Report

Oregon DEQ 2015 Five Year Ambient Monitoring Network Plan

Submitted to: Environmental Protection Agency

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DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.

State of Oregon
Department of Environmental Quality

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Table of Contents

1 Executive Summary

The Oregon DEQ five year monitoring plan considers the population demographics, air pollution levels, monitoring network data, meteorological data, and current of past airshed monitoring efforts.

According to Portland State's Population Center estimate, Oregon's 2014 population is 3,963K which is 132K more than in 2010. This is a 3.4% growth in four years. The Oregon population is projected to grow to 4.3 million in 2020, which will be a 13% growth from 2010. Most of this growth will occur in the Portland Metro area, Salem, Eugene/Springfield, Deschutes County, and Medford. The sensitive population, population in poverty, and diversity populations will also grow mostly in these already populated areas.

The PM2.5 pollutant levels are highest in the Eastern Oregon communities of Lakeview, Klamath Falls, Prineville, and Burns. They are also most elevated in Western Oregon in Hillsboro, Medford, Oakridge, and Eugene. These areas all have PM2.5 federal reference monitors currently, and there is no plan to change this.

The ozone levels are similar in most areas monitored and are all below but near the current standard. The EPA is proposing a lower standard this year, and these monitors will all stay in place in the next five years.

The air toxics levels are above the Oregon ambient benchmark concentrations for VOCs, and PAHs in both rural and urban areas. This is likely due to combustion processes from vehicles, furnaces, industry, and wood stoves which occur in all parts of the state. Metals are highest in the Portland Metro area. The National Air Toxic Trend monitoring will continue in N. Portland and in La Grande in the next five years and beyond as long as EPA continues funding these sites. The DEQ community assessment monitoring site will continue to move to new locations around the state in the next five years. It is currently being sited in Gresham. When the NATA results are released by EPA later in 2015, DEQ can determine which areas of the state need to be assessed in the next five years. The Oregon Legislature also funded an air toxics monitoring site for neighborhoods that may be impacted by nearby sources. This is currently in Swan Island but may be relocated in the next five years to assess other neighborhoods around the state that could be impacted by point sources. Future locations will be determined when the NATA results are released.

Finally, DEQ hopes to restart our PM2.5 monitoring surveys to determine if our current monitors adequately represent the communities they are in. The Portland Metro area has grown tremendously since our last survey and we are not certain if our current sites are representative of the whole area. We also hope to restart our PM2.5 assessment program which will allow us to monitor in areas of the state we have no measurements in. Redmond has grown into a sizable community and DEQ has no information about air quality there. Both of these programs will rely on available funding.

2 Introduction

2.1. Purpose of the Five Year Monitoring Plan (The Plan)

Every five years Oregon DEQ is required to update our five year ambient air monitoring plan by 40 CFR Part 58.10. EPA requires states and local agencies to update their monitoring plans in order to keep the monitoring networks current with changes in demographics, climate, monitoring technology, and the needs of the public and health agencies. The Plan was last updated in 2010 and this version is required in 2015.

The plan also offers DEQ and our stake holders the opportunity to review the pollutant information we currently collect and adjust our monitoring network to keep it aligned to the goals of the agency. DEQ's current goals are

a) To monitor for comparison to the EPA's National Ambient Air Protection Standards (NAAQS) which determines if communities need to develop plans to abate pollution.
b) To monitor to provide immediate information to the public and health agencies in order to limit exposure to pollutants. This is accomplished with the Air Quality Index.
c) To monitor for trending information to track the effect of pollution control programs.
d) To monitor for burning programs with the USFS, BLM, ODF, and ODA. This network is used to measure the impact of prescribed burning and field burning.
e) To monitor for air toxics at both receptors (i.e. neighborhoods) and sources (near industry, freeways, etc...).
f) To support air quality health research by universities using the existing network.

Finally, the plan provides DEQ the chance to get feedback from stakeholders on our network design. The plan is available for public comment and we seek input from the public, other health or resource agencies, businesses, and researchers.

2.1.1. What is in the Plan

The Plan will begin with an update of the current state demographics and discuss population, poverty, and sensitive populations. The population section will include forecasts for future growth. The Plan will provide climate and meteorology information, air quality emission inventory, modeling, and monitoring data. This information will be compiled into a decision matrix which will be used to prioritize monitoring needs with limited resources.

2.1.2. What decisions will be made and by who

DEQ will design the plan and put it out for public comment. Input will be considered when making final decisions on where to place our resources. The DEQ Air Quality Section managers will make the final decision on the monitoring network.

2.1.3. Air Quality Background

In the 1980s, Oregon had PM10, ozone, and CO non-attainment areas across the state. During the 1990's these areas were brought into attainment and are now kept in attainment using maintenance plans. Oregon still has five CO and seven PM10 maintenance areas that have been below the NAAQS for at least 20 years. These areas are still maintenance areas because their maintenance plans have a 20 year expiration schedule. After their maintenance plans have expired, monitoring (or a pollution tracking surrogate method) will no longer be required. The effective dates of the maintenance plans are in the table below.

In 1998, EPA established a PM2.5 standard which all of Oregon met. In 2008, the EPA lowered the PM2.5 standard which resulted in two communities (Klamath Falls and Oakridge) becoming non-attainment areas. Since then, Klamath Falls has moved into attainment and is currently working on a maintenance plan. The figure and table below show the non-attainment and maintenance areas and schedules.

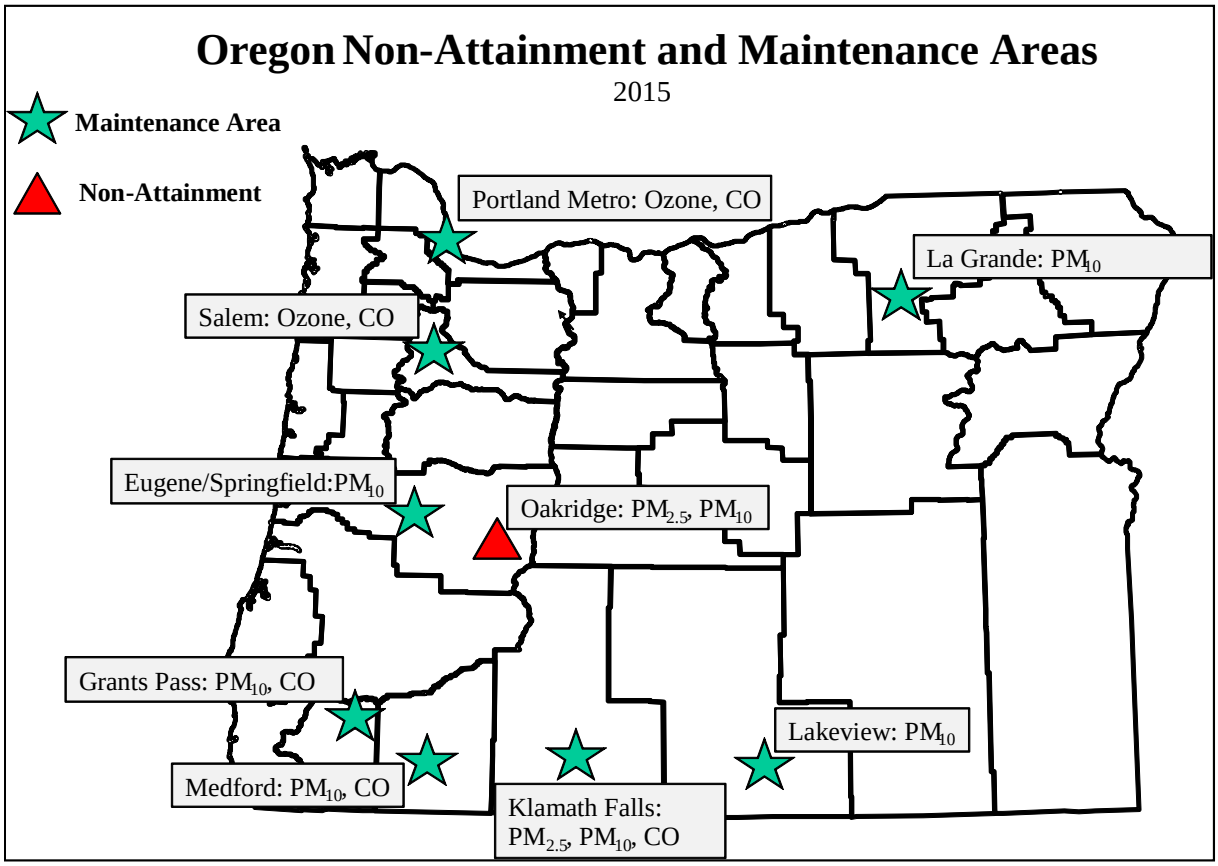


Figure 1. Non-Attainment and Maintenance Areas

Table 1. Maintenance Plans Effective Dates

	Maintenance Plans Effective Dates			
City	PM10	CO	Ozone	PM2.5
Eugene/Springfield	6/10/2013	-	-	-
Grants Pass	12/26/2003	10/30/2000	-	-
Klamath Falls	12/22/2003	-	-	In development
La Grande	7/19/2006	-	-	-
Lakeview	7/19/2006	-	-	-
Medford	8/18/2006	9/23/2002	-	-
Oakridge	In development	-	-	No SIP*
Portland Metro	-	10/2/1997	6/18/1997	-
Salem	-	3/2/2009	-	-

SIP = State implementation Plan

3 Methodology

Population, climate, meteorology, emission inventory, modeling, and monitoring information will be compiled and placed into a decision matrix. A decision matrix is a quantitative way to assign values to the different inputs used to design a monitoring network and prioritize them based on the highest number. This is a tool to help prioritize monitoring but is not the only deciding factor on where to put monitoring resources. Other factors, such as required monitoring and DEQ experience with monitoring are also included.

3.1. The Population data

Current population information is fairly easy to gather these days. Portland State University, College of Urban and Public Affairs, Population Research Center estimates population for every year and makes this information available at: http://www.pdx.edu/prc/home . The U.S. government also estimates population every year across the country https://www.census.gov/popest/index.html . The U.S. government census also includes information about race, age, and poverty. The census also has population growth forecasts as does the Oregon Office of Economic Analysis for population growth forecasts at: http://www.oregon.gov/DAS/OEA/pages/index.aspx .

Also, the local Metropolitan Transportation Agencies (MPOs) often provide information about changes to the urban growth boundaries (UGBs) for their respective communities. In Oregon, the UGBs refer to zoning laws which keep urban growth constrained to high density areas and keep the areas around cities rural. The UGBs have schedule expansions into designated areas which make spatial forecasting of growth very accurate.

3.2. Climate and Meteorology data

Climate information is available from the Oregon Climate Service at: http://www.ocs.oregonstate.edu/ , The National Weather Service, and other Weather services.

DEQ and LRAPA have meteorology sites throughout the state operating year round. These monitors provide detailed information about wind direction, wind speed, and temperatures. The National Weather Service also has meteorology sensors at airports which we can use to fill in the gaps.

3.3. Existing Air Quality data

There are numerous sources of air quality information.

Monitoring

a) DEQ and LRAPA monitor year round across the state for both criteria pollutants and air toxics.
b) EPA monitors for PM2.5 speciation in pristine areas around Oregon in the IMPROVE Network. This data can be used to understand the source of PM2.5 in mountain areas.
c) The USDA recently did a moss study to collect air toxics in the Portland Metro area. This is useful to understand spatial concentrations of air toxics.
d) Dr. Dan Jaffe of the University of Washington does transport monitoring on the top of Mt. Bachelor which can be used to understand impact from Asia.
e) Tribal monitoring and private monitoring can be used to track air quality in localized areas that we are not in.
f) NASA satellite monitoring is useful for determining relative concentrations of NO2 in Oregon.

Modeling

a) DEQ produced the Portland Air Toxics Solution model for the Portland Metro area in 2009. This model is updated when new emission inventory data becomes available and is very useful for locating monitors in the Portland Metro area.
b) NW AIRQUEST and Washington State University produce the AIRPACT air pollution model using the University of Washington's MM-5 Meteorology model and emission inventory. This model is useful for seeing the ozone plume direction on specific days.
c) The EPA Blue Skies model is used along with other information in the Hysplit model which is useful for determining plume direction during high pollution events for ozone and PM2.5.

Emission Inventory

a) DEQ conducts a complete emission inventory every third year. The most recent inventory was completed in 2011.
b) EPA collects Toxic Release Information for point sources across the country. This is used with an understanding that it is self reported. This is most useful for tracking TSP lead sources that have Potential to Plant Site Emit Limit Permits (PSEL) over the monitoring requirement threshold but are not monitored because of low monitored values.
c) EPA produces a National Air Toxics Assessment which estimates the air toxic levels at the county level across the country using emission inventory information. The next NATA results are scheduled to be released in the fall of 2015.

Traffic Counts

a) Traffic emissions are included in the emission inventory mobile monitoring estimates and in modeling.
b) Traffic counts on major roads are obtained from ODOT and City MPO's. They are used to see if changes in traffic have added significant emissions near the monitoring sites. If so, the sites purpose needs to be redefined or the site may need to be relocated.

3.4. Monitoring Network

The current and past monitoring networks for DEQ, LRAPA, tribes, EPA IMPROVE, and the National Atmospheric Deposition program are provided by their respective agencies.

3.5. Decision matrix using the above data

The decision matrix concept was provided by EPA for the 2010 five year monitoring plan and was developed by DEQ.

4 Results

4.1. Demographics

4.1.1. Core Based Statistical Areas (CBSA)

Before we discuss Oregon's current demographics, Oregon's CBSAs must be identified. The CBSAs are the designated boundaries of population centers throughout the country. The CBSAs are assigned by the US Census Bureau to track population~~s~~ changes and are a useful way to discuss population shifts for ambient monitoring needs. The Oregon CBSAs are shown in the map and table below. Note that the Portland –Vancouver-Hillsboro and the Boise City – Mountain Home – Ontario CBSAs have counties from neighboring states. In this review, the populations of these CBSAs are split up so only Oregon counties are included.

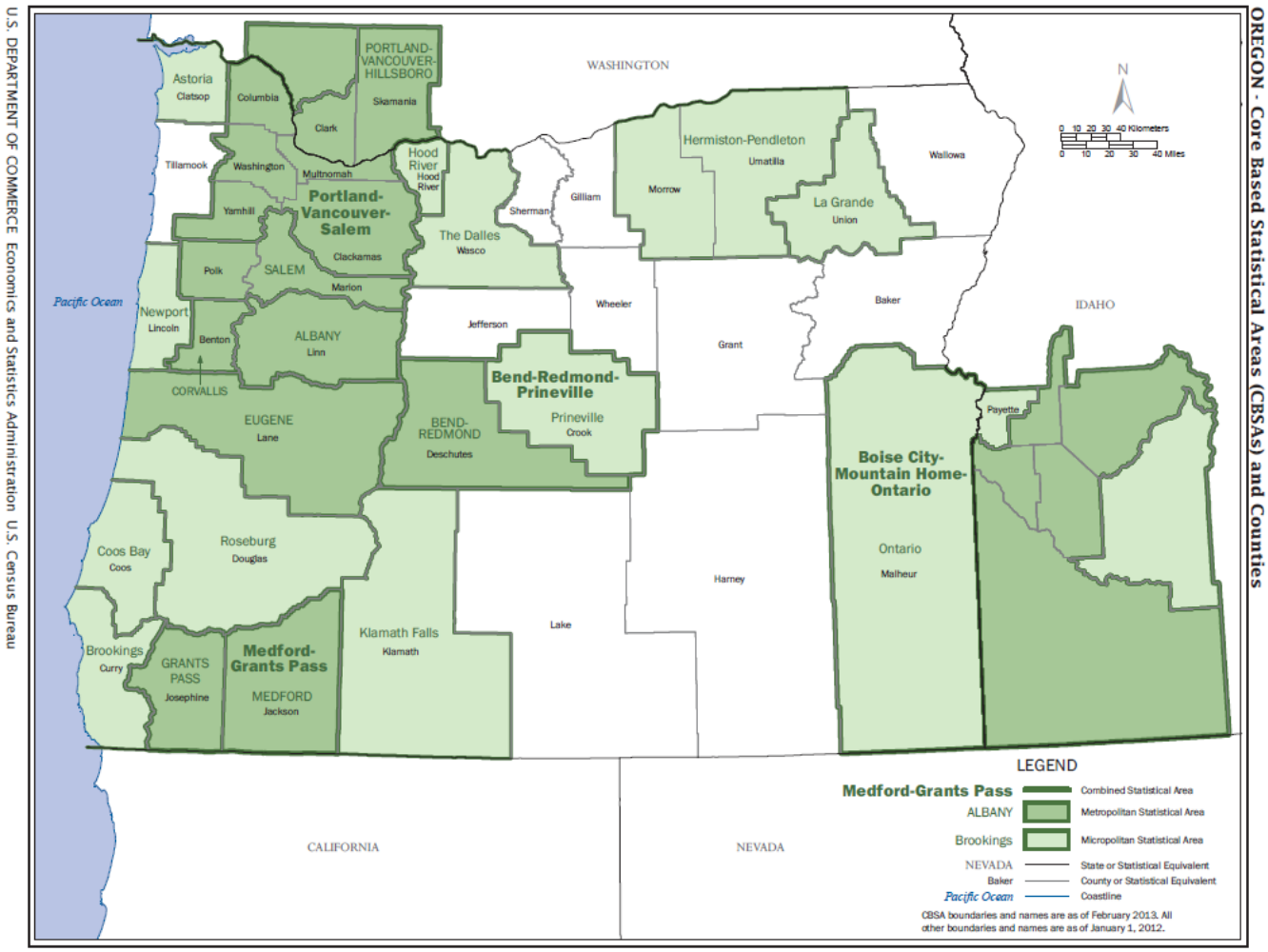


Figure 2. Oregon Core Based Statistical Areas
http://www.census.gov/geo/maps-data/maps/statecbsa.html

4.1.2. Population

Oregon is one of the top 25 fastest growing states since 2010. Oregon's population has grown by 139K or 3.6% according to the United States Census Bureau Estimates. Oregon had the 18 highest growth rates in the country by population and was the 21st fastest growing state by percentage of state population. The table below shows the 2010 to 2014 population growth by CBSA and county.

Table 2. 2010 to 2014 CBSA Population Growth

		Population		Population Growth	
CBSA	County	2014 (1000)	Percent of State Pop. (2014) (%)	2010-14 Pop. Growth (1000)	Percent Growth compared to State Pop. (%)
Oregon	All	3,963	-	131.6	3.4
Portland–Hillsboro-Salem	Clackamas, Columbia, Multnomah, Washington, Yamhill	1,870	47.2	80.8	2.36
Salem	Marion, Polk	404	10.2	13.1	0.38
Eugene	Lane	359	9.1	7.1	0.21
Medford-Grants Pass	Jackson, Josephine	291	7.4	5.6	0.15
Bend-Redmond	Deschutes	166	4.2	8.7	0.30
Albany	Linn	120	3.0	3.0	0.09
Roseburg	Douglas	109	2.8	1.7	0.05
Hermiston-Pendleton	Umatilla	90	2.3	2.8	0.08
Corvallis	Benton	89	2.2	3.2	0.09
Klamath Falls	Klamath	67	1.7	0.5	0.02
Coos Bay	Coos	63	1.6	-0.1	0.00
Newport	Lincoln	47	1.2	0.9	0.03
Astoria	Clastsop	37	0.9	0.5	0.01
Ontario	Malhuer	31	0.8	0.2	0.00
La Grande	Union	26	0.7	0.7	0.02
The Dalles	Wasco	26	0.7	0.9	0.03
Hood River	Hood River	24	0.6	1.3	0.04
Brookings	Curry	22	0.6	0.0	0.00
Prineville	Crook	21	0.5	-0.2	-0.01
Not in CBSA	Tillamook	25	0.6	0.2	0.01
Not in CBSA	Jefferson	22	0.6	0.5	0.01
Not in CBSA	Lake	8	0.2	0.1	0.00
Not in CBSA	Grant	7	0.2	0.0	0.00
Not in CBSA	Harney	7	0.2	-0.1	0.00
Not in CBSA	Wallowa	7	0.2	0.1	0.00
Not in CBSA	Gilliam	2	0.05	0.1	0.00
Not in CBSA	Sherman	2	0.05	0.0	0.00
Not in CBSA	Wheeler	1	0.04	0.0	0.00

The most populated areas became even bigger, as the largest population growth was in the Portland Metro Area (Portland-Hillsboro-Salem CBSA), Salem (Salem CBSA), Eugene/Springfield, The Rogue Valley (Medford - Grants Pass CBSA), and the Bend-Redmond area. The majority of the population remains between the Coastal Range and the Cascades, in the Portland Metro Area down into the Willamette Valley. South West Oregon and the Bend area also continue to have substantial populations. Much of Eastern Oregon and the Oregon Coast had low or no population growth and remain very rural. The county maps below shows the 2014 population distribution by number of people (in 1000s) and the population growth between 2010 and 2014 (by percent).

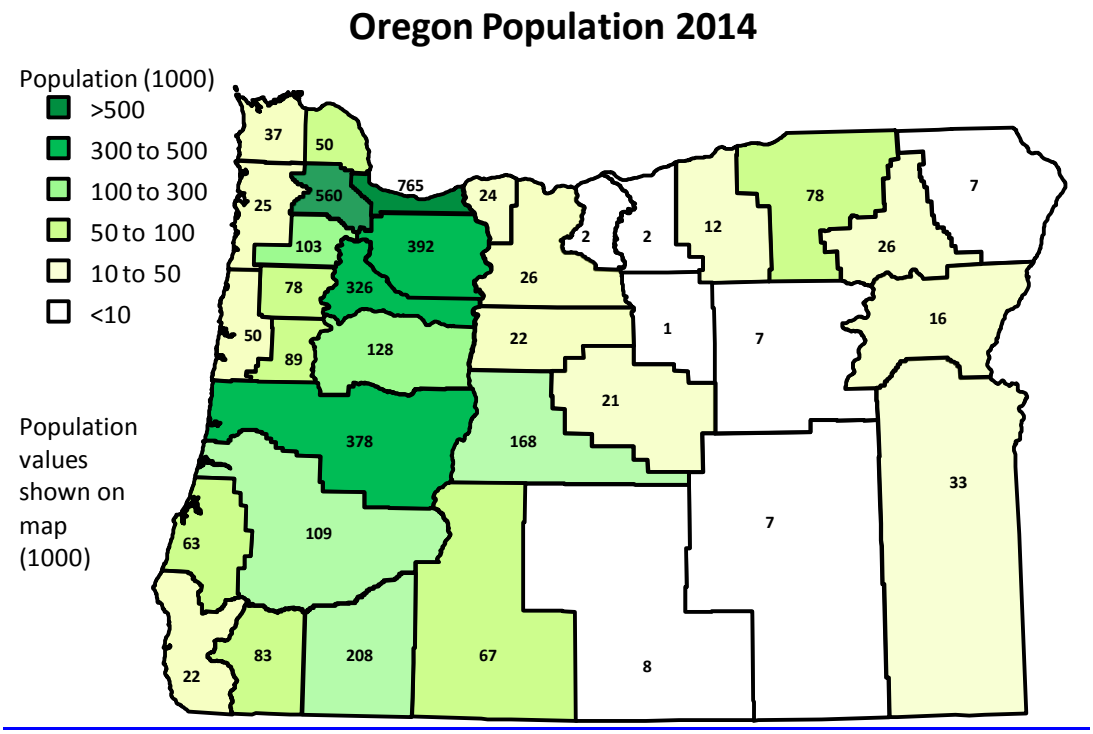


Figure 3. Oregon County Population Map (2014)
Estimates from Portland State University, Population Center.
http://www.pdx.edu/prc/population-reports-estimates

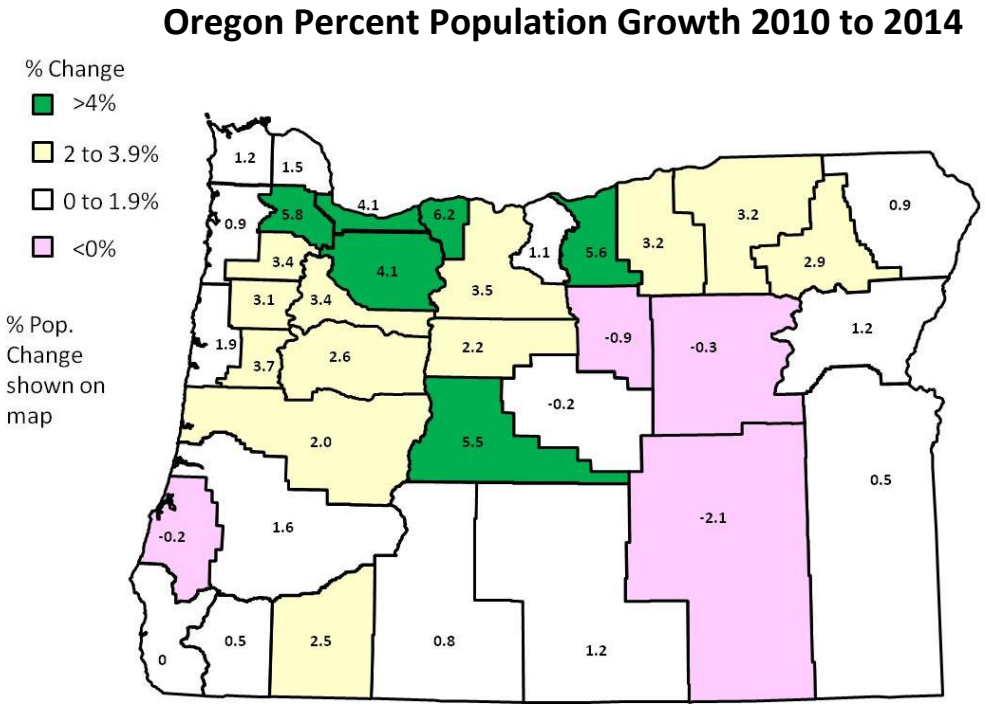


Figure 4. Oregon population growth from 2010 to 2014
% Change of by county versus total state population.
Estimates from Portland State University, Population Center.

http://www.pdx.edu/prc/population-reports-estimates

4.1.2.1. Sensitive populations

Ambient air quality monitoring standards are established to protect the most sensitive people in the population. For air quality, sensitive people are children, seniors, and people with lung problems. Children's lungs and bodies are developing and are more susceptible to pollution than adults. Seniors often have reduced lung function and diminished immune systems. People with reduced lung function are often adversely impacted by much lower levels of pollution. Read more on this at EPA's AIRnow.gov.

2014 Population estimates for people under 18 and over 65 are shown in the county map below. This data was estimated by the US Census Bureau.

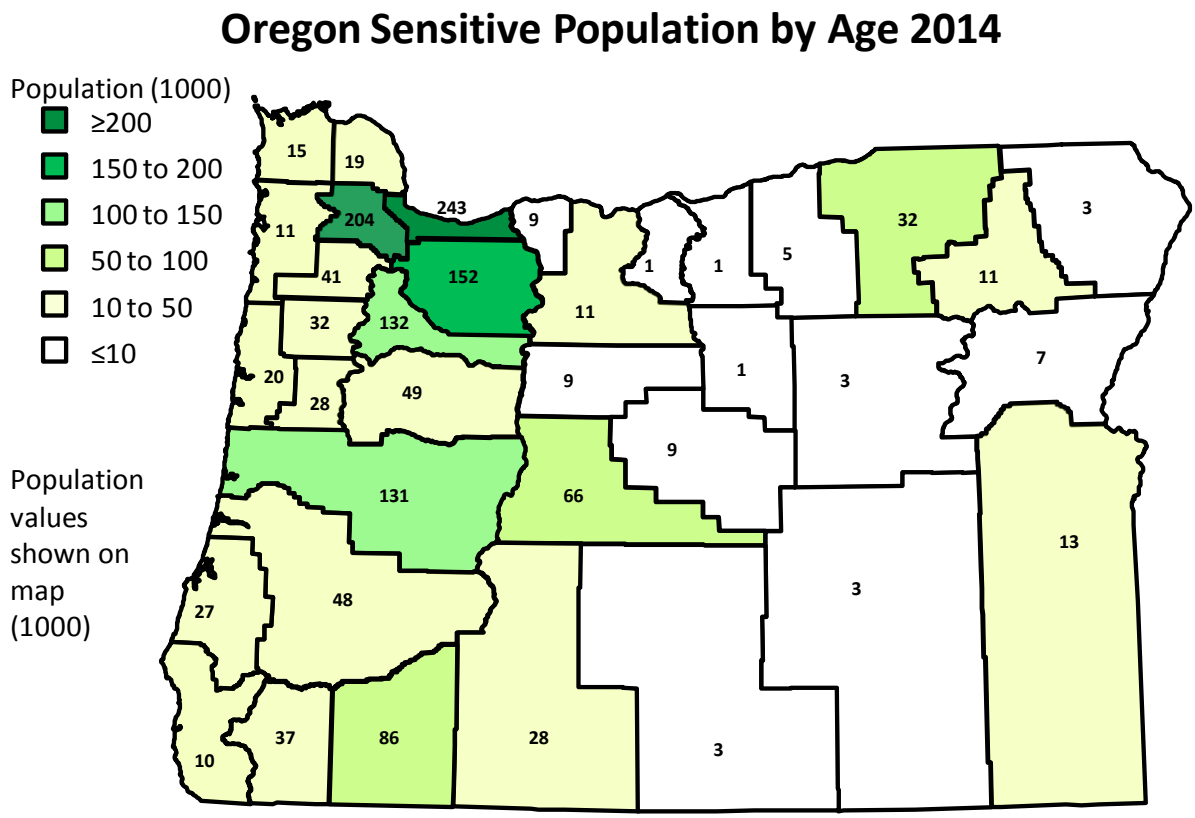


Figure 5. Oregon sensitive population by county
Sensitive populations are defined as below 18 and above 64.

The Portland State Population Center estimate that most of the young and elderly live in the Portland Metro Area, Salem, Eugene/Springfield, the Rogue Valley, and the Bend area. This is mostly consistent with the general population distribution.

4.1.2.2. Minority Population

Oregon's 2013 population is estimated to be 89% Caucasian by Portland State's Population Center. The Majority of the minority population lives in Multnomah County which is not surprising since it also has the highest

population. If the minority population in each county is mapped, Multnomah still has the most people. The map below shows the percent minority population in each county.

