NORTHERN SIERRA AIR QUALITY MANAGEMENT DISTRICT **Gretchen Bennitt, Executive Director**

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Gwen Yashimura June 18, 2014

Air Quality Analysis Office
U.S. Environmental Protection Agency, Region 9
Air Quality Analysis Office (AIR-7)
75 Hawthorne Street
San Francisco, CA 94105

Ms. Yashimura,

Following a phone conference with you and other EPA staff and California Air Resources Board (CARB) staff on June 6, 2014, I was informed that Region 9 will be submitting recommendations on PM 2.5 designations to Headquarters in regards to their scheduled August 14, 2014 proposed designation letter for the annual PM2.5 NAAQS.

Specifically, the Northern Sierra Air Quality Management District (District) is extremely concerned about what EPA will designate as the nonattainment boundaries for the violation of the annual PM 2.5 standard recorded in Portola, which is located in Plumas County, California. It was not determined that Portola exceeded the annual standard until Spring 2014, primarily due to exceedances recorded in late 2013. This has left the District and CARB with very little time to provide valuable information to the EPA which will assist in determining an appropriate PM2.5 nonattainment boundary. Because of this, I hope that Region 9 will take all necessary action to assure the information forthcoming from CARB and the District in the form of this letter reach headquarters in time for their review and consideration as they develop the nonattainment boundaries for Portola.

The District, in consultation with CARB, believes that the appropriate PM2.5 NAAQS nonattainment boundary is consistent with the previously established PM2.5 CAAQS (California Ambient Air Quality Standards) nonattainment boundary. Please refer to Attachment 1: The Portola Valley State PM2.5 Nonattainment Area.

Discussion
At a most basic level, the situation in Portola (population approximately 2,000) is that many residents use wood for residential heating, burn yard waste in open burn piles and the U.S. Forest Service performs prescribed burning in nearby federal lands. There is also a railroad switching yard located in downtown Portola. The city is isolated in a bowl formed by surrounding mountains where smoke can easily become trapped by wintertime inversion conditions. The District's opinion is that using the established State nonattainment boundary, as opposed to a larger area, would provide for maximum protection of public health

because resources could quickly be focused to solve a known problem that is limited in its scope.

Plumas County is large, covering 2,613 square miles (larger than the State of Delaware and Washington DC combined). The vast majority is zoned as Timber Resource Land. More than 75% of Plumas County is owned and managed by the federal government. The county has nearly 20,000 people (having lost more people than any other California county between 2000 and 2010, exhibiting a 3.9% population decline), and there are four main population centers, all rural in character and separated by mountainous terrain: Portola, Quincy/East Quincy, Greenville and Chester/Lake Almanor. The overall county density is 7.7 people per square mile.

Boundary Analysis
It is the District's understanding that the governing methodology for determining PM 2.5 boundaries consists of a case-by-case analysis that considers at least the following 5 factors:
Factor 1: Air Quality Data
Factor 2: Emissions and Emissions-Related Data
Factor 3: Meteorology
Factor 4: Geography/Topography
Factor 5: Jurisdictional Boundaries
Below is a quick assessment of these factors, indicating that the existing state nonattainment area is the appropriate federal nonattainment area.

Factor 1: Air Quality Data
There are 4 air monitors in Portola: An FRM sampler, a non-FEM BAM, a SASS (Speciation Air Sampling System) and a URG 3000n carbon sampler. Data from all of these indicate that residential wood burning is the primary driving force for PM2.5 concentrations. The wood that is available in the Portola area is mainly pine and fir, which has a lower heating value than hardwoods.

2011-2013 data indicate that carbonaceous aerosols (organic matter plus elemental carbon) comprise, on average, 87% of the total mass, with organic matter being 79%. In 2013 (the year with the highest concentrations of the three years), the organic matter portion was 2% higher than the 3-year average.

During the winter months, the carbonaceous total was 4 to 5 times higher than during the summer months. If it weren't for elevated wintertime concentrations, the area would be well below the NAAQS for PM2.5. The 24-hour standard was not exceeded during 2013 until November 12. Unusually strong inversion conditions persisted through November and December, resulting in 7 days over the 24-hour standard. Before that, there had been more than 11 months without a 24-hour violation.

Diurnal patterns clearly indicate that the concentrations increase at night,

beginning between 4 and 5 PM (when people are lighting their wood stoves and fireplaces) and peaking around midnight (after people have stoked their stoves and reduced the air flow for the night). There is another, smaller peak starting around 5 AM and lasting until 8 AM or so (when people are firing up their stoves in the morning). This trend is most observable in the winter months, but is also followed in the spring and fall. During the summer, it mostly, but not entirely, disappears. Portola has some chilly nights during the summer.

Similar seasonal and diurnal patterns are present in Quincy to some degree, but Quincy does not exhibit a well-defined morning peak and does not see nearly as much increase in the late evening hours.

In summary, as stated informally but concisely by CARB staff, "Any similarity of measured concentrations [at Portola and Quincy] is due to sampling of comparable local environments rather than a uniformly regional air mass."

Factor 2: Emissions and Emissions-Related Data

The only stationary sources in the Portola area with permits issued by the air district are 2 gas stations, 5 emergency standby generators and a crematory. The population is too small for traffic emissions to be significant, as evidenced by the fact that only a few years ago Portola's first traffic light was installed (one of two in the whole county), and that was because of safety issues where the 2-lane highway (Hwy. 70) passes through town rather than traffic congestion.

The population of Portola plunged 8.8% between 2000 and 2012. Portola is not part of any CBSA (being far too small to be considered a micropolitan area). It is the only incorporated city in Plumas County, which has a population of 20,000 (having declined 3.9% between 2000 and 2010) and a density of 7.7 folks per square mile. Plumas County has two traffic lights – one in Portola and one in Quincy, 32 miles away.

Public transportation in Plumas County is limited to 2 trips/week to Reno and 1 trip/week to Chico, with 3 routes per day between Chester, Quincy and Portola. There is no passenger train service in the county.

Natural gas is not available anywhere near Portola, so that is not an option for residential heating, although it is available and widely used in Quincy. The cost of running natural gas lines up over the mountains from Quincy, or through the desert from Nevada, to serve the small population of Portola may not make that an economically feasible option.

