Seeley Lake PM2.5 Saturation Study

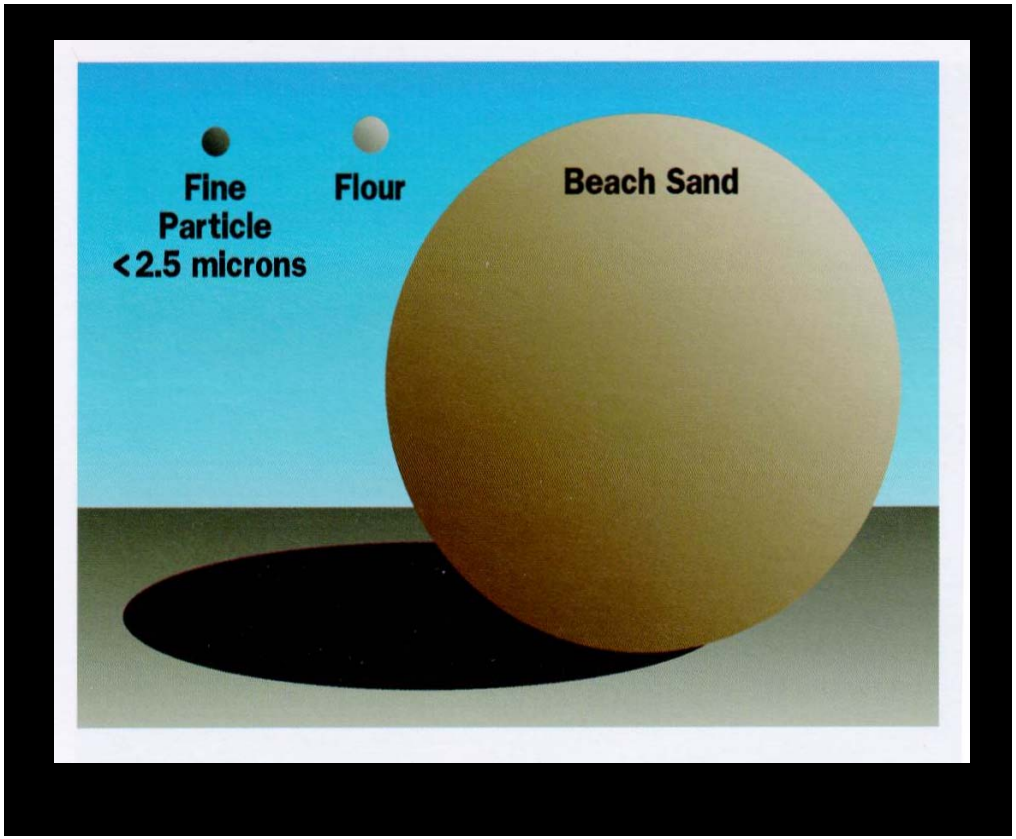
Missoula City-County Health Department

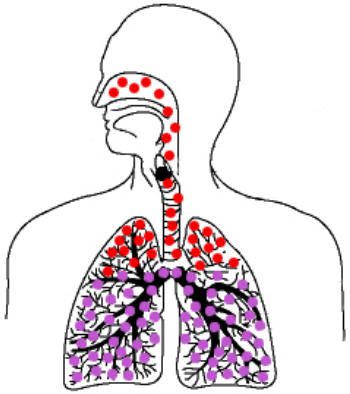
May 24, 2011

Objectives

- Introduction
  - PM and health
  - PM2.5 National Ambient Air Quality Standards
  - Early Seeley Lake data
- Saturation Study Design
- Study Results
- Discussion

Introduction: Particulates and health





Fine Particulate Matter goes deep into the lungs. Some portions of it can go straight into the bloodstream.

Why do we care about particulates?

- Woodsmoke particles cause structural and chemical changes deep in the lungs.

- Other toxic and cancer causing compounds can attach to the smallest smoke particles and enter the lungs at the same time.

Health Effects of Elevated Fine Particulate Pollution

- Irritated Respiratory Tract
- Reduced Lung Function
- Increased Hospital Visits
- Stroke
- Heart Attack
- COPD aggravation
- Pneumonia complications
- Asthma attacks

Particulate Matter Health Effects

- Woodsmoke exposure leads to increased emergency room visits, decreased lung function, increased asthma symptoms in children and premature death.