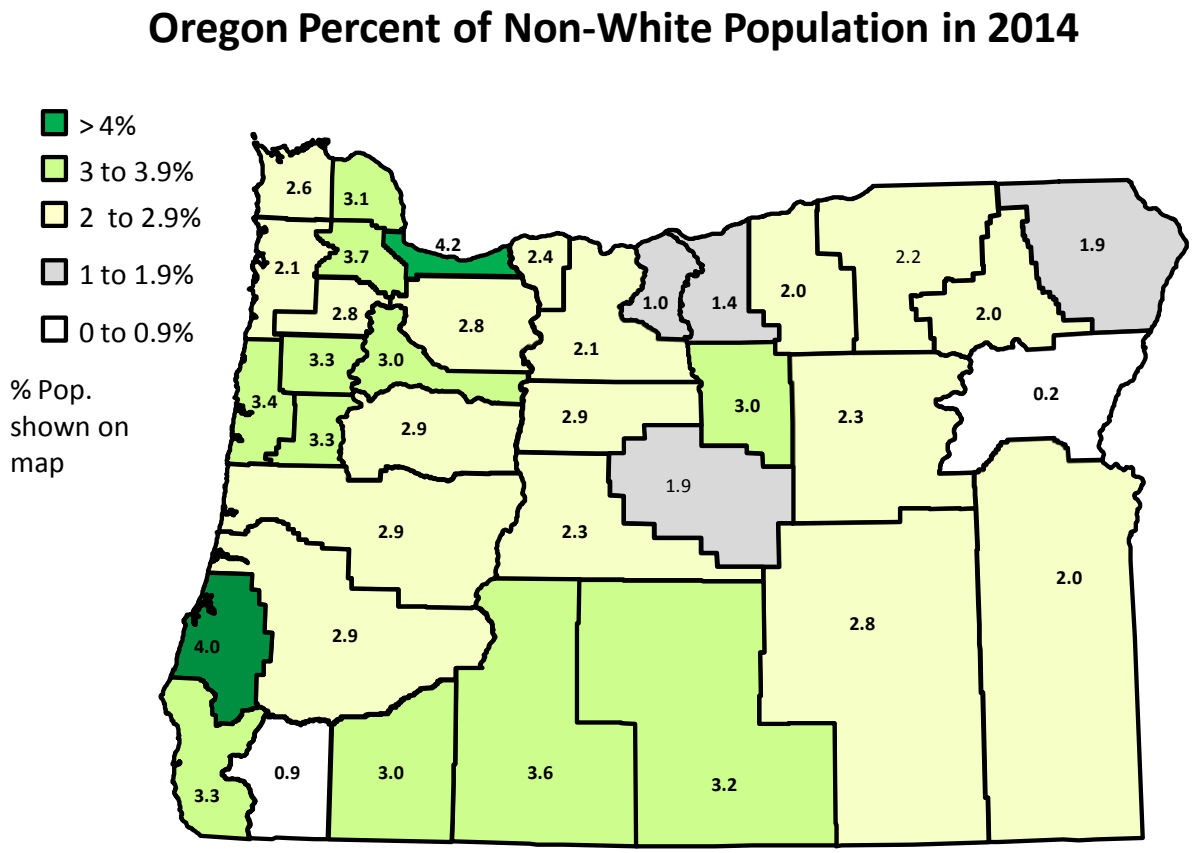


Figure 6. Percent minority population in each county

Note: This map does not show the percentage of minority population in each county as a percentage of the whole state rather as a percentage of the respective county. (i.e. Coos county minority population is 5K and its total population is 64K so the percent is 5K/64K = 4%).

4.1.2.3. Poverty Population

According to 2012 census data, Oregon's poverty levels continue to be relatively high. More than one in five Oregonians rely on food stamps and 16.6 percent of Oregonians live in poverty according to data from Oregon Department of Human Services, U.S. Census Bureau, Oregon Employment Department, Population Research Center at Portland State University, Oregon Health Authority and reported by the Oregonian http://projects.oregonlive.com/maps/poverty/. The map below shows the poverty levels by county for 2012 (the latest year available).

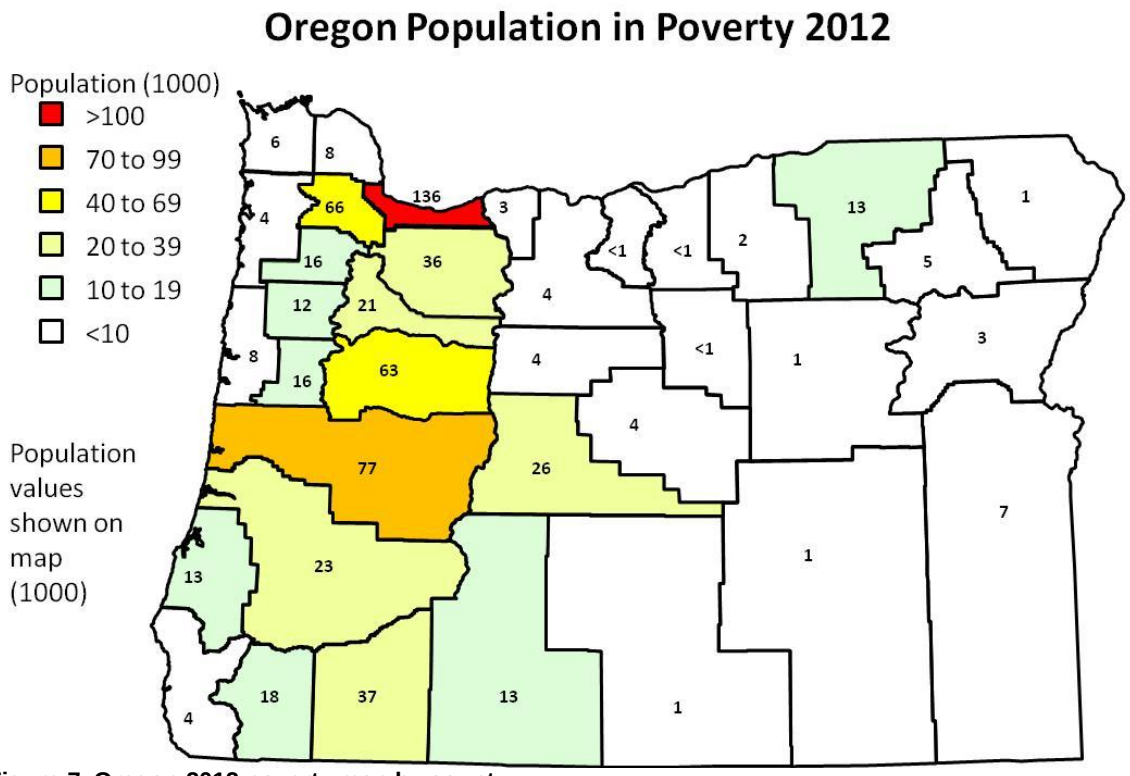


Figure 7. Oregon 2012 poverty map by county

Another way to look at poverty is to look at the percent of the county's population in poverty by total county population. This is a way to look at the counties affluence and not just a count of people in poverty. For example, Washington County has more people in poverty than Jackson County because it has a higher total population, but Jackson County has a higher percentage of its people in poverty as a percent of its population.

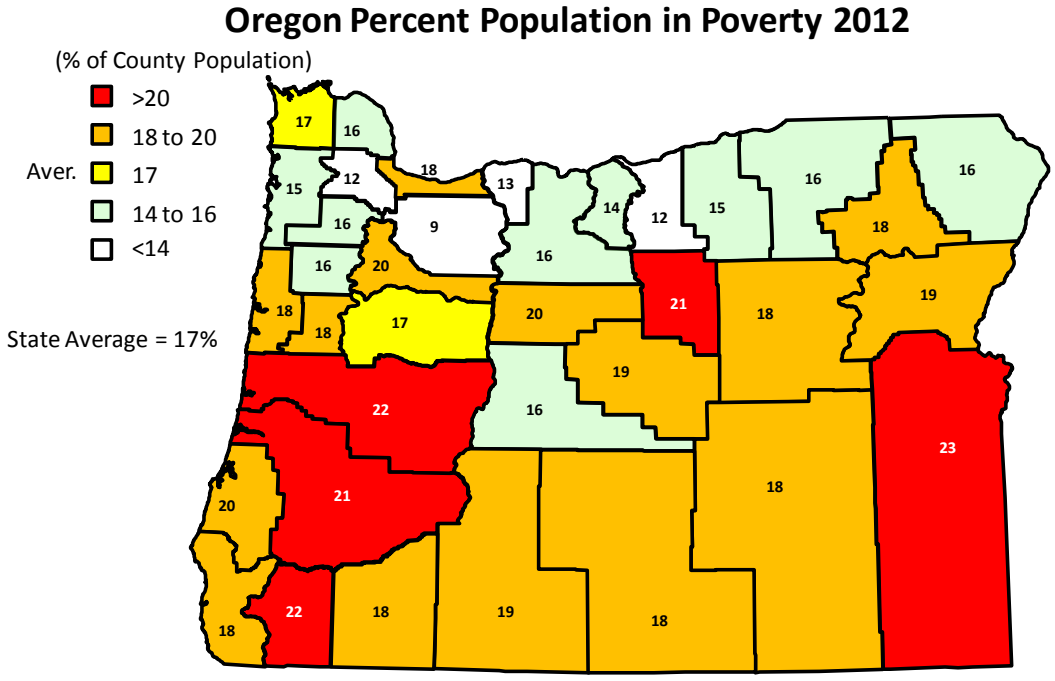


Figure 8. Oregon 2012 percent population in poverty by total county population

4.1.2.4. Forecasted growth

Oregon will continue to have population growth over the next five years. The Oregon Office of Economic Development estimates that the 2020 state population will be 4.3 million, a growth of 420K from 2010. Over half of this growth will occur in the Portland Metro Area which is projected to have a 2020 population of 2 million (not including Vancouver, WA). The graph below shows the growth from 2000 to 2014 and the forecasted growth to 2025.

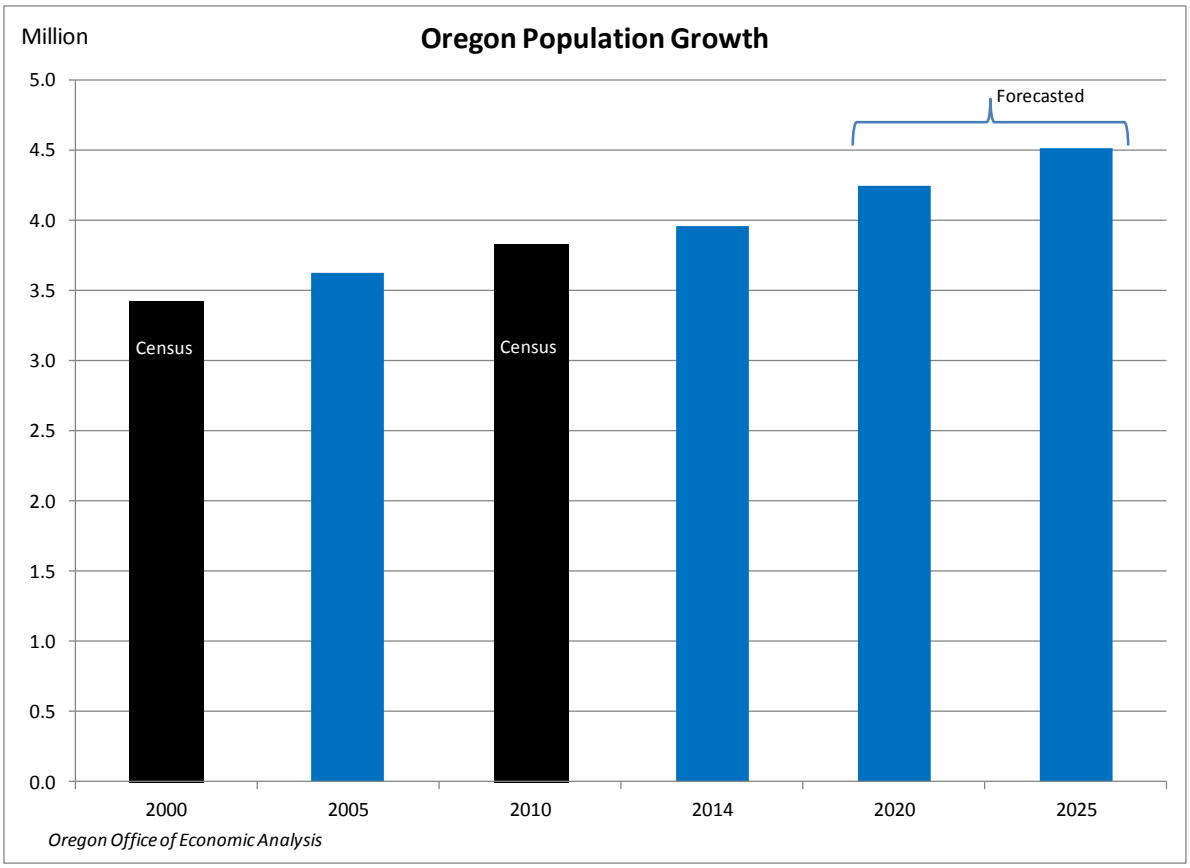


Figure 9. Oregon population growth and forecast.

Most of Oregon's forecasted growth will occur in already densely populated areas. Washington County will have the highest growth with an additional 62K people in the next five years followed by Multnomah County with 41K. Most of the rest of the population increase will occur in the Willamette Valley and in SW Oregon. Deschutes County is the only Eastern Oregon area that will see high growth. The population growth is shown in the map below.

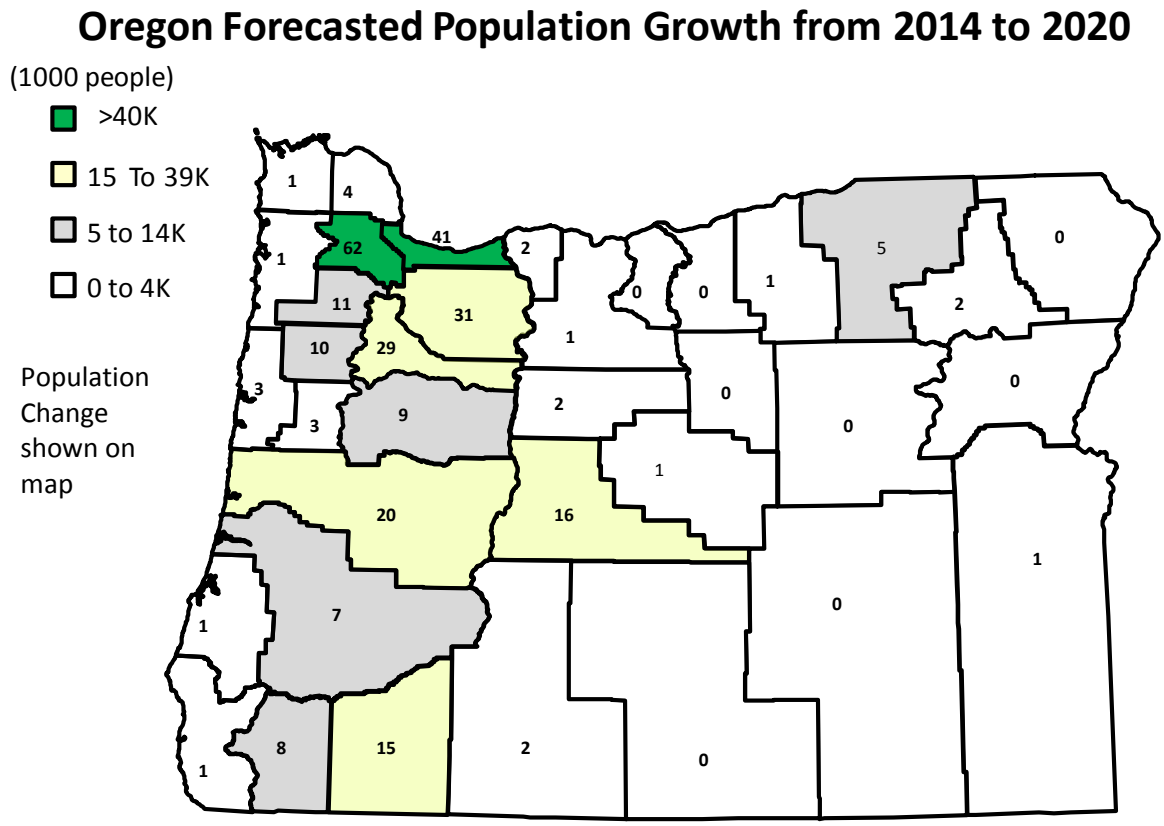


Figure 10. Oregon forecasted population growth 2014 to 2020

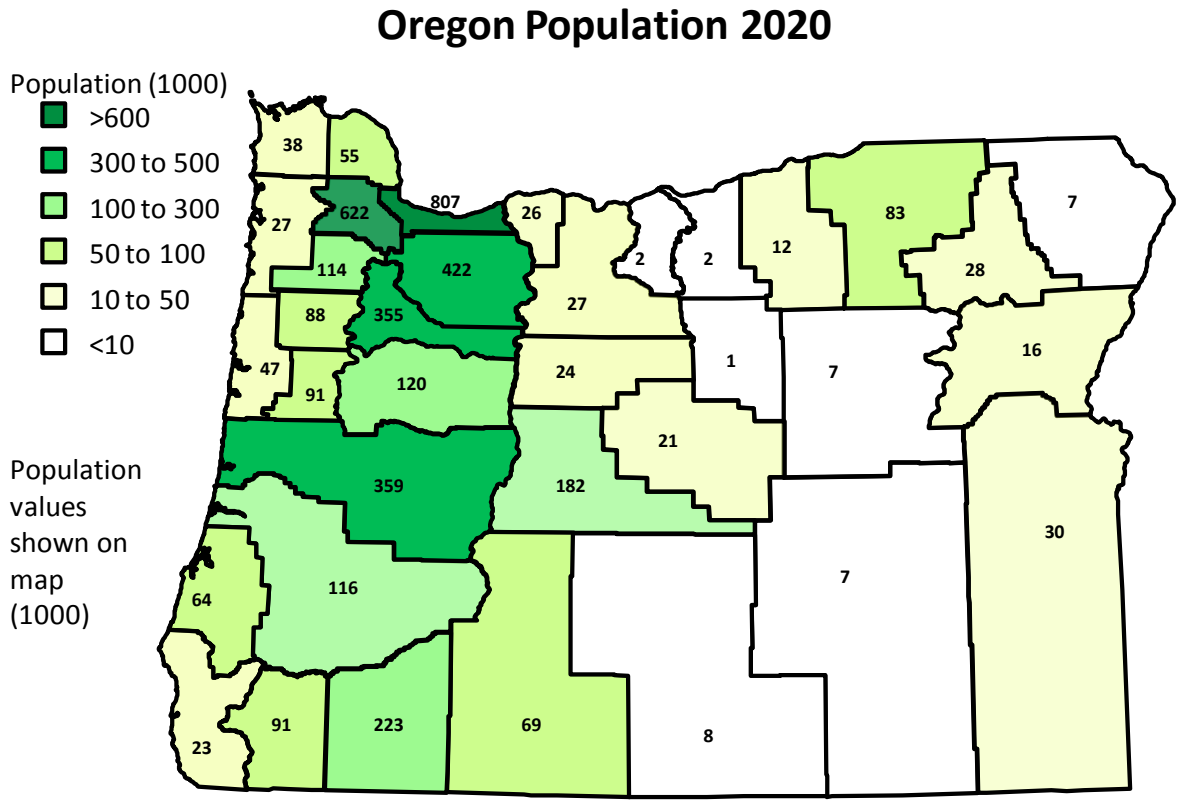


Figure 11. Forecasted 2020 state population by county.

In 2020 Multnomah County will still be the most populated county with 19.0% of the population but Washington County will gain the most people, remaining the second most populous county. The table below shows the change in percent population for the counties with over 2% or more of the state's population.

Table 3. Percent of state population by county

Most populated	County	2014	2020	Change
1	Multnomah	19.3%	19.0%	-0.34%
2	Washington	14.1%	14.6%	0.49%
3	Clackamas	9.9%	9.9%	0.06%
4	Lane	9.1%	8.9%	-0.16%
5	Marion	8.2%	8.4%	0.12%
6	Jackson	5.3%	5.3%	0.00%
7	Deschutes	4.2%	4.3%	0.09%
8	Linn	3.0%	3.0%	0.00%
9	Douglas	2.8%	2.7%	-0.03%
10	Yamhill	2.6%	2.7%	0.08%
11	Benton	2.2%	2.1%	-0.09%
12	Josephine	2.1%	2.1%	0.04%
13	Polk	2.0%	2.1%	0.11%
14	Umatilla	2.0%	2.0%	-0.02%

4.2. Meteorology

Meteorology plays a critical role in monitoring for air pollutants. Areas that have low wind speeds and inversions tend to have higher pollutant concentrations at ground level. Predominant wind direction also indicates where the air pollutants may be impacting at ground level. In this report, the wind direction, wind speed, and inversions are considered. The prevailing wind directions for each community are included in the Appendix B. These have not changed from previous measurements and no new information was discovered.

4.3. Climate discussion

This is a brief discussion of Oregon's climate by region, then by season.
In general dry and cold winters can lead to inversions and high pollutant concentrations. Dry hot summers can lead to high ozone levels. Dry summers also result in more forest fire smoke.

4.3.1. Climate by Region

Western Oregon
West of the Cascades and East of the Coastal Range, Oregon typically has wet and mild falls and winters, wet and warm springs, and dry summers with very low humidity. The wet and moist winters often result in blustery conditions which lead to good atmospheric mixing. During some years (like 2011 and 2013) Western Oregon had stagnation events during the winter that cause multiday inversions in the valleys. In other years (like 2010, 2012, and 2014) Western Oregon had no major stagnation events and relatively good air quality.

In the summer, the maximum temperatures in Southern Oregon can be between 100 to 110˚F while Portland and the Willamette Valley hover in the 90s˚F. Stagnation events do not usually occur in the summer.

Eastern Oregon

East of the Cascades is very dry fall, winter and summer with some rain during the spring. The Cascade Range blocks the lower elevation clouds creating a rain shadow. Much of Eastern Oregon is on an elevated plateau which has routine winter evening inversions and multiday stagnation events.

Coastal Oregon:

The area west of the Coastal range on the Pacific Ocean is very wet and blustery during the winter and spring. The summer and fall have less rainfall but the coastal fog keeps the area humid and cool.

Climate Change

Climate change is impacting Oregon by producing warmer winters and summers and lower snowpack. The forest fire season has gotten longer, now going into late September. Forest fire smoke has been impacting Eastern and Southern Oregon almost every year in the last five years. This trend will likely continue.

4.4. Air Pollution Data

Air quality data is available to inform future monitoring decisions. Emission inventories can be used to find the sources and amount of pollutions emitted. Models can be used to find relative pollution concentrations in some areas. Pollutant monitoring is not available for all areas. Monitoring information is available for existing monitoring areas and from other agencies in unmonitored areas. All these data are used in concert for planning future monitoring.

4.4.1. DEQ Emission Inventory

a. The three year state wide emission inventory
   The latest emission inventory (for 2011) was unavailable at the time of this report.
b. The 2014 Portland Metro wood stove survey.
   In 2014, DEQ and Portland State University conducted a phone survey to determine residential burning patterns in the Portland Metro area. The results are shown below.

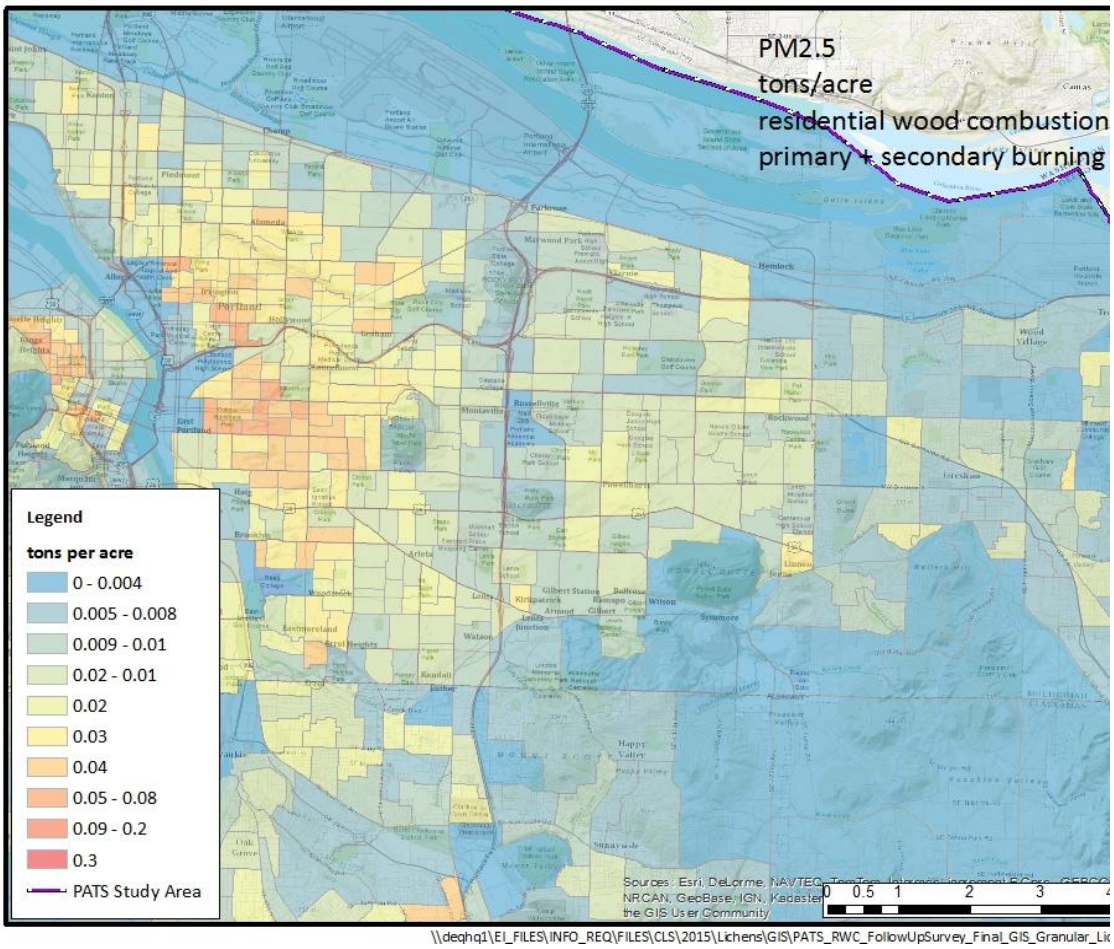


Figure 12. 2014 Residential wood heating phone survey results

The results show that the most tons per acre are being burned in downtown Portland for ambiance. Burning for heat is done less often in the metro area. This is important because it shows whether our existing monitors are in areas with a lot of burning.

4.4.2. Model summaries

Available models are used to assess geographical air quality and are useful for monitoring network planning. For criteria pollutants, the AIRPACT model continues to be useful to see the ozone plumes direction and relative concentrations. PSU has been working on modeling NO2 for the Portland Metro area which shows relative concentrations. These results are useful in determining the possible NO2 hot spots. For air toxics, the Portland Air Toxics Solution model by Oregon DEQ is still useful for identifying likely hot spots. The PSU NO2 modeling also is useful for identifying areas where high diesel particulate concentrations are likely to occur. The USDA also modeled PAHS using monitored data for the Portland Metro area. This is helpful for siting air toxic assessment monitors.

The data from these models is too numerous to show here but links to the models are provided below.

a. Portland Air Toxics Solution Model

DEQ developed the PATS model for air toxics in 2009. This model was used in the 2010 report and is still being used now to locate the air toxics assessment monitor.

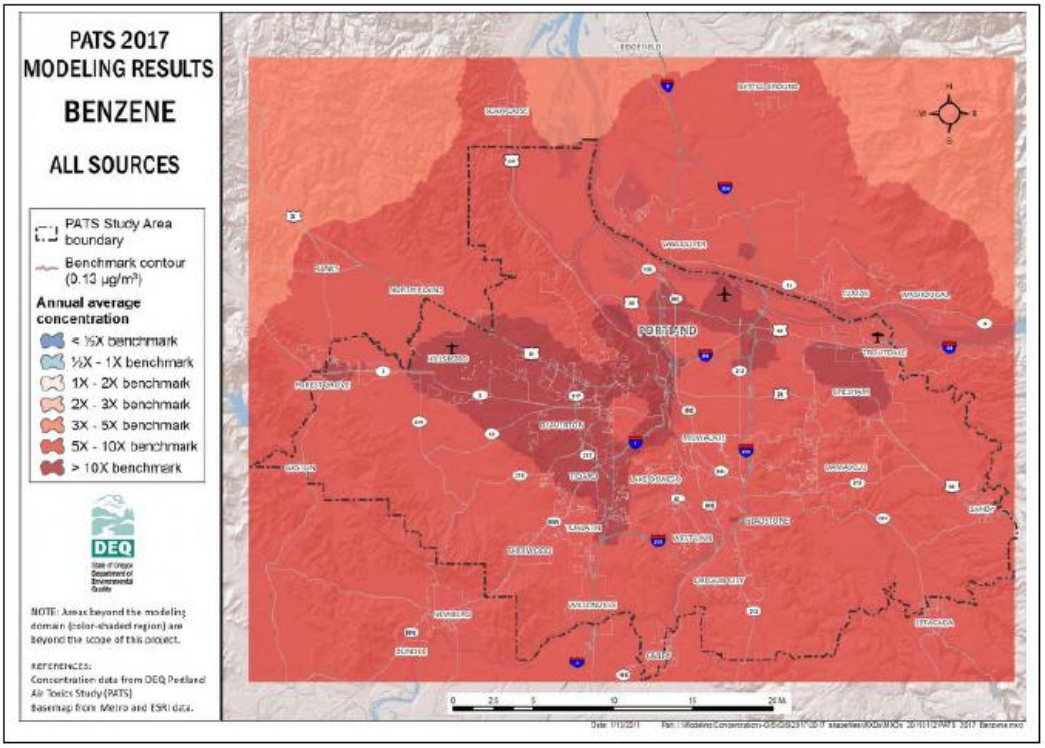


Figure 13. Portland Air Toxics model health risk map for Benzene.

Other pollutant maps are at:

Portland Air Toxics Modeling data: http://www.deq.state.or.us/aq/toxics/pats.htm

b. AIRPACT ozone and PM2.5 forecasting model.

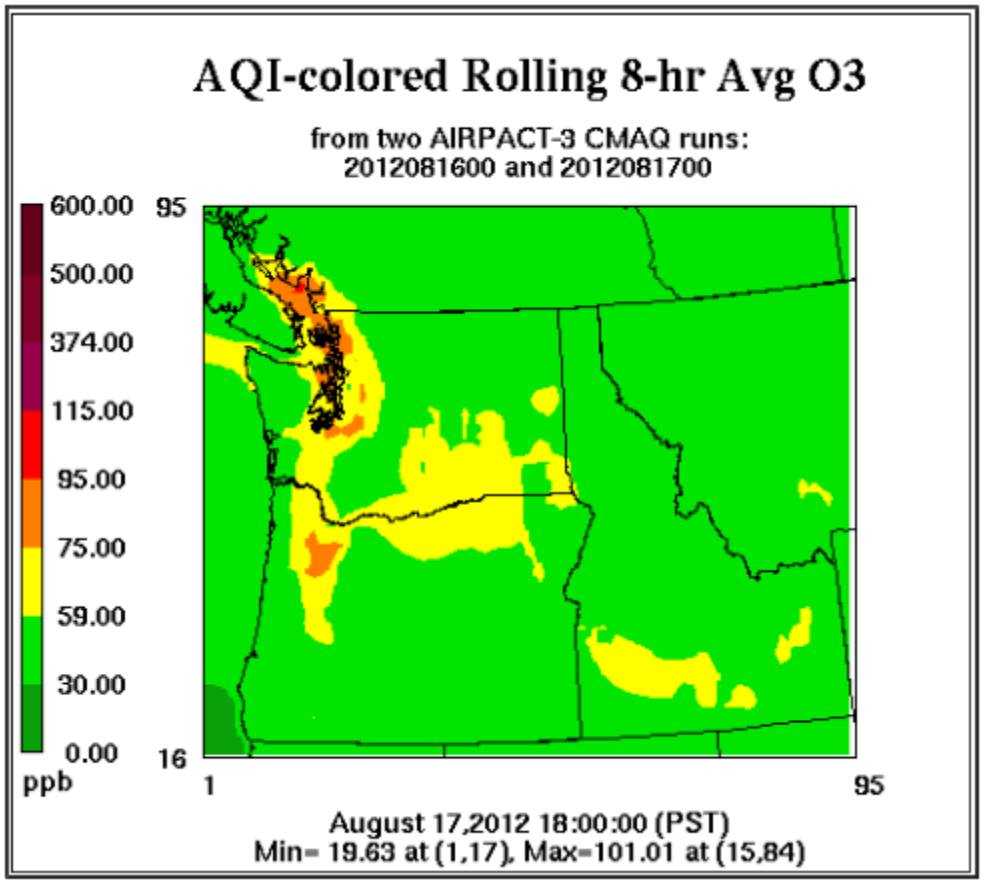


Figure 14. Example of AIRPACT ozone model run on high ozone day.
This model shows the source and direction of the ozone plume. This is useful to see if our monitors are in the plume. The modeling runs are available for ozone and PM2.5 at:
AIRPACT: **http://lar.wsu.edu/airpact/**

c. Portland State University Portland summer-time NO2 model.

