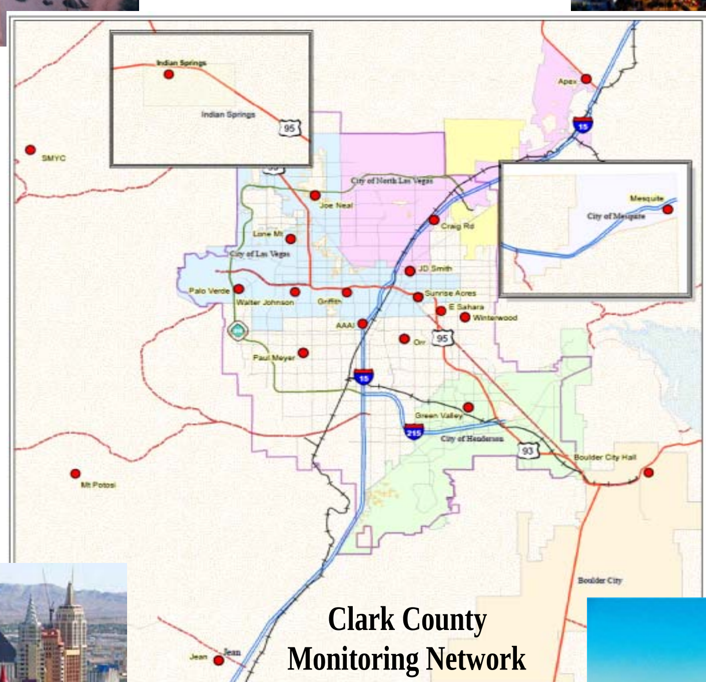
CLARK COUNTY
DEPARTMENT OF AIR QUALITY

FIVE-YEAR NETWORK ASSESSMENT



June 29, 2015

Signatures

The *Five-Year Network Assessment* is reviewed and approved for submission to EPA:

Lewis Wallenmeyer
Director

Distribution

The *Five-Year Network Assessment* shall be distributed as follows:

Organization:	**Title:**	**Location:**
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DAQ	Monitoring Manager	Las Vegas, NV
DAQ	Planning Manager	Las Vegas, NV
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Foreword

The *Five-Year Network Assessment* was written to address internal operational needs and to address the U.S. Environmental Protection Agency's five-year network assessment requirement.

Executive Summary

This assessment is one outcome of the U.S. Environmental Protection Agency (EPA) implementation of the National Ambient Air Monitoring Strategy. The purpose of the strategy is to optimize national air monitoring networks to achieve, with limited resources, the best possible scientific value and protection of public and environmental health and welfare.

On October 17, 2006, EPA finalized an amendment to the monitoring regulations for ambient air that required monitoring agencies to conduct a network assessment once every five years (40 CFR 58.10(d)). This is the second five-year assessment for Clark County, Nevada. In addition to making monitoring recommendations, this assessment updates the historical summary of the county monitoring network, updates pollutant trends information, and updates pollutant studies the county has conducted.

DAQ's analysis shows the following sites are a priority in the Clark County monitoring network and should be maintained during the next five years:

- Paul Meyer
- Boulder City[1]
- Apex
- Jean
- Joe Neal
- Palo Verde
- Walter Johnson
- Mesquite[2]
- Green Valley
- Jerome Mack (NCore)
- Indian Springs
- Logandale
- Rancho & Teddy (Near Road 1)
- Central Fire Station (Near Road 2)
- J.D. Smith[3]
- Sunrise Acres[3]
- North Las Vegas Airport[4]

DAQ is proposing the following modifications and redeployments within the existing Clark County monitoring network:

- Redeployment of an SPM ozone monitor at Spring Mountain Youth Camp.[5]

[1] Monitoring activities will continue in Boulder City, but this site is proposed for relocation within the community.
[2] Monitoring activities will continue in Mesquite, but this site is proposed for relocation within the community.
[3] J.D. Smith and Sunrise Acres are currently maintained, but due to redundancy they are proposed to be consolidated into a single new site on Cecile Ave. J.D. Smith and Sunrise Acres will remain open until the new site is established. The consolidated site will monitor for ozone, CO, NO_2 (or NO_x), PM_{10} and $PM_{2.5}$.
[4] There is no ambient air monitoring at this location, but upper air atmospheric meteorology is recorded.

- Proposed redeployment of an ozone monitor in Laughlin.
- Proposed redeployment of $PM_{2.5}$ monitor at Palo Verde and Apex.
- Redeployment of a PM_{10} monitor at Walter Johnson. [6]
- Proposed deployment of an ozone monitor at the Green Valley site.
- Proposed deployment of an NO_2 monitor at the Jerome Mack (NCore) site.
- Proposed redeployment of upper air meteorological monitoring at North Las Vegas Airport.

DAQ is proposing the following new sites be added to the Clark County monitoring network:

- Proposed deployment of a SLAMS PM and ozone monitoring site in both the southwest and southeast portions of the Las Vegas Valley.
- Proposed deployment of an ozone monitoring site in Coyote Springs.
- Proposed deployment of a gaseous and PM monitoring site in Sandy Valley.
- Proposed deployment of a gaseous and PM monitoring site in Primm.
- Proposed deployment of a gaseous and PM monitoring site in Overton.
- Proposed deployment of visibility cameras at M Resort.
- Other proposed sites and network modifications may be considered as part of studies for upper elevation (surface) ozone monitoring, upper air (aloft) meteorological monitoring, and transport corridor evaluation.

[5] This redeployment occurred in April 2015.
[6] This redeployment occurred in May 2015.

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ACRONYMS AND ABBREVIATIONS

Acronyms

ALA	American Lung Association
AQS	Air Quality System
BAM	beta attenuation monitor
CAA	Clean Air Act
CFR	Code of Federal Regulation
DAQ	Clark County Department of Air Quality
EPA	U.S. Environmental Protection Agency
FEM	federal equivalent method
FRM	federal reference method
NAAQS	National Ambient Air Quality Standards
PCA	principal component analysis
SIP	state implementation plan
SLAMS	State and Local Air Monitoring Stations
SMOKE	Sparse Matrix Operational Kernel Emissions
SNHD	Southern Nevada Health District
SPM	special purpose monitoring

Abbreviations

CO	carbon monoxide
H_2S	hydrogen sulfide
hi-vol	high-volume sampler
NH_3	ammonia
ID	(site) identification
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
O_3	ozone
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter of ≤ 10 microns
$PM_{2.5}$	particulate matter with an aerodynamic diameter of ≤ 2.5 microns
ppb	parts per billion
ppm	parts per million
SO_2	sulfur dioxide
TSP	total suspended particulates
$\mu g/m^3$	micrograms per cubic meter

1.0 REGULATORY REQUIREMENT

On October 17, 2006, the U.S. Environmental Protection Agency (EPA) finalized an amendment to the ambient air monitoring regulations. In Title 40, Part 58.10(d) of the Code of Federal Regulations (40 CFR 58.10(d)), the EPA added the following requirement:

> The state, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to determine, at a minimum, if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma), and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby states and tribes or health effects studies. The state, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The assessments are due every five years beginning July 1, 2010.

This requirement is an outcome of the EPA implementation of the document titled *Ambient Air Monitoring Strategy for State, Local, and Tribal Agencies*, the most recent version of which is dated December 2008.[7] The primary objectives of this strategy are to:

- Implement a multi-pollutant monitoring approach that will broaden the understanding of air quality conditions and pollutant interactions, furthering the capability to evaluate air quality models, develop emission control strategies, and support long-term health studies.
- Pursue opportunities for integrating monitoring networks and programs.
- Reconfigure the existing National Ambient Air Quality Standards (NAAQS) compliance networks, mainly the State and Local Air Monitoring Stations (SLAMS), to place emphasis on pollutants for which problems with attainment are more widespread and persistent, such as ozone (O_3) and particulate matter with an aerodynamic diameter of ≤ 2.5 microns ($PM_{2.5}$). In part, this emphasis will require shifting resources currently expended on NAAQS attainment problem pollutants that have largely been addressed (such as carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2). However, EPA recognizes that future NAAQS reviews could result in lower standards, which may in turn change network resource requirements.
- Ensure the quality system and other technical requirements for monitors are appropriate for the intended use of the data and that methods are performance-based in order to provide high-quality data.

[7] Reference: http://www.epa.gov/ttn/amtic/files/ambient/monitorstrat/AAMS%20for%20SLTs%20%20-%20FINAL%20Dec%202008.pdf

- Encourage the use of continuous and high-sensitivity methods and the adoption of the latest digital data acquisition technology and data handling methods in order to provide easy access to timely, high-quality, high-resolution air quality data.

2.0 METHODOLOGY

A project management approach provided the framework to evaluate the Clark County monitoring network design, and included the following:

- Historical review of the network.
- Historical review of pollutant studies performed within Clark County.
- Data end users (see Section 4).
- Review of climatological and topographical conditions (see Section 5).
- Review of population growth (see Section 6).
- Review of applicable monitoring requirements (see Section 7).
- Network analysis (see Section 8).

2.1 HISTORICAL REVIEW OF THE NETWORK

Staff reviewed Air Quality System (AQS) and DAQ records to identify every known site that has operated in Clark County for the stated purpose of monitoring ambient air pollution. Appendix A provides a list of these sites, along with operating dates, the pollutants monitored, and, to the extent known, an explanation of the development of the air monitoring network over time, including the motivations and circumstances behind network alterations, such as changes in regulatory requirements and resource availability. Appendix B contains maps showing in timeline the locations of pollutants monitored since 1957. Appendix C contains trend plots of pollutant concentrations for the last 17 years for CO, ozone, NO_2, SO_2, and PM_{10}, and for the last 16 years for $PM_{2.5}$.

2.2 HISTORICAL REVIEW OF POLLUTANT STUDIES PERFORMED WITHIN CLARK COUNTY

Over the years, and often in support of state implementation plan (SIP) development, DAQ has conducted many air quality studies. Staff reviewed these studies, which primarily provided recommendations on pollutant-specific improvements to the monitoring network, and compiled a list of their recommendations. The relevant studies are:

- *Ozone Characterization Study* (January 2006)
- *Clark County Regional Ozone & Precursors Study* (CCROPS) (March 2006)
- *Southwest Desert/Las Vegas Ozone Transport Study* (SLOTS) (July 2008)
- *Carbon Monoxide Saturation Study (CMSS) (April 2002)*
- *PM_{10} Saturation Study (February 2007)*
- *Stratospheric Ozone Intrusion Study (May 2013)*

Section 3 outlines these studies in detail.

2.3 RESULTS

The assessment of the monitoring network includes the following considerations:

- Existing sites that are to continue:

  These include sites required by regulation; sites required by SIP commitments; sites required by court order or settlement; sites required by unique status (e.g., the only maximum concentration site); sites required by political will; and sites required by statute, ordinance, or grant.

- Existing sites that may be combined or moved:

  Examples include, but are not limited to, locations with problematic leases or other legal challenges; sites that are not ideally sited; and sites that are redundant.

- Future sites based on monitoring needs:

  Examples include, but are not limited to, sites that fill a spatial gap; sites that serve specific or under-monitored populations; sites that help assess transport; sites that identify hot spots; and sites that help validate modeling results.

- Sites that have some value in the network, but are not critical:

  Examples include, but are not limited to, sites that have some redundancy; sites that have collected enough historical data to serve their purpose; and sites that are temporary or special purpose.

2.4 RECOMMENDATIONS

Recommendations are provided based on the qualitative and quantitative network analysis (see Section 8) and the priorities stated above.

2.5 GUIDANCE DOCUMENTS

Three EPA documents provide analytical techniques and a discussion of assessment goals and objectives:

- *Ambient Air Monitoring Network Assessment Guidance* (February 2007)
- *Network Assessment Analyses and Tools Documentation* (April 28, 2010)
- *Ambient Air Monitoring Strategy for State, Local, and Tribal Agencies* (December 2008)

3.0 HISTORY OF NETWORK STUDIES

In the last 15 years, DAQ has conducted numerous studies, research projects, and investigations relative to pollutant levels and the monitoring network. Four ozone studies, one CO study, and one particulate matter (PM) study provide insight and recommendations that relate to changes in the monitoring network. This section lists these six studies and any monitoring network-related recommendations.

3.1 CLARK COUNTY REGIONAL OZONE & PRECURSOR STUDY (CCROPS) (MARCH 2006)[8]

CCROPS collected data needed to characterize and understand tropospheric ozone in Clark County. Network recommendations based on the study included the following:

- Shutdown of the City Center site was recommended; ozone monitoring at this site was determined not to be representative due to titration by NO_x from vehicles on the nearby freeway, and criteria pollutant monitoring was shut down in 2005.
- Permanent site at Paiute and Indian Springs to investigate peak ozone and to define extent of high ozone was recommended. Ozone monitoring at the Paiute began in 2014. Ozone special purpose monitoring (SPM) began at Indian Springs in 2010, and SLAMS monitoring began in 2015.
- Sites in the northwest foothills and Craig Ranch area were recommended in that urban ozone plume extends well into these areas.
- Sites at Black Mountain and Lower Potosi were recommended to determine the importance of ozone aloft at night and early morning. Although not directly in the Black Mountain and Lower Potosi area, ozone monitoring at the Green Valley site is in the same proximity as Black Mountain. The Green Valley site serves the Henderson/Black Mountain area.

3.2 SOUTHWEST DESERT/LAS VEGAS OZONE TRANSPORT STUDY (SLOTS) (JULY 2008)[9]

SLOTS was conducted to determine the mechanisms and impact of pollutant transport into southern Nevada through enhanced monitoring of ozone air quality and meteorology at key locations during the 2007 ozone season (May 1-Sept. 30). Network recommendations included additional monitoring in key locations in the Mojave Desert along identified transport paths to further characterize transport mechanisms. DAQ continues to conduct SPM monitoring to identify

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[8] T&B Systems (2006). *Clark County Regional Ozone & Precursor Study*. Retrieved June 30, 2014, from http://www.clarkcountynv.gov/Depts/AirQuality/Documents/Planning/Studies/PollutantSpecific/Clark_County_Regional_Ozone_and_Precursor_Study_(2006).pdf.

[9] T&B Systems (2006). *Southwest Desert/Las Vegas Ozone Transport Study*. Retrieved June 30, 2014, from http://www.clarkcountynv.gov/Depts/AirQuality/Documents/Planning/Studies/PollutantSpecific/Southwest_Desert_Las_Vegas_Transport_Study_(2008).pdf.

transport corridors and assess transport impacts. Some SPM examples include sites in Indian Springs (now SLAMS) and Logandale.

3.3 OZONE CHARACTERIZATION STUDY (JANUARY 2006)[10]

The purpose of this study was to characterize ozone, its precursors, and transport during high-ozone events. Network recommendations included the following additional monitoring:

- Sites in the extreme northwest and northeast of the valley and along the western foothills were recommended to determine if the existing ozone network adequately characterizes peak levels. DAQ has conducted SPM monitoring in Clark County, including in the northern areas of the Las Vegas Valley, to help characterize peak ozone levels. The Las Vegas Paiute Tribal ozone also helps to determine peak ozone levels, which are concentrated at the Tribal site.
- Upper air measurements for boundary layer measurements of temperature, winds, and stability were recommended for at least at one site in the valley and at an upwind location. To meet this, DAQ conducts upper air meteorological measurements at the North Las Vegas Airport as a special project.
- Sites at elevated platforms of opportunity (e.g., isolated hilltops or tall towers) to determine the importance of ozone aloft at night and early morning. DAQ has monitored ozone at a number of upper elevation surface sites. The Stratospheric Ozone Intrusion Study in conjunction with upper air meteorological measurements at the North Las Vegas Airport has assisted in determining the influence of ozone aloft and its effects on surface conditions.

3.4 CARBON MONOXIDE SATURATION STUDY (APRIL 2002)[11]

The Carbon Monoxide Saturation Study is a detailed assessment of CO concentrations in the Las Vegas Valley conducted by Technical and Business Systems, Inc. Network recommendations included possible additional monitoring at sites near Boulder Highway, south of Nellis, and northwest of the I-15/U.S. 95 interchange due to the effects of rapidly increasing population. The Jerome Mack (NCore) site has CO monitoring and represents the area of Boulder Highway/S. Nellis Blvd. DAQ is now in attainment for CO, and CO is no longer considered a problem for the community.

[10] T&B Systems (2006). *Ozone Characterization Study*. Retrieved June 30, 2014, from http://www.clarkcountynv.gov/Depts/AirQuality/Documents/Planning/Studies/PollutantSpecific/Ozone_Characterization_Study_(2006).pdf.

[11] T&B Systems (2002). *Carbon Monoxide Saturation Study*. Retrieved June 30, 2014, from http://www.clarkcountynv.gov/Depts/AirQuality/Documents/Planning/Studies/PollutantSpecific/Carbon_Monoxide_Saturation_Study_(2002).pdf.

3.5 PM_{10} SATURATION STUDY (FEBRUARY 2007)[12]

This field study was conducted to understand the spatial distribution of particulate matter with an aerodynamic diameter of less than or equal to 10 microns (PM_{10}) and assess how well the existing monitoring network could measure impacts. Network recommendations included the following:

- The possible relocation of the Paul Meyer, Palo Verde, and Walter Johnson sites to the south or to newly developed areas was recommended. Walter Johnson was shut down; however, in order to leverage resources (the site and infrastructure already exist) and for spatial coverage and population representation, DAQ redeployed PM_{10} monitoring at Walter Johnson.
- Additional monitoring at sites in the extreme south and southwest due to the Jean dry lake bed plume and population growth was recommended. Due to the economic downturn, however, growth did not take place at the expected rate. DAQ recognizes the importance of spatial coverage and population representation, and DAQ acknowledges recommendations of the PM_{10} Saturation Study (February 2007). DAQ is actively planning sites, which includes PM measurements, in the southwest and southeast part of the valley.

3.6 STRATOSPHERIC OZONE INTRUSION STUDY (MAY 2013) [13]

The purpose of this study was to determine if stratosphere-to-troposphere and long-range transport from Asia influenced springtime ozone in Clark County, and to estimate the importance of these processes compared to local ozone production and regional transport from Los Angeles or wildfires. Further studies may be required to make conclusive recommendations.

[12] T&B Systems (2007). *Particulate Matter (PM_{10}) Saturation Monitoring Study*. Retrieved June 30, 2014, from http://www.clarkcountynv.gov/Depts/AirQuality/Documents/Planning/Studies/PollutantSpecific/Particulate_Matter_(PM10)_Saturation_Monitoring_Study_(February_2007).pdf.

[13] National Oceanic and Atmospheric Administration (2013). Retrieved May 8, 2015 from http://www.clarkcountynv.gov/Depts/AirQuality/Documents/Planning/Studies/PollutantSpecific/LVOS_final_report.pdf

4.0 DATA END USERS

4.1 USERS AND USER GROUPS

DAQ has a number of end users and user groups. Data is made available through the DAQ website, and custom reports are provided to end users upon request. Some of the end users include, but are not limited to:

- Southern Nevada Health District (SNHD)
- American Lung Association (ALA)
- State, local, federal, and tribal air quality and environmental agencies
- The public
- DAQ Planning Division (including the modeling and emissions inventory groups)

4.2 USER PURPOSES

- SNHD correlates pollutant levels with epidemiological factors, such as distance from high-measuring sites and emergency medical system pickups.
- ALA correlates the number of high ozone and PM days to the quality of lung health in Las Vegas and reports the number in its annual *State of the Air* report.
- EPA and other air quality agencies use monitoring data for regulatory decision-making.
- The public uses data for decision-making purposes.
- Ozone and NO_2 provide validation for air quality modeling runs performed by DAQ staff.

4.3 REPORTING SOURCES

Users obtain their data from different sources:

- SNHD obtains data from DAQ’s Web site and the Air Quality Index.
- ALA obtains data from AQS.
- EPA and other air quality agencies obtain data from AQS.
- The public obtains data from DAQ’s Web site and Airnow.
- Internal users obtain data from the network server and AQS.

5.0 CLIMATOLOGICAL AND TOPOGRAPHICAL INFORMATION

The information in this section was taken from the National Weather Service's Las Vegas climate book.

5.1 TOPOGRAPHY AND HISTORY

Las Vegas is located in a broad desert valley in southern Nevada. Mountains surrounding the valley extend 2,000 to 10,000 feet above the valley floor. The Las Vegas Valley comprises 600 square miles and runs from northwest to southeast. It is bounded on the north by the Sheep Range, on the south by Boulder City and the Lake Mead National Recreation Area. To the west are the Spring Mountains, which include Mt. Charleston, the region's highest peak at 11,918 feet. Several smaller ranges line the eastern rim of the valley, including the Muddy Mountains, the Black Mountains, and the Eldorado Range. For most of the Las Vegas metropolitan area, the valley floor slopes downward from west to east. This slope affects local climatology by driving variations in wind, precipitation, and storm runoff.

Official weather observations have been recorded in Las Vegas since 1937, initially at Nellis Field in the northeast part of the valley. In late 1948, the U.S. Weather Bureau moved to McCarran Field (now McCarran International Airport), seven miles south of downtown Las Vegas.

5.2 GENERAL CLIMATIC SUMMARY

The four seasons are well defined in Las Vegas, although they differ from the traditional view of seasonal variation. Summers display classic desert Southwest characteristics. Daily high temperatures typically exceed 100°F, with lows in the 70s. The summer heat is usually tempered by low relative humidity, which can, however, increase markedly for several weeks each summer in association with a moist monsoonal flow from the south, typically during July and August. These moist winds support the development of spectacular desert thunderstorms associated with significant flash flooding and/or strong downburst winds.

Winters, overall, are mild with high pressure dominating. Early morning and late night subsidence inversion are common. Afternoon temperatures average near 60°, and skies are mostly clear. Pacific storms occasionally produce rainfall in Las Vegas during winter months, but in general, the Sierra Nevada Mountains of eastern California and the Spring Mountains immediately west of the Las Vegas Valley act as barriers to moisture.

Snow accumulation is rare in Las Vegas. Flurries are observed once or twice during most winters, but snowfall of an inch or more occurs only once every four to five years. However, freezing temperatures occur regularly each year: the valley has a 30-year average of 24 days with low temperatures at or below 32°F. Snowfall is common in the mountains surrounding Las Vegas, with the Spring Mountains receiving between 5 and 10 feet annually. The spring and fall seasons are generally considered ideal. Although sharp temperature changes can occur, outdoor activities are seldom hampered.

Strong winds are the most persistent weather hazard in the area. Winds over 50 mph are infrequent, but can occur with vigorous storms. Winter and spring wind events often generate widespread areas of blowing dust and sand. Strong wind episodes in the summertime are usually connected with thunderstorms, and are thus isolated and localized. Prevailing wind direction is typically either southwest or north unless associated with a thunderstorm outflow.

Regional transport and local influences produce higher ozone concentrations on the west and northwest sides of the valley. Ozone episodes in the Las Vegas Valley are generally characterized by a surface (thermal) low pressure system extending over Arizona, Southern California, and Nevada; ridging of 500 millibars over the southwest or central United States; and southwesterly surface flow during the afternoon hours, accompanied by ample sunshine and high temperatures. Superimposed on the synoptic-scale meteorological conditions are the local, terrain-induced mesoscale meteorological features. Together, these determine the horizontal and vertical advection and dispersion of pollutants and their eventual removal from the Las Vegas Valley.

5.3 SYNOPTIC METEOROLOGY

Based on a National Meteorological Center modeling analysis at 500 millibars, a broad, flat ridge of pressure over the central United States is dominant during the summer season. Winds at this level, as indicated by the Mercury/Desert Rock Weather Service Meteorological Observatory radiosonde, are normally westerly and characterized by moderate (10-15 meters per second) wind speeds. The National Meteorological Center's surface analyses indicate that southern Nevada is enveloped by a thermal low-pressure system.

6.0 POPULATION

More than 95 percent of Clark County's population resides in the Las Vegas Valley (Hydrographic Area 212), which encompasses the cities of Las Vegas, North Las Vegas, and Henderson, along with portions of Boulder City. Communities outside the valley have experienced significant growth in the last 20 years, including the City of Mesquite, located on the county's northeastern edge, and Laughlin, located on the Colorado River at the county's southern end.

Clark County's population has increased more than fivefold since 1980, and currently stands at over 2.1 million. Table 1 provides data on population growth in Clark County from 1990 to 2014.

Table 1. Clark County Population History (1990-2014)

Year	Population	Annual Population Change	Annual Increase
1990	805,519	—	—
1991	829,839	24,320	3%
1992	870,692	40,853	5%
1993	919,388	48,696	6%
1994	986,152	66,764	7%
1995	1,048,668	62,516	6%
1996	1,119,708	71,040	7%
1997	1,170,113	50,405	5%
1998	1,246,193	76,080	7%
1999	1,321,176	74,983	6%
2000	1,428,689	107,513	8%
2001	1,498,278	69,589	5%
2002	1,578,332	80,054	5%
2003	1,641,529	63,197	4%
2004	1,747,025	105,496	6%
2005	1,815,700	68,675	4%
2006	1,912,654	96,954	5%
2007	1,996,542	83,888	4%
2008	1,986,145	-10,397	-1%
2009	2,006,347	20,202	1%
2010	2,036,358	30,011	1%
2011	1,966,630	-69,728	-3%
2012	2,008,654	42,024	2%
2013	2,062,253	53,599	3%
2014	2,103,000	40,747	2%

Source: Southern Nevada Regional Planning Coalition Consensus Population Estimates / Clark County Demographics (1990-2013 figures) and Center for Business and Economic Research, UNLV (2014 figures).

7.0 MONITORING REQUIREMENTS

7.1 REQUIREMENT SUMMARY

40 CFR 58 outlines requirements for maintaining ambient air monitoring networks. The following requirements have been considered in this assessment of network design.

1. *Determine the highest NAAQS concentration area in the network.*

The results presented below are based on primary NAAQS standards applied to 2014 data:

- The area of highest CO concentration is the Sunrise Acres station at 2501 Sunrise Ave.
- The areas of highest ozone concentration (excluding SPM) are the Joe Neal station at 6651 W. Azure Way and the Las Vegas Paiute Tribal site, which is non-regulatory and not in Clark County's jurisdiction. (See Section 8.2 High Ozone Site Analysis for detailed analysis on Clark County's high ozone concentration.)
- The site with highest PM_{10} concentration is the Jean monitoring station at 1965 State Highway 161. Although this is a background/low-reading site for PM, during high wind events, the Jean site can record the highest values in the DAQ network.
- The area of highest annual average $PM_{2.5}$ concentration is the Sunrise Acres station at 2501 Sunrise Ave.
- The area of highest annual average NO_2 concentration is the J.D. Smith station at 1301 E. Tonopah Dr.

2. *Compare pollutant design values for 2014 with the NAAQS.*

Table 2. Comparison of Annual Ozone Design Values with NAAQS

Station	Ozone Design Value (ppm)	NAAQS Standard (ppm)	Valid Design Value*
Apex	0.072	0.075	N
Mesquite	0.067	0.075	N
Paul Meyer	0.073	0.075	Y
Walter Johnson	0.073	0.075	Y
Palo Verde	0.074	0.075	Y
Joe Neal	0.075	0.075	Y
Winterwood	0.071	0.075	N
Jerome Mack	0.070	0.075	Y
Boulder City	0.072	0.075	Y
Jean	0.074	0.075	Y
J.D. Smith	0.072	0.075	Y
Spring Mountain Youth Camp	0.085	0.075	N
Indian Springs	0.069	0.075	N

Station	Ozone Design Value (ppm)	NAAQS Standard (ppm)	Valid Design Value*
Frenchman Mountain	0.067	0.075	N
Arden Peak	0.076	0.075	N
Laughlin	0.073	0.075	N
Logandale	0.064	0.075	N

* Represents information as gathered from the AQS database.
Note: ppm = parts per million.

Table 3. Comparison of Annual $PM_{2.5}$ Primary Design Values with NAAQS

Station	$PM_{2.5}$ Design Value ($\mu g/m^3$)	NAAQS Standard ($\mu g/m^3$)	Valid Design Value*
Green Valley	7.0	12	N
Jerome Mack	8.5	12	Y
Sunrise Acres	9.9	12	Y
Jean	4.9	12	Y
J.D. Smith	9.7	12	N

* Represents information as gathered from the AQS database.
Note: $\mu g/m^3$ = micrograms per cubic meter.

Table 4. Comparison of 24-hour $PM_{2.5}$ Design Values with NAAQS

Station	$PM_{2.5}$ Design Value ($\mu g/m^3$)	NAAQS Standard ($\mu g/m^3$)	Valid Design Value*
Green Valley	14	35	N
Jerome Mack	21	35	Y
Sunrise Acres	24	35	Y
Jean	14	35	Y
J.D. Smith	20	35	N

* Represents information as gathered from the AQS database.
Note: $\mu g/m^3$ = micrograms per cubic meter.

3. Determine representative concentrations in areas of high population density.

Presented below is an average of hourly pollutant data in 2014. The methodology varies from the NAAQS to summarize actual pollutant concentrations observed in a demographic area.

- City of Las Vegas:
  - Annual mean CO concentration of 0.496 ppm.
  - Annual mean ozone concentration of 0.032 ppm.
  - Annual mean PM_{10} concentration of 23.6 $\mu g/m^3$.
  - Average mean $PM_{2.5}$ concentration of 10.2 $\mu g/m^3$.

    - Annual mean NO_2 concentration of 0.012 ppm.

- City of Henderson:
    - Annual mean PM_{10} concentration of 18.44 μg/m^3.
    - Average mean $PM_{2.5}$ concentration of 7.31 μg/m^3.

- City of Boulder City:
    - Annual mean ozone concentration of 0.041 ppm.
    - Annual mean PM_{10} concentration of 13.9 μg/m^3.

- City of Mesquite (summer monitoring only):
    - Annual mean ozone concentration of 0.035 ppm.

4. *Determine impacts of significant sources during 2014 on air quality.*

- CO sources: vehicle and non-vehicle combustion sources; impact: zero exceedance days.
- NO_2 sources: vehicle and non-vehicle combustion sources; impact: zero exceedance days.
- $PM_{2.5}$ sources: vehicle and non-vehicle combustion sources, fugitive dust, wildfires, fireworks.
- PM_{10} sources: fugitive dust, industrial processes, vacant lands, road dust, and construction activities; impact: zero exceedance days.

5. *Determine background concentration levels.*

The results below are based on 2014 data from the Jean monitoring site.

- PM_{10}: average of 13.75 μg/m^3.
- $PM_{2.5}$: average of 5.17 μg/m^3.
- Ozone: average of 0.04 ppm.

6. *Determine extent of regional ozone transport.*

Studies show that regional transport, which may result in ozone exceedances, has a significant impact on Clark County. Smoke from wildfires contributes significantly to ozone and PM concentrations in Clark County.

7. *Determine welfare-related impacts in rural and remote areas.*

Monitoring at Jean serves a rural area, provides background levels, and can be used to indicate transport from California. Monitoring at Boulder City serves a rural population. Ozone monitoring at Mesquite serves a remote population, and the monitoring site is located at an outflow transport corridor adjacent to a jurisdictional boundary.

7.2 CLARK COUNTY AIR MONITORING NETWORK COMPLIANCE

Table 5 outlines how the network meets or exceeds the minimum monitoring requirements in 40 CFR 58.

Table 5. Number of Monitors by Pollutant

Pollutant	Monitors Required	Monitors in Service in 2014
CO	1 (at NCore)	4
Ozone	2	11
SO_2	1 (at NCore)	1
NO_2	2 (at Near-Road)	3, 0 Near-Road
PM_{10} BAM	6-10	9
$PM_{2.5}$ BAM	0	5
$PM_{2.5}$ FRM	2 + collocation	3 + collocation
Lead	1 (at NCore)	1

Note: BAM stands for beta attenuation monitor and FRM stands for federal reference method.

DAQ uses the following criteria to evaluate the placement and function of the network to meet the requirements of 40 CFR 58:

- Monitoring objectives
- AQS scale of representation
- Emission densities
- Dispersion modeling
- Special studies
- Revised monitoring strategies
- Sampling schedules
- Local population.

8.0 NETWORK ASSESSMENT ANALYSIS

DAQ analyzed the Clark County monitoring network for redundancy, possible gaps in spatial representation, and population exposure representativeness using various techniques described below. These techniques were both quantitative and qualitative. No one tool provides all information for an ideal network design, but these tools taken in conjunction can indicate what possible additions, deletions, or consolidations of monitors result in an improved and more efficient network.

The current DAQ monitoring network is provided in Figure 1, and a Clark County hydrographic area map is provided in Figure 2.

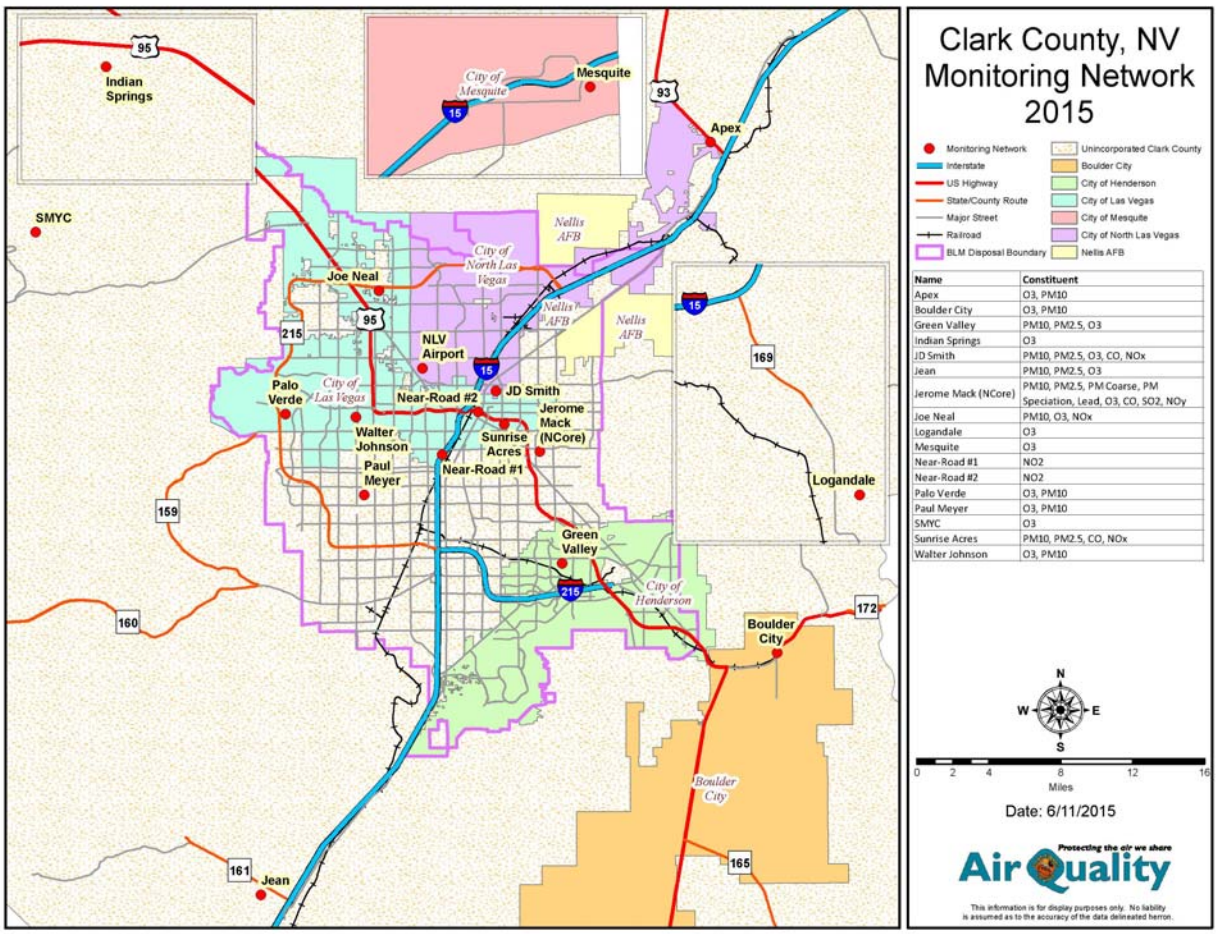

Figure 1. Clark County 2015 monitoring network.

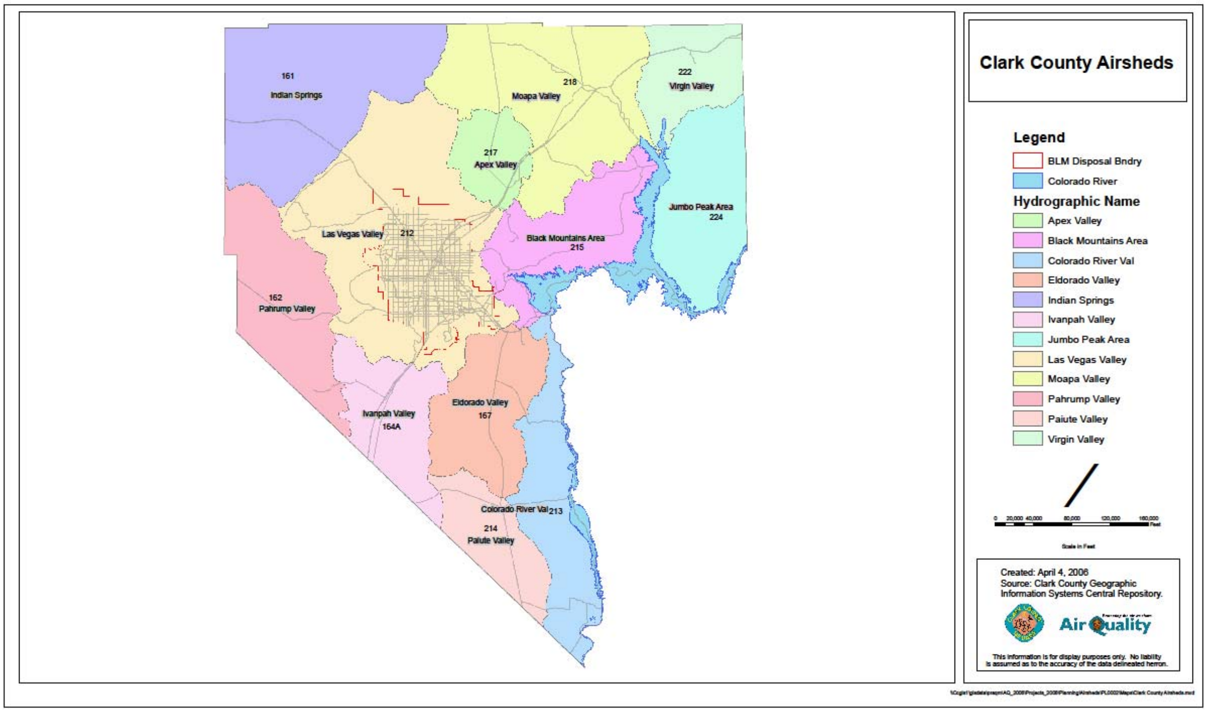

Figure 2. Clark County hydrographic areas.

8.1 STATISTICAL ANALYSIS

8.1.1 Statistical Analysis of the Ozone Monitoring Network

Ozone is a secondary pollutant, and high ozone concentrations often occur downwind of emission sources. For determining high correlations between existing monitoring stations in Clark County, DAQ utilized a monitor-to-monitor correlation technique and principal component analysis (PCA). Monitor-to-monitor correlation can help determine the temporal and spatial relationship among monitors. PCA creates new variables (termed principal components (PCs)) that are orthogonal and uncorrelated to each other. These PCs are linear combinations of the original variables and are obtained such that the first PC explains the largest fraction of the original data variability. The second PC explains a lesser fraction of the data variance than the first PC, and so forth. The data for ozone, PM_{10}, and $PM_{2.5}$ used in these analyses were obtained from EPA's AQS for 2009 through 2013. Both techniques were applied to ozone and PM_{10}, but only the monitor-to-monitor correlation technique was applied to $PM_{2.5}$ due to insufficient data for that pollutant. The data analyzed for ozone were daily maximum 8-hour average concentrations for May, June, July, and August, and the data analyzed for PM_{10} and $PM_{2.5}$ were the daily averaged concentrations for all calendar months.

Table 6 provides a statistical summary for the 10 sites analyzed for ozone:

Table 6. Statistical Summary for Ozone

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Apex	575	58.35	8.11	35.17	81.77
Mesquite	575	51.26	7.32	29.98	72.49
Paul Meyer	575	59.75	8.52	33.22	91.17
Walter Johnson	575	59.46	9.19	20.45	90.42
Palo Verde	575	60.04	8.53	34.1	88.42
Joe Neal	575	61.47	8.87	34.49	90.21
Winterwood	575	57.17	8.53	24.79	80.93
Boulder City	575	57.04	8.54	27.78	81.36
Jean	575	59.67	8.25	34.41	84.9
J.D. Smith	575	58.04	8.94	16.13	80.15

Table 7 shows the results from the monitor-to-monitor correlation technique. Paul Myers, Walter Johnson, and Palo Verde are very highly correlated (>.90) to each other; this can be explained because these monitors are frequently downwind from ozone precursor sources. Winterwood (now closed) is highly correlated (>.90) to Apex and J.D. Smith, which may be due to its upwind location.

Table 7. Correlation for Ozone

Site	Apex	Mesquite	Paul Meyer	Walter Johnson	Palo Verde	Joe Neal	Winterwood	Boulder City	Jean	J.D. Smith
Apex	1.0000	--	--	--	--	--	--	--	--	--
Mesquite	0.7689	1.0000	--	--	--	--	--	--	--	--
Paul Meyer	0.8091	0.6275	1.0000	--	--	--	--	--	--	--
Walter Johnson	0.7492	0.5829	0.9321	1.0000	--	--	--	--	--	--
Palo Verde	0.7851	0.5973	0.9491	0.9256	1.0000	--	--	--	--	--
Joe Neal	0.7947	0.5295	0.8823	0.8921	0.9124	1.0000	--	--	--	--
Winterwood	0.9218	0.7211	0.8685	0.7914	0.8112	0.8076	1.0000	--	--	--
Boulder City	0.8703	0.7910	0.7471	0.6641	0.6832	0.6426	0.8782	1.0000	--	--
Jean	0.7841	0.6539	0.8588	0.7796	0.8271	0.7498	0.8355	0.7712	1.0000	--
J.D. Smith	0.8617	0.6142	0.8875	0.8638	0.8670	0.8924	0.9043	0.7538	0.7785	--

Tables 8 and 9 show the results from the PCA technique. Considering the criteria (eigenvalues greater than 0.824 and cumulative variances greater than 89.7%) two PCs in Table 8 were selected. The eigenvectors in Table 9 indicate the influence of the analyzed data at sites on the PCs. PC1 has roughly equivalent influences on all sites, although the Mesquite site is slightly less influenced. Paul Meyer, Water Johnson, Joe Neal, and Palo Verde indicate similar influence patterns on PC2. The results indicate that Paul Meyer, Water Johnson, and Palo Verde have redundant measurements, and that Winterwood has redundant measurements to Apex and J.D. Smith.

Table 8. Results of the PCA Application for Ozone with 575 Observations

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	8.152760	7.328350	0.815300	0.815300
Comp2	0.824408	0.527685	0.082400	0.897700
Comp3	0.296724	0.032826	0.029700	0.927400

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp4	0.263898	0.128922	0.026400	0.953800
Comp5	0.134976	0.032389	0.013500	0.967300
Comp6	0.102589	0.028327	0.010300	0.977500
Comp7	0.074262	0.009580	0.007400	0.985000
Comp8	0.064682	0.011508	0.006500	0.991400
Comp9	0.053174	0.020644	0.005300	0.996700
Comp10	0.032530	--	0.003300	1.000000

Table 9. Eigenvectors of PCs for Ozone

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Comp8	Comp9	Comp10
Apex	0.3237	0.2399	-0.3603	0.1080	0.3186	0.3110	-0.4885	-0.4253	0.2516	-0.1233
Mesquite	0.2642	0.5850	0.4992	0.4975	0.1852	-0.1773	0.0924	0.1045	-0.0713	-0.0316
Paul Meyer	0.3336	-0.2114	0.1888	-0.0926	-0.2785	-0.1026	-0.3872	0.2193	-0.1614	-0.6983
Walter Johnson	0.3189	-0.3228	0.2521	0.2013	-0.4053	-0.1124	0.1036	-0.6784	-0.0215	0.2041
Palo Verde	0.3258	-0.2979	0.2494	0.0613	-0.0015	0.2783	-0.3186	0.4610	0.2710	0.5237
Joe Neal	0.3162	-0.3475	-0.1681	0.2646	0.3298	0.4190	0.4854	0.0958	-0.3475	-0.1761
Winterwood	0.3318	0.1496	-0.3492	-0.1570	-0.0194	-0.3195	-0.2005	0.0777	-0.6536	0.3809
Boulder City	0.3016	0.4478	-0.1747	-0.2269	-0.5814	0.3797	0.3293	0.1238	0.1433	-0.0094
Jean	0.3123	0.0254	0.3538	-0.7242	0.4147	-0.0734	0.2057	-0.1574	0.0880	-0.0053
J.D. Smith	0.3282	-0.1352	-0.3921	0.1319	0.0565	-0.5865	0.2531	0.1791	0.5054	-0.0631

8.1.2 Statistical Analysis of the PM_{10} Monitoring Network

PM_{10} is a pollutant that is directly emitted from sources. Sunrise Acres and J.D. Smith are urban sites with abundant anthropogenic emissions, Jean is a rural site with little anthropogenic emissions, and others are suburban sites. The following table provides a statistical summary for the 8 sites analyzed:

Table 10. Statistical Summary for PM_{10}

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Paul Meyer	1572	17.7226	10.2986	2.92	158.19
Palo Verde	1572	13.4084	10.3170	0.65	204.48
Joe Neal	1572	20.26461	12.54427	2.32	217.56
Green Valley	1572	18.16228	11.71207	1.2	189.24
Sunrise Acres	1572	25.2699	14.8486	4.02	257.6
Boulder City	1572	13.7761	15.55473	2.42	302.12
Jean	1572	12.28905	10.75937	1.78	159.63
J.D. Smith	1572	25.945	13.53099	4.61	228.9

Table 11 shows the results the of monitor-to-monitor correlation technique. Jean is relatively less correlated to Joe Neal, Sunrise Acres, J.D. Smith, and Boulder City. Sunrise Acres and J.D. Smith are very highly correlated (>0.92). Both correlations can be explained by emission source locations relative to the monitoring sites.

Table 11. PM_{10} Correlation

Site	Paul Meyer	Palo Verde	Joe Neal	Green Valley	Sunrise Acres	Boulder City	Jean	J.D. Smith
Paul Meyer	1.0000	--	--	--	--	--	--	--
Palo Verde	0.8885	1.0000	--	--	--	--	--	--
Joe Neal	0.8749	0.8560	1.0000	--	--	--	--	--
Green Valley	0.8538	0.8134	0.7912	1.0000	--	--	--	--
Sunrise Acres	0.7760	0.7180	0.7713	0.7703	1.0000	--	--	--
Boulder City	0.7797	0.7684	0.7480	0.7923	0.6647	1.0000	--	--
Jean	0.7652	0.7384	0.6679	0.7502	0.5730	0.6704	1.0000	--
J.D. Smith	0.8195	0.7909	0.8169	0.8046	0.9228	0.7228	0.6239	1.0000

Table 12 shows the results of the PCA application for PM_{10} at all monitoring sites. Considering the same criteria of ozone, two PCs were selected. The eigenvectors in Table 13 indicate the influence of the original sites on the PCs. PC1 had roughly equivalent contributions for all sites. In PC2, Jean contributes the highest influence, and Sunrise Acres and J.D. Smith have the similar, relatively high influence. The results of these two techniques indicate that Sunrise Acres and J.D. Smith have redundant measurements.

Table 12. Results of the PCA Application for PM_{10} with 1,572 Observations

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	6.397380	5.850240	0.7997	0.7997
Comp2	0.547139	0.236504	0.0684	0.8681
Comp3	0.310635	0.029672	0.0388	0.9069
Comp4	0.280963	0.116667	0.0351	0.9420
Comp5	0.164296	0.031239	0.0205	0.9626
Comp6	0.133057	0.033911	0.0166	0.9792
Comp7	0.099146	0.031760	0.0124	0.9916
Comp8	0.067386	--	0.0084	1.0000

Table 13. Eigenvectors of PCs for PM_{10}

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Comp8
Paul Meyer	0.3743	0.0909	0.0194	-0.2769	-0.1416	0.0061	-0.8559	-0.1479
Palo Verde	0.3641	0.1478	-0.1046	-0.4598	-0.0401	-0.7012	0.2848	0.2208
Joe Neal	0.3618	-0.0837	-0.1541	-0.5365	0.1316	0.6662	0.2982	0.0241
Green Valley	0.3639	0.0880	0.0132	0.3067	-0.8384	0.1351	0.2108	-0.0094
Sunrise Acres	0.3431	-0.5688	0.2656	0.2442	0.1465	0.0006	-0.1160	0.6274
Boulder City	0.3395	0.1968	-0.7321	0.4575	0.3099	0.0008	-0.0538	0.0423
Jean	0.3184	0.6270	0.5788	0.2076	0.3291	0.0984	0.0965	0.0094
J.D. Smith	0.3601	-0.4469	0.1524	0.1344	0.1799	-0.1912	0.1651	-0.7302

8.1.3 Statistical Analysis of Current $PM_{2.5}$ Monitoring Network

$PM_{2.5}$ can be directly emitted from sources or formed by the oxidation of other pollutants. Much of $PM_{2.5}$ is not regional, and there can be significant short-term impacts from blowing dust and diesel emissions. When meteorological conditions change, ground-level $PM_{2.5}$ concentrations shift within the valley. Figure 3 shows the Clark County $PM_{2.5}$ emissions inventory by source sector. Figures 4 through 8 are examples of the changing locations of $PM_{2.5}$ emissions on different days based on Sparse Matrix Operational Kernel Emissions (SMOKE) modeling system. While steady $PM_{2.5}$ emissions are always significant in the center of the Las Vegas Valley, meteorology clearly plays a significant role on source emission locations.

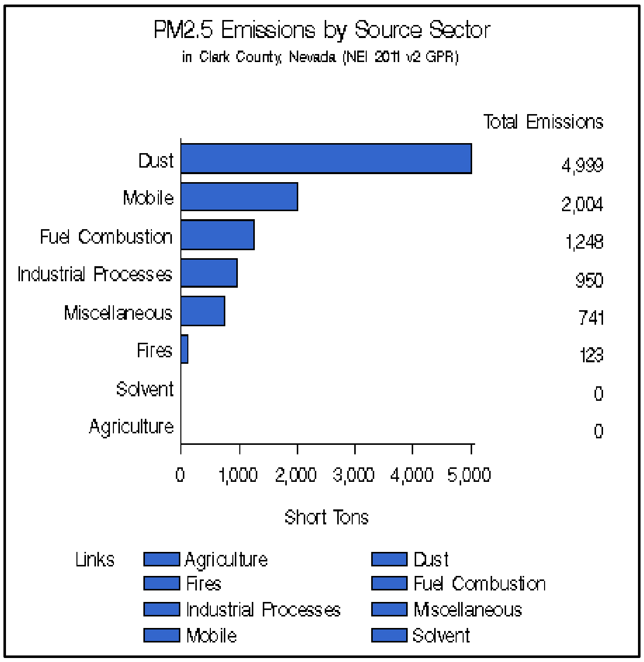

Figure 3. Clark County $PM_{2.5}$ emissions by source sector. [14]

[14] Generated from EPA emissions inventory website: http://www.epa.gov/cgi-bin/broker?_service=data&_debug=0&_program=dataprog.state_1.sas&pol=PM25_PRI&stfips=32

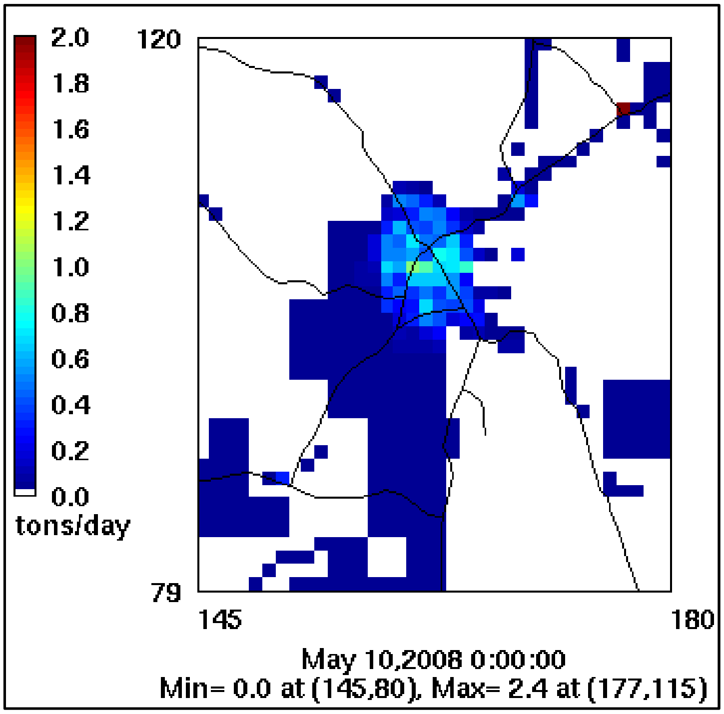

Figure 4. May 10, 2008 $PM_{2.5}$ emissions by location.

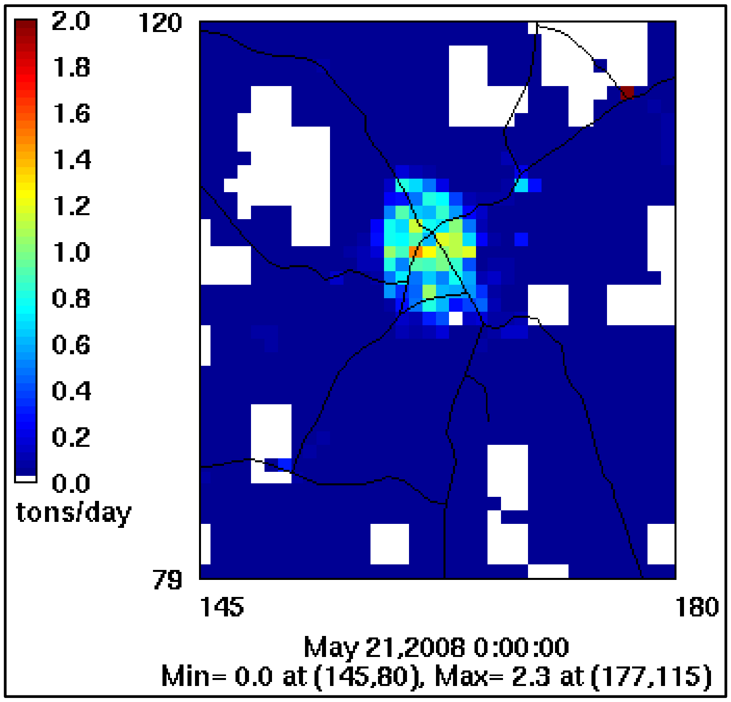

Figure 5. May 21, 2008 $PM_{2.5}$ emissions by location.

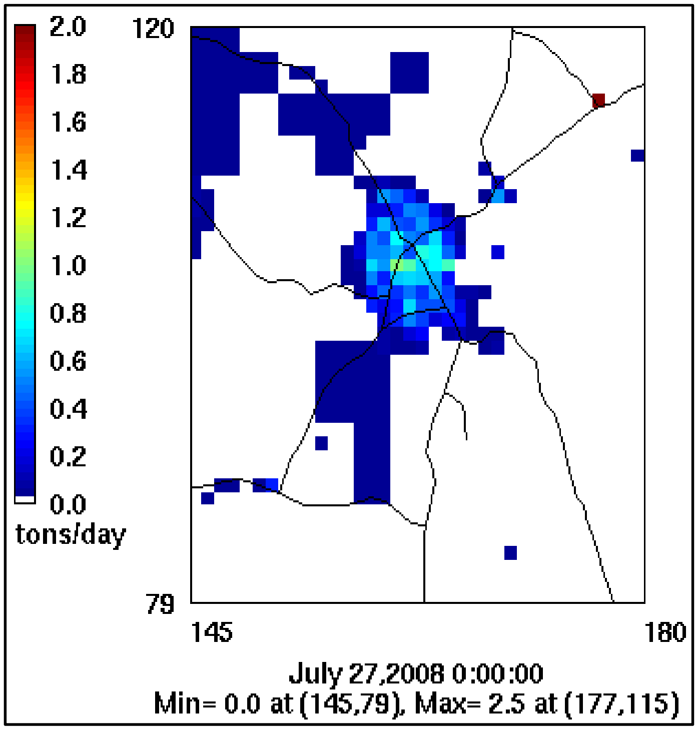

Figure 6. July 27, 2008 $PM_{2.5}$ emissions by location.

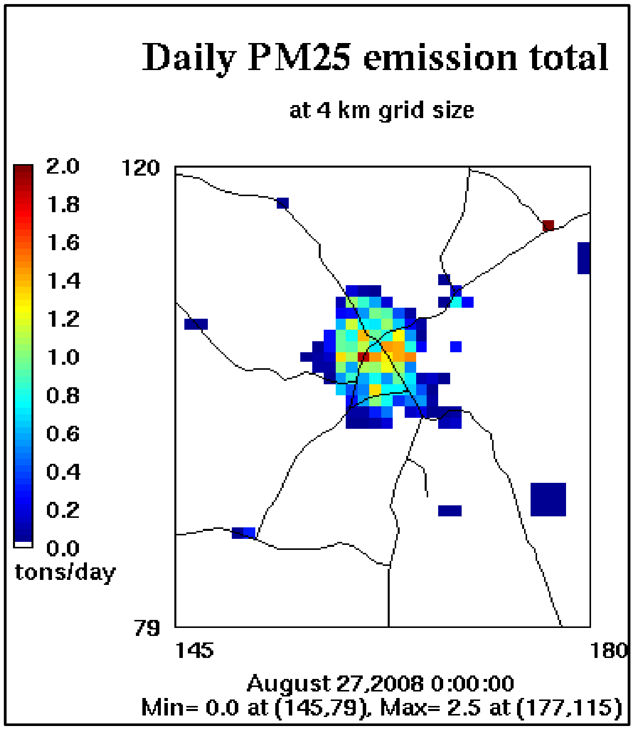

Figure 7. August 27, 2008 $PM_{2.5}$ emissions by location.

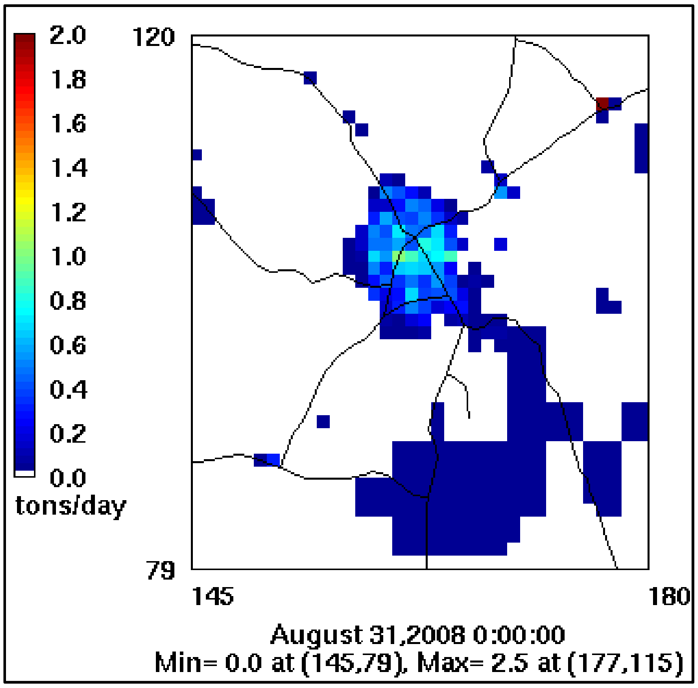

Figure 8. August 31, 2008 $PM_{2.5}$ emissions by location.