In addition to wood burning appliances, local residential open burning and nearby prescribed forest management burning are also important contributors to the City's PM2.5 burden; as soon as open burning prohibitions are lifted in the fall, 24-hour PM2.5 concentrations rise. Nonetheless, both anecdotal evidence and a large body of existing data indicate that wood burning appliances dominate Portola's

PM2.5 emission profile. The most obvious data underlining the importance of wood burning appliances in the emission inventory is the diurnal PM2.5 concentration trend. On the burn day recorders (which people must call each day before burning), the air district always recommends burning between 9AM and 3PM, and most people adhere to these hours. Even large land management projects involving burning occur mainly during the day. There have been instances of US Forest Service projects causing increases in PM2.5 concentrations that persisted overnight, but these have been rare and have been immediately addressed by the air district and the USFS.

Portola has already made some progress toward reducing particulate matter pollution. The City has a change-of-ownership requirement that when a home is sold, all wood burning appliances must be EPA Phase II Certified, as well as all newly installed wood burning appliances. Also, there is a railway switching yard in Portola where locomotives formerly idled for long periods, but the City negotiated with the railway to make sure trains do not idle there as they did before.

Emissions in Quincy are also mainly from wood burning appliances (as supported by diurnal PM2.5 concentration patterns), although Sierra Pacific Industries maintains a biomass-fired cogeneration facility in Quincy that emitted an 2010-2012 average of 44 tons per year of total particulate matter.

In short, emissions in all four of Plumas County's population centers are too small to affect any of the others, given the topography and meteorology (discussed below), and they are distinctly separated from each other by forested mountains.

Factor 3: Meteorology

Prevailing winds in the Portola Valley are from the southwest during the day, and there are many days that are quite windy. At night, the air is often very still, although there is sometimes a gentle breeze from the east following the Middle Fork of the Feather River downstream through a convoluted canyon system. The air district does not have meteorological data for Portola (basic meteorological equipment is on the district's wish list).

Prevailing winds in Quincy are from the west, as indicated by meteorological data (see attached wind roses). Much of the time, there is no measurable wind in Quincy.

Factor 4: Geography/Topography

The Portola area is an intermontaine basin isolated by rugged mountains, transitioning from conifer-dominated forest to the north, west and south to grassland/high desert to the east. The mountain chains that dominate the topography of Plumas County affect the climate of Portola drastically. First, it receives much less precipitation than areas farther west (see map Plumas County Average Annual Precipitation). Portola averages 20 inches of precipitation annually, versus 40 inches in Quincy. Second, it is at a generally higher elevation

than the other populated portions of the county (4,890' versus Quincy at 3,420' or Greenville at 3,580'). Third, Portola is much colder than other populated areas of the county. The average daily low temperature for the 6-month period of October through March is 21.8 degrees Fahrenheit, and Portola sees frost an average of 218 days per year. In contrast, Quincy's average daily low for the same period is 27.4 and it has frost 179 days per year. Fourth, the simple fact that Portola is closely hemmed in by mountains impairs pollution dispersion, especially when there is a low temperature inversion, as is often the case in the winter. In contrast, Quincy is located in a much larger airshed, where pollutants have room to disperse laterally under inversion conditions.

The reason the NSAQMD operates monitors in 3 locations of Plumas County is that those locations are distinctly isolated from each other by mountainous terrain. If a common airshed existed, it could be assumed that conditions are relatively similar over larger distances, and the expense of operating separate monitors would not be justifiable. This is not the case. The monitors in Chester are representative of conditions in the Lake Almanor Basin; the monitors in Quincy are indicative of conditions in the American and Thompson Valleys, as well as the downwind Greenville/Indian Valley area; and the monitors in Portola are indicative of conditions in the Portola Valley (which would be better visualized as a bowl). In creating the Portola Valley Nonattainment Area, CARB recognized this fact. Vast tracts of sparsely inhabited mountainous forest, mostly federal government land, separate these three main airsheds.

There is a distinct ridge, with numerous peaks in the 6,000- to 7,000-foot elevation range separating Portola from Quincy, 32 miles to the west-northwest. The Feather River provides an air corridor from Portola to the west (an easterly flow) on relatively still evenings, and then dives deep into a canyon as it drops southwest toward Lake Oroville between Portola and Quincy. Thus, it is not surprising that CARB's analyses clearly indicate that air quality conditions in Quincy are entirely independent from conditions in Portola. There is no correlation; neither area contributes to PM2.5 concentrations in the other area.

Factor 5: Jurisdictional Boundaries

Portola is the only incorporated city in Plumas County. The surrounding communities identify with Portola and rely on Portola businesses for most of their goods and services. There is very little daily connection between Portola and the rest of Plumas County.

It would be relatively easy to implement and publicize emission reduction programs for the Portola area. The residential area is clearly delineated by uninhabited federal land on the north, south and west, and by the intersection of Hwy. 70 and Grizzly Road (well-known locally) to the east. Where the western extent of the area crosses Hwy. 70, there is a summer camp and an intersection of two rivers. Additionally, the southern boundary is the county line.

In a region where human settlement patterns are defined exclusively by mountains and waterways, watershed boundaries are the most sensible boundaries to rely on for matters regarding air resources. Air travels where it is directed by land. Artificially drawn polygons representing governmental boundaries of jurisdiction are secondary in relevance, as air flow does not conform to such boundaries.

Conclusion

In summary, there is no connection between the existing Portola nonattainment area and the other populated areas of Plumas County in terms of emissions or air pollution transport. The boundary of California's established Portola Valley PM2.5 Nonattainment Area is the most appropriate and health-protective boundary to use for a federal nonattainment designation in this unusual situation.

Solution

There is room to undertake certain emission reduction programs in the Portola Area. A biomass gasification plant has been proposed on the outskirts of Portola, which could provide an option to the disposal of residential yard waste through open burning. Increased street sweeping with an expensive, high-efficiency street sweeper might also improve the situation a little bit. However, it is wood stoves and fireplaces that dominate the area's PM2.5 emission inventory.

All relevant data, taken in aggregate, indicate that the solution to Portola's PM2.5 problem is to reduce smoke from residential wood burning appliances. However, Portola is economically disadvantaged and many of its residents cannot afford to pay even partial costs of changing out woodstoves. Portola's unemployment rate is well above the national and state averages, having reached 22.3% in 2010. The 2011 median home value was only 41% of the state average, and the median household income was approximately half (54%) of the state average. As a casual observer will easily notice, many of the homes in and around Portola are visibly in need of repair.