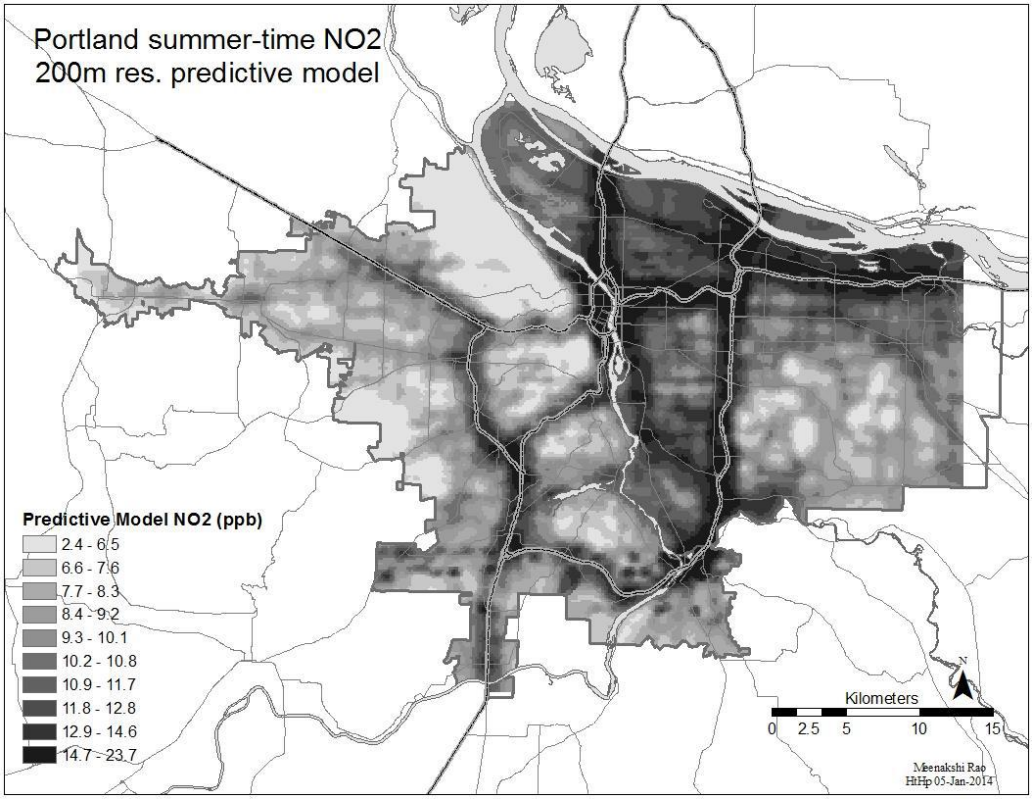


Figure 15. Portland State University Portland Metro NO2 Predictive Model

The model shows where DEQ might find the highest NO2 levels if we decide to expand our NO2 network or place diesel particulate monitors.

PSU Modeling Study: http://web.pdx.edu/~h6lg/mrao.envpoll.jan10.revisions.final.lag.accepted.pdf

d. EPA's National Air Toxics Assessment results

This assessment uses emission inventories to model the air toxics across the country. This assessment is at: http://www.epa.gov/airtoxics/natamain/ . The latest assessment is from 2005. The most current assessment is expected in the fall and will be used after this report has been issued.

4.4.3. Monitoring summaries

Monitoring data from DEQ and LRAPA's existing ambient network continues to affirm that we are in the right area or shows that we can move a monitor because the levels are no longer very high. Monitoring from other agencies is also useful in showing pollutant concentrations, and these data can be used to show where we need to site monitors. One example of this is the recent Portland Metro air toxics survey by the USDA where they collected and analyzed moss samples for PAHS and toxic metals. This provided an area wide monitoring concentration maps of these pollutants were later modeled to produce contoured concentration maps. This data is expected to be published at the end of 2015.

4.4.3.1. Oregon monitoring results

a. Criteria Air Pollutants:

The monitored levels can best be summarized when compared to the NAAQS http://www.epa.gov/air/criteria.html . The latest design values are shown in the tables below (design values are the monitored concentrations which determine whether an area is in violation of the standards).

Table 4. Current design values for PM2.5, PM10, ozone, CO, NO2, SO2, and Lead

Pollutant	Design Value Type	City	Design Value	% of NAAQS
Ozone	8 hour	Hermiston	64 ppb	85%
		Medford	64 ppb	85%
		Portland Metro	62 ppb	83%
		Salem	60 ppb	80%
		Bend	59 ppb	79%
		Eugene/Springfield	58 ppb	77%
CO	8 hour (2nd highest day)	Portland Metro	1.3 ppb	14%
NO2	Hourly/Annual	Portland Metro	35/8 ppb	15 / 35%
SO2	Hourly	Portland Metro	8 ppb	8%
PM2.5	Daily/Annual	Lakeview	57.5/11.0 ug/m3	162/ 92 %
		Prineville	41.8/ 9.6 ug/m3	118/ 80 %
		Oakridge	40.2/ 9.0 ug/m3	113/ 75 %
		Cave Junction	34.0/ 7.8 ug/m3	96 / 65 %
		Klamath Falls	33.9/10.4 ug/m3	95 / 87 %
		Eugene/Springfield	31.6 / 7.3 ug/m3	89 / 61 %
		Burns	31.4 / 9.2 ug/m3	88 / 77 %
		La Grande	29.9 / 8.5 ug/m3	84 / 71 %
		John Day	29.6 / 9.8 ug/m3	83 / 82 %
		Portland Metro	27.7 / 7.8 ug/m3	78 / 65 %
		Pendleton	25.5 / 7.4 ug/m3	72 / 62 %
		Medford	25.3 /10.1 ug/m3	71 / 84 %
		Salem	24.2 / 6.8 ug/m3	68 / 57 %
		Albany	23.9 / 6.6 ug/m3	67 / 55 %
		Cottage Grove	23.1 / 7.1 ug/m3	65 / 59 %
		The Dalles	22.0 / 6.3 ug/m3	62 / 53 %
		Enterprise	21.5 / 6.1 ug/m3	61 / 51 %
		Sweet Home	21.3 / 6.0 ug/m3	60 / 50 %
		Baker City	20.7 / 7.6 ug/m3	58 / 63 %
		Bend	19.9 / 5.5 ug/m3	56 / 46 %
		Grants Pass	18.9 / 8.2 ug/m3	53 / 68 %
		Corvallis	18.7 / 5.5 ug/m3	53 / 46 %
		Sisters	17.3 / 4.7 ug/m3	51 / 39 %
PM10	Daily – 2nd highest day	Klamath Falls	44 $\mu g/m^3$	29%
		Oakridge	43 $\mu g/m^3$	29%
		La Grande	43 $\mu g/m^3$	29%
		Eugene	37 $\mu g/m^3$	25%
		Grants Pass	37 $\mu g/m^3$	25%
		Medford	35 $\mu g/m^3$	23%
		Portland Metro	30 $\mu g/m^3$	20%
Lead	3 Month Aver	Hillsboro (Only 2yrs in average)	0.006 $\mu g/m^3$	3%
		Portland	0.005 $\mu g/m^3$	1%
		La Grande	0.001 $\mu g/m^3$	4%

PM2.5

For the daily standard, Oregon has one non-attainment area (Oakridge) and one former non-attainment area that is moving into maintenance (Klamath Falls). Oregon has two other communities (Lakeview and Prineville) that are violating the NAAQS and are in danger of being designated as non-attainment areas when EPA reconsiders designation status (expected in 2017). In addition, Burns, Medford, and Eugene are within 85% of the standard. All Oregon communities are in attainment for the annual PM2.5 standard as shown in the table below.

Ozone

All communities are currently in attainment for ozone and are below the current standard. The EPA is proposing a new standard which will be in the range of 65 to 70 ppb. All Oregon communities are currently below the lower end of this range but are within 80% of 70ppb and 90% of 65ppb.

CO, NO2, SO2, PM10, Lead

All the other criteria pollutants measured are ≤ 35% of the NAAQS. Monitoring of these pollutants continues because of CFR or maintenance plan requirements.

Recent monitoring in communities shown to have low pollutant concentrations are shown in Table 16. This information should be considered when evaluating whether a new monitoring is needed.

Figure 16. Design values for past PM2.5 and lead sites.

Pollutant		Design Value Type	City	Design Value	% of NAAQS
PM2.5	2007	Daily/Annual	Hermiston	24.3 /7.6 ug/m3	69 / 63 %
	2009-10	Daily/Annual	Madras	23.4 / 7.3 ug/m3	67 / 61 %
	2009-10	Daily/Annual	McMinnville	15.1 / 5.0 ug/m3	43 / 42 %
			Florence	12.4	35%
Lead	2010-12	3 Month Aver	McMinnville	0.01 µg/m3	7 %

b. Air toxics

To determine health risks for air toxics, Oregon uses times above the ambient benchmark concentrations. The toxics in this metric are benzene, acetaldehyde, formaldehyde, arsenic, and cadmium. The ambient benchmark concentrations http://www.deq.state.or.us/aq/toxics/benchmark.htm were derived from EPA's benchmarks and were decided upon by the Oregon Air Toxics Science Advisory Committee. Cumulative times above benchmark, is the sum of the annual average divided by the benchmark concentration.

City	Latest Year	Times over Benchmark	Monitoring type	Neighborhood type
N. Portland	2014	11.1	Urban	Residential, commercial, industrial, transportation
La Grande	2014	9.8	Rural	Residential
Hillsboro	2014	11.8	Urban	Residential, commercial, industrial, transportation
Medford	2012	17.1	Urban	Residential, commercial, industrial, transportation
Klamath Falls	2011	14.2	Rural	Residential
Eugene	2010	15.1	Urban	Residential, commercial, transportation
Salem	2010	12.6	Urban	Residential, commercial, transportation

e. Monitoring Network

Most of the current monitoring network has been in place for years with a few adjustments occurring every year. The current network supports NAAQS compliance, the air quality index, visibility, field burning advisory, wood stove advisory, forest health burning forecasting, air quality trend data collection, and air quality assessment of an area we haven't monitored in for a long time.

The maps below show the 2015 monitoring network shown by pollutant.

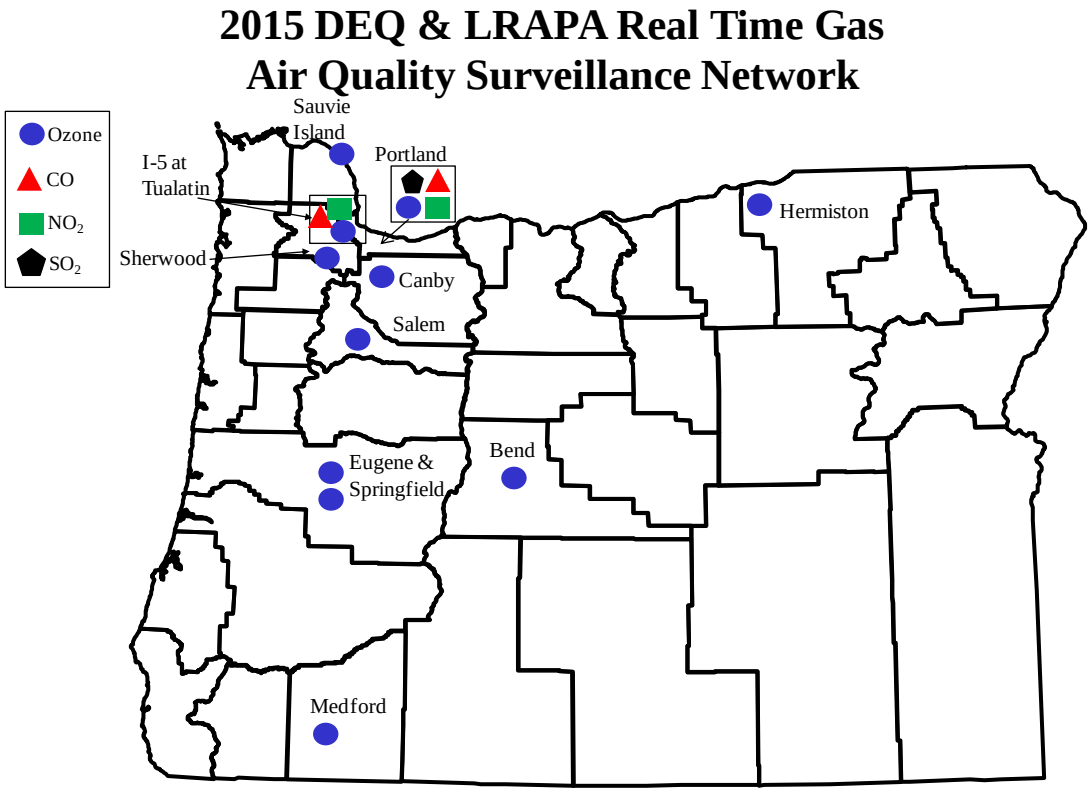


Figure 17. 2015 ozone, NO2, SO2, CO monitoring network.

2015 Oregon DEQ PM Monitoring Network

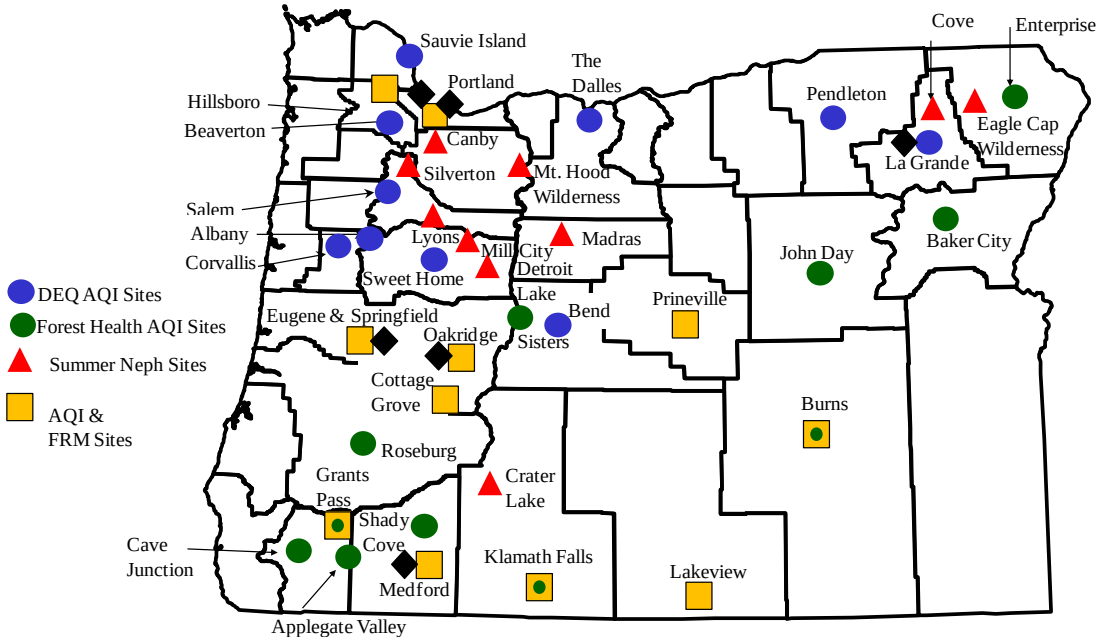


Figure 18. 2015 PM monitoring network.

2015 DEQ & LRAPA Meteorology Network

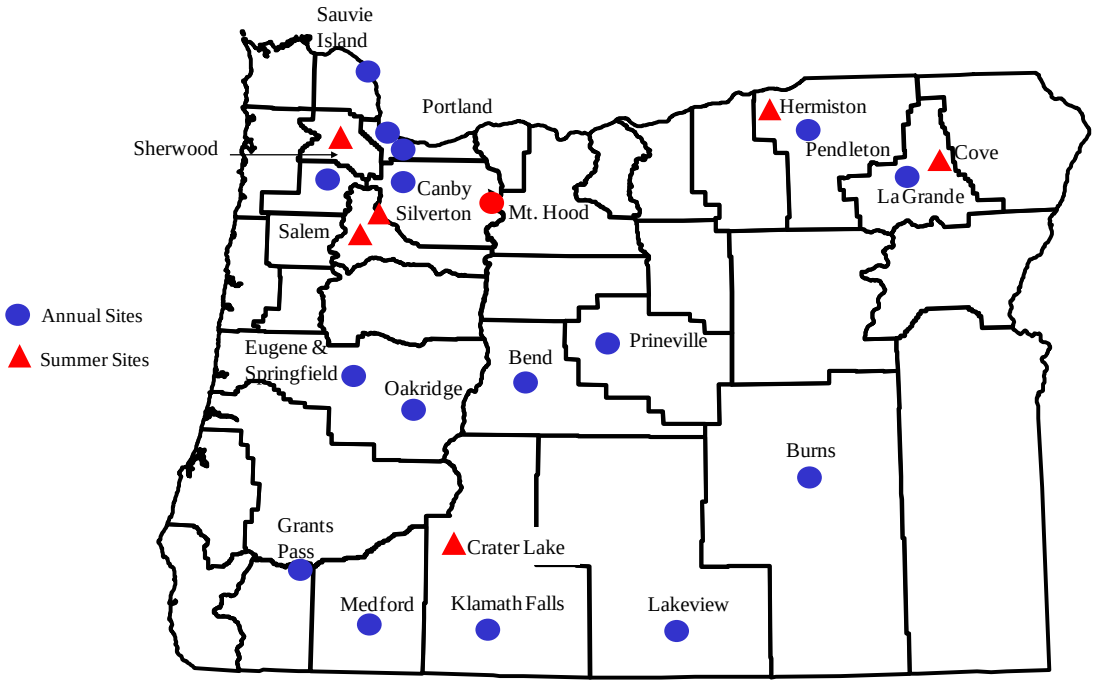


Figure 19. 2015 meteorology monitoring network.

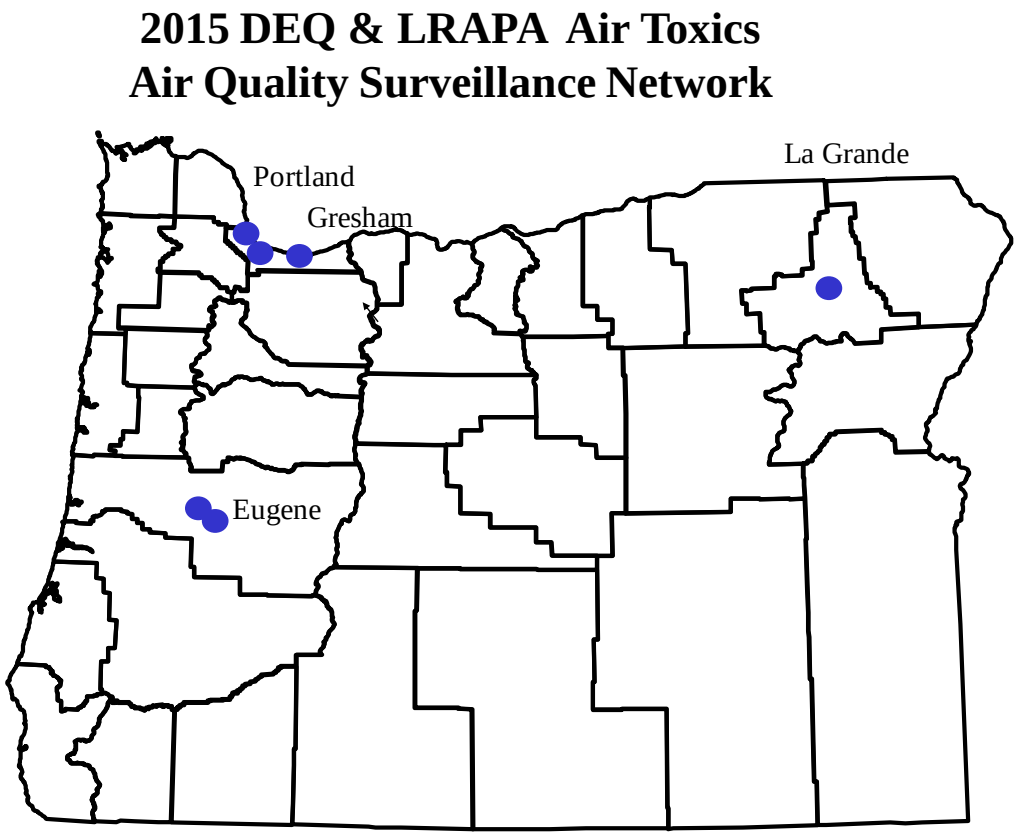


Figure 20. 2015 air toxics monitoring network.

4.5. Decision Matrix

The information from the categories discussed above has been inserted into a decision matrix which is used to prioritize the importance of the existing sites and to identify cities which could benefit from monitoring. In addition to the categories above, the decision matrix includes factors such as whether there is any previous monitoring in the area, public pressure to monitor, whether the monitor supports a pollution prevention program like woodstove advisories, and how many monitors are already in an air shed.

The air toxics decision matrices also include total risk which is estimated using the NATA or other modeling results.

The table below shows an example of the decision matrix used in 2015. The following tables show the decision matrix broken down by pollutants. The entire decision matrix is in Appendix F.

Criteria Pollutant Monitoring Decision Matrix

		Categories:	Design Value			Population				Met	PreSum	Qualitative Categories							PreSum	Sum
		Notes:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
City	Site	Network Parameter	2012-14 "Design value" (Dailyfor PM2.5)	% of Std	DV vs. NAAQS: DV < 50% = 0.1,DV 50 to 70%=1,70% to 100% = 5,DV>100% =10	Population	% of total OR Pop	Pop Growth	Population Factor	Meteorological Mixing (1 to 4) 1 good 4 poor	DV, Pop, & Met Score	Used for Forecast/WSA	Other agency Site	NCORE Site	Sole monitor in airshed	EJ area (y =1, no=0)	Required by the CFR	Political pressure	Qualitative Score	Overall Score
Hillsboro	Hare Field	PM2.5FRM	27.7	78%	50	1,870,365	47%	5%	2.1	3	248.6	1	0	0	0	1	1	0	4	994.4
Forest Grove	Hillsboro	PM2.5Est	27.7	78%	50	1,870,365	47%	5%	2.1	3	248.6	1	0	0	1	0	0	0	2	497.2
Portland	Carus	Ozone	62	95%	50	1,870,365	47%	5%	2.1	1	101.3	1	0	0	0	0	1	0	3	303.9
Portland	SE Lafayette	Ozone	56	86%	50	1,870,365	47%	5%	2.1	1	91.5	1	0	0	0	0	1	0	3	274.5
Portland	Sherwood	Ozone	57	88%	50	1,870,365	47%	5%	2.1	1	93.1	1	0	0	0	0	0	0	2	186.3
Portland	Sauvie Is	Ozone	50	77%	50	1,870,365	47%	5%	2.1	1	81.7	1	0	0	0	0	0	0	2	163.4
Salem	Turner-Cascade Jr. Hi.	Ozone	59	91%	50	403,885	10%	3%	0.3	2	31.5	1	0	0	0	1	1	0	4	125.8
Medford	Grant & Belmont	PM2.5FRM	31.3	88%	50	208,375	5%	3%	0.1	4	23.2	1	0	0	0	1	1	0	4	92.7
Eugene	Saginaw	Ozone	58	89%	50	358,805	9%	2%	0.2	2	16.2	1	0	0	0	1	1	1	5	80.8
Eugene	Amazon Pk	PM2.5FRM	31.6	89%	50	358,805	9%	2%	0.2	2	16.1	1	0	0	0	1	1	1	5	80.6
Eugene	Amazon Pk	Ozone	56	86%	50	358,805	9%	2%	0.2	2	15.6	1	0	0	0	1	1	1	5	78.0

Figure 21. Example of the criteria pollutant monitoring decision matrix

Community Scale Air Toxics Assessment Monitor Decision Matrix

Community scale air toxics assessment is done by monitoring at neighborhood receptor sites (like schools) around the state. It is focused more on the risk to population from exposure to air toxics than on maximum source contribution. Its purpose is to measure the contribution of all sources in a neighborhood no matter what the source. This monitor moves from location to location on a one to two year schedule. The locations are determined in part by the decision matrix. The decision matrix for 2016 to 2020 will be completed in early 2016 and sent out for public comment.

		Concentration & Benchmark						Population					Qualitative Categories					
Name	Network Parameter	Sum of modeled value summed for pollutant class (6=highest site, 1=lowest site)[1]	Modeled % of Benchmark[2]	Order of magnitude over benchmark (1= ≤ BM to 20xBM, 2= ≥20xBM)[3]	Over BM no=1, yes=2[3]	Concentration Score[4]	Weighted Concentration Score[5]	Population[6]	% of total Pdx Metro Pop[7]	Pop Growth[8]	Population Factor[9]	Conc and Population Score 10	EJ community yes = 2, no = 1[15]	Setup costs (1 to 2) 1 = high 2 = low	Previous AT monitoring (1 to 2, 1 = yes, 2 = none)	Sole monitor in airshed (1 = no, 2 = yes)[13]	Politically important	Qualitative Score[16]
Multnomah	VOC	38	1742%	1	2	76	2.04	89285	6%	0.25	1.4	3.5	2	2	2	1	1	1.6
	Metals	31	649%	1	2	62												
	Carbonyls	16	553%	1	2	32												
	PAH	10	1%	1	1	10												
	Diesel PM	6	6300%	2	2	24												
	Total	101				204												
N. Portland	VOC	24	1041%	1	2	48	1.53	61400	4%	0.08	0.3	1.8	2	1	2	2	1	1.6
	Metals	28	507%	1	2	56												
	Carbonyls	14	709%	1	2	28												
	PAH	9	1%	1	1	9												
	Diesel PM	3	3600%	2	2	12												
	Total	78				153												

Figure 22. Example of community scale air toxics assessment monitoring decision matrix.

Near Source Air Toxics Assessment Monitor Decision Matrix

Near Source Air Toxics Assessment is done by monitoring in a neighborhood near an air toxics source, such as a factory. It is focused more on the risk to population near a large industrial source. This monitor moves from location to location on a one to two year schedule. The locations are determined in part by the decision matrix. The decision matrix for 2016 to 2020 will be completed in early 2016 and sent out for public comment.

						Presence of sensitive population			
		Total Risk[1]	Level of Previous AT monitoring[2]	# of People potentially at risk[3]	Presence of community health concern[4]	Minorities[5]	K-12 Schools within 2mile Radius[6]	Low income (Title 1 Schools)[7]	
Name	Parameter	Very High = 5, High = 3 , Medium 1 or 2, Low 0 or 1	None = 5, Partially characterized = 3, well characterized = 0	Dense = 5, Medium = 3, Low = 1	>4 yrs of documented concerns and complaints = 5, Emerging or intermittent concerns and complaints = 3, Unknown = 0	> 25% = 5. 10 to 25% = 3, <10% = 0	> 5 = 5, 1 to 4 = 3, 0 = 0	> 5 = 5, 1 to 4 = 3, 0 = 0	Total
Location 1	VOC								
	Metals								
	Carbonyls								
	PAH								
	Diesel PM								
	Total								
Location 2	VOC								
	Metals								
	Carbonyls								
	PAH								
	Diesel PM								
	Total								
Location n	VOC								
	Metals								
	Carbonyls								
	PAH								
	Diesel PM								
	Total								

1 Total Risk is calculated using the available nearby air toxic emission source information, modeling information, or monitoring information.
2 This is an assessment monitor so it's purpose is to collect data in areas where DEQ has not gone before or in a long time.
3 Census block data is used to determine population density
4 Funding for this monitor is in response to citizen's health concerns about populations near industrial sources.
This remains one of the intents of the monitor however, DEQ feels that all air toxics sources are of concern and reserves the right to place the monitor near non point sources.
Neighborhood or environmental organizations may also have more influence than individuals.
5 Minority population is all non-white people and is determined using census data
6 The number of K-12 schools are used to determine the population of children in an area. This is readily available from many sources.
7 Low income areas are already determined by the school districts for free lunch programs. DEQ will use this information.

Figure 23. Example of near source air toxics assessment monitoring decision matrix.

The decision matrix for PM2.5 federal reference method monitoring is shown below. The decision matrix suggests discontinuing three FRM samplers in the current network. This is based on the design values and the continuous (non- FRM) monitors will stay in place to keep measuring the air.

Table 5. PM2.5 Federal Reference Method site ranking

Rank	City	Site	Site # (41-)	Network Parameter	Purpose	Recommend Action
1	Hillsboro	Hare Field	067-0004	PM2.5FRM	NAAQS	Keep
2	Medford	Grant & Belmont	029-0133	PM2.5FRM	NAAQS	Keep
3	Eugene	Amazon Pk	039-0060	PM2.5FRM	NAAQS	Keep
4	Prineville	Davidson Pk	013-0100	PM2.5FRM	NAAQS	Keep
5	Eugene	Hwy 99 -Key Bank	029-0059	PM2.5FRM	NAAQS	Keep
6	Klamath Falls	Peterson Sch	035-0004	PM2.5FRM	NAAQS	Keep
7	Tualitan	Roadway site	067-0005	PM2.5FRM	CFR	Keep
8	Portland	SE Lafayette	051-0080	PM2.5FRM	CFR	Keep
9	Oakridge	Willamette Pk	029-2013	PM2.5FRM	Above the NAAQS	Keep
10	Lakeview	Center & M	037-0001	PM2.5FRM	Above the NAAQS	Keep
11	Grants Pass	Parkside Sch	033-0114	PM2.5FRM	PM10 maintenance requirement	Shutdown and use PM2.5est as a surrogate
12	Burns	Madison St.	025-0004	PM2.5FRM	Close to NAAQS	Keep
13	Springfield	City Hall	039-	PM2.5FRM	Locally funded	Shutdown and use PM2.5est as a surrogate
14	Cottage Grove	City Shops	039-	PM2.5FRM		Shutdown and use PM2.5est as a surrogate

CFR = Code of Federal Regulations, NATTS = National Air Toxics Trends, NAAQS = National Ambient Air Quality Standards

The decision matrix for the AQI PM2.5 sites show a high priority for all existing sites which are used for forest health, field burning, visibility, woodstove advisories, and public air quality reporting. Table 10 shows areas that need to be assessed to possibly add more PM2.5 AQI monitors.

