OVERVIEW

Surrounding the Willamette River and bordered by the Coast Range and Cascades, the Mid-Willamette Valley contains fertile sedimentary soil and is the agricultural center of the state. The Mid-Willamette Valley counties of Marion, Polk, Yamhill, Linn, and Benton are some of the top greenhouse and nursery producing counties in Oregon. The area is also renowned for its wine production, particularly Pinot varietals, which has developed into a vital tourist economy. The five most populous cities in the region are the state capital city of Salem (population 153,435), Corvallis (51,110), Albany (48,081), Keizer (35,864), and McMinnville (31,185). The region is growing demographically, particularly within the Hispanic population. Hispanic residents represent approximately 5% of the population of Linn and Benton counties, 10% in Polk and Yamhill counties, and 17% of the Marion County population.¹

Marion County

With the Willamette River forming the western border and the Cascade Range to the east, Marion County covers 1,200 miles and has a population of 306,665. Marion County includes the state capital, Salem, and is home to a number of large state agencies.² Marion County is the fifth most populous county in Oregon and the population is expected to increase to 350,000 by 2015 and 450,000 by 2040. However, this population growth is occurring primarily in urban areas, with some rural communities seeing a decrease in residents.³ Marion County is Oregon's largest producer of agricultural income.

Polk County

Positioned west of I-5 and east of the Coast Range, 35% of Polk County is farmland, more than 40% is private timberland and 10% is Bureau of Land Management or Forest Service land.⁴ Polk County is second only to Yamhill County in the production of wine grapes in Oregon. The county's other industries include agriculture, forest products, manufacturing, government, and education. Polk County is home to Western Oregon University in Monmouth.⁵ Of the county's 77,074 residents, 76% live in urban areas and 24% reside in rural parts of the county.
Yamhill County
The heart of Oregon’s wine country with more than eighty wineries and 200 vineyards, Yamhill County has the state’s highest concentration of wine growers and producers. Yamhill County is seventh in the state in annual market value of agricultural production from wheat, barley, horticulture and dairy farming. Logging and timber are also significant activities in the western part of Yamhill County. Approximately one-fifth of the county’s 98,168 residents commute to the Portland metropolitan area for work. Yamhill’s county seat is McMinneville, located along the Yamhill River.

Linn County
In the center of the Willamette Valley, Linn County is rich with abundant farmland, lakes, rivers, and forest. Favorable climate and soil conditions provide a diversified agricultural area. Linn County was established in 1847 and covers an area of 2,297 square miles. With a population of over 115,000 people (63% urban, 37% rural), the county is a home to major producers of rare and primary metals, processed food, manufactured homes and motor homes, as well as the traditional logging and wood products.

Benton County
Benton County is home to more than 80,000 people (81% urban, 19% rural). It is located in the Western region of the Mid-Willamette Valley, an hour inland of the Pacific Ocean and two hours west of the Cascade Mountains. Along with Linn County, Benton County enjoys a distinctive combination of soil and climate, which has supported development of specialty crop production that includes Christmas trees, grass and legume seeds, dairy sheep, plywood, lumber and wine grapes. The county is also a host to a number of natural attractions such as Mary’s Peak and Alsea Falls.

HUMAN SYSTEMS

Education
The five county region is home to Oregon State University, which ranks among the country’s top research universities and is a federally designated Land-, Sea-, Sun- and Space-Grant university. OSU has more than 20,000 students and is the largest employer in Benton County. Other colleges and universities in the Mid Willamette region include Willamette University, Corban College, Western Oregon University, George Fox University, Linfield College, Chemeketa Community College, and Linn-Benton Community College. Across the five counties of Marion, Polk, Yamhill, Linn, and Benton, 85% of people 25 years of age or older have a high school degree or higher and 25% have a bachelor’s degree or higher.
Emergency Management

Emergency preparedness is a significant issue in the Mid-Willamette Valley since it is vulnerable to such hazards as flooding, earthquakes, landslides, wildfires, drought, high winds, winter storms and volcanic activity. Infrastructure hazards are also a concern, such as dam failure, vehicular accidents, and hazardous materials spills.