Although the District maintains a woodstove change-out program (consisting of either a $1,000 or $1,500 rebate to change out an old stove to an EPA-certified stove), there have been no residents willing to partake in the program in over 10 years. The District feels that what is needed is funding adequate to cover 100% of the cost of cleaner woodstoves. There are approximately 1,000 homes in Portola that very likely contain at least one woodstove per household. In order to replace all woodstoves in the Portola area, and bring the area to attainment, approximately $3,000,000 would be required. The Northern Sierra Air Quality Management District would greatly appreciate any funding that EPA may have available to be utilized in the Portola area.

Sincerely,

Gretchen Bennitt,
Executive Director

Attachments

Cc:
Lynn Terry, Deputy Executive Officer, California Air Resources Board
Sylvia Vanderspeck, Chief, Air Quality Planning, California Air Resources Board
Deborah Jordan, Director, Air Division, EPA, Region 9
Kerry Drake, Associate Director, Air Division, EPA, Region 9

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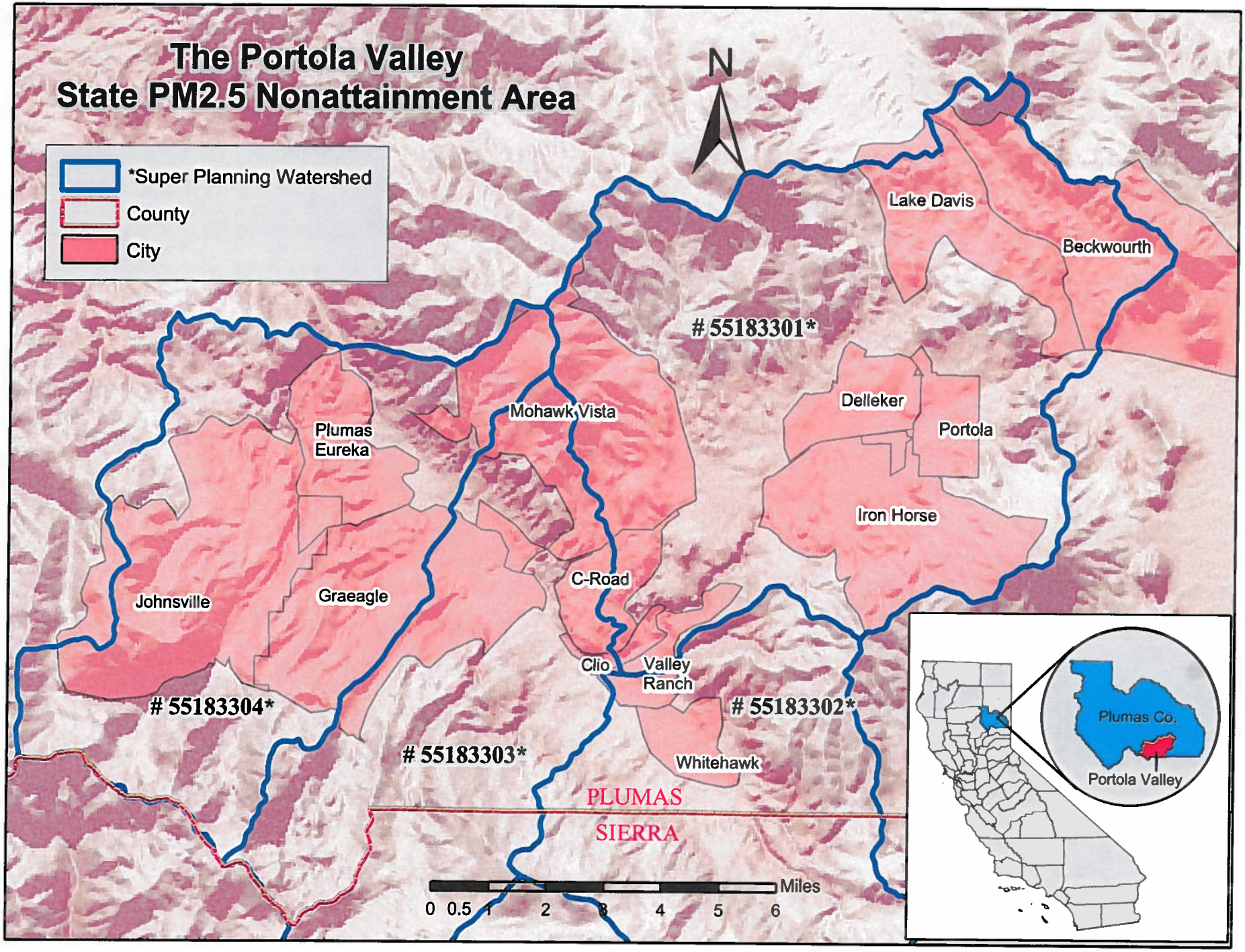
Nevada County Supervisor Richard Anderson

ATTACHMENT 1

The Portola Valley State PM2.5 Nonattainment Area


The Portola Valley
State PM2.5 Nonattainment Area
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*Super Planning Watershed
County
City
Lake Davis
Beckwourth
55183301*
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Mohawk Vista
Plumas
Eureka
Iron Horse
C-Road
Johnsville
Graeagle
Clio
Valley
Ranch
55183304*
55183302*
55183303*
Whitehawk
PLUMAS
SIERRA
Miles
0 0.5 1 2 3 4 5 6
Plumas Co.
Portola Valley

ATTACHMENT 2

Excerpt from CARB's Staff Report for Proposed Amendments to the Area Designation Criteria and Area Designations for State Ambient Air Quality Standards

Proposed Amendments to the Area Designation Criteria and Area Designations for State Ambient Air Quality Standards

and

Maps of Area Designations for State and National Ambient Air Quality Standards

STAFF REPORT:
Initial Statement of Reasons for Proposed Rulemaking

Release Date: December 5, 2003

California Environmental Protection Agency
Air Resources Board
Planning and Technical Support Division
P. O. Box 2815
Sacramento, California 95812

This document has been reviewed and approved by the staff of the California Environmental Protection Agency, Air Resources Board. Approval does not signify that the contents necessarily reflect the views and policies of the California Air Resources Board.

