



FNSB PM_{2.5} November 29, 2011 FNSB Air Quality

Presentation to Board of Forest
November 29, 2011

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Division of Air Quality
FNSB



01/10/2009 12:17



EPA Health Standards are developed to protect the “Sensitive Groups” of our population

“Sensitive Groups” – who are we protecting?

FNSB’s future – ***our children***

Alaska’s pioneers – ***our elders***

FEB 5 2008

Revised Particulate Matter Rule

PM_{2.5} = Fine Particulates

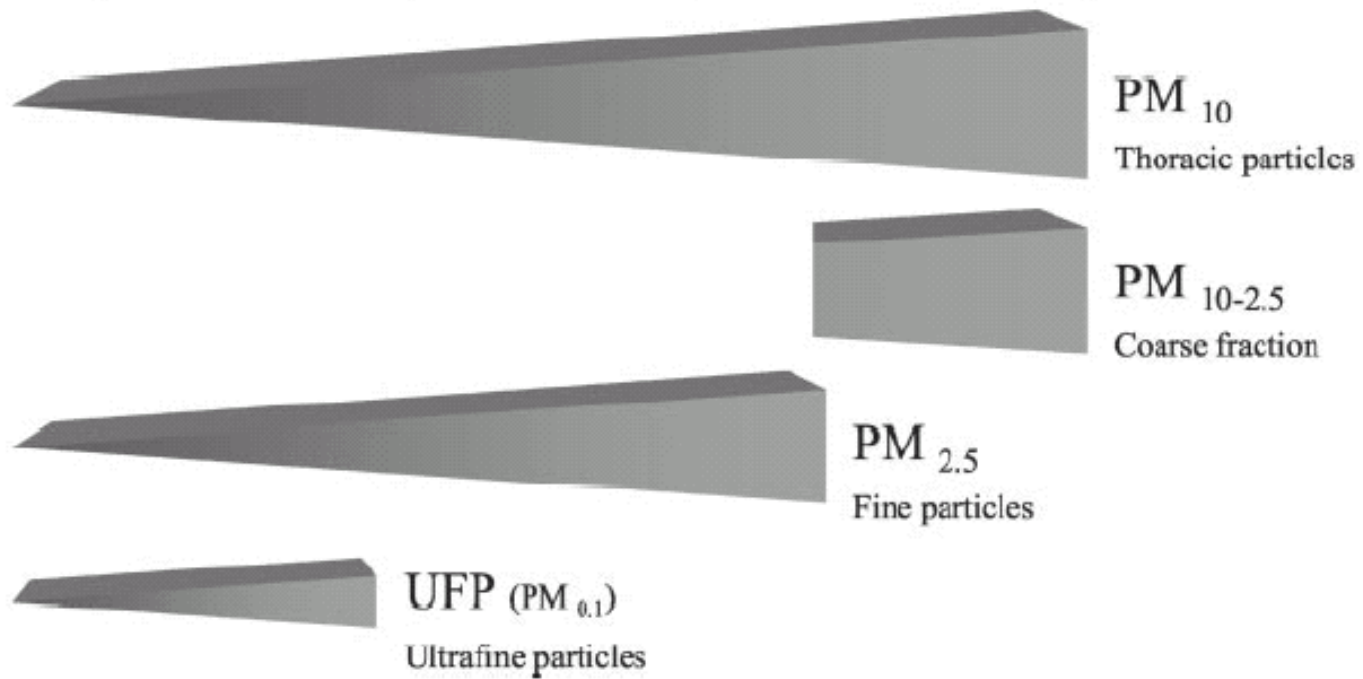
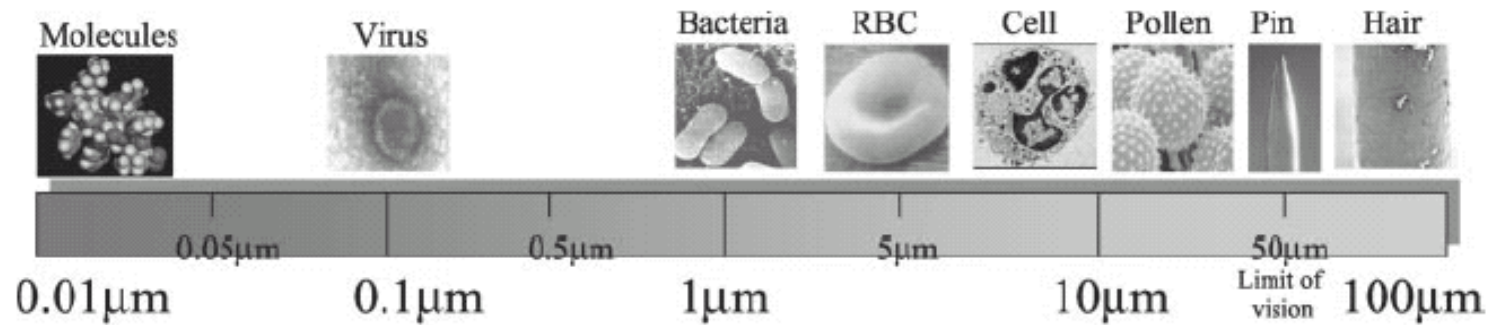
EPA published the revised Particulate Matter Rule on September 21, 2006

– annual standard for PM_{2.5} retained at 15 µg/m³

Possible change in 2011 to 12 µg/m³

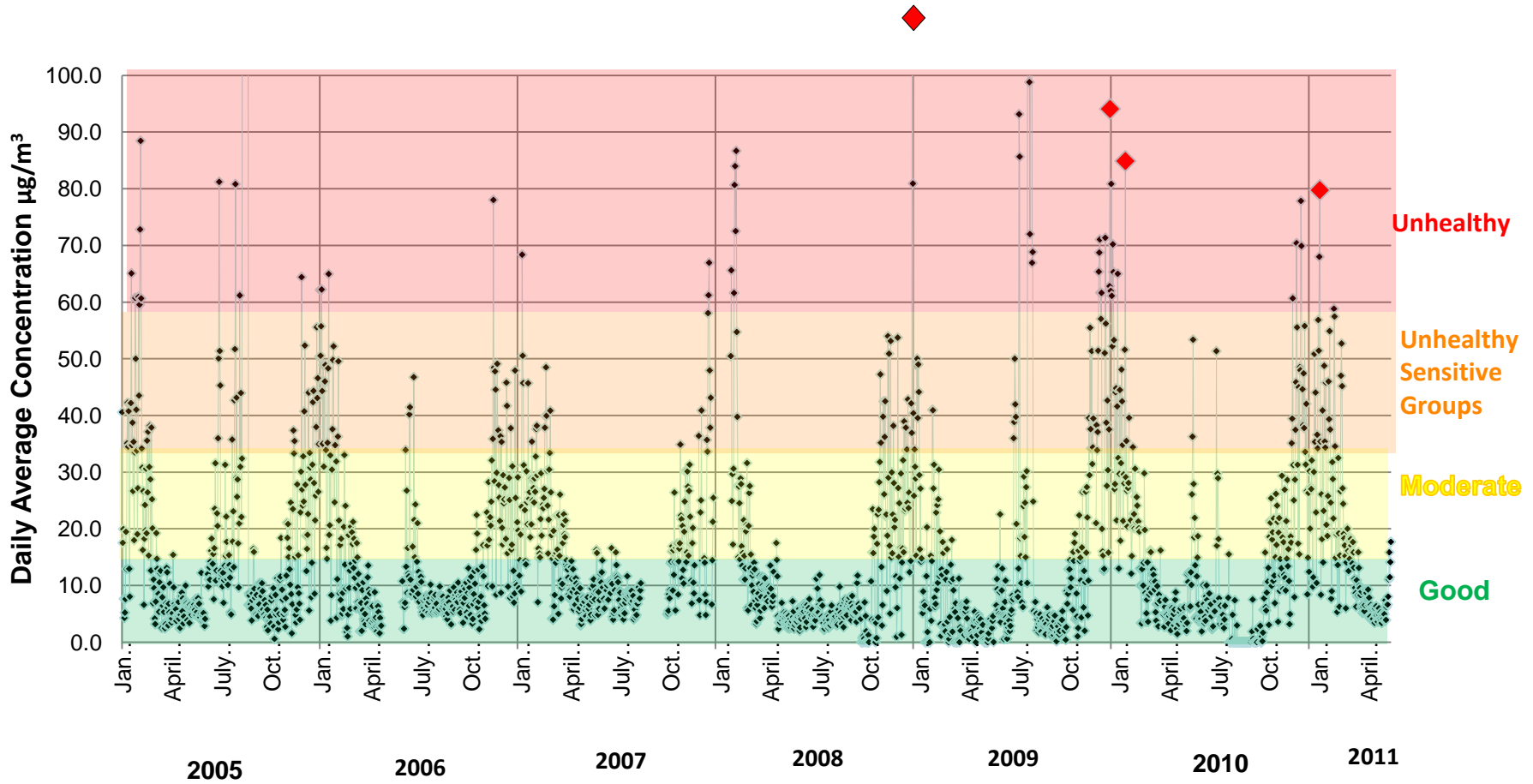
– 24 hour standard for PM_{2.5} is more stringent: formerly 65 µg/m³ - now 35 µg/m³ to further protect public health