PM2.5 National Ambient Air Quality Standards (NAAQS)

- The PM2.5 NAAQS become more restrictive as additional health effects data become available.

Standard	1997	2006	2011?
Annual	15	15	?
Daily	65	**35**	Probably ~30

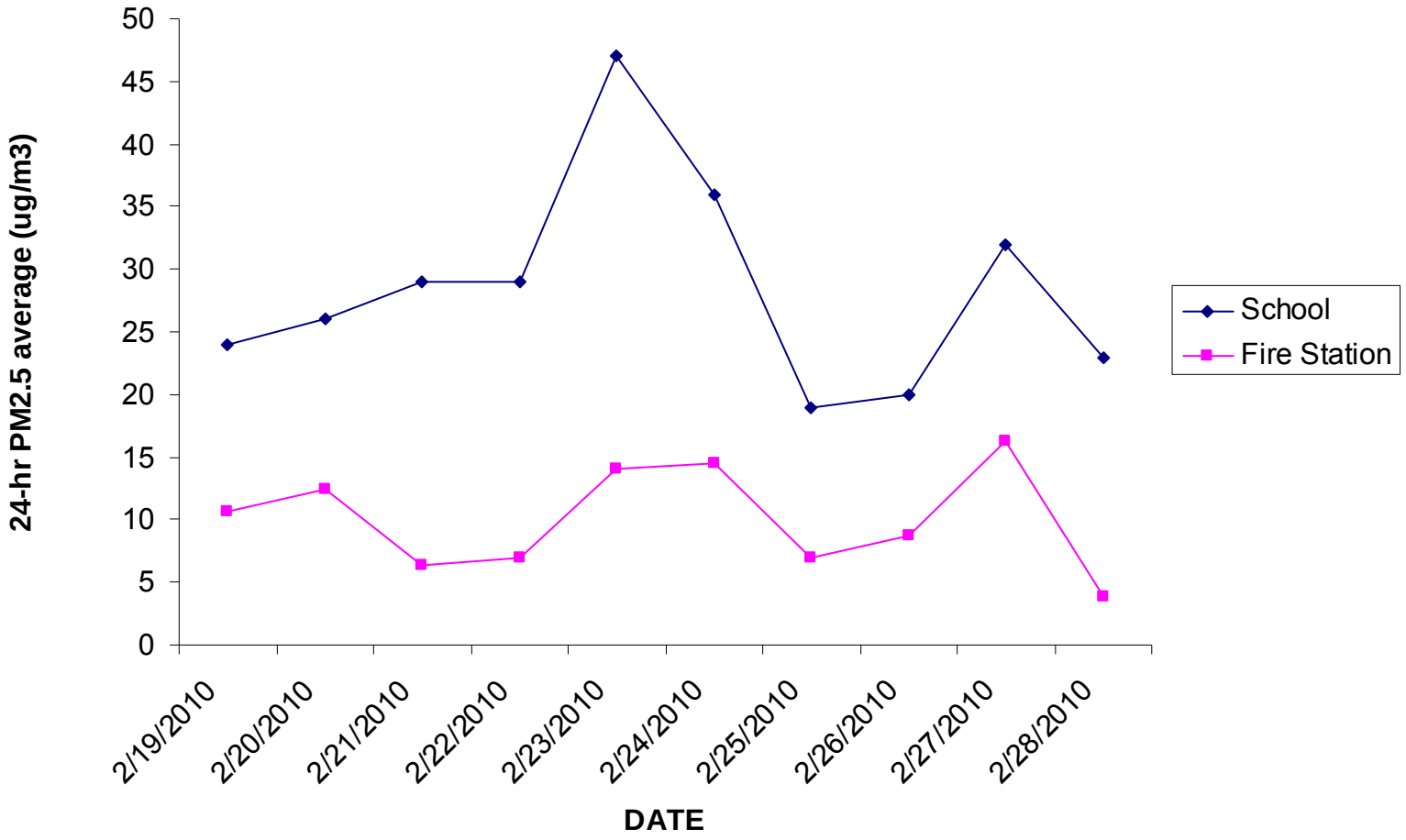
According to the EPA, the benefits of meeting the 35 ug/m^3 24-hour PM2.5 standard in the U.S. include an estimated reduction in:

- 1,200 to 13,000 premature deaths in people with heart or lung disease
- 2,600 cases of chronic bronchitis
- 5,000 nonfatal heart attacks
- 1,630 hospital admissions for cardiovascular or respiratory symptoms
- 1,200 emergency room visits for asthma
- 7,300 cases of acute bronchitis
- 97,000 cases of upper and lower respiratory symptoms
- 51,000 cases of aggravated asthma
- 350,000 days when people miss work or school
- 2 million days when people must restrict their activities because of particle pollution-related symptoms

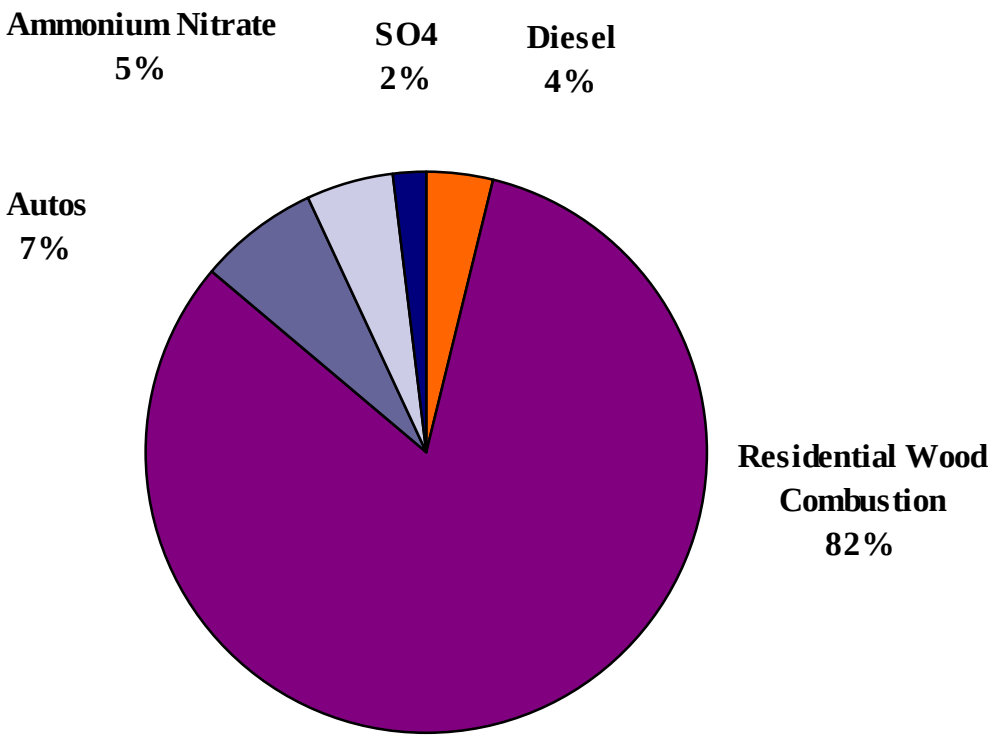
Seeley Lake PM Monitoring

- Seeley Lake air quality monitoring began in 2005, with filter-based monitors at the fire station.
- 2009-2010 – Continuous PM monitor added at the elementary school.
- Higher readings at the elementary school suggested that PM pollution may be localized in neighborhoods.

Fire station and elementary school site comparison Feb. 2010.