Table 6. PM2.5 Air Quality Index city ranking

Rank	*City*	*Site*		*Network Parameter*	*Purpose*	*Recommend Action*
1	*Hillsboro*	*Hare Field*		*PM2.5Est*	*AQI needs*	*Keep*
2	*Medford*	*Grant & Belmont*		*PM2.5Est*	*AQI needs*	*Keep*
3	*Eugene*	*Amazon Pk*		*PM2.5Est*	*AQI needs*	*Keep*
4	*Prineville*	*Davidson Pk*		*PM2.5Est*	*AQI needs*	*Keep*
5	*Eugene*	*Hwy 99 -Key Bank*		*PM2.5Est*	*Minimal cost*	*Keep*
6	*Klamath Falls*	*Peterson Sch*		*PM2.5Est*	*AQI needs*	*Keep*
7	*Portland*	*SE Lafayette*		*PM2.5Est*	*AQI needs*	*Keep*
8	*Oakridge*	*Willamette Pk*		*PM2.5Est*	*AQI needs*	*Keep*
9	*Lakeview*	*Center & M*		*PM2.5Est*	*AQI needs*	*Keep*
10	*Grants Pass*	*Parkside Sch*		*PM2.5Est*	*AQI needs*	*Keep*
11	*Burns*	*Madison St.*		*PM2.5Est*	*AQI needs*	*Keep*
13	*Cottage Grove*	*City Shops*		*PM2.5Est*	*AQI needs*	*Keep*
14	*Pendleton*	*Mckay Cr*		*PM2.5Est*	*AQI needs*	*Keep*
15	*Beaverton*	*Highland Pk*		*PM2.5Est*	*AQI needs*	*Keep*
16	*La Grande*	*Ash St*		*PM2.5Est*	*AQI needs*	*Keep*
17	*Salem*	*State Hospital*		*PM2.5Est*	*AQI needs*	*Keep*
18	*Bend*	*Pump Station*		*PM2.5Est*	*AQI needs*	*Keep*
19	*Corvallis*	*Circle Drive*		*PM2.5Est*	*AQI needs*	*Keep*
20	*Albany*	*Calooia Sch*		*PM2.5Est*	*AQI needs*	*Keep*
21	*Cave Junction*	*Airport*		*PM2.5Est*	*USFS/BLM*	*Keep*
22	*Roseburg*	*RGV*		*PM2.5Est*	*USFS/BLM*	*Keep*
23	*John Day*	*Blue Mt. Sch*		*PM2.5Est*	*USFS/BLM*	*Keep*
24	*The Dalles*	*Cherry Lane*		*PM2.5Est*	*AQI needs*	*Keep*
25	*Madras*	*Washington St.*		*PM2.5Est*	*AQI needs*	*Keep*
26	*Sweet Home*	*Fire Dept*		*PM2.5Est*	*AQI needs*	*Keep*
27	*Baker City*	*Fire Dept*		*PM2.5Est*	*USFS/BLM*	*Keep*
28	*Enterprise*	*USFS*		*PM2.5Est*	*USFS/BLM*	*Keep*
29	*Sisters*	*USFS*		*PM2.5Est*	*USFS/BLM*	*Keep*
30	*Shady Cove*	*USFS*		*PM2.5Est*	*USFS/BLM*	*Keep*
12	*Springfield*	*City Hall*		*PM2.5Est*	*Locally funded*	*Keep*
31	*Applegate Vlly*	*USFS*		*PM2.5Est*	*USFS/BLM*	*Keep*

Table 7. Field burning network rankings

Rank	*City*	*Site*		*Network Parameter*	*Purpose*	*Recommend Action*
1	*Salem*	*State Hospital*		*PM2.5Est*	*Field burning*	*Keep*
2	*Silverton*	*Hare Field*		*PM2.5Est*	*Field burning*	*Keep*
3	*Lyons*	*Grant & Belmont*		*PM2.5Est*	*Field burning*	*Keep*
4	*Cove*	*City Hall*		*PM2.5Est*	*Field burning*	*Keep*
5	*Madras*	*Westside School*		*PM2.5Est*	*Field burning*	*Keep*
6	*Mill City*	*Amazon Pk*		*PM2.5Est*	*Field burning*	*Keep*
7	*Detroit Lake*	*Davidson Pk*		*PM2.5Est*	*Field burning*	*Keep*

Table 8. Visibility network rankings

Rank	*City*	*Site*		*Network Parameter*	*Purpose*	*Recommend Action*
1	*Mt. Hood*	*Multorpor*		*PM2.5Est*	*Visibility*	*Keep*
2	*Crater Lake*	*Crater Lake*		*PM2.5Est*	*Visibility*	*Keep*
3	*Eagle Cap*	*Mt. Fanny*		*PM2.5Est*	*Visibility*	*Keep*

Table 9. Areas that need PM2.5 assessments.

City		**Comments**	***Purpose***	***Recommend Action***
Forest Grove	PM2.5Est	Large growth area	Neighborhood level exposure and possible SLAMs and AQI site.	Survey planned for winter 2014-15
Gresham	PM2.5Est	Densely populated area		
Oregon City	PM2.5Est	Large growth area		
Sherwood	PM2.5Est	Large growth rate		
Aloha		Large growth rate		
Redmond	PM2.5Est	Large growth rate		Pursue funding for survey
Woodburn	PM2.5Est	Environmental Justice		
Ontario	PM2.5Est	No AQ information about area		
Salem Kaizer	PM2.5Est	Large population		

The ozone decision matrix shows high importance for all existing monitors because the design values are near the existing standards and the EPA is going to lower the standard in the fall of 2015. New ozone monitoring may be needed downwind of Albany/Corvallis because there is a large population in the area and in the Columbia Gorge which has an increase of ozone precursor sources (trains).

Table 10. Ozone city rankings

Rank	City	Site	Purpose	Required / Comment	Recommend Action
1	Portland	Carus	NAAQS	Yes / highest site in Portland	Keep
2	Salem	Turner-Cascade Jr. High	NAAQS	No / Salem downwind site	Keep
3	Eugene	Saginaw	NAAQS	No / Eugene downwind site	Keep
4	Medford	Talent	NAAQS	No / Medford downwind site	Keep
5	Portland	Sherwood	NAAQS	No / West Metro downwind site	Keep
6	Eugene	Amazon Park	NAAQS	No / Eugene city site	Keep
7	Hermiston	Municipal Airport	NAAQS	No / Rural community site & currently highest concentration in the state.	Keep
8	Bend	Road Dept	NAAQS	No / Bend downwind site	Keep
9	Portland	Sauvie Island	transport	No / but Portland upwind site	Keep
10	Portland	SE Lafayette	NCORE	Yes / CFR	Keep
11	Portland	Tualatin on I-5	Roadway site	No / EPA requested	Keep
Proposed					
12	Corvallis/ Albany	Proposed	NCORE	No / Corvallis and Albany have over 55K and ozone levels may be elevated here.	One year Survey
13	Columbia Gorge	Proposed	Visibility, forest health	No / Haze in the gorge is present and may contribute to	

CFR = Code of Federal Regulations, NATTS = National Air Toxics Trends, NAAQS = National Ambient Air Quality Standards

The PM10 matrix shows low importance for all monitors because of low design values. The existing Portland monitors need to remain because of CFR requirements. Eugene and Oakridge can discontinue their monitors and use PM2.5 as a surrogate when they get approval from EPA.

Table 11. PM10 city rankings

Rank	City	Site	Purpose	Required	Recommend Action
1	Portland	SE Lafayette	CFR & NCORE	CFR requires 2 sites in Portland	Keep
2	Portland	N. Roselawn	NATTS & CFR	CFR and NATTs site	Keep
3	La Grande	Ash St	NATTS & maintenance	Maintenance Plan and NATTS	Keep
4	Oakridge	Willamette Park	SIP Required	Shutdown when possible and use PM2.5 as a surrogate	Shut down and use PM2.5 as a surrogate
5	Eugene	Hwy 99 -Key Bank	PM10 maintenance		
6	Medford	Welch & Jackson	PM10 maintenance		

CFR = Code of Federal Regulations, NATTS = National Air Toxics Trends, NAAQS = National Ambient Air Quality Standards.

The other criteria pollutants have low design values and monitoring has already been cut. The existing monitors are required by the CFR.

Table 12. Others pollutant sites ratings

Rank	City	Site	Pollutant	Requirement	Comments	Recommend
1	Tualatin	Roadway site	NO2	CFR	Required monitoring. Cheaper sensors could reduce costs.	Keep
2	Portland	SE Lafayette	NO2	CFR, NCORE		Keep
3	Tualatin	Roadway site	CO	CFR		Keep
4	Portland	SE Lafayette	SO2	CFR, NCORE		Keep, for now
5	Portland	SE Lafayette	CO	CFR, NCORE		Keep, for now
6	Portland	SE Lafayette	Lead	CFR, NCORE	Required but very low concentration	Keep, for now
7	Portland	SE Lafayette	PM10-2.5	CFR, NCORE	No additional monitoring required for this parameter.	Keep

CFR = Code of Federal Regulations, NATTS = National Air Toxics Trends, NAAQS = National Ambient Air Quality Standards

The air toxics assessment monitors move every one to two years to assess the next community. The 2010 plan had the next assessment area as Oregon City. DEQ is going to make a new ranking list for this five year plan but EPA's National Air Toxics Assessment results don't come out until late summer. The DEQ assessment monitors are not required by EPA so DEQ will leave that ranking list out of this report but will come up with an air toxics monitoring plan in late 2015. The table below shows the existing monitoring sites.

Table 13. Air Toxics site ratings

Rank	City	Site	Program	Comment	Recommend
1	Portland	N. Portland	NATTS	EPA funded	Keep
2	La Grande	Ash Street	NATTS	EPA funded	Keep
3	Gresham	Site selection ongoing	Community Assessment	General funds	Keep
4	Portland	Swan Island	Source Assessment	General funds	Keep
5	Eugene	Amazon Pk	Community Assessment	Locally funded	Keep
6	Eugene	Hwy 99	Community Assessment	Locally funded	Keep

NATTS = National Air Toxics Trends

5 Discussion

5.1. Monitoring Goals

5.1.1. Maintain existing monitoring goals

Over the next five years, much of ODEQ and LRAPA's monitoring goals will remain the same. Our primary purposes are still to monitor for NAAQS compliance, provide real time air quality health information, to assess for air toxics risk around the state, and to provide monitoring support for air quality maintenance programs such as air quality forecasting, residential wood heating advisories, and vehicle inspection effectiveness. ODEQ works with other agencies to monitor in support of field burning programs, forest health programs, the forest fire smoke, EPA trend monitoring, and air quality research.

Some previously held goals we hope to reemphasize are:
1. DEQ hopes to reinstitute the goal of assessing unmonitored areas in the state for PM2.5. This has not been done since the 2007-2009 biennium and will depend on funding.
2. DEQ hopes to reinstitute our PM2.5 surveys around existing monitors to determine if we are still sited correctly. This will depend on funding. DEQ intends to survey for PM2.5 in the Portland Metro area because the population has grown into new areas since the last particulate survey which occurred before PM2.5 was even a standard. DEQ needs to characterize the metro area to see if our sites are representative of air quality. Even after the survey is done, large areas of the metro area will remain untested. DEQ supports other monitoring outside of our agency to determine area wide air quality.

5.1.2. Develop new monitoring goals

Some new monitoring goals since the 2010 five year plan are:
a. DEQ's goal is to support EPA's program to encourage development of cheaper and less complicated monitoring sensors. Our role is to provide local researchers with accurate monitoring data so they can determine the efficacy of cheaper monitoring sensors. DEQ has tried some of these sensors but have determined that it is too early in their development to establish a testing program. EPA continues to test new sensor technology.
b. DEQ's goal is to increase the timeliness of the air quality index so it is updated several times per hour. This can be done with today's technology; the difficultly is in procuring and implementing that technology.
3. DEQ's goal is to update our older monitors to take advantage of the modern, more accurate, and more efficient instruments. We will update the following:
1) Update the PM2.5 FRM filter samplers with PM2.5 FEM continuous monitors which are much cheaper to operate, provide both AQI and NAAQS data, and are more reliable.
2) Update the continuous monitor dataloggers which are from the early 1990's with modern dataloggers which communicate with modern operating systems.
3) Update the modems from dial-up and DSL which are unreliable to wireless modems.
4) Update the meteorology sensors which are from the 1970's and 1980's.

5) Update the air quality index so that it reports every 15 minutes, is more user friendly with graphs and data downloads, is easier to maintain, and is supported by an outside vendor.

5.2. Monitoring Network

The decision matrix is used to quantify monitoring priorities to indicate what areas and pollutants DEQ and LRAPA need to monitor to maximize air quality protection (with available resources). The decision matrix is weighted for more populated areas, areas with rapid population growth, and areas with existing pollution concerns. In this section the monitoring plans for the individual CBSAs are discussed, using the factors from the decision matrix.

5.2.1. Portland CBSA

Portland Metro The CBSA has 47% of the state's population and is has the highest population growth in the state. DEQ monitors for all criteria and HAPs pollutants in various communities in the metro and we are satisfied with the level of monitoring we have for CO, NO2, Ozone, SO2, PM10, and lead, because aside from ozone, none of other pollutants are near the NAAQS. Additionally, monitoring trends show that their concentrations remain flat or are dropping. For ozone, we have monitors in the four corners* of the Portland Metro area and in the urban area both in a neighborhood and near the freeway.
*****The Southwest Washington Clean Air Agency has a monitor in Vancouver providing coverage for the NE part of the metro area.

For PM2.5, the metro area has grown substantially since DEQ did any type of area wide particulate survey and a PM2.5 monitoring survey will need to be done to determine if the existing monitors adequately represent the metro area. DEQ plans to perform an area wide survey during the winter of 2015-16. The PATS model and residential wood heating poll survey will be used to site the monitors.
For air toxics, the Portland Metro area continues to need more assessment. Over the past 11 years, DEQ has collected data next to the industrial areas of NW Portland and N. Portland and in the more residential areas in Hillsboro, N. Portland, SE Portland, SW Portland, and Beaverton. In 2015-16, we are going to collect air toxics data in Gresham and would like to collect data near an industrial area in SE Portland. We still have not assessed the southern part of the metro area around Oregon City and Tualatin. This data will be used to improve the PATS model which provides an even more thorough coverage of the Metro area.
We are still waiting on the most recent NATA before considering the rest of the state.

5.2.2. Salem CBSA

Salem CBSA area has 10% the state population and has one ozone monitor downwind of Salem (in Turner) and has one PM2.5 monitor (located in north Salem). One ozone monitor is sufficient to monitor ozone because ozone is more of a regional pollutant that forms into a haze and covers a large area. This is still in a good location because AIRPACT modeling shows that the wind pushes the plume into Turner over the existing monitor.
PM2.5 was shown to be representative of Salem when survey was done in the early 2000's. A new survey should be done to see if this monitor is still representative. This survey would be down on the priority list following the

Portland Metro area and communities near or above the NAAQS without recent surveys. These are listed in Table 10 above.
Salem's air toxics were assessed from 2008 to 2010 and there are no plans to reassess in the next five years.

5.2.3. Eugene CBSA

The Eugene CBSA has 9% of the population and has adequate coverage with three PM2.5 monitors and two ozone monitors in Eugene-Springfield, one PM2.5 in Cottage Grove, and one PM2.5 in Oakridge. Eugene-Springfield and Oakridge also continue to have PM10 monitors even though PM10 is well below the NAAQS. These monitors are only running because their SIPs require it. There PM10/PM2.5 correlations are very good so PM2.5 could be used as a surrogate if the PM10 monitors were discontinued. EPA has allowed DEQ to discontinue PM10 and use PM2.5 as a surrogate in Klamath Falls and Grants Pass with similar monitoring requirements and PM10/PM2.5 correlations. LRAPA will likely apply to EPA for a waiver to use this surrogate method for these areas within the next five years to free up resources for other pollutant monitoring.

LRAPA also strives to fund air toxics monitoring in Eugene for chronic health assessment and trending information. There are currently two monitoring sites in Eugene.

5.2.4. Medford - Grants Pass CBSA

Medford-Grants Pass CBSA has 7.4% of the population and is growing. The area has multiple PM2.5 monitors in both urban and rural areas. Many of the monitors are funded by the USFS. They also have downwind ozone. They have also had recent air toxics monitoring. Medford is near the PM2.5 NAAQS and will continue to need the PM2.5 FRM sampler (or FEM). Grants Pass is well below the NAAQS and DEQ would like to use the nephelometer alone to measure PM2.5 but we can't because we are using the PM2.5 FRM as the PM10 surrogate for the PM10 maintenance plan. The solution is to replace both the nephelometer and the PM2.5 FRM with a PM2.5 FEM which would be used for NAAQS, AQI, and PM10 surrogate.

DEQ monitored for air toxics in three locations in Medford from 2008 to 2011. DEQ does not plan to reassess Medford in the next five years.

5.2.5. Bend – Redmond CBSA

Bend-Redmond has 4.2 percent of the population and is growing. The area has PM2.5 monitors in Bend, Prineville, and Madras (in the summer). Redmond is rapidly growing and needs to be assessed to see if it also needs a permanent PM2.5 monitor.

DEQ has never assessed Bend for air toxics. We will wait until the EPA 2015 National Air Toxics Assessment is released in the fall to prioritize the next assessment communities. One of our criteria is to assess areas we have not monitored previously.

5.2.6. Coastal CBSAs

The coastal area CBSA's make up 4.9% of the state. This includes the Brookings, Tillamook, Newport, and Astoria CBSAs. The Eugene and Roseburg CBSAs include coastal areas but population counts in these areas are not easy to separate from their CBSAs. The coastal areas have very good ventilation and air pollution is believed to be readily moved away from the breathing zone. LRAPA monitored in Florence in 2008 and 2009 and found low PM2.5 levels. This further confirms that coastal monitoring is a lower priority than inland areas with high populations and poor ventilation. DEQ has no plans to expand monitoring to coastal areas in the next five years. The Siletz Tribe was monitoring for PM2.5 in Coos Bay over the last five years, so information is available.

DEQ has never assessed any coastal communities for air toxics. We will wait until the EPA 2015 National Air Toxics Assessment is released in the fall to prioritize the next assessment communities. One of our criteria is to assess areas we have not monitored previously, however, another criteria is to prioritize areas with poor ventilation and the coast has very good ventilation. It is unlikely that we will monitor for air toxics on the coast in the next five years.

5.2.7. Other Eastern Oregon CBSAs

Smaller CBSA's in Eastern Oregon have populations clustered around rural communities. Some of these have communities which are near or above the PM2.5 NAAQS because of residential wood heating and poor ventilation. These include the Burns, Klamath Falls, Lakeview, and Prineville. All of these need to have PM2.5 FRM monitoring for the next five years. Many other areas of Eastern Oregon have AQI PM2.5 monitors that are adequate to track air quality at a fraction of the cost. One community that might need assessment monitoring is Ontario. This has a large enough population and may have poor enough winter ventilation to be assessed for PM2.5. If assessment monitoring is funded, we may monitor in Ontario in the next five years. The rest of Eastern Oregon is lower priority monitoring areas because of low populations, low population growth, and relatively good air quality. DEQ will continue to monitor for PM2.5 for the AQI but not for NAAQS comparison in these areas.

DEQ monitors air toxics in La Grande as a rural trend site. This monitor is funded by EPA and will continue indefinitely. DEQ also monitored for air toxics in Klamath Falls in 2010.

For future air toxics monitoring, we will wait until the EPA 2015 National Air Toxics Assessment is released in the fall to prioritize the next assessment communities. One of our criteria is to assess areas we have not monitored previously, however, with the possible exception of Bend, it is unlikely we will monitor for air toxics in Eastern Oregon in the next five years.

6 Conclusion:

Oregon's population is mostly growing in Portland, the Willamette Valley, Deschutes County, and Jackson County, and these areas need to have new PM2.5 surveys to determine if the current monitoring sites are still representative of their airsheds. Whether we do the surveys will depend on funding and DEQ requested funding for surveys in the 2015-2017 biennial budget. This funding has not been determined at the time of this report.

DEQ would like to restart the assessment of areas in unmonitored communities which ended in 2009. This too will depend on funding and we requested funds in the 2015-17 biennium. Outside of Portland, the communities that need to be assessed are Redmond, Ontario, Woodburn and areas surrounding Salem.

Air toxics monitoring will continue at the National Air Toxics Trends sites (N. Portland and La Grande) and assessment monitoring will continue using demographics, emission inventory, modeling, meteorology, community need, and existing monitoring information to determine the next locations. This will be done in the fall of 2015 when the latest National Air Toxics Assessment information is available.

Finally, DEQ needs to upgrade our monitoring network with newer monitors and better communication hardware and software. We need to upgrade our AQI to be more robust and responsive to the public's needs. We need to have better temporal and spatial AQI coverage, possibly using lower cost (and lower accuracy) monitors to fill in the gaps between our existing monitors. We will strive for these goals but as always this depends on economical and political conditions that are not always in our control.

• Appendix A. Oregon Population

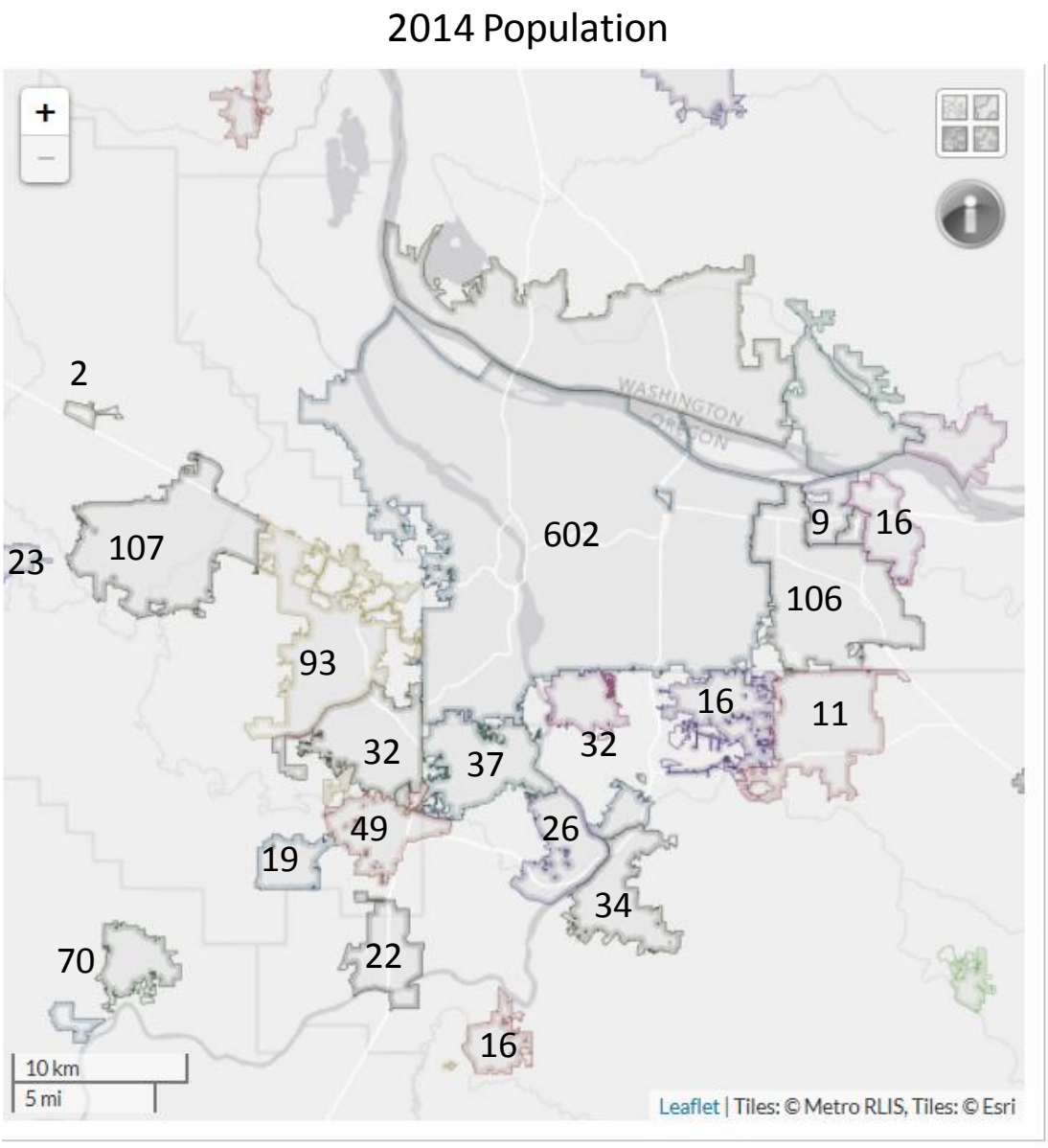
The table below shows the forecasted population growth by county .

Appendix A. 1. Percent of state population per county (2014 and forecasted for 2020).

	% of state population		
	2014	2020	Change
Baker	0.4%	0.4%	0.0%
Benton	2.2%	2.1%	-0.1%
Clackamas	9.9%	9.9%	0.1%
Clatsop	0.9%	0.9%	0.0%
Columbia	1.3%	1.3%	0.0%
Coos	1.6%	1.5%	-0.1%
Crook	0.5%	0.5%	0.0%
Curry	0.6%	0.5%	0.0%
Deschutes	4.2%	4.3%	0.1%
Douglas	2.8%	2.7%	0.0%
Gilliam	0.0%	0.0%	0.0%
Grant	0.2%	0.2%	0.0%
Harney	0.2%	0.2%	0.0%
Hood River	0.6%	0.6%	0.0%
Jackson	5.3%	5.3%	0.0%
Jefferson	0.6%	0.6%	0.0%
Josephine	2.1%	2.1%	0.0%
Klamath	1.7%	1.6%	-0.1%
Lake	0.2%	0.2%	0.0%
Lane	9.1%	8.9%	-0.2%
Lincoln	1.2%	1.2%	0.0%
Linn	3.0%	3.0%	0.0%
Malheur	0.8%	0.8%	0.0%
Marion	8.2%	8.4%	0.1%
Morrow	0.3%	0.3%	0.0%
Multnomah	19.3%	19.0%	-0.3%
Polk	2.0%	2.1%	0.1%
Sherman	0.0%	0.0%	0.0%
Tillamook	0.6%	0.6%	0.0%
Umatilla	2.0%	2.0%	0.0%
Union	0.7%	0.7%	0.0%
Wallowa	0.2%	0.2%	0.0%
Wasco	0.7%	0.6%	0.0%
Washington	14.1%	14.6%	0.5%
Wheeler	0.0%	0.0%	0.0%
Yamhill	2.6%	2.7%	0.1%

The map below shows the Portland Metro area 2014 population. The Portland Metro area has 47% of the state's population.

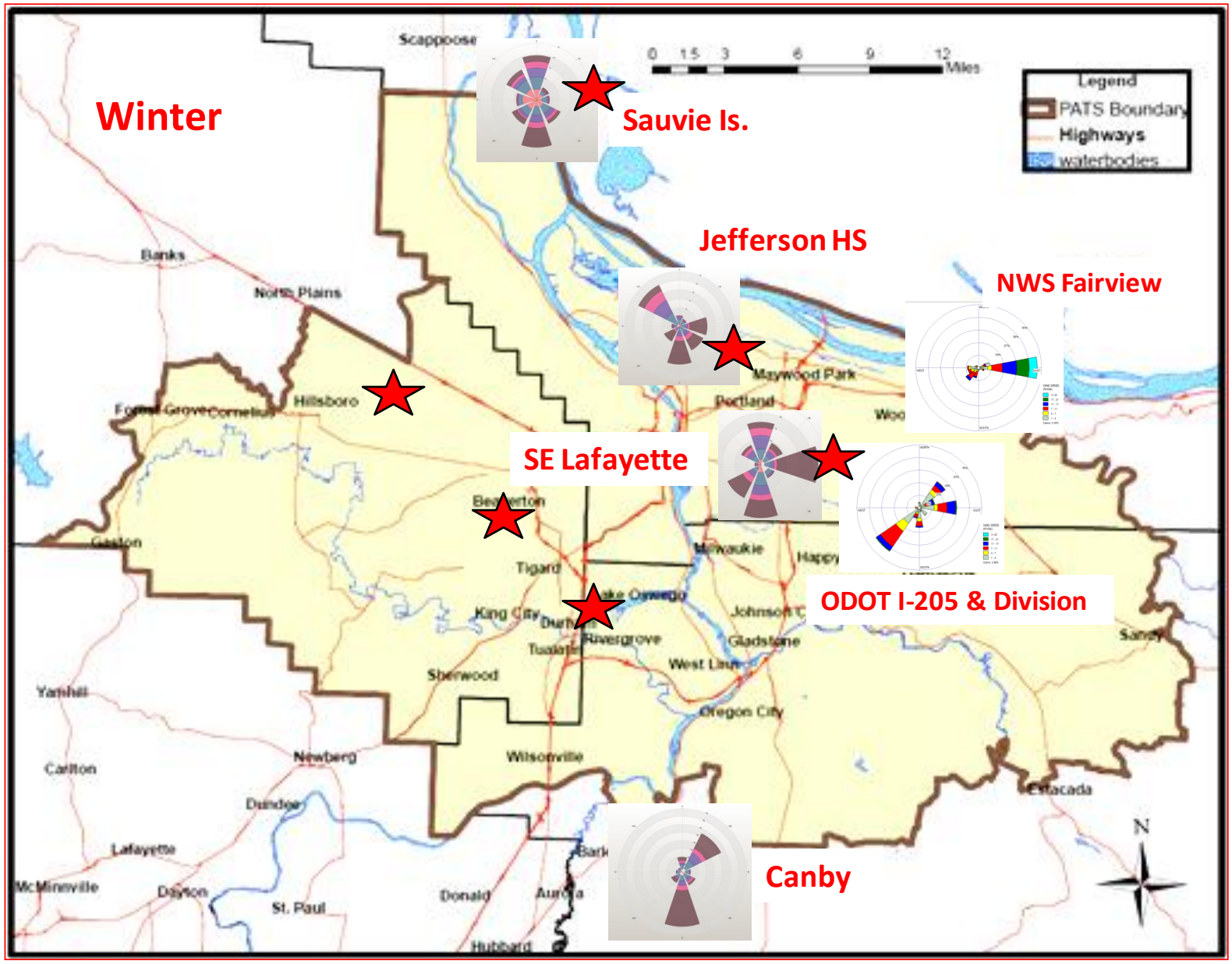
Appendix A. 2 Portland Metro's 2014 Population by city.



Appendix B. Meteorology data

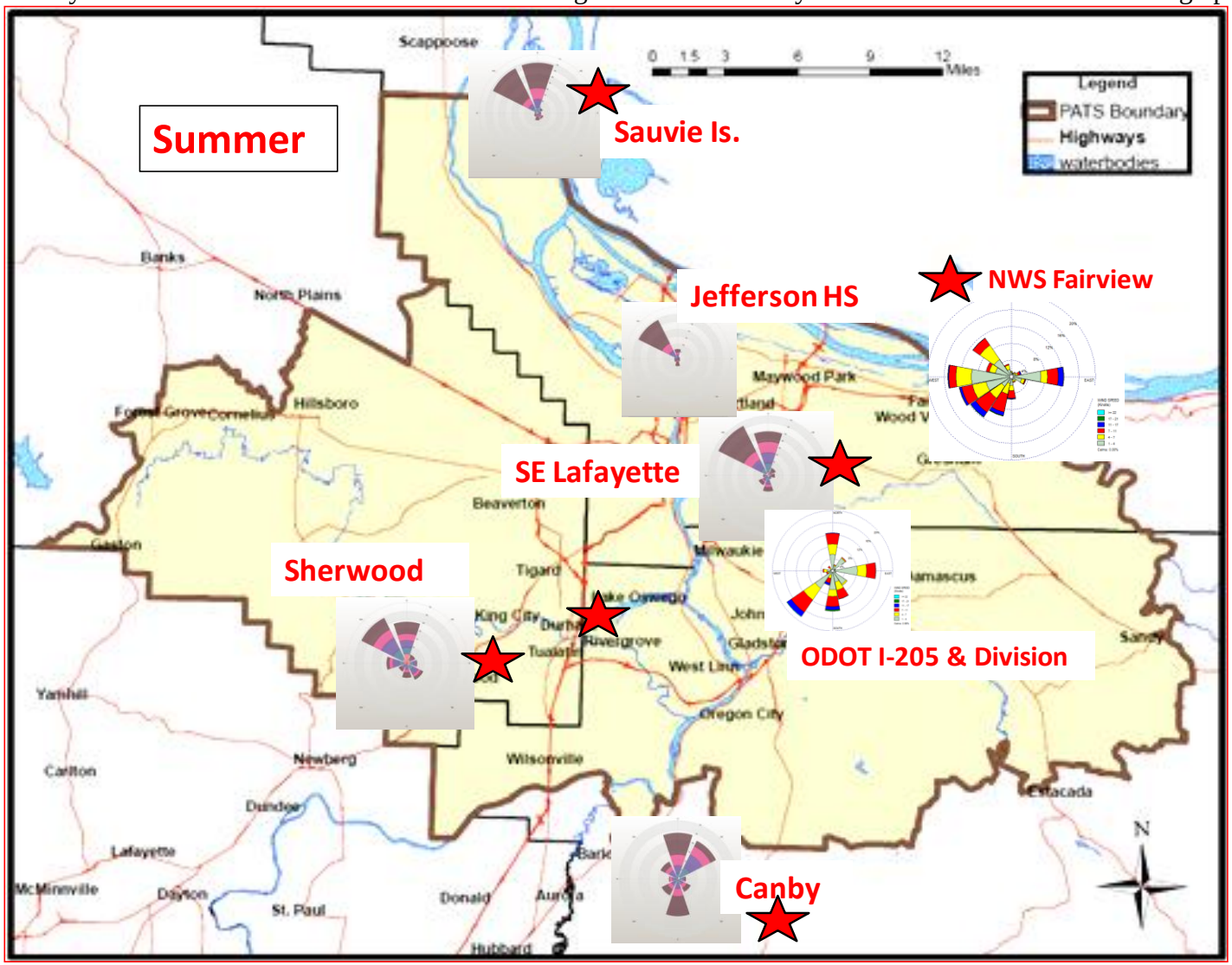
The following figures show the boundaries of the various Oregon communities along with their wind roses. These provide an indication as to the air flow in each community.