Possible change in 2011 to 25 µg/m³





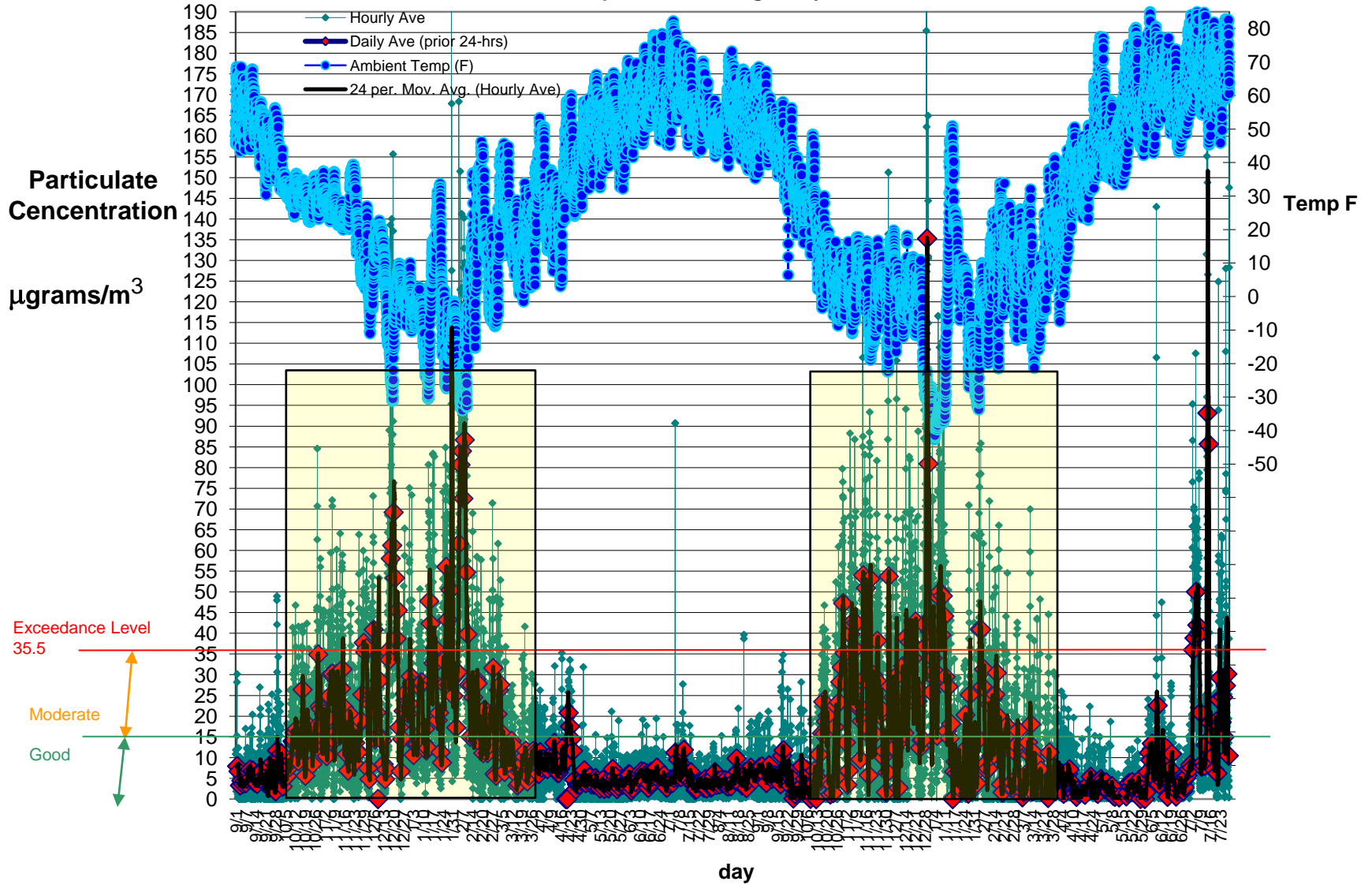
2005-2011 Daily Average Concentration State Office Building



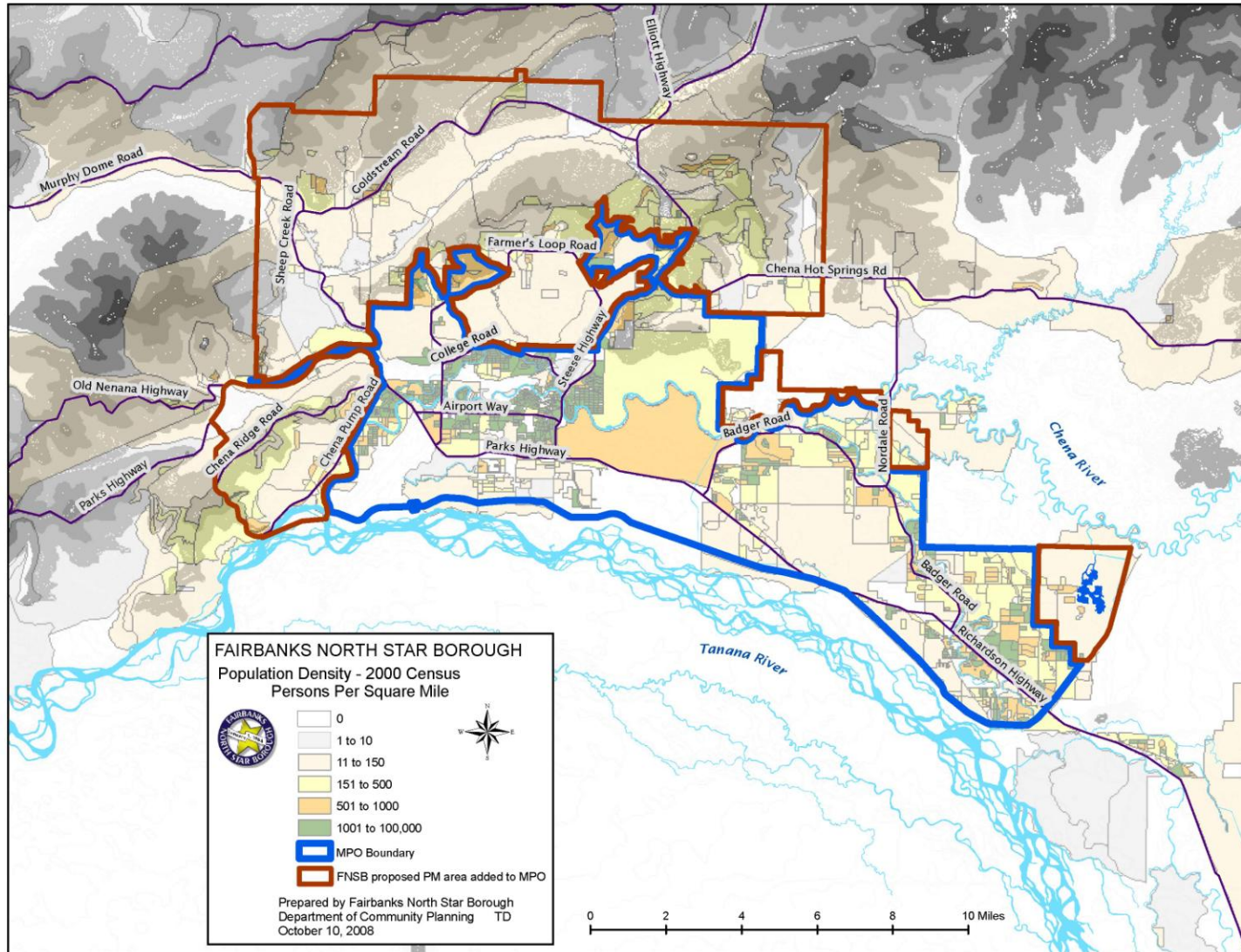
Preliminary Data

2.5 micron Airborne Particulate Matter measurements in Downtown Fairbanks Current Sept 1 2007 through July 2009