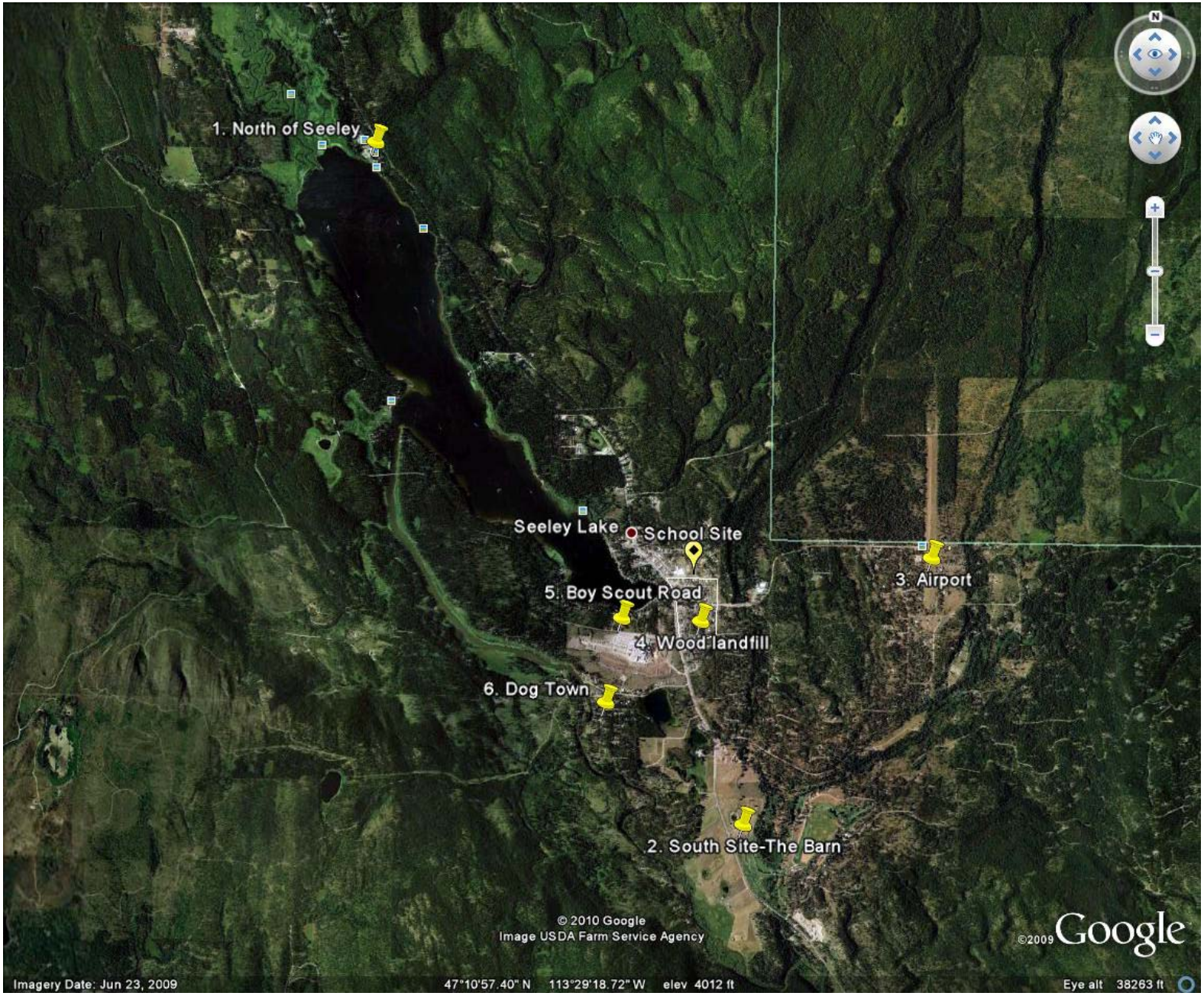


Libby $PM_{2.5}$ Winter Sources 2003-2004 Study Averages



Saturation study design

- Study duration = October 2010 – March 2011
- Six portable continuous PM2.5 monitors placed around the community
  - Three in outlying areas (USFS ranger station, Airport, Barn).
  - Three in neighborhoods (Juniper & Alder, Boy Scout Rd, Dogtown).


1. North of Seeley
Seeley Lake
School Site
3. Airport
5. Boy Scout Road
4. Wood landfill
6. Dog Town
2. South Site-The Barn
© 2010 Google
Image USDA Farm Service Agency
©2009 Google
Imagery Date: Jun 23, 2009
47°10'57.40" N 113°29'18.72" W elev 4012 ft
Eye alt 38263 ft