The following table provides a statistical summary for the 5 current $PM_{2.5}$ monitoring sites analyzed:

Table 14. Statistical Summary for $PM_{2.5}$

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Green Valley	90	6.912444	1.995863	3.07	14.79
Jerome Mack	864	8.361829	5.081157	0.20	44.80
Sunrise Acres	869	9.652060	5.635141	1.30	61.20
J.D. Smith	587	8.754906	4.349347	0.80	41.90
Jean	732	4.976503	3.261369	0.10	28.51

As mentioned, PCA was not applied to $PM_{2.5}$ in this current network analysis because of an insufficient number of observations. The result of monitor-to-monitor correlation technique, however, was applied and is shown in Table 15. Sunrise Acres, J.D. Smith, and Jerome Mack are highly correlated (>0.82) to each other, and Jean is considerably less correlated to those monitors. Like PM_{10}, this can be explained by the emission source locations relative to the monitoring sites. Based on the results outlined in Table 15, Sunrise Acres, J.D. Smith, and Jerome Mack indicate redundant measurements.

Table 15. $PM_{2.5}$ Correlation

Correlation/No. of Obs.	Green Valley	Jerome Mack	Sunrise Acres	J.D. Smith	Jean
Green Valley	1/90	--	--	--	--
Jerome Mack	0.6371/90	1/864	--	--	--
Sunrise Acres	0.5914/90	0.8479/652	1/869	--	--
J.D. Smith	0.6474/90	0.8246/367	0.8226/561	1/587	--
Jean	0.4601/87	0.0428/518	0.1996/703	0.3423/485	1/732

8.1.4 Statistical Analysis of the Historical $PM_{2.5}$ Monitoring Network

Due to budget restraints, lease issues, and other concerns in past years, the following six $PM_{2.5}$ monitoring sites had been discontinued in Clark County: E. Charleston, E. Craig, Palo Verde, E. Sahara, Boulder City, and Apex. The first four are within the Las Vegas Valley (Hydrographic Area 212), and the Boulder City site and the Apex site are in adjoining hydrographic areas (see Figure 2). As part of this network assessment analysis, DAQ reviewed the closing of these six $PM_{2.5}$ monitoring sites to determine if the reopening of any should occur due to non-redundancy with the current $PM_{2.5}$ network in conjunction with other considerations.

Figure 9 shows the locations of the Clark County's historical $PM_{2.5}$ monitors.

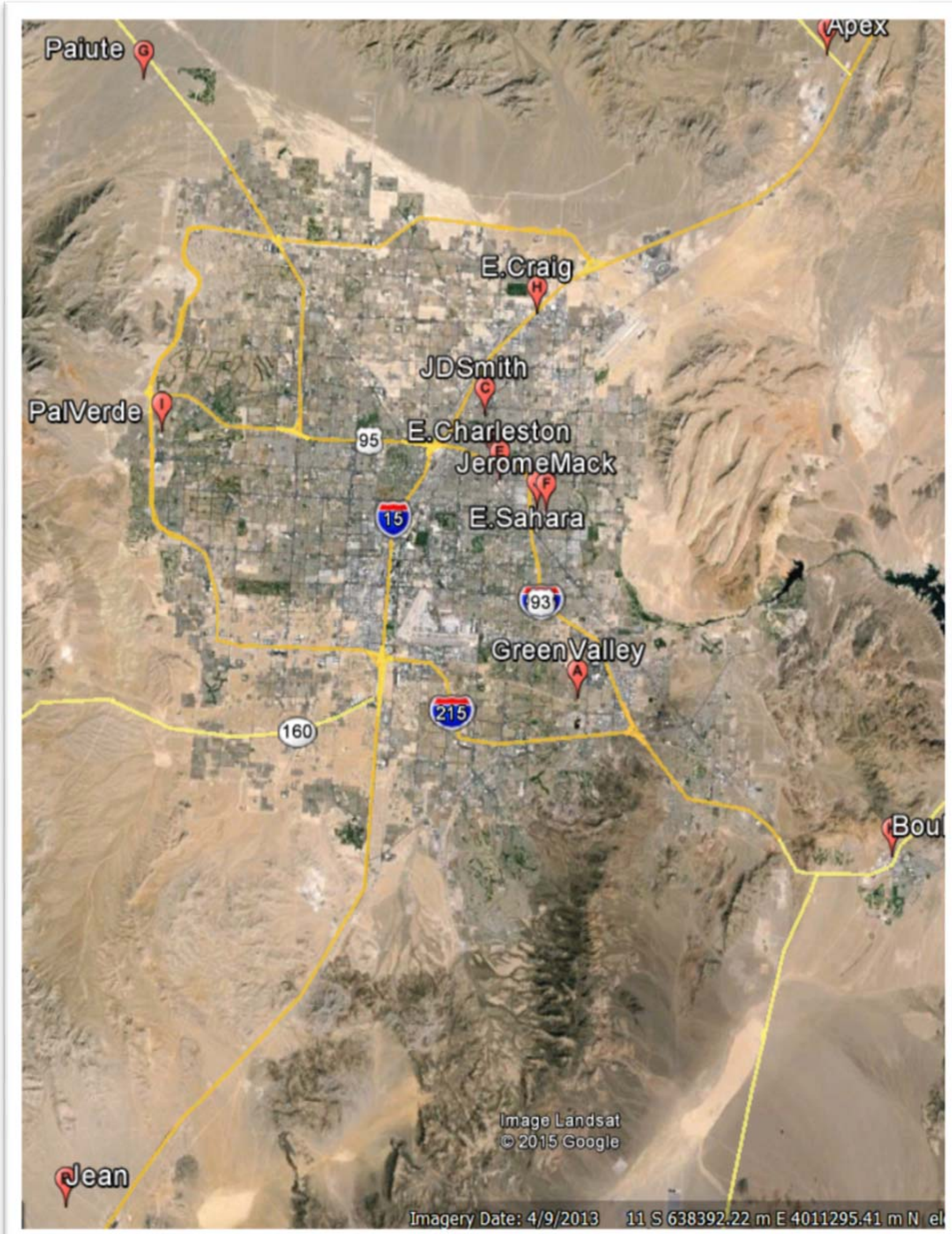

Figure 9. Monitor location map of historical $PM_{2.5}$ sites.

For the historical $PM_{2.5}$ monitoring analysis, both monitor-to-monitor correlation and PCA methods were employed. The historical data in AQS falls into two parameter codes, as outlined in Table 16.

Table 16: $PM_{2.5}$ Parameter Codes

Parameter Name	Parameter Code	Purpose
$PM_{2.5}$ Local Conditions	88101	Appropriate code for all FRM/FEM/ARMs
Acceptable $PM_{2.5}$ AQI & Speciation Mass	88502	Valid data that does reasonably match the FRM with or without correction, but not to be used in NAAQS decisions.

Note: FEM stands for federal equivalent method and ARM stands for approved regional method.

Tables 17 and 18 list which monitors used in this analysis contained AQS data for the two applicable parameter codes and for what years of operation.

Table 17: Valid Data for Parameter Code 88101

Year	Green Valley	Jean	J.D. Smith	Sunrise Acres	E. Charleston	Jerome Mack	Paiute
2001	x	x	x	--	x	--	--
2002	x	x	x	--	x	--	--
2003	x	x	x	--	x	--	--
2004	x	x	x	x	x	--	--
2005	x	x	x	x	--	--	--
2006	x	x	x	x	--	--	--
2007	x	x	x	x	--	--	--
2008	--	x	x	x	--	--	--
2009	--	x	x	x	--	--	--
2010	--	x	x	x	--	x	--
2011	--	x	--	x	--	x	--
2012	--	x	x	x	--	x	--
2013	x	x	x	x	--	x	x

Table 18: Valid Data for Parameter Code 88502

Year	Green Valley	Jean	J.D. Smith	Sunrise Acres	E. Craig	Palo Verde	E. Sahara	Boulder City	Apex
2001	--	--	--	--	--	--	--	--	--
2002	--	--	--	--	--	--	--	--	--
2003	--	--	--	--	--	--	--	--	--
2004	--	--	--	--	--	--	--	--	--
2005	x	--	x	x	x	x	x	x	--
2006	x	--	x	x	x	x	x	--	--
2007	x	x	x	x	x	x	x	--	x
2008	x	x	x	x	x	--	--	--	x
2009	x	x	x	x	x	--	--	--	x
2010	x	x	x	x	x	--	--	--	x
2011	x	x	x	x	--	--	--	--	--
2012	x	x	x	x	--	--	--	--	--
2013	x	x	--	--	--	--	--	--	--

Table 19 provides a statistical summary of the 7 sites analyzed using parameter code 88101 data, and Table 20 provides a statistical summary for the 9 sites analyzed using parameter code 88502 data.

Table 19: Statistical Summary for Parameter Code 88101

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Green Valley	815	6.110331	3.186461	1.1	59.5
Jerome Mack	864	8.361829	5.081157	0.2	44.8
E. Charleston	1128	10.90683	6.954879	1.2	84.6
Sunrise Acres	2046	9.338612	5.591457	1.3	61.2
Jean	1626	4.402276	2.816526	0.1	28.51
J.D. Smith	1501	8.890893	4.567679	0.8	48.5
Paiute	265	3.706981	4.731896	0	49.96

Table 20: Statistical Summary for Parameter Code 88502

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
E. Craig	2026	8.398806	3.875275	0	46.88
Apex	1282	5.771661	2.976263	0.66	31.2
Palo Verde	815	6.03692	2.852014	0	28.67
Green Valley	3129	6.295759	2.981269	0	61.75
E. Sahara	827	9.843531	5.059547	0	38
Sunrise Acres	2610	9.943655	5.224895	0	78.75
Boulder City	189	4.347355	2.309907	1.25	15.75
Jean	2056	5.279494	2.647643	0.1	32.99
J.D. Smith	2843	9.236243	4.362398	0	67.25

Table 21 shows the results from the monitor-to-monitor correlation technique using parameter code 88502 data, and Table 22 shows the results of the monitor-to-monitor correlation technique using parameter code 88101 data.

Table 21: $PM_{2.5}$ Correlation for Parameter Code 88502

88502	Green Valley	Jean	J.D. Smith	Sunrise Acres	E. Craig	Palo Verde	E. Sahara	Boulder City	Apex
Green Valley	1.00	--	--	--	--	--	--	--	--
Jean	0.55	1.00	--	--	--	--	--	--	--
J.D. Smith	0.68	0.42	1.00	--	--	--	--	--	--
Sunrise Acres	0.56	0.32	0.81	1.00	--	--	--	--	--
E. Craig	0.64	0.64	0.65	0.52	1.00	--	--	--	--
Palo Verde	0.72	NA	0.56	0.32	0.63	1.00	--	--	--
E. Sahara	0.59	NA	0.78	0.90	0.57	0.43	1.00	--	--
Boulder City	0.81	NA	0.53	0.32	0.66	0.77	0.54	1.00	--
Apex	0.56	0.73	0.44	0.37	0.66	0.62	0.08	NA	1.00

Table 22: $PM_{2.5}$ Correlation for Parameter Code 88101

88101	Green Valley	Jean	J.D. Smith	Sunrise Acres	E. Charleston	Jerome Mack	Paiute
Green Valley	1.00	--	--	--	--	--	--
Jean	0.51	1.00	--	--	--	--	--
J.D. Smith	0.71	0.30	1.00	--	--	--	--
Sunrise Acres	0.52	0.21	0.84	1.00	--	--	--
E. Charleston	0.51	0.06	0.86	NA	1.00	--	--
Jerome Mack	0.64	0.04	0.82	0.85	NA	1.00	--
Paiute	0.53	0.52	0.34	0.13	NA	-0.03	1.00

With regard to the closed $PM_{2.5}$ monitoring stations based on correlation, the following conclusions are made:

- The E. Charleston site, which was replaced by the Sunrise Acres site, correlates highly (0.86) with the J.D. Smith site.
- The E. Sahara site, which was replaced by the Jerome Mack site, correlates highly (0.90) with the Sunrise Acres site.
- The Craig Road site did not correlate with any existing site for $PM_{2.5}$. Note that the readings for $PM_{2.5}$ at this site were only moderate.
- The Boulder City site correlated highly (0.81) with the Green Valley site. These sites may often be reading the same air mass, but because they are in different hydrographic areas, they are not necessarily redundant. Note that the readings for $PM_{2.5}$ at this site were relatively low.
- The Apex site did not correlate with any existing site for $PM_{2.5}$. Note that Apex is in a different hydrographic area than the other sites, and that the readings for $PM_{2.5}$ were relatively low.
- The Palo Verde site did not correlate with any existing site for $PM_{2.5}$. Note that the readings for $PM_{2.5}$ at this site were relatively low.

PCA was conducted to backup or refine the monitor-to-monitor correlation method. Appendix E of this document outlines the results of this PCA analysis. No definitive conclusion, however, could be made from this method, most likely because the number of observations for this historical analysis was not great enough. The variance (cumulative) generally required two components to consider, but the two components did not effectively support each other. The monitor-to-monitor correlation method, however, was deemed adequate by itself to draw supported conclusions for this historical $PM_{2.5}$ network analysis.

8.2 HIGH OZONE SITE ANALYSIS

In EPA's 2012 Technical System Audit of DAQ, Finding Number 2 instructed DAQ to assess the maximum ozone concentration within Clark County. DAQ responded that it would address this EPA finding in this 2015 Network Assessment.

Summer studies of ozone monitoring at the Spring Mountain Youth Camp site (operating in 2010-2012) revealed higher 8-hour design value estimate concentrations (by approximately 5 parts per billion (ppb)) than the currently listed maximum ozone SLAMS monitor at the Joe Neal site. Spring Mountain Youth Camp was the only summer study site (of several that were in operation between 2010 and 2012) to operate for three consecutive years.

Ozone at the Spring Mountain Youth Camp site was measured using FEM instruments, which have been approved by EPA as appropriate for NAAQS comparison. Due to the site's high elevation (~8400 ft), however, operational boundaries specified by the FEM instrument designation may not have been within range.

Due to its special purpose nature, the Spring Mountain Youth Camp summer study site was not set up to meet the quality assurance criteria of 40 CFR 58 Appendix A. Accordingly, DAQ excluded summer ozone study seasonal monitors from its Annual Data Certification package submitted for 2011 calendar year data. Siting criteria of 40 CFR 58 Appendix E was also not adhered to for the Spring Mountain Youth Camp site.

Previous ozone saturation studies have shown that the maximum concentration of ozone should occur at or near the Paiute Indian Reservation, located approximately eight miles northwest of Las Vegas. In the last five years, DAQ has worked with the Paiute Indians and EPA to implement ozone monitoring at their reservation. The first data set was submitted to AQS for the first and second quarter of 2013.

DAQ made an assessment of the maximum ozone concentrations in Clark County and found that the high monitoring site is on the Las Vegas Paiute Tribe's land, outside of Clark County jurisdiction. The next highest ozone concentration is the Joe Neal site, located southeast of the Tribe.

Paiute ozone monitoring started on January 1, 2013. In 2013 a total of 11 ozone exceedance days were recorded in Clark County. Seven of the 11 exceedance days had the highest reading at the Paiute site. In 2014, there were six ozone exceedance days in Clark County. Two of those six exceedance days had the highest reading at the Paiute site.

DAQ has monitored at Indian Springs, located northwest of the Paiute Tribe, during summer months of 2010, 2014, and 2015. After reviewing the ozone data for multiple years for the Joe Neal site, the Paiute Tribe's site, and the Indian Springs site, ozone concentrations decline when moving away from the Paiute Tribe's site in directions toward both Joe Neal and Indian Springs. DAQ has assessed that the high ozone concentration in the Clark County geographic area is on the Las Vegas Paiute Tribe's land, and that the highest site within Clark County's jurisdiction is the Joe Neal site. Indians Springs is lower than either.

The following site location information and map (Figure 10) are provided for clarity:

- Las Vegas Paiute Air Monitoring Site, EPA site number: 32-003-8000
  +36.357814, -115.361415
- Joe Neal Air Monitoring Site, EPA site number: 32-003-0075
  +36.270583, -115.238256
- Indian Springs Monitoring Site, EPA site number: 32-003-7772
  +36.569444, -115.676667

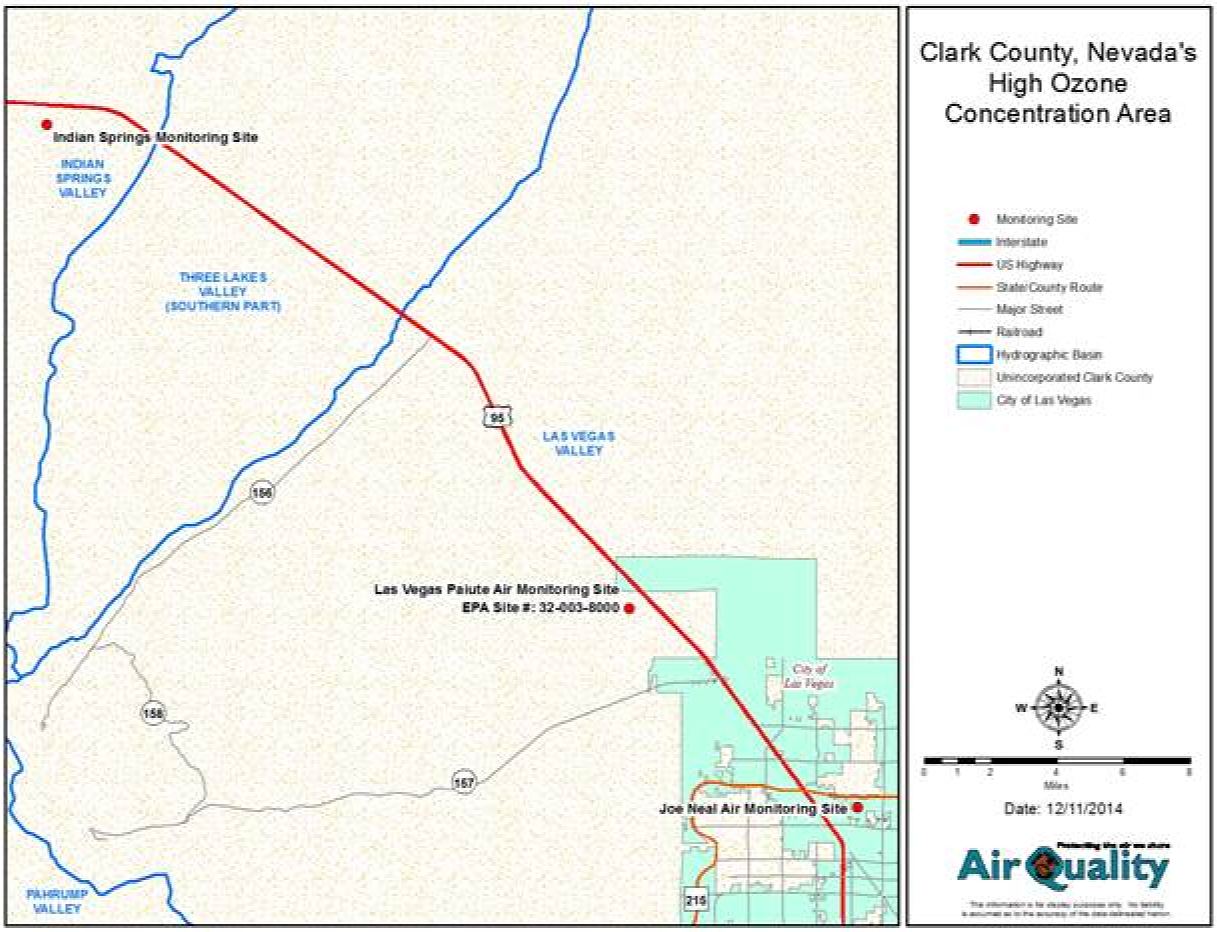

Figure 10. Clark County's high ozone area.

Figure 11 is a chart showing the current 8-hour ozone design values for Indian Springs, the Paiute Tribe, and the Joe Neal monitors.

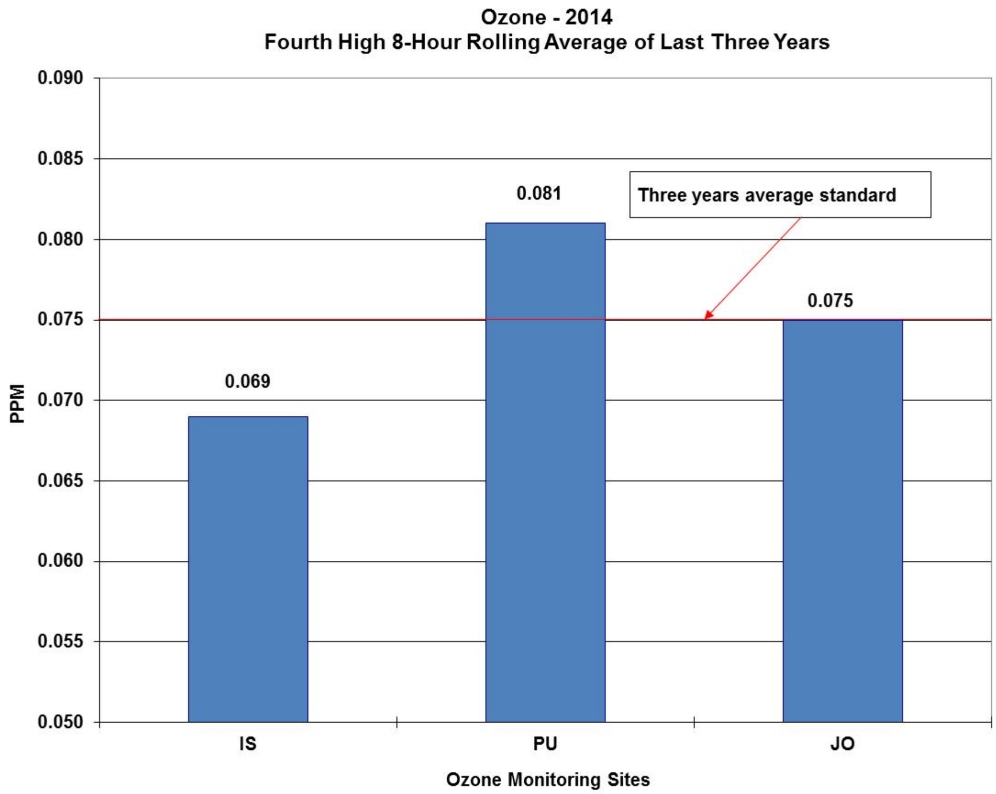

Figure 11. Ozone – 2014 Fourth High 8-Hour Rolling Average of Last Three Years

In 2015, DAQ submitted this information to EPA in a Finding Corrective Action Form. EPA performed an initial review of the submittal and asked that DAQ provide additional information with consideration to the entire Clark County ozone monitoring network. Appendix F of this document outlines the data used for this analysis, and Figure 12 is a chart summary of the finding.

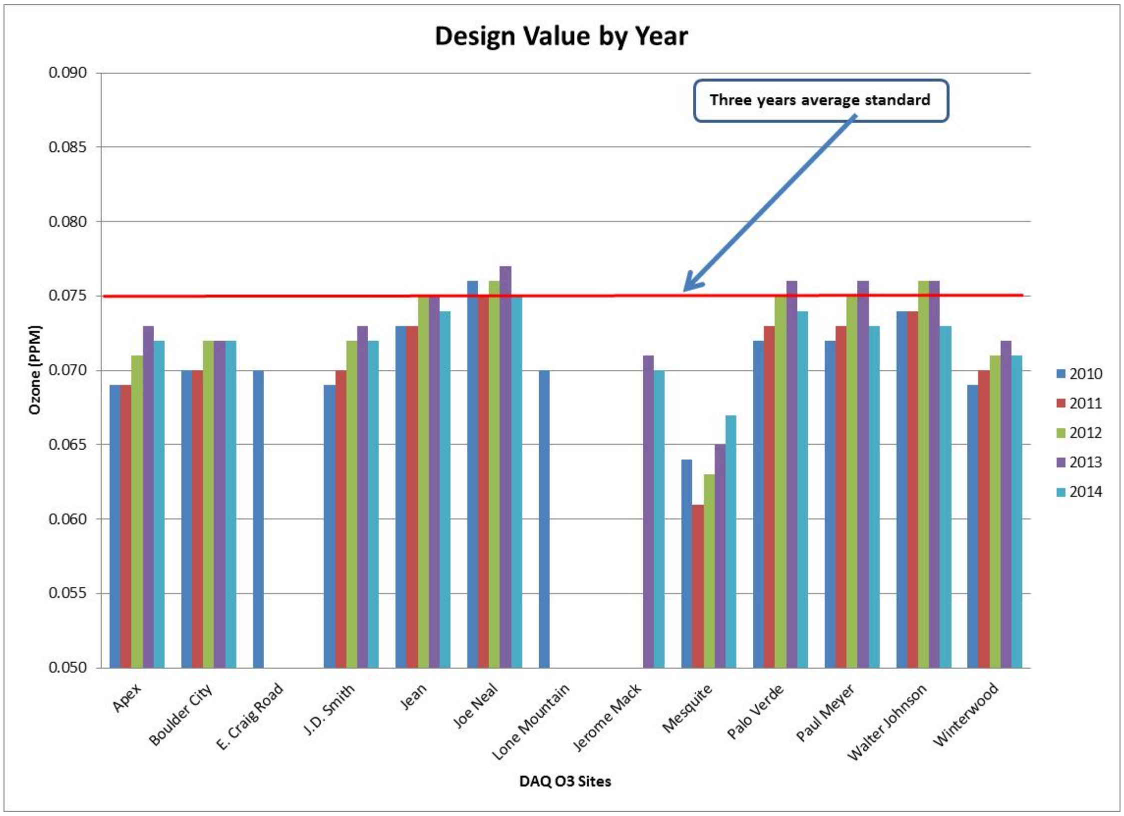

Figure 12. Fourth-High 8-Hour Rolling 3-Year Averages.

From Figure 12, Joe Neal is the high ozone site within DAQ's jurisdiction in Clark County. Figure 11 indicates that the ozone concentrations are notably higher on the Paiute Tribal land than at Joe Neal. Within DAQ's jurisdiction, the Palo Verde, Paul Meyer, and Walter Johnson sites are relatively high within the Clark County network. All three of these monitors are in the western portion of the Las Vegas Valley, indicating increasingly concentrations of ozone while approaching Joe Neal to the northwest, and even higher concentrations occurring further northwest on the Paiute Tribal land.

8.3 MONITOR CONSOLIDATION

As outlined in the Clark County 2015 Annual Network Plan, DAQ intends to shut down criteria pollutant monitoring at the Sunrise Acres and J.D. Smith sites and deploy as one combined site currently slated for Cecile Avenue (approximate GPS coordinates: + 36.214582°, -115.093097°).

Although historical monitoring data has been acceptable from both Sunrise Acres and J.D. Smith, DAQ notes that these sites are not optimally sited and may be subject to local pollution influences. The statistical analysis, outlined in Sections 8.1.2 and 8.1.3 of this report, indicates the Sunrise Acres and J.D. Smith sites have redundant measurements. This analysis supports the shutting down/combining of the Sunrise Acres and J.D. Smith sites.

At the Cecile Avenue site, DAQ is expecting to deploy criteria pollutant SLAMS monitors, including ozone, CO, NO_2 (or NO_x), PM_{10} and $PM_{2.5}$, which will be either FRM or FEM. Monitoring objectives are expected to be for NAAQS comparison, population exposure, highest concentration site type, and neighborhood spatial scale. For shutdown of the Sunrise Acres and J.D. Smith sites and deployment of the Cecile Avenue monitoring site, DAQ will submit to EPA for its consideration a formal request in accordance with 40 CFR 58.14 at the time DAQ determines that this new site is a viable location. The anticipated date of monitor consolidation at Cecile Avenue is June 2016.

Figure 13 shows the site location of J.D. Smith, Sunrise Acres, and proposed Cecile Avenue.

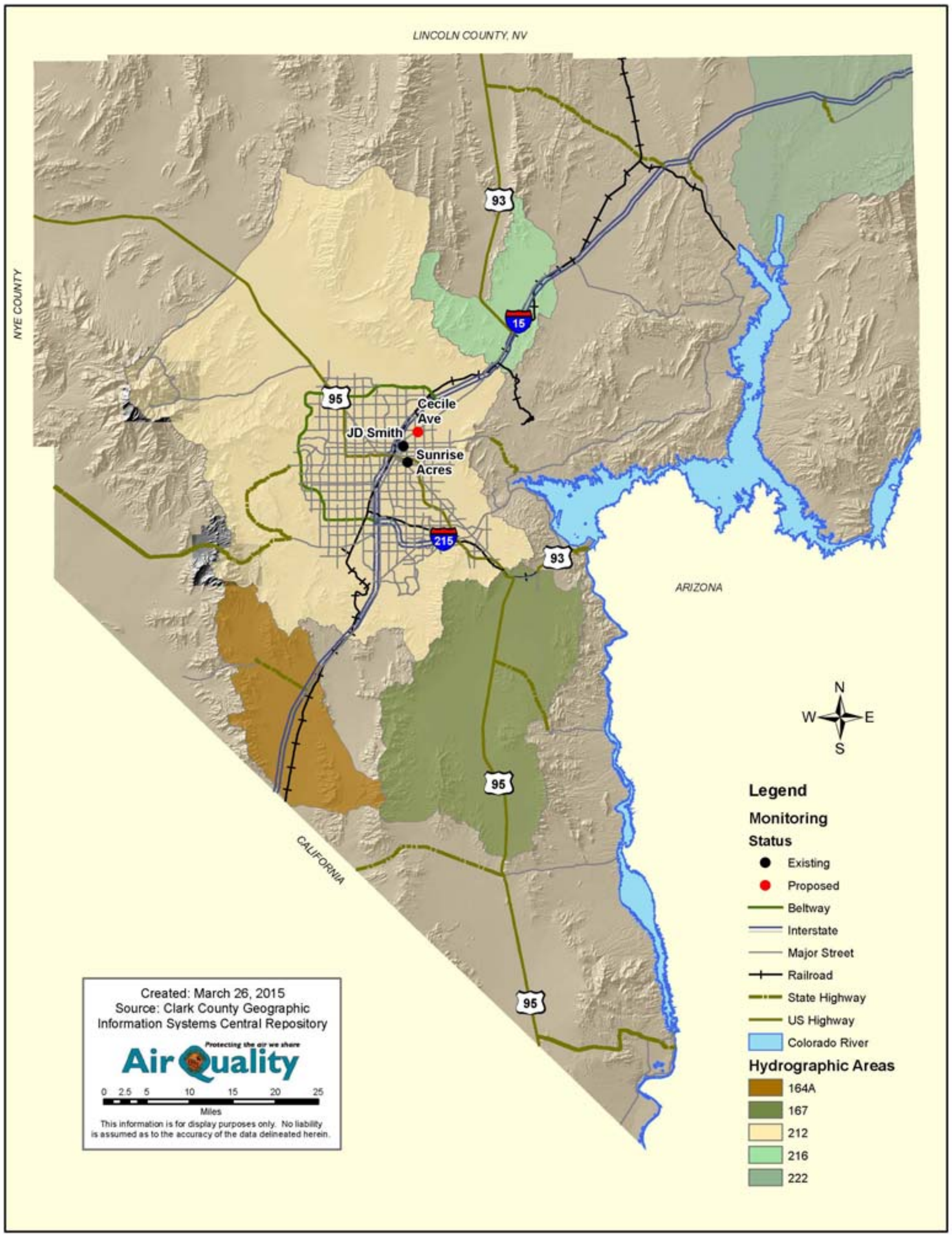

Figure 13. Proposed consolidation of Sunrise Acres and J.D. Smith on Cecile Avenue.

8.4 MONITORING SITE RELOCATIONS

DAQ is proposing to relocate the Boulder City and the Mesquite monitoring sites. The current Boulder City monitoring location (see Figure 1) is in a split-flow corridor, does not have neighborhood representation, and cannot properly accommodate meteorological measurements. The proposed new site, which is slated to be at Garrett Junior High School, can address a number of these issues and is expected to be a good indicator of population exposure. This deployment is outlined in the Clark County 2015 Annual Network Plan, and the anticipated date of change is in 2016. The Boulder City site currently monitors for ozone and PM_{10}. The site had also monitored for $PM_{2.5}$ for a short time in the past, and DAQ is considering redeployment of $PM_{2.5}$ after relocation.

Due to siting issues at the Mesquite monitoring location (see Figure 1), DAQ is investigating an alternate location where ozone and PM_{10} can be effectively monitored. The current location monitors ozone during the summer months only, but the new location is expected to monitor ozone and PM_{10} on a year-round basis. DAQ is still exploring potential site locations. DAQ expects the new location in Mesquite (Virgin Valley airshed, Hydrographic Area 222) to have NAAQS-compliant SLAMS monitoring.

8.5 POPULATION EXPOSURE, SPATIAL REPRESENTATION ANALYSIS, RESEARCH, AND PUBLIC INFORMATION

Important factors for siting air quality monitors include adequate spatial representation and clear monitoring objectives. Air quality agencies also have an obligation to protect communities and populations under their jurisdiction. Adequate population exposure and representation are important monitoring objectives that DAQ strives to achieve. Additionally, through the Annual Network Plan process, DAQ communicates with stakeholders and EPA. Through this process DAQ develops monitoring commitments that are planned and carried out as feasible.

This following outlines proposed network updates based on spatial representation, population exposure/representation, research, public information, and items developed or committed to in DAQ's Annual Network Plans:

- <u>Proposed deployment of SLAMS PM and ozone monitoring in the southwest area of the Las Vegas Valley:</u>

  In an effort to improve PM and ozone monitoring spatial coverage, DAQ intends to deploy SLAMS PM and ozone monitoring in the southwestern part of the Las Vegas Valley. This monitoring will provide greater spatial representation as indicated by the $PM_{2.5}$ Continuous Monitoring Network map, the PM_{10} Monitoring Network map, and the ozone Monitoring Network map (see Figures 14-17). This deployment is outlined in the Clark County 2015 Annual Network Plan. This proposed site (approximate GPS coordinates: +36.013353°, -115.237265°) is expected to be deployed in 2016. Clark County parks and schools are currently being considered as primary locations. Monitoring objectives are expected to be NAAQS comparison, with a site type of general/background or population exposure, and a spatial scale of urban or neighborhood.

- <u>Proposed deployment SLAMS PM and ozone monitoring in the southeast area of the Las Vegas Valley:</u>

  In an effort to improve PM and ozone monitoring spatial coverage, DAQ intends to deploy SLAMS PM and ozone monitoring in the southeastern part of the Las Vegas Valley. This monitoring will provide greater spatial representation as indicated by the $PM_{2.5}$ Continuous Monitoring Network map, the PM_{10} Monitoring Network map, and the ozone Monitoring Network map (see Figures 14-17). This site could be to be deployed as early as 2016. Clark County parks and schools are currently being considered as primary locations. Monitoring objectives are expected to be NAAQS comparison, with a site type of general/background or population exposure, and a spatial scale of urban or neighborhood.

- Proposed deployment of an ozone monitor at Green Valley:

  DAQ intends to add ozone monitoring at the Green Valley site. This monitor will fill a spatial gap (see Figures 16 and 17) and serve the population in Henderson. This ozone monitor deployment was approved in the 2014 Network Plan.

- Redeployment of a PM_{10} Monitor at Walter Johnson:

  The PM_{10} monitor was removed from Walter Johnson in March 2008 due to safety concerns. Because these concerns no longer exist, DAQ reinstalled a PM_{10} Monitor at this same location. This monitor is to provide greater spatial representation (see Figures 15 and 17). This deployment was outlined in the Clark County 2015 Annual Network Plan and occurred in May 2015.

- Redeployment of an ozone monitor in Indian Springs as SLAMS:

  This redeployment of ozone monitoring at Indian Springs (AQS 32-003-7772) is outlined in the Clark County 2015 Annual Network Plan and occurred in June 2015. This SLAMS monitor helps identify high ozone, helps to characterize transport, and fills a spatial gap (see Figure 16). Indian Springs is approximately 45 miles northwest of Las Vegas (approximate GPS coordinates: +36.569333°, -115.676651°), and provides high-ozone triangulation between Joe Neal and the Las Vegas Paiute Tribe. Monitoring objectives are NAAQS comparison, the site type is regional transport, and the spatial scale is regional.

- Redeployment of an SPM ozone monitor at Spring Mountain Youth Camp:

  The redeployment of this monitor at the Spring Mountain Youth Camp site (GPS coordinates: +36.318889°, -115.585278°), approximately 30 miles northwest of Las Vegas (see Figure 16), is outlined in the Clark County 2015 Annual Network Plan and occurred in April 2015. This site is run as SPM and helps characterize upper elevation ozone. Previously run as an upper-elevation ozone research site, it is operated as an SPM pursuant to 40 CFR 58.20(a). Some site/instrument-specific issues include siting/flow path obstruction and instrument flow rate out of specification, which cannot be corrected due to limitations of operating at such a high altitude.

- Redeployment of an ozone SPM monitor in Logandale:

  In April 2015, DAQ redeployed an ozone SPM in Logandale (see Figure 16). The site is approximately 50 miles northeast of Las Vegas, and the monitor fills a spatial gap in the ozone network and could provide insight into transport. This redeployment is outlined in the Clark County 2015 Annual Network Plan. Depending on results, DAQ may redeploy the ozone SPM in Logandale after 2015.

- Proposed deployment of an ozone monitor in Coyote Springs:

  DAQ intends to deploy one ozone SPM monitor in Coyote Springs (see Figure 16). DAQ has selected a location ((GPS coordinates: +36.810871°, -114.956383°). The location is at a Clark County IT facility, and DAQ must wait until IT gets power and communications at this location. The anticipated Coyote Springs site will help provide ozone monitoring spatial coverage, may provide insight into ozone transport, and may serve as a background site.

- Proposed redeployment of an ozone monitor in Laughlin:

  DAQ had monitored in Laughlin for ozone in 2012 and now plans to redeploy an ozone monitoring station to improve spatial coverage, assess population exposure, and assess transport along the Colorado River corridor (see Figure 17). The proposed site is expected to be redeployed in 2016.

- Proposed redeployment of $PM_{2.5}$ monitoring sites at Palo Verde and Apex:

  As discussed in Section 8.1.4, $PM_{2.5}$ monitoring at the Palo Verde site had been discontinued. Although the $PM_{2.5}$ measurements were relatively low, the statistical analysis indicated that this location was not redundant with other $PM_{2.5}$ monitoring locations. Redeployment of $PM_{2.5}$ at the Palo Verde site could provide information to the public represented in its vicinity.

  The results of the statistical analysis of the historical $PM_{2.5}$ monitoring network also indicted that the now-closed Apex $PM_{2.5}$ monitor was not redundant with other $PM_{2.5}$ monitors in the network. The Apex site currently monitors seasonally for ozone. While the $PM_{2.5}$ measurements were relatively low in Apex, redeployment of the $PM_{2.5}$ monitor would provide information for its hydrographic basin (HA 216), which adjoins the Las Vegas Valley (HA 212). Redeployment of this monitor is not critical, but it is worthy of consideration based on time and resources. If PM is monitored in Apex once again, the location of the monitor will have to be reconsidered in that its previous placement for PM monitoring was primarily source monitoring.

- Proposed redeployment of upper air meteorological monitoring at North Las Vegas Airport:

  Upper air meteorological monitoring at this site in the north part of the valley will be helpful in developing exceptional event demonstration packages and for air quality studies. In previous years, DAQ conducted upper air meteorological measurements at the North Las Vegas Airport. Measurement instruments included a radar wind profiler, a microwave radiometer, and Sodar technology. Due to equipment and budgetary issues, the site was discontinued on October 13, 2013. DAQ intends to reestablish measurements using the radar wind profiler and the microwave radiometer, which delivers continuous temperature and humidity profiles with radiosonde-equivalent assimilation accuracy. This deployment is outlined in the Clark County 2015 Annual Network Plan, and the anticipated date of change is August 2015. The North Las Vegas Airport also has a set of visibility cameras that help support exceptional event demonstration packages and provide information to the community.

- Proposed deployment of visibility cameras at M Resort:

  In addition to the visibility cameras at the North Las Vegas Airport, DAQ intends to deploy visibility cameras at M Resort at the south side of the valley. In conjunction with the visibility cameras at the North Las Vegas Airport, the cameras at M Resort will help support exceptional event demonstration packages and provide information to the community.

- Other proposed sites:

  Through special studies, modeling, forecasting, and network plans and assessments, DAQ has projected spatial gaps and other monitoring concerns in specific areas of Clark County. In order to improve spatial coverage, serve less represented populations, and to help assess transport, DAQ will explore the possibility of gaseous, PM, and meteorological monitoring in parts of the Las Vegas Valley, Sandy Valley, Primm, and Overton. Other studies may include upper elevation (surface) ozone monitoring, upper air (aloft) meteorological monitoring, and transport corridor evaluation. Any special study sites will likely be started as SPM.

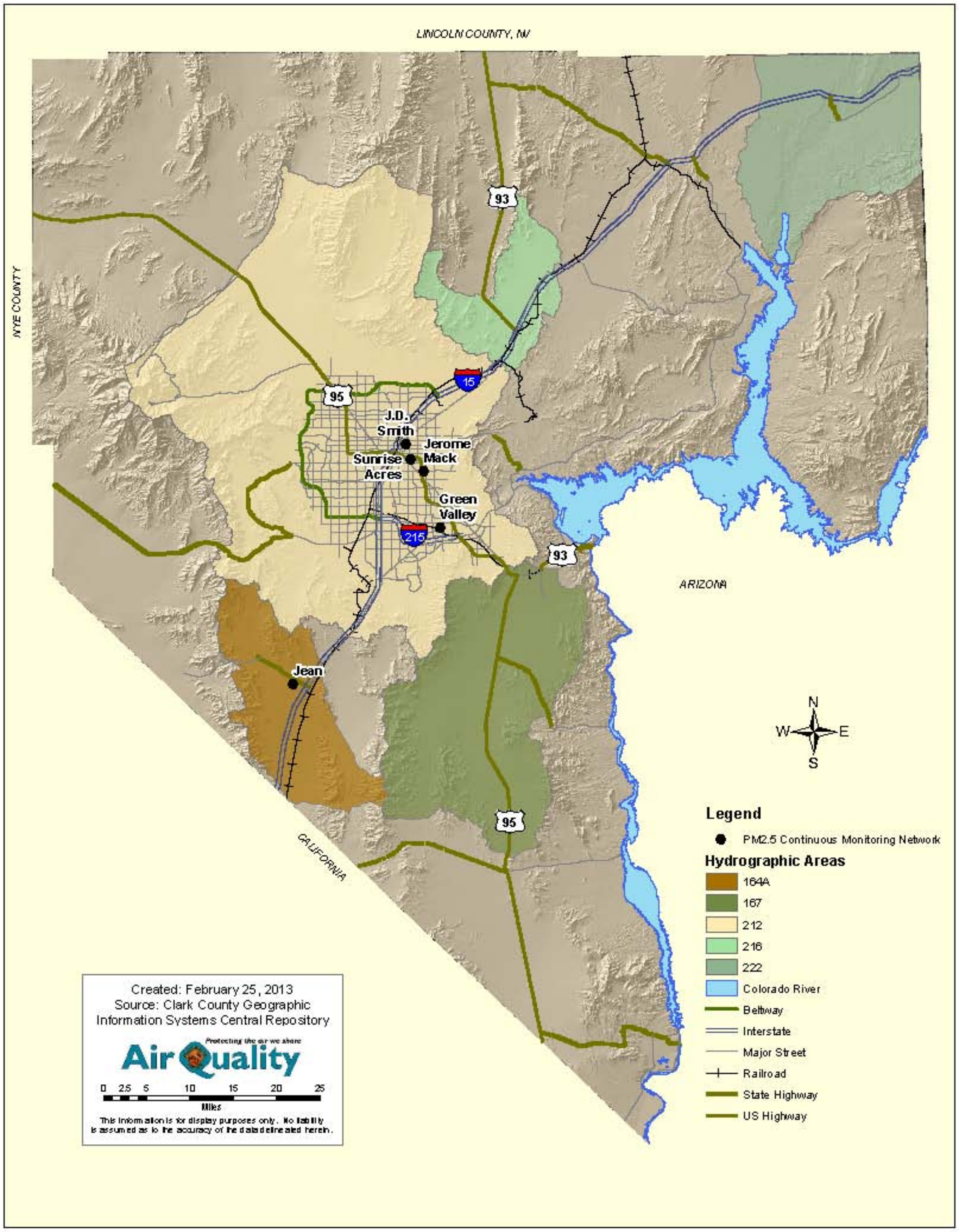

Figure 14. Clark County $PM_{2.5}$ continuous monitoring network.

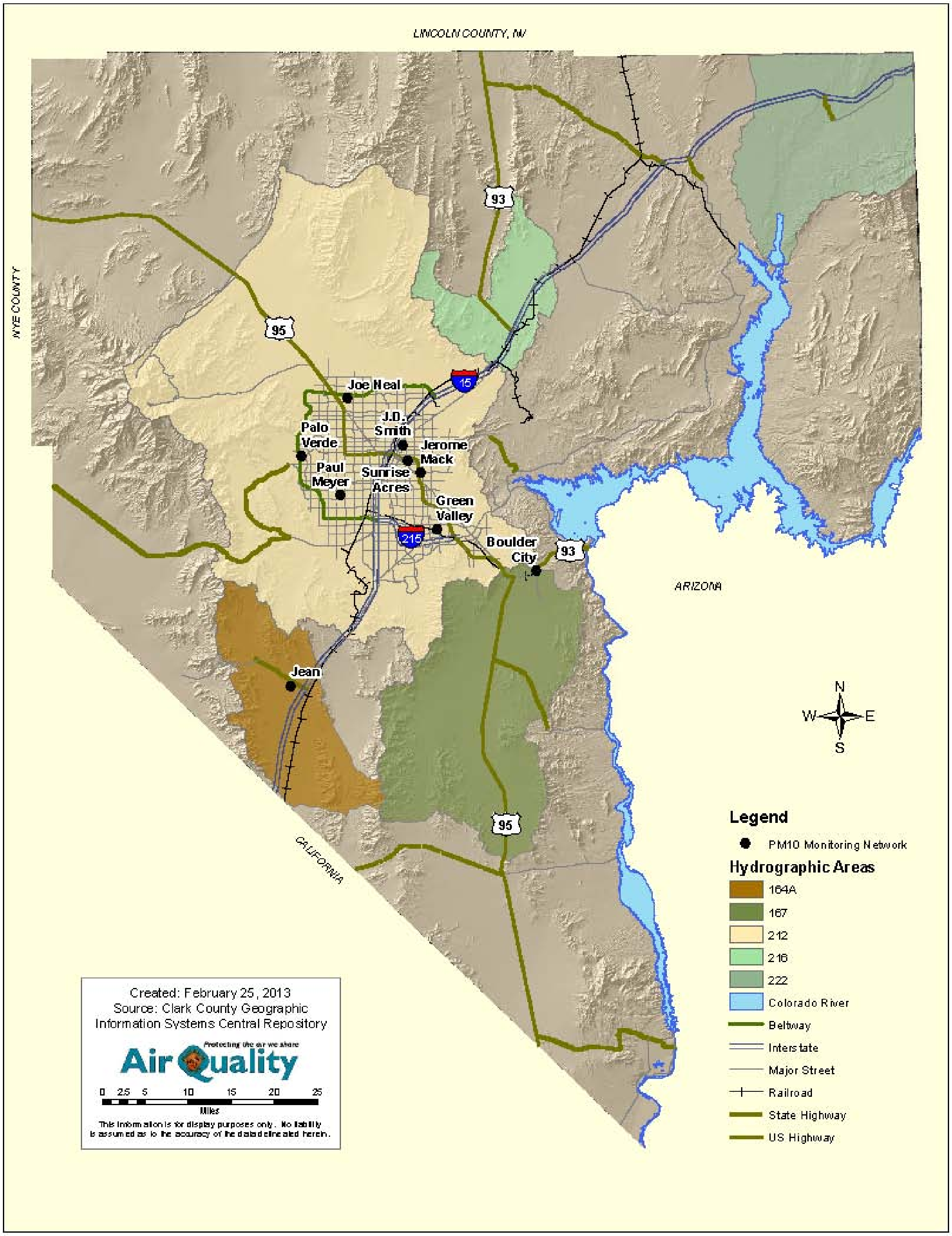

Figure 15. Clark County PM_{10} monitoring network.

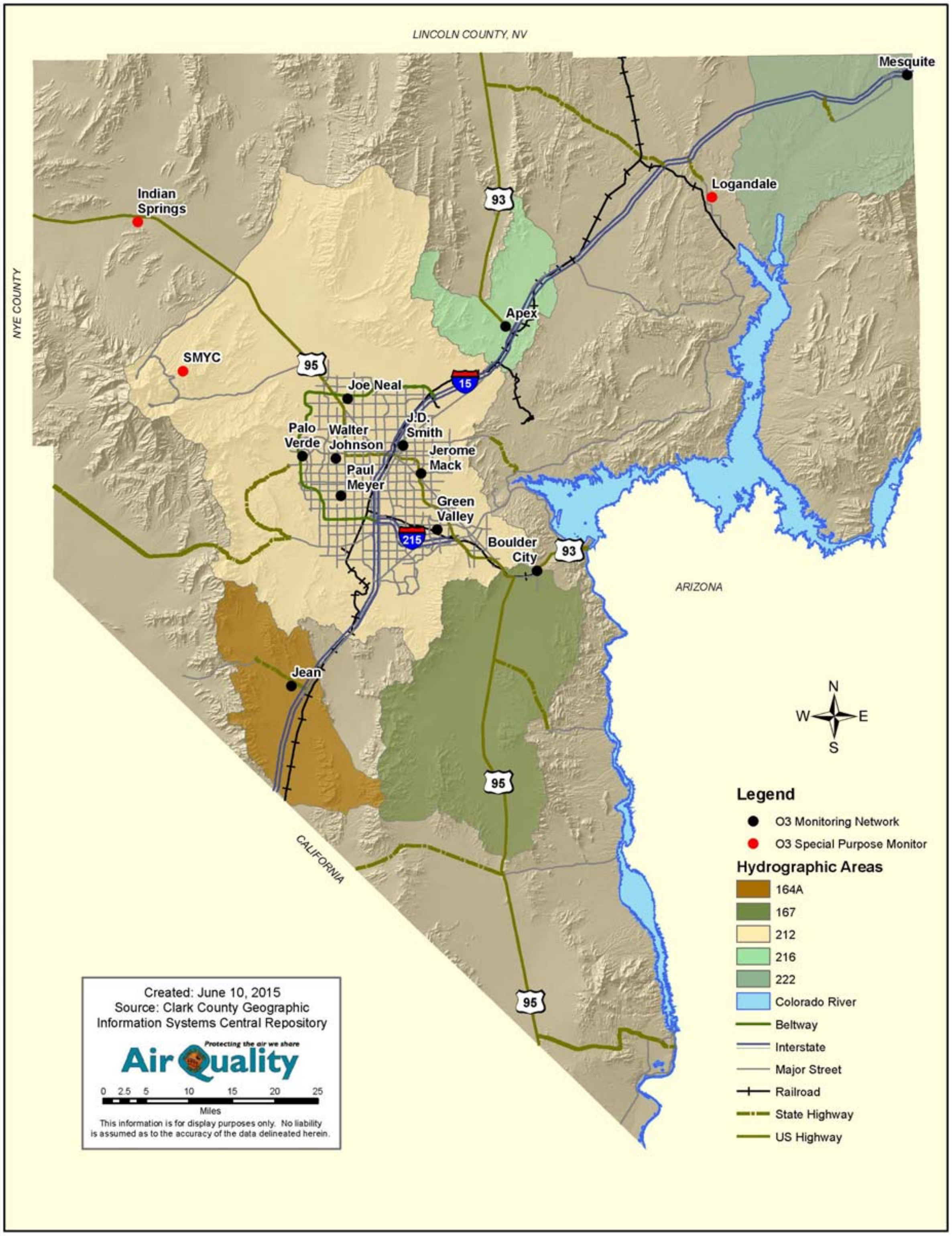

Figure 16. Clark County ozone monitoring network.

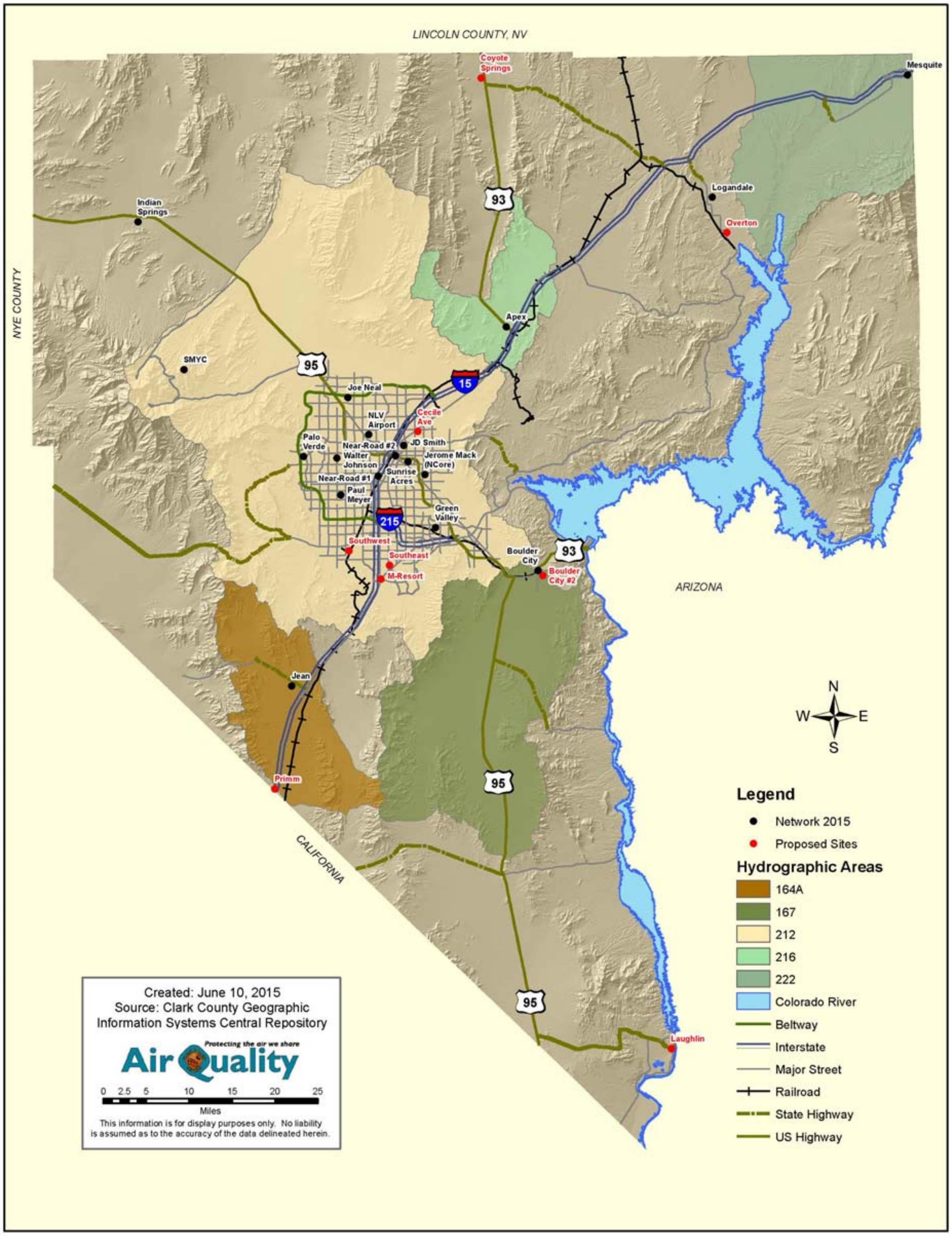

Figure 17. Clark County monitoring network (all current and proposed sites).

9.0 RECOMMENDATIONS

9.1 EXISTING SITES TO BE MAINTAINED IN THE NETWORK

DAQ's analysis shows the following sites are a priority in the Clark County monitoring network and should be maintained during the next five years:

- Paul Meyer
- Boulder City[15]
- Apex
- Jean
- Joe Neal
- Palo Verde
- Walter Johnson
- Mesquite[15]
- Green Valley
- Jerome Mack (NCore)
- Indian Springs[16]
- Logandale
- Rancho & Teddy (Near Road 1)
- Central Fire Station (Near Road 2)
- J.D. Smith[17]
- Sunrise Acres[17]
- North Las Vegas Airport[18]

9.2 PROPOSED MODIFICATIONS TO EXISTING SITES IN THE NETWORK

DAQ is proposing the following modifications and redeployments to the existing Clark County monitoring network:

- Redeployment of an SPM ozone monitor at Spring Mountain Youth Camp as a research tool to help characterize upper elevation ozone. (This redeployment occurred in April 2015.)
- Proposed redeployment of an ozone monitor in Laughlin to improve spatial coverage, to assess population exposure, and determine ozone transport along the Colorado River corridor.
- Redeployment of $PM_{2.5}$ monitoring sites at Palo Verde and Apex to fills spatial gaps.

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[15] Due to siting issues, this monitoring site is proposed to be relocated.
[16] This site was recently redeployed as SLAMS to identify high ozone, help characterize ozone, and fill a spatial gap.
[17] J.D. Smith and Sunrise Acres are currently maintained, but due to redundancy they are proposed to be consolidated into a single new site. They will remain open until the new site is established. The consolidated site will monitor for ozone, CO, NO_2 (or NO_x), PM_{10} and $PM_{2.5}$.
[18] There is no ambient air monitoring at this location; only upper air atmospheric meteorology is recorded.

- Redeployment of a PM_{10} Monitor at Walter Johnson to fill a spatial gap. (This redeployment occurred in May 2015.)

- Proposed deployment of an ozone monitor at the existing Green Valley site to provide greater spatial representation.

- Proposed deployment of an NO_2 monitor at the Jerome Mack (NCore) site, which currently measures NO_Y, to provide emissions refinement for ozone modeling.

- Proposed redeployment of upper air meteorological monitoring at North Las Vegas Airport to better develop exceptional event demonstration packages and to assist in air quality studies.

9.3 PROPOSED NEW SITES IN THE NETWORK

DAQ is proposing the following new sites to the existing Clark County monitoring network:

- Proposed deployment of a SLAMS PM and ozone monitoring in the southwest portion of the Las Vegas Valley to provide greater spatial representation.

- Proposed deployment of a SLAMS PM and ozone monitoring in the southeast portion of the Las Vegas Valley to provide greater spatial representation.

- Proposed deployment of an ozone monitor in Coyote Springs for spatial coverage, to provide insight into ozone transport, and to possibly serve as a background site.

- Proposed deployment of visibility cameras at M Resort to help support exceptional event demonstration packages and to provide information to the community.

- Proposed deployment of gaseous, PM, and meteorological monitoring in Sandy Valley for purposes of spatial gaps, population exposure, and research.

- Proposed deployment of gaseous, PM, and meteorological monitoring in Primm for purposes of spatial gaps, population exposure, and research.

- Proposed deployment of gaseous, PM, and meteorological monitoring in Overton for purposes of spatial gaps, population exposure, and research.

- Other proposed sites and network modifications may include studies for upper elevation (surface) ozone monitoring, upper air (aloft) meteorological monitoring, and transport corridor evaluation.

APPENDIX A: HISTORICAL AIR QUALITY MONITORING IN LAS VEGAS

Monitoring in Clark County started in 1957, well before the passage of the 1970 Clean Air Act (CAA). There have been a total of 83 monitoring sites in the 58 years since, 15 of which are still operating (not counting the North Las Vegas Airport site, which is in DAQ's LEADS system, monitors conditions and visibility, but does not currently measure pollutants).

This section contains brief descriptions of all historical and current air monitoring sites in Clark County. The reason for starting or terminating a site is also provided, if known. Site closures were most often the result of loss of lease, development of surrounding area with noncompatible uses (or uses that created siting conflicts), trend analyses showing low pollutant concentrations, or network redundancy. Operating dates and location information are given for each site, along with, if known, a brief explanation of sampling methods and schedules.

Sites are listed in order of date established. Every site in the AQS database has a site identification (ID). Sites that are not in the AQS database do not have a site ID and are noted as such. For completeness, descriptions of existing sites also provide current monitoring objectives and spatial scales.

The locations of the 83 sites described in this section are mapped in time sequence in Appendix B of this document. While these maps also show the locations of former pollen sites in Clark County, the pollen network was shut down at the end of 2010 and is not discussed in this assessment.

