



Wyoming Ambient Air Monitoring Annual Network Plan 2014

June 25, 2014



Photo from Website Camera at Cloud Peak Monitoring Site

TABLE OF CONTENTS

1.0	Introduction	2
1.1	The AQD Monitoring History.....	2
1.2	General Monitoring Goals and Objectives.....	3
2.0	Air Monitoring Plan in 2013.....	8
2.1	State and Local Air Monitoring Stations (SLAMS).....	8
2.1.1	Casper - SLAMS.....	8
2.1.2	Cheyenne - SLAMS.....	10
2.1.3	Cody - SLAMS	11
2.1.4	Gillette - SLAMS.....	13
2.1.5	Jackson - SLAMS	14
2.1.6	Lander - SLAMS.....	16
2.1.7	Laramie- SLAMS.....	17
2.1.8	Rock Springs- SLAMS	19
2.1.9	Sheridan–Meadowlark-SLAMS	20
2.1.10	Sheridan – Police Station - SLAMS	22
2.2	Special Purpose Monitoring (SPM)	23
2.2.1	Big Piney.....	23
2.2.2	Boulder.....	24
2.2.3	Campbell County	25
2.2.5	Cloud Peak.....	26
2.2.6	Daniel South.....	27
2.2.7	Farson.....	27
2.2.8	Hiawatha	28
2.2.9	Juel Spring	28
2.2.10	Moxa	29
2.2.11	Murphy Ridge	30
2.2.12	Pinedale.....	31
2.2.13	South Pass	31
2.2.14	Thunder Basin.....	32
2.2.15	Wamsutter	33
2.2.16	Wright	34
2.2.17	Wyoming Range	34
2.2.18	Powder River Basin (PRB) NO _x	35
2.2.19	Powder River Basin (PRB) PM _{2.5}	36
2.3	Mobile Monitoring Trailers.....	36
2.3.1	Mobile #1 Rock Springs	37
2.3.2	Mobile #2 Sinclair.....	38
2.3.3	Mobile #3 Converse County	39
2.4	Cheyenne National Core (NCore) Multi Pollutant Station	40
2.5	Industrial Monitoring Sites.....	41
2.6	IMPROVE Network.....	41
3.0	Compliance with NAAQS.....	42

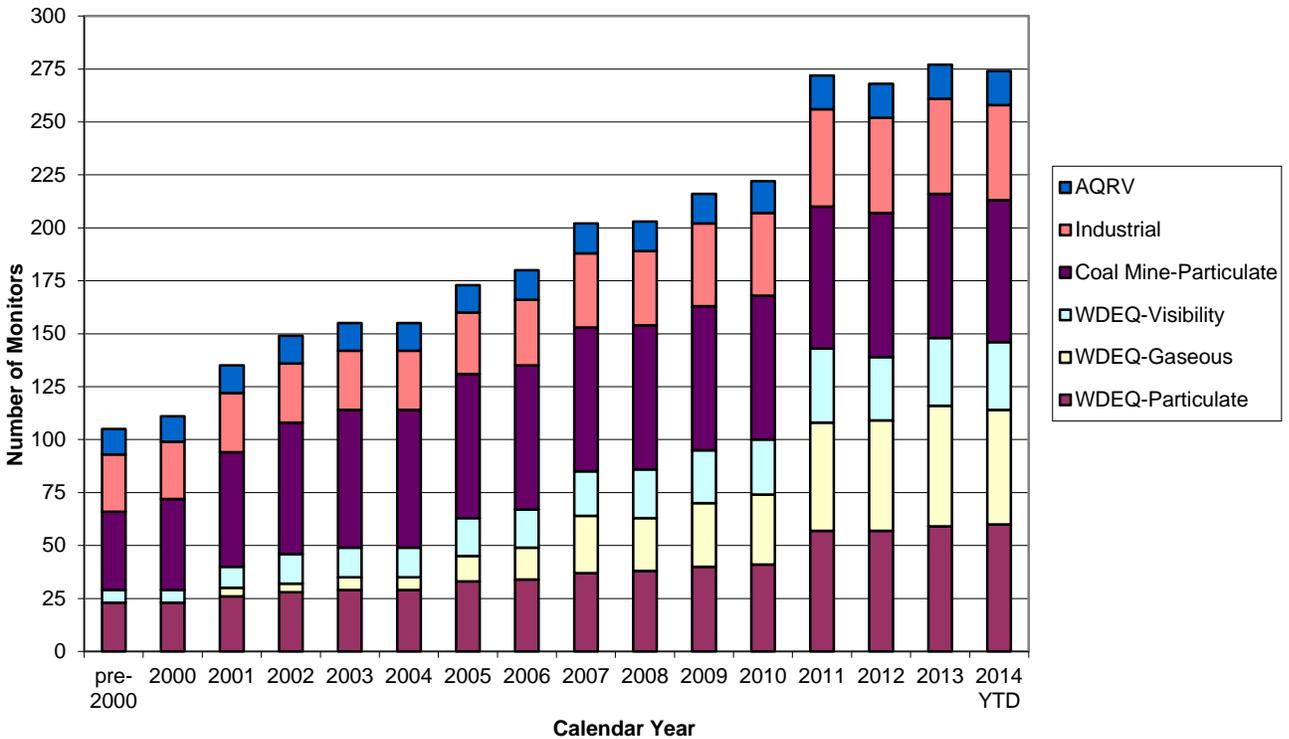
3.1	Particulate Matter (PM ₁₀).....	42
3.2	Particulate Matter (PM _{2.5})	44
3.3	Nitrogen Dioxide (NO ₂).....	46
3.4	Sulfur Dioxide (SO ₂).....	48
3.5	Carbon Monoxide (CO)	49
3.6	Ozone (O ₃).....	49
4.0	Special Studies	50
4.1	Upper Green Winter Ozone Study (UGWOS).....	50
4.2	VOC Monitoring.....	51
4.3	Mobile Beta Attenuation Monitor (BAM) Deployment	51
4.3.1	Afton	51
4.4	Grand Teton	51
4.5	Three-State Study.....	52
5.0	Future Air Monitoring Modifications	52
5.1	Converse County Long-Term Monitoring.....	52
5.2	Lovell.....	52
6.0	Conclusion.....	52
	Appendix A	54
	Appendix B.....	56
	Appendix C.....	58

1.0 Introduction

The United States Environmental Protection Agency (EPA), through the Code of Federal Regulations (CFR) and the Performance Partnership Agreement, requires the State of Wyoming Department of Environmental Quality, Air Quality Division (AQD) to complete the Wyoming Ambient Air Monitoring Annual Network Plan for the State's ambient air monitoring stations. EPA's requirements for the annual plan are listed in 40 CFR § 58.10. The annual plan will cover a review of the ambient air monitoring stations and verify the network is meeting the requirements of 40 CFR § 58, Appendices A, C, D, and E. The Wyoming Department of Environmental Quality (WDEQ) strives to protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.

1.1 *The AQD Monitoring History*

Since the 1970's the AQD Monitoring Program has been working actively to evaluate monitoring requirements and use available resources effectively for the State of Wyoming. The Air Quality Resource Management Program serves the AQD by looking at monitored data in conjunction with emission inventory trends and planned development to shape the AQD's air quality management policies in the future. Not only does the AQD run the State and Local Air Monitoring Stations (SLAMS) to monitor public health, but also runs or oversees several special purpose monitoring stations (SPM) to track impacts from the many industrial sources that reside in Wyoming. The AQD also helps fund and evaluate data from Air Quality Related Value (AQRV) monitoring within Wyoming, such as visibility and acid deposition. The following graph shows the number of monitors the AQD runs or oversees by year since 2000.



1.2 General Monitoring Goals and Objectives

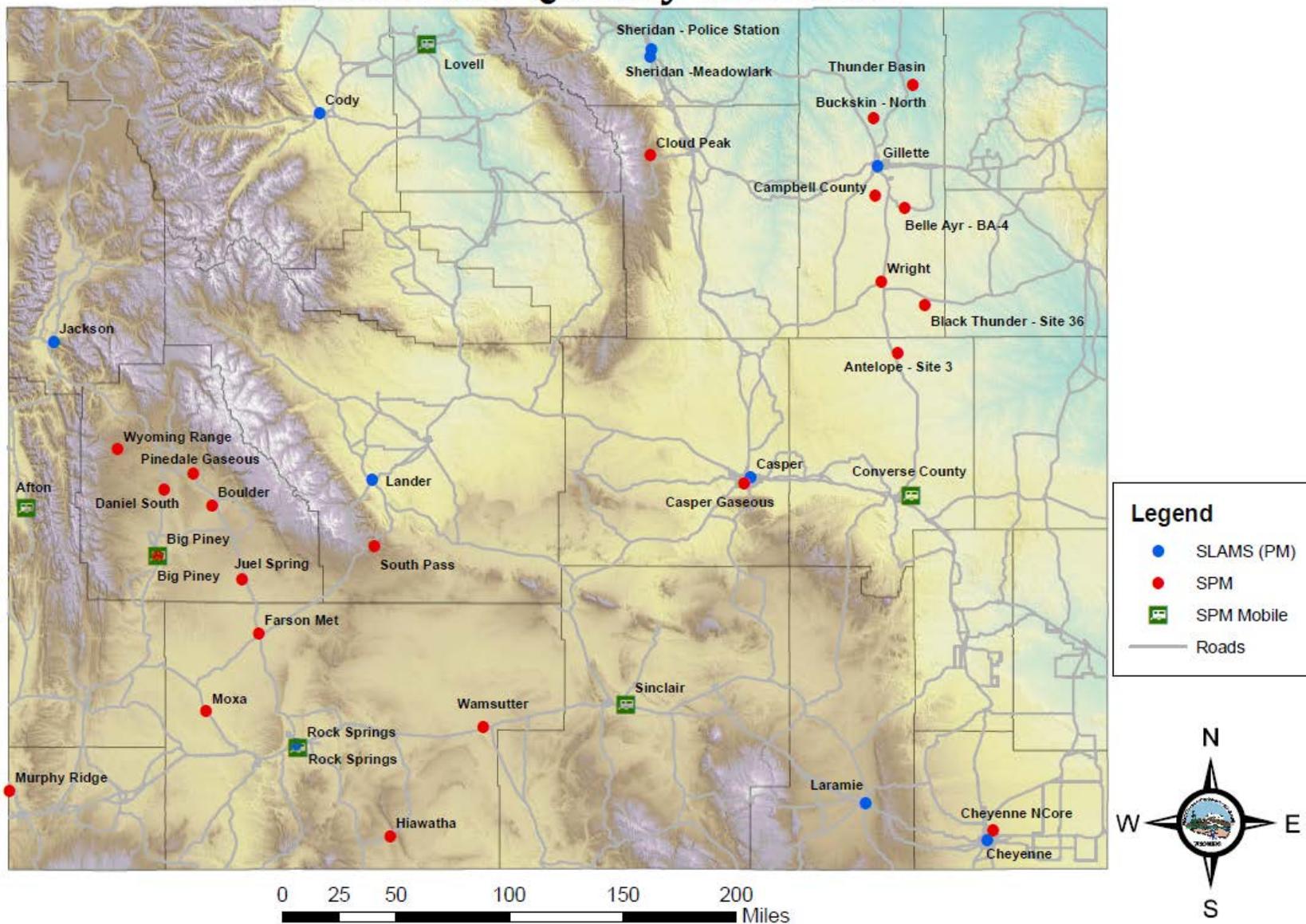
The Wyoming AQD has the responsibility to protect, conserve, and enhance the quality of Wyoming's air resource. The AQD helps ensure the ambient air quality in the State of Wyoming is maintained in accordance with the National Ambient Air Quality Standards (NAAQS). To carry out this goal, the AQD operates and maintains a network of ambient air quality monitors and requires industrial pollution sources to conduct source-specific ambient air monitoring.

The Wyoming monitoring network, as a whole, is designed to meet the following seven basic ambient air monitoring objectives:

- 1) Determine representative concentrations in areas of high population density
- 2) Determine impact on ambient air quality from significant sources
- 3) Determine general background concentration levels
- 4) Determine the extent of regional pollutant transport among populated areas and in rural and remote areas
- 5) Determine welfare-related impacts in support of secondary standards
- 6) Determine highest concentration expected to occur in the area covered by the network
- 7) Research pollutant and meteorological behaviors in areas of concern

Not every monitor will meet each one of the objectives, but the complete monitoring network will encompass all seven objectives. The following map shows the Wyoming monitor locations separated into Particulate Matter, Gaseous, Visibility and Mobile stations that were operated by the AQD between May 2013 and May 2014. The table below the map provides a brief overview of the Wyoming Monitoring Network.

State of Wyoming Ambient Air Quality Monitors



Overview of Wyoming Monitors

Name	County	PARAMETER										
		PM ₁₀ (manual)	PM ₁₀ (continuous)	PM _{2.5} (manual)	PM _{2.5} (continuous)	NO _x	O ₃	SO ₂	CO	Camera	Met	Other
Laramie - SLAMS	Albany Co	X		X								
Belle Ayr - BA-4 (PRB PM2.5 and PRB NO _x)	Campbell Co				X	X						
Black Thunder - Site 36 (PRB PM2.5)	Campbell Co				X							
Buckskin - North (PRB PM2.5)	Campbell Co				X							
Campbell County	Campbell Co		X			X	X			X	X	
Gillette - SLAMS	Campbell Co	X										
Thunder Basin	Campbell Co					X	X			X	X	Visibility
Wright	Campbell Co	X										
Sinclair (Mobile #2)	Carbon Co		X		X	X	X	X		X	X	Methane/NMHC*
Antelope - Site 3 (PRB PM2.5)	Converse Co				X						X	
Converse County (Mobile #3)	Converse Co		X		X	X	X			X	X	Methane/NMHC*
Lander- SLAMS	Fremont Co	X		X								
South Pass	Fremont Co		X		X	X	X			X	X	
Cloud Peak	Johnson Co									X	X	Visibility
Cheyenne - SLAMS	Laramie Co	X		X								
Cheyenne NCore	Laramie Co		X	X	X	X	X	Trace	Trace	X	X	NO/NO _y , PM _{10-2.5} , Speciated PM _{2.5}
Casper - SLAMS	Natrona Co	X		X								
Casper Gaseous	Natrona Co					X	X			X	X	
Cody - SLAMS	Park Co	X		X								
Sheridan – Meadowlark - SLAMS	Sheridan Co	X		X								
Sheridan - Police Station - SLAMS	Sheridan Co		X	X							X	

Overview of Wyoming Monitors (continued)

Name	County	PARAMETER										
		PM ₁₀ (manual)	PM ₁₀ (continuous)	PM _{2.5} (manual)	PM _{2.5} (continuous)	NO _x	O ₃	SO ₂	CO	Camera	Met	Other
Big Piney	Sublette Co					X	X			X	X	
Big Piney (Mobile #2)	Sublette Co		X		X	X	X			X	X	Methane/NMHC*
Boulder	Sublette Co		X			X	X			X	X	NO _y Methane/NMHC* Photolytic NO ₂
Daniel South	Sublette Co		X			X	X			X	X	
Farson	Sublette Co										X	
Juel Spring	Sublette Co					X	X			X	X	
Pinedale	Sublette Co				X	X	X			X	X	
Hiawatha	Sweetwater Co						X			X	X	
Moxa	Sweetwater Co		X			X	X	X		X	X	
Rock Springs - SLAMS	Sweetwater Co	X		X								
Rock Springs (Mobile #1)	Sweetwater Co		X		X	X	X			X	X	Methane/NMHC*
Wamsutter	Sweetwater Co		X			X	X			X	X	Methane/NMHC*
Wyoming Range	Sweetwater Co		X		X	X	X			X	X	
Jackson - SLAMS	Teton Co	X		X								
Murphy Ridge	Uinta Co		X			X	X			X	X	

* Non-Methane Hydrocarbons

2.0 Air Monitoring Plan in 2014

2.1 State and Local Air Monitoring Stations (SLAMS)

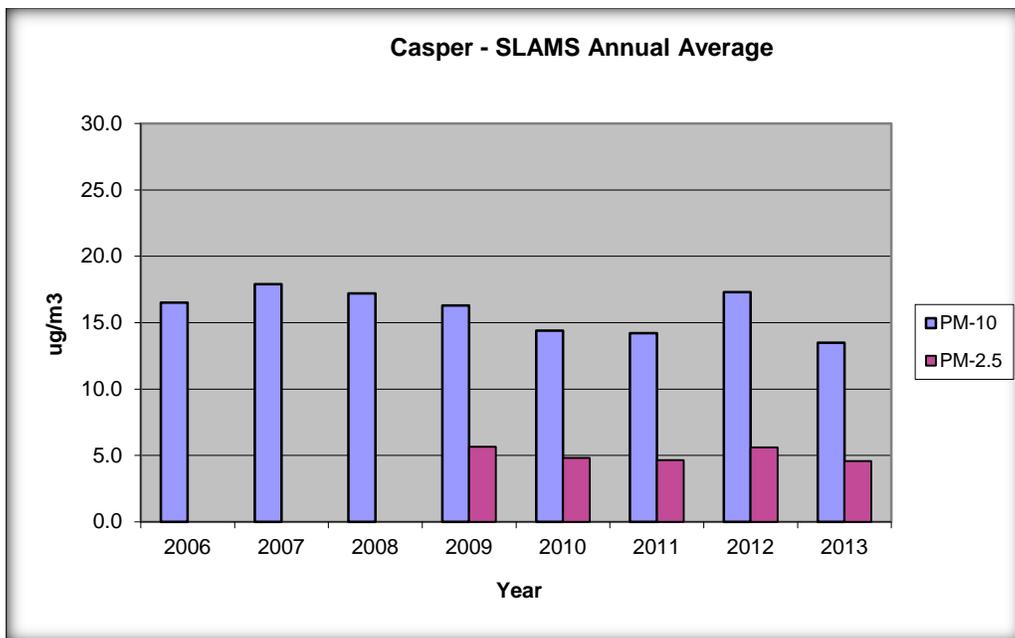
The State and Local Air Monitoring Stations (SLAMS) are used for supplying general monitoring data for criteria pollutants and determining compliance with the NAAQS. The SLAMS are relatively stable stations that must meet and follow specific quality assurance, monitoring methodology, sampling objectives and siting requirements. The AQD SLAMS stations have been placed in Wyoming's most populous towns with the purpose of determining compliance with NAAQS for the protection of public health. The ten stations specified as Wyoming SLAMS locations are described below:

2.1.1 Casper - SLAMS



Casper Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Sample Frequency	Operational Status
Casper - SLAMS PM ₁₀ with collocation	City, County Bldg.; Center & C Streets (Casper MSA)	56-025-0001	PM ₁₀	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3 Collocation 1/12	No planned changes
Casper - SLAMS PM _{2.5}	City, County Bldg.; Center & C Streets (Casper MSA)	56-025-0001	PM _{2.5}	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3	No planned changes

This station is located in downtown Casper, a city of approximately 56,000 people. Casper is the second largest city in Wyoming, located in Natrona County near the center of the State. This station is in the Casper, Wyoming Metropolitan Statistical Area (MSA). PM₁₀ sampling began at this station in 1991. A collocated PM₁₀ sampler was added in 2001 and the station hi-volume PM₁₀ samplers were replaced with low-volume partisol during 2010. The AQD added PM_{2.5} sampling at the Casper station on May 22, 2009. The AQD is interested in monitoring PM_{2.5} concentrations in Casper because it is one of Wyoming's most heavily populated areas.