If you have special language needs, please contact Marcella Nystrom, document coordinator, at (916) 323-8543 or *mnystrom@arb.ca.gov.*

Unclassified Areas: Remainder of the San Bernardino County Portion of the MDAB and the Kern, Los Angeles, and Riverside County Portions of the MDAB

Limited PM2.5 data for the last three years are available for one monitor at each of the two sites in the Kern County portion of the MDAB and one monitor at each of the two sites in the Los Angeles County portion of the MDAB. These PM2.5 data do not meet the representativeness or completeness criteria to support an attainment designation. Also, no monitoring data are available for the remainder of San Bernardino County within the MDAB or the Riverside County portion of MDAB. Hence, ARB staff proposes that the remainder of San Bernardino County within MDAB and the portions of Kern, Los Angeles, and Riverside counties within MDAB be designated as unclassified for the State PM2.5 standard.

Mountain Counties Air Basin

In designating areas for PM2.5 in the Mountain Counties Air Basin (MCAB), we propose retaining the same boundaries as the existing PM10 areas, where counties constitute smaller designation areas. However, there are some isolated valleys with distinct microclimates, with meteorology and air quality that are not representative of an entire county. ARB staff therefore proposes that sub-areas within the MCAB be designated as indicated below. In addition, pursuant to area designation criteria in CCR, title 17, section 70302, ARB staff proposes that contiguous areas that would have the same designation within an air basin be one designated area.

Nonattainment Area: Portola Valley (Plumas County)

PM2.5 data were obtained from two monitors located at Portola and Quincy in Plumas County. Data available from these monitors do not meet the representativeness or completeness criteria. The Portola monitor however, was missing only a few data points. Therefore, by substituting the missing PM2.5 concentrations in 2001 with a concentration of 0 $\mu g/m^3$, we calculated an annual PM2.5 concentration of 13 $\mu g/m^3$ for the Portola monitor. Hence, Portola would be nonattainment. Available PM2.5 data from the Quincy monitor show that PM2.5 concentrations in Quincy are consistently lower than the concentrations in Portola, especially during winter, which is the season of peak PM2.5 concentrations in Plumas County. Hence, the Quincy monitor is not expected to exceed the State PM2.5 standard.

The Northern Sierra Air Quality Management District (NSAQMD) requested that the nonattainment area in Plumas County be limited to the city of Portola. Portola and Quincy are each located in small and isolated valleys at approximately 5,000 feet elevation that appear to be representative of microenvironments. During the winter season, wood burning in woodstoves and fireplaces contributes significantly to the high PM2.5 concentrations measured at Portola.

ARB staff evaluated the topography, meteorology, and population distribution in the area surrounding Portola. Portola is situated in an area comprised of the Humbug and Mohawk Valleys that are geographically isolated from the remainder of Plumas County. However, there are a number of other communities within this area in addition to Portola, and the population within this region is growing. We refer to this entire area as the Portola Valley. Because of the additional population areas outside of Portola, the expected wood smoke contributions in these additional communities, and the growth potential of the area, we propose that the Portola Valley area in Plumas County be designated as nonattainment for the State PM2.5 standard.

In order to define the area encompassed by the Portola Valley, we further propose using hydrographic boundaries based on watersheds. A watershed boundary defines a ridge of high land that separates areas drained by different river systems. Specifically, the Portola Valley would be defined as that portion of Plumas County within the following Super Planning Watersheds (SPWS): Humbug Valley (# 55183301), Sulpher Creek (#55183302), Frazier Creek (#55183303), and Eureka Lake (#55183304). These are the SPWS as created by the California Interagency Watershed Mapping Committee and described in CalWater version 2.2, October 1999. Information about CalWater version 2.2 can be found on the web at the following address: *http://www.ca.nrcs.usda.gov/features/calwater/index.html.* Since Portola Valley is a non-county area, the ARB staff proposes to include a reference to the area boundary description in the area designation regulations as CCR, title 17, section 60200(c).

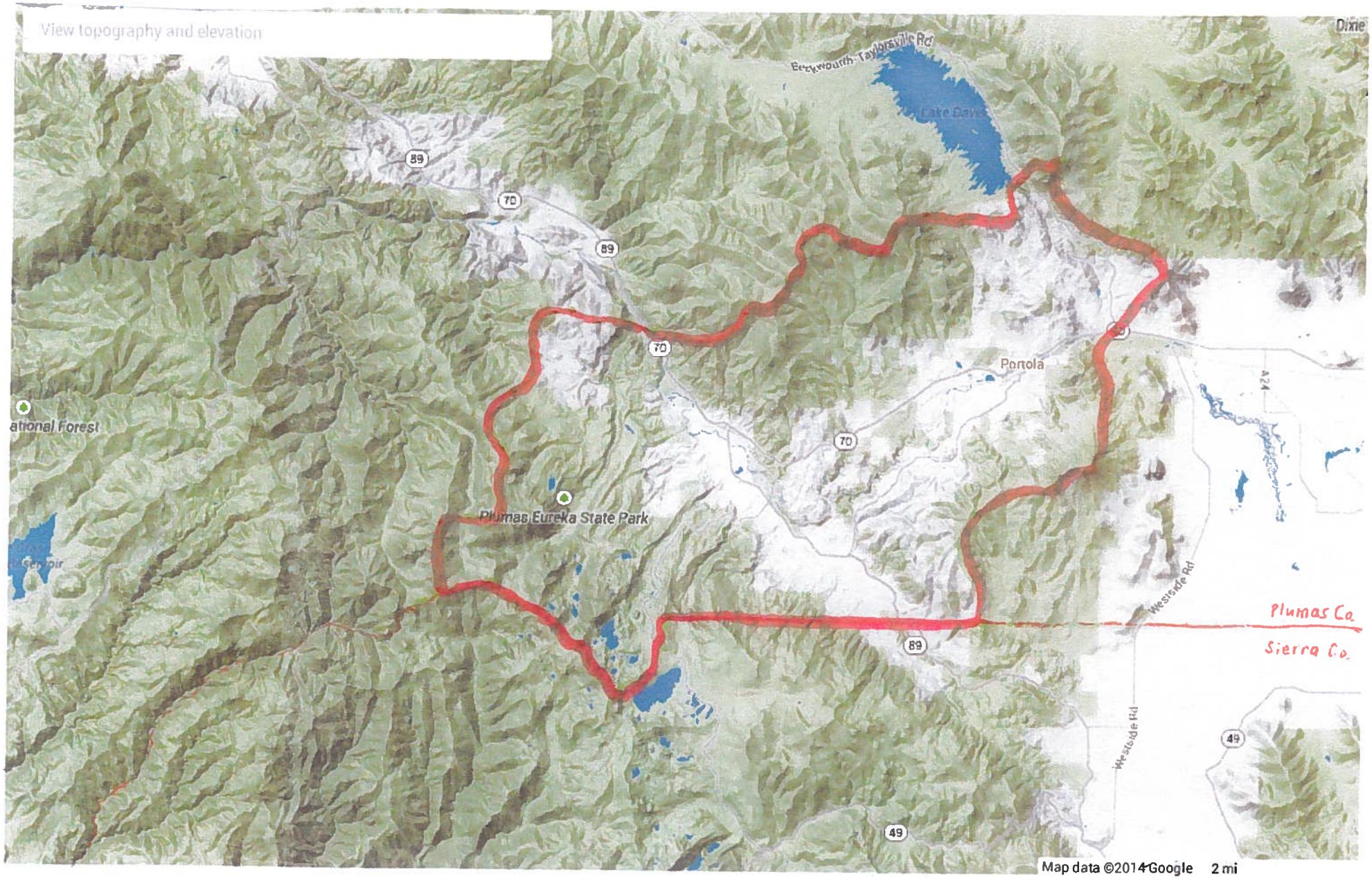
Unclassified Areas: Amador, Calaveras, Mariposa, Nevada, Sierra, and Tuolumne Counties, the El Dorado and Placer County portions of MCAB, and the Remainder of Plumas County