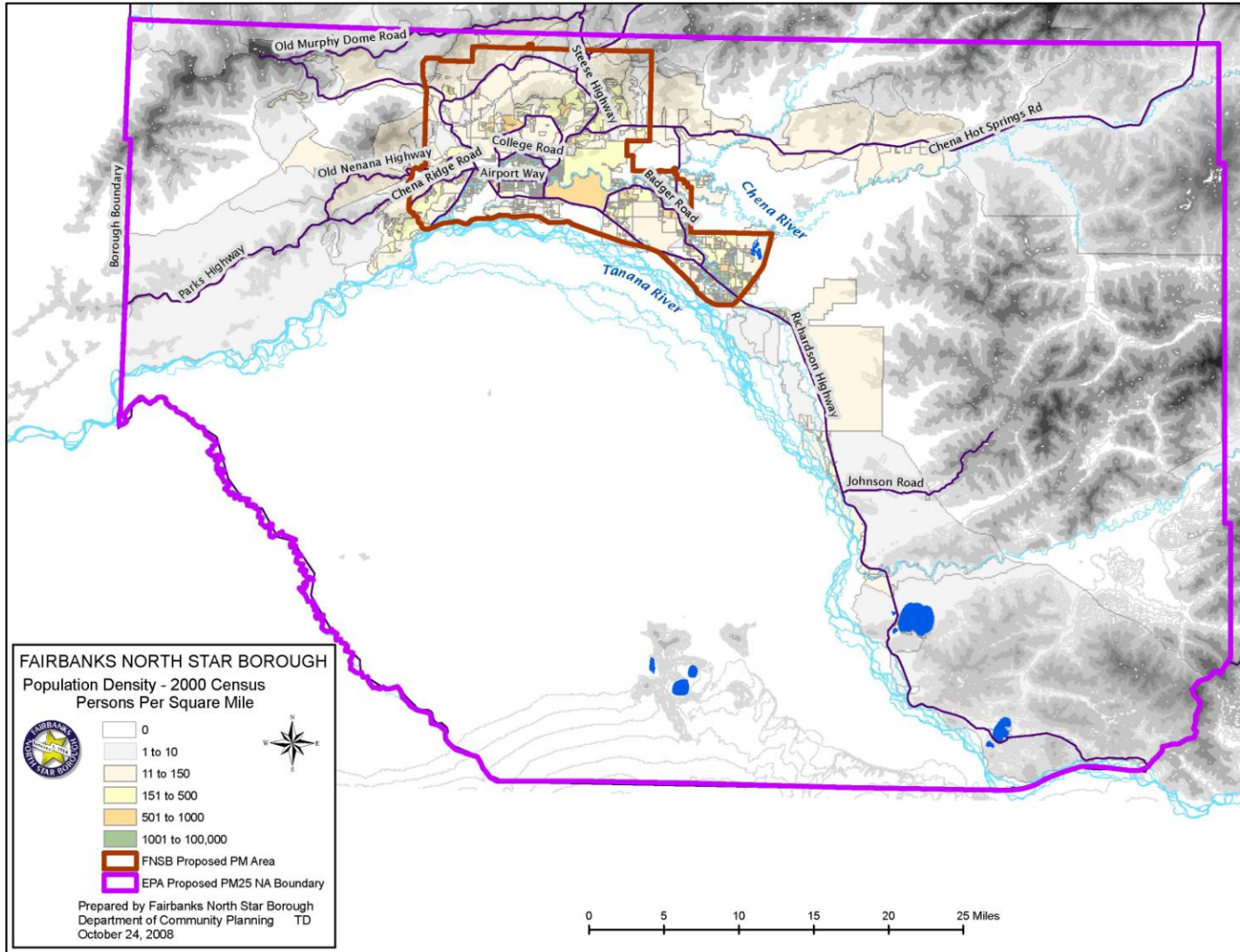
Preliminary Data



Combined FMATS and Proposed PM2.5 Nonattainment Boundary

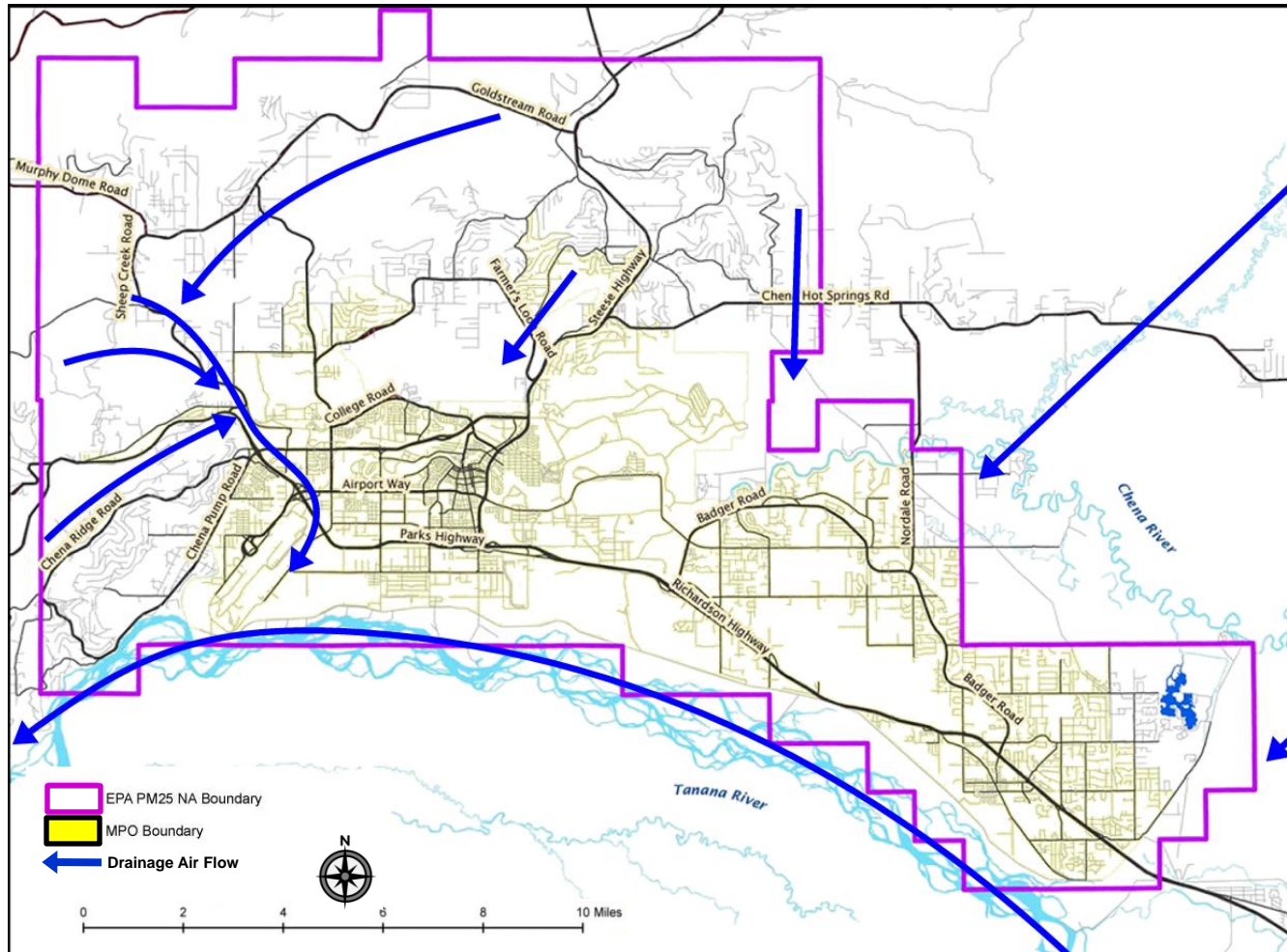


Contrast Between Proposed PM2.5 Nonattainment Boundary and EPA Recommended Boundary

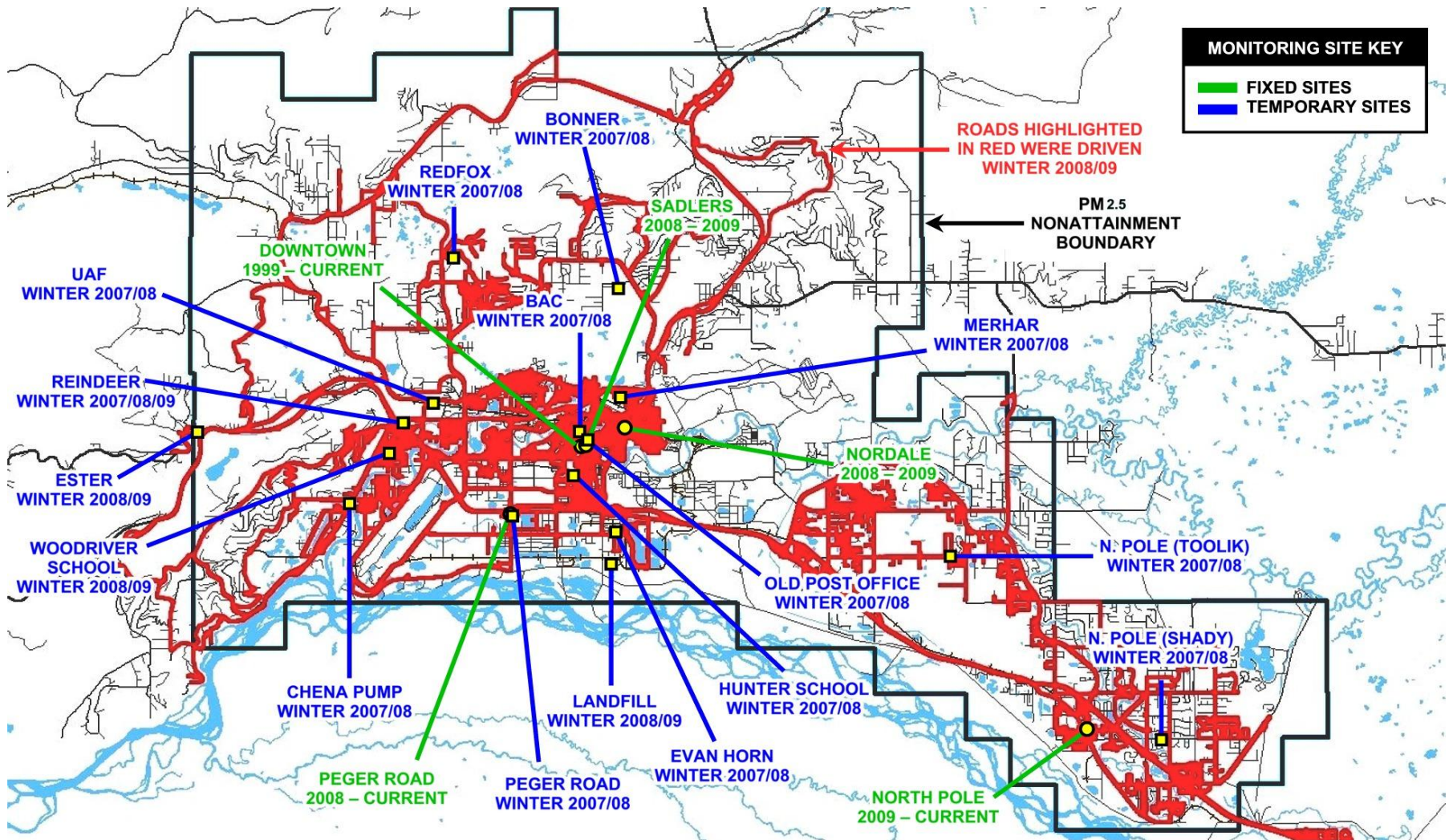




FNSB PM_{2.5} Nonattainment Area



Monitoring Sites (Fixed and Temporary) and Roads in Fairbanks Where PM_{2.5} Data Has Been Collected (1999 – 2009)