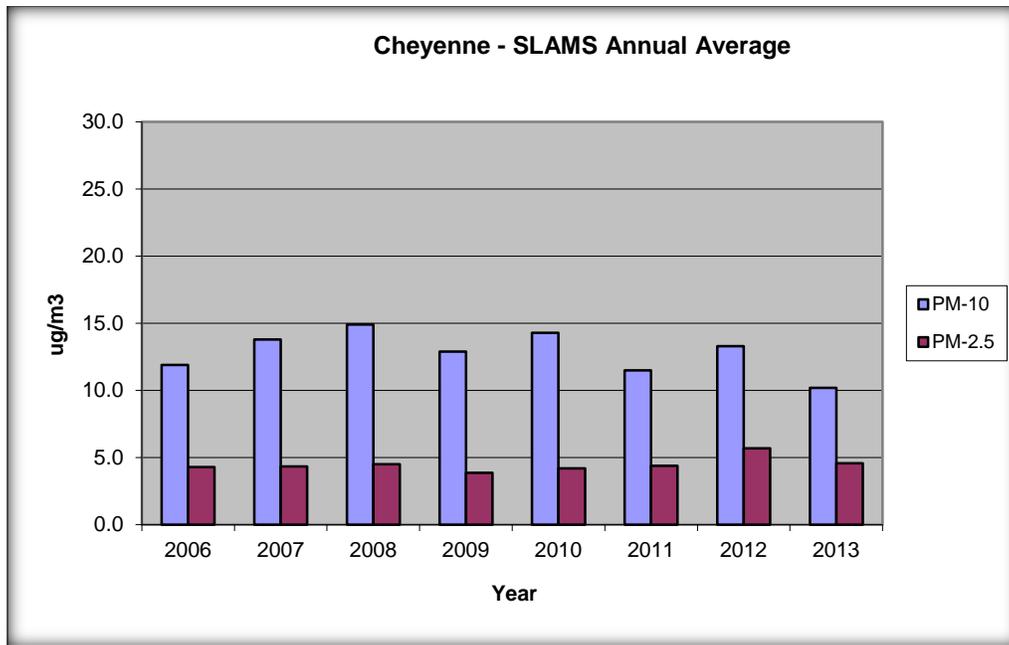


2.1.2 Cheyenne - SLAMS



Cheyenne - SLAMS Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Sample Frequency	Operational Status
Cheyenne - SLAMS PM ₁₀ with collocation	State Office Building 23 rd & Central Ave. (Cheyenne MSA)	56-021-0001	PM ₁₀	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3 Collocation 1/12	No planned changes
Cheyenne - SLAMS PM _{2.5} with collocation	State Office Building 23 rd & Central Ave. (Cheyenne MSA)	56-021-0001	PM _{2.5}	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3 Collocation 1/12	No planned changes

The Cheyenne monitoring station is located in downtown Cheyenne on a State of Wyoming building. Cheyenne's population is approximately 60,100 people; it is the capital and largest city in Wyoming. This station is in the Cheyenne, Wyoming Metropolitan Statistical Area. The PM₁₀ sampling began at this station in 1991. A collocated PM₁₀ sampler was added in 2002. The PM_{2.5} monitors were installed in 1998. A collocated PM_{2.5} sampler was added in March 2009 to comply with 40 CFR § 58 requirements for collocation of samplers.

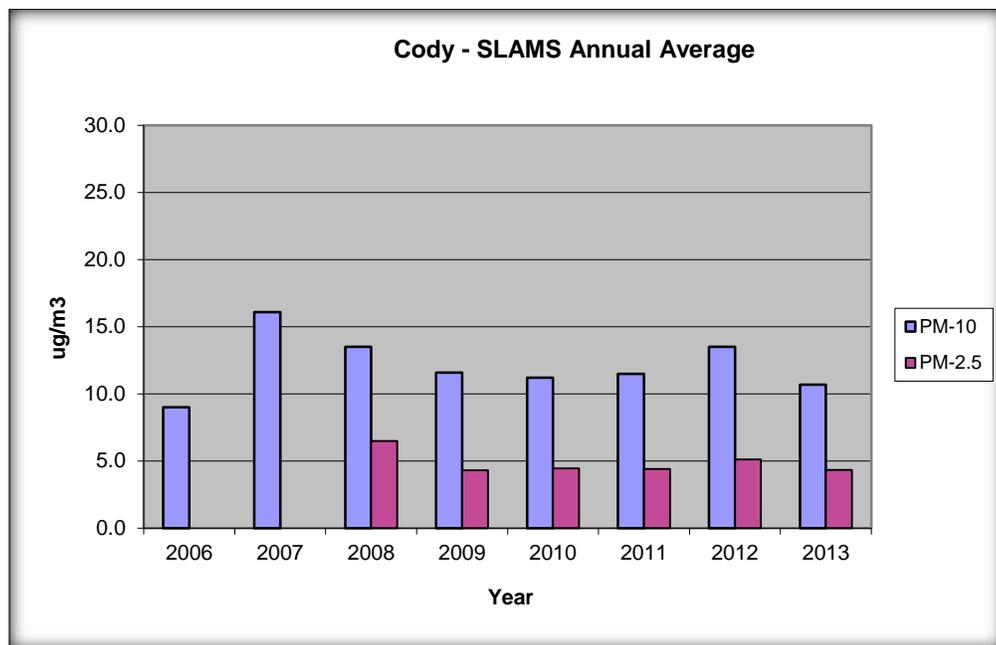


2.1.3 Cody - SLAMS

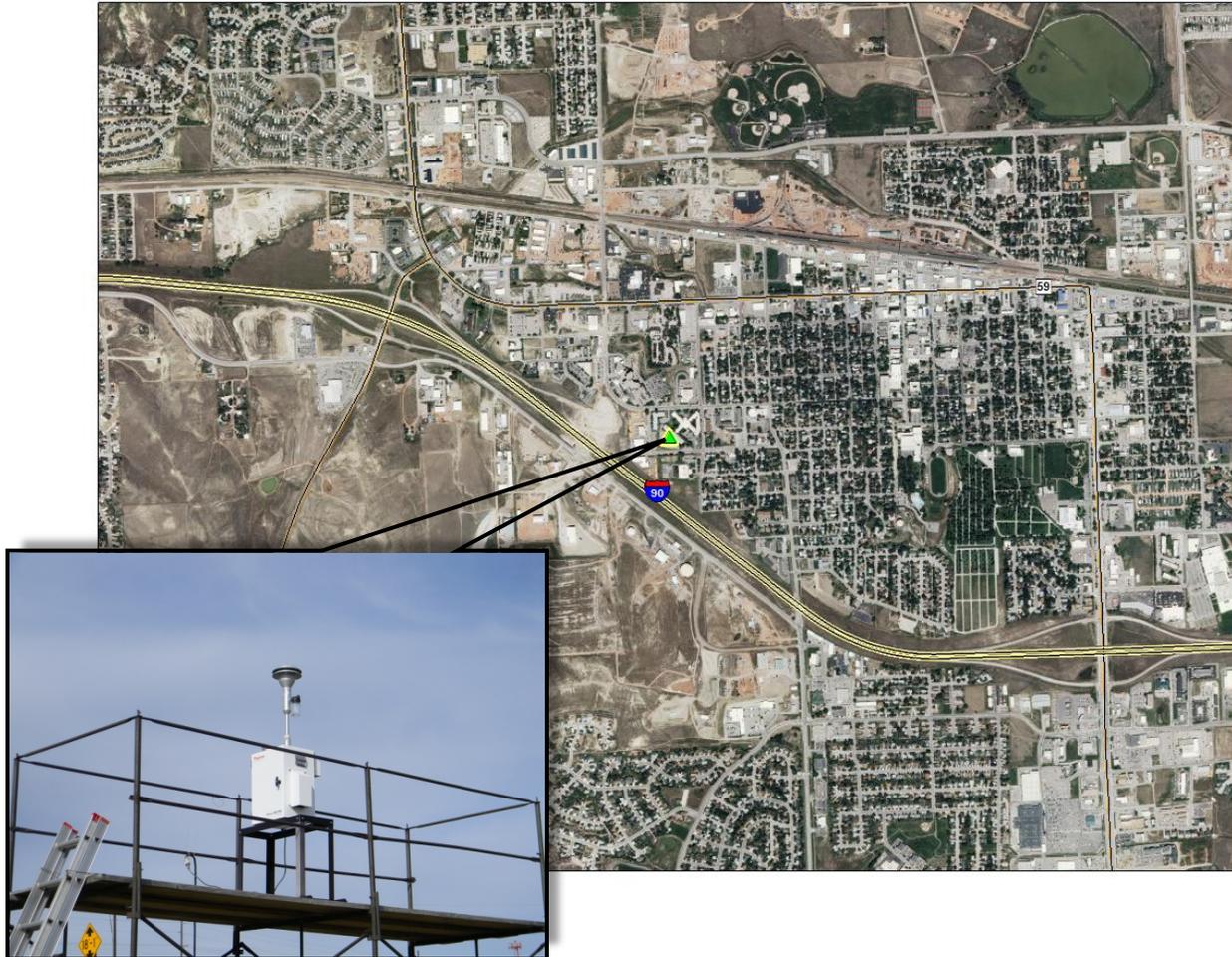


Cody- SLAMS Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Sample Frequency	Operational Status
Cody – SLAMS PM ₁₀	Cody Jr. High School	56-029-0001	PM ₁₀	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3	No planned changes
Cody – SLAMS PM _{2.5}	Cody Jr. High School	56-029-0001	PM _{2.5}	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3	No planned changes

Cody is located in the northwest portion of the State in Park County; its population is approximately 9,600. PM₁₀ sampling began at this station in 1988 and the PM₁₀ samplers were upgraded to more reliable low-volume samplers during 2010. Cody PM_{2.5} monitoring started in June 2008. The AQD is interested in monitoring PM_{2.5} concentrations in Cody to monitor impacts from wintertime sanding, wood smoke, summertime forest fires, and the nearby lake bed that can be exposed when available water is low.

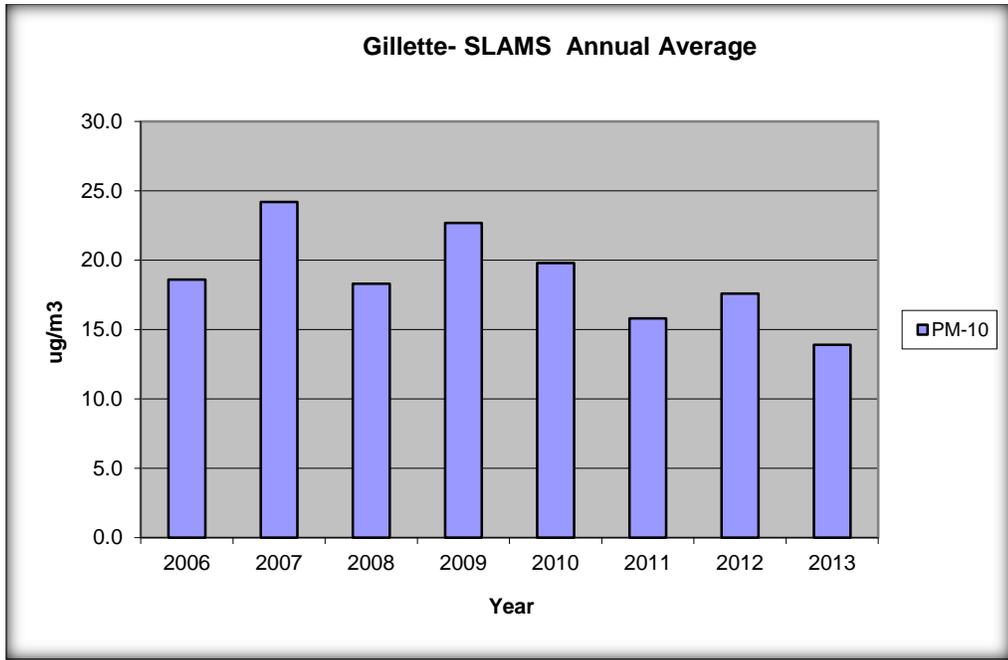


2.1.4 Gillette - SLAMS

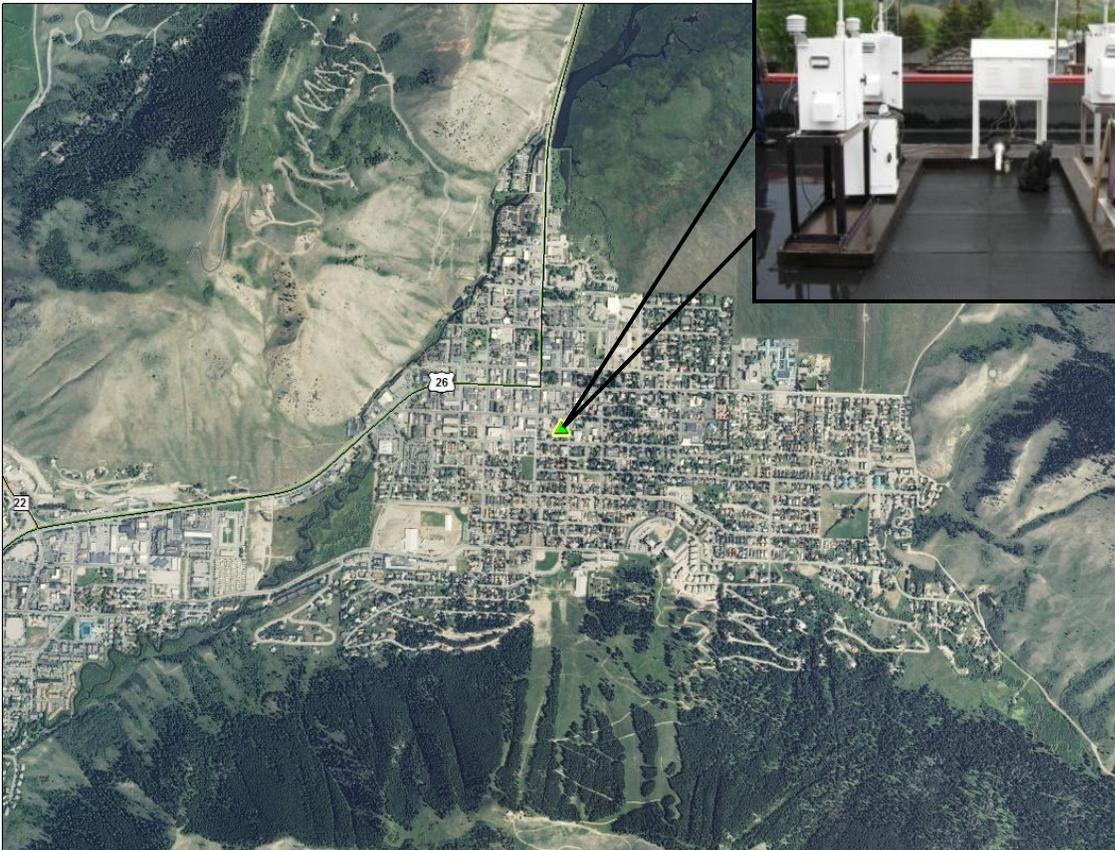


Gillette- SLAMS Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Sample Frequency	Operational Status
Gillette - SLAMS PM ₁₀	1000 West 8 th Street	56-005-1002	PM ₁₀	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/6	No planned changes

Gillette is located in Campbell County Wyoming; its population is approximately 29,400 and is considered a micropolitan statistical area. PM₁₀ sampling began at this station in 1991. The Gillette PM₁₀ sampler was upgraded to a more reliable low-volume sampler during 2010.