PM2.5 concentrations were measured at one monitor each in Calaveras, Mariposa, and the remainder of Plumas counties. In addition, there were three PM2.5 monitors at two sites in Nevada County. No PM2.5 monitors were operating in the MCAB portions of El Dorado and Placer counties or in Amador, Sierra, or Tuolumne counties. Data from the San Andreas-Gold Strike Road site in Calaveras County show annual average PM2.5 concentrations that do not exceed the State standard. However, as described in the 1999 area designation staff report (ARB 1999), the San Andreas monitoring site was originally established to measure maximum ozone concentrations, and PM data from this site do not represent the highest PM concentrations that might be expected to occur in Calaveras County. The available PM2.5 data from monitors located in the remaining counties do not meet the representativeness or completeness criteria. The ARB staff therefore proposes that Amador, Calaveras, Mariposa, Nevada, Sierra, and Tuolumne counties, the El Dorado and Placer county portions of MCAB, and the remainder of Plumas County, be designated as unclassified for the State PM2.5 standard.

ATTACHMENT 3

Enhanced Portola Valley State PM2.5 Nonattainment Area – depicting topography, elevation and roadways

ATTACHMENT 3



Enhanced Portola Valley State PM2.5 Nonattainment Area – depicting topography, elevation and roadways

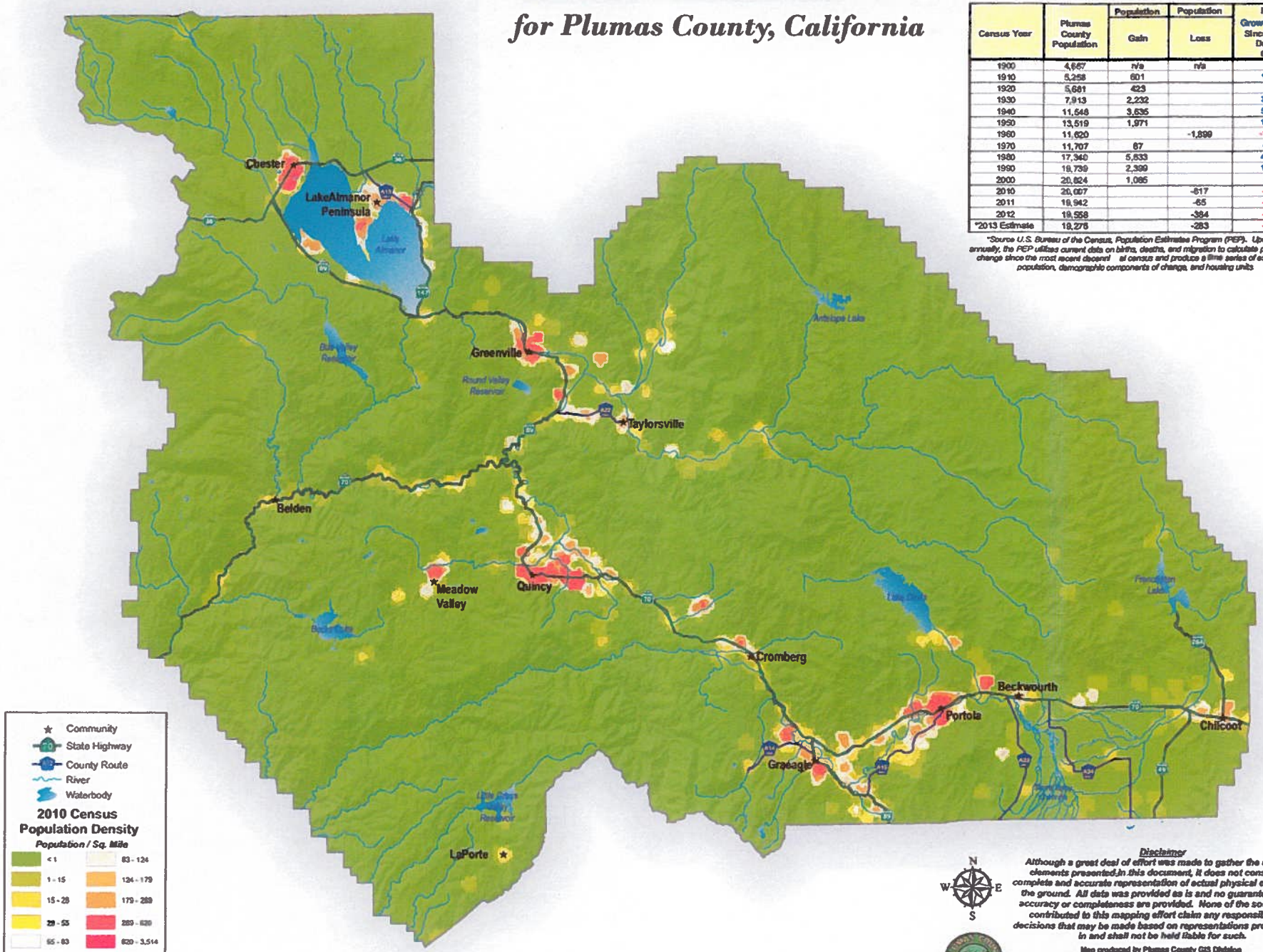
ATTACHMENT 4

2010 Population Density for Plumas County, California

ATTACHMENT 4