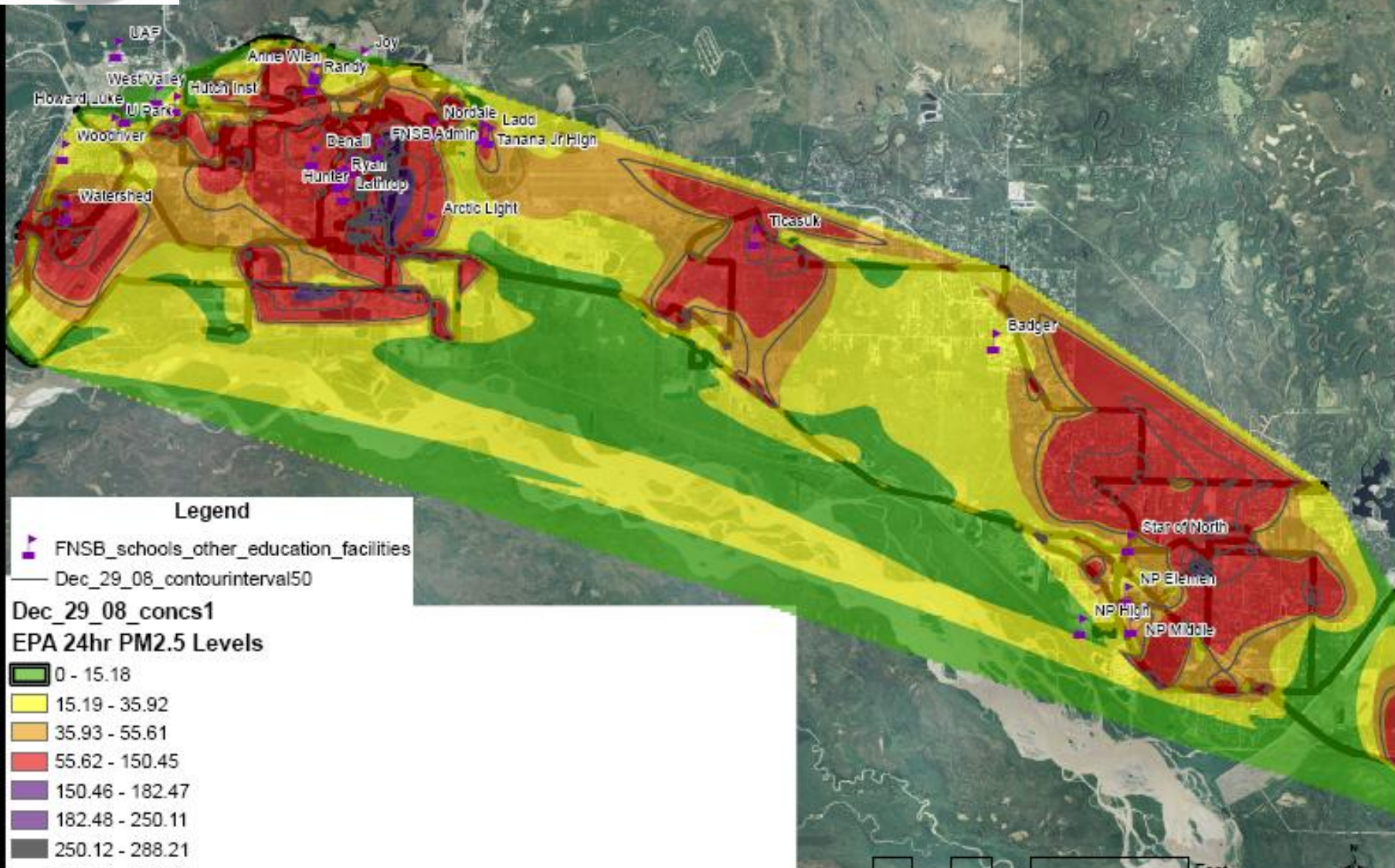




December 29 2008 Sniffer Runs

Pearl Creek

Weller



Legend

FNSB_schools_other_education_facilities

Dec_29_08_contourinterval50

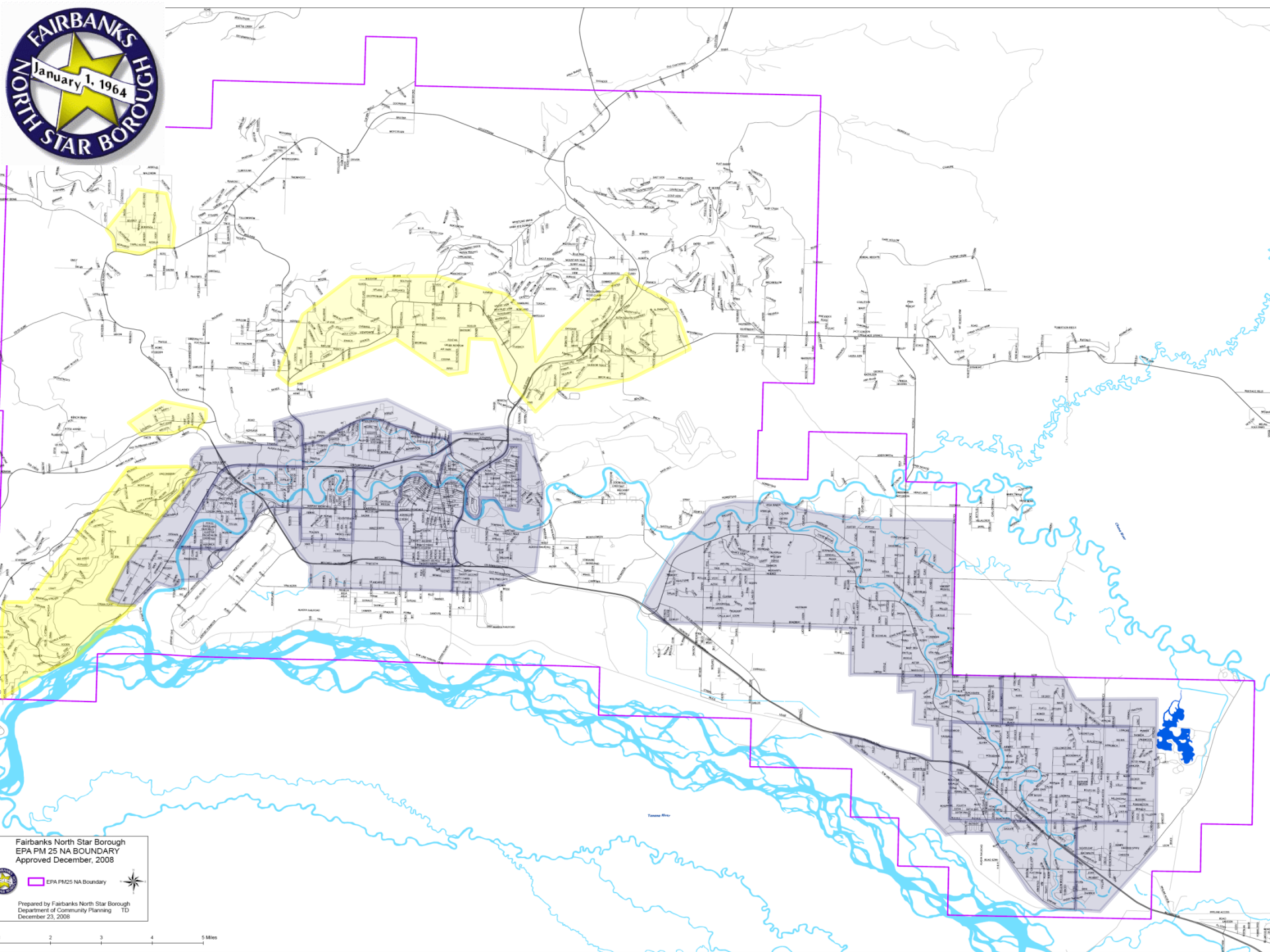
Dec_29_08_concs1

EPA 24hr PM2.5 Levels

- 0 - 15.18
- 15.19 - 35.92
- 35.93 - 55.61
- 55.62 - 150.45
- 150.46 - 182.47
- 182.48 - 250.11
- 250.12 - 288.21
- 288.22 - 350.51
- 350.52 - 370.55

0 6,000 12,000 24,000 Feet





Fairbanks North Star Borough
EPA PM 25 NA BOUNDARY
Approved December, 2008

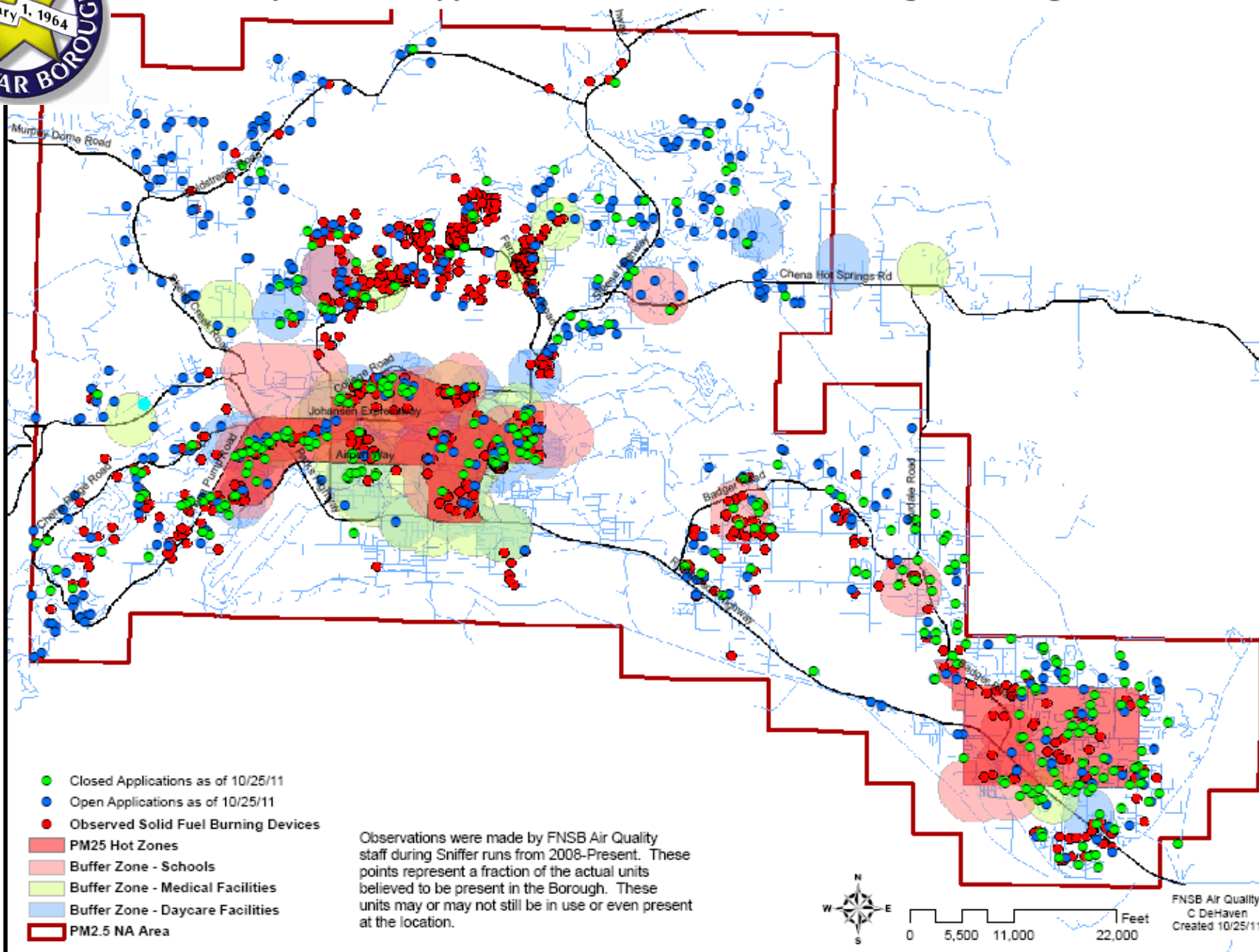
 EPA PM25 NA Boundary

Prepared by Fairbanks North Star Borough
Department of Community Planning TD
December 23, 2008

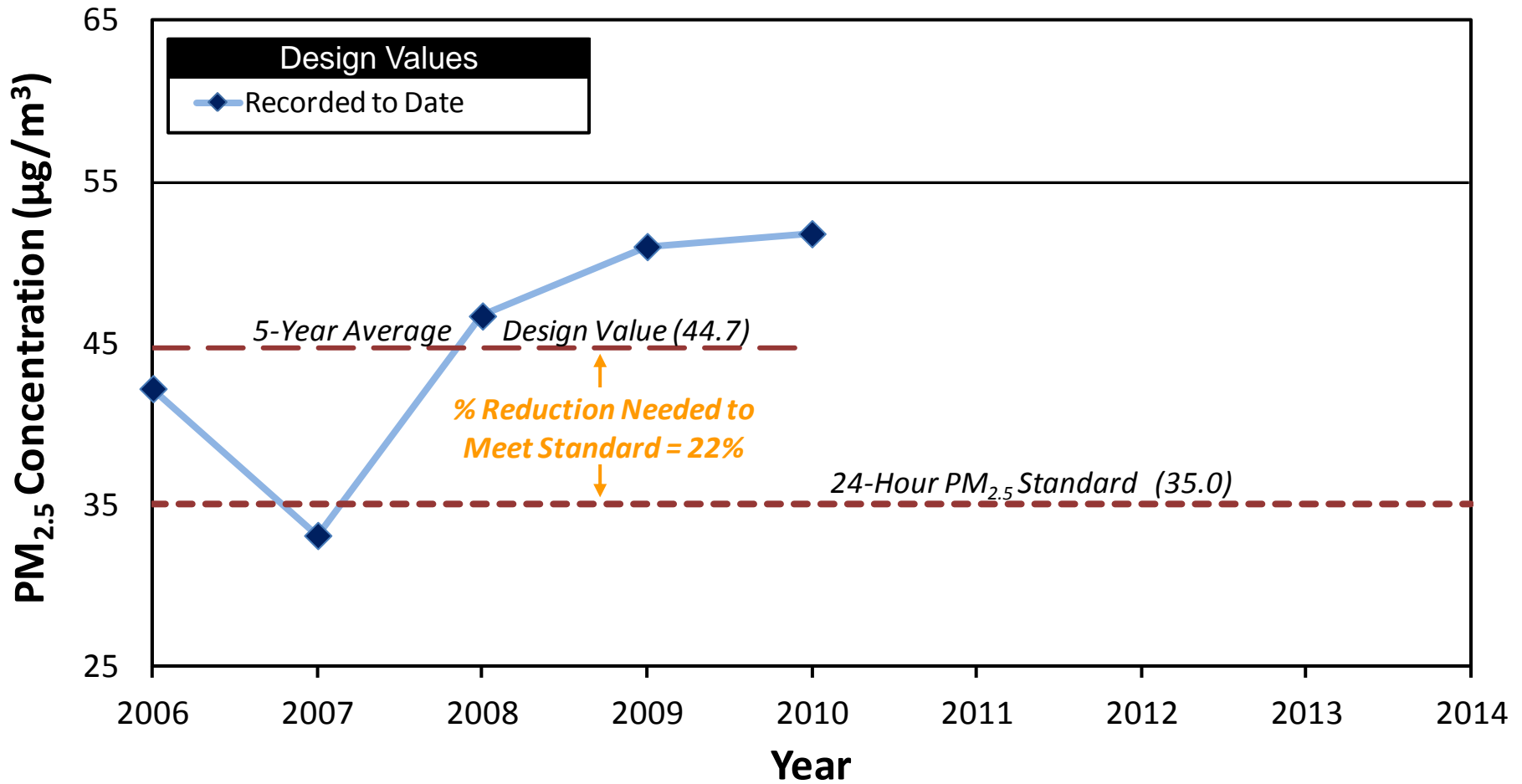




Observed Solid Fuel Burning Devices in FNSB PM2.5 Nonattainment Area in Comparison to Applicants for the Wood Stove Change Out Program