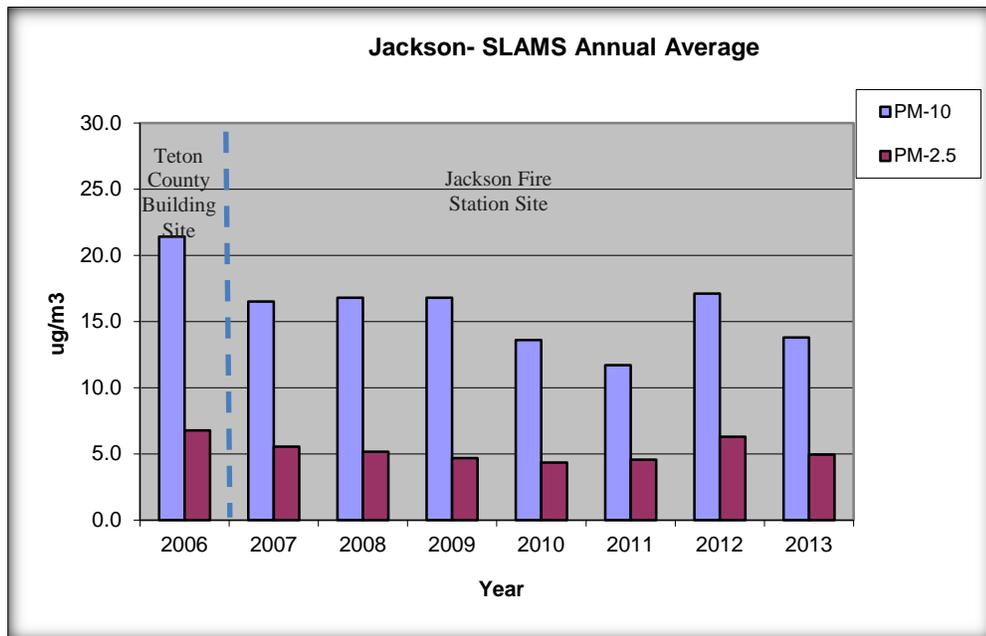


2.1.5 Jackson - SLAMS



Jackson- SLAMS Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Sample Frequency	Operational Status
Jackson – SLAMS PM ₁₀	40 E Pearl Ave.	56-039-1006	PM ₁₀	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3	No planned changes
Jackson – SLAMS PM _{2.5}	40 E Pearl Ave.	56-039-1006	PM _{2.5}	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3	No planned changes

Jackson is located in Teton County in northwest Wyoming. Jackson is considered a micropolitan statistical area with a population of approximately 9,700. PM₁₀ and PM_{2.5} sampling began in Jackson in 2001 at the Teton County Building Site. Sampling at the current location, Jackson Fire Station site, began in 2007.



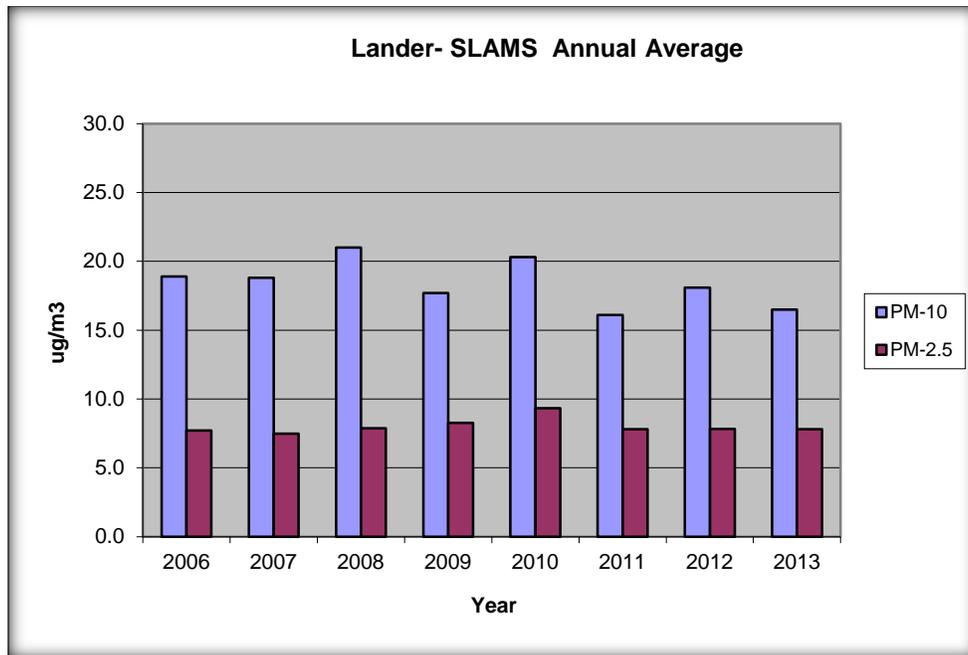
2007 value is a weighted value for the Teton County Building Site and the Fire Station Site

2.1.6 Lander - SLAMS

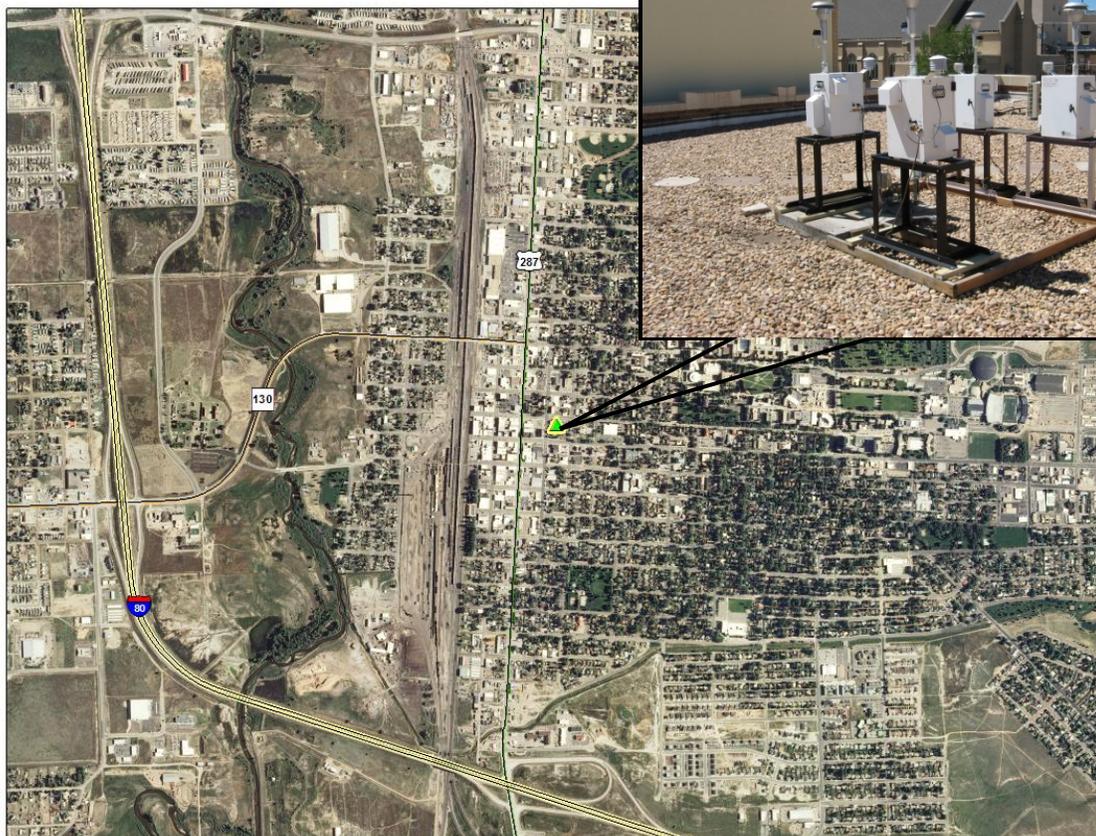


Lander- SLAMS Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Sample Frequency	Operational Status
Lander – SLAMS PM ₁₀	600 Washington	56-013-1003	PM ₁₀	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3	No planned changes
Lander – SIAMS PM _{2.5}	600 Washington	56-013-1003	PM _{2.5}	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3	No planned changes

The Lander monitoring station is located in Fremont County and has a population of approximately 7,600. PM₁₀ sampling began at this station in 1989. The PM_{2.5} monitors were installed in 2001.

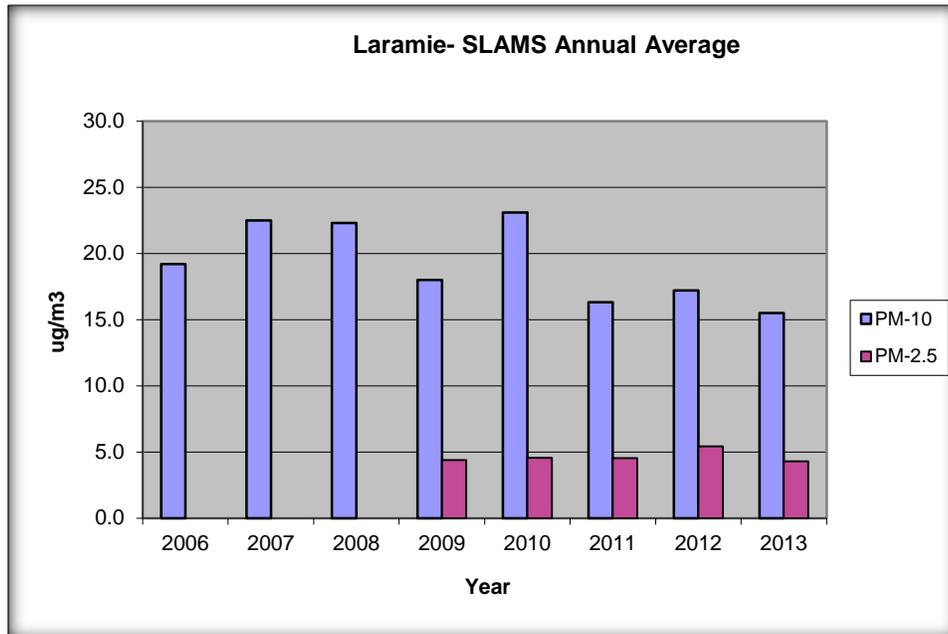


2.1.7 Laramie- SLAMS

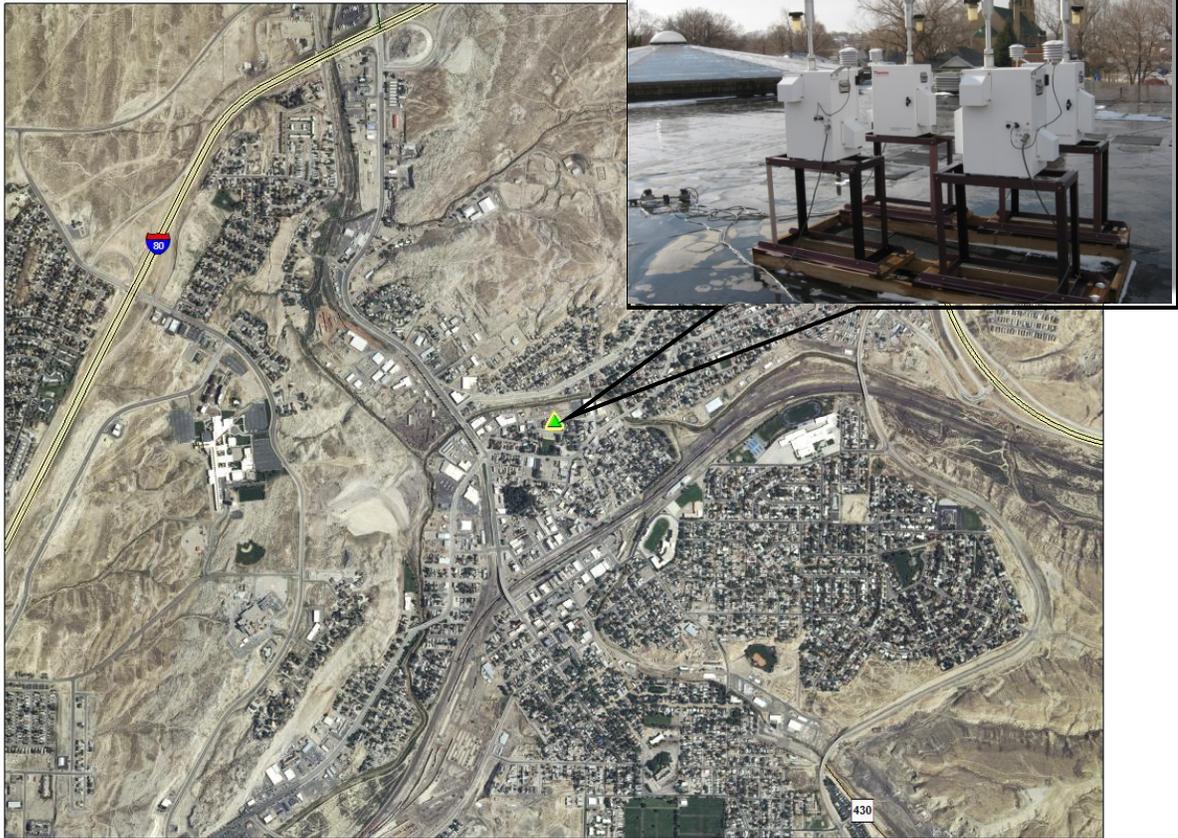


Laramie – SLAMS Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Sample Frequency	Operational Status
Laramie – SLAMS PM ₁₀	406 Ivinson	56-001-0006	PM ₁₀	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3	No planned changes
Laramie - SLAMS PM _{2.5}	406 Ivinson	56-001-0006	PM _{2.5}	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3	No planned changes

Laramie is located in the southeast portion of Wyoming in Albany County. Laramie has a population of approximately 31,300 and is considered a micropolitan statistical area. PM₁₀ sampling began at this station in 1989 and the AQD upgraded the Laramie station PM₁₀ samplers to low-volume samplers during 2010. The AQD began PM_{2.5} sampling in Laramie in July 2009 to monitor impacts from wintertime sanding, wood smoke, and summertime forest fires.

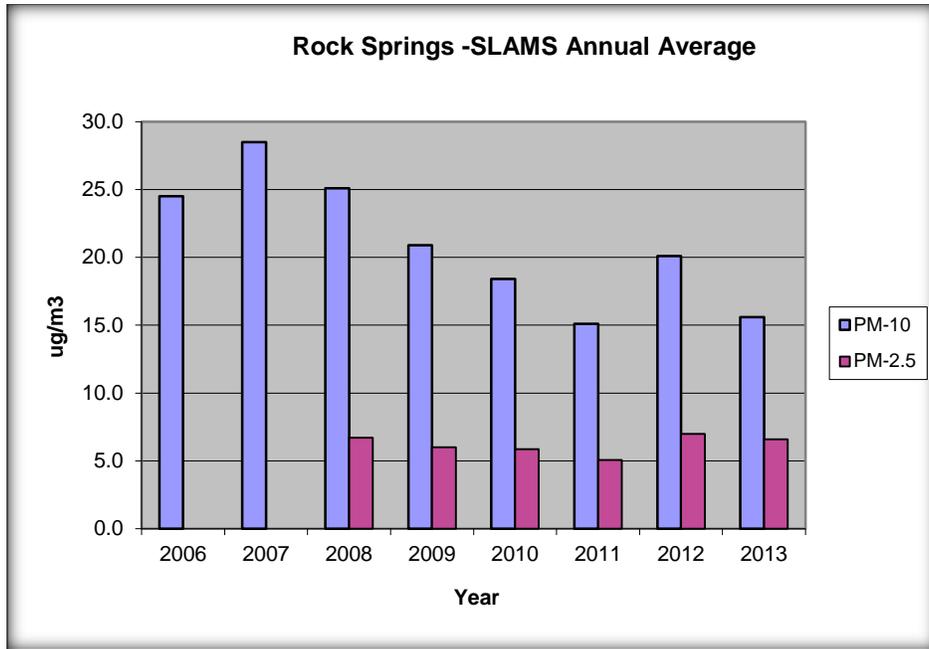


2.1.8 Rock Springs- SLAMS

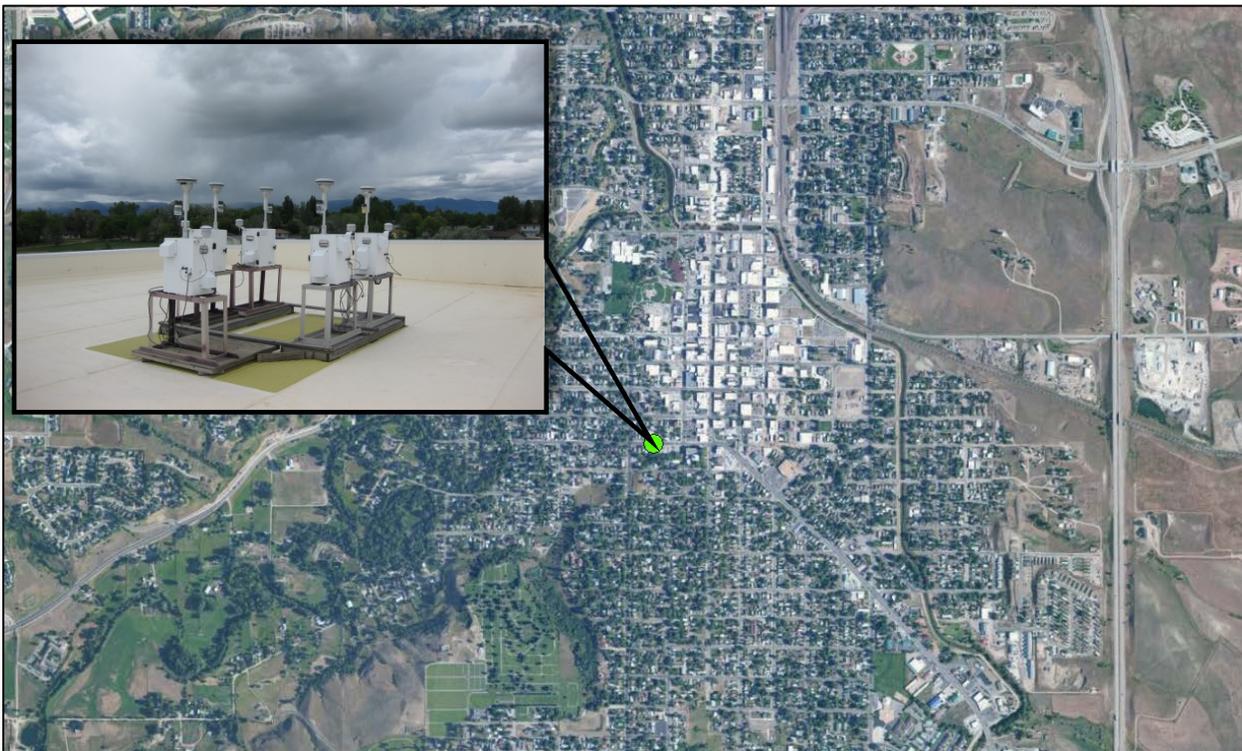


Rock Springs - SLAMS Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Sample Frequency	Operational Status
Rock Springs – SLAMS PM ₁₀	625 Ahsay Ave.	56-037-0007	PM ₁₀	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3	No planned changes
Rock Springs – SLAMS PM _{2.5}	625 Ahsay Ave.	56-037-0007	PM _{2.5}	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3	No planned changes

Rock Springs is located in Sweetwater County in southwest Wyoming. Rock Springs is a micropolitan statistical area and has a population of approximately 23,200. PM₁₀ sampling began at this station in 1989. The AQD added PM_{2.5} monitoring to Rock Springs in March 2008 to monitor PM_{2.5} concentrations with population growth and energy development occurring in the area.

