



LEAGUE OF WOMEN VOTERS OF MARION AND POLK COUNTIES

LWVOR WATER STUDY – LOCAL SURVEY RESPONSES

Our local information is presented in the following order:

Cities within Marion County – Salem, Keizer, Woodburn, Silverton, Stayton

Marion County

Cities within Polk County – Dallas, Monmouth, Independence

Polk County

Pollution Concerns in the Willamette Basin

We attempted to provide responses to the following questions from the State Water Study Committee for eight cities and our two counties. Smaller cities were not included.

Provide a brief description of the community surveyed, including the population, and transient population, geographic location, climate, and annual rainfall.

Identify the major watersheds and sub-watersheds in which you live. Describe the uses of the water resources in that community, i.e. recreational, agricultural, industrial, residential, and ecological. Have major pollutant concerns been identified (sediment/turbidity, mercury, temperature, bacteria, etc.)?

Which organization or organizations provide the drinking water and what are the sources of that drinking water? What percentage of the population draws water from private wells?

Describe briefly the characteristics of the water, stormwater and wastewater treatment utilities (number of users being served, projected growth, facilities maintained, cost to users, etc.)

Salem (in Marion and Polk Counties)

Location: Mid-Willamette Valley – measured south to north and east to west. The Willamette River flows through the City of Salem and marks the border between Marion and Polk Counties. The 45th parallel passes through the northern portion of Salem's City Limits

Population: 152,290 (2007)

Climate: Salem has a Marine west coast climate. Rainfall is heaviest in late fall and throughout winter. Only five percent of precipitation in the valley falls in July and

August. Major snow events are uncommon. Winters are cloudy and rainy with moderate freezes at night. Summers can be wet but are generally warm, sunny and dry. Summer drought becomes an issue during the dry years. Salem's mean annual temperature is 53 degrees F.

Annual Rainfall: Mean 40 inches.

Description: Salem is the State Capitol and Oregon's third largest city. It has grown 11.2 % since 2000. Salem's metropolitan area population, including Keizer, was 378,570 in 2007, making it the second largest Oregon metropolitan area. Elevation varies from about 120 to 800 feet above sea level with volcanic Salem Hills in the south and 1,000' Eola Hills in the West. The city's largest employer is state government. Salem is also an agricultural and food processing center and has had limited success diversifying into manufacturing and high-tech industries.

Salem Watersheds

The Willamette River flows through Salem, but the North Santiam River is Salem's primary drinking water source. Salem's other main streams are Mill Creek, Mill Race, Pringle Creek, and Shelton Ditch. Smaller southern and eastern side streams are Clark Creek, Jory Creek, Battle Creek, Croisan Creek; in the north, Claggett Creek; and flowing through West Salem (western side of the Willamette River) are Glen Creek and Brush Creek.

Salem's three watersheds are:

- Willamette Watershed
- North Santiam Watershed
- Pudding River Watershed

Salem's Stormwater Sub-basins

East Bank Willamette	West Bank Willamette
Pringle Creek	Upper Claggett Creek
Lower Claggett Creek	Mill Creek
Butte Creek	Croisan Creek
Glenn/Gibson Creek	East and West Willamette Slough
Pettijohn Creek	Little Pudding Creek

Salem Recreational Water Uses

The Willamette River is used for recreational boating and is the focal point of several large city parks: Wallace Marine Park (soccer and softball fields and boat ramp), Minto-Brown Island (bike and walking paths), Riverfront Park and carousel, Gilbert House Children's Museum complex, and the Willamette River Queen Riverboat dock. Downtown redevelopment near the river includes Salem Conference Center and Hotel and new apartment/retail space under construction. Portions of a former Boise Cascade Mill site on the Willamette were sold to the City and used for the southern portion of Riverfront Park. Additional portions of the Boise property on the river are slated for redevelopment.

Salem's smaller rivers do not provide boating opportunities, but do flow through other Salem parks and neighborhoods and the Willamette University campus.