Example of Fairbanks Design Values Needed to Demonstrate Attainment with PM_{2.5} 24-hour NAAQS by 2014

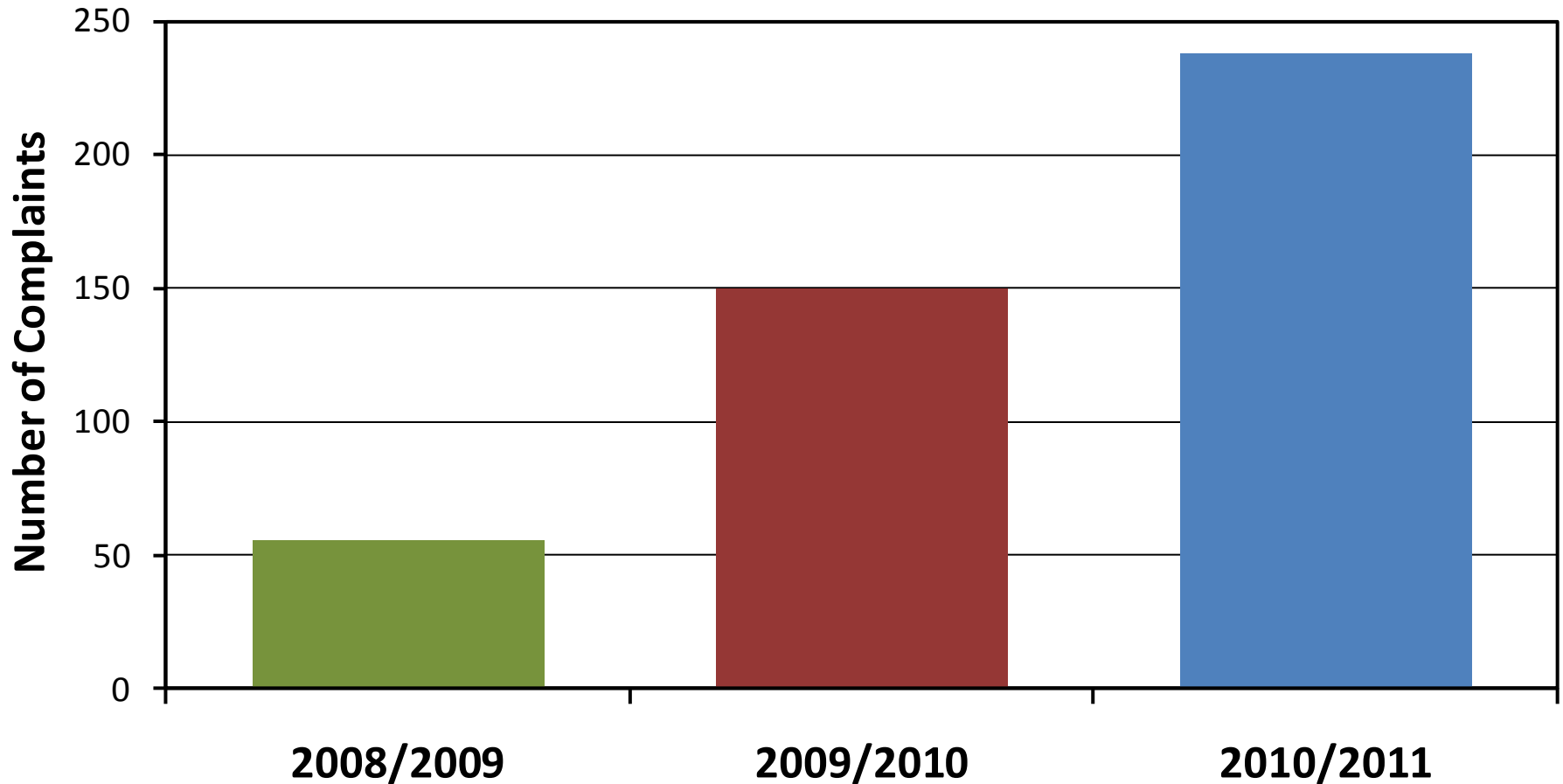


Design Value Summary

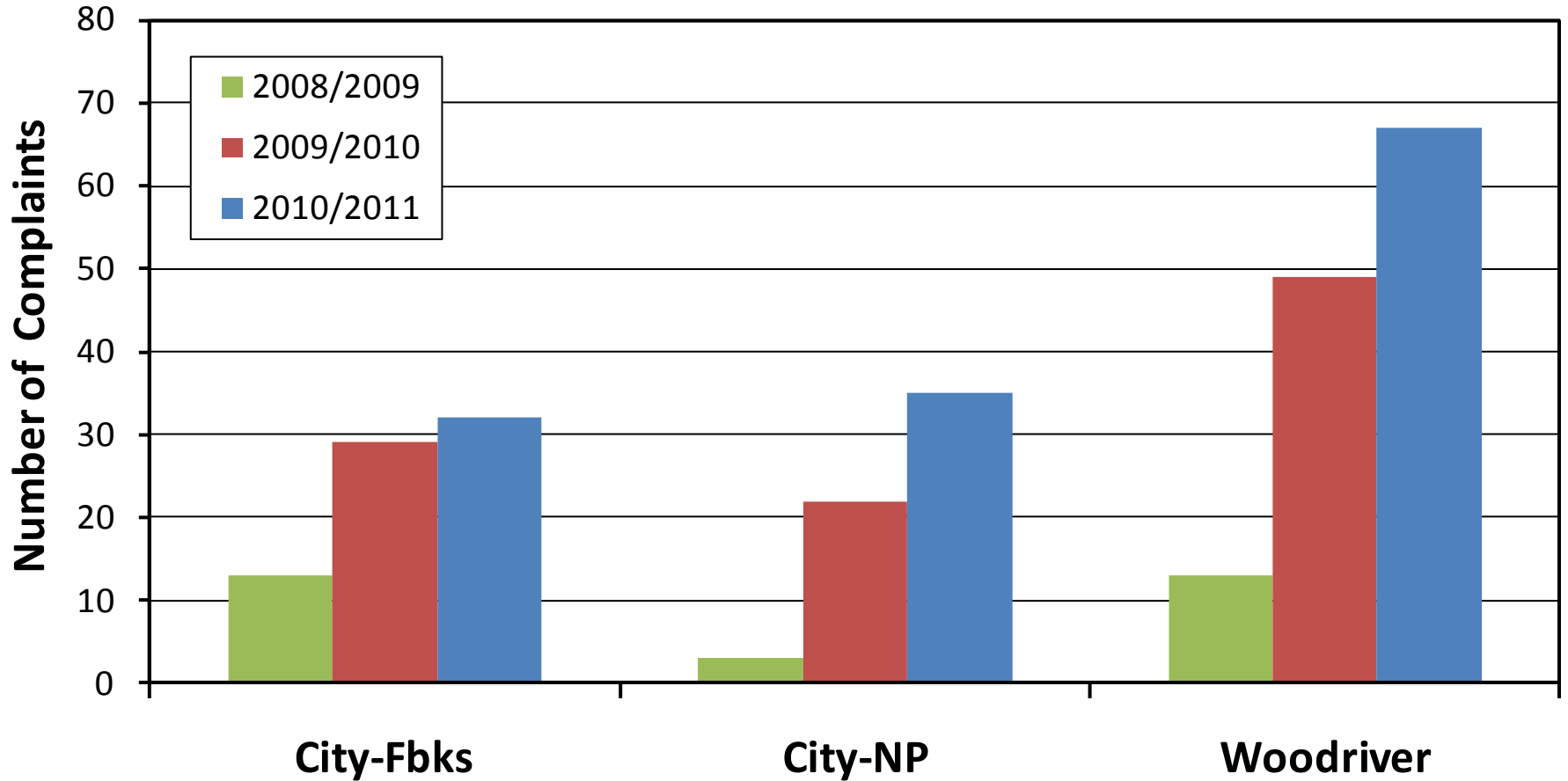
- Annual values reflect the net of three independent activities
 - Meteorology
 - Owner response to shifting space heating fuel prices
 - Borough/State efforts to reduce emissions
- While shifting weather patterns can influence year-to-year trends, they are not the cause of a long-term trajectory
- Owners have responded to increasing fuel prices by shifting to lower cost, dirtier fuels
- Efforts to reduce emissions and design values need to more than offset the combined effects of weather and owner responses to changing fuel prices