Airport

Barn

Forest Service

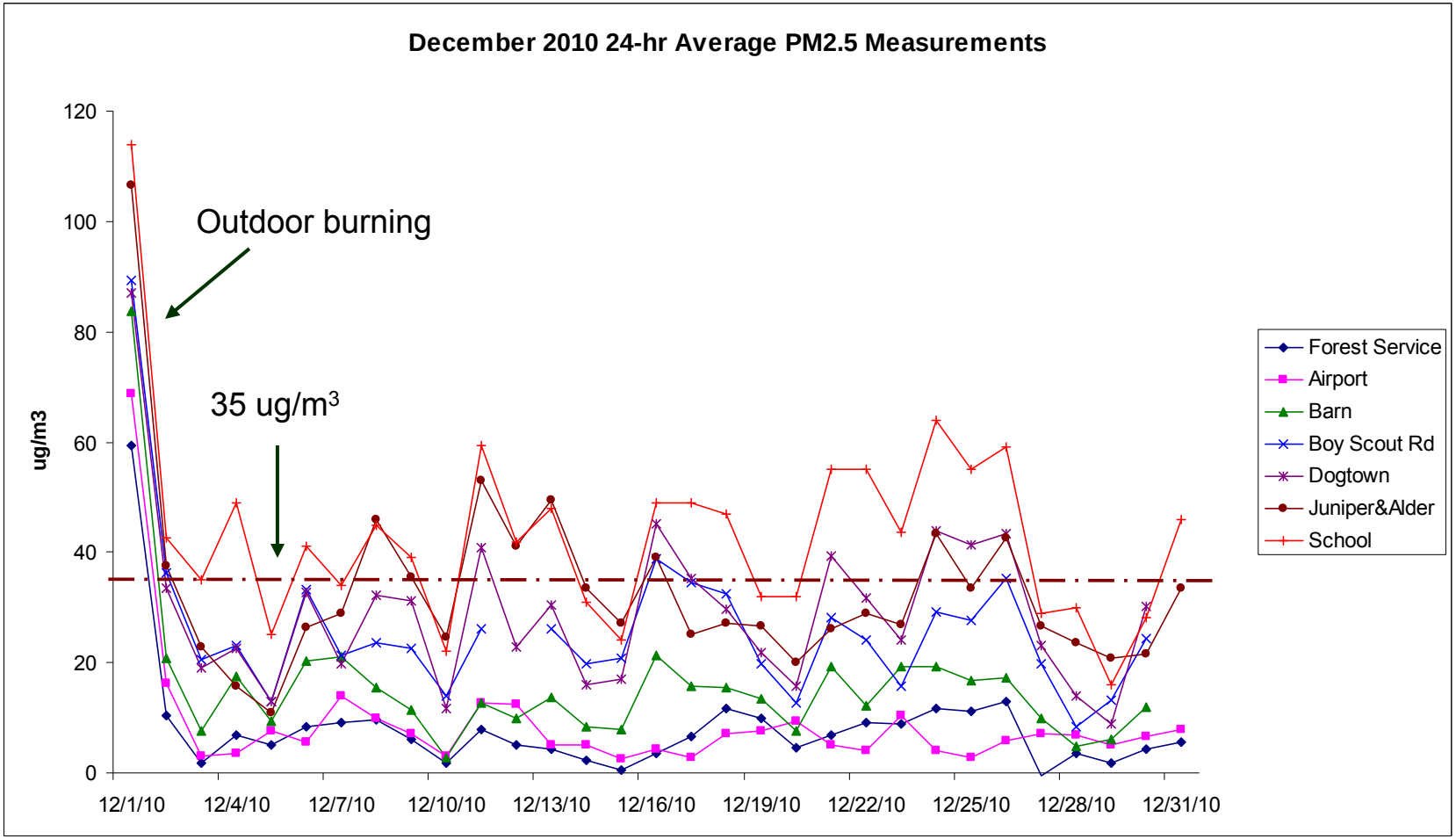
