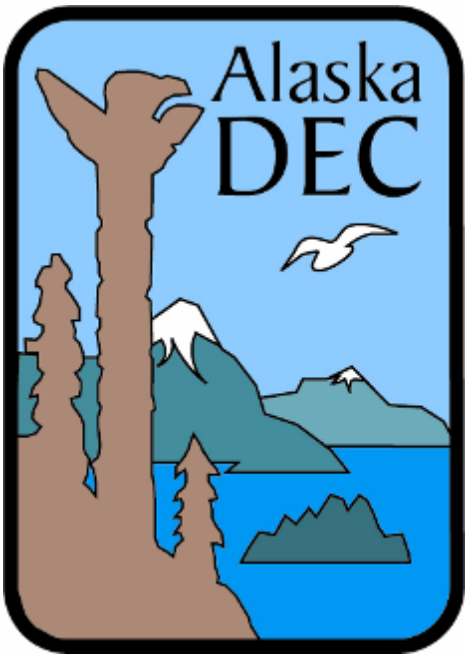
Alaska's 2011 Air Monitoring Network Plan

Addendum



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ADDENDUM

The Alaska 2011 Air Monitoring Network Plan was published June 2010. Upon review, the EPA Region 10 requested supplemental information be added to the 2011 plan. The requested information was prepared as an addendum to this document. Updates to this information will be incorporated into appropriate sections of the 2012 Air Monitoring Plan.

The supplemental information includes the NCORE Self-Assessment form, design value information for all sites for PM10 and PM2.5, and a description of the Alaska (Class I) IMPROVE visibility monitoring sites.

NCore Readiness Self-Assessment for State/local/Tribal Agencies

Agency Name: ADEC **Date Prepared:** August 31, 2010 **By:** Bob Morgan

A. NETWORK DESIGN

a. Proposed NCore Station #1 ___NEW SITE X EXISTING SITE AQS # AQS # Not Established
b. Proposed NCore Station #2 ___NEW SITE ___EXISTING SITE AQS #_____
c. Proposed NCore Station #3 ___NEW SITE ___EXISTING SITE AQS #_____

	Item	Criteria	Status	Next Steps
1	Urban or Rural	Largest MSA(s) covered by urban station.	Determined – Fairbanks, AK	
2	Scale of Representation	Neighborhood X Urban __ Regional __ Other __	Neighborhood	Neighborhood scale or larger as recommended.
3	Population Oriented	Yes X No __		Population oriented monitoring as recommended.
4	Proximity to local emissions sources	No biasing local sources within 500 meters for urban stations. No biasing sources or large urban population centers within 50 km for rural stations.	Site established in down-town Fairbanks where $PM_{2.5}$ exceedances have been recorded	
5	Suitability for meteorological measurements	Distance from obstructions is 10x height of obstruction above station. See Volume IV: Meteorological Measurements Version 2.0(Final)	A 10 meter tower has not been install but will be located adjacent to monitoring shelter	Selected site in an open area, any influence from distance obstructions are anticipated to be insignificant
6	Information (including site photographs) provided for AMTIC NCore web site	Photographs in 8 cardinal directions needed.	Photos of existing site provided in the 2011 Monitoring Plan, Section 3.4	
7	Station Coordinates	Determined by GPS	latitude 64° 50’ 44.6” north, longitude 147° 43’ 38.2” west	
8	Site visited by EPA in past 3 years	Meets applicable Appendix D and E criteria.	No EPA inspections to date.	Schedule an inspection once the new shelter and instrumentation have been installed.

	Item	Criteria	Status	Next Steps
9	Network leveraging	Collocation with other networks encouraged: STN__ Supplemental CSN__ NATTS __ CASTNET __ IMPROVE __ NADP __ PAMS __ Other __	Other network location not readily available	
10	Applicable site fields updated in AQS including coordinates	Consider setting additional monitor type to "Proposed NCore" (station should also be categorized as SLAMS).	Not yet available	
LOGISTICAL CONSIDERATIONS				
11	Site access	Access for at least five years is suggested.	Site established with temporary shelter in place to measure $PM_{2.5}$ and elemental carbon	RFP issued for purchase of new monitoring shelter, closing date for receipt of bid packages 9/1/10
12	Power requirements and availability	200A service suggested. 240vac service typically needed for a/c. Key power outlets protected by UPS units.	Electrical power in place for temporary shelter, specs for new shelter out to bid	Specs for new shelter to be included in bid package
13	Telecommunications	Minimum dial-up service. Broadband service suggested for polling of 1-minute data.	DR DAS web-based system planned for site	
14	A/C cooling capacity	Minimum 18,000BTU a/c capacity.	New shelter to be designed to accommodate temperature control issues for Sub-Arctic location	H/VAC requirements to be included in bid package
15	Interior space	Sufficient for minimum of two 19" inner dimension, 6' tall instrument racks and related equipment and accessories, or equivalent shelf space.		Interior design requirements to be included in bid package