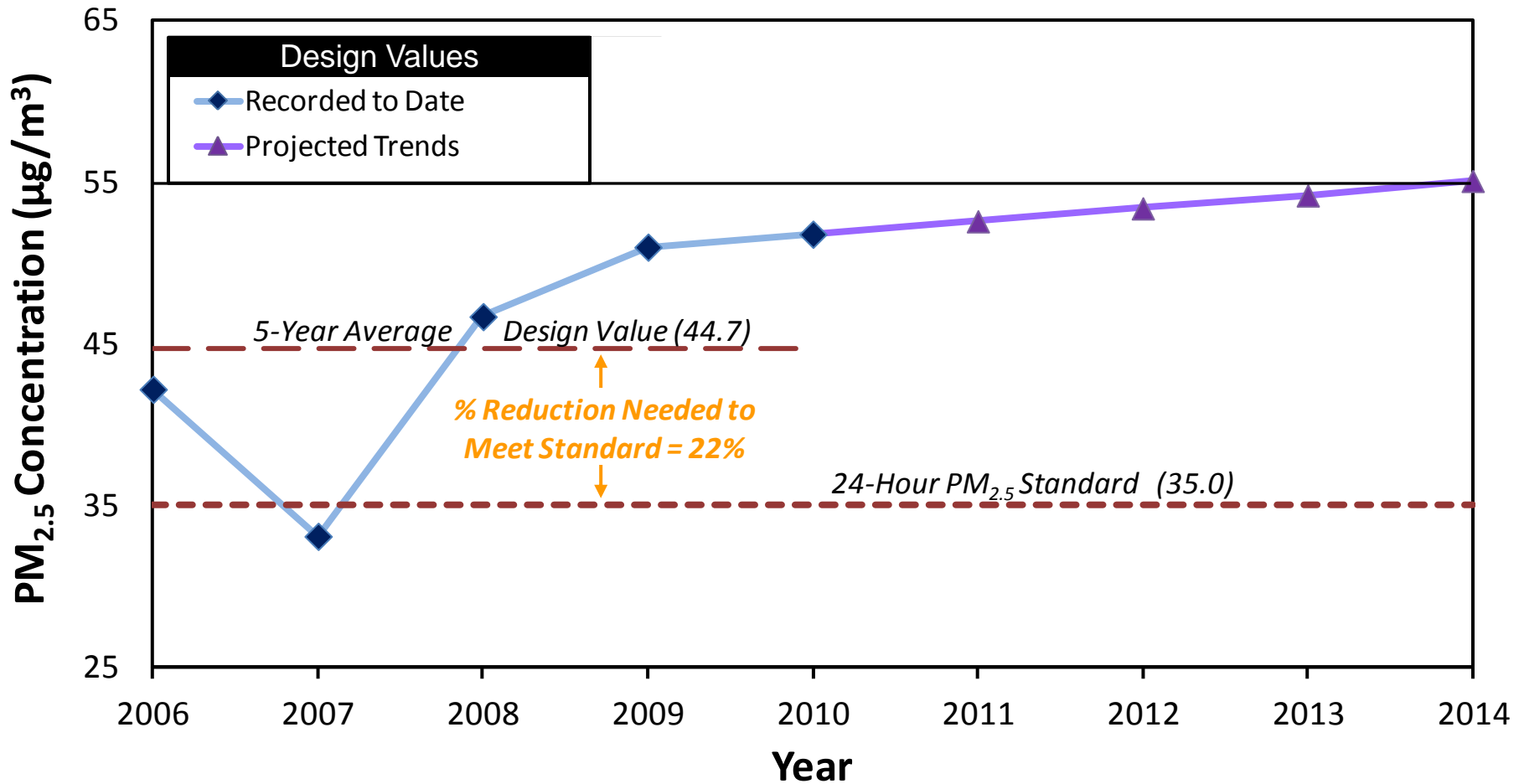
Trend in Winter Air Quality Complaints



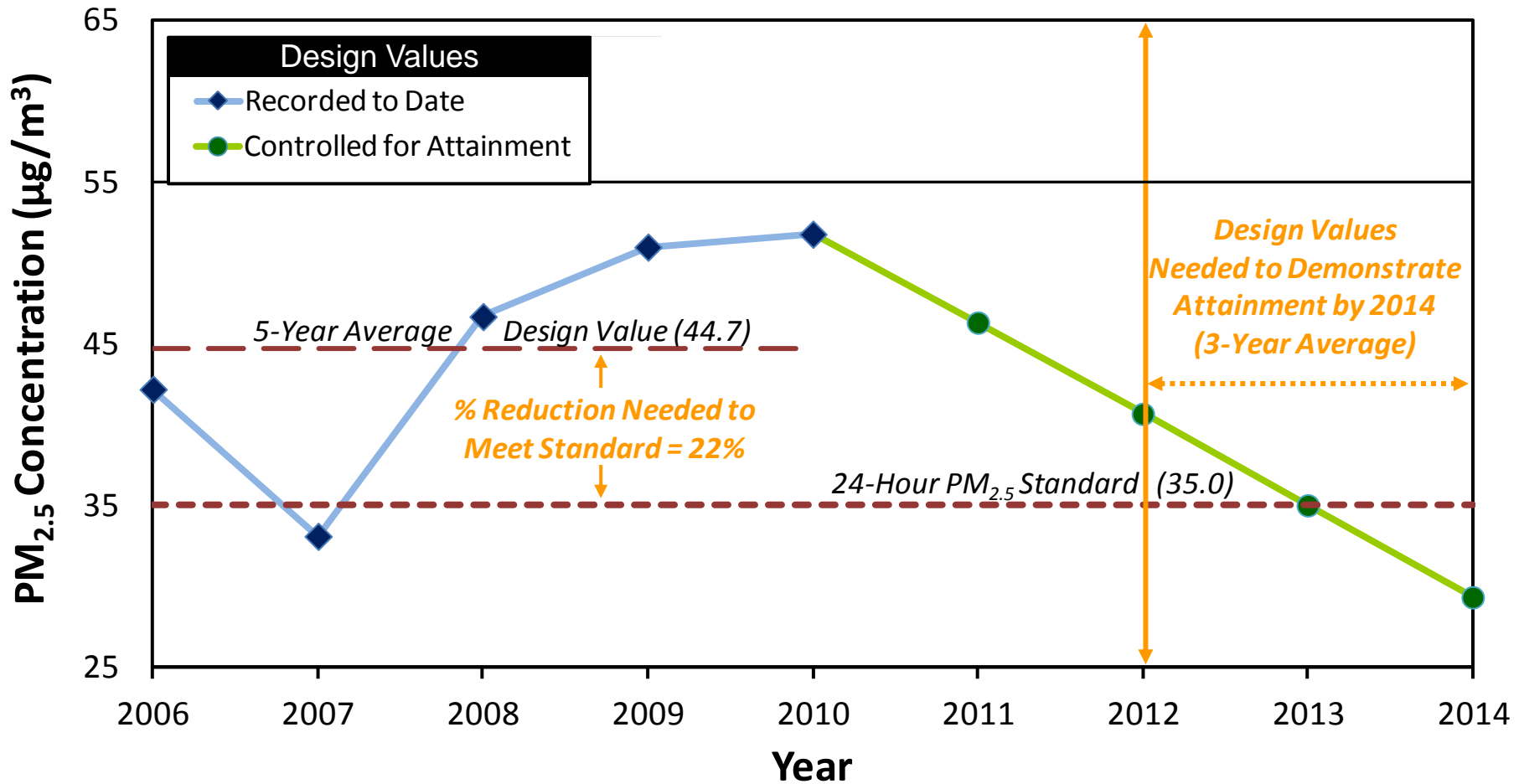
Trends in Winter Air Quality Hot Spot Complaints



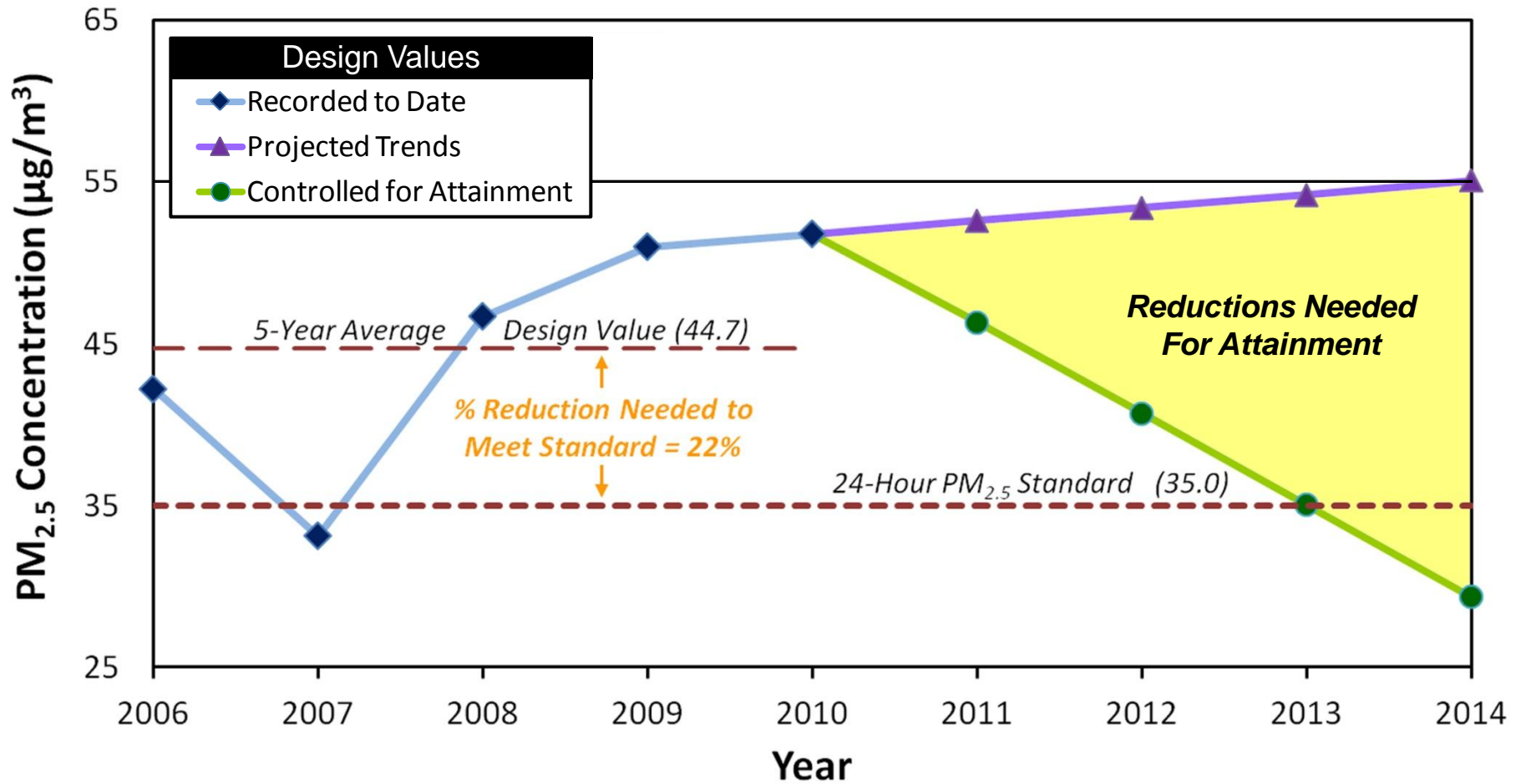
Example of Fairbanks Design Values Needed to Demonstrate Attainment with PM_{2.5} 24-hour NAAQS by 2014