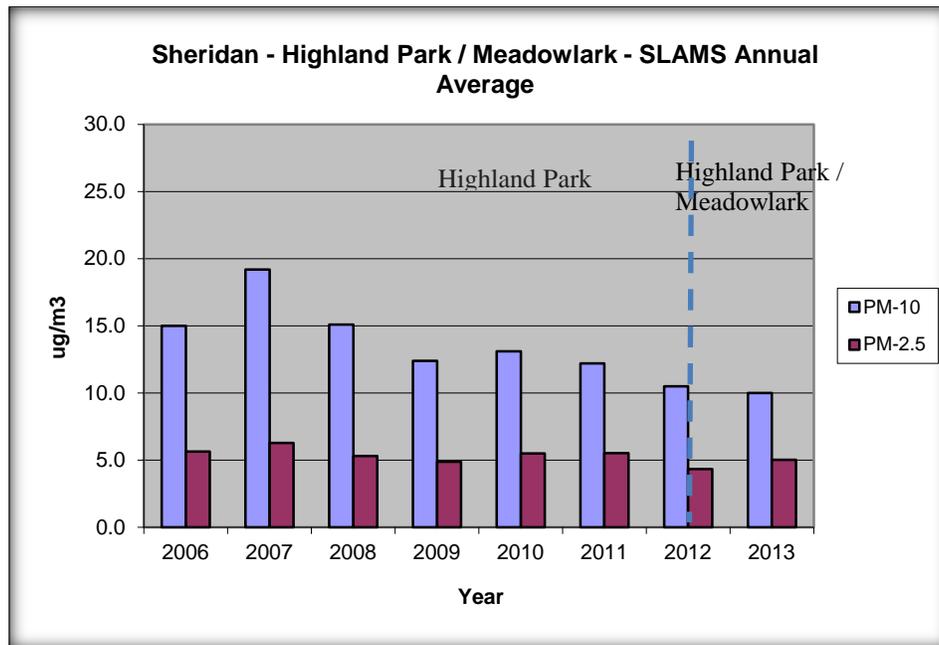


2.1.9 Sheridan–Meadowlark-SLAMS



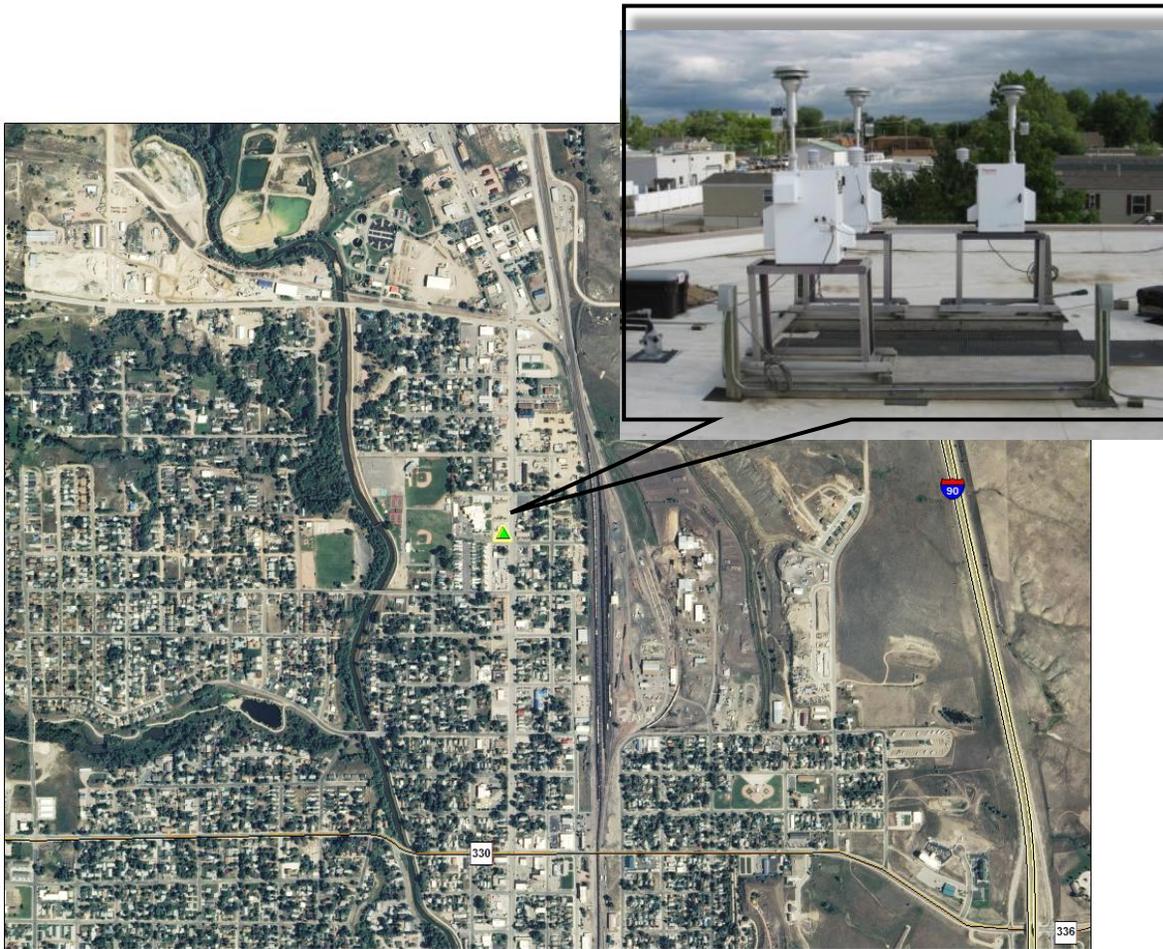
This monitoring location is one of two monitoring stations in the City of Sheridan, a micropolitan statistical area. Sheridan is located in Sheridan County and has a population of approximately 17,500. The City of Sheridan is Wyoming’s only nonattainment area for annual PM_{10} .

Since 1998, the neighborhood scale, population oriented station has moved several times. From 1998 to 2005 PM_{10} and $PM_{2.5}$ had been monitored at the Sheridan Middle School; from 2005 to 2012 the station was located at the Highland Park School; beginning July 2012 the station is currently located at the Meadowlark Elementary School. A collocated PM_{10} monitor was placed at the station in 2007, to fulfill collocation requirements for the SLAMS network.



2012 value is a weighted average of the Highland Park and Meadowlark values

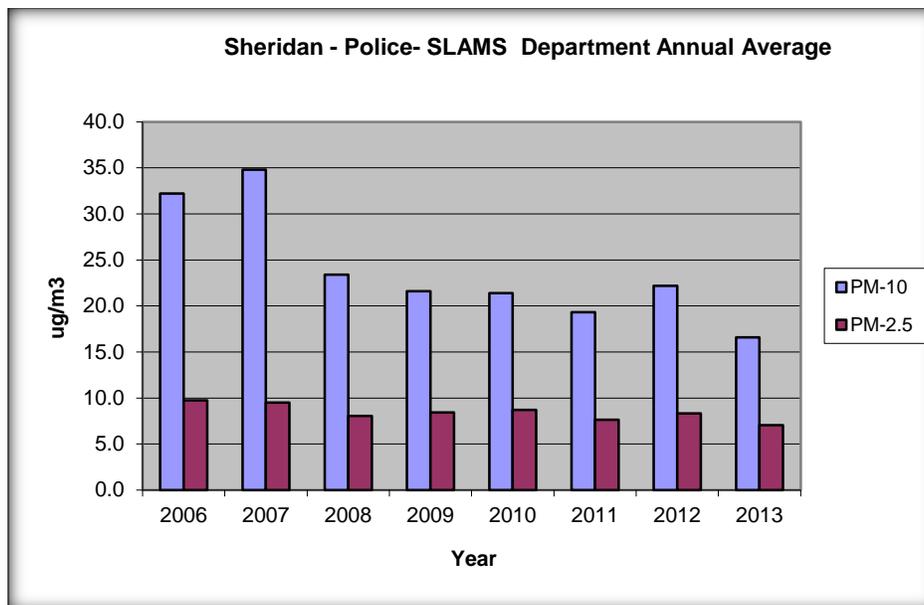
Sheridan – Meadowlark – SLAMS Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Sample Frequency	Operational Status
Sheridan – Meadowlark – SLAMS PM_{10} with collocation	Meadowlark 1410 DeSmet Ave.	56-033-1003	PM_{10}	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3 Collocation 1/12	No Planned Changes
Sheridan – Meadowlark - SLAMS $PM_{2.5}$	Meadowlark 1410 DeSmet Ave.	56-033-1003	$PM_{2.5}$	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3	No Planned Changes



2.1.10 Sheridan – Police Station - SLAMS

Sheridan – Police Station- SLAMS Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Sample Frequency	Operational Status
Sheridan – Police Station - SLAMS PM ₁₀	45 West 12 th Street	56-033-0002	PM ₁₀	Continuous TEOM	Neighborhood	Hourly	No planned changes
Sheridan – Police Station - SLAMS PM _{2.5} with collocation	45 West 12 th Street	56-033-0002	PM _{2.5}	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/3 Collocation 1/12	No planned changes

The Sheridan – Police Station is one of the oldest monitoring stations in Wyoming. Sheridan is considered a micropolitan statistical area. Sheridan is a nonattainment area for annual PM₁₀. Filter-based PM₁₀ sampling began at this station in 1985. A PM₁₀ continuous TEOM sampler replaced the filter-based monitors on October 1, 2007. This allows the AQD to run year-round, everyday sampling in Sheridan in an efficient and cost effective manner. Additionally, meteorological instrumentation was added to the Police Station in 2008 to monitor weather conditions, giving the AQD better information to work with the community to prevent PM₁₀ exceedances. PM_{2.5} sampling started in 1998 at this station.



*Note: Vertical scale is larger than other SLAMS graphs.

2.2 Special Purpose Monitoring (SPM)

The Special Purpose Monitoring (SPM) stations are used in addition to the SLAMS stations and provide information needed by the State and local agencies to support air program activities and fulfill the objectives of the air monitoring network. The SPMs can be adjusted to accommodate changing circumstances, needs and priorities. Section 2.2 includes SPM stations operating in Wyoming as of May 2014.

The following SPM stations have a spatial (measurement) scale associated with each parameter at each station used to allow for an understanding of what the ambient air monitor represents in terms of a surrounding, relatively homogeneous parcel of air. These spatial scales are spelled out in 40 CFR § 58. A scale is assigned to each parameter at the station to indicate what the measurement scale of a particular monitor represents. The monitoring objective and spatial scale are determined when the monitoring station is initiated and may be updated if the monitoring objective changes throughout the life of the monitoring station.

2.2.1 Big Piney

The Big Piney station is located four (4) miles south of the Town of Big Piney. In March 2011, the AQD placed a mobile monitoring station at this location to achieve the objective of monitoring near the Big Piney and LaBarge Gas Fields. The mobile monitoring station equipment included a digital camera, ozone analyzer, oxides of nitrogen analyzer, methane/non-methane hydrocarbons, continuous PM₁₀ beta attenuation monitor (BAM), PM_{2.5} BAM monitor and meteorological tower. After two full years of operation, the AQD performed an assessment of the data and determined that it would be beneficial to continue monitoring some parameters at the Big Piney Station location to achieve the station objective. The full analysis can be found in Appendix C. On December 10, 2013, the long-term Big Piney Station became fully operational. The station currently monitors ozone, oxides of nitrogen, meteorological parameters, and has a

camera. Since the station was kept in the same location, data from this station continues to be reported under AQS ID 56-035-0700.

Big Piney Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Big Piney	4 mi. South of Big Piney, WY	56-035-0700	Ozone	Real Time	Regional	Hourly	No planned changes
			Nitric Oxide	Real Time	Regional	Hourly	No planned changes
			Nitrogen Dioxide	Real Time	Regional	Hourly	No planned changes
			Oxides of Nitrogen	Real Time	Regional	Hourly	No planned changes
			Methane/NMHC	Real Time	Regional	Hourly	Discontinued 12/1/13
			PM ₁₀	Continuous BAM	Regional	Hourly	Discontinued 12/1/13
			PM _{2.5}	Continuous BAM	Regional	Hourly	Discontinued 12/1/13

2.2.2 Boulder

The Boulder Station is located approximately five (5) miles southwest of Boulder, Wyoming and is used to track air quality in an area of natural gas development. The Boulder Station began monitoring in February 2005, and includes gaseous (NO_x and ozone), continuous particulate (PM₁₀ TEOM), camera system and meteorological monitoring. The nephelometer for visibility data was removed from this station on June 30, 2012, due to budget constraints. The Boulder Station was also a hub for the AQD's 2007 - 2014 Upper Green Winter Ozone Studies. There is also long-term monitoring at the Boulder Station to further understand ozone formation in the Upper Green River Basin Ozone Nonattainment Area. In 2014, this monitoring included photolytic NO₂, methane/non-methane hydrocarbons, speciated VOC monitoring, NO_y monitoring, UV radiometers, and upper air monitoring. Shell Exploration and Production assisted with funding for this station and uses the station, since December 2006, to monitor for ammonia.



Boulder Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Boulder	5 mi. SW of Boulder, WY	56-035-0099	Ozone	Real Time	Neighborhood/Urban	Hourly	No planned changes
			Nitric Oxide	Real Time	Neighborhood	Hourly	No planned changes
			Nitrogen Dioxide	Real Time	Neighborhood	Hourly	No planned changes
			Oxides of Nitrogen	Real Time	Neighborhood	Hourly	No planned changes
			Methane/NMHC	Real Time	Regional	Hourly	No planned changes
			PM ₁₀	Continuous TEOM	Neighborhood	Hourly	No planned changes



2.2.3 Campbell County

The Campbell County station began operation in June 2003 and is located approximately 15 miles southwest of Gillette. This station is used to track air quality in an area of heavy coal-bed methane development. This station includes gaseous (NO_x and ozone), continuous particulate (PM₁₀ TEOM), camera system and meteorological monitoring.

Campbell County Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Campbell County	15 mi. SSW of Gillette, WY	56-005-0456	Ozone	Real Time	Urban	Hourly	No planned changes
			Nitric Oxide	Real Time	Urban	Hourly	No planned changes
			Nitrogen Dioxide	Real Time	Urban	Hourly	No planned changes
			Oxides of Nitrogen	Real Time	Urban	Hourly	No planned changes
			PM ₁₀	Continuous TEOM	Urban	Hourly	No planned changes

2.2.4 Casper Gaseous

The Casper Gaseous Station began operation in March 2013. The Casper Gaseous Station is sited to monitor population-based ozone concentrations in Wyoming's second largest city. Population-based ozone monitoring in Casper was identified as a need in the 2010 Network Assessment. The Casper Gaseous Station includes ozone, NO_x, meteorological monitoring, and a camera.



Casper Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Casper	2800 Pheasant Dr.	56-025-0100	Ozone	Real Time	Neighborhood/Urban	Hourly	No planned changes
			Nitric Oxide	Real Time	Neighborhood	Hourly	No planned changes
			Nitrogen Dioxide	Real Time	Neighborhood	Hourly	No planned changes
			Oxides of Nitrogen	Real Time	Neighborhood	Hourly	No planned changes

2.2.5 Cloud Peak



The Cloud Peak Station began operation in October 1999 and will be shut down July 1, 2014. The decision to remove this site from the network was made based on available staff resources and monitoring priorities. An AQD internal assessment found the data collected at this station, meteorology and camera images, to be of low priority. Historical data from this monitoring station can be found at www.wyvisnet.com.

2.2.6 Daniel South

The Daniel South Station is located approximately five (5) miles south of the town of Daniel in Sublette County and is used to track air quality upwind of an area of extensive natural gas development. The Daniel South Station includes gaseous (NO_x and ozone), continuous particulate (PM₁₀ TEOM), camera system and meteorological monitoring. The Daniel South Station began operation in July 2005.



Daniel South Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Daniel South	5 mi. S of Daniel, WY	56-035-0100	Ozone	Real Time	Regional	Hourly	No planned changes
			Nitric Oxide	Real Time	Regional	Hourly	No planned changes
			Nitrogen Dioxide	Real Time	Regional	Hourly	No planned changes
			Oxides of Nitrogen	Real Time	Regional	Hourly	No planned changes
			PM ₁₀	Continuous TEOM	Regional	Hourly	No planned changes

2.2.7 Farson

The AQD established a meteorological monitoring station in May 2011 to obtain meteorological data for the purposes of characterizing the general meteorology and air characteristics near Farson, Wyoming. This general area was targeted in the 2008 Southwest Wyoming Network Assessment and 2010 Network Assessment, as a location to help fill a gap in needed meteorological data. The data collected at this station will be used for AERMOD or other meteorological modeling and comparison with other meteorological monitoring data.



2.2.8 Hiawatha



The AQD began operation of the Hiawatha Station in May 2011. This is the AQD's first monitoring station that uses renewable energy as its primary power source. The solar/wind powered monitoring station is located 35 miles south of Rock Springs, in the Hiawatha Gas Field. This area of industrial oil and gas development was noted in the 2010 Network Assessment as an area that would benefit from ambient air quality monitoring. The Hiawatha station includes ozone, camera system, and meteorological monitoring. The Hiawatha station is part of the Three-State Study.

Hiawatha Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Hiawatha	35 mi. S of Rock Springs, WY	56-037-0077	Ozone	Real Time	Regional	Hourly	No planned changes

2.2.9 Juel Spring

The Juel Spring monitoring began operation in December 2009 and is located approximately 15 miles downwind (southeast) of the Jonah Gas Field. The Juel Spring Station includes gaseous (NO_x and ozone), camera system and meteorological monitoring. This station is located in conjunction with the Union Cellular Juel Spring Tower station.