	Item	Criteria	Status	Next Steps
16	Exterior space (roof and accompanying platforms)	Allow for: a) 1m spacing of low-volume PM sampler inlets – up to seven* required plus PEP audit sampler. b) 1m spacing between low-volume PM sampler inlets and gas manifold cane or Teflon tubing. Facilitate usage of TTP audit vehicle or trailer.	In planning stages	Exterior design requirements to be included in bid package
17	10m tower compatibility	Required for meteorological equipment, NO_y converter. Room to drop tower for calibrations and audits.	10 meter, crank up tower planned for site	

*Notes

1. PM2.5 FRM sampler
2. PM10c FRM sampler for PM10-2.5 mass (dichotomous sampler could substitute for #1 and #2 if future FRM/FEMs available) or PM10-2.5 continuous
3. PM2.5 continuous sampler (does not have to be FEM/ARM)
4. PM2.5 speciation sampler (CSN or IMPROVE)
5. URG sampler for carbon channel (PM2.5 speciation) if using CSN samplers
6. Sampler for PM10-2.5 speciation (unless dichotomous sampler or PM2.5 speciation sampler (spare channels) is used)
7. URG sampler for PM10 carbon speciation (speculative need for PM10-2.5 carbon speciation by difference)

NCore Readiness Self-Assessment for State/local/Tribal Agencies

Agency Name: ADEC **Date Prepared:** August 31, 2010 **By:** Bob Morgan

B. REQUIRED PARAMETER/METHODOLOGICAL EVALUATION

d. Proposed NCore Station #1 ___NEW SITE _X EXISTING SITE AQS #_AQS # Not Established__
e. Proposed NCore Station #2 ___NEW SITE ___EXISTING SITE AQS #_____
f. Proposed NCore Station #3 ___NEW SITE ___EXISTING SITE AQS #_____

	Parameter	**Existing Measurements** **Sampling Began**	**Method**	**Future Measurements** **Date Expected**	**New or Relocated**	**Notes**
1	Ozone			1/1/2011	Teledyne API Model 400E EQOA-0992-087 Purchased new	Year-round operation (not seasonal)
2	Sulfur dioxide			1/1/2011	Thermo Electron Model 43i EQSA-0486-060 Purchased new	High sensitivity
3	Carbon monoxide			1/1/2011	Thermo Electron. Model 48 RFCA-0981-054 Purchased relocated	High sensitivity
4	Nitrogen oxides (NO_y)*			1/1/2011	Thermo Electron. Model 42i-Y RFNA-1289—074 Purchased new	High sensitivity External converter mounted at 10m
5	Lead (Pb)			1/1/2012	TSP-Pb by ICP-MS EQL-0710-192	
6	PM2.5 mass	10/29/09	Thermo Electron Partisol 2000 RFPS-0498-117			1-in-3 day FRM/FEM integrated
7	PM2.5 continuous	10/29/09	Thermo Electron Model 8500 FDMS TEOM EQPM-0609-181			FEM or ARM preferred but not required
8	PM2.5 Elemental Carbon	10/29/09	Magee Scientific			

NCore Readiness Self-Assessment for State/local/Tribal Agencies

Agency Name: ADEC **Date Prepared:** August 31, 2010 **By:** Bob Morgan

	Parameter	Existing Measurements Sampling Began	Method	Future Measurements Date Expected	New or Relocated	Notes
			Aethalometer/BGI 2.5 VSCC			
9	PM10-2.5 mass					Integrated samplers (FRM difference or dichot) or continuous monitor
10	PM10-2.5 speciation					Details to be provided later (2008) on sampling requirements.
11	Wind speed and direction**			1/1/2011	Relocated	At 10 m
12	Ambient temperature**			1/1/2011	Relocated	At 2 m
13	Relative humidity**					At 2 m (Not planned at this time)
14	Optional – Vertical wind speed, solar radiation, precipitation, barometric pressure, delta-T for 2-10m.					(Not planned at this time)
15	Optional – Ammonia and nitric acid			1/1/2011	Thermo Electron Model 17i Ammonia Analyzer	Pilot project using denuders scheduled for 2008-2009.