Salem Industrial Uses

In 2007, industrial water use accounted for an average of 12 percent of the overall water use in Salem. Top industrial users include food processors, correction facilities, hospitals, and universities/colleges.

Salem Pollutant Concerns

Land uses in North Santiam watershed (city drinking water source): Regulation and monitoring of potential sources of pollution and increased runoff - septic tanks, mining, development, agricultural and forestry operations. The North Santiam subbasin is primarily forested, with agricultural uses downstream of the Little North Fork. Total Maximum Daily Load limits were set in 2006 for temperature and dissolved oxygen, important factors for fish rearing. Also see Willamette Basin pollution section.

SALEM DRINKING WATER

Drinking Water Provider: City of Salem

Source: North Santiam River - a high quality water source. Intake 17 miles east of Salem. Salem uses a slow sand filtration system and has the largest slow sand filtration system in the U.S. Salem's water testing shows non-existent levels or levels well below EPA and Oregon standards for 120 regulated substances.

Salem sells six percent of its drinking water to serve Suburban East Salem Water District, Orchard Heights Water District (outer West Salem), and the City of Turner.

There are water wells within the city limits, but we were not able to determine the percent of the population that is served. That population is small.

Salem's Water System

Citizens Served	180594	1/30/2007
Water Utility Accounts	47870	8/30/2006
Average Water Use/Day (millions gallons)	29.1	8/30/2006
Peak Water Use (millions gallons)	54	8/1/2006
Daily Transmission Capacity (MGD)	66	2/15/2006

Salem Drinking Water Facilities

Geran Island Water Treatment Facility on the North Santiam River, 18 system reservoirs, 59,300 residential and multi-family connections, 3,800 commercial and industrial connections, Aquifer Storage and Recovery System wells.

Salem's Aquifer Storage and Recovery (ASR) System injects treated drinking water from the North Santiam River into an aquifer 300 feet under the South Salem Hills

(Columbia River Basalts). The water is injected into the wells during the winter months, when water demand is low and flows within the North Santiam are high. The water can be pumped out for use during summer peak demand or during an emergency. This system allows the city to let more water flow in the North Santiam during its lowest flows.

In 2006, Salem began additional treatment to reduce the corrosiveness of its water due to the potential for the leaching of lead and copper from older household plumbing. The City began adding soda ash in the water treatment process to help stabilize the pH of the water entering customer's homes. That treatment has been successful – one of 218 samples taken in 2007 exceeded EPA standards for copper or lead.

The city is replacing the main delivery pipeline from the Geren Island Water Treatment Facility. The new pipe has a capacity of 75 million gallons per day (MGD). In 2007, the transmission main was completed between 70th Avenue in Salem and Delaney Road in Turner and construction was begun on additional improvements in the City of Turner.

This year two water quality monitoring sites on the Little North Fork of the North Santiam were installed above and below a proposed development at the existing Elkhorn Golf Club. These were installed in cooperation with the United States Geological Survey (USGS).

If population and development continue to grow in greater Salem, the City will need additional miles of water lines and additional storage as well as additional conservation.

SALEM WASTEWATER

Sewage is collected and transported from the cities of Salem, Keizer, Turner, and East Salem (within the UGB) to Willow Lake Treatment Facility for processing. The Willow Lake facility (on the Willamette River north of Salem-Keizer) also serves several other unincorporated areas of Marion County.

The system includes (2007) 770 miles of pipeline and 29 sewage pump stations. And 200-300 new mainline taps per year.

Salem's Wastewater System

Citizens Served	219779	1/30/2007
Sewer Utility Accounts	56569	8/30/2006
Average Daily Sewage Treatment(MGD)	44	1/22/2007
Willow Lake Current Capacity Summer/Winter (MGD)	1/3	7/12/2006

The Willow Lake Facility's goal is to meet or exceed Federal Clean Water Act and Oregon DEQ requirements to protect instream water quality of the Willamette. Between

14 and 16 billion gallons of wastewater are treated annually prior to release into the river.