Juniper & Alder

Dogtown

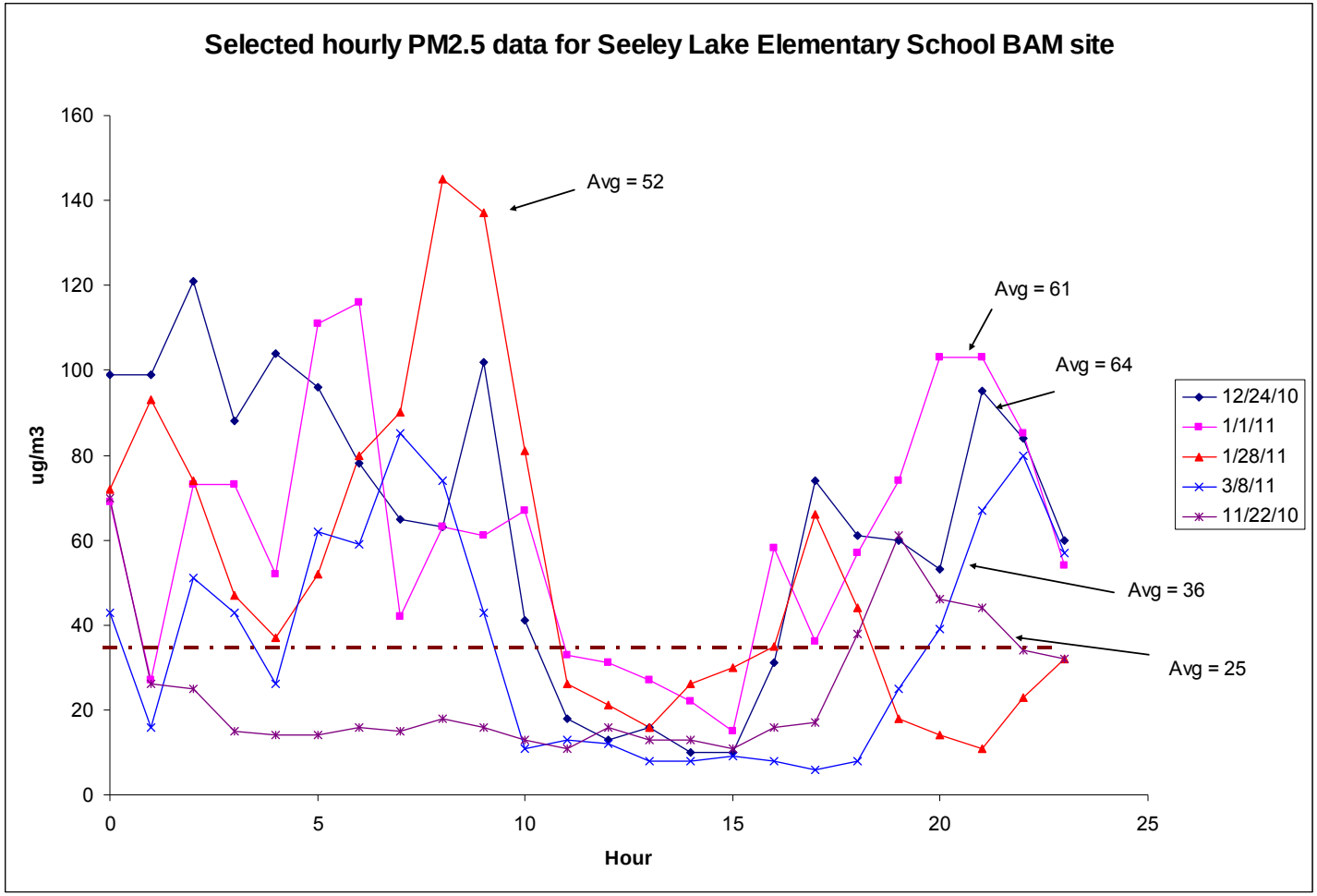
Boy Scout Rd.