Notes

* Although the measurement of NO_y is required in support of a number of monitoring objectives, available commercial instruments may indicate little difference in their measurement of NO_y compared to the conventional measurement of NOx, particularly in areas with relatively fresh sources of nitrogen emissions. Therefore, in areas with negligible expected difference between NOy and NOx measured concentrations, the Administrator may allow for waivers that permit high-sensitivity NO_X monitoring to be substituted for the required NOy monitoring at applicable NCore sites.

** EPA recognizes that, in some cases, the physical location of the NCore site may not be suitable for representative meteorological measurements due to the site's physical surroundings. It is also possible that nearby meteorological measurements may be able to fulfill this data need. In these cases, the requirement for meteorological monitoring can be waived by the Administrator.

NCore Readiness Self-Assessment for State/local/Tribal Agencies

Agency Name: ADEC **Date Prepared:** August 31, 2010 **By:** Bob Morgan

C. **SUPPORTING EQUIPMENT EVALUATION**

a. Proposed NCore Station #1 ___NEW SITE _X EXISTING SITE AQS #_AQS # Not Established__
b. Proposed NCore Station #2 ___NEW SITE ___EXISTING SITE AQS #_____
c. Proposed NCore Station #3 ___NEW SITE ___EXISTING SITE AQS #_____

	Item	Criteria	Status	Next Steps
1	Calibrator (field)	Suitable for trace-level dilutions, see Appendix A audit concentrations. Capable of automated QC checks. Internal O3 generator – photometer preferred.	Environics Model 6103 Multi-gas calibration with certified ozone generator Planned Purchase	
2	Calibrator (lab or field)	Suitable for generation of MDL-level concentrations	See note above	
3	Zero Air Source	Compliant with TAD recommendations. Ultra-pure air cylinder recommended for occasional comparison to zero air source. Capacity for 20+ LPM of dilution air.	To be purchased (tentative selection Teledyne API 701 zero air system)	
4	Data acquisition system	Digital-capable system	DR DAS web based system planned for site	
5	Gas cylinder standards	Suitable for trace-level dilutions, see Appendix A audit concentrations, EPA Protocol certifications. Special low-level standards needed for MDL concentrations (CO, SO_2, NO_y)	EPA Protocol Calibration Gases for SO_2, NO_X, and CO with Certificates of Analysis	
6	Meteorological calibration devices	Provide NIST traceability of required meteorological parameters.	Calibration devices in-house	NIST traceability available for temperature devices. Need to investigate NIST traceability for WS/WD.
7	Sampling manifold	Per Appendix E. Residence time <20 seconds, only glass or Teflon materials, probe and monitor inlets acceptable heights.		Sampling manifold to be included with bid package for new monitoring shelter.

8	Auditing equipment	Independent calibrator, zero air source and gas standards compatible with trace level specifications. Independent meteorological and flow standards, it not already available.	Audit equipment already available and NIST traceability of reference devices will be provided.	