Juel Spring Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Juel Spring	20 mi. NW of Farson, WY	56-035-1002	Ozone	Real Time	Urban	Hourly	No planned changes
			Nitric Oxide	Real Time	Urban	Hourly	No planned changes
			Nitrogen Dioxide	Real Time	Urban	Hourly	No planned changes
			Oxides of Nitrogen	Real Time	Urban	Hourly	No planned changes

2.2.10 Moxa

The Moxa station was installed in May 2010. This station is located approximately 25 miles northwest of the City of Green River. The purpose of this monitoring station is to characterize and monitor meteorology and air quality in an area of heavy energy development. This station includes NO_x, SO₂, ozone, continuous particulate (PM₁₀ BAM), camera system, and meteorological monitors.



Moxa Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Moxa	25 mi. NW of Green River, WY	56-037-0300	Ozone	Real Time	Urban	Hourly	No planned changes
			Sulfur Dioxide	Real Time	Urban	Hourly	No planned changes
			Nitric Oxide	Real Time	Urban	Hourly	No planned changes
			Nitrogen Dioxide	Real Time	Urban	Hourly	No planned changes
			Oxides of Nitrogen	Real Time	Urban	Hourly	No planned changes
			PM ₁₀	Continuous BAM	Urban	Hourly	No planned changes

2.2.11 Murphy Ridge

The Murphy Ridge Station began operations during 2007. The station is located in the town of Bear River, approximately ten (10) miles north of Evanston on the Wyoming/Utah border. The



Murphy Ridge Station is located approximately one (1) mile from the former Murphy Ridge NADP wet deposition station. The purpose of this station is to monitor the air masses coming from Utah and to provide insight on these air masses. This station monitors NO_x, ozone, continuous particulate (PM₁₀ TEOM), and meteorology. The station is also equipped with a camera. The Murphy Ridge NADP monitor was removed on June 30, 2012, due to budget constraints.

Murphy Ridge Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Murphy Ridge	Bear River, WY	56-041-0101	Ozone	Real Time	Regional	Hourly	No planned changes
			Nitric Oxide	Real Time	Regional	Hourly	No planned changes
			Nitrogen Dioxide	Real Time	Regional	Hourly	No planned changes
			Oxides of Nitrogen	Real Time	Regional	Hourly	No planned changes
			PM ₁₀	Continuous TEOM	Regional	Hourly	No planned changes

2.2.12 Pinedale

The Pinedale gaseous station began operations in January 2009. The need for population-based monitoring in this location was noted in the 2008 Southwest Wyoming Network Assessment.



This station includes ozone, NO_x, continuous PM_{2.5} Beta Attenuation Monitor (BAM), camera system and meteorology within the town of Pinedale to monitor concentrations in this increasingly populated area.

Pinedale Gaseous Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Pinedale	West side of City Park and Pine Creek	56-035-0101	Ozone	Real Time	Urban	Hourly	No planned changes
			Nitric Oxide	Real Time	Urban	Hourly	No planned changes
			Nitrogen Dioxide	Real Time	Urban	Hourly	No planned changes
			Oxides of Nitrogen	Real Time	Urban	Hourly	No planned changes
			PM _{2.5}	Continuous BAM	Urban	Hourly	No planned changes

2.2.13 South Pass



The South Pass Station began operation in 2007. The station is located on South Pass at the southern end of the Wind River Range. The purpose of this station is to monitor air quality on the southern end of the range which sees air masses from both the Upper Green River Basin to the northwest, and from the southwestern corner of the State. The station has NO_x, ozone, continuous particulate, meteorology, and a camera. The PM₁₀ TEOM was shut down on 3/20/14 due

to reliability issues, and it was replaced with a PM_{2.5} BAM that started data collection on 3/24/14. The switch to PM_{2.5} was made to assist the AQD in studying the impact of wildfires in the area.

South Pass Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
South Pass	South Pass, WY	56-013-0099	Ozone	Real Time	Urban	Hourly	No planned changes
			Nitric Oxide	Real Time	Urban	Hourly	No planned changes
			Nitrogen Dioxide	Real Time	Urban	Hourly	No planned changes
			Oxides of Nitrogen	Real Time	Urban	Hourly	No planned changes
			PM ₁₀	Continuous TEOM	Urban	Hourly	Discontinued 3/20/14
			PM _{2.5}	Continuous BAM	Urban	Hourly	Started 3/24/14

2.2.14 Thunder Basin

The Thunder Basin Station is located approximately 30 miles northeast of Gillette, Wyoming and is used to track visibility, meteorology, and air quality in the area. The Thunder Basin Station began operating in October 1999 and includes gaseous (NO_x and ozone), camera system and meteorological monitoring.



Thunder Basin Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Thunder Basin	30 mi. NE of Gillette, WY	56-005-0123	Ozone	Real Time	Regional	Hourly	No planned changes
			Nitric Oxide	Real Time	Regional	Hourly	No planned changes
			Nitrogen Dioxide	Real Time	Regional	Hourly	No planned changes
			Oxides of Nitrogen	Real Time	Regional	Hourly	No planned changes

2.2.15 Wamsutter

The Wamsutter Station is approximately two (2) miles west of the town of Wamsutter in Sweetwater County, and is used to track meteorology and air quality downwind of an area of extensive natural gas development. The Wamsutter Station includes gaseous (NO_x and ozone), continuous particulate (PM₁₀ TEOM), methane/non-methane hydrocarbons, camera system and meteorological monitoring. This station began operations on March 13, 2006.



Wamsutter Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Wamsutter	2 mi. W of Wamsutter, WY	56-037-0200	Ozone	Real Time	Urban	Hourly	No planned changes
			Nitric Oxide	Real Time	Urban	Hourly	No planned changes
			Nitrogen Dioxide	Real Time	Urban	Hourly	No planned changes
			Oxides of Nitrogen	Real Time	Urban	Hourly	No planned changes
			Methane/NMHC	Real Time	Urban	Hourly	No planned changes
			PM ₁₀	Continuous TEOM	Urban	Hourly	No planned changes

2.2.16 Wright

The Wright monitoring station is located in Campbell County in northern Wyoming. Wright is a community located west of the southern group of the Power River Basin coal mines. The purpose of this monitor is to track population exposure to PM₁₀ in a community that is downwind of the coal mines.



Wright Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Wright PM ₁₀	Adjacent to Wright Junior-Senior High School	56-005-0099	PM ₁₀	Manual Filter-based Gravimetric (partisol)	Neighborhood	1/6	No planned changes

2.2.17 Wyoming Range

The Wyoming Range Station was located in Sublette County approximately 16 miles south of Bondurant and east of the Wyoming Range. Monitoring at this station began in January 2011, and was shut down on November 15, 2013. The primary objective of this station was to monitor transported pollutants entering the Upper Green River Basin from the west.

Additionally, this location fulfilled the need for meteorological monitoring as stated in the 2010 Network Assessment. An AQD analysis of data, monitoring priorities, and staff resources found that data from this station was redundant with Daniel South;

therefore, equipment from this station was used to outfit a long-term monitoring station at Big Piney. The full analysis can be found in Appendix C.



Wyoming Range Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Wyoming Range	16 mi. S of Bondurant, WY	56-035-0097	Ozone	Real Time	Regional	Hourly	Shut Down
			Nitric Oxide	Real Time	Regional	Hourly	Shut Down
			Nitrogen Dioxide	Real Time	Regional	Hourly	Shut Down
			Oxides of Nitrogen	Real Time	Regional	Hourly	Shut Down
			PM ₁₀	Continuous BAM	Regional	Hourly	Shut Down
			PM _{2.5}	Continuous BAM	Regional	Hourly	Shut Down

2.2.18 Powder River Basin (PRB) NO_x

The Powder River Basin NO_x network began operation in January 2001 through a cooperative agreement between the AQD and the Wyoming Mining Association. The purpose of the network is to monitor regional NO₂ concentrations in the Powder River Basin (PRB). The Belle Ayr - BA-4 Station is located near the railroad and represents a “maximum concentration” in and around the coal mines. The Antelope Station is located upwind from mining activities and is considered to be background. The AQD also collects and uploads data from the Thunder Basin Coal Company’s Station at the Tracy Ranch; this monitoring station is considered downwind of mining activity. The AQD did not list the Tracy Ranch Station below because it is funded solely by the Thunder Basin Coal Company. The Antelope Station has been temporarily mothballed due to power constraints at the current site. In an effort to bring the Antelope Station back online, the AQD is currently working with the Antelope Mine to upgrade the electrical service. Resumption of service at a new, adequately powered site is expected during the third quarter 2014.

PRB NO _x Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Antelope - Site 3	Converse County	56-009-0819	Nitric Oxide	Real Time	Regional	Hourly	Site changes needed
			Nitrogen Dioxide	Real Time	Regional	Hourly	Site changes needed
			Oxides of Nitrogen	Real Time	Regional	Hourly	Site changes needed
Belle Ayr - BA-4	Campbell County	56-005-0892	Nitric Oxide	Real Time	Micro Scale	Hourly	No planned changes
			Nitrogen Dioxide	Real Time	Micro Scale	Hourly	No planned changes
			Oxides of Nitrogen	Real Time	Micro Scale	Hourly	No planned changes

2.2.19 Powder River Basin (PRB) PM_{2.5}

The Powder River Basin PM_{2.5} Network began official operation in 1999. The purpose of the network is to characterize ambient fine particulate at and around the PRB coal mines. One monitor is located at each “group” of mines (north, middle and south) and one monitor is located away from mining activities to represent background. Due to the age of the instrumentation in the network, the AQD upgraded the instruments to continuous Thermo 1405DF TEOM monitors in 2010. In second quarter 2013, the AQD replaced the 1405DF instruments with Met One Beta Attenuation Monitors (BAMs) due to reliability issues with the 1405DF instruments. Due to the construction of an oilfield service road less than 100 feet from Antelope – Site 3 (PRB-8), the site was shut down on July 1, 2013. Data collection at a new location that meets siting criteria is expected in the third quarter 2014.

PRB PM _{2.5} Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Antelope - Site 3 (PRB-8)	Converse County	56-009-0819	PM _{2.5}	Continuous BAM	Regional	Hourly	Instruments upgraded in 2Q-13 Shut down 7/1/13
Belle Ayr - BA-4 (PRB-3)	Campbell County	56-005-0892	PM _{2.5}	Continuous BAM	Neighborhood	Hourly	Instruments upgraded in 2Q-13
Black Thunder - Site 36 (PRB-5)	Campbell County	56-005-0891	PM _{2.5}	Continuous BAM	Neighborhood	Hourly	Instruments upgraded in 2Q-13
Buckskin - North (PRB-1)	Campbell County	56-005-1899	PM _{2.5}	Continuous BAM	Neighborhood	Hourly	Instruments upgraded in 2Q-13

2.3 Mobile Monitoring Trailers

Three (3) mobile monitoring trailers have been established and are being operated to help characterize air quality at various locations throughout the State of Wyoming. The mobile monitoring stations are self-contained monitoring shelters that may be moved to different locations in a relatively short time frame. The trailers include gaseous monitors (NO_x, O₃ and methane/non-methane hydrocarbons), continuous PM₁₀, continuous PM_{2.5}, camera system, and meteorological instrumentation. The mobile monitoring stations may be used to monitor and characterize events, trends in air quality or areas downwind of industrial development. The AQD locates and operates the mobile monitoring trailers at a location for approximately one (1) year at a time. Current locations as of May 2014 for the three (3) mobile trailers include: Mobile #1 Rock Springs (not operational), Mobile #2 Sinclair, and Mobile #3 Converse County. More information about the future mobile monitoring trailer locations can be found in Section 5.0 of this Network Plan.

2.3.1 Mobile #1 Rock Springs



The Rock Springs air quality mobile monitoring station began operation in March 31, 2013, and operated at this location for one (1) year. The mobile station was located within the city limits of Rock Springs, in a residential neighborhood. The station's objective is to characterize the population-based ozone and other air quality parameters in the City of Rock Springs. A digital camera, ozone analyzer, oxides of nitrogen analyzer, methane/NMHC, continuous PM₁₀ BAM, PM_{2.5} BAM monitor and meteorological equipment were located at this station. The station will relocate to Lovell in early 2014. For more information, see Section 5.2 of this Plan.

Rock Springs Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Rock Springs	1275 Adams Ave. Rock Springs, WY	56-037-0100	Ozone	Real Time	Regional	Hourly	Shutdown (3/31/14)
			Nitric Oxide	Real Time	Regional	Hourly	Shutdown (3/31/14)
			Nitrogen Dioxide	Real Time	Regional	Hourly	Shutdown (3/31/14)
			Oxides of Nitrogen	Real Time	Regional	Hourly	Shutdown (3/31/14)
			Methane/ NMHC	Real Time	Regional	Hourly	Shutdown (3/31/14)
			PM ₁₀	Continuous BAM	Regional	Hourly	Shutdown (3/31/14)
			PM _{2.5}	Continuous BAM	Regional	Hourly	Shutdown (3/31/14)

2.3.2 Mobile #2 Sinclair



The Sinclair air quality mobile monitoring station began operation in December 2013, and is expected to operate at this location for one (1) year. The mobile station is located at the northwest side of town in Sinclair, in a residential neighborhood. The station's objective is to characterize the population exposure to sulfur dioxide and other air quality parameters near a Major Source in the City of Sinclair. A digital camera, ozone analyzer, oxides of nitrogen analyzer, sulfur dioxide, methane/NMHC, continuous PM₁₀ BAM, PM_{2.5} BAM monitor and meteorology equipment are located at this station.

Sinclair Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Sinclair	510 N. 7 th St. Sinclair, WY	56-007-1000	Ozone	Real Time	Regional	Hourly	No Planned Changes
			Nitric Oxide	Real Time	Regional	Hourly	No Planned Changes
			Nitrogen Dioxide	Real Time	Regional	Hourly	No Planned Changes
			Oxides of Nitrogen	Real Time	Regional	Hourly	No Planned Changes
			Methane/NMHC	Real Time	Regional	Hourly	No Planned Changes
			Sulfur Dioxide	Real Time	Regional	Hourly	No Planned Changes
			PM ₁₀	Continuous BAM	Regional	Hourly	No Planned Changes
			PM _{2.5}	Continuous BAM	Regional	Hourly	No Planned Changes

2.3.3 Mobile #3 Converse County

The AQD established a monitoring location in Converse County near Douglas, Wyoming on December 17, 2012. This station was sited due to citizen concerns about oil and gas development in an area of rural residential population. This mobile monitoring station is slated to operate for an additional year. The trailer includes gaseous monitors (NO_x, O₃ and Methane/Non-Methane Hydrocarbons), continuous PM₁₀, continuous PM_{2.5}, camera system, and meteorological instrumentation.

The AQD is currently evaluating the need for a long-term monitoring station in Converse County due to the anticipated increase of oil and gas development in the area. During the additional year of operations at the current Converse County location, the AQD will be investigating field growth with companies in the area and any potential Environmental Impact Statement work that may lead to properly siting a potential long-term location.



Converse County Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Converse County	369 Antelope Road, Douglas, WY	56-009-0801	Ozone	Real Time	Regional	Hourly	No planned changes
			Nitric Oxide	Real Time	Regional	Hourly	No planned changes
			Nitrogen Dioxide	Real Time	Regional	Hourly	No planned changes
			Oxides of Nitrogen	Real Time	Regional	Hourly	No planned changes
			Methane/ NMHC	Real Time	Regional	Hourly	No planned changes
			PM ₁₀	Continuous BAM	Regional	Hourly	No planned changes
			PM _{2.5}	Continuous BAM	Regional	Hourly	No planned changes

2.4 Cheyenne National Core (NCore) Multi Pollutant Station



Cheyenne NCore Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Cheyenne NCore	6909 Chief Washakie Ave. Cheyenne, WY	56-021-0100	Ozone	Real Time	Neighborhood	Hourly	No planned changes
			Trace Sulfur Dioxide	Real Time	Neighborhood	Hourly	No planned changes
			Trace Carbon Monoxide	Real Time	Neighborhood	Hourly	No planned changes
			Nitric Oxide	Real Time	Neighborhood	Hourly	No planned changes
			Nitrogen Dioxide	Real Time	Neighborhood	Hourly	No planned changes
			Oxides of Nitrogen	Real Time	Neighborhood	Hourly	No planned changes
			Total Reactive Nitrogen	Real Time	Neighborhood	Hourly	No planned changes
			PM ₁₀	Continuous BAM	Neighborhood	Hourly	No planned changes
			PM _{10-2.5}	Continuous BAM	Neighborhood	Hourly	No planned changes
			PM _{2.5} (Primary)	Continuous BAM	Neighborhood	Hourly	No planned changes
PM _{2.5}	Manual Filter-based Gravimetric	Neighborhood	1/3	No planned changes			

Cheyenne NCore Monitoring Site Specifications							
Site Name	Location	AQS ID	Parameter	Analysis Method	Scale	Operating Schedule	Operational Status
Cheyenne NCore	6909 Chief Washakie Ave. Cheyenne, WY	56-021-0100	Speciated PM _{2.5}	Manual Filter-based Gravimetric	Neighborhood	1/3	No planned changes

The Wyoming NCore monitoring station is located in the City of Cheyenne, North Soccer Complex Park. The NCore monitoring station was established during the summer of 2010 and became fully operational January 1, 2011. This station was incorporated as part of the National Core Monitoring Network. The NCore stations will be the basis for developing a representative report card on air quality across the nation, capable of delineating differences among geographic and climatological regions. The monitored data will be used to characterize and monitor trends in air quality, air quality standards' compliance and may be used for national health assessments, model evaluations, and comparison with other ambient air monitoring data.

Particulate monitoring is a large part of operations at the Cheyenne NCore monitoring station. Currently, this station has a MetOne BAM Coarse system (includes PM₁₀ and PM_{2.5} instruments). This setup provides continuous data and an economical way to monitor PM₁₀, PM_{10-2.5} and PM_{2.5}. The BAM PM_{2.5} (FEM) is considered the primary monitor at the NCore station. Two (2) Thermo Partisol 2000i (FRM) were installed and began sampling on the 1-in-3 day schedule on January 1, 2014. This new setup helps fulfill the Wyoming PM_{2.5} monitor network Federal Reference Monitoring (FRM) and Federal Equivalent Method (FEM) collocation requirements.