In 2005 Willow Lake received the National Association of Clean Water Agencies Platinum Award for five consecutive years of 100 percent permit compliance and continued the 100 percent compliance records in 2005, 2006, and 2007.

Willow Lake's capacity is being increased from 105 million gallons per day (MGD) to 155 MGD by the fall of 2009. The expansion is necessary due to growth and to eliminate sanitary sewer overflows under most conditions by 2010 as required by federal and state regulations. Another part of the project under construction is a separate 50 MGD facility several miles upstream of the treatment plant to be operated only during high flow periods to prevent discharges of sewage into the Willamette under most conditions.

Biosolids from the treatment facility are sold to farmers and ranchers as soil enhancers and fertilizers.

The City of Salem has an Industrial Pretreatment Program as part of its compliance with the Federal Clean Water Act. This program regulates businesses that discharge wastes into the local sewer system.

SALEM STORMWATER

Salem's stormwater system is separate from the sanitary sewer system.

Stormwater Facilities:

- 66 Miles of Streams
- 444 Miles of Storm Drain Pipe
- 98 Miles of Drainage Ditches
- 70 Miles of Roadside Ditches
- 71 Public Detention Basins
- 611 Private Detention Basins
- 14,530 Catch Basins
- 2,400 Cleanouts
- 4,690 Manholes
- 1,246 Culverts
- 3 Fish Ladders
- 1 Fish Screen

The City monitors surface water at 21 sites on eleven streams each month to identify and track conditions. The City also works with DEQ on an erosion control program, including monitoring of development sites. Currently nine Continuous Monitoring Stations monitor for pH, Dissolved Oxygen, turbidity, temperature, conductivity, stage height, and flow. Twenty six total stations are in the long term plan. In addition to the monitoring stations, a City Stormwater Quality Monitoring Team samples stormwater during rainstorms to help the staff evaluate pollutants going into streams

COSTS TO SALEM USERS

Average Monthly bill \$56.32 (FY 05-06)

16.6% Stormwater

43.2 % Water

40.2 % Sewer

The city has proposed a rate increase of 6.5% each for water and sewer with a public hearing scheduled for December 8, 2008.

The city administers a Water and Sewer Low Income Assistance Program and an Environmental Assistance Donation Program financed through donations, periodically sending appeals for contributions with billing statements.

Keizer (in Marion County)

Location: Mid-Willamette Valley, adjacent to (north) of Salem and lying along the east side of the Willamette River

Population: 35,435 (2007)

Climate: Same as Salem

Annual Rainfall: Mean 40 inches

Descriptor: Keizer was not incorporated until 1982 and is the state's 14th largest city. Keizer is flat with mean elevation 120-150 feet above sea level and is bounded on the north and east by farmland. The city has grown 10% since 2000 (none by annexation)

Keizer Drinking Water Source and Facilities

Keizer's water source is groundwater, the Troutdale Aquifer, lying beneath the entire city. Currently 14 deep wells serve the city's water needs. The water currently meets state and federal standards for drinking water. The water is hard (hardness of 140 parts per million) so leaching of lead from piping is not a problem. The City adds an iron/manganese sequestrant to the water to reduce staining. The system is controlled by a computer system which monitors water pressure and controls individual wells.

The distribution system includes 105 miles of piping. Winter use averages from 1.5 to 3 MGD and summer use from 6.5 to 8 MGD. Keizer has three water storage facilities for a total of 2.75 million gallons of storage. The city recently completed a storage water tower near the Chemawa Road Interchange on Interstate 5. The tower will be used especially for high peak demands and additional fire protection.

Keizer Wastewater

Keizer's wastewater is treated at the Willow Lake Treatment facility (see description under Salem Wastewater)

Woodburn (in Marion County)

Population: 22,875 (2007)

Woodburn Water Source and Facilities:

Woodburn's drinking water derives from six wells and three treatment plants where iron, manganese, arsenic, radon gas, and hydrogen sulfide are removed using a potassium

permanganate oxidation process, pressure green-sand filters and aeration. The storage system consists of one 750,000 gallon elevated storage tank, and three ground storage reservoirs with an additional 4,700,000 gallon capacity.