D. ORGANIZATIONAL FACTORS

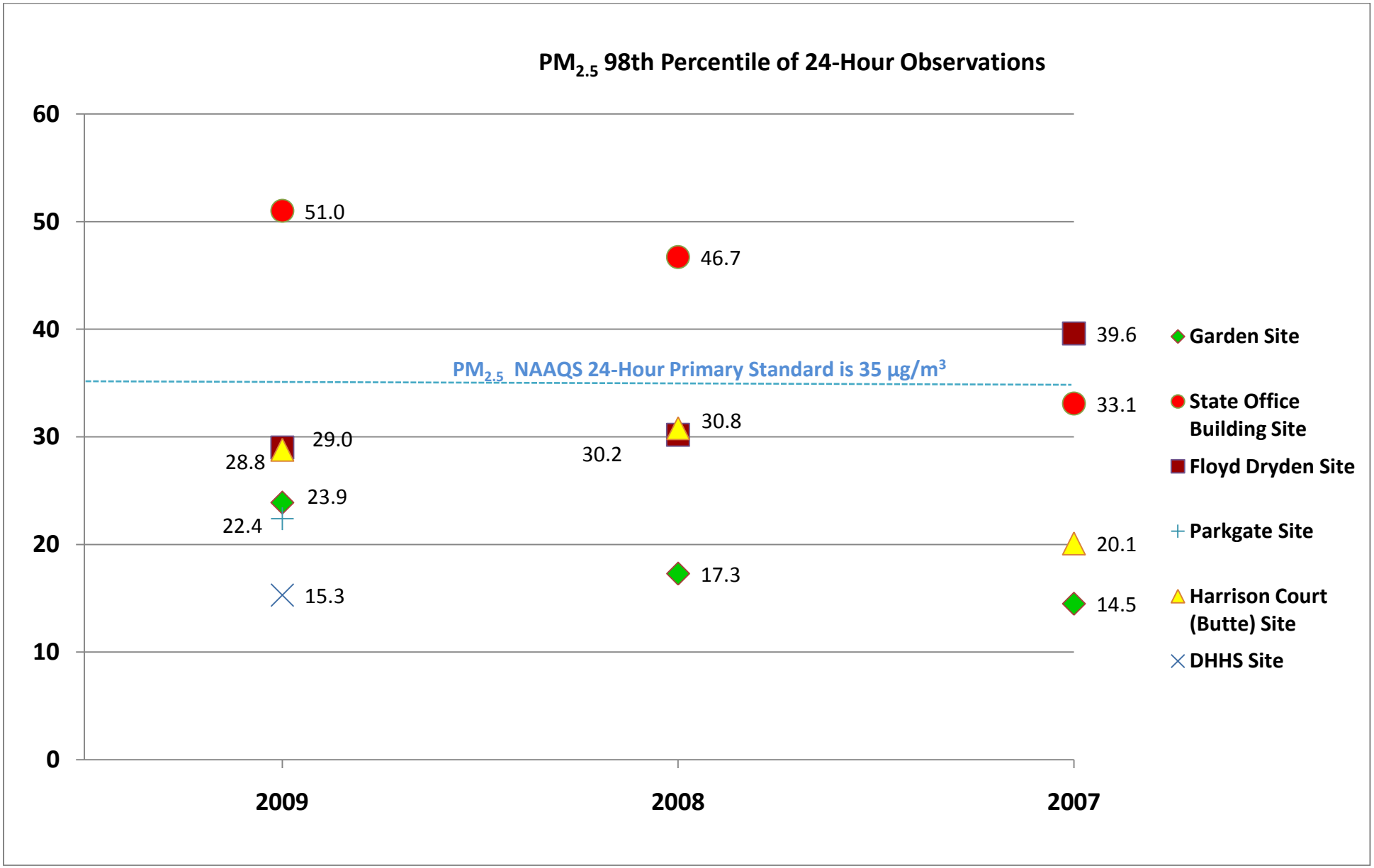
	Item	Criteria	Status	Next Steps
1	Training considerations	Key monitoring personnel have attended OAQPS provided monitoring workshops or equivalent training.		
2	Monitoring station documentation	NCore station(s) described in Annual Monitoring Network Plan.		Must be included in plan due on or before July 1, 2009. Discuss siting with health researchers and other data stakeholders.
3	Section 103 funds received and obligated for equipment purchases			Work with EPA Regional contacts.

Alaska 2011 Monitoring Plan
PM Design Data for 2007 -2009

Alaska Monitoring Design Values for $PM_{2.5}$ as $\mu g/m^3$

$PM_{2.5}$ Monitoring Sites	98th Percentile			Weighted Mean			2007-2009 Design Value	
	2009	2008	2007	2009	2008	2007	24-hour	Annual
Garden Site	23.9	17.3	14.5	7.1	5.5	4.9	19	5.9
DHHS Site	15.3			5.3			15	5.3
Parkgate Site	22.4			6.3			22	6.3
Harrison Court (Butte) Site	28.8	30.8	20.1	7.8	6.2	5.5	27	6.5
State Office Building Site	51.0	46.7	33.1	11.5	11.3	10.7	44	11.2
Floyd Dryden Site	29.0	30.2	39.6	7.0	7.1	6.6	33	6.9