Elementary School

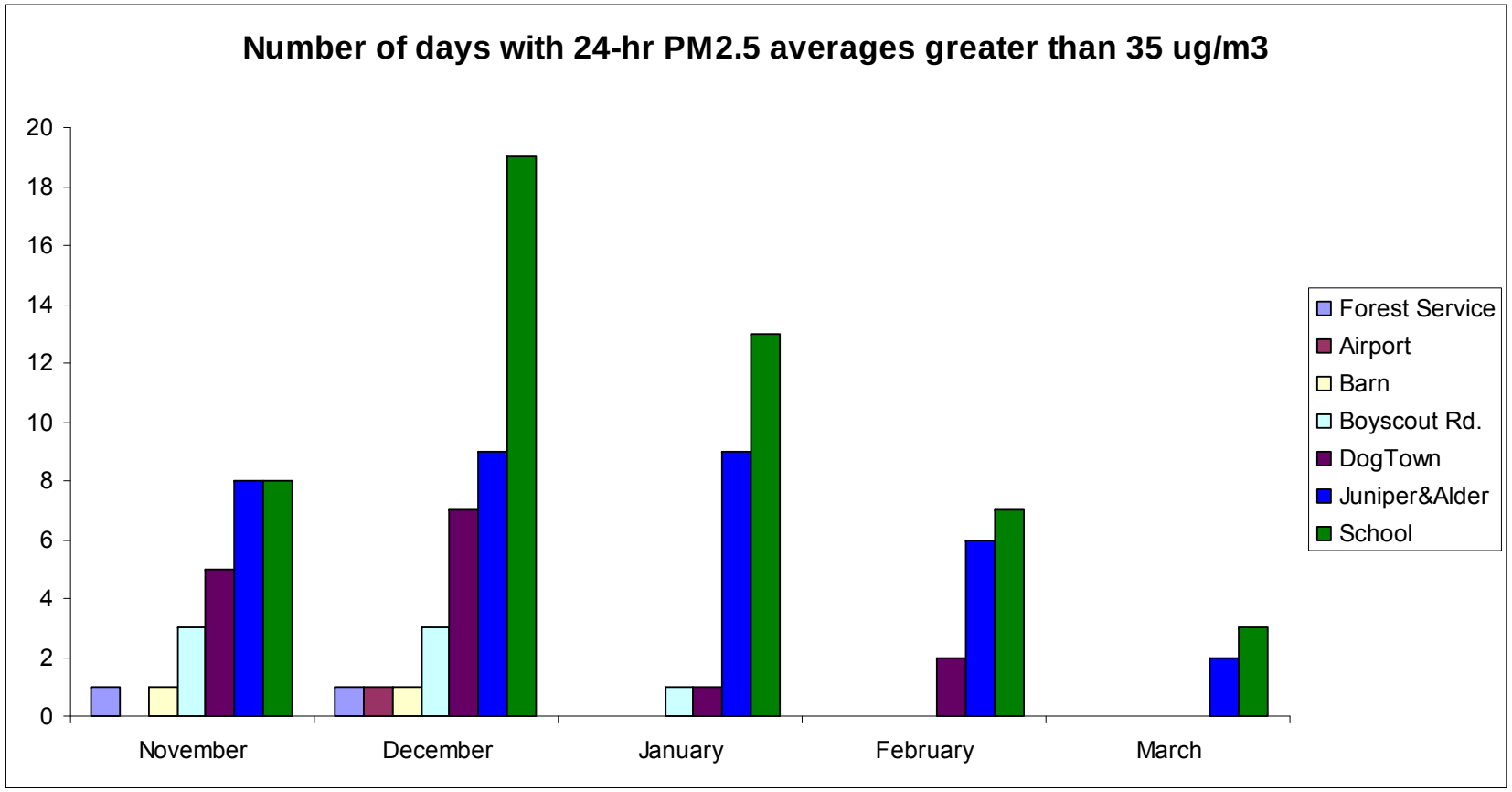
Results: Trends



Results: Trends – hourly data



Results: Summary



Results: Study Days > 35µg/m^3

	Forest Service	Airport	Barn	Boy Scout Rd.	DogTown	Juniper & Alder	School
October	0	0	0	0	N/A	0	0
November	1	0	1	3	5	8	8
December	1	1	1	3	7	9	19
January	0	0	0	1	1	9	13
February	0	0	0	0	2	6	7
March	0	0	0	0	0	2	3
Total	**2**	**1**	**2**	**7**	**15**	**34**	**50**

Results: Conclusion

- Seeley Lake exceeded the 24-hr PM2.5 NAAQS multiple times during the study period, but most of these exceedances were restricted to neighborhoods.

Put it in perspective.

- In 2010, Missoula exceeded the 24-hour PM2.5 NAAQS **3 times**.
- In 2010, Seeley Lake exceeded the 24-hour PM2.5 NAAQS **47 times**.

Where do we go from here?

- The good news: Particulate pollution is localized in neighborhoods and can most likely be greatly reduced by replacing dirty woodstoves.
- The bad news: Seeley Lake's design value for 2010 is ~58 μg/m^3. If the EPA uses 2010 data when determining nonattainment areas, Seeley Lake has little chance of avoiding the nonattainment designation.
- The good news: If a community shows it is moving toward fixing a problem AND gets below the standard, the EPA may choose not to use data from before programs are set in place.

Possible Solutions

- Local Pellet Mill with Pellet Stoves
- Electric Heat – Ground Source Heat Pumps
- Weatherization
- Woodstove Change Out Program
- Central Boiler for District Heating
- Propane or Other Liquid Fuel

QUESTIONS?