The winter wind roses for the Portland Metro area show variable winds with the exception of strong winds out of the gorge and SW and NE winds in the south. The worse air quality occurs when winds are very low.



Appendix B. 1 2014 October through February wind roses for the Portland Metro Area.

The summer wind rose shows predominant winds from the NW. The ozone monitor located in Canby usually has the highest concentrations and is correctly located. The Sherwood monitor is measuring the Tualatin Valley ozone. Sauvie Island is measuring upwind air.

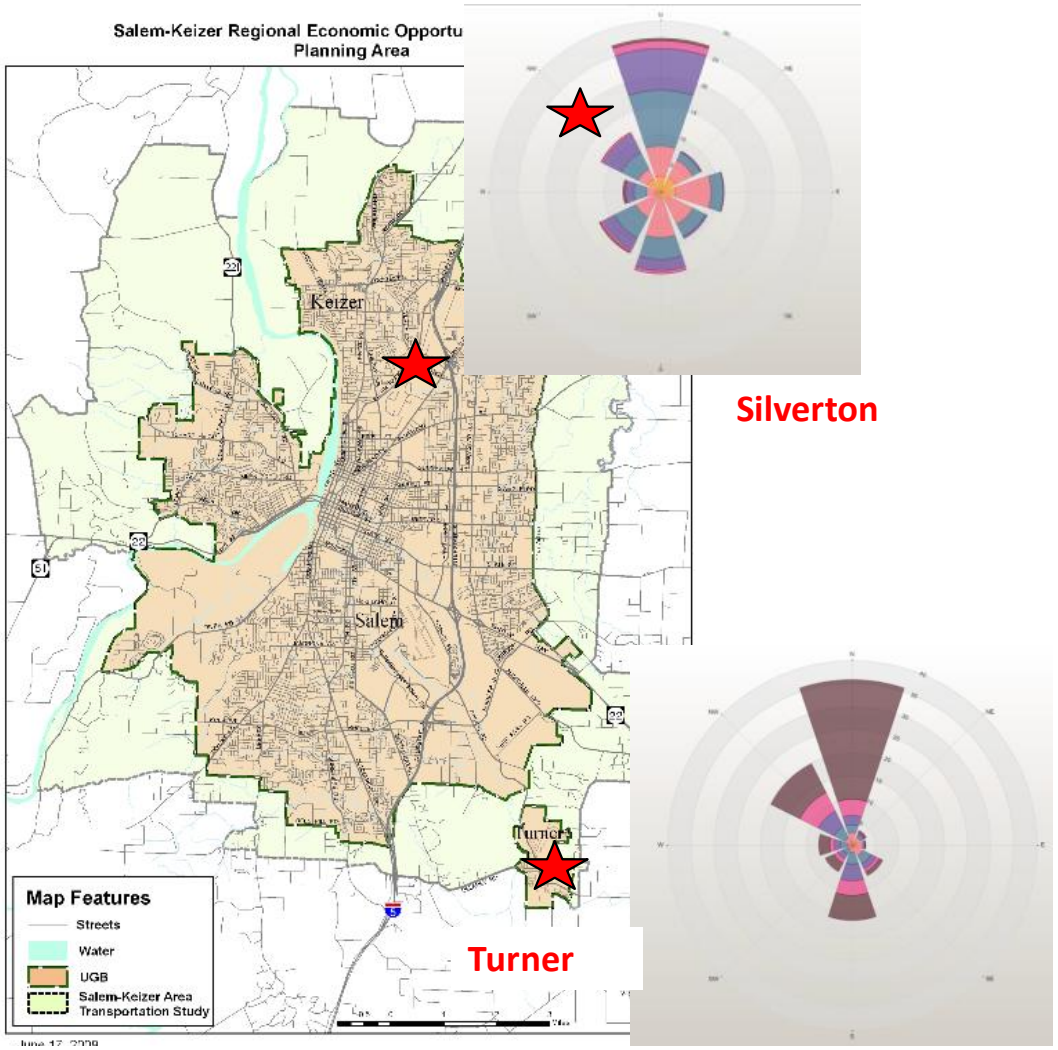


Appendix B. 2 2014 March through September wind roses for the Portland Metro Area.

In Salem the summer wind direction is predominantly from the north and northwest. Turner is to the SE of Salem and is catching most of the Salem plume. I-5 is directly south of town where the plume may also be, but the nitric oxide from the traffic is quenching the ozone and this would not be the highest reading. DEQ does not have a meteorology station in the winter.

Summer

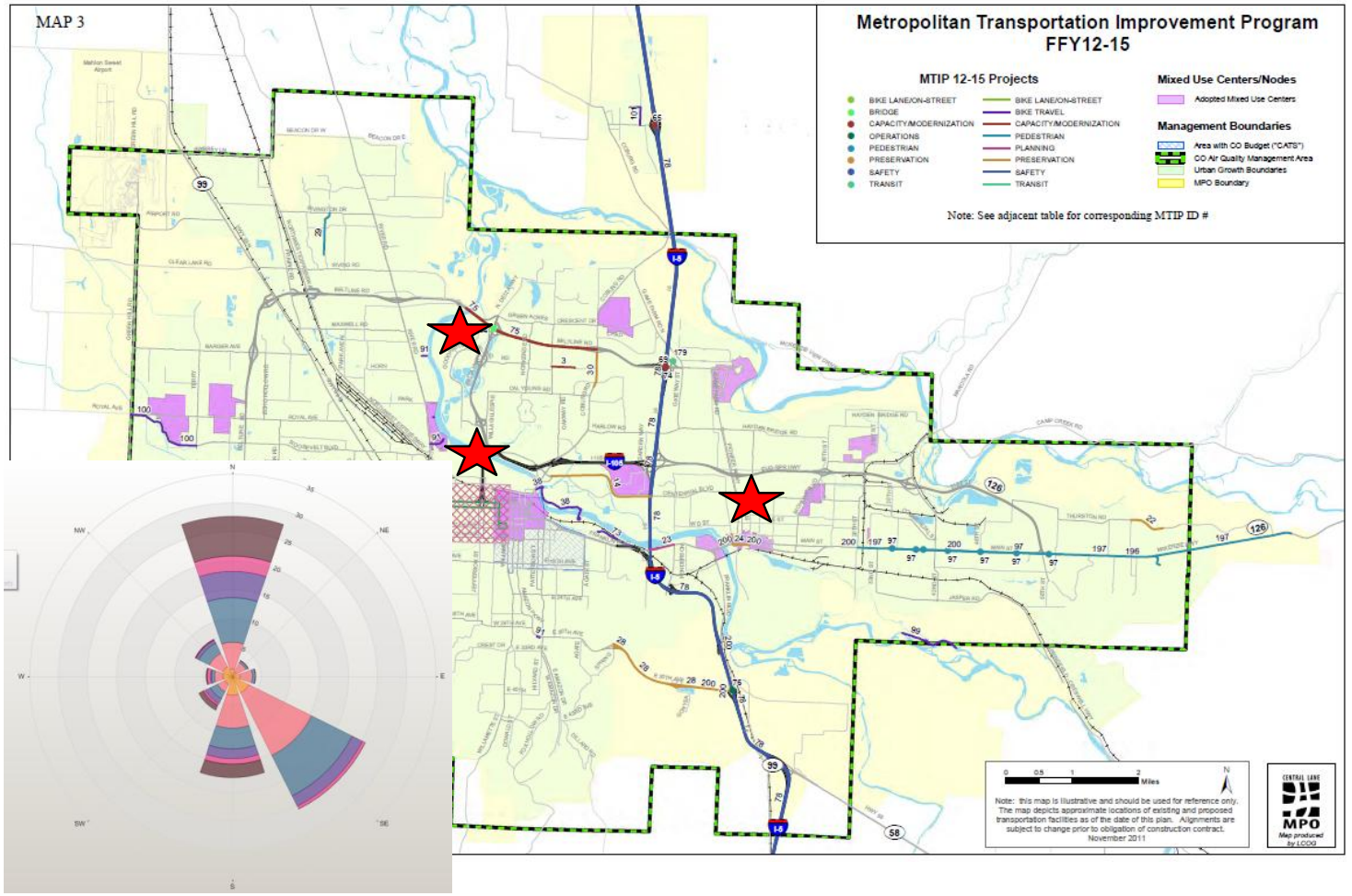
Salem/Keizer Windrose



Appendix B. 3. 2014 March through September wind roses for the Salem/Kaizer Area

For Eugene, the predominant winter wind direction is north and south. The monitors are in the center of town which seems like a good location.

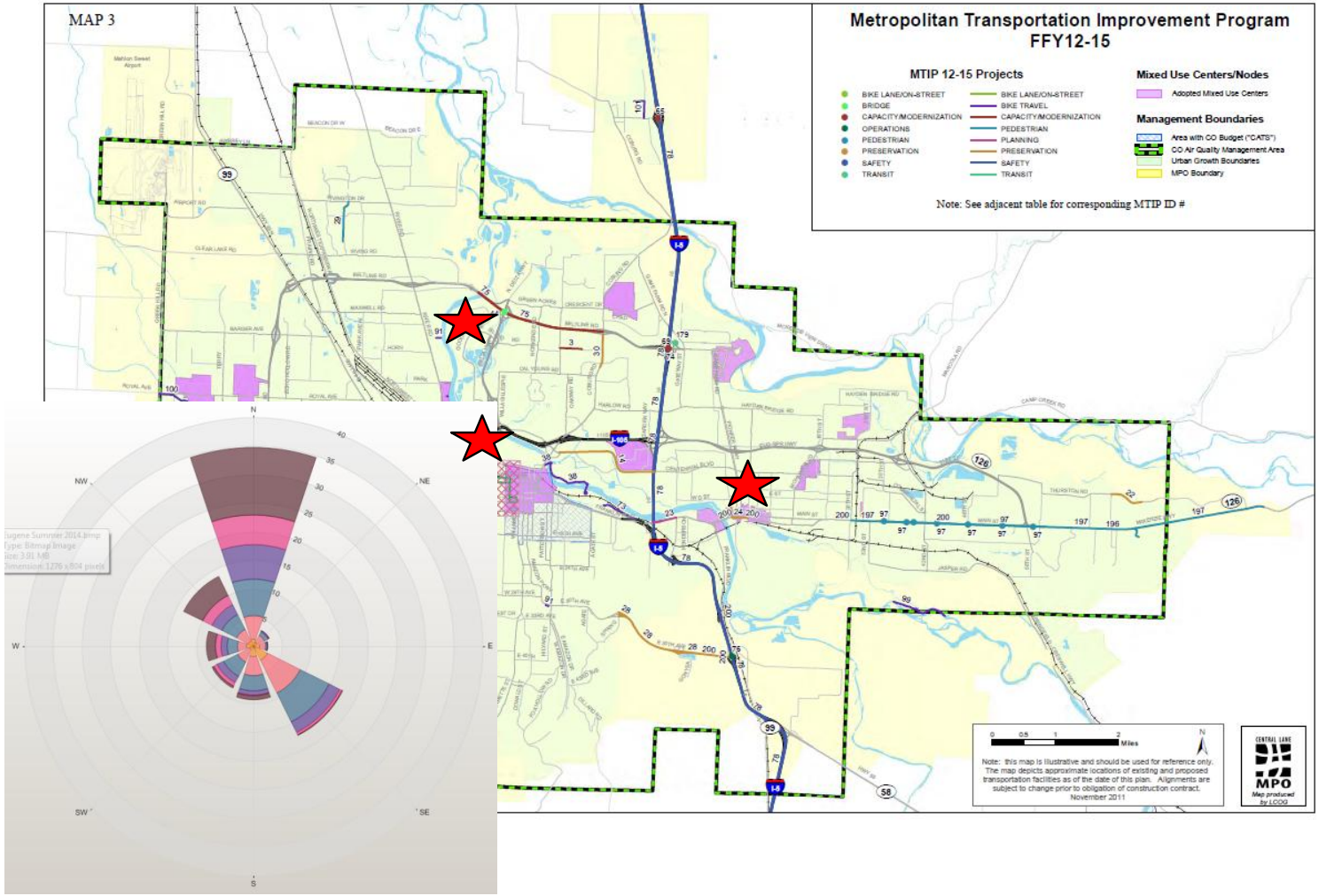
Eugene/Springfield Winter Wind Rose



Appendix B. 4 Eugene/Springfield 2014 Winter Wind Rose

For Eugene, the predominant summer wind direction is from the south. The ozone monitor is south of Eugene, in a downwind location.

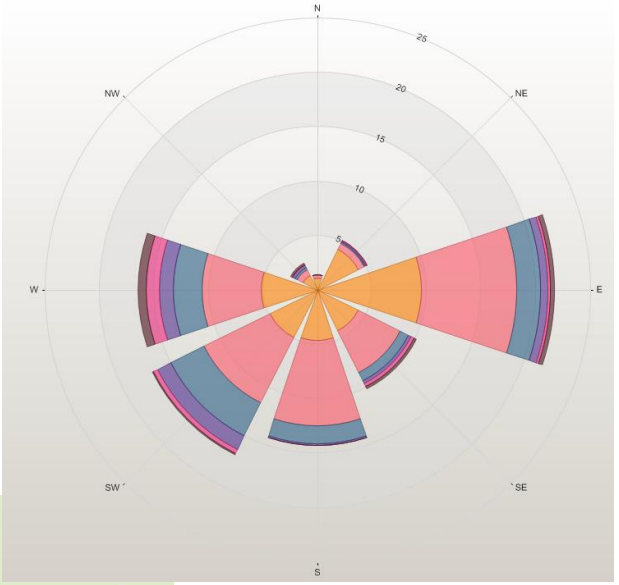
Eugene/Springfield Summer Wind Rose



Appendix B. 5 Eugene/Springfield 2014 Summer Wind Rose

For Oakridge, the predominant winter wind direction is variable because the town is in a canyon with poor ventilation. The hill is to the north.

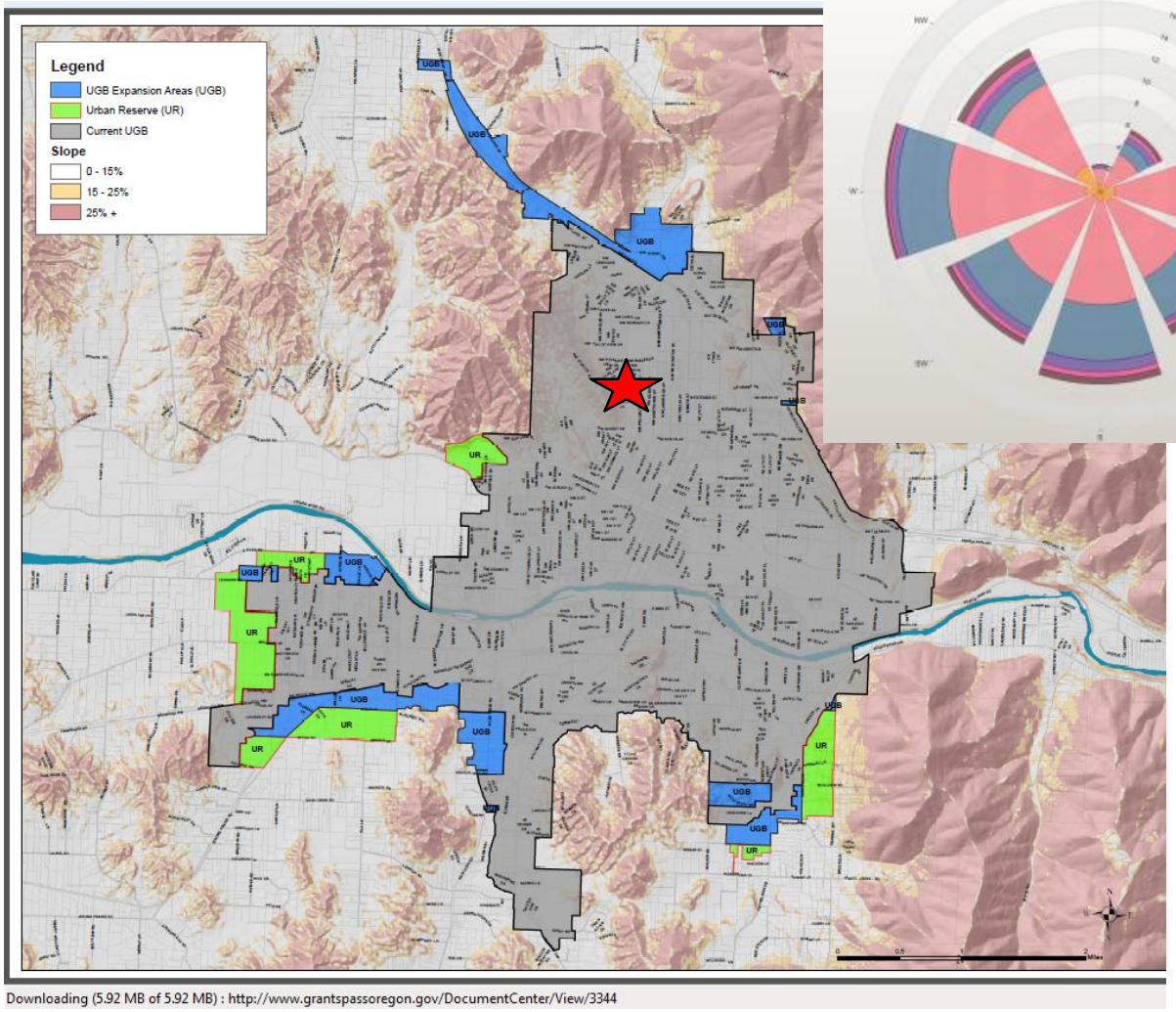
Oakridge Winter Wind Rose



Appendix B. 6 Oakridge 2014 Summer Wind Rose

For Grants Pass, the predominant winter, wind direction is variable because it is in a valley. The monitoring site is in a neighborhood and is representative.

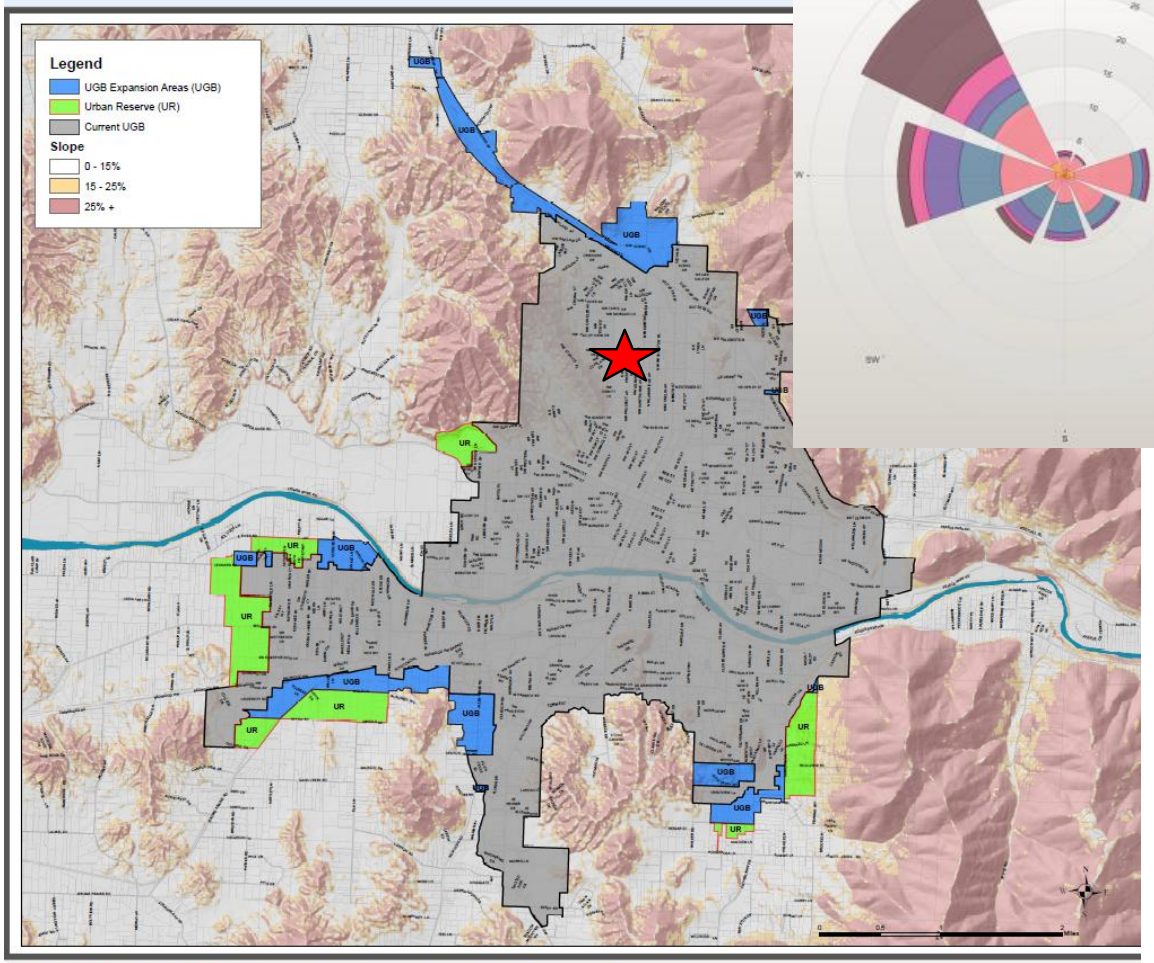
Grants Pass Winter Wind Rose



Appendix B. 7 Grants Pass 2014 Winter Wind Rose

The predominant wind direction in summer is from the NW and west. This is noat as important because of low summer pollution levels aside from forest fire smoke.

Grants Pass Summer Wind Rose



Appendix B. 8 Grants Pass 2014 Summer Wind Rose

For Medford, the predominant winter, wind direction is variable because it is in a valley. The monitoring site is in a neighborhood and is representative.

Medford Winter Wind Rose

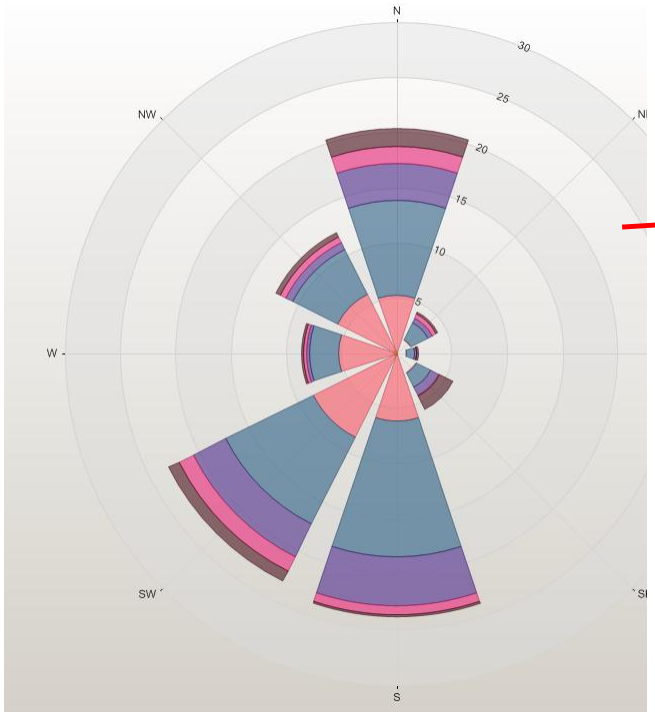
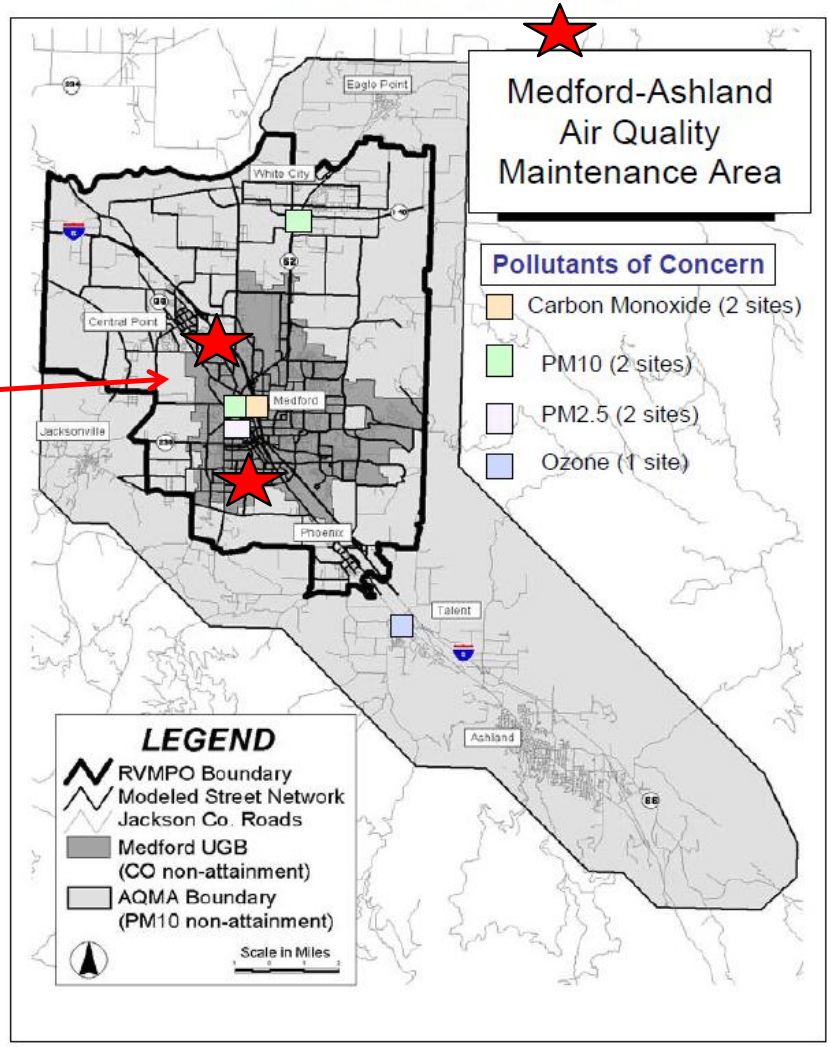


Figure 8: Map of Medford-Ashland AQMA



Medford-Ashland AQMA PM_{10} SIP Page 3

Appendix B. 9 Medford 2014 Winter Wind Rose

The predominant wind direction is from the north and northwest. The ozone site is south of Medford and is correctly located.