Alaska 2011 Monitoring Plan
PM Design Data for 2007 -2009



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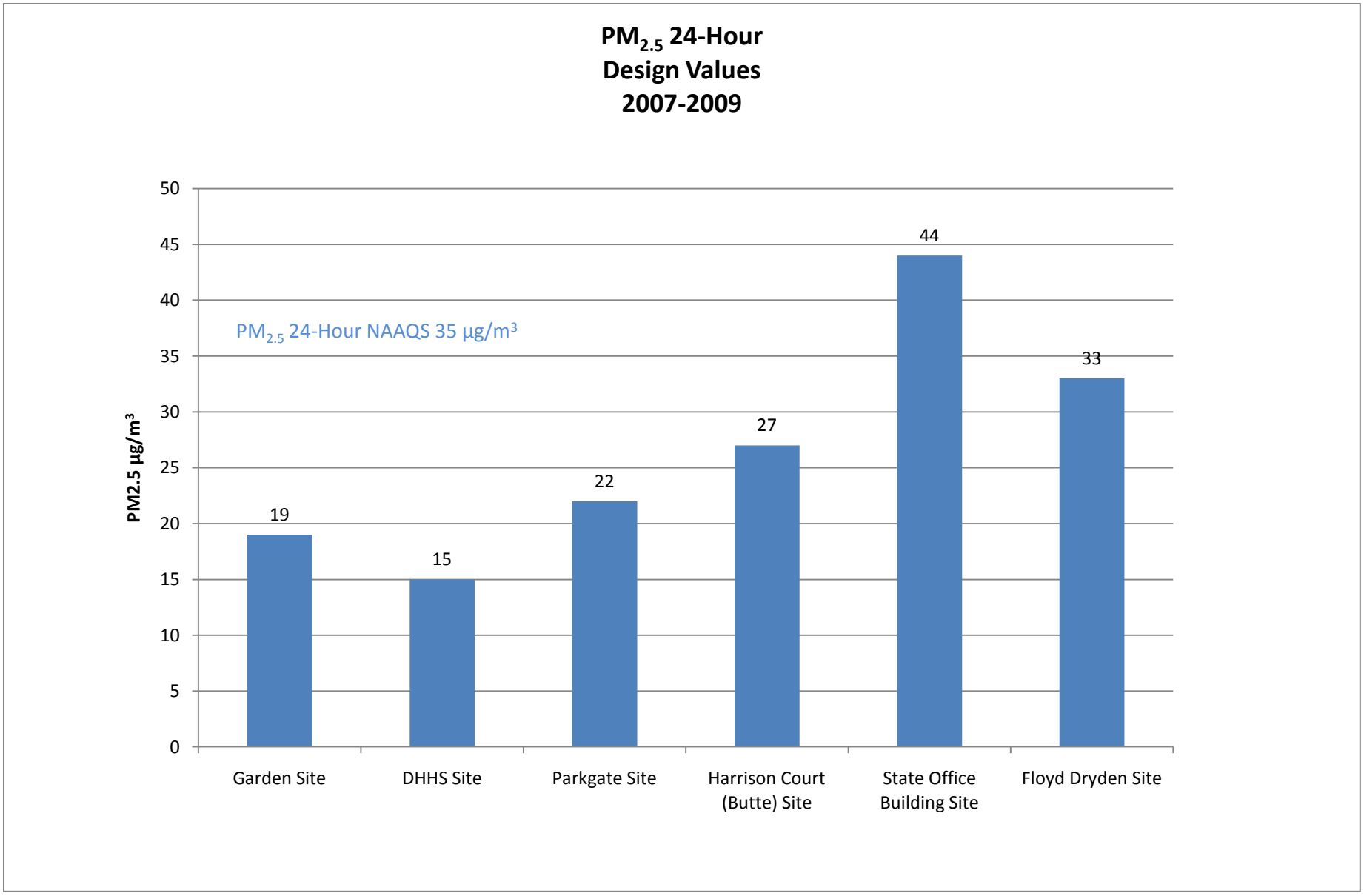
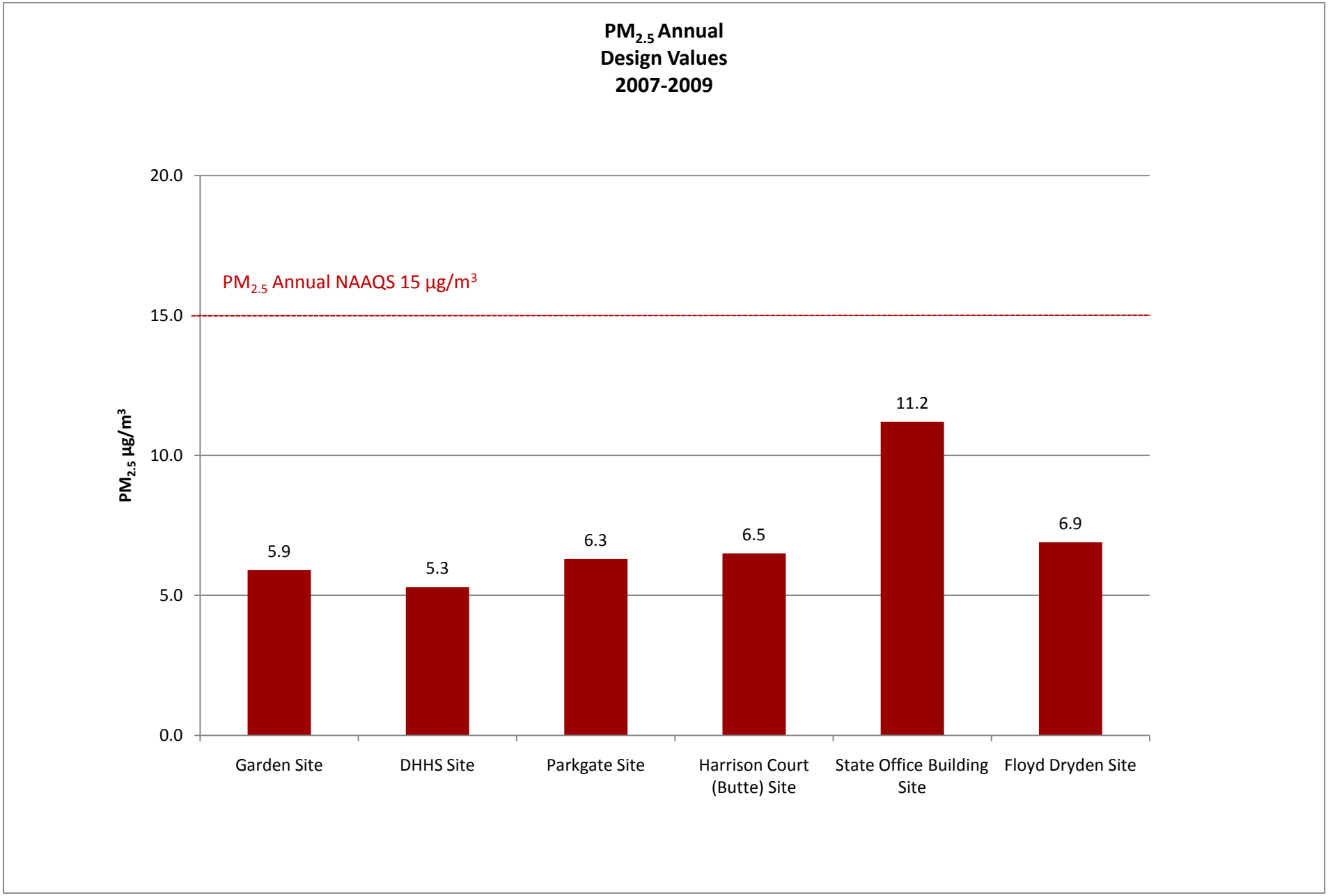
PM Design Data for 2007 -2009