Site ID: 32-003-1001 (E. Bonanza)

Street Address: 280 E. Bonanza Rd.	City: Las Vegas
Date Established: Jan. 1, 1957	Date Terminated: March 31, 1995
Site Latitude: +36.173611	Site Longitude: -115.140833

According to information retrieved from the AQS database, this is the first air monitoring site in Clark County. Its initial operation predates the CAA. Data from the site was collected from more than one location, but the final reporting location was atop the roof of what used to be a Nevada Highway Patrol building. Comments in the AQS site record suggest that before this final location, instruments were housed in or on a trailer at a nearby fire station. This operation started as a total suspended particulate (TSP) site and ended as a PM_{10} site; other pollutants measured included CO, nitrogen oxide (NO_x), ozone, and sulfation rate.

The site was closed after the transition from TSP to PM_{10} monitoring; closure could have been the result of low measured results, insufficient infrastructure to support PM_{10} sampling, an insufficient number of PM_{10} samplers, conflicts with siting criteria, or any combination of these reasons.

Site ID: 32-003-0001 (pre-CAA)

Street Address: 500 Railroad St.
City: Boulder City
Date Established: Jan. 1, 1966
Date Terminated: April 26, 1984
Site Latitude: +35.982222
Site Longitude: -114.835000

This was one of the earliest air monitoring locations in Clark County, and pre-dates the CAA. The site was run with very early monitoring techniques, such as total dustfall, sulfation rate, silver tarnishing, dyed fabric, rubber cracking, and nylon deterioration. The actual discontinuation date of the site appears to be Dec. 31, 1969; however, the closure date in AQS is April 26, 1984, which reflects the date entered to officially close this site in the EPA database.

Reason for site closure was low measured results.

Site ID: 32-003-0002 (Nellis)

Street Address: Nellis Operations Bldg.
City: Sunrise Manor
Date Established: Jan. 1, 1972
Date Terminated: Dec. 31, 1977
Site Latitude: +36.245547
Site Longitude: -115.036112

As evidenced by the street address, this site was located on the Nellis Air Force Base in the northeast part of the Las Vegas Valley. The site operated with a high volume sampler (hi-vol) that monitored TSP. It operated on a 1-in-6 day sampling frequency.

Reason for site closure is unknown.

Site ID: 32-003-0003 (Fish & Game)

Street Address: 601 Nevada Hwy.
City: Boulder City
Date Established: Jan. 1, 1972
Date Terminated: June 30, 1981
Site Latitude: +35.981944
Site Longitude: -114.835000

This site operated at the corner of Wyoming Street and Nevada Highway in Boulder City with a hi-vol monitoring TSP, which operated on a 1-in-6 day sampling frequency.

Reason for site closure was low measured results.

Site ID: 32-003-0004 (Pittman PO)

Street Address: 1540 Boulder Hwy.
City: Henderson
Date Established: Jan. 1, 1972
Date Terminated: Jan. 11, 1981
Site Latitude: +36.032778
Site Longitude: -114.983889

This site operated on the roof of a post office in Henderson. The method used was a hi-vol monitoring TSP, which operated on a 1-in-6 day sampling frequency.

Reason for site closure was low measured results.

Site ID: 32-003-0005 (Burkholder)

Street Address: 355 W. Van Wagenen St. City: Henderson
Date Established: Jan. 1, 1972 Date Terminated: Dec. 31, 1994
Site Latitude: +36.031111 Site Longitude: -115.144167

This site operated at what was originally Basic High School. It became Burkholder Junior High in August 1985, then Burkholder Middle School. The site originally monitored TSP using the hi-vol method; it began to also monitor PM_{10} in 1987, and TSP monitoring was discontinued Dec. 31, 1988. In addition the site monitored pollen from 1988 to 2003.

Reason for site closure was implementation of continuous PM_{10} technology at a neighboring site.

Site ID: 32-003-0009 (Shadow Lane 1)

Street Address: 625 Shadow Lane City: Las Vegas
Date Established: Jan. 1, 1972 Date Terminated: Dec. 31, 1981
Site Latitude: +36.163889 Site Longitude: -115.163333

This site was located in the center of the Las Vegas Valley at the location of the air quality agency in Clark County from its inception in 1965 through May 2001. Though it primarily monitored TSP, data from the site was also submitted for ozone, oxides of nitrogen (NO_x), and carbon monoxide (CO). (Note: another Shadow Lane site that reported data briefly is described later.)

Reason for site closure was low measured results.

Site ID: 32-003-0011 (LV Wash)

Street Address: Park Service Bldg., Las Vegas Wash Marina City: Las Vegas
Date Established: Jan. 1, 1972 Date Terminated: Dec. 31, 1993
Site Latitude: +36.108611 Site Longitude: -114.833611

This site at the Lake Mead fish hatchery sampled TSP using a hi-vol.

The site closed after the transition from TSP to PM_{10} monitoring; closure could have been the result of low measured results, insufficient infrastructure to support PM_{10} sampling, an insufficient number of PM_{10} samplers, conflicts with siting criteria, or any combination of these reasons.

Site ID: 32-003-0012 (Logandale at Whitney residence)

Street Address: Whipple Rd. City: Logandale
Date Established: Jan. 1, 1972 Date Terminated: Dec. 31, 1981
Site Latitude: +36.597778 Site Longitude: -114.484722

A TSP hi-vol operated at this location as a background monitor. The hi-vol was located on the roof of the Whitney residence; Mr. Whitney agreed to change the filters after every run and mail them to the air quality agency. However, Mrs. Whitney's failing health forced the family to relocate to a different climate, and the site was shut down.

Reason for site closure was loss of lease.

Site ID: 32-003-1003 (Moapa)

Street Address: Indian Council Bldg., Moapa River Reservation
City: Near Moapa
Date Established: Jan. 1, 1972
Date Terminated: Dec. 31, 1972
Site Latitude: +36.633042
Site Longitude: -114.584159

This site near Moapa sampled for TSP for a short time.

Reason for site closure was low measured results.

Site ID: 32-003-1004 (Sunrise Power)

Street Address: Sunrise Power Station, E. Vegas Valley Dr.
City: Las Vegas
Date Established: Jan. 1, 1972
Date Terminated: Dec. 31, 1987
Site Latitude: +36.138056
Site Longitude: -115.034444

This site was located in the eastern part of the Las Vegas Valley, west of the landfill. TSP was the only pollutant measured.

The site was closed after the transition from TSP to PM_{10} monitoring; closure could have been the result of low measured results, insufficient infrastructure to support PM_{10} sampling, an insufficient number of PM_{10} samplers, conflicts with siting criteria, or any combination of these reasons.

Site ID: 32-003-1005 (Sunset Rd 2)

Street Address: 680 Sunset Rd.
City: Las Vegas
Date Established: Jan. 1, 1972
Date Terminated: Dec. 31, 1979
Site Latitude: +36.072772
Site Longitude: -115.148613

This site measured ozone and TSP and was located in the southeast part of the Las Vegas Valley, south of McCarran International Airport.

Reason for site closure is unknown.

Site ID: 32-003-2001 (NLV PO)

Street Address: 1301 E. Lake Mead Blvd. City: North Las Vegas
Date Established: Jan. 1, 1972 Date Terminated: Dec. 31, 2004
Site Latitude: +36.195000 Site Longitude: -115.123889

This site, located at the North Las Vegas Post Office, originally measured TSP. In 1985, it began monitoring PM_{10}.

The site was closed in October 1998 when the PM_{10} hi-vol samplers were moved to the J.D. Smith site.

Site ID: 32-003-1007 (McCarran)

Street Address: McCarran Int'l Airport City: Las Vegas
Date Established: Jan. 1, 1972 Date Terminated: Dec. 31, 1989
Site Latitude: +36.078333 Site Longitude: -115.167500

This site, provided by the state of Nevada, was primarily a TSP site from 1972 to 1976; the site ID was reused in special studies for ozone monitoring.

The site was closed when the state completed its project and removed the shelter.

Site ID: 32-003-1008 (Old Mormon Farm)

Street Address: 5805 E. Monson City: Las Vegas
Date Established: Jan. 1, 1972 Date Terminated: Dec. 31, 1976
Site Latitude: +36.116383 Site Longitude: -115.047500

This address is no longer valid. It is near the site of an old Mormon farm on the east side of the valley, north of Stephanie Street and Flamingo Road. The pollutant measured was TSP.

Reason for site closure is unknown.

Site ID: 32-003-0013 (Arden)

Street Address: Civil Defense Bldg., Arden City: Enterprise
Date Established: Jan. 1, 1972 Date Terminated: Dec. 31, 1974
Site Latitude: +36.016383 Site Longitude: -115.236393

This site in the southwest Las Vegas Valley measured TSP using a hi-vol.

Since the levels were only background, the site was discontinued.

Site ID: 32-003-0010 (LVFD 2)

Street Address: 2801 E. Charleston Blvd. City: Las Vegas
Date Established: March 1, 1973 Date Terminated: June 30, 1989
Site Latitude: +36.158889 Site Longitude: -115.110278

This site was located in the east-central area of the Las Vegas Valley. It was known as Las Vegas Fire Department No. 2, and sampling consisted of collocated TSP hi-vols. The primary sampler was used for lead analysis. With the discontinuation of leaded gasoline, lead values in Las Vegas became insignificant, and the site was shut down; however, data from the site continued to be reported until Dec. 31, 1993 under site ID 32-003-1010.

Reason for site closure was low measured lead levels.

Site ID: 32-003-0018 (Katherine's Landing)

Street Address: Across the Colorado River from Katherine's Landing in AZ City: Bullhead City, AZ
Date Established: Jan. 1, 1974 Date Terminated: Dec. 31, 1979
Site Latitude: +35.211406 Site Longitude: -114.585821

This site, just north of Laughlin, measured TSP.

Reason for site closure was low measured results.

Site ID: 32-003-1011 (Sahara Hotel)

Street Address: 2500 Paradise Rd. City: Las Vegas
Date Established: Jan. 1, 1972 Date Terminated: Dec. 31, 1991
Site Latitude: +36.141389 Site Longitude: -115.155000

This site measured TSP using a hi-vol mounted on the roof of a maintenance building behind the Sahara Hotel.

The site was closed after the transition from TSP to PM_{10} monitoring; closure could have been the result of low measured results, insufficient infrastructure to support PM_{10} sampling, an insufficient number of PM_{10} samplers, conflicts with siting criteria, or any combination of these reasons.

Site ID: 32-003-1012 (Tropicana & Paradise)

Street Address: 481 E. Tropicana Ave. City: Las Vegas
Date Established: Jan. 1, 1974 Date Terminated: Dec. 31, 1978
Site Latitude: +36.100549 Site Longitude: -115.154447

This site near the corner of Tropicana Avenue and Paradise Road measured TSP.

Reason for site closure is unknown.

Site ID: 32-003-1013 (Silver Bowl)

Street Address: Russell Rd. & Broadbent
City: Las Vegas
Date Established: Jan. 1, 1974
Date Terminated: Dec. 31, 1981
Site Latitude: +36.091667
Site Longitude: -115.026111

This site measured TSP using a hi-vol mounted on top of a building at the open end of Sam Boyd Stadium (then known as the Silver Bowl).

Reason for site closure is low measured results.

Site ID: 32-003-0006 (Sunset Rd)

Street Address: Pump Station, Sunset Rd.
City: Henderson
Date Established: Jan. 1, 1975
Date Terminated: March 23, 1977
Site Latitude: +36.063328
Site Longitude: -115.057777

This site was located at a Las Vegas Valley Water District pumping station on Sunset Road in Henderson. It monitored sulfur dioxide (SO_2).

Reason for site closure is unknown.

Site ID: 32-003-0014 (Southwest Gas)

Street Address: 5241 Spring Mtn. Rd.
City: Las Vegas
Date Established: Jan. 1, 1977
Date Terminated: Dec. 31, 1988
Site Latitude: +36.124167
Site Longitude: -115.210833

This site measured TSP in the developing southwest part of the valley using a hi-vol, which was located on the roof of a maintenance shed behind what was then the Southwest Gas Company's main office.

The site was closed after the transition from TSP to PM_{10} monitoring; closure could have been the result of low measured results, insufficient infrastructure to support PM_{10} sampling, an insufficient number of PM_{10} samplers, conflicts with siting criteria, or any combination of these reasons.

Site ID: 32-003-0015 (Wildlife Bldg.)

Street Address: 4747 Vegas Dr.
City: Las Vegas
Date Established: Jan. 1, 1978
Date Terminated: Dec. 31, 1985
Site Latitude: +36.191667
Site Longitude: -115.201667

This site measured TSP in the west-central area of the Las Vegas Valley using a hi-vol, which was located on the roof of the Nevada Division of Wildlife Building on Vegas Drive.

The site was closed after the transition from TSP to PM_{10} monitoring; closure could have been the result of low measured results, insufficient infrastructure to support PM_{10} sampling, an insufficient number of PM_{10} samplers, conflicts with siting criteria, or any combination of these reasons.

Site ID: 32-003-0556 (6th Street)

Street Address: E. Sahara Ave.
City: Las Vegas
Date Established: Jan. 1, 1979
Date Terminated: Dec. 31, 1980
Site Latitude: +36.1451
Site Longitude: -115.146383

The original East Sahara site was located near 6th Street and East Sahara Avenue, in the center of the Las Vegas Valley. It monitored CO and NO_x.

Reason for site closure was low measured results.

Site ID: 32-003-0538 (Winterwood)

Street Address: 5483 Clubhouse Dr.
City: Las Vegas
Date Established: July 1, 1979
Date Terminated: Oct. 1, 2014
Site Latitude: +36.143056
Site Longitude: -115.051667

This was the easternmost site in the valley, and monitored CO and ozone. DAQ performed some SPM in response to citizen complaints about odors from nearby sewage treatment plants, specifically monitoring hydrogen sulfide (H_2S) in the mid-1990s.

Closure of this site was due to data redundancy with the Jerome Mack NCore site and lease issues.

Site ID: 32-003-0016 (City Center)

Street Address: 559 N. 7th St.
City: Las Vegas
Date Established: Jan. 1, 1980
Date Terminated: April 30, 2006
Site Latitude: +36.174444
Site Longitude: -115.135278

This site was originally located in the parking lot of a post office at 3rd Street and Stewart Avenue. Then known as the Casino Center site, the name was changed to City Center when DAQ moved it to 7th Street. At that time, this site was considered the center of the developed Las Vegas Valley. Over the years it has measured many pollutants, including CO, ozone, NO_x, TSP, and PM_{10}.

Interstate 515 was constructed within 50 meters of this site. As a result of the increased freeway traffic, NO_x scrubbing and other high-traffic effects were observed in the pollutant data trends. All pollutant monitoring at this site was stopped in April 2006.

Site ID: 32-003-0558 (Paradise)

Street Address: 2500 Paradise Rd. City: Las Vegas
Date Established: Jan. 1, 1980 Date Terminated: Dec. 31, 1986
Site Latitude: +36.171667 Site Longitude: -115.146667

This was the original Las Vegas microscale site, located in the Sahara Hotel walkway bridge over Paradise Road. It measured only CO.

The site was closed when the Sahara decided to discontinue climate control in the maintenance room containing the monitor.

Site ID: 32-003-0007 (Powerline/SE Valley)

Street Address: 545 Lake Mead Dr. City: Henderson
Date Established: Jan. 1, 1980 Date Terminated: Dec. 31, 2007
Site Latitude: +36.028889 Site Longitude: -114.988889

This site was initially called "Powerline," later "Southeast Valley" and, eventually, "Henderson." It was located directly south of the Black Mountain, Inc. (BMI) complex, originally known as Basic Management, Inc. The pollutants that have been measured at this site include carbon monoxide, ozone, chlorine, ammonia (NH_3), PM_{10}, peroxyacetyl nitrate, total hydrocarbons, and visibility (nephelometer). At the site's inception, several industrial companies, including Kerr-McGee, Stauffer, and Timet, were operating directly north of it, and originally the site monitored only ozone and NH_3. In the early to mid-1980s, however, it became part of several studies to determine the makeup of the "Henderson Cloud," a white cloud that formed, especially during the winter months, as a result of chlorine and NH_3 emissions from the nearby chemical plants. These emissions produced pollutants such as ozone, ammonium chloride, and peroxyacetyl nitrate. As a result of the monitoring studies, the facilities in the BMI complex implemented increased pollutant controls.

The site was discontinued on Dec. 31, 2007 as a result of ongoing safety challenges.

Site ID: 32-003-0557 (E. Charleston)

Street Address: 2850 E. Charleston Blvd. City: Las Vegas
Date Established: April 1, 1980 Date Terminated: March 31, 1997
Site Latitude: +36.158889 Site Longitude: -115.110000

This site, located in the "Five Points" area on the east side of the valley, was established as a high CO monitoring site. Originally located near 30th Street and East Charleston Boulevard (lat/long +36.159478, -115107194), the site was later moved to 2850 E. Charleston Blvd. While

CO was the primary pollutant monitored at this site, DAQ also monitored NO_x, SO_2, and PM_{10}. DAQ conducted many CO studies over the years, and they all provided the same results: the area of 28th Street and Charleston Boulevard consistently showed the highest levels of CO.

In 1997, the high CO site was moved to Sunrise Acres because of lease issues.

Site ID: 32-003-0559 (Channel 10)

Street Address: 4210 Channel 10 Dr.	City: Las Vegas
Date Established: Jan. 1, 1983	Date Terminated: June 27, 1987
Site Latitude: +36.118056	Site Longitude: -115.116667

This site monitored only TSP.

The site was closed after the transition from TSP to PM_{10} monitoring; closure could have been the result of low measured results, insufficient infrastructure to support PM_{10} sampling, an insufficient number of PM_{10} samplers, conflicts with siting criteria, or any combination of these reasons.

Site ID: 32-003-0008 (SNAP)

Street Address: 1239 N. Boulder Hwy.	City: Henderson
Date Established: Jan. 1, 1983	Date Terminated: June 30, 1987
Site Latitude: +36.057778	Site Longitude: -115.001667

This site was located in the southeast corner of the Southern Nevada Auto Parts (SNAP) facility. It was used as a downwind site for the BMI complex, measuring NH_3 and TSP.

There was some controversy over this site because an adjacent property directly south of it had a small collection of livestock and birds. These animals may have interfered with NH_3 measurements: although the NH_3 analyzer was housed in a small wooden shed, the hi-vol was mounted on top of a large wooden tower and the birds often roosted on top of it.

Reasons for site closure were low measured results and a lack of value in monitoring NH_3.

Site ID: Not Entered in AQS (Kerr-McGee)

Street Address: 8000 W. Lake Mead Dr.	City: Henderson
Date Established: ~1984	Date Terminated: Feb. 28, 1994
Site Latitude: +36.043375	Site Longitude: -115.004317

This site, immediately downhill of a perchlorate processing facility, was established to measure NH_3 levels at the BMI complex. Actual start-up date is uncertain, but it was operating in the mid-1980s. Data before 1990 is unavailable.

Because NH_3 production declined as the source made changes to its operation, rendering the site obsolete, it was closed.

Site ID: Not Entered in AQS (Pepcon)

Street Address: Gibson Rd. & Lake Mead Dr. City: Henderson
Date Established: ~1986 Date Terminated: May 4, 1988
Site Latitude: +36.034803 Site Longitude: -115.032972

This site was established to determine NH_3 levels at Pepcon's ammonium perchlorate production facility.

The site was destroyed in the Pepcon explosion on May 4, 1988. Follow-up sampling was done with a PM_{10} hi-vol to determine the effects of the explosion, but the dates of the sampling and the associated data are unavailable.

Site ID: 32-003-0019 (Frias)

Street Address: Frias & Schuster City: Las Vegas
Date Established: May 1, 1986 Date Terminated: Dec. 31, 1994
Site Latitude: +36.115000 Site Longitude: -115.191389

This was established as a background site near the southern boundary of the Las Vegas Valley, and measured PM_{10} using a dichotomous sampler.

As the area's population increased, it was no longer suitable as a background site.

Site ID: 32-003-0017 (Wengert)

Street Address: 2001 Winterwood Blvd. City: Las Vegas
Date Established: Sept. 1, 1987 Date Terminated: Dec. 31, 1998
Site Latitude: +36.143333 Site Longitude: -115.051944

This site, located at the Wengert Elementary School on the east side of the valley, originally monitored TSP, but also began measuring PM_{10} in 1988. It was shut down in 1998.

The site was closed after the transition from PM_{10} high-vols to PM_{10} beta-gauge samplers. The site was not able to accommodate the beta-gauge sampler.

Site ID: 32-003-1002 (E. Bonanza 2)

Street Address: 208 E. Bonanza Rd. City: Las Vegas
Date Established: Dec. 5, 1987 Date Terminated: Dec. 30, 1988
Site Latitude: +36.172778 Site Longitude: -115.087500

This site, in the center of the Las Vegas Valley, monitored PM_{10} for a short time.

The site was closed after the transition from TSP to PM_{10} monitoring; closure could have been the result of low measured results, insufficient infrastructure to support PM_{10} sampling, an insufficient number of PM_{10} samplers, conflicts with siting criteria, or any combination of these reasons.

Site ID: 32-003-1010 (LVFD 2)

Street Address: 2801 E. Charleston Blvd. City: Las Vegas
Date Established: July 3, 1989 Date Terminated: Dec. 31, 1993
Site Latitude: +36.156667 Site Longitude: -114.999167

This site measured TSP. See site ID 32-003-0010 for more information.

Site ID: 32-003-0539 (E. Sahara/Maycliff)

Street Address: 4001 E. Sahara Ave. City: Las Vegas
Date Established: Jan. 1, 1990 Date Terminated: March 31, 2010
Site Latitude: +36.144444 Site Longitude: -115.085556

Originally called "Maycliff," this site was located on the east side of the valley. It monitored CO, SO_2, NO_x, PM_{10}, and $PM_{2.5}$.

Reasons for closure were excessive lease expenses and installation of the Jerome Mack NCore site approximately 0.2 miles to the east.

Site ID: 32-003-0021 (Shadow Lane 2)

Street Address: 625 Shadow Lane City: Las Vegas
Date Established: Jan. 1, 1991 Date Terminated: Sept. 30, 2001
Site Latitude: +36.163611 Site Longitude: -115.162222

The second of two Shadow Lane sites, this one was established as a gaseous site. Pollutants sampled included CO, ozone, and NO_x.

The site was closed when the air agency was reassigned from the Southern Nevada Health District (SNHD) to Clark County and relocated to a county facility.

Site ID: 32-003-0020 (Craig Rd)

Street Address: 4701 Mitchell St. City: North Las Vegas
Date Established: Jan. 1, 1992 Date Terminated: Sept. 16, 2010
Site Latitude: +36.245278 Site Longitude: -115.092222

This site in the northeast part of the Las Vegas Valley was originally a permittee requirement for pre/post-construction monitoring for a facility owned by Bemis and which used NH_3 in its production. After the permittee met the requirements of the permit, it requested to discontinue monitoring and agreed to turn the site over to DAQ. EPA requested that DAQ install a downwind ozone monitor at the site; later, PM_{10} and $PM_{2.5}$ beta attenuation monitors (BAMs) were added, and the NH_3 analyzer was shut down. A speciation sampler was later operated at the site.

The site was closed due to lease issues, needs for improvements, and a high correlation to a nearby monitor.

Site ID: Not Entered in AQS (Dime III)

Street Address: 3220 Gavilan Lane
City: Las Vegas
Date Established: April 1, 1993
Date Terminated: May 31, 2000
Site Latitude: +36.130828
Site Longitude: -115.051964

Located in a mobile home park (Desert Inn Mobile Estates #3), this was a special monitoring site for NH_3 and H_2S. Several citizens in the area complained about odors emanating from sewage treatment plants in the area. This site, in conjunction with the Winterwood and Landfill sites, monitored in response to those complaints.

As the wastewater treatment plants expanded their facilities and implemented better odor controls, complaints diminished, and measured concentrations dropped. The need to continue monitoring ceased as user requirements were met.

Site ID: Not Entered in AQS (Proximity Site)

Street Address: 2900 E. Charleston Blvd.
City: Las Vegas
Date Established: Oct. 1, 1993
Date Terminated: March 31, 1996
Site Latitude: +36.15986
Site Longitude: -115.10925

This site was operated to establish whether the drive-through at a neighboring fast-food restaurant was affecting readings at the East Charleston site, 100 yards to the east.

The site was operated only for study purposes and closed after the study was completed.

Site ID: Not Entered in AQS (Variety School)

Street Address: 2501 Sunrise Ave.
City: Las Vegas
Date Established: Nov. 1, 1993
Date Terminated: Jan. 31, 1996
Site Latitude: +36.163994
Site Longitude: -115.113930

This site was established as part of an effort to pinpoint the highest CO levels in the East Charleston area. It is the current location of the Sunrise Acres site.

Site ID: Not Entered in AQS (Lake Mead)

Street Address: 1600 E. Lake Mead Blvd. City: N. Las Vegas
Date Established: June 7, 1994 Date Terminated: Sept. 23, 1998
Site Latitude: +36.196353 Site Longitude: -115.122792

This site on Nevada Power Company property monitored PM_{10} and $PM_{2.5}$.

Nevada Power asked the air quality agency to vacate the property, and the J.D. Smith site replaced this one.

Site ID: Not Entered in AQS (Saguaro Power)

Street Address: 8000 W. Lake Mead Blvd. City: Henderson
Date Established: Jan. 1, 1995 Date Terminated: Nov. 30, 2000
Site Latitude: +36.042525 Site Longitude: -115.011903

This site was initiated under permit condition requirements: a large NH_3 storage tank resulted in NH_3 monitoring. It was operated by a contractor until Saguaro Power Company met the conditions of the permit for post-construction monitoring, at which point they agreed to allow Air Quality to continue operating the site.

Reasons for site closure were low measured results and lack of value in monitoring NH_3.

Site ID: 32-003-1019 (Jean)

Street Address: 1965 State Hwy. 161 City: Jean
Date Established: Jan. 1, 1995 Date Terminated: n/a
Site Latitude: +35.785634 Site Longitude: -115.357060

This site currently monitors ozone, PM_{10}, and $PM_{2.5}$. Previously, it also monitored NO_x.

Jean	PM_{10}	$PM_{2.5}$ Continuous	Ozone
Spatial scale	Regional	Regional	Regional
Monitoring objective	Background	Background	Transport

Site ID: 32-003-0107 (Pittman)

Street Address: 1137 N. Boulder Hwy. City: Henderson
Date Established: Jan. 1, 1995 Date Terminated: Feb. 28, 2002
Site Latitude: +36.054444 Site Longitude: -114.997222

This site was downwind of the BMI complex. Pollutants monitored included NH_3, CO, and PM_{10}.

Reasons for site closure were low measured results and lack of value in monitoring NH_3.

Site ID: 32-003-1022 (E. Flamingo)

Street Address: 210 E. Flamingo Rd. City: Las Vegas
Date Established: July 1, 1995 Date Terminated: Sept. 30, 2002
Site Latitude: +36.114444 Site Longitude: -115.162500

This site measured CO and PM_{10}, but was replaced with the Orr site.

Site ID: 32-003-0071 (Walter Johnson)

Street Address: 7701 Ducharme Ave. City: Las Vegas
Date Established: July 1, 1995 Date Terminated: n/a
Site Latitude: +36.170278 Site Longitude: -115.261389

This site, on the west side of the valley, currently monitors ozone and occasionally measures the valley's highest 8-hour ozone levels. Previously, it monitored PM_{10}.

Walter Johnson	Ozone
Spatial scale	Neighborhood
Monitoring objective	Population exposure

Site ID: Not Entered in AQS (Chris Crane)

Street Address: ~9100 S. Jones City: Las Vegas
Date Established: 1996 Date Terminated: 1997
Site Latitude: +36.024231 Site Longitude: -115.225703

This site in a warehouse at the Chris Crane Company measured PM_{10}. It was initiated because of complaints of excessive dust from the facility.

The site was closed after the source demonstrated control of its dust emissions.

Site ID: 32-003-1023 (MGM)

Street Address: 3799 S. Las Vegas Blvd. City: Las Vegas
Date Established: Oct. 1, 1996 Date Terminated: March 31, 2007
Site Latitude: +36.101389 Site Longitude: -115.171944

This site was located in a maintenance closet under an escalator next to the MGM Grand Hotel. It was the third microscale site and monitored CO.

The site was closed after years of measuring very low pollutant levels.

Site ID: 32-003-0561 (Sunrise Acres)

Street Address: 2501 Sunrise Ave. City: Las Vegas
Date Established: Oct. 1, 1996 Date Terminated: n/a
Site Latitude: +36.163994 Site Longitude: -115.113930

This site, in the "Five Points" area, monitors CO, PM_{10}, and $PM_{2.5}$. Previously NO_x had also been monitored. It was originally housed in a maintenance room at the Sunrise Acres School, until a new school was built and DAQ determined that it needed a full-scale site to house PM monitors. DAQ purchased a shelter and relocated the monitoring site to 2501 Sunrise Ave., a place previously known as the Variety School site that is described in a later section.

Site ID: 32-003-0562 (Crestwood)

Street Address: 130 Pauline Way City: Las Vegas
Date Established: Oct. 1, 1996 Date Terminated: Feb. 28, 2002
Site Latitude: +36.155278 Site Longitude: -115.127222

This site was established in the "Five Points" area as part of a study to pinpoint the highest CO level in the Las Vegas Valley. $PM_{2.5}$ was also monitored at this location.

Reason for closure was a Clark County School District site improvement that conflicted with 40 CFR siting criteria.

Site ID: Not Entered in AQS (Victory Road)

Street Address: Buchanan Ave. & Victory Rd. City: Henderson
Date Established: July 3, 1997 Date Terminated: March 31, 2002
Site Latitude: +36.029978 Site Longitude: -114.995806

This site was established to address citizen concerns following a chlorine leak from Timet. A chlorine monitor was installed in a closet off the snack bar at the ball fields.

Reason for site closure was low measured results.

Site ID: 32-003-0022 (Apex)

Street Address: 12101 U.S. Hwy. 93 City: Las Vegas
Date Established: Jan. 1, 1998 Date Terminated: n/a
Site Latitude: +36.390775 Site Longitude: -114.906810

This site was set up as a downwind/background site in the Apex Valley, adjacent to the northeast outflow of the Las Vegas Valley. It currently monitors for ozone; in the past, it had also monitored for $PM_{2.5}$, PM_{10}, and NO_x.

DAQ recently discovered that this site is on the industrial property of an operating quarry and gypsum kiln, whose operations have affected pollutant measurements at the site. This site cannot meet any National Ambient Air Quality Standards (NAAQS) demonstration design objective or scale. In addition, there are no residential uses or populations within the achievable spatial scale of this site. While it has no identifiable value for NAAQS monitoring, it was decided to maintain the site while relocation could be determined.

Site ID: 32-003-0298 (Green Valley)

Street Address: 298 Arroyo Grande Blvd.
City: Henderson
Date Established: Jan. 1, 1998
Date Terminated: n/a
Site Latitude: +36.052222
Site Longitude: -115.056944

This site is located in the southeast part of the Las Vegas Valley and currently monitors PM_{10} and $PM_{2.5}$. Previously, it also monitored CO.

Green Valley	PM_{10}	$PM_{2.5}$ Continuous
Spatial scale	Middle	Middle
Monitoring objective	Population exposure	Population exposure

Site ID: 32-003-0043 (Paul Meyer)

Street Address: 4525 New Forest Dr.
City: Las Vegas
Date Established: Jan. 1, 1998
Date Terminated: n/a
Site Latitude: +36.108056
Site Longitude: -115.253611

This site, in the southwest part of the valley, currently monitors ozone and PM_{10}; previously, it also monitored CO.

Paul Meyer	PM_{10}	Ozone
Spatial scale	Neighborhood	Neighborhood
Monitoring objective	Population exposure	Population exposure

Site ID: 32-003-0072 (Lone Mountain)

Street Address: 3525 N. Valadez St.
City: Las Vegas
Date Established: Jan. 1, 1998
Date Terminated: April 27, 2010
Site Latitude: +36.224722
Site Longitude: -115.266667

This site was located on the west side of the Las Vegas Valley and monitored ozone and PM_{10}. It was closed due to redundancy with the Walter Johnson site.

Site ID: 32-003-0560 (Microscale)

Street Address: 2801A E. Charleston Blvd. City: Las Vegas
Date Established: Jan. 1, 1998 Date Terminated: June 29, 2004
Site Latitude: +36.158611 Site Longitude: -115.110833

The East Charleston microscale site was located in the "Five Points" area on the east side of the Las Vegas Valley, where it monitored CO, PM_{10}, and $PM_{2.5}$. When DAQ relocated the Federal Reference Method monitor (FRM) to Sunrise Acres, staff reassembled the platform at the Sunrise Acres site.

Reason for site closure was loss of lease.

Site ID: 32-003-0601 (Boulder City)

Street Address: 1005 Industrial Rd. City: Boulder City
Date Established: Jan. 1, 1998 Date Terminated: n/a
Site Latitude: +35.978889 Site Longitude: -114.844167

This site currently monitors ozone and PM_{10}. Previously, it also monitored NO_x, SO_2, and $PM_{2.5}$.

Site ID: Not Entered in AQS (Landfill)

Street Address: Sunrise Landfill City: Las Vegas
Date Established: May 4, 1998 Date Terminated: Dec. 31, 2005
Site Latitude: +36.136175 Site Longitude: -115.009733

This site monitored H_2S and SO_2. It was set up to monitor the closing of the Sunrise Landfill and nearby wastewater treatment facilities.

Reasons for site closure were improved wastewater treatment plant controls and low measured concentrations.

Site ID: 32-003-0073 (Palo Verde)

Street Address: 333 Pavilion Center Dr. City: Las Vegas
Date Established: July 1, 1998 Date Terminated: n/a
Site Latitude: +36.173056 Site Longitude: -115.331667

This is the most western site in the Las Vegas Valley, and is located at the highest elevation. Currently, it monitors ozone and PM_{10}; previously, it also monitored NO_x and $PM_{2.5}$.

Palo Verde	PM_{10}	Ozone
Spatial scale	Middle	Neighborhood
Monitoring objective	Population exposure	Population exposure

Site ID: 32-003-2002 (J.D. Smith)

Street Address: 1301B E. Tonopah Dr.
City: North Las Vegas
Date Established: Oct. 1, 1998
Date Terminated: n/a
Site Latitude: +36.191111
Site Longitude: -115.122222

This site, on the east side of the Las Vegas Valley, monitors CO, ozone, NO_x, PM_{10}, and $PM_{2.5}$.

J.D. Smith	PM_{10}	$PM_{2.5}$ Continuous	Ozone	CO	$PM_{2.5}$ (FRM)	NO_2
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Monitoring objective	Population exposure	Population exposure	Population exposure	Population exposure	Population exposure	Population exposure

Site ID: Not Entered in AQS (Wet 'N' Wild)

Street Address: 2601 S. Las Vegas Blvd.
City: Las Vegas
Date Established: Nov. 24, 1998
Date Terminated: March 31, 1999
Site Latitude: +36.142194
Site Longitude: -115.156817

This site was part of a special CO study along the I-15/Strip corridor. This site was closed at the conclusion of the study.

Site ID: Not Entered in AQS (Spring Mountain Road)

Street Address: W. Spring Mtn. Rd. & Aldebaran Ave.
City: Las Vegas
Date Established: Nov. 24, 1998
Date Terminated: March 31, 1999
Site Latitude: +36.129436
Site Longitude: -115.182106

This site was part of a special CO study along the I-15/Strip corridor. This site was closed at the conclusion of the study.

Site ID: 32-003-0075 (Joe Neal)

Street Address: 6651 W. Azure Ave.
City: Las Vegas
Date Established: July 1, 2000
Date Terminated: n/a
Site Latitude: +36.272382
Site Longitude: -115.238241

This site in the northwest part of the valley monitors NO_x, ozone, and PM_{10}.

Joe Neal	PM_{10}	Ozone	NO_2
Spatial scale	Neighborhood	Neighborhood	Neighborhood
Monitoring objective	Population exposure	Highest concentration	Population exposure

Site ID: 32-003-0078 (Searchlight)

Street Address: 103 U.S. Hwy. 95
City: Searchlight
Date Established: July 1, 2000
Date Terminated: Feb. 25, 2004
Site Latitude: +35.465050
Site Longitude: -114.919615

This site monitored ozone, NO_x, and SO_2.

Reasons for site closure were loss of lease and very low concentration trends.

Site ID: 32-003-0563 (Freedom Park)

Street Address: 650 N. Mojave Rd.
City: Las Vegas
Date Established: Oct. 1, 2001
Date Terminated: April 30, 2005
Site Latitude: +36.176390
Site Longitude: -115.102780

This site was established because modeling showed the area north of Sunrise Acres would have higher CO levels. However, this proved not to be the case; CO levels were midway between those at the Sunrise Acres and J.D. Smith sites. This site also monitored NO_x.

The site was closed after results satisfied user requirements and disproved the model.

Site ID: 32-003-0023 (Mesquite)

Street Address: 465 E. Old Mill Rd.
City: Mesquite
Date Established: Oct. 1, 2001
Date Terminated: n/a
Site Latitude: +36.808060
Site Longitude: -114.060830

This site currently monitors ozone. In the past, it had also monitored PM_{10}, CO, and NO_x.

Mesquite	Ozone
Spatial scale	Neighborhood
Monitoring objective	Population exposure

Site ID: 32-003-1021 (Orr)

Street Address: 1562 Katie Ave.
City: Las Vegas
Date Established: Oct. 1, 2002
Date Terminated: April 2010
Site Latitude: +36.120500
Site Longitude: -115.130000

This site, on the east side of the valley near the Boulevard Mall, monitored CO, ozone, and PM_{10}.

The site was closed as a result of cost-saving measures, significant shelter replacement costs, and measurements that correlated well with other sites.

Site ID: 32-003-7771 (Spring Mountain Youth Camp)

Street Address: Ries Rd.
City: Unincorporated Clark County
Date Established: May 10, 2010
Date Terminated: Oct. 1, 2012
Site Latitude: +36.318889
Site Longitude: -115.585278

This station is an exploratory test site for ozone.

Site ID: 32-003-7775 (Mt. Potosi)

Street Address: 11480 Mt. Potosi Canyon Rd.
City: Unincorporated Clark County
Date Established: May 11, 2010
Date Terminated: Aug. 26, 2010
Site Latitude: +35.980833
Site Longitude: -115.530833

This station is an exploratory test site for ozone.

Site ID: 32-003-7772 (Indian Springs)

Street Address: 668 Gretta Ln.
City: Unincorporated Town of Indian Springs
Date Established: May 11, 2010
Date Terminated: n/a
Site Latitude: +36.569444
Site Longitude: -115.676667

This station is an exploratory test site for ozone.

Site ID: 32-003-7773 (Shooting Park)

Street Address: 11357 N. Decatur Blvd.
City: Unincorporated Clark County
Date Established: May 26, 2010
Date Terminated: Sept. 16, 2010
Site Latitude: +36.336111
Site Longitude: -115.209444

This station is an exploratory test site for ozone.

Site ID: 32-003-0540 (Jerome Mack)

Street Address: 4250 Karen Ave.
City: Las Vegas
Date Established: Aug. 27, 2010
Date Terminated: n/a
Site Latitude: +36.141895
Site Longitude: -115.078725

This NCore site was established to meet EPA regulatory requirements promulgated in October 2006 in its amendments to 40 CFR Parts 53 and 58. This multi-pollutant monitoring site is part of the National Core Network and monitors ozone, NO_x, CO, SO_2, PM_{10}, and $PM_{2.5}$.

Site ID: 32-003-7777 (Sandy Valley)

Street Address: Inside Peace Park, near Osage St. and Quartz Ave.
City: Unincorporated Town of Sandy Valley
Date Established: May 4, 2011
Date Terminated: Sept. 19, 2011
Site Latitude: +35.810278
Site Longitude: -115.646667

This station is an exploratory test site for ozone.

Site ID: 32-003-7778 (Arden Peak)

Street Address: Arden Peak
City: Unincorporated Clark County
Date Established: May 4, 2011
Date Terminated: Oct. 1, 2012
Site Latitude: +35.945833
Site Longitude: -115.042778

This station is an exploratory test site for ozone.

Site ID: 32-003-7776 (Mt. Pass)

Street Address: State Hwy 160, Mt. Pass
City: Unincorporated Clark County
Date Established: May 12, 2011
Date Terminated: Sept. 19, 2011
Site Latitude: +36.017778
Site Longitude: -115.496389

This station is an exploratory test site for ozone.

Site ID: 32-003-7779 (Laughlin)

Street Address: 101 Civic Way
City: Unincorporated Town of Laughlin
Date Established: May 1, 2012
Date Terminated: Oct. 1, 2012
Site Latitude: +35.169444
Site Longitude: -114.579444

This station is an exploratory test site for ozone.

Site ID: 32-003-7780 (Logandale)

Street Address: 3570 Lyman Street
City: Unincorporated Town of Logandale
Date Established: April 30, 2014
Date Terminated: n/a
Site Latitude: +36.606003
Site Longitude: -114.473983

This station is an exploratory test site for ozone.

Site ID: 32-003-9992 (NLV)

Street Address: 2730 Airport Drive
City: North Las Vegas
Date Established: n/a
Date Terminated: n/a
Site Latitude: +36.215574
Site Longitude: -115.195232

Site is not collecting data yet.

Site ID: 32-003-1501 (Near-Road #1)

Street Address: Teddy and Rancho
Date Established: TBD
Site Latitude: +36.139745

City: Las Vegas
Date Terminated: n/a
Site Longitude: -115.175635

Site established as part of EPA's near-road NO_2 monitoring requirement.

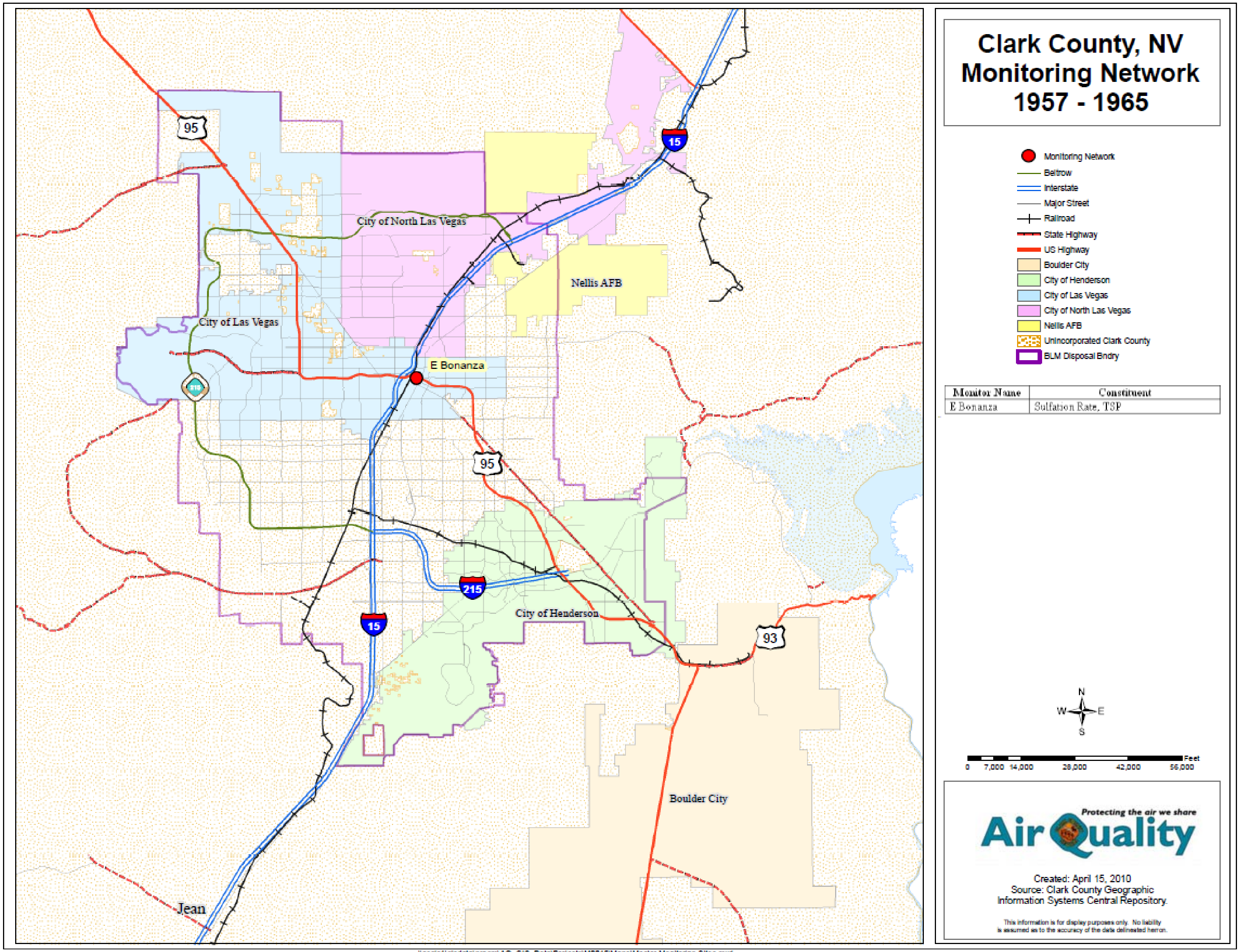
Site ID: 32-003-1502 (Near-Road #2)

Street Address: I-515 and N. 4^{th} Street
Date Established: TBD
Site Latitude: +36.174137

City: Las Vegas
Date Terminated: n/a
Site Longitude: -115.139718

Site established as part of EPA's near-road NO_2 monitoring requirement.

APPENDIX B: HISTORICAL MONITORING MAPS



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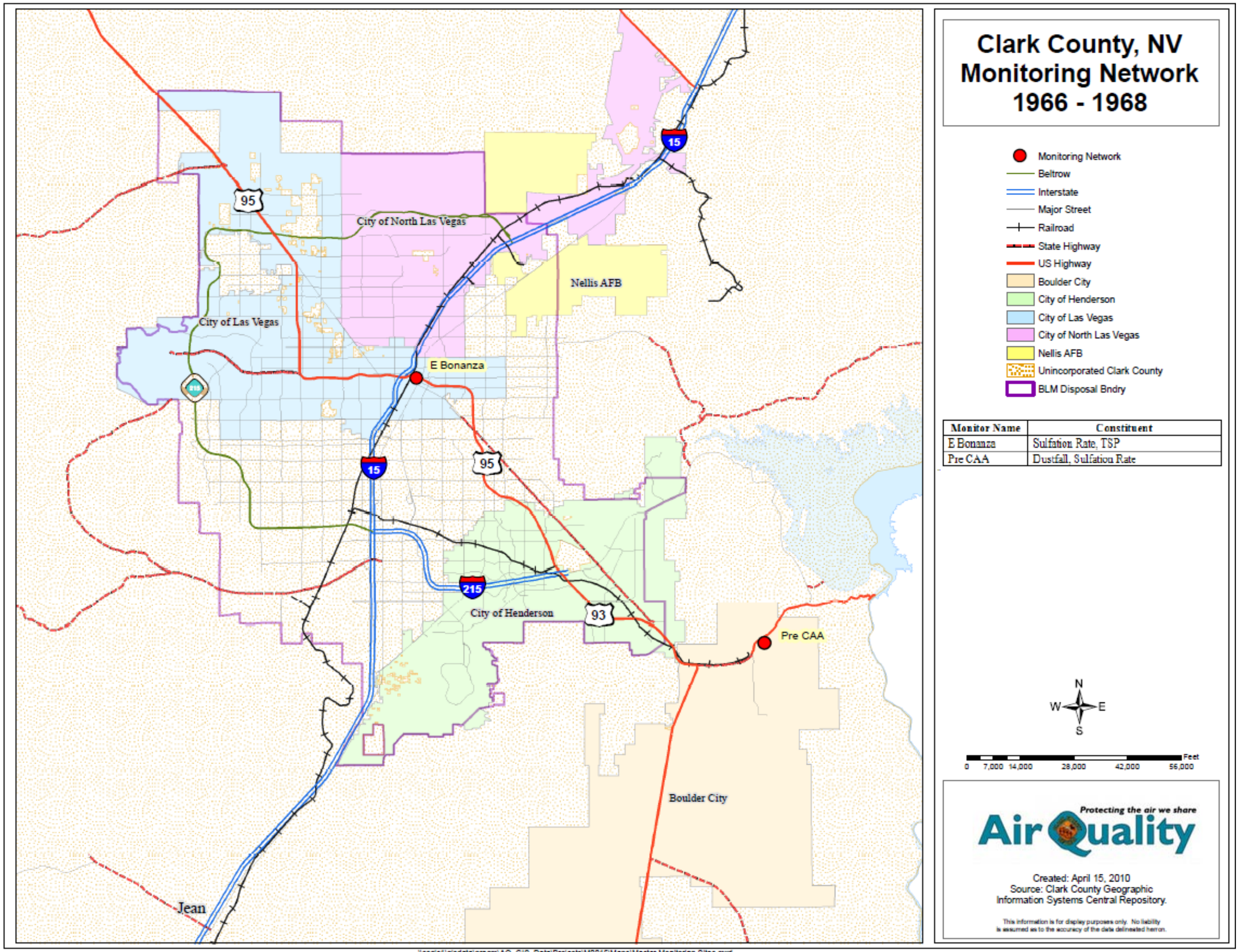

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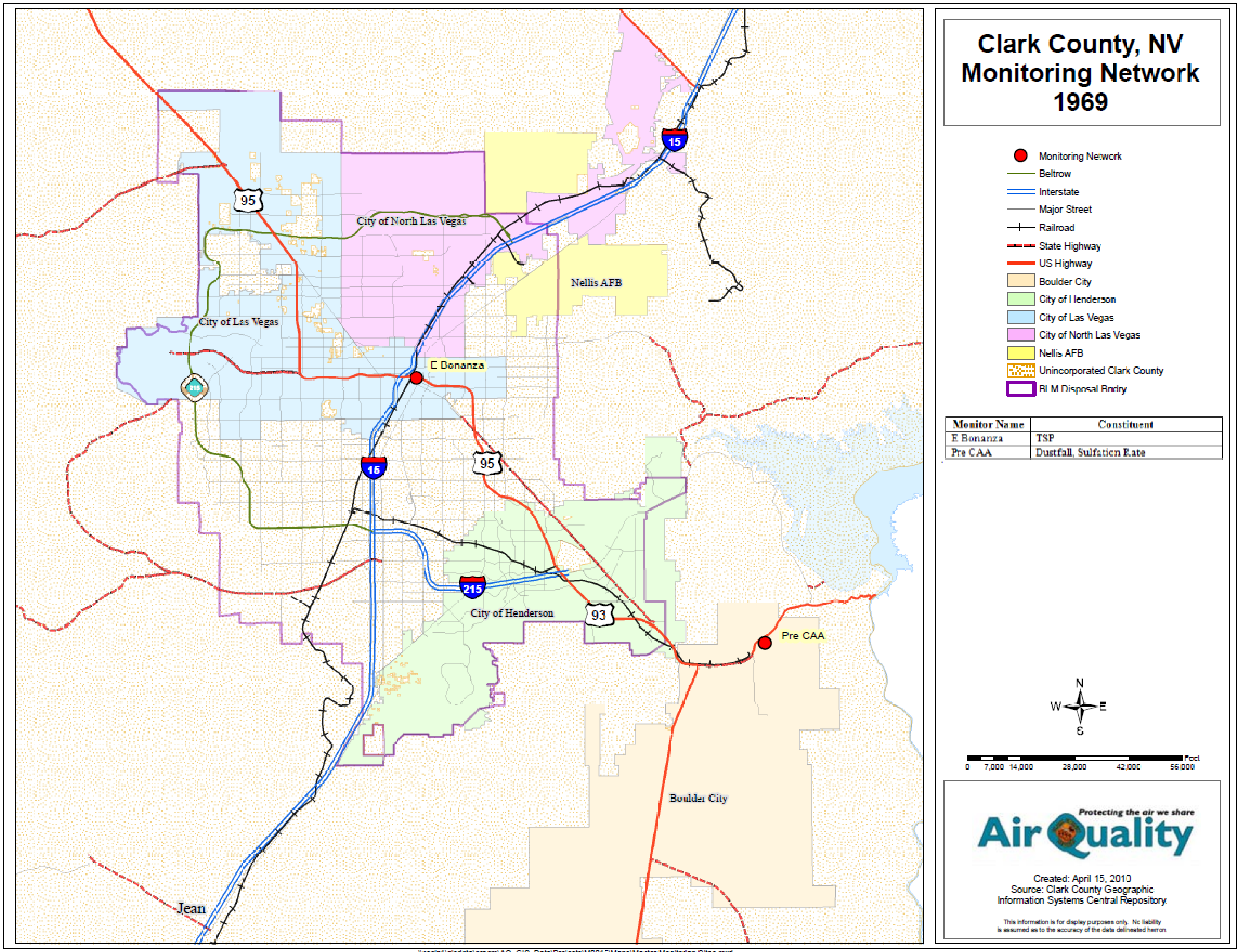

Monitor Name	Constituent
E Bonanza	TSP
Pre CAA	Dustfall, Sulfation Rate

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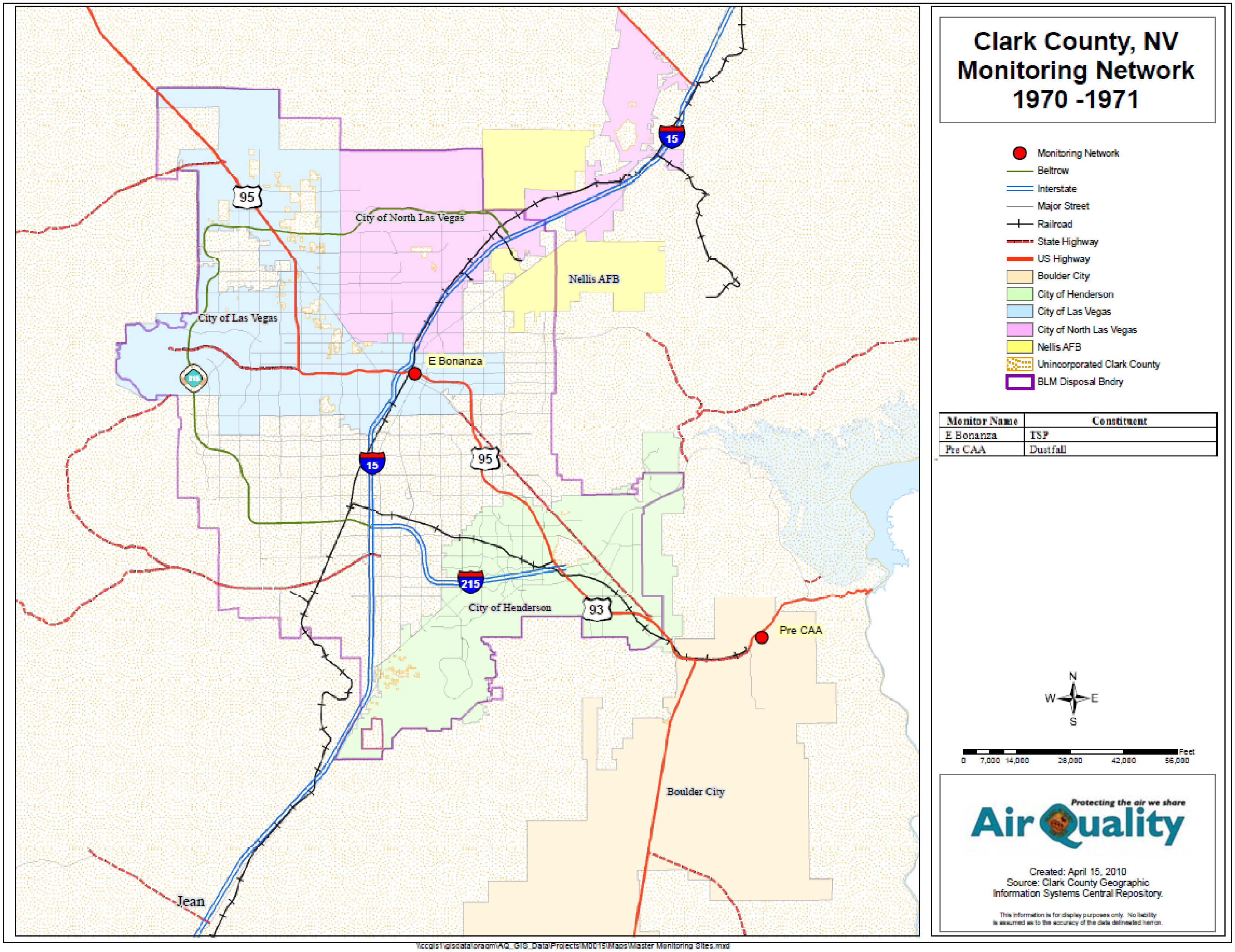