2010 POPULATION DENSITY

for Plumas County, California



HISTORIC POPULATION TRENDS (1900 TO 2013)
Population Growth / Decline per Decennial Census

Census Year	Plumas County Population	Population Gain	Population Loss	Percent Growth / Decline Since Previous Decennial Census
1900	4,667	n/a	n/a	n/a
1910	5,258	601		12.88%
1920	5,681	423		8.04%
1930	7,913	2,232		39.29%
1940	11,548	3,635		59.34%
1950	13,519	1,971		17.07%
1960	11,620		-1,899	-14.05%
1970	11,707	87		0.75%
1980	17,340	5,633		48.12%
1990	19,739	2,399		13.83%
2000	20,824	1,085		5.50%
2010	20,007		-817	-3.92%
2011	19,942		-65	-0.32%
2012	19,558		-384	-1.93%
*2013 Estimate	19,276		-283	-1.43%

*Source U.S. Bureau of the Census, Population Estimates Program (PEP). Updated annually, the PEP utilizes current data on births, deaths, and migration to calculate population change since the most recent decennial census and produce a time series of estimates of population, demographic components of change, and housing units.

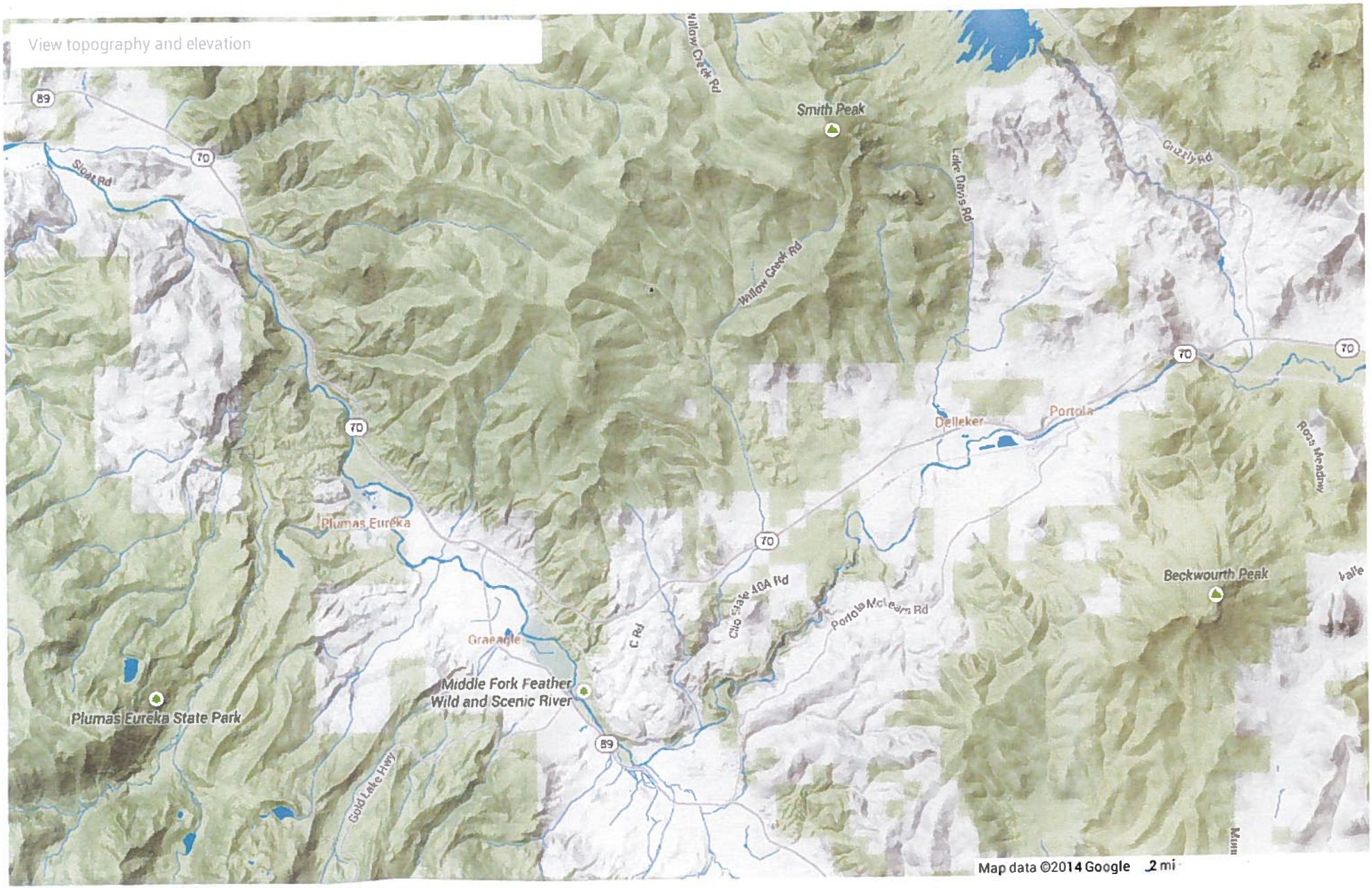
Disclaimer

Although a great deal of effort was made to gather the mapping elements presented in this document, it does not constitute a complete and accurate representation of actual physical elements on the ground. All data was provided as is and no guarantees to the accuracy or completeness are provided. None of the sources that contributed to this mapping effort claim any responsibility for decisions that may be made based on representations provided here in and shall not be held liable for such.