Alaska 2011 Monitoring Plan
PM Design Data for 2007 -2009



Alaska 2011 Monitoring Plan
PM Design Data for 2007 -2009

Alaska Monitoring Design Value Information for PM_{10}

PM_{10} Sites	2009 Exceedances		2008 Exceedances		2007 Exceedances		2009-2007 Exceedances
	Estimated	Count	Estimated	Count	Estimated	Count	Estimated
Garden Site	0	0	0	0	0	0	0
Tudor Site	0	0	0	0	0	0	0
Parkgate Site	0	0	0	0	0	0	0
Harrison Court (Butte) Site	0	0	4.1	1	0	0	1.4
Floyd Dryden Site	0	0	0	0	0	0	0

Visibility and Regional Haze Monitoring Network

In 1977, Congress amended the Clean Air Act to include provisions to protect the scenic vistas of the nation's national parks and wilderness areas. In these amendments, Congress declared as a national visibility goal:

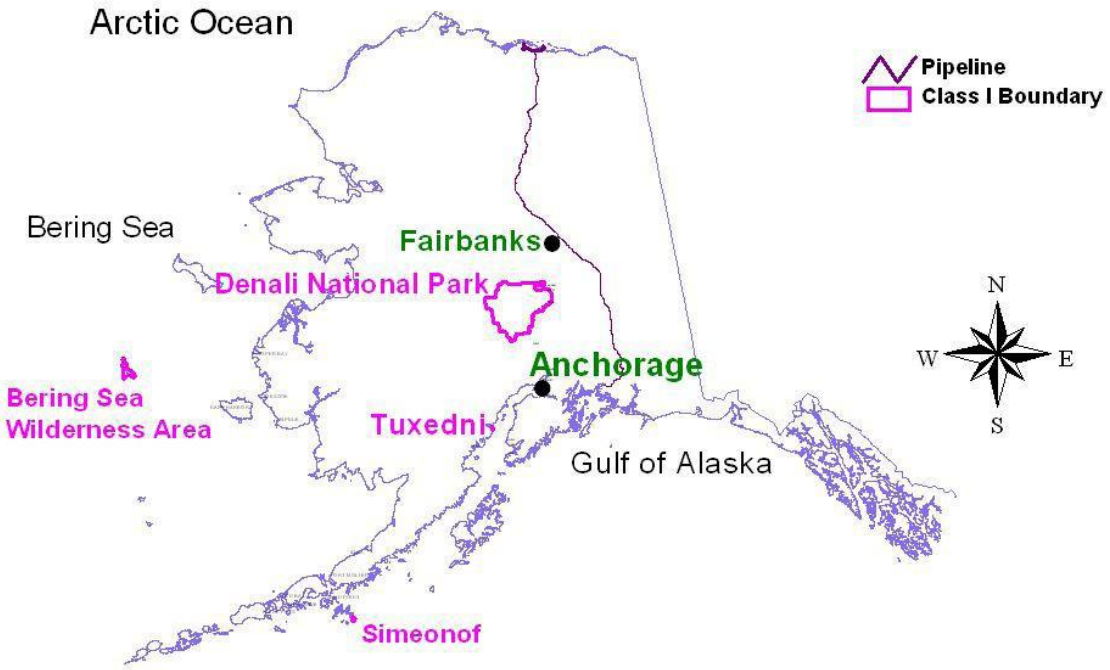
> *The prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution. (Section 169A)*