Monitor Name	Constituent
E Bonanza	TSP
Pre CAA	Dustfall

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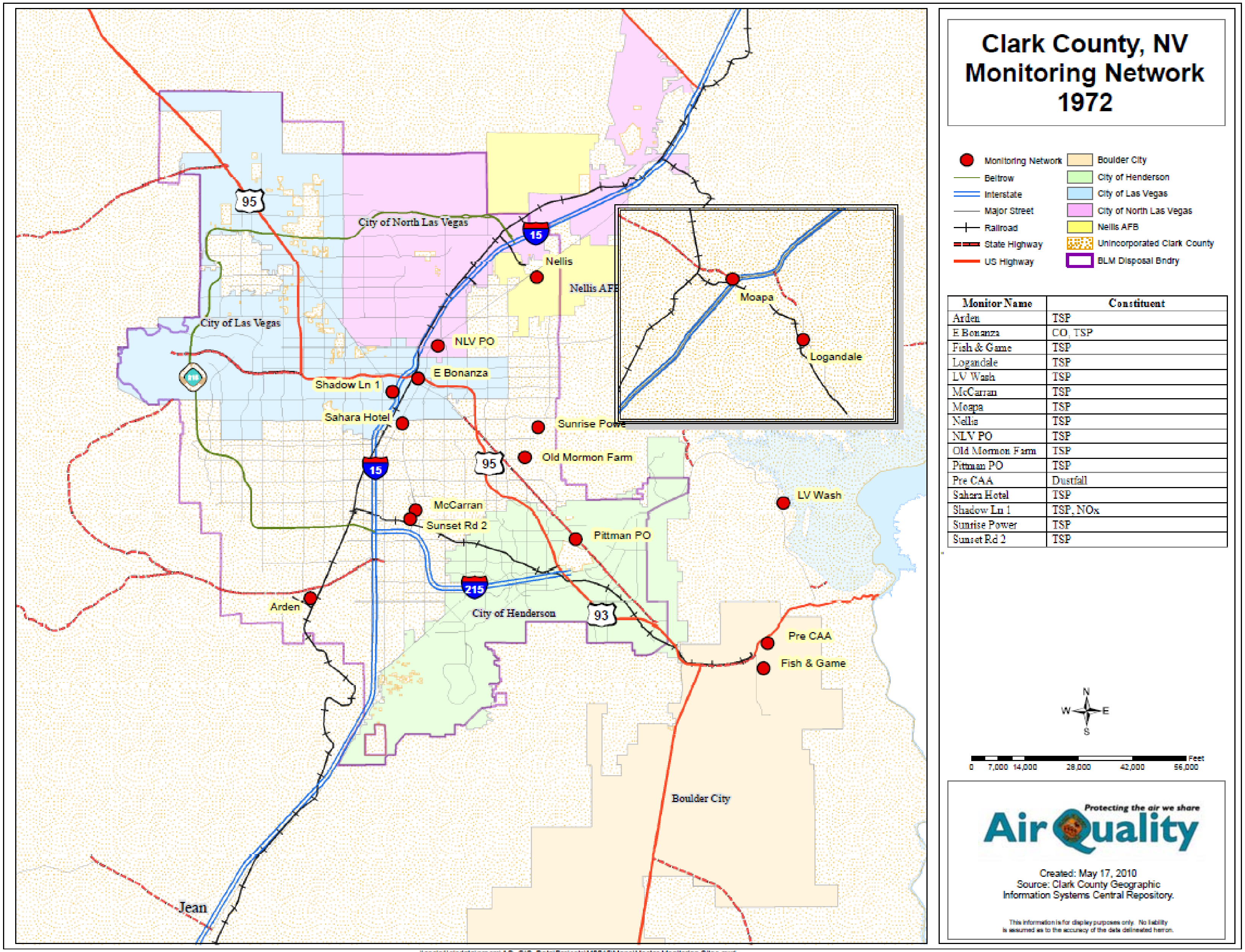
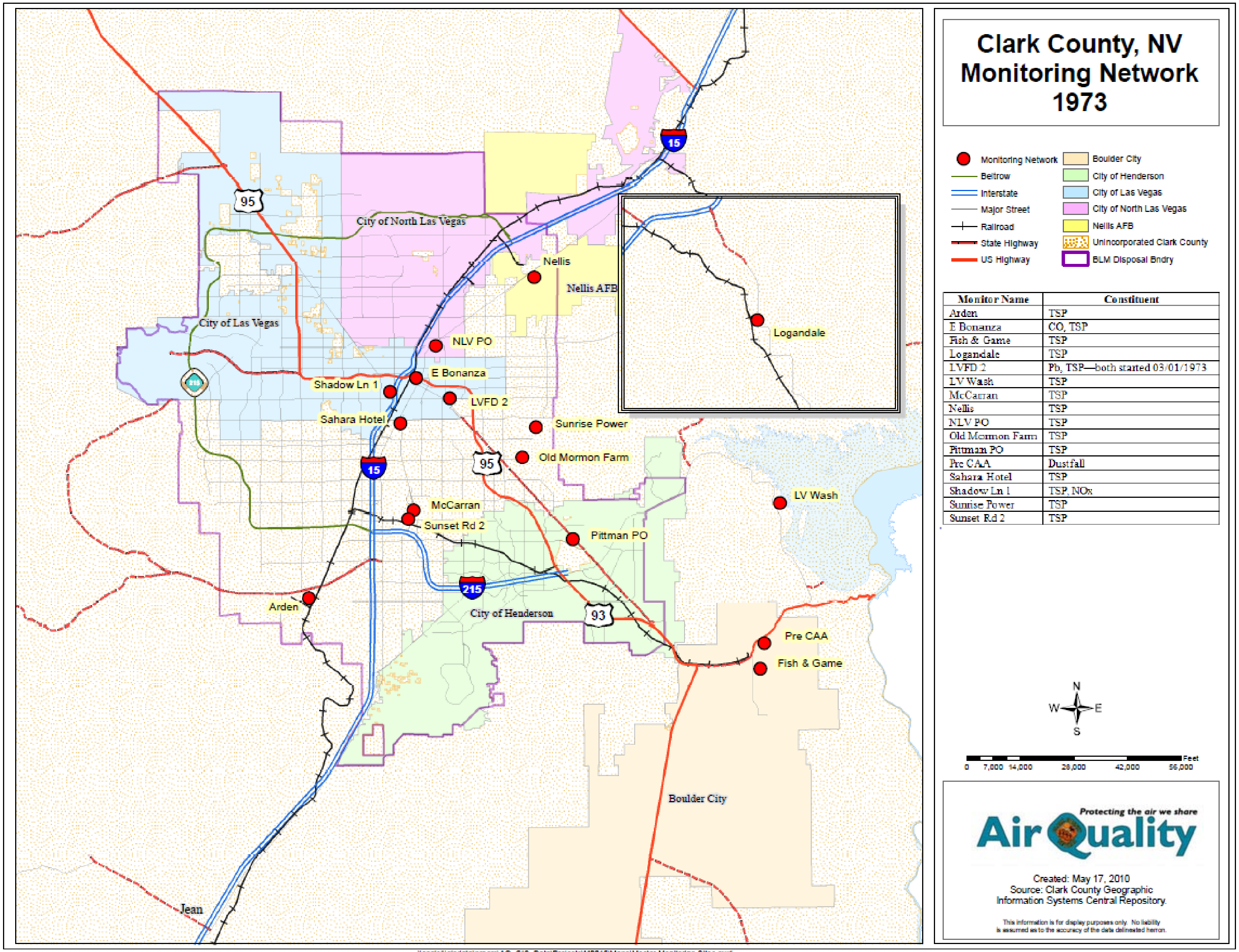


Monitor Name	Constituent
Arden	TSP
E Bonanza	CO, TSP
Fish & Game	TSP
Logandale	TSP
LV Wash	TSP
McCarran	TSP
Moapa	TSP
Nellis	TSP
NLV PO	TSP
Old Mormon Farm	TSP
Pittman PO	TSP
Pre CAA	Dustfall
Sahara Hotel	TSP
Shadow Ln 1	TSP, NOx
Sunrise Power	TSP
Sunset Rd 2	TSP



Monitor Name	Constituent
Arden	TSP
E Bonanza	CO, TSP
Fish & Game	TSP
Logandale	TSP
LVFD 2	Pb, TSP—both started 03/01/1973
LV Wash	TSP
McCarran	TSP
Nellis	TSP
NLV PO	TSP
Old Mormon Farm	TSP
Pittman PO	TSP
Pre CAA	Dustfall
Sahara Hotel	TSP
Shadow Ln 1	TSP, NOx
Sunrise Power	TSP
Sunset Rd 2	TSP

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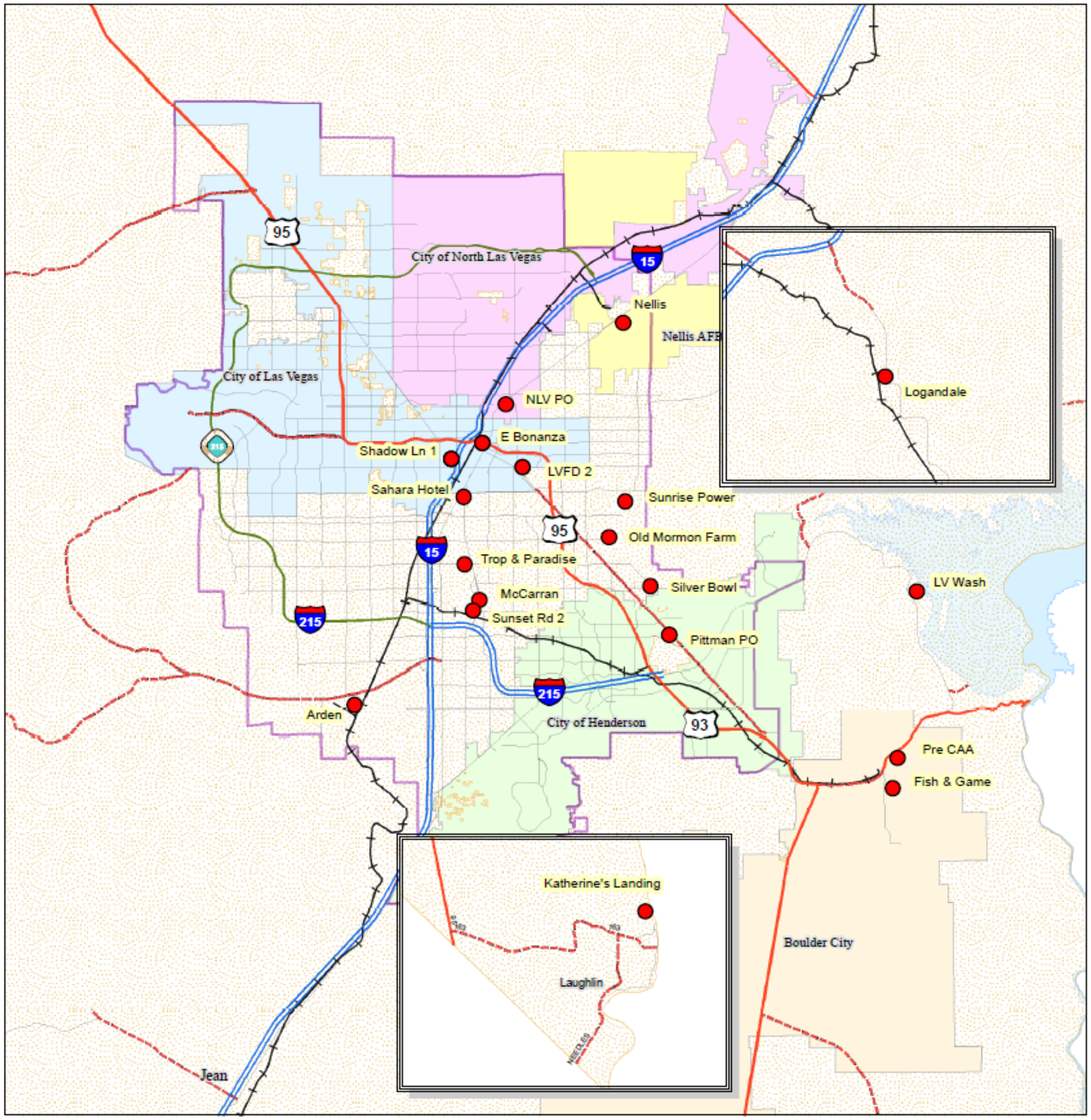

Clark County, NV Monitoring Network 1974

Monitoring Network
Beltrow
Interstate
Major Street
Railroad
State Highway
US Highway
Boulder City
City of Henderson
City of Las Vegas
City of North Las Vegas
Nellis AFB
Unincorporated Clark County
BLM Disposal Bndry

Monitor Name	Constituent
Arden	TSP—ended 03/25/1974
E Bonanza	CO, O3 , TSP
Fish & Game	TSP
Katherine's Landing	TSP
Logandale	TSP
LVFD 2	Pb, TSP
LV Wash	TSP
McCarran	TSP
Nellis	TSP
NLV PO	TSP
Old Mormon Farm	TSP
Pittman PO	TSP
Pre CAA	Dustfall
Sahara Hotel	TSP
Shadow Ln 1	CO, O3 , TSP, NOx
Silver Bowl	TSP
Sunrise Power	TSP
Sunset Rd 2	TSP—ended 06/29/1974
Trop & Paradise	TSP

N W E S

0 7,000 14,000 28,000 42,000 56,000 Feet

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Air Quality

Created: May 17, 2010
Source: Clark County Geographic Information Systems Central Repository.

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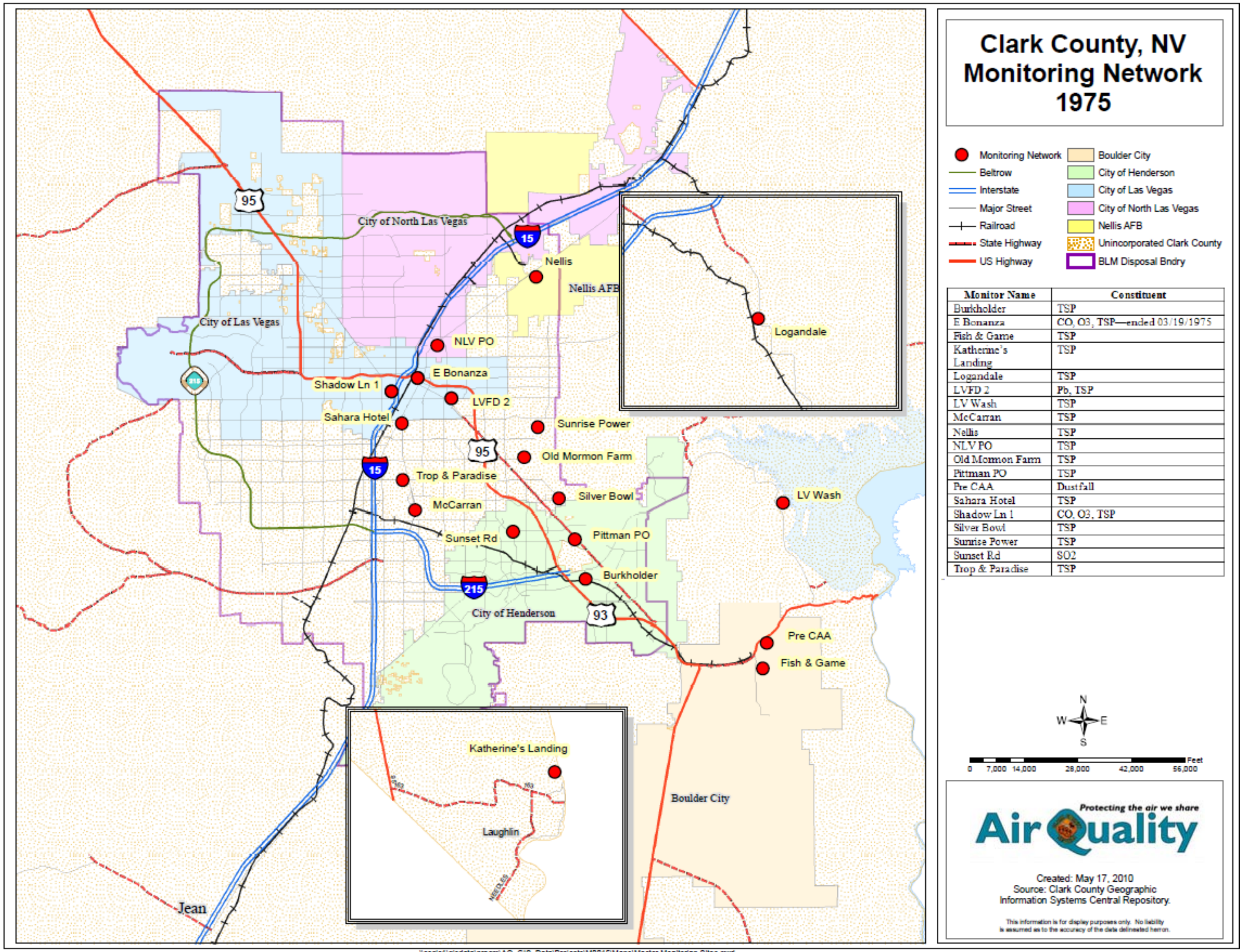

Monitor Name	Constituent
Burkholder	TSP
E Bonanza	CO, O3, TSP—ended 03/19/1975
Fish & Game	TSP
Katherine's Landing	TSP
Logandale	TSP
LVFD 2	Pb, TSP
LV Wash	TSP
McCarran	TSP
Nellis	TSP
NLV PO	TSP
Old Mormon Farm	TSP
Pittman PO	TSP
Pre CAA	Dustfall
Sahara Hotel	TSP
Shadow Ln 1	CO, O3, TSP
Silver Bowl	TSP
Sunrise Power	TSP
Sunset Rd	SO2
Trop & Paradise	TSP

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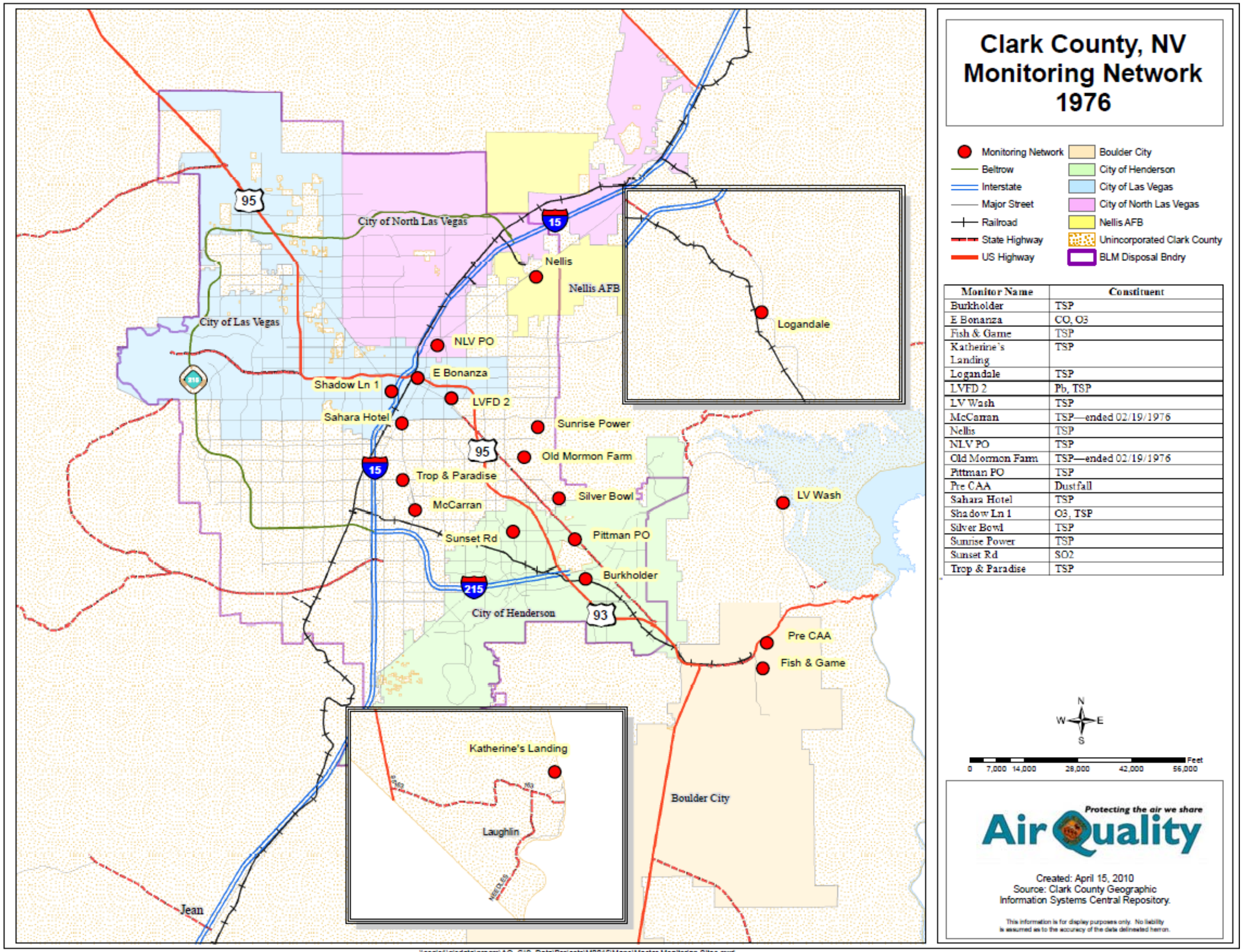

Monitor Name	Constituent
Burkholder	TSP
E Bonanza	CO, O3
Fish & Game	TSP
Katherine's Landing	TSP
Logandale	TSP
LVFD 2	Pb, TSP
LV Wash	TSP
McCarran	TSP—ended 02/19/1976
Nellis	TSP
NLV PO	TSP
Old Mormon Farm	TSP—ended 02/19/1976
Pittman PO	TSP
Pre CAA	Dustfall
Sahara Hotel	TSP
Shadow Ln 1	O3, TSP
Silver Bowl	TSP
Sunrise Power	TSP
Sunset Rd	SO2
Trop & Paradise	TSP

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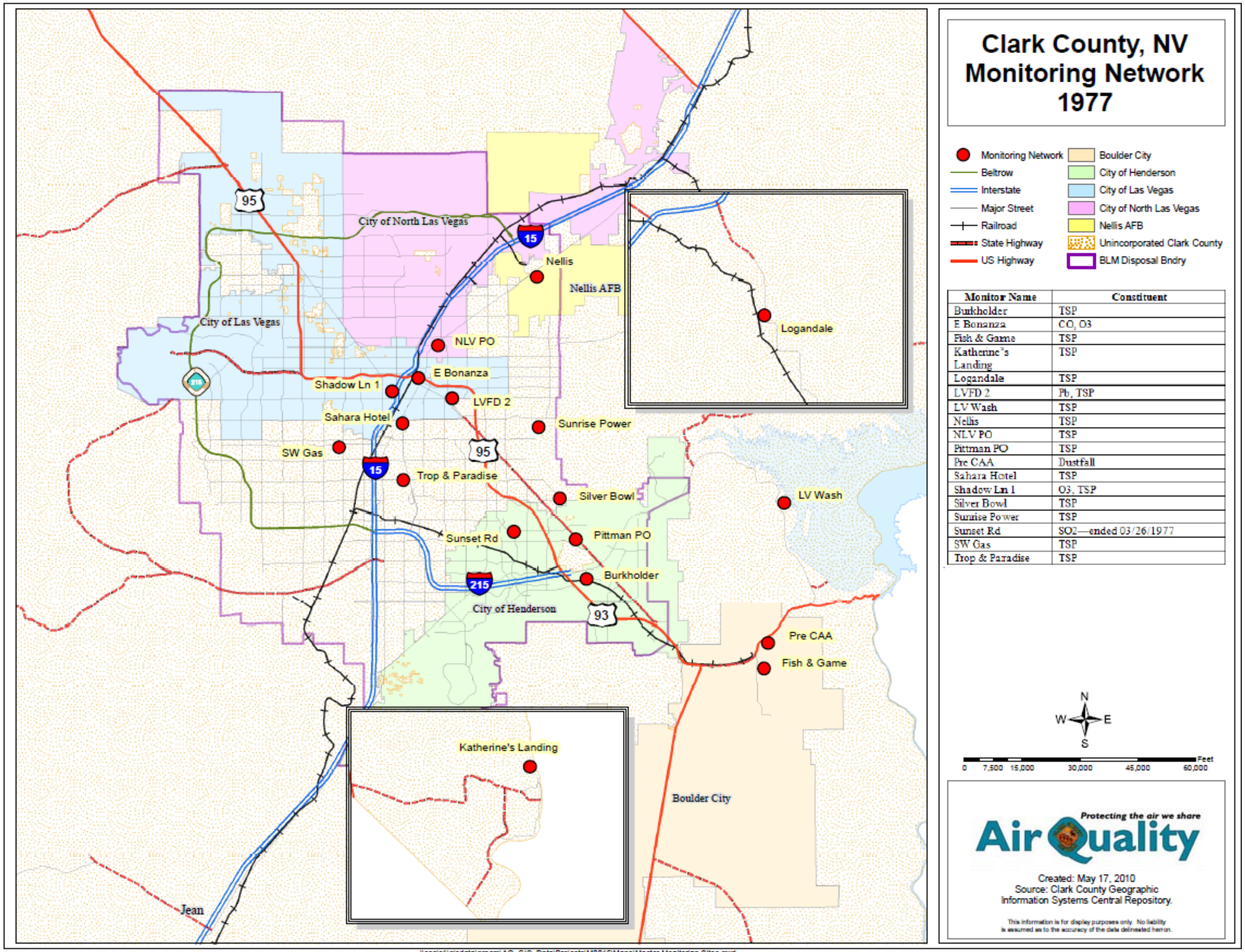
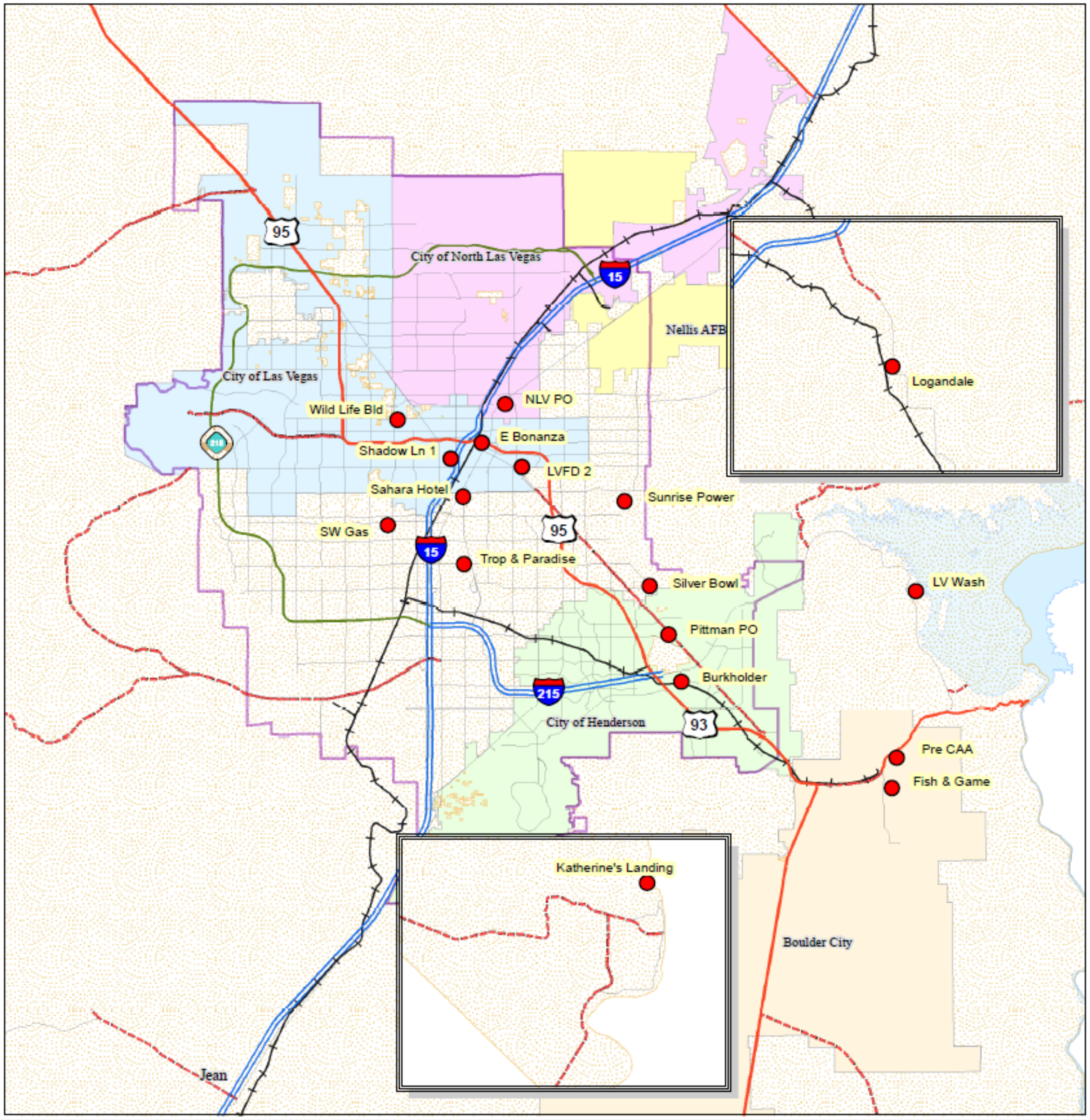


Monitor Name	Constituent
Burkholder	TSP
E Bonanza	CO, O3
Fish & Game	TSP
Katherine's Landing	TSP
Logandale	TSP
LVFD 2	Pb, TSP
LV Wash	TSP
Nellis	TSP
NLV PO	TSP
Pittman PO	TSP
Pre CAA	Dustfall
Sahara Hotel	TSP
Shadow Ln 1	O3, TSP
Silver Bowl	TSP
Sunrise Power	TSP
Sunset Rd	SO2—ended 03/26/1977
SW Gas	TSP
Trop & Paradise	TSP



Clark County, NV Monitoring Network 1978

Monitoring Network
Beltrow
Interstate
Major Street
Railroad
State Highway
US Highway
Boulder City
City of Henderson
City of Las Vegas
City of North Las Vegas
Nellis AFB
Unincorporated Clark County
BLM Disposal Bndry

Monitor Name	Constituent
Burkholder	TSP
E Bonanza	CO, O3
Fish & Game	TSP
Katherine's Landing	TSP
Logandale	TSP
LVFD 2	Pb, TSP
LV Wash	TSP
NLV PO	TSP
Pittman PO	TSP
Pre CAA	Dustfall
Sahara Hotel	TSP
Shadow Ln 1	O3, TSP
Silver Bowl	TSP
Sunrise Power	TSP
SW Gas	TSP
Trop & Paradise	TSP—ended 03/28/1978
Wild Life Bld	TSP

N W E S

Feet
0 7,000 14,000 28,000 42,000 56,000

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Air Quality

Created: May 17, 2010
Source: Clark County Geographic Information Systems Central Repository.

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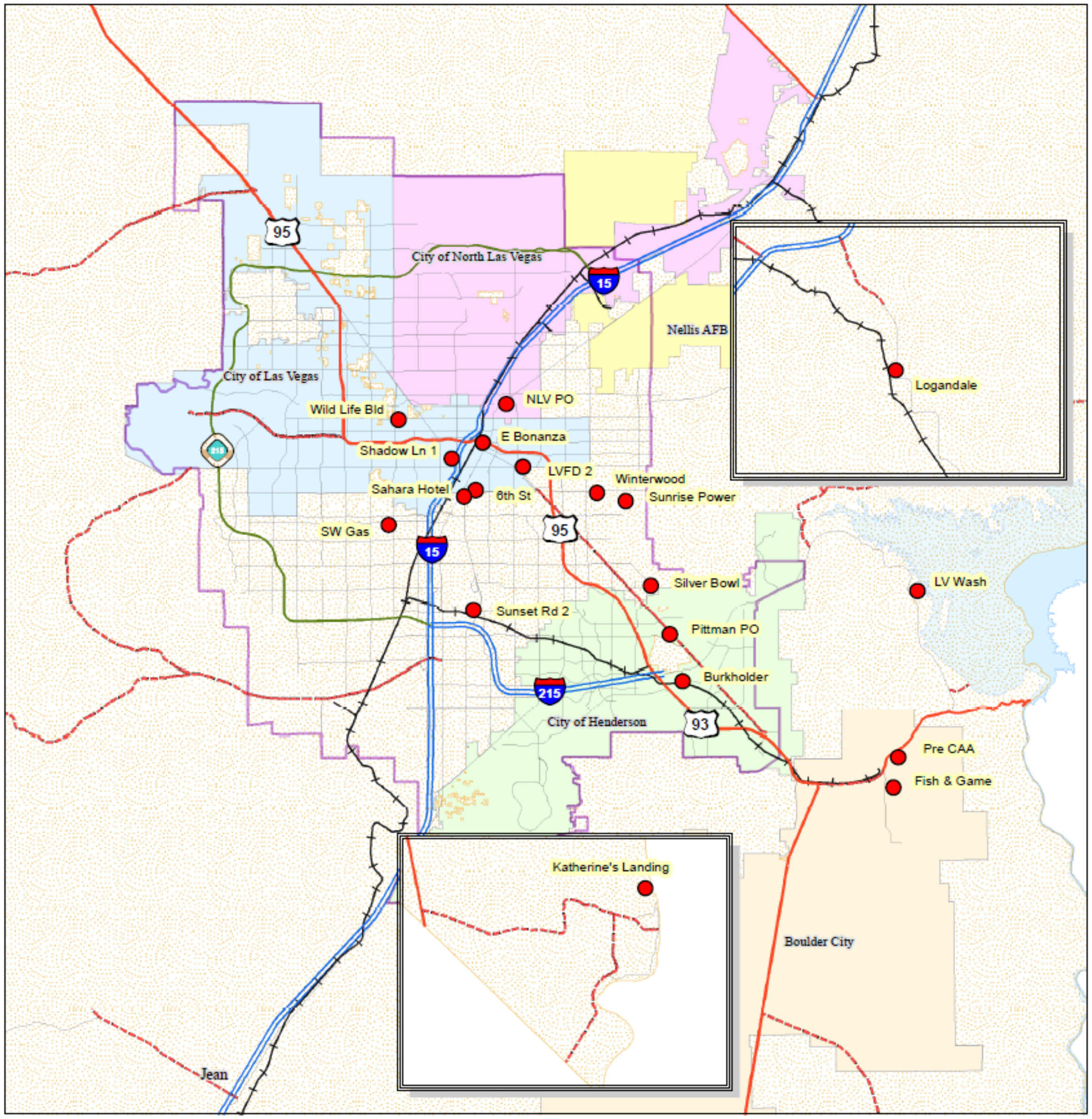

Clark County, NV Monitoring Network 1979

- Monitoring Network
- Beltrow
- Interstate
- Major Street
- Railroad
- State Highway
- US Highway
- Boulder City
- City of Henderson
- City of Las Vegas
- City of North Las Vegas
- Nellis AFB
- Unincorporated Clark County
- BLM Disposal Bndry

Monitor Name	Constituent
6th St	CO
Burkholder	TSP
E Bonanza	CO, O3
Fish & Game	TSP
Katherine's Landing	TSP—ended 3/11/1979
Logandale	TSP
LVFD 2	Pb, TSP
LV Wash	TSP
NLV PO	TSP
Pittman PO	TSP
Pre CAA	Dustfall
Sahara Hotel	TSP
Shadow Ln 1	TSP
Silver Bowl	TSP
Sunrise Power	TSP
Sunset Rd 2	O3
SW Gas	TSP
Wild Life Bld	TSP
Winterwood	O3—started 07/01/1979

N W E S

0 7,000 14,000 28,000 42,000 56,000 Feet

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Air Quality

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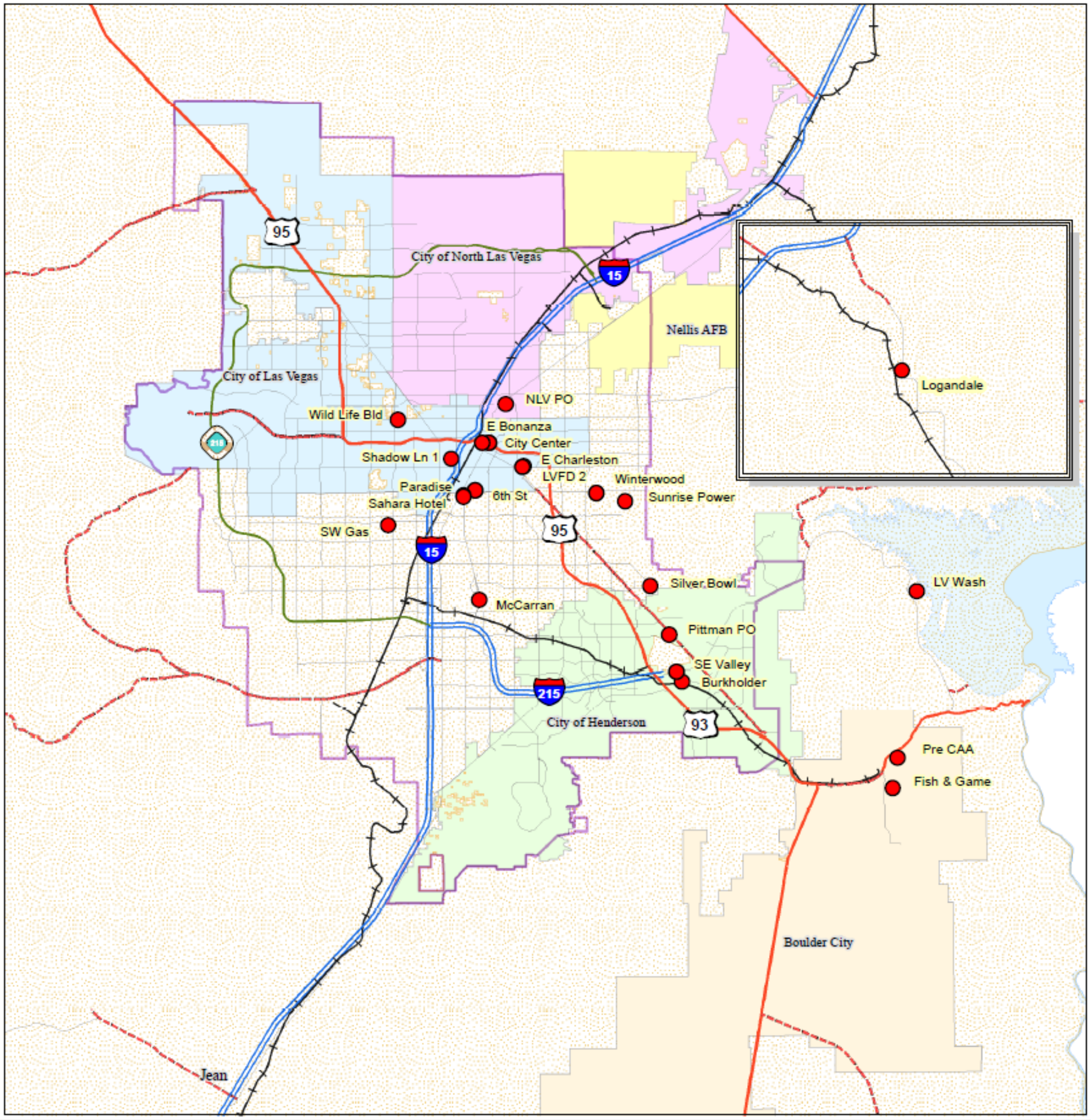

Clark County, NV Monitoring Network 1980

- Monitoring Network
- Beltrow
- Interstate
- Major Street
- Railroad
- State Highway
- US Highway
- Boulder City
- City of Henderson
- City of Las Vegas
- City of North Las Vegas
- Nellis AFB
- Unincorporated Clark County
- BLM Disposal Bndry

Monitor Name	Constituent
6th St	CO—ended 09/08/1980, NOx—ended 9/13/1980
Burkholder	TSP
City Center	CO, O3, NOx
E Bonanza	CO, O3
E Charleston	CO—started 04/01/1980
Fish & Game	TSP
Logandale	TSP
LVFD 2	Pb, TSP
LV Wash	TSP
McCarran	O3
NLV PO	TSP
Paradise	CO
Pittman PO	TSP
Pre CAA	Dustfall
Sahara Hotel	TSP
SE Valley	CO, O3
Shadow Ln 1	TSP
Silver Bowl	TSP
Sunrise Power	TSP
SW Gas	TSP
Wild Life Bld	TSP
Winterwood	CO, O3

N W E S

0 7,000 14,000 28,000 42,000 56,000 Feet

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Air Quality

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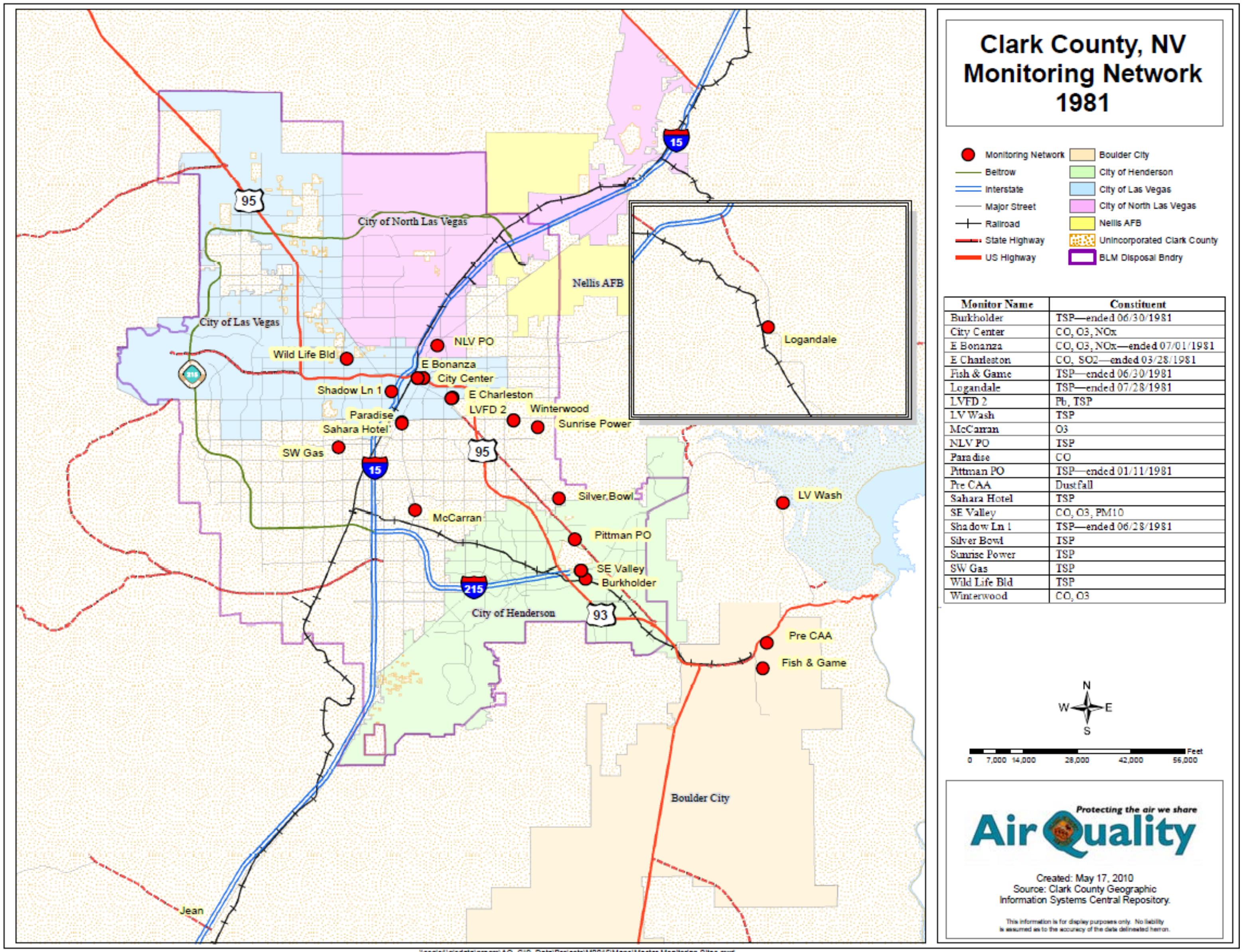
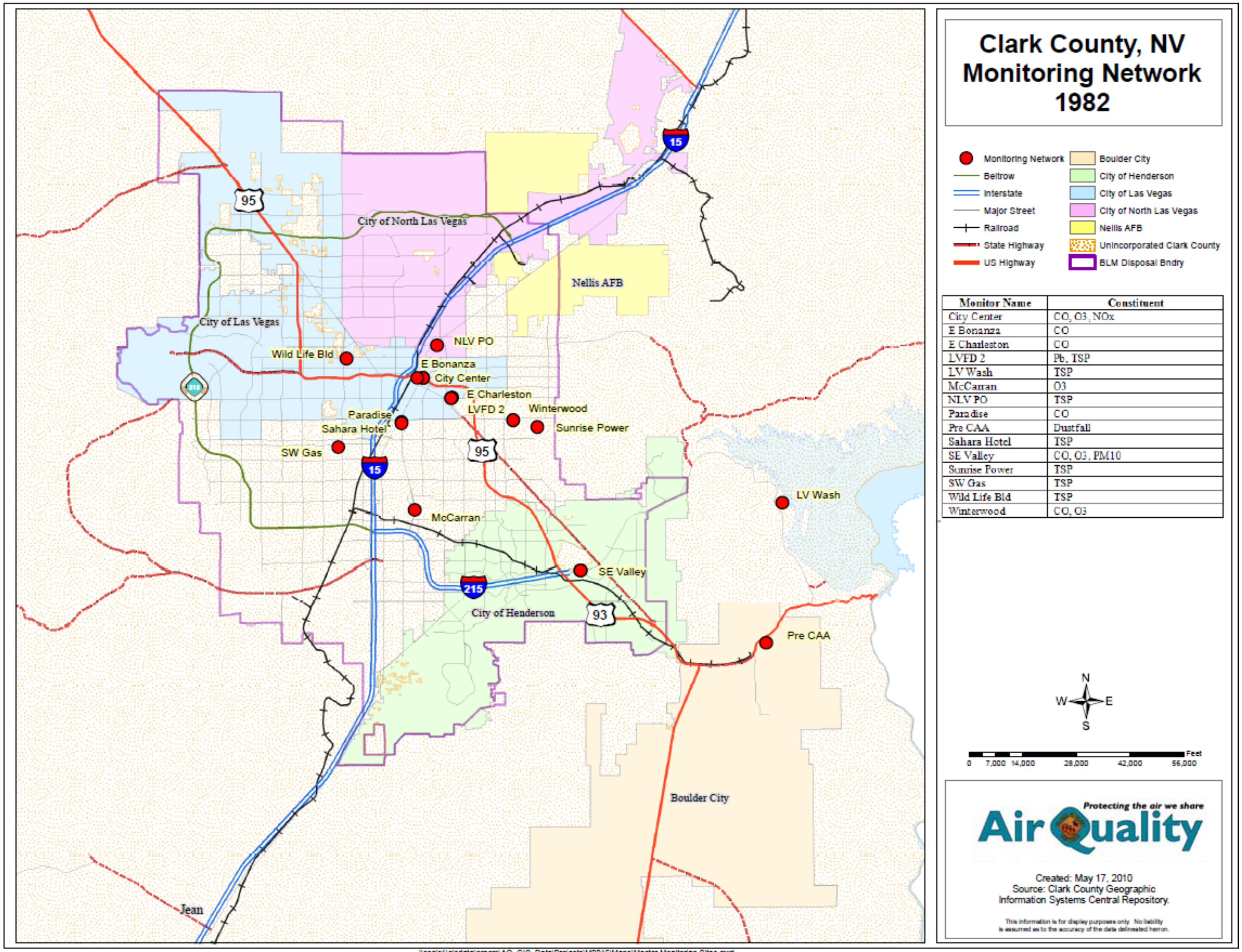


Monitor Name	Constituent
Burkholder	TSP—ended 06/30/1981
City Center	CO, O3, NOx
E Bonanza	CO, O3, NOx—ended 07/01/1981
E Charleston	CO, SO2—ended 03/28/1981
Fish & Game	TSP—ended 06/30/1981
Logandale	TSP—ended 07/28/1981
LVFD 2	Pb, TSP
LV Wash	TSP
McCarran	O3
NLV PO	TSP
Paradise	CO
Pittman PO	TSP—ended 01/11/1981
Pre CAA	Dustfall
Sahara Hotel	TSP
SE Valley	CO, O3, PM10
Shadow Ln 1	TSP—ended 06/28/1981
Silver Bowl	TSP
Sunrise Power	TSP
SW Gas	TSP
Wild Life Bld	TSP
Winterwood	CO, O3



Monitor Name	Constituent
City Center	CO, O3, NOx
E Bonanza	CO
E Charleston	CO
LVFD 2	Pb, TSP
LV Wash	TSP
McCarran	O3
NLV PO	TSP
Paradise	CO
Pre CAA	Dustfall
Sahara Hotel	TSP
SE Valley	CO, O3, PM10
Sunrise Power	TSP
SW Gas	TSP
Wild Life Bld	TSP
Winterwood	CO, O3

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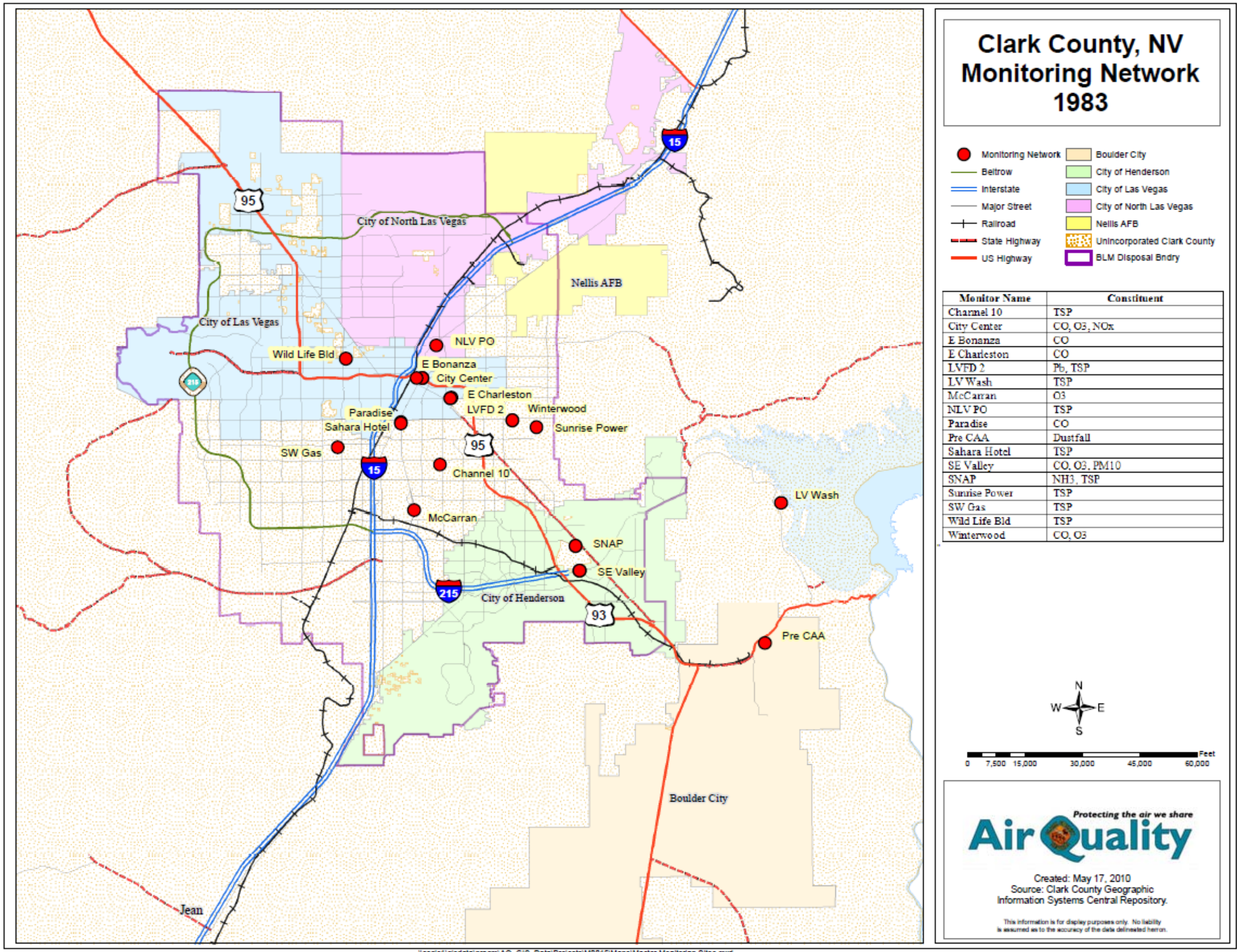
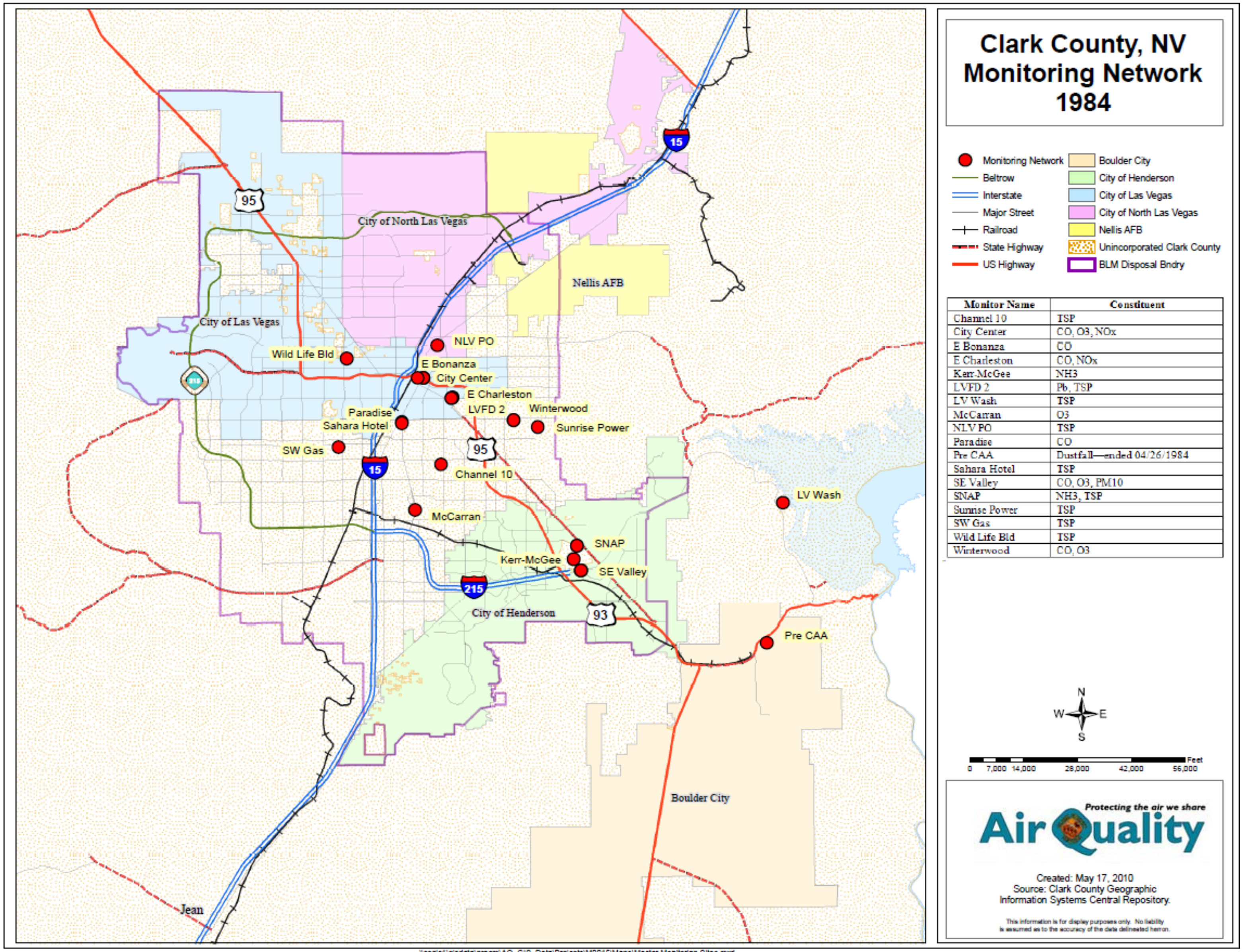
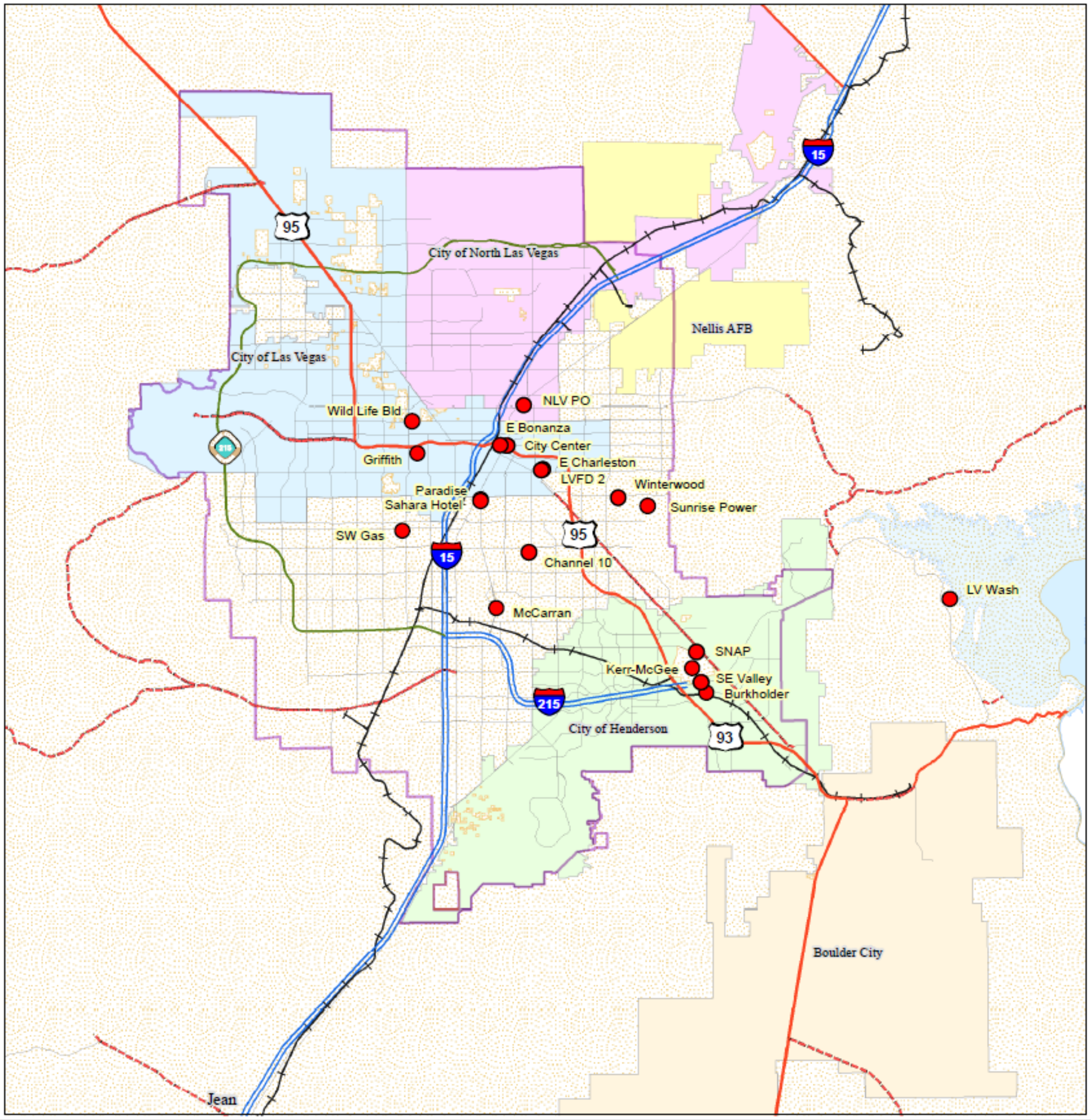


Monitor Name	Constituent
Channel 10	TSP
City Center	CO, O3, NOx
E Bonanza	CO
E Charleston	CO
LVFD 2	Pb, TSP
LV Wash	TSP
McCarran	O3
NLV PO	TSP
Paradise	CO
Pre CAA	Dustfall
Sahara Hotel	TSP
SE Valley	CO, O3, PM10
SNAP	NH3, TSP
Sunrise Power	TSP
SW Gas	TSP
Wild Life Bld	TSP
Winterwood	CO, O3



Monitor Name	Constituent
Channel 10	TSP
City Center	CO, O3, NOx
E Bonanza	CO
E Charleston	CO, NOx
Kerr-McGee	NH3
LVFD 2	Pb, TSP
LV Wash	TSP
McCarran	O3
NLV PO	TSP
Paradise	CO
Pre CAA	Dustfall—ended 04/26/1984
Sahara Hotel	TSP
SE Valley	CO, O3, PM10
SNAP	NH3, TSP
Sunrise Power	TSP
SW Gas	TSP
Wild Life Bld	TSP
Winterwood	CO, O3



Clark County, NV Monitoring Network 1985

Monitoring Network
Beltrow
Interstate
Major Street
Railroad
State Highway
US Highway
Boulder City
City of Henderson
City of Las Vegas
City of North Las Vegas
Nellis AFB
Unincorporated Clark County
BLM Disposal Bndry

Monitor Name	Constituent
Burkholder	Pollen
Channel 10	TSP, Pollen
City Center	CO, O3, NOx
E Bonanza	CO, PM10—started 11/01/1985
E Charleston	CO, NOx, PM10—started 06/01/1985
Griffith	Pollen
Kerr-McGee	NH3
LVFD 2	Pb, TSP
LV Wash	TSP
McCarran	O3
NLV PO	TSP, PM10—started 11/01/1985
Paradise	CO
Sahara Hotel	TSP
SE Valley	CO, O3, PM10
SNAP	NH3, TSP
Sunrise Power	TSP
SW Gas	TSP
Wild Life Bld	TSP—ended 09/25/1985
Winterwood	CO, O3

N W E S

0 7,000 14,000 28,000 42,000 56,000 Feet

Air Quality — Protecting the air we share

Created: May 17, 2010
Source: Clark County Geographic Information Systems Central Repository.