2.5 Industrial Monitoring Sites

Historically, the AQD has required several industrial sources in the State to conduct ambient monitoring for criteria pollutants in and around specific facilities. AQD's largest industrial network is at the Powder River Basin coal mines and consists of approximately 50 PM₁₀ monitoring locations. The AQD also requires extensive networks of PM₁₀ monitoring at the Trona facilities outside of Green River and coal mines in southwest Wyoming. As facilities obtain construction or modification permits from the AQD's New Source Review program, they are often required to monitor for compliance with the ambient air quality standards downwind of their facilities. The monitoring program receives these data on a quarterly basis, and checks for compliance with the NAAQS as well as confirming that the facilities are following appropriate quality assurance measures.

2.6 IMPROVE Network

The purpose of the Interagency Monitoring of Protected Visual Environments (IMPROVE) network is to establish current visibility and aerosol conditions along with characterization of broad regional trends and visibility conditions using monitoring data collected in or near Class I areas across the United States. Wyoming has five (5) IMPROVE locations which include: Yellowstone National Park, Est. 1988; Bridger Wilderness Area, Est. 1988; North Absaroka Wilderness Area, Est. 2000; Thunder Basin National Grasslands, Est. 2002; and Cloud Peak Wilderness Area, Est. 2002. The Cloud Peak IMPROVE monitor (operated by Federal Land Managers) will continue to operate after the meteorology and camera is shut down in July 2014.

3.0 Compliance with NAAQS

The primary purpose of the AQD's SLAMS and SPM networks is to evaluate compliance with the NAAQS. The AQD's SLAMS and SPMs employ reference or equivalent method technologies and are run according to SLAMS or PSD quality assurance specifications and therefore may be compared with the NAAQS. The AQD's SLAMS and SPM networks currently operate under project-specific quality assurance plans, which are available in the Cheyenne State Office for viewing. Data from the mobile trailers are also reported in the tables in this section. While mobile trailers are operated to EPA specifications for comparison with NAAQS, they often contain less than a full year of data due to their short-term deployments. Therefore, these data are generally not comparable to the design value, which is the true test of compliance with the NAAQS. They are also not included in our count of long-term monitors listed in each subsection.

The following tables show 2011 through 2013 data and design values for each SLAMS and SPM monitor. All stations that operated in 2013 are included in the tables, with the exception of the Mobile #2: Sinclair. The AQD chose not to report Sinclair data in these tables since the monitors were only operational for 18 days in 2013. All stations operated by the AQD are in compliance with the NAAQS from 2011-2013, with the exception of the Boulder monitor for ozone.

3.1 Particulate Matter (PM_{10})

There were twenty-three (23) stations that monitored PM_{10} in 2013. The PM_{10} SLAMS network, consisting of ten stations, has two types of monitors (Thermo Partisol 2000 or Thermo TEOM). The Thermo Partisol 2000 PM_{10} monitors, in the network, have 30% collocation. This fulfills the collocation requirements in 40 CFR 58 Appendix A. The Sheridan Police Department PM_{10} TEOM is not required to have another analyzer collocated for precision purposes according to 40 CFR 58, Appendix A. The AQD network has eight (8) stations that have continuous Thermo TEOM PM_{10} monitors and five (5) stations that have continuous MetOne BAM PM_{10} monitors.

To comply with the 24-hour PM_{10} NAAQS, a monitor must record one or less "exceedance" (24-hour concentration greater than $150 \mu\text{g}/\text{m}^3$) per year over a three-year period. The design value is the average number of exceedances per year from 2011-2013. A design value of zero (0) means the station has recorded no values above $150 \mu\text{g}/\text{m}^3$ during that three-year time frame. Wyoming also has an annual ambient air quality standard for PM_{10} . Compliance with the annual PM_{10} Wyoming Ambient Air Quality Standards (WAAQS) is determined by the three-year average of the annual mean. The three-year average of the mean must be below $50 \mu\text{g}/\text{m}^3$.

PM₁₀ Compliance with WAAQS of 50 µg/m³ Annual Arithmetic Mean (µg/m³)					
Site Name	2011	2012	2013	Average ('11-'13) [^]	In Compliance
SLAMS					
Casper	14	18	14	15	Yes
Cheyenne	12	13	12	12	Yes
Cody	12	14	11	12	Yes
Gillette	16	18	14	16	Yes
Jackson	12	17	14	14	Yes
Lander	16	18	17	17	Yes
Laramie	16	17	16	16	Yes
Rock Springs	16*	20	16	17	Yes
Sheridan - Meadowlark	N/A	15*	10	N/A	N/A
Sheridan – Police Dept.	19	22	17	19	Yes
SPM					
Boulder	9	11	8	9	Yes
Campbell County	11	16	12	13	Yes
Daniel South	8	12	7	9	Yes
Moxa	9	14	9	11	Yes
Murphy Ridge	10	12	9	10	Yes
South Pass	8	11	8	9	Yes
Wamsutter	12	16	12	13	Yes
Wright	11	17*	16	15	Yes
Wyoming Range	7	12	8*	9	N/A
NCore					
Cheyenne NCore	N/A	14*	10	N/A	N/A
Mobile Trailers**					
Big Piney***	8*	12	9*	10	N/A
Converse County	N/A	N/A	10	N/A	N/A
Rock Springs	N/A	N/A	11	N/A	N/A

N/A – data not available

* - site has one or more quarterly reports that did not meet data completeness or operated less than 4 quarters

** - Mobile Trailers are located in one location for approximately one year

*** - Site changed from a Mobile Trailer to a permanent location

[^] For the three-year average incomplete data years were used per WAQSR Chapter 2 Appendix 1

PM₁₀ Compliance with NAAQS of 150 µg/m³ Highest 24- Hour Average (µg/m³)					
Site Name	2011	2012	2013	Design Value (‘11-‘13)	In Compliance
SLAM					
Casper	63	66	39	0	Yes
Cheyenne	44	50	41	0	Yes
Cody	46	45	33	0	Yes
Gillette	45	65	36	0	Yes
Jackson	40	86	63	0	Yes
Lander	40	68	51	0	Yes
Laramie	49	53	57	0	Yes
Rock Springs	59	94	43	0	Yes
Sheridan - Meadowlark	N/A	41*	31	N/A	N/A
Sheridan – Police Dept.	96	75	57	0	Yes
SPM					
Boulder	33	68	41	0	Yes
Campbell County	41	71	39	0	Yes
Daniel South	35	72	41	0	Yes
Moxa	43	152 ⁺	79	0	Yes
Murphy Ridge	51	53	43	0	Yes
South Pass	39	49	34	0	Yes
Wamsutter	71	72	193	0.3	Yes
Wright	52	76	53	0	Yes
Wyoming Range	67	79	64*	0	Yes
NCore					
Cheyenne NCore	N/A	46*	42	N/A	N/A
Mobile Trailers**					
Big Piney***	27	190	59*	0.3	Yes
Converse County	N/A	N/A	99	N/A	N/A
Rock Springs	N/A	N/A	119	N/A	N/A

N/A – data not available

*- site has one or more quarterly reports that did not meet data completeness or operated less than 4 quarters

** - Mobile Trailers are located in one location for approximately one year

⁺ - Value rounded to 150 µg/m³ per 40 CFR § 50, Appendix K

*** - Site changed from a Mobile Trailer to a permanent location

3.2 Particulate Matter (PM_{2.5})

There were nineteen (19) State-run monitoring stations that collected PM_{2.5} data in 2013. Within the PM_{2.5} SLAMS network, which includes Thermo Partisol 2000 PM_{2.5} monitors in Casper, Cheyenne, Cody, Jackson, Lander, Laramie, Rock Springs, Sheridan – Meadowlark, and Sheridan – Police Department, the AQD has 22.2% of the monitors collocated. This meets the

40 CFR 58 Appendix A requirement for collocation of 15%. The PRB PM_{2.5} monitors changed from Thermo 1405DF monitors to MetOne BAM 1020 monitors during 2013. The other six (6) stations are running MetOne BAM 1020 monitors with a Very Sharp Cut Cyclone (VSSC) used to monitor PM_{2.5}. All of the nineteen (20) monitors can be compared to the annual PM_{2.5} NAAQS as defined by 40 CFR § 58.30. The annual PM_{2.5} standard is attained when the three (3) year average is less than or equal to 12.0 µg/m³. Compliance with the 24-hour PM_{2.5} NAAQS is met when the 3-year average of the 98th percentile concentration is less than or equal to 35 µg/m³.

PM_{2.5} Compliance with NAAQS of 15.0 µg/m³ Annual Arithmetic Mean (µg/m³)					
Site Name	2011	2012	2013	Average ('11-'13)	In Compliance
SLAMS					
Casper	4.5	5.4	4.3	4.7	Yes
Cheyenne	4.4	5.7	4.3	4.8	Yes
Cody	4.4	5.1	4.3	4.6	Yes
Jackson	4.6	6.3	4.9	5.3	Yes
Lander	7.8	7.8*	7.8*	7.8	Yes
Laramie	4.6	5.6	4.6	4.9	Yes
Rock Springs	5.1	7.0	5.1	5.7	Yes
Sheridan - Meadowlark	N/A	7.1*	5.0	N/A	N/A
Sheridan – Police Dept.	7.6	8.3*	6.7	7.5	Yes
SPM					
Antelope - Site 3	3.6*	8.0*	3.3	5.0	Yes
Belle Ayr - BA-4	5.5*	7.9*	6.4*	6.6	Yes
Black Thunder - Site 36	3.1*	4.9*	4.2	4.1	Yes
Buckskin - North	4.9*	5.9*	4.8	5.2	Yes
Pinedale	5.0	7.1	4.8	5.6	Yes
Wyoming Range	3.3	4.4	2.8*	3.5	Yes
NCore					
Cheyenne NCore	3.4	3.8*	2.2	3.1	Yes
Mobile Trailers**					
Big Piney***	2.9*	5.8*	4.2*	4.3	Yes
Converse County	N/A	N/A	10.7	N/A	N/A
Rock Springs	N/A	N/A	2.0	N/A	N/A

N/A – data not available

* - site has one or more quarterly reports that did not meet data completeness or operated less than 4 quarters

** - Mobile Trailers are located in one location for approximately one year

***- Site changed from a Mobile Trailer to a permanent location

PM_{2.5} Compliance with NAAQS of 35 µg/m³ 98% 24-Hour Average (µg/m³)					
Site Name	2011	2012	2013	Average ('11-'13)	In Compliance
SLAMS					
Casper	13	17	13	14	Yes
Cheyenne	9	17	11	12	Yes
Cody	12	16	15	14	Yes
Jackson	12	25	11	16	Yes
Lander	30	25*	29*	28	Yes
Laramie	10	17	10	12	Yes
Rock Springs	12	27	12	17	Yes
Sheridan - Meadowlark	N/A	19*	14	N/A	N/A
Sheridan – Police Dept.	23	19*	17	20	Yes
SPM					
Antelope - Site 3	11*	27*	8*	15	Yes
Belle Ayr - BA-4	20*	55*	14*	30	Yes
Black Thunder - Site 36	14*	16*	14*	15	Yes
Buckskin - North	16*	18*	14	16	Yes
Pinedale	11	27	13	17	Yes
Wyoming Range	8	25	9*	14	Yes
NCore					
Cheyenne NCore	8	9*	9	9	Yes
Mobile Trailers**					
Big Piney***	7*	54*	9*	23	Yes
Converse County	N/A	N/A	9	N/A	N/A
Rock Springs	N/A	N/A	7	N/A	N/A

N/A – data not available

*- site has one or more quarterly reports that did not meet data completeness or operated less than 4 quarters

** - Mobile Trailers are located in one location for approximately one year

***- Site changed from a Mobile Trailer to a permanent location

3.3 Nitrogen Dioxide (NO₂)

There were seventeen (17) State-run monitoring stations that monitored for NO₂ in 2013. Compliance with the annual primary NO₂ NAAQS is met when the annual average concentration in the calendar year is less than or equal to 53 ppb. The primary standard 1-hour average concentration is 100 ppb. The maximum 1-hour concentration per year is listed in the second NO₂ table below. The NO₂ calculated design value is met when the three-year average of the annual 98th percentile of the daily maximum 1-hour average concentration is less than or equal to 100 ppb. This calculated three-year design value is located in the second NO₂ table below.

NO₂ Compliance with NAAQS of 53 ppb Annual Arithmetic Mean (ppb)				
Site Name	2011	2012	2013	In Compliance
Belle Ayr - BA-4	6	8	7	Yes
Boulder	2	3	2	Yes
Campbell County	3	3	3	Yes
Casper	N/A	N/A	3*	Yes
Daniel South	0	0*	1	Yes
Juel Spring	2	1	1	Yes
Moxa	2	2	2	Yes
Murphy Ridge	2	2	2	Yes
Pinedale	3	3	1	Yes
South Pass	1	1	1	Yes
Thunder Basin	2	2*	1	Yes
Wamsutter	4	5*	4	Yes
Wyoming Range	1	1	1*	Yes
NCore				
Cheyenne NCore	4	4	4	Yes
Mobile Trailer**				
Big Piney***	1*	2*	1	Yes
Converse County	N/A	N/A	3	Yes
Rock Springs	N/A	N/A	4	Yes

N/A – data not available

* - site has one or more quarterly reports that did not meet data completeness or operated less than 4 quarters

** - Mobile Trailers are located in one location for approximately one year

***- Site changed from a Mobile Trailer to a permanent location

NO2 Compliance with NAAQS of 100 ppb					
Annual 98% of Daily Maximum 1-hour average (ppb)				3-year 98% 1-hour Design Value (ppb)	
Site Name	2011	2012	2013	Design Value ('11-'13)	In Compliance
Belle Ayr - BA-4	36*	34	35	35	Yes
Boulder	49	24	17	30	Yes
Campbell County	33	32	32	32	Yes
Casper	N/A	N/A	34*	N/A	N/A
Daniel South	5	5*	4	5	Yes
Juel Spring	16	10	11	12	Yes
Moxa	23	21	22	22	Yes
Murphy Ridge	13	10	14	12	Yes
Pinedale	31	26	17	25	Yes
South Pass	4	5	5	5	Yes
Thunder Basin	11	11*	9	10	Yes
Wamsutter	38	36*	38	37	Yes
Wyoming Range	4	7	N/A	N/A	N/A
NCore					
Cheyenne NCore	32	36	37	35	Yes
Mobile Trailers**					
Big Piney***	12*	11*	9	11	Yes
Converse County	N/A	N/A	27	N/A	N/A
Rock Springs	N/A	N/A	31	N/A	N/A

N/A – data not available

*-site has one or more quarterly reports that did not meet data completeness or operated less than 4 quarters

** -Mobile Trailers are located in one location for approximately one year

***- Site changed from a Mobile Trailer to a permanent location

3.4 Sulfur Dioxide (SO₂)

There were two (2) State-run monitoring stations that monitored for SO₂ in 2013. The NAAQS 1-hour primary standard is met when the three-year average of the annual (99th percentile) of the daily maximum 1-hour average concentrations is less than or equal to 75 ppb.

SO ₂ Compliance with NAAQS of 75 ppb					
Annual 99% 1-hour average (ppb)				3-year 99% 1-hour average (ppb)	
Site Name	2011	2012	2013	Design Value ('11-'13)	In Compliance
Moxa	17	21*	20	18	Yes
NCore					
Cheyenne NCore	4	7	6	6	Yes

*-site has one or more quarterly reports that did not meet data completeness or operated less than 4 quarters

3.5 Carbon Monoxide (CO)

The AQD operated one (1) trace CO monitor during 2013. In past years the State of Wyoming has operated stations that have monitored for Carbon Monoxide (CO). Most CO levels were relatively low and the benefit of monitoring at SPM locations was not justified for a long-term period. The level for the maximum 8-hour NAAQS for CO is 9 ppm. The level for the 1-hour NAAQS for CO is 35 ppm.

CO Compliance with NAAQS					
Site Name	35 ppm Maximum 1-hour average concentration (ppm)		9 ppm Maximum 8-hour average concentration (ppm)		In Compliance
	2012	2013	2012	2013	
NCore					
Cheyenne NCore	0.79	0.51	0.5	0.3	Yes

3.6 Ozone (O₃)

The AQD operated seventeen (17) O₃ monitoring stations in Wyoming during 2013, and all of the stations were SPMs. To comply with the 8-hour ozone NAAQS, the daily maximum 8-hour ozone averages are ranked over a year. The 3-year average of the 4th highest yearly value must be less than or equal to 0.075 ppm. In July 2012, the EPA designated the Upper Green River Basin, including Sublette and portions of Lincoln and Sweetwater Counties, nonattainment for ozone. The area designated nonattainment is classified as Marginal. The remainder of the State is designated as unclassifiable/attainment.

O₃ Compliance with NAAQS of 0.075 ppm 4th Highest 8-Hour Average (ppm)					
Site Name	2011	2012	2013	Design Value ('11-'13)	In Compliance
Boulder	0.103	0.070	0.061	0.078	No
Campbell County	0.062	0.069	0.061	0.064	Yes
Casper	N/A	N/A	0.065*	N/A	N/A
Daniel South	0.075	0.067	0.063	0.068	Yes
Hiawatha	0.063	0.065	0.064	0.064	Yes
Juel Spring	0.076	0.066	0.064	0.068	Yes
Moxa	0.068	0.064	0.067	0.066	Yes
Murphy Ridge	0.065	0.067	0.065	0.065	Yes
Pinedale	0.076	0.067	0.061	0.068	Yes
South Pass	0.068	0.067	0.062	0.067	Yes
Thunder Basin	0.061	0.071	0.061	0.064	Yes
Wamsutter	0.064	0.063	0.064	0.063	Yes
Wyoming Range	0.072	0.066	N/A	N/A	N/A
NCore					
Cheyenne NCore	0.067	0.068	0.069	0.068	Yes
Mobile Trailers **					
Big Piney***	0.064	0.067	0.064	0.065	Yes
Converse County	N/A	N/A	0.067	N/A	N/A
Rock Springs	N/A	N/A	0.064	N/A	N/A

N/A – data not available

** - Mobile Trailers are located in one location for approximately one year

***- Site changed from a Mobile Trailer to a permanent location

4.0 Special Studies

In addition to the AQD's extensive network of long-term monitoring, the AQD is also conducting several short-term special studies. Primarily, these studies and additional monitoring revolve around investigations of industrial source growth within the State.