At that time, Congress designated all wilderness areas over 5,000 acres and all national parks over 6,000 acres as ―mandatory federal Class I areas. These Class I areas receive special visibility protection under the Clean Air Act.

The 1990 amendments to the Clean Air Act established a new Section 169(B) to address regional haze. To address the 1990 Clean Air Act amendments, the problem of long-range transport of pollutants causing regional haze, and to meet the national goal of reducing man-made visibility impairment in Class I areas, EPA adopted, the Regional Haze Rule in 1999.

Alaska has four Class I areas subject to the Regional Haze Rule: Denali National Park, Tuxedni National Wildlife Refuge, Simeonof Wilderness Area, and Bering Sea Wilderness Area. They were designated Class I areas in August 1977. Figure 1 shows their locations, with Denali National Park in the Interior, Tuxedni and Simeonof Wilderness Areas as coastal, and the Bering Sea Wilderness Area.

Figure 1-Alaskan Class I Areas



In Alaska, Class I Areas are managed by the National Park Service (NPS) and the U.S. Fish and Wildlife Service (USFWS.)

The IMPROVE Monitoring Network

The Alaska Regional Haze SIP includes a monitoring plan for measuring, estimating and characterizing air quality and visibility impairment at Alaska's four Class I areas. The haze species concentrations are measured as part of the IMPROVE monitoring network deployed throughout the United States. Alaska uses four IMPROVE monitoring stations representing three of the four Class I Areas. Three of these stations were initiated specifically in response to Regional Haze rule requirements. There is no air monitoring being conducted for the Bering Sea Wilderness Area due to its remote location.

Denali National Park and Preserve

Denali National Park and Preserve is a large park in the interior of Alaska. It has kept its integrity as an ecosystem because it was set aside for protection fairly early in Alaska's history. Denali National Park headquarters lies 240 miles north of Anchorage and 125 miles southwest of Fairbanks, in the center of the Alaska Range. The park area totals more than 6 million acres.. Denali is the only Class I site in Alaska that is easily accessible and connected to the road system. Denali has the most extensive air monitoring of Alaska's Class I areas, so more detailed examinations of long-term and seasonal air quality trends are possible for this site.

IMPROVE monitoring sites were established at two locations within or near the boundaries of the National Park and Preserve. The first air monitoring site is located near the eastern end of the park road at the Park Headquarters. A second, newer site, known as ―Trapper Creek, is located to the south of the Park at another site with reliable year-round access and electrical power.

The Denali Headquarters monitoring site (DENA1) is across the Park Road from park headquarters, approximately 250 yards from headquarters area buildings. The site (elevation of 2,125 feet) sits above the main road (elevation 2,088 feet). The side road to the monitoring site winds uphill for 130 yards, providing access to the monitoring site and a single-family residential staff cabin. The hill is moderately wooded, but the monitoring site sits in a half- acre clearing. During the park season, mid-September to mid-May, 70 buses and approximately 560 private vehicles per day traverse the road loaded with park visitors. During the off season, approximately100 passenger and maintenance vehicles pass within 0.3 miles of the monitoring site. Private vehicles are only allowed on the first 14.8 miles of the Park Road.

The Trapper Creek IMPROVE monitoring site (TRCR1) is located 100 yards east of the Trapper Creek Elementary School. The site is located west of Trapper Creek, Alaska and a quarter mile south of Petersville Road. The site is the official IMPROVE site for Denali National Park and Preserve and was established in September 2001 to evaluate the long-range transport of pollution into the Park from the south. The elementary school experiences relatively little traffic during the day, about 4 buses and 50 automobiles. The school is closed June through August. This site was selected because it has year-round access to power, is relatively open and is not directly impacted by local sources.