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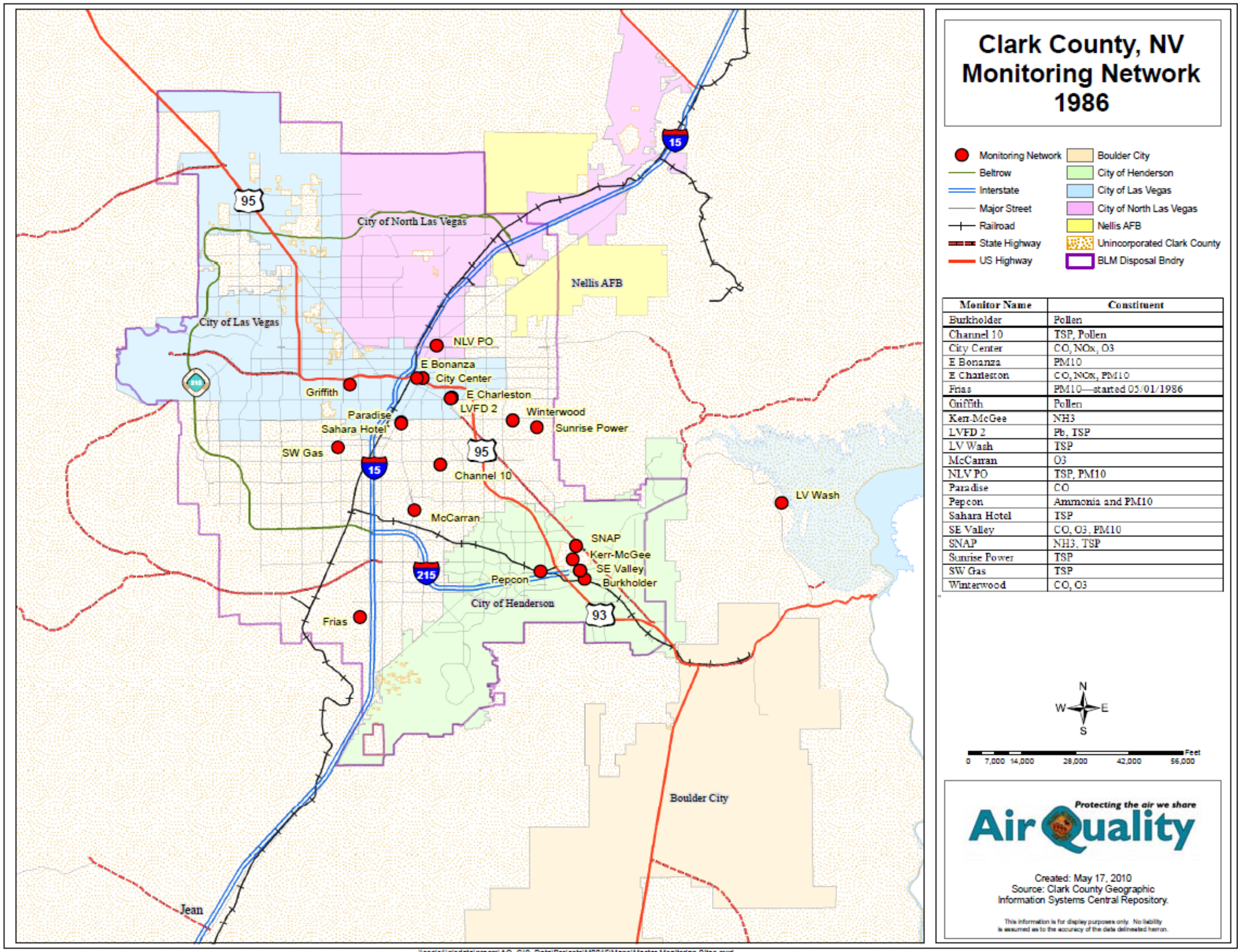

Monitor Name	Constituent
Burkholder	Pollen
Channel 10	TSP, Pollen
City Center	CO, NOx, O3
E Bonanza	PM10
E Charleston	CO, NOx, PM10
Frias	PM10—started 05/01/1986
Griffith	Pollen
Kerr-McGee	NH3
LVFD 2	Pb, TSP
LV Wash	TSP
McCarran	O3
NLV PO	TSP, PM10
Paradise	CO
Pepcon	Ammonia and PM10
Sahara Hotel	TSP
SE Valley	CO, O3, PM10
SNAP	NH3, TSP
Sunrise Power	TSP
SW Gas	TSP
Winterwood	CO, O3

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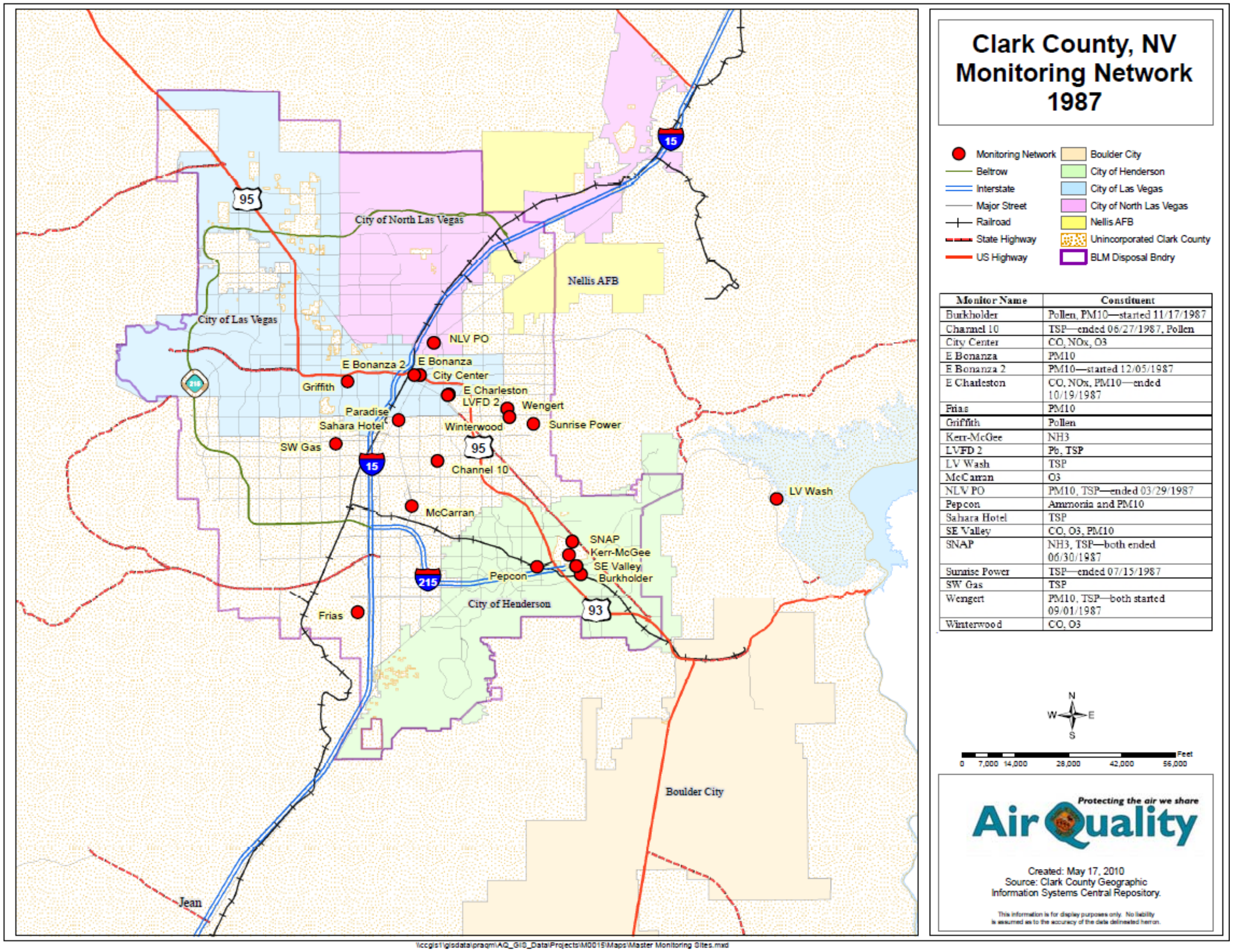
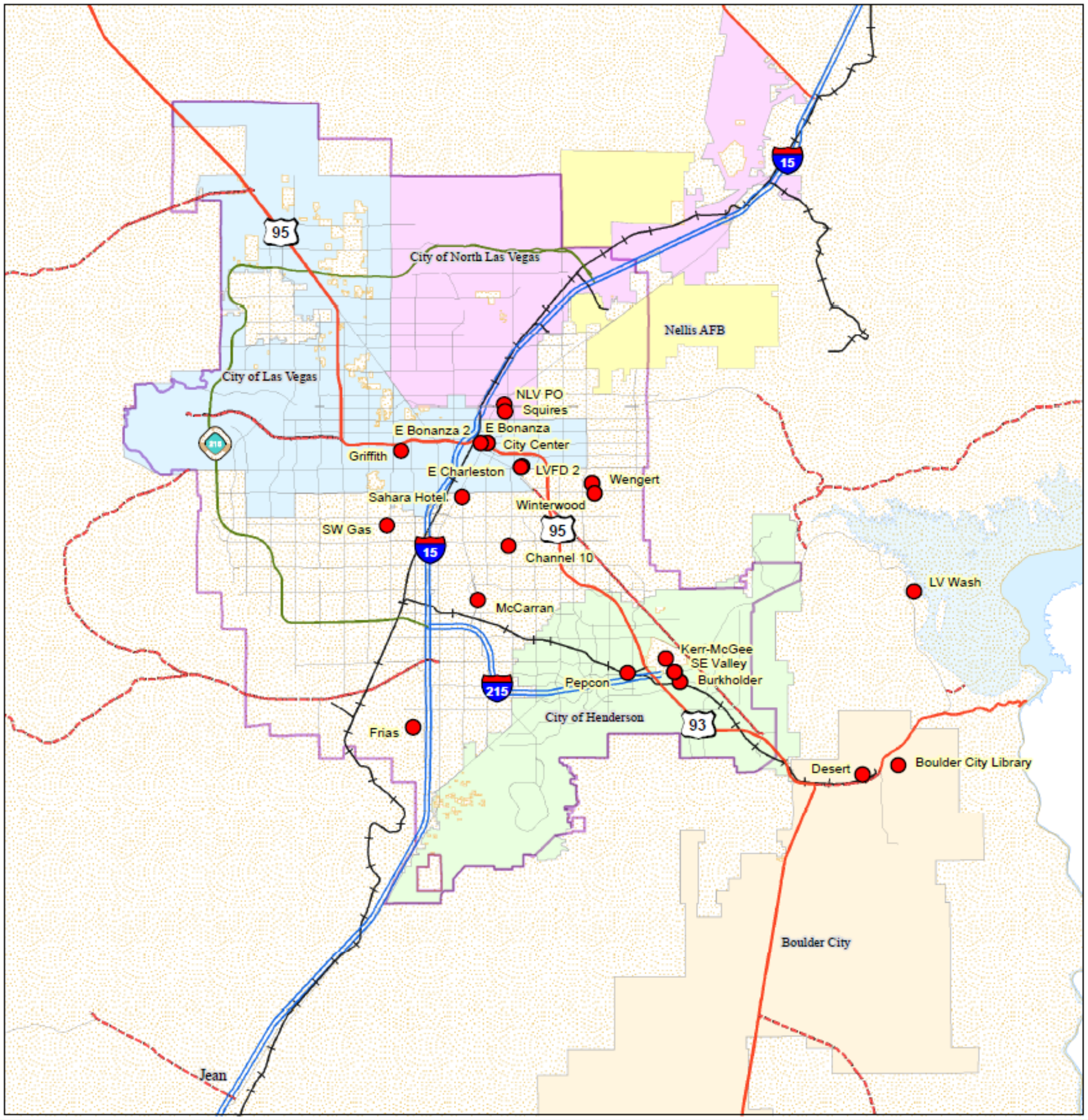


Monitor Name	Constituent
Burkholder	Pollen, PM10—started 11/17/1987
Channel 10	TSP—ended 06/27/1987, Pollen
City Center	CO, NOx, O3
E Bonanza	PM10
E Bonanza 2	PM10—started 12/05/1987
E Charleston	CO, NOx, PM10—ended 10/19/1987
Frias	PM10
Griffith	Pollen
Kerr-McGee	NH3
LVFD 2	Pb, TSP
LV Wash	TSP
McCarran	O3
NLV PO	PM10, TSP—ended 03/29/1987
Pepcon	Ammonia and PM10
Sahara Hotel	TSP
SE Valley	CO, O3, PM10
SNAP	NH3, TSP—both ended 06/30/1987
Sunrise Power	TSP—ended 07/15/1987
SW Gas	TSP
Wengert	PM10, TSP—both started 09/01/1987
Winterwood	CO, O3

Clark County, NV Monitoring Network 1988



Monitoring Network
Beltrow
Interstate
Major Street
Railroad
State Highway
US Highway
Boulder City
City of Henderson
City of Las Vegas
City of North Las Vegas
Nellis AFB
Unincorporated Clark County
BLM Disposal Bndry

Monitor Name	Constituent
Boulder City Library	Pollen
Burkholder	Pollen, PM10
Channel 10	Pollen
City Center	CO, NOx, O3
Desert	Pollen
E Bonanza	PM10
E Bonanza 2	PM10
E Charleston	CO, NOx
Frias	PM10
Griffith	Pollen
Kerr-McGee	NH3
LVFD 2	Pb, TSP
LV Wash	TSP
McCarran	O3
NLV PO	PM10
Pepcon	Ammonia and PM10—ended 05/04/1988
Sahara Hotel	TSP
SE Valley	CO, O3, PM10
SW Gas	TSP—ended 08/02/1988
Squires	Pollen
Wengert	PM10, TSP—ended 09/30/1988
Winterwood	CO, O3

N W E S

0 7,000 14,000 28,000 42,000 56,000 Feet

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Air Quality

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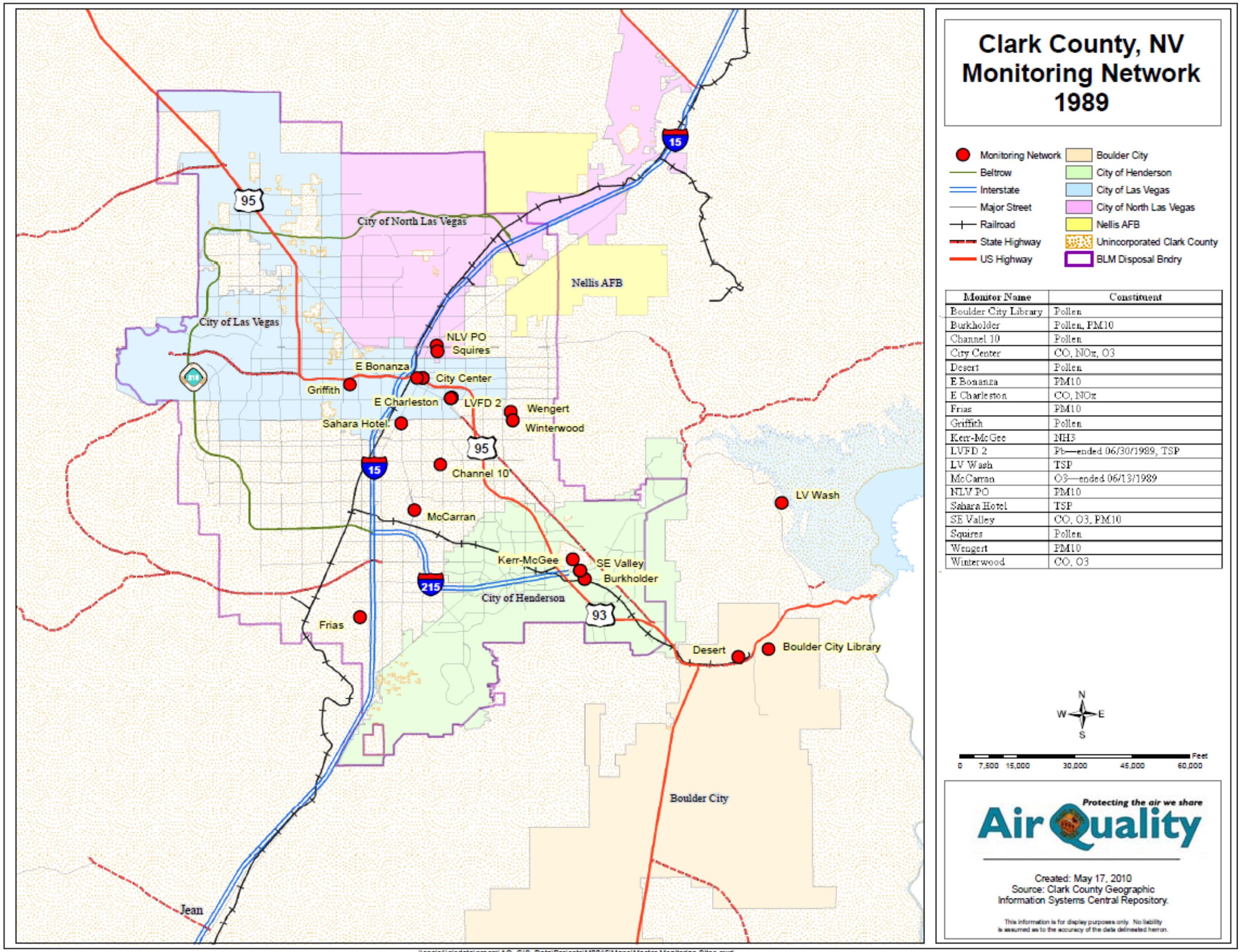
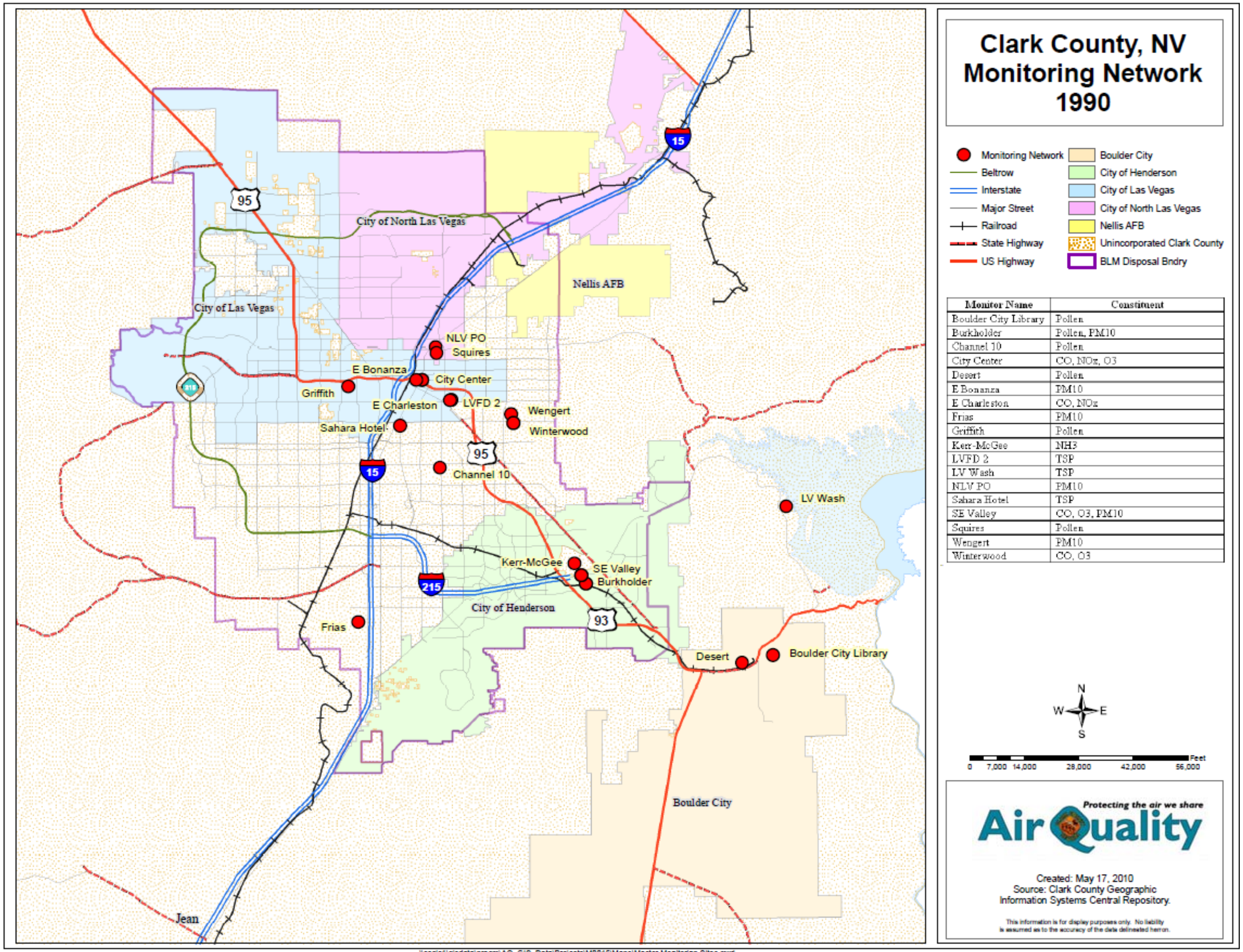


Monitor Name	Constituent
Boulder City Library	Pollen
Burkholder	Pollen, PM10
Channel 10	Pollen
City Center	CO, NOx, O3
Desert	Pollen
E Bonanza	PM10
E Charleston	CO, NOx
Frias	PM10
Griffith	Pollen
Kerr-McGee	NH3
LVFD 2	Pb—ended 06/30/1989, TSP
LV Wash	TSP
McCarran	O3—ended 06/13/1989
NLV PO	PM10
Sahara Hotel	TSP
SE Valley	CO, O3, PM10
Squires	Pollen
Wengert	PM10
Winterwood	CO, O3



Monitor Name	Constituent
Boulder City Library	Pollen
Burkholder	Pollen, PM10
Channel 10	Pollen
City Center	CO, NOx, O3
Desert	Pollen
E Bonanza	PM10
E Charleston	CO, NOx
Frias	PM10
Griffith	Pollen
Kerr-McGee	NH3
LVFD 2	TSP
LV Wash	TSP
NLV PO	PM10
Sahara Hotel	TSP
SE Valley	CO, O3, PM10
Squires	Pollen
Wengert	PM10
Winterwood	CO, O3

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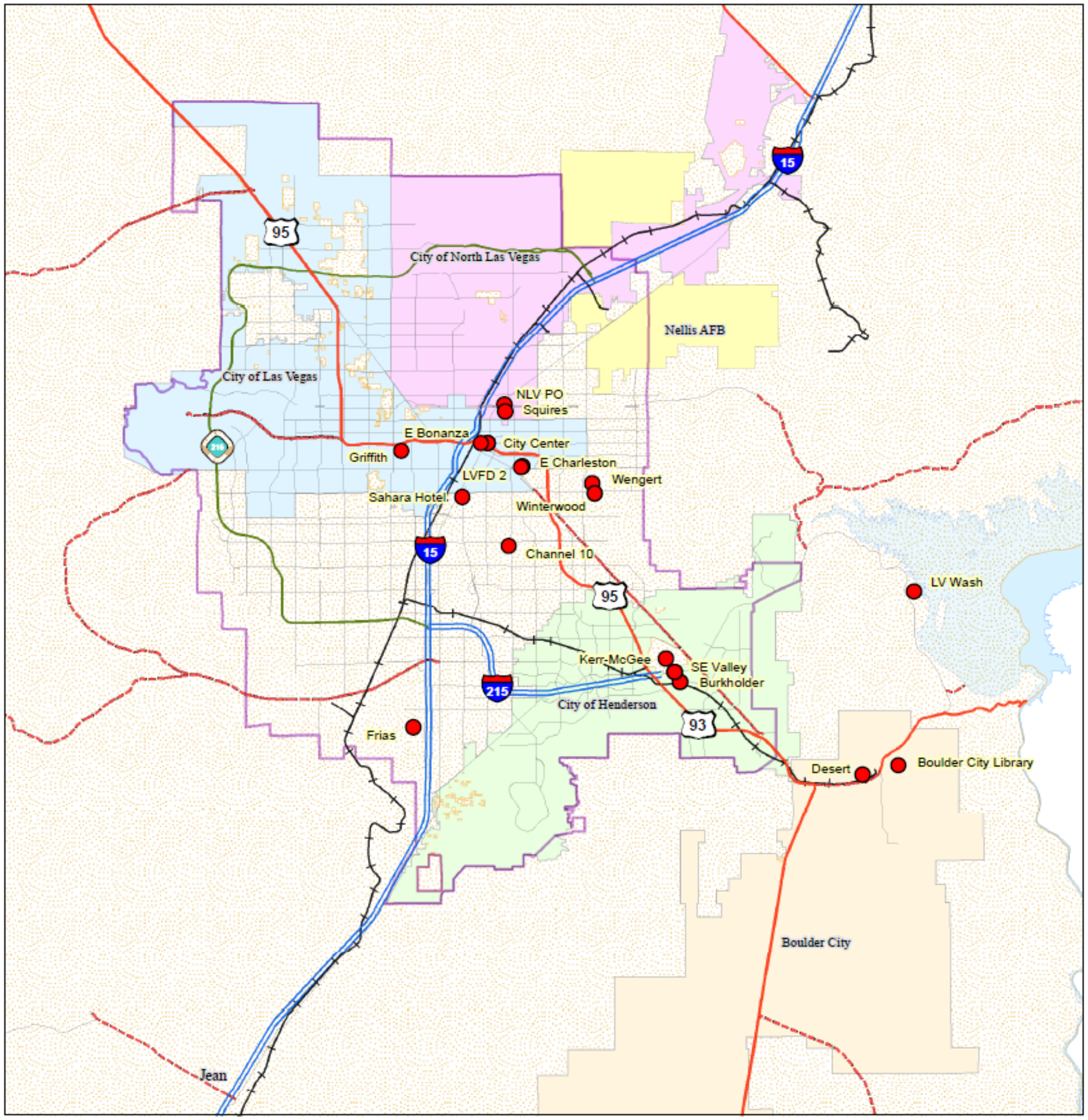

Clark County, NV Monitoring Network 1991

Monitoring Network
Beltrow
Interstate
Major Street
Railroad
State Highway
US Highway
Boulder City
City of Henderson
City of Las Vegas
City of North Las Vegas
Nellis AFB
Unincorporated Clark County
BLM Disposal Bndry

Monitor Name	Constituent
Boulder City Library	Pollen
Burkholder	Pollen, PM10
City Center	CO, NOx, O3
Channel 10	Pollen
Desert	Pollen
E Bonanza	PM10
E Charleston	CO, NOx
Frias	PM10
Griffith	Pollen
Kerr-McGee	NH3
LVFD 2	TSP
LV Wash	TSP
NLV PO	PM10
Sahara Hotel	TSP
SE Valley	CO, O3, PM10
Squires	Pollen
Wengert	PM10
Winterwood	CO, O3

N W E S

0 7,000 14,000 28,000 42,000 56,000 Feet

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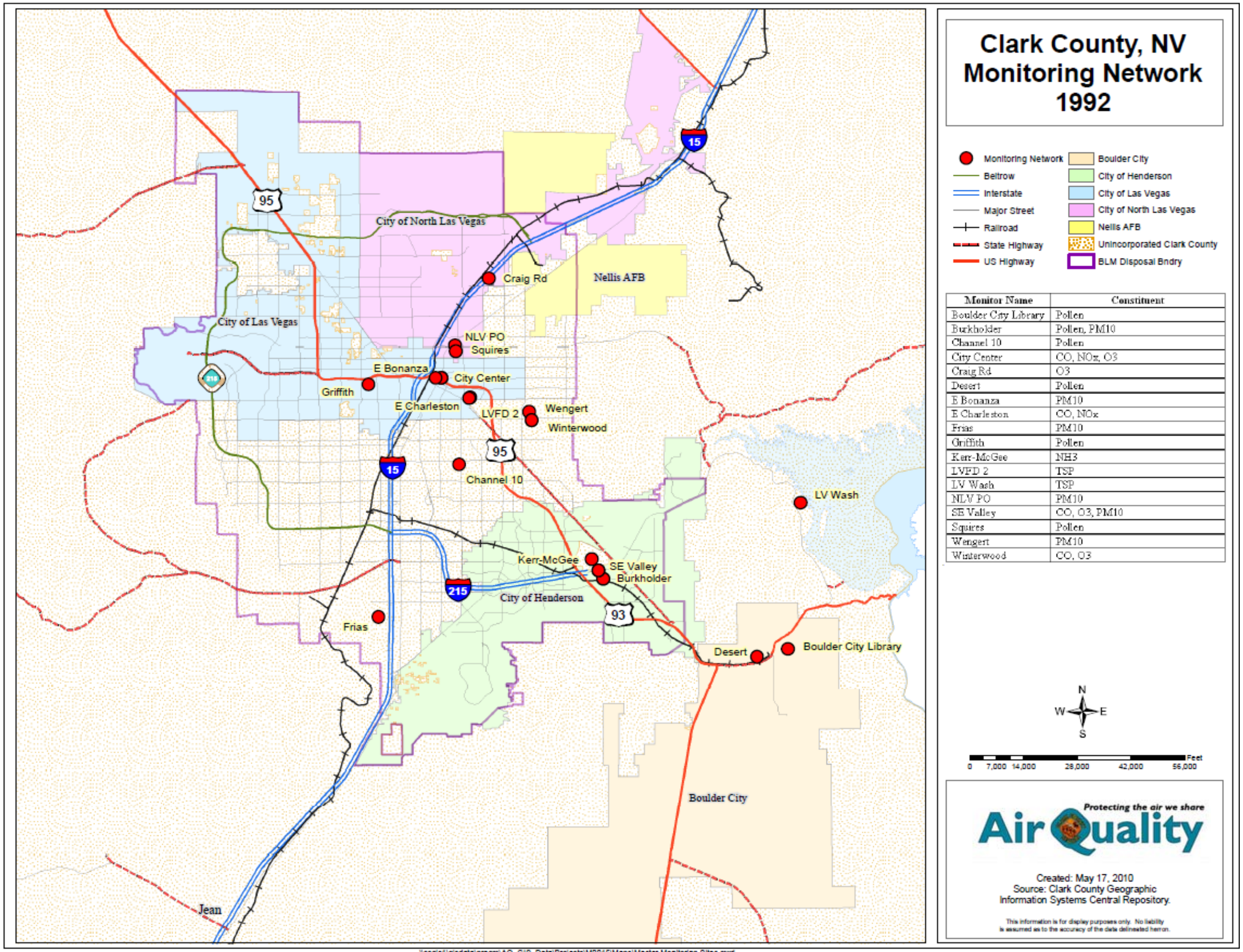
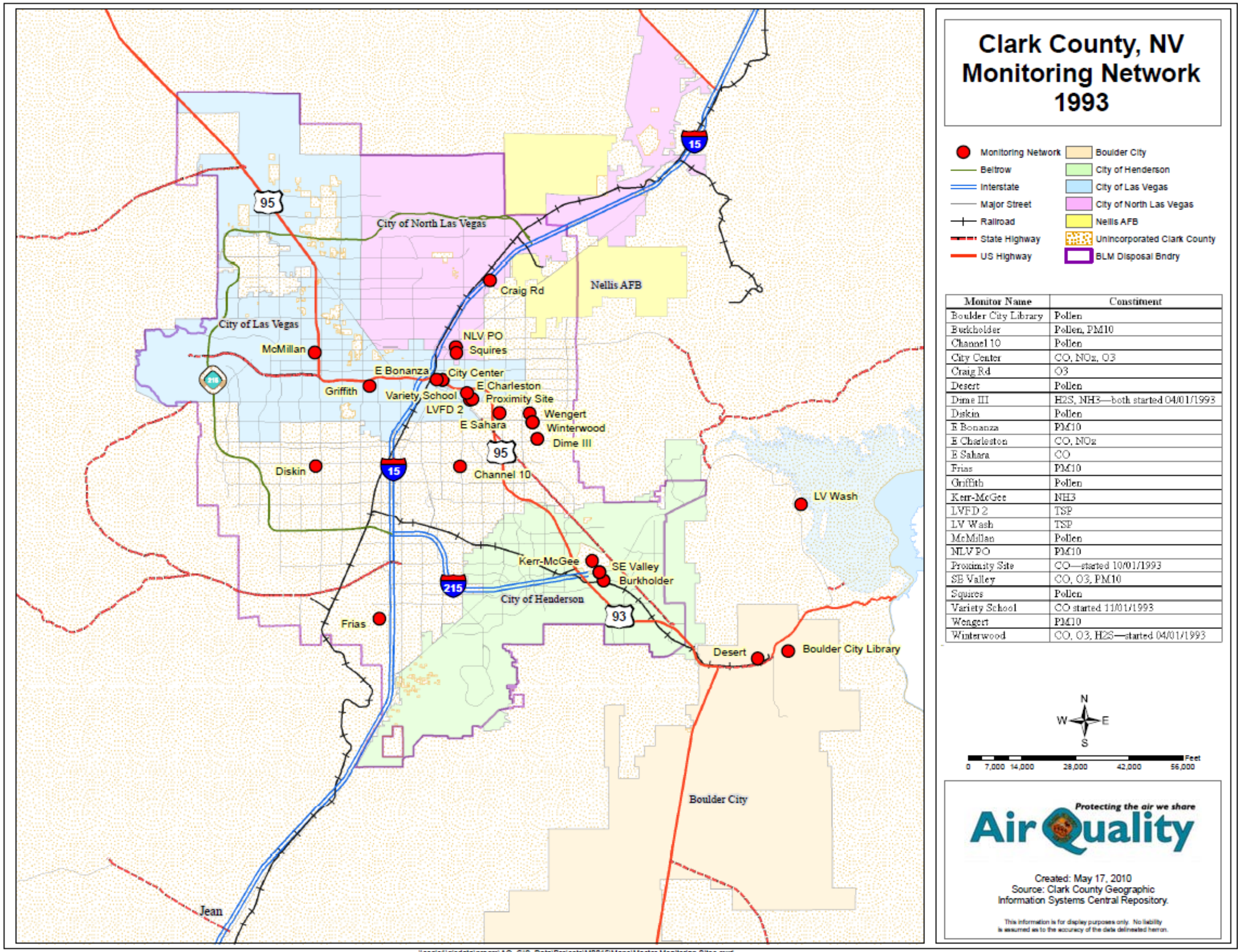
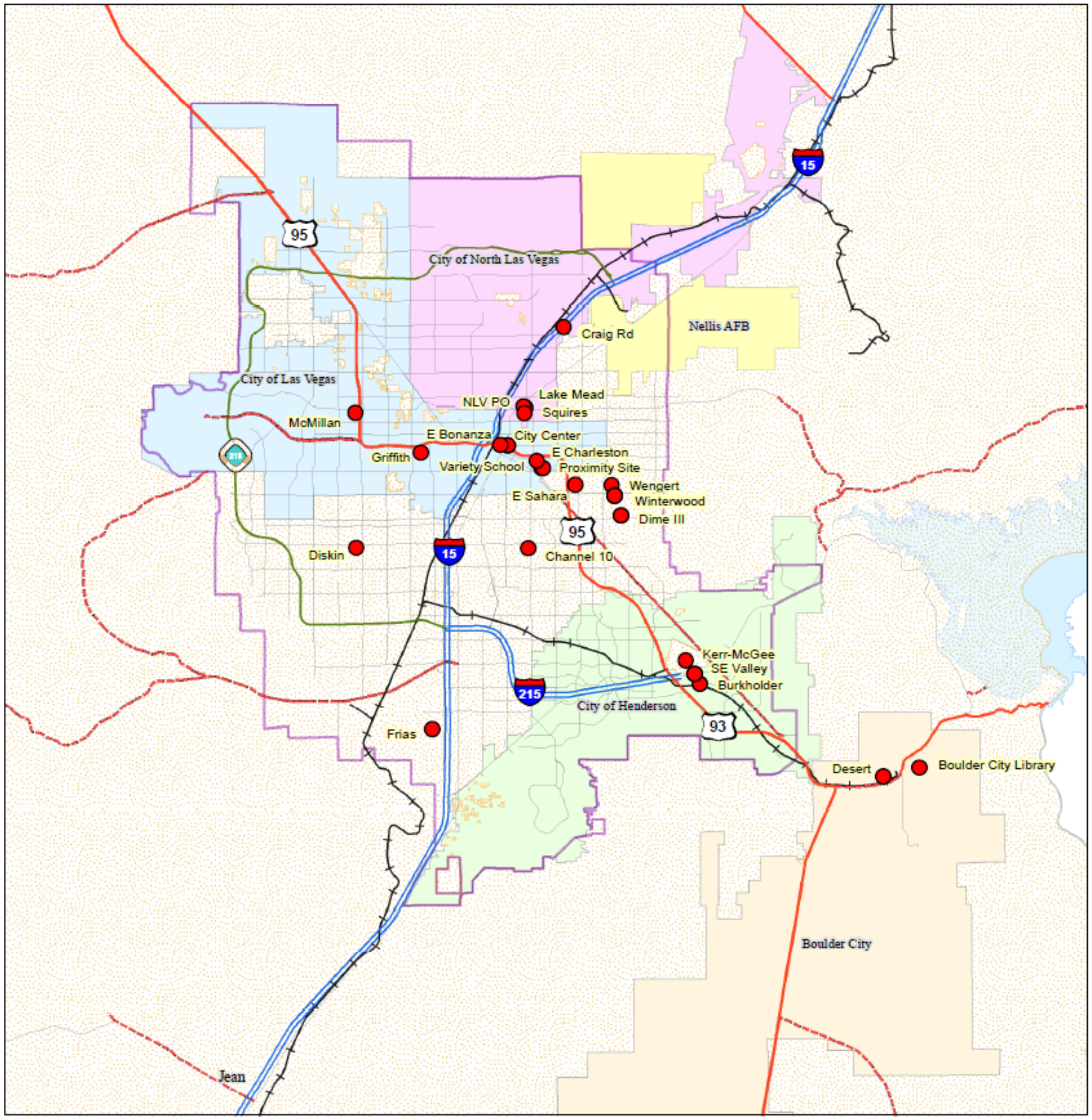


Monitor Name	Constituent
Boulder City Library	Pollen
Burkholder	Pollen, PM10
Channel 10	Pollen
City Center	CO, NOx, O3
Craig Rd	O3
Desert	Pollen
E Bonanza	PM10
E Charleston	CO, NOx
Frias	PM10
Griffith	Pollen
Kerr-McGee	NH3
LVFD 2	TSP
LV Wash	TSP
NLV PO	PM10
SE Valley	CO, O3, PM10
Squires	Pollen
Wengert	PM10
Winterwood	CO, O3



Monitor Name	Constituent
Boulder City Library	Pollen
Burkholder	Pollen, PM10
Channel 10	Pollen
City Center	CO, NOx, O3
Craig Rd	O3
Desert	Pollen
Dime III	H2S, NH3—both started 04/01/1993
Diskin	Pollen
E Bonanza	PM10
E Charleston	CO, NOx
E Sahara	CO
Frias	PM10
Griffith	Pollen
Kerr-McGee	NH3
LVFD 2	TSP
LV Wash	TSP
McMillan	Pollen
NLV PO	PM10
Proximity Site	CO—started 10/01/1993
SE Valley	CO, O3, PM10
Squires	Pollen
Variety School	CO started 11/01/1993
Wengert	PM10
Winterwood	CO, O3, H2S—started 04/01/1993



Clark County, NV Monitoring Network 1994

Monitoring Network
Beltrow
Interstate
Major Street
Railroad
State Highway
US Highway
Boulder City
City of Henderson
City of Las Vegas
City of North Las Vegas
Nellis AFB
Unincorporated Clark County
BLM Disposal Bndry

Monitor Name	Constituent
Boulder City Library	Pollen
Burkholder	Pollen, PM10
Channel 10	Pollen
City Center	CO, NOx—ended 05/31/194, O3
Craig Rd	O3
Desert	Pollen
Dime III	H2S, NH3
Diskin	Pollen
E Bonanza	PM10
E Charleston	CO, NOx
E Sahara	CO
Griffith	Pollen
Frias	PM10
Kerr-McGee	NH3—ended 02/28/1994
Lake Mead	PM10, PM2.5 BAM—both started 06/07/1994
McMillan	Pollen
NLV PO	PM10
Proximity Site	CO
SE Valley	CO, O3, PM10
Variety School	CO
Squires	Pollen
Wengert	PM10
Winterwood	CO, O3, H2S

N W E S

0 7,000 14,000 28,000 42,000 56,000 Feet

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Air Quality

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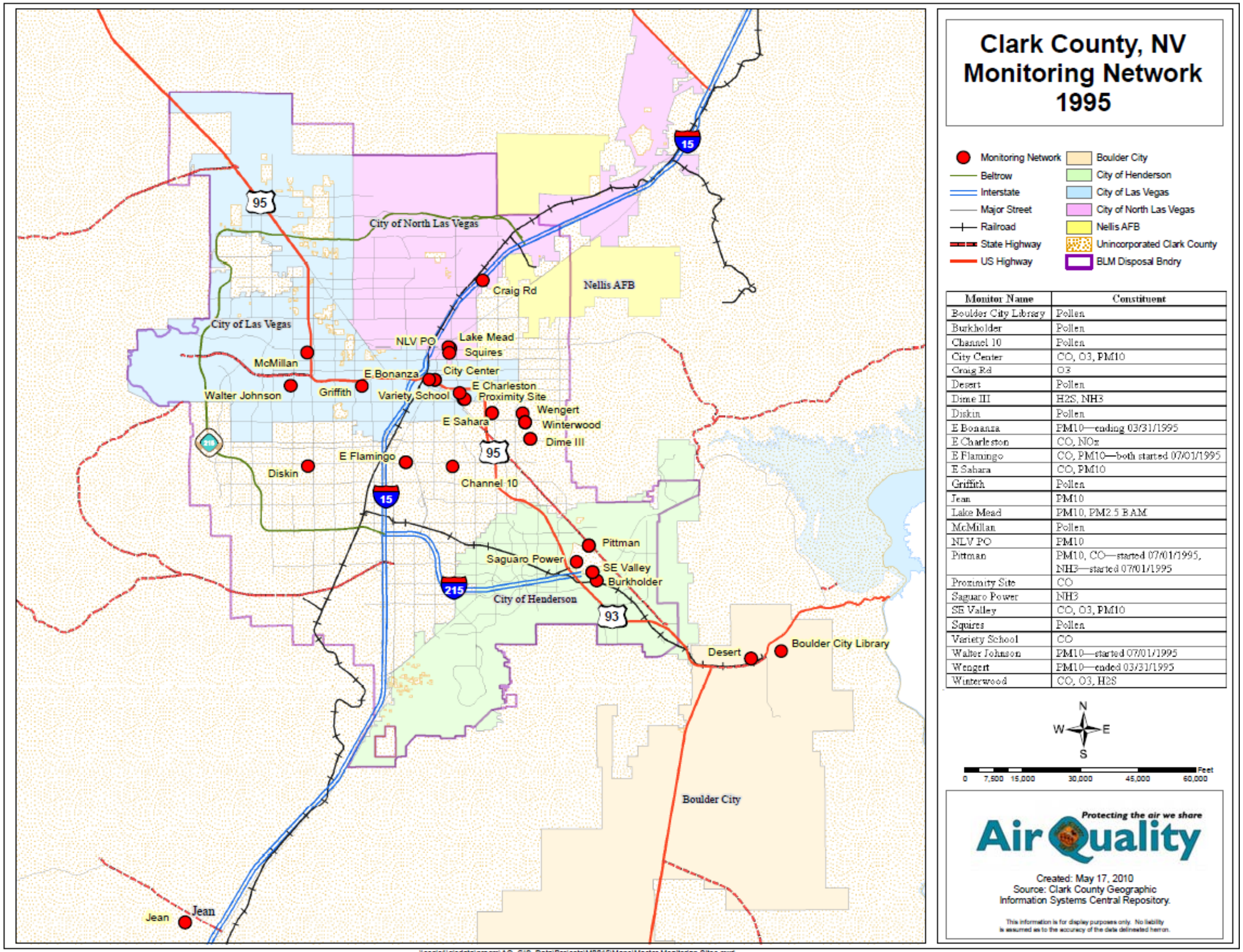
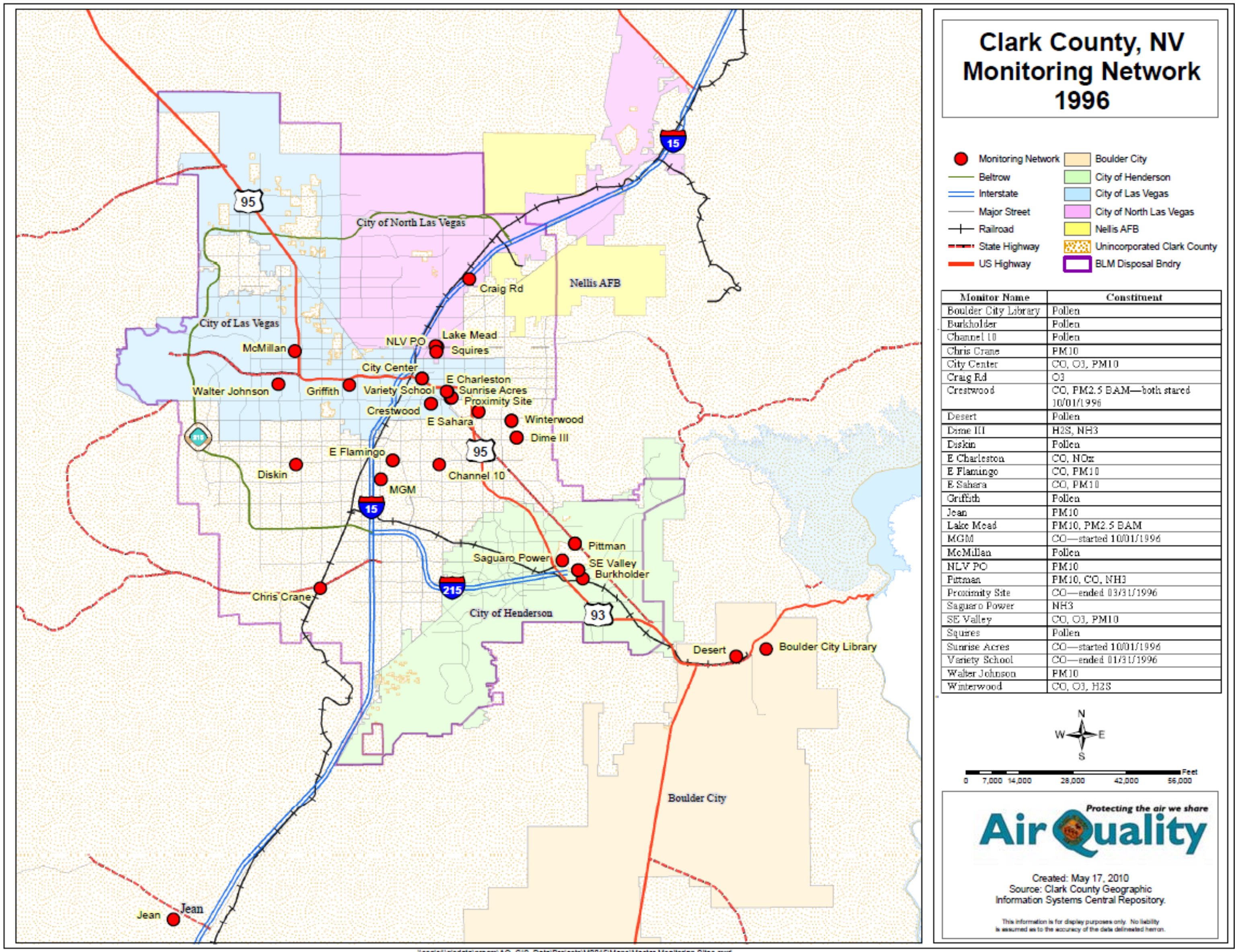
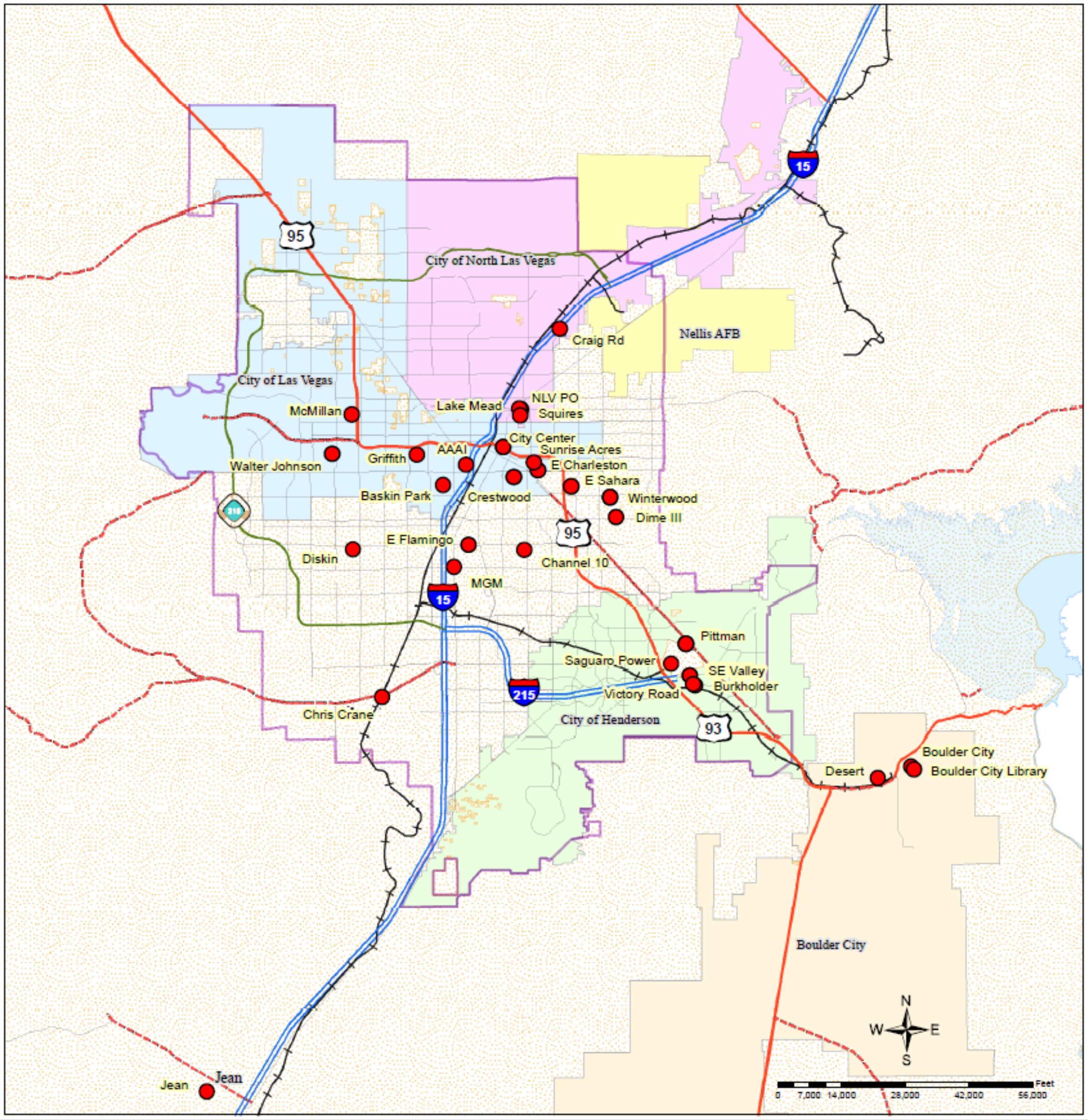


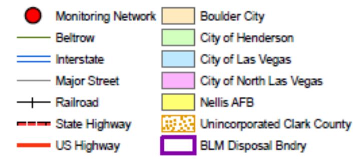
Monitor Name	Constituent
Boulder City Library	Pollen
Burkholder	Pollen
Channel 10	Pollen
City Center	CO, O3, PM10
Craig Rd	O3
Desert	Pollen
Dime III	H2S, NH3
Diskin	Pollen
E Bonanza	PM10—ending 03/31/1995
E Charleston	CO, NOx
E Flamingo	CO, PM10—both started 07/01/1995
E Sahara	CO, PM10
Griffith	Pollen
Jean	PM10
Lake Mead	PM10, PM2.5 BAM
McMillan	Pollen
NLV PO	PM10
Pittman	PM10, CO—started 07/01/1995, NH3—started 07/01/1995
Proximity Site	CO
Saguaro Power	NH3
SE Valley	CO, O3, PM10
Squires	Pollen
Variety School	CO
Walter Johnson	PM10—started 07/01/1995
Wengert	PM10—ended 03/31/1995
Winterwood	CO, O3, H2S



Monitor Name	Constituent
Boulder City Library	Pollen
Burkholder	Pollen
Channel 10	Pollen
Chris Crane	PM10
City Center	CO, O3, PM10
Craig Rd	O3
Crestwood	CO, PM2.5 BAM—both stared 10/01/1996
Desert	Pollen
Dime III	H2S, NH3
Diskin	Pollen
E Charleston	CO, NOx
E Flamingo	CO, PM10
E Sahara	CO, PM10
Griffith	Pollen
Jean	PM10
Lake Mead	PM10, PM2.5 BAM
MGM	CO—started 10/01/1996
McMillan	Pollen
NLV PO	PM10
Pittman	PM10, CO, NH3
Proximity Site	CO—ended 03/31/1996
Saguaro Power	NH3
SE Valley	CO, O3, PM10
Squires	Pollen
Sunrise Acres	CO—started 10/01/1996
Variety School	CO—ended 01/31/1996
Walter Johnson	PM10
Winterwood	CO, O3, H2S

Clark County, NV Monitoring Network 1997





Monitor Name	Constituent
AAAI	Pollen
Baskin Park	Pollen
Boulder City Library	Pollen
Boulder City	Pollen
Burkholder	Pollen
Channel 10	Pollen
Chris Crane	PM10
City Center	CO, O3, PM10
Craig Rd	O3
Crestwood	CO. PM2.5 BAM
Desert	Pollen
Dime III	H2S, NH3
Diskin	Pollen
E Charleston	CO, NOx—both ended 03/31/1997
E Flamingo	CO, PM10
E Sahara	CO, PM10
Griffith	Pollen
Jean	PM10
Lake Mead	PM10, PM2.5 BAM
MGM	CO
McMillan	Pollen
NLV PO	PM10
Pittman	PM10, CO, NH3—ended on 06/30/1997
Saguaro Power	NH3
SE Valley	CO, O3, PM10
Sunrise Acres	CO
Squires	Pollen
Victory Road	Cl—started 07/03/1997
Walter Johnson	O3, PM10
Winterwood	CO, O3, H2S, Pollen

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Air Quality

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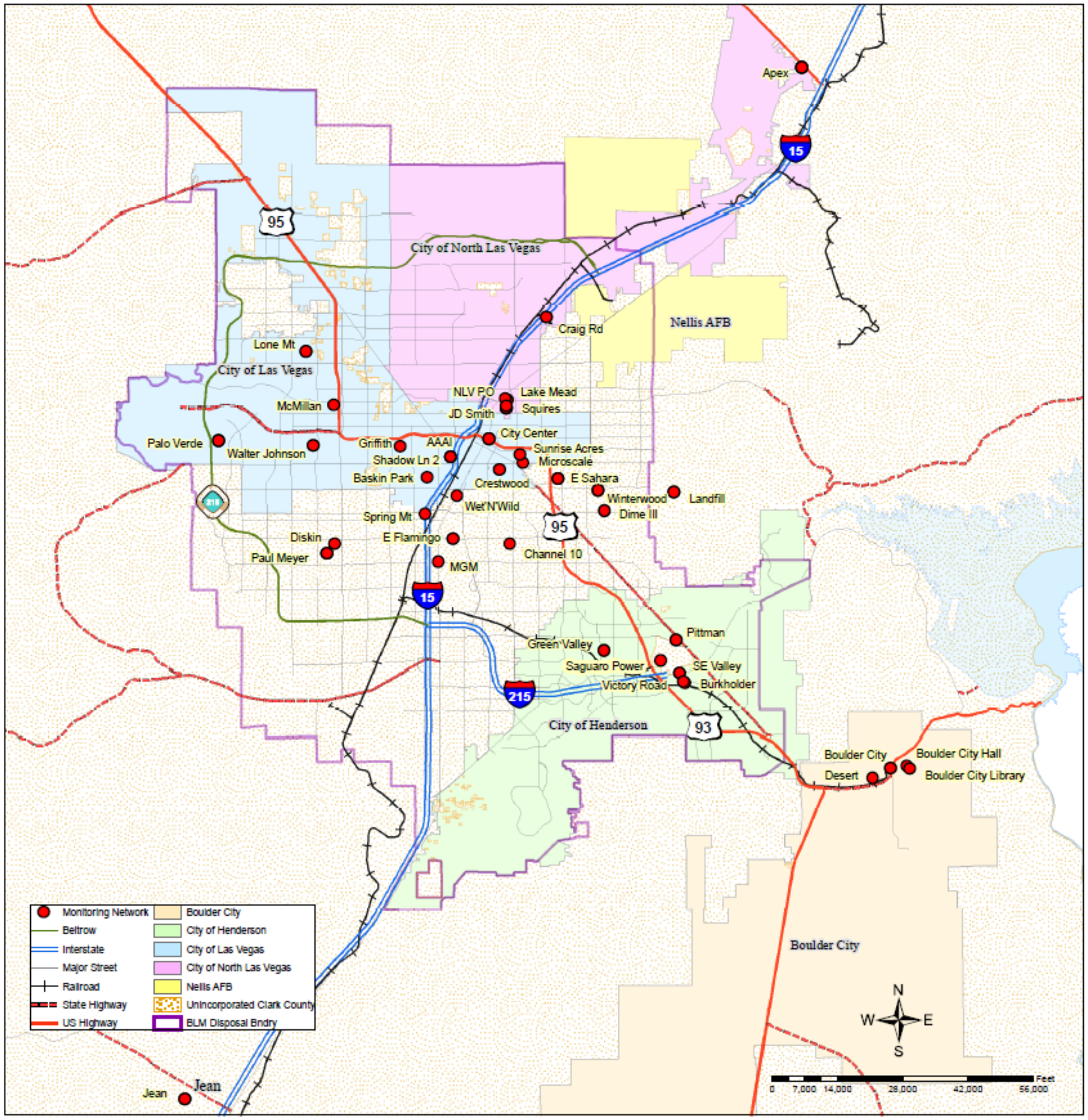

Clark County, NV Monitoring Network 1998

Monitor Name	Constituent
AAAI	Pollen
Apex	NOx, O3, SO2, PM10
Baskin Park	Pollen
Boulder City	PM10, O3—started 08/01/1998,
Boulder City Hall	Pollen
Boulder City Library	Pollen
Burkholder	Pollen
Channel 10	Pollen
City Center	CO, O3, PM10
Craig Rd	O3, PM10
Crestwood	CO, PM2.5 BAM
Desert	Pollen
Dime III	H2S, NH3
Diskin	Pollen
E Flamingo	CO, PM10
E Sahara	CO, NOx, SO2, PM10
Green Valley	CO, PM10
Griffith	Pollen
JD Smith	CO, NOx, O3, PM10
Jean	PM10, NOx—started 08/01/1998, O3—started 08/01/1998
Lake Mead	PM10, PM2.5 BAM—both ended 09/23/1998
Landfill	H2S, SO2—both started 05/04/1998
Lone Mt	O3, PM10
MGM	CO
McMillan	Pollen
Microscale	PM10
NLV PO	PM10
Palo Verde	O3, PM10—both started on 07/01/1998, NOx—started 08/01/1998
Paul Meyer	CO, PM10, O3—stared 07/01/1998
Pittman	PM10, CO
Saguaro Power	NH3
SE Valley	CO, O3, PM10
Shadow Ln 2	CO, NOx, O3—started 03/01/1998
Spring Mt	CO—started 11/24/1998
Squires	Pollen
Sunrise Acres	CO
Victory Road	Cl
Walter Johnson	O3, PM10—started 08/01/1998
Wet 'N' Wild	CO—started 11/24/1998
Winterwood	CO, O3, H2S, Pollen