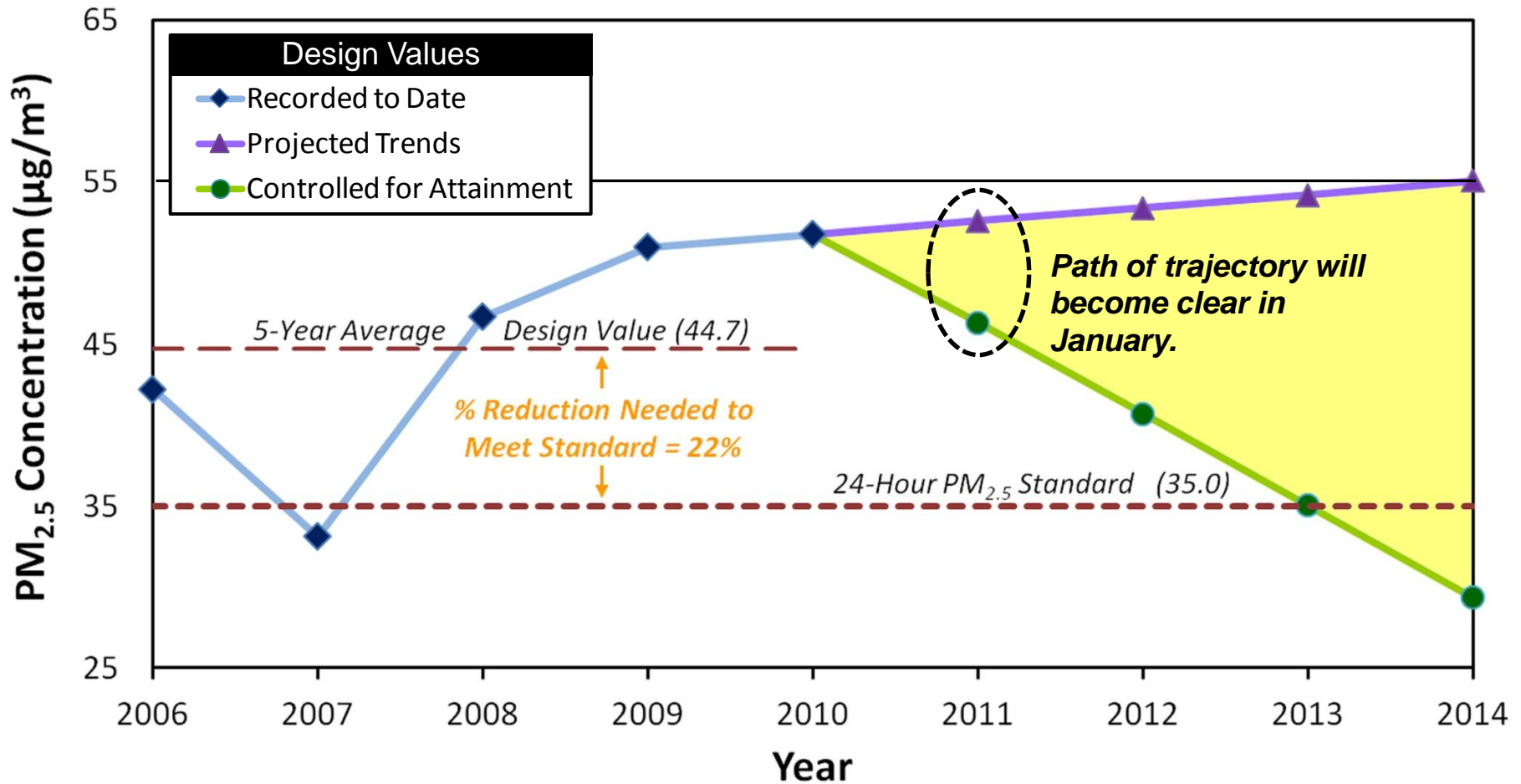
Example of Fairbanks Design Values Needed to Demonstrate Attainment with PM_{2.5} 24-hour NAAQS by 2014



Example of Fairbanks Design Values Needed to Demonstrate Attainment with PM_{2.5} 24-hour NAAQS by 2014



Example of Fairbanks Design Values Needed to Demonstrate Attainment with PM_{2.5} 24-hour NAAQS by 2014



apportionment



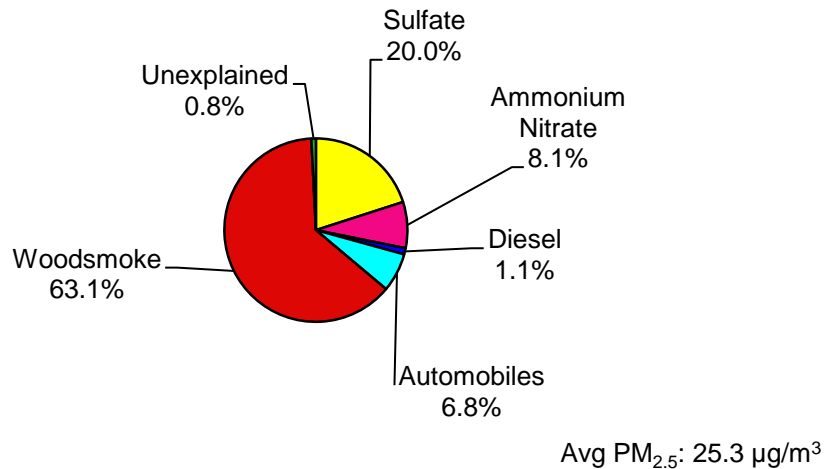
FNSB PM_{2.5} Issues

- Fairbanks has 23-35 winter days/year with measured PM_{2.5} concentrations above standard
- Very complex issue – continue to gather information about areal extent, severity, specific sources
- Suspected emission sources:
 - local space heating (fuel oil, wood, waste oil)
 - diesel and gasoline powered vehicles
 - local (residential) / regional coal burning (including power plants)

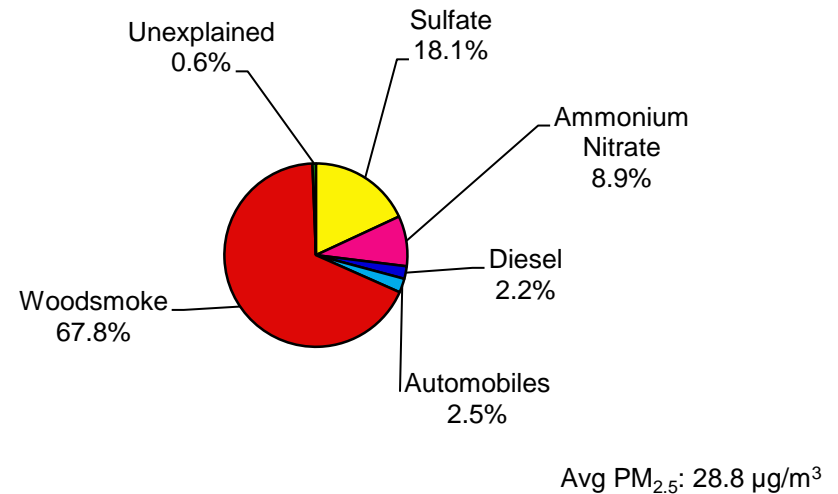


Sources - Chemical Mass Balance (CMB) Results State Building

Winter 2008/2009



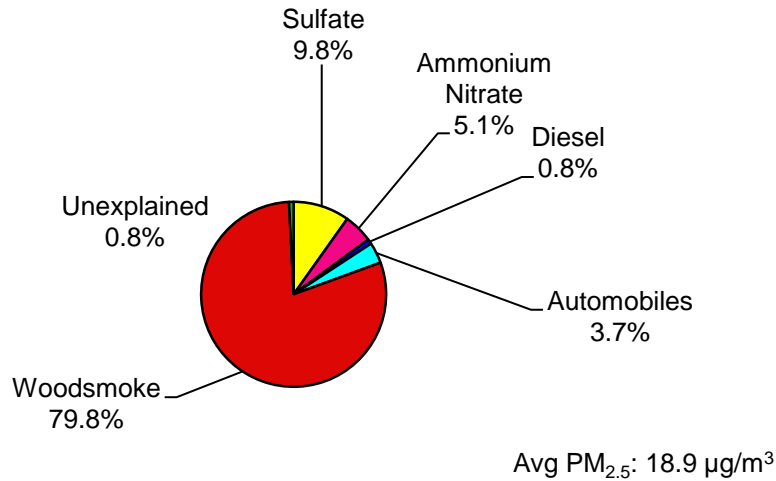
Winter 2009/2010



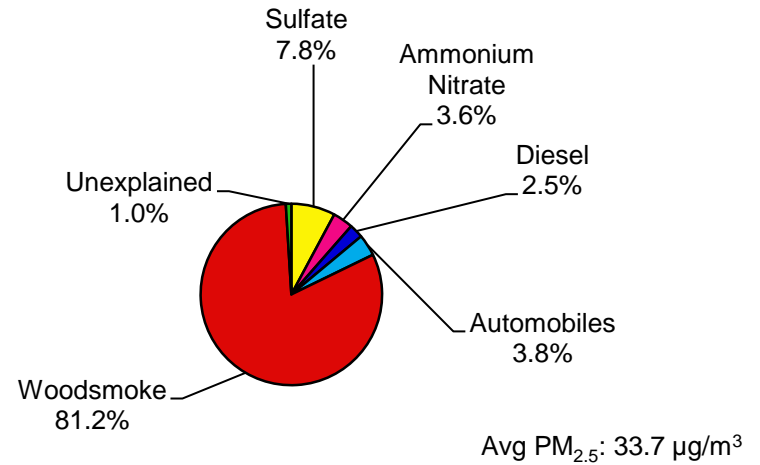


Sources - Chemical Mass Balance (CMB) Results North Pole

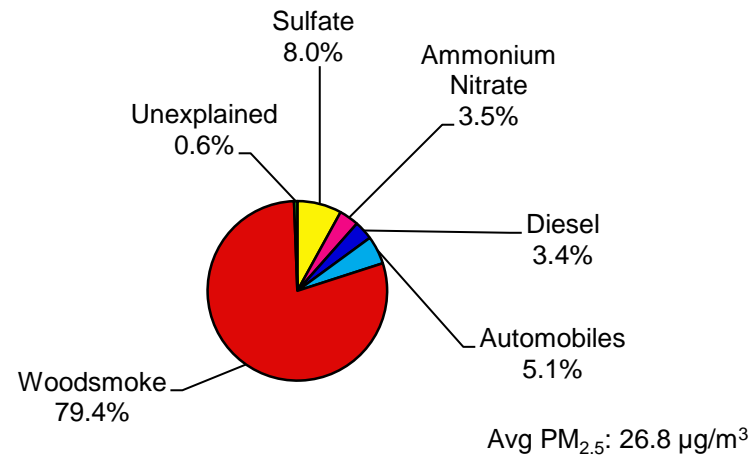
Winter 2008/2009



Winter 2009/2010



Winter 2010/2011

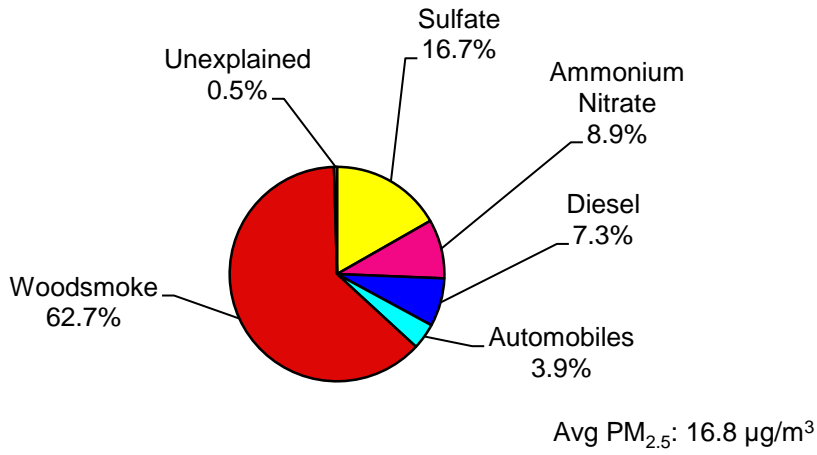




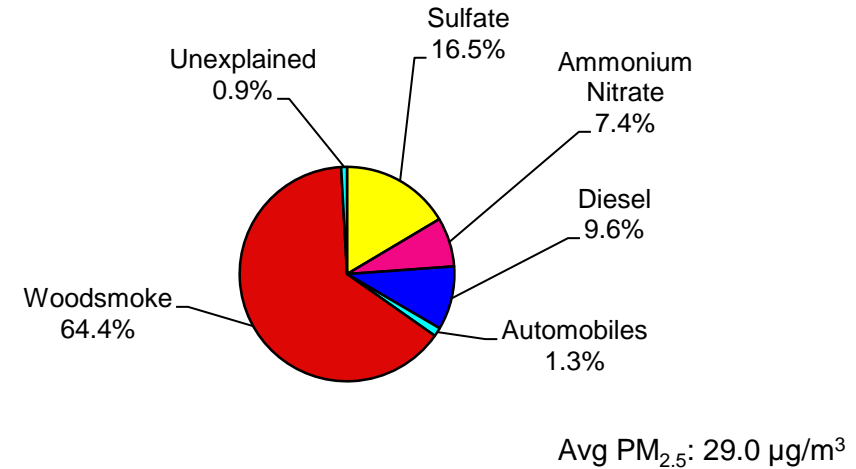
Sources - Chemical Mass Balance (CMB) Results