Medford Summer Wind Rose

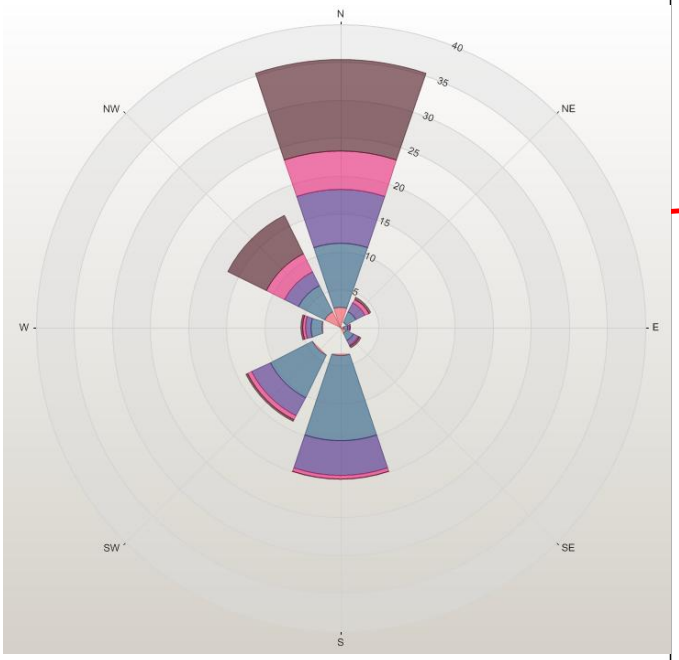
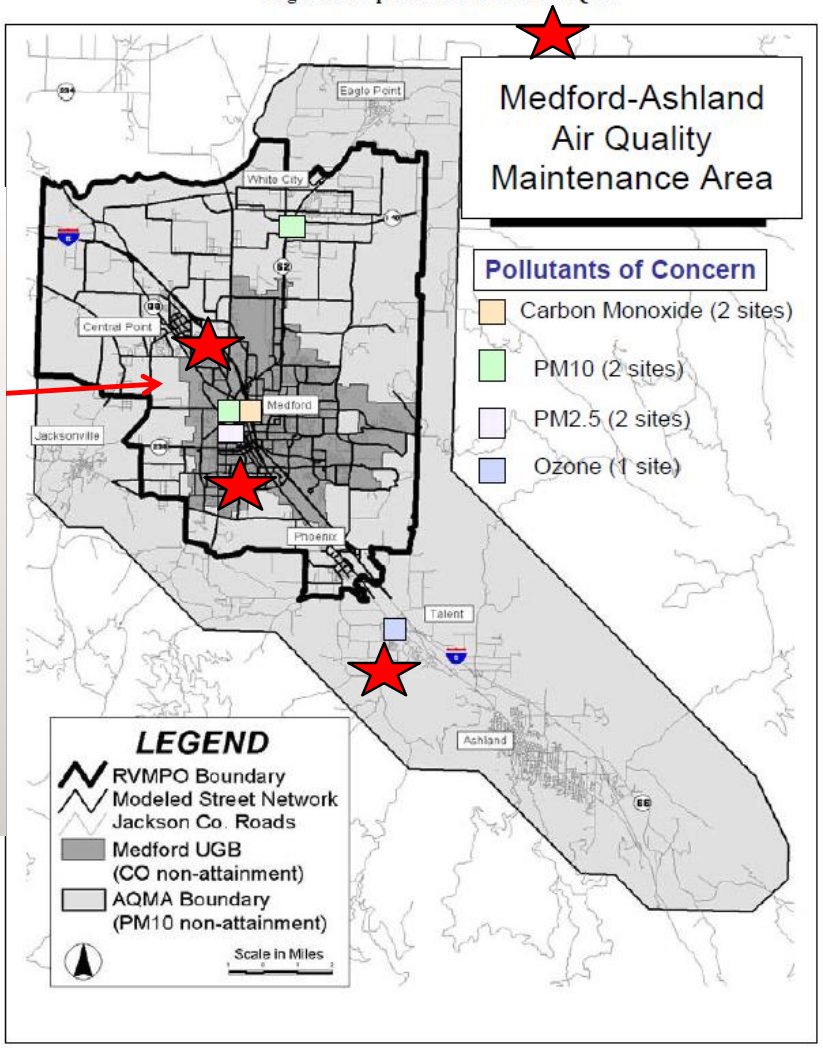


Figure 8: Map of Medford-Ashland AQMA



Medford-Ashland AQMA PM_{10} SIP Page 3

Appendix B. 10 Medford 2014 Summer Wind Rose

Medford Spring Wind Rose

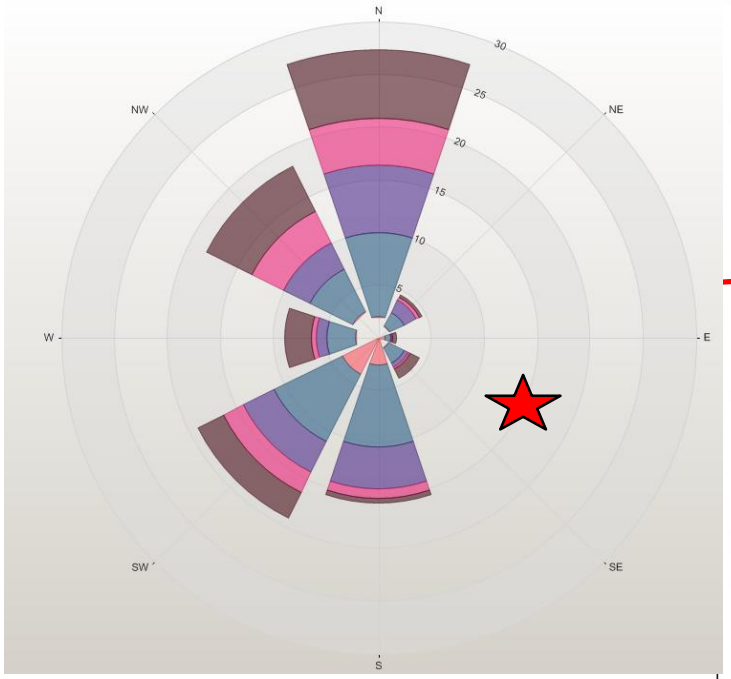
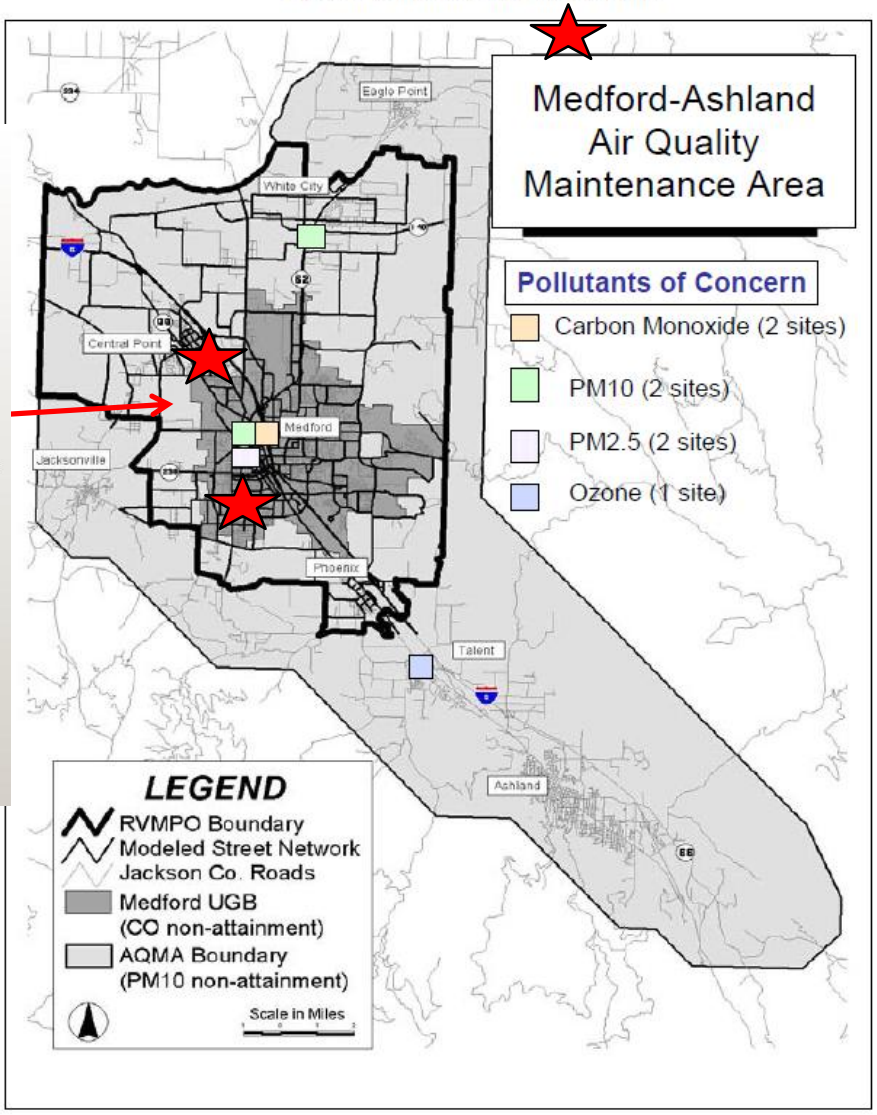


Figure 8: Map of Medford-Ashland AQMA

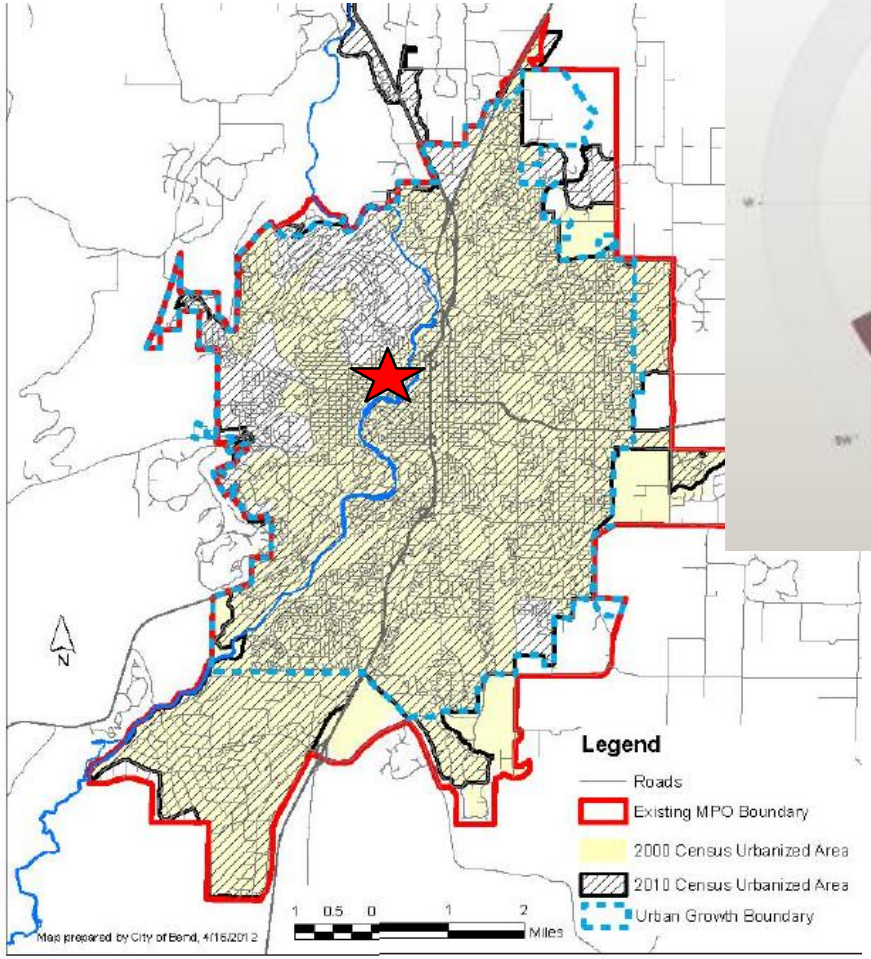


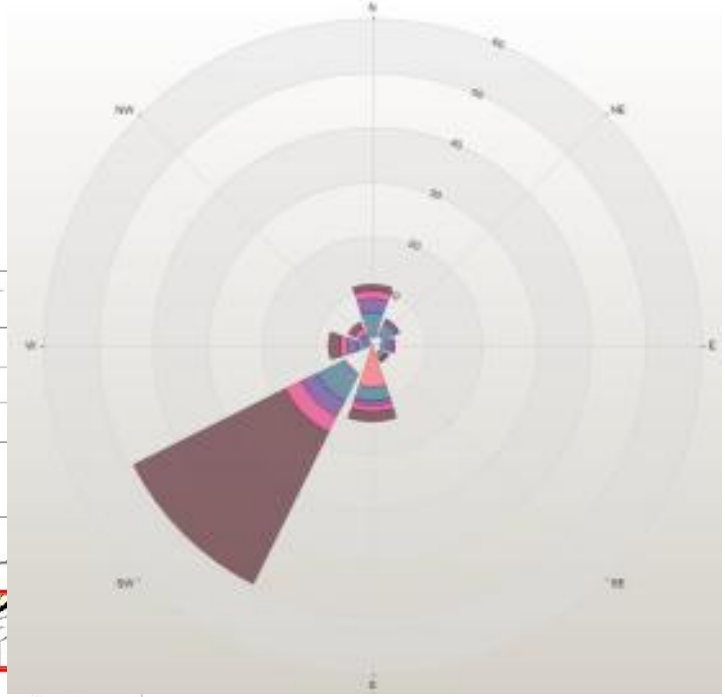
Medford-Ashland AQMA PM_{10} SIP Page 3

Appendix B. 11 Medford 2014 Spring Wind Rose

The predominant winter wind direction in Bend is from the SW. Much of the rest of the winter, Bend had variable low wind speeds. The monitoring site is in the middle of Bend and may be missing some of the impact from the newer neighborhoods in Bend to the Northeast.

Bend Winter Wind Rose

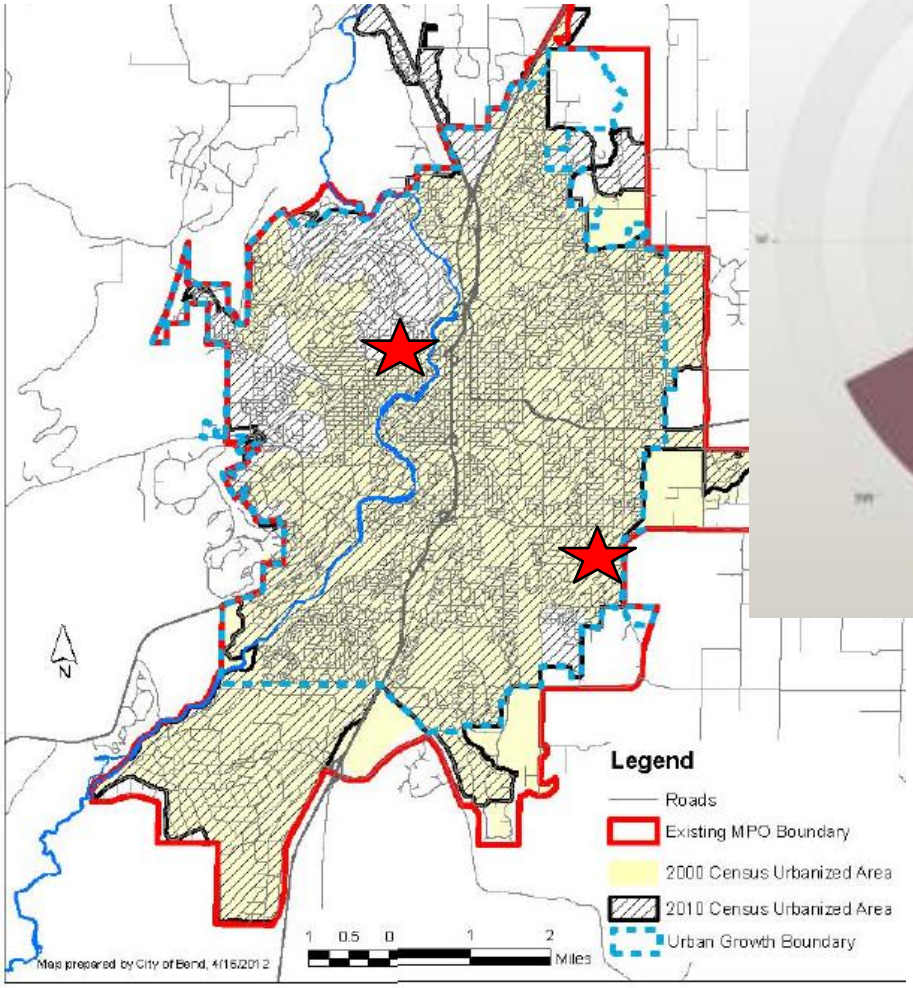


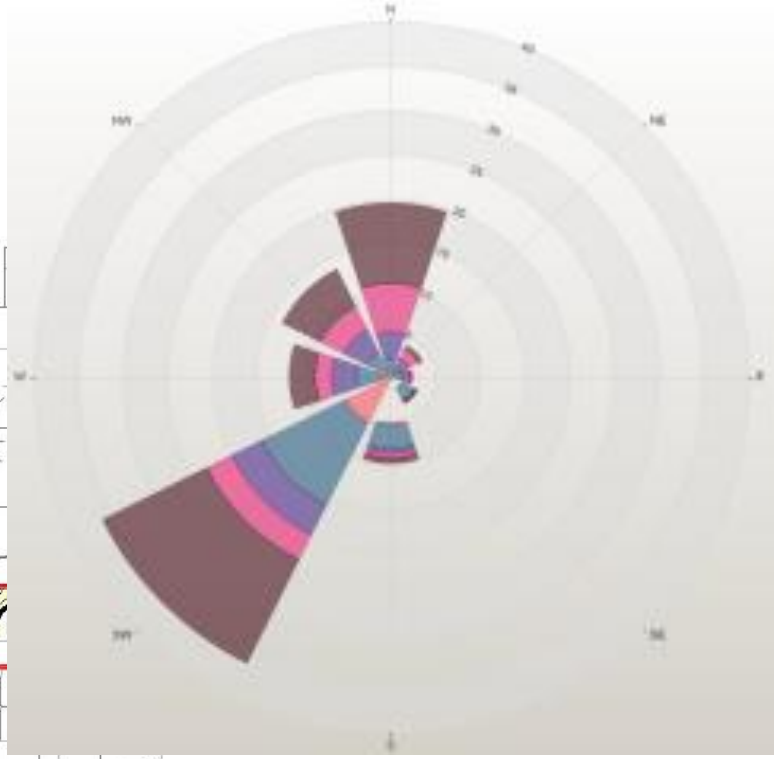


Appendix B. 12 Bend 2014 Winter Wind Rose

Bend's summer wind rose shows winds from the North to the southwest. The monitor is located on the edge of the SE side of town. This site is located in a good location to measure ozone.

Bend Summer Wind Rose

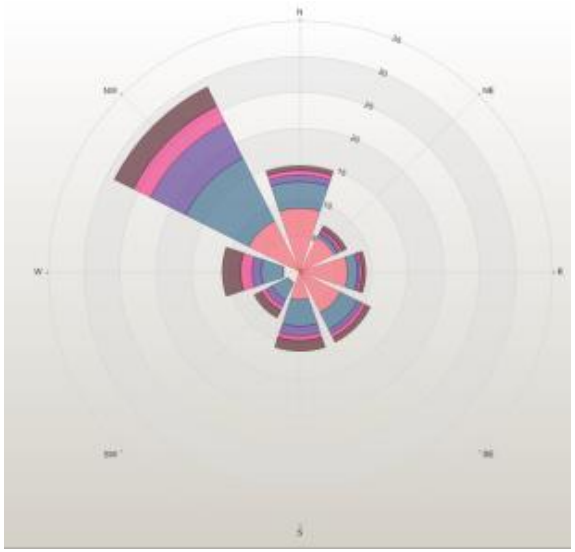




Appendix B. 13 Bend 2014 Summer Wind Rose

The predominant winter, wind direction in Klamath Falls is from the NW or is variable with low wind speeds. The current site is in a neighborhood downwind of the downtown to the NW so it measures impact from both sources.

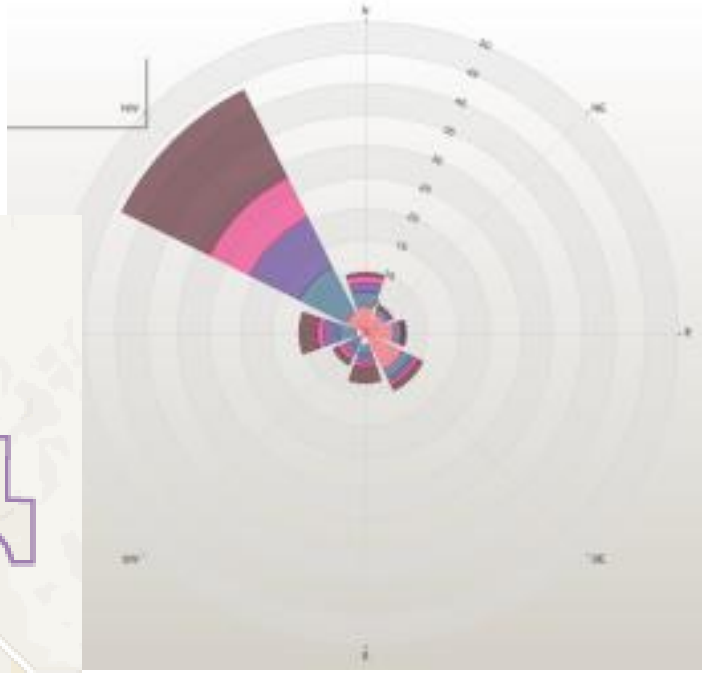
Klamath Winter Wind Rose

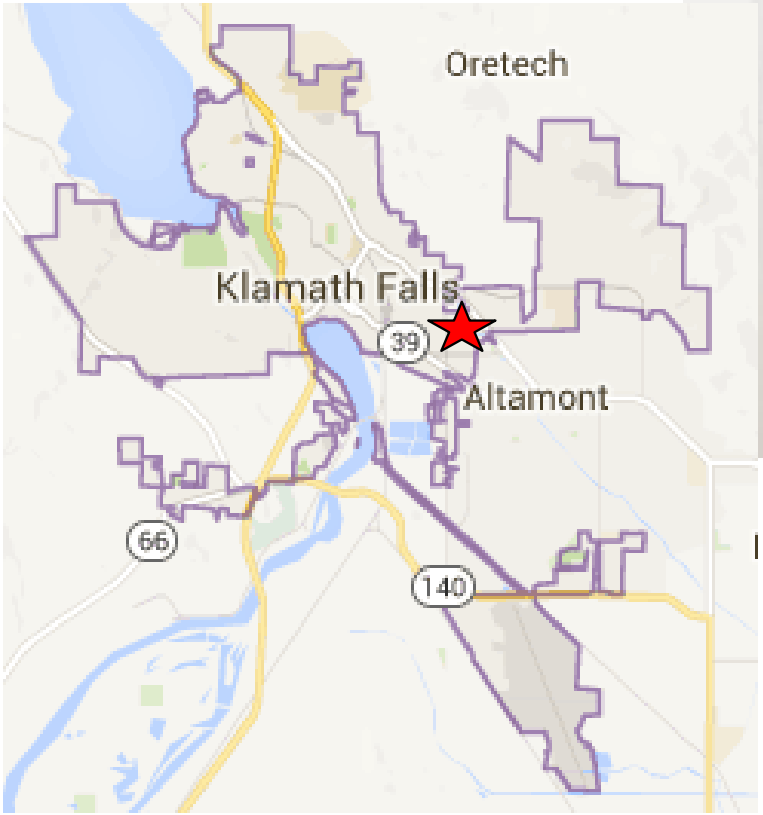


Appendix B. 14 Klamath Falls 2014 Winter Wind Rose

Klamath Falls summer wind direction is predominantly from the NW. There is very little pollution during the summer other than forest fire smoke and some ag burning.

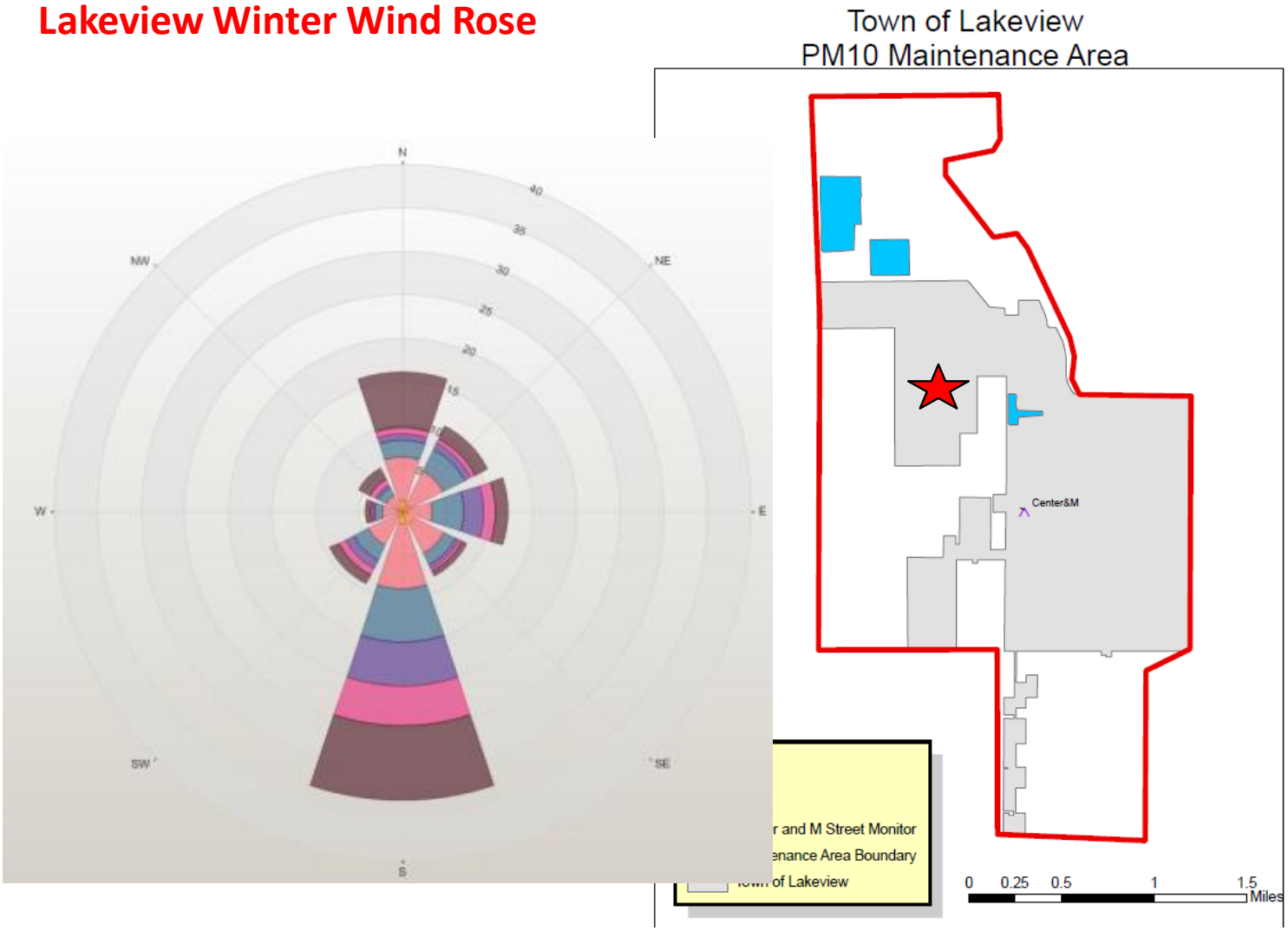
Klamath Summer Wind Rose





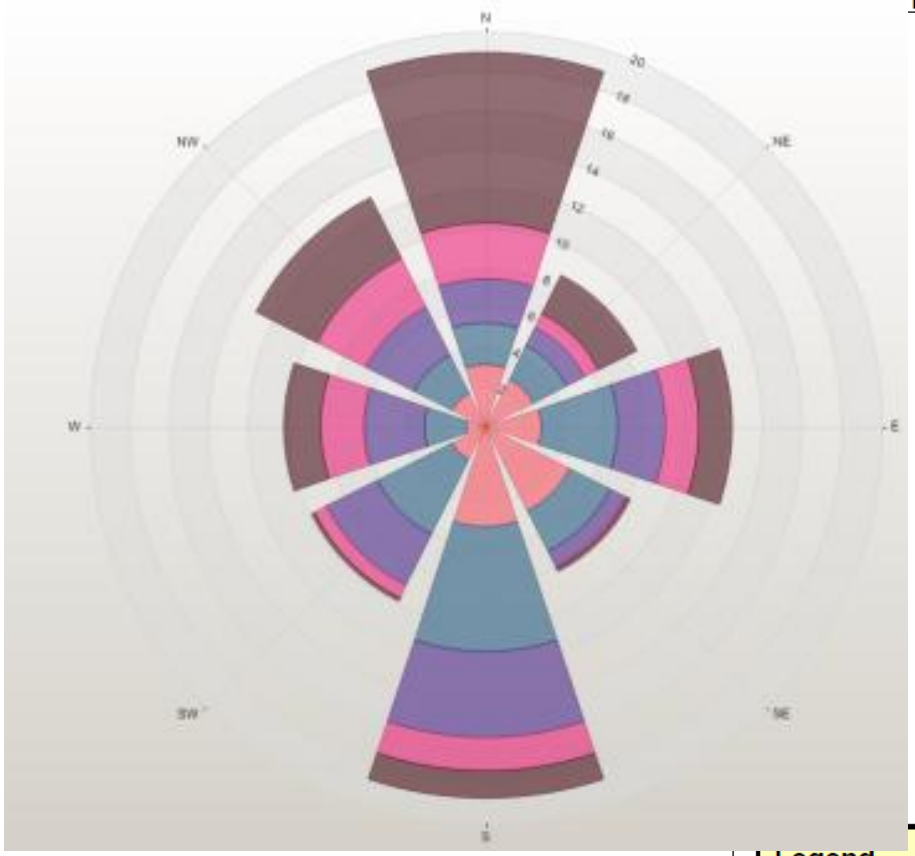
Appendix B. 15 Klamath Falls 2014 Summer Wind Rose

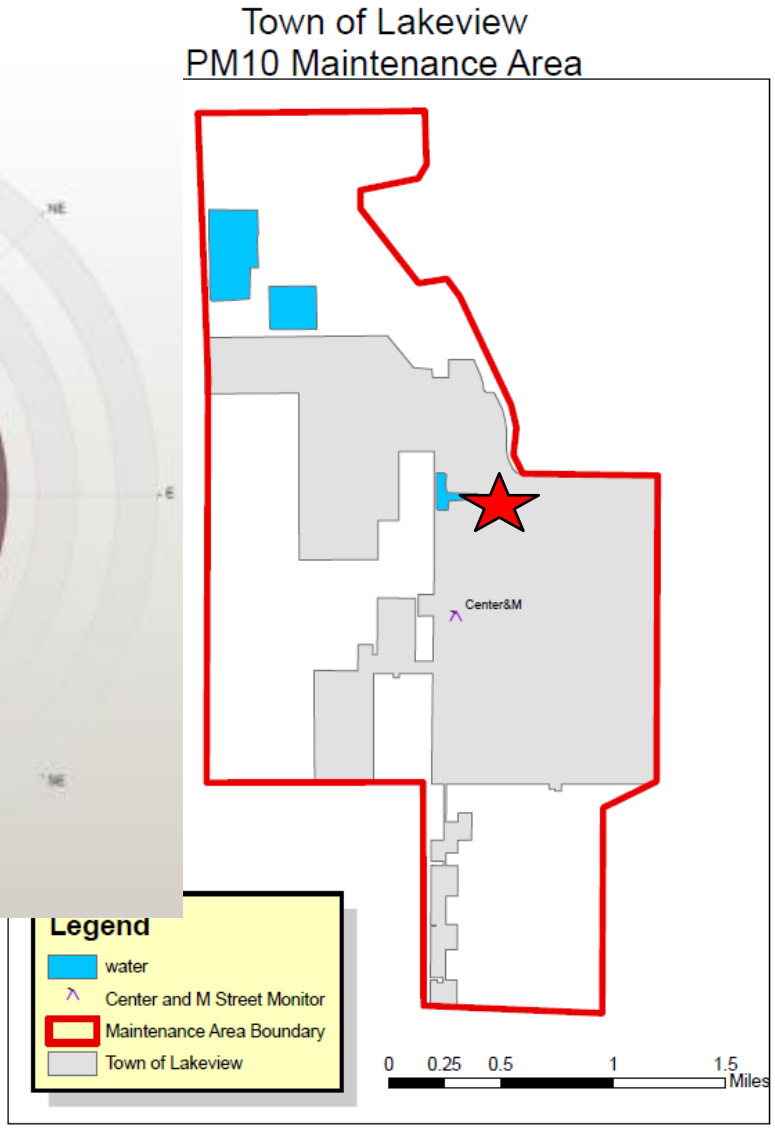
Lakeview's winter, wind direction is mostly from the South. The site is located in a neighborhood and measures very localized sources. The wind direction does not really impact the monitor.