Air Quality — Protecting the air we share

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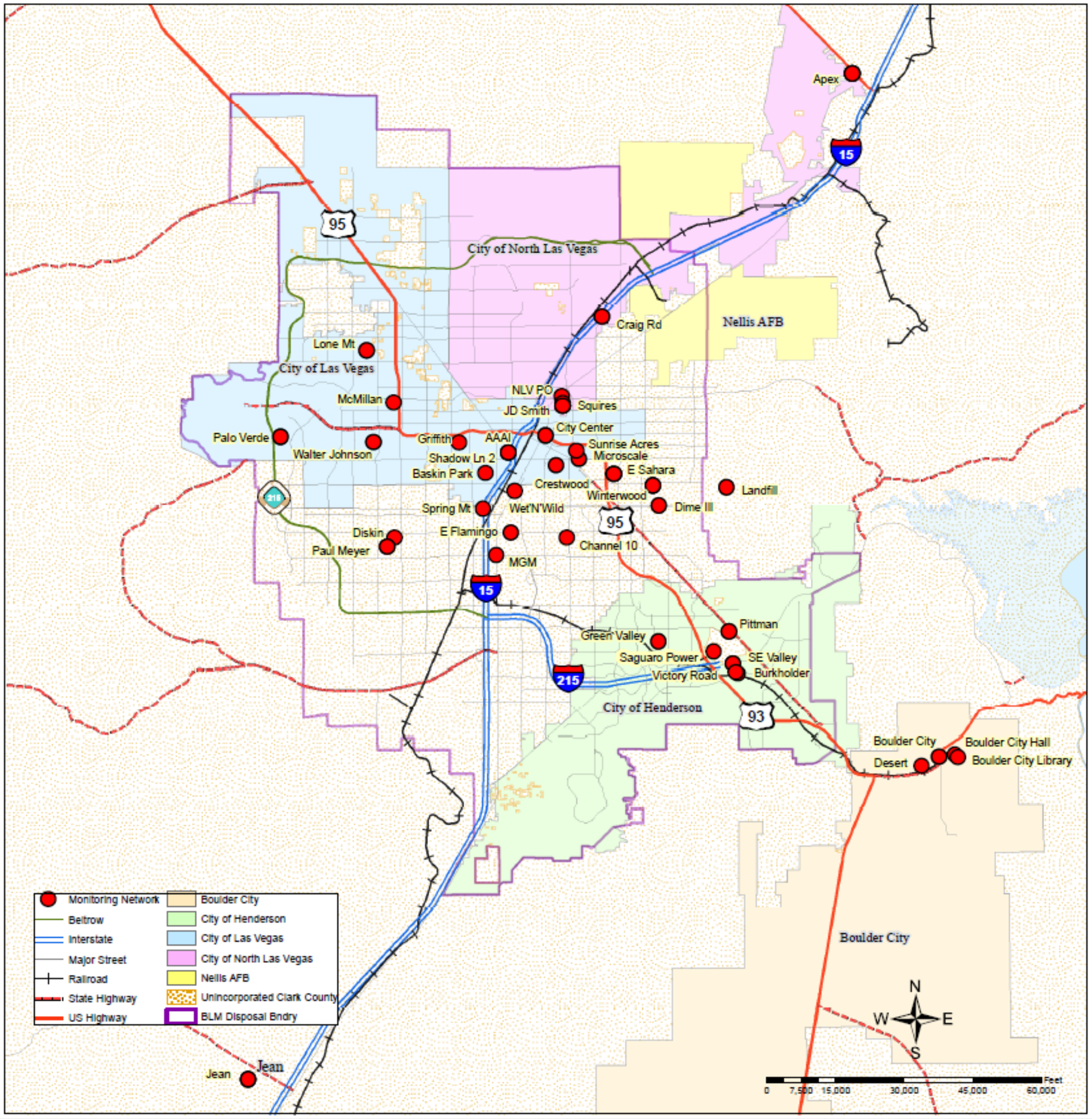

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Clark County, NV Monitoring Network 1999

Monitor Name	Constituent
AAAI	Pollen
Apex	NOx, O3, SO2, PM2.5 FRM, PM10
Baskin Park	Pollen
Boulder City	PM10, O3
Boulder City Hall	Pollen
Boulder City Library	Pollen
Burkholder	Pollen
Channel 10	Pollen
City Center	CO, O3, PM10
Craig Rd	O3, PM10
Crestwood	CO, PM2.5 BAM
Desert	Pollen
Dime III	H2S, NH3
Diskin	Pollen
E Flamingo	CO, PM10
E Sahara	CO, NOx, SO2, PM10
Green Valley	CO, PM10
Griffith	Pollen
JD Smith	CO, PM10, PM2.5 FRM, NOx, O3
Jean	PM10, O3, NOx, PM2.5 FRM
Landfill	H2S, SO2
Lone Mt	O3, PM10
MGM	CO
McMillan	Pollen
Microscale	PM10, PM2.5 FRM
NLV PO	PM10
Palo Verde	NOx, O3, PM10
Paul Meyer	CO, PM10, O3
Pittman	PM10, CO
Saguaro Power	NH3
SE Valley	CO, O3, PM10
Shadow Ln 2	CO, NOx, O3
Spring Mt	CO—ended 03/31/1999
Squires	Pollen
Sunrise Acres	CO
Victory Road	Cl
Walter Johnson	O3, PM10
Wet 'N' Wild	CO—ended 03/31/1999
Winterwood	CO, O3, H2S, Pollen

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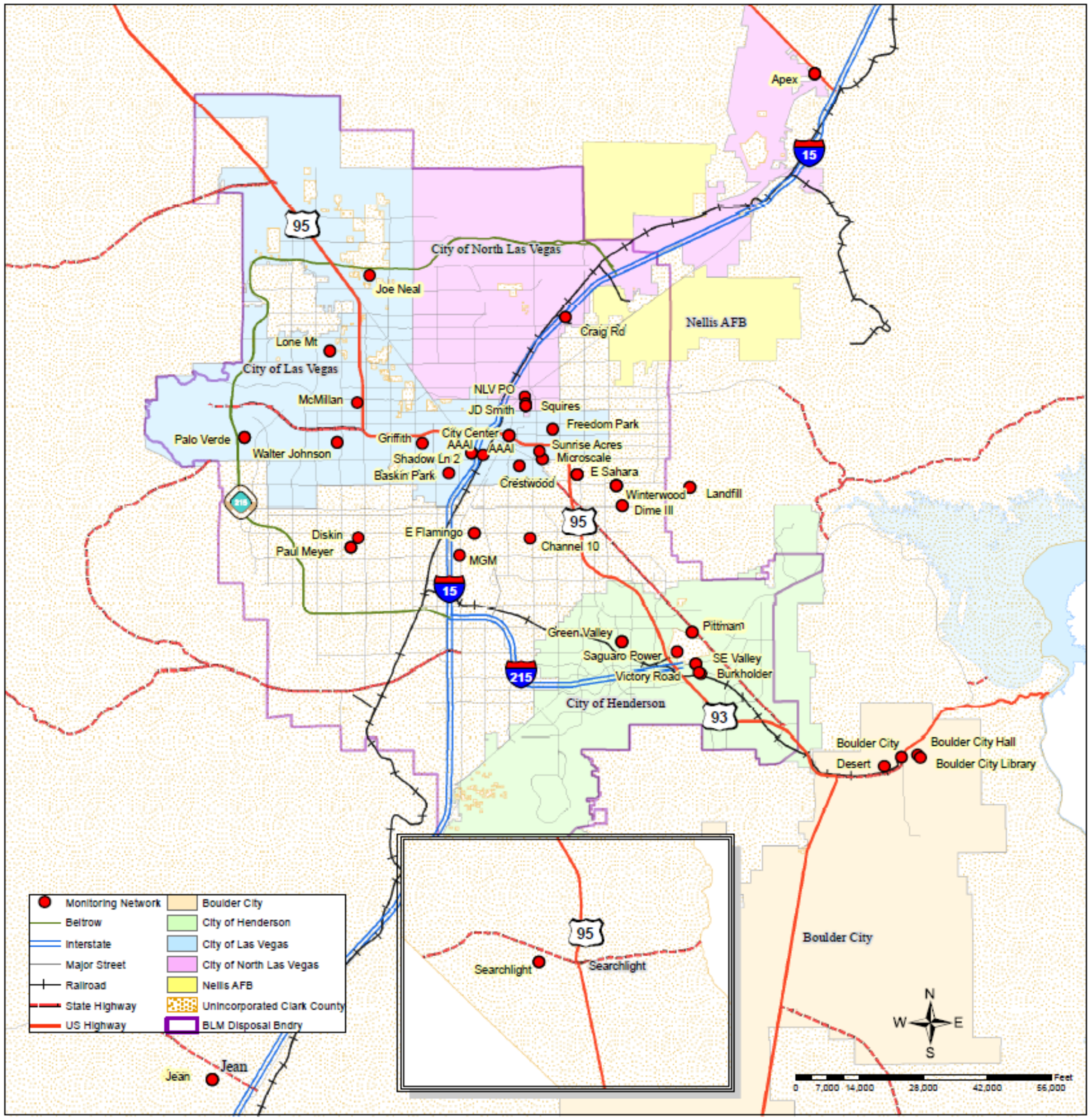

Clark County, NV Monitoring Network 2000

AAAI	Pollen—ended 08/01/2000 , Pollen—started 08/02/2000 (new location)
Apex	NOx, O3, SO2, PM2.5 FRM, PM10
Baskin Park	Pollen
Boulder City	PM10, O3
Boulder City Hall	Pollen
Boulder City Library	Pollen
Burkholder	Pollen
Channel 10	Pollen
City Center	CO, O3, PM10
Craig Rd	O3, PM10
Crestwood	CO, PM2.5 BAM
Desert	Pollen
Dime III	H2S, NH3—both ended 05/31/2000
Diskin	Pollen
E Flamingo	CO, PM10
E Sahara	CO, NOx, SO2, PM10
Freedom Park	CO, NOx—both started 10/01/2000
Green Valley	CO, PM10, PM2.5 FRM
Griffith	Pollen
JD Smith	CO, PM10, PM2.5 FRM, NOx, O3
Jean	PM10, O3, NOx, PM2.5 FRM
Joe Neal	O3—started 07/01/2000
Landfill	H2S, SO2
Lone Mt	O3, PM10
MGM	CO
McMillan	Pollen
Microscale	PM10, PM2.5 FRM
NLV PO	PM10
Palo Verde	NOx, O3, PM10
Paul Meyer	CO, PM10, O3
Pittman	PM10, CO
Saguaro Power	NH3—ended 11/30/2000
SE Valley	CO, O3, PM10
Searchlight	NOx, O3, SO2—all started 07/01/2000
Shadow Ln 2	CO, NOx, O3
Squires	Pollen
Sunrise Acres	CO
Victory Road	Cl
Walter Johnson	O3, PM10
Winterwood	O3, CO, H2S—ended 05/31/2000, Pollen

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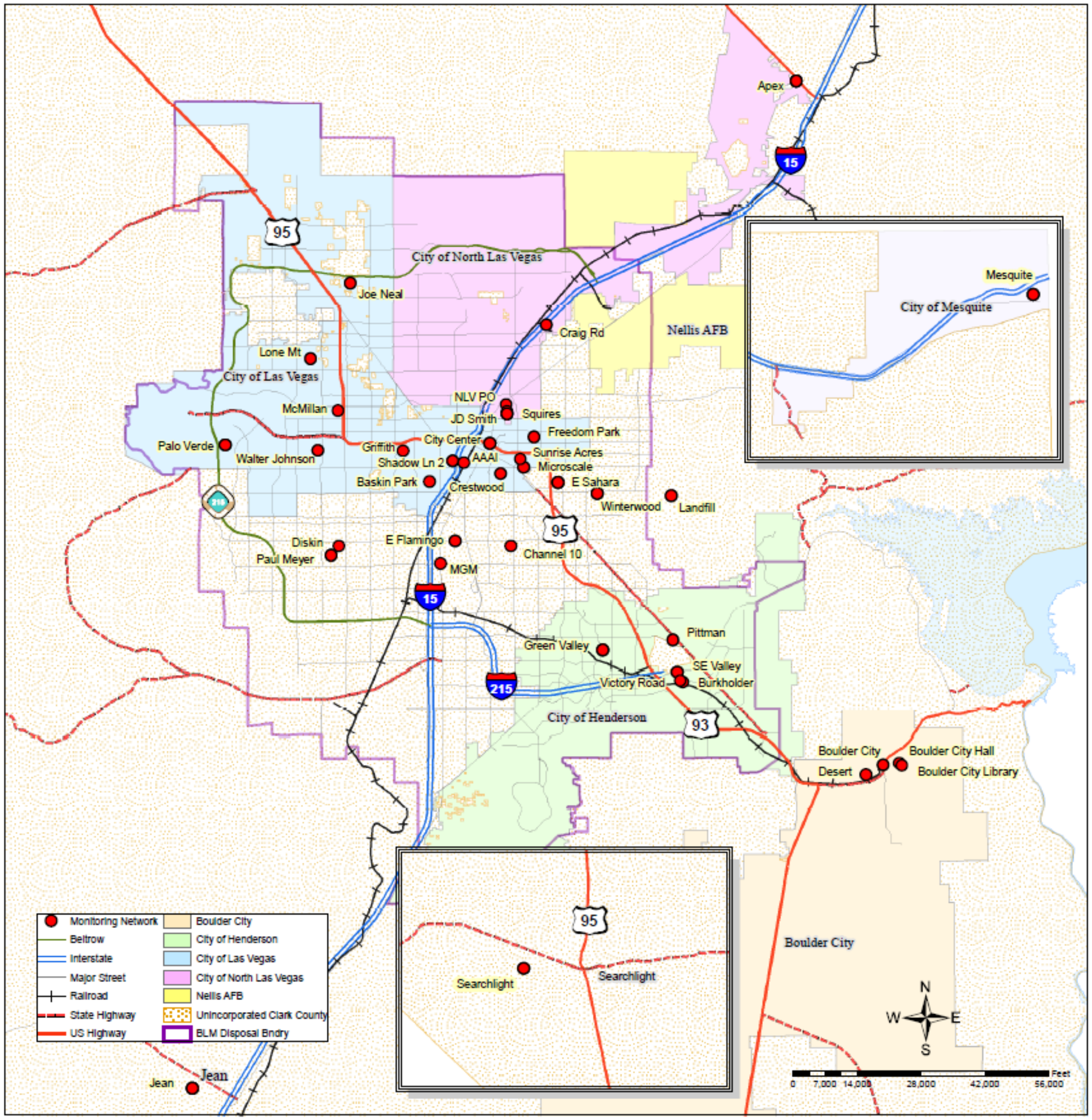

Clark County, NV Monitoring Network 2001

Monitor Name	Constituent
AAAI	Pollen
Apex	NOx, O3, SO2, PM2.5 FRM, PM10
Baskin Park	Pollen
Boulder City	PM10, O3
Boulder City Hall	Pollen
Boulder City Library	Pollen
Burkholder	Pollen
Channel 10	Pollen
City Center	CO, O3, PM10
Craig Rd	O3, PM10
Crestwood	CO, PM2.5 BAM
Desert	Pollen
Diskin	Pollen
E Flamingo	CO, PM10
E Sahara	CO, NOx, SO2, PM10
Freedom Park	CO, NOx
Green Valley	CO, PM10, PM2.5 FRM
Griffith	Pollen
JD Smith	CO, PM10, PM2.5 FRM, NOx, O3
Jean	PM10, O3, NOx, PM2.5 FRM
Joe Neal	O3, PM10
Landfill	H2S, SO2
Lone Mt	O3, PM10
Mesquite	NOx, O3, PM10—all started 11/01/2001
MGM	CO
McMillan	Pollen
Microscale	PM10, PM2.5 FRM
NLV PO	PM10
Palo Verde	NOx, O3, PM10
Paul Meyer	CO, PM10, O3
Pittman	PM10, CO
Searchlight	NOx, O3, SO2
SE Valley	CO, O3, PM10
Shadow Ln 2	CO, NOx—both ended 10/01/2001, O3—ended 09/30/2001
Squires	Pollen
Sunrise Acres	CO
Victory Road	Cl
Walter Johnson	O3, PM10
Winterwood	O3, CO, Pollen

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Air Quality

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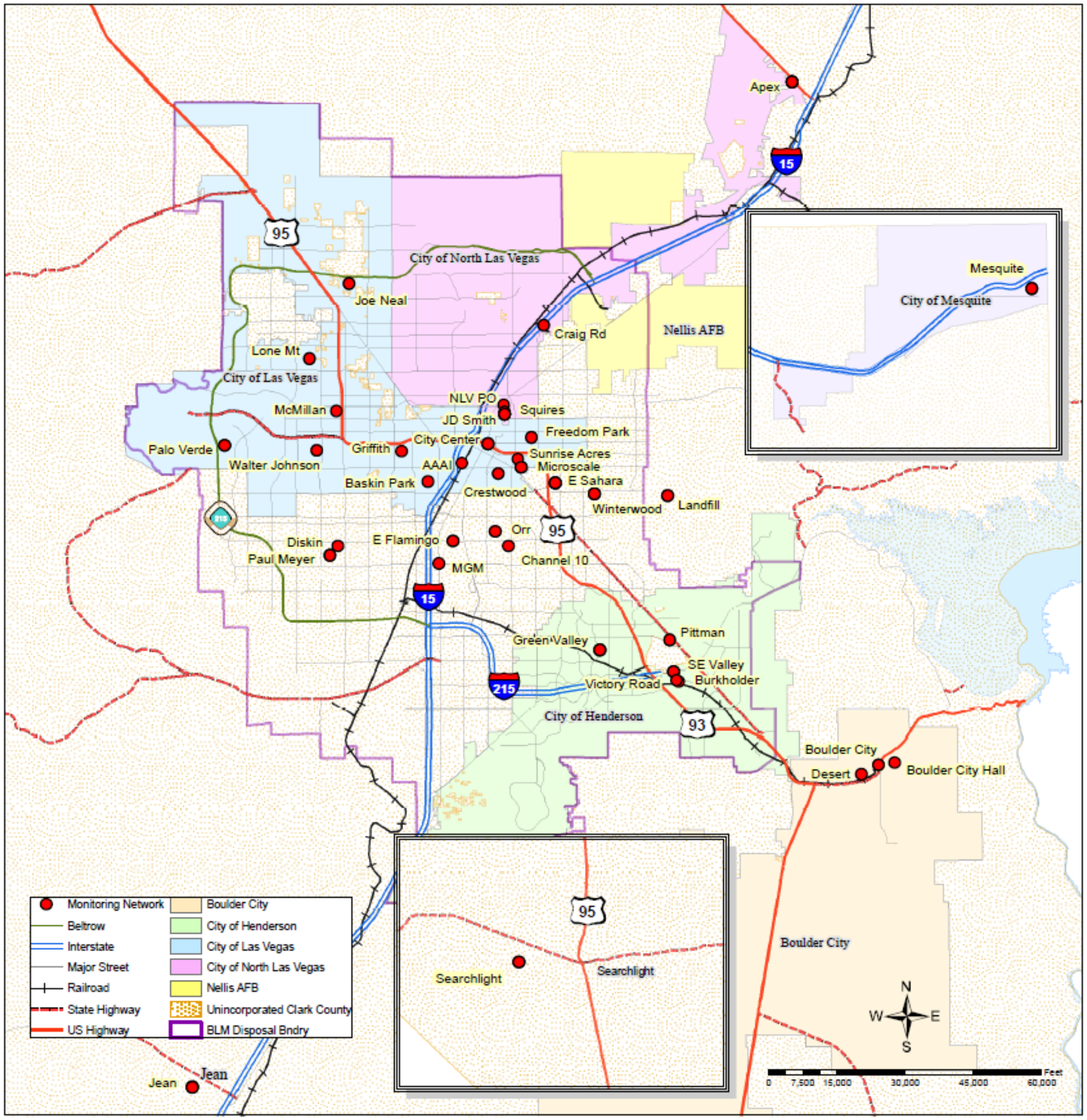
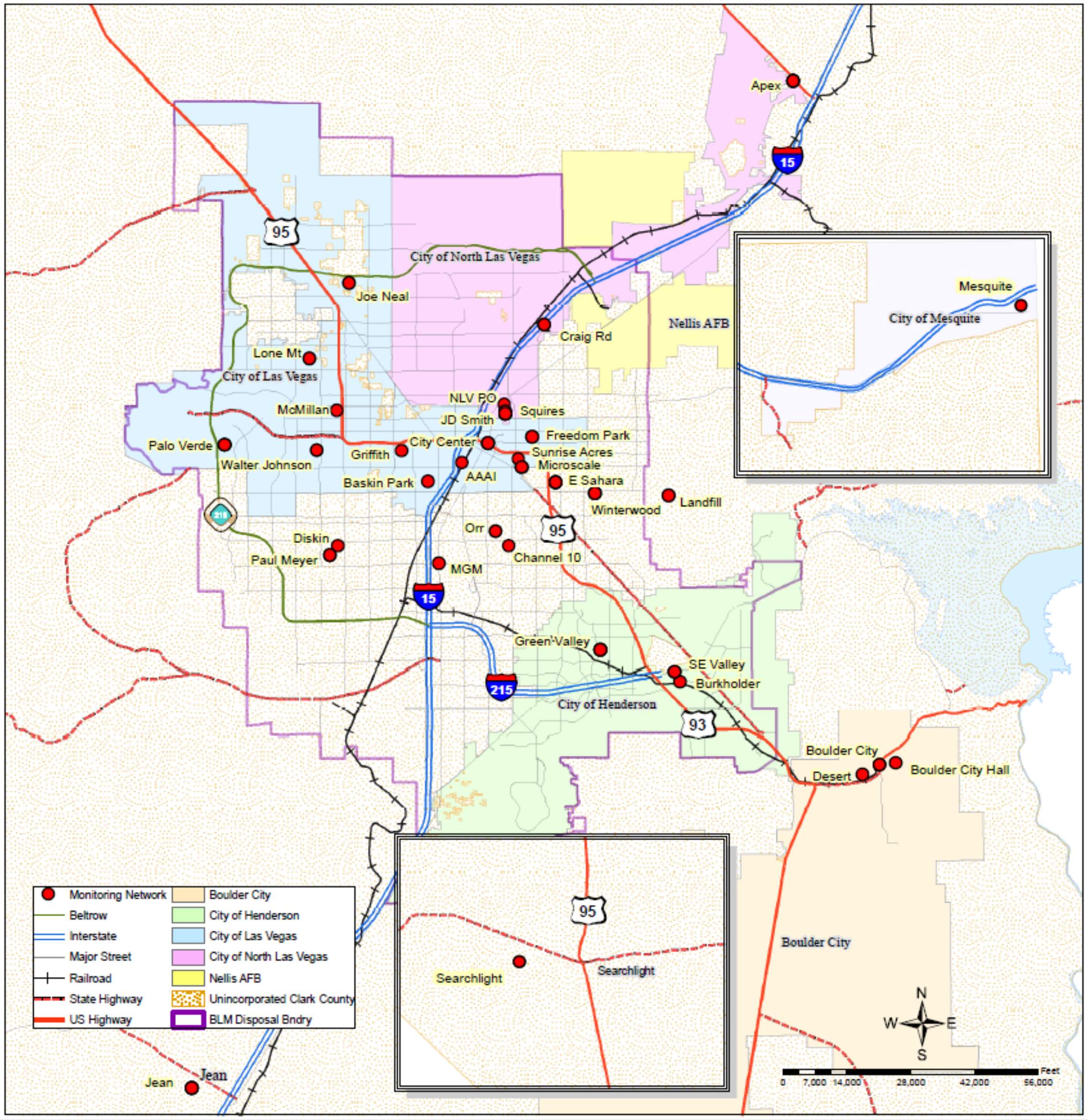


Clark County, NV Monitoring Network 2002

Monitor Name	Constituent
AAAI	Pollen
Apex	PM10, O3, PM2.5 FRM NOx, SO2
Baskin Park	Pollen
Boulder City	PM10, O3
Boulder City Hall	Pollen
Burkholder	Pollen
Channel 10	Pollen
City Center	CO, O3, PM10
Craig Rd	O3, PM10
Crestwood	CO, PM2.5 BAM—both ended 02/28/2002
Desert	Pollen
Diskin	Pollen
E Flamingo	CO, PM10—both ended 09/30/02
E Sahara	CO, PM10, NOx, SO2
Freedom Park	CO, NOx
Green Valley	CO, PM10, PM2.5 FRM
Griffith	Pollen
JD Smith	PM10, PM2.5 FRM, CO, NOx, O3
Jean	PM10, NOx, O3, PM2.5 FRM
Joe Neal	PM10, O3
Landfill	H2S, SO2
Lone Mt	O3, PM10
Mesquite	NOx, O3, PM10
McMillan	Pollen
Microscale	PM10, PM2.5 FRM, PM2.5 BAM—started 06/01/2002
MGM	CO
NVL PO	PM10
Orr	CO, PM10—both started 10/01/2002
Palo Verde	O3, PM10, NOx
Paul Meyer	CO, PM10, O3
Pittman	PM10, CO—both ended 02/28/2002
SE Valley	CO, PM10, O3
Searchlight	NOx, SO2, O3
Squires	Pollen
Sunrise Acres	CO
Victory Road	Cl—ended 03/31/2002
Walter Johnson	O3, PM10
Winterwood	O3, CO, Pollen

Created: May 17, 2010
Source: Clark County Geographic Information Systems Central Repository.



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Clark County, NV Monitoring Network 2003

Monitor Name	Constituent
AAAI	Pollen
Apex	PM10, PM2.5 FRM, O3, NOx, SO2—ended 06/30/2003
Baskin Park	Pollen
Boulder City	PM10, O3, PM2.5 BAM
Boulder City Hall	Pollen
Burkholder	Pollen
Channel 10	Pollen
City Center	CO, O3, PM10
Craig Rd	O3, PM10, PM2.5 BAM
Desert	Pollen
Diskin	Pollen
E Sahara	CO, PM10, NOx, SO2, PM2.5 BAM
Freedom Park	CO, NOx
Green Valley	CO—ended 06/30/2003, PM10, PM2.5 FRM, PM2.5BAM
Griffith	Pollen
JD Smith	PM10, PM2.5, FRM, PM2.5 BAM, CO, NOx, O3
Jean	PM10, NOx, O3, PM2.5 FRM
Joe Neal	PM10, O3
Landfill	H2S, SO2
Lone Mt	O3, PM10
Mesquite	NOx, O3, PM10
MGM	CO
McMillan	Pollen
Microscale	PM10, PM2.5 FRM, PM2.5 BAM
NVL PO	PM10
Orr	CO, PM10
Palo Verde	O3, PM10, NOx, PM2.5 BAM
Paul Meyer	CO—ended 06/30/2003, PM10, O3
SE Valley	CO—ended 06/30/2003, PM10, O3
Searchlight	NOx, SO2—both ended 6/30/03, O3
Squires	Pollen
Sunrise Acres	CO
Walter Johnson	O3, PM10
Winterwood	O3, CO, Pollen

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Air Quality

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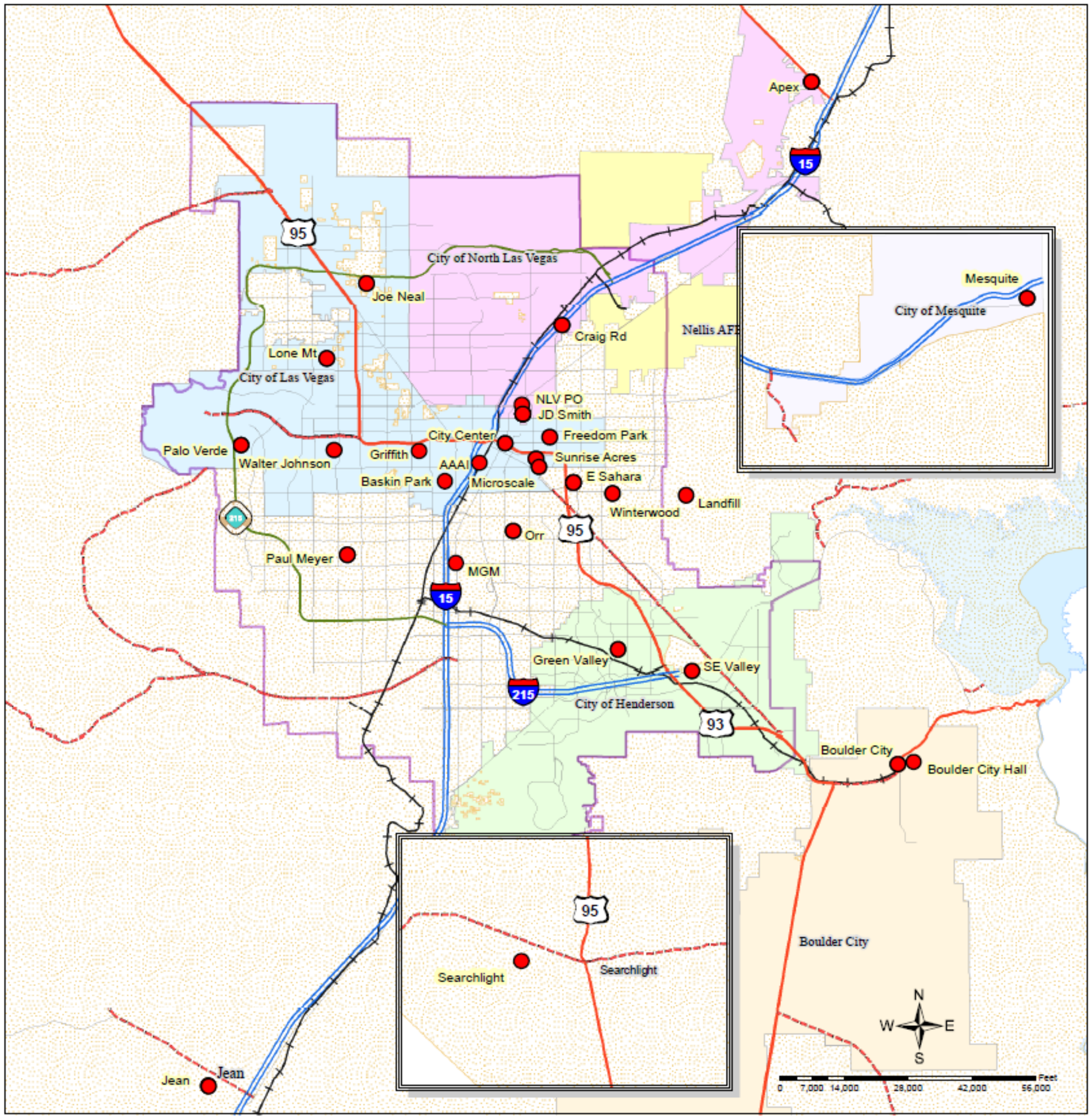

Clark County, NV Monitoring Network 2004

Monitoring Network
Beltrow
Interstate
Major Street
Railroad
State Highway
US Highway
Boulder City
City of Henderson
City of Las Vegas
City of North Las Vegas
Nellis AFB
Unincorporated Clark County
BLM Disposal Bndry

Monitor Name	Constituent
AAAI	Pollen
Apex	PM2.5 FRM, PM10, O3, NOx, Pollen
Baskin Park	Pollen
Boulder City	PM10, O3, PM2.5 BAM
Boulder City Hall	Pollen
City Center	CO, O3, PM10
Craig Rd	O3, PM10, PM2.5
E Sahara	CO, PM10, NOx, SO2, PM2.5 BAM
Freedom Park	CO, NOx
Green Valley	PM10, PM2.5 BAM, PM2.5 FRM
Griffith	Pollen
JD Smith	PM10, PM2.5 BAM, PM2.5 FRM, CO, NOx, O3, Pollen
Jean	PM10, NOx, O3, PM2.5 FRM
Joe Neal	PM10, O3
Landfill	H2S, SO2
Lone Mt	O3, PM10, Pollen
Mesquite	NOx, O3, PM10
MGM	CO
Microscale	PM10—ended 06/29/04, PM2.5 BAM—ended 04/10/2004, PM2.5 FRM 04/12/2004
NVL PO	PM10—ended 09/30/04
Orr	CO, PM10, Pollen
Palo Verde	O3, PM10, NOx, PM2.5 BAM
Paul Meyer	PM10, O3, Pollen
SE Valley	PM10, O3, Pollen
Searchlight	O3—ended 02/25/04
Sunrise Acres	CO, PM10—started 04/17/2004, PM2.5 FRM—started 04/14/2004
Walter Johnson	O3, PM10
Winterwood	O3, CO, Pollen

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Air Quality

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Source: Clark County Geographic Information Systems Central Repository.

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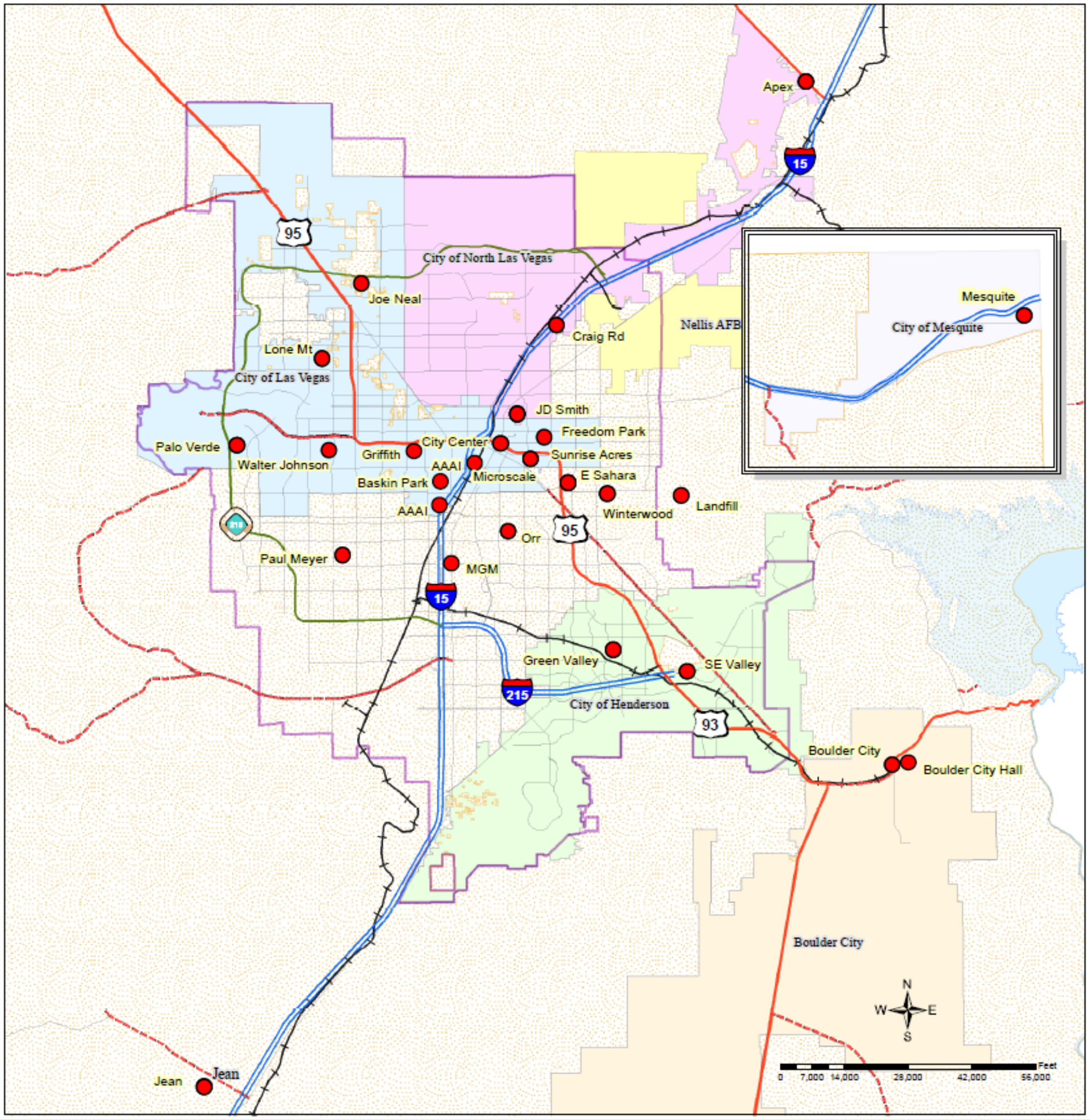

Clark County, NV Monitoring Network 2005

- Monitoring Network
- Beltrow
- Interstate
- Major Street
- Railroad
- State Highway
- US Highway
- Boulder City
- City of Henderson
- City of Las Vegas
- City of North Las Vegas
- Nellis AFB
- Unincorporated Clark County
- BLM Disposal Bndry

Monitor Name	Constituent
AAAI	Pollen—ended 10/31/2005, Pollen—started 11/01/2005 (new location)
Apex	PM2.5 FRM, PM10, O3, NOx, Pollen
Baskin Park	Pollen
Boulder City	PM10, O3, PM2.5 BAM
Boulder City Hall	Pollen
City Center	CO, O3, PM10
Craig Rd	O3, PM10, PM2.5 BAM
E Sahara	CO, PM10, NOx, SO2, PM2.5 BAM
Freedom Park	CO—ended 04/30/2005, NOx—ended 04/22/2005
Green Valley	PM10, PM2.5 BAM, PM2.5 FRM
Griffith	Pollen
JD Smith	PM10, PM2.5 BAM, P2.5 FRM, CO, NOx, O3, Pollen
Jean	PM10, NOx, O3, PM2.5 BAM
Joe Neal	PM10, O3
Landfill	H2S, SO2
Lone Mt	O3, PM10, Pollen
Mesquite	NOx, O3, PM10
MGM	CO
Orr	CO, PM10, Pollen
Palo Verde	O3, PM10, NOx, PM2.5 BAM
Paul Meyer	PM10, O3, Pollen
SE Valley	PM10, O3, Pollen
Sunrise Acres	CO, PM10, PM2.5 FRM, PM2.5 BAM—started 07/01/2005
Walter Johnson	O3, PM10
Winterwood	O3, CO, Pollen

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Air Quality

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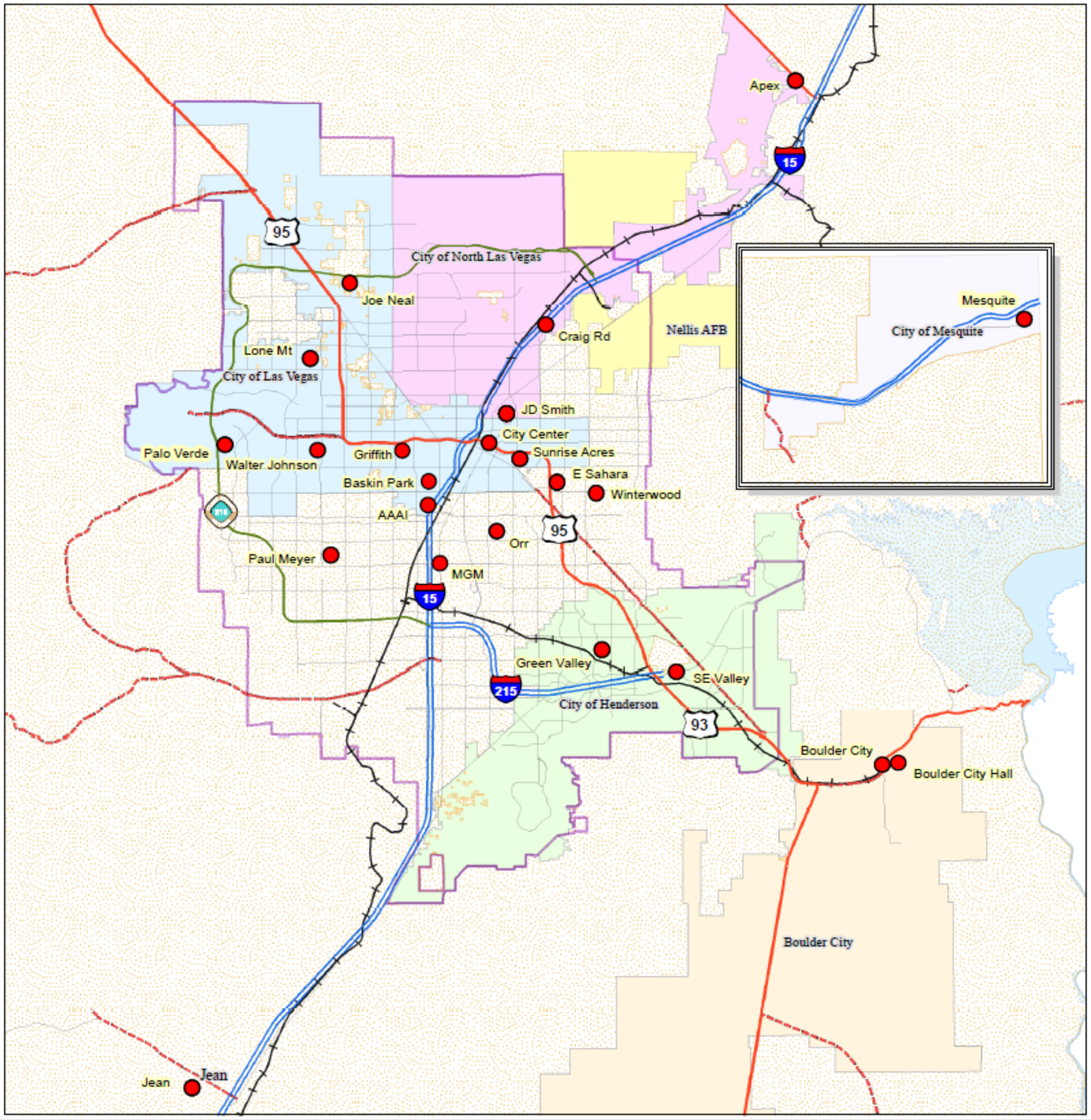

Clark County, NV Monitoring Network 2006

Monitoring Network
Beltrow
Interstate
Major Street
Railroad
State Highway
US Highway
Boulder City
City of Henderson
City of Las Vegas
City of North Las Vegas
Nellis AFB
Unincorporated Clark County
BLM Disposal Bndry

Monitor Name	Constituent
AAAI	Pollen
Apex	PM2.5 FRM, PM10, O3, NOx, Pollen
Baskin Park	Pollen
Boulder City	PM10, O3
Boulder City Hall	Pollen
City Center	O3—ended 03/31/2006, CO, PM10—both ended 04/30/2006
Craig Rd	O3, PM10, PM2.5 BAM
E Sahara	CO, PM10, NOx, SO2, PM2.5 BAM
Green Valley	PM10, PM2.5 BAM, PM2.5 FRM
Griffith	Pollen
JD Smith	PM10, PM2.5 BAM, PM2.5 FRM, CO, NOx, O3, Pollen
Jean	PM10, NOx, O3, PM2.5 FRM
Joe Neal	PM10, O3
Lone Mt	O3, PM10, Pollen
Mesquite	NOx, O3, PM10
MGM	CO
Orr	CO, PM10, O3—started 04/01/2006, Pollen
Palo Verde	O3, PM10, NOx, PM2.5 BAM
Paul Meyer	PM10, O3, Pollen
SE Valley	PM10, O3, Pollen
Sunrise Acres	CO, PM10, PM2.5 FRM, PM2.5 BAM
Walter Johnson	O3, PM10
Winterwood	O3, CO, Pollen

N W E S

0 7,500 15,000 30,000 45,000 60,000 Feet

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Air Quality

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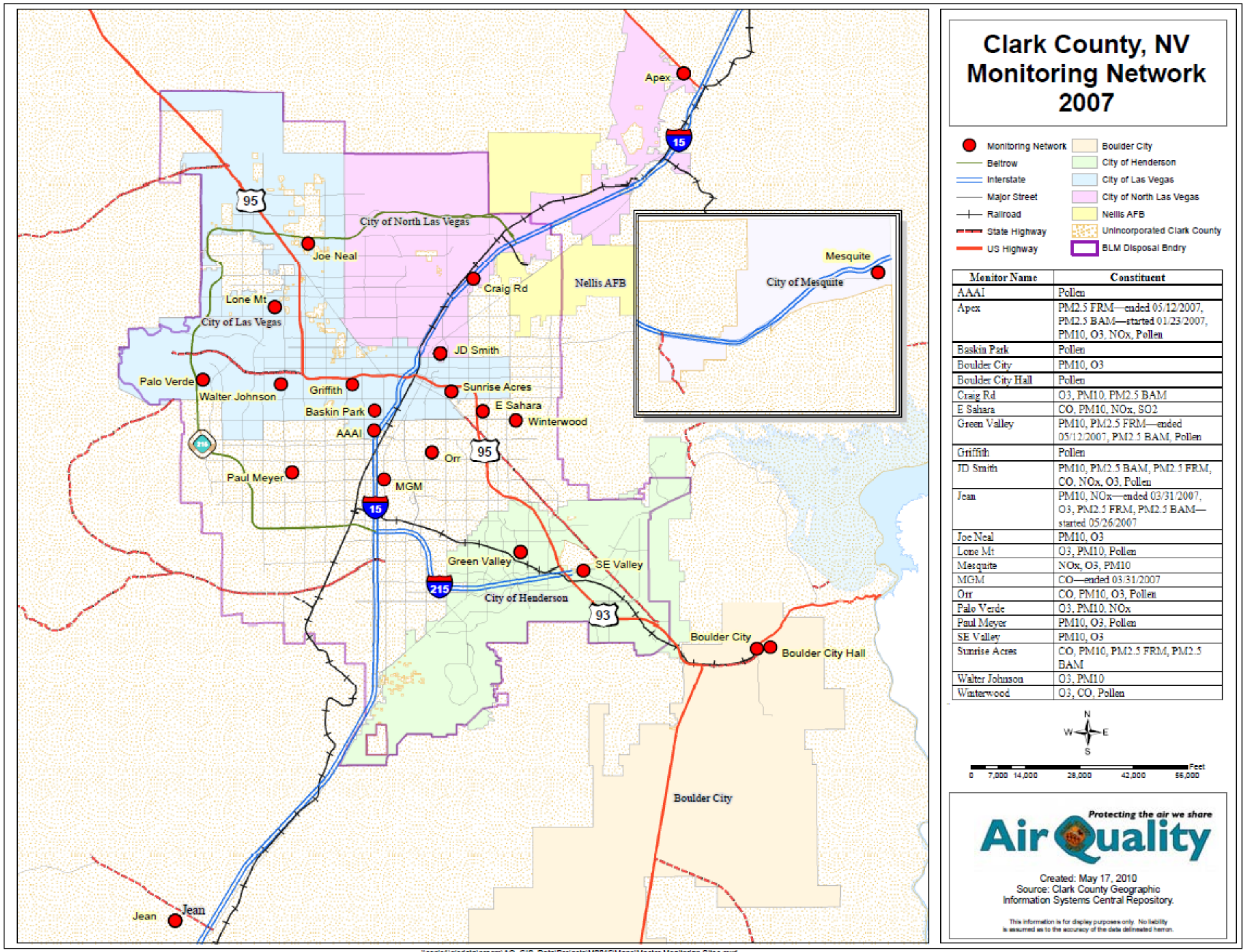
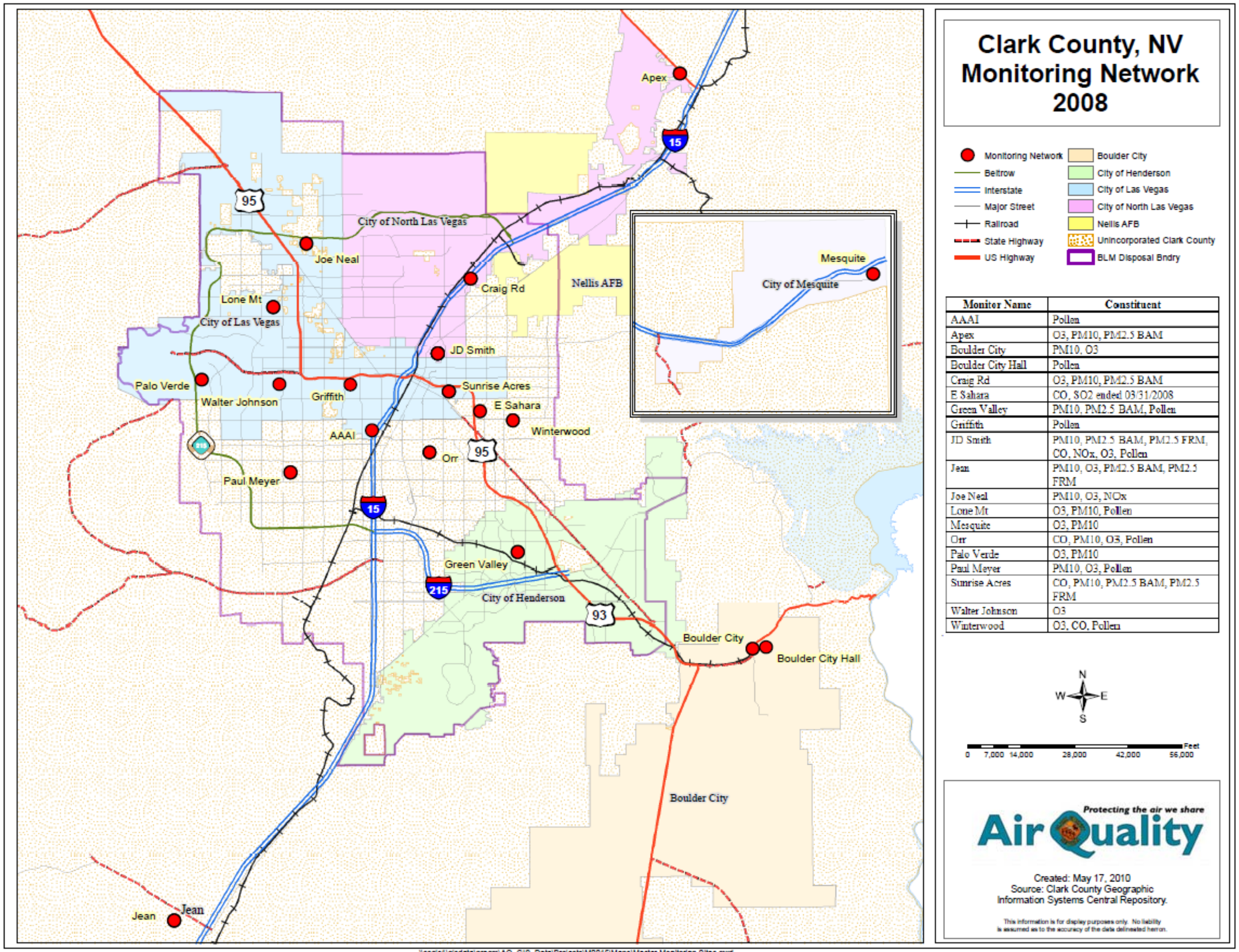
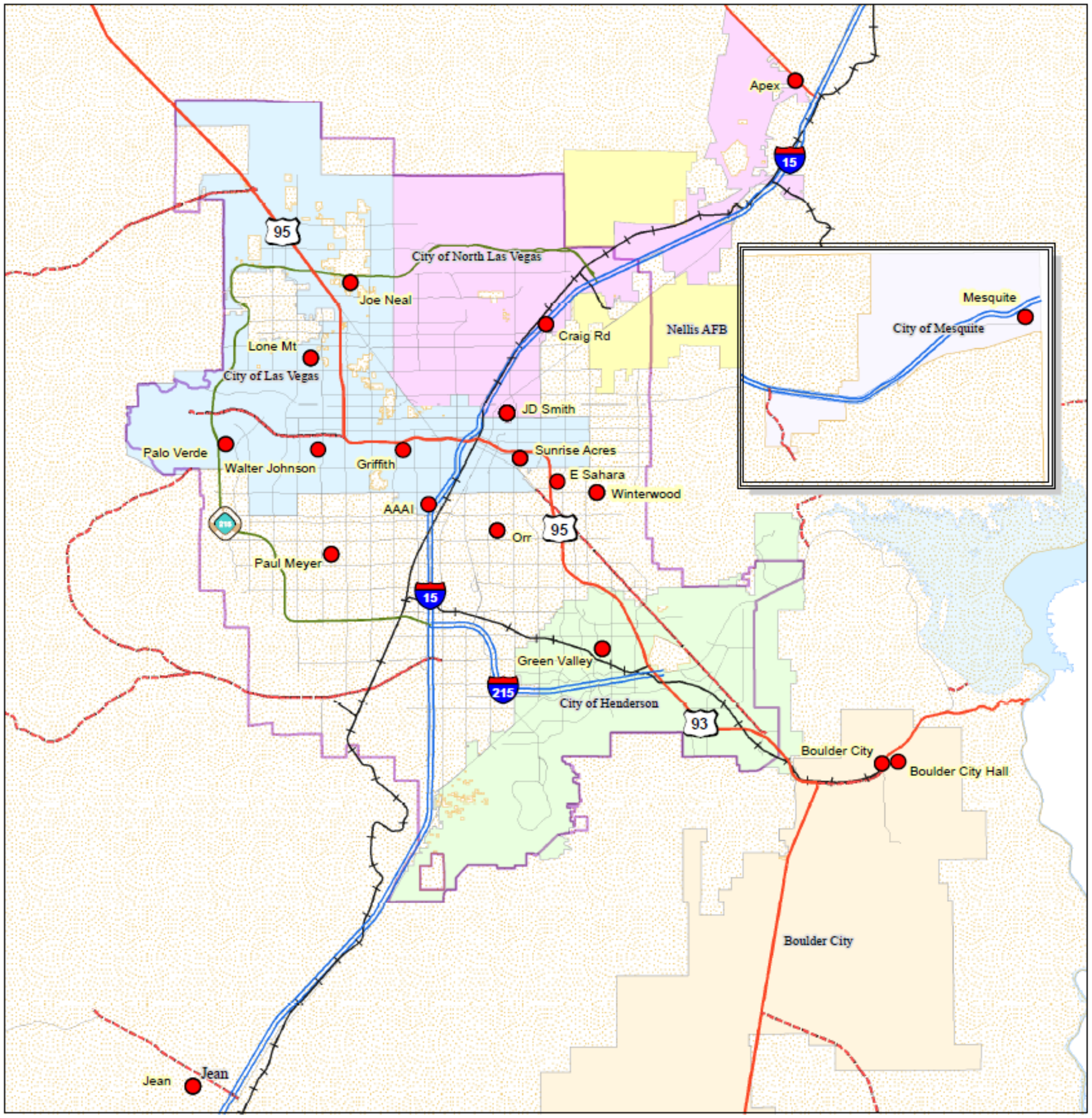


Monitor Name	Constituent
AAAI	Pollen
Apex	PM2.5 FRM—ended 05/12/2007, PM2.5 BAM—started 01/23/2007, PM10, O3, NOx, Pollen
Baskin Park	Pollen
Boulder City	PM10, O3
Boulder City Hall	Pollen
Craig Rd	O3, PM10, PM2.5 BAM
E Sahara	CO, PM10, NOx, SO2
Green Valley	PM10, PM2.5 FRM—ended 05/12/2007, PM2.5 BAM, Pollen
Griffith	Pollen
JD Smith	PM10, PM2.5 BAM, PM2.5 FRM, CO, NOx, O3, Pollen
Jean	PM10, NOx—ended 03/31/2007, O3, PM2.5 FRM, PM2.5 BAM—started 05/26/2007
Joe Neal	PM10, O3
Lone Mt	O3, PM10, Pollen
Mesquite	NOx, O3, PM10
MGM	CO—ended 03/31/2007
Orr	CO, PM10, O3, Pollen
Palo Verde	O3, PM10, NOx
Paul Meyer	PM10, O3, Pollen
SE Valley	PM10, O3
Sunrise Acres	CO, PM10, PM2.5 FRM, PM2.5 BAM
Walter Johnson	O3, PM10
Winterwood	O3, CO, Pollen



Monitor Name	Constituent
AAAI	Pollen
Apex	O3, PM10, PM2.5 BAM
Boulder City	PM10, O3
Boulder City Hall	Pollen
Craig Rd	O3, PM10, PM2.5 BAM
E Sahara	CO, SO2 ended 03/31/2008
Green Valley	PM10, PM2.5 BAM, Pollen
Griffith	Pollen
JD Smith	PM10, PM2.5 BAM, PM2.5 FRM, CO, NOx, O3, Pollen
Jean	PM10, O3, PM2.5 BAM, PM2.5 FRM
Joe Neal	PM10, O3, NOx
Lone Mt	O3, PM10, Pollen
Mesquite	O3, PM10
Orr	CO, PM10, O3, Pollen
Palo Verde	O3, PM10
Paul Meyer	PM10, O3, Pollen
Sunrise Acres	CO, PM10, PM2.5 BAM, PM2.5 FRM
Walter Johnson	O3
Winterwood	O3, CO, Pollen



Clark County, NV Monitoring Network 2009

Monitoring Network
Beltrow
Interstate
Major Street
Railroad
State Highway
US Highway
Boulder City
City of Henderson
City of Las Vegas
City of North Las Vegas
Nellis AFB
Unincorporated Clark County
BLM Disposal Bndry

Monitor Name	Constituent
AAAI	Pollen
Apex	O3, PM10, PM2.5 BAM
Boulder City	PM10—ended 11/24/2009, O3—ended 11/27/2009
Boulder City Hall	Pollen
Craig Rd	O3, PM10, PM2.5 BAM
E Sahara	CO
Green Valley	PM10, PM2.5 BAM, Pollen
Griffith	Pollen
JD Smith	PM10, PM2.5 BAM, PM2.5 FRM, CO, NOx, O3, Pollen
Jean	PM10, O3, PM2.5 BAM, PM2.5 FRM
Joe Neal	PM10, O3, NOx
Lone Mt	O3, PM10, Pollen
Mesquite	O3, PM10
Orr	CO, PM10, O3 , Pollen
Palo Verde	O3, PM10
Paul Meyer	PM10, O3, Pollen
Sunrise Acres	CO, PM10, PM2.5 BAM, PM2.5 FRM
Walter Johnson	O3
Winterwood	O3, CO, Pollen

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Feet
0 7,000 14,000 28,000 42,000 56,000