Each of the five counties in the Mid-Willamette Valley includes an emergency management program that partners with public health departments, Sheriff’s offices, state agencies like Oregon Emergency Management (OEM), and federal agencies such as the Federal Emergency Management Agency (FEMA) and the Centers for Disease Control and Prevention (CDC). The Mid-Willamette Valley’s emergency management programs work to mitigate and respond to natural and human-caused hazards by developing plans that complement other emergency response agencies in the region and by informing the public about effective disaster preparation, response, and recovery. In 2003, counties in the region contracted with the Mid-Willamette Valley Council of Governments and the Oregon Natural Hazards Workshop to develop a Natural Hazards Mitigation Plan to identify ways to reduce vulnerability to disasters in the region.

Public Health

Public health services in the region provide preventative treatment, childhood immunizations, family planning services, mental health services, and food safety. Public health departments also work to control the spread of diseases, which involves educating residents through health alerts. Mid-Willamette Public Health Departments also alert residents to public health crises such as the West Nile Virus epidemic or the recent Salmonella outbreak that was linked to contaminated peanut products. The H1N1 influenza outbreak is currently a primary focus for health departments.

BUILT SYSTEMS

Utilities

The primary electricity providers in the Mid-Willamette Valley are Portland General Electric, Pacific Power and Light Co, Salem Electric, Consumers Power Inc., Energy Assistance Program, Columbia River Peoples Utility District, and Tillamook Peoples Utility District. The region’s use of hydroelectric power (48.6% of the fuel mix) is significantly greater than the national average (6.5%). Gas is the second highest energy source (10.8%), followed by coal (34.4%), nuclear (3.3%), and non-hydro renewables (2.3%). The most common heating fuels in the Mid-Willamette Valley are utility gas, electricity and wood.

Marion County: Utility gas (49.8%), Electricity (37.0%), Fuel oil, kerosene (6.5%)
Polk County: Electricity (43.2%), Utility gas (38.0%), Wood (9.9%)
Yamhill County: Electricity (61.6%), Utility gas (20.4%), Wood (9.5%)
Linn County: Utility gas (41.1%), Electricity (39.1%), Wood (12.3%)
Benton County: Utility gas (53.4%), Electricity (32.9%), Wood (8.4%)

Northwest Natural provides natural gas for heating, hot water, and stoves. Cities and water associations in the region manage water and sewer systems for residents. Additionally, Comcast, Qwest, and Verizon are major telecommunication companies in the area that provide telephone, television, and internet services.
Transportation
While large sections of the region consist of agricultural and forestland, they are well connected to the rest of the Northwest due to their proximity to Interstate 5 and Highway 99. Additionally, Route 22 crosses the Willamette River via the Marion and Center Street bridges. Other bridges in the region include the Sheridan Bridge that crosses the South Yamhill River and historic covered bridges in Linn and Benton County (Harris Bridge, Hayden Bridge, Hoffman Bridge, and Weddle Bridge).

Amtrak runs through Albany and Salem, connecting the cities to Eugene, Portland, Klamath Falls, Sacramento, San Francisco and Los Angeles. Regular in-city bus lines are also available in major cities such as Salem, Corvallis, and Albany. In addition, each of the five counties in the region has a municipal airport, including the Salem Municipal Airport (McNary Field), Independence State Airport, McMinnville Municipal Airport, Albany Municipal Airport, and Corvallis Municipal Airport.

Marion County’s cities are growing and facing subsequent transportation concerns, such as traffic congestion and freeway access to Highway 99 and 22. Cities have proposed major transportation projects including bypass routes or alternative routes. There is also interest in many communities to increase the connectivity of pedestrian and bicycle paths (specifically between Albany and Corvallis).\textsuperscript{xv}

ECONOMIC SYSTEMS

Employers
Agriculture, food processing, lumber, manufacturing, education, government, and tourism are significant components of the region’s economy. The most common industries for men in the region are: construction, natural resources (agriculture, forestry, fishing and hunting), and professional, scientific, and technical service. On the other hand, health care, educational services, and accommodation and food services are the predominant industries for women.\textsuperscript{xvi} The median household income for the five-county area of Marion, Polk, Yamhill, Linn, and Benton is approximately $51,000, which is slightly above the state average of $50,169.\textsuperscript{xvii}

Agriculture
The Mid-Willamette Valley is home to some of Oregon’s most productive agricultural areas. Together, Marion, Polk, Yamhill, Linn, and Benton counties have more than 9,000 farms.\textsuperscript{xviii} Greenhouse and nursery commodities and caneberries (i.e. raspberries and blackberries) are leading commodities of Marion and Yamhill counties. The region’s major agricultural commodities are as follows:

- Marion County leads the state in the sale of agricultural products, particularly agricultural income from nursery products, hogs and pigs, as well as mink and their pelts.
- Polk County specializes in seed crops, hay, milk and other diary products from cows.
- Yamhill County is the number one county in Oregon in broilers and other meat-type chicken, as well as hazelnuts. The county also specializes in nursery and greenhouse products, fruit, tree nuts and berries.
• Linn County leads the state in the sale of sheep, goats, and their products, as well as grass seed crops, contributing to the region’s distinction as “grass seed capital of the world.”
• Benton County specializes in the sale of vegetables, melons, potatoes, and sweet potatoes.

Additionally, viniculture is a prominent and growing industry in the region, particularly for cool-climate varieties like Pinot noir, Pinot gris, Chardonnay, Gewürztraminer, and Riesling. Yamhill and Polk are the top two most productive wine growing counties in Oregon and local winemakers consistently win international honors.

Tourism
The Mid-Willamette Valley’s abundance of forests, lakes, rivers, and waterfalls as well as moderate year-round temperatures make it an excellent place for outdoors recreation. Popular recreational activities include kayaking, camping, hiking, mountain biking, climbing, fly-fishing, and rafting. The Mid-Willamette valley also has a vibrant agri-tourism industry where tourists are drawn to roadside farm stands, bed and breakfasts, and locally-owned fine dining establishments in towns like Dundee and McMinnville. Yamhill County sees an estimated 1.5 million visitor each year at local wineries. Local fairs and festivals (like the French Prairie Garden Harvest Festival and the International Pinot Noir Celebration) and hot air balloon rides over farmland and wine country are favorite activities among visitors. Silverton’s Oregon Garden is another popular destination with more than twenty specialty gardens spread over 80 acres and Oregon’s only Frank Lloyd Wright-designed home.

Timber
The 1930s and ‘40s were the time of the timber-harvesting boom in the region. During that period Albany became a prominent lumber-processing city and is the site of an annual timber carnival. The Willamette River served as an important corridor for the industry to transport lumber. Following World War II, military contracts led to the continuation of a thriving timber industry. Logging and forest products are still a part of the Mid-Willamette Valley’s economy, particularly in the western part of the valley.

Manufacturing
Non-seasonal industries in the Mid-Willamette Valley include aircraft servicing, electronics manufacturing, newsprint and steel rolling mills, and dental instrument manufacturing. Manufacturing is an economic mainstay of Linn County, with approximately 18% of the county’s non-farm employment in the manufacturing sector (almost twice the state and regional average). The economic downturn, however, has had a negative affect on the manufacturing industry and has resulted in significant employment losses for the region. From 2008 to 2009, manufacturing sector jobs in the Mid-Willamette Valley declined by 14% in Linn County and 20% in Benton, Marion, and Polk counties.

CULTURAL SYSTEMS

Native Americans
The residents of the region were the Kalapuya people. The Mid-Willamette Valley was the home of several central Kalapuya groups, which include the Yamhelas who lived along the Yamhill River, the Santiam who lived along the lower Santiam River near what is now
Lebanon, the Tsankupi who lived along the Calapooia River, and the Chepenefa who lived along Mary’s River near present-day Corvallis.xxv The Kalapuya harvested camas root, hunted elk, and fished salmon from the region’s streams. Contact with Euro-Americans led to a smallpox epidemic and malaria, which caused the death of 90% of the Kalapuya population by 1833.xxvi A treaty between the Tribes and the U.S. government in 1855 ceded much of the Willamette Valley to the United States and the Kalapuya people were removed from their traditional homeland and relocated to the Grand Ronde Indian Reservation in Yamhill and Polk counties.xxvii Descendents of the Kalapuya tribes are now part of the Confederated Tribes of the Grand Ronde Community of Oregon.