Silverton (in Marion County)

Population: 9,205 (2007)

Silverton Water Source and Facilities

Abiqua Creek and Silver Creek are Silverton's main water supply sources and Silverton Reservoir is the third source with 420 million gallons of storage capacity. The city has the Abiqua diversion dam and supply pipeline, two treatment plants, three booster pump stations, three treated water storage tanks (total 4.5 million gallons) and 30 miles of water distribution lines. The water supply is anticipated to handle expected growth beyond the next 30 years.

Silverton Wastewater

The city's two wastewater treatment plants have a capacity of 5.5 MGD. The city sends up to 1 million gallons a day of treated effluent to the Oregon Garden for landscape irrigation and wetlands supply. Other treated effluent is returned to Silver Creek. The city meets state and federal wastewater permit requirements.

Wastewater biosolids are used as a soil conditioner on local grass seed farms.

Stayton (in Marion County)

Population: 7,765 (2007)

Stayton Water Source and Facilities

The city draws water from the North Santiam River via a canal into a slow sand filtration system. Chlorine is added for disinfection and soda ash is added to reduce corrosiveness. The city tests for 80 contaminants and of the tests conducted in 2007, only two contaminants were detected and they were well below the allowed federal and state limits. The city has 44 miles of water distribution lines to residential, commercial, and industrial users.

The city can use groundwater during times of river turbidity. It has two wells just north of the river, one 25 feet and one 35 feet.

The city wastewater treatment plant is connected by over 30 miles of pipeline and five pump stations.

MARION COUNTY

Population: 311,070 (2007)

Unincorporated Population: 83,168 (26.7%)

Resource Protection

Counties do not manage or permit uses of water, but county land-use decisions affect and are affected by water quality and supply.

Marion County Comprehensive Plan includes maintenance of rural densities of 1.5 to 3 acres per dwelling in rural residential areas to minimize groundwater pollution from septic tanks. And in areas with septic tank pollution detected by monitoring, the county encourages treatment systems in allowable developments.

Marion County Stormwater:

Marion County Public Works is developing a Stormwater Management Program to meet EPA National Pollutant Discharge Elimination System Phase II permit requirements for areas just outside Salem's urban growth boundary and the East Salem Service District. The county must develop best management practices and develop a program must meet six minimum control measures:

- 1) Public Education and Outreach
- 2) Public Participation and Involvement
- 3) Illicit Discharge Detection and Elimination
- 4) Construction Site Runoff Control
- 5) Post Construction Runoff Control
- 6) Pollution Prevention and Good Housekeeping

The county has appointed a task force and has some best management practices and programs in place from completed salmon recovery work and will use materials and programs that other jurisdictions have already developed.

Household Hazardous Waste

Since 2005, residents of Salem, Dallas, Independence, and Monmouth and rural Marion and Polk County residents can dispose of their household hazardous waste at the Marion County transfer facility on certain days of the week or by appointment. The facility will accept pesticides, cleaners, thermometers, and fuels, but not latex paint, batteries, radioactive waste, motor oil, asbestos, medical waste, ammunition or creosote treated wood. Batteries and motor oil can be placed at curbside recycling within the City of Salem. Polk County has also provided satellite collection events.

Marion County Salmon Recovery:

The decline of Pacific salmon populations has resulted in the listing of four Marion County stocks as threatened under the Endangered Species Act. The National Marine Fisheries Service (NMFS) identified the Upper Willamette and Lower Columbia Spring Chinook Salmon and the Upper Willamette Winter Steelhead as threatened March 19, 1999. The Lower Columbia Winter Steelhead was previously declared threatened March 19, 1998.

Marion County Public Works is actively participating in the recovery of threatened steelhead and chinook salmon through a number of projects designed to protect aquatic

habitat. Marion County is working to increase the quality and availability of fish habitat through restoration projects, by making all county road culverts passable by all fish species, and through an integrated vegetation management plan to reduce pollution entering streams. In addition, Public Works is assessing the impact its activities have on salmon habitat and developing a Best Management Practices Guide to minimize any adverse impacts.

Marion County Supply

Counties do not manage or permit uses of water, but county land-use decisions affect and are affected by water supply.

Marion County Groundwater

Marion County has no areas designated by the state as “critical groundwater areas” – the most serious groundwater limited classification. The county does however have areas that are designated as “groundwater limited areas.” These areas are South Salem Hills, Stayton-Sublimity, and Mt Angel. New water rights in these areas may be restricted, but domestic uses are generally allowed. Other “exempt” uses include stock watering, small lawn or garden watering, and commercial or industrial uses of less than 5,000 gallons a day. These uses do not require a groundwater right or permit, but well drilling is regulated to protect the resource from contamination.

Population growth and growth in irrigated agriculture are increasing summer groundwater demand as many streams are closed to new appropriations in summer. According to the U.S. Geological Survey (USGS-2005), seasonal groundwater level fluctuations have increased by as much as 55 feet in the central Willamette basin due to increased summer pumping. But in most areas, the groundwater levels return to their historic levels in winter. Groundwater levels also vary in response to climatic trends, “but these changes are small compared to seasonal fluctuations.” Long term water declines are observed in wells from basalt areas with concentrated pumping.

The county lacks enough data for certain land use decisions as indicated in Marion County’s Comprehensive Plan:

Because adequate information regarding groundwater occurrence and sustainability is lacking, the best strategy for the county is to require an applicant for a development to provide information that the proposed use will not result in a detrimental impact on the long-term sustainability of the groundwater resource. Although the county needs the best possible information regarding groundwater resources in order to make informed land use decisions, due to variability of subsurface conditions and the uncertainty of even the best estimates of availability, the county cannot ensure that a particular parcel or development will find an adequate water supply.

A well monitoring program coordinated with the State Water Resources Board is part of the county strategy.

Dallas (in Polk County)

Location: Mid-Willamette Valley, 10 miles west of Salem.

Population: 15,065 (2007)

Description: Dallas is the county seat. The city population has grown 20.9% since 2000

Water Source and Demand

The city's water demand is made up of about 60 % residential and 40 % commercial and industrial. The city's water source is Rickeall Creek, which is diverted and stored at their Mercer Dam site. The water rights on file total close to 9.0 cfs (8.5 MGD) of available water.

Monmouth (in Polk County)

Population: 9,335 (2007)

Description and Water Sources

The City's largest employer is Western Oregon University with 656 employees. Agriculture makes up the majority of the City's industrial base. The City exclusively receives its water from four individual groundwater wells with a combined reliable yield of approximately 1,500 gpm (2.77 cfs).

Independence (in Polk County)

Population: 7,905 (2007)

Description and Water Sources

The city is located along the Willamette River. The economy of the City is a primarily a mix of commercial and retail establishments. The local industry is drawn mainly from agriculture and logging activities. The City receives its water exclusively from six active groundwater wells with a reliable yield of 1,250 gpm (2.79 cfs).

POLK COUNTY

Population: 67,505 (2007)

Unincorporated Population: 11,055 (16.4%)

Polk County Water Sources: According to a 2004 study, over 40% of Polk County's population relies solely on surface water for drinking water, 30% solely on groundwater, and the remaining 30% on a combination. County water providers hold varying ground and surface water rights, some of which are fully developed and certificated. The permitted rates from the report (below) do not take into account seasonal or infrastructure limitations:

Polk County Water Providers Permitted Rates	cfs	(MGD)
Perrydale Domestic Water Association	5.34	(3.45)
Monmouth, City of	11.88	(7.68)

Dallas, City of	15.33	(9.91)
Buell Red Prairie Water District	0.84	(0.54)
Independence, City of	7.68	(4.96)
Falls City	5.26	(3.40)
Rickreall Community Water Association	4.37	(2.82)
Grand Ronde Community Water Association	0.74	(0.48)
Luckiamute Domestic Water Cooperative	6.05	3.91)
Rock Creek Water District	0.14	(0.10)
Willamina, City of	3.80	(2.46)
Adair Village	85.00	(55.0)
Total (with Adair Village)	146.4	(94.6)
Total (without Adair Village)	61.4	(39.7)

The majority of groundwater rights are located in low-lying areas adjacent to the Willamette and the majority of surface water sources are in the Rickreall, Luckiamute, and Yamhill River drainages. The only utilities that rely on streamflow (non-storage diversions) are Grand Ronde Community Water Association, and the Cities of Falls City and Adair Village. The cities of Dallas and Willamina and the other water districts depend to some degree on small storage reservoirs. The City of Dallas holds 1,550 acre feet of stored water rights in Mercer Reservoir, located along Rickreall Creek west of the city.

Polk County Permitting: Among other responsibilities, Polk County’s Environmental Health Division reviews and approves permits for installation of septic tanks and drain fields, monitors drinking water systems for compliance with the Federal Safe Drinking Water Act, and administers the solid waste collection franchise ordinance.

Polk County Water Needs Study:

In 2004, Polk County conducted a water needs study recognizing that the area does not have enough water to meet the anticipated 50-year demand. Unincorporated county residents use both surface and ground water. Some are served by water associations, authorities, or co-ops. The county’s principal aquifers are located near the Willamette River and they are relatively shallow and impacted by land uses such as agriculture and septic tanks.

The county identified potential water sources such as Adair Village’s old municipal water right on the Willamette River, new water rights on the Willamette River, surface water storage along various creeks, expansion of ground water withdrawals, additional resource sharing among providers, and conservation. The study report quoted the Oregon Water Resources Department in 2003 as indicating that 1,000 CFS of water was available from the Willamette above Mill Creek with no current minimum instream flow standard on the Willamette River.

The study also found that over 75% of the region's future demand will center around Dallas, Monmouth, and Independence (West Salem in Polk County was not included because it is served by the City of Salem).

The study concluded that the most viable options based on cost and reliability were withdrawals from the Willamette River; either the expansion of Adair Village's water treatment plant or a new water right and construction of a new intake and treatment plant at a diversion point near the City of Independence. The technical advisory committee also wanted to keep the option of potential ground water supplies as a secondary source of supply.

Since that 2004 needs study, Monmouth has put in a new well and Independence may add a well. The City of Dallas is pilot testing an Aquifer Storage and Recovery System.

A water consortium in the county has applied for a new water right on the Willamette River. The county is also conducting a study with Lincoln County to see if joint water projects are feasible. The counties have applied for a SB 1069 Water Conservation, Reuse, and Storage Program matching grant from the Water Resources Department to study the feasibility of a joint storage reservoir at Valsetz near the Coast Range divide. The site had a dam previously that was removed in the late 1980's. The South Fork of the Siletz and the Luckiamute could be used to bring water from the reservoir to lower diversion points. The water would be to meet anticipated deficits for agriculture and municipal water as well as supplementing flows for improved fish habitat.

Polk County has no areas designated by the state as "critical groundwater areas" – the most serious groundwater limited classification. The Eola Hills however is an area designated as a "groundwater limited area." New water rights in these designated areas may be restricted, but domestic uses are generally allowed.

Marion and Polk Counties Watershed Councils (OSU Extension Service):

- Salem-Keizer Urban Watershed Council Association
- Claggett Creek Watershed Council
- Friends of Mill Creek
- North Santiam Watershed Council
- Pringle Creek Watershed Council
- Pudding River Watershed Council
- Glenn-Gibson Watershed Council
- Luckiamute Watershed Council
- Rickreall Watershed Council

General Pollution Concerns in the Willamette Basin:

The Federal Clean Water Act requires the Oregon Department of Environmental Quality (DEQ) to set limits known as Total Maximum Daily Load (TMDLs) for pollutants that are often exceeded in basins and watersheds. In the Willamette Basin those pollutants are: bacteria, mercury, and temperature. Willamette Basin TMDLs were adopted in 2006. To implement the TMDLs over time, DEQ can set and change limits for industrial and sewage treatment plant discharges at the time discharge permits are issued or renewed. The main sources for the three pollutants are:

Bacteria: From failed septic systems, storm water runoff containing animal wastes, and sewer system malfunctions. Treated sewage and industrial wastewater currently meet bacteria standards so are not considered current sources of bacteria problems.

Mercury: Mercury is of concern throughout the Willamette Basin. Elevated levels are partially due to runoff from native soil and atmospherically-deposited mercury. Wastewater system discharges contain mercury and are estimated to contribute about 4% of mercury levels in the basin. One concern is retention of mercury in fish tissue and consumption by humans. Eating much fish from local waterways is discouraged as hazardous.

Temperature: Elevated temperatures result from natural warming, sedimentation, low flows due to stream withdrawals, erosion of banks, slower flows, removal of shading vegetation along stream sides, and degradation of the natural floodplains that provide cooler groundwater flow. Declines of native fish result from warming of waterways. Salmon are considered an indicator species for the health of the system.

Other Pollutants

Some of the basin-wide TMDLs apply to specific watersheds, but individual watershed TMDLs may be required where other standards are exceeded. The **Molalla Pudding** Watershed TMDL was recently submitted to the U.S. Environmental Protection Agency and will be one of the last of the 16 Willamette Basin watersheds adopted. It contains TMDLs for bacteria, iron, DDT, and nitrate. The **North Santiam** Watershed (Salem drinking water source), adopted in 2006, has TMDLs for temperature and dissolved oxygen, important factors for fish rearing. The watershed provides habitat for spring Chinook, fall Chinook, coho, summer steelhead, and winter steelhead.

Other watersheds in the Willamette Basin within Marion and Polk Counties are listed as not meeting water quality standards.

- Clark Creek – E. Coli
- Gibson Gulch – Dissolved Oxygen
- Glenn Creek – Dissolved Oxygen
- Mill Creek – Coliform
- Rickreall Creek – Temperature
- Pringle Creek* - Zinc, dieldrin, copper, lead

*The TMDLs for zinc, dieldrin, copper, and lead in Pringle Creek have not been determined due to insufficient data, but the TMDL reduction strategies for bacteria, temperature, and mercury are expected to reduce the other pollutant levels as well.

Dieldrin is a chlorinated pesticide, and like DDT and chlordane, is termed a “legacy” pollutant since it is no longer used but persists in the soil. Dieldrin is toxic, carcinogenic, very persistent, and bioaccumulates as it moves up the food chain. It affects the development of aquatic life forms. It was used extensively until it was banned in the U.S. in 1987. Some use as an ingredient in existing stocks of other pesticides was allowed but probably did not result in significant use after 1987.

In 1994, DEQ established a TMDL for ammonia and Biological Oxygen Demand in Rickreall Creek that continue to remain in effect.

Willamette Basin Groundwater Pollution Studies

Elevated **nitrate** levels occur in localized areas including the Mission Bottom area near north Salem, but occur more in the southern Willamette Valley – Coburg and Junction City areas (Lane County).

Bacteria were found in groundwater in scattered areas throughout the basin. Scio in Marion County is one of those localized areas. As of 2004, DEQ considered the bacteria problem localized and that it implied well construction and maintenance problems.

Pesticides at very low levels were found in about a third of well samples

References:

Individual City and County Websites

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USGS - Groundwater Hydrology of the Willamette Basin (2005)

<http://pubs.usgs.gov/sir/2005/5168/>

Marion County Comprehensive Plan

<http://www.co.marion.or.us/PW/Planning/zoning/comprehensiveplan/environmental.ht>

Oregon Water Resources Department – Water Protections and Restrictions

http://www.oregon.gov/OWRD/PUBS/aquabook_protections.shtml

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<http://www.deq.state.or.us/lab/techrpts/groundwater/WBGroundwater/WBGroundwaterQualityRpt.pdf>

DEQ - Willamette Basin TMDL (2006)
<http://www.deq.state.or.us/WQ/TMDLs/willamette.htm>