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Air Quality

Created: May 17, 2010
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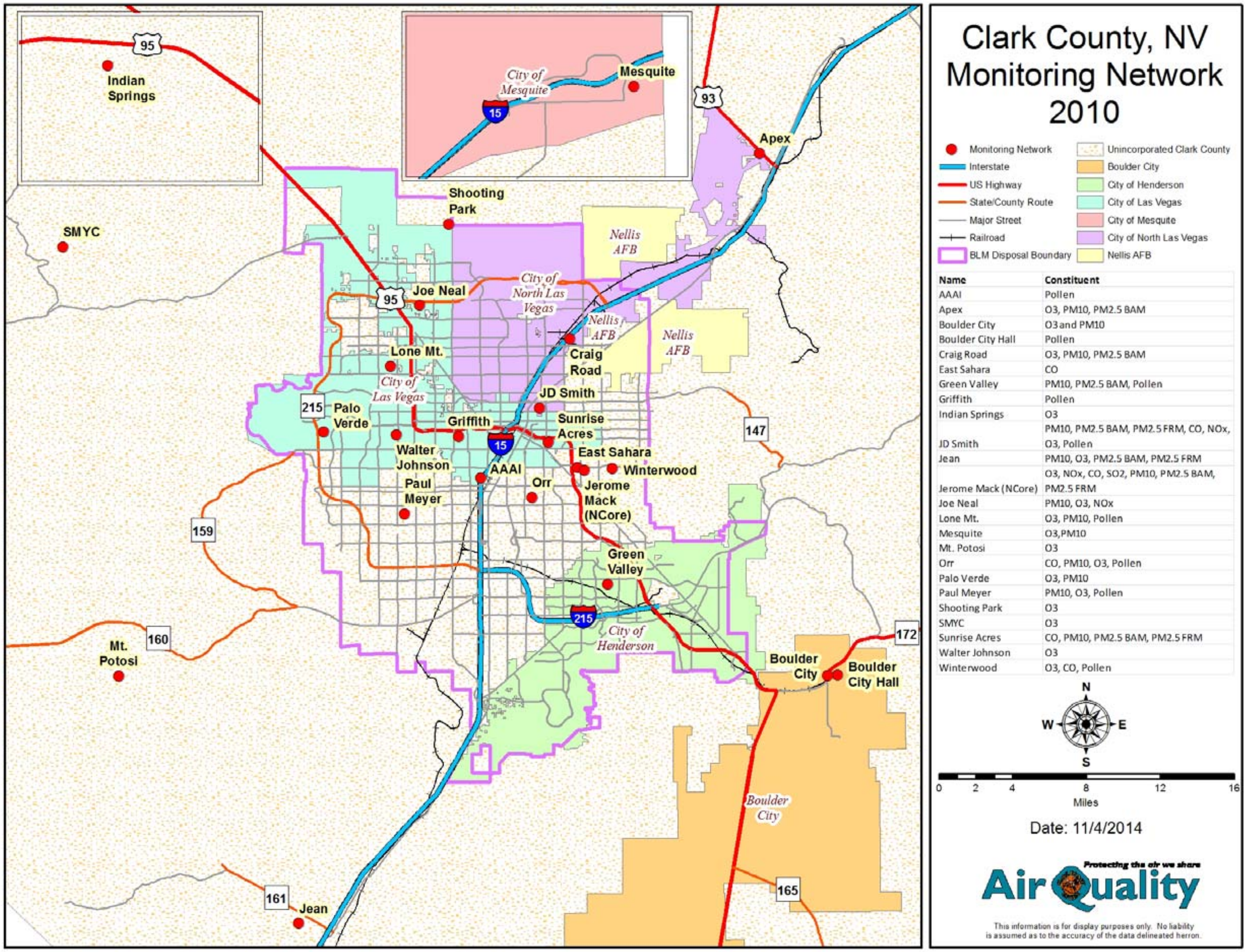
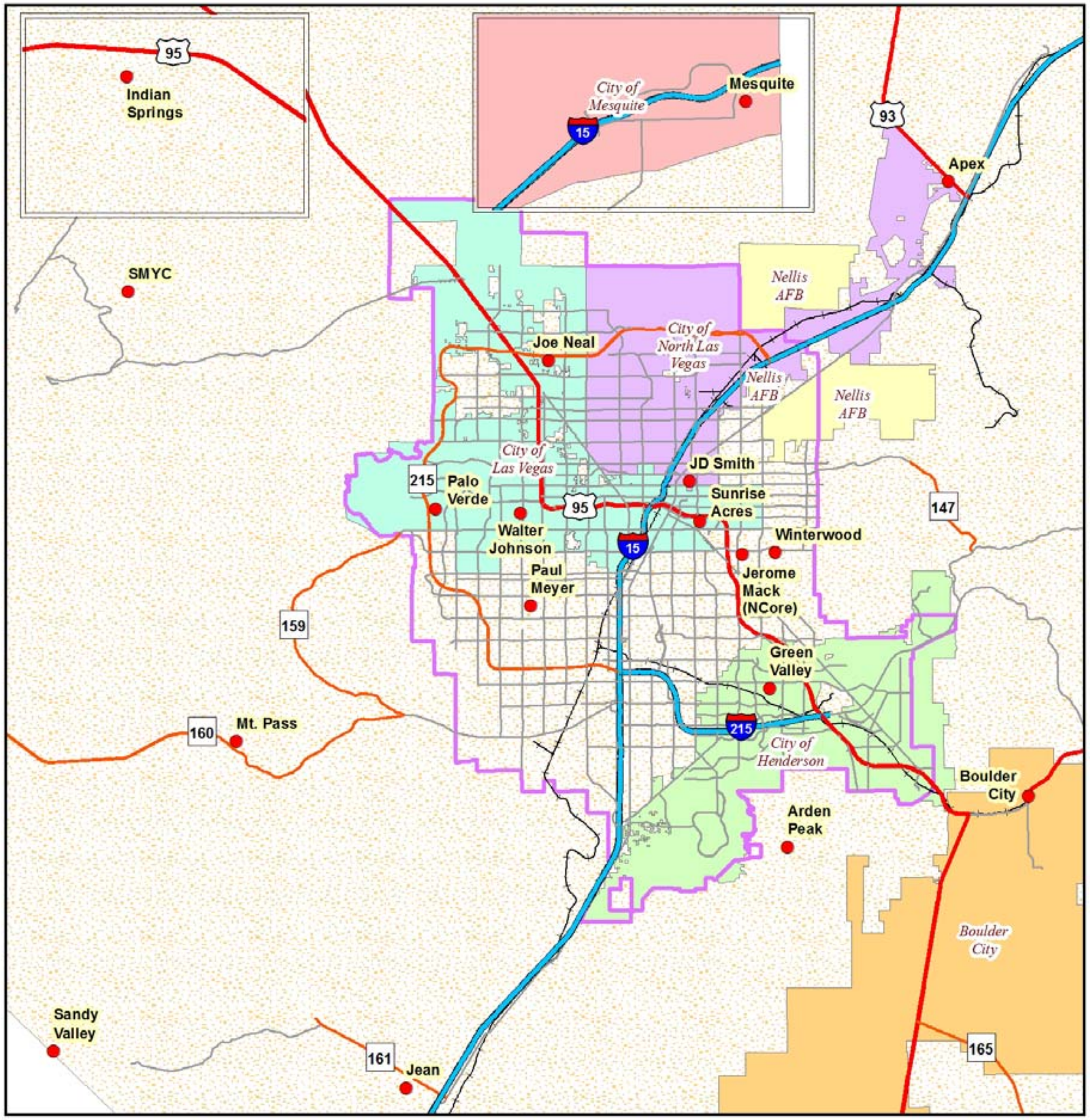


Name	Constituent
AAAI	Pollen
Apex	O3, PM10, PM2.5 BAM
Boulder City	O3 and PM10
Boulder City Hall	Pollen
Craig Road	O3, PM10, PM2.5 BAM
East Sahara	CO
Green Valley	PM10, PM2.5 BAM, Pollen
Griffith	Pollen
Indian Springs	O3
JD Smith	PM10, PM2.5 BAM, PM2.5 FRM, CO, NOx, O3, Pollen
Jean	PM10, O3, PM2.5 BAM, PM2.5 FRM
Jerome Mack (NCore)	O3, NOx, CO, SO2, PM10, PM2.5 BAM, PM2.5 FRM
Joe Neal	PM10, O3, NOx
Lone Mt.	O3, PM10, Pollen
Mesquite	O3, PM10
Mt. Potosi	O3
Orr	CO, PM10, O3, Pollen
Palo Verde	O3, PM10
Paul Meyer	PM10, O3, Pollen
Shooting Park	O3
SMYC	O3
Sunrise Acres	CO, PM10, PM2.5 BAM, PM2.5 FRM
Walter Johnson	O3
Winterwood	O3, CO, Pollen



Clark County, NV Monitoring Network 2011

- Monitoring Network
- Interstate
- US Highway
- State/County Route
- Major Street
- Railroad
- BLM Disposal Boundary
- Unincorporated Clark County
- Boulder City
- City of Henderson
- City of Las Vegas
- City of Mesquite
- City of North Las Vegas
- Nellis AFB

Name	Constituent
Apex	O3
Arden Peak	O3
Boulder City	O3 and PM10
Green Valley	PM10, PM2.5 BAM
Indian Springs	O3
JD Smith	PM10, PM2.5 BAM, CO, NOx, O3
Jean	PM10, O3, PM2.5 BAM, PM2.5 FRM
Jerome Mack (NCore)	O3, NOx, CO, SO2, PM10, PM2.5 BAM, PM2.5 FRM
Joe Neal	PM10, O3, NOx
Mesquite	O3
Mt. Pass	O3
Palo Verde	O3, PM10
Paul Meyer	PM10, O3
Sandy Valley	O3
SMYC	O3
Sunrise Acres	CO, PM10, PM2.5 BAM, PM2.5 FRM
Walter Johnson	O3
Winterwood	O3, CO

N W E S

0 2 4 8 12 16
Miles

Date: 11/4/2014

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Air Quality

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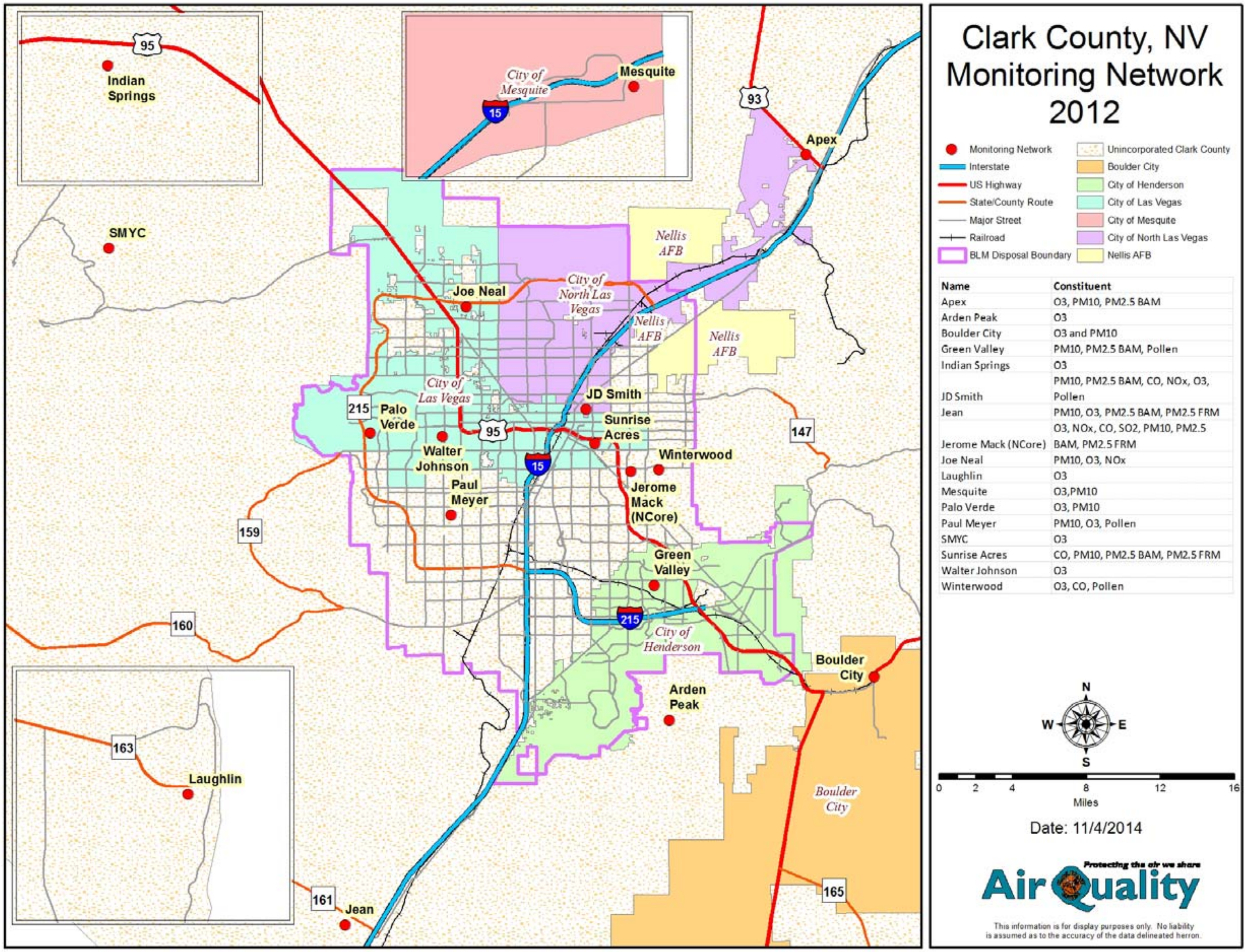
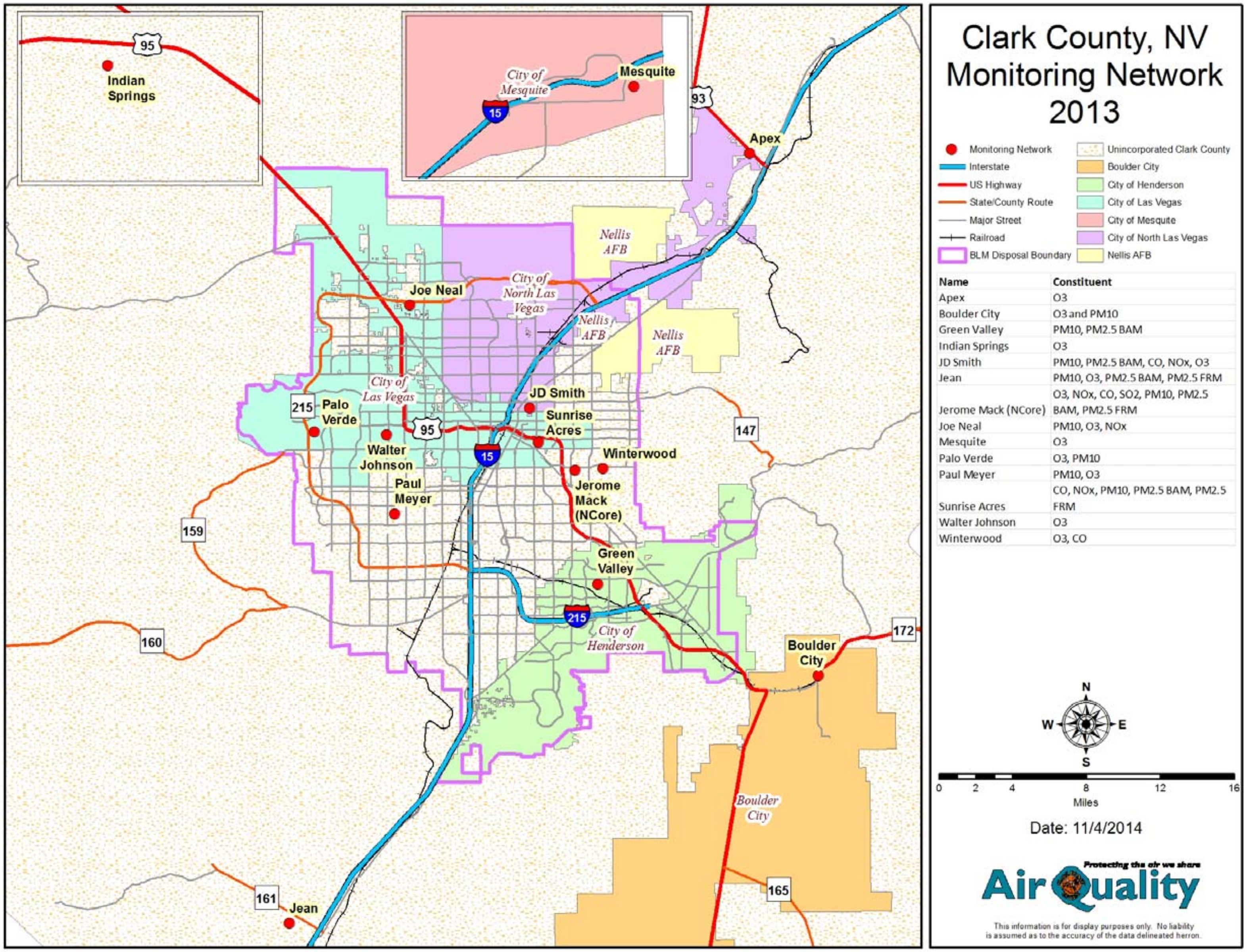
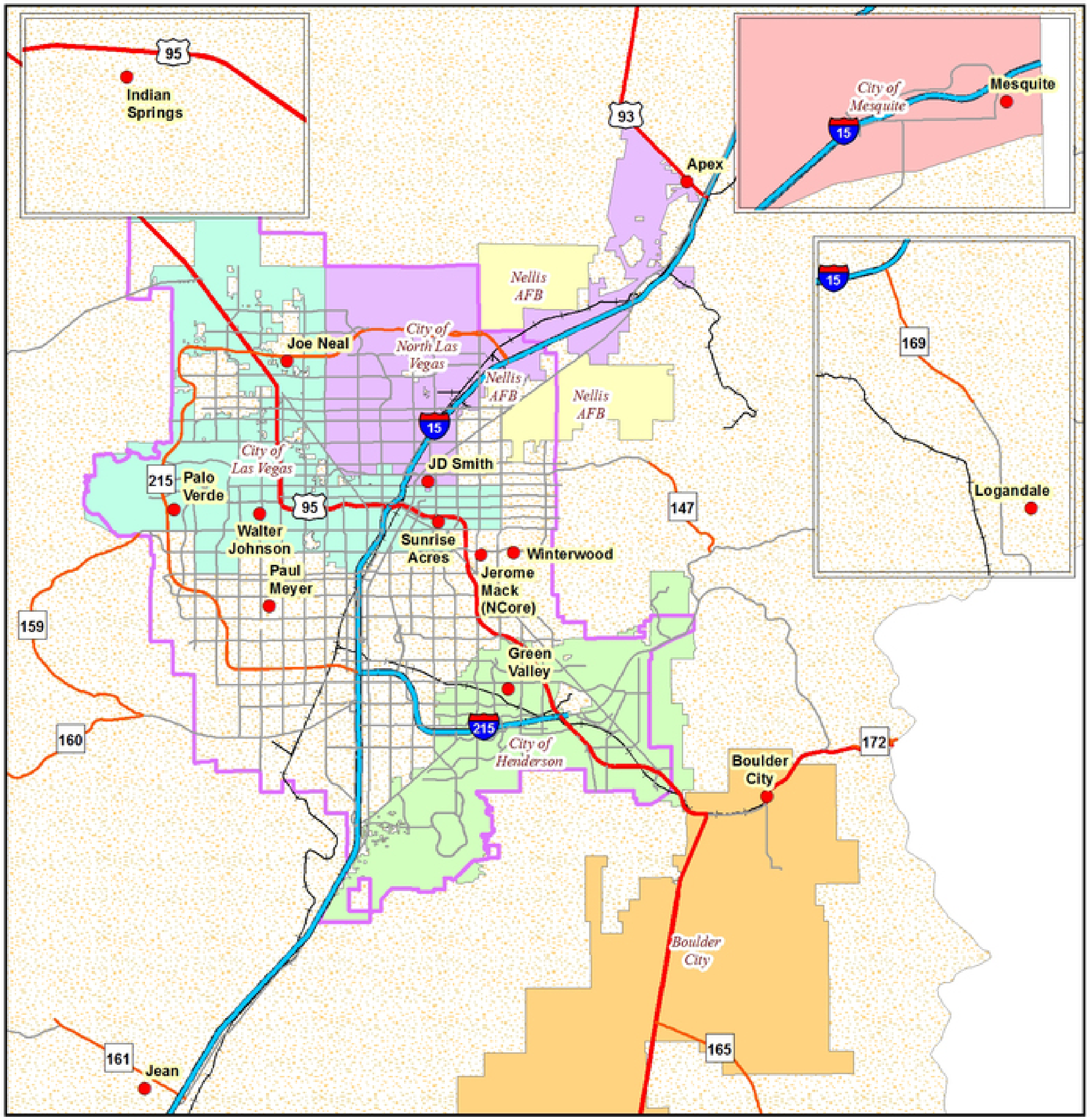


Name	Constituent
Apex	O3, PM10, PM2.5 BAM
Arden Peak	O3
Boulder City	O3 and PM10
Green Valley	PM10, PM2.5 BAM, Pollen
Indian Springs	O3
JD Smith	PM10, PM2.5 BAM, CO, NOx, O3, Pollen
Jean	PM10, O3, PM2.5 BAM, PM2.5 FRM
Jerome Mack (NCore)	O3, NOx, CO, SO2, PM10, PM2.5 BAM, PM2.5 FRM
Joe Neal	PM10, O3, NOx
Laughlin	O3
Mesquite	O3,PM10
Palo Verde	O3, PM10
Paul Meyer	PM10, O3, Pollen
SMYC	O3
Sunrise Acres	CO, PM10, PM2.5 BAM, PM2.5 FRM
Walter Johnson	O3
Winterwood	O3, CO, Pollen



Clark County, NV
Monitoring Network
2013
Monitoring Network
Interstate
US Highway
State/County Route
Major Street
Railroad
BLM Disposal Boundary
Unincorporated Clark County
Boulder City
City of Henderson
City of Las Vegas
City of Mesquite
City of North Las Vegas
Nellis AFB
Name | Constituent
Apex | O3
Boulder City | O3 and PM10
Green Valley | PM10, PM2.5 BAM
Indian Springs | O3
JD Smith | PM10, PM2.5 BAM, CO, NOx, O3
Jean | PM10, O3, PM2.5 BAM, PM2.5 FRM
Jerome Mack (NCore) | O3, NOx, CO, SO2, PM10, PM2.5 BAM, PM2.5 FRM
Joe Neal | PM10, O3, NOx
Mesquite | O3
Palo Verde | O3, PM10
Paul Meyer | PM10, O3
Sunrise Acres | CO, NOx, PM10, PM2.5 BAM, PM2.5 FRM
Walter Johnson | O3
Winterwood | O3, CO
N
W
E
S
0 2 4 8 12 16
Miles
Date: 11/4/2014
Air Quality
Protecting the air we share
This information is for display purposes only. No liability is assumed as to the accuracy of the data delineated herron.
Indian Springs
95
City of Mesquite
Mesquite
15
93
Apex
Nellis AFB
City of North Las Vegas
Joe Neal
City of Las Vegas
215
Palo Verde
Walter Johnson
Paul Meyer
JD Smith
Sunrise Acres
Winterwood
Jerome Mack (NCore)
147
159
Green Valley
215
City of Henderson
160
172
Boulder City
165
161
Jean



Clark County, NV Monitoring Network 2014

Monitoring Network	Unincorporated Clark County
Interstate	Boulder City
US Highway	City of Henderson
State/County Route	City of Las Vegas
Major Street	City of Mesquite
Railroad	City of North Las Vegas
BLM Disposal Boundary	Nellis AFB

Name	Constituent
Apex	O3
Boulder City	O3 and PM10
Green Valley	PM10, PM2.5 BAM
Indian Springs	O3
JD Smith	PM10, PM2.5 BAM, CO, NOx, O3
Jean	PM10, O3, PM2.5 BAM, PM2.5 FRM
Jerome Mack (NCore)	O3, NOx, CO, SO2, PM10, PM2.5 BAM, PM2.5 FRM
Joe Neal	PM10, O3, NOx
Logandale	O3
Mesquite	O3
Palo Verde	O3, PM10
Paul Meyer	PM10, O3
Sunrise Acres	CO, PM10, PM2.5 BAM, PM2.5 FRM
Walter Johnson	O3
Winterwood	O3, CO

N W E S

0 2 4 8 12 16
Miles

Date: 11/4/2014

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Air Quality

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APPENDIX C: POLLUTANT TREND PLOTS

This appendix contains plots of receptor-measured criteria pollutant trends. In general, NO_2 and $PM_{2.5}$ have remained steady over the past few years; CO, ozone, and PM_{10} have declined; and SO_2 has remained insignificant.

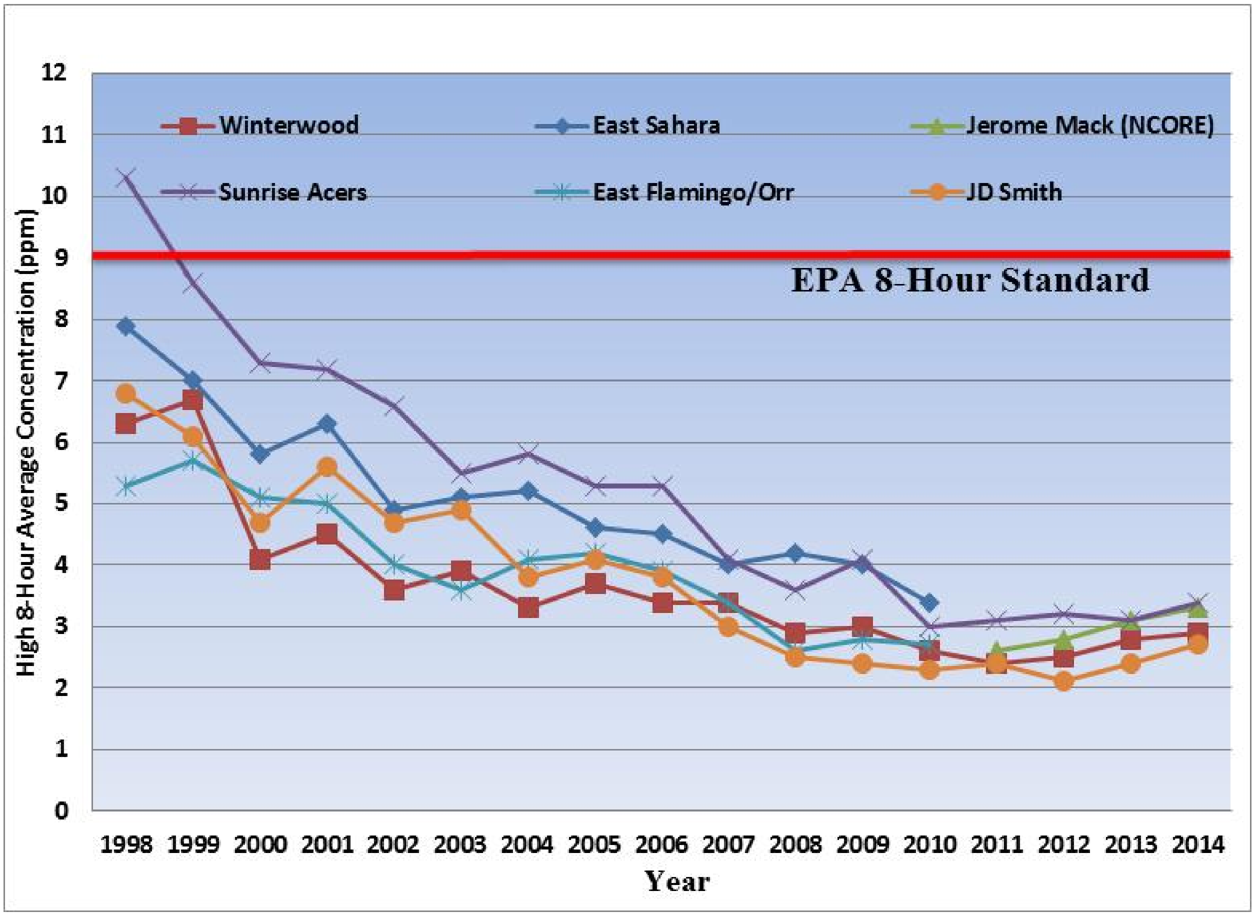

Figure C-1. Clark County CO high 8-hour average trends.

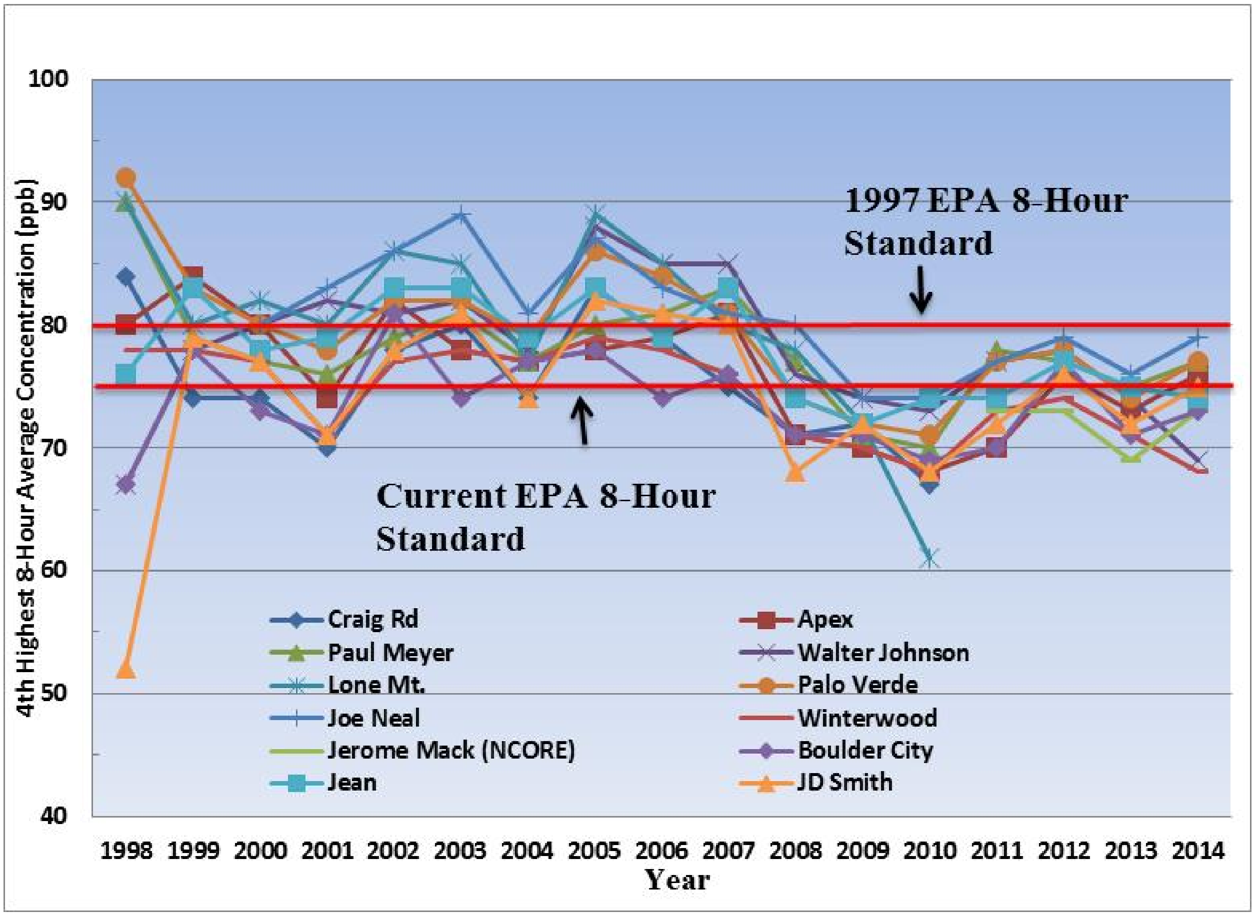

Figure C-2. Clark County ozone 4th highest 8-hour average trends.

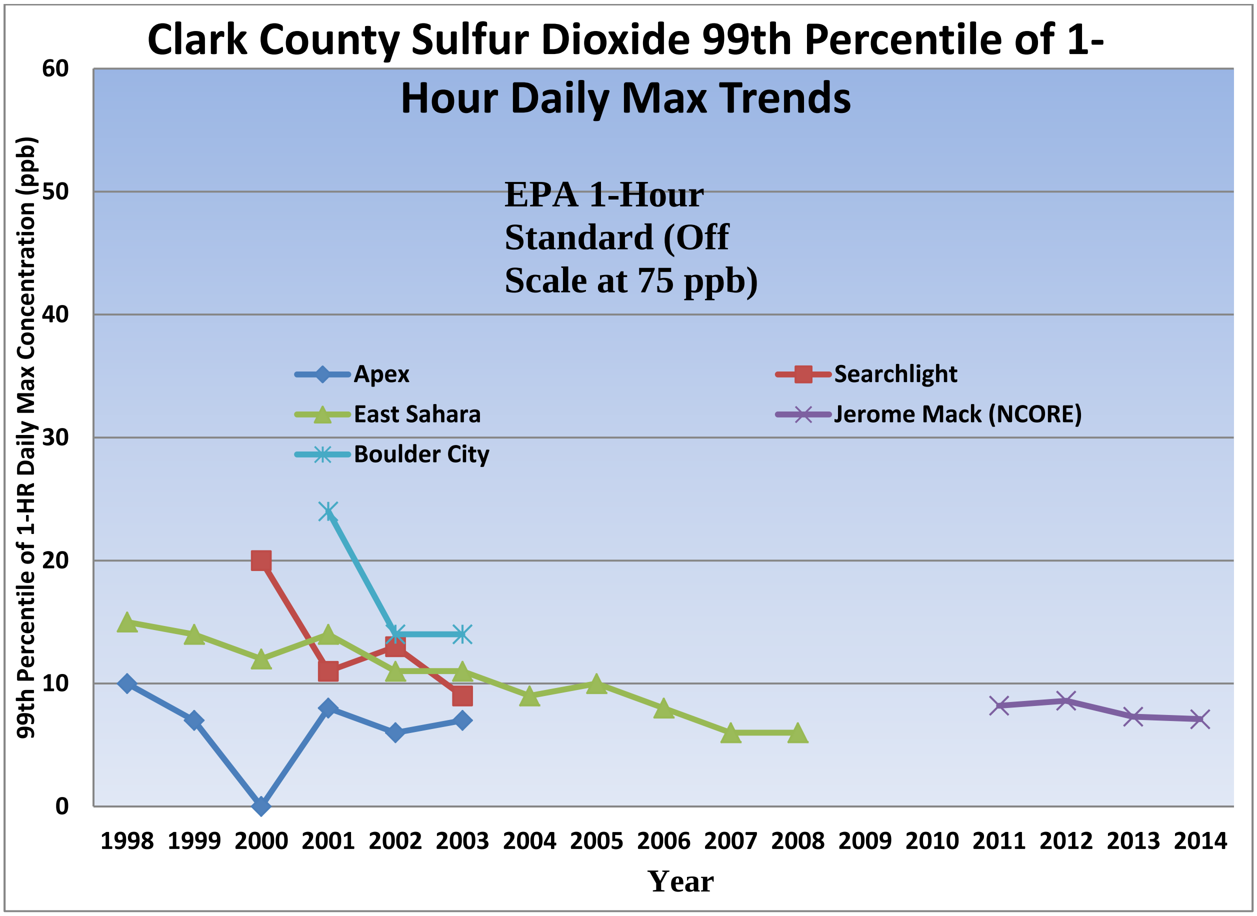

Figure C-3. Clark County SO_2 99th percentile of 1-hour daily maximum concentrations.

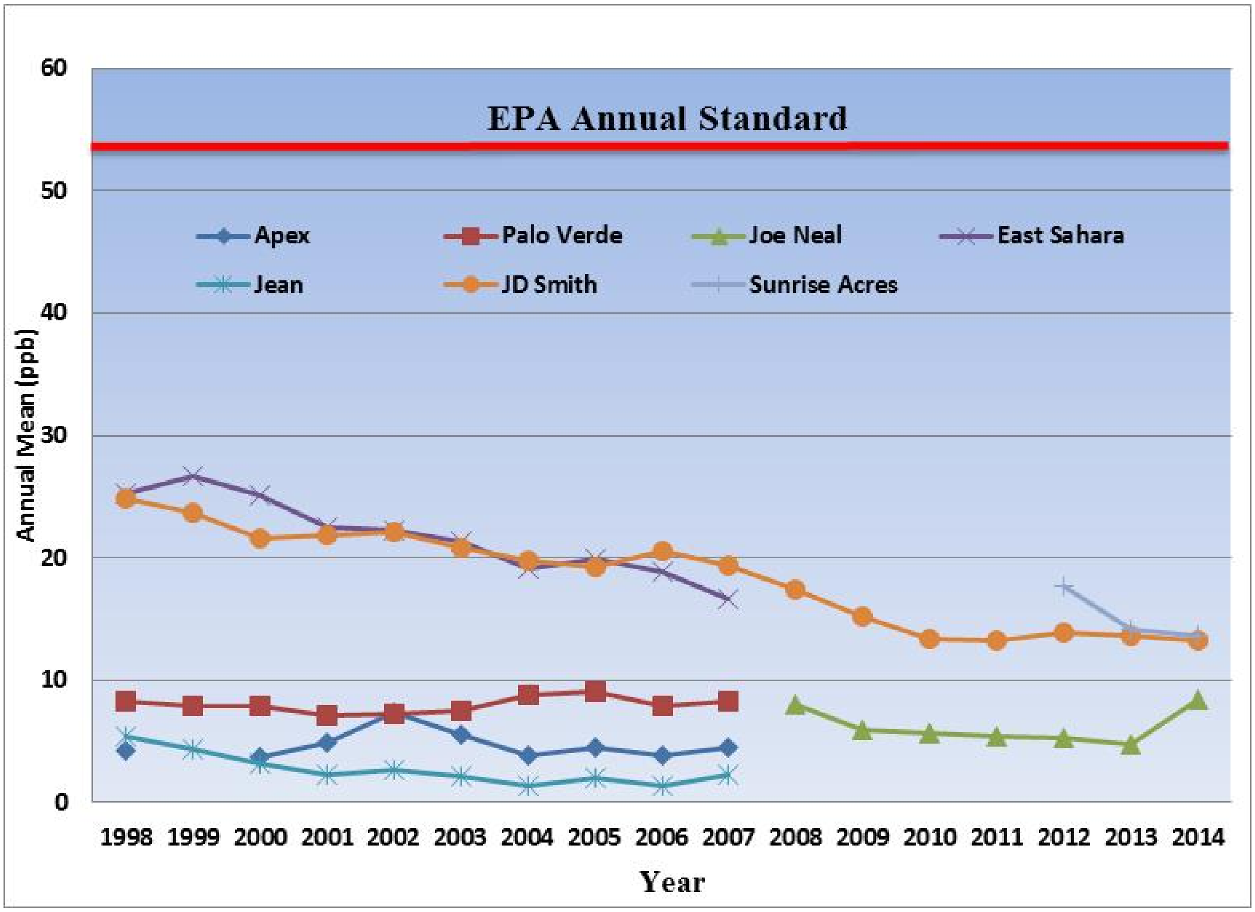

Figure C-4. Clark County NO_2 annual mean trends.

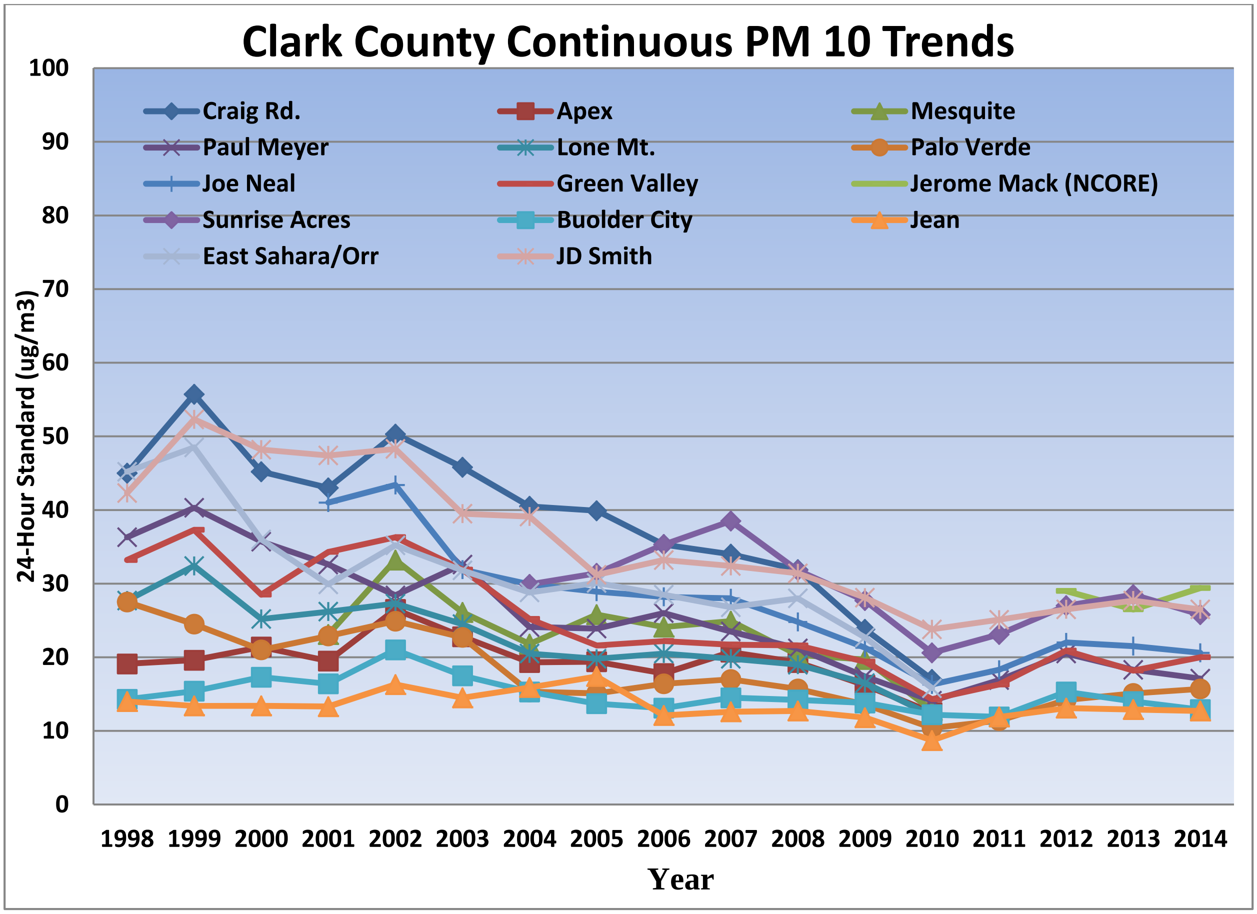

Figure C-5. Clark County continuous PM_{10} 24-hour trends.

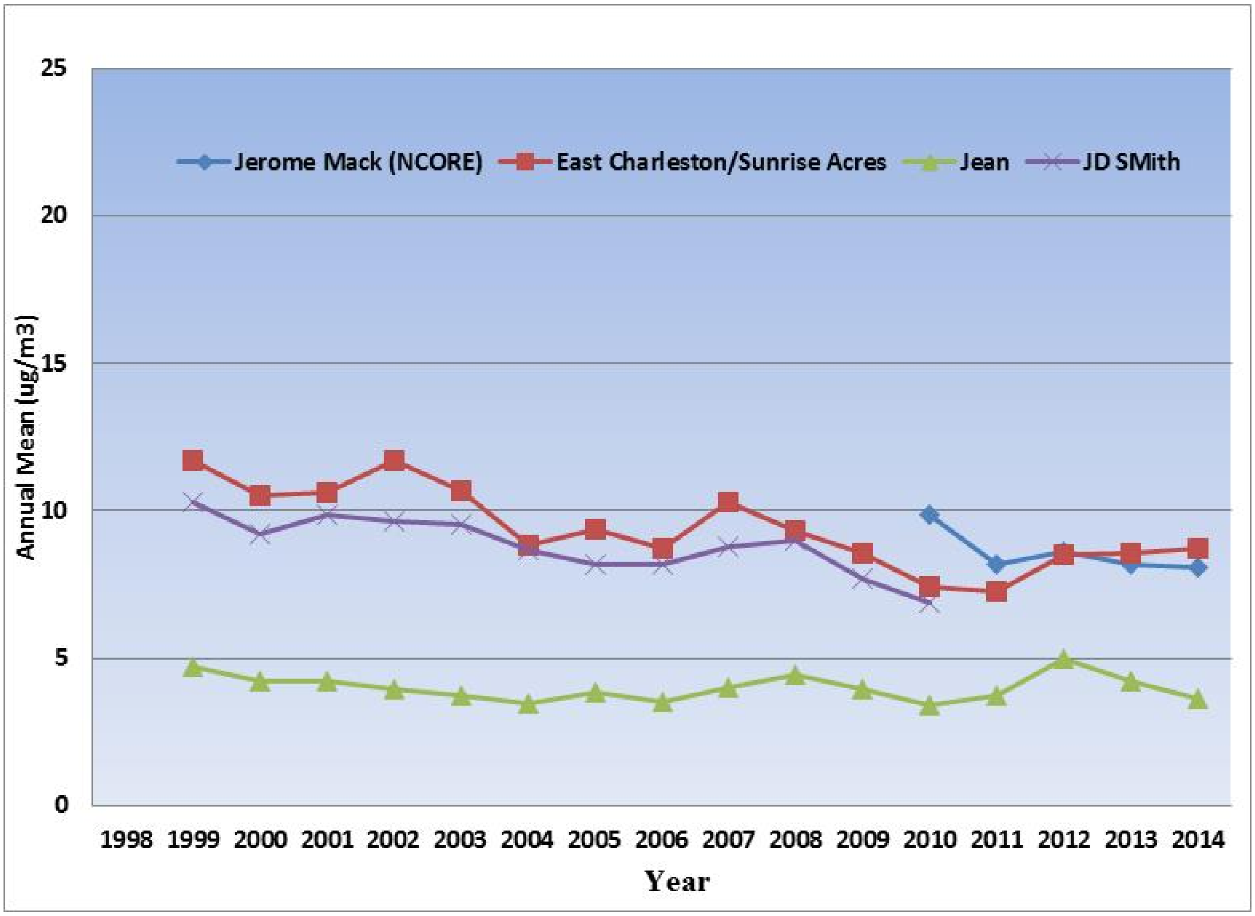

Figure C-6. Clark County filter-based $PM_{2.5}$ FRM annual mean trends.

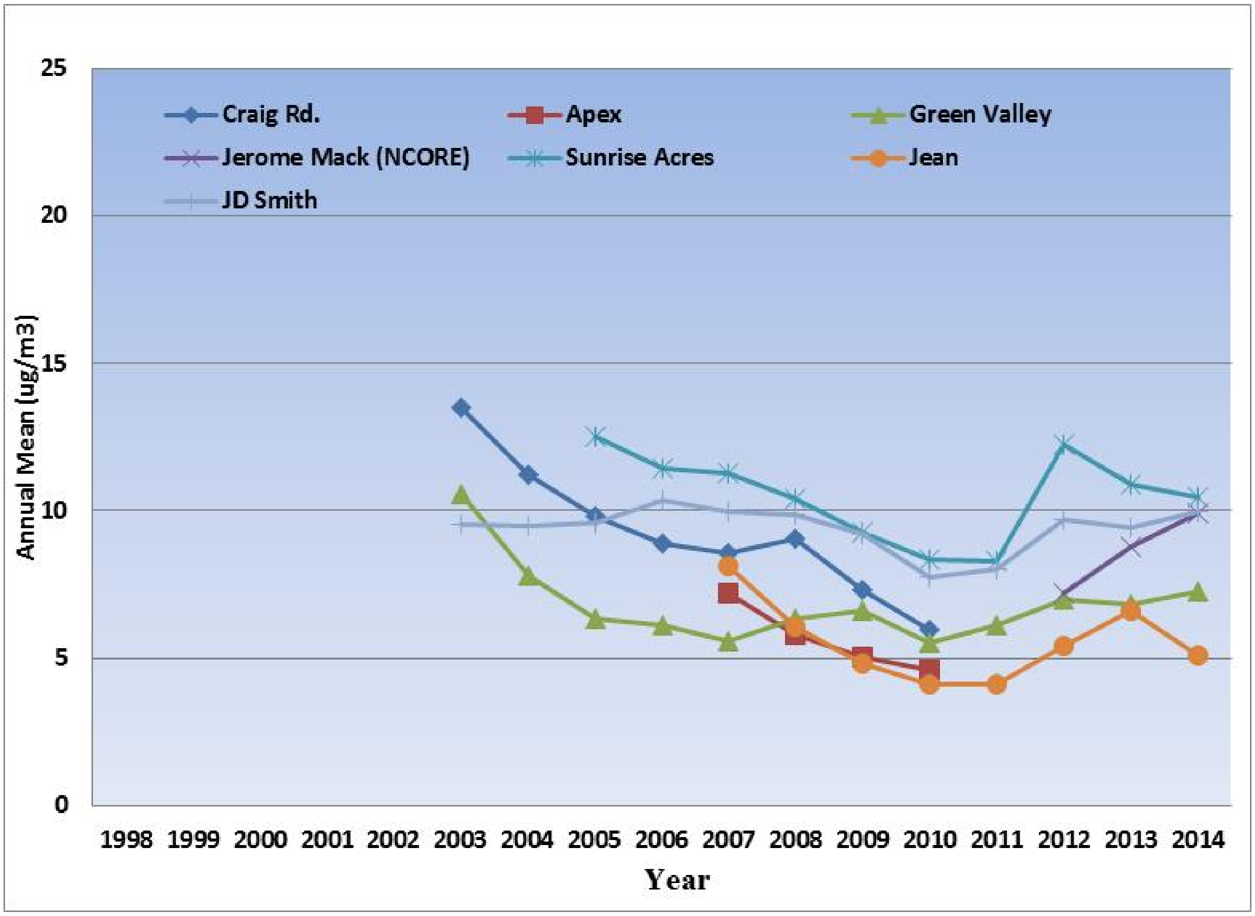

Figure C-7. Clark County continuous $PM_{2.5}$ annual mean trends.

APPENDIX D: CRITERIA USED IN MONITORING CRITERIA PRIORITIZATION

Site Mandated to Keep (Nonnegotiable) Due to:

(A) 40 CFR 58 NCore requirement for one NCore site in Clark County.
(B) CAA § 103: grant requirements dictate $PM_{2.5}$ FRM collocation and background be maintained at unique sites.
(C) SIP: specific SIPs may have monitoring mandates.

Site Mandated to Keep (Negotiable):

(A) Site meets 40 CFR 58.14 criteria on design value: if design value is high, the monitor generally is to be maintained; this is negotiable if nearby monitors have similar design values.
(B) Site meets 40 CFR 58.14 criteria on exceedances in the last five years: if there have been exceedances, the monitor is to be maintained; this is negotiable if other monitors nearby match exceedance results.
(C) Site meets 40 CFR 58.14 criteria on probability of exceedance of 80 percent of NAAQS in the next three years: if there have been exceedances, and the design value is high, it is probable there will be additional exceedances in the next three years; the monitor is to be maintained unless other monitors nearby match the exceedance results, in which case maintaining the monitor is negotiable.

Network Mandated to Keep Due to:

(A) 40 CFR 58, Appendix D (high concentration site for CO and ozone): requires DAQ to maintain a high concentration site for ozone.
(B) 40 CFR 58, Appendix D (background site ozone and $PM_{2.5}$): requires DAQ to maintain a background site for ozone and $PM_{2.5}$.
(C) 40 CFR 58, Appendix D (transport site ozone and $PM_{2.5}$): requires DAQ to maintain a transport site for ozone and $PM_{2.5}$.

Nonmandated Sites to Keep Due to:

(A) Not correlating well to other sites because of unique air shed or unique area within the air shed.
(B) Serving a unique population, e.g., city, remote population, young pulmonary-challenged population.
(C) Serving a relatively high population density area (unique population of greater than 50,000).
(D) Being located in a residential area (population exposure where monitors are upwind of a residential neighborhood).
(E) Serving a unique area where the site's purpose is more for a topographical or spatial area, rather than a population-based area.

(F) The absence of the monitor would result in significant hole in the network for monitored pollutant.
(G) Adding value from a historical (trend) perspective.
(H) Being used to define the extent of regional pollutant transport among populated areas.
(I) Supporting a secondary standard.
(J) Being used to evaluate welfare-based impacts (generally, a site that is located near rural populations or that supports a secondary standard).
(K) Being located 10–30 miles downwind from a Metropolitan Statistical Area.
(L) Being located in an ideal ozone flow path.
(M) Demonstrating pollutant flow patterns from the valley out of state.
(N) Being located in the low point of the valley (applicable for CO monitoring).
(O) Being used by meteorologist to prepare exceptional event justification packages.
(P) Providing improved understanding of ozone-related atmospheric processes.

Site Mandated to Close (Nonnegotiable) Due to:

(A) Eviction notice received.

Site Mandated to Close (Negotiable) Due to:

(A) Expired/nonexistent lease, but no eviction notice.
(B) A new shelter needed, but no budget.
(C) General improvements or safety upgrades needed, but no budget
(D) Site not meeting ideal use siting criteria; site may meet AQS listed siting objective and scale, but if the siting and scale have no true benefit for the location, the site should be considered for closure.
(E) 40 CFR 58, Appendix D, attainment demonstration: monitor is not usable for attainment demonstrations.
(F) 40 CFR 58, Appendix D, 1.1(a): providing pollution data to the general public; some SPMs may not meet this qualifier.

Network Mandated to Close (Negotiable) Due to:

(A) Site correlating well to a nearby site: if the monitor has a high correlation to a nearby site, it should be considered for closure.

Nonmandated to Close Due to:

(A) Historical concentration trends no longer of value.
(B) It being one of many sites for a population served.
(C) It being one of many sites in an area served.
(D) Comparatively high operating cost.

APPENDIX E: PRINCIPAL COMPONENT ANALYSIS OUTPUT FOR THE CLARK COUNTY HISTORICAL $PM_{2.5}$ MONITORING NETWORK

```
. pca greenvalley jean jdsmith  echarlston

Principal components/correlation                  Number of obs    =       305
                                                  Number of comp.  =         4
                                                  Trace            =         4
    Rotation: (unrotated = principal)             Rho              =    1.0000

    --------------------------------------------------------------------------
        Component |   Eigenvalue   Difference         Proportion   Cumulative
    -------------+------------------------------------------------------------
            Comp1 |      2.56161      1.46939             0.6404       0.6404
            Comp2 |      1.09223      .883362             0.2731       0.9135
            Comp3 |      .208864     .0715679             0.0522       0.9657
            Comp4 |      .137296            .             0.0343       1.0000
    --------------------------------------------------------------------------

Principal components (eigenvectors)

    ------------------------------------------------------------------
        Variable |    Comp1     Comp2     Comp3     Comp4 | Unexplained
    -------------+----------------------------------------+------------
     greenvalley |   0.5593    0.2727   -0.6816    0.3849 |           0
            jean |   0.3311    0.7775    0.5247   -0.1028 |           0
         jdsmith |   0.5683   -0.2882   -0.0817   -0.7664 |           0
      echarlston |   0.5046   -0.4879    0.5034    0.5040 |           0
    ------------------------------------------------------------------
```

Figure E-1. PCA output for parameter code 88101 for 2001 to 2004: Green Valley, Jean, J.D. Smith, and E. Charleston.

```
. pca greenvalley jean jdsmith  sunriseacres

Principal components/correlation                  Number of obs    =       301
                                                  Number of comp.  =         4
                                                  Trace            =         4
    Rotation: (unrotated = principal)             Rho              =    1.0000

    --------------------------------------------------------------------------
        Component |   Eigenvalue   Difference         Proportion   Cumulative
    -------------+------------------------------------------------------------
            Comp1 |      2.61813      1.71494             0.6545       0.6545
            Comp2 |      .903195      .504764             0.2258       0.8803
            Comp3 |      .398431       .31819             0.0996       0.9799
            Comp4 |     .0802407            .             0.0201       1.0000
    --------------------------------------------------------------------------

Principal components (eigenvectors)

    ------------------------------------------------------------------
        Variable |    Comp1     Comp2     Comp3     Comp4 | Unexplained
    -------------+----------------------------------------+------------
     greenvalley |   0.5393    0.1446   -0.7189    0.4140 |           0
            jean |   0.3162    0.8685    0.3767   -0.0612 |           0
         jdsmith |   0.5854   -0.2440   -0.0541   -0.7712 |           0
    sunriseacres |   0.5162   -0.4064    0.5817    0.4796 |           0
    ------------------------------------------------------------------
```

Figure E-2. PCA output for parameter code 88101 for 2004 to 2007: Green Valley, Jean, J.D. Smith, and Sunrise Acres.

. pca jean jdsmith sunriseacres jeromemack

Principal components/correlation — Number of obs = 4; Number of comp. = 3; Trace = 4

Rotation: (unrotated = principal) — Rho = 1.0000

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.89526	3.8246	0.9738	0.9738
Comp2	.0706662	.0365938	0.0177	0.9915
Comp3	.0340724	.0340724	0.0085	1.0000
Comp4	0	.	0.0000	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Unexplained
jean	0.5003	0.2002	-0.8038	0
jdsmith	0.4953	0.7318	0.4451	0
sunriseacres	0.5028	-0.4656	-0.0311	0
jeromemack	0.5016	-0.4556	0.3935	0

Figure E-3. PCA output for parameter code 88101 for 2010 to 2013: Jean, J.D. Smith, Sunrise Acres, and Jerome Mack.

. pca greenvalley jeromemack sunriseacres jean jdsmith paiute

Principal components/correlation — Number of obs = 71; Number of comp. = 6; Trace = 6

Rotation: (unrotated = principal) — Rho = 1.0000

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.38762	1.46285	0.5646	0.5646
Comp2	1.92477	1.56761	0.3208	0.8854
Comp3	.357156	.143959	0.0595	0.9449
Comp4	.213197	.136543	0.0355	0.9805
Comp5	.0766538	.0360464	0.0128	0.9932
Comp6	.0406074	.	0.0068	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6
greenvalley	0.4119	0.3787	0.1427	-0.8157	0.0271	-0.0214
jeromemack	0.5174	-0.1245	0.1471	0.2626	0.6526	-0.4475
sunriseacres	0.5213	-0.1509	0.0629	0.1838	0.0298	0.8167
jean	-0.0680	0.6450	0.6538	0.3754	-0.1000	0.0314
jdsmith	0.5248	-0.0667	-0.0916	0.2029	-0.7360	-0.3590
paiute	0.1044	0.6307	-0.7199	0.2232	0.1441	0.0498

Figure E-4. PCA output for parameter code 88101 for 2013: Green Valley, Jerome Mack, Sunrise Acres, Jean, J.D. Smith, and Paiute.

```
. pca greenvalley jeromemack sunriseacres jean jdsmith

Principal components/correlation                  Number of obs    =        87
                                                  Number of comp.  =         5
                                                  Trace            =         5
    Rotation: (unrotated = principal)             Rho              =    1.0000
```

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.34133	2.02253	0.6683	0.6683
Comp2	1.3188	1.11737	0.2638	0.9320
Comp3	.201431	.105717	0.0403	0.9723
Comp4	.0957144	.0529872	0.0191	0.9915
Comp5	.0427272	.	0.0085	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained
greenvalley	0.4159	0.4783	-0.7721	0.0442	0.0085	0
jeromemack	0.5253	-0.1076	0.2484	0.6514	-0.4758	0
sunriseacres	0.5242	-0.1886	0.1783	0.0684	0.8082	0
jean	0.0062	0.8458	0.5276	-0.0095	0.0778	0
jdsmith	0.5256	-0.0927	0.1788	-0.7543	-0.3381	0

Figure E-5. PCA output for parameter code 88101 for 2013: Green Valley, Jerome Mack, Sunrise Acres, Jean, and J.D. Smith.

```
. pca jeromemack sunriseacres jean jdsmith  paiute

Principal components/correlation                  Number of obs    =       241
                                                  Number of comp.  =         5
                                                  Trace            =         5
    Rotation: (unrotated = principal)             Rho              =    1.0000
```

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.64152	1.15006	0.5283	0.5283
Comp2	1.49146	.944296	0.2983	0.8266
Comp3	.547162	.360282	0.1094	0.9360
Comp4	.186879	.0538944	0.0374	0.9734
Comp5	.132985	.	0.0266	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained
jeromemack	0.5674	-0.2042	0.0428	-0.1942	0.7726	0
sunriseacres	0.5701	-0.1178	0.0480	0.7692	-0.2592	0
jean	0.0737	0.6872	0.7150	0.0389	0.0976	0
jdsmith	0.5775	0.0888	-0.0376	-0.5969	-0.5486	0
paiute	0.1189	0.6814	-0.6951	0.1134	0.1598	0

Figure E-6. PCA output for parameter code 88101 for 2013: Jerome Mack, Sunrise Acres, Jean, J.D. Smith, and Paiute.

```
. pca ecraig paloverde esahara  greenvalley jdsmith

Principal components/correlation                  Number of obs    =       253
                                                  Number of comp.  =         5
                                                  Trace            =         5
    Rotation: (unrotated = principal)             Rho              =    1.0000
```

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	4.05293	3.55934	0.8106	0.8106
Comp2	.493583	.263839	0.0987	0.9093
Comp3	.229745	.0753277	0.0459	0.9553
Comp4	.154417	.0850881	0.0309	0.9861
Comp5	.0693288	.	0.0139	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained
ecraig	0.4492	-0.3730	-0.4487	-0.6471	0.1975	0
paloverde	0.4442	-0.5072	0.2016	0.5842	0.4044	0
esahara	0.4210	0.7112	0.2319	-0.1268	0.4971	0
greenvalley	0.4659	-0.0914	0.6016	-0.2247	-0.6018	0
jdsmith	0.4545	0.2991	-0.5851	0.4163	-0.4339	0

Figure E-7. PCA output for parameter code 88502 for 2005: E. Craig, Palo Verde, E. Sahara, Green Valley, and J.D. Smith.

```
. pca ecraig paloverde esahara  bouldercity jdsmith

Principal components/correlation                  Number of obs    =       140
                                                  Number of comp.  =         5
                                                  Trace            =         5
    Rotation: (unrotated = principal)             Rho              =    1.0000
```

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.90899	3.32408	0.7818	0.7818
Comp2	.584901	.318929	0.1170	0.8988
Comp3	.265972	.120585	0.0532	0.9520
Comp4	.145387	.0506314	0.0291	0.9810
Comp5	.0947552	.	0.0190	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained
ecraig	0.4700	-0.0357	-0.5573	-0.4206	0.5389	0
paloverde	0.4814	0.1498	-0.2096	-0.2293	-0.8058	0
esahara	0.4396	-0.3758	0.7386	-0.3331	0.0955	0
bouldercity	0.3884	0.7986	0.2765	0.2895	0.2262	0
jdsmith	0.4509	-0.4442	-0.1535	0.7587	0.0108	0

Figure E-8. PCA output for parameter code 88502 for 2005: E. Craig, Palo Verde, E. Sahara, Boulder City, and J.D. Smith.

```
. pca ecraig paloverde esahara  jdsmith  sunriseacres  greenvalley

Principal components/correlation                 Number of obs    =        543
                                                 Number of comp.  =          6
                                                 Trace            =          6
    Rotation: (unrotated = principal)            Rho              =     1.0000
```

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.80969	2.76039	0.6349	0.6349
Comp2	1.0493	.520842	0.1749	0.8098
Comp3	.528458	.242535	0.0881	0.8979
Comp4	.285923	.0575571	0.0477	0.9456
Comp5	.228366	.130102	0.0381	0.9836
Comp6	.0982637	.	0.0164	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6
ecraig	0.3652	0.3052	0.8451	-0.2399	0.0305	0.0278
paloverde	0.3439	0.6163	-0.1762	0.6859	0.0072	-0.0177
esahara	0.4292	-0.4415	0.0254	0.1674	0.4576	-0.6187
jdsmith	0.4572	-0.1675	-0.1311	-0.1091	-0.8300	-0.2120
sunriseacres	0.4372	-0.4395	-0.0043	0.1928	0.1128	0.7522
greenvalley	0.4050	0.3329	-0.4867	-0.6284	0.2968	0.0728

Figure E-9. PCA output for parameter code 88502 for 2005 to 2007: E. Craig, Palo Verde, E. Sahara, J.D. Smith, Sunrise Acres, and Green Valley.

```
. pca greenvalley jean jdsmith sunriseacres ecraig apex

Principal components/correlation                 Number of obs    =       1084
                                                 Number of comp.  =          6
                                                 Trace            =          6
    Rotation: (unrotated = principal)            Rho              =     1.0000
```

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.98295	3.0029	0.6638	0.6638
Comp2	.980049	.644967	0.1633	0.8272
Comp3	.335082	.0519071	0.0558	0.8830
Comp4	.283175	.0134564	0.0472	0.9302
Comp5	.269719	.120696	0.0450	0.9752
Comp6	.149023	.	0.0248	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6
greenvalley	0.4318	-0.0979	-0.6885	0.4159	0.3711	0.1387
jean	0.3785	0.5187	0.2414	0.5626	-0.4521	-0.0917
jdsmith	0.4245	-0.4328	0.0201	-0.1303	-0.1359	-0.7725
sunriseacres	0.3786	-0.5390	0.5493	0.1530	0.0841	0.4837
ecraig	0.4429	0.1050	-0.2814	-0.5973	-0.4756	0.3616
apex	0.3881	0.4822	0.2939	-0.3367	0.6373	-0.1045

Figure E-10.PCA output for parameter code 88502 for 2007 to 2010: Green Valley, Jean, J.D. Smith, Sunrise Acres, E. Craig, and Apex.