4.1 Upper Green Winter Ozone Study (UGWOS)

In the winters of 2005 and 2006, primarily in the month of February, the AQD measured 8-hour ozone concentrations greater than 80 ppb at the Daniel South, Jonah and Boulder monitoring stations. Elevated ozone concentrations are uncommon during the winter months; however, they do not appear to be an anomaly because these conditions were recorded in both February 2005 and February 2006. After recording elevated values for two (2) years, the AQD decided to conduct a study of winter ozone formation. The purposes of the study were, originally, to better understand the formation mechanisms and collect data to form a conceptual model of the winter ozone formation. Since 2007 the objectives of the study have been modified to fill gaps in data and conceptual understanding of winter ozone formation with the ultimate intent of developing a working photochemical model for the Upper Green River Basin.

The focus of the 2014 winter monitoring study was ongoing regulatory monitoring supplemented with a monitoring trailer in the Jonah Field and three mesonet locations with ozone in the Pinedale Anticline Field. There were also six (6) locations for canister/cartridge collection with speciated VOC and aldehyde analyses.

Quality Assurance Plans and data from the UGWOS campaigns can be downloaded from the DEQ website. Final reports can also be downloaded at the website. During summer 2014, the AQD will be critically evaluating all studies conducted in the Upper Green to determine whether specific aspects of winter ozone formation will still need to be monitored in the future.

4.2 VOC Monitoring

The AQD continues to perform continuous methane/non-methane measurements at the Boulder location in addition to pulling periodic speciated VOC canisters. The AQD is also operating methane/non-methane hydrocarbon analyzers in the mobile trailers. The AQD also installed a methane/non-methane hydrocarbon analyzer at the Wamsutter monitoring station. The AQD, in cooperation with other agencies involved in the Three-State Study, continues to collect methane/non-methane hydrocarbons in 2014.

4.3 Mobile Beta Attenuation Monitor (BAM) Deployment

The AQD has outfitted a mobile monitoring trailer with continuous BAM PM₁₀ and PM_{2.5} monitoring devices for deployment in communities that may be impacted by smoke from wildfire activity, agricultural burning, or windblown dust. This portable system will allow the AQD to monitor near real-time PM₁₀ and PM_{2.5} concentrations, and meteorological conditions so the AQD can properly inform the public when particulate levels may cause adverse health effects.

4.3.1 Afton

The AQD deployed the mobile BAM monitoring station in the Star Valley area for initial investigation monitoring for particulate matter (PM_{2.5} and PM₁₀) concentrations and meteorological conditions. Data collection began on January 1, 2014. The station also collects local wind speed, wind direction and temperature. The station is located south of town, near the Afton-Lincoln County Airport. The AQD plans to operate the Afton BAM Trailer for a period of one (1) year. The Afton BAM Trailer sampling will conclude on December 31, 2014.

4.4 Grand Teton

The AQD is working cooperatively with the National Park Service to fund a portion of the Grand Teton Monitoring Station near the Teton Science School, located in Grand Teton National Park. This monitoring station includes ozone, NADP wet deposition, nephelometer, camera system and meteorological instrumentation.

4.5 Three-State Study

From 2010 through 2014 the AQD has participated in a cooperative activity known as the “Three-State Study.” The Wyoming AQD is cooperating with Colorado and Utah State agencies as well as Federal Land Managers and EPA to develop systems which will aid in modeling and predicting impacts from energy development. As part of this study, the Federal Government committed to partially fund the Hiawatha station in Southwest Wyoming. Hiawatha was installed during spring of 2011. More information about the Hiawatha station can be found in Section 2.2.8 of this document. The AQD also received funding to install a methane/non-methane hydrocarbon analyzer along with speciated canisters at the Wamsutter monitoring station. After collecting 2 years of speciated canister and methane/non-methane hydrocarbon data at Wamsutter, the AQD decided to discontinue the canister sampling. The methane/non-methane hydrocarbon monitoring will continue through 2014.

5.0 Future Air Monitoring Modifications

The State of Wyoming is experiencing rapid energy development, especially in the northeast and southwest quadrants of the State. Energy development is also anticipated to increase in southeast Wyoming. The AQD continues to review the need for special purpose monitoring to monitor for possible impacts from increased development or other air quality issues as they arise. This section of the Plan reviews AQD’s plans for possible network modifications in 2014 and early 2015.

5.1 Converse County Long-Term Monitoring

The AQD is currently evaluating the need for a long-term monitoring station in Converse County due to the anticipated increase of oil and gas development in the area. During the additional year of operations at the current Converse County location, the AQD will be investigating field growth with companies in the area and any potential Environmental Impact Statement work that may lead to properly siting a potential long-term location.

5.2 Lovell

The AQD has determined the next location for the Mobile #1 station will be Lovell. Lovell is a mid-sized town with just over 2,100 people that has not had air monitoring since the Total Suspended Particulate sampler was removed in 1981 (56-003-0001). The area has a large number of major industrial sources and seasonal agricultural burning. A land use agreement for a suitable location is being pursued at this time. The AQD anticipates start-up of the station in mid-2014.

6.0 Conclusion

There is an ongoing effort to help ensure the Wyoming Ambient Air Monitoring Network demonstrates adequate coverage across the entire State. As the State’s population and industry changes, the AQD works to make sure the monitoring needs in the State of Wyoming are being met. Wyoming mineral price fluctuations and resource constraints may play a part in the availability of ambient monitoring activities deployed throughout the State.

Data collected at the AQD monitoring stations through 2013 show that all monitors are attaining NAAQS for PM₁₀, PM_{2.5}, NO₂, SO₂, and CO. Currently, all of the AQD monitors, except for Boulder, are attaining the NAAQS for ozone. The Boulder monitor and Upper Green River Basin area ozone issue will be addressed in the nonattainment process.

The AQD continually evaluates data collected at the AQD, industrial and AQRV monitors to determine if changes in policy are needed to continue to manage the air resource in the State of Wyoming.

Any comments pertaining to the Wyoming Ambient Air Monitoring Annual Network Plan should be sent to the following contact:

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Appendix A

AQS ID	Site Name	Address	Land Use Type	Location Type	Monitor Type	Meets 40 CFR § 58 Appendix A, C, D and E Requirements*	Monitor Objective	Longitude	Latitude	Site Start Date
56-025-0001	Casper	City County Bldg. - Center & C Streets	Commercial	Urban And Center City	SLAMS	X	Population Exposure	-106.3256921	42.85146789	10/15/1998
56-021-0001	Cheyenne	State Office Bldg. 23rd & Central Avenue	Residential	Urban And Center City	SLAMS	X	Population Exposure	-104.8176611	41.13686502	1/1/1979
56-029-0001	Cody	Cody Jr High School	Residential	Suburban	SLAMS	X	Population Exposure	-109.0685071	44.52464211	1/1/1975
56-005-1002	Gillette	1000 West 8th St	Commercial	Urban And Center City	SLAMS	X	Population Exposure	-105.516389	44.288056	1/1/1978
56-039-1006	Jackson	40 E Pearl Ave.	Commercial	Urban And Center City	SLAMS	X	Population Exposure	-109.0685071	44.52464211	6/8/2007
56-013-1003	Lander	600 Washington	Residential	Suburban	SLAMS	X	Highest Concentration, General/Background	-108.735562	42.84222775	1/1/1987
56-001-0006	Laramie	406 Ivinson	Commercial	Urban And Center City	SLAMS	X	Population Exposure	-105.591725	41.31158614	1/1/1968
56-037-0007	Rock Springs	625 Ahsay Ave	Residential	Urban And Center City	SLAMS	X	Population Exposure	-109.220125	41.59259168	1/1/1983
56-033-0002	Sheridan - Police Station	45 West 12th St	Commercial	Urban And Center City	SLAMS	X	Highest Concentration, Population Exposure	-106.955933	44.815142	10/5/1983
56-033-1003	Sheridan - Meadowlark	1410 DeSmet Ave.	Residential	Urban And Center City	SLAMS	X	Population Exposure	-106.9643166	44.78275	7/1/2012
56-009-0819	Antelope Site 3	Antelope Site 3	Industrial	Rural	Special Purpose	X	General/Background	-105.386161	43.426103	9/1/1982
56-005-0892	Belle Ayr BA-4	Belle Ayr BA-4	Industrial	Rural	Special Purpose	X	Highest Concentration, Source Oriented	-105.343164	44.097074	7/9/1991
56-035-0700	Big Piney	4 miles south of Big Piney, WY	Residential	Rural	Special Purpose	X	Source Oriented, General/Background	-110.0989	42.4864	3/30/2011
56-005-0891	Black Thunder Site 36	Black Thunder Site 36	Industrial	Rural	Special Purpose	X	General/Background	-105.214	43.677	1/1/1985
56-035-0099	Boulder	5 miles southwest of Boulder, WY	Desert	Rural	Special Purpose	X	Source Oriented, General/Background	-109.753	42.719	2/1/2005
56-005-1899	Buckskin North	Triton Coal Gillette, WY	Industrial	Rural	Special Purpose	X	General/Background	-105.6	44.472	9/4/2008
56-005-0456	Campbell County	Approx. 15 Miles SSW of Gillette	Desert	Rural	Special Purpose	X	Source Oriented, General/Background	-105.529994	44.146964	7/15/2003

AQS ID	Site Name	Address	Land Use Type	Location Type	Monitor Type	Meets 40 CFR § 58 Appendix A, C, D and E Requirements*	Monitor Objective	Longitude	Latitude	Site Start Date
56-025-0100	Casper Gaseous	2800 Pheasant Dr. Casper	Commercial	Urban And Center City	Special Purpose	X	Population Exposure	-106.36501	42.82231	3/1/2013
56-021-0100	Cheyenne – NCore	6909 Washakie Ave. Cheyenne	Residential	Suburban	NCore	X	National Core Monitoring Site	-104.77842	41.18235	1/1/2011
Not in AQS	Cloud Peak	Cloud Peak	Forest	Rural	Special Purpose Met		Regional Meteorology(not in AQS)	-106.9565	44.3335	1/1/2002
56-009-0801	Converse County	369 E. Antelope, Douglas	Agricultural	Rural	Special Purpose	X	Population Exposure	-105.303528	42.766972	12/17/2012
56-035-0100	Daniel South	5 miles south of Daniel, WY	Desert	Rural	Special Purpose	X	General/Background	-110.0551	42.7907	7/1/2005
56-037-1000	Farson Met	0.7 mi NW of intersection of Hwy 191 & Hwy 28	Desert	Rural	Special Purpose Met		General Background	-109.4541	42.1184	4/27/2011
Not in AQS	Afton Mobile	0.15 mi. E of Airport Rd. Afton WY	Residential	Rural	Special Purpose	X	Population Exposure	-110.937	42.708	1/1/2014
56-037-0077	Hiawatha	Bitter Creek Rd. 43 miles SE of Rock Springs	Desert	Rural	Special Purpose	X	General Background	-108.6176	41.1545	3/30/2011
56-035-1002	Juel Spring	20 miles NW of Farson, WY	Desert	Rural	Special Purpose	X	Source Oriented, General/Background	-109.5604983	42.37349916	12/11/2009
56-037-0300	Moxa	25 miles NW of Green River	Desert	Rural	Special Purpose	X	Source Oriented, General/Background	-109.788654	41.751009	5/27/2010
56-041-0101	Murphy Ridge	Bear River	Agricultural	Rural	Special Purpose	X	General/Background	-111.0417	41.373	1/1/2007
56-035-0101	Pinedale	West side of City Park & Pine Creek	Residential	Suburban	Special Purpose	X	Population Exposure	-109.87076	42.869824	1/1/2009
56-037-0100	Rock Springs Mobile	1275 Adams Ave.	Residential	Suburban	Special Purpose	X	Population Exposure	-109.207000	41.575000	2/12/2013
56-007-1000	Sinclair Mobile	SW corner of CCR351 and N. 8 th St.	Residential	Suburban	Special Purpose	X	Population Exposure	-107.119184	41.783389	12/11/2013
56-013-0099	South Pass	South Pass	Forest	Rural	Special Purpose	X	General/Background	-108.7200027	42.52999916	3/12/2007
56-005-0123	Thunder Basin	30 Mi N-NE of Gillette	Desert	Rural	Special Purpose	X	General/Background	-105.2903	44.6522	5/1/2001
56-037-0200	Wamsutter	2 miles west of Wamsutter	Desert	Rural	Special Purpose	X	Source Oriented, General/Background	-108.0238889	41.6775	3/1/2006
56-005-0099	Wright	Adjacent To Wright Jr-Senior High School	Residential	Rural	Special Purpose	X	General/Background, Population Exposure	-105.490771	43.757812	11/1/2002

Appendix B

2013 SLAMS Precision and Accuracy for PM₁₀

	Site AQS I.D.	POC	Site Name	Precision Checks (Number - Type)	Accuracy Audit				Flow Verification			
					1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
PM₁₀	56-025-0001	POC 4	Casper	44- Analytical	1	0	1	0	3	3	3	3
	56-025-0001	POC 5	Casper	N/A	1	0	1	0	3	3	3	3
	56-021-0001	POC 1	Cheyenne	41 - Analytical	1	0	1	0	3	3	3	3
	56-021-0001	POC 2	Cheyenne	N/A	1	0	1	0	3	3	3	3
	56-021-0100	POC 3	Cheyenne NCore	N/A	2	0	1	0	3	3	3	3
	56-029-0001	POC 3	Cody	N/A	0	1	0	1	3	3	3	3
	56-005-1002	POC 5	Gillette	N/A	0	1	0	1	3	3	3	3
	56-039-1006	POC 1	Jackson	N/A	0	1	0	1	3	3	3	3
	56-013-1003	POC 3	Lander	N/A	0	1	0	1	3	3	3	3
	56-001-0006	POC 5	Laramie	N/A	1	0	1	0	3	3	3	3
	56-037-0007	POC 2	Rock Springs	N/A	0	1	0	1	3	3	3	3
	56-033-0002	POC 1	Sheridan PD TEOM	N/A	1	0	1	0	3	3	3	3
	56-033-1003	POC 1	Sheridan Meadowlark School	12 - Analytical	1	0	1	0	3	3	3	3
	56-033-1003	POC 2	Sheridan Meadowlark School	N/A	1	0	1	0	N/A	N/A	3	3

2013 SLAMS Precision and Accuracy for PM_{2.5}

	Site AQS I.D.	POC	Site Name	Precision Checks (Number - Type)	Accuracy Audit				Flow Verification			
					1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
PM_{2.5}	56-021-0100	POC 2	Cheyenne NCore	N/A	1	0	1	0	3	3	3	3
	56-021-0100	POC 3	Cheyenne NCore	13 – Analytical	2	0	1	0	3	3	3	3
	56-021-0001	POC 1	Cheyenne	51 - Analytical	1	0	1	0	3	3	3	3
	56-021-0001	POC 2	Cheyenne	N/A	1	0	1	0	3	3	3	3
	56-025-0001	POC 1	Casper	N/A	1	0	1	0	3	3	3	3
	56-039-1006	POC 1	Jackson	N/A	0	1	0	1	3	3	3	2
	56-029-0001	POC 1	Cody	N/A	0	1	0	1	3	3	3	3
	56-013-1003	POC 1	Lander	N/A	0	1	0	1	3	3	3	3
	56-001-0006	POC 1	Laramie	N/A	1	0	1	0	3	3	3	3
	56-037-0007	POC 1	Rock Springs	N/A	0	1	0	1	3	3	3	3
	56-033-0002	POC 1	Sheridan Police Dept.	56 - Analytical	1	0	1	0	3	2	3	3
	56-033-0002	POC 2	Sheridan Police Dept.	N/A	1	0	1	0	3	3	2	3
	56-033-1003	POC 1	Sheridan Meadowlark School	N/A	1	0	1	0	3	3	3	3

Appendix C
Big Piney Long-Term Monitoring Data Evaluation



Department of Environmental Quality

To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.



Matthew H. Mead, Governor

Todd Parfitt, Director

MEMORANDUM

TO: Steven A. Dietrich, Air Quality Division Administrator *SAD*

THROUGH: Darla Potter, AQRM Program Manager *DP*

FROM: Cara Keslar, Monitoring Section Supervisor *CK*

RE: Options for Outfitting a Long-term Station at Big Piney

The March 8, 2013 memo discussing results of the Big Piney Mobile Station (2011-2012) found that a long-term station should be established. The conclusions stated:

"Taking into account anticipated development, findings of the Network Assessment, ozone non-attainment, and the uniqueness of the LaBarge gas field, the Monitoring Section recommends a long-term monitoring, replacing the mobile trailer."

This memo reviews possible options for outfitting a long-term station at the Big Piney monitoring location. Currently there are four options for a long-term station:

1. Leave the mobile trailer in place
2. Contract an all-new station
3. Contract the long-term station using AQD spare equipment
4. Move equipment from an existing station

Regardless of the options, the Monitoring Section has determined that the Big Piney station should monitor for ozone, NO_x, meteorology and have the space to pull speciated VOC canisters during the winter season. Additionally, with any option that is chosen, the AQD will need to enter into negotiations with the County on a long term land use agreement.

Leave the mobile trailer in place

The mobile trailer has been at the Big Piney location since March 2011. Typically, mobile trailers are left in place for 1 year, however, due to the mild winter of 2012, the Monitoring Section decided to leave it in place through the 2013 winter season. The mobile station could continue to run in place under the existing contract. Leaving the mobile trailer in place for the long-term would set a precedent that the AQD's mobile trailers can be turned into long-term stations. Making the mobile trailer a long-term station would also lessen the AQD's ability to investigate emerging, leaving only two trailers available for deployment.



Contract an all-new station

Contracting an all new station for the Big Piney location would cost approximately \$150,000 and take at minimum six months to implement. The AQD would also incur long-term operational costs (approximately \$68,000/year) and additional staff time to oversee the project. There are currently not staff resources or funding in the budget for this additional project.

Contract the long-term station using spare AQD equipment

Contracting the long-term station would take at minimum six months to implement. The Monitoring Section could use existing air quality equipment (ozone, NO_x, calibration equipment, shelter). Items that would need to be purchased are data logger, communications system, meteorological equipment and tower, and plumbing. Cost for the equipment, installation, and QAPP would be approximately \$35,000, which the AQD could request existing funding to complete in BFY13-14. However, the AQD would also incur long-term operational costs (approximately \$68,000/year) and additional staff time to oversee the project. There are currently not staff resources or funding in the budget for this additional project.

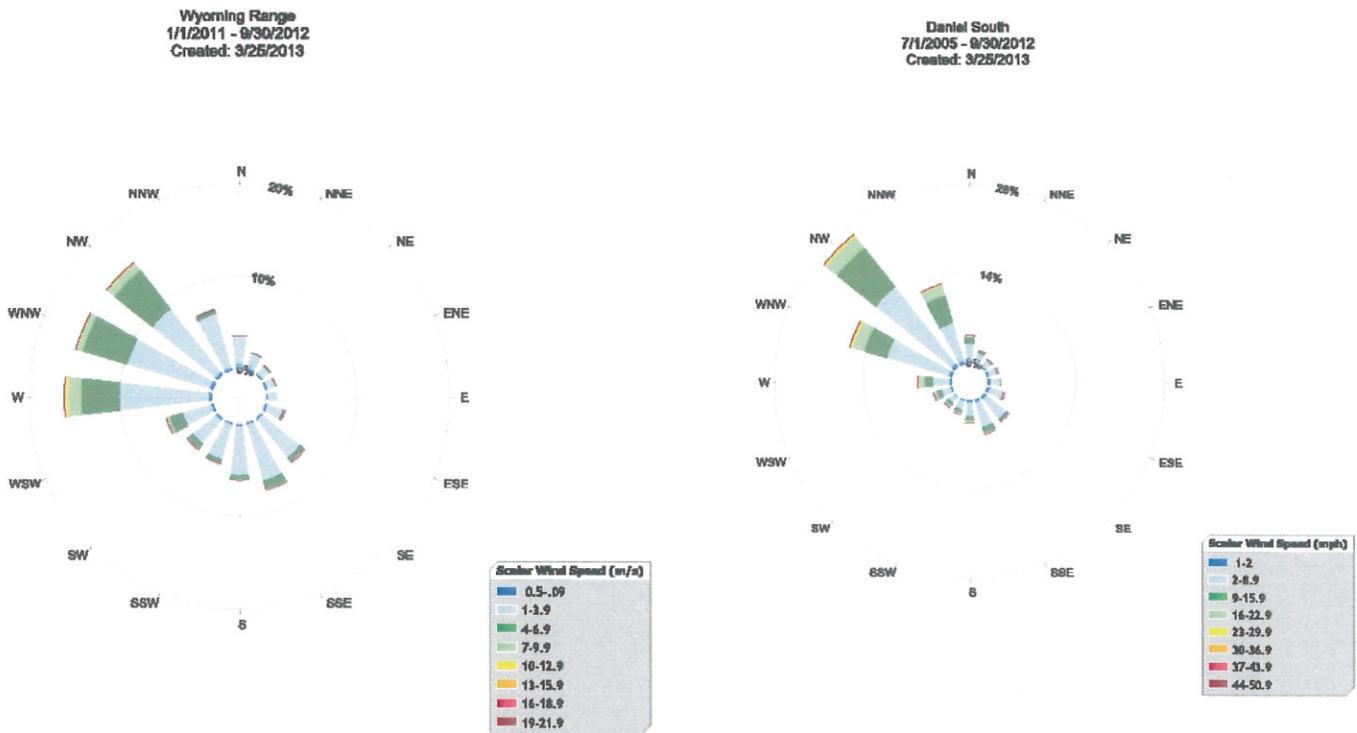
Move equipment from an existing station

Moving equipment from an existing station would take approximately one month. The Monitoring Section believes this could be done under an existing contract and the contract would be rebid when the existing contract expires. The Monitoring Section has evaluated current objectives, stations, and priorities and has determined that the Wyoming Range Station would be the most feasible to move. The cost to move this station would be approximately \$26,500, which the AQD could request existing funding to complete in BFY 13-14. The long-term operational costs and staff resources are already budgeted through the Wyoming Range contract.

The objective of the Wyoming Range Station is to monitor transported pollutants from the west. At the time it was sited, the location was also expected to monitor possible impacts from the Eagle Prospect planned development. Since that time, the Eagle Prospect leases have been bought out and will not be developed. The AQD also has another station in the UGRB sited to monitor transported pollutants, the Daniel Station. To evaluate whether these stations are redundant, the Monitoring Section has performed an analysis of the differences between meteorological characteristics and air quality parameters at the two stations. The period of record for each station has been used for this analysis.

Wind Rose Comparison

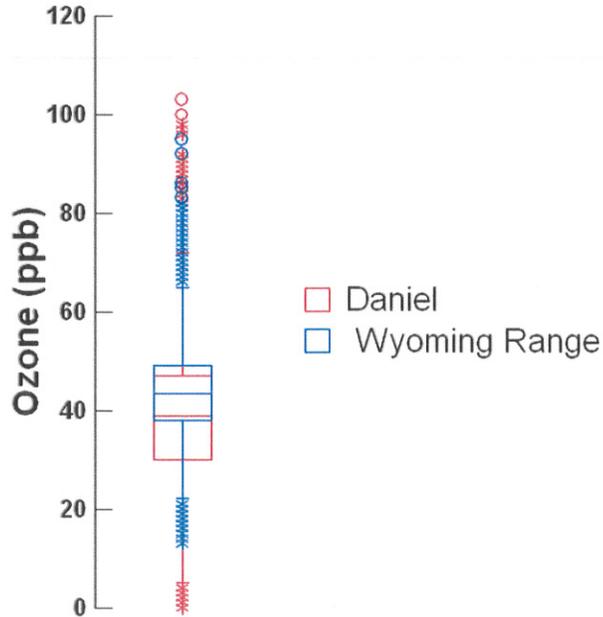
The following graphics, called wind roses, illustrate the frequency of wind speeds and directions at the Wyoming Range and Daniel Stations. While not exactly the same, the wind roses are similar, with the majority of wind blowing from the northwest quadrant. Even with the elevation difference between the stations (approximately 300 meters), the stations exhibit similar wind patterns.



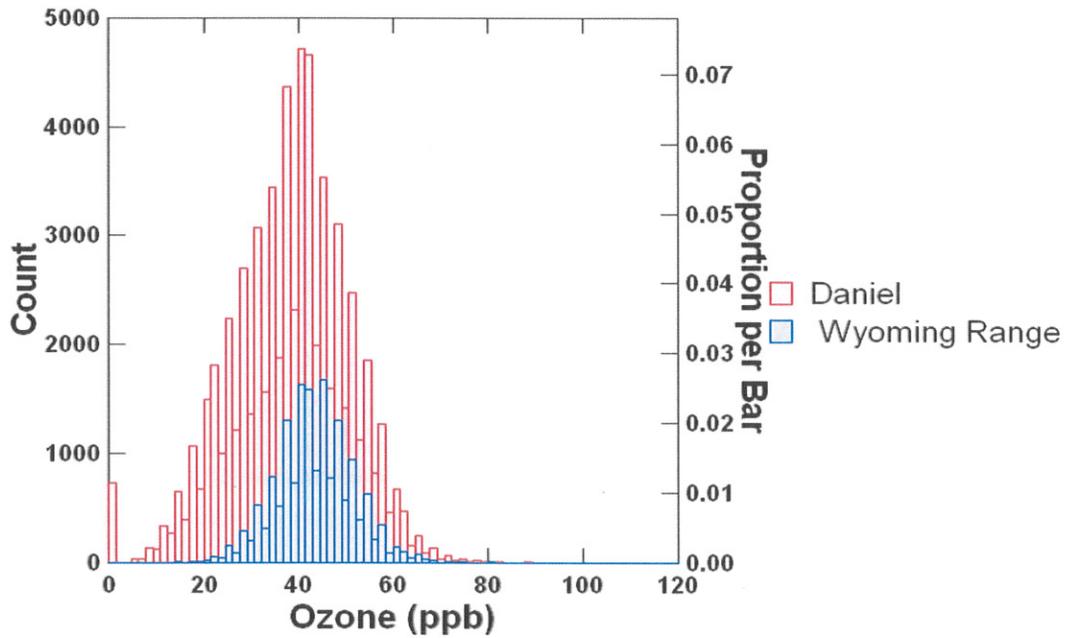
Ozone Comparison

The following graphics show the distribution of hourly ozone concentrations at the Wyoming Range and Daniel stations. The ozone data look similar, with the mean and interquartile range (25th to 75th percentile) nearly overlapping. Higher outlier concentrations were seen at Daniel compared to Wyoming Range, which is consistent with AQD's knowledge of ozone formation and transport in the UGRB. The distribution of ozone is nearly identical between the two stations.

Daniel and Wyoming Range 1-Hour Average Ozone



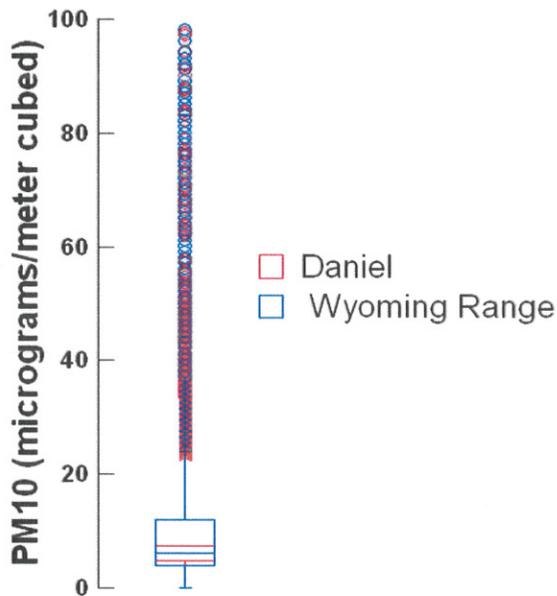
Daniel and Wyoming Range 1-Hour Average Ozone



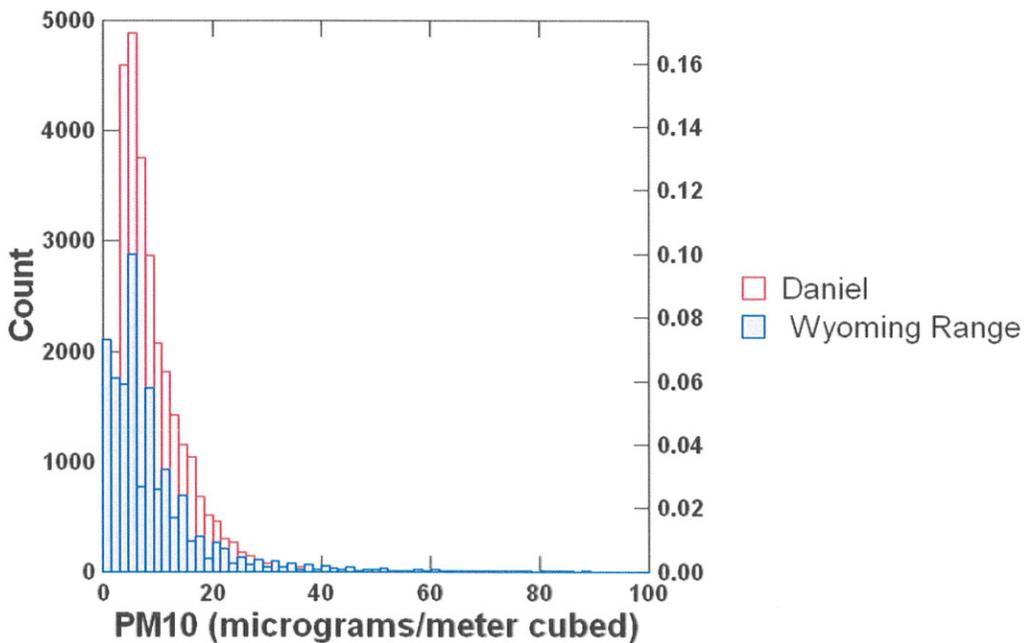
PM₁₀ Comparison

The following graphics show the distribution of hourly PM₁₀ concentrations at the Wyoming Range and Daniel stations. The data look very similar, with the mean, interquartile range (25th to 75th percentile), and outliers overlapping. The distribution of PM₁₀ concentrations is nearly identical.

Daniel and Wyoming Range Hourly PM10

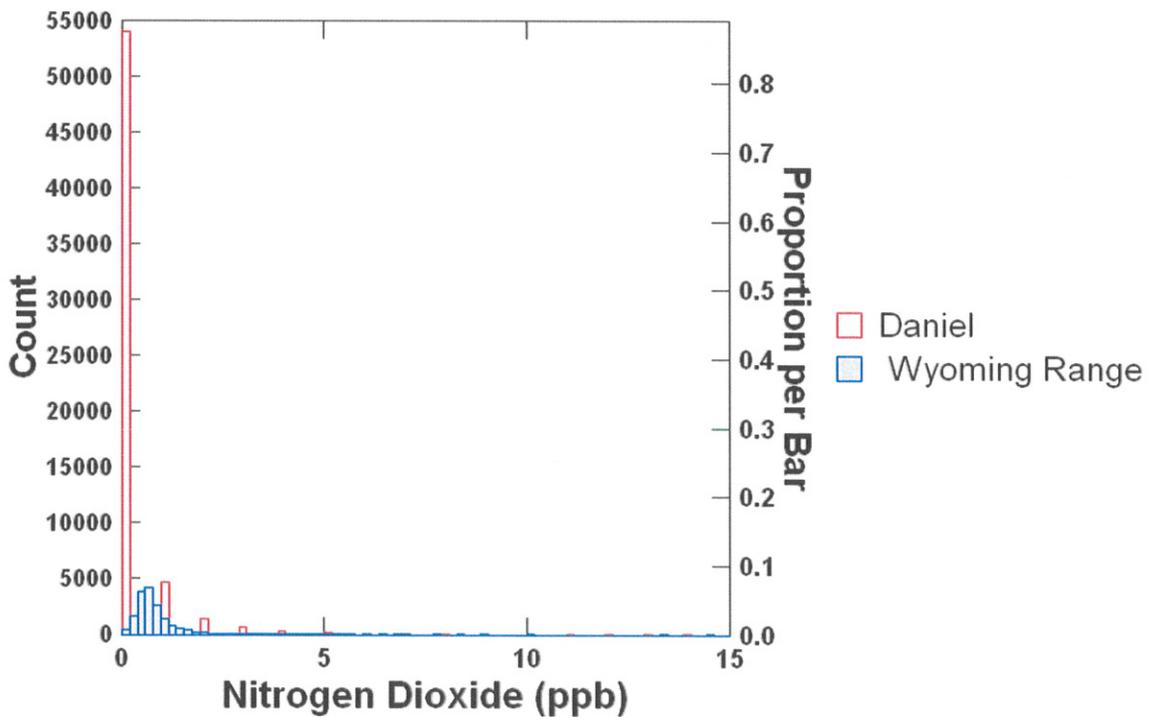
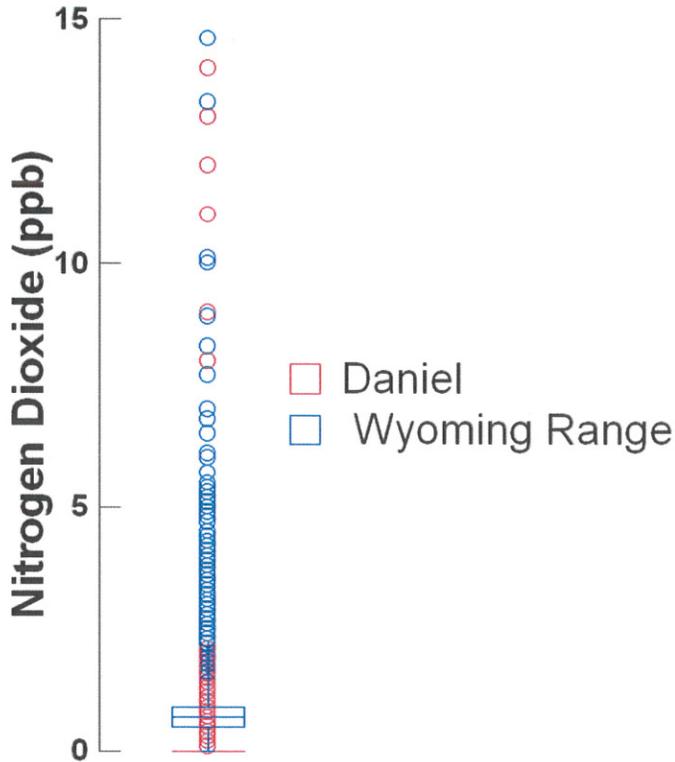


Daniel and Wyoming Range Hourly PM10



NO₂ Comparison

The following graphics show the distribution of hourly NO₂ concentrations at the Wyoming Range and Daniel stations. The data look similar, with the mean and interquartile range (25th to 75th percentile) both close to the detection level of the instrument. The highest outlier concentrations are nearly identical. The distribution of NO₂ is nearly identical, with differences at very low concentrations near the detection level of the instrument.



Conclusions

The AQD has evaluated four options to outfit a long-term station at the Big Piney location. The Monitoring Section does not believe that leaving the mobile trailer in place is a viable option. This would leave the AQD with only two mobile trailers available for short-term deployment, lessening the AQD's ability to investigate emerging issues. Additionally, since the Monitoring Section did not budget for an all new station, that option is not feasible either.

Either option of using existing equipment or moving a currently operating station is feasible. Using existing equipment will cost more money and time, and would leave the Monitoring Section with less spare equipment in its inventory. Moving the Wyoming Range station would cost less money and time and is the only option with available staff resources and budget for long-term operations. Based on the data analysis, the Monitoring Section believes the Wyoming Range station is redundant with the Daniel Station. Considering the objectives of the stations, the data analysis, and understanding the possibility of a reduced budget in the future, moving the Wyoming Range station to Big Piney would increase the network's overall efficiency and effectiveness. Therefore, the preferred option is to move the Wyoming Range station to Big Piney.