Map produced by Plumas County GIS Division
Mapper: Becky Osborn Date: 5/8/2013; Updated: 3/26/2014
Data Sources: US Census Bureau, CA DOF, Plumas County Framework Data
Source: 2010_Pop_Density_34x44.mxd
Projection: California State Plane, Zone 1, NAD 1983

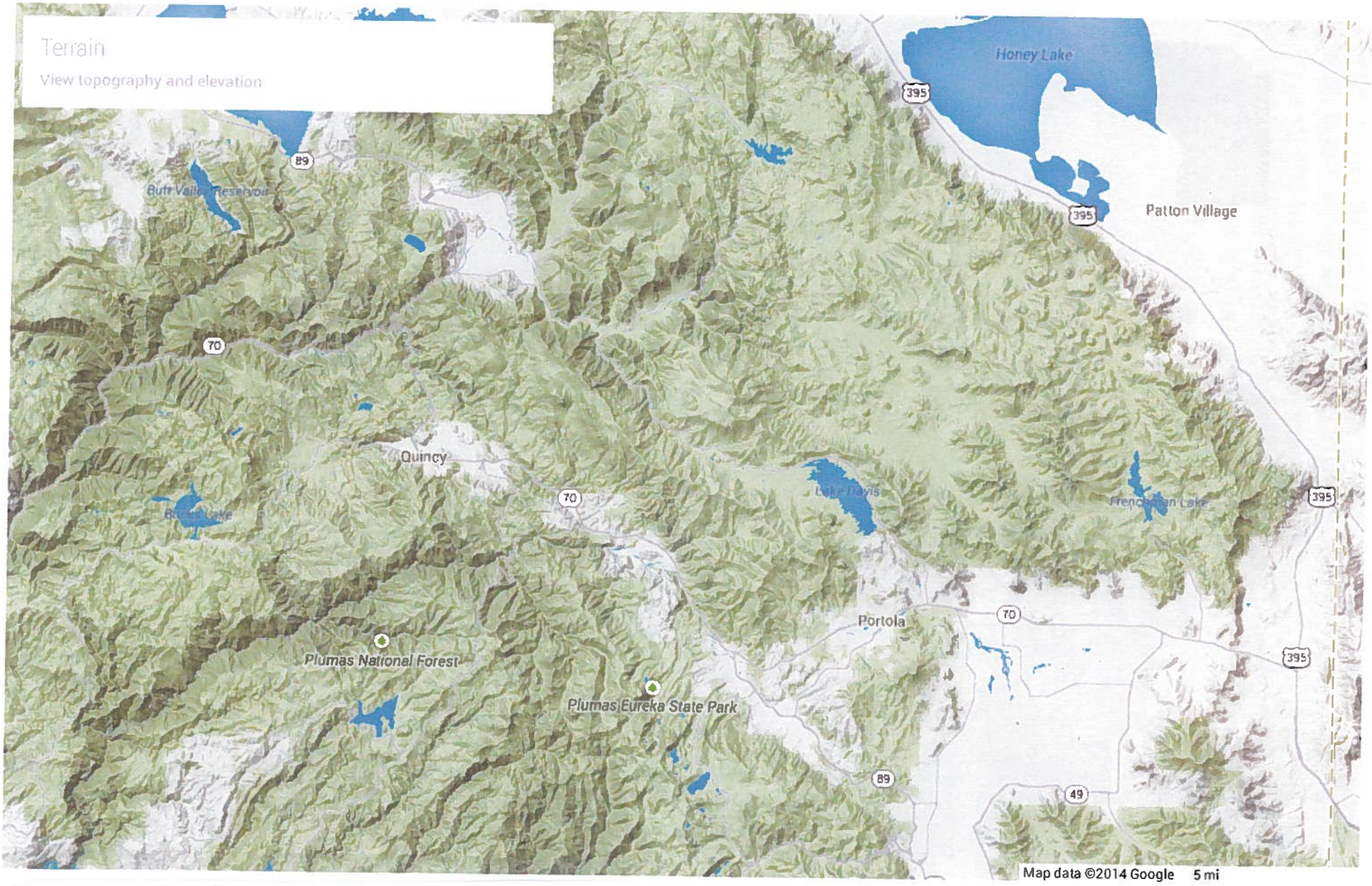
ATTACHMENT 5

Terrain View Depicting Portola Bowl
And
Topography of Plumas County, California



