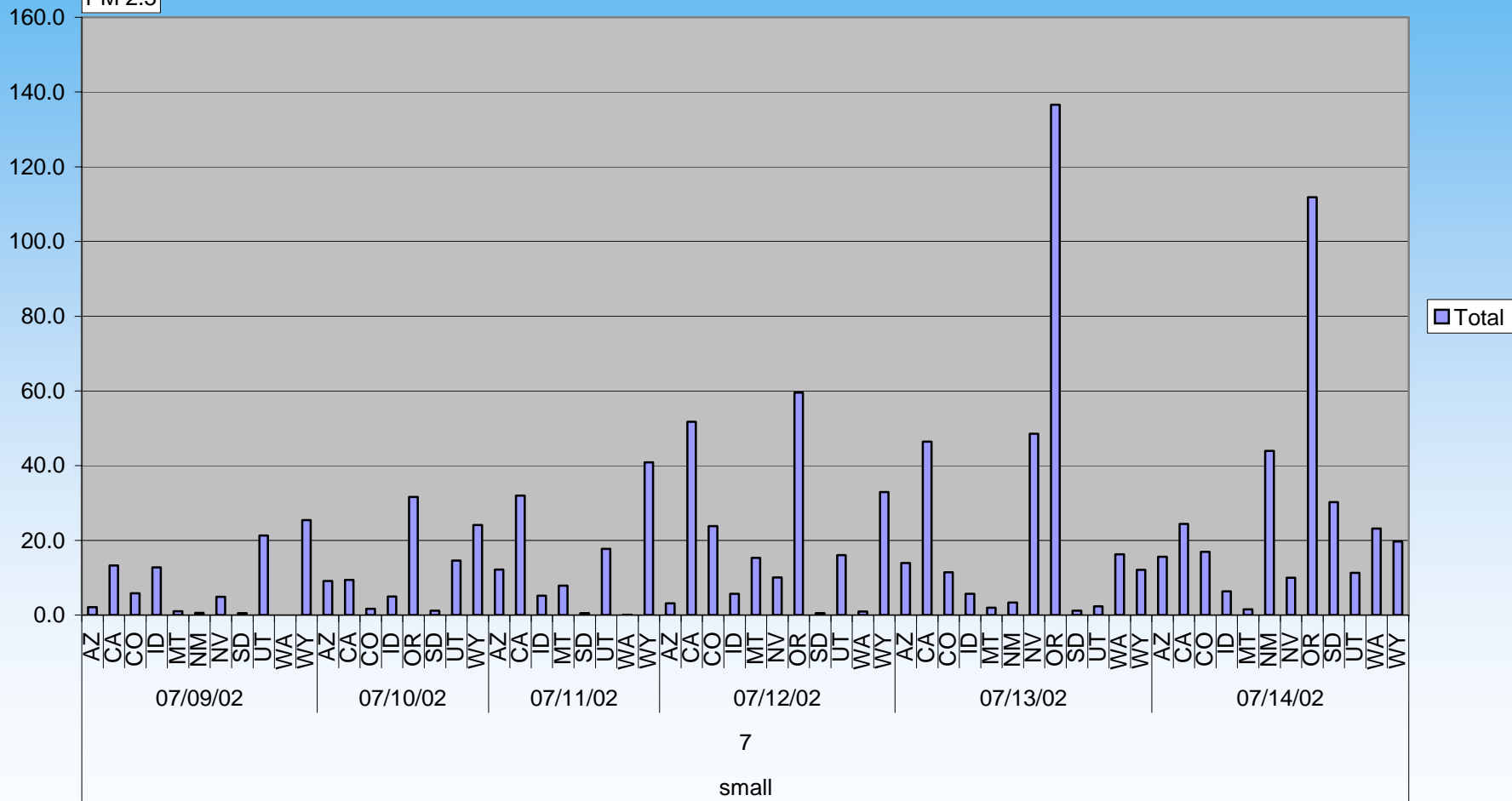


Focus – Large WF

QUALITY|ei

Total

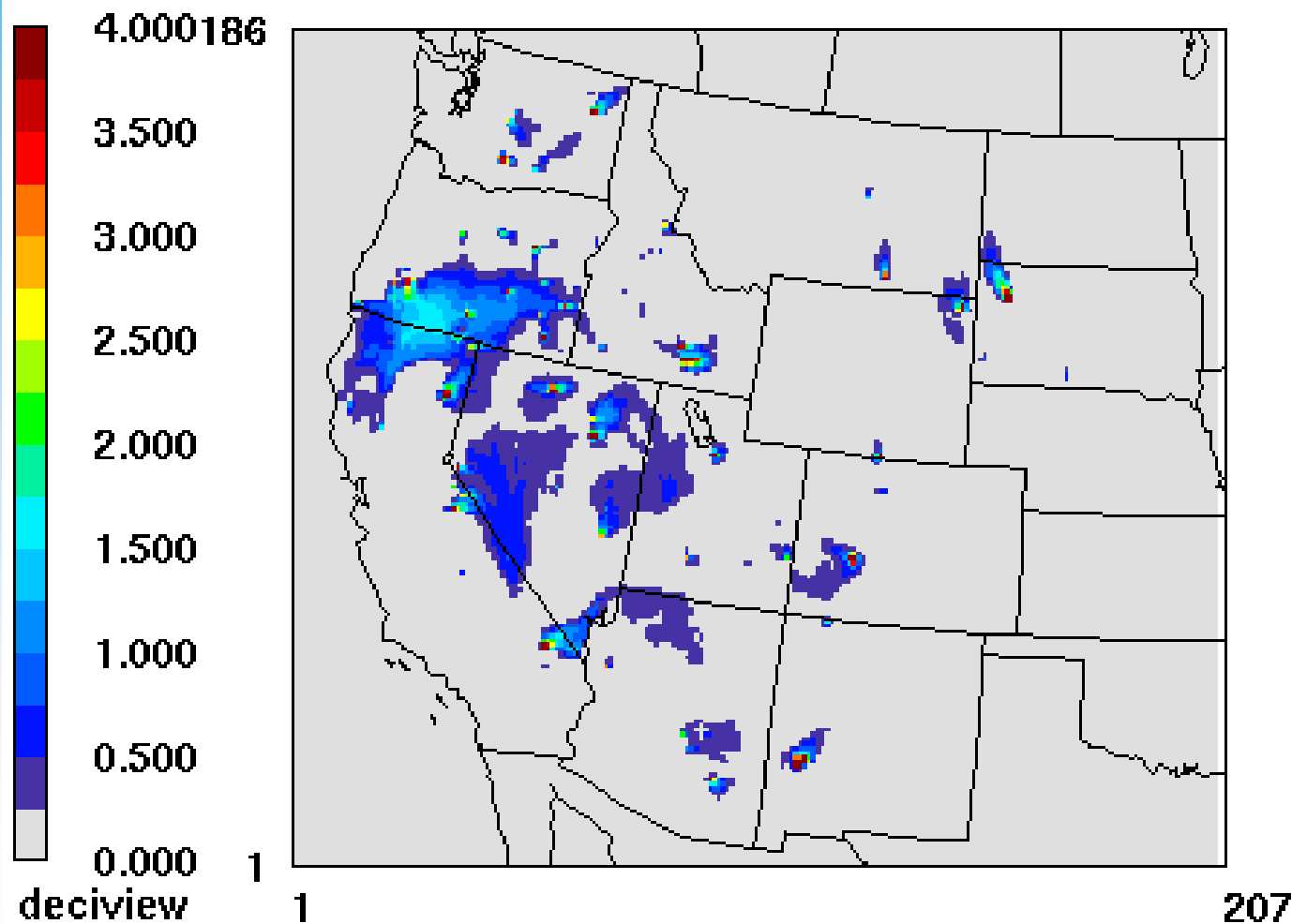
PM 2.5



large|MONTH|DATE|SLSH|STATE

Delta DCV_Recon

Base02a - Base02a Fire