Parks and Historic Landmarks
The Mid-Willamette Valley is home to numerous parks and historic landmarks that have been preserved for the enjoyment and education of residents and visitors. Notable examples include the following:

- The *Willamette National Forest* stretches into Linn and Marion counties and contains Mount Jefferson.
- The *Siuslaw National Forest* extends into Benton, Yamhill, and Polk counties and includes Mary’s Peak, the highest peak in the Coast Range.xxviii
- *Silver Falls State Park* is a temperate rain forest in the lower elevations of the Cascades with ten waterfalls.xxx
- *Detroit Lake State Park* was created by the Detroit Dam project. The lake has 32 miles of shoreline and is 400 feet deep. It is a popular destination for fishing, boating, and camping. xxx
- *Erratic Rock State Natural Site* provides access to a 40-ton rock that was carried to the area during a prehistoric flood during the last Ice Age and is the largest glacial erratic rock in the Willamette Valley.xxxi
- The *Mission Mill Museum* in Salem produced wool products from 1889 to 1962 and the site contains the oldest Presbyterian Church in the Pacific Northwest and historic Oregon Trail settler’s homes. It has been designated an American Treasure by the National Park Service.xxxii
- *McDowell Creek Falls County Park* includes hiking trails and views of Royal Terrace and Majestic Falls.xxxiii

**HISTORICAL EXTREME WEATHER EVENTS**

**Severe Weather Events of the Mid-Willamette Valley**
The following are major winter storm events, periods of drought, historic fires, and flooding in the Mid-Willamette Valley.xxxiv

- **Severe Storm Events**
  - 1937: heavy snowfall occurred in the Willamette Valley
  - 1892: substantial storm with snow totals from 15 to 30 inches
  - 1909: six-day snowstorm
  - 1919: snowstorm over a widespread area in Oregon
  - 1924: freezing temperatures formed hazardous ice in the Willamette River
  - 1937: snowfall that caused structures in Marion County to collapse
• 1950: snowstorm accompanied by sleet, freezing rain and high winds
• 1957: cold snap accompanied by snow and high winds that froze water pipes
• 1960: snowstorm that caused fatalities and storm-related injuries
• 1962: Historic Columbus Day storm caused extensive structural wind damage and tree fall
• 1978: freezing rain causing traffic fatalities and accidents
• 1989: zero-degree temperatures that significantly damaged the cranberry crop
• 1993: snowstorm resulting in lost power and storm-related hospitalizations
• 1996: severe ice storm causing traffic accidents and power outages
• 2004: ice storm that cancelled flights and downed historic oak trees

Periods of Drought
• 1976-1981: period of drought in the region that resulted in low stream flows
• 2005: the driest February since the 1977 drought with low stream flows

Historic Fires
• 1848: Nestucca Fire in Yamhill County that burned 290,000 acres
• 1849: Siletz Fire in Polk County that burned 800,000 acres
• 1865: Silverton Fire in Marion County that burned 988,000 acres
• 1939: Saddle Mountain Fire in Yamhill County that burned 190,000 acres
• 1951: North Fork/Elkhorn in Yamhill County that burned 33,000 acres
• 2003: B&B Complex Fire in Linn and Marion counties that burned 80,000 acres

Flooding
• 1964: flood that resulted in fatalities and severe damage to infrastructure
• 1974: flood caused by snowmelt that causes fatalities, injuries, and sewage overflow
• 1996: snowmelt and prolonged precipitation that resulted in widespread damage
• 1997: heavy rains that caused the Willamette River to crest a foot above flood level

POTENTIAL IMPACTS OF CLIMATE CHANGE

Climate change is likely to impact ecosystems, individuals, business, and communities in the region. The area is vulnerable to high winds, drought, wildfires, and flooding. Some of the expected impacts include reductions in stream flows and salmon populations, reduced rangeland productivity, crop reduction due to water stress and higher temperatures, fish and wildlife diseases and invasive species, and storm damage. Winter recreation and tourism economies are also likely to be negatively affected, however, warmer weather recreation may be expanded.xxxv

Extreme temperatures (such as heat waves), increased ground ozone levels, and severe weather events also pose a public health threat to residents. Key threats include heat stroke, respiratory and cardiovascular diseases from deteriorated air quality, mental health problems following flooding and windstorm events, and vector-borne disease outbreaks.xxxvi Sea level rise may also have implications on the natural systems and communities of the Mid-Willamette Valley, even if the region's elevation will protect it from direct effects; however, little research has been given to this potential impact. Communities across the Mid-Willamette Valley may also experience an influx of “climate refugees” (i.e.
people moving from other regions of the country and world that are likely to be more severely impacted by climate change).

For more information on specific projections and likely impacts, please see the “Mid-Willamette Climate Modeling Projections" document, available at [http://climlead.uoregon.edu/node/157](http://climlead.uoregon.edu/node/157) (password: climate).

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