Terrain View Depicting Portola Bowl

ATTACHMENT 5



Topography of Plumas County, California

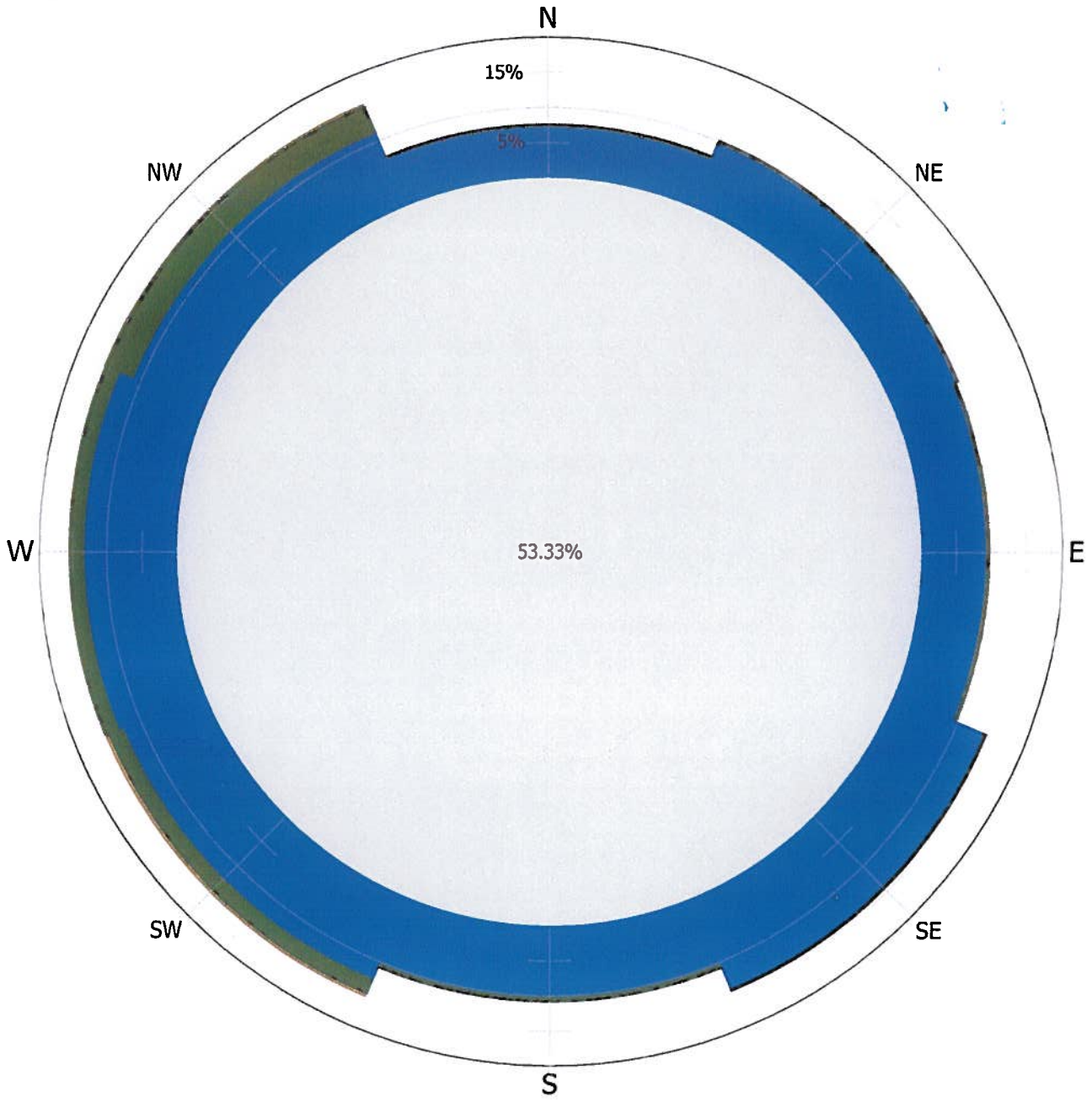
ATTACHMENT 5

ATTACHMENT 6

Wind Rose Meteorological Data for Quincy, California

ATTACHMENT 6

Wind Rose [[QUI_08] Quincy BAM]



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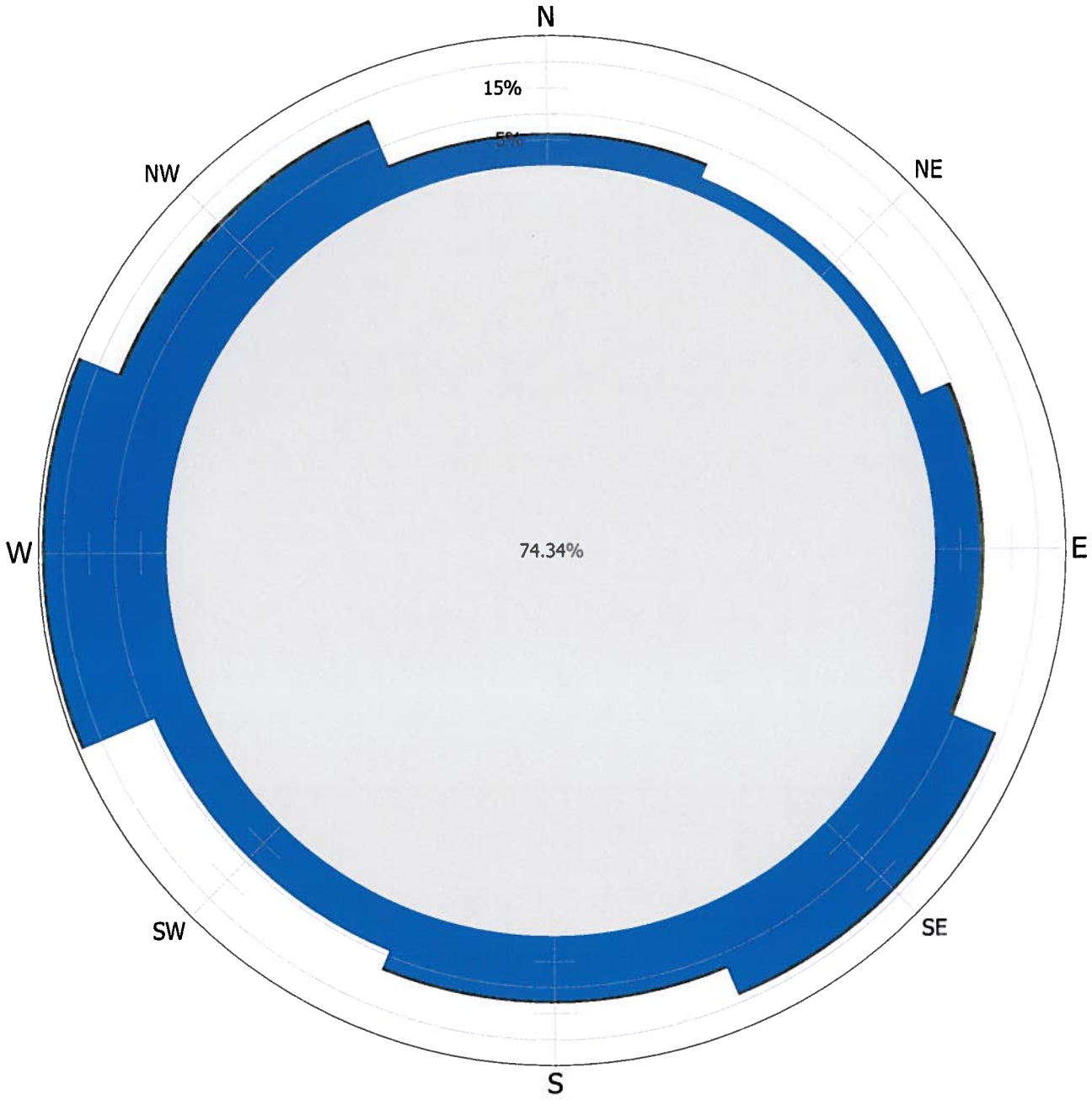

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