Daily average concentration



July 14, 2002 0:00:00

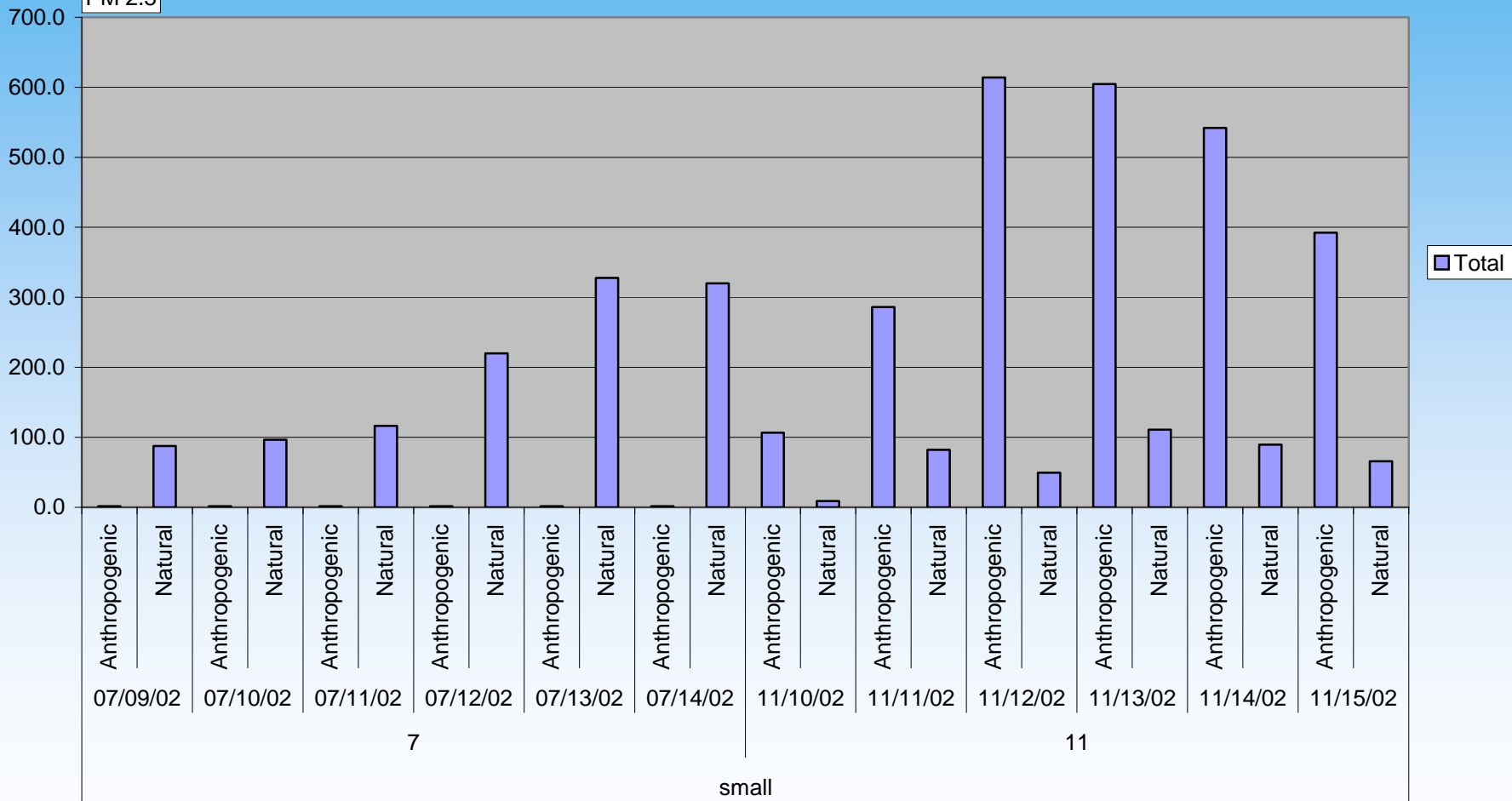
Min= -0.304 at (27,132), Max= 13.052 at (113,23)

Focus – Large WF

QUALITY | ei

Total

PM 2.5



large | MONTH | DATESLSH | NATANTHRO

Threshold Questions

- Should Land Managers and Air Agencies track all Rx (planned) fire events?
- Should Land Managers and Air Agencies only track WF (unplanned) fire events larger than 100/300 acres?

YES

YES