Appendix B. 16 Lakeview 2014 Winter Wind Rose

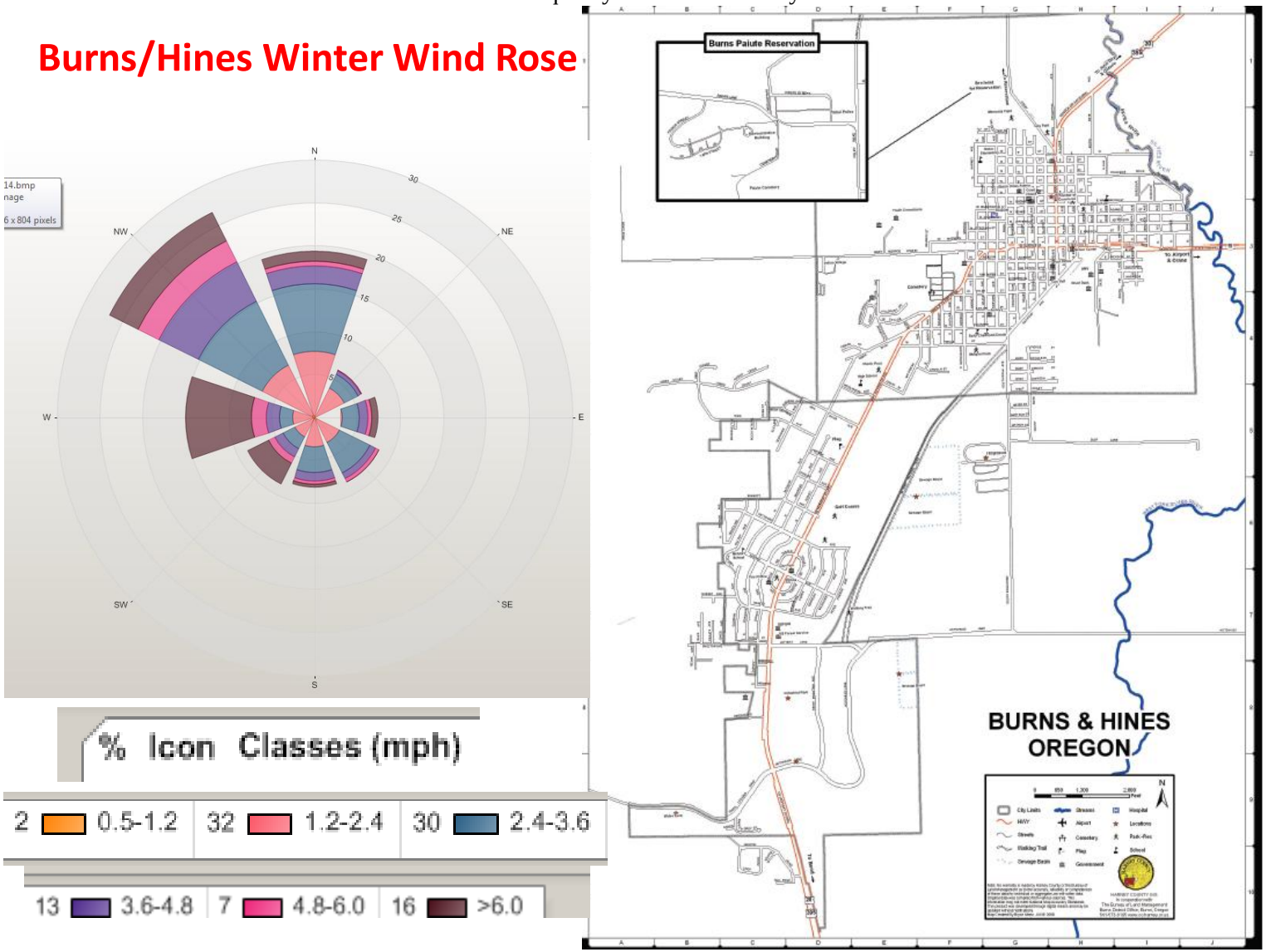
Lakeview Summer Wind Rose





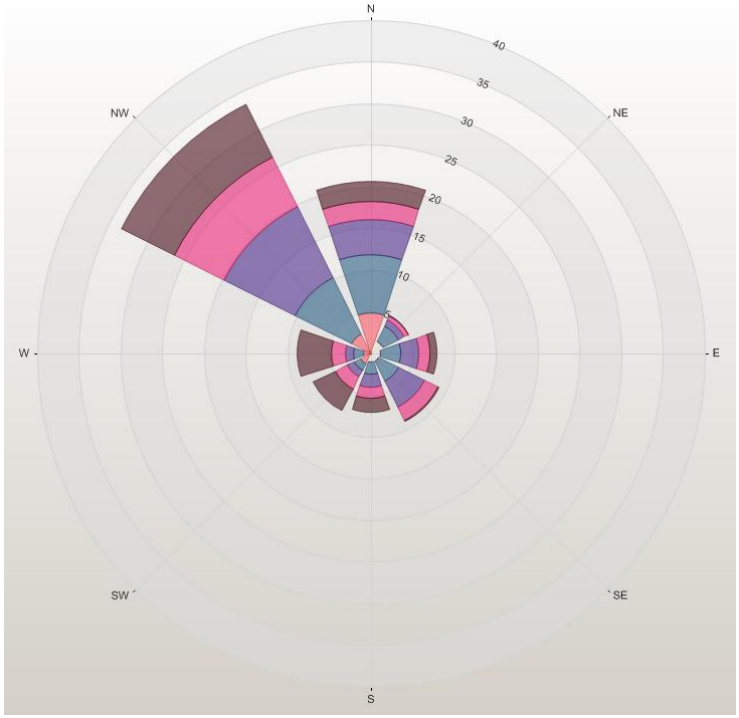
Appendix B. 17 Lakeview 2014 Summer Wind Rose

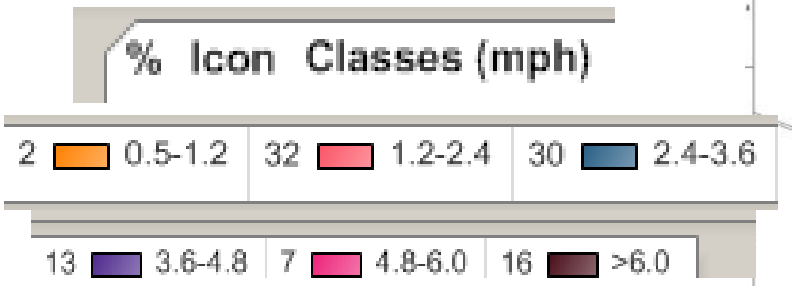
ghborhood in the NE part of town. Burns is a small town and the monitor is well situated to measure the air quality for the community.

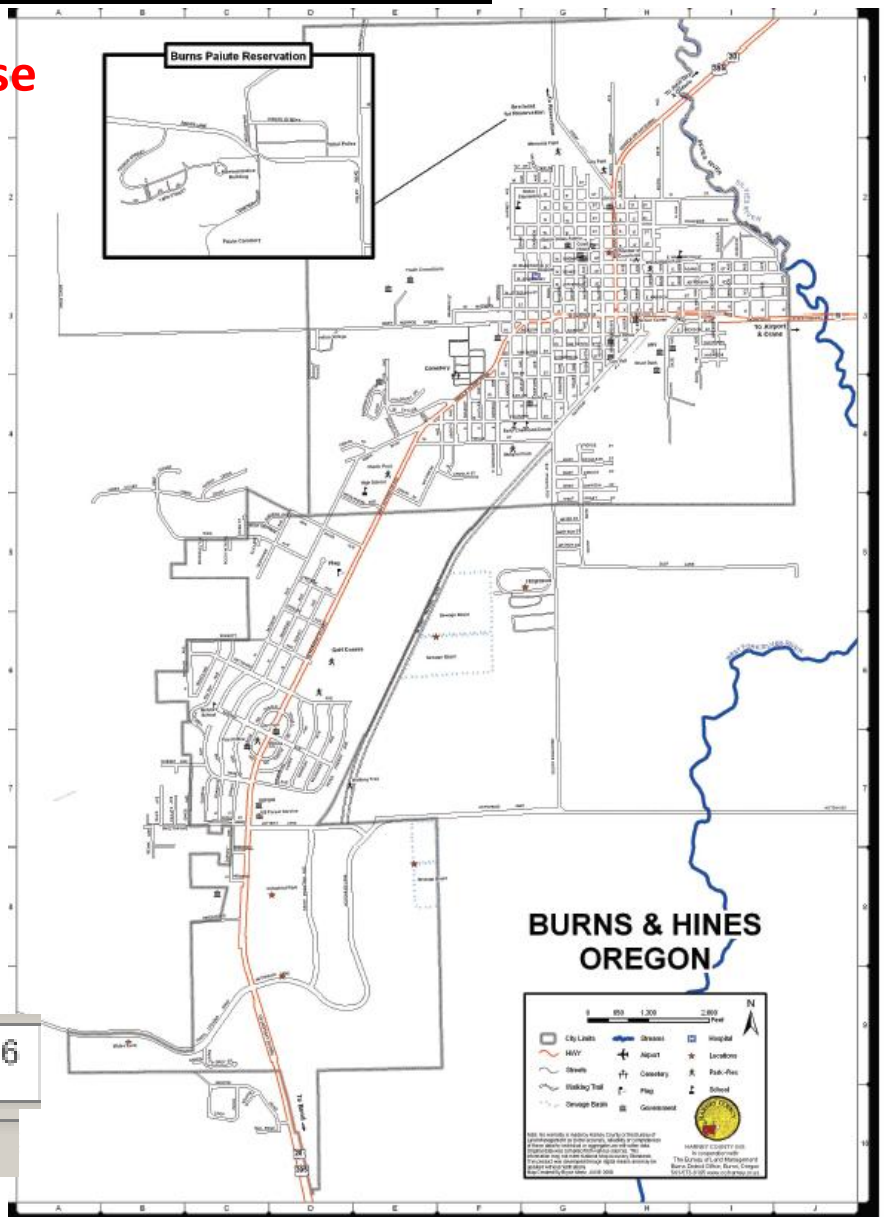


Appendix B. 18 Burns/Hines 2014 Winter Wind Rose

Burns/Hines Summer Wind Rose



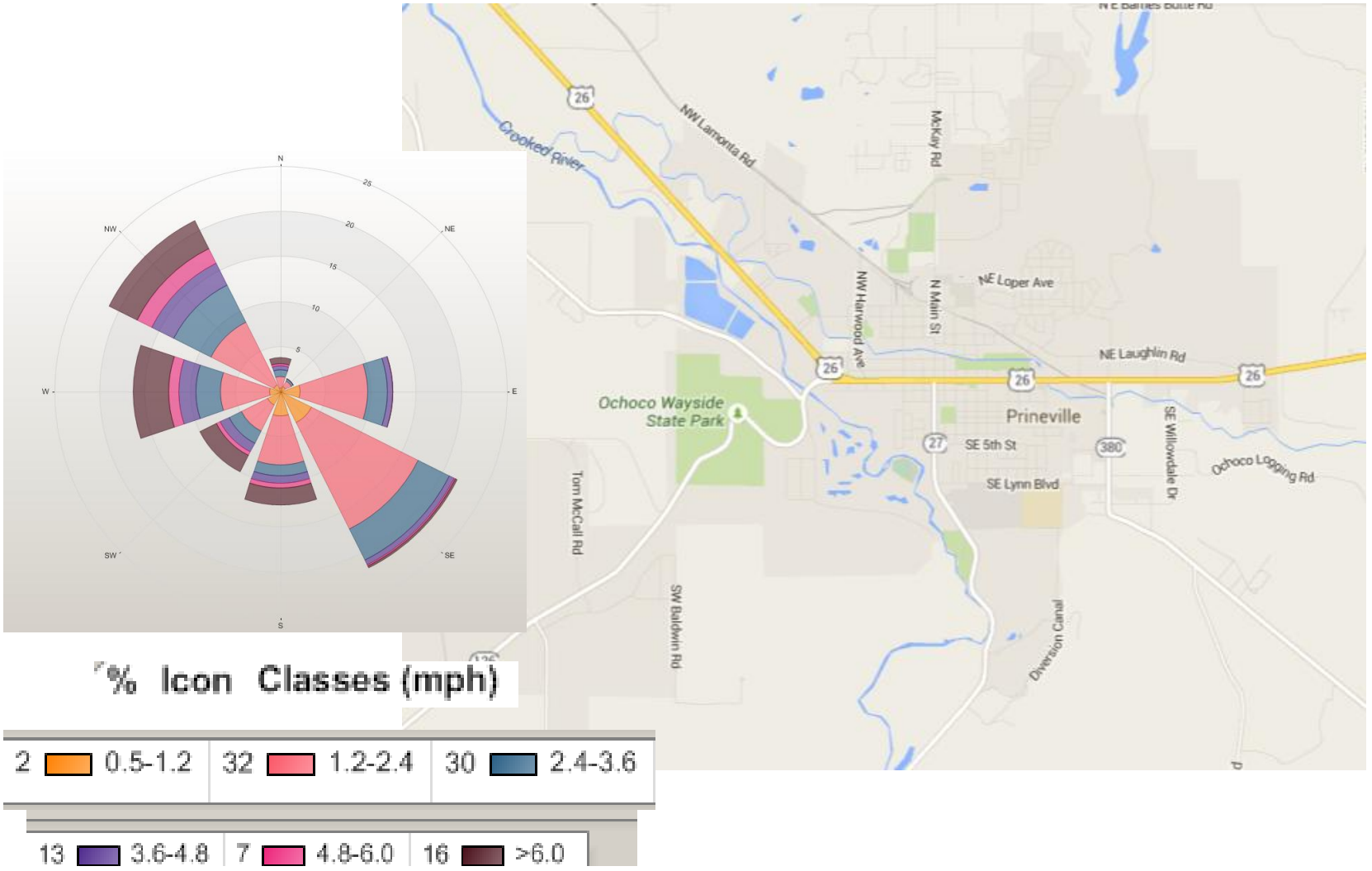




Appendix B. 19 Burns/Hines 2014 Summer Wind Rose

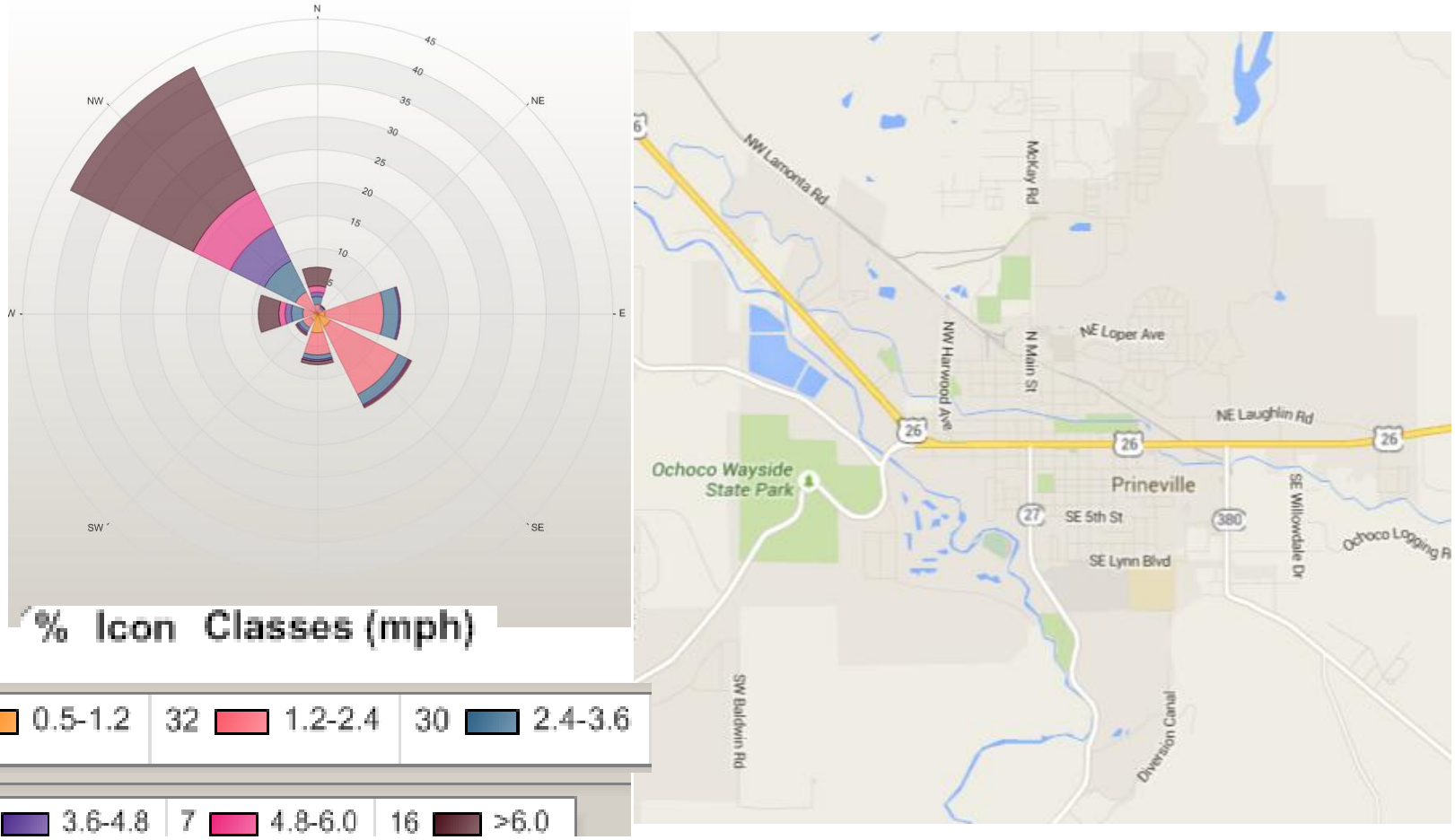
The predominant winter, wind direction is variable and since the site is located in the middle of town in a neighborhood it is well sited.

Prineville Winter Wind Rose



Appendix B. 20 Prineville 2014 Winter Wind Rose

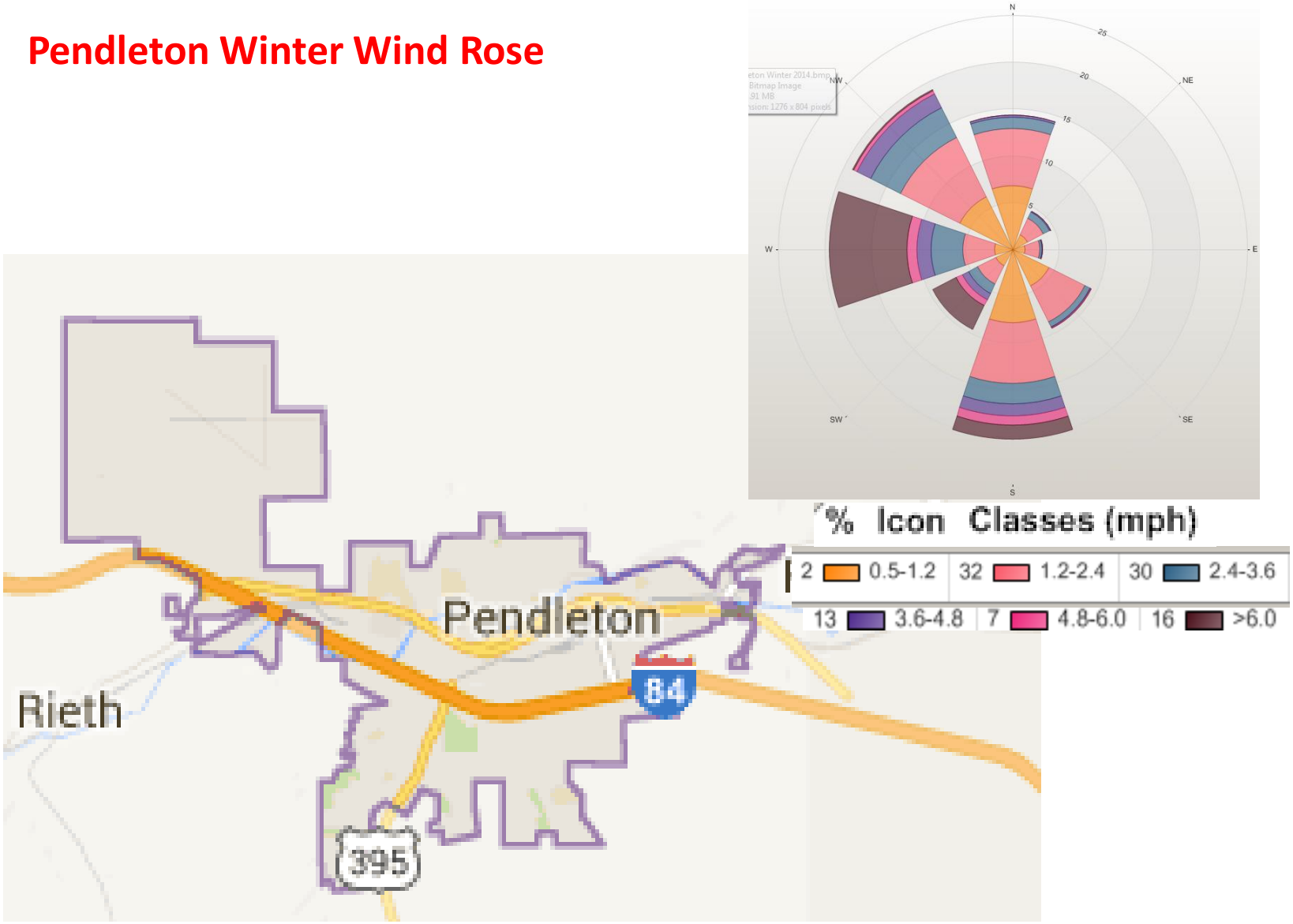
Prineville Summer Wind Rose



Appendix B. 21 Prineville 2014 Summer Wind Rose

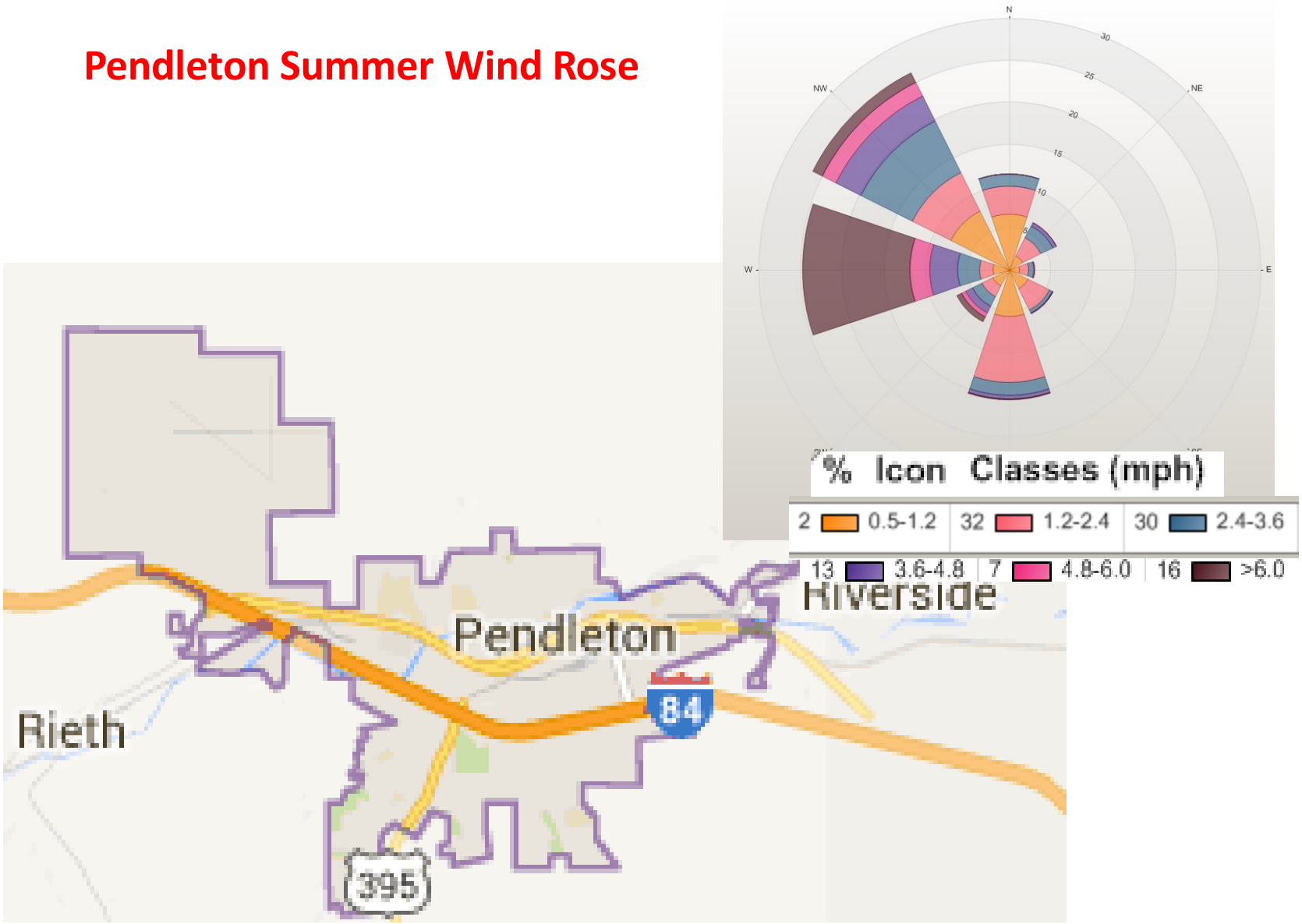
Pendleton's winter wind direction is variable and the site is in a neighborhood and is well sited.

Pendleton Winter Wind Rose



Appendix B. 22 Pendleton 2014 Winter Wind Rose

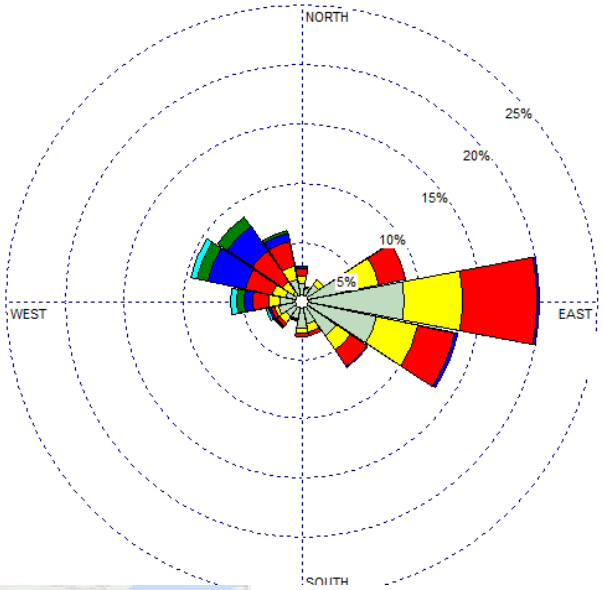
Pendleton Summer Wind Rose



Appendix B. 23 Pendleton 2014 Summer Wind Rose

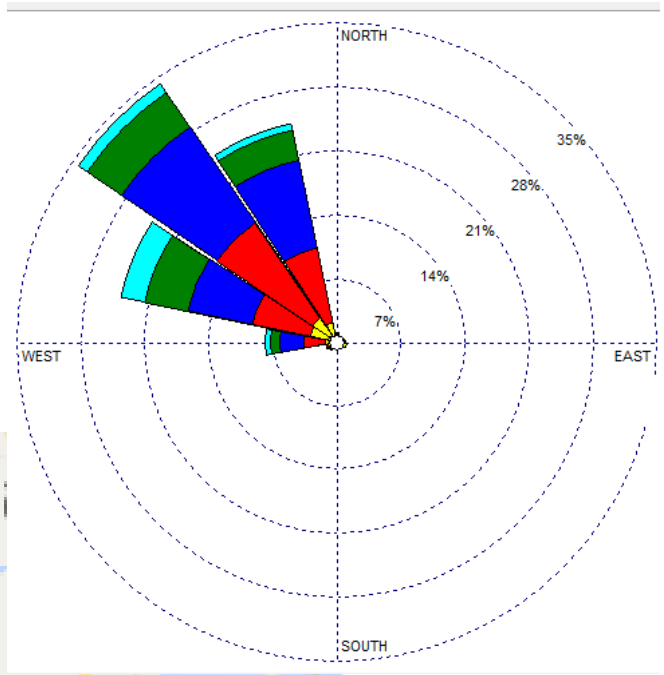
The Dalles winter, wind rose shows high winds from the direction of the river. The wind direction is from the air port in Dallesport. The monitoring site is in the community up away from the river and likely has lower wind speed. Unless there is met near the monitoring site it is difficult to know whether it is correctly located. No met is planned in the next five years.

The Dalles Winter Wind Rose



Appendix B. 24 The Dalles 2014 Winter Wind Rose

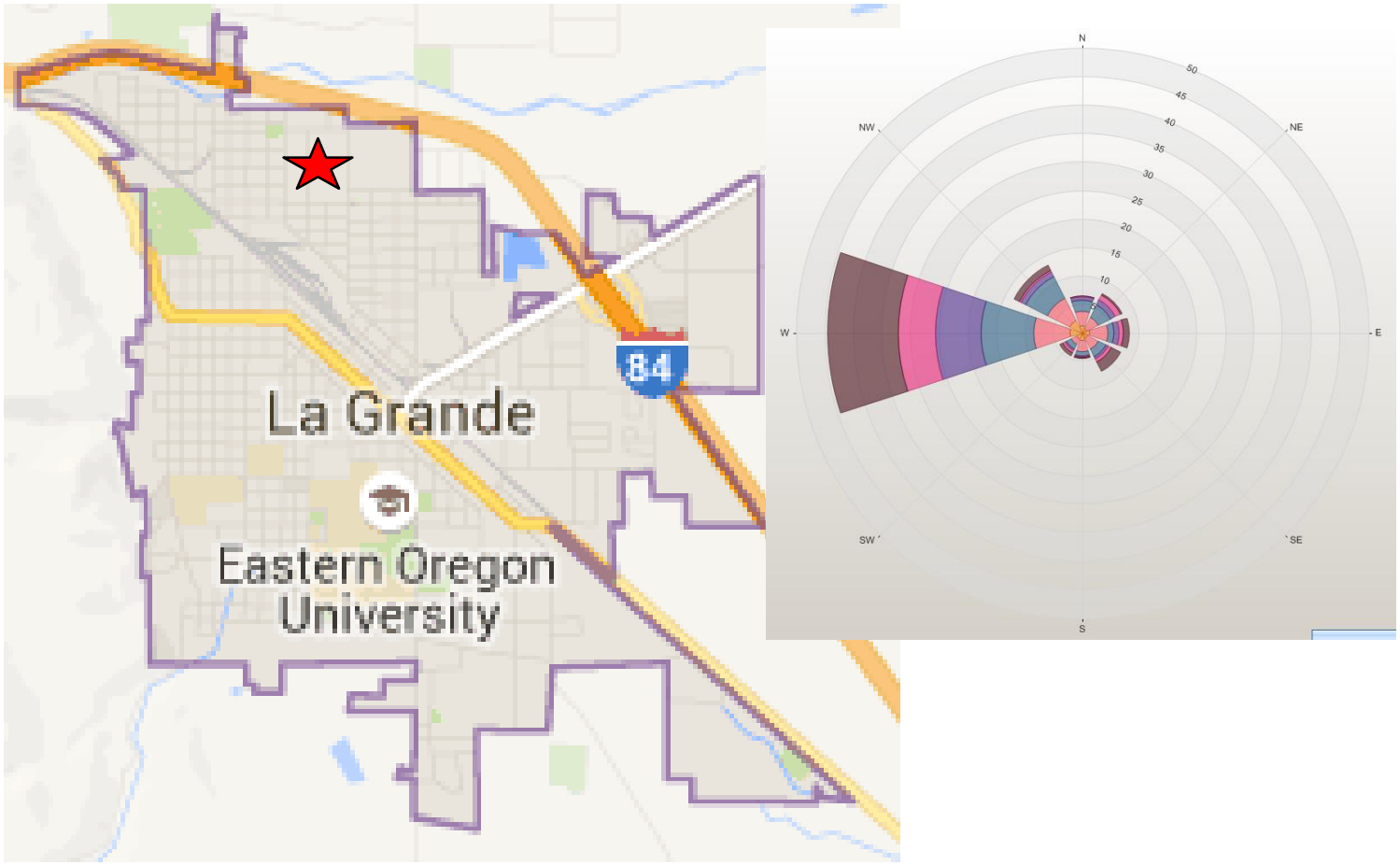
The Dalles Summer Wind Rose



Appendix B. 25 The Dalles 2014 Summer Wind Rose

The La Grande winter, wind rose shows predominant winds from the west. The site is located on the west side of town and this is not appropriately located to measure impact from the community. It is measuring air from outside of La Grande. This site should be moved to the southeast.