IMPROVE monitoring data have been recorded at the Denali Headquarters IMPROVE site from March of 1988 to present. The IMPROVE monitor near the park's headquarters was originally the IMPROVE site. Due to topographical barriers, such as the Alaska Range, it was determined that the headquarters site was not adequately representative of the entire Class I area. Therefore, Trapper Creek, just outside of the park's southern boundary, was chosen as a second site for an

IMPROVE monitor and is the official Denali IMPROVE site as of September 10, 2001. The headquarters site is now the protocol site. A CASTNet (Clean Air Status and Trends Network) monitor is located near the Denali Headquarters IMPROVE site.

Simeonof Wilderness Area

Simeonof Wilderness Area consists of 25,141 acres located in the Aleutian Chain 58 miles from the mainland. It is one of 30 islands that make up the Shumagin Group on the western edge of the Gulf of Alaska. Access to Simeonof is difficult due to its remoteness and the unpredictable weather. Winds are mostly from the north and northwest as part of the midlatitude westerlies. Occasionally winds from Asia blow in from the west.

The island is isolated and the closest air pollution sources are from marine traffic in the Gulf of Alaska and the community of Sand Point.

The Fish and Wildlife Service has placed an IMPROVE air monitor in the community of Sand Point to represent the wilderness area. The community is on a nearby more accessible island approximately 60 miles north west of the Simeonof Wilderness Area. The monitor has been on line since September 2001. The location was selected to provide representative data for regional haze conditions at the wilderness area.

Tuxedni National Wildlife Refuge

Tuxedni National Wildlife Refuge is located on a fairly isolated pair of islands in Tuxedni Bay off of Cook Inlet in Southcentral Alaska. There is little human use of Tuxedni except for a few kayakers and some backpackers. There is an old cannery built near Snug Harbor on Chisik Island which is not part of the wilderness area; however it is a jumping off point for ecotourists staying at Snug Harbor arriving by boat or plane. The owners of the land have a commercial fishing permit as do many Cook Inlet fishermen. Set nets are installed around the perimeter of the island and in Tuxedni Bay during fishing season.

Along with commercial fishing, Cook Inlet has reserves of gas and oil that are currently under development. Gas fields are located at the Kenai area and farther north. The inlet produces 30,000 barrels of oil a day and 485 million cubic feet of gas per day. Pipelines run from Kenai to the northeast and northeast along the western shore of Cook Inlet starting in Redoubt Bay. The offshore drilling is located north of Nikiski and the West McArthur River. All of the oil is refined at the Nikiski refinery and the Kenai Tesoro refinery for use in Alaska and overseas.

The Fish and Wildlife Service has installed an IMPROVE monitor near Lake Clark National Park to represent conditions at Tuxedni Wilderness Area. This site is on the west side of Cook Inlet, approximately 5 miles from the Tuxedni Wilderness Area. The site was operational as of December 18, 2001, and represents regional haze conditions for the wilderness area.

Bering Sea Wilderness Area

The Bering Sea Wilderness is located off the coast of Alaska about 350 miles southwest of Nome. Hall Island is at the northern tip of the larger St Matthew Island.

The Bering Sea Wilderness Area had a DELTA-DRUM sampler placed on it during a field visit in 2002. However, difficulties were encountered with the power supply for the sampler and no viable data is available from that effort. No IMPROVE monitoring is currently planned for Bering Sea Wilderness Area because of its inaccessibility.

Monitoring data and additional information for the Alaskan IMPROVE sites are available from the EPA website, http://vista.cira.colostate.edu/improve .

Additional Monitoring Considerations

One of the monitoring issues that Alaska has identified is the logistical difficulty of monitoring at remote locations. Remote locations make it challenging to provide power for instrumentation. If a monitor is located at the nearest power source, such as a town, it is also near local sources of emissions, and therefore less likely to be representative of the Class I area. Remote sampling in Class I areas may be needed to verify that data from an off-site IMPROVE monitor are representative. DRUM aerosol impactor sampling may provide an opportunity to verify impacts at remote Class I areas like Simeonof and Tuxedni. The challenges for ongoing air and visibility monitoring in Alaska are transportation and site maintenance. Sites are remote, access may be only by air or water, and electrical power may be lacking. In many places winter temperatures are extreme, often dipping well below zero Fahrenheit for weeks at a time.

DELTA-DRUM Samplers have been used at several sites in Alaska for relatively short periods. Researchers have unsuccessfully modified these samplers for remote winter use in Denali Park. Drum samplers were set up at the Denali and Trapper Creek sites as well as in McGrath and Lake Minchumina in February and March 2008. They proved to be quite problematic with mechanical and pump issues in winter conditions. They ran intermittently between February/March 2006 and April 2009.

Alaska will continue to evaluate as resources allow their portable sampling platforms for use in remote environments.