Peger Road

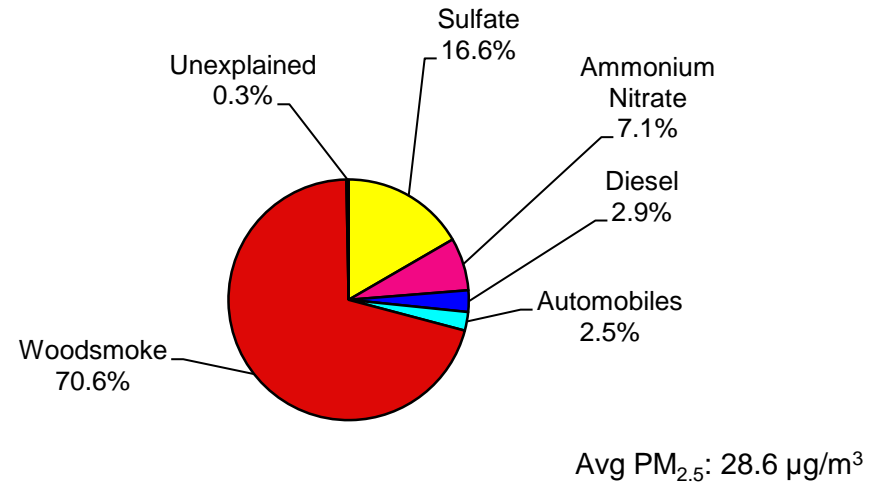
Winter 2008/2009



Winter 2009/2010



Winter 2010/2011



Residential Heating Device and Fuel Surveys for Fairbanks Winter

Main Purposes: Determine an accurate mix of heating devices and fuels to estimate $PM_{2.5}$ for Fairbanks.

- Surveys conducted for 2006, 2007, 2010 and 2011
- 2011 Survey sample size of 712 respondents
 - Six zip codes: 99701, 99703, 99705, 99709, 99712, 99775
 - 626 landline (apportioned by zip code population)
 - 86 cell phone (randomly selected)
- Key questions answered
 - Device counts
 - Device and fuel usage
 - Device and fuel properties
 - Home heating costs
 - Regional and sub-regional variations

2011 Home Heating Survey Device Counts

Statistic	Parameter	Survey Results	
Total Estimated Devices for Fairbanks	Wood	8,623	22.53%
	Central Oil	20,265	52.70%
	Portable	1,294	2.95%
	Direct Vent	4,635	10.80%
	Natural Gas	1,006	2.60%
	Coal Heat	359	0.82%
	District Heat	755	2.22%
	Electric Device	683	1.62%
	Other	1,509	3.75%
	Total		39,129

Summary of 2006, 2007, 2010 and 2011 Home Heating Surveys

Statistic	Parameter	Survey Results			
		2006	2007	2010	2011
Average Winter Device Use by Type (% of Household Use)	Wood	10.1%	11.8%	17.2%	14.8%
	Central Oil	68.0%	63.6%	67.3%	68.0%
	Portable	0.7%	0.5%	0.2%	0.9%
	Direct Vent	8.6%	7.4%	8.2%	9.2%
	Natural Gas	2.6%	2.3%	4.5%	3.3%
	Coal Heat	n/a	n/a	0.5%	0.6%
	District Heat	2.8%	1.1%	1.3%	1.9%
	Electric Device	n/a	n/a	n/a	0.5%
	Other	7.2%	13.4%	0.7%	0.9%



Air Quality Planning

Air Quality Plan Attainment Demonstration Administrative Requirements

- Clean Air Act requires following to implement a plan
 - Adequate funding
 - Adequate personnel
 - Legal authority
- A mix of federal, state, and local programs
 - Some programs require ordinances or regulations
 - All committed programs must be funded and implemented

Air Quality Plan Attainment Demonstration Technical Requirements

- Identification of pollutant(s) to be regulated
 - PM_{2.5} and pre-cursor pollutants (SO₂, NO_x, NH₃)
- Prepare estimates of current & projected emissions
- Use modeling to demonstrate attainment
- Attainment date must comply with Clean Air Act schedule
- Selected controls must be enforceable
- Demonstrate science supports findings

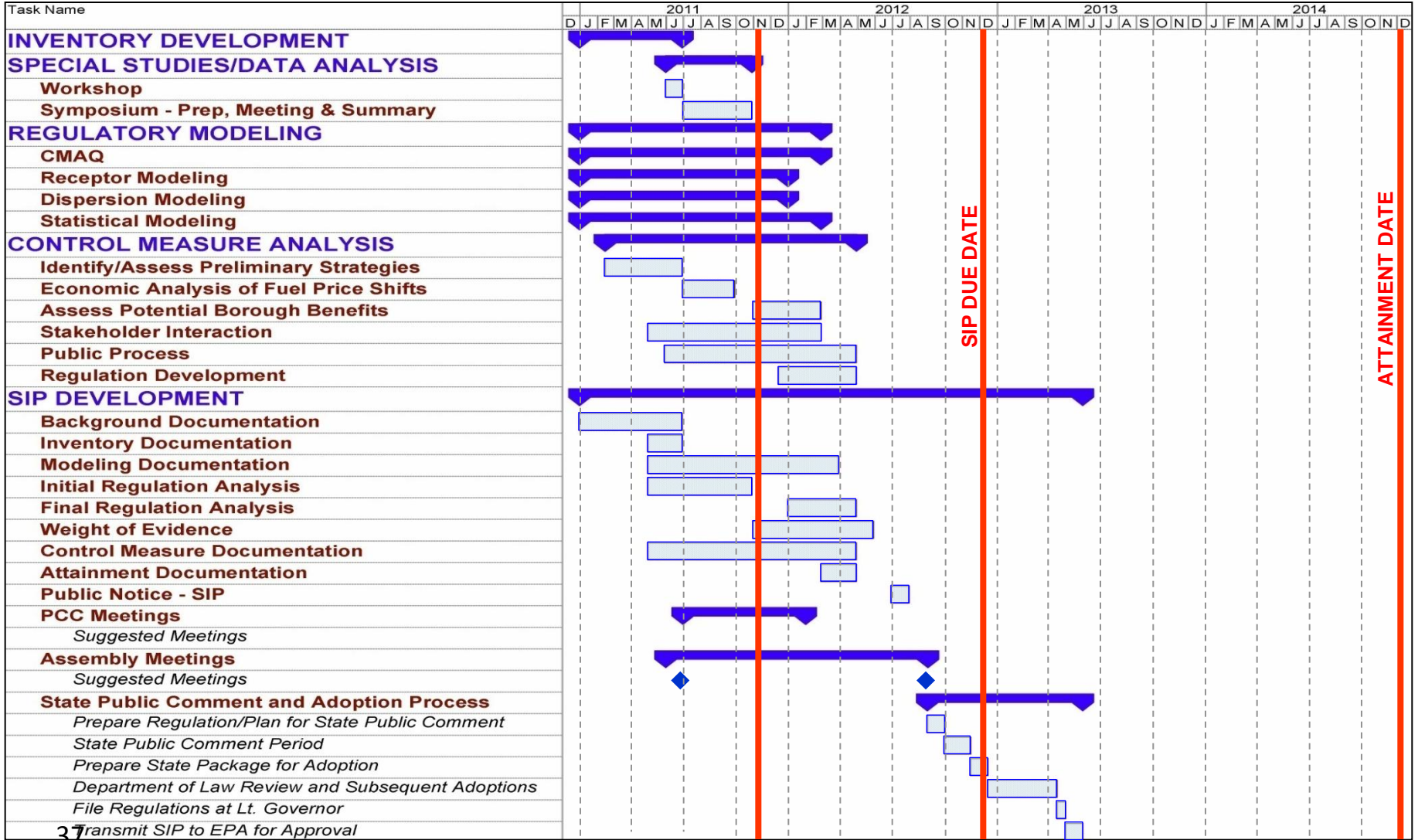
State Responsibility

- State has lead for air quality under the Clean Air Act
 - Borough agreed to take air quality lead under MOU
 - State responsible for ensuring Plan developed by Borough is approvable and implemented
- State is working closely with Borough to develop a Plan
 - Providing technical, regulatory and contractual assistance
 - Assisting inventory development, modeling and control measure analysis
 - Allocating considerable staff time and financial support

Borough Responsibility

- Preparing approvable PM_{2.5} Plan
- Working with DEC & EPA to develop Plan
- Selecting controls needed to attain PM_{2.5} standard
- Demonstrating selected controls attain PM_{2.5} standard
- Allocating resources to fulfill Borough responsibilities
 - Funding
 - Personnel
 - Ordinances
 - Enforcement

Fairbanks PM_{2.5} Air Quality Plan (SIP) Schedule



CURRENT DATE

Control Measure Issues

- Existing control programs include:
 - Wood stove change out
 - Limit locations where new OWBs can be installed
 - Burn dry wood
 - Public education
- How far will existing measures take us towards meeting EPA standards?
- Best estimate, without modeling, suggests minimum of 2,600 uncertified wood stoves would need to be changed out to meet EPA PM_{2.5} standard
 - Reductions from 300 stoves changed out to date have not yet been seen in the monitoring data
 - Dry wood burning, OWB installation limits and public education are new and no estimates of benefits are available

Control Measure Issues (cont.)

- Additional control measures will be needed to ensure attainment
- Since EPA has limits on voluntary measure benefits, additional resources and authority will be need to implement controls
- Looking for input from public on which measures to use

Options to Reduce Air Pollution

- Local options
 - Wood burning limits (sale of dry wood, etc.)
 - Shift to #1 heating oil as Borough has
 - Diesel retrofits
- State options
 - Wood burning limits (curtailment during episodes)
 - OWB standards
 - Limit wood cutting on public lands to only taking split wood
 - Permitted facility emission controls
 - Large scale natural gas availability (e.g., pipeline)
- Federal options
 - Tighter wood stove standards (technology forcing)
 - National standards on fuels & equipment
 - Additional funds for local programs
- Have to work together to assemble a mix of acceptable measures

Public Education

- Critical to changing behavior and reducing air pollution
- Health effects
 - Reduce impacts on people in Borough
 - Improve quality of life
 - Avoid decisions to no longer live here
- CCHRC studies provide local data to guide better wood burning
 - When to cut wood
 - Time needed to dry wood
 - Cost of burning wet wood
 - Use moisture meters
- What can public do to reduce pollution?
 - Wood stove change out program
 - Burn dry wood (Split, Stack, Store & Save)
 - Switch to cleaner fuels during poor air quality

Questions?