La Grande Winter Wind Rose



Appendix B. 26 La Grande 2014 Winter Wind Rose

La Grande Summer Wind Rose

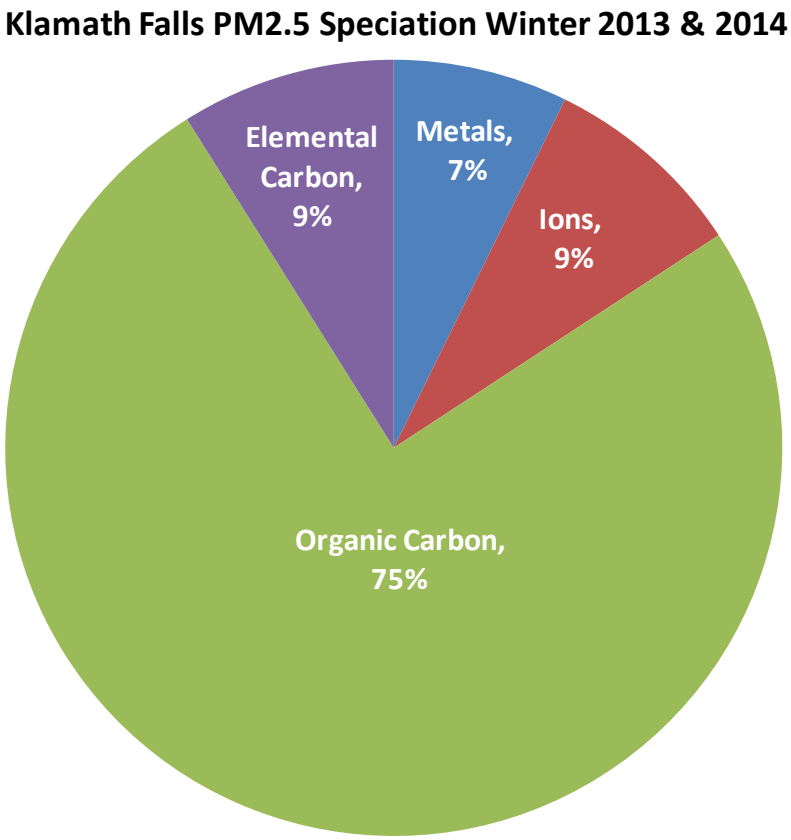
Appendix B. 27 La Grande 2014 Summer Wind Rose

- # Appendix C. Emission Inventory data

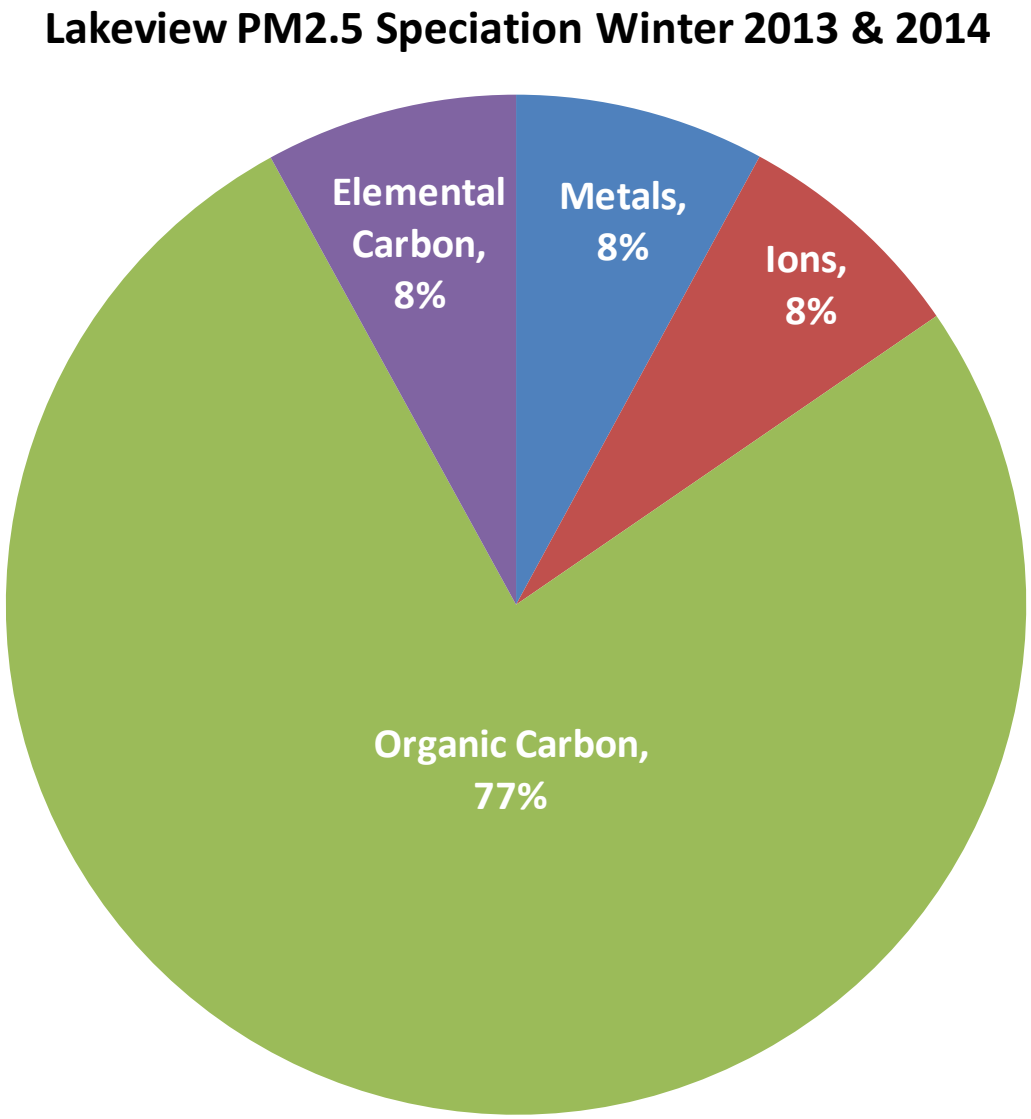
No recent emission inventory data was available at the time of this report.

Appendix D. Speciation data

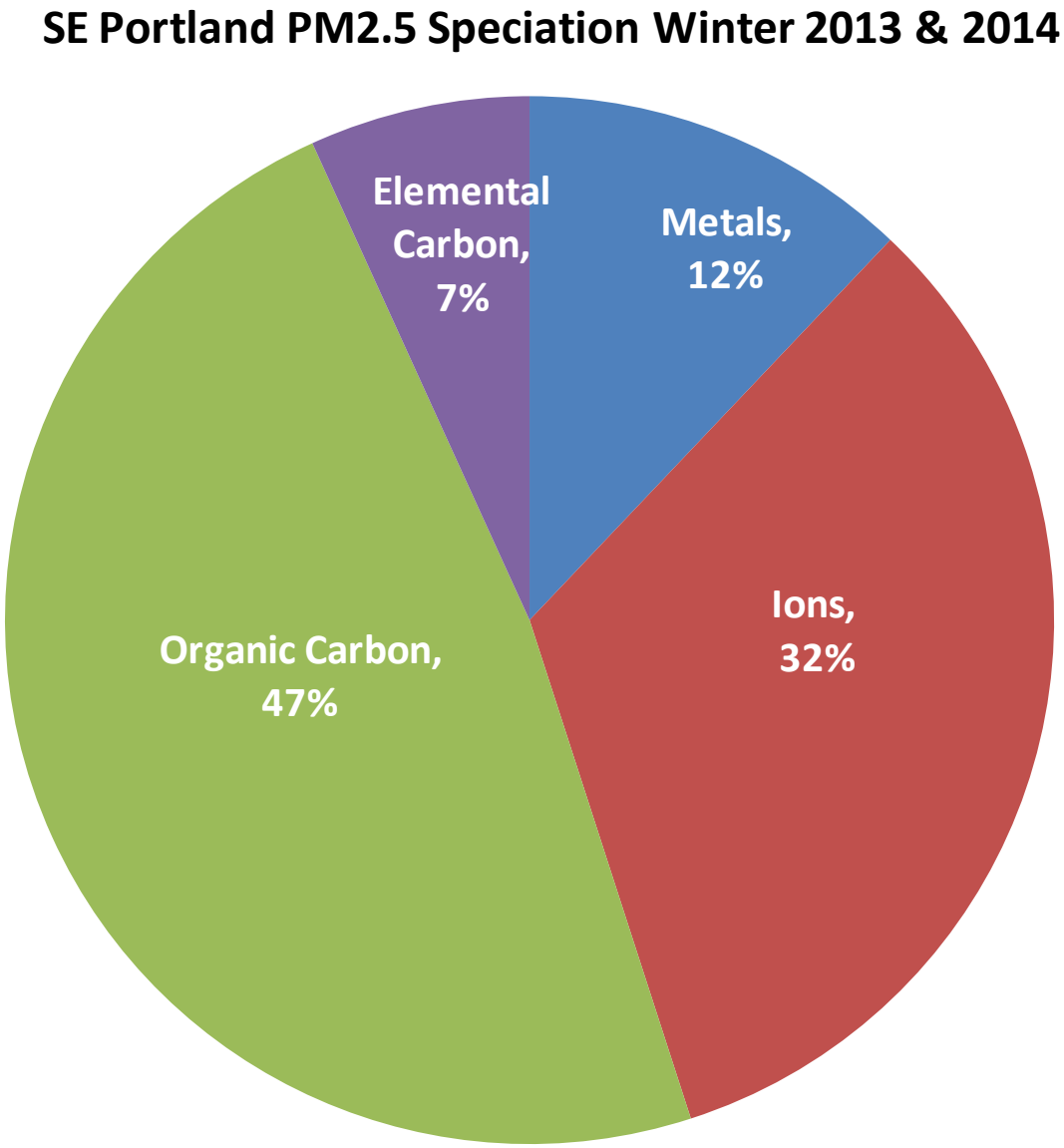
The PM2.5 speciation data is used primarily for winter time stagnation episodes. The charts below show the average chemical speciation for the winters of 2013 and 2014 for Klamath Falls, Lakeview, SE Portland, and Eugene. The speciation for the smaller communities has higher organic compound fractions than the cities. The percentage of ions and the metal fractions are also higher in the cities. This is indictitive of burning as a single source in smaller communities and a much more burning, transportation, industry and other sources in larger cities.



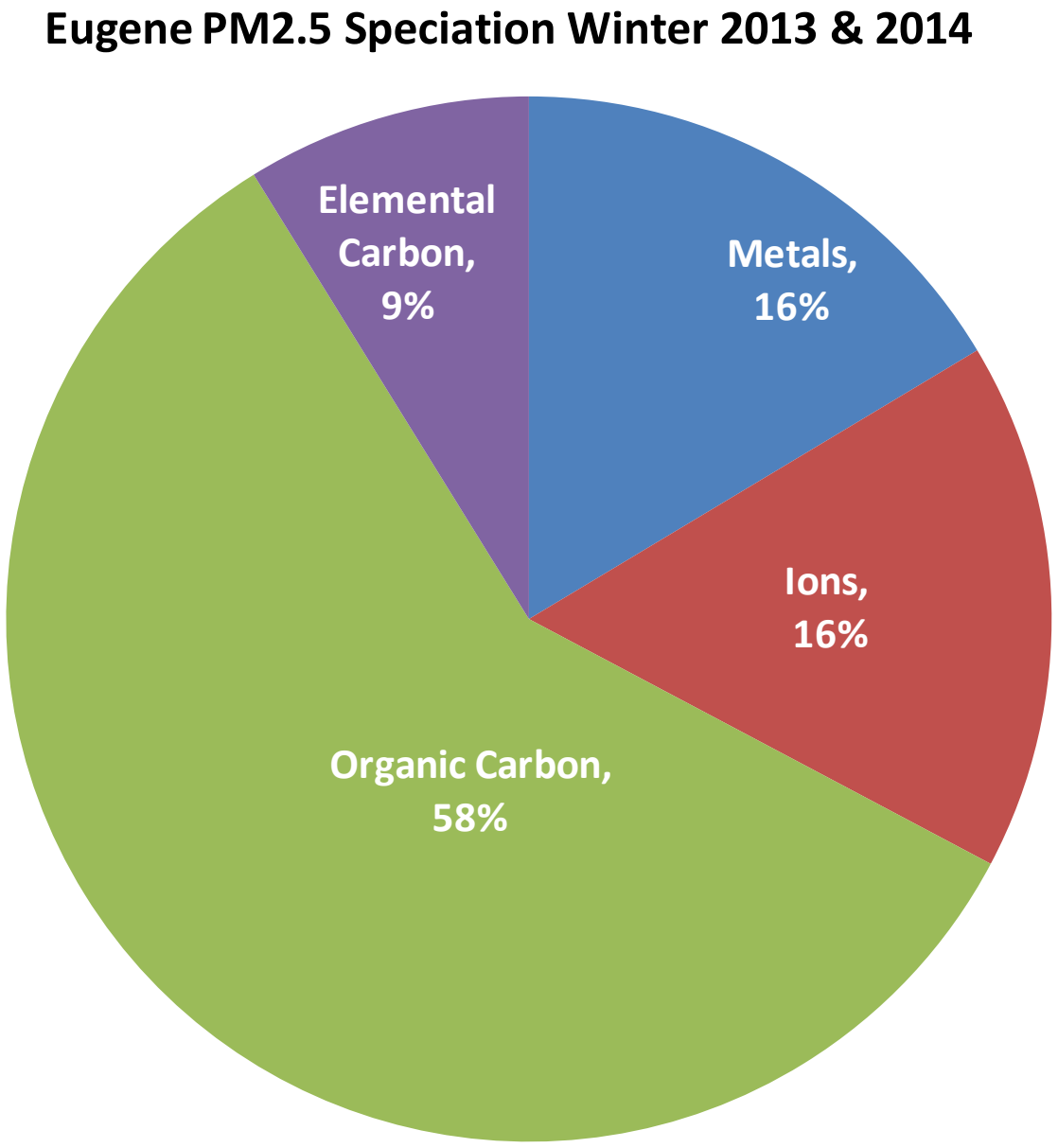
Appendix D. 1. Klamath Falls Winter 2013 & 2014 PM2.5 speciation average



Appendix D. 2 Lakeview Winter 2013 & 2014 PM2.5 speciation average



Appendix D. 3 SE Portland Winter 2013 & 2014 PM2.5 speciation average



Appendix D. 4 Eugene Winter 2013 & 2014 PM2.5 speciation average

Appendix E. Modeling data

There is no new air quality modeling data from Oregon DEQ since the 2010 report.

Other modeling:

1. Portland State University refined their NO2 model of the Portland Metro Area to include area sources. This model is useful for identifying areas where DEQ may place monitors in the future for NO2 and diesel particulate. The model can be found at:

http://web.pdx.edu/~h6lg/mrao.envpoll.jan10.revisions.final.lag.accepted.pdf

Assessing the relationship among urban 4 trees, nitrogen dioxide, and respiratory 5 health,
Meenakshi Raoa, Linda A. Georgea*, Todd N. Rosenstielb, Vivek 7 Shandasc, Alexis Dinnoc, Environmental Pollution,

2. The USDA did a moss collection study for metals and PAHs in 2013 and modeled the results in 2014. This information was shared with DEQ but has not been published at the time of this report. The data is useful for siting air toxics monitors.

• Appendix F. Decision Matrix

A decision matrix was made for criteria pollutant monitoring and for air toxics monitoring. The criteria pollutant monitoring decision matrix is below. The air toxics monitoring matrix has not been completed at the time of this report because the NATA results will not be released until the fall of 2015. At that time an air toxics decision matrix will be made and added to an amended copy of this report.

2015 Five Year Oregon DEQ Ambient Monitoring Network Plan

			Categories:	Design Value			Population				Met	Pre Sum	Qualitative Categories							Pre Sum	Sum	
			Notes:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Overall Rank	City	Site	Network Parameter	2012-14 "Design value" (Dailyfor PM2.5)	% of Std	DV vs. NAAQS: DV < 50% = 0.1,DV 50 to 70%=1,70% to 100% = 5,DV>100% =10	Population	% of total OR Pop	Pop Growth	Population Factor	Meteorological Mixing (1 to 4) 1 good 4 poor	DV, Pop, & Met Score	Used for Forecast/WSA	Other agency Site	NCORE Site	Sole monitor in airshed	EJ area (y =1, no=0)	Required by the CFR	Political pressure	Qualitative Score	Overall Score	Comment
1	Hillsboro	Hare Field	PM2.5FRM	27.7	78%	50	1,870,365	47%	5%	2.1	3	248.6	1	0	0	0	1	1	0	4	994.4	Pop & NAAQS
2	Forest Grove	Hillsboro	PM2.5Est	27.7	78%	50	1,870,365	47%	5%	2.1	3	248.6	1	0	0	1	0	0	0	2	497.2	Pop & NAAQS
3	Portland	Carus	Ozone	62	95%	50	1,870,365	47%	5%	2.1	1	101.3	1	0	0	0	0	1	0	3	303.9	Pop & NAAQS
4	Portland	SE Lafayette	Ozone	56	86%	50	1,870,365	47%	5%	2.1	1	91.5	1	0	0	0	0	1	0	3	274.5	NCORE
5	Portland	Sherwood	Ozone	57	88%	50	1,870,365	47%	5%	2.1	1	93.1	1	0	0	0	0	0	0	2	186.3	Pop & NAAQS
6	Portland	Sauvie Is	Ozone	50	77%	50	1,870,365	47%	5%	2.1	1	81.7	1	0	0	0	0	0	0	2	163.4	Pop & NAAQS
7	Salem	Turner-Cascade Jr. Hi.	Ozone	59	91%	50	403,885	10%	3%	0.3	2	31.5	1	0	0	0	1	1	0	4	125.8	Pop & NAAQS
8	Medford	Grant & Belmont	PM2.5FRM	31.3	88%	50	208,375	5%	3%	0.1	4	23.2	1	0	0	0	1	1	0	4	92.7	Pop & NAAQS
9	Eugene	Saginaw	Ozone	58	89%	50	358,805	9%	2%	0.2	2	16.2	1	0	0	0	1	1	1	5	80.8	Pop & NAAQS
10	Eugene	Amazon Pk	PM2.5FRM	31.6	89%	50	358,805	9%	2%	0.2	2	16.1	1	0	0	0	1	1	1	5	80.6	Pop & NAAQS
11	Eugene	Amazon Pk	Ozone	56	86%	50	358,805	9%	2%	0.2	2	15.6	1	0	0	0	1	1	1	5	78.0	Pop & NAAQS
12	Central Point	Medford	PM2.5Est	31.3	88%	50	208,375	5%	3%	0.1	4	23.2	1	0	0	0	1	0	0	2	46.4	Pop & NAAQS
13	Bend	Road Dept	Ozone	59	91%	50	166,400	4%	6%	0.2	2	21.0	0	0	0	0	0	1	0	2	41.9	Pop & NAAQS
14	Prineville	Davidson Pk	PM2.5FRM	41.8	118%	1000	20,780	1%	1%	0.0	4	12.3	1	0	0	1	0	0	0	3	37.0	NAAQS
15	Eugene	Hwy 99 -Key Bank	PM2.5FRM	30.4	86%	50	358,805	9%	2%	0.2	2	15.5	0	0	0	0	1	0	0	2	31.0	**Redundant**
16	Medford	Talent	Ozone	61	94%	50	208,375	5%	3%	0.1	1	6.2	1	0	0	1	1	1	0	5	30.8	Pop & NAAQS
17	Corvallis	Sherwood	Ozone	57	88%	50	88,740	2%	4%	0.1	2	7.3	0	0	0	1	0	1	0	3	21.8	Pop & NAAQS
18	Hermiston	Municipal Airport	Ozone	64	98%	50	89,865	2%	3%	0.1	1	3.6	0	0	0	1	1	1	0	4	14.3	Pop & NAAQS
19	Albany	Turner-Cascade Jr. Hi.	Ozone	59	91%	50	119,705	3%	3%	0.1	2	7.1	0	0	0	0	0	1	0	2	14.3	Pop & NAAQS
20	Klamath Falls	Peterson Sch	PM2.5FRM	33.9	95%	50	66,910	2%	1%	0.0	4	2.6	1	1	0	1	0	1	0	5	**12.8**	Pop & NAAQS
21	Tualitan	Roadway site	PM2.5FRM	22.1	62%	1	1,870,365	47%	5%	2.1	2	2.6	1	0	1	0	0	1	0	4	10.6	NCORE
22	Portland	SE Lafayette	PM2.5FRM	22.1	62%	1	1,870,365	47%	5%	2.1	2	2.6	1	0	1	0	0	1	0	4	10.6	NCORE
23	Pendleton	Mckay Cr	PM2.5FRM	25.5	72%	50	89,865	2%	2%	0.0	2	2.6	1	0	0	1	0	1	0	4	10.4	Pop & NAAQS
24	Beaverton	Highland Pk	PM2.5Est	20.4	57%	1	1,870,365	47%	5%	2.1	2	2.4	1	0	0	1	0	0	0	3	7.3	Pop & NAAQS
25	Oakridge	Willamette Pk	PM2.5FRM	40.2	113%	1000	3,220	0%	1%	0.0	3	1.4	1	0	0	1	0	1	0	4	**5.5**	**NAAQS**
26	La Grande	Ash St	PM2.5FRM	29.9	84%	50	26,485	1%	3%	0.0	2	1.6	1	0	0	1	0	0	0	3	4.9	**Will shut down**
27	Lakeview	Center & M	PM2.5FRM	57.5	162%	1000	2,300	0%	0%	0.0	3	0.8	1	1	0	1	0	1	0	5	**4.2**	NAAQS
28	Grants Pass	Parkside Sch	PM2.5FRM	25.3	71%	50	83,105	2%	1%	0.0	2	0.7	1	1	0	1	0	1	0	5	3.7	Pop & NAAQS
29	Gresham	SE Lafayette	PM2.5Est	22.1	62%	1	1,870,365	47%	5%	2.1	1	1.3	1	0	0	0	1	0	0	2	2.6	Pop & NAAQS

2015 Five Year Oregon DEQ Ambient Monitoring Network Plan
79

			Categories:	Design Value			Population				Met	Pre Sum	Qualitative Categories							Pre Sum	Sum	
			Notes:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Overall Rank	City	Site	Network Parameter	2012-14 "Design value" (Dailyfor PM2.5)	% of Std	DV vs. NAAQS: DV < 50% = 0.1,DV 50 to 70%=1,70% to 100% = 5,DV>100% =100	Population	% of total OR Pop	Pop Growth	Population Factor	Meteorological Mixing (1 to 4) 1 good 4 poor	DV, Pop, & Met Score	Used for ForecastWSA	Other agency Site	NCORE Site	Sole monitor in airshed	EJ area (y =1, no=0)	Required by the CFR	Political pressure	Qualitative Score	Overall Score	Comment
30	Sherwood	Beaverton	PM2.5Est	20.4	57%	1	1,870,365	47%	5%	2.1	2	2.4	0	0	0	0	0	0	0	1	2.4	Pop
31	The Dalles Ozone	Hermiston	Ozone	64	98%	50	26,105	1%	4%	0.0	1	1.1	0	1	0	0	0	0	1	2	2.3	NAAQS
32	Salem	State Hospital	PM2.5Est	24.2	68%	1	403,885	10%	3%	0.3	2	0.5	0	1	0	1	1	0	0	4	1.9	Pop & NAAQS
33	Redmond	Bend	PM2.5Est	19.9	56%	1	166,400	4%	6%	0.2	2	0.5	1	0	0	1	1	0	0	3	1.4	**Pop**
34	Oregon City	SE Lafayette	PM2.5Est	22.1	62%	1	1,870,365	47%	5%	2.1	1	1.3	1	0	0	0	0	0	0	1	1.3	**Population**
35	Bend	Pump Station	PM2.5Est	19.9	56%	1	166,400	4%	6%	0.2	3	0.4	1	0	0	0	0	0	0	2	0.8	Pop
36	Woodburn	Salem	PM2.5Est	24.2	68%	1	403,885	10%	3%	0.3	2	0.5	0	0	0	1	0	0	0	1	0.5	**Pop**
37	Dallas	Salem	PM2.5Est	24.2	68%	1	403,885	10%	3%	0.3	2	0.5	0	0	0	1	0	0	0	1	0.5	Pop & NAAQS
38	McMinnville	Newby Sch	PM2.5Est	15.1	43%	0.1	1,870,365	47%	5%	2.1	2	0.2	0	0	0	1	0	0	0	2	0.4	population
39	Burns	Madison St.	PM2.5FRM	31.4	88%	50	4,395	0%	1%	0.0	3	0.1	1	1	0	1	0	0	0	4	0.4	NAAQS
40	Tualitan	Roadway site	NOx	8.0	35%	0.1	1,870,365	47%	5%	2.1	2	0.1	0	0	0	0	0	1	0	2	0.3	NCORE
41	Portland	SE Lafayette	NOx	8.0	35%	0.1	1,870,365	47%	5%	2.1	2	0.1	0	0	0	0	0	1	0	2	0.3	NCORE
42	Corvallis	Circle Drive	PM2.5Est	18.7	53%	1	88,740	2%	4%	0.1	2	0.1	0	0	0	1	0	0	1	3	0.3	Pop
43	Portland	SE Lafayette	PM10	30	20%	0.1	1,870,365	47%	5%	2.1	2	0.1	0	0	1	0	0	1	0	3	0.3	NCORE
44	Albany	Calooia Sch	PM2.5Est	23.9	67%	1	119,705	3%	3%	0.1	2	0.1	0	0	0	1	0	0	0	2	0.2	Pop & NAAQS
45	Cave Junction	Airport	PM2.5Est	34.0	96%	50	1,905	0%	1%	0.0	2	0.1	0	1	0	1	0	0	0	3	0.2	**USFS Funded**
46	Lebanon	Sweet Home Fire Dept	PM2.5Est	21.3	60%	1	119,705	3%	3%	0.1	3	0.1	0	0	0	1	0	0	0	1	0.1	Pop & NAAQS
47	Roseburg	RGV	PM2.5Est	18.9	53%	1	109,385	3%	2%	0.0	2	0.0	0	1	0	1	0	0	0	3	0.1	**Pop/USFS**
48	Tualitan	Roadway site	CO	1.3	14%	0.1	1,870,365	47%	5%	2.1	2	0.1	0	0	0	0	0	1	0	2	0.1	NCORE
49	Portland	SE Lafayette	CO	1.3	14%	0.1	1,870,365	47%	5%	2.1	2	0.1	0	0	0	0	0	1	0	2	0.1	NCORE
50	Portland	SE Lafayette (12-14)	SO2	8.0	8%	0.1	1,870,365	47%	5%	2.1	2	0.0	0	0	1	0	0	1	0	3	0.1	NCORE
51	Hermiston	Municipal Airport	PM2.5Est	24.3	68%	1	89,865	2%	3%	0.1	1	0.0	0	0	0	1	0	0	0	2	0.1	**Pop**
52	John Day	Blue Mt. Sch	PM2.5Est	29.6	83%	50	1,745	0%	1%	0.0	3	0.0	0	1	0	1	0	0	0	3	0.1	**USFS Funded**
53	The Dalles	Cherry Lane	PM2.5Est	22.0	62%	1	26,105	1%	4%	0.0	1	0.0	0	0	0	1	0	0	1	3	0.0	Gorge monitor
54	Springfield	City Hall	PM2.5FRM	15.6	44%	0.1	358,805	9%	2%	0.2	2	0.0	0	0	0	0	0	0	1	2	0.0	**Pop**
55	Portland	N. Roselawn	PM10	17.0	11%	0.1	1,870,365	47%	5%	2.1	1	0.0	0	0	0	0	0	0	0	1	0.0	NATTS
56	Madras	Washington St.	PM2.5Est	23.4	66%	1	6,260	0%	4%	0.0	3	0.0	0	0	0	1	0	0	0	2	0.0	NAAQS
57	Cottage Grove	City Shops	PM2.5FRM	23.1	65%	1	9,840	0%	2%	0.0	2	0.0	1	0	0	1	0	1	0	4	0.0	NAAQS
58	Eugene	Hwy 99 -Key Bank	PM10	37.0	25%	0.1	358,805	9%	2%	0.2	2	0.0	0	0	0	0	1	0	0	2	0.0	**Maintenance plan pending**
59	Sweet Home	Fire Dept	PM2.5Est	21.3	60%	1	9,060	0%	2%	0.0	3	0.0	0	0	0	1	0	0	0	2	0.0	NAAQS
60	Medford	Welch & Jackson	PM10	35.0	23%	0.1	208,375	5%	3%	0.1	4	0.0	0	0	0	0	0	0	0	1	0.0	**Will shut down**
61	Baker City	Fire Dept	PM2.5Est	20.7	58%	1	9,890	0%	1%	0.0	2	0.0	0	1	0	1	0	0	0	3	0.0	USFS Funded

2015 Five Year Oregon DEQ Ambient Monitoring Network Plan
80

			Notes:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Overall Rank	City	Site	Network Parameter	2012-14 "Design value" (Dailyfor PM2.5)	% of Std	DV vs. NAAQS: DV < 50% = 0.1,DV 50 to 70%=1,70% to 100% = 5,DV>100% =100	Population	% of total OR Pop	Pop Growth	Population Factor	Meteorological Mixing (1 to 4) 1 good 4 poor	DV, Pop, & Met Score	Used for Forecast/WSA	Other agency Site	NCORE Site	Sole monitor in airshed	EJ area (y =1, no=0)	Required by the CFR	Political pressure	Qualitative Score	Overall Score	Comment
62	Klamath Falls	Peterson Sch	PM10	44	29%	0.1	66,910	2%	1%	0.0	4	0.0	0	0	0	1	0	0	0	2	0.0	Pop
63	Pendleton	Mckay Cr	PM10	25.5	17%	0.1	89,865	2%	2%	0.0	2	0.0	0	0	0	1	0	0	0	2	0.0	Will shut down
64	La Grande	Ash St	PM10	43	29%	0.1	26,485	1%	3%	0.0	2	0.0	0	0	0	1	0	0	0	2	0.0	Air toxics
65	Grants Pass	Parkside Sch	PM10	37.0	25%	0.1	83,105	2%	1%	0.0	2	0.0	0	0	0	1	0	0	0	2	0.0	Will shut down
66	Sisters	USFS	PM2.5Est	17.3	49%	0.1	2,190	0%	8%	0.0	2	0.0	0	0	0	1	0	0	1	2	0.0	USFS Future Funded?
67	Enterprise	USFS	PM2.5Est	21.5	61%	1	1,940	0%	1%	0.0	1	0.0	0	1	0	1	0	0	0	3	0.0	USFS Funded
68	Oakridge	Willamette Pk	PM10	43	29%	0.1	3,220	0%	1%	0.0	3	0.0	0	0	0	1	1	1	0	4	0.0	Maintenance plan pending
69	Ontario	Meridian ID	PM2.5Est		0%		31,470	1%	1%	0.0	3	0.0	0	0	0	1	0	0	0	1	0.0	NAAQS

Notes:

1 The 2009 design value was obtained for each available site and pollutant parameter. For non- monitored sites, the nearest sites DV was used as a surrogate. For PM2.5 the daily DV is used not the annual.

2 The 2009 design value was divided by the NAAQS to get the percent of standard. 0.065ppm NAAQS was used for ozone because it is in the middle of the proposed NAAQS range.

3 The DV wasweighted to give more importance to sites near or above the NAAQS.

4 2008 Population estimate taken from the PSU Population Research Center. For Ozone, NO2, and SO2 the whole Metro Area Population is used. For CO more localized community populations are used.

5 The 2008 estimated city population is divided by the 2008 estimated state population.

6 The 2000 to 2007 percent population growth for each city.

7 Population factor is the population multiplied by the population growth and further multiplied by 100 to remove the percentage.

8 Meteorological mixing. This ranks mixing from 1 to 4 to account for stagnation occurances. The more stagnant an area is the higher the score. Stagnant air traps pollutants at ground level.

9 The % of std, design value vs. NAAQS, population factor, and met mixing scores are multiplied give a preliminary quantitative score.

10 Does the site provide Forecasting or Woodstove smoke advisory information? Yes = 1, No = 0.

11 Is the site funded and used by other agencies? Yes = 1, No = 0.

12 Is this an National Core site (NCORE) required by EPA? Yes = 1, No = 0.

13 Is this the only monitor in an airshed? Yes = 1, No = 0.

14 Is this an environmental justice site? Yes = 1, No = 0.

15 Is this site required by the EPA in the CFR? Yes = 1, No = 0.

16 Is there a lot of local interest and pressure to monitor here? Yes = 1, No = 0.

17 The Qualitative scores are summed and one is added so no sites have zero (for mathmatical reasons)

18 The overall score is the DV, Pop, & Met Score multiplied by the qualitative score.

19 The overall rank is determined by the overall score, with 1 being the most important City/Site and 98 being the least.