. pca greenvalley jean jdsmith sunriseacres apex

Principal components/correlation — Number of obs = 1096; Number of comp. = 5; Trace = 5; Rotation: (unrotated = principal); Rho = 1.0000

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.25047	2.27438	0.6501	0.6501
Comp2	.976095	.647406	0.1952	0.8453
Comp3	.32869	.054055	0.0657	0.9111
Comp4	.274635	.104527	0.0549	0.9660
Comp5	.170108	.	0.0340	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained
greenvalley	0.4827	-0.0704	-0.8256	-0.0448	0.2801	0
jean	0.4132	0.5551	0.1485	0.7061	-0.0218	0
jdsmith	0.4751	-0.4082	0.0481	0.0087	-0.7780	0
sunriseacres	0.4365	-0.5045	0.4858	0.0564	0.5619	0
apex	0.4243	0.5155	0.2408	-0.7044	-0.0043	0

Figure E-11.PCA output for parameter code 88502 for 2007 to 2010: Green Valley, Jean, J.D. Smith, Sunrise Acres, and Apex.

. pca greenvalley jean jdsmith sunriseacres ecraig

Principal components/correlation — Number of obs = 1127; Number of comp. = 5; Trace = 5; Rotation: (unrotated = principal); Rho = 1.0000

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.42806	2.6362	0.6856	0.6856
Comp2	.791864	.459352	0.1584	0.8440
Comp3	.332512	.0388799	0.0665	0.9105
Comp4	.293632	.139701	0.0587	0.9692
Comp5	.153931	.	0.0308	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained
greenvalley	0.4718	0.0375	-0.5234	0.6944	0.1407	0
jean	0.3753	0.7169	0.5492	0.1497	-0.1453	0
jdsmith	0.4807	-0.3668	-0.0130	-0.1585	-0.7804	0
sunriseacres	0.4338	-0.5322	0.5240	0.0270	0.5032	0
ecraig	0.4660	0.2585	-0.3868	-0.6852	0.3112	0

Figure E-12.PCA output for parameter code 88502 for 2007 to 2010: Green Valley, Jean, J.D. Smith, Sunrise Acres, and E. Craig.

APPENDIX F: DATA FOR THE ASSESSMENT OF MAXIMUM OZONE CONCENTRATION MONITORING WITHIN CLARK COUNTY

Table F-1. Ozone Network Site Information

Las Vegas DAQ Air Monitoring Sites	Site Code	AQS ID
Craig Road	CR	32-003-0020
Apex	AP	32-003-0022
Mesquite	MQ	32-003-0023
Pall Meyer	PM	32-003-0043
Walter Johnson	WJ	32-003-0071
Lone Mountain	LO	32-003-0072
Palo Verde	PV	32-003-0073
Joe Neal	JO	32-003-0075
Winterwood	WW	32-003-0538
Jerome Mack	JM	32-003-0540
Boulder City	BC	32-003-0601
Jean	JN	32-003-1019
JD Smith	JD	32-003-2002

Table F-2. Summer Ozone Site Information

DAQ Summer Ozone Sites	Site Code	AQS ID
Spring Mountain Youth Camp	YC	32-003-7771
Indian Springs	IS	32-003-7772
Shooting Park	SH	32-003-7773
Frenchman Mountain	FM	32-003-7774
Mount Potosi	MP	32-003-7775
Mountain Pass	PM	32-003-7776
Sandy Valley	SV	32-003-7777
Arden Peak	AR	32-003-7778
Laughlin	LN	32-003-7779
LV Paiute	PU	32-003-8000

Table F-3. 2010 Ozone Data Completeness (%)

Monitor Type	Site ID	POC	City	Street Address	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yearly
SLAMS	32-003-0020	1	North Las Vegas	4701 Mitchell Street	99	99	99	87	95	99	97	99	96	0	0	0	97
SLAMS	32-003-0022	1	Apex	NE of city-12101 HWY 93/I15	99	99	99	99	99	99	99	99	95	0	0	0	99
SLAMS	32-003-0023	1	Mesquite	465 E. Old Mill Road	98	99	99	99	99	99	92	96	96	0	0	0	98
SLAMS	32-003-0043	1	Spring Val-ley	4525 New Forest Drive	99	99	99	99	99	99	99	99	99	99	99	99	99
SLAMS	32-003-0071	1	Las Vegas	7701 Ducharme Ave.	98	99	99	99	99	99	99	99	99	92	99	86	97
SLAMS	32-003-0072	1	Las Vegas	3525 N. Valadez Street	99	98	99	97	0	0	0	0	0	0	0	0	98
SLAMS	32-003-0073	1	Las Vegas	333 Pavilion Center Drive	98	99	99	98	99	99	99	99	99	99	99	95	99
SLAMS	32-003-0075	1	Las Vegas	6651 W. Azure Ave.	99	99	99	98	99	99	99	99	99	98	99	95	99
SLAMS	32-003-0538	2	Sunrise Manor	5483 Clubhouse Dr.	99	99	99	99	98	99	99	99	99	99	99	99	99
SLAMS	32-003-0601	1	Boulder City	1005 Industrial Road	0	0	0	94	81	98	95	94	99	99	99	99	95
SLAMS	32-003-1019	1	Jean	1965 State Hwy 161	99	99	99	99	99	99	99	99	99	98	99	99	99
SLAMS	32-003-1021	1	Las Vegas	1562 Katie Ave.	99	99	99	96	0	0	0	0	0	0	0	0	99
SLAMS	32-003-2002	1	North Las Vegas	1301B E. Tonopah	99	99	96	99	99	99	99	99	99	99	99	99	99
Non-Regulatory	32-003-7771	1	Mt. Charleston	Ries Rd, Spring Mountain Youth Camp	0	0	0	0	95	99	99	99	95	0	0	0	98
Non-Regulatory	32-003-7772	1	Indian Springs	668 Gretta Ln, Indian Springs	0	0	0	0	97	98	99	99	95	0	0	0	98
Non-Regulatory	32-003-7773	1	LV far north	11357 N. Decatur Blvd.	0	0	0	0	92	98	99	99	95	0	0	0	98
Non-Regulatory	32-003-7775	1	LV upper air	11480 Mt. Potosi Canyon Rd.	0	0	0	0	0	95	99	96	0	0	0	0	97
Non-Regulatory	32-003-7775	2	LV upper air POC-2	11480 Mt. Potosi Canyon Rd.	0	0	0	0	0	97	99	97	0	0	0	0	98

Table F-4. 2011 Ozone Data Completeness (%)

Monitor Type	Site ID	POC	City	Street Address	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yearly
SLAMS	32-003-0022	1	Apex	NE of city-12101 HWY 93/I15	0	0	0	0	99	99	99	99	95	0	0	0	99
SLAMS	32-003-0023	1	Mesquite	465 E. Old Mill Road	0	0	0	0	99	99	99	99	96	0	0	0	99
SLAMS	32-003-0043	1	Spring Valley	4525 New Forest Drive	99	99	99	98	95	99	99	99	99	99	99	99	99
SLAMS	32-003-0071	1	Las Vegas	7701 Ducharme Ave.	99	99	99	99	99	99	95	99	99	99	99	99	99
SLAMS	32-003-0073	1	Las Vegas	333 Pavilion Center Drive	99	99	99	98	99	99	99	99	99	99	99	99	99
SLAMS	32-003-0075	1	Las Vegas	6651 W. Azure Ave.	90	99	99	97	95	99	99	99	99	99	88	99	97
SLAMS	32-003-0538	2	Sunrise Manor	5483 Clubhouse Dr.	99	99	99	99	99	87	99	99	99	99	99	99	98
SLAMS	32-003-0540	1	Sunrise Manor	4250 Karen Ave.	97	99	96	98	99	99	98	99	99	96	96	64	95
SLAMS	32-003-0601	1	Boulder City	1005 Industrial Road	96	99	99	99	99	95	99	99	99	94	99	99	98
SLAMS	32-003-1019	1	Jean	1965 State Hwy 161	99	99	99	99	99	99	98	99	99	99	99	99	99
SLAMS	32-003-2002	1	North Las Vegas	1301B E. Tonopah	98	99	99	99	90	99	98	99	99	99	99	99	98
SLAMS	32-003-7771	4	Mt. Charleston	Ries Rd, Spring Mountain Youth Camp	0	0	0	0	99	99	99	99	99	99	99	99	99
SLAMS	32-003-7776	4	LV Hwy 160	Mt. Pass, State Hwy 160 to Pahrump	0	0	0	0	99	99	88	99	91	0	0	0	95
SLAMS	32-003-7777	4	Sandy Valley	650 Quartz	0	0	0	0	99	99	99	99	96	0	0	0	99
SLAMS	32-003-7778	4	LV Arden Peak	Southeast of Las Vegas, near comm towers in Henderson	0	0	0	0	99	95	99	99	96	0	0	0	98

Table F-5. 2012 Ozone Data Completeness (%)

Monitor Type	Site ID	POC	City	Street Address	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yearly
SLAMS	32-003-0022	1	Apex	NE of city-12101 HWY 93/I15	0	0	0	99	99	99	99	99	99	0	0	0	99
SLAMS	32-003-0023	1	Mesquite	465 E. Old Mill Road	0	0	0	99	97	99	99	99	99	0	0	0	99
SLAMS	32-003-0043	1	Spring Val-ley	4525 New Forest Drive	98	99	99	99	99	99	99	99	99	99	99	99	99
SLAMS	32-003-0071	1	Las Vegas	7701 Ducharme Ave.	99	99	99	99	99	98	99	99	99	99	99	98	99
SLAMS	32-003-0073	1	Las Vegas	333 Pavilion Center Drive	99	99	99	99	99	99	99	99	92	99	99	99	99
SLAMS	32-003-0075	1	Las Vegas	6651 W. Azure Ave.	99	99	99	99	99	99	94	99	99	99	99	99	99
SLAMS	32-003-0538	2	Sunrise Manor	5483 Clubhouse Dr.	99	99	99	99	99	99	99	99	99	99	99	99	99
SLAMS	32-003-0540	1	Sunrise Manor	4250 Karen Ave.	97	99	99	98	99	99	99	99	99	99	99	99	99
SLAMS	32-003-0601	1	Boulder City	1005 Industrial Road	99	99	99	98	99	99	99	99	98	99	98	99	99
SLAMS	32-003-1019	1	Jean	1965 State Hwy 161	99	99	99	99	99	99	99	99	99	99	99	99	99
SLAMS	32-003-2002	1	North Las Vegas	1301B E. Tonopah	98	99	97	99	99	99	99	99	99	99	99	99	99
SLAMS	32-003-7771	4	Mt. Charleston	Ries Rd, Spring Mountain Youth Camp	99	99	99	99	99	99	99	99	97	0	0	0	99
SLAMS	32-003-7774	4	Sunrise Manor	Top of Frenchman Moun-tain comm tower	0	0	0	0	0	0	99	99	99	99	99	99	99
SLAMS	32-003-7778	4	LV Arden Peak	Southeast of Las Vegas, near comm towers in Hen-derson	0	0	0	0	99	99	97	92	93	0	0	0	96
SLAMS	32-003-7779	4	Laughlin	101 Laughlin Civic Drive Laughlin	0	0	0	0	97	99	99	99	99	0	0	0	99

Table F-6. 2013 Ozone Data Completeness (%)

Monitor Type	Site ID	POC	City	Street Address	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yearly
SLAMS	32-003-0022	1	Apex	NE of city-12101 HWY 93/I15	0	0	0	98	99	99	99	99	99	0	0	0	99
SLAMS	32-003-0023	1	Mesquite	465 E. Old Mill Road	0	0	0	87	99	99	98	99	99	0	0	0	97
SLAMS	32-003-0043	1	Spring Val-ley	4525 New Forest Drive	99	99	99	99	99	99	99	99	99	88	99	99	98
SLAMS	32-003-0071	1	Las Vegas	7701 Ducharme Ave.	97	99	99	99	99	99	98	99	99	98	99	99	99
SLAMS	32-003-0073	1	Las Vegas	333 Pavilion Center Drive	99	99	99	98	99	99	99	99	99	98	99	99	99
SLAMS	32-003-0075	1	Las Vegas	6651 W. Azure Ave.	99	99	99	98	99	99	98	99	99	99	99	99	99
SLAMS	32-003-0538	2	Sunrise Manor	5483 Clubhouse Dr.	99	99	99	99	99	99	99	99	99	99	99	99	99
SLAMS	32-003-0540	1	Sunrise Manor	4250 Karen Ave.	98	99	99	99	99	97	92	99	95	98	99	99	98
SLAMS	32-003-0601	1	Boulder City	1005 Industrial Road	99	99	98	99	99	99	82	99	99	99	99	99	98
SLAMS	32-003-1019	1	Jean	1965 State Hwy 161	99	98	99	99	99	99	99	99	99	99	99	99	99
SLAMS	32-003-2002	1	North Las Vegas	1301B E. Tonopah	99	99	99	99	99	99	99	99	99	99	95	99	99
Non-Regulatory	32-003-8000	1	LV Paiute	Las Vegas Indian Colony, NV	94	95	95	95	47	43	95	79	90	90	13	95	78

Table F-7. 2014 Ozone Data Completeness (%)

Monitor Type	Site ID	POC	City	Street Address	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yearly
SLAMS	32-003-0022	1	Apex	NE of city-12101 HWY 93/I15	0	0	0	99	99	99	99	89	98	95	0	0	97
SLAMS	32-003-0023	1	Mesquite	465 E. Old Mill Road	0	0	0	99	99	99	99	99	98	0	0	0	99
SLAMS	32-003-0043	1	Spring Val-ley	4525 New Forest Drive	99	99	99	99	99	96	99	99	96	96	0	0	98
SLAMS	32-003-0071	1	Las Vegas	7701 Ducharme Ave.	99	99	99	99	99	99	99	99	94	97	0	0	98
SLAMS	32-003-0073	1	Las Vegas	333 Pavilion Center Drive	99	99	99	99	99	99	99	99	99	99	100	99	99
SLAMS	32-003-0075	1	Las Vegas	6651 W. Azure Ave.	99	99	99	88	94	99	99	99	98	99	99	97	98
SLAMS	32-003-0538	2	Sunrise Manor	5483 Clubhouse Dr.	99	99	98	99	99	98	99	99	99	0	0	0	99
SLAMS	32-003-0540	1	Sunrise Manor	4250 Karen Ave.	99	98	99	99	95	99	99	99	99	98	99	99	99
SLAMS	32-003-0601	1	Boulder City	1005 Industrial Road	99	99	99	98	99	99	93	99	99	97	99	96	98
SLAMS	32-003-1019	1	Jean	1965 State Hwy 161	99	99	98	99	99	93	99	99	97	66	97	95	95
SLAMS	32-003-2002	1	North Las Vegas	1301B E. Tonopah	99	99	99	99	99	99	99	99	78	98	99	99	97
SPM	32-003-7772	1	Indian Springs	668 Gretta Lane	0	0	0	99	99	99	99	99	99	94	0	0	99
SPM	32-003-7780	4	Moapa Val-ley	3570 Lyman Street	0	0	0	0	99	88	99	98	95	90	0	0	95
Non-Regulatory	32-003-8000	1	LV Paiute	Las Vegas Indian Colony, NV	91	43	79	94	93	92	100	99	99	99	99	99	91

Table F-8. 2010 1-Hour Ozone

Site ID	POC	1st Max 1-Hr	2nd Max 1-Hr	3rd Max 1-Hr	4th Max 1-Hr
320030020	1	0.079	0.077	0.076	0.076
320030022	1	0.081	0.078	0.077	0.076
320030023	1	0.070	0.069	0.068	0.067
320030043	1	0.081	0.079	0.078	0.078
320030071	1	0.084	0.084	0.083	0.082
320030072	1	0.075	0.075	0.072	0.066
320030073	1	0.089	0.088	0.084	0.083
320030075	1	0.090	0.089	0.088	0.085
320030538	2	0.080	0.079	0.078	0.075
320030601	1	0.078	0.077	0.076	0.073
320031019	1	0.082	0.082	0.079	0.078
320031021	1	0.073	0.072	0.071	0.064
320032002	1	0.084	0.082	0.080	0.079
320037771	1	0.095	0.092	0.087	0.086
320037772	1	0.085	0.083	0.082	0.081
320037773	1	0.088	0.088	0.086	0.085
320037775	1	0.077	0.077	0.075	0.074
320037775	2	0.074	0.074	0.073	0.072

Table F-9. 2010 8-Hour Ozone

Site ID	POC	1st Max 8-Hr	2nd Max 8-Hr	3rd Max 8-Hr	4th Max 8-Hr
320030020	1	0.074	0.068	0.067	0.067
320030022	1	0.074	0.073	0.069	0.068
320030023	1	0.067	0.066	0.065	0.063
320030043	1	0.073	0.071	0.070	0.070
320030071	1	0.077	0.074	0.073	0.073
320030072	1	0.070	0.069	0.066	0.061
320030073	1	0.074	0.071	0.071	0.071
320030075	1	0.082	0.075	0.074	0.074
320030538	2	0.073	0.071	0.069	0.068
320030601	1	0.074	0.072	0.070	0.069
320031019	1	0.075	0.074	0.074	0.074
320031021	1	0.068	0.067	0.064	0.060
320032002	1	0.076	0.069	0.069	0.068
320037771	1	0.084	0.083	0.081	0.079
320037772	1	0.075	0.073	0.071	0.068
320037773	1	0.080	0.074	0.074	0.073
320037775	1	0.074	0.074	0.073	0.072
320037775	2	0.071	0.070	0.070	0.069

Table F-10. 2011 1-Hour Ozone

Site ID	POC	1st Max 1-Hr	2nd Max 1-Hr	3rd Max 1-Hr	4th Max 1-Hr
320030022	1	0.086	0.086	0.080	0.080
320030023	1	0.073	0.067	0.066	0.066
320030043	1	0.102	0.091	0.089	0.086
320030071	1	0.108	0.088	0.088	0.087
320030073	1	0.104	0.089	0.086	0.085
320030075	1	0.092	0.091	0.090	0.089
320030538	2	0.086	0.082	0.081	0.080
320030540	1	0.086	0.083	0.082	0.079
320030601	1	0.084	0.076	0.075	0.075
320031019	1	0.085	0.085	0.084	0.083
320032002	1	0.086	0.082	0.082	0.081
320037771	4	0.091	0.091	0.088	0.086
320037776	4	0.086	0.086	0.084	0.081
320037777	4	0.074	0.073	0.071	0.071
320037778	4	0.090	0.088	0.088	0.088

Table F-11. 2011 8-Hour Ozone

Site ID	POC	1st Max 8-Hr	2nd Max 8-Hr	3rd Max 8-Hr	4th Max 8-Hr
320030022	1	0.078	0.074	0.071	0.070
320030023	1	0.067	0.061	0.059	0.059
320030043	1	0.090	0.082	0.079	0.078
320030071	1	0.089	0.079	0.079	0.077
320030073	1	0.088	0.081	0.080	0.077
320030075	1	0.079	0.079	0.077	0.077
320030538	2	0.076	0.075	0.073	0.073
320030540	1	0.075	0.075	0.074	0.073
320030601	1	0.081	0.071	0.070	0.070
320031019	1	0.083	0.080	0.079	0.074
320032002	1	0.073	0.072	0.072	0.072
320037771	4	0.084	0.083	0.082	0.079
320037776	4	0.082	0.082	0.080	0.080
320037777	4	0.072	0.070	0.066	0.066
320037778	4	0.086	0.084	0.083	0.083

Table F-12. 2012 1-Hour Ozone

Site ID	POC	1st Max 1-Hr	2nd Max 1-Hr	3rd Max 1-Hr	4th Max 1-Hr
320030022	1	0.089	0.086	0.086	0.083
320030023	1	0.076	0.075	0.074	0.074
320030043	1	0.089	0.085	0.085	0.085
320030071	1	0.093	0.089	0.088	0.087
320030073	1	0.093	0.091	0.086	0.086
320030075	1	0.105	0.095	0.087	0.086
320030538	2	0.091	0.086	0.083	0.082
320030540	1	0.089	0.084	0.082	0.080
320030601	1	0.092	0.087	0.085	0.082
320031019	1	0.088	0.088	0.087	0.085
320032002	1	0.087	0.086	0.085	0.084
320037771	4	0.114	0.090	0.088	0.088
320037774	4	0.074	0.074	0.073	0.072
320037778	4	0.088	0.086	0.085	0.084
320037779	4	0.078	0.078	0.077	0.077

Table F-13. 2012 8-Hour Ozone

Site ID	POC	1st Max 8-Hr	2nd Max 8-Hr	3rd Max 8-Hr	4th Max 8-Hr
320030022	1	0.081	0.080	0.076	0.076
320030023	1	0.072	0.071	0.071	0.069
320030043	1	0.082	0.079	0.078	0.077
320030071	1	0.079	0.078	0.078	0.078
320030073	1	0.081	0.079	0.079	0.078
320030075	1	0.089	0.081	0.08	0.079
320030538	2	0.080	0.078	0.076	0.074
320030540	1	0.078	0.077	0.076	0.073
320030601	1	0.078	0.078	0.077	0.077
320031019	1	0.083	0.082	0.080	0.077
320032002	1	0.079	0.079	0.077	0.076
320037771	4	0.091	0.089	0.086	0.085
320037774	4	0.072	0.069	0.068	0.067
320037778	4	0.081	0.080	0.079	0.076
320037779	4	0.074	0.074	0.074	0.073

Table F-14. 2013 1-Hour Ozone

Site ID	POC	1st Max 1-Hr	2nd Max 1-Hr	3rd Max 1-Hr	4th Max 1-Hr
320030022	1	0.084	0.083	0.082	0.081
320030023	1	0.073	0.072	0.072	0.072
320030043	1	0.090	0.084	0.082	0.080
320030071	1	0.092	0.084	0.084	0.083
320030073	1	0.091	0.086	0.085	0.080
320030075	1	0.088	0.087	0.086	0.085
320030538	2	0.083	0.081	0.078	0.076
320030540	1	0.081	0.080	0.076	0.075
320030601	1	0.079	0.079	0.076	0.075
320031019	1	0.088	0.084	0.080	0.078
320032002	1	0.082	0.080	0.080	0.080
320038000	1	0.101	0.097	0.096	0.095

Table F-15. 2013 8-Hour Ozone

Site ID	POC	1st Max 8-Hr	2nd Max 8-Hr	3rd Max 8-Hr	4th Max 8-Hr
320030022	1	0.078	0.074	0.073	0.073
320030023	1	0.068	0.068	0.067	0.067
320030043	1	0.087	0.080	0.076	0.075
320030071	1	0.087	0.080	0.075	0.074
320030073	1	0.083	0.082	0.076	0.074
320030075	1	0.081	0.077	0.077	0.076
320030538	2	0.076	0.075	0.073	0.071
320030540	1	0.074	0.073	0.072	0.069
320030601	1	0.074	0.072	0.072	0.071
320031019	1	0.084	0.078	0.076	0.075
320032002	1	0.076	0.074	0.074	0.072
320038000	1	0.092	0.091	0.085	0.082

Table F-16. 2014 1-Hour Ozone

Site ID	POC	1st Max 1-Hr	2nd Max 1-Hr	3rd Max 1-Hr	4th Max 1-Hr
320030022	1	0.082	0.081	0.081	0.081
320030023	1	0.073	0.071	0.071	0.070
320030043	1	0.089	0.086	0.084	0.082
320030071	1	0.085	0.082	0.079	0.079
320030073	1	0.087	0.086	0.083	0.083
320030075	1	0.091	0.090	0.088	0.087
320030538	2	0.079	0.077	0.077	0.075
320030540	1	0.086	0.082	0.078	0.078
320030601	1	0.085	0.079	0.078	0.075
320031019	1	0.081	0.080	0.078	0.077
320032002	1	0.086	0.086	0.086	0.081
320037772	1	0.082	0.082	0.080	0.078
320037780	4	0.076	0.071	0.068	0.068
320038000	1	0.098	0.090	0.089	0.088

Table F-17. 2014 8-Hour Ozone

Site ID	POC	1st Max 8-Hr	2nd Max 8-Hr	3rd Max 8-Hr	4th Max 8-Hr
320030022	1	0.074	0.072	0.070	0.069
320030023	1	0.068	0.067	0.066	0.065
320030043	1	0.069	0.067	0.067	0.067
320030071	1	0.074	0.071	0.070	0.069
320030073	1	0.071	0.071	0.070	0.070
320030075	1	0.072	0.071	0.071	0.071
320030538	2	0.073	0.073	0.072	0.068
320030540	1	0.075	0.073	0.072	0.069
320030601	1	0.074	0.073	0.069	0.069
320031019	1	0.075	0.074	0.072	0.071
320032002	1	0.081	0.075	0.075	0.069
320037772	1	0.074	0.072	0.070	0.069
320037780	4	0.071	0.066	0.066	0.064
320038000	1	0.087	0.084	0.083	0.081

Table F-18. 2010 8-hour Ozone Violation Day Readings (standard = 0.075)

AIRS Site ID	POC	Year	Date	Max Hour	Max Value	Number of Primary Violations	Max Ozone Reading
32-003-0071	1	2010	20100622	10	0.077	3	--
32-003-2002	1	2010	20100622	10	0.076	2	
32-003-0075	1	2010	20100622	11	0.082	5	X

Table F-19. 2010 8-hour Ozone Violation Day SPM Readings (standard = 0.075)

AIRS Site ID	POC	Year	Date	Max Hour	Max Value	Number of Primary Violations	Max Ozone Reading
32-003-7771	1	2010	20100527	22	0.081	5	--
32-003-7771	1	2010	20100528	0	0.076	1	--
32-003-7771	1	2010	20100617	20	0.078	7	--
32-003-7771	1	2010	20100622	14	0.077	4	--
32-003-7771	1	2010	20100625	5	0.077	3	--
32-003-7771	1	2010	20100630	23	0.083	4	--
32-003-7771	1	2010	20100701	0	0.084	5	X
32-003-7771	1	2010	20100828	10	0.079	3	--
32-003-7771	1	2010	20100901	13	0.079	6	--
32-003-7773	1	2010	20100622	11	0.080	4	--

Table F-20. 2011 8-hour Ozone Violation Day Readings (standard = 0.075)

AIRS Site ID	POC	Year	Date	Max Hour	Max Value	Number of Primary Violations	Max Ozone Reading
32-003-0022	1	2011	20110616	10	0.078	5	--
32-003-0043	1	2011	20110614	11	0.078	3	--
32-003-0043	1	2011	20110616	14	0.079	8	--
32-003-0043	1	2011	20110621	11	0.078	2	--
32-003-0043	1	2011	20110701	11	0.090	8	X
32-003-0043	1	2011	20110702	9	0.082	5	--
32-003-0043	1	2011	20110721	12	0.077	3	--
32-003-0071	1	2011	20110614	11	0.079	3	--
32-003-0071	1	2011	20110616	9	0.077	5	--
32-003-0071	1	2011	20110626	9	0.077	3	--
32-003-0071	1	2011	20110701	11	0.089	7	--
32-003-0071	1	2011	20110702	9	0.079	4	--
32-003-0071	1	2011	20110828	10	0.076	1	--
32-003-0073	1	2011	20110701	12	0.088	7	--
32-003-0073	1	2011	20110702	10	0.080	4	--
32-003-0073	1	2011	20110721	13	0.081	6	--
32-003-0073	1	2011	20110828	10	0.077	3	--
32-003-0538	2	2011	20110616	13	0.076	2	--
32-003-0601	1	2011	20110616	14	0.081	8	--
32-003-1019	1	2011	20110615	16	0.079	6	--
32-003-1019	1	2011	20110616	13	0.083	11	--
32-003-1019	1	2011	20110721	11	0.080	8	--
32-003-0075	1	2011	20110614	11	0.076	2	--
32-003-0075	1	2011	20110616	10	0.076	1	--
32-003-0075	1	2011	20110618	8	0.076	2	--
32-003-0075	1	2011	20110626	8	0.076	3	--

32-003-0075	1	2011	20110701	11	0.079	3	--
32-003-0075	1	2011	20110702	9	0.079	4	--
32-003-0075	1	2011	20110721	11	0.077	3	--
32-003-0075	1	2011	20110828	10	0.077	3	--

Table F-21. 2011 8-hour Ozone Violation Day SPM Readings (standard = 0.075)

AIRS Site ID	POC	Year	Date	Max Hour	Max Value	Number of Primary Violations	Max Ozone Reading
32-003-7771	4	2011	20110528	19	0.079	4	--
32-003-7771	4	2011	20110531	9	0.077	7	--
32-003-7771	4	2011	20110610	14	0.077	5	--
32-003-7771	4	2011	20110611	20	0.079	6	--
32-003-7771	4	2011	20110612	0	0.077	2	--
32-003-7771	4	2011	20110616	13	0.079	6	--
32-003-7771	4	2011	20110626	12	0.077	5	--
32-003-7771	4	2011	20110701	14	0.084	9	--
32-003-7771	4	2011	20110721	18	0.083	13	--
32-003-7771	4	2011	20110722	0	0.082	5	--
32-003-7776	4	2011	20110610	15	0.077	4	--
32-003-7776	4	2011	20110615	17	0.076	3	--
32-003-7776	4	2011	20110616	14	0.080	8	--
32-003-7776	4	2011	20110621	13	0.080	5	--
32-003-7776	4	2011	20110622	21	0.076	2	--
32-003-7776	4	2011	20110701	12	0.082	8	--
32-003-7776	4	2011	20110702	3	0.076	2	--
32-003-7776	4	2011	20110721	11	0.082	15	--
32-003-7778	4	2011	20110531	20	0.076	4	--
32-003-7778	4	2011	20110601	0	0.076	3	--
32-003-7778	4	2011	20110603	23	0.076	1	--
32-003-7778	4	2011	20110604	0	0.076	3	--
32-003-7778	4	2011	20110610	16	0.077	8	--
32-003-7778	4	2011	20110611	0	0.077	10	--
32-003-7778	4	2011	20110612	5	0.077	6	--
32-003-7778	4	2011	20110615	18	0.084	11	--
32-003-7778	4	2011	20110616	14	0.086	14	X
32-003-7778	4	2011	20110618	19	0.078	5	--
32-003-7778	4	2011	20110621	13	0.077	3	--
32-003-7778	4	2011	20110622	21	0.078	4	--
32-003-7778	4	2011	20110623	0	0.078	4	--
32-003-7778	4	2011	20110626	20	0.077	5	--
32-003-7778	4	2011	20110627	0	0.077	4	--
32-003-7778	4	2011	20110701	14	0.083	12	--
32-003-7778	4	2011	20110721	19	0.083	9	--
32-003-7778	4	2011	20110722	0	0.078	1	--

Table F-22. 2012 8-hour Ozone Violation Day Readings (standard = 0.075)

AIRS Site ID	POC	Year	Date	Max Hour	Max Value	Number of Primary Violations	Max Ozone Reading
32-003-0022	1	2012	20120504	10	0.076	1	--
32-003-0022	1	2012	20120515	11	0.080	7	--
32-003-0022	1	2012	20120516	10	0.081	5	--
32-003-0022	1	2012	20120529	11	0.076	1	--
32-003-0022	1	2012	20120630	9	0.076	1	--
32-003-0043	1	2012	20120515	11	0.077	3	--
32-003-0043	1	2012	20120523	7	0.078	3	--
32-003-0043	1	2012	20120529	10	0.079	4	--
32-003-0043	1	2012	20120530	11	0.082	5	--
32-003-0043	1	2012	20120602	12	0.077	5	--
32-003-0071	1	2012	20120523	6	0.078	3	--
32-003-0071	1	2012	20120529	10	0.078	4	--
32-003-0071	1	2012	20120530	10	0.079	4	--
32-003-0071	1	2012	20120710	10	0.078	3	--
32-003-0073	1	2012	20120515	10	0.078	6	--
32-003-0073	1	2012	20120524	17	0.076	4	--
32-003-0073	1	2012	20120529	10	0.079	5	--
32-003-0073	1	2012	20120530	11	0.081	5	--
32-003-0073	1	2012	20120602	14	0.079	5	--
32-003-0073	1	2012	20120711	9	0.076	2	--
32-003-0538	2	2012	20120523	7	0.080	5	--
32-003-0538	2	2012	20120529	11	0.076	1	--
32-003-0538	2	2012	20120530	11	0.078	2	--
32-003-0601	1	2012	20120515	14	0.077	4	--
32-003-0601	1	2012	20120516	9	0.076	2	--
32-003-0601	1	2012	20120523	6	0.078	5	--
32-003-0601	1	2012	20120529	12	0.078	6	--
32-003-0601	1	2012	20120530	12	0.076	3	--
32-003-0601	1	2012	20120602	11	0.077	3	--
32-003-0601	1	2012	20120605	10	0.076	2	--
32-003-1019	1	2012	20120510	13	0.076	2	--
32-003-1019	1	2012	20120515	11	0.077	4	--
32-003-1019	1	2012	20120524	16	0.076	3	--
32-003-1019	1	2012	20120529	10	0.082	6	--
32-003-1019	1	2012	20120530	11	0.080	4	--
32-003-1019	1	2012	20120602	12	0.083	11	--
32-003-2002	1	2012	20120523	7	0.077	3	--
32-003-2002	1	2012	20120529	10	0.079	4	--
32-003-2002	1	2012	20120530	10	0.079	3	--
32-003-2002	1	2012	20120602	13	0.076	1	--
32-003-0075	1	2012	20120515	10	0.076	2	--
32-003-0075	1	2012	20120529	10	0.079	4	--
32-003-0075	1	2012	20120530	11	0.080	3	--
32-003-0075	1	2012	20120710	11	0.078	3	--

32-003-0075	1	2012	20120711	10	0.076	2	--
32-003-0075	1	2012	20120802	10	0.076	1	--
32-003-0075	1	2012	20120809	9	0.077	3	--
32-003-0075	1	2012	20120810	9	0.078	3	--
32-003-0075	1	2012	20120811	10	0.076	1	--
32-003-0075	1	2012	20120813	10	0.081	5	--
32-003-0075	1	2012	20120824	10	0.089	6	X
32-003-0540	1	2012	20120523	7	0.077	3	--
32-003-0540	1	2012	20120529	10	0.076	1	--
32-003-0540	1	2012	20120530	11	0.078	2	--

Table F-23. 2012 8-hour Ozone Violation Day SPM Readings (standard = 0.075)

AIRS Site ID	POC	Year	Date	Max Hour	Max Value	Number of Primary Violations	Max Ozone Reading
32-003-7771	4	2012	20120514	23	0.078	2	--
32-003-7771	4	2012	20120515	9	0.086	20	--
32-003-7771	4	2012	20120516	0	0.076	1	--
32-003-7771	4	2012	20120521	19	0.077	5	--
32-003-7771	4	2012	20120524	23	0.081	8	--
32-003-7771	4	2012	20120525	5	0.085	19	--
32-003-7771	4	2012	20120528	20	0.081	8	--
32-003-7771	4	2012	20120529	10	0.081	15	--
32-003-7771	4	2012	20120602	17	0.078	9	--
32-003-7771	4	2012	20120603	0	0.079	9	--
32-003-7771	4	2012	20120604	23	0.091	3	X
32-003-7771	4	2012	20120605	0	0.089	3	--
32-003-7771	4	2012	20120620	13	0.081	7	--
32-003-7771	4	2012	20120621	16	0.077	4	--
32-003-7778	4	2012	20120510	19	0.076	2	--
32-003-7778	4	2012	20120515	12	0.076	3	--
32-003-7778	4	2012	20120523	7	0.076	2	--
32-003-7778	4	2012	20120529	13	0.079	7	--
32-003-7778	4	2012	20120530	13	0.081	10	--
32-003-7778	4	2012	20120601	22	0.076	2	--
32-003-7778	4	2012	20120602	15	0.080	8	--

Table F-24. 2013 8-hour Ozone Violation Day Readings (standard = 0.075)

AIRS Site ID	POC	Year	Date	Max Hour	Max Value	Number of Primary Violations	Max Ozone Reading
32-003-0022	1	2013	20130621	10	0.078	4	--
32-003-0043	1	2013	20130504	14	0.080	7	--
32-003-0043	1	2013	20130525	10	0.076	5	--
32-003-0043	1	2013	20130703	11	0.087	6	X
32-003-0071	1	2013	20130504	14	0.080	6	--
32-003-0071	1	2013	20130703	11	0.087	6	X
32-003-0073	1	2013	20130504	14	0.082	7	--
32-003-0073	1	2013	20130525	12	0.076	3	--
32-003-0073	1	2013	20130703	10	0.083	4	--
32-003-0538	2	2013	20130504	16	0.076	1	--
32-003-1019	1	2013	20130504	13	0.084	12	--
32-003-1019	1	2013	20130521	14	0.078	4	--
32-003-1019	1	2013	20130525	11	0.076	3	--
32-003-2002	1	2013	20130621	10	0.076	1	--
32-003-0075	1	2013	20130504	14	0.077	4	--
32-003-0075	1	2013	20130525	9	0.076	4	--
32-003-0075	1	2013	20130621	10	0.077	4	--
32-003-0075	1	2013	20130703	11	0.081	4	--
32-003-0075	1	2013	20130720	10	0.076	1	--

Table F-25. 2013 8-hour Ozone Violation Day Readings at Paiute Tribe (standard = 0.075)

AIRS Site ID	POC	Year	Date	Max Hour	Max Value	Number of Primary Violations	Max Ozone Reading
32-003-8000	1	2013	20130430	17	0.091	14	--
32-003-8000	1	2013	20130504	13	0.085	11	--
32-003-8000	1	2013	20130621	8	0.082	6	--
32-003-8000	1	2013	20130703	11	0.080	4	--
32-003-8000	1	2013	20130713	10	0.077	3	--
32-003-8000	1	2013	20130718	11	0.092	8	X
32-003-8000	1	2013	20130719	9	0.076	2	--
32-003-8000	1	2013	20130725	10	0.081	6	--

Table F-26. 2014 8-hour Ozone Violation Day Readings (standard = 0.075)

AIRS Site ID	POC	Year	Date	Max Hour	Max Value	Number of Primary Violations	Max Ozone Reading
32-003-0022	1	2014	20140601	10	0.077	2	--
32-003-0022	1	2014	20140605	11	0.080	5	--
32-003-0022	1	2014	20140606	10	0.077	4	--
32-003-0022	1	2014	20140607	10	0.076	2	--
32-003-0043	1	2014	20140601	9	0.077	3	--
32-003-0043	1	2014	20140605	10	0.081	5	--
32-003-0043	1	2014	20140606	10	0.080	6	--
32-003-0043	1	2014	20140607	10	0.083	6	--
32-003-0071	1	2014	20140605	10	0.078	3	--
32-003-0071	1	2014	20140606	10	0.076	1	--
32-003-0071	1	2014	20140607	10	0.079	4	--
32-003-0073	1	2014	20140601	11	0.077	3	--
32-003-0073	1	2014	20140605	10	0.082	5	--
32-003-0073	1	2014	20140606	10	0.078	4	--
32-003-0073	1	2014	20140607	11	0.083	6	--
32-003-0073	1	2014	20140611	10	0.076	2	--
32-003-0601	1	2014	20140601	10	0.076	2	--
32-003-0601	1	2014	20140607	10	0.077	3	--
32-003-1019	1	2014	20140606	8	0.079	6	--
32-003-1019	1	2014	20140607	10	0.078	4	--
32-003-2002	1	2014	20140605	10	0.081	3	--
32-003-2002	1	2014	20140606	10	0.079	3	--
32-003-2002	1	2014	20140607	10	0.079	3	--
32-003-0075	1	2014	20140601	10	0.079	4	--
32-003-0075	1	2014	20140605	9	0.087	5	X
32-003-0075	1	2014	20140606	10	0.083	5	--
32-003-0075	1	2014	20140607	10	0.085	7	--
32-003-0075	1	2014	20140611	10	0.079	5	--
32-003-0540	1	2014	20140605	10	0.077	2	--
32-003-0540	1	2014	20140606	10	0.077	2	--

Table F-27. 2014 8-hour Ozone Violation Day SPM Readings (standard = 0.075)

AIRS Site ID	POC	Year	Date	Max Hour	Max Value	Number of Primary Violations	Max Ozone Reading
32-003-7772	1	2014	20140611	11	0.076	4	X

Table F-28. 2014 8-hour Ozone Violation Day Readings at Paiute Tribe (standard = 0.075)

AIRS Site ID	POC	Year	Date	Max Hour	Max Value	Number of Primary Violations	Max Ozone Reading
32-003-8000	1	2014	20140601	11	0.079	5	--
32-003-8000	1	2014	20140605	11	0.087	8	X
32-003-8000	1	2014	20140606	10	0.083	7	--
32-003-8000	1	2014	20140607	11	0.084	8	--
32-003-8000	1	2014	20140609	12	0.078	2	--
32-003-8000	1	2014	20140611	10	0.081	7	--

Table F-29. 2010 3-Year Average

Site	Year	1st High	2nd High	3rd High	4th High	Average 4th High
E. Craig Road	2008	0.080	0.077	0.074	0.071	0.070
	2009	0.076	0.073	0.073	0.072	
	2010	0.074	0.068	0.067	0.067	
Apex	2008	0.076	0.075	0.073	0.071	0.069
	2009	0.077	0.072	0.070	0.070	
	2010	0.074	0.073	0.069	0.068	
Mesquite	2008	0.071	0.071	0.070	0.069	0.064
	2009	0.068	0.066	0.063	0.062	
	2010	0.067	0.066	0.065	0.063	
Paul Meyer	2008	0.082	0.078	0.078	0.077	0.072
	2009	0.074	0.073	0.072	0.071	
	2010	0.073	0.071	0.070	0.070	
Walter Johnson	2008	0.083	0.078	0.076	0.076	0.074
	2009	0.081	0.078	0.077	0.074	
	2010	0.077	0.074	0.073	0.073	
Lone Mountain	2008	0.081	0.079	0.078	0.078	0.070
	2009	0.074	0.074	0.073	0.072	
	2010	0.070	0.069	0.066	0.061	
Palo Verde	2008	0.079	0.078	0.078	0.074	0.072
	2009	0.073	0.072	0.072	0.072	
	2010	0.074	0.071	0.071	0.071	
Joe Neal	2008	0.083	0.082	0.080	0.080	0.076
	2009	0.079	0.077	0.075	0.074	
	2010	0.082	0.075	0.074	0.074	
Winterwood	2008	0.075	0.073	0.072	0.071	0.069
	2009	0.075	0.074	0.071	0.070	
	2010	0.073	0.071	0.069	0.068	
Boulder City	2008	0.074	0.073	0.073	0.071	0.070
	2009	0.076	0.072	0.071	0.071	
	2010	0.074	0.072	0.070	0.069	
Jean	2008	0.078	0.075	0.074	0.074	0.073
	2009	0.079	0.076	0.074	0.072	
	2010	0.075	0.074	0.074	0.074	
J.D. Smith	2008	0.069	0.069	0.069	0.068	0.069
	2009	0.076	0.074	0.073	0.072	
	2010	0.076	0.069	0.069	0.068	

Table F-30. 2011 3-Year Average

Site	Year	1st High	2nd High	3rd High	4th High	Average 4th High
Apex	2009	0.077	0.072	0.070	0.070	0.069
	2010	0.074	0.073	0.069	0.068	
	2011	0.078	0.074	0.071	0.070	
Mesquite	2009	0.068	0.066	0.063	0.062	0.061
	2010	0.067	0.066	0.065	0.063	
	2011	0.067	0.061	0.059	0.059	
Paul Meyer	2009	0.074	0.073	0.072	0.071	0.073
	2010	0.073	0.071	0.070	0.070	
	2011	0.090	0.082	0.079	0.078	
Walter Johnson	2009	0.081	0.078	0.077	0.074	0.074
	2010	0.077	0.074	0.073	0.073	
	2011	0.089	0.079	0.079	0.077	
Palo Verde	2009	0.073	0.072	0.072	0.072	0.073
	2010	0.074	0.071	0.071	0.071	
	2011	0.088	0.081	0.080	0.077	
Joe Neal	2009	0.079	0.077	0.075	0.074	0.075
	2010	0.082	0.075	0.074	0.074	
	2011	0.079	0.079	0.077	0.077	
Winterwood	2009	0.075	0.074	0.071	0.070	0.070
	2010	0.073	0.071	0.069	0.068	
	2011	0.076	0.075	0.073	0.073	
Boulder City	2009	0.076	0.072	0.071	0.071	0.070
	2010	0.074	0.072	0.070	0.069	
	2011	0.081	0.071	0.070	0.070	
Jean	2009	0.079	0.076	0.074	0.072	0.073
	2010	0.075	0.074	0.074	0.074	
	2011	0.083	0.080	0.079	0.074	
J.D. Smith	2009	0.076	0.074	0.073	0.072	0.070
	2010	0.076	0.069	0.069	0.068	
	2011	0.073	0.072	0.072	0.072	

Table F-31. 2012 3-Year Average

Site	Year	1st High	2nd High	3rd High	4th High	Average 4th High
Apex	2010	0.074	0.073	0.069	0.068	0.071
	2011	0.078	0.074	0.071	0.070	
	2012	0.081	0.080	0.076	0.076	
Mesquite	2010	0.067	0.066	0.065	0.063	0.063
	2011	0.067	0.061	0.059	0.059	
	2012	0.072	0.071	0.071	0.069	
Paul Meyer	2010	0.073	0.071	0.070	0.070	0.075
	2011	0.090	0.082	0.079	0.078	
	2012	0.082	0.079	0.078	0.077	
Walter Johnson	2010	0.077	0.074	0.073	0.073	0.076
	2011	0.089	0.079	0.079	0.077	
	2012	0.079	0.078	0.078	0.078	
Palo Verde	2010	0.074	0.071	0.071	0.071	0.075
	2011	0.088	0.081	0.080	0.077	
	2012	0.081	0.079	0.079	0.078	

Joe Neal	2010	0.082	0.075	0.074	0.074	0.076
	2011	0.079	0.079	0.077	0.077	
	2012	0.089	0.081	0.080	0.079	
Winterwood	2010	0.073	0.071	0.069	0.068	0.071
	2011	0.076	0.075	0.073	0.073	
	2012	0.080	0.078	0.076	0.074	
Boulder City	2010	0.074	0.072	0.070	0.069	0.072
	2011	0.081	0.071	0.070	0.070	
	2012	0.078	0.078	0.077	0.077	
Jean	2010	0.075	0.074	0.074	0.074	0.075
	2011	0.083	0.080	0.079	0.074	
	2012	0.083	0.082	0.080	0.077	
J.D. Smith	2010	0.076	0.069	0.069	0.068	0.072
	2011	0.073	0.072	0.072	0.072	
	2012	0.079	0.079	0.077	0.076	

Table F-32. 2013 3-Year Average

Site	Year	1st High	2nd High	3rd High	4th High	Average 4th High
Apex	2011	0.078	0.074	0.071	0.070	0.073
	2012	0.081	0.080	0.076	0.076	
	2013	0.078	0.074	0.073	0.073	
Mesquite	2011	0.067	0.061	0.059	0.059	0.065
	2012	0.072	0.071	0.071	0.069	
	2013	0.068	0.068	0.067	0.067	
Paul Meyer	2011	0.090	0.082	0.079	0.078	0.076
	2012	0.082	0.079	0.078	0.077	
	2013	0.087	0.080	0.076	0.075	
Walter Johnson	2011	0.089	0.079	0.079	0.077	0.076
	2012	0.079	0.078	0.078	0.078	
	2013	0.087	0.080	0.075	0.074	
Palo Verde	2011	0.088	0.081	0.080	0.077	0.076
	2012	0.081	0.079	0.079	0.078	
	2013	0.083	0.082	0.076	0.074	
Joe Neal	2011	0.079	0.079	0.077	0.077	0.077
	2012	0.089	0.081	0.080	0.079	
	2013	0.081	0.077	0.077	0.076	
Winterwood	2011	0.076	0.075	0.073	0.073	0.072
	2012	0.080	0.078	0.076	0.074	
	2013	0.076	0.075	0.073	0.071	
Boulder City	2011	0.081	0.071	0.070	0.070	0.072
	2012	0.078	0.078	0.077	0.077	
	2013	0.074	0.072	0.072	0.071	
Jean	2011	0.083	0.080	0.079	0.074	0.075
	2012	0.083	0.082	0.080	0.077	
	2013	0.084	0.078	0.076	0.075	
J.D. Smith	2011	0.073	0.072	0.072	0.072	0.073
	2012	0.079	0.079	0.077	0.076	
	2013	0.076	0.074	0.074	0.072	
Jerome Mack	2011	0.075	0.075	0.074	0.073	0.071
	2012	0.078	0.077	0.076	0.073	
	2013	0.074	0.073	0.072	0.069	

Table F-33. 2014 3-Year Average

Site	Year	1st High	2nd High	3rd High	4th High	Average 4th High
Apex	2012	0.081	0.080	0.076	0.076	0.072
	2013	0.078	0.074	0.073	0.073	
	2014	0.074	0.072	0.070	0.069	
Mesquite	2012	0.072	0.071	0.071	0.069	0.067
	2013	0.068	0.068	0.067	0.067	
	2014	0.068	0.067	0.066	0.065	
Paul Meyer	2012	0.082	0.079	0.078	0.077	0.073
	2013	0.087	0.080	0.076	0.075	
	2014	0.069	0.067	0.067	0.067	
Walter Johnson	2012	0.079	0.078	0.078	0.078	0.073
	2013	0.087	0.080	0.075	0.074	
	2014	0.074	0.071	0.070	0.069	
Palo Verde	2012	0.081	0.079	0.079	0.078	0.074
	2013	0.083	0.082	0.076	0.074	
	2014	0.071	0.071	0.070	0.070	
Joe Neal	2012	0.089	0.081	0.080	0.079	0.075
	2013	0.081	0.077	0.077	0.076	
	2014	0.072	0.071	0.071	0.071	
Winterwood	2012	0.080	0.078	0.076	0.074	0.071
	2013	0.076	0.075	0.073	0.071	
	2014	0.073	0.073	0.072	0.068	
Boulder City	2012	0.078	0.078	0.077	0.077	0.072
	2013	0.074	0.072	0.072	0.071	
	2014	0.074	0.073	0.069	0.069	
Jean	2012	0.083	0.080	0.079	0.074	0.074
	2013	0.083	0.082	0.080	0.077	
	2014	0.075	0.074	0.072	0.071	
J.D. Smith	2012	0.079	0.079	0.077	0.076	0.072
	2013	0.076	0.074	0.074	0.072	
	2014	0.081	0.075	0.075	0.069	
Jerome Mack	2011	0.078	0.077	0.076	0.073	0.070
	2012	0.074	0.073	0.072	0.069	
	2013	0.075	0.073	0.072	0.069	

Table F-34. 3-Year 4th-High 8-Hour Average

Site	2010	2011	2012	2013	2014
Apex	0.069	0.069	0.071	0.073	0.072
Boulder City	0.070	0.070	0.072	0.072	0.072
E. Craig Road	0.070	—	—	—	—
J.D. Smith	0.069	0.070	0.072	0.073	0.072
Jean	0.073	0.073	0.075	0.075	0.074
Joe Neal	0.076	0.075	0.076	0.077	0.075
Lone Mountain	0.070	—	—	—	—
Jerome Mack	—	—	—	0.071	0.070
Mesquite	0.064	0.061	0.063	0.065	0.067
Palo Verde	0.072	0.073	0.075	0.076	0.074
Paul Meyer	0.072	0.073	0.075	0.076	0.073
Walter Johnson	0.074	0.074	0.076	0.076	0.073
Winterwood	0.069	0.070	0.071	0.072	0.071

Table F-35. Data Completeness for Indian Springs, Joe Neal, and Paiute Tribe

Year	Site	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	IS	-	-	-	-	97	98	99	95	-	-	-	-
	JO	99	99	99	98	99	99	99	99	98	99	95	99
	PU	-	-	-	-	-	-	-	-	-	-	-	-
2011	IS	-	-	-	-	-	-	-	-	-	-	-	-
	JO	90	99	99	97	95	99	99	99	99	99	88	99
	PU	-	-	-	-	-	-	-	-	-	-	-	-
2012	IS	-	-	-	-	-	-	-	-	-	-	-	-
	JO	99	99	99	99	99	99	94	99	99	99	99	99
	PU	-	-	-	-	-	-	-	-	-	-	-	-
2013	IS	-	-	-	-	-	-	-	-	-	-	-	-
	JO	99	99	99	98	99	99	98	99	99	99	99	99
	PU	94	95	95	95	47	43	95	79	90	90	13	95
2014	IS	-	-	-	99	99	99	99	99	99	94	-	-
	JO	99	99	99	88	94	99	99	99	98	99	99	98
	PU	91	43	79	94	93	92	100	99	99	99	99	99

Note: Indian Springs {IS} (32-003-7772); Joe Neal {JO} (32-003-0075); LV Paiute {PU} (32-003-8000).

Table F-36. 1-Hour Ozone Data for Indian Springs, Joe Neal, and Paiute Tribe

Year	Site	Valid Days	1st Max 1-Hr	2nd Max 1-Hr	3rd Max 1-Hr	4th Max 1-Hr
2010	IS	127	0.085	0.083	0.082	0.081
	JO	362	0.09	0.089	0.088	0.085
	PU	-	-	-	-	-
2011	IS	-	-	-	-	-
	JO	356	0.092	0.091	0.09	0.089
	PU	-	-	-	-	-
2012	IS	-	-	-	-	-
	JO	362	0.105	0.095	0.087	0.086
	PU	-	-	-	-	-
2013	IS	-	-	-	-	-
	JO	365	0.081	0.077	0.077	0.076
	PU	292	0.092	0.091	0.085	0.082
2014	IS	195	0.082	0.082	0.08	0.078
	JO	357	0.091	0.09	0.088	0.087
	PU	338	0.098	0.09	0.089	0.088

Note: Indian Springs {IS} (32-003-7772); Joe Neal {JO} (32-003-0075); LV Paiute {PU} (32-003-8000)

Table F-37. 8-Hour Ozone Data for Indian Springs, Joe Neal, and Paiute Tribe

Year	Site	Valid Days	1st Max 8-Hr	2nd Max 8-Hr	3rd Max 8-Hr	4th Max 8-Hr
2010	IS	127	0.075	0.073	0.071	0.068
	JO	360	0.082	0.075	0.074	0.074
	PU	-	-	-	-	-
2011	IS	-	-	-	-	-
	JO	353	0.079	0.079	0.077	0.077
	PU	-	-	-	-	-
2012	IS	-	-	-	-	-
	JO	362	0.089	0.081	0.08	0.079
	PU	-	-	-	-	-
2013	IS	-	-	-	-	-
	JO	365	0.081	0.077	0.077	0.076
	PU	292	0.092	0.091	0.085	0.082
2014	IS	195	0.074	0.072	0.07	0.069
	JO	356	0.072	0.071	0.071	0.071
	PU	338	0.087	0.084	0.083	0.081

Note: Indian Springs {IS} (32-003-7772); Joe Neal {JO} (32-003-0075); LV Paiute {PU} (32-003-8000)

Table F-38. 8-Hour Ozone Violation Day (Standard = 0.075 ppm)

Year	Site	Date	Concentration
2010	JO	2010/06/22	0.082
2011	JO	2011/06/14	0.076
	JO	2011/06/16	0.076
	JO	2011/06/18	0.076
	JO	2011/06/26	0.076
	JO	2011/07/01	0.079
	JO	2011/07/02	0.079
	JO	2011/07/21	0.077
	JO	2011/07/28	0.077
2012	JO	2012/05/15	0.076
	JO	2012/05/29	0.079
	JO	2012/05/30	0.080
	JO	2012/07/10	0.078
	JO	2012/07/11	0.076
	JO	2012/08/02	0.076
	JO	2012/08/09	0.077
	JO	2012/08/10	0.078
	JO	2012/08/11	0.076
	JO	2012/08/13	0.081
	JO	2012/08/24	0.089
2013	JO	2013/05/04	0.077
	JO	2013/05/25	0.076
	JO	2013/06/21	0.077
	JO	2013/07/03	0.081
	JO	2013/07/20	0.076
	PU	2013/04/30	0.091
	PU	2013/05/04	0.085
	PU	2013/06/21	0.082
	PU	2013/07/03	0.080

	PU	2013/07/13	0.077
	PU	2013/07/18	0.092
	PU	2013/07/19	0.076
	PU	2013/07/25	0.081
2014	JO	2014/06/01	0.079
	JO	2014/06/05	0.087
	JO	2014/06/06	0.083
	JO	2014/06/07	0.085
	JO	2014/06/11	0.079
	IS	2014/06/11	0.076
	PU	2014/06/01	0.079
	PU	2014/06/05	0.087
	PU	2014/06/06	0.083
	PU	2014/06/07	0.084
	PU	2014/06/09	0.078
	PU	2014/06/11	0.081

Table F-39. 8-Hour Ozone Design Values

AIRS Code	Site	Site Code	3-Year Rolling Average
320037772	Indian Springs	IS	0.069
320038000	LV Paiute	PU	0.081
320030075	Joe Neal	JO	0.075

Note: Indian Springs {IS} (32-003-7772); Joe Neal {JO} (32-003-0075); LV Paiute {PU